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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

**CERCLA**

July 1987



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1.0 INTRODUCTION

In response to written approval by the North Carolina Solid and Hazardous Waste Management Branch as shown in Appendix A concerning Stewart-Warner Corporation's (Bassick-Sack Division) comprehensive sampling/analysis plan to determine the extent of chemical contamination at two (2) spill sites at their Winston-Salem, North Carolina facility, Research & Analytical Laboratories, Inc. commenced immediately to carry out these plan objectives. Appendix B refers specifically to the sampling/analysis plan which identifies site plan development, methodologies, criteria, and formulation for remedial activities, etc. The following sections of this comprehensive site report covering a period from 03 July 1987 through 24 July 1987 include:

- 1) Site Plan
- 2) Preliminary Sampling Results
- 3) Contamination Assessment
- 4) Remedial Proposal
- 5) Schedule for Completion

2.0 SITE PLAN

A copy of the site plan identifying chemical spill sites, sampling quadrants and sections, topography, existing permanent structures, and associated fuel, water, sewer, and property lines are provided in the insert packet of this report. It is important to note that Chemical Spill Site 2 identified as 1 A-E is immediately adjacent to the main Southern Railroad track which forms a natural dike next to the spill site. Chemical Spill Site 1 identified as 2 A-E, 3 A,B is directly adjacent to the railroad siding tracks(RR) and intersects chemical spill site 2 at 2 A, 1 E. No ground water supplies were identified within 1,000 feet radius of spill sites.

3.0 Preliminary Sampling Results

The sampling results provided in this report were based upon criteria set forth by the North Carolina Solid and Hazardous Waste Management Branch which states that "residual clean-up levels (extractables) of the heavy metals will be the interim primary drinking water standards and 1.0 ppm for cyanide" (Appendix A). The interim primary drinking water standards for heavy metals approved for testing (see Appendix B) include the following:

- 1) Copper - - - - - 1.0 mg/l
- 2) Zinc - - - - - 5.0 mg/l
- 3) Chromium - - - - 0.05 mg/l
- 4) Nickel - - - - - None

*Plan calls for  
EP metals  
see pg 4 in App. B*

Both total heavy metals-cyanide and extractable heavy metals for parameters mentioned above were analyzed as shown in Tables 1-21. Percent total solids (ie: dry weight calculations) and pH were also tested in accordance with Sampling and Analysis Plan (Appendix B) as shown in Tables 11 through 14 . Methodologies and procedures, etc. are also identified in Appendix B.

TABLE 1 - Total and Extractable Zinc Results for Chemical Spill Site 1  
 Quadrant 2, Sections A-E and Quadrant 3, Sections A,B in Milligrams  
 per Liter

Quadrant	Section	Type	Date	Depth Interval(inches)			
				0-3	3-6	6-9	9-12
2	A	Total	7/8/87	4,200	3,500	400	1,800
2	B	Total	7/8/87	9,200	660	81	46
2	C	Total	7/8/87	20,000	17,000	1,200	680
2	D	Total	7/8/87	36,000	38,000	11,000	6,500
2	E	Total	7/8/87	4,100	3,100	2,300	230
3	A	Total	7/9/87	3,000	3,000	3,000	5,700
3	B	Total	7/9/87	2,000	1,100	2,500	210
2	A-E	Extractable	7/8/87	350	350	110	10
3	A,B	Extractable	7/9/87	16	41	33	10

TABLE 2 - Total and Extractable Zinc Results for Chemical Spill Site 2  
 Quadrant 1, Sections A-E in Milligrams per Liter

Quadrant	Section	Type	Date	Depth Interval(inches)			
				0-3	3-6	6-9	9-12
1	A	Total	7/7/87	3,400	4,700	720	230
1	B	Total	7/7/87	6,100	11,000	3,600	730
1	C	Total	7/7/87	2,000	880	390	84
1	D	Total	7/7/87	2,700	1,100	130	140
1	E	Total	7/7/87	2,700	1,500	960	2,000
1	A-E	Extractable	7/7/87	57	49	13	6.2

TABLE 3 - Total and Extractable Copper Results for Chemical Spill Site 1  
 Quadrant 2, Sections A-E and Quadrant 3, Sections A,B in Milligrams  
 per Liter

Quadrant	Section	Type	Date	Depth Interval(inches)			
				0-3	3-6	6-9	9-12
2	A	Total	7/8/87	1,700	1,600	320	810
2	B	Total	7/8/87	4,100	300	36	460
2	C	Total	7/8/87	8,400	6,800	2,900	340
2	D	Total	7/8/87	12,000	18,000	14,000	9,000
2	E	Total	7/8/87	3,700	4,000	3,900	930
3	A	Total	7/9/87	1,400	1,900	1,400	430
3	B	Total	7/9/87	1,100	440	1,500	58
2	A-E	Extractable	7/8/87	50	70	33	4.5
3	A,B	Extractable	7/9/87	2.7	6.3	5.6	1.4

TABLE 4 - Total and Extractable Copper Results for Chemical Spill Site 2  
 Quadrant 1, Sections A-E in Milligrams per Liter

Quadrant	Section	Type	Date	Depth Interval(inches)			
				0-3	3-6	6-9	9-12
1	A	Total	7/7/87	2,200	4,200	930	320
1	B	Total	7/7/87	2,800	2,700	2,000	1,300
1	C	Total	7/7/87	1,500	2,000	2,300	1,200
1	D	Total	7/7/87	1,300	750	440	310
1	E	Total	7/7/87	1,600	740	400	560
1	A-E	Extractable	7/7/87	16	14	5.6	3.5

5 core synthesis  
and ~~product~~ section  
↓  
Composite

TABLE 5 - Total and Extractable Nickel Results for Chemical Spill Site 1  
 Quadrant 2, Sections A-E and Quadrant 3, Sections A,B in Milligrams  
 per Liter

ppm

Quadrant	Section	Type	Date	0-3	Depth Interval(inches)		
					3-6	6-9	9-12
2	A	Total	7/8/87	93	95	34	56
2	B	Total	7/8/87	83	36	20	26
2	C	Total	7/8/87	300	210	33	26
2	D	Total	7/8/87	580	350	590	230
2	E	Total	7/8/87	910	430	680	75
3	A	Total	7/9/87	58	35	34	25
3	B	Total	7/9/87	280	180	60	26
2	A-E	Extractable	7/8/87	4.4	3.6	2.0	0.5
3	A,B	Extractable	7/9/87	0.42	0.85	0.72	0.67

✓

would separate  
 extractable for  
 each section

TABLE 6 - Total and Extractable Nickel Results for Chemical Spill Site 2  
 Quadrant 1, Sections A-E in Milligrams per Liter

Quadrant	Section	Type	Date	0-3	Depth Interval(inches)		
					3-6	6-9	9-12
1	A	Total	7/7/87	1,100	2,900	170	89
1	B	Total	7/7/87	2,800	2,900	1,400	530
1	C	Total	7/7/87	640	530	510	170
1	D	Total	7/7/87	700	270	66	40
1	E	Total	7/7/87	470	310	140	860
1	A-E	Extractable	7/7/87	4.3	6.0	1.4	1.4

Cr  
EXT. .05 ppm

TABLE 7 - Total and Extractable Chromium Results for Chemical Spill Site 1  
Quadrant 2, Sections A-E and Quadrant 3, Sections A,B in Milligrams  
per Liter

Quadrant	Section	Type	Date	Depth Interval(inches)			
				0-3	3-6	6-9	9-12
2	A	Total	7/8/87	27	21	18	26
2	B	Total	7/8/87	85	26	13	13
2	C	Total	7/8/87	32	32	16	8.5
2	D	Total	7/8/87	51	40	85	210
2	E	Total	7/8/87	87	61	36	10
3	A	Total	7/9/87	29	22	22	17
3	B	Total	7/9/87	39	20	41	13
2	A-E	Extractable	7/8/87	<0.017	<0.017	<0.017	<0.017
3	A,B	Extractable	7/9/87	<0.017	<0.017	<0.017	<0.017

separate  
extractable  
for each  
section?

TABLE 8 - Total and Extractable Chromium Results for Chemical Spill Site 2  
Quadrant 1, Sections A-E in Milligrams per Liter

Quadrant	Section	Type	Date	Depth Interval(inches)			
				0-3	3-6	6-9	9-12
1	A	Total	7/7/87	100	230	28	20
1	B	Total	7/7/87	150	180	46	14
1	C	Total	7/7/87	41	21	20	15
1	D	Total	7/7/87	110	26	16	27
1	E	Total	7/7/87	49	25	24	37
1	A-E	Extractable	7/7/87	0.34	0.052	<0.017	<0.017

TABLE 9 - Total Cyanide Results for Chemical Spill Site 1, Quadrant 2, Sections A-E and Quadrant 3, Sections A,B in Milligrams per Liter

Quadrant	Section	Type	Date	0-3	Depth Interval(inches)		
					3-6	6-9	9-12
2	A	Total	7/8/87	15	7.2	4.0	7.3
2	B	Total	7/8/87	22	3.4	0.17	0.42
2	C	Total	7/8/87	53	4.3	11	1.8
2	D	Total	7/8/87	990	980	450	205
2	E	Total	7/8/87	37	37	12	0.79
3	A	Total	7/8/87	31	24	33	25
3	B	Total	7/8/87	63	330	544	2.4

TABLE 10 - Total Cyanide Results for Chemical Spill Site 2, Quadrant 1, Sections A-E in Milligrams per Liter

Quadrant	Section	Type	Date	0-3	Depth Interval(inches)		
					3-6	6-9	9-12
1	A	Total	7/7/87	32	39	29	27
1	B	Total	7/7/87	180	32	43	32
1	C	Total	7/7/87	20	37	26	8.3
1	D	Total	7/7/87	50	68	22	10
1	E	Total	7/7/87	26	22	16	60

TABLE 11 - Total pH Results for Chemical Spill Site 1, Quadrant 2, Sections A-E and Quadrant 3, Sections A,B in Standard Units

Quadrant	Section	Type	Date	Depth Intervals(inches)			
				0-3	3-6	6-9	9-12
2	A	Total	7/8/87	7.8	7.6	7.0	6.5
2	B	Total	7/8/87	7.7	7.6	6.5	5.9
2	C	Total	7/8/87	8.2	8.0	7.8	8.0
2	D	Total	7/8/87	8.2	8.2	8.6	8.1
2	E	Total	7/8/87	7.7	7.6	7.5	7.6
3	A	Total	7/8/87	8.2	8.4	8.4	8.1
3	B	Total	7/8/87	8.0	7.3	8.5	7.7

TABLE 12 - Total pH Results for Chemical Spill Site 2, Quadrant 1, Sections A-E in Standard Units

Quadrant	Section	Type	Date	Depth Intervals(inches)			
				0-3	3-6	6-9	9-12
1	A	Total	7/7/87	7.9	7.8	7.4	7.3
1	B	Total	7/7/87	7.9	7.9	7.6	7.7
1	C	Total	7/7/87	8.2	7.8	7.6	7.6
1	D	Total	7/7/87	8.2	8.3	7.6	7.4
1	E	Total	7/7/87	8.2	7.9	7.5	7.4

TABLE 13 - Total Percent Solids Results for Chemical Spill Site 1, Quadrant 2, Sections A-E and Quadrant 3, Sections A,B

Quadrant	Section	Type	Date	0-3	Depth Intervals(inches)		
					3-6	6-9	9-12
2	A	Total	7/8/87	84	79	80	86
2	B	Total	7/8/87	88	86	86	82
2	C	Total	7/8/87	79	76	85	86
2	D	Total	7/8/87	80	77	80	84
2	E	Total	7/8/87	86	79	83	83
3	A	Total	7/8/87	84	83	85	88
3	B	Total	7/8/87	86	86	83	90

TABLE 14 - Total Percent Solids Results for Chemical Spill Site 2, Quadrant 1, Sections A-E

Quadrant	Section	Type	Date	0-3	Depth Intervals(inches)		
					3-6	6-9	9-12
1	A	Total	7/7/87	76	79	82	83
1	B	Total	7/7/87	74	77	83	85
1	C	Total	7/7/87	80	78	83	87
1	D	Total	7/7/87	83	80	82	90
1	E	Total	7/7/87	85	80	83	81

TABLE 15 - Background Total and Extractable Zinc Results for Quadrant 5, Sections A-D in Milligrams per liter

Quadrant	Section	Type	Date	0-3	Depth Interval(inches)		
					3-6	6-9	9-12
5	A	Total	7/20/87	70	110	55	37
5	B	Total	7/20/87	170	120	160	150
5	C	Total	7/20/87	1,600	430	140	150
5	D	Total	7/20/87	270	41	41	39
5	A-D	Extractable	7/20/87	2.8	0.94	0.24	0.35

TABLE 16- Background Total and Extractable Copper Results for Quadrant 5, Sections A-D in Milligrams per liter

Quadrant	Section	Type	Date	0-3	Depth Interval(inches)		
					3-6	6-9	9-12
5	A	Total	7/20/87	30	39	25	21
5	B	Total	7/20/87	52	47	40	23
5	C	Total	7/20/87	370	170	66	79
5	D	Total	7/20/87	76	33	40	39
5	A-D	Extractable	7/20/87	0.038	0.038	0.019	0.077

TABLE 17 - Background Total and Extractable Nickel Results for Quadrant 5, Sections A-D in Milligrams per liter

Quadrant	Section	Type	Date	0-3	Depth Interval(inches)		
					3-6	6-9	9-12
5	A	Total	7/20/87	25	25	22	18
5	B	Total	7/20/87	32	25	27	33
5	C	Total	7/20/87	74	73	60	51
5	D	Total	7/20/87	25	25	24	21
5	A-D	Extractable	7/20/87	<0.056	<0.056	<0.056	<0.056

TABLE 18 - Background Total and Extractable Chromium Results for Quadrant 5, Sections A-D in Milligrams per liter

Quadrant	Section	Type	Date	0-3	Depth Interval(inches)		
					3-6	6-9	9-12
5	A	Total	7/20/87	34	31	23	20
5	B	Total	7/20/87	37	22	20	30
5	C	Total	7/20/87	96	100	87	64
5	D	Total	7/20/87	41	46	39	36
5	A-D	Extractable	7/20/87	<0.017	<0.017	<0.017	<0.017

TABLE 19 - Background Total Cyanide Results for Quadrant 5, Sections A-D,  
in Milligrams per Liter

Quadrant	Section	Type	Date	0-3	Depth Interval (inches)		
					3-6	6-9	9-12
5	A	Total	7/20/87	<0.13	0.64	0.55	0.37
5	B	Total	7/20/87	0.53	0.34	0.73	0.11
5	C	Total	7/20/87	0.34	0.13	0.18	0.75
5	D	Total	7/20/87	0.12	0.20	0.39	0.59

*Relate total cyanides to ~~attainable~~ using DI water*

TABLE 20 - Background Total pH Results for Quadrant 5, Sections A-D in Standard Units

Quadrant	Section	Type	Date	Depth Interval(inches)			
				0-3	3-6	6-9	9-12
5	A	Total	7/20/87	6.5	7.3	6.8	5.8
5	B	Total	7/20/87	6.3	6.6	6.8	6.9
5	C	Total	7/20/87	6.5	7.8	7.8	6.9
5	D	Total	7/20/87	6.0	5.7	5.6	5.5

TABLE 21 - Background Total Percent Solids Results for Quadrant 5, Sections A-D

Quadrant	Section	Type	Date	Depth Intervals(inches)			
				0-3	3-6	6-9	9-12
5	A	Total	7/20/87	89	89	88	89
5	B	Total	7/20/87	90	89	90	91
5	C	Total	7/20/87	89	90	89	91
5	D	Total	7/20/87	83	83	85	84

4.0 CONTAMINATION ASSESSMENT

The results of the chemical analyses for both spill sites show that contamination was found down to the maximum depth interval (9-12 inches) for zinc, copper, and cyanide and exceeded maximum allowable contaminant limitations. Maximum allowable contaminant limitations for chromium was not exceeded at any depth interval within spill sites 1 and 2. Contamination caused by nickel could not be compared with criteria used in this study since no interim primary drinking water standards exist for this parameter. Extractable concentrations for nickel ranged from 0.42 mg/l to 6.0 mg/l.

Generally, contaminant concentrations for total and extractable decreased significantly from 0-3" to the 9-12" depth interval. Soil characteristics from 0-6" were typically sandy-loam and from 6-12" interval clay-loam was mostly observed.

The horizontal and vertical extent of contamination for zinc, copper, *nickel* and cyanide has not been fully determined since expected background sampling stations 1-A and 2-A showed contamination at all depths sampled. Background data from Quadrant 5 A-D showed no apparent contamination from spill sites 1 and 2.

*any other extractables?*

*per the approval letter (App A)  
safety was to continue at 6" intervals  
until clear*

5.0 REMEDIAL PROPOSAL

Since it has been determined that vertical and horizontal extent of contamination has not been fully demonstrated and soils within spill sites 1 and 2 are contaminated at the maximum depths sampled, it is proposed that the following actions be taken:

- 1) <sup>All</sup> Soils within spill sites 1 and 2 to be removed down to the 1.5 foot depth interval in accordance with RCRA procedures and by an approved hazardous waste disposal company.
- 2) Lateral extent of contamination will be determined by sampling at 50 foot intervals north of 1-A and south of 1-E until "clean". Contaminated soils will be removed in accordance with RCRA requirements.
- 3) Vertical extent of contamination will be determined after contaminated soils have been removed at the 1.5 foot depth interval. Soil samples will be split with field representatives from the North Carolina Solid and Hazardous Waste Management Branch. Contaminated soils verified after remedial sampling below 1.5 feet will be removed in accordance with RCRA requirements.
- 4) Final verification sampling and soil removal activities will be coordinated with representatives of the North Carolina Solid and Hazardous Waste Management Branch.

→ profile graph? sample locations per section/gradient  
- explain spill chronology (where from, path)  
- area downgradient  
→ post-excavation sampling procedure?  
- extractable cyanides using DI  
free cyanide  
Residual levels

6.0 SCHEDULE FOR COMPLETION

The following schedule of completion is based upon known and projected remedial activities necessary for total compliance with RCRA regulations and could be subject to change due to factors beyond Stewart-Warner Corporations control.

<u>Subject</u>	<u>Completion Date</u>
1) Enter into an agreement or contract with an approved hazardous waste removal and/or disposal company	August 10, 1987
2) Removal of known contaminated soil at spill sites 1 & 2 down to 1.5 foot level and verification of lateral contaminant movement	September 1, 1987
3) Split sampling and analysis with regulatory agency	October 1, 1987
4) Remedial clean-up, if necessary	November 1, 1987
5) Split sampling and analysis with regulatory agency, if necessary	December 1, 1987

APPENDIX A

Written Approval by NC Solid & Hazardous Management Branch



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, Field Operations Supervisor  
Hazardous Waste Compliance Unit  
Solid & Hazardous Waste Management Branch

RDH:pgb

cc: Steve Phibbs

6923A

APPENDIX B

Sampling & Analysis Plan

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

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

Representative 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

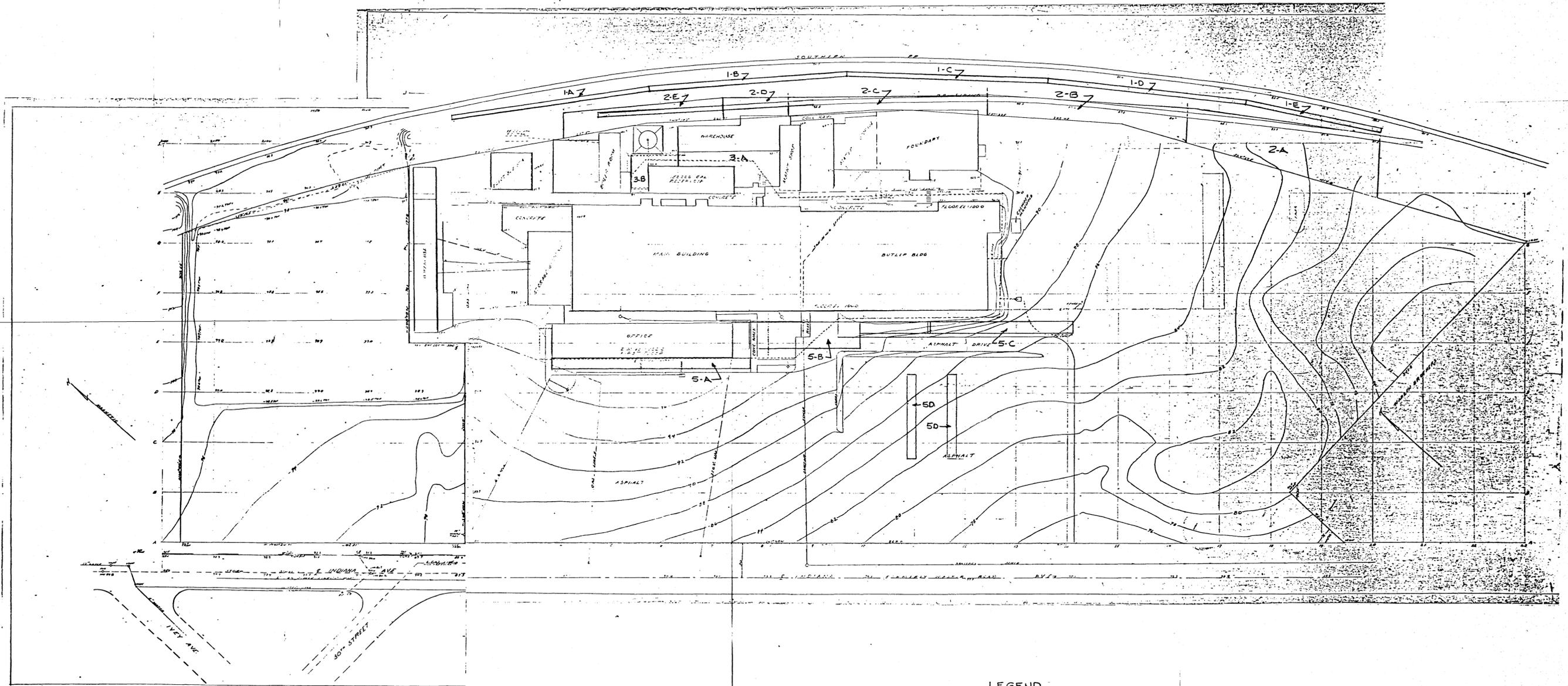
The methodology utilized in the analytical testing include the following:

- 1) EPA Test Methods for Evaluating Solid 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.



**LEGEND**  
 CHEMICAL SPILL SITE 1 = 2A-2E, 3A & 3B  
 CHEMICAL SPILL SITE 2 = 1A-1E  
 BACKGROUND = SA-50

REV. NO.	DESCRIPTION	BY	DATE
	Chemical Spill Assessment for Spill Sites 1 and 2		
PROJECT Stewart Warner Corporation - Bassick Sack Division			
LOCATION Winston-Salem, North Carolina			
<b>SITE PLAN</b>			
SCALE 1"=50'	DATE: 7/24/87	SHEET	DWG. NO.
DRAWN: R&A	APPVD:	1 OF 1	