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PRELIMINARY REPORT OF GROUNDWATER INVESTIGATION AT BOVANO INDUSTRIES OF CHESHIRE

TRC Environmental Consultants, Inc.

Prepared By:

Frederick W. Johnson
Assistant Project Scientist
Project Manager

Mark S. Halvorsen, P. E.
Principal Engineer

Project No. 2045-N51-00

November 1982

800 Connecticut Blvd.
East Hartford, CT 06108
(203) 289-8631

RDMS Doc ID 106766

TABLE OF CONTENTS

SECTION		PAGE
1.0	INTRODUCTION	1
2.0	SITE GEOLOGY	2
3.0	FIELD INVESTIGATION	3
4.0	RESULTS	6
4.1	Ground Water Flow	6
4.2	Chemical Analysis	6
5.0	RECOMMENDATIONS	9
5.1	TCE Usage	9
5.2	Chemical Storage	9
5.3	Copper Sludge Process	9
5.4	Further Site Contamination Study	10
6.0	COSTS	12
6.1	TCE Usage	12
6.2	Chemical Storage	12
6.3	Sludge Process Revision	12
6.4	Further Site Investigation Work	13

LIST OF FIGURES

FIGURE		PAGE
1	General Site Map - Bovano Industries, Cheshire, Conn.	4

LIST OF TABLES

TABLE		PAGE
1	Bovano of Cheshire Water Analysis Results	7

1.0 INTRODUCTION

On April 30, 1982 Bovano Industries of Cheshire, Connecticut was issued a legal order of abatement from the Connecticut Department of Environmental Protection (DEP) to conduct the following:

1) Investigate the extent and degree of ground water, surface water and soil contamination at the Bovano property.

2) Implement a chemical storage, usage and waste handling plan.

3) Eliminate the discharge of metal finishing waste to the ground water of the state.

These actions were required by the DEP due to the suspect contribution to contamination of the ground water of the state from a copper sludge basin operated by Bovano, and from spillage of trichlorocthylene used in a manufacturing process at Bovano.

Bovano contracted with TRC on August 31, 1982 to provide consulting services as outlined in May 21, 1982 proposal No. 8205-N51-27.

2.0 SITE GEOLOGY

The underlying bedrock at the Bovano site is a coarse-grained variety of the sedimentary rocks known as the New Haven Arkose. The New Haven Arkose is typically a conglomeratic arkose and arkosic siltstone (Fritts 1963). The bedding of this bedrock unit all dip toward the east at an angle of between 10-20 degrees. Bedrock mapping of the Mt. Carmel Quadrangle (Fritts 1963) does not indicate any faults, intrusions or other unconformities in the vicinity (less than 1/2 mile) of the Bovano property.

Bedrock surface contours as mapped by Halni 1974 indicate that the bedrock surface slopes to the west at a slope of approximately 0.038 ft/ft in the vicinity of the site.

Depth to Bedrock maps of the Mt. Carmel Quadrangle (Handman et al, 1975) indicate the depth of unconsolidated sediment over bedrock increases in a westerly direction across the Bovano property from approximately 25 feet to over 100 feet.

Backhoe test pits conducted on site indicated that the unconsolidated sediments underlying the Bovano property consist primarily of a stratified drift of coarse sand and gravel with some alluvial deposits along the banks of the Mill River.

3.0 FIELD INVESTIGATION

On September 21, 1982 four backhoe test pits were excavated on the Bovano property using Bovano's equipment and operator. A TRC geologist and field technician were present to install ground water monitoring wells in the pits and to log soils data (see Figure 1, Site Map). Monitoring wells were installed in the test pits using 4 inch PVC perforated drain pipe wrapped with filter fabric for the screened interval.

After allowed to stabilize for one week, the water levels of these wells were recorded and ground water samples collected. At this time water samples from the Mill River, both upstrem and downstream of the Bovano property, were collected.

A general site reconnaissance of the property was made in order to determine present and past waste handling practices that may have contributed to ground water contamination.

Bovano Industries presently operates a metal finishing waste treatment system for a copper acid wash. This waste is collected in a 1500 gallon concrete tank where it is batch treated by neutralizing with caustic to a pH of 10.5 to 11. Copper is precipitated out during this process and the copper sludge is discharged to a sludge lagoon lined with limestone chips. The supernatant from this process is drawn off and discharged to a leaching catch basin. This catch basin also collects storm water runoff from the parking area. Approximately 1500 gallons supernatant is discharged every 10 days. As a requirement of a state DEP discharge permit, the supernatant is analyzed monthly for suspended solids (S.S.) copper (Cu), and pH. The average values for these parameters are generally less than 5ppm S.S., less than 1ppm Cu and 10.5 to 11 pH. The copper sludge from this process amounts to less than 1/2 cubic yard per year.

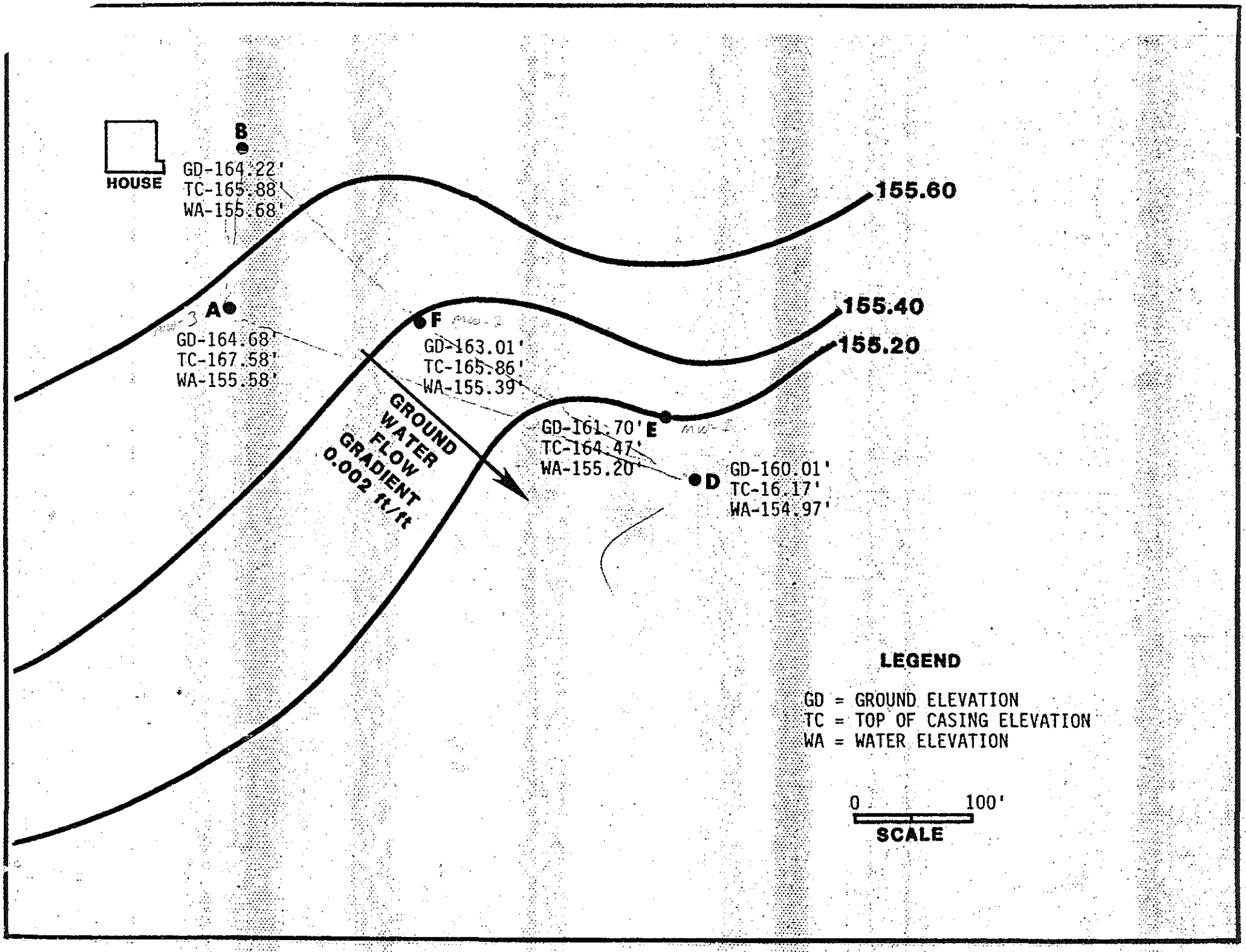

Figure 1a. Site Elevations - Bovano Industries, Cheshire, Connecticut.

Bovano Industries has used Trichlorocthylene (TCE) as a degreasing and dying agent since about 1964. The use of this chemical was discontinued recently. The TCE used in processing was kept in a heated vat for the dipping of parts. The only means of discharge of the TCE was apparently from "dragout", when baskets of parts were removed from the tank. This dragout would have fallen to a concrete floor where it would have been collected in a concrete trough used to discharge cooling waters. This trough discharges to a 4 inch PVC sewer and eventually to a subsurface sewage disposal system, located to the east of the Bovano property, approximately 100 feet from the Mill River. The septic tank in this system was found to contain 6" of a metallic grey sludge. This disposal system is apparently no longer in use.

What else besides 6" sludge go into tank

? where does [illegible] lead [illegible] where does [illegible] go now)

Another possible source of TCE contamination of ground water at Bovano may have been from spillage or leakage due to handling and storage. Chemical feedstacks and waste are presently stored in a barn on an earthen floor.

4.0 RESULTS

4.1 Ground Water Flow

Ground water levels measured in the four wells indicated a 0.9 foot drop in the water table from wells A and B towards wells C and D. This change in elevation results in a ground water flow gradient through the Bovano property of 0.002 ft/ft towards the east-southeast.

4.2 Chemical Analysis

Three ground water samples and two river water samples were analyzed for TCE. Two ground water samples in the vicinity of the sludge lagoon were also analyzed for copper.

In the review of the chemical analyses data (Table 1), it can be seen that well B shows significantly elevated concentrations of both TCE and copper. The elevated copper concentration (10.20 mg/L) can be attributed to the proximity of this well to the copper supernatant leaching basin and the copper sludge lagoon. Copper concentration of 0.09 mg/L in well A indicate ground water that is relatively unaffected by the copper lagoon and leachate basin. As a point of reference, the State of Connecticut's Drinking Water Standard for copper is 1.0 mg/L.

The elevated TCE level of 1.22 mg/L in well B is most likely attributed to chemical handling and storage practices at the loading dock and the storage barn area. It is possible that inadvertent spillage and/or leakage throughout the years may have caused some minor contamination of the soils in this area. It should be noted that no noticable (via site or odor) contamination of the soils or ground water were observed during the digging of well B.

TABLE 1

BOVANO OF CHESHIRE
WATER ANALYSIS RESULTS

sample for 3"

SAMPLING POINT	TCE	COPPER
Well A	-	0.09 mg/L
Well B	1.22 mg/L	10.20 mg/L
Well C	Nondetectable <14.6 µg/L	-
Well D	25.46 µg/L	-
Mill River Upstream	Nondetectable <14.6 µg/L	-
Mill River Downstream	Nondetectable <14.6 µg/L	-

Less significant amounts of TCE (25.46μg/L) were found in well D. This contamination can be attributed to the leaching field up-gradient of this well. Well C and Mill River upstream and downstream samples were found to have nondetectable (< 14.6 μg/L) concentrations of TCE.

5.0 RECOMMENDATIONS

5.1 TCE Usage

Bovano has presently totally discontinued its use of TCE. All remaining chemicals not being used should either be sold or disposed of by a state-licensed waste hauler. Either transaction must be documented by a bill of sale or a hazardous waste manifest. With all TCE and other solvents off the premises the potential of further contamination of ground water is virtually eliminated.

5.2 Chemical Storage

It is recommended that the present chemical storage in the barn be updated by the installation of a concrete pad with containment curb. This would eliminate any hazard from ground water contamination due to leaking drums, spillage, etc.

5.3 Copper Sludge Process

To eliminate any further contamination from the copper sludge lagoon and leaching basin, it is recommended they both be eliminated. A viable alternative to on-site disposal would be to discharge the supernatant to the town sanitary sewer, and to dispose of the sludge off-site at a landfill licensed to handle such material.

Access to the sewer can be obtained by connecting into the existing 4" sewer leaving the building near the process line. Effluent would then be conveyed through this sewer to a point behind the office building. At this point, a connection to the town sewer could be made by installing 120 feet of additional sewer line. A permit from the Town Sewer Authority and a State DEP 25-54i permit would be required for this discharge.

In reviewing the monthly quality reports for the supernatant we see no reason why this permit would not be granted.

The sewer line should be made to bypass the two existing septic tanks. The structual integrity of the sewer should be assured for a distance with 75 feet of the water supply well.

The sludge generated from this process should be dewatered in order to reduce volume and cut disposal costs. The sludge could be discharged to screens and allowed to dry. The water from the sludge could be collected in a sump and pumped to the sewer on an as-needed basis. The dried sludge could then be placed in drums for disposal.

The sludge and lime chips from the existing lagoon should be removed and placed in drums for disposal.

5.4 Further Site Contamination Study

In order to comply with state DEP requirements, further site contamination study may be required of Bovano. TRC recognizes the areas of concern to be the loading dock and leaching field. Ten soil samples could be taken from the loading dock area to determine the extent and magnitude of TCE contamination. Samples would be taken at various depths in order to determine the vertical extent of contamination. The sludge from the septic tank next to the leaching field should also be analyzed to determine the degree of contamination. If found to be heavily contaminated, this material would have to be removed and disposed of.

Through TRC communication with the DEP, it was indicated that further ground water monitoring wells would be required around Bovano property.

For planning purposes, two 30 feet deep wells with a 10 foot screened interval, located down-gradient of both areas should be sufficient for comprehensive ground water monitoring of this site. Water samples from the two newly installed wells and three of the existing wells would be collected and analyzed for TCE.

6.0 COSTS

6.1 TCE Usage

If sold, there would be a net gain. If waste is to be disposed of at a hazardous waste facility, assume a cost ot $150 per 55 gal drum for disposal and transportation costs.

6.2 Chemical Storage

Assume a 10' x 10' concrete pad with a 6" concrete containment curb. Estimated = $500.00.

6.3 Sludge Process Revision

Capital:	Costs
1) 120 LF 6" sewer installed @ $20/LF	$2,400
2) Bypassing septic tanks and interior plumbing	500
3) Sludge dewatering process	1,500
4) Lagoon closure (remove and drum ≈1.5 yd^3 of material)	300
5) Lagoon sludge disposal (assume 3 drums x $150/drum)	450
Total Estimated Capital Costs	$5,150

Operation and Maintenance Costs:

1) Sewer user charge; assume $0.40/100 ft^3 x 3500 ft^3/yr	$13/yr
2) Sludge disposal; 2 drums/yr x $150	300
Total Estimated O & M Costs	$313/yr

6.4 Further Site Investigation Work

1) Collect samples	$ 160
2) Analyze 10 soil/sludge samples for TCE	750
3) Report	130
4) ODC's	50
	$1,090

1) Monitoring Wells (2) Assume 1 day drilling @ $800/day	$ 800
2) Well pipe 20' Screen x $7 = 140 40 Solid x 5 = 200	340
3) Inspection	258
4) Analysis 5 TCE @ $150	300
5) Report	86
	$1,784