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BLACK & VEATCH Waste Science, Inc.

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U.S. Environmental Protection Agency
Toastmaster, Inc.
Work Assignment 12

BVWS Project 52012.496
April 3, 1995

RECD
JUN 0 5 1995

Mr. Narindar Kumar, Chief
Site Assessment Section
U.S. Environmental Protection Agency
345 Courtland Street, NE
Atlanta, Georgia 30365

DATE REPORT ACCEPTED 4-7-95
DISPOSITION NFRAP
SAM SIGNATURE Cynthia Gunley

Subject: Site Inspection Prioritization
Toastmaster, Inc.
Laurinburg, Scotland County, NC
EPA ID NCD037160439

Dear Mr. Kumar:

BLACK & VEATCH Waste Science, Inc. has been tasked by the U.S. Environmental Protection Agency (EPA) to conduct a Site Inspection Prioritization for the Toastmaster, Inc. facility (the facility) in Laurinburg, Scotland County, North Carolina. In accordance with the scope of work, a preliminary Hazard Ranking System (HRS) score was prepared to determine the need for future activities at the facility.

The facility is located on Old Laurel Hill Church Road, approximately 0.5 mile north of Laurinburg, North Carolina. The facility is bordered by Old Laurel Hill Church Road to the northeast, Rea Wire Magnet Company, Inc., to the northwest, and a railroad right of way to the southwest. The city of Laurinburg sanitation lagoon is located on the southern border of the facility. Leith Creek is located southwest of the railroad right of way (Refs. 1, p. 2; 2; 3, p. 2).

The 30-acre facility began electroplating operations in 1959 which continued until approximately 1985, with the exception of 1970 through 1974 when no electroplating

was performed at the facility (Refs. 1, p. 2; 4, p. 1). The facility has operated as an electric clock manufacturer since 1985 (Ref. 1, p. 2).

The facility includes a plant building which is still in use and a closed wastewater treatment system. The wastewater treatment system included waste treatment tanks, a primary lagoon, a secondary lagoon, sand filter beds, and sludge burial trenches. Wastewater was treated in two 15,000-gallon and two 3,000-gallons tanks. The primary lagoon (50 feet by 80 feet by 5 feet) and secondary lagoon (30 feet by 170 feet by 5 feet) were used to hold treated wastewater. Two 20 feet by 20 feet sand filter beds separated sludge from the treated wastewater. From 1977 until 1980, dried sludge was removed from the filter beds and buried in trenches. The exact area, depth, and locations of the trenches were not documented (Refs. 5; 6). However, the buried sludge is estimated to cover approximately 0.5 acre (Ref. 7, p. 5). The lagoons and filter beds underwent Resource Conservation and Recovery Act (RCRA) closure in 1983 (Refs. 1, p. 1; 8). Sludge and residual material in the lagoons and filter beds were removed and disposed of at SCA Services in Pinewood, South Carolina (Ref. 5). As part of the closure, five monitoring wells were installed at the facility (Ref 1., p. 1).

In December 1984, the North Carolina Department of Human Resources, Division of Health Services, Solid and Hazardous Waste Management Branch performed a Site Inspection at the facility. A total of three subsurface soil samples were collected from the primary lagoon, the sand filter bed, and the sludge burial trench. One groundwater sample was collected from a monitoring well located immediately downgradient from the burial trenches. All soil and water samples were analyzed for cadmium, chromium, lead, nickel, trichloroethylene (TCE), and 1,1,1-trichloroethane. No organic compounds were detected in any of the samples. Chromium, lead, and nickel were detected in subsurface soil samples collected from a sand filter bed, the burial trenches, and the primary lagoon; however, no background concentrations were established. Lead was detected in the groundwater sample approximately ten times greater than EPA and North Carolina drinking water standards; however, no background concentration was established (Ref. 1, p. 1, 3 - 4, 7, Appendix B).

In May 1990, Water and Air Research, Inc., conducted a preliminary environmental audit at the facility. Two monitoring wells were installed on the western,

undeveloped portion of the facility. Three groundwater samples were collected, one sample from well T-7 and an upper and lower sample from T-6. The three groundwater samples were analyzed for volatile organics compounds using EPA Methods 601 and 602. Two groundwater samples, one from each well, were collected and analyzed for cyanide, chromium, copper, lead, nickel, and zinc. High levels of TCE were detected in both wells. Between 1960 and 1984, TCE was used as a degreaser at the facility and may have leaked or been disposed of on site (Refs. 4, p. 1; 9, p. 1). Metal concentrations detected in the groundwater samples were low. No soil samples were collected during this investigation (Ref. 4, p. 3, Appendix B).

In March 1991, Groundwater Technology, Inc., prepared a Site Characterization Report. This investigation included the collection of 8 soil samples and 14 groundwater samples. Soil samples were analyzed for TCE using EPA Method 8010; however, TCE was not detected in any of the soil samples. Groundwater samples were analyzed for halogenated volatile organics using EPA Method 8010. No background concentrations were established for groundwater; however, numerous organic compounds were detected. TCE was detected at the highest concentrations and frequency (Ref. 3, pp. 12 - 14, Appendix G). In February 1993, Richard Catlin & Associates, Inc., prepared a Corrective Action Plan to address the TCE plume identified in the Site Characterization Report. The plan proposed that the groundwater would be extracted using recovery wells, then pumped into an aeration tank. The treated groundwater would be pumped through silt filters and discharged into an infiltration gallery (Ref. 9, p. 5). Current status of cleanup is unknown.

The facility is underlain by a surficial sand aquifer approximately 0 to 12 feet below land surface (bls). The surficial aquifer, which is approximately 30 feet thick, is underlain by a continuous clay confining unit. The Cretaceous aquifer underlies this confining unit approximately 68 feet bls and is at least 400 feet thick (Refs 3, pp. 6, 7; 10, pp. 90 - 94). Potable water within a 4-mile radius is supplied by a municipal system, a community systems and private wells. The City of Laurinburg operates a blended system, with 9 wells serving 16,949 persons (Ref. 11). The Elmore Trailer Park operates a community system which services approximately 30 households (Ref. 12). All community and municipal wells are screened in the Cretaceous aquifer (Refs. 9, p. 3; 10, pp. 93 - 94; 11). The nearest municipal well is located approximately 3 miles south of the facility (Refs. 2; 11). The nearest community well

is located approximately 2.5 miles west of the facility (Refs. 2; 11; 12). Based on historical well logs, the majority of the private wells are screened in the Cretaceous aquifer (Ref. 10, pp. 93 - 94). The nearest private well is located within 0.25 mile of the facility (Ref. 2). The estimated population receiving drinking water from groundwater within 4 miles of the facility is radially distributed as follows: 0 - 0.25 mile, 39 persons; 0.25 - 0.50 mile, 69 persons; 0.50 - 1 mile, 367 persons; 1 - 2 miles, 958 persons; 2 - 3 miles, 1,052 persons; and 3 - 4 miles, 13,094 persons (Refs. 2; 11; 12; 13).

Surface water runoff from the facility flows approximately 1,000 feet west to Leith Creek, and continues approximately 8 miles to Johns Pond. Surface water flow continues in Leith Creek downstream of Johns Pond for approximately 1 mile before entering Bridge Creek. The 15-mile surface water pathway ends approximately where Bridge Creek joins the Pee Dee River just over the South Carolina border (Refs. 2; 14). The facility is located within the 500-year flood plain of Leith Creek (Ref. 15). Approximately 20 miles of wetlands frontage are located along the surface water migration pathway (Ref. 2). The ranges of several federal and/or state endangered and/or threatened species may include the water bodies along the surface water migration pathway; however, exact locations of these species have not been identified (Refs. 16; 17). There are no surface water intakes along the surface water migration pathway (Ref. 18). The approximate flow rate for Leith Creek and Bridge Creek is 8 to 12 cubic feet per second (Ref. 1, p. 4). Leith Creek, Johns Pond, and Bridge Creek are recreationally fished (Ref. 14).

Approximately 15,233 residents are located within a 4-mile radius of the facility. The estimated population within the 4-mile radius is radially distributed as follows: 0 - 0.25 mile, 42 persons; 0.25 - 0.50 mile, 81 persons; 0.50 - 1 mile, 903 persons; 1 - 2 miles, 4,864 persons; 2 - 3 miles, 7,459 persons; and 3 - 4 miles, 1,884 persons (Refs. 2; 13; 19). The nearest residence is within 0.25 mile of the facility (Ref. 2). The facility employs approximately 550 persons (Ref. 20). Land use within a 4-mile radius of the facility consists of industrial, residential, agricultural, and undeveloped areas (Refs. 1, p. 5; 2).

Approximately 5,160 acres of wetlands are located within 4 miles of the facility. The estimated wetlands are radially distributed as follows: 0 - 0.25 mile, 55 acres; 0.25 -

0.50 mile, 105 acres; 0.50 - 1 mile, 240 acres; 1 - 2 miles, 960 acres; 2 - 3 miles, 2,000 acres; and 3 - 4 miles, 1,800 acres (Ref. 2). Sensitive areas within 4 miles of the facility include sightings of Boykin's lobelia (*Lobelia boykinii*), a state and federal candidate species; awned meadowbeauty (*Rhexia aristosa*), a state threatened species; and quillwort arrowhead (*Sagittaria isoetiformis*), a state and federal endangered species. The McIntosh Bay Complex, located within 4 miles of the facility, is an Identified Natural Heritage Priority Area (Ref. 16). The ranges of several other federally endangered or threatened species may include area within 4 miles of the facility; however, exact locations of these species have not been identified (Ref. 17).

Evaluation of available file material indicates that hazardous constituents were detected in subsurface soil samples; however, no samples have been analyzed for the full range of metals. Although groundwater in the surficial aquifer may be contaminated with hazardous constituents, groundwater target populations are minimal. No surface water or sediment samples have been collected from Leith Creek, a documented fishery and a wetland habitat; however, toxicity values for metals associated with the electroplating process are low. An observed release to ambient air was not documented. Therefore, no further action is recommended for the Toastmaster, Inc. facility.

Attached are all references used during this evaluation. If you have any questions or comments, please contact me at (206) 383-1436 or Victor Blix at (404) 643-2320.

Sincerely,

BLACK & VEATCH Waste Science, Inc.

Charlotte M Bulmd for

Ginger K. Ferguson
Site Manager

gkf
Enclosure

REFERENCES

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Reference #1

EPA's copy

SITE INSPECTION REPORT

Reevaluation on 3/21/91
Rec. ESI< to resample monitoring wells & determine nearest D.G. well + sample.
K Cain

TOASTMASTER INCORPORATED

LAURINBURG, NORTH CAROLINA

EPA ID #NC D037160439

RCRA 3012 Site Inspection Date: December 18, 1984
Submitted to EPA: December 12, 1985

Lenox E. Bramble, Environmental Engineer
and
D. Mark Durway, Geologist

North Carolina Department of Human Resources
Division of Health Services
Solid and Hazardous Waste Management Branch
RCRA 3012 Group/CERCLA Unit

Reference #3

SITE CHARACTERIZATION REPORT
INGRAHAM TIME PRODUCTS DIVISION
TOASTMASTER INC.
LAURINBURG, NORTH CAROLINA

26 MARCH 1991

Prepared for:

Larry Clark
Director of Safety/Environmental Afairs
Toastmaster Inc.
1801 North Stadium Drive
Columbia, MO

Prepared by:
GROUNDWATER TECHNOLOGY, INC.

Julie Lewis
Project Geologist

Roger Nordlinger
Site Manager

1.0 INTRODUCTION

1.1 Purpose of Investigation

The purpose of this site characterization report (SCR) is to define the lateral and vertical extent of trichloroethene (TCE) in soil and groundwater at the Toastmaster Inc. Ingraham Time Products Division facility in Laurinburg, North Carolina (Figure 1). The scope of work conducted during this investigation was as follows:

- installation of one 4-inch diameter PVC monitoring well to a depth of 30 feet, installation of three 4-inch diameter PVC monitoring wells to a depth of 25 feet, and installation of two 2-inch PVC monitoring wells to a depth of 25 feet;

- installation of one 2-inch diameter vertical profile well to a depth of 50 feet;

- collecting one soil sample from each of the seven soil borings during monitoring well installation. The soil samples were analyzed for halogenated volatile organics by EPA method 8010;

- collecting groundwater samples from the seven monitoring wells referenced above. Additionally, groundwater samples were collected from the seven existing monitoring wells on site. 14 groundwater samples were analyzed for halogenated volatile organics by EPA method 8010;

- performed rising-head permeability tests on three of the monitoring wells.

Additionally, as required by the North Carolina Department of Environment, Health and Natural Resources (NCDEHNR) guidelines, this report also includes a site history, a potential receptor survey, surface water features, site geology, site hydrogeology, a preliminary exposure assessment and a preliminary evaluation of remedial approaches.

1.2 Site History

The Toastmaster Inc. facility is located on the southwest side of N.C. State Route 1301, approximately 1000 feet northwest of Route 501 in Laurinburg, North Carolina. The southern portion of the property

abuts the City of Laurinburg sanitation lagoon, the southwestern portion of the property abuts a railroad right-of-way and the northwestern portion of the property abuts Rea Wire Magnet Company, Inc. Leith Creek is located southwest of the railroad right-of-way (Figure 2).

The property was purchased by Toastmaster Inc. in 1959. Prior to the purchase, the property was undeveloped farm land. The plant has been operating as a clock manufacturing facility since its inception. In 1964, an addition was added to the structure. A waste treatment facility was located on the southwest side of the building and extended to the southern corner of the property. The waste treatment system was closed in 1983.

TCE was reportedly used at the site as a machinery degreaser between 1960 and 1984. Accurate records of usage and disposal practices are unavailable.

1.3 Previous Investigations

Subsequent to a refinancing request, Toastmaster Inc. began to assess potential environmental liabilities associated with the facility. Toastmaster Inc. contracted Water and Air Research, Inc. (WAR) to conduct a preliminary environmental audit in April 1990. Two monitoring wells, T-6 and T-7 (MW-6 and MW-7) (Figure 3), were installed and sampled for volatile organic and metal analyses. Analytical results presented by WAR indicated that metals concentrations were at levels well below regulatory concern and that trichloroethene (TCE) and associated compounds were the only volatile organic compounds exhibiting detectable concentrations in groundwater. TCE concentrations were measured at 4,700 parts per billion (ppb) and 14,300 ppb. The actual laboratory reports are presented in Appendix A.

The results of the WAR investigation prompted Toastmaster to sample five groundwater monitoring wells that had been installed at the site in the late 1970's. The five monitoring wells, #1, #2, #3, #4, and #5 (MW-1 through MW-5) (Figure 3), were sampled for volatile organics. Again, TCE and associated compounds were the only analytes exhibiting detectable concentrations in groundwater. TCE concentrations detected in monitoring wells #1 through #5 ranged from 960 ppb to 3200 ppb. The actual laboratory results are presented in Appendix A.

Due to the previous limited investigative activities, Toastmaster Inc. contracted Groundwater Technology, Inc. to conduct a more thorough, complete subsurface assessment.

Groundwater Technology, Inc. subsequently recommended a phase driven approach to effectively delineate the TCE plume, characterize the shallow aquifer and comply with all applicable regulatory requirements.

The purpose of the first phase was to define the lateral extent of TCE in the shallow groundwater underlying the site. In order to obtain shallow groundwater, the use of a KV™ miniature well point system was proposed. The KV™ system consists of a slotted aluminum shield point, 3/16" O.D. hardened steel rods and a slide hammer. Teflon tubing is utilized to connect the slotted shield point to an Erlenmeyer flask which is used to collect the groundwater. A vacuum is used to draw the groundwater into the shield point and up through the tubing into the collection flask. On 22 October 1990, groundwater sampling activities began. During the first sampling event, it became evident that the proposed KV™ system would not be successful due to: the presence of fine clayey particles clogging both the slotted shield point and the tubing, the excessive depth to the saturated zone and the nature of the clayey soils made both driving the shield point and extracting the rods extremely difficult.

In order to complete the project, an alternative sampling procedure was implemented. A 2" hand auger was utilized to allow access to the shallow groundwater. A slotted 1/2" I.D. schedule 40 PVC pipe was placed into the excavated borehole. A 3/8" virgin piece of slitted surgical tubing covered with surgical gauze was then threaded down-hole through the tubing into the shallow groundwater. The groundwater was then extracted as above. Several volumes of groundwater were extracted in order to ensure that a representative sample was collected. The PVC piping was then removed from borehole. The borehole was backfilled with native material leaving the surgical tubing in place. The tubing was housed in a flush-mounted PVC cap and the location was staked and surveyed. All equipment was thoroughly decontaminated prior to moving to the next sampling location.

Groundwater samples were collected from KV-1 through KV-16 (Figure 4) on 23 October through 26 October 1990. The samples were analyzed by EPA method 8010 for TCE only. All groundwater samples were collected and analyzed according to approved EPA protocols. These protocols included personal protective equipment, approved sampling devices and techniques, approved sample containers, chain of custody documentation and approved laboratory techniques. The laboratory results are presented in Appendix A.

The purpose of the first phase was to define the lateral extent of TCE in the shallow groundwater underlying the site. The lithology, sample depth and laboratory results are tabulated as follows:

Sample Number	Lithology at Sampled Depth	Sample Depth (ft)	Results of EPA 8010 Water Analysis (ppb)
KV-1	Saturated, grey to brown, silty CLAY	4	BDL
KV-2	Saturated, grey to brown, silty fine sandy CLAY	4	BDL
KV-3	Saturated, grey, silty CLAY with some fine sands	4	BDL
KV-4	Saturated, light tan to rust, silty CLAY with some fine sands. Note: Burgundy stained sands at 10'-13'	17	240
KV-5	Saturated, yellow to orange, clayey, silty medium grained SAND	22	BDL
KV-6	Saturated, light tan to rust, silty CLAY with some fine sands Note: Burgundy stained sands at 10'-13'	17	200
KV-7	Saturated, light tan to rust, silty CLAY with some fine sands	20	34
KV-8	Saturated, tan to brown, silty, sandy CLAY	13	2.4
KV-9	Saturated, tan to brown, fine-medium SAND with some clays	8	BDL
KV-10	Saturated, tan to brown, fine-medium SAND	6.5	BDL
KV-11	Saturated, tan to brown, fine-medium SAND	8	12
KV-12	Saturated, tan to brown, silty SAND with some clay	6.5	11
KV-13	Saturated, tan to brown, fine-medium SAND	8	BDL
KV-14	Saturated, tan to brown, fine-medium SAND	8	BDL
KV-15	Saturated, light tan, sandy CLAY	8	BDL
KV-16	Saturated, grey to brown, silty CLAY	4	BDL

NOTE: BDL = Below Detection Limit (<0.56 ppb)

The results of the shallow groundwater laboratory results have been used to compile a TCE isoconcentration map which is presented as Figure 5. Figure 5 shows the TCE plume located in the

area to the west of the Toastmaster building and along the closed waste treatment facility. The shallow groundwater sampled from areas directly to the north and south of the building did not contain detectable TCE concentrations.

2.0 RESULTS OF INVESTIGATION

2.1 Site Characterization

2.1.1 Site Topography and Surface Water

The Toastmaster Inc. Ingraham Time Products Division, Laurinburg facility is located in Scotland County, North Carolina. With the exception of the plant and parking areas located on the northeastern side of the property, the site may be characterized as a gently sloping grassy field/wooded area. The site is situated in a rural setting and is serviced by municipal water and sewer systems. The southwestern portion of the property abuts a railroad right-of-way. Leith Creek, a sluggish, swampy stream is located southwest of the railroad. Leith Creek flows southeasterly.

The Laurinburg area of Scotland County is located near the western edge of the Atlantic Coastal Plain physiographic province. The coastal plain is characterized by the Sandhills, rounded hills and long wide ridges; and the Flatwoods, almost level plains. The province is underlain by beds of sand and clay which dip toward the southeast and range in thickness up to several hundred feet. The Cape Fear River System and Yadkin-Pee Dee River system drain the area to the south and southeast (Schipf, 1961).

2.1.2 Regional Geology

The Laurinburg area is characterized by the Flatwoods section of the Middendorf Formation (North Carolina Department of Natural Resources, 1985) and is drained by large, sluggish streams with swampy flood plains. The Flatwoods section is underlain by the Cretaceous age Blackwoods Formation which consists of thin layers of clay alternating with thin layers of fine-grained sand. This formation dips to the southeast approximately 16 feet per mile.

Surficial sediments consisting of fine to medium sand in a clay matrix overlie the Blackwoods Formation. These surficial sediments are expected to have a thickness of about 30 feet (Schipf, 1961). The stratigraphy directly beneath the site is characterized mainly by sand and silty clay with some laterally discontinuous clay lenses.

2.1.3 Site Geology

The stratigraphy directly beneath the site, as determined by drill logs compiled during the drilling activities (Appendix B), is characterized by alternating clay and sand layers. The layers may actually be lenticular and discontinuous. In many cases, the boundaries between layers are gradational. The site stratigraphy can be summarized as silty clay overlain by a silty clayey sand which is overlain by sandy to silty clay. The soil types can be generalized as follows:

Depth (ft)	Description
0-8	damp to moist, grey/brown to orange/beige, sandy CLAY to silty, sandy CLAY
8-12	moist to saturated, beige/rose/orange, clayey SAND
12-16	saturated, beige/brown, silty sand CLAY
16-32	saturated, yellow/rose, silty, clayey SAND
32-40	moist, yellow/beige to brown, silty sandy CLAY
40-50	moist, grey to black, silty CLAY

All borings were drilled with a CME-75 drill rig. Wells GT-8, GT-9 and GT-13 were drilled using 6-inch diameter hollow stem augers and are constructed of 2-inch PVC. Wells GT-10, GT-11, GT-12 and GT-14 were drilled using 10-inch diameter hollow stem augers and are constructed of 4-inch PVC. During the drilling operation, a geologist logged the drill cuttings and collected continuous split-spoon samples until saturated soils were encountered, usually at a depth of around 14 feet. Split spoon samples were then collected at 5-foot intervals to the base of the boring. Borings for GT-8 through GT-12 were drilled to a depth of 25 feet; the boring for GT-13 was drilled to 50 feet and the boring for GT-14 was drilled to 30 feet. The locations of the soil borings are shown as Figure 6.

Geologic cross sections have been prepared using the borings logs from wells GT-8 through GT-14. Figure 7 shows the locations of these geologic cross-sections. Cross-section A-A' which trends northeast and cross-section B-B' which trends northwest are illustrated as Figure 8. Cross-section C-C' which trends north is illustrated as Figure 8A.

Cross-section A-A' shows a clay layer containing a sand lens overlying layers of sand and clay. Cross-section B-B' shows two discontinuous layers of clay and sand overlying a continuous clay layer. The clay is underlain by a layer of clayey sand containing a clay lens. Cross-section C-C' shows the

discontinuous clay layer, underlain by a sand layer containing some clay lenses. The vertical profile well, GT-13, shows that with depth, the sand layer grades conformably into a clay layer.

2.1.4 Regional Hydrogeology

Groundwater recharge in the Laurinburg area is derived from precipitation. The average annual precipitation rate is 47 inches per year. Approximately one-third of the precipitation reaches the water table (Schipf, 1961). Groundwater recharge occurs in interstream areas and discharge occurs at creeks, rivers, swamps and wells.

The site is mapped as being underlain by several aquifers. The upper aquifer is known as the Surficial Sand Aquifer and is predominantly sand but contains clay as a binding agent and in lenses (Schipf, 1961). This surficial aquifer is reported to attain a maximum thickness of 30 feet and supplies water only to dug or driven wells. Yields from this zone usually are adequate for domestic uses except during prolonged dry periods. The lower aquifer is named the Cretaceous Sand Aquifer and consists of alternating strata of sand and clay. The sand beds are numerous but probably lenticular (Schipf, 1961). This aquifer is capable of producing large supplies of groundwater. Yields from wells penetrating this zone have been reported to range between 1 and 5 gallons per minute per foot of depth.

2.1.5 Site Hydrogeology

In order to define the natural gradient of the water table and to determine site-specific aquifer characteristics such as transmissivity and hydraulic conductivity, the seven soil borings were converted to monitoring wells during the period 5 through 7 February 1991 (Figure 6).

Monitoring wells GT-8 through GT-14 were designed in such a manner that the screened interval extends above the predicted static water table, allowing for fluctuations in the water table elevation. Wells were GT-8, GT-9, and GT-13 were completed using flush-threaded, two-inch diameter, schedule 40 PVC casing with 0.010 inch slot screen. Wells GT-10 through GT-12 and GT-14 were completed using four-inch diameter, schedule 40 PVC casing. The bottom of each well was fitted with an appropriate diameter threaded PVC cap. The annular space between the well casing and the drilled hole was back-filled with washed sand to a minimum of one foot above the screened interval. A one foot thick bentonite seal was placed above the sand pack. The annulus was completed with cement grout. Each monitoring well was then fitted with a well cap and secured in a locking stand pipe embedded in concrete, with the exception of GT-8, which was secured in a flush-mounted manhole casing. Typical monitoring well construction is shown on Figure 9.

The construction of GT-13 varied from that which was previously described. GT-13 was designed to serve as a vertical profile well. As such, this well was constructed with the screened interval between 45 and 50 feet below the ground surface. The annulus of the well was grouted from 42 feet to the surface. Logs showing the geologic materials penetrated by each boring and the details of well construction are presented in Appendix B.

The elevation of the top of the PVC of each monitoring well was determined to within 0.01 feet accuracy using an assumed temporary benchmark. The benchmark, a fire hydrant located along the north property line, was assumed to have an elevation of 120.00 feet. Each well was then tied into that point. This type of survey enables the determination of the groundwater flow direction after the wells have been gauged. Well-head elevation data is presented in Appendix C.

During the drilling of the monitoring wells, saturated soil was encountered at a depth of approximately 12 to 17 feet below the ground surface, with the exception of GT-8 in which saturated soils were encountered at a depth of approximately two feet below the ground surface. Subsequent to well completion, the water level stabilized at approximately 0.25 feet below the surface in GT-8, approximately 50 feet below the surface in GT-13 (the vertical profile well), and at approximately six to 14 feet below the ground surface in all other wells.

The monitoring wells were gauged with an interface probe during this investigation, and the well gauging data for 12 and 19 February 1991, is presented in Appendix D.

The liquid level measurements were used to prepare a water table gradient map (Figure 10). The contour lines on this map indicate that groundwater flows across the site to the south-southwest. The average groundwater gradient is .0092 ft/ft.

Site-specific aquifer characteristics were determined by conducting three rising-head permeability tests on 12 February 1991, in wells GT-11, GT-12 and GT-14. The field data was evaluated using the Bouwer and Rice computer-generated curve matching program. The aquifer test data is included as Appendix E. The site-specific aquifer characteristics that were determined are hydraulic conductivity and transmissivity. From these values, the groundwater velocity was then calculated.

Hydraulic conductivity (K) is defined as the rate of flow of water in feet per day through a cross-sectional area of one square foot of the saturated zone. The graphical analysis indicates that the hydraulic

conductivity is 2.637 ft/day for GT-11, 2.268 ft/day for GT-12, and 2.004 ft/day for GT-14. The average of these values, 2.303 ft/day will be used to calculate groundwater velocity.

Transmissivity, the capacity of a water-bearing zone to transmit groundwater, is defined as the rate at which water flows (in square feet per day) through a unit width (one foot) of the saturated thickness of the saturated zone (column of water in the well) under one unit hydraulic gradient. Transmissivity is equal to the hydraulic conductivity multiplied by the saturated thickness of the water-bearing zone. Transmissivity at this site is calculated to be 46.41 ft^2/day for GT-11, 42.80 ft^2/day for GT-12 and 42.74 ft^2/day for GT-14. The average of these values is 43.98 ft^2/day.

The velocity of groundwater movement at the site was determined by the following equation:

$$V = \frac{K}{n} \frac{dh}{dl}$$

where: V = Rate of groundwater flow (ft/day)
$\frac{dh}{dl}$ = Water table gradient (.0092 ft/ft)
K = Average Hydraulic conductivity (2.303 ft/day)
n = Assumed porosity factor (.35)

The average rate of groundwater flow beneath the site was calculated using a porosity typical of silt (35%) and is .0605 ft/day or 22.1 ft/year.

2.2 Extent of Contamination

2.2.1 Soil Investigation

During soil boring activities, a geologist logged the drill cuttings and collected split-spoon soil samples. All split-spoon soil samples were scanned with a flame ionization detection (FID). Following completion of the drilling of each soil boring, FID readings were reviewed and the soil sample exhibiting the highest reading, above the water table, was selected for laboratory analysis. FID results are presented in Table 1.

Table 1
FID Readings (ppm)

Depth (ft)	GT-8	GT-9	GT-10	GT-11	GT-12	GT-13	GT-14
0-2	0	–	–	–	–	–	–
2-4	0	–	–	–	–	–	–
4-6	0	1.1	.1	.3	.9	.8	.7
6-8	.4	1.6	0	.5	.2	.6	0
8-10	.3	1.5	.1	.4	160	1.5	.9
10-12	1	.8	0	.1	5.2	1.4	1.4
12-14	.4	1.4	0	.8	90	4.4	1.0
14-16	.4	.6	–	–	7.2	15	1.6
16-18	.5	–	0	.4	–	–	–
18-20	–	4	–	–	26	–	–
19-21	.2	–	–	–	–	19	7.2
20-22	–	–	.1	.9	–	–	–
22-24	–	–	–	–	.1	–	–
24-26	1.2	5.2	0	3.2	.4	11	18
29-31	–	–	–	–	–	34	5
34-36	–	–	–	–	–	13	–
39-41	–	–	–	–	–	0	–
44-46	–	–	–	–	–	0	–
49-51	–	–	–	–	–	0	–

NOTE: – Indicates that sample from this depth not screened.

FID readings indicated that organic vapors above background levels were detected in soil borings GT-12, GT-13 and GT-14.

Soil samples collected from wells GT-8 through GT-14 were analyzed for halogenated volatile organics by EPA method 8010. Two additional soil samples were collected from GT-13, the deepest soil boring. One sample was collected 24 to 26 feet below the ground surface and the other soil sample was collected at the base of the well, or at 49-51 feet below the ground surface. These soil samples were analyzed for TCE only by EPA method 8010. The purpose of the collection of soil at these two intervals was to evaluate the presence of TCE adsorbed to soil at depth.

Halogenated volatile organic compounds were not detected in any of the soil samples analyzed. The soil laboratory analytical reports are presented as Appendix F.

2.2.2 Groundwater Investigation

Groundwater samples were collected from all 14 existing monitoring wells. Groundwater samples were collected from wells MW-1 through MW-7, GT-8 through GT-12 and GT-14 on 12 February 1991. Groundwater was collected from GT-13 on 19 February 1991. All groundwater samples were analyzed for halogenated volatile organics by EPA method 8010. The groundwater laboratory analytical results are presented in Appendix G and are summarized as Table 2.

An isoconcentration map depicting dissolved TCE in the groundwater is presented as Figure 11. The groundwater data suggests the presence of TCE and associated compounds in the vicinity of the plant and extending to the south and southwest. Three areas have been identified which appear to contain higher levels of dissolved TCE concentrations: the area along the northwestern side of the plant; an area to the southwest of the plant in the vicinity of the removed waste treatment system; and the area to the extreme south of the site, where, as above, the removed waste treatment system was located.

Monitoring well GT-13 was constructed to serve as a vertical profile well. This well is screened 45 to 50 feet below ground surface in a moist, gray to black silty clay. During well development activities, 8-11 February 1991, water yield from this well was almost non-existent. Due to the low water yield and the resulting slow recharge, this well was not sampled until 19 February 1991. Analytical results indicate that concentrations of 950 ppb of TCE were detected in groundwater collected from the vertical profile well. This sample, however, may not be indicative of the actual aquifer characteristics within this zone due to

the fact that it was not possible to properly purge the required amount of groundwater from this well prior to sampling.

The groundwater data indicates that neither the horizontal or vertical extent of the dissolved TCE plume has been fully defined.

2.3 Potential Receptors

Potential receptors include surface bodies of water, water supply wells and other man-made features such as subsurface utilities and basements. Leith Creek, a sluggish, swampy stream is located approximately 1000 feet to the southwest of the site. There is also a sanitary lagoon owned by the City of Laurinburg approximately 900 feet southwest of the site.

As previously stated, the Toastmaster facility is provided potable water and sanitary sewer service by the City of Laurinburg. There are no known water supply wells within 2000 feet hydraulically downgradient of the site. Further, there are no known residences within 2000 feet hydraulically downgradient of the site. Additionally, there are no existing underground utilities which may act as conduits within the apparently impacted area of the facility.

Table 2
Summary of Groundwater Analytical Results
Concentrations in parts per billion (ppb)

Analyte	MW-1	MW-2	MW-3	MW-4	MW-5	T-6 (MW-6)	T-7 (MW-7)
Vinyl Chloride	–	–	5.7	–	–	–	–
1,1-Dichloroethene	–	–	1.9	2.5	–	–	–
1,1-Dichloroethane	–	–	–	–	–	–	–
trans-1,2 Dichloroethene	–	–	–	–	–	–	–
Chloroform	–	–	–	–	–	–	–
1,1,1-Trichloroethene	–	–	–	–	–	–	280
Trichloroethene	250	110	2200	6000	6500	2900	12000
Tetrachloroethene	–	–	–	–	–	–	1900
Analyte	**GT-8**	**GT-9**	**GT-10**	**GT-11**	**GT-12**	**GT-13**	**GT-14**
Vinyl Chloride	–	–	–	–	–	–	–
1,1-Dichloroethene	–	0.60	–	–	–	2.9	0.48
1,1-Dichloroethane	–	–	–	–	–	0.66	–
trans-1,2 Dichloroethene	–	–	–	–	–	–	0.25
Chloroform	–	1.1	–	–	–	1.0	1.2
1,1,1-Trichloroethene	–	–	–	–	–	3.2	–
~~Tetrachloroethane~~ 1,1-Trichloroethene	–	870	25	–	93	950	870
Tetrachloroethane	–	1.5	–	–	–	18	2.6

NOTE: – indicates analyte not detected.

APPENDIX A

Previous Analytical Results

APPENDIX B

Well Logs

GROUNDWATER TECHNOLOGY INC.

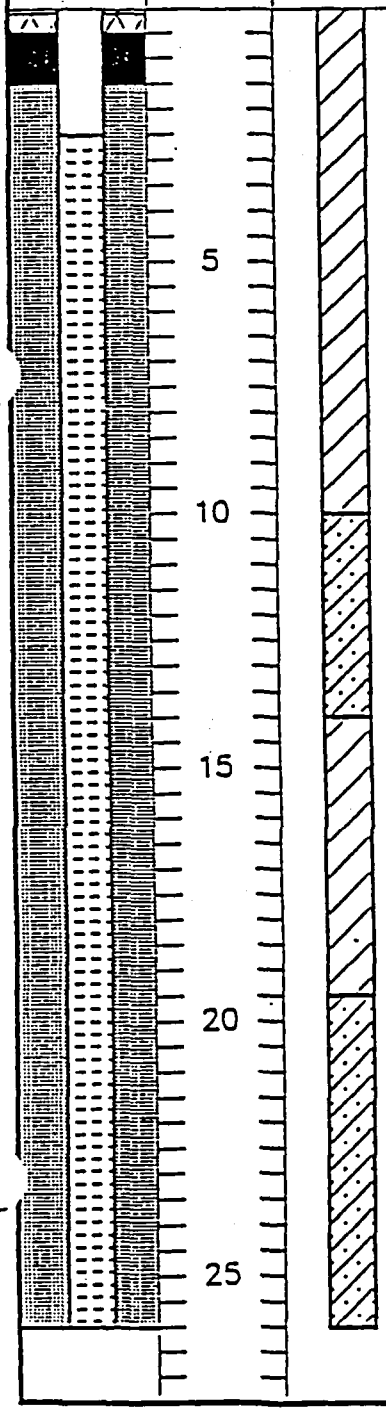
CLIENT: TOASTMASTER INC
PROJECT NAME: TOASTMASTER - LAURINBURG
PROJECT NUMBER: 013210320-01
LOCATION: PLANT ROAD
LAURINBURG, N.C.
DRILLER: FISHBURNE DRILLING, INC

DATE 02/13/91 WELL NUMBER GT8

CASED FROM 0' TO 2.5' WITH SCH 40 PVC
SCREENED FROM 2.5' TO 26' WITH 0.010 SLOT
WELL DEPTH 26' WELL DIAMETER 2"
ELEVATION 117.90'

DRILL RIG CME 75
DRILL METHOD H.S.A.
DATE(S) DRILLED 5 FEBRUARY 1991
LOGGED BY J. LEWIS

ANNULUS COMPLETION 0-.5' GROUT; .5'-1.5' BENTONITE; 1.5'-26' SAND
OTHER WELL SECURED WITH LOCKING CAP & FLUSH MOUNTED MANHOLE



DEPTH	LITHOLOGICAL DESCRIPTION	SAMPLE	COMMENTS BLOW COUNTS	FID(ppm)
				0
	damp to saturated, grey-brown,			
	sandy CLAY	GT		0
		8		
	saturated, beige, medium grained,		7 7 7 9	0
5	sandy CLAY			
	saturated, grey/beige/brown, medium to		5 8 10 12	.4
	coarse, sandy CLAY			
	saturated, beige, medium to fine, sandy CLAY		7 10 13 14	.3
10	saturated, beige/white/brown, clayey		8 9 13 15	1
	SAND with lenses of sandy clay			
			5 4 6 8	.4
15				
	saturated, brown/beige/orange, medium		2 4 4 5	.5
	to fine, sandy CLAY			
			3 4 10 12	.3
20	saturated, beige/rose/yellow, silty,			
	clayey SAND with lenses of sandy clay			
	saturated, orange/beige, silty, clayey,		10 8 14 18	1
25	coarse SAND with finer grained & cleaner			
	sand lenses			

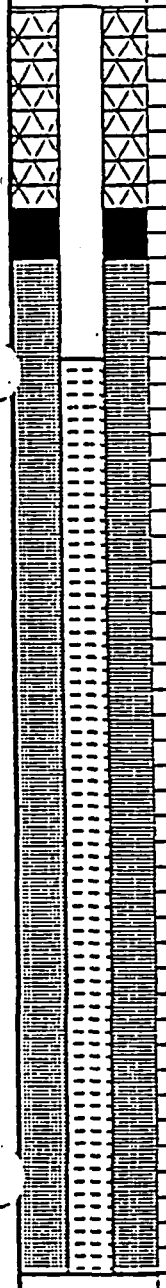
GROUNDWATER TECHNOLOGY INC.

CLIENT: TOASTMASTER, INC
PROJECT NAME: TOASTMASTER - LAURINBURG
PROJECT NUMBER: 013210320-01
LOCATION: PLANT ROAD
LAURINBURG, N.C.
DRILLER: FISHBURNE DRILLING, INC

DATE 02/13/91 WELL NUMBER GT9

CASED FROM 0' TO 7' WITH SCH 40 PVC
SCREENED FROM 7' TO 25' WITH 0.010 SLOT
WELL DEPTH 25' WELL DIAMETER 2"
ELEVATION 120.06'
ANNULUS COMPLETION 0-4' GROUT; 4'-5' BENTONITE; 5'-25' SAND
OTHER WELL SECURED IN LOCKING METAL STAND-UP PIPE

DRILL RIG CME 75
DRILL METHOD H.S.A.
DATE(S) DRILLED 5 FEBRUARY 1991
LOGGED BY J. LEWIS



DEPTH	LITHOLOGICAL DESCRIPTION	SAMPLE	COMMENTS BLOW COUNTS	FID(ppm)
	damp, orange/beige, medium to fine,			
	sandy CLAY with little silt			
			6 6 11 12	1.1
5				
		GT	12 14 17 23	1.6
		9		
			14 13 14 15	1.5
10	damp, beige/orange, silty, medium to		14 14 16 19	.8
	fine, sandy CLAY with clayey sand lense @ 14'			
			14 16 17 20	1.4
			7 6 7 9	.6
15				
			12 12 14 17	4
	saturated, beige, well sorted, silty,			
20	clayey, coarse to medium SAND			
	saturated, orange-beige, silty, clayey,		10 14 11 13	5.2
25	medium to fine SAND			

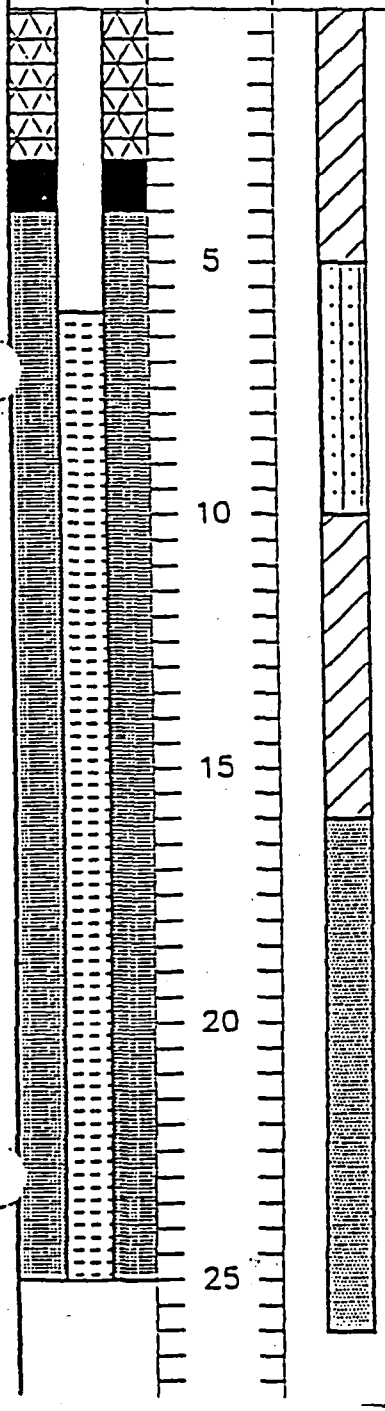
GROUNDWATER TECHNOLOGY INC.

CLIENT: TOASTMASTER, INC
PROJECT NAME: TOASTMASTER - LAURINBURG
PROJECT NUMBER: 013210320-01
LOCATION: PLANT ROAD
LAURINBURG, N.C.
DRILLER: FISHBURNE DRILLING, INC

DATE 02/13/91 WELL NUMBER GT10

CASED FROM 0' TO 6' WITH SCH 40 PVC
SCREENED FROM 6' TO 25' WITH 0.010 SLOT
WELL DEPTH 25' WELL DIAMETER 4"
ELEVATION 113.78'
ANNULUS COMPLETION 0-3' GROUT; 3'-4' BENTONITE; 4'-25' SAND
OTHER WELL SECURED IN LOCKING METAL STAND-UP PIPE

DRILL RIG CME 75
DRILL METHOD H.S.A.
DATE(S) DRILLED 5 FEBRUARY 1991
LOGGED BY J. LEWIS



DEPTH	LITHOLOGICAL DESCRIPTION	SAMPLE	COMMENTS BLOW COUNTS	FID(ppm)
	damp, brown, fine, sandy CLAY			
			6 6 7 8	.1
5	moist, orange/beige/rose, clayey, silty,			
	medium to fine SAND with lenses of silty clay	GT	8 10 12 13	0
		10		
			6 6 6 8	.1
10	damp, grey/rose/orange, silty,		8 8 8 9	0
	fine, sandy CLAY			
			9 8 9 10	0
15				
			9 9 9 11	0
	saturated, brown/beige/orange, medium			
	to fine, sandy CLAY			
20			15 20 12 17	.1
			5 4 7 12	0
25				

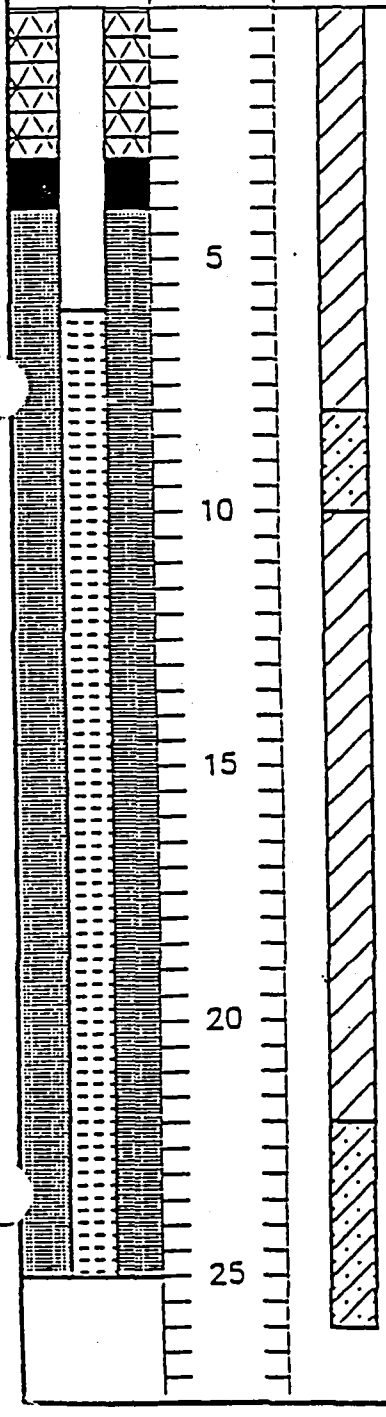
GROUNDWATER TECHNOLOGY INC.

CLIENT: TOASTMASTER, INC
PROJECT NAME: TOASTMASTER - LAURINBURG
PROJECT NUMBER: 013210320-01
LOCATION: PLANT ROAD
LAURINBURG, N.C.
DRILLER: FISHBURNE DRILLING, INC

DATE 02/13/91 WELL NUMBER GT11

CASED FROM 0' TO 6' WITH SCH 40 PVC
SCREENED FROM 6' TO 25' WITH 0.010 SLOT
WELL DEPTH 25' WELL DIAMETER 4"
ELEVATION 120.42'
ANNULUS COMPLETION 0-3' GROUT; 3'-4' BENTONITE; 4'-25' SAND
OTHER WELL SECURED IN LOCKING METAL STAND-UP PIPE

DRILL RIG CME 75
DRILL METHOD H.S.A.
DATE(S) DRILLED 6 FEBRUARY 1991
LOGGED BY J. LEWIS



LITHOLOGICAL DESCRIPTION	SAMPLE	COMMENTS BLOW COUNTS	FID(ppm)
damp, orange to red/beige, silty,			
sandy CLAY			
		10 11 12 12	.3
	GT	8 8 10 24	.5
	11		
moist, red/orange/beige, clayey SAND		8 10 12 12	.4
moist to damp, beige-grey/rose, sandy		6 7 7 9	.1
CLAY with little silt; small lenses present			
with slightly different compositions		10 10 13 15	.8
saturated @ 13'		6 7 7 10	.4
		8 10 11 21	.9
saturated, yellow-rose, silty, clayey,		6 7 9 11	3.2
coarse to medium SAND			

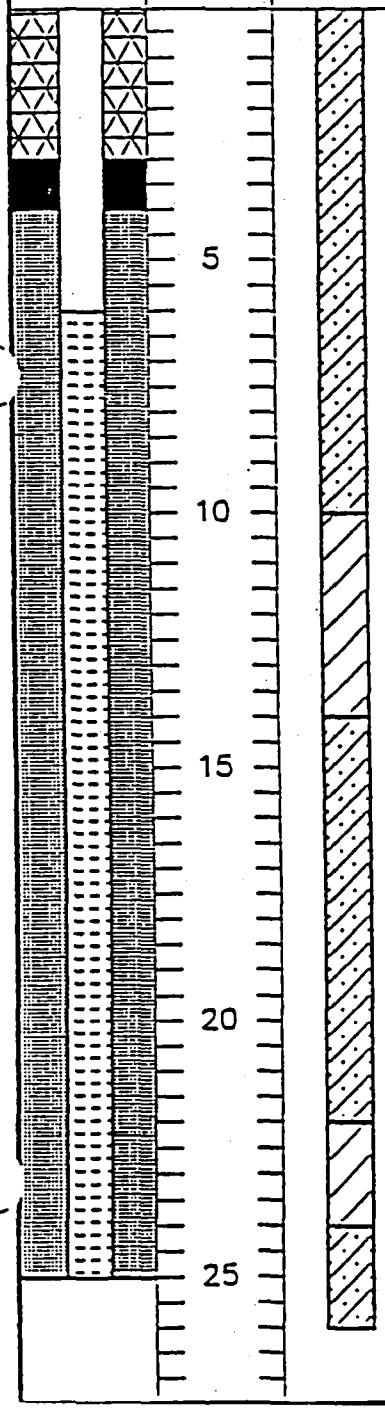
GROUNDWATER TECHNOLOGY INC.

CLIENT: TOASTMASTER, INC
PROJECT NAME: TOASTMASTER - LAURINBURG
PROJECT NUMBER: 013210320-01
LOCATION: PLANT ROAD
LAURINBURG, N.C.
DRILLER: FISHBURNE DRILLING, INC

DATE 02/13/91 WELL NUMBER GT12

CASED FROM 0' TO 6' WITH SCH 40 PVC
SCREENED FROM 6' TO 25' WITH 0.010 SLOT
WELL DEPTH 25' WELL DIAMETER 4"
ELEVATION 112.25'
ANNULUS COMPLETION 0-3' GROUT; 3'-4' BENTONITE; 4'-25' SAND
OTHER WELL SECURED IN LOCKING METAL STAND-UP PIPE

DRILL RIG CME 75
DRILL METHOD H.S.A.
DATE(S) DRILLED 6 FEBRUARY 1991
LOGGED BY J. LEWIS



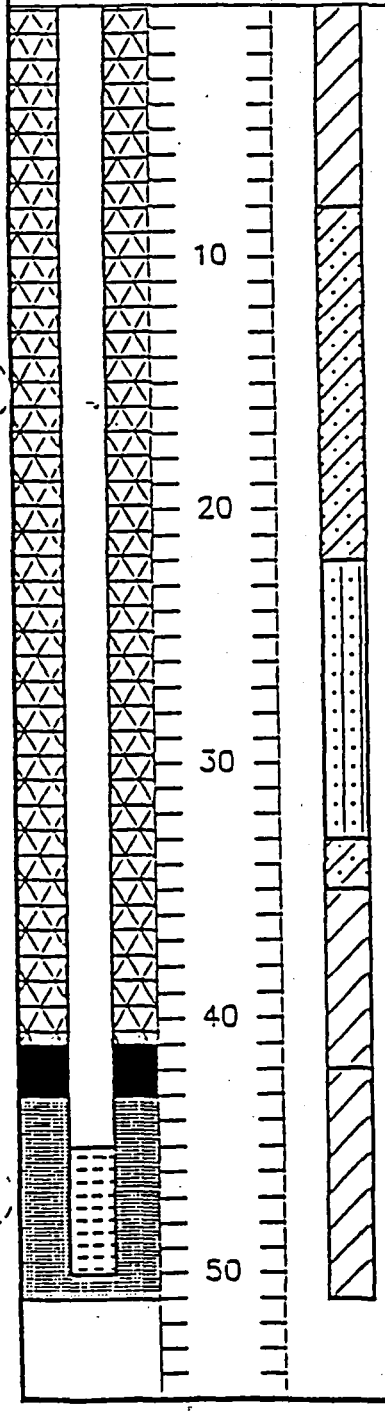
DEPTH	LITHOLOGICAL DESCRIPTION	SAMPLE	COMMENTS BLOW COUNTS	FID(ppm)
	damp, brown-grey, silty, clayey			
	SAND with lense of cleaner sand @ 9'			
		GT	10 13 14 13	.9
5		12		
			9 9 9 9	.2
			20 13 5 5	160
				16
10	moist to damp, brown/orange/purple,		4 7 6 7	5.2
	silty, sandy CLAY			
			6 7 7 10	90
	saturated, grey-beige, silty, clayey,		12 7 4 13	7.2
15	medium to fine SAND with few silty			
	clay lenses			
			2 5 14 17	26
20				
	saturated, grey-beige, silty, sandy CLAY		7 5 8 13	.1
	saturated, grey-beige, silty, clayey SAND		5 7 7 11	.4
25				

GROUNDWATER TECHNOLOGY INC.

CLIENT: TOASTMASTER INC
PROJECT NAME: TOASTMASTER - LAURINBURG
PROJECT NUMBER: 013210320-01
LOCATION: PLANT ROAD
LAURINBURG, N.C.
DRILLER: FISHBURNE DRILLING, INC

DATE 02/13/91 WELL NUMBER GT13

CASED FROM 0' TO 45' WITH SCH 40 PVC
SCREENED FROM 45' TO 50' WITH 0.010 SLOT
WELL DEPTH 50' WELL DIAMETER 2"
ELEVATION 123.38'
DRILL RIG CME 75
DRILL METHOD H.S.A.
DATE(S) DRILLED 7 FEBRUARY 1991
LOGGED BY J. LEWIS
ANNULUS COMPLETION 0-41' GROUT; 41'-43' BENTONITE; 43'-50' SAND
OTHER WELL SECURED IN LOCKING METAL STAND-UP PIPE



WELL DETAIL	DEPTH	GRAPHIC COLUMN	LITHOLOGICAL DESCRIPTION	SAMPLE	COMMENTS BLOW COUNTS	FID(ppm)
			damp to moist, orange, silty, sandy			
			CLAY; some organics present to 6'	GT13a	4 5 6 7	.8
					7 7 11 13	.6
					7 13 14 13	1.5
	10		saturated @ 12', orange/rose/beige, silty,		7 12 14 20	1.4
			clayey, medium to fine SAND		20 14 24 16	4.4
			saturated, yellow/beige/rose, silty, clayey,		15 20 18 26	15
			coarse to medium SAND			
			saturated, beige/grey/orange/rose, silty,		12 15 23 20	19
	20		clayey, medium to fine SAND			
			saturated, stained bright orange-yellow,	GT13b	10 12 14 13	11
			silty, fine SAND			
	30				13 15 20 19	34
			saturated, rose/yellow/beige, silty, clayey, coarse to medium SAND		10 7 11 19	5.6
						13
	40		moist, yellow/beige to brown, silty, sandy CLAY		7 11 18 24	0
			moist, grey to black, silty CLAY		12 14 13 21	0
	50			GT13c	7 7 13 11	0

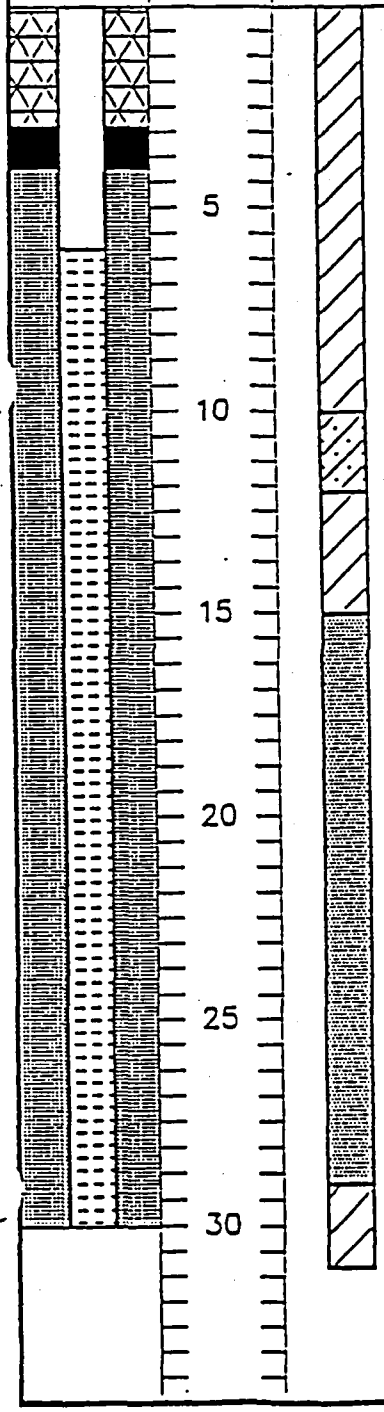
GROUNDWATER TECHNOLOGY INC.

CLIENT: TOASTMASTER, INC
PROJECT NAME: TOASTMASTER - LAURINBURG
PROJECT NUMBER: 013210320-01
LOCATION: PLANT ROAD
LAURINBURG, N.C.
DRILLER: FISHBURNE DRILLING, INC

DATE 02/13/91 WELL NUMBER GT14

CASED FROM 0' TO 6' WITH SCH 40 PVC
SCREENED FROM 6' TO 30' WITH 0.010 SLOT
WELL DEPTH 30' WELL DIAMETER 4"
ELEVATION 122.16'
ANNULUS COMPLETION 0-3' GROUT; 3'-4' BENTONITE; 4'-30' SAND
OTHER: WELL SECURED IN LOCKING METAL STAND-UP PIPE

DRILL RIG CME 75
DRILL METHOD H.S.A.
DATE(S) DRILLED 7 FEBRUARY 1991
LOGGED BY J. LEWIS



DEPTH	LITHOLOGICAL DESCRIPTION	SAMPLE	COMMENTS BLOW COUNTS	FID(ppm)
	damp, orange/beige, silty, sandy CLAY			
		GT	10 11 13 12	.7
5		14		
			14 12 11 14	0
			8 10 12 14	.9
10	damp, orange/red, silty, clayey SAND			
			7 8 7 9	1.4
	damp, beige/brown/orange,		6 9 11 14	1
	silty, sandy CLAY			
15			14 13 15 16	1.6
	moist, grey/beige/brown, silty, clayey,			
	fine to medium SAND			
			6 7 6 9	7.2
20				
25	saturated, beige-grey SAND with		7 6 7 10	18
	trace silt & clay			
	moist, beige-rose, sandy,			
30	silty CLAY		7 10 12 6	5

APPENDIX C

Site Survey

APPENDIX D

Liquid Level Data

APPENDIX E

Rising-Head Permeability Test Results

APPENDIX F

Soil Analytical Results

APPENDIX G

Groundwater Analytical Results

GTEL
ENVIRONMENTAL
LABORATORIES, INC.
Northeast Region
Meadowbrook Industrial Park
Milford, NH 03055
(603) 672-4835
(603) 673-8105 (FAX)

Client Number: 013210320
Project ID: Toastmaster Laurinburg
Work Order Number: N1-02-426

February 28, 1991

Roger Nordlinger
Groundwater Technology, Inc.
1244-B Executive Blvd
Chesapeake, VA 23320

Dear Mr. Nordlinger:

Enclosed please find the analytical results for the samples received by GTEL Environmental Laboratories, Inc. on 02/14/91 under chains-of-custody records 31414 and 31415.

A formal Quality Assurance / Quality Control (QA/QC) program is maintained by GTEL, which is designed to meet or exceed the EPA requirements. Analytical work for this project met QA/QC criteria unless otherwise stated in the footnotes.

GTEL is certified (approved) by the State of Virginia under certificate number 00155.

If you have any questions regarding this analysis, or if we can be of further assistance, please call our Customer Service Representative.

Sincerely,
GTEL Environmental Laboratories, Inc.

Mark M. Emmons
Volatile Organics Manager

cc: Julia Lewis
Groundwater Technology, Inc.
1000 Perimeter Park
Morrisville, NC 27560

GTEL Milford, NH
N102426.DOC:1

Client Number: 013210320
Project ID: Toastmaster, Inc.
Work Order Number: N1-02-543

ANALYTICAL RESULTS

Halogenated Volatile Organics in Water
EPA Method 8010[a]

GTEL Sample Number		02543-01	–	–	–
Client Identification		GT-13	–	–	–
Date Sampled		2/19/91	–	–	–
Date Analyzed		2/27/91	–	–	–
Analyte	Detection Limit, ug/L	Concentration, ug/L			
Chloromethane	0.52	< 0.52	–	–	–
Vinyl Chloride	1.2	< 1.2	–	–	–
Chloroethane	0.13	< 0.13	–	–	–
Bromomethane	0.09	< 0.09	–	–	–
Methylene Chloride	0.49	< 0.49	–	–	–
1,1-Dichloroethene	0.45	2.9	–	–	–
1,1-Dichloroethane	0.20	0.66	–	–	–
trans-1,2-Dichloroethene	0.21	< 0.21	–	–	–
Chloroform	0.63	1.0	–	–	–
1,2-Dichloroethane	0.29	< 0.29	–	–	–
1,1,1-Trichloroethane	0.34	3.2	–	–	–
Carbon Tetrachloride	0.31	< 0.31	–	–	–
Bromodichloromethane	0.57	< 0.57	–	–	–
1,2-Dichloropropane	0.21	< 0.21	–	–	–
cis-1,3-Dichloropropene	0.21	< 0.21	–	–	–
Trichloroethene	0.56	950[c]	–	–	–
Dichlorodifluoromethane	0.12	< 0.12	–	–	–
Dibromochloromethane	0.34	< 0.34	–	–	–
1,1,2-Trichloroethane	0.34	< 0.34	–	–	–
trans-1,3-Dichloropropene	0.34	< 0.34	–	–	–
2-Chloroethylvinyl Ether	0.13	< 0.13	–	–	–
Detection Limit Multiplier[b]		1	–	–	–

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 013210320
Project ID: Toastmaster, Inc.
Work Order Number: N1-02-543

ANALYTICAL RESULTS

Halogenated Volatile Organics in Water
EPA Method 8010[a]

GTEL Sample Number		02543-01	–	–	–
Client Identification		GT-13	–	–	–
Date Sampled		2/19/91	–	–	–
Date Analyzed		2/27/91	–	–	–
Analyte	Detection Limit, ug/L	Concentration, ug/L			
Bromoform	0.20	< 0.20	–	–	–
Tetrachloroethene	0.24	18	–	–	–
1,1,2,2-Tetrachloroethane	0.24	< 0.24	–	–	–
Chlorobenzene	0.27	< 0.27	–	–	–
1,2-Dichlorobenzene	0.41	< 0.41	–	–	–
1,3-Dichlorobenzene	0.41	< 0.41	–	–	–
1,4-Dichlorobenzene	0.24	< 0.24	–	–	–
Trichlorofluoromethane	0.35	< 0.35	–	–	–
Detection Limit Multiplier[b]		1	–	–	–

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; Extraction by EPA Method 5030 (purge and trap).
b The detection limit multiplier indicates the adjustments made to the data and detection limits for sample dilutions.
c Concentration obtained from a sample analyzed diluted by a factor of fifty.

GTEL ENVIRONMENTAL LABORATORIES, INC.

GTEL
ENVIRONMENTAL
LABORATORIES, INC.

Northeast Region
Meadowbrook Industrial Park
Milford, NH 03055
(603) 672-4835
(603) 673-8105 (FAX)

Client Number: 013210320
Project ID: Toastmaster, Inc.
Work Order Number: N1-02-543

March 4, 1991

Roger Nordlinger
Groundwater Technology, Inc.
1244-B Executive Blvd.
Chesapeake, VA 23320

Dear Mr. Nordlinger:

Enclosed please find the analytical results for the samples received by GTEL Environmental Laboratories, Inc. on 2/20/91 under chain-of-custody record 36948.

A formal Quality Assurance / Quality Control (QA/QC) program is maintained by GTEL, which is designed to meet or exceed the EPA requirements. Analytical work for this project met QA/QC criteria unless otherwise stated in the footnotes.

If you have any questions regarding this analysis, or if we can be of further assistance, please call our Customer Service Representative.

Sincerely,
GTEL Environmental Laboratories, Inc.

Mark M. Emmons
Volatile Organics Manager

Client Number: 013210320
Project ID: Toastmaster Laurinburg
Work Order Number: N1-02-426

ANALYTICAL RESULTS

Halogenated Volatile Organics in Water
EPA Method 8010[a]

GTEL Sample Number		02426-01	02426-02	02426-03	02426-04
Client Identification		MW1	MW2	MW3	MW4
Date Sampled		02/12/91	02/12/91	02/12/91	02/12/91
Date Analyzed		02/19/91	02/19/91	02/19/91	02/21/91
Analyte	Detection Limit, ug/L	Concentration, ug/L			
Chloromethane	0.52	< 0.52	< 0.52	< 0.52	< 100
Vinyl Chloride	1.2	< 1.2	< 1.2	5.7[c]	< 240
Chloroethane	0.13	< 0.13	< 0.13	< 0.13	< 26
Bromomethane	0.09	< 0.09	< 0.09	< 0.09	< 18
Methylene Chloride	0.49	< 0.49	< 0.49	< 0.49	< 98
1,1-Dichloroethene	0.45	< 0.45	< 0.45	1.9	2.5[h]
1,1-Dichloroethane	0.20	< 0.20	< 0.20	< 0.20	< 40
trans-1,2-Dichloroethene	0.21	< 0.21	< 0.21	< 0.21	< 42
Chloroform	0.63	< 0.63	< 0.63	< 0.63	< 130
1,2-Dichloroethane	0.29	< 0.29	< 0.29	< 0.29	< 58
1,1,1-Trichloroethane	0.34	< 0.34	< 0.34	< 0.34	< 68
Carbon Tetrachloride	0.31	< 0.31	< 0.31	< 0.31	< 62
Bromodichloromethane	0.57	< 0.57	< 0.57	< 0.57	< 110
1,2-Dichloropropane	0.21	< 0.21	< 0.21	< 0.21	< 42
cis-1,3-Dichloropropene	0.21	< 0.21	< 0.21	< 0.21	< 42
Trichloroethene	0.56	250[e]	110[e]	2200[e]	6000
Dichlorodifluoromethane	0.12	< 0.12	< 0.12	–[c]	< 24
Dibromochloromethane	0.34	< 0.34	< 0.34	< 0.34	< 68
1,1,2-Trichloroethane	0.34	< 0.34	< 0.34	< 0.34	< 68
trans-1,3-Dichloropropene	0.34	< 0.34	< 0.34	< 0.34	< 68
2-Chloroethylvinyl Ether	0.13	< 0.13	< 0.13	< 0.13	< 26
Detection Limit Multiplier[b]		1	1	1	200

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 013210320
Project ID: Toastmaster Laurinburg
Work Order Number: N1-02-426

ANALYTICAL RESULTS

Halogenated Volatile Organics in Water
EPA Method 8010[a]

GTEL Sample Number		02426-01	02426-02	02426-03	02426-04
Client Identification		MW1	MW2	MW3	MW4
Date Sampled		02/12/91	02/12/91	02/12/91	02/12/91
Date Analyzed		02/19/91	02/19/91	02/19/91	02/21/91
Analyte	Detection Limit, ug/L	Concentration, ug/L			
Bromoform	0.20	< 0.20	< 0.20	< 0.20	< 40
Tetrachloroethene	0.24	< 0.24	< 0.24	< 0.24	< 48
1,1,2,2-Tetrachloroethane	0.24	< 0.24	< 0.24	< 0.24	< 48
Chlorobenzene	0.27	< 0.27	< 0.27	< 0.27	< 54
1,2-Dichlorobenzene	0.41	< 0.41	< 0.41	< 0.41	< 82
1,3-Dichlorobenzene	0.41	< 0.41	< 0.41	< 0.41	< 82
1,4-Dichlorobenzene	0.24	< 0.24	< 0.24	< 0.24	< 48
Trichlorofluoromethane	0.35	< 0.35	< 0.35	< 0.35	< 70
Detection Limit Multiplier[b]		1	1	1	200

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 013210320
Project ID: Toastmaster Laurinburg
Work Order Number: N1-02-426

ANALYTICAL RESULTS

Halogenated Volatile Organics in Water
EPA Method 8010[a]

GTEL Sample Number		02426-05	02426-06	02426-07	02426-08
Client Identification		MW5	T6	T7	GT8
Date Sampled		02/12/91	02/12/91	02/12/91	02/12/91
Date Analyzed		02/21/91	02/21/91	02/20/91	02/19/91
Analyte	Detection Limit, ug/L	Concentration, ug/L			
Chloromethane	0.52	< 26	< 100	< 100	< 0.52
Vinyl Chloride	1.2	< 60	< 240	< 240	< 1.2
Chloroethane	0.13	< 6.5	< 26	< 26	< 0.13
Bromomethane	0.09	< 4.5	< 18	< 18	< 0.09
Methylene Chloride	0.49	< 24	< 98	< 98	< 0.49
1,1-Dichloroethene	0.45	< 22	< 90	< 90	< 0.45
1,1-Dichloroethane	0.20	< 10	< 40	< 40	< 0.20
trans-1,2-Dichloroethene	0.21	< 10	< 42	< 42	< 0.21
Chloroform	0.63	< 32	< 130	< 130	< 0.63
1,2-Dichloroethane	0.29	< 14	< 58	< 58	< 0.29
1,1,1-Trichloroethane	0.34	< 17	< 68	280	< 0.34
Carbon Tetrachloride	0.31	< 16	< 62	< 62	< 0.31
Bromodichloromethane	0.57	< 28	< 110	< 110	< 0.57
1,2-Dichloropropane	0.21	< 10	< 42	< 42	< 0.21
cis-1,3-Dichloropropene	0.21	< 10	< 42	< 42	< 0.21
Trichloroethene	0.56	6900[f]	2900	12000	< 0.56
Dichlorodifluoromethane	0.12	< 6.0	< 24	< 24	< 0.12
Dibromochloromethane	0.34	< 17	< 68	< 68	< 0.34
1,1,2-Trichloroethane	0.34	< 17	< 68	< 68	< 0.34
trans-1,3-Dichloropropene	0.34	< 17	< 68	< 68	< 0.34
2-Chloroethylvinyl Ether	0.13	< 6.5	< 26	< 26	< 0.13
Detection Limit Multiplier[b]		50	200	200	1

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 013210320
Project ID: Toastmaster Laurinburg
Work Order Number: N1-02-426

ANALYTICAL RESULTS

Halogenated Volatile Organics in Water
EPA Method 8010[a]

GTEL Sample Number		02426-05	02426-06	02426-07	02426-08
Client Identification		MW5	T6	T7	GT8
Date Sampled		02/12/91	02/12/91	02/12/91	02/12/91
Date Analyzed		02/21/91	02/21/91	02/20/91	02/19/91
Analyte	Detection Limit, ug/L	Concentration, ug/L			
Bromoform	0.20	< 10	< 40	< 40	< 0.20
Tetrachloroethene	0.24	< 12	< 48	1900[d]	< 0.24
1,1,2,2-Tetrachloroethane	0.24	< 12	< 48	–[d]	< 0.24
Chlorobenzene	0.27	< 14	< 54	< 54	< 0.27
1,2-Dichlorobenzene	0.41	< 20	< 82	< 82	< 0.41
1,3-Dichlorobenzene	0.41	< 20	< 82	< 82	< 0.41
1,4-Dichlorobenzene	0.24	< 12	< 48	< 48	< 0.24
Trichlorofluoromethane	0.35	< 18	< 70	< 70	< 0.35
Detection Limit Multiplier[b]		50	200	200	1

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 013210320
Project ID: Toastmaster Laurinburg
Work Order Number: N1-02-426

ANALYTICAL RESULTS

Halogenated Volatile Organics in Water
EPA Method 8010[a]

GTEL Sample Number		02426-09	02426-10	02426-11	02426-12
Client Identification		GT9	GT10	GT11	GT12
Date Sampled		02/12/91	02/12/91	02/12/91	02/12/91
Date Analyzed		02/19/91	02/21/91	02/21/91	02/21/91
Analyte	Detection Limit, ug/L	Concentration, ug/L			
Chloromethane	0.52	< 0.52	< 0.52	< 0.52	< 0.52
Vinyl Chloride	1.2	< 1.2	< 1.2	< 1.2	< 1.2
Chloroethane	0.13	< 0.13	< 0.13	< 0.13	< 0.13
Bromomethane	0.09	< 0.09	< 0.09	< 0.09	< 0.09
Methylene Chloride	0.49	< 0.49	< 0.49	< 0.49	< 0.49
1,1-Dichloroethene	0.45	0.60	< 0.45	< 0.45	< 0.45
1,1-Dichloroethane	0.20	< 0.20	< 0.20	< 0.20	< 0.20
trans-1,2-Dichloroethene	0.21	< 0.21	< 0.21	< 0.21	< 0.21
Chloroform	0.63	1.1	< 0.63	< 0.63	< 0.63
1,2-Dichloroethane	0.29	< 0.29	< 0.29	< 0.29	< 0.29
1,1,1-Trichloroethane	0.34	< 0.34	< 0.34	< 0.34	< 0.34
Carbon Tetrachloride	0.31	< 0.31	< 0.31	< 0.31	< 0.31
Bromodichloromethane	0.57	< 0.57	< 0.57	< 0.57	< 0.57
1,2-Dichloropropane	0.21	< 0.21	< 0.21	< 0.21	< 0.21
cis-1,3-Dichloropropene	0.21	< 0.21	< 0.21	< 0.21	< 0.21
Trichloroethene	0.56	870[e]	25[g]	< 0.56	93[g]
Dichlorodifluoromethane	0.12	< 0.12	< 0.12	< 0.12	< 0.12
Dibromochloromethane	0.34	< 0.34	< 0.34	< 0.34	< 0.34
1,1,2-Trichloroethane	0.34	< 0.34	< 0.34	< 0.34	< 0.34
trans-1,3-Dichloropropene	0.34	< 0.34	< 0.34	< 0.34	< 0.34
2-Chloroethylvinyl Ether	0.13	< 0.13	< 0.13	< 0.13	< 0.13
Detection Limit Multiplier[b]		1	1	1	1

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 013210320
Project ID: Toastmaster Laurinburg
Work Order Number: N1-02-426

ANALYTICAL RESULTS

Halogenated Volatile Organics in Water
EPA Method 8010[a]

GTEL Sample Number		02426-09	02426-10	02426-11	02426-12
Client Identification		GT9	GT10	GT11	GT12
Date Sampled		02/12/91	02/12/91	02/12/91	02/12/91
Date Analyzed		02/19/91	02/21/91	02/21/91	02/21/91
Analyte	Detection Limit, ug/L	Concentration, ug/L			
Bromoform	0.20	< 0.20	< 0.20	< 0.20	< 0.20
Tetrachloroethene	0.24	1.5	< 0.24	< 0.24	< 0.24
1,1,2,2-Tetrachloroethane	0.24	< 0.24	< 0.24	< 0.24	< 0.24
Chlorobenzene	0.27	< 0.27	< 0.27	< 0.27	< 0.27
1,2-Dichlorobenzene	0.41	< 0.41	< 0.41	< 0.41	< 0.41
1,3-Dichlorobenzene	0.41	< 0.41	< 0.41	< 0.41	< 0.41
1,4-Dichlorobenzene	0.24	< 0.24	< 0.24	< 0.24	< 0.24
Trichlorofluoromethane	0.35	< 0.35	< 0.35	< 0.35	< 0.35
Detection Limit Multiplier[b]		1	1	1	1

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 013210320
Project ID: Toastmaster Laurinburg
Work Order Number: N1-02-426

ANALYTICAL RESULTS

Halogenated Volatile Organics in Water
EPA Method 8010[a]

GTEL Sample Number		02426-13	–	–	–
Client Identification		GT14	–	–	–
Date Sampled		02/12/91	–	–	–
Date Analyzed		02/19/91	–	–	–
Analyte	Detection Limit, ug/L	Concentration, ug/L			
Chloromethane	0.52	< 0.52	–	–	–
Vinyl Chloride	1.2	< 1.2	–	–	–
Chloroethane	0.13	< 0.13	–	–	–
Bromomethane	0.09	< 0.09	–	–	–
Methylene Chloride	0.49	< 0.49	–	–	–
1,1-Dichloroethene	0.45	0.48	–	–	–
1,1-Dichloroethane	0.20	< 0.20	–	–	–
trans-1,2-Dichloroethene	0.21	0.25	–	–	–
Chloroform	0.63	1.2	–	–	–
1,2-Dichloroethane	0.29	< 0.29	–	–	–
1,1,1-Trichloroethane	0.34	< 0.34	–	–	–
Carbon Tetrachloride	0.31	< 0.31	–	–	–
Bromodichloromethane	0.57	< 0.57	–	–	–
1,2-Dichloropropane	0.21	< 0.21	–	–	–
cis-1,3-Dichloropropene	0.21	< 0.21	–	–	–
Trichloroethene	0.56	870[e]	–	–	–
Dichlorodifluoromethane	0.12	< 0.12	–	–	–
Dibromochloromethane	0.34	< 0.34	–	–	–
1,1,2-Trichloroethane	0.34	< 0.34	–	–	–
trans-1,3-Dichloropropene	0.34	< 0.34	–	–	–
2-Chloroethylvinyl Ether	0.13	< 0.13	–	–	–
Detection Limit Multiplier[b]		1	–	–	–

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 013210320
Project ID: Toastmaster Laurinburg
Work Order Number: N1-02-426

ANALYTICAL RESULTS

Halogenated Volatile Organics in Water
EPA Method 8010[a]

GTEL Sample Number		02426-13	–	–	–
Client Identification		GT14	–	–	–
Date Sampled		02/12/91	–	–	–
Date Analyzed		02/19/91	–	–	–
Analyte	Detection Limit, ug/L	Concentration, ug/L			
Bromoform	0.20	< 0.20	–	–	–
Tetrachloroethene	0.24	2.6	–	–	–
1,1,2,2-Tetrachloroethane	0.24	< 0.24	–	–	–
Chlorobenzene	0.27	< 0.27	–	–	–
1,2-Dichlorobenzene	0.41	< 0.41	–	–	–
1,3-Dichlorobenzene	0.41	< 0.41	–	–	–
1,4-Dichlorobenzene	0.24	< 0.24	–	–	–
Trichlorofluoromethane	0.35	< 0.35	–	–	–
Detection Limit Multiplier[b]		1	–	–	–

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 013210320
Project ID: Toastmaster Laurinburg
Work Order Number: N1-02-426

ANALYTICAL RESULTS

Halogenated Volatile Organics in Water
EPA Method 8010[a]

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; Extraction by EPA Method 5030 (purge and trap).
b The detection limit multiplier indicates the adjustments made to the data and detection limits for sample dilutions.
c Vinyl chloride and Dichlorodifluoromethane coelute, therefore results may pertain to either one or both compounds.
d Tetrachloroethene and 1,1,2,2,-Tetrachloroethane coelute, therefore results may pertain to either one or both compounds.
e Results taken from sample analyzed diluted by a factor of 50.
f Results taken from sample analyzed diluted by a factor of 200.
g Results taken from sample analyzed diluted by a factor of 10.
h Results taken from sample analyzed undiluted.

FAX 5/16

GTE ENVIRONMEN LABORATORIES, ...

Northeast Region
Meadowbrook Industrial Park
Milford, NH 03055
(603) 672-4835
(603) 673-8105 (FAX)

Client Number: 013210320
Project ID: Toastmaster, Inc.
ork Order Number: N1-04-584

May 16, 1991

Roger Nordlinger
Groundwater Technology, Inc.
1244-B Executive Blvd
Chesapeake, VA 23320

Dear Mr. Nordlinger:

Enclosed please find the analytical results for the samples received by GTEL Environmental Laboratories, Inc. on 04/22/91 under chain-of-custody record 30661.

A formal Quality Assurance / Quality Control (QA/QC) program is maintained by GTEL, which is designed to meet or exceed the EPA requirements. Analytical work for this project met QA/QC criteria unless otherwise stated in the footnotes.

If you have any questions regarding this analysis, or if we can be of further assistance, please call our Customer Service Representative.

Sincerely,
GTEL Environmental Laboratories, Inc.

Ellen Abrams for
Mark M. Emmons
Volatile Organics Manager

5-16-91
Post-It™ brand fax transmittal memo 7671 | # of pages ▸ 3

To Roger Nordlinger	From Connie Hill
Co.	Co.
Dept. 013210320	Phone #
Fax # N1-04-584	Fax #

GTEL Milford, NH
N104584.DOC:1

Client Number: 013210320
Project ID: Toastmaster, Inc.
Work Order Number: N1-04-584

ANALYTICAL RESULTS

Halogenated Volatile Organics in Water
EPA Method 8010[a]

GTEL Sample Number		04584-01	04584-02	04584-03	04584-04
Client Identification		GT-13	GT-9	GT-306	GT-310
Date Sampled		04/18/91	04/18/91	04/18/91	04/18/91
Date Analyzed		05/19/91[e,f]	04/25/91[c]	04/25/91[c,d]	04/25/91
Analyte	Detection Limit, ug/L	Concentration, ug/L			
Chloromethane	0.52	< 0.52	< 0.52	< 0.52	< 0.52
Vinyl Chloride	1.2	< 1.2	< 1.2	< 1.2	< 1.2
Chloroethane	0.13	< 0.13	< 0.13	< 0.13	< 0.13
Bromomethane	0.09	< 0.09	< 0.09	< 0.09	< 0.09
Methylene Chloride	0.49	< 0.49[f]	< 0.49	< 0.49	< 0.49
1,1-Dichloroethene	0.45	0.54	1.8	1.3	< 0.45
1,1-Dichloroethane	0.20	< 0.20[f]	0.57	< 0.20	< 0.20
trans-1,2-Dichloroethene	0.21	< 0.21	< 0.21	< 0.21	< 0.21
Chloroform	0.63	< 0.63	< 0.63	2.7	< 0.63
1,2-Dichloroethane	0.29	< 0.29	< 0.29	< 0.29	< 0.29
1,1,1-Trichloroethane	0.34	0.95[f]	1.1	2.2	< 0.34
Carbon Tetrachloride	0.31	< 0.31	< 0.31	< 0.31	< 0.31
Bromodichloromethane	0.57	< 0.57	< 0.57	< 0.57	< 0.57
1,2-Dichloropropane	0.21	< 0.21[f]	< 0.21	< 0.21	< 0.21
cis-1,3-Dichloropropene	0.21	< 0.21[f]	< 0.21	< 0.21	< 0.21
Trichloroethene	0.58	300[e]	1000[c]	11[c]	0.88
Dichlorodifluoromethane	0.12	< 0.12	< 0.12	< 0.12	< 0.12
Dibromochloromethane	0.34	< 0.34	< 0.34	< 0.34	< 0.34
1,1,2-Trichloroethane	0.34	< 0.34	< 0.34	< 0.34[d]	< 0.34
trans-1,3-Dichloropropene	0.34	< 0.34	< 0.34	< 0.34	< 0.34
2-Chloroethylvinyl Ether	0.13	< 0.13	< 0.13	< 0.13	< 0.13
Detection Limit Multiplier[b]		1[e,f]	1[c]	1[c,d]	1

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 013210320
Project ID: Toastmaster, Inc.
Work Order Number: N1-04-584

ANALYTICAL RESULTS

Halogenated Volatile Organics in Water
EPA Method 8010[a]

GTEL Sample Number		04584-01	04548-02	04584-03	04584-04
Client Identification		GT-13	GT-9	GT-308	GT-310
Date Sampled		04/18/91	04/18/91	04/18/91	04/18/91
Date Analyzed		05/19/91[e,f]	04/25/91[c]	04/25/91[c,d]	04/25/91
Analyte	Detection Limit, ug/L	Concentration, ug/L			
Bromoform	0.20	< 0.20	< 0.20	< 0.20	< 0.20
Tetrachloroethene	0.24	12	13	4.4	0.26
1,1,2,2-Tetrachloroethane	0.24	< 0.24	< 0.24	< 0.24	< 0.24
Chlorobenzene	0.27	< 0.27	< 0.27	< 0.27	< 0.27
1,2-Dichlorobenzene	0.41	< 0.41	< 0.41	< 0.41	< 0.41
1,3-Dichlorobenzene	0.41	< 0.41	< 0.41	< 0.41	< 0.41
1,4-Dichlorobenzene	0.24	< 0.24	< 0.24	< 0.24	< 0.24
Trichlorofluoromethane	0.35	< 0.35	< 0.35	< 0.35	< 0.35
Detection Limit Multiplier[b]		1[e,f]	1[c]	1[c,d]	1

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; Extraction by EPA Method 5030 (purge and trap).
b The detection limit multiplier indicates the adjustments made to the data and detection limits for sample dilutions.
c Detection Limit Multiplier for analyte noted = 10, Date Analyzed = 04/30/91.
d Detection Limit Multiplier for analyte noted = 1, Date Analyzed = 04/30/91.
e Detection Limit Multiplier for analyte noted = 10, Date Analyzed = 05/02/91.
f Date Analyzed for analyte noted = 05/02/91.

GTEL ENVIRONMENTAL LABORATORIES, INC.

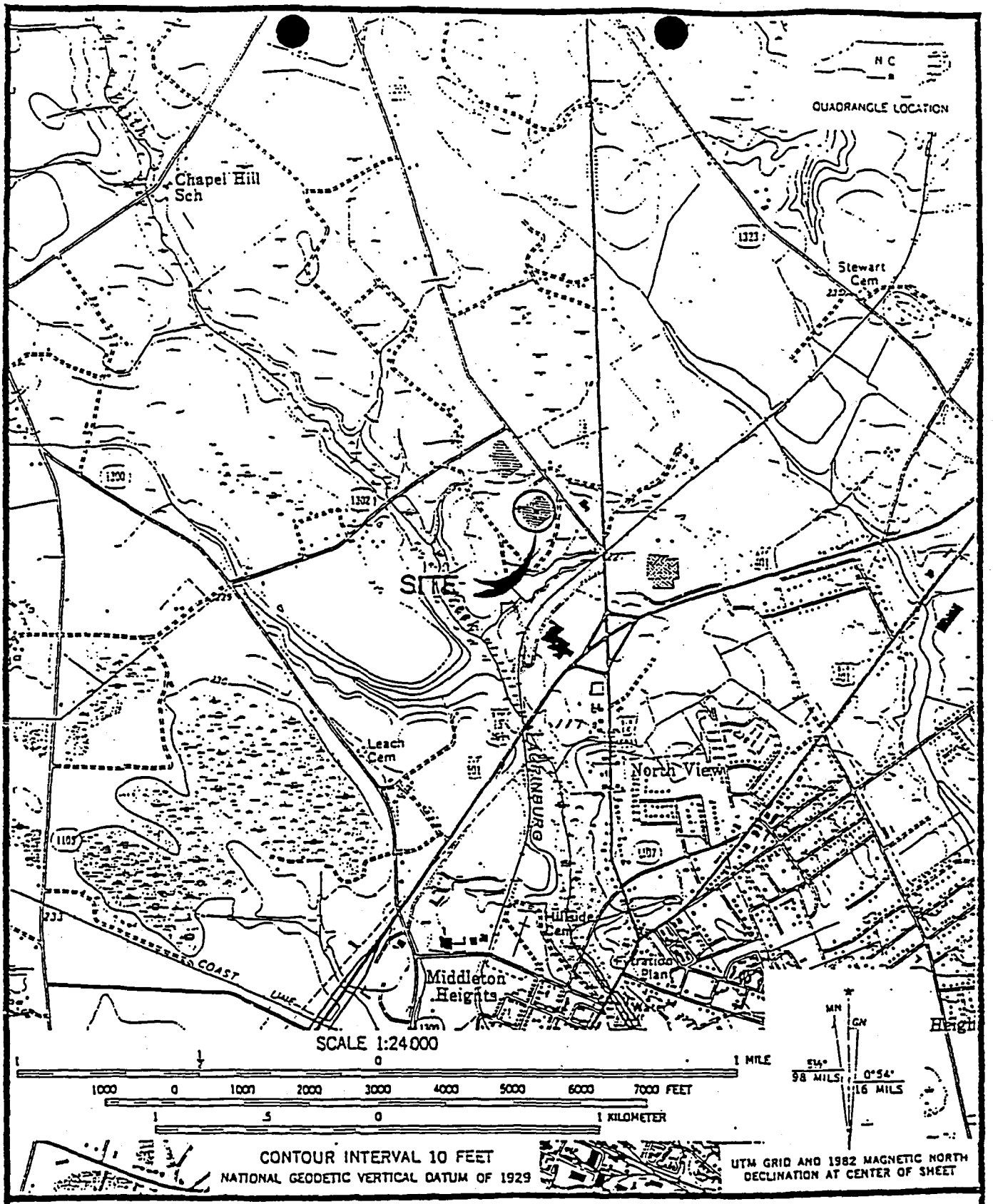


FIGURE 1
SITE LOCATION MAP
TOASTMASTER INC.
PLANT ROAD
LAURINBURG, N.C.

SOURCE: U.S.G.S. LAURINBURG QUADRANGLE, 7.5' SERIES NORTH CAROLINA

GROUNDWATER TECHNOLOGY, INC.

(TMASTER\TMASTER1.DWG)

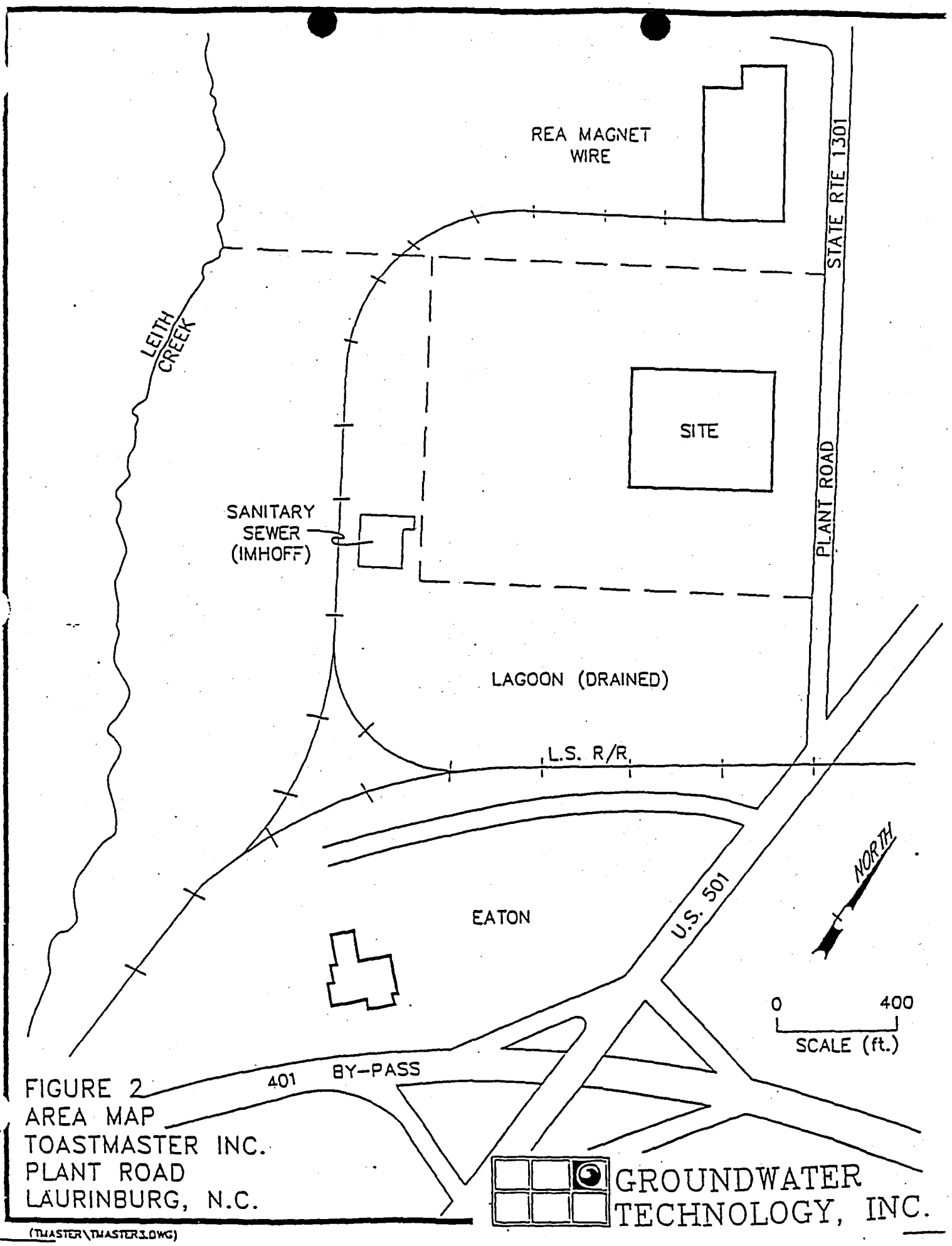


FIGURE 2
AREA MAP
TOASTMASTER INC.
PLANT ROAD
LAURINBURG, N.C.

(TMASTER\TMASTER3.DWG)

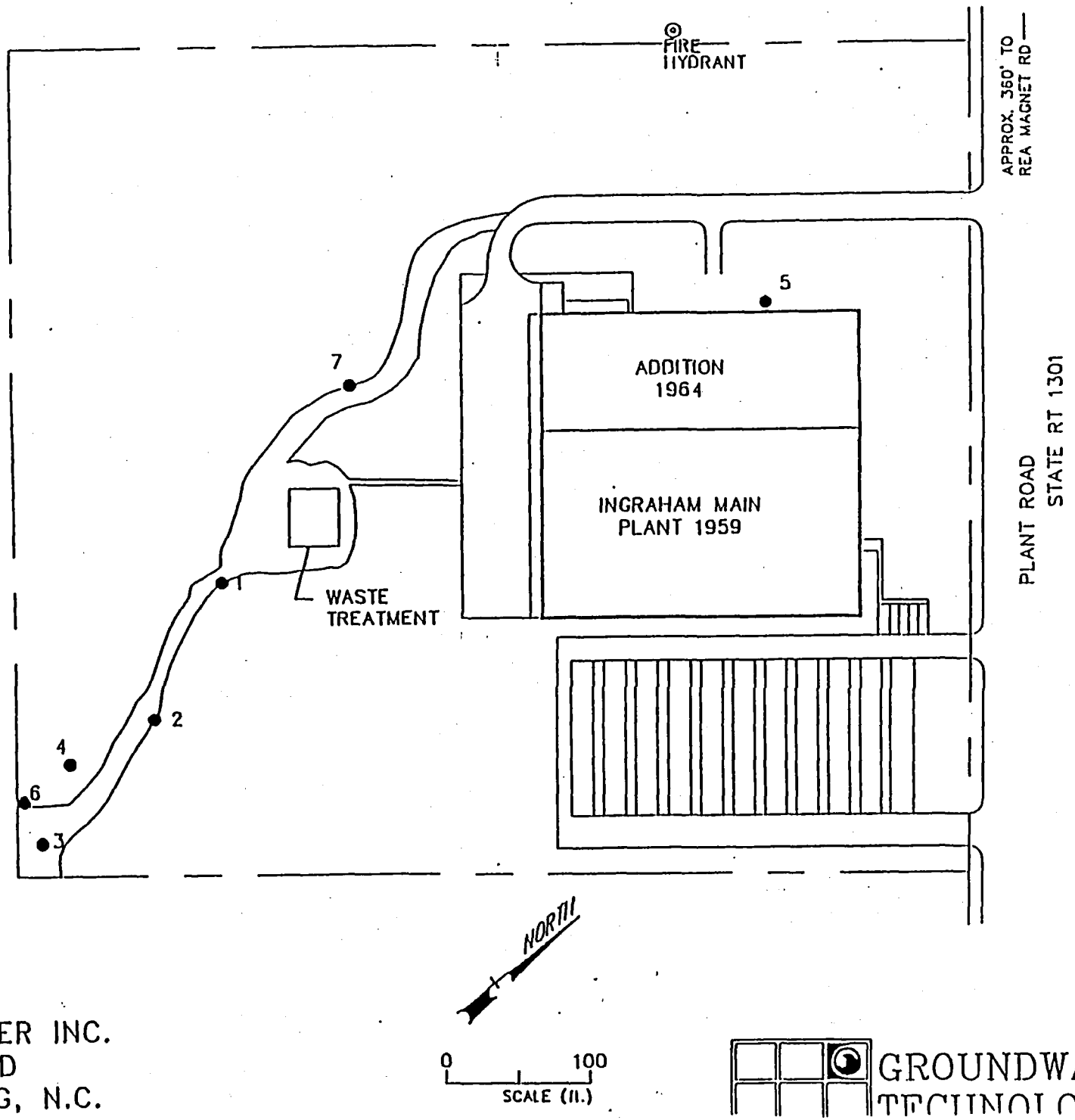


FIGURE 3
SITE MAP
TOASTMASTER INC.
PLANT ROAD
LAURINBURG, N.C.

GROUNDWATER TECHNOLOGY INC

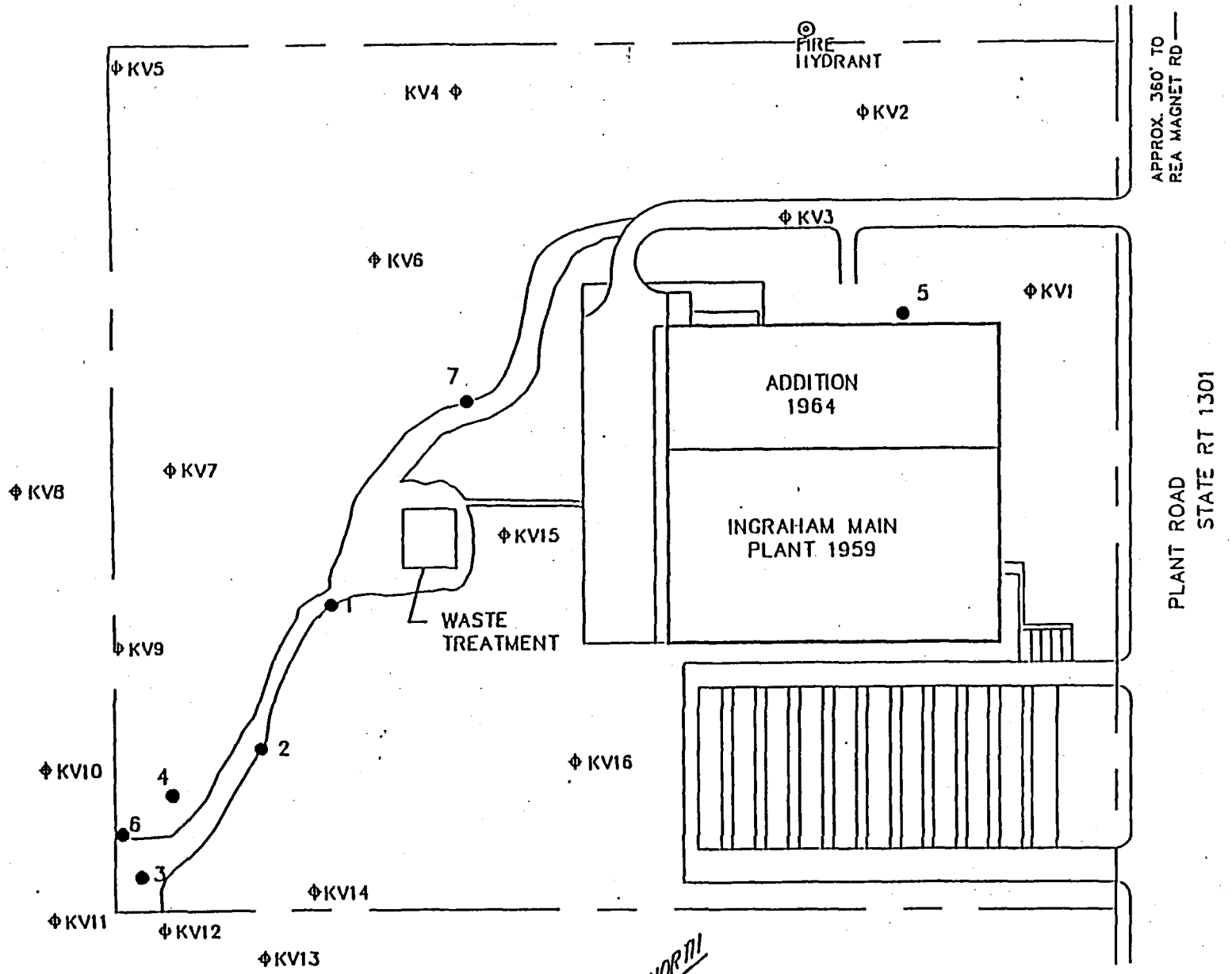


FIGURE 4
SITE MAP (WELLS & KV POINTS)
TOASTMASTER INC.
PLANT ROAD
LAURINBURG, N.C.

0 200
APPROXIMATE SCALE (ft.)

GROUNDWATER TECHNOLOGY INC

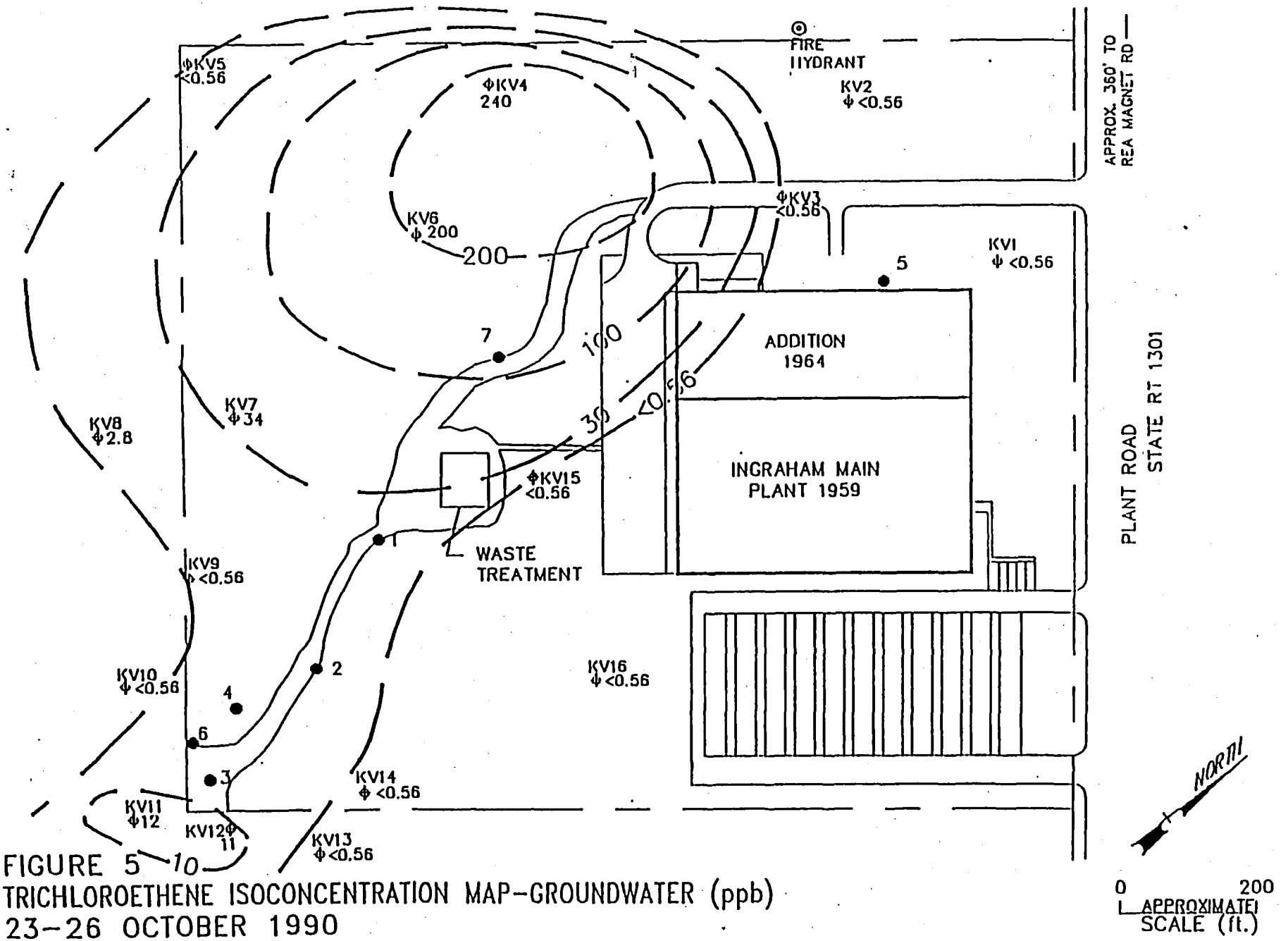


FIGURE 5
TRICHLOROETHENE ISOCONCENTRATION MAP-GROUNDWATER (ppb)
23-26 OCTOBER 1990
TOASTMASTER INC.
PLANT ROAD
LAURINBURG, N.C.

GROUNDWATER TECHNOLOGY, INC

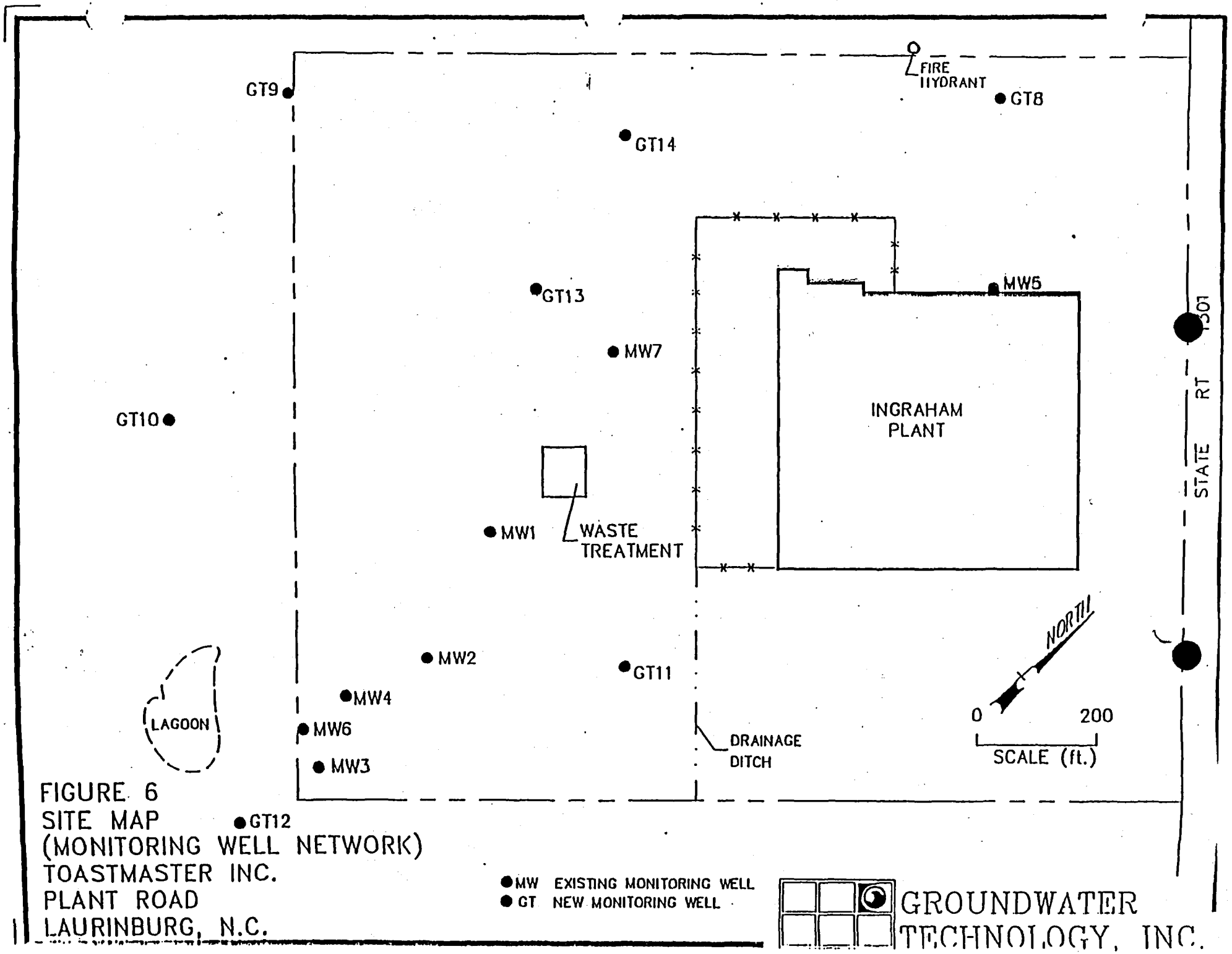


FIGURE 6
SITE MAP
(MONITORING WELL NETWORK)
TOASTMASTER INC.
PLANT ROAD
LAURINBURG, N.C.

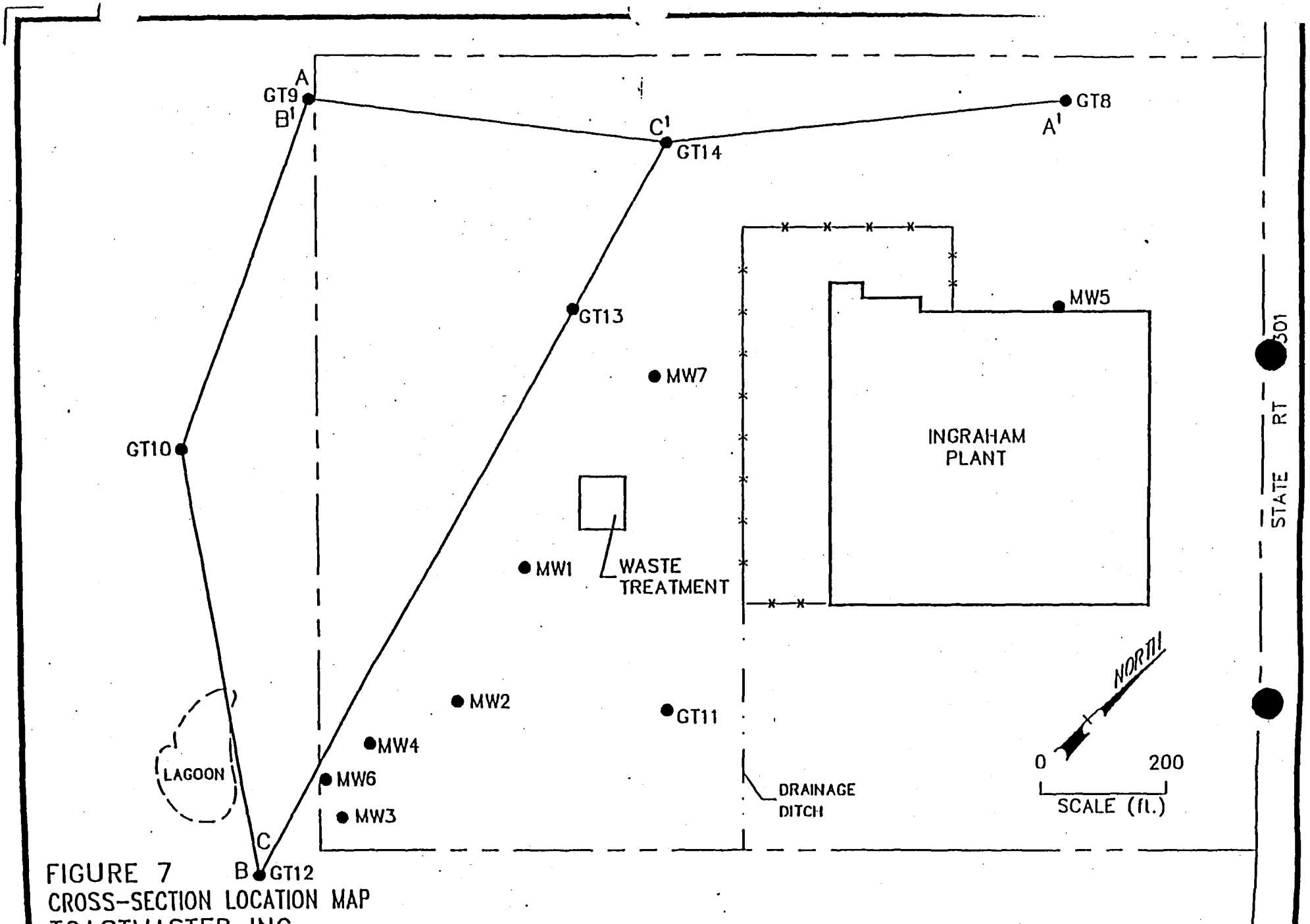


FIGURE 7
CROSS-SECTION LOCATION MAP
TOASTMASTER INC.
PLANT ROAD
LAURINBURG N.C.

● MW EXISTING MONITORING WELL
● GT · NEW MONITORING WELL

GROUNDWATER
TECHNOLOGY INC

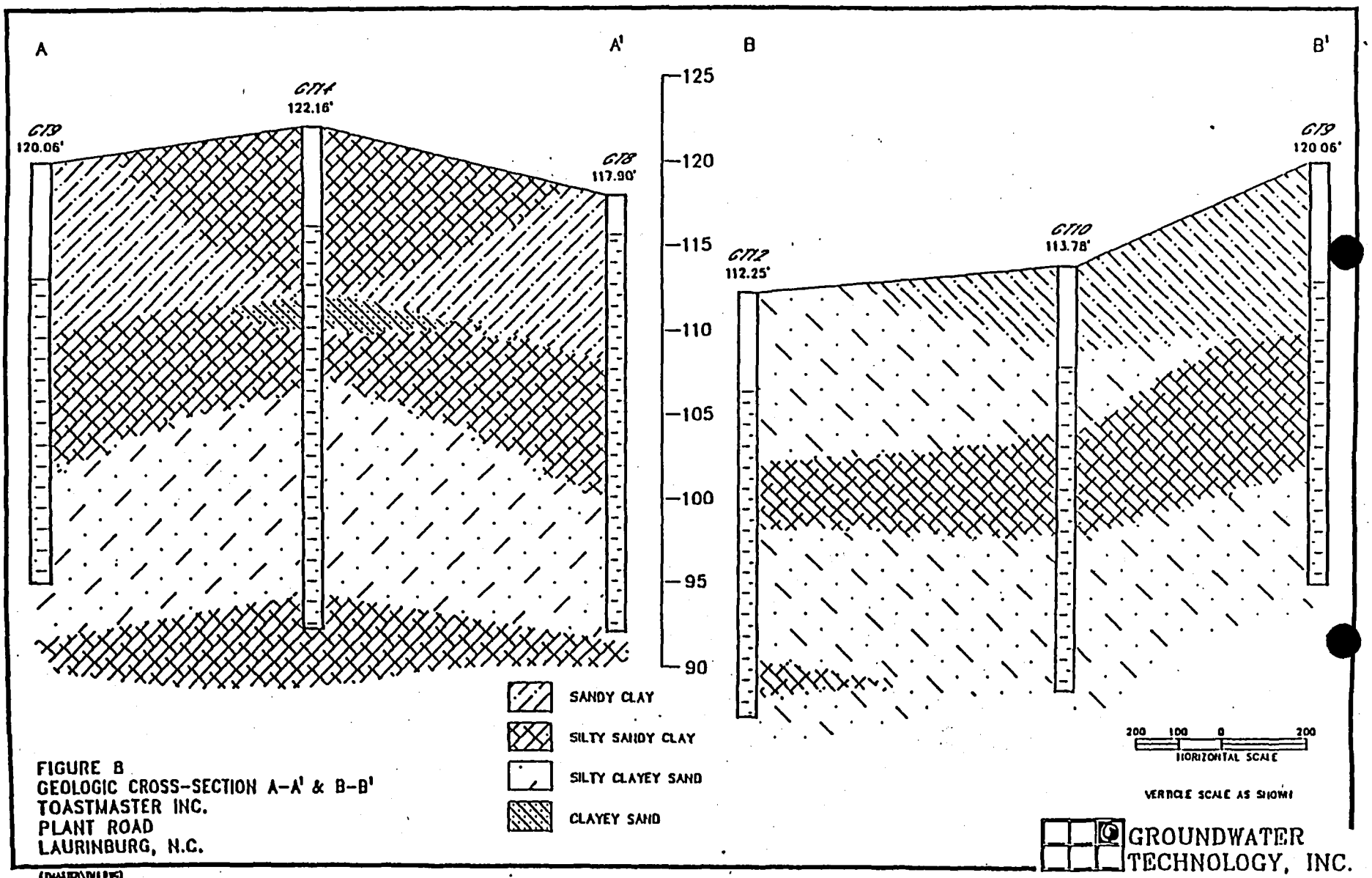
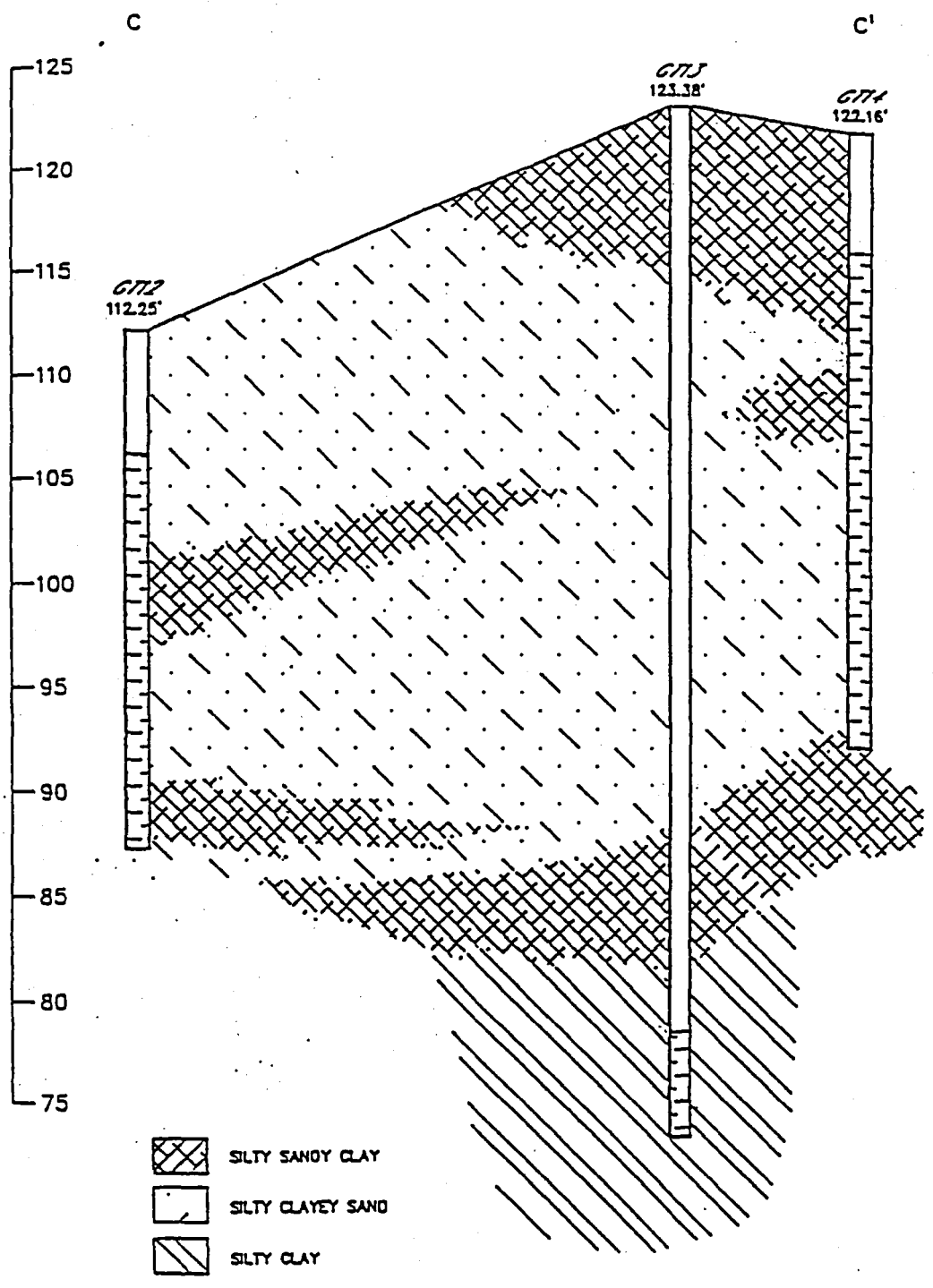


FIGURE 8
GEOLOGIC CROSS-SECTION A-A' & B-B'
TOASTMASTER INC.
PLANT ROAD
LAURINBURG, N.C.



200 100 0 200
HORIZONTAL SCALE

VERTICLE SCALE AS SHOWN

FIGURE 8A
GEOLOGIC CROSS-SECTION C-C'
TOASTMASTER INC.
PLANT ROAD
LAURINBURG, N.C.

GROUNDWATER TECHNOLOGY, INC.

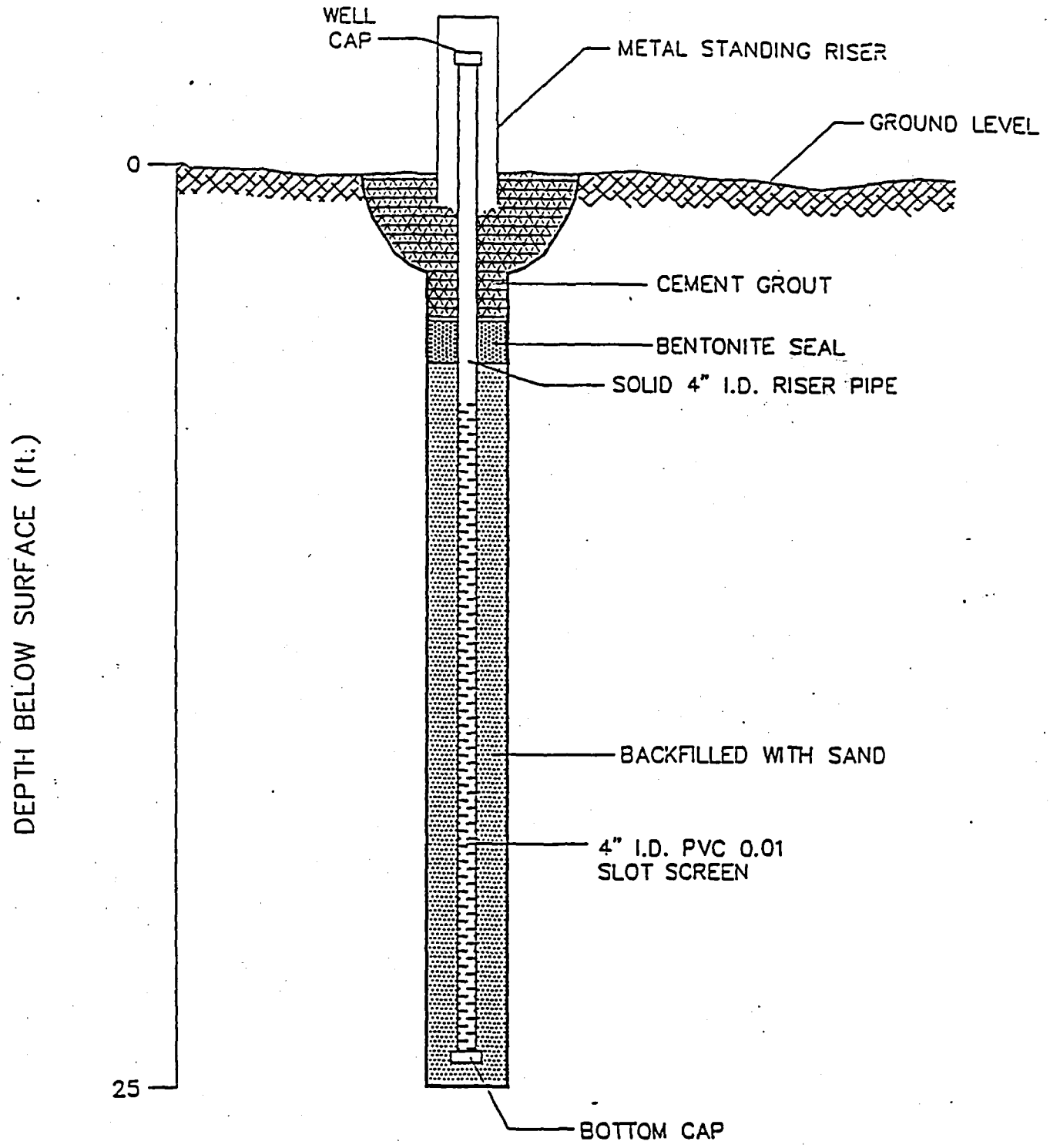


FIGURE 9
TYPICAL MONITORING WELL CONSTRUCTION
TOASTMATER INC.
PLANT ROAD
LAURINBURG, N,C.

GROUNDWATER TECHNOLOGY, INC.

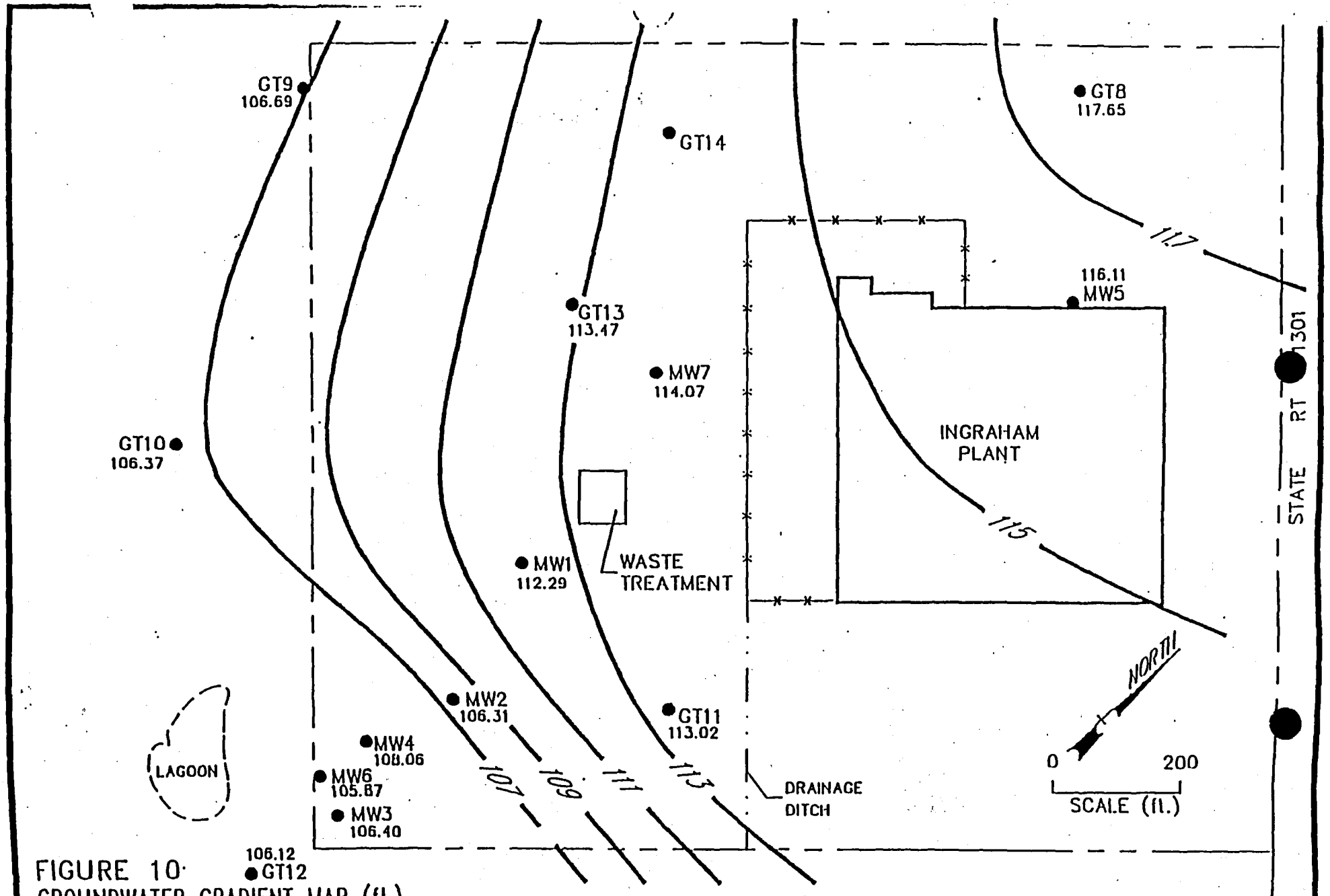


FIGURE 10
GROUNDWATER GRADIENT MAP (ft.)
TOASTMASTER INC.
PLANT ROAD
LAURINBURG, N.C.

● MW EXISTING MONITORING WELL
● GT NEW MONITORING WELL

12 FEBRUARY 1991

GROUNDWATER TECHNOLOGY, INC.

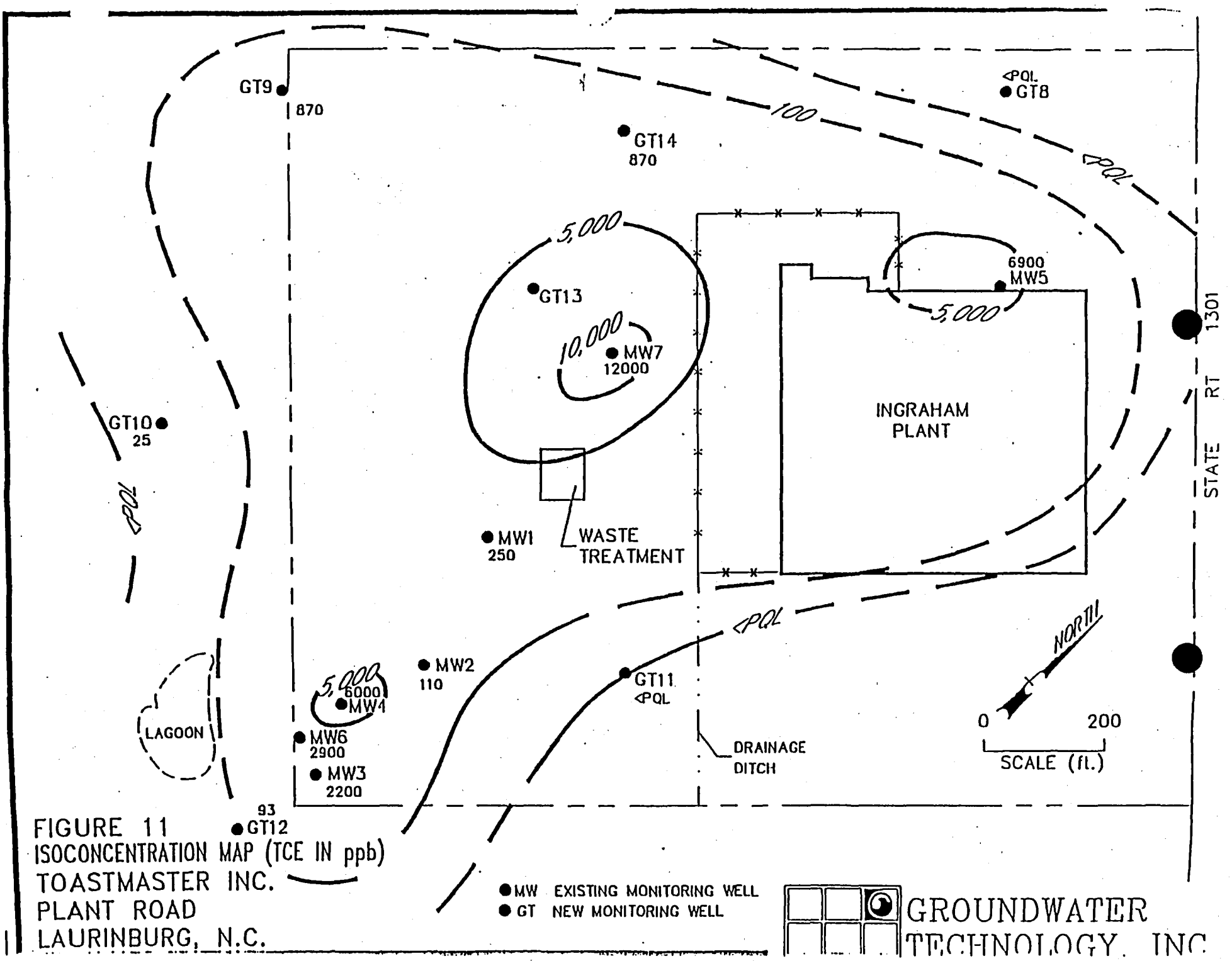


FIGURE 11
ISOCONCENTRATION MAP (TCE IN ppb)
TOASTMASTER INC.
PLANT ROAD
LAURINBURG, N.C.

Water and Air Research, Inc.
CONSULTING ENVIRONMENTAL ENGINEERS AND SCIENTISTS
6821 S.W. ARCHER ROAD • P.O. BOX 1121 • GAINESVILLE, FLORIDA 32602 • TEL. (904) 372-1500 • FAX 378-1500

Reference #4

May 21, 1990
Project No. 73300

Mr. Larry Clark
Toastmasters, Inc.
1801 North Stadium Road
Columbia, Missouri 65202

Dear Larry:

Enclosed is a brief report summarizing Water and Air Research, Inc. (WAR), work at the Time Products Division of Toastmasters, Inc., in Laurinburg, North Carolina. The report addresses field activities, laboratory test results, recommendations and estimated costs for additional site testing.

If you have any questions or comments, please do not hesitate to contact me at (904) 372-1500.

Sincerely,

WATER AND AIR RESEARCH, INC.

Scott Burgard

Scott L. Burgard
Hydrogeologist

SLB:jlm

Enclosure

AUDIT.5[WP]SLB5-21

INTRODUCTION

Water and Air Research, Inc. (WAR), conducted limited testing of groundwater at the Time Products Division of Toastmaster, Inc., in Laurinburg, North Carolina. This document contains a summary of field activities, results of laboratory testing, and recommendations regarding follow-up work. Field activities were accomplished April 11-13, 1990. The site covers approximately 30 acres and is located one mile north of Laurinburg, North Carolina, and west of U.S. Highway 15-501. Figure 1 shows the lay out of the site and locations of monitoring wells installed by WAR.

Field activities were initiated following a site investigation by Dr. Jerry Steinberg of WAR. Dr. Steinberg's investigation identified areas at the rear or western portion of the site on which solvents and degreasers may have leaked or been disposed. These were areas which received industrial wastewater discharges or which may have been affected by burning of waste materials. The former industrial wastewater treatment facility was designed to precipitate metal bearing salts from plating wastewaters. Also, filter beds which received dried sludges from the wastewater treatment facility are located on this portion of the site.

FIELD ACTIVITIES

MONITORING WELL INSTALLATION

Based on findings from the initial investigation, WAR scientists determined that installation of two monitoring wells on the western, undeveloped portion of the site was necessary. Well placement was based on examination of this parcel. Two monitoring wells, T-6 and T-7, were installed April 11-12, 1990, by a local well drilling firm. Well T-6 was placed near the property boundary which is presumed to be downgradient on the site and adjacent to a former sludge receiving area. This location is anticipated to intercept any contaminants migrating downgradient from the rest of Toastmaster property. Well T-7 was placed in an area where no vegetation presently grows and where plant personnel stated that materials were burned in the past. Well locations are identified on Figure 1, and detailed well schematics showing well

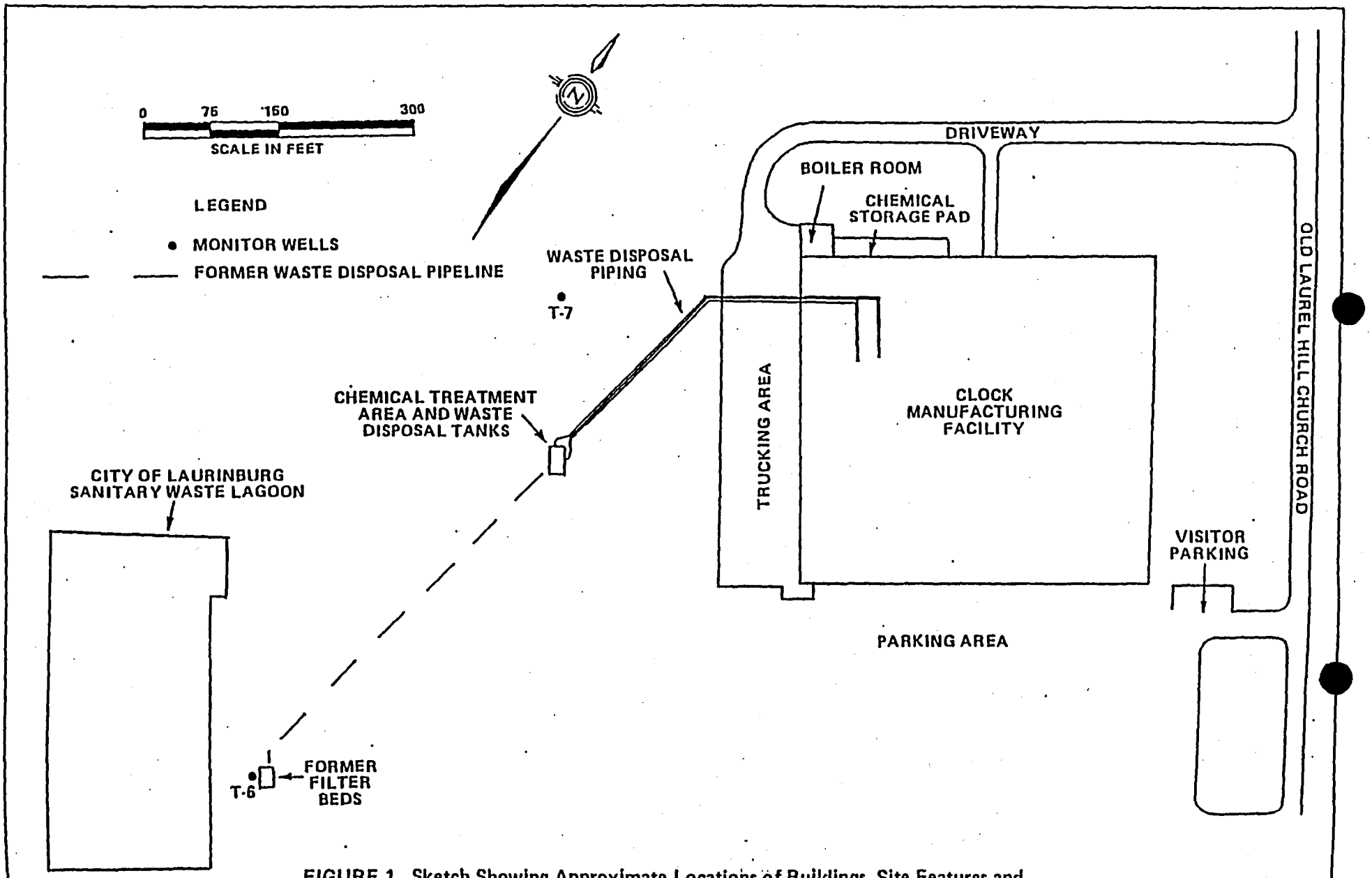


FIGURE 1. Sketch Showing Approximate Locations of Buildings, Site Features and Monitoring Wells at Toastmaster, Inc., Laurinburg, N.C.

·WAR 1990.

construction information are attached as Appendix A. Well T-6 was installed to a depth of 35 feet below land surface and well T-7 was installed to a depth of 40 feet below land surface. These depths were chosen due to the fact that the solvents of concern are denser than water and can move downward and also to examine the strata for a confining layer.

Prior to drilling, all well drilling equipment was decontaminated using a high-pressure steam cleaner. Only new, unused materials were used downhole to construct wells. Bores were constructed using a 6.75-inch-diameter hollow stem auger. After drilling was completed, 2-inch-diameter Schedule 40 PVC well screen and casing were inserted downhole.

A silica quartz sand gravel pack was installed around the well screen interval to act as a filter. The purpose of the sand pack is to remove fines created during well drilling, allowing a less turbid water sample to be obtained from the well. A 1- to 2-foot layer of sodium bentonite pellets was installed over the sand to act as a barrier preventing any potential contaminants from migrating down the well annulus into the well. Portland Type 1 cement was then poured over the bentonite layer up to the surface forming a 2-foot X 2-foot pad. The cement serves a variety of purposes, including grouting the well materials in place, acting as a barrier to potential contaminants and cementing the locking steel protective cover in place. Following placement of cement, a locking steel protective cover was installed over the wells to prevent tampering or damage to the wells.

WELL DEVELOPMENT

After installation, the wells were developed by a WAR hydrogeologist to remove fines from the well. Wells were developed April 12-13. Development consisted of pumping each well using a gasoline-powered centrifugal pump. The pump was placed such that the exhaust outlet was always downwind from the well opening. Wells were developed until clear water was produced and pH, conductance and temperature water quality parameters had stabilized. Each well was developed and monitored three times. Wells were developed at a flow rate of

approximately 10 gallons per minute; neither well was pumped dry. Groundwater recovered to predevelopment levels within five minutes of pumping cessation.

WELL SAMPLING

Groundwater samples were collected April 13 to be analyzed for six metals as well as volatile organic compounds. Depth to groundwater below the top of the well casing was measured prior to purging wells of 4 to 5 well volumes before samples were collected. For metals samples, both filtered and unfiltered samples were collected. These samples were analyzed to provide data on both total and dissolved metals. Groundwater samples were split with Larry Clark of Toastmaster to compare data. Groundwater was also analyzed for volatile organic compounds using EPA Methods 601 and 602. Well T-6 was sampled at two depth intervals for volatile organics: sample T-6U was collected near the groundwater surface; and sample T-6L near the bottom of the well. Well T-6 was sampled at two depths because of its presumed downgradient location. This method of sampling was used to determine if contaminants with greater densities than local groundwater were present at greater depth in the groundwater column. Volatile organics samples were also split with Larry Clark. Equal aliquots of groundwater were used to obtain both filtered and unfiltered samples to be analyzed for metals. Volatile organics samples were collected from the same bailer. Both wells were sampled using precleaned, dedicated PVC bailers. Conductance, pH, and temperature water quality parameters were also measured following sample collection.

RESULTS

Metals test results show only very low concentrations of metals or levels less than laboratory detection limits. Volatile organics test results indicate the presence of high levels of trichloroethene in both wells. A travel blank was also analyzed; no contamination was found in the sample. Concentrations of trichloroethene are as follows: T-6U, 4,700 ug/l; T-6L, 6,200 ug/l; and T-7, 14,300 ug/l. Complete laboratory data sheets are presented in Appendix B.

CONCLUSIONS

Groundwater test results indicate high levels of trichloroethene are present in groundwater on the western portion of Toastmaster property. A level of 3 to 5 ug/l of trichloroethene is considered to be of regulatory significance. Metals present no problem in groundwater which was tested.

Subsequent testing of groundwater should confirm existing results. This confirmation work should also address horizontal and vertical extent of contaminants. Testing should also be implemented in a manner to address defining, if possible, potential sources of the contamination.

With regard to additional monitoring well installation, WAR believes drilling costs were excessive and a more reasonably priced driller can be located while maintaining quality.

This type of contamination can have regulatory significance. It is our opinion that careful site definition is essential prior to contacting a regulatory agency. This definition could include preliminary remedial activities, if found to be in Toastmaster's best interest.

RECOMMENDATIONS

Based on groundwater testing results, WAR recommends the following courses of action. Estimated costs per item follow each recommendation.

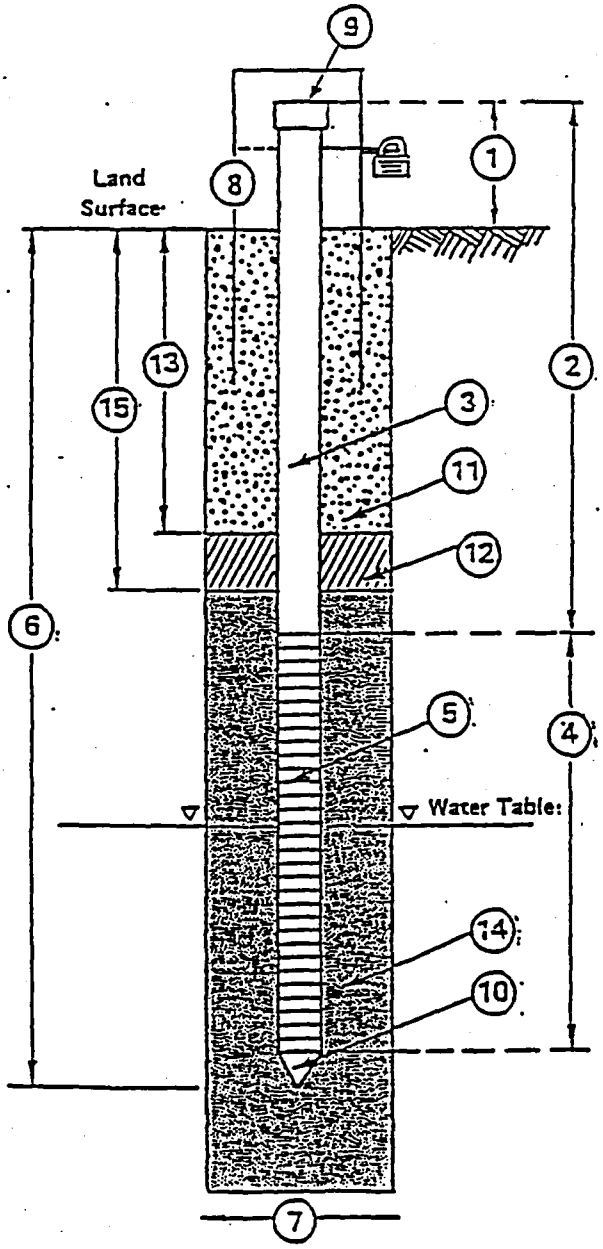
1. Examine local hydrogeology in more detail to determine if a confining layer exists under the site. This would aid in assessing potential vertical mobility of contamination. Presence of a confining layer would slow or prevent the vertical migration of a contaminant plume. Estimated cost: $400-$500 based on six to eight hours of research at $50 per hour.

2. Confirm previous results by resampling wells T-6 and T-7. Estimated cost: $600 for three samples to be analyzed if sampled at the time other field work is accomplished.

3. Install and sample 2 to 3 additional monitoring wells to help define vertical and horizontal extent of contamination. Total cost is estimated to range between $9,000-$10,500. Broken down, these costs include $3,500-$5,500 for drilling two or three wells depending on depth of drilling; $700 for lab analysis of 3 samples and a travel blank; $2,500-$3,000 for mobilization, field work, demobilization, hotel, rental car, airfare and meals.

4. Analyze data to address contamination extent and identify source or sources of contamination. Estimated cost: $1,500-$2,000 based on time estimates for senior staff.

APPENDIX A



WELL CONSTRUCTION DETAILS

WELL ID: T-6

DATE OF INSTALLATION 4/11-12/90

WELL DRILLER Hilly

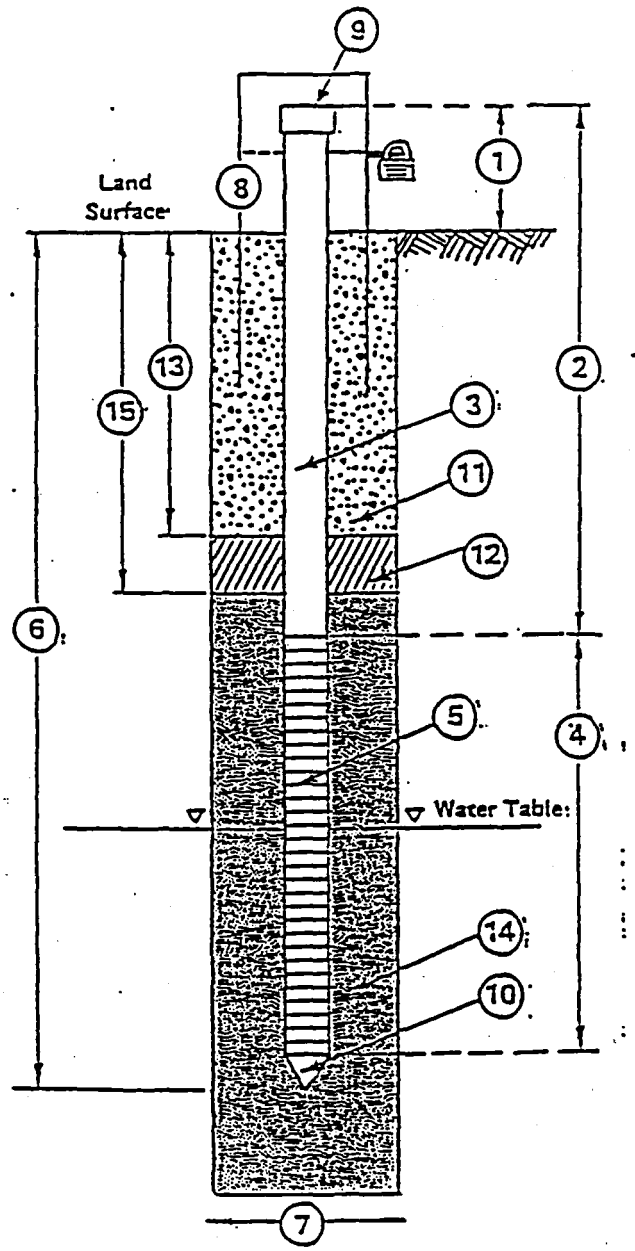
GEOLOGIST SLB

DRILLING METHOD Hollow Stem Auger

STATIC WATER LEVEL 10' btoc msl

WELL ELEVATION _____ msl

1. Height of Casing above Ground 3.42'
2. Total Length of Casing 17'
3. Type of Casing Schedule 40 PVC 2"
4. Total Length of Screen 20'
5. Type of Screen Schedule 40 PVC 2"
6. Total Well Depth 35'
7. Hole Diameter 8"
8. 4' x 4' x 5' Locking Steel Cover
9. PVC Well Cap
10. PVC Well Point
11. Type of Grout Portland Type I
12. Type of Seal Bentonite
13. Depth to Top of Seal 8.5'
14. Type of Filter Pack Silica Sand
15. Depth to Top of Filter Pack 10'



WELL CONSTRUCTION DETAILS

WELL ID: T-7

DATE OF INSTALLATION 4/12-13/90

WELL DRILLER Willy

GEOLOGIST SLB

DRILLING METHOD Hollow Stem Auger

STATIC WATER LEVEL 10.5' btoc msl

WELL ELEVATION _____ msl

1. Height of Casing above Ground 1.6'
2. Total Length of Casing 17'
3. Type of Casing Schedule 40 PVC 2"
4. Total Length of Screen 25'
5. Type of Screen Schedule 40 PVC 2"
6. Total Well Depth 40'
7. Hole Diameter 8"
8. 4' x 4' x 5' Locking Steel Cover
9. PVC Well Cap
10. PVC Well Point
11. Type of Grout Portland Type I
12. Type of Seal Bentonite
13. Depth to Top of Seal 8.5'
14. Type of Filter Pack Silica Sand
15. Depth to Top of Filter Pack 10'

APPENDIX B

ppb

ENVIRONMENTAL LABORATORIES, INC.

REPORT OF ANALYSES

WATER AND AIR RESEARCH, INC.
6821 SW ARCHER ROAD
GAINESVILLE, FL 32608-
Attn: MR. SCOTT BURGARD

DATE: 05/01/90
DHRS # 82282, E82001

WAR/TOASTMASTERS SAMPLE RECEIVED APRIL 16, 1990. (Page 1 of 1)

CLIENT STATION ID:		T-6
PPB #:		41206
CYANIDE, TOTAL	mg/L	<0.004
CHROMIUM, TOTAL	ug/L	6.0
CHROMIUM, DISSOLVED	ug/L	<3
COPPER, TOTAL	ug/L	126
COPPER, DISSOLVED	ug/L	115
LEAD, TOTAL	ug/L	1.8
LEAD, DISSOLVED	ug/L	<1
NICKEL, TOTAL	ug/L	146
NICKEL, DISSOLVED	ug/L	167
ZINC, TOTAL	ug/L	130
ZINC, DISSOLVED	ug/L	158

PROJECT MANAGER Tom Park

6821 SW ARCHER ROAD. GAINESVILLE. FLORIDA 32608 Tel. (904) 377-234

DHRS # 82315

Southeastern Environmental Laboratories, Inc.
80 Industrial Loop North, Building 5
Orange Park, FL 32073
(904) 269-6176

DHRS E-82179

WATER AND AIR RESEARCH, INC.
6821 S.W.ARCHER ROAD
P. O. BOX 1121
GAINESVILLE FL 32602
ATTN:

Description: 4 Samples Received on 04/19/90

Sampled By: CLIENT Client Job/PO Number:

Reference Number: 01956 Reported Date : 05/02/90
Invoice Number: 01823

Sample	Description	Client Id
0001	T-6U	TOASTMASTER
0002	T-6L	TOASTMASTER
0003	T-7	TOASTMASTER
0004	TRAVEL BLANK	TOASTMASTER

PARAMETER		SAMPLE NUMBER 0001	0002	0003
PROFILE: EPA 601				
1,1,1-TRICHLOROETHANE	UG/L	< 100	< 100	< 100
1,1,2,2-TETRACHLOROETHANE	UG/L	< 100	< 100	< 100
1,1,2-TRICHLOROETHANE	UG/L	< 100	< 100	< 100
1,1-DICHLOROETHANE	UG/L	< 100	< 100	< 100
1,1-DICHLOROETHENE	UG/L	< 100	< 100	< 100
1,2-DICHLOROBENZENE	UG/L	< 100	< 100	< 100
1,2-DICHLOROETHANE	UG/L	< 100	< 100	< 100
1,2-DICHLOROPROPANE	UG/L	< 100	< 100	< 100
1,3-DICHLOROBENZENE	UG/L	< 100	< 100	< 100
1,4-DICHLOROBENZENE	UG/L	< 100	< 100	< 100
2-CHLOROVINYLETHER	UG/L	< 100	< 100	< 100
BROMODICHLOROMETHANE	UG/L	< 100	100	< 100
BROMOFORM	UG/L	< 100	< 100	< 100
CARBONTETRACHLORIDE	UG/L	< 100	< 100	< 100
CHLOROBENZENE	UG/L	< 100	< 100	< 100
CHLOROETHANE	UG/L	< 100	< 100	< 100

DHRS # 82315

Southeastern Environmental Laboratories, Inc.
80 Industrial Loop North, Building 5
Orange Park, FL 32073
(904) 269-6176

DHRS E-82179

Reference Number: 01956 Page: 2

PARAMETER		SAMPLE NUMBER 0001	SAMPLE NUMBER 0002	SAMPLE NUMBER 0003
CHLOROFORM	UG/L	< 100	< 100	< 100
CHLOROMETHANE	UG/L	< 100	< 100	< 100
DIBROMOCHLOROMETHANE	UG/L	< 100	< 100	< 100
DICHLORODIFLUOROMETHANE	UG/L	< 100	< 100	< 100
METHYLENE CHLORIDE	UG/L	< 100	< 100	< 100
T-1,2-DICHLOROETHENE	UG/L	< 100	< 100	< 100
TETRACHLOROETHANE	UG/L	< 100	< 100	< 100
TETRACHLOROETHENE	UG/L	< 100	< 100	< 100
TRICHLOROETHENE V	UG/L	4700	6200	14300
TRICHLOROFLUOROMETHANE	UG/L	< 100	< 100	< 100
VINYL CHLORIDE	UG/L	< 100	< 100	< 100
PROFILE: EPA 602				
1,2-DICHLOROBENZENE	UG/L	< 100	< 100	< 100
1,3-DICHLOROBENZENE	UG/L	< 100	< 100	< 100
1,4-DICHLOROBENZENE	UG/L	< 100	< 100	< 100
BENZENE	UG/L	< 100	< 100	< 100
CHLOROBENZENE	UG/L	< 100	< 100	< 100
ETHYLBENZENE	UG/L	< 100	< 100	< 100
TOLUENE	UG/L	< 100	< 100	< 100
XYLENES	UG/L	< 100	< 100	< 100

DHRS # 82315

Southeastern Environmental Laboratories, Inc.
80 Industrial Loop North, Building 5
Orange Park, FL 32073
(904) 269-6176

DHRS E-82179

Reference Number: 01956 Page:

PARAMETER			SAMPLE NUMBER 0004
PROFILE: EPA 601			
1,1,1-TRICHLOROETHANE	UG/L	<	100
1,1,2,2-TETRACHLOROETHANE	UG/L	<	100
1,1,2-TRICHLOROETHANE	UG/L	<	100
1,1-DICHLOROETHANE	UG/L	<	100
1,1-DICHLOROETHENE	UG/L	<	100
1,2-DICHLOROBENZENE	UG/L	<	100
1,2-DICHLOROETHANE	UG/L	<	100
1,2-DICHLOROPROPANE	UG/L	<	100
1,3-DICHLOROBENZENE	UG/L	<	100
1,4-DICHLOROBENZENE	UG/L	<	100
2-CHLOROVINYLETHER	UG/L	<	100
BROMODICHLOROMETHANE	UG/L	<	100
BROMOFORM	UG/L	<	100
CARBONTETRACHLORIDE	UG/L		100
CHLOROBENZENE	UG/L	<	100
CHLOROETHANE	UG/L	<	100
CHLOROFORM	UG/L	<	100
CHLOROMETHANE	UG/L	<	100
DIBROMOCHLOROMETHANE	UG/L	<	100
DICHLORODIFLUOROMETHANE	UG/L	<	100
METHYLENE CHLORIDE	UG/L	<	100
T-1,2-DICHLOROETHENE	UG/L	<	100
TETRACHLOROETHANE	UG/L	<	100
TETRACHLOROETHENE	UG/L	<	100
TRICHLOROETHENE	UG/L	<	100
TRICHLOROFLUOROMETHANE	UG/L	<	100
VINYL CHLORIDE	UG/L	<	100
PROFILE: EPA 602			
1,2-DICHLOROBENZENE	UG/L		100
1,3-DICHLOROBENZENE	UG/L	<	100
1,4-DICHLOROBENZENE	UG/L	<	100
BENZENE	UG/L	<	100

DHRS # 82315

Southeastern Environmental Laboratories, Inc.
80 Industrial Loop North, Building 5
Orange Park, FL 32073
(904) 269-6176

DHRS E-82175

Reference Number: 01956 Page:

PARAMETER			SAMPLE NUMBER 0004
CHLOROBENZENE	UG/L	<	100
ETHYLBENZENE	UG/L	<	100
TOLUENE	UG/L	<	100
XYLENES	UG/L	<	100

APPROVED BY:

Terry L. Spaulding
Laboratory Manager

Reference #6

Toastmaster Inc.
P.O. Box 1609 Laurinburg, North Carolina 28352 919 276 3101

RECEIVED
SEP 20 1984
SOLID & HAZARDOUS WASTE MANAGEMENT BRANCH

September 13, 1984

Mr. Lenox E. Bramble
Environmental Engineer
Environmental Health Section
Solid & Hazardous Waste Management Branch
Division of Health Services
P. O. Box 2091
Raleigh, N. C. 27602-2091

Dear Mr. Bramble:

The following information is provided as requested in your letter of August 27, 1984.

Electroplating operations have been conducted at this plant since 1959 (with the exception of the years 1970 through 1974). Attachment 1, hereto, gives a general description of the waste water treatment system and procedures in effect prior to closure of our lagoons and the sand filter bed in August, 1983. Attachment 2 describes the system and operation subsequent to this closure. All hexavalent chrome present in waste waters was converted to trivalent state during treatment. Burial of treated sludge on-site was minimal from 1977 until discontinued (prior to November 19, 1980), due primarily to utilization of rinse waters as make-up water for the chrome and nickle plating baths. All sludge has been shipped to SCA Services, Pinewood, S. C., since. Copies of our annual reports on hazardous waste generation and disposal for the years 1981, 1982, and 1983 are Attachment 3.

Attachment 4 shows the location and depth of five ground water sampling wells, and copies of analysis reports of samples from these

wells is Attachment 5.

Site operation has continued under the same management since 1959 although corporate management has changed as follows:

1959 - 1968	Ingraham Co.	Bristol, Conn.
1968 - 1980	McGraw Edison Co.	Elgin, Ill.
1980 - 1983	Toastmaster Inc.	Columbia, Mo.
1983 - Present	Magic Chef	Cleveland, Tenn.

Both Jerry Rhodes and Terry Dover of your organization are familiar with our site and operations.

Please advise if additional information is required.

Sincerely yours,

TOASTMASTER INC.
INGRAHAM DIV.

R. J. Ronalter Sr.

R. J. Ronalter, Sr.
Vice-Pres. & Gen. Mgr.

RJR:mn

Attachments

Reference #5

Toastmaster Inc.
P.O. Box 1609 Laurinburg, North Carolina 28352 919 276 3101

May 18, 1983

RECEIVED
MAY 20 1983
SOLID & HAZARDOUS WASTE MANAGEMENT BRANCH

Mr. O. W. Strickland, Head
Solid & Hazardous Waste Management Branch
Environmental Health Section
North Carolina Division of Health Services
P. O. Box 2091
Raleigh, N. C. 27602-2091

ATTEN: Jerry Rhodes

Dear Sir:

The attached Closure Plan for the Primary Lagoon and Sand Filter has been revised as requested in your letter of May 2, 1983.

Since our NPDES Permit has subsequently been renewed, a copy of the permit now replaces the draft copy originally attached to our plan.

Sincerely yours,

TOASTMASTER INC.
INGRAHAM, TIME PRODUCTS DIVISION

Ralph J. Ronalter
Vice President, General Manager

RJR:mn

Enclosure

Page 1

CLOSURE PLAN FOR SURFACE IMPOUNDMENTS IN WHICH WASTES ARE REMOVED AT CLOSURE

EPA Facility I. D. No. NC. D 037160439

Owner/Operator Toastmaster, Inc.
P. O. Box 1609
Old Laurel Hill Church Road
Laurinburg, N. C. 28352
Phone: (919) 276-3101

I. Facility conditions

A. General information
This plan includes two impoundments (see attached ref. map)

1. Primary lagoon
   Size: 50' X 80' X 5' Deep
   Volume: 150,000 Gals.
   Use: Impoundment of treated electroplating waste water effluent.

2. Filter bed
   Size: 20' X 40' X 3' Deep
   Use: Separation of sludge from effluent for treated electroplating waste water & drying of sludge.
   Note: Although a NPDES permit has been issued, no releases under this permit have been required since 1978 due to controlled restrictions on the amount of waste water generated. The most recent renewal of this permit was effective April 20, 1983. Copy attached.

B. Schedule of final closure

1. Final date wastes accepted: Jan. 15, 1983
2. Date all treatment completed: Jan. 15, 1983
3. Date all free liquids removed: (Est.) June, 1983
4. Date all sludges removed: July, 1983
5. Final date of completed closure: Aug. 31, 1983
6. Total time required to close facility: 6 months

II. Removing all inventory

A. Maximum amount of waste on site: (Est.) 140 Cu. Yds.

1. Bulk waste: 140 cu. yds.
2. Maximum quantity of liquid in impoundment: (Est.) -0- evaporated. (If evaporation is not sufficient, remaining liquid will be re-treated as required to meet approved release specification under NPDES permit or necessary approval be obtained for disposal in an approved facility.)
3. Maximum quantity of sludge in impoundment: (Est.) 50 cu. yds.

B. Removing sludge

1. Volume of sludge to be removed: (Est.) 50 cu. yds.
2. Method for removing sludge & residuals:
   Using both equipment & labor on-site & contractor furnished, an estimated three inch depth of dried sludge & soil (sand in the case of the filter bed) will be stripped and loaded for shipment in sealed & covered trucks or into approved one cubic yard plastic containers, followed by stripping of contaminated soil (est. 6 inches) until soil appears uncontaminated. Core samples will be analyzed for level of chromium, cadmium, and nickel (when samples measure less than 20 ppm nickel in leachate. Other contaminates should be well below specified limits.) All material removed will be shipped (either bulk or in approved containers) for disposal in an approved facility (SCA, Pinewood, S. C. - distance approximately 113 miles).

III. Decontamination

All equipment used will be brushed clean of residue, scrubbed and rinsed. Residue (including liquid combined with bulking agent), estimated two cubic yards, will be disposed of in the same manner as other inventory in Section II. Estimate of equipment to be used is a powered barrow, hand tools, shovels, etc., and possibly a backhoe. Owner/operator labor will be primarily used with possibly some contracted labor to operate contracted equipment.

IV. Ground water monitoring

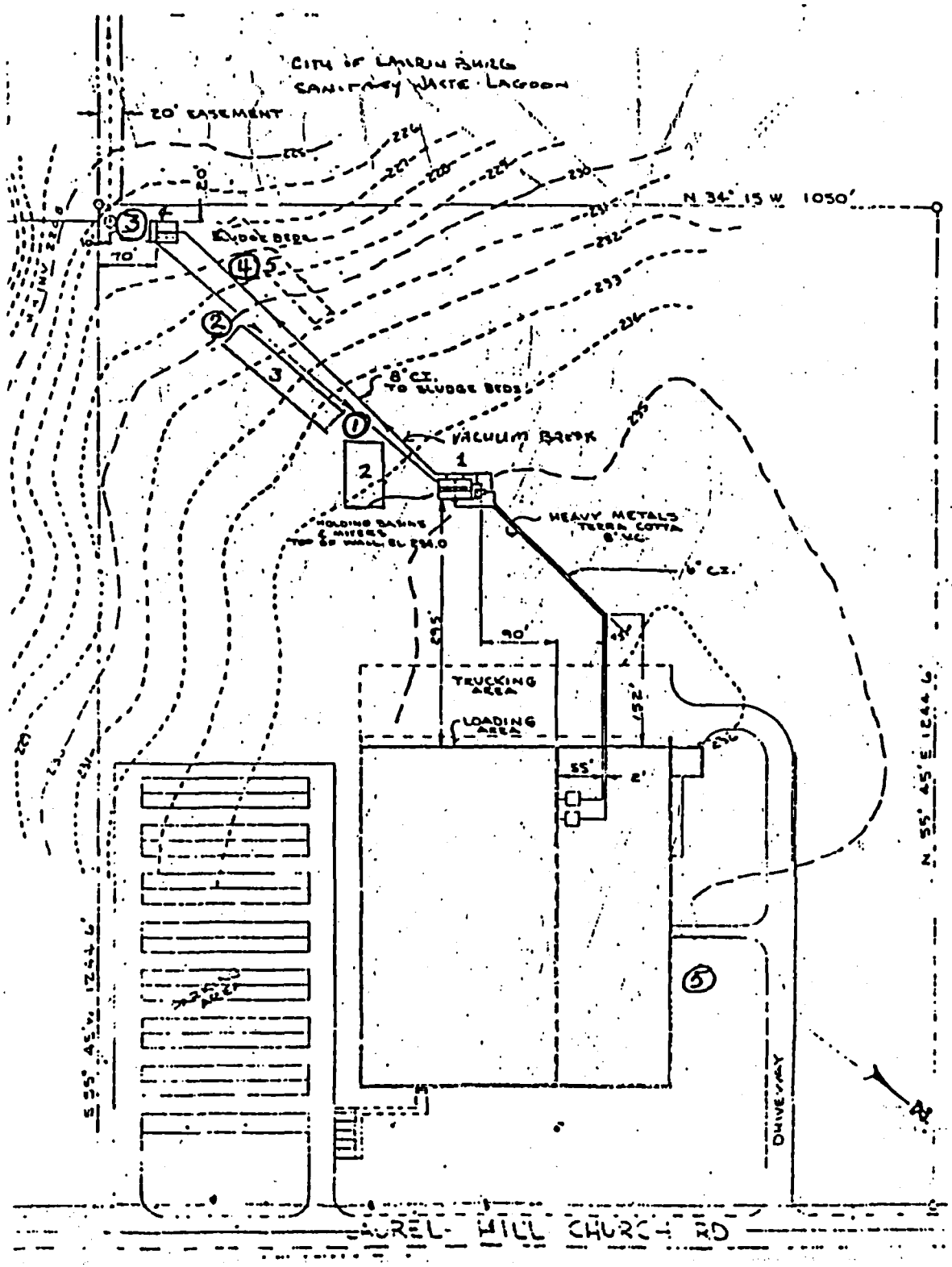
After completion of stripping & decontamination of equipment & determination that all contamination has been removed to the required level, the ground water sampling (see attached report for analysis of samples in December, 1982) and analysis will be repeated. One additional sampling and analysis of ground water will be made six months after soil removal to verify water quality.

V. Closure certification

Concurrent with in-house sampling & analysis, the services of a qualified registered professional engineer will be utilized to inspect the completed work. Core samples, well samples & analyses will be provided as required for closure certification. Estimate one preliminary & one final inspection of the site. Certification by owner/operator and the independent registered professional engineer that the facility has been closed in accordance with the specifications in the approved closure plan will be submitted to the Solid & Hazardous Waste Management Branch, Division of Health Services.

VI. Costs

(SCA)	Disposal 140 cu. yds. X 1 ton / Cu. Yd. X $70/ton	$ 9,800.
(SCA)	Transp. 7 truckloads X 113 mi. X $3.78/mi.	3,000.
	Labor & equipment	5,400.
	Containers superbags 140 @ $20.	2,800.
	Professional engineering services	1,000.
	TOTAL	$ 22,000.



Toastmaster Inc.

Ingraham Time Products Division
Laurinburg, N C 2835

1. Waste Treatment Tanks - 2 @ 15,000 Gal. Ea
   (Security Fenced) 2 @ 3,000 Gal. Ea
2. Lagoon (Primary) For Holding Treated Supern
   (Overflow Drain Is Permanently Deactivated.
   (Security Fenced.)
   50 Ft. X 80 Ft. X 5 Ft. Deep
3. Standby Lagoon For Temporary Retention O
   Treated Supernate When Cleaning Primary
   30 Ft. X 170 Ft. X 5 Ft.
4. Filter Beds - 2 - 20 Ft. X 20 Ft. With Sub
   Pump For Returning Supernate To Treatment T
   (Drain Line Is Permanently Deactivated.)
   (Security Fenced)
5. Burial Area, Stablized And Dried Sludge.

GROUNDWATER WELLS

WELL NO.	DEPTH
1	24.6 FT.
2	30.0 FT.
3	19.5 FT.
4	18.0 FT.
5	25.0 FT. (REFERENCE)

Reference #7

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 1 - SITE LOCATION AND INSPECTION INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NC	D037160439

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site)	02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER				
Toastmaster, Inc.	Old Laurel Hill Church Road				
03 CITY	04 STATE	05 ZIP CODE	06 COUNTY	07 COUNTY CODE	08 CONG DIST
Laurinburg	NC	28352	Scotland	83	8

09 COORDINATES — LATITUDE 34 48 10 . — LONGITUDE 079 27 42 . —

10 TYPE OF OWNERSHIP (Check one): [X] A. PRIVATE [ ] B. FEDERAL ____ [ ] C. STATE [ ] D. COUNTY [ ] E. MUNICIPAL [ ] F. OTHER ____ [ ] G. UNKNOWN

III. INSPECTION INFORMATION

01 DATE OF INSPECTION	02 SITE STATUS	03 YEARS OF OPERATION
12 / 18 / 84 (MONTH DAY YEAR)	[X] ACTIVE [ ] INACTIVE	1959 / — (BEGINNING YEAR / ENDING YEAR) (on-site TSD activity ceased August 1983) ___ UNKNOWN

04 AGENCY PERFORMING INSPECTION (Check all that apply): [ ] A. EPA [ ] B. EPA CONTRACTOR ____ (Name of firm) [ ] C. MUNICIPAL [ ] D. MUNICIPAL CONTRACTOR ____ (Name of firm) [X] E. STATE [ ] F. STATE CONTRACTOR ____ (Name of firm) [ ] G. OTHER ____ (Specify)

05 CHIEF INSPECTOR	06 TITLE	07 ORGANIZATION	08 TELEPHONE NO.
Len Bramble	Envir. Engineer	NC DHR/DHS	(919) 733-2178

09 OTHER INSPECTORS	10 TITLE	11 ORGANIZATION	12 TELEPHONE NO.
Mark Durway	Geologist	NC DHR/DHS	(919) 733-2178
			( )
			( )
			( )
			( )

13 SITE REPRESENTATIVES INTERVIEWED	14 TITLE	15 ADDRESS	16 TELEPHONE NO
Ralph J. Ronalter, VP & GM	V.P., Gen. Mgr.	Toastmaster, Laurinburg	(919) 276-3101
Frankie Ciandella, Chem.		Toastmaster, Laurinburg	(919) 276-3101
Richard Page		Toastmaster, Laurinburg	(919) 276-3101
L.J. Watts		Toastmaster, Laurinburg	(919) 276-3101
			( )
			( )

17 ACCESS GAINED BY (Check one)	18 TIME OF INSPECTION	19 WEATHER CONDITIONS
[X] PERMISSION [ ] WARRANT	1200-1600	Partly cloudy, About 65 Degrees F

IV. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency/Organization)	03 TELEPHONE NO.
Ralph J. Ronalter	Toastmaster, Laurinburg	(919) 276-3101

04 PERSON RESPONSIBLE FOR SITE INSPECTION FORM	05 AGENCY	06 ORGANIZATION	07 TELEPHONE NO.	08 DATE
Len Bramble	NC DHR/DHS	SHW Mgmt. Br.	(919) 733-2178	03 / 29 / 85 (MONTH DAY YEAR)

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NC	D037160439

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

- ☐ A. SOLID
- ☐ B. POWDER, FINES
- ☒ C. SLUDGE
- ☐ D. OTHER _____ (Specify)
- ☐ E. SLURRY
- ☒ F. LIQUID
- ☐ G. GAS

02 WASTE QUANTITY AT SITE (Measures of waste quantities must be independent)

TONS _____
CUBIC YARDS Unknown
NO. OF DRUMS _____

03 WASTE CHARACTERISTICS (Check all that apply)

- ☒ A. TOXIC
- ☐ B. CORROSIVE
- ☐ C. RADIOACTIVE
- ☐ D. PERSISTENT
- ☒ E. SOLUBLE
- ☐ F. INFECTIOUS
- ☐ G. FLAMMABLE
- ☐ H. IGNITABLE
- ☐ I. HIGHLY VOLATILE
- ☐ J. EXPLOSIVE
- ☐ K. REACTIVE
- ☐ L. INCOMPATIBLE
- ☐ M. NOT APPLICABLE

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE	Unknown		Electroplating sludge was
OLW	OILY WASTE			treated on-site; treatment system
SOL	SOLVENTS	Unknown		utilized unlined surface
PSD	PESTICIDES			impoundments and filter beds.
OCC	OTHER ORGANIC CHEMICALS			From 1977 to 1980, treated electroplat
IOC	INORGANIC CHEMICALS			sludge was disposed in on-site burial
ACD	ACIDS			trenches.
BAS	BASES			
MES	HEAVY METALS			

IV. HAZARDOUS SUBSTANCES (See Appendix for most frequently cited CAS Numbers)

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION
MES	Chromium	7440473	These wastes were	N.D.	——
MES	Lead	7440439	treated and disposed	0.58	mg/l
MES	Nickel	7440020	on-site from 1977	5.0	mg/l
IOC	Cyanide	57125	till 10-31-80.	Unknown	——
SOL	Trichloroethylene	79016		N.D.	——
SOL	1,1,1-Trichloroethane	71556		N.D.	——
				(Above concentrations	
				were obtained using	
				extraction procedure)	

V. FEEDSTOCKS (See Appendix for CAS Numbers)

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS	N/A		FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

1. Sample Analyses (See Appendix B) provided by the NC DHR/DHS State Laboratory of Public Health.
2. Preliminary Assessment form for this site.
3. Files at the NC Solid and Hazardous Waste Management Branch, Raleigh, NC.

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NC	D037160439

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 [X] A. GROUNDWATER CONTAMINATION — 02 [X] OBSERVED (DATE: 12/18/84) — [ ] POTENTIAL — [X] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

See sample analysis from Well #4 (lead and nickel).

01 [X] B. SURFACE WATER CONTAMINATION — 02 [ ] OBSERVED (DATE: _____) — [X] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

Site is adjacent to Leith Creek.

01 [ ] C. CONTAMINATION OF AIR — 02 [ ] OBSERVED (DATE: _____) — [ ] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

Not suspected at this time.

01 [ ] D. FIRE/EXPLOSIVE CONDITIONS — 02 [ ] OBSERVED (DATE: _____) — [ ] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

Not suspected at this time.

01 [X] E. DIRECT CONTACT — 02 [ ] OBSERVED (DATE: _____) — [X] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

In area of sludge burial trenches although these are covered at present.

01 [X] F. CONTAMINATION OF SOIL — 02 [X] OBSERVED (DATE: 12/18/84) — [ ] POTENTIAL — [X] ALLEGED
03 AREA POTENTIALLY AFFECTED: _____ (Acres) 04 NARRATIVE DESCRIPTION

Around sludge burial trenches.

01 [X] G. DRINKING WATER CONTAMINATION — 02 [ ] OBSERVED (DATE: _____) — [X] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

Groundwater contamination is known although there are no known users nearby.

01 [ ] H. WORKER EXPOSURE/INJURY — 02 [ ] OBSERVED (DATE: _____) — [ ] POTENTIAL — [ ] ALLEGED
03 WORKERS POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

Not suspected at this time.

01 [ ] I. POPULATION EXPOSURE/INJURY — 02 [ ] OBSERVED (DATE: _____) — [ ] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

Not suspected at this time.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NC	D037160439

II. HAZARDOUS CONDITIONS AND INCIDENTS (Continued)

01 ☐ J. DAMAGE TO FLORA — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

Not suspected at this time.

01 ☐ K. DAMAGE TO FAUNA — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION (Include name(s) of species)

Not suspected at this time.

01 ☐ L. CONTAMINATION OF FOOD CHAIN — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

Not suspected at this time.

01 ☒ M. UNSTABLE CONTAINMENT OF WASTES (Spills/Runoff/Standing liquids, Leaking drums) — 02 ☒ OBSERVED (DATE: 12/18/84) ☐ POTENTIAL ☒ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

Sludge burial trenches.

01 ☒ N. DAMAGE TO OFFSITE PROPERTY — 02 ☐ OBSERVED (DATE: _____) ☒ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

Via groundwater contamination.

01 ☐ O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

Not suspected at this time.

01 ☐ P. ILLEGAL/UNAUTHORIZED DUMPING — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

Not suspected at this time.

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS

None known.

III. TOTAL POPULATION POTENTIALLY AFFECTED: None known.

IV. COMMENTS

Recommend sampling of all wells that were not sampled as part of this site investigation.

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

As previously cited.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION
PART 4 - PERMIT AND DESCRIPTIVE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NC	D037160439

II. PERMIT INFORMATION

01 TYPE OF PERMIT ISSUED (Check all that apply)	02 PERMIT NUMBER	03 DATE ISSUED	04 EXPIRATION DATE	05 COMMENTS
☐ A. NPDES	NC 0005053	4-20-83	3-31-88	
☐ B. UIC				
☐ C. AIR	4302R			
☐ D. RCRA				
☐ E. RCRA INTERIM STATUS				
☐ F. SPCC PLAN				
☐ G. STATE (Specify)				
☐ H. LOCAL (Specify)				
☐ I. OTHER (Specify)				
☐ J. NONE				

III. SITE DESCRIPTION

01 STORAGE/DISPOSAL (Check all that apply)	02 AMOUNT	03 UNIT OF MEASURE
☒ A. SURFACE IMPOUNDMENT (2)	150,000 190,000	gal. gal.
☐ B. PILES		
☐ C. DRUMS, ABOVE GROUND		
☐ D. TANK, ABOVE GROUND		
☐ E. TANK, BELOW GROUND		
☒ F. LANDFILL	0.5	acres
☐ G. LANDFARM		
☐ H. OPEN DUMP		
☐ I. OTHER (Specify)		

04 TREATMENT (Check all that apply)

- ☐ A. INCENERATION
- ☐ B. UNDERGROUND INJECTION
- ☐ C. CHEMICAL/PHYSICAL
- ☐ D. BIOLOGICAL
- ☐ E. WASTE OIL PROCESSING
- ☐ F. SOLVENT RECOVERY
- ☐ G. OTHER RECYCLING/RECOVERY
- ☐ H. OTHER (Specify)

05 OTHER

- ☒ A. BUILDINGS ON SITE

06 AREA OF SITE: 10 (Acres)

07 COMMENTS

Surface Impoundments - closed under RCRA in August 1983.

Landfill - sludge, buried in on-site trenches, remains in situ.

IV. CONTAINMENT

01 CONTAINMENT OF WASTES (Check one)

☐ A. ADEQUATE, SECURE ☐ B. MODERATE ☒ C. INADEQUATE, POOR ☐ D. INSECURE, UNSOUND, DANGEROUS

02 DESCRIPTION OF DRUMS, DIKING, LINERS, BARRIERS, ETC.

N/A

V. ACCESSIBILITY

01 WASTE EASILY ACCESSIBLE: ☒ YES ☐ NO

02 COMMENTS

Unrestricted access to sludge burial area.

VI. SOURCES OF INFORMATION (Cite specific references, e.g. state files, sample analysis, reports)

1. RCRA Part A.
2. As previously cited.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NC	D037160439

II. DRINKING WATER SUPPLY

01 TYPE OF DRINKING SUPPLY (Check as applicable)

	SURFACE	WELL
COMMUNITY	A. ☐	B. ☒
NON-COMMUNITY	C. ☐	D. ☒

02 STATUS Not affected at present/ wells are upgradient from site.

ENDANGERED	AFFECTED	MONITORED
A. ☐	B. ☐	C. ☐
D. ☐	E. ☐	F. ☐

03 DISTANCE TO SITE
A. _____ (mi)
B. ½ (mi)

III. GROUNDWATER

01 GROUNDWATER USE IN VICINITY (Check one)

☐ A. ONLY SOURCE FOR DRINKING ☒ B. DRINKING (Other sources available) COMMERCIAL, INDUSTRIAL, IRRIGATION (No other water sources available) ☐ C. COMMERCIAL, INDUSTRIAL, IRRIGATION (Limited other sources available) ☐ D. NOT USED, UNUSEABLE

02 POPULATION SERVED BY GROUND WATER 25-50

03 DISTANCE TO NEAREST DRINKING WATER WELL ½ (mi)

04 DEPTH TO GROUNDWATER	05 DIRECTION OF GROUNDWATER FLOW	06 DEPTH TO AQUIFER OF CONCERN	07 POTENTIAL YIELD OF AQUIFER	08 SOLE SOURCE AQUIFER
4-8 (ft)	S-SW	Unknown (ft)	Unknown (gpd)	☒ YES ☐ NO

09 DESCRIPTION OF WELLS (Including useage, depth, and location relative to population and buildings)

No known wells closer than ½ mile. These wells were sampled during 8/84 site investigation of Rea Magnet Wire (NC D002972966).

10 RECHARGE AREA
☒ YES ☐ NO
COMMENTS: For Leith Creek watershed.

11 DISCHARGE AREA
☒ YES ☐ NO
COMMENTS: Leith Creek is adjacent to site.

IV. SURFACE WATER

01 SURFACE WATER USE (Check one)

☐ A. RESERVOIR, RECREATION DRINKING WATER SOURCE ☒ B. IRRIGATION, ECONOMICALLY IMPORTANT RESOURCES ☐ C. COMMERCIAL, INDUSTRIAL ☐ D. NOT CURRENTLY USED

02 AFFECTED/POTENTIALLY AFFECTED BODIES OF WATER

NAME	AFFECTED	DISTANCE TO SITE
Leith Creek	☐	adjacent (mi)
	☐	(mi)
	☐	(mi)

V. DEMOGRAPHIC AND PROPERTY INFORMATION

01 TOTAL POPULATION WITHIN

ONE (1) MILE OF SITE	TWO (2) MILES OF SITE	THREE (3) MILES OF SITE
A. 1000 NO. OF PERSONS	B. 10,000 NO. OF PERSONS	C. 15,000 NO. OF PERSONS

02 DISTANCE TO NEAREST POPULATION ¼ (mi)

03 NUMBER OF BUILDINGS WITHIN TWO (2) MILES OF SITE: Hundreds

04 DISTANCE TO NEAREST OFF-SITE BUILDING ¼ (mi)

05 POPULATION WITHIN VICINITY OF SITE (Provide narrative description of nature of population within vicinity of site, e.g., rural, village, densely populated urban area)

Predominately rural within ½ mile radius of site.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NC	D037160439

VI. ENVIRONMENTAL INFORMATION

01 PERMEABILITY OF UNSATURATED ZONE (Check one)

☐ A. $10^{-6} - 10^{-8}$ cm/sec ☐ B. $10^{-4} - 10^{-6}$ cm/sec ☐ C. $10^{-4} - 10^{-3}$ cm/sec ☒ D. GREATER THAN 10^{-3} cm/sec

02 PERMEABILITY OF BEDROCK (Check one)

☐ A. IMPERMEABLE (Less than 10^{-6} cm/sec) ☐ B. RELATIVELY IMPERMEABLE ($10^{-4} - 10^{-6}$ cm/sec) ☐ C. RELATIVELY PERMEABLE ($10^{-2} - 10^{-4}$ cm/sec) ☐ D. VERY PERMEABLE (Greater than 10^{-2} cm/sec)

03 DEPTH TO BEDROCK	04 DEPTH OF CONTAMINATED SOIL ZONE	05 SOIL pH
300 (ft)	several feet at burial trenches (ft)	6.0

06 NET PRECIPITATION	07 ONE YEAR 24 HOUR RAINFALL	08 SLOPE: SITE SLOPE	DIRECTION OF SITE SLOPE	TERRAIN AVERAGE SLOPE
4 (in)	3.25 (in)	1.7 %	SW	low-mod. %

09 FLOOD POTENTIAL

SITE IS IN _____ YEAR FLOODPLAIN

10 ☐ SITE IS ON BARRIER ISLAND, COASTAL HIGH HAZARD AREA, RIVERINE FLOODWAY

11 DISTANCE TO WETLANDS (5 acre minimum)

ESTUARINE: A. N/A (mi)

OTHER: B. 0.1 (mi)

12 DISTANCE TO CRITICAL HABITAT (of endangered species)

_____ (mi) N/A

ENDANGERED SPECIES: _____

13 LAND USE IN VICINITY

DISTANCE TO:

COMMERCIAL/INDUSTRIAL	RESIDENTIAL AREAS; NATIONAL/STATE PARKS, FORESTS, OR WILDLIFE RESERVES	AGRICULTURAL LANDS: PRIME AG LAND	AGRICULTURAL LANDS: AG LAND
A. 0 (mi)	B. ½ (mi)	C. ½ (mi)	D. ½ (mi)

14 DESCRIPTION OF SITE IN RELATION TO SURROUNDING TOPOGRAPHY

Site is situated on low to moderately sloping terrain. Slope direction is to the south towards Leith Creek. Site slope is approximately 7'/420' or 1.7%.

VII. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

1. North Carolina Atlas, Clay, Orr, Stuart, 1975, which includes maps from US Environmental Data Service and National Weather Service.
2. Site map of facility plan and topography, provided by Toastmaster.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 6 - SAMPLE AND FIELD INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NC	D037160439

II. SAMPLES TAKEN

SAMPLE TYPE	01 NUMBER OF SAMPLES TAKEN	02 SAMPLES SENT TO	03 ESTIMATED DATE RESULTS AVAILABLE
GROUNDWATER	1	NC DHS	Now
SURFACE WATER			
WASTE	1	NC DHS	Now
AIR			
RUNOFF			
SPILL			
SOIL	2	NC DHS	Now
VEGETATION			
OTHER			

III. FIELD MEASUREMENTS TAKEN

01 TYPE	02 COMMENTS

IV. PHOTOGRAPHS AND MAPS

01 TYPE ☒ GROUND ☐ AERIAL

02 IN CUSTODY OF NC Solid and Haz. Waste Mgmt. Branch.
(Name of organization or individual)

03 MAPS ☒ YES ☐ NO

04 LOCATION OF MAPS NC DHR/DHS Solid and Hazardous Waste Mgmt. Branch, Raleigh, NC.

V. OTHER FIELD DATA COLLECTED (Provide narrative description)

Photographs and notes.

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

As previously cited.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 7 - OWNER INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NC	D037160439

II. CURRENT OWNER(S)				PARENT COMPANY (If applicable)			
01 NAME		02 D+B NUMBER		08 NAME		09 D+B NUMBER	
Magic Chef Inc.							
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE		10 STREET ADDRESS (P.O. Box, RFD #, etc.)		11 SIC CODE	
740 King Edward Avenue							
05 CITY	06 STATE	07 ZIP CODE		12 CITY	13 STATE	14 ZIP CODE	
Cleveland	TN	37311					
01 NAME (Tel. 615/472-3371)		02 D+B NUMBER		08 NAME		09 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE		10 STREET ADDRESS (P.O. Box, RFD #, etc.)		11 SIC CODE	
05 CITY	06 STATE	07 ZIP CODE		12 CITY	13 STATE	14 ZIP CODE	
01 NAME		02 D+B NUMBER		08 NAME		09 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE		10 STREET ADDRESS (P.O. Box, RFD #, etc.)		11 SIC CODE	
05 CITY	06 STATE	07 ZIP CODE		12 CITY	13 STATE	14 ZIP CODE	
01 NAME		02 D+B NUMBER		08 NAME		09 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE		10 STREET ADDRESS (P.O. Box, RFD #, etc.)		11 SIC CODE	
05 CITY	06 STATE	07 ZIP CODE		12 CITY	13 STATE	14 ZIP CODE	

III. PREVIOUS OWNER(S) (List most recent first)				IV. REALTY OWNER(S) (If applicable; list most recent first)			
01 NAME		02 D+B NUMBER		01 NAME		02 D+B NUMBER	
Toastmaster, Inc.							
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE		03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE	
05 CITY	06 STATE	07 ZIP CODE		05 CITY	06 STATE	07 ZIP CODE	
Columbia	MO						
01 NAME		02 D+B NUMBER		01 NAME		02 D+B NUMBER	
McGraw Edison Co.							
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE		03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE	
05 CITY	06 STATE	07 ZIP CODE		05 CITY	06 STATE	07 ZIP CODE	
Elgin	IL						
01 NAME		02 D+B NUMBER		01 NAME		02 D+B NUMBER	
Ingraham Co.							
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE		03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE	
05 CITY	06 STATE	07 ZIP CODE		05 CITY	06 STATE	07 ZIP CODE	
Bristol	CT						

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

As previously cited.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 8 - OPERATOR INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NC	D037160439

II. CURRENT OPERATOR (Provide if different from owner)

01 NAME	02 D+B NUMBER
Toastmaster Inc.	037160439

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
Old Laurel Hill Church Rd.	

05 CITY	06 STATE	07 ZIP CODE
Laurinburg	NC	28352

08 YEARS OF OPERATION	09 NAME OF OWNER

OPERATOR'S PARENT COMPANY (If applicable)

10 NAME	11 D+B NUMBER

12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE

14 CITY	15 STATE	16 ZIP CODE

III. PREVIOUS OPERATOR(S) (List most recent first; provide only if different from owner)

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD

PREVIOUS OPERATORS' PARENT COMPANIES (If applicable)

10 NAME	11 D+B NUMBER

12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE

14 CITY	15 STATE	16 ZIP CODE

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD

10 NAME	11 D+B NUMBER

12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE

14 CITY	15 STATE	16 ZIP CODE

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD

10 NAME	11 D+B NUMBER

12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE

14 CITY	15 STATE	16 ZIP CODE

IV. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

1. Letter to Lenox E. Bramble from R.J. Ronalter, Sr. at Toastmaster, Inc., 9-13-84.
2. As previously cited.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 9 - GENERATOR/TRANSPORTER INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NC	D037160439

II. ON-SITE GENERATOR

01 NAME	02 D+B NUMBER
see Part 8, II .01	

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

III. OFF-SITE GENERATOR(S)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE

IV. TRANSPORTER(S)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

As previously cited.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NC	D037160439

II. PAST RESPONSE ACTIVITIES

01 ☐ A. WATER SUPPLY CLOSED — 02 DATE ____ — 03 AGENCY ____
04 DESCRIPTION

01 ☐ B. TEMPORARY WATER SUPPLY PROVIDED — 02 DATE ____ — 03 AGENCY ____
04 DESCRIPTION

01 ☐ C. PERMANENT WATER SUPPLY PROVIDED — 02 DATE ____ — 03 AGENCY ____
04 DESCRIPTION

01 ☐ D. SPILLED MATERIAL REMOVED — 02 DATE ____ — 03 AGENCY ____
04 DESCRIPTION

01 ☒ E. CONTAMINATED SOIL REMOVED — 02 DATE 8/1983 — 03 AGENCY ____
04 DESCRIPTION 181.6 tons of contaminated soil was removed during closure of lagoons and sand filter bed. Waste was manifested to SCA in Pinewood, SC.

01 ☐ F. WASTE REPACKAGED — 02 DATE ____ — 03 AGENCY ____
04 DESCRIPTION

01 ☐ G. WASTE DISPOSED ELSEWHERE — 02 DATE ____ — 03 AGENCY ____
04 DESCRIPTION

01 ☒ H. ON SITE BURIAL — 02 DATE ____ — 03 AGENCY ____
04 DESCRIPTION
Sludge burial trenches from 1977 to 1980.

01 ☐ I. IN SITU CHEMICAL TREATMENT — 02 DATE ____ — 03 AGENCY ____
04 DESCRIPTION

01 ☐ J. IN SITU BIOLOGICAL TREATMENT — 02 DATE ____ — 03 AGENCY ____
04 DESCRIPTION

01 ☐ K. IN SITU PHYSICAL TREATMENT — 02 DATE ____ — 03 AGENCY ____
04 DESCRIPTION

01 ☐ L. ENCAPSULATION — 02 DATE ____ — 03 AGENCY ____
04 DESCRIPTION

01 ☐ M. EMERGENCY WASTE TREATMENT — 02 DATE ____ — 03 AGENCY ____
04 DESCRIPTION

01 ☐ N. CUTOFF WALLS — 02 DATE ____ — 03 AGENCY ____
04 DESCRIPTION

01 ☐ O. EMERGENCY DIKING/SURFACE WATER DIVERSION — 02 DATE ____ — 03 AGENCY ____
04 DESCRIPTION

01 ☐ P. CUTOFF TRENCHES/SUMP — 02 DATE ____ — 03 AGENCY ____
04 DESCRIPTION

01 ☐ Q. SUBSURFACE CUTOFF WALL — 02 DATE ____ — 03 AGENCY ____
04 DESCRIPTION

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NC	D037160439

II. PAST RESPONSE ACTIVITIES (Continued)

01 ☐ R. BARRIER WALLS CONSTRUCTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ S. CAPPING/COVERING — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ T. BULK TANKAGE REPAIRED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ U. GROUT CURTAIN CONSTRUCTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ V. BOTTOM SEALED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ W. GAS CONTROL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ X. FIRE CONTROL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ Y. LEACHATE TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ Z. AREA EVACUATED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☒ 1. ACCESS TO SITE RESTRICTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
Unrestricted.

01 ☐ 2. POPULATION RELOCATED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ 3. OTHER REMEDIAL ACTIVITIES — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

III. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

1. Letter from Ralph J. Ronalter of Toastmaster to O.W. Strickland, 10-14-83.
2. As previously cited.

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 11 - ENFORCEMENT INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NC	D037160439

II. ENFORCEMENT INFORMATION

01 PAST REGULATORY/ENFORCEMENT ACTION ☐ YES ☐ NO

C2 DESCRIPTION OF FEDERAL, STATE, LOCAL REGULATORY/ENFORCEMENT ACTION

The NC DHR/DHS Solid and Hazardous Waste Management Branch approved Toastmaster's plan for closure of its filter bed and two lagoons in a letter dated 5-23-83. Closure called for removal of contaminated soil at these three land units, installation of five monitoring wells, and sampling.

III. SOURCES OF INFORMATION *(Cite specific references, e.g., state files, sample analysis, reports)*

As previously cited.

Reference #8

KOONCE, NOBLE & ASSOCIATES, Inc.
CONSULTING ENGINEERS

RECEIVED
NOV 3 1983
SOLID & HAZARDOUS WASTE MANAGEMENT BRANCH

November 2, 1983

Mr. O. W. Strickland, Head
Solid Hazardous Waste Management Branch
Environmental Health Section
North Carolina Division of Health Services
Post Office Box 2091
Raleigh, North Carolina 27602-2091

Attention Mr. Jerry Rhodes

Dear Sir:

RE: Closure Plan for Primary Lagoon, Filter Bed, and Secondary Lagoon, Toastmaster, Inc., Laurinburg, North Carolina

The purpose of this letter is to certify that on October 31, 1983, a final inspection was held on the above-referenced project. As of that date, the primary lagoon and sand filter had been closed in accordance with the specifications in the closure plan as approved in your letter of May 23, 1983. The certification is expanded to also include the secondary lagoon which was closed in accordance with an agreed to modification of the closure plan.

Well water samples were collected October 3, 1983, and are to be collected again in six months.

Sincerely,

KOONCE, NOBLE & ASSOC., INC.

Sam R Noble Jr.

Sam R. Noble, Jr., P. E.

SRNjr/ftf

cc: Mr. Richard Page

208 EAST FIFTH STREET • P. O. Box 1027 • LUMBERTON, N. C. 28358 • (910) 738-9376

Reference #9

CORRECTIVE ACTION PLAN

PREPARED FOR TOASTMASTER, INC.
1801 North Stadium Drive
Columbia, Missouri

Ingraham Time Products Facility
Laurinburg, North Carolina
RC&A Project # 92196

February 2, 1993

RICHARD CATLIN & ASSOCIATES, INC.
P.O. BOX 10279
WILMINGTON, NORTH CAROLINA 28405
(919) 452-5861

• REPRODUCTIONS •

This report has been prepared on behalf of and exclusively for the use of Toastmaster, Inc.. This report and findings contained herein shall not, in whole or in part, be disseminated or conveyed to any parties other than Toastmaster, Inc. or be used or relied upon by any other party, in whole or in part, without Toastmaster, Inc. and Richard Catlin & Associates, Inc. prior written consent.

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TABLES:

TABLE I SUMMARY OF GROUND WATER ANALYTICAL RESULTS

FIGURES:

FIGURE 1 VICINITY MAP
FIGURE 2 SITE MAP WITH WELL LOCATIONS
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FIGURE 8 REMEDIATION SYSTEM LAYOUT
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FIGURE 10 RECOVERY WELL DETAIL
FIGURE 11 INFILTRATION GALLERY DETAIL

APPENDICES:

APPENDIX I COMPILED FIELD DATA/BORING LOGS
APPENDIX II DESIGN CALCULATIONS
APPENDIX III SPECIFICATIONS
APPENDIX IV PERMITTING
APPENDIX V PREVIOUS REPORTS

CORRECTIVE ACTION PLAN

INGRAHAM TIME PRODUCTS DIVISION FACILITY
TOASTMASTER, INC.
LAURINBURG, NORTH CAROLINA

PREPARED FOR TOASTMASTER, Inc.
February 2, 1993

I. PURPOSE OF REPORT:

The purpose of this Corrective Action Plan (CAP) is to address the remediation of ground water contaminated with trichloroethene (TCE) proposed in the March, 26 1991 Site Characterization Report (SCR; Appendix V, Previous Reports) prepared by *Groundwater Technology, Inc.* (*GTI*) and subsequent field data gathered by Richard Catlin & Associates, Inc. (RC&A). This report should:

- *Provide details of proposed corrective actions for review and approval by the North Carolina Division of Environmental Management, Ground Water Section*
- *Provide back up material for requests for permitting*
- *Provide schematic design and detail of the proposed corrective actions*

II. PROBLEM REVIEW:

The Toastmaster, Inc. Ingraham Time Products Division Facility is located on SR 1301, north of Laurinburg, North Carolina (see Figures 1&2). TCE reportedly was used at this site as a machinery degreaser between 1960 and 1984. The SCR prepared for this site located three areas of higher ground water contamination (see Appendix V Figure 11). These locations are in the vicinity of monitoring wells MW-4 (6,000 ppb), MW-5 (6,900 ppb), and MW-7 (12,000 ppb). It is the intent of this CAP to mitigate ground water contamination identified in these three areas of higher ground water contamination.

The *GTI* SCR identified ground water as flowing in a south-southwesterly direction (see Appendix V, Previous Reports, Figure 10, Ground Water Gradient Map). TCE is soluble in water and, as reported in the *GTI* SCR, believed to be migrating horizontally with ground water flow. TCE has a specific gravity greater than water (S_g=1.44 at 20°C) and is believed to be migrating downward, in the vertical direction, as well.

The horizontal extent of ground water contamination was investigated in the SCR. According to the *GTI* SCR, the TCE plume has migrated south, off site, but is bounded on three upgradient sides. Subsequent to the *GTI* report, RC&A constructed a map of *strictly* interpolated contaminant isocontours for TCE from the February 1991 analytical data (see Figure 3). Isocontours depicted in Figure 3 are strictly interpolated and, therefore, differ from those shown in the *GTI* SCR Figure 11. A summary of the

ground water analytical data from the GTI SCR is provided as follows.

TABLE I -- Summary of Ground Water Analytical Results
Concentrations in parts per billion

WELL	Trichloroethene
MW-1	250
MW-2	110
MW-3	2,200
MW-4	6,000
MW-5	6,900
MW-6	2,900
MW-7	12,000
GT-8	BDL
GT-9	870
GT-10	25
GT-11	BDL
GT-12	93
GT-13	950
GT-14	870
*RC-15	BDL
**RW-1	2,000

NCAC 2L ground water action level for TCE is 2.8 parts per billion
BDL= below detectable limits
* sampled on July 22, 1992 by RC&A
** sampled on November 13, 1992 by RC&A

The vertical extent of ground water contamination was also investigated but not completely defined according to the *GTI* SCR. Subsequent to the *GTI* report RC&A installed a telescoping well (RC-15). Well RC-15 is screened from sixty-five to seventy feet in a clayey sand layer. This layer is overlain by a clay layer that extends from approximately forty-five to sixty two feet. A ground water sample collected from well RC-15 was analyzed for TCE and exhibited no detectable levels of contamination. The vertical extent of ground water contamination is believed to terminate at approximately forty five or above the dense clay layer as referenced above.

Although the lithology of this site is diverse, two significant zones of low permeability have been identified. The first zone is present at a depth of approximately fifteen feet below the ground surface and appears to thin out towards the south end of the site. The boring log for RW-1 shows this layer as being approximately two feet thick. While this layer may act as an aquatard, it does not appear to be continous across

the site and therefore ha[illegible]t stopped the downward migrati[illegible] of TCE.

The second zone of low permeability begins at a depth of approximately forty-five to fifty feet and, as discussed above, appears to be restrict the downward migration of contamination.

III. GOALS OF REMEDIATION:

The goal of remediation is to mitigate ground water contamination in the areas of greater contamination. These areas were identified in the *GTI* SCR as being proximate to MW-4, MW-5, and MW-7.

III.A. Source Removal or Reduction:

The source of ground water contamination surrounding MW-5 is thought to be the result of an indiscriminant surface spillage near a door located on the Northwest side of the building. The area surrounding MW-7 was a former fire staging site for the training of fire fighting personnel and fire brigades. Ground water contamination in the area of MW-4 is believed to be associated with the disposal of sludges from waste treatment. Since this facility no longer handles TCE, sources of further contamination have been eliminated.

III.B. Plume Containment:

Ground water contamination is apparently migrating in both the horizontal and vertical directions. In an attempt to recover the contaminant plume and impede its movement, recovery well placement has been proposed in the areas of greater ground water contamination to maximize the area of influence affected by pumping. Recovery wells are proposed to be screened immediately above the zone of low permeability located at a depth of approximately forty-five feet underlying the areas of higher ground water contamination. Based on a review of the drilling logs, standard penetration testing, and pump test data -- this zone of low permeability appears to be a substantial aquatard. Pumping above this formation, where coarser sediments exist, should maximize the cone of depression created by pumping -- maximizing contaminant plume recovery. While the proposed system will not completely contain the plume, the areas of highest contaminant concentrations will be affected.

Based on the distance-drawdown analysis performed from data collected during the pump test (contained in Appendix I, Compiled Field Data), three ground water recovery wells have been proposed. Recovery wells are proposed in the vicinity of MW-4, MW-5, and MW-7 (see Figure 8, Remediation System Layout). A more detailed discussion of recovery well placement is contained in Section V.C, Ground Water Extraction.

III.C. Site Rehabilitation Levels:

The goals for ground water remediation are those set forth in North Carolina Administrative Code, Title 15, Subchapter 2L, or as required by the NCDEM. Current

action levels for ground water contaminated with TCE is 2.8 parts per billion. While these goals may be difficult to obtain, long term monitoring of the ground water may provide useful data for establishing optimal cleanup goals.

IV. GENERAL DESCRIPTION OF REMEDIATION PLAN:

In an attempt to impede the rate of ground water contaminant migration and reduce the levels of contamination, a network of recovery wells is proposed. The recovered ground water will be treated by aeration prior to being discharged into an infiltration gallery on site. The actions recommended for remediation of ground water contaminated with TCE are planned as follows.

V. COMPONENT DESIGNS AND SPECIFICATIONS:

The calculations for design of the proposed ground water recovery system are contained in Appendix II, Design Calculations. The proposed system design is shown in Figure 8, Remediation System Layout and is detailed in Appendix III, Specifications.

V.A. Free Product Removal:

Free product was not detected at this site during the preparation of the *GTI* SCR or subsequent investigations. Therefore, provisions for removal of free product have not been included in this design.

V.B. Soil Remediation:

Flame ionization detector readings recorded during well installations (for wells constructed by *GTI)* are summarized in Table 1 of the SCR (Appendix V, Previous Reports). Because no consistent area of significant soil contamination has been identified, active measures to remediate soil are not proposed.

V.C. Ground Water Extraction:

From the data collected by RC&A during the September 29, 1992 pump test (see Appendix I, Compiled Field Data), potentiometric maps drawn for this location (see Figures 4 and 5), and the distance-drawdown analysis performed – a ground water recovery well network has been designed. Ground water extraction is proposed through a network of three recovery wells (see Figure 8, Remediation System Layout).

To determine aquifer response, one well, RW-1, was installed in the vicinity of well MW-4. This four inch diameter well was installed immediately above the clay layer identified at fifty feet below the land surface (see Appendix I, Boring Logs) in a coarse sand layer (well screen is from thirty to fifty feet). This location was selected to utilize the other monitoring wells installed in the area as data points and to serve as a recovery well in the future. Well RW-1 was pumped at a constant rate of nine gallons per minute. After 360 minutes, the draw down measured in well RW-1 was 7.53 feet. The

draw down in surrounding wells is as follows: well GT-12, located 250 feet downgradient was drawn down 0.12 feet; MW-2 located 165 feet upgradient was drawn down 3.27 feet; MW-3 located 105' downgradient was drawn down 1.07'; MW-4 located 15' downgradient was drawn down 0.66'; MW-6 located 70' downgradient was drawn down 2.53' (see Appendix I, Compiled Field Data).

In designing the ground water recovery system, an important consideration was effluent discharge. The selected discharge option (see section V.E. for discussion) is infiltration back into the subsurface. Economic considerations associated with constuction of an infiltration gallery limit effluent discharge to twenty gallons per minute (see section V.E.2). Therefore, a recovery well network has been designed to maximize contaminant collection for a combined recovery rate of twenty gallons per minute. Downgradient recovery well RW-1 is proposed to be pumped at a rate of five gallons per minute. From the distance-drawdown relationships noted above, this pumping rate should affect a radius of approximately 125 feet. Upgradient well RW-3 is proposed to be pumped at a rate of five gallons per minute (affecting a radius of 125'). Because it is located in the area of greatest ground water contamination, RW-2 is proposed to be pumped at a rate of ten gallons per minute (affecting a radius of approximately 250 feet). RW-1 should provide a measure of leading-edge containment and RW-2 & RW-3 should reduce contaminant concentrations near upgradient source areas.

Ground water recovery wells are proposed to be screened from a depth of thirty to fifty feet below land surface. *GTI* extracted ground water samples from both above twenty feet and below thirty feet. Laboratory analysis of these samples consistently showed that contamination was higher at greater depths.

Using 1¼-inch flex hose running in conduit, head losses for pump selection have been approximated at sixty-three feet (10' depth to water + 8' drawdown + 10' to height of system + 5' of vertical relief + 30' of friction losses). Based on this criteria, a *Grundfos Model 10E5* electric submersible pump, or equivalent unit, has been selected for recovery wells.

V.D. Ground Water Treatment:

The proposed method of ground water treatment includes aeration followed by silt filtration to prevent fouling of the infiltration gallery. Ground water will pumped from the recovery wells into an aeration tank. The treated ground water will then be pumped through a series of silt filters and the effluent discharged into an infiltration gallery.

V.D.1. *Aeration/Air Stripping:*

Aeration has been selected as the primary method for treatment of ground water containing dissolved concentrations of TCE due to the volatility of this compound. A *PECO Model AT-30* aeration tank, or equivalent unit, is recommended for treatment. This unit has been sized to handle flows of up to thirty gallons per minute. Using a safety factor of two, the required air flow to obtain one hundred percent removal of TCE

from recovered ground water has been calculated at eighty cubic feet per minute (see Appendix II, Design Calculations). This aeration system design is based on the volatility of TCE which is derived from the Henry's constant for TCE [450 atm-moles(air) / moles(water)] and an assumed TCE concentration (worse-case well MW-7 was used, 12,000 ppb TCE). Head losses for aeration blower selection are approximated at thirty three inches (H_2O). Aeration tank and air supply (blower) specifications are contained in Appendix III, Specifications.

Estimated TCE air emissions from this system are 2.9 pounds per day. A draft letter of notification to the Air Quality Section of the DEM is included in Appendix IV, Permitting for submission along with the discharge calculations.

V.E. Water Disposal Alternatives:

Ground water disposal options considered are infiltration of effluent back into the subsurface, discharge into the storm sewer, discharge into the sanitary sewer, and pump and haul.

V.E.1. ***Sanitary Sewer:***

Preliminary conversations with Mr. Carl Hegwer of the Laurinburg POTW have indicated that this organization will not accept any form of discharge associated with ground water clean-ups.

V.E.2. ***Infiltration Gallery or Pond:***

Based on site soil descriptions (from both the *GTI* SCR and data gathered since this report), data gathered during the aquifer analysis, and the observed characteristics of the shallow aquifer in this vicinity – the area shallow soils are believed to be suitable, although not optimum, for an infiltration gallery. A gallery has been designed to handle the effluent from the proposed ground water treatment system (see Appendix II, Design Calculations). Infiltration has been selected primarily because no other feasible discharge option exists and because the Toastmaster facility in Laurinburg is located on a piece of property that can accommodate a gallery of the proposed size (see Figure 8, Infiltration Gallery Detail).

V.E.2.a. *Design Parameters:*

The design parameters for the sizing and locating of the infiltration gallery are as follows:

Buffer Zones: Fifty feet from right-of-ways, easements, and property lines

Average Design Flow: Twenty gallons per minute

Gallery Dimensions: 500' long, by 2' wide, by 6' deep

Seasonal High Water Table: Seven to nine feet from land surface across the proposed gallery

Filtration: Treated effluent will be discharged through a centrifugal–particle filter combination

Separation: Two feet of undisturbed soil will separate the base of the gallery from the seasonal high water table

Hydraulic Conductivity of In-situ Soils: 2.33 feet per day (from *GTI* SCR)

A review of the US Department of Agriculture Soil Survey for Scotland County, North Carolina published by the Soil Conservation Service (SCS) in 1976 describes area soils as belonging to the Marlboro series. Based on a review of the boring logs contained in *GTI* SCR and the boring logs contained in Appendix I, area soils are believed to be among those described by the SCS as Marlboro series. These soils are described as being well drained, moderately permeable, with medium water capacity. The following table is cited from the SCS publication.

Depth (in)	Unified Classification	Description	K-value (in/hr)	Shrink-Swell Potential
0-9	SM	sandy loam	2.0 - 6.0	low
9-63	CL	sandy clay, sandy clay loam	0.6 - 2.0	low
63-75	SM,SM-SC,SC	sandy loam	2.0 - 6.0	low

Field values obtained for hydraulic conductivity were gathered by *GTI* and the methods that were used to calculate these values are contained in the SCR (Appendix IV). An average value of 2.33 feet per day (or 1.17 in/hr) was selected for design purposes for area shallow soils. The hydraulic conductivities determined through field tests are considered conservative in comparison with the values provided by SCS.

Infiltration piping will be perforated to allow for distributed flow into the subsurface. To prevent breakout, float switches will be installed in sumps in the trench one foot below the ground surface. Upon activation, the float switches will be triggered and power cut to the recovery pumps preventing further flow into the trench.

Careful monitoring of trench conditions during scheduled inspections will help optimize system operation.

V.E.2.b. *Details*

The location of the infiltration gallery is shown in Figure 8, Remediation System Layout. The proposed gallery is further detailed in Figure 10, Infiltration Gallery Detail.

V.E.2.c. *Permits Required:*

A Non-Discharge permit is required per 15 NCAC 2H Section .0020 prior to construction and operation of the proposed ground water treatment system. This CAP will provide the information necessary for this permit.

V.E.3. *Surface Water Discharge:*

The treatability requirements associated with surface water discharge in comparison to the feasibility of an infiltration gallery makes this option less viable.

V.E.4. *Pump and Haul:*

Due to the large volume of water to be recovered – combined with the feasibility of an infiltration gallery, this option has been deemed impractical.

V.E.5. *Other Disposal Methods:*

No other discharge options were considered during the design of this system.

VI. SYSTEM SAFETY AND SECURITY:

The following provisions have been proposed to secure and safeguard this remediation system from the public.

VI.A. Automatic Shut-Offs and Controls:

Upon loss of air pressure (indicating blower failure) or activation of the high level float switch (indicating overflow) in the aeration tank, the ground water recovery pumps will shut off. High level float switches will also be present in the infiltration gallery and, upon activation, will shut down recovery pumps. A comprehensive monitoring program is proposed for the site where actual investigation of system operation is to be performed. This procedure is outlined in Section VII., "MONITORING AND OPERATION".

VI.B. Safety and Security:

Remediation equipment will be contained within property bounds of the Toastmaster facility and secured by an existing chain link fence.

VII. MONITORING AND OPERATION:

After construction of the remediation system has been completed and the system is functioning, comprehensive monitoring is proposed as follows. This proposed schedule is provided to satisfy the requirements that will be established in the conditions of the Non-Discharge Permit.

- *Weekly Visits: Weekly site visits to check system operation are planned for the first month to ensure the treatment system is functioning properly.*

- *Monthly Visits: Monthly site visits are planned to sample aeration tank influent and effluent, to observe infiltration gallery operations, and to obtain water level measurements in monitoring wells*

- *Quarterly Visits: Quarterly site visits to sample aeration tank influent and effluent and selected wells for TCE are proposed. Quarterly reports detailing the remediation progress will also be submitted.*

VIII. PERMITTING:

The following permits are required prior to system construction and operation:

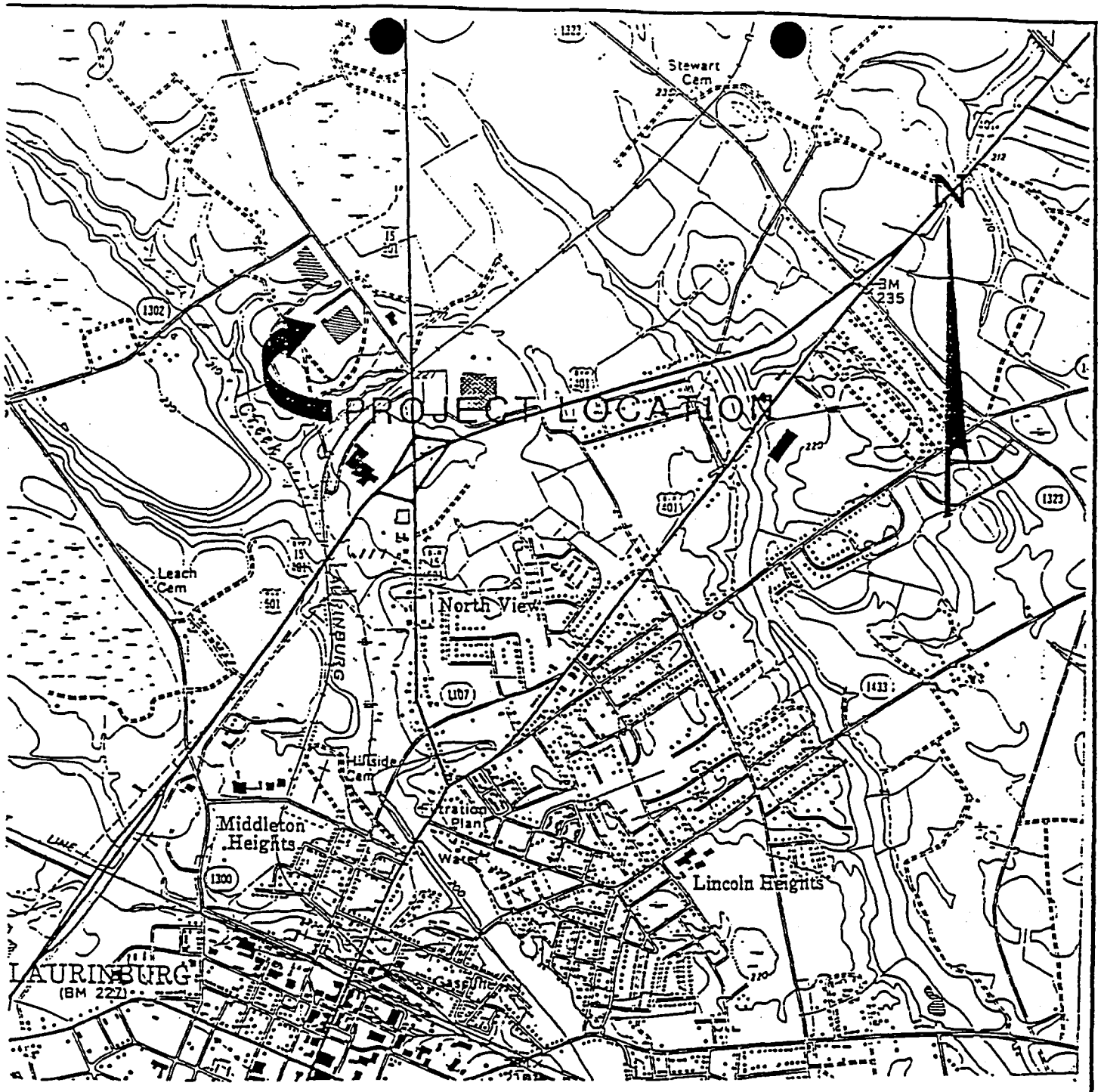
- *Air Quality Notification: The Air Quality section of DEM requires that potential air pollution sources be registered. This system includes an aeration tank which will discharge air emissions into the atmosphere. The combined discharge from this system has been calculated to be approximately 1.7 pounds per day of TCE. Note that these expected emission rates are within the permitting requirement and necessitate registration only as an air pollution source. The discharge calculations, along with a copy of the draft cover letter, are included in Appendix V, Permitting.*

- *Non Discharge Permit: A Non-Discharge Permit is required prior to construction, operation, and discharge into the infiltration gallery.*

IX. LIMITATIONS OF INVESTIGATION:

Conclusions of this investigation and report are based upon information and conclusions presented in *GTI* SCR and previous investigations in an effort to assist in the understanding, control, and clean-up of an existing problem. No guarantee is expressed or implied that new or additional data and/or remedial measures will not be required for ultimate solution of the existing problem or project.

FIGURES



SCALE 1:24000

1 ½ 0 1 MILE

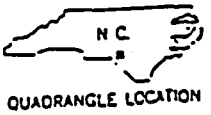
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

CONTOUR INTERVAL 10 FEET

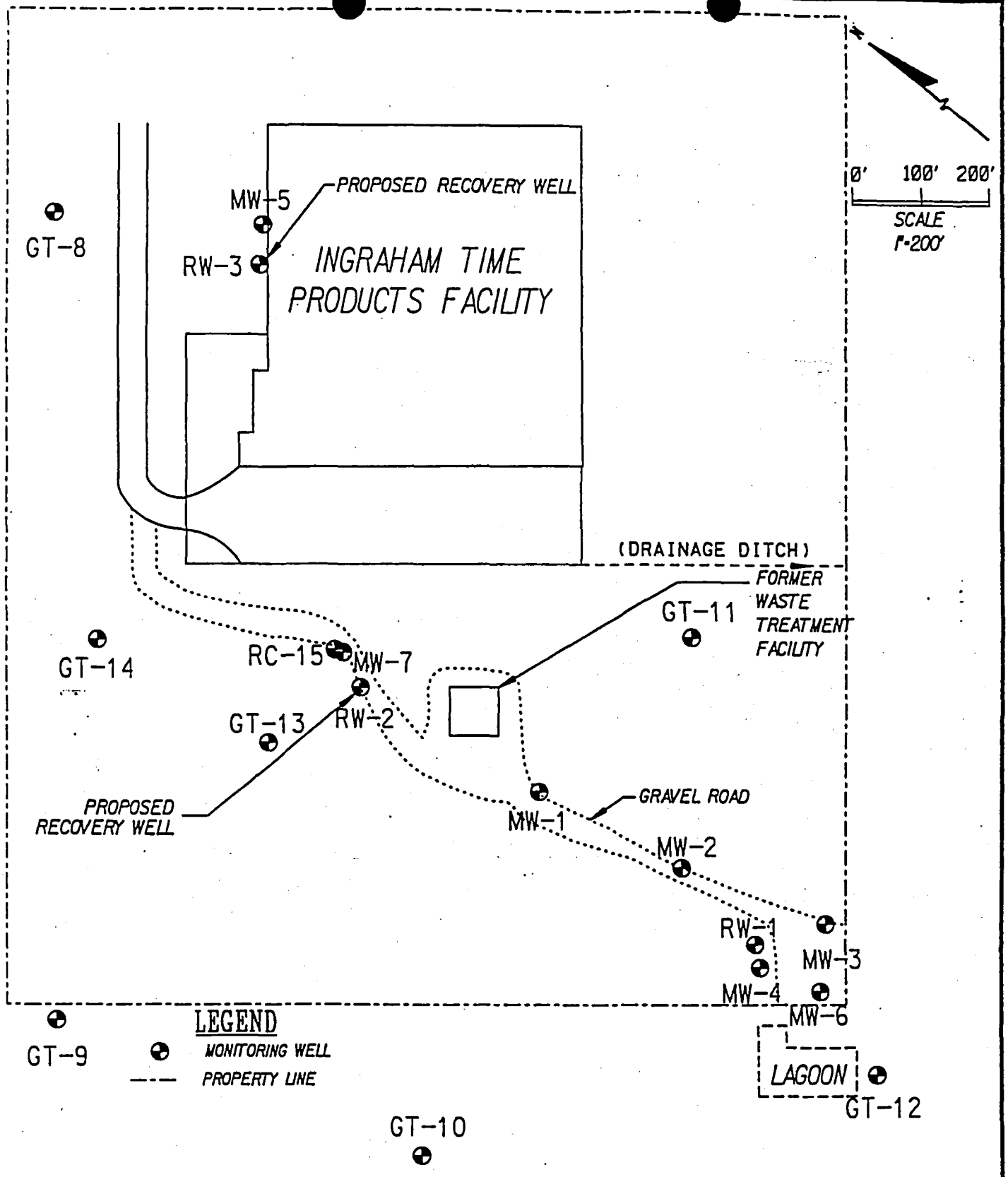
NATIONAL GEODETIC VERTICAL DATUM OF 1929

FROM: USGS TOPOQUAD LAURINBURG, N.C. QUADRANGLE, 1982

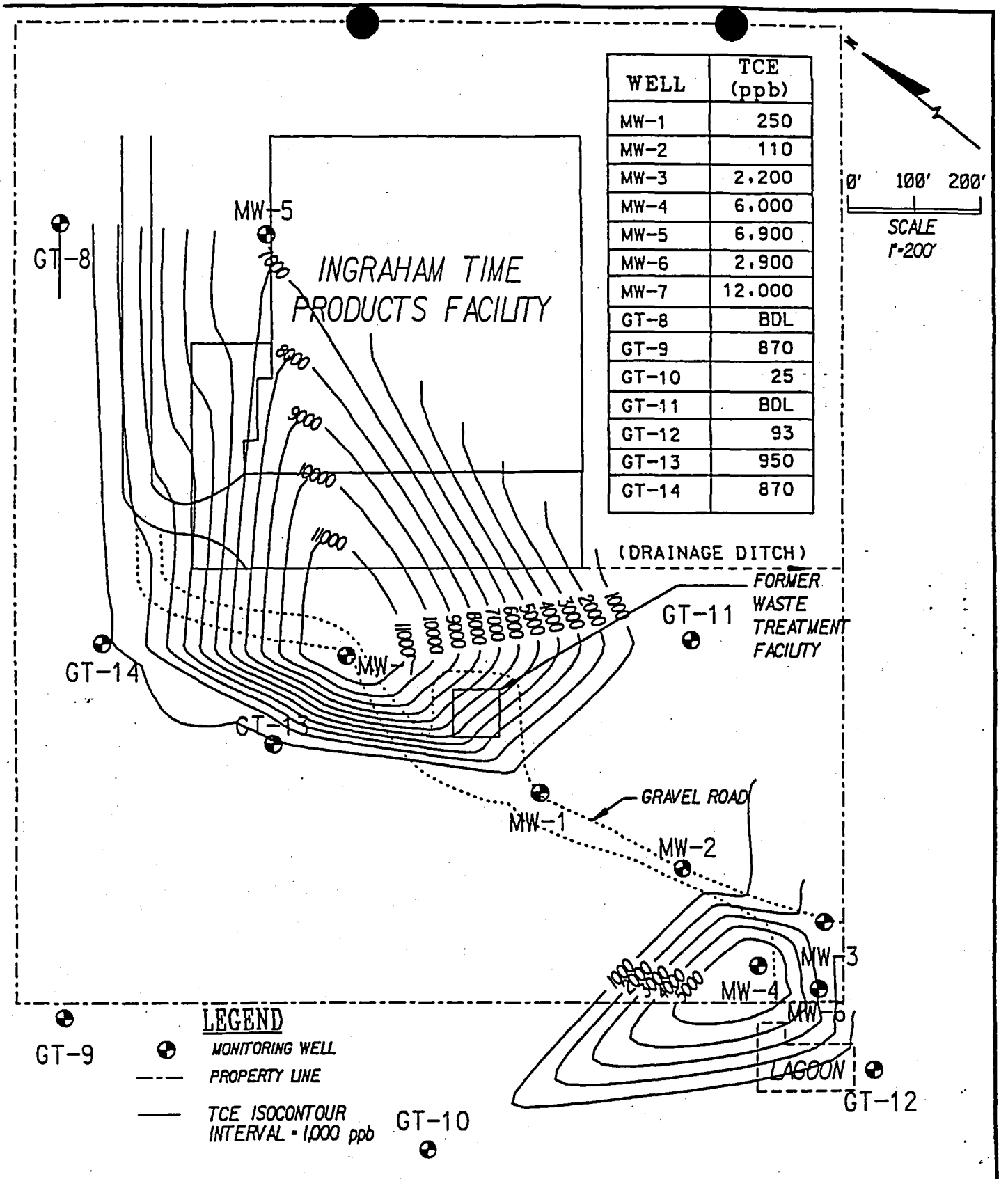


QUADRANGLE LOCATION

PROJECT:	TITLE:				FIGURE:
TOASTMASTER, INC. LAURINBURG, N.C.	VICINITY MAP			Richard Catlin & Associates, Inc. CONSULTING ENGINEERS AND HYDROGEOLOGISTS RCA	1
	JOB #: 92196	DRAWN BY: SPC	SCALE:		

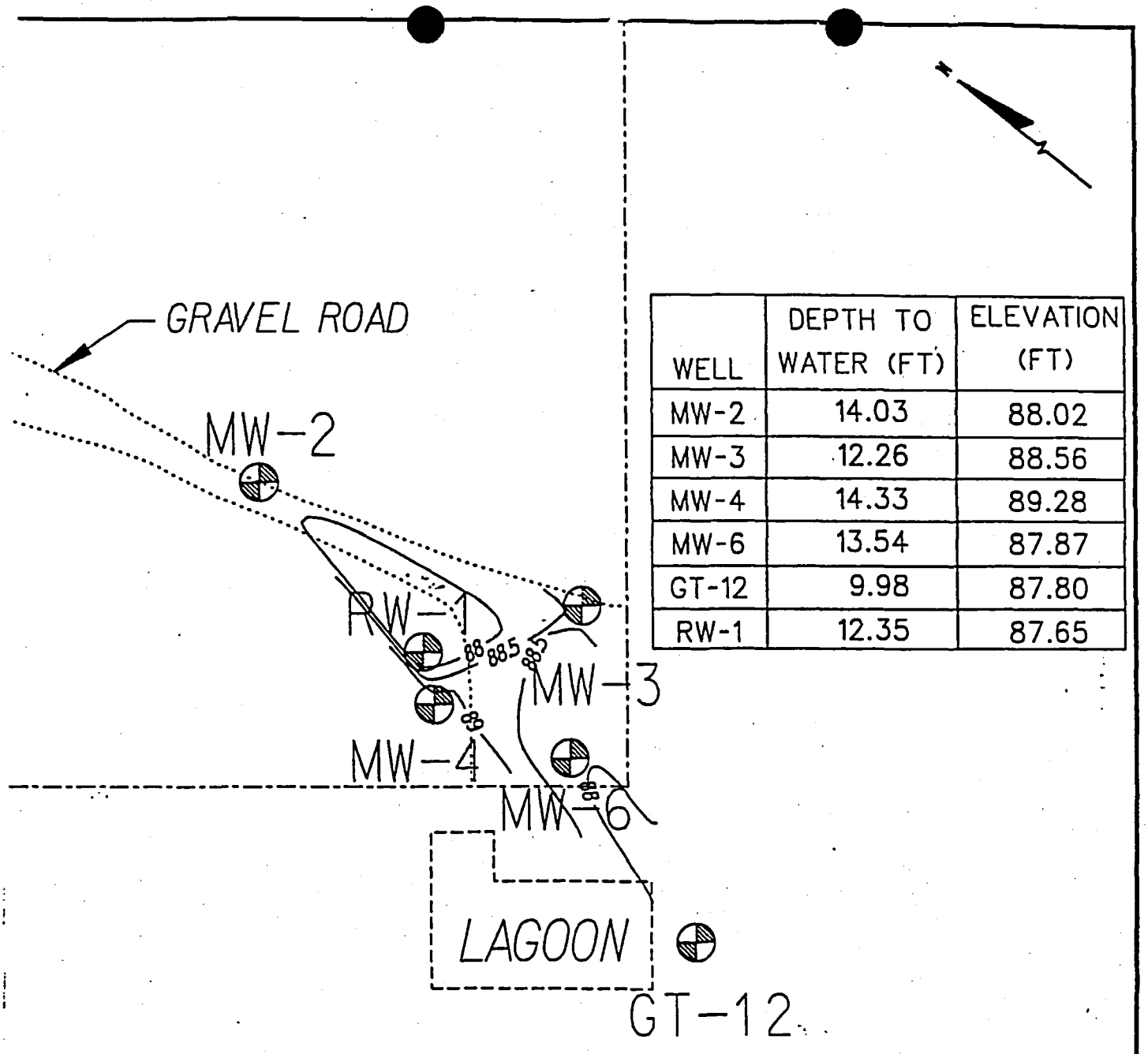


PROJECT: TOASTMASTER, INC. LAURINBURG, NC	TITLE: SITE MAP WITH WELL LOCATIONS	Richard Catlin & Associates, Inc. CONSULTING ENGINEERS AND HYDROGEOLOGISTS RCSA	FIGURE: 2
	JOB #: 92196 / DRAWN BY: DMM / SCALE: 1"=200'		



WELL	TCE (ppb)
MW-1	250
MW-2	110
MW-3	2,200
MW-4	6,000
MW-5	6,900
MW-6	2,900
MW-7	12,000
GT-8	BDL
GT-9	870
GT-10	25
GT-11	BDL
GT-12	93
GT-13	950
GT-14	870

PROJECT:	TITLE:			FIGURE:
TOASTMASTER, INC. LAURINBURG, NC	TRICHLOROETHENE ISOCONTOURS (FEB 1991)	Richard Catlin & Associates, Inc. CONSULTING ENGINEERS AND HYDROGEOLOGISTS RCA		3
	JOB #: 92196	DRAWN BY: DMM	SCALE: 1"=200'	



WELL	DEPTH TO WATER (FT)	ELEVATION (FT)
MW-2	14.03	88.02
MW-3	12.26	88.56
MW-4	14.33	89.28
MW-6	13.54	87.87
GT-12	9.98	87.80
RW-1	12.35	87.65

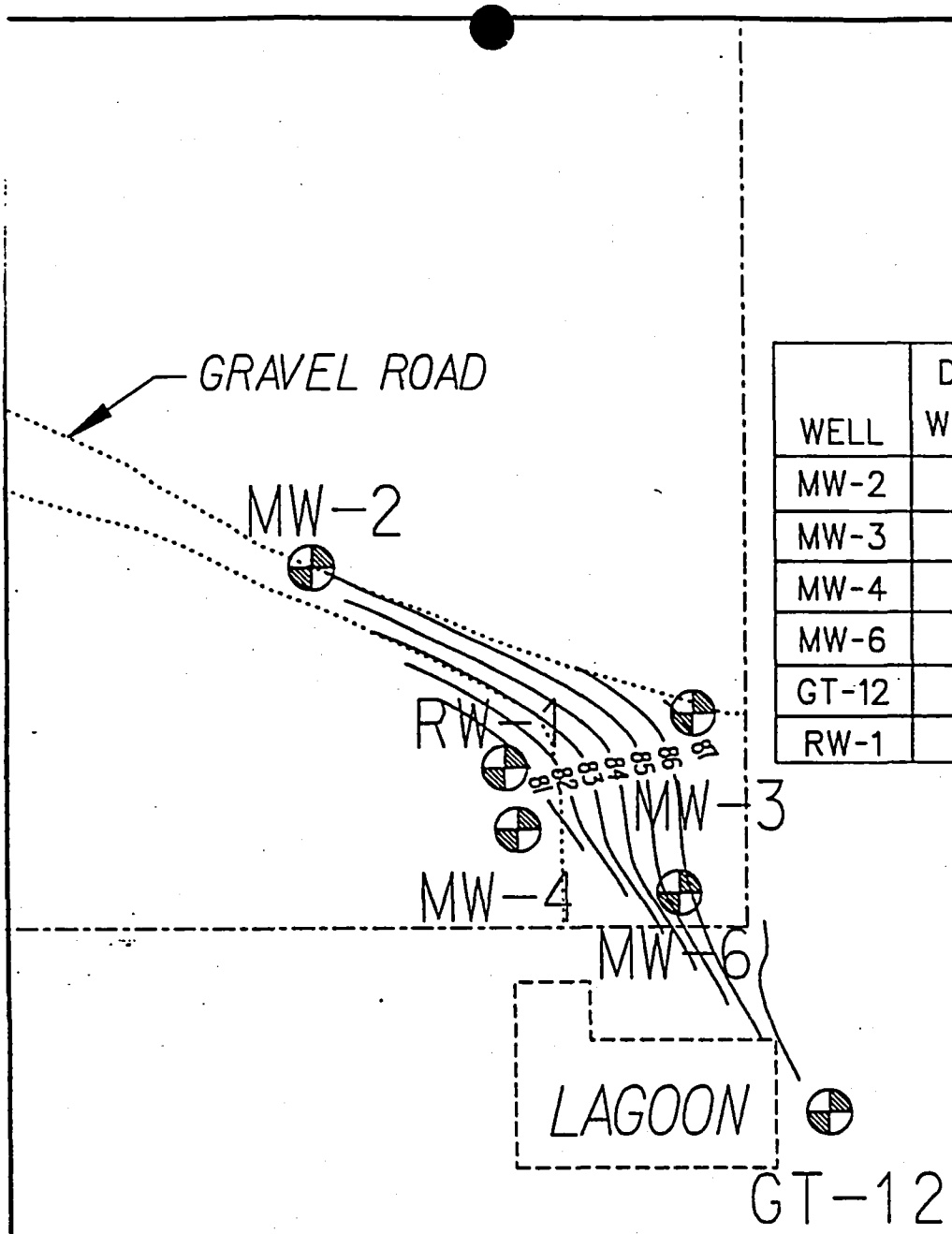
LEGEND

MONITORING WELL

PROPERTY LINE

GROUND WATER CONTOUR INTERVAL = 0.5 FEET

PROJECT:	TITLE:				FIGURE:
TOASTMASTER, INC. LAURINBURG, NC	GROUND WATER CONTOURS BEFORE PUMP TEST (10/15/92)			Richard Catlin & Associates, Inc. CONSULTING ENGINEERS AND HYDROGEOLOGISTS RCA	4
	JOB #: 92196	DRAWN BY: DMM	SCALE: 1"=100'		



WELL	DEPTH TO WATER (FT)	ELEVATION (FT)
MW-2	17.30	84.93
MW-3	13.33	87.49
MW-4	14.99	88.62
MW-6	15.85	85.56
GT-12	10.10	87.68
RW-1	19.88	80.12

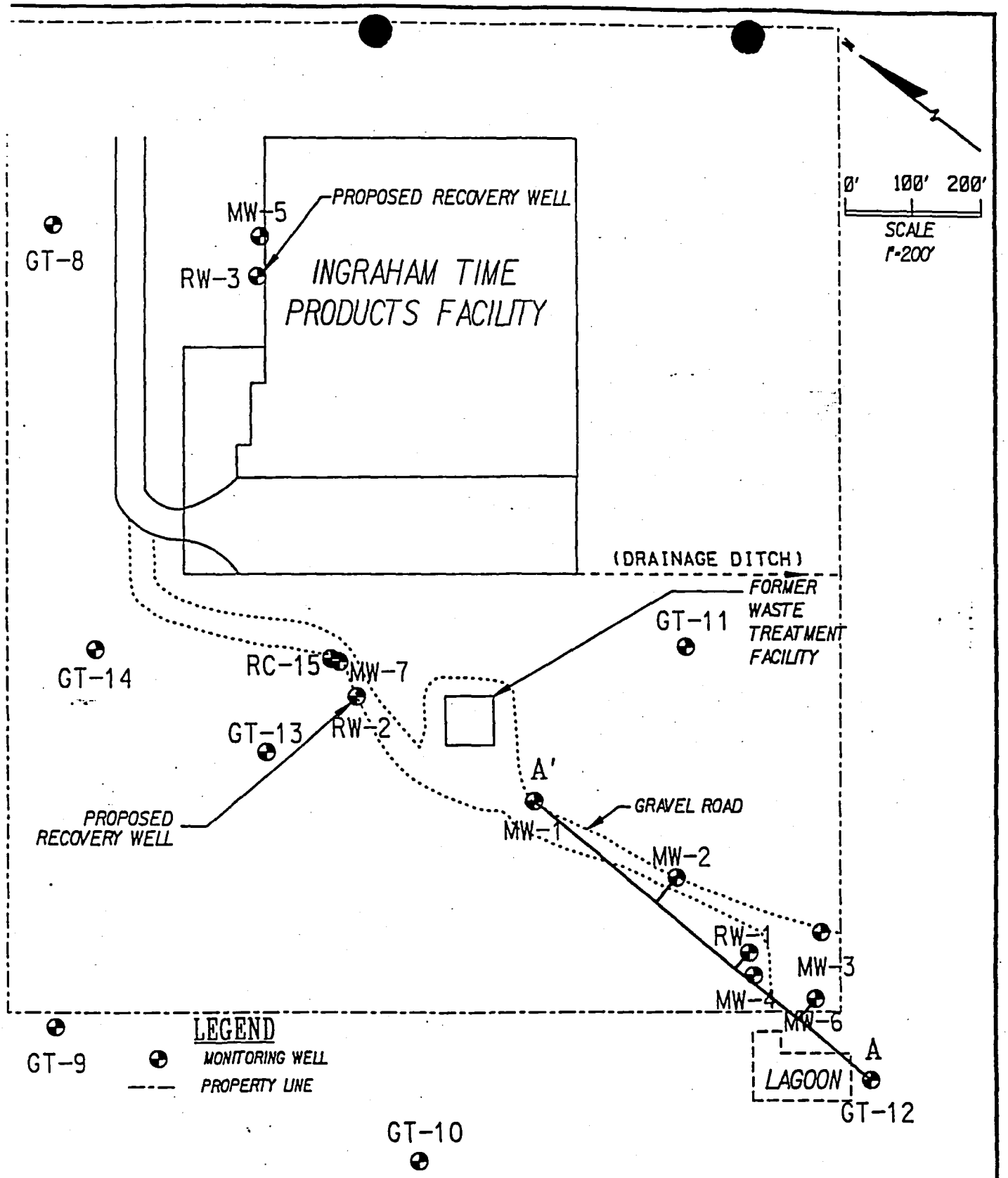
LEGEND

MONITORING WELL

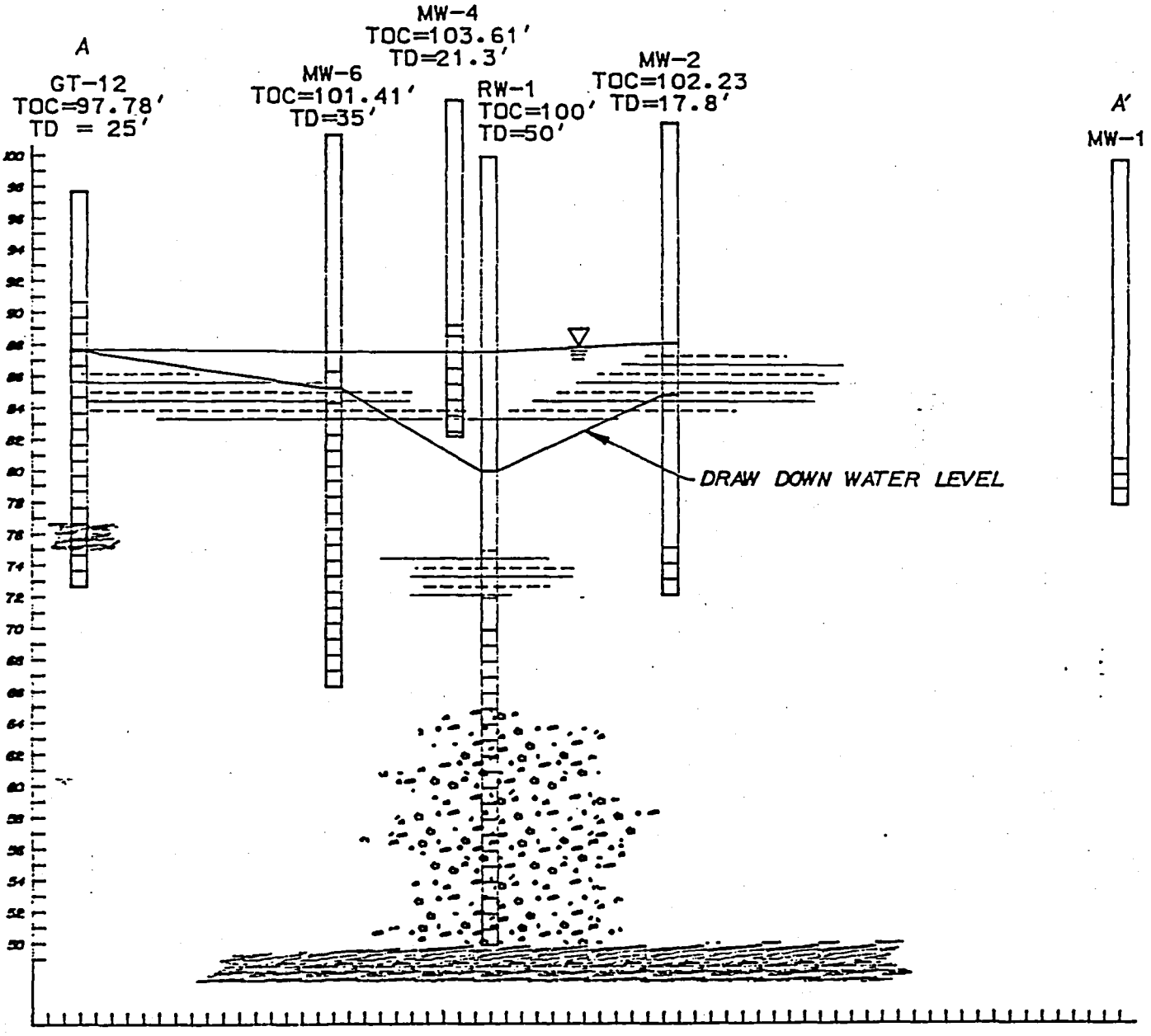
PROPERTY LINE

GROUND WATER CONTOUR INTERVAL - 1.0 FEET

PROJECT:	TITLE:				FIGURE:
TOASTMASTER, INC. LAURINBURG, NC	GROUND WATER CONTOURS AFTER PUMP TEST (10/15/92)			Richard Catlin & Associates, Inc. CONSULTING ENGINEERS AND HYDROGEOLOGISTS RCA	5
	JOB #: 92196	DRAWN BY: DMM	SCALE: 1"=100'		



PROJECT:	TITLE:				FIGURE:
TOASTMASTER, INC. LAURINBURG, NC	LOCATION OF TRANSECT A-A'			Richard Catlin & Associates, Inc. CONSULTING ENGINEERS AND HYDROGEOLOGISTS RCA	6
	JOB #: 92196	DRAWN BY: DMM	SCALE: 1"=200'		



SILTY SANDY CLAY

MEDIUM GRAINED SAND LAYER

DENSE GRAY CLAY

STATIC WATER TABLE

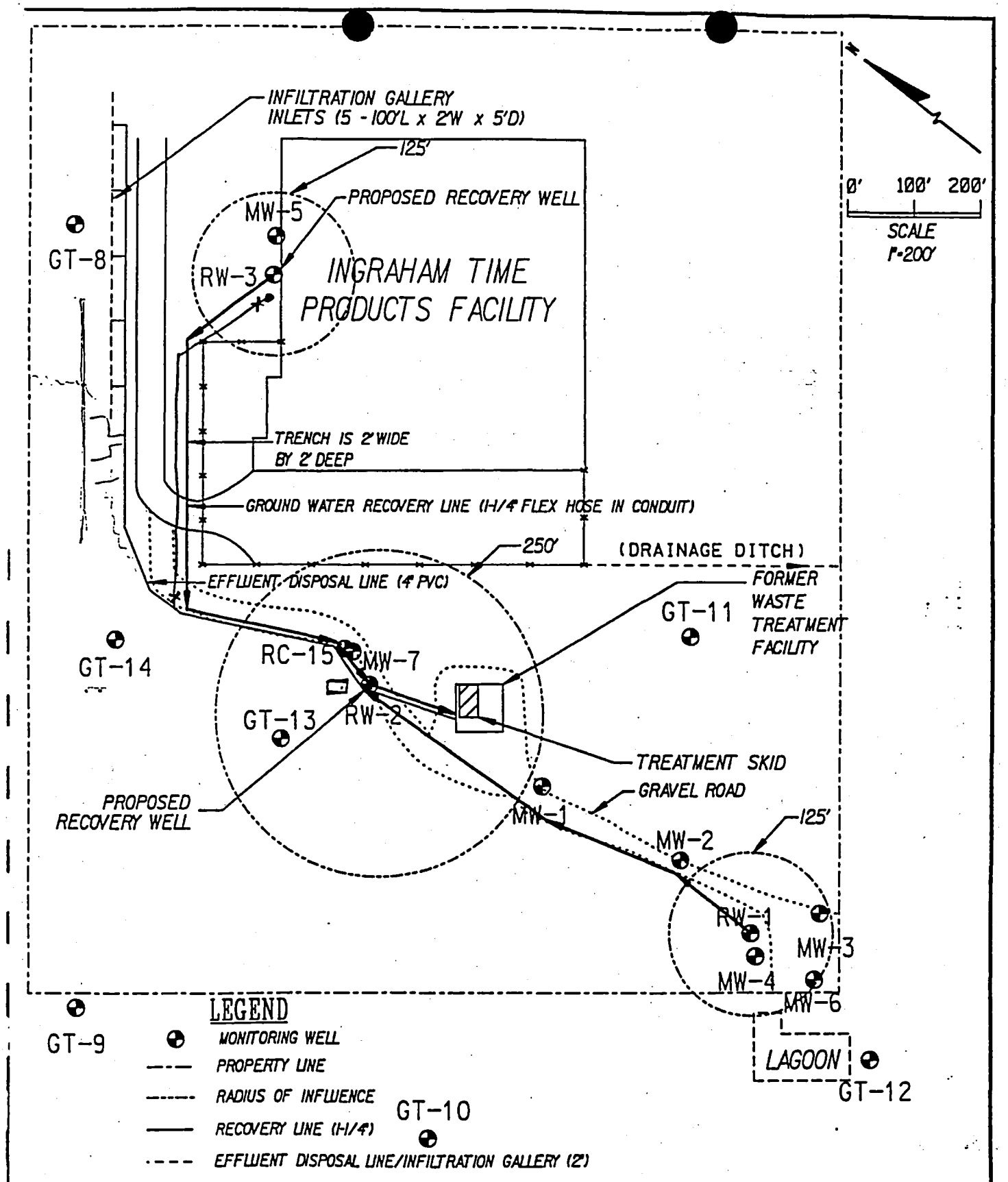
0' 50' 100'

5' scale

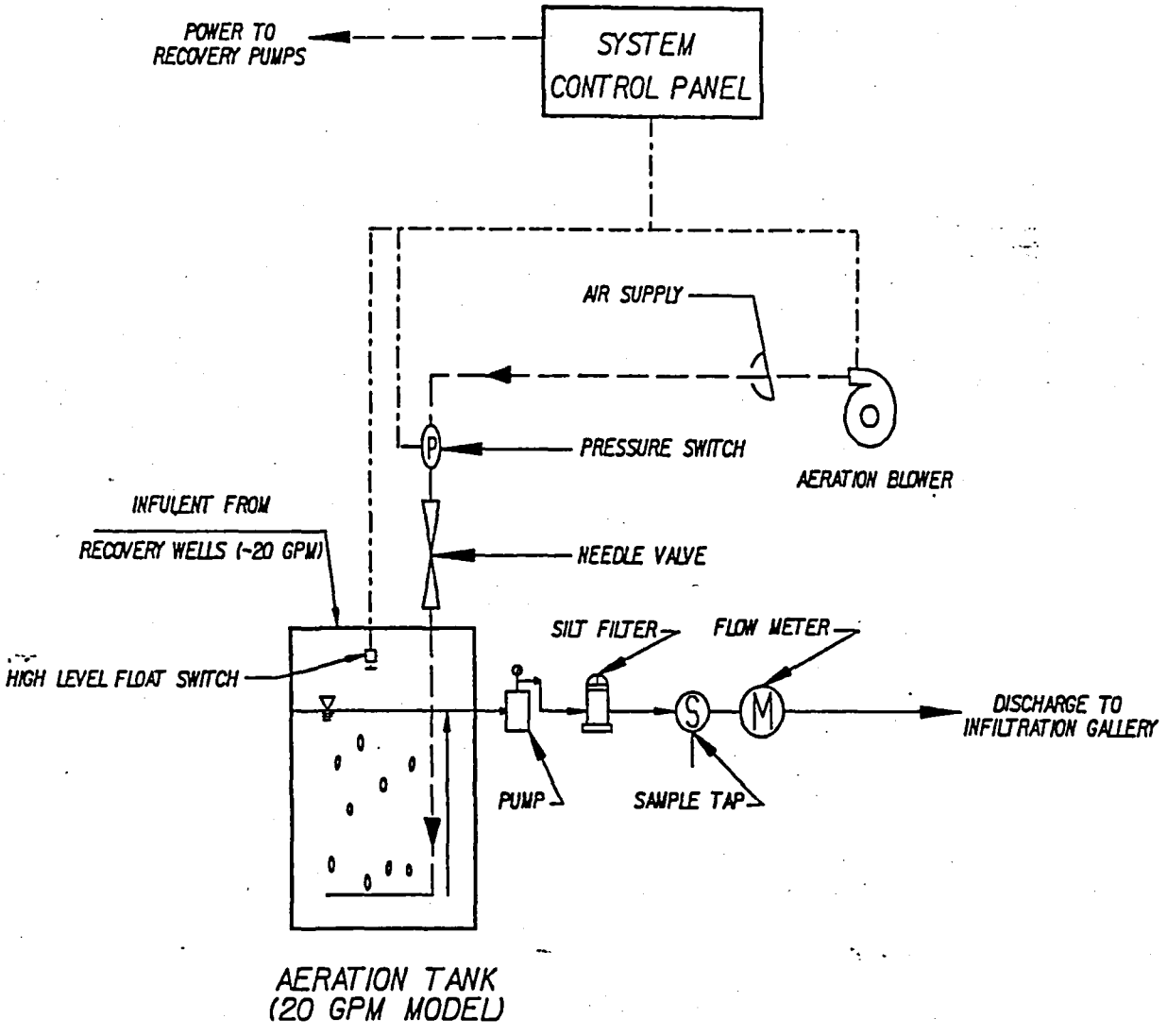
10'

TOC = Top of Casing
TD = Total Depth of Well

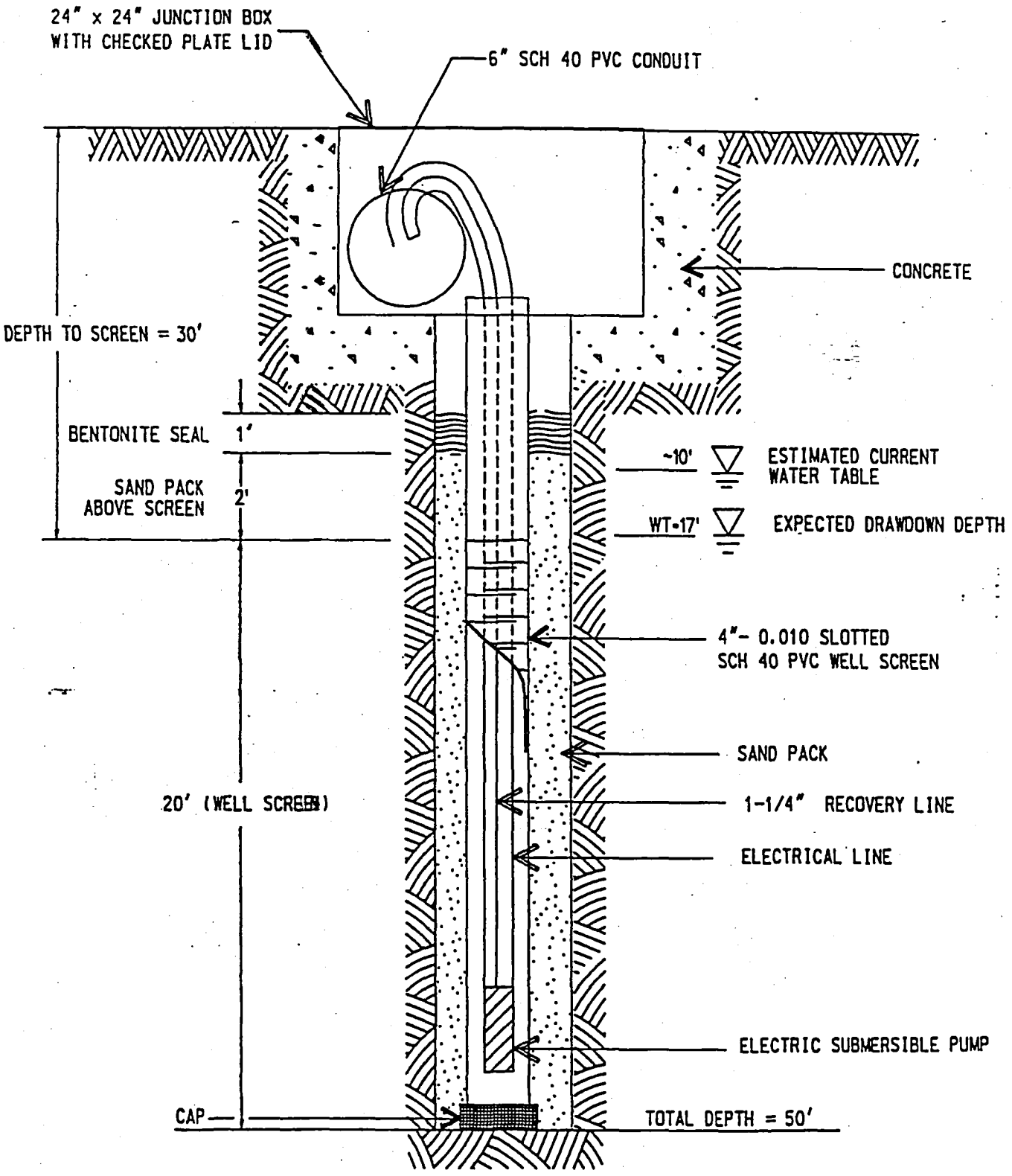
PROJECT: TOASTMASTER, INC. LAURINBURG, NC	TITLE: CROSS-SECTION SHOWING DRAW DOWN ACHIEVED DURING PUMP TEST	Richard Catlin & Associates, Inc. CONSULTING ENGINEERS AND HYDROGEOLOGISTS	FIGURE: 7
	JOB #: 92196 / DRAWN BY: DMM / SCALE:		



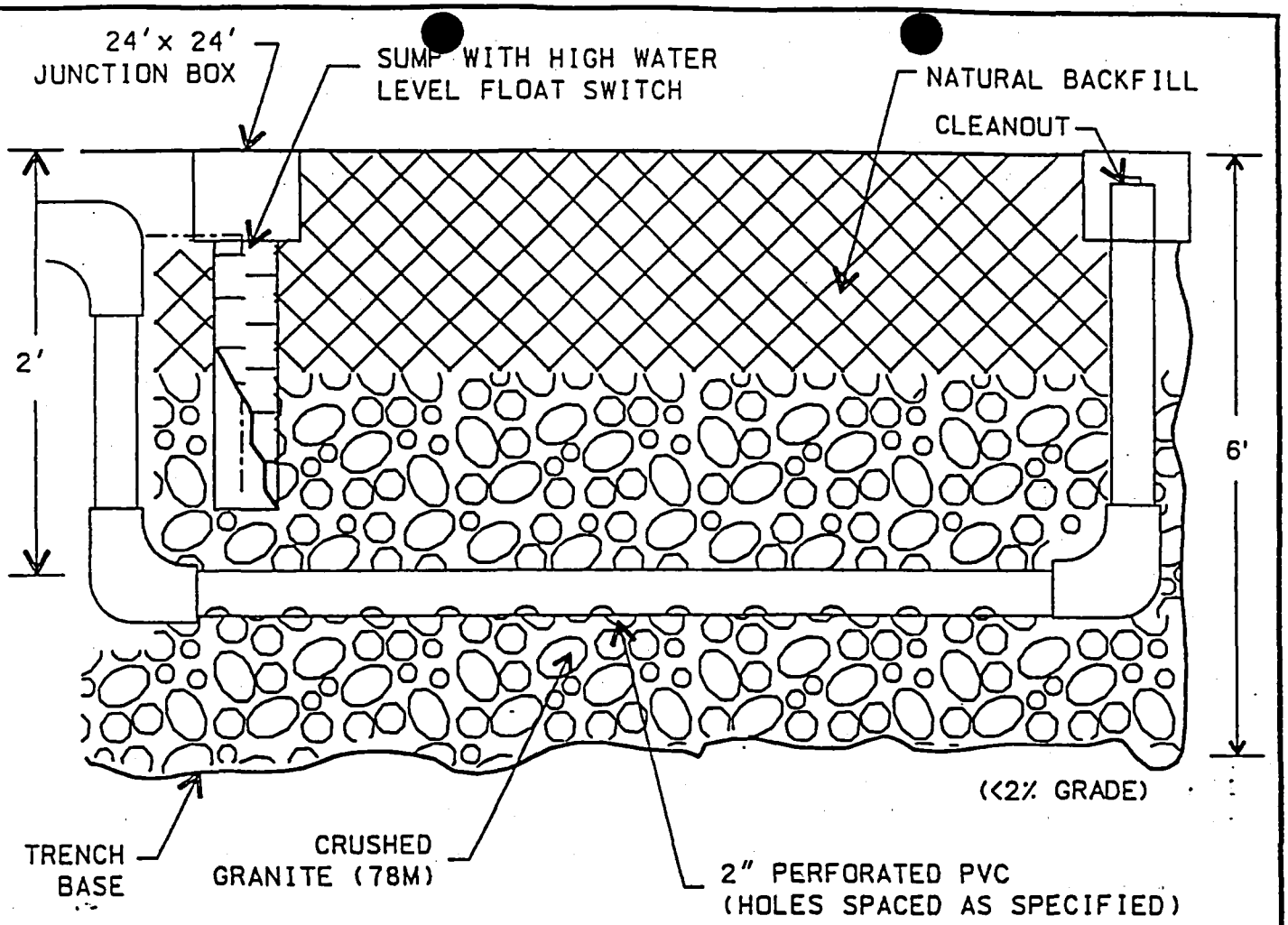
PROJECT:	TITLE:			Richard Catlin & Associates, Inc.	FIGURE:
TOASTMASTER, INC. LAURINBURG, NC	REMEDIATION SYSTEM LAYOUT			CONSULTING ENGINEERS AND HYDROGEOLOGISTS RCIA	8
	JOB #: 92196	DRAWN BY: DMM	SCALE: 1"=200'		



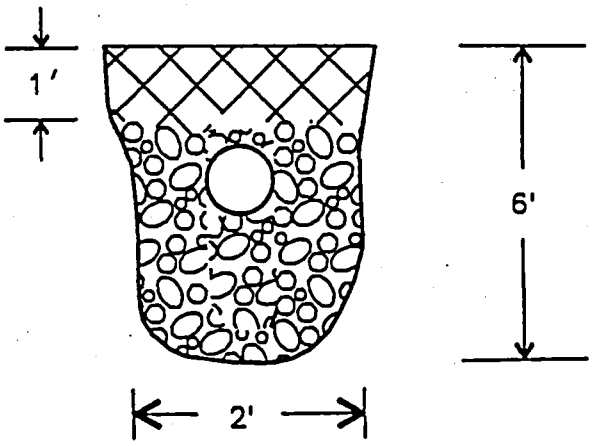
PROJECT:	TITLE:			Richard Catlin & Associates, Inc.	FIGURE:
TOASTMASTER, INC. LAURINBURG, NC	TREATMENT SYSTEM SCHEMATIC			CONSULTING ENGINEERS AND HYDROGEOLOGISTS RCIA	9
	JOB #: 92196	DRAWN BY: DMM	SCALE: NTS		



PROJECT:	TITLE:			
TOASTMASTER, INC. LAURINBURG, NC	RECOVERY WELL DETAIL		Richard Catlin & Associates, Inc.	FIGURE: 10
	JOB #: 92196	DRAWN BY: DMM	SCALE: NTS	CONSULTING ENGINEERS AND HYDROGEOLOGISTS RCA



HORIZONTAL CROSS-SECTION



VERTICAL CROSS-SECTION

PROJECT:	TITLE:				FIGURE:
TOASTMASTER, INC LAURINBURG, NC	INFILTRATION GALLERY DETAIL			Richard Catlin & Associates, Inc. CONSULTING ENGINEERS AND HYDROGEOLOGISTS RCSA	11
	JOB #: 92196	DRAWN BY: DMM	SCALE: NTS		

APPENDIX I

COMPILED FIELD DATA/BORING LOGS/ANALYTICAL DATA

Summary of Aquifer Testing

From the pump test data collected, time-drawdown analyses were performed for wells MW-2 and MW-6. From these analyses, transmissivity values of the aquifer were calculated to be approximately 1,218 gallons per day per foot (gpd/ft) and 1,594 gpd/ft respectively. Storativity values were calculated to be 9.32×10^{-5} and 6.83×10^{-4} (unitless). From the storativity values calculated, aquifer response to short term pumping is indicative of confined conditions. Storativity coefficients for confined aquifers typically range from 1.0×10^{-5} to 1.0×10^{-3}.

After approximately 200 minutes of pumping, slight recharge in MW-2 and MW-6 is observed from the time-drawdown plots of these wells. Based on this observed recharge and the lithological data collected during drilling, the apparent recharge may be attributed to vertical leakage from an overlying water-bearing strata with greater porosities than the lower, pump-test aquifer. This condition suggests that the aquifer is semi-confined and that the clay layer comprising the upper altitude of the aquifer is inhomogeneous or discontinuous in areal extent. This is supported by the distance-drawdown plot drawn after 300 minutes of withdrawal for wells GT-12, MW-3, and MW-6. The average storativity value calculated using the slope created by that plot is 1.20×10^{-3} – which exceeds the upper limits of typically confined conditions, suggesting that the aquifer is reacting as a semi-confined unit.

From the distance-drawdown analysis of MW-2, the limits of a pronounced cone of depression were observed at a distance of 115 feet from the pumping well after 300 minutes of withdrawal. Since the pumping rate (Q) is proportional to the drawdown (ds) observed during the test, the data plot is used to project the horizontal limits of drawdown. The data plot illustrates that more than 0.5 feet of drawdown would occur at a distance of greater than 750 feet from the pumping well will if pumping were continued. This suggests that significant capture can be anticipated from the proposed recovery well network -- which conservatively uses a 150 feet radius of capture for recovery well spacing.

TOASTMASTERS FACILITY -- LAURINBURG, NORTH CAROLINA

PUMP TEST -- September 29, 1992

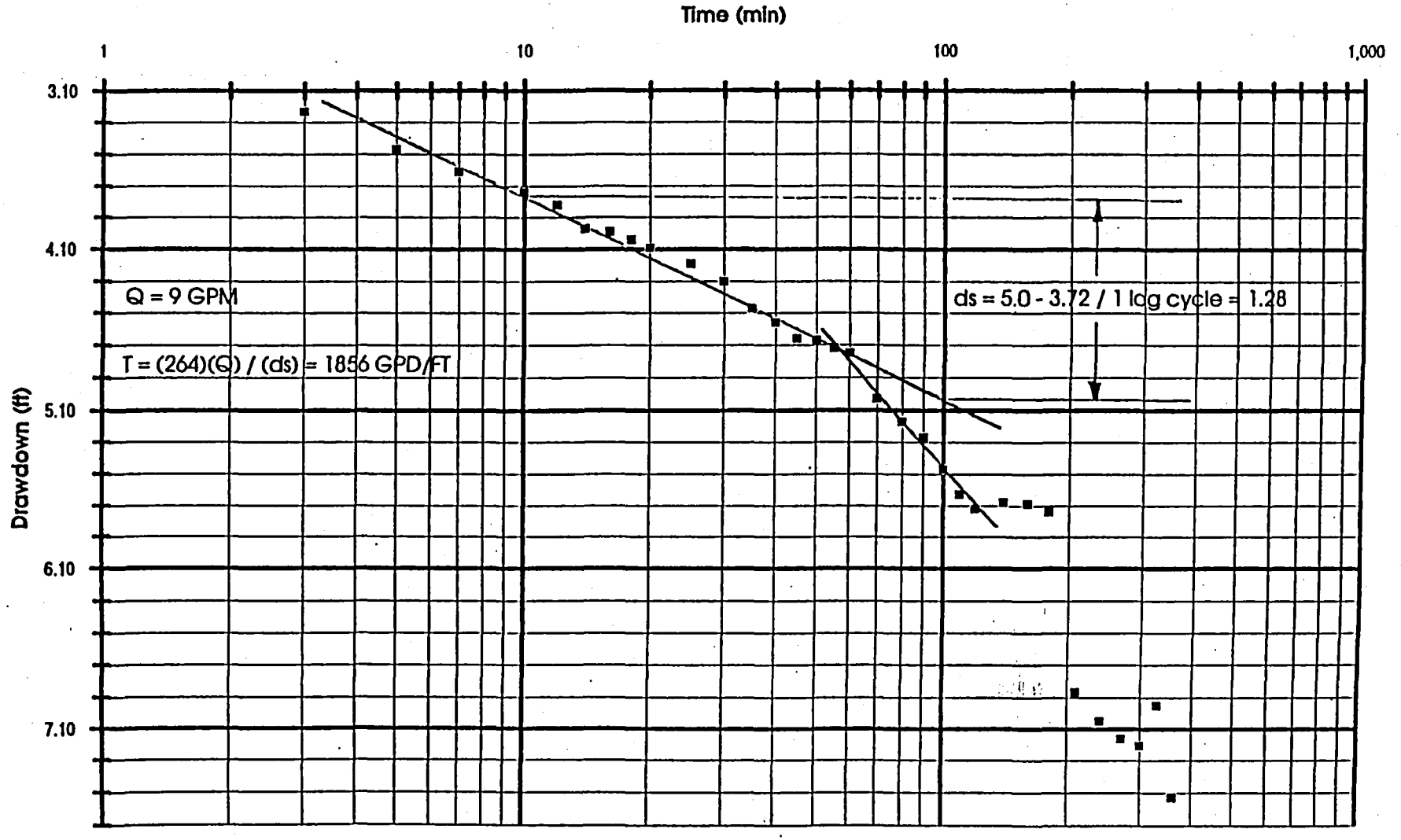
TABLE I -- Drawdown, 6-Hour Pump Test

Elapsed Time (min)	DRAWDOWN (ft)												FLOW (gpm)
	RW-1		MW-4		MW-6		MW-2		MW-3		GT-12		
	TD = 50.0		TD = 21.3		TD = 35.0		TD = 30.0		TD = 17.8		TD = 25.0		
	TOC = 100		TOC = 103.61		TOC = 101.41		TOC = 102.23		TOC = 100.82		TOC = 97.78		
start = 9:45 am	DTW	ELEV	DTW	ELEV	DTW	ELEV	DTW	ELEV	DTW	ELEV	DTW	ELEV	
0	12.35	87.65	14.33	89.28	13.76	87.65	14.03	88.20	12.28	88.56	9.98	87.80	9.00
3	15.58	84.42			13.76		14.03						9.00
5	15.82	84.18											9.00
7	15.96	84.04											9.00
10	16.09	83.91											9.00
12	16.17	83.83											9.00
14	16.32	83.68	14.33	89.28									9.00
16	16.34	83.66			14.32	87.09							9.00
18	16.39	83.61	14.34	89.27									9.00
20	16.44	83.56											9.00
22									12.38	88.44			9.00
25	16.54	83.46	14.49	89.12			14.99	87.24					9.00
26					14.48	86.93			12.43	88.39			9.00
30	16.65	83.35											9.00
33			14.42	89.19									9.00
35	16.82	83.18			14.48	86.93			13.44	87.38			9.00
40	16.91	83.09					15.21	87.02					9.00
45	17.01	82.99	14.46	89.15	14.71	86.70			12.53	88.29			9.00
50	17.02	82.98	14.48	89.13	14.79	86.62	15.42	86.81	12.55	88.27			9.00
55	17.07	82.93	14.50	89.11									9.00
60	17.10	82.90	14.51	89.10	14.66	86.76	15.55	86.68	12.60	88.22			9.00
70	17.38	82.62	14.53	89.08	14.74	86.67	15.66	86.57	12.65	88.17	10.00	87.78	9.00
80	17.52	82.48	14.57	89.04	14.84	86.57	15.78	86.45	12.69	88.13			9.00
90	17.62	82.38	14.60	89.01	14.92	86.49	15.88	86.35	12.73	88.09			9.00
100	17.82	82.18	14.62	88.99	15.01	86.40	16.00	86.23	12.77	88.05			9.00
110	17.98	82.02	14.65	88.96	15.00	86.41	16.08	86.15	12.80	88.02	10.03	87.75	9.00
120	18.07	81.93	14.67	88.94	15.13	86.28	16.18	86.05	12.84	87.98			9.00
140	18.03	81.97	14.71	88.90	15.22	86.19	16.28	85.95	12.89	87.93			9.00
160	18.04	81.96	14.74	88.87	15.30	86.11	16.35	85.88	12.94	87.88			9.00
180	18.09	81.91	14.77	88.84	15.35	86.06	16.42	85.81	12.97	87.85	10.05	87.73	12.00
210	19.22	80.78	14.80	88.81	15.62	85.79	16.76	85.47	12.99	87.83			12.00
240	19.40	80.60	14.87	88.74	15.74	85.67	16.95	85.28	13.14	87.68			12.00
270	19.51	80.49	14.90	88.71	16.02	85.39	17.05	85.18	13.18	87.64			12.00
300	19.56	80.44	14.94	88.67	15.92	85.49	17.14	85.09	13.25	87.57	10.09	87.69	12.00
330	19.30	80.70	14.96	88.65	16.00	85.41	17.20	85.03	13.28	87.54			12.00
360	19.88	80.12	14.99	88.62	16.07	85.34	17.30	84.93	13.33	87.49	10.10	87.68	12.00
													12.00
Maximum Drawdown	-7.53		-0.66		-2.31		-3.27		-1.07		-0.12		9.00
Feet from RW-1			12		89.1		115		115		250		

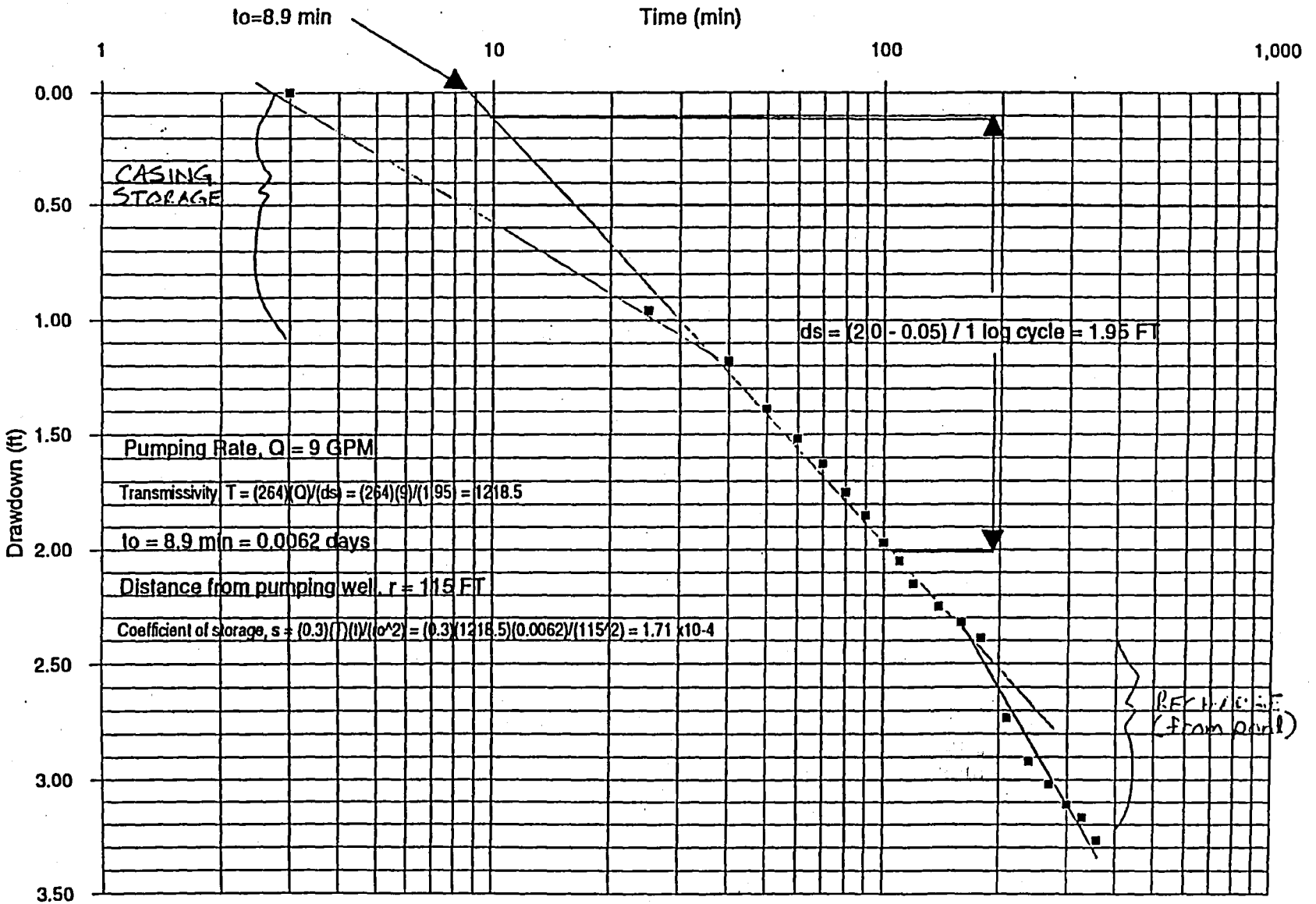
TD = total depth of well, ft

TOC = top of casing, ft

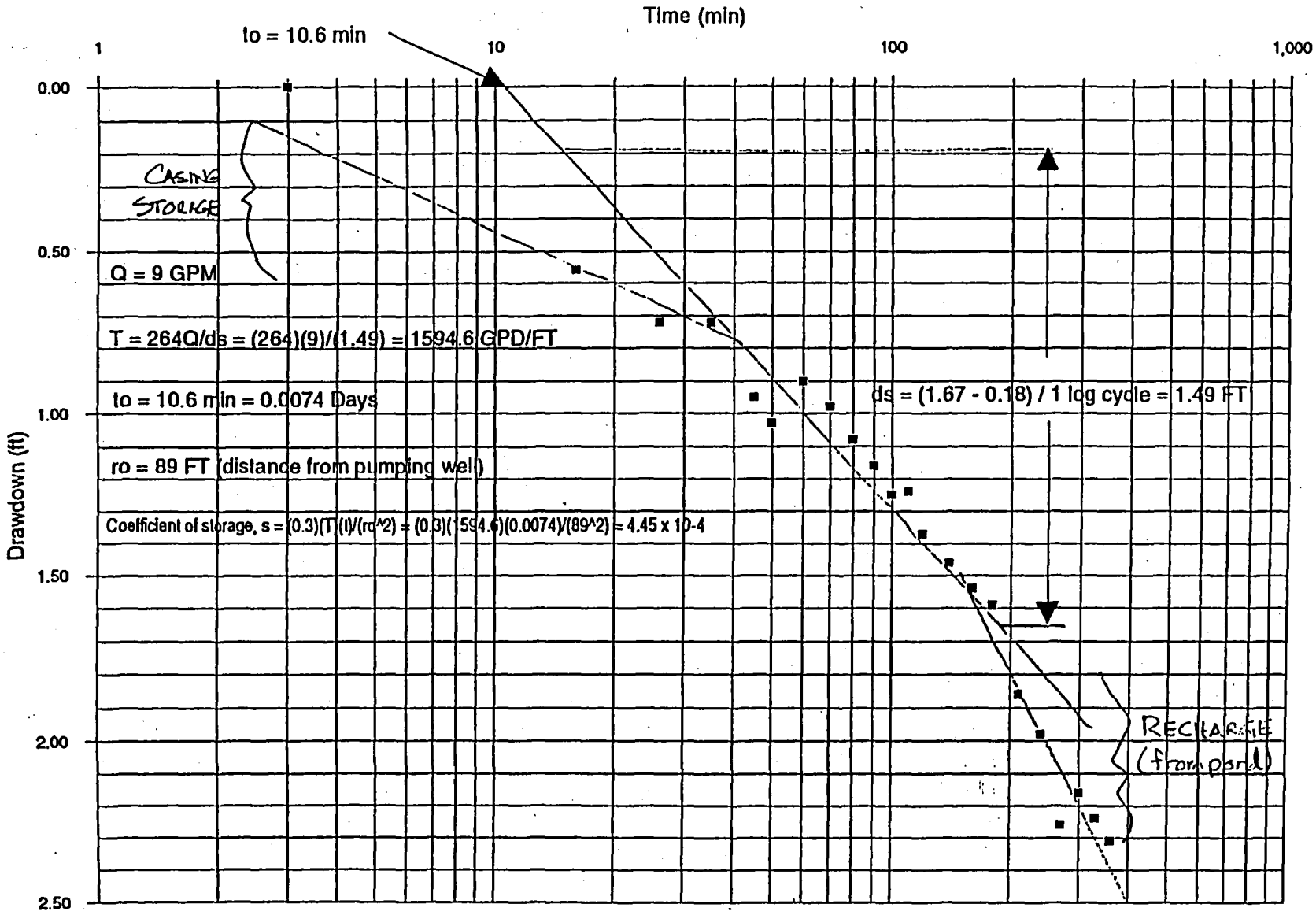
Time-Drawdown RW-1



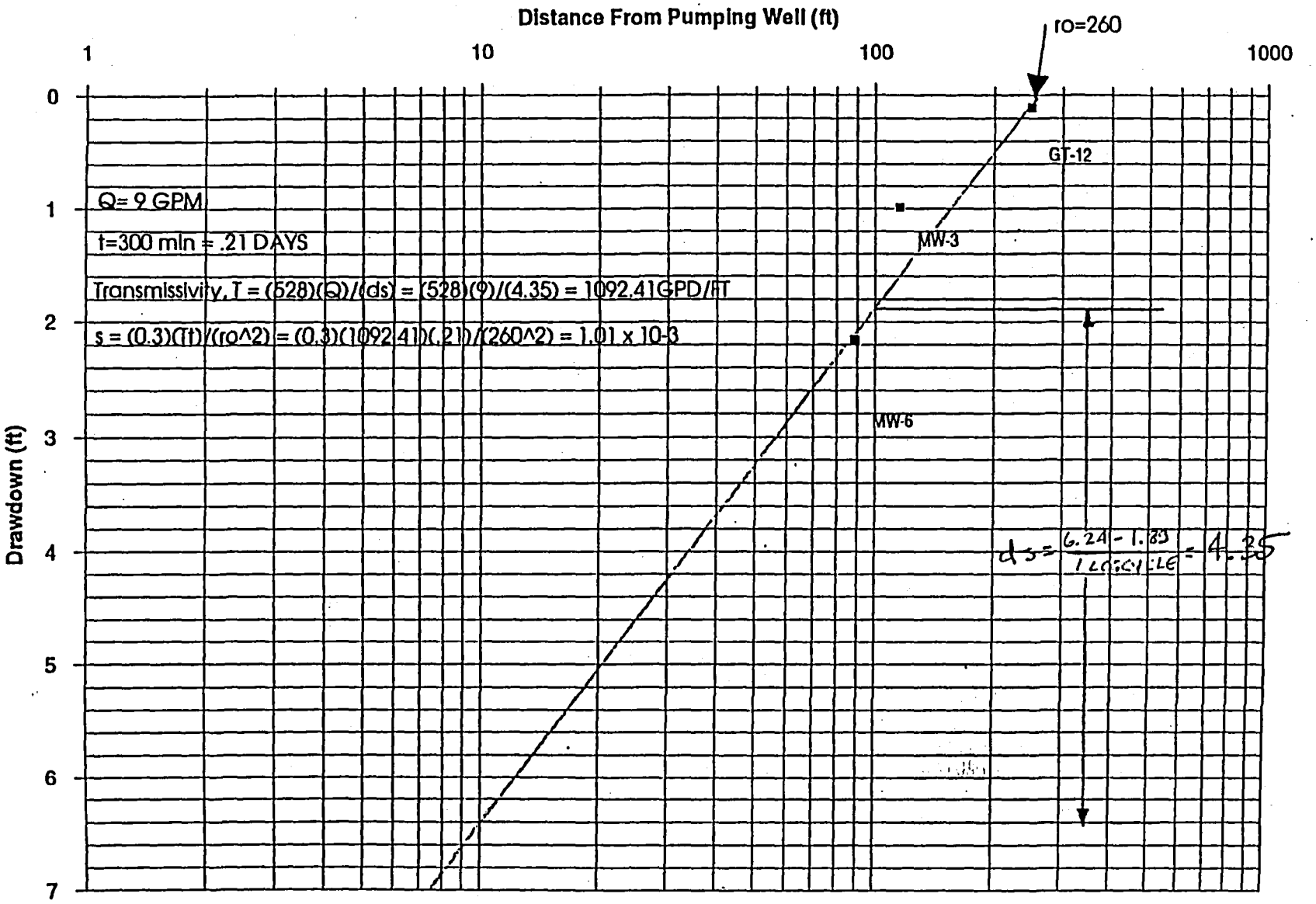
Time-Drawdown MW-2



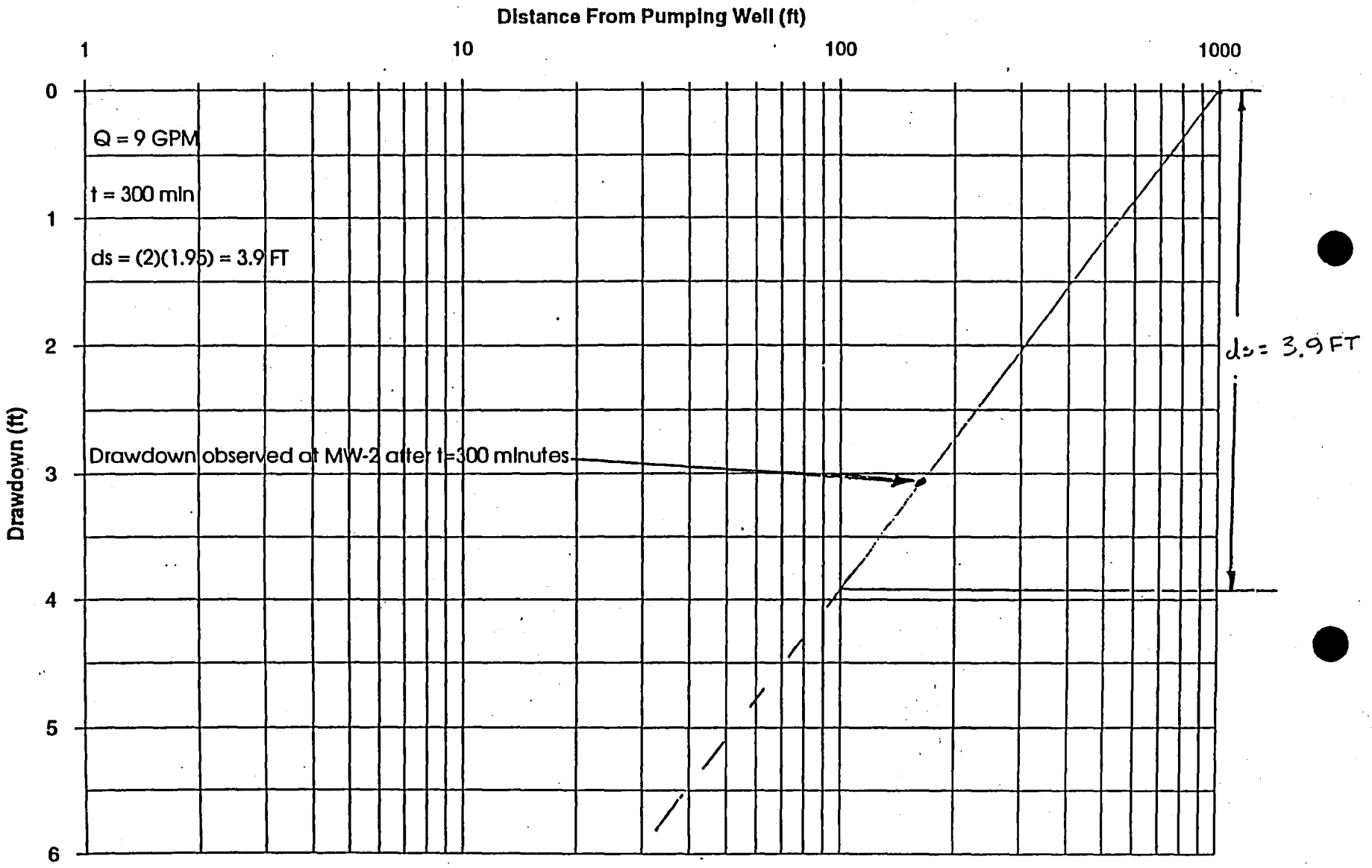
Time-Drawdown MW-6



Distance - Drawdown (Average T)



Distance - Drawdown MW-2



BORING LOGS

DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH, NC 27611-7687
PHONE (919)733-3221

Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

RW-1

LING CONTRACTOR RICHARD CATLIN & ASSOCIATES, INC.

LER REGISTRATION NUMBER 1142

STATE WELL CONSTRUCTION PERMIT NUMBER: Existing GTI permit per Jim Bales

LL LOCATION: (Show sketch of the location below)

arest Town: Laurinburg

County: Scotland

t. of U.S. 15/501 and S.R. 1301
ad, Community, or Subdivision and Lot No.),

WNER Toastmasters, Inc.

DRESS 1801 North Stadium Blvd.
(Street or Route No.)

Columbia Missouri 65202
City or Town State Zip Code

TE DRILLED 7/15/92 USE OF WELL Monitoring

TAL DEPTH 75.0' CUTTINGS COLLECTED ☒ Yes ☐ No

DES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No

ATIC WATER LEVEL: ±20.0 FT. ☐ above ☒ below TOP OF CASING,
TOP OF CASING IS 2.5 FT. ABOVE LAND SURFACE.

ELD (gpm): N/A METHOD OF TEST N/A

ATER ZONES (depth): underlying aquifer

HLORINATION: Type N/A Amount N/A

ASING:

	Depth			Diameter	Wall Thickness or Weight/Ft.	Material
From	0.0	To	50.0 Ft.	6"	SCH40	PVC
From	+2.5	To	72.5 Ft.	2"	SCH40	PVC
From		To	Ft.			

ROUT:

	Depth			Material	Method
From	0.0	To	64.0 Ft.	Neat	Tremie
From	64.0	To	66.5 Ft.	Bentonite	In-Place

CREEN:

	Depth			Diameter	Slot Size	Material
From	67.5	To	72.5 Ft.	2" in.	0.010 in.	PVC
From		To	Ft.	in.	in.	
From		To	Ft.	in.	in.	

GRAVEL PACK:

	Depth			Size	Material
From	66.5	To	72.5 Ft.	Coarse	Sand
From		To	Ft.		

DRILLING LOG

Depth From	Depth To	Formation Description

SEE ATTACHED

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

SEE ATTACHED

REMARKS:

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

Shawn P. Carroll 12/18/93
SIGNATURE OF CONTRACTOR OR AGENT DATE

Submit original to Division of Environmental Management and copy to well owner.

-: REVISED 2/90

BORING LOG

BORING NUMBER RW-1 SITE LOCATION Toastmaster, Inc. DRILLED BY M. Sage

TOTAL DEPTH 52.0' Laurinburg, NC LOGGED BY S. Carroll

DRILLING DATE 9/8/92

SAMPLE DEPTH (FT.)		SAMPLE DESCRIPTION	WATER CONTENT	HC ODOR	PID/ FID PPM	BLOW COUNT
5.0	7.0	Loamy sand with some coarse sand. Well rounded, poorly sorted. Tan.	low	no	0	6,10,10,12
10.0	12.0	Sand. Fine to medium grained. Well rounded and well sorted. Grey.	moderate	no	12	6,6,9,10
15.0	17.0	Clayey sand. Fine grained. Well rounded. Grey to rose.	saturated	no	6	6,6,9,10
20.0	22.0	Coarse grained with small gravel. Poorly sorted and rounded. Grey	saturated	no	10	7,7,8,9
25.0	27.0	Sandy clay. Fine grained. Grey to tan.	saturated	no	3	8,10,14,16
30.0	32.0	Sand. Medium grained. Well rounded. Grey.	saturated	no	10	8,12,16,14

REMARKS

BORING LOG

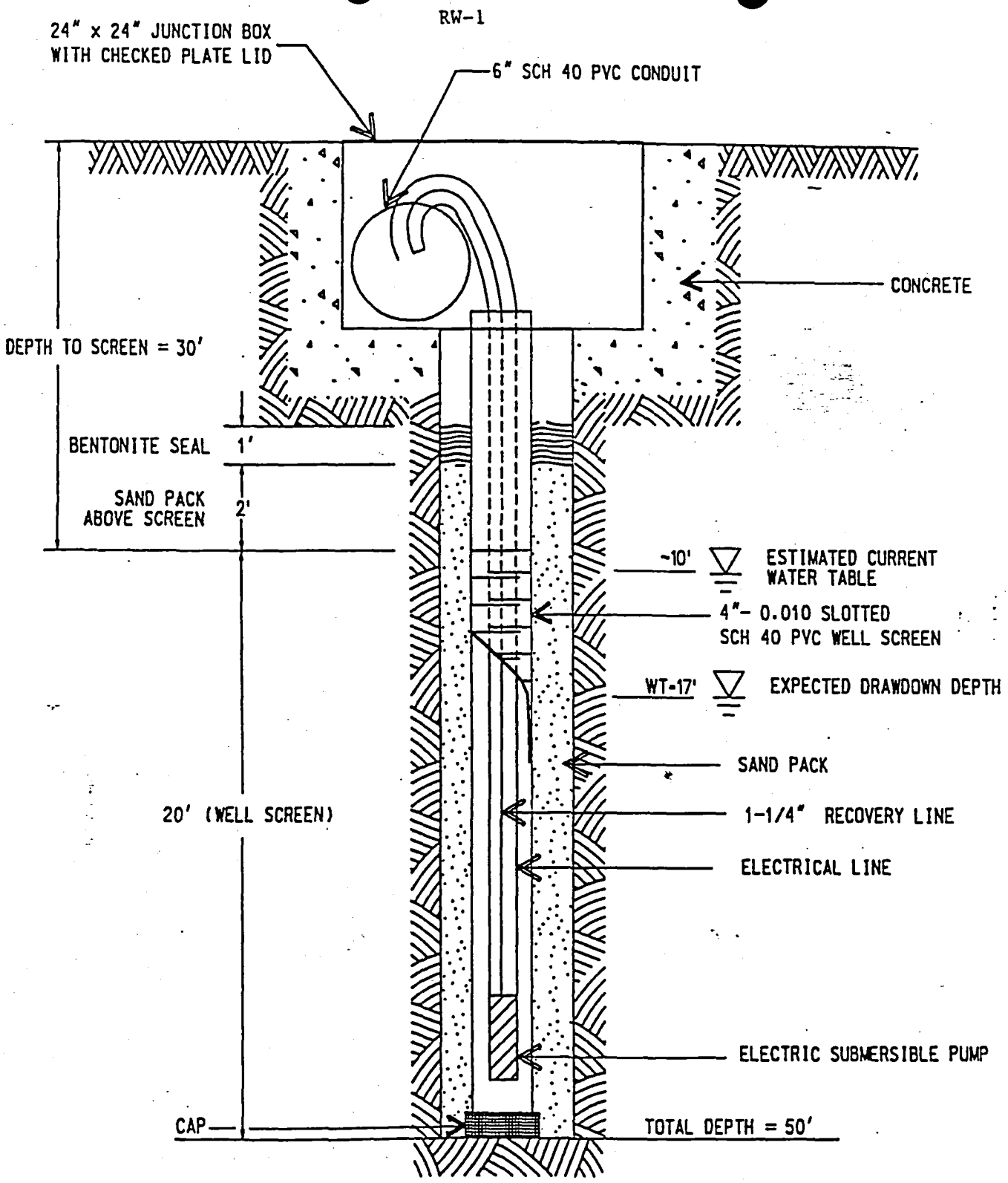
ORING NUMBER RW-1 SITE LOCATION Toastmaster, Inc. DRILLED BY M. Sage

OTAL DEPTH 52.0' Laurinburg, NC LOGGED BY S. Carroll

DRILLING DATE 9/8/92

SAMPLE DEPTH (FT.)		SAMPLE DESCRIPTION	WATER CONTENT	HC ODOR	PID/ FID PPM	BLOW COUNT
35.0	37.0	Sand, clay-sand. Fine. Grey-tan.	saturated	no	12	12,16,26,32
40.0	42.0	Sand. Medium grained. Poorly sorted. Grey.	saturated	no	1	10,18,22,36
45.0	47.0	Sand. Medium to coarse grained. Poorly sorted. Tan/grey mix.	saturated	no	0.6	7,7,5,6
50.0	52.0	Top 20" sand. Medium-coarse grained. Poorly sorted. Tan.	saturated	no	0	3,5,3,5
		Bottom 4" thick, sandy, clay. Grey.	saturated	no		

REMARKS WR = Weight of Rods, NR = No Reading due to equipment failure



PROJECT:	TITLE:				FIGURE:
TOASTMASTER, INC. LAURINBURG, NC	RECOVERY WELL DETAIL			Richard Catlin & Associates, Inc. CONSULTING ENGINEERS AND HYDROGEOLOGISTS RCA	
	JOB #: 92196	DRAWN BY: DWM	SCALE: NTS		

P.O. BOX 27687 • RALEIGH, NC 27611-7687
PHONE (919)733-3221

WELL CONSTRUCTION RECORD

RC-15

Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

LLING CONTRACTOR RICHARD CATLIN & ASSOCIATES, INC.

LLER REGISTRATION NUMBER 1142

STATE WELL CONSTRUCTION PERMIT NUMBER: Existing GTI permit per Jim Bales

ELL LOCATION: (Show sketch of the location below)

earest Town: Laurinburg

County: Scotland

nt. of U.S. 15/501 and S.R. 1301
oad, Community, or Subdivision and Lot No.),

WNER Toastmasters, Inc.

DDRESS 1801 North Stadium Blvd.
(Street or Route No.)

Columbia (City or Town) Missouri (State) 65202 (Zip Code)

ATE DRILLED 7/15/92 USE OF WELL Monitoring

OTAL DEPTH 75.0' CUTTINGS COLLECTED ☒ Yes ☐ No

OES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No

TATIC WATER LEVEL: ±20.0 FT. ☐ above ☒ below TOP OF CASING,
TOP OF CASING IS .5 FT. ABOVE LAND SURFACE.

IELD (gpm): N/A METHOD OF TEST N/A

ATER ZONES (depth): underlying aquifer

HLORINATION: Type N/A Amount N/A

CASING:

	Depth From	To	Diameter	Wall Thickness or Weight/Ft.	Material
	0.0	50.0	6"	SCH40	PVC
	+2.5	72.5	2"	SCH40	PVC

GROUT:

	Depth From	To	Material	Method
	0.0	64.0	Neat	Tremie
	64.0	66.5	Bentonite	In-Place

SCREEN:

	Depth From	To	Diameter	Slot Size	Material
	67.5	72.5	2" in.	0.010 in.	PVC
			in.	in.	
			in.	in.	

GRAVEL PACK:

	Depth From	To	Size	Material
	66.5	72.5	Coarse	Sand

DRILLING LOG

Depth From	To	Formation Description

SEE ATTACHED

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

SEE ATTACHED

REMARKS:

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

Shawn P. Carroll — 12/18/93
SIGNATURE OF CONTRACTOR OR AGENT — DATE

Submit original to Division of Environmental Management and copy to well owner.

W-1 REVISED 2/90

BORING LOG

RING NUMBER RC-15
TAL DEPTH 75.0'

SITE LOCATION Toastmaster, Inc.
Laurinburg, NC

DRILLED BY M. Sage
LOGGED BY S. Carroll

DRILLING DATE 7/15 - 7/17/92

AMPLE DEPTH (FT.)		SAMPLE DESCRIPTION	WATER CONTENT	HC ODOR	PID/ FID PPM	BLOW COUNT
0	7.0	Clayey, SAND. Fine to medium grained. Well sorted. Tan to brown.	low	yes	NR	5,6,8,12
0.0	12.0	Clayey SAND. Medium grained. Mottled red/tan/grey. Well rounded.	medium	yes	NR	6,9,9,10
5.0	17.0	SAND. Medium to coarse grained. Well sorted. Rose colored.	saturated	slight	NR	8,10,22,24
0.0	22.0	Sandy CLAY. Medium grained. Well rounded. Grey with rose mottling.	saturated	slight	NR	2,3,4,4
5.0	27.0	Sandy CLAY. Fine to medium grained. Well rounded and well sorted. Mottled tan/grey/rose.	saturated	no	NR	HP
0.0	32.0	Top 18": Sandy CLAY. Fine to medium grained. Well rounded and well sorted. Mottled tan/grey/rose.	saturated	no	NR	HP
		Bottom 6": SAND. Coarse. Light brown.				

EMARKS HP = Hydraulic Push . NR = No Reading due to equipment failure

BORING LOG

BORING NUMBER RC-15
TOTAL DEPTH 75.0'

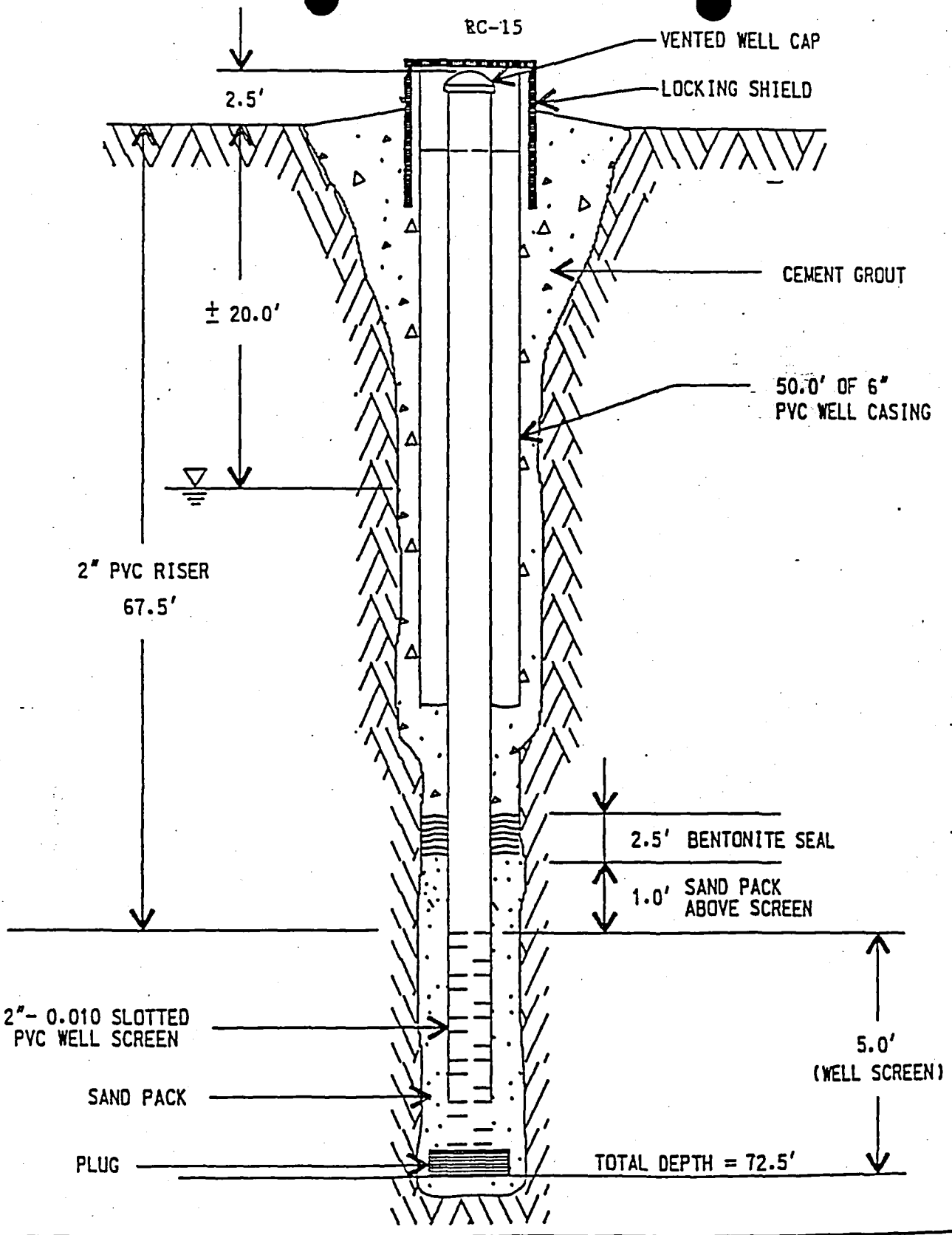
SITE LOCATION Toastmaster, Inc.
Laurinburg, NC

DRILLED BY M. Sage
LOGGED BY S. Carroll

DRILLING DATE 7/15 - 7/17/92

SAMPLE DEPTH (FT.)		SAMPLE DESCRIPTION	WATER CONTENT	HC ODOR	PID/ FID PPM	BLOW COUNT
35.0	37.0	SAND. Medium to coarse grained. Well rounded and well sorted. Tan/grey with rose mottling.	saturated	no	NR	22,28,30,20
40.0	42.0	SAND. Coarse with rounded pebbles. Poorly sorted. Tan.	saturated	no	NR	WR,WR,20 22
45.0	47.0	CLAY. Tan.	low	no	NR	HP
50.0	52.0	CLAY. Dark grey.	low	no	NR	HP
		Set 50' of 6" PVC casing. Tremie grounted to surface.			NR	
55.0	57.0	CLAY. Grey	low	no	3.0	4,3,3,5
60.0	62.0	Top 18": CLAY. Grey. Bottom 6": Sandy CLAY. Fine grained, well rounded. Tan.	low	no	1.8	4,5,5,8
65.0	67.0	Clayey SAND. Fine to medium grained. Poorly sorted. Grey.	moderate	no	0.8	WR
73.5	75.5	SAND. Medium grained. Well rounded. Grey to dark grey.	saturated	no	1.0	4,5,6,8

REMARKS WR = Weight of Rods. NR = No Reading due to equipment failure



PROJECT:	TITLE:				FIGURE:
TOASTMASTER, INC. LAURINBURG, N.C.	AS BUILT ABOVE GROUND TELESCOPING WELL DETAIL			Richard Catlin & Associates, Inc. CONSULTING ENGINEERS AND HYDROGEOLOGISTS RCA	3
	JOB #: 92196	DRAWN BY: BFB	SCALE: NTS		

GeoChem, Incorporated

Environmental Laboratories

November 27, 1992

Mr. Rudy Smithwick
Richard Catlin & Associates
P.O. Box 10279
Wilmington, NC 28405

Reference: **Toastmaster, Inc.**
92196
GCI# 9211-071

Dear Mr. Rudy Smithwick:

This is the analytical report for the above referenced project. On November 16, 1992 we received one water sample for analysis. The analytical and quality control results are presented in separate tables for your convenience. Brief summaries of analytical methods employed are as follows. GeoChem analytical reports contain information based strictly on the analysis requested on the chain of custody (COC) accompanying this report. Non-target compounds are not identified or quantified. Our clients must request such additional documentation in writing.

EPA method 601

Samples are loaded into a specially designed purging chamber at ambient temperature. Helium is bubbled through the sample. This drives the organics onto a sorbent trap. Once purging has been completed the sorbent column is rapidly heated. This efficiently transfers the organics into the gas chromatograph which separates the components of the sample. The purgeable organics are then detected using a halide specific detector.

If there are any technical questions please feel free to call me at 919-460-8093. Thank you for allowing GeoChem to serve your analytical needs.

Sincerely,

Dean Gekel
President

2500 Gate Way Centre Blvd., Suite 300 • Morrisville, NC 27560
Telephone: 919-460-8093 • FAX: 919-460-0167

Report To:
Shawn Carroll
BCA

GeoChem, Incorporated

Environmental Laboratories
2500 Gate Way Centre Blvd., Suite 300
Morrisville, NC 27560

BCA

Chain of Custody Record

Page 1 of 1

PROJECT SITE	PO#	GeoChem PROJECT #
Laurinburg, NC	920722-5	9207-082

SITE NAME: Toastmaster, Inc.

DATE REPORT DUE: 7/29/92

COLLECTED BY (Signature): Shawn P. Carroll

VERBAL / FAX / HARDCOPY

FIELD SAMPLE ID	TURNAROUND IN DAYS	SAMPLE MATRIX	DATE COLLECTED	NO. OF CONTAINERS PER LOCATION	ANALYSES: EPA 601	REMARKS	LAB ID NO. (for lab use only)
T-1	~~10~~ 5 (SRC)	H_2O	7/21/92	6			3235

REMARKS

RELINQUISHED BY: Shawn P. Carroll — DATE 7/22 — TIME 1600

RECEIVED BY:	DATE	TIME	RELINQUISHED BY:	DATE	TIME	RECEIVED BY:	DATE	TIME	RELINQUISHED BY:	DATE	TIME
[illegible]	7/23	1:00 PM									
RECEIVED BY:	DATE	TIME	RELINQUISHED BY:	DATE	TIME	RECEIVED BY:	DATE	TIME	RELINQUISHED BY:	DATE	TIME

This Chain of Custody is considered a written contract to perform the services requested in the analyses section of this document.

FORM 110 11

GeoChem, Incorporated

Environmental Laboratories

QUALITY CONTROL RESULTS

METHOD	RECOVERY	METHOD DETECTION LIMIT
601		
1,2-Dichloroethane	83 %	0.5 ppb
Chlorobenzene	89 %	
1,4-Dichlorobenzene	90 %	

REVIEWED BY

REVIEWED BY

2500 Gate Way Centre Blvd., Suite 300 • Morrisville, NC 27560
Telephone: 919-460-8093 • FAX: 919-460-0167

GeoChem, Incorporated

Environmental Laboratories

Geochem (NC #336/SC #99008)
Project#9207-082 1 Site Name Toastmaster, Inc.

LAB ID.	3236
DATE SAMPLED	7/21/92
FIELD ID.	T-1

METHOD

ANALYTE	ug/l	pql
EPA 601		
Dichlorodifluoromethane	BDL	0.5
Chloromethane	BDL	
Vinyl chloride	BDL	
Bromomethane	BDL	
Chloroethane	BDL	
Methylene chloride	BDL	
Trichlorofluoromethane	BDL	
trans-1,2Dichloroethene	BDL	
1,1-Dichloroethane	BDL	
Chloroform	BDL	
1,1,1-Trichloroethane	BDL	
Carbon tetrachloride	BDL	
1,2-Dichloroethane	BDL	
Trichloroethene	BDL	
1,1-Dichloroethene	BDL	
1,2-Dichloropropane	BDL	
Bromodichloromethane	BDL	
trans1,3Dichloropropene	BDL	
cis-1,3-Dichloropropene	BDL	
1,1,2-Trichloroethane	BDL	
Tetrachloroethene	BDL	
Dibromochloromethane	BDL	
Chlorobenzene	BDL	
Bromoform	BDL	
1,1,2,2Tetrachloroethane	BDL	
1,3-Dichlorobenzene	BDL	
1,2-Dichlorobenzene	BDL	
1,4-Dichlorobenzene	BDL	

	soil	water
parts per million =	*mg/kg*	*mg/l*
parts per billion =	*ug/kg*	*ug/l*

pql = practical quantitation limit due to matrix effects.
bdl = below method detection limit.
bql = below quantitation limit.

2500 Gate Way Centre Blvd., Suite 300 • Morrisville, NC 27560
Telephone: 919-460-8093 • FAX: 919-460-0167

GeoChem, Incorporated

Environmental Laboratories

July 29, 1992

Mr. Shawn Carroll
Richard Catlin & Associates
P.O. Box 10279
Wilmington, NC 28405-3755

Reference: Toastmaster, Inc.
Laurinburg, NC
GCI# 9207-082

Dear Mr. Shawn Carroll:

This is the analytical report for the above referenced project. On July 23, 1992 we received one water sample for analysis. The analytical and quality control results are presented in separate tables for your convenience. Brief summaries of analytical methods employed are as follows.

EPA method 601

Samples are loaded into a specially designed purging chamber at ambient temperature. Helium is bubbled through the sample. This drives the organics onto a sorbent trap. Once purging has been completed the sorbent column is rapidly heated. This efficiently transfers the organics into the gas chromatograph which separates the components of the sample. The purgeable organics are then detected using a halide specific detector.

If there are any technical questions please feel free to call me at 919-460-8093. Thank you for allowing GeoChem to serve your analytical needs.

Sincerely,

Dean Gokel
President

2500 Gate Way Centre Blvd., Suite 300 • Morrisville, NC 27560
Telephone: 919-460-8093 • FAX: 919-460-0167

ANALYTICAL DATA

GeoChem, Incorporated

Environmental Laboratories

Geochem (NC #336/SC #99008)
Project#9211-071 1 Site Name Toastmaster, Inc.

LAB ID.	4773
DATE SAMPLED	11/13/92
DATE ANALYZED	11/22/92
FIELD ID.	RW-1

METHOD

ANALYTE	ug/l	pql
EPA 601		
Dichlorodifluoromethane	BDL	0.5
Chloromethane	BDL	
Vinyl chloride	BDL	
Bromomethane	BDL	
Chloroethane	BDL	
Methylene chloride	BDL	
Trichlorofluoromethane	BDL	
trans-1,2Dichloroethene	1.3	
1,1-Dichloroethane	BDL	
Chloroform	3.3	
1,1,1-Trichloroethane	BDL	
Carbon tetrachloride	BDL	
1,2-Dichloroethane	BDL	
Trichloroethene	2000	5.0
1,1-Dichloroethene	BDL	0.5
1,2-Dichloropropane	BDL	
Bromodichloromethane	BDL	
trans1,3Dichloropropene	BDL	
cis-1,3-Dichloropropene	BDL	
1,1,2-Trichloroethane	0.7	
Tetrachloroethene	0.5	
Dibromochloromethane	BDL	
Chlorobenzene	BDL	
Bromoform	BDL	
1,1,2,2Tetrachloroethane	BDL	
1,3-Dichlorobenzene	BDL	
1,2-Dichlorobenzene	BDL	
1,4-Dichlorobenzene	BDL	

	soil	*water*
parts per million =	*mg/kg*	*mg/l*
parts per billion =	*ug/kg*	*ug/l*

pql = practical quantitation limit due to matrix effects.
bdl = below method detection limit.
bql = below quantitation limit.

2500 Gate Way Centre Blvd., Suite 300 • Morrisville, NC 27560
Telephone: 919-460-8093 • FAX: 919-460-0167

GeoChem, Incorporated

Environmental Laboratories

QUALITY CONTROL RESULTS

METHOD	RECOVERY	METHOD DETECTION LIMIT
601		
Trichloroethene	102 %	0.5 ppb
Chloroform	108 %	
Bromoform	98 %	

REVIEWED BY

B.A. Mullell

REVIEWED BY

Kevin Baker

2500 Gate Way Centre Blvd., Suite 300 • Morrisville, NC 27560
Telephone: 919-460-8093 • FAX: 919-460-0167

Report To: Rudy Smithwick

GeoChem, Incorporated

Environmental Laboratories

2500 Gate Way Centre Blvd., Suite 300
Morrisville, NC 27560

Bill To: RCrA

Chain of Custody Record

PROJECT SITE NUMBER	PO#	GEOCHEM PROJECT #
92196	921113 -6	9211-071

SITE NAME: Toastmaster, Inc.

DATE DUE: 12-01-92

COLLECTED BY (Signature): Sharon P. Carroll

VERBAL/FAX/HARDCOPY

FIELD SAMPLE ID	TURNAROUND IN DAYS	SAMPLE MATRIX	DATE AND TIME COLLECTED	NO. OF CONTAINERS PER LOCATION	EPA 601 GC/	ANALYSES	REMARKS	LAB ID NO. (for lab use only)
RW-1	10	H_2O	11/13/92 1100	3	✓			4773

REMARKS

RELINQUISHED BY: Sharon P. Carroll — DATE 11/13 — TIME 1:00

RECEIVED BY:	DATE	TIME	RELINQUISHED BY:	DATE	TIME	RECEIVED BY:	DATE	TIME	RELINQUISHED BY:	DATE	TIME
[illegible signature]	11/16	1240				[illegible signature]	11/16/92	5:00			

This Chain of Custody is considered a written contract to perform the services requested in the analyses section of this document.

APPENDIX V

PREVIOUS REPORTS

Reference #11

BLACK & VEATCH Waste Science, Inc.

TELEPHONE MEMORANDUM

USEPA
Toastmaster, Inc.
Laurinburg municipal water system

BVWS Project 52012.496
BVWS File
February 15, 1995
8:15

To: Robert Ellis
Company: Laurinburg Water Department
Phone No.: (910) 277-0214

Recorded by: Ginger Ferguson

Mr. Ellis provided information about the Laurinburg municipal water system. Currently, the Laurinburg Water Department operates 9 wells, one additional well is constructed but not online and one well is under construction. All wells are screened between 100 and 150 feet. No surface water is used by the department. Water is treated at a central treatment plant then distributed to customers. The department provides service to approximately 16,949 persons.

Mr. Ellis will outline the Laurinburg service area and identify well locations on a map.

BLACK & VEATCH Waste Science, Inc.

TELEPHONE MEMORANDUM

USEPA
Toastmaster, Inc.
Laurinburg water system

BVWS Project 52012.496
BVWS File
February 22, 1995
10:15

To: Robert Ellis
Company: City of Laurinburg
Phone No.: (910) 277-0214

Recorded by: Ginger Ferguson

I called Mr. Ellis for further clarification of the Laurinburg service area. According to Mr. Ellis, the northern boundary of the service area follows the city limits. The eastern boundary extends along the city limits in the northern section, includes East Laurinburg, and connects with the Laurinburg-Maxton Airbase. Laurinburg only supplies water to the Airbase in emergency situations. The western boundary extends to the intersection of the I-75 Business Route and I-75 Bypass. The southern boundary extends well outside the 4-mile radius.

City of Laurinburg

OFFICE OF SUPERINTENDENT
WATER & WASTEWATER PLANT

February 13, 1995

RECEIVED
FEB 21 1995

Ms. Ginger Ferguson
Site Manager
Black & Veatch Waste science, Inc.
1201 Pacific Avenue, Suite 1100
Tacoma, Washington 98402-4301

Dear Ms. Ferguson:

Enclosed please find the map with the information that you requested. The City's water service goes to the south approximately 1.5 miles from the state line of South Carolina, to the west approximately 1.5 miles from Laurel Hill, NC. Our water service to the north goes no further than Highland, McFarland Road, and east the service goes to the LOF Glass Plant, here we are also connected with the water system at the Laurinburg-Maxton Airbase. The water department serves 16,949 people not households.

I know for sure there is a community water system at the Elmore Trailer Park and at one time there was a community system at the Northwoods Trailer Park. I am not sure if this system is still in operation. Mr. Edd Wilbanks with the Fayetteville Regional Office could inform you of any additional water systems in this area. Mr. Wilbanks can be reached at (910) 486-1191.

Please call if you have any questions.

Sincerely,

Robert Ellis

Robert Ellis
City of Laurinburg
Director WTP & WWTP

603 LAUCHWOOD DRIVE • P.O. BOX 249 • LAURINBURG, N.C. 28352 • 919/277-0214

Reference #12

BLACK & VEATCH Waste Science, Inc.

TELEPHONE MEMORANDUM

USEPA
Toastmaster
Community Wells

BVWS Project 52012.496
BVWS File
February 22, 1995
10:45

To: Ed Wilbanks
Company: NC Division of Environmental Management, Fayetteville
Phone No.: (910) 486-1191

Recorded by: Ginger Ferguson

Mr. Wilbanks provided additional information about community systems operating near Toastmaster. Elmore Trailer Park operates 1 well that services approximately 20 to 30 hookups. The Northwoods Trailer Park used to operate a community system. The system currently services less than 15 households so it is no longer classified as a community system. No other community systems were identified in the 4-mile radius.

Reference #13

1990 CPH-1-35

1990 Census of Population and Housing

Summary Population and Housing Characteristics

North Carolina

Issued August 1991

U.S. Department of Commerce
Robert A. Mosbacher, Secretary
Rockwell A. Schnabel, Deputy Secretary

Economics and Statistics Administration
Michael R. Darby, Under Secretary
for Economic Affairs and Administrator

BUREAU OF THE CENSUS
Barbara Everitt Bryant, Director

Table 6. Household, Family, and Group Quarters Characteristics: 1990

[For definitions of terms and meanings of symbols, see text]

State County Place and [In Selected States] County Subdivision	Persons in households	All households	Family households: Total	Family households: Married-couple family	Family households: Female householder, no husband present	Nonfamily households: Total	Nonfamily households: Householder living alone: Total	Nonfamily households: Householder living alone: 65 years and over: Total	Nonfamily households: Householder living alone: 65 years and over: Female	Persons per— Household	Persons per— Family	Persons in group quarters: Total	Persons in group quarters: Institutionalized persons	Persons in group quarters: Other persons in group quarters
The State	6 404 767	2 517 026	1 812 053	1 424 206	309 876	704 973	596 959	226 384	182 329	2.54	3.03	224 470	83 400	141 070
COUNTY														
Alamance County	105 327	42 652	30 745	24 295	5 130	11 907	10 467	4 598	3 748	2.47	2.94	2 886	1 173	1 713
Alexander County	27 245	10 331	8 049	6 715	952	2 282	2 022	839	651	2.64	3.02	299	299	-
Alleghany County	9 381	3 894	2 829	2 421	303	1 065	990	539	433	2.41	2.88	209	193	16
Anson County	23 117	8 531	6 359	4 552	1 475	2 172	2 042	1 075	860	2.71	3.23	357	344	13
Ashe County	21 965	8 848	6 748	5 643	816	2 100	1 935	1 014	809	2.48	2.89	244	220	24
Avery County	13 918	5 520	4 162	3 500	480	1 358	1 229	549	420	2.52	2.95	949	320	629
Beaufort County	41 704	16 157	11 840	9 140	2 186	4 317	3 915	1 974	1 605	2.58	3.07	579	441	138
Bertie County	20 321	7 412	5 501	3 831	1 419	1 911	1 797	957	755	2.74	3.28	67	67	-
Bladen County	28 150	10 760	8 017	5 854	1 762	2 743	2 579	1 243	1 000	2.62	3.11	513	509	4
Brunswick County	50 497	20 069	15 291	12 636	2 031	4 778	4 227	1 640	1 194	2.52	2.91	488	307	181
Buncombe County	169 713	70 802	49 335	39 637	7 684	21 467	18 868	8 174	6 642	2.40	2.90	5 108	2 966	2 142
Burke County	73 281	29 184	21 711	17 462	3 148	7 473	6 589	2 706	2 228	2.51	2.93	2 463	2 410	53
Cabarrus County	97 255	37 515	28 367	23 279	3 972	9 148	8 038	3 599	2 971	2.59	3.02	1 680	1 223	457
Caldwell County	69 917	27 172	20 656	16 653	2 944	6 516	5 660	2 287	1 846	2.57	2.97	792	735	57
Camden County	5 875	2 180	1 692	1 385	225	488	437	234	169	2.69	3.11	29	-	29
Carteret County	51 554	21 238	15 276	12 681	2 021	5 962	5 081	1 901	1 431	2.43	2.88	1 002	750	252
Caswell County	20 053	7 468	5 781	4 454	1 024	1 687	1 593	727	573	2.69	3.13	640	624	16
Catawba County	116 387	45 700	33 773	27 418	4 841	11 927	10 270	3 844	3 115	2.55	2.99	2 025	1 134	891
Chatham County	38 315	15 293	11 227	9 115	1 605	4 066	3 445	1 412	1 141	2.51	2.95	444	377	67
Cherokee County	19 899	7 966	6 069	5 065	765	1 897	1 764	975	759	2.50	2.91	271	196	75
Chowan County	13 233	5 113	3 775	2 842	767	1 338	1 238	641	499	2.59	3.07	273	273	-
Clay County	7 150	2 928	2 177	1 894	203	751	699	418	314	2.44	2.90	5	4	1
Cleveland County	83 012	32 037	24 282	19 011	4 168	7 755	7 011	3 202	2 624	2.59	3.02	1 702	915	787
Columbus County	48 953	18 459	13 754	10 381	2 757	4 705	4 351	2 152	1 695	2.65	3.15	634	624	10
Craven County	78 014	29 542	22 481	18 189	3 511	7 061	6 121	2 436	1 930	2.64	3.07	3 599	811	2 788
Cumberland County	253 342	91 500	69 966	54 433	12 883	21 534	17 718	4 724	3 752	2.77	3.19	21 204	1 499	19 705
Currituck County	13 486	5 038	3 854	3 272	407	1 184	984	419	312	2.68	3.08	250	217	33
Dare County	22 542	9 349	6 425	5 498	682	2 924	2 264	714	522	2.41	2.88	204	140	64
Davidson County	125 358	48 944	37 176	30 410	5 120	11 768	10 262	4 189	3 319	2.56	2.96	1 319	1 277	42
Davie County	27 541	10 785	8 270	6 999	953	2 515	2 246	1 025	817	2.55	2.95	318	288	30
Duplin County	39 368	14 925	11 036	8 376	2 099	3 889	3 553	1 779	1 439	2.64	3.12	627	560	67
Durham County	173 310	72 297	45 985	33 614	10 321	26 312	20 860	5 553	4 471	2.40	2.99	8 525	2 175	6 350
Edgecombe County	55 856	20 319	15 085	10 000	4 293	5 234	4 703	2 124	1 717	2.75	3.25	702	657	45
Forsyth County	257 466	107 419	72 621	55 715	14 052	34 798	29 870	9 779	7 975	2.40	2.94	8 412	3 493	4 919
Franklin County	35 237	13 503	10 047	7 640	1 845	3 456	3 120	1 384	1 126	2.61	3.07	1 177	568	609
Gaston County	172 791	65 347	49 754	38 905	8 439	15 593	13 580	5 720	4 720	2.64	3.07	2 302	1 458	844
Gates County	9 202	3 352	2 593	2 040	404	759	705	394	288	2.75	3.19	103	102	1
Graham County	7 176	2 772	2 166	1 839	246	606	562	294	225	2.59	2.98	20	18	2
Granville County	35 191	13 134	9 883	7 501	1 857	3 251	2 889	1 236	978	2.68	3.13	3 154	3 079	75
Greene County	14 665	5 395	4 066	3 003	875	1 329	1 189	574	481	2.72	3.18	719	704	15
Guilford County	335 348	137 706	92 891	71 195	17 570	44 815	36 578	12 180	9 951	2.44	2.97	12 072	3 084	8 988
Halifax County	54 122	20 335	14 874	10 092	4 018	5 461	5 005	2 398	1 897	2.66	3.18	1 394	1 356	38
Harnett County	65 340	25 150	18 529	14 489	3 154	6 621	5 773	2 438	1 962	2.60	3.06	2 482	1 240	1 242
Haywood County	46 152	19 211	14 120	11 831	1 774	5 091	4 601	2 337	1 886	2.40	2.83	790	751	39
Henderson County	68 206	28 709	21 169	18 113	2 344	7 540	6 838	3 531	2 859	2.38	2.80	1 079	967	112
Hertford County	21 612	8 150	5 921	4 164	1 473	2 229	2 063	977	766	2.65	3.19	911	279	632
Hoke County	21 612	7 405	5 794	3 847	1 605	1 611	1 419	523	420	2.92	3.34	1 244	1 244	-
Hyde County	5 383	2 094	1 533	1 151	321	561	516	269	191	2.57	3.07	28	19	9
Iredell County	92 082	35 573	26 869	21 726	4 023	8 704	7 646	3 271	2 682	2.59	3.02	849	814	35
Jackson County	23 834	9 683	6 970	5 749	981	2 713	2 242	966	745	2.46	2.91	3 012	280	2 732
Johnston County	80 341	31 566	23 217	18 566	3 634	8 349	7 441	3 380	2 750	2.55	3.01	965	893	72
Jones County	9 412	3 492	2 639	2 034	482	853	774	406	311	2.70	3.17	2	2	-
Lee County	40 651	15 689	11 739	9 087	2 135	3 950	3 482	1 369	1 107	2.59	3.03	723	672	51
Lenoir County	55 652	21 938	15 611	11 131	3 798	6 327	5 706	2 580	2 073	2.54	3.06	1 622	1 559	63
Lincoln County	49 802	18 764	14 661	12 207	1 827	4 103	3 580	1 467	1 173	2.65	3.03	517	517	-
McDowell County	35 064	13 680	10 366	8 576	1 363	3 314	2 996	1 399	1 135	2.56	2.99	617	416	201
Macon County	22 992	9 834	7 235	6 236	773	2 599	2 388	1 307	1 021	2.34	2.76	507	233	274
Madison County	16 104	6 488	4 806	4 058	516	1 682	1 510	789	581	2.48	2.92	849	104	745
Martin County	24 813	9 317	6 900	5 087	1 518	2 417	2 213	1 100	906	2.66	3.17	265	257	8
Mecklenburg County	499 886	200 219	134 361	103 211	25 013	65 858	52 037	12 990	10 610	2.50	3.05	11 547	3 578	7 969
Mitchell County	14 288	5 779	4 420	3 777	479	1 359	1 265	649	539	2.47	2.88	145	130	15
Montgomery County	22 279	8 290	6 274	4 823	1 119	2 016	1 838	876	690	2.69	3.14	1 067	997	70
Moore County	58 010	23 827	17 483	14 312	2 473	6 344	5 662	2 744	2 201	2.43	2.87	1 003	970	33
Nash County	75 450	29 041	21 224	16 322	3 968	7 817	6 926	2 880	2 316	2.60	3.09	1 227	807	420
New Hanover County	116 999	48 139	32 400	24 723	6 383	15 739	12 434	4 372	3 512	2.43	2.95	3 285	1 321	1 964
Northampton County	20 055	7 591	5 644	3 958	1 436	1 947	1 816	968	704	2.64	3.13	743	742	1
Onslow County	115 274	40 658	32 971	28 037	3 343	7 687	6 271	1 752	1 384	2.84	3.16	34 564	954	33 610
Orange County	84 627	36 104	21 123	16 854	3 380	14 981	10 110	2 257	1 839	2.34	2.93	9 224	770	8 454
Pamlico County	11 247	4 523	3 382	2 717	547	1 141	1 055	528	410	2.49	2.93	125	112	13
Pasquotank County	29 884	11 384	8 326	6 356	1 681	3 058	2 725	1 342	1 065	2.63	3.13	1 414	383	1 031
Pender County	28 497	11 112	8 420	6 707	1 371	2 692	2 388	1 055	796	2.56	2.99	358	348	10
Perquimans County	10 302	3 988	3 038	2 444	468	950	862	443	342	2.58	3.02	144	144	-
Person County	29 830	11 423	8 570	6 607	1 547	2 853	2 608	1 209	994	2.61	3.07	350	304	46
Pitt County	102 400	40 491	26 434	19 369	5 857	14 057	10 412	3 104	2 511	2.53	3.10	5 524	946	4 578
Polk County	14 187	6 110	4 346	3 693	511	1 764	1 599	952	768	2.32	2.79	229	227	2
Randolph County	105 440	41 096	31 363	26 135	3 957	9 733	8 590	3 435	2 789	2.57	2.97	1 106	1 050	56
Richmond County	43 534	16 793	12 270	9 126	2 551	4 523	4 174	2 011	1 600	2.59	3.11	984	875	109
Robeson County	103 186	36 154	27 429	18 451	7 353	8 725	7 891	3 355	2 651	2.85	3.34	1 993	1 280	713
Rockingham County	85 242	33 446	24 671	19 351	4 193	8 775	7 959	3 649	2 982	2.55	3.02	822	781	41
Rowan County	107 079	42 512	31 055	25 100	4 618	11 457	10 236	4 748	3 815	2.52	2.99	3 526	2 408	1 118
Rutherford County	56 197	22 198	16 480	13 191	2 551	5 718	5 255	2 556	2 050	2.53	2.99	721	721	-
Sampson County	46 754	17 526	13 191	10 058	2 525	4 335	3 975	2 032	1 610	2.67	3.14	543	490	53
Scotland County	32 679	11 837	8 971	6 225	2 338	2 866	2 618	1 173	935	2.76	3.25	1 075	401	674
Stanly County	50 734	19 747	14 967	12 451	1 975	4 780	4 396	2 164	1 785	2.57	3.01	1 031	470	561
Stokes County	36 842	14 123	11 022	9 341	1 273	3 101	2 825	1 246	1 016	2.61	3.00	361	361	-
Surry County	60 950	24 252	18 252	15 253	2 341	6 000	5 474	2 732	2 256	2.51	2.94	754	650	104
Swain County	10 653	4 173	3 083	2 382	550	1 090	985	467	349	2.55	3.01	615	215	400
Transylvania County	24 283	9 924	7 496	6 442	797	2 428	2 224	1 131	912	2.45	2.86	1 237	178	1 059
Tyrrell County	3 852	1 471	1 078	810	213	393	359	208	148	2.62	3.13	4	4	-
Union County	82 633	29 307	23 530	19 607	3 063	5 777	5 018	2 148	1 755	2.82	3.18	1 578	455	1 123

Reference #14

BLACK & VEATCH Waste Science, Inc.

TELEPHONE MEMORANDUM

USEPA
Toastmaster, Inc.
Fisheries in Leith Creek

BVWS Project 52012.496

February 3, 1995
11:15

To: Fred Harris
Company: NC Wildlife Resources Commission
Phone No.: (919) 733-3633

Recorded by: Ginger Ferguson

Mr. Harris provided information on fisheries of Leith Creek. All of Leith Creek provides "good fishing" for various species. All fishing in Leith Creek is recreational. Leith Creek is a tributary to Bridge Creek, which is a tributary to the Pee Dee River. See attached documentation.

LMR - Lumber River

10-7-1. Juniper Creek
Headwaters of McNair Pond to origin: 9 miles; Av. width 4'; 5 acres; E/C Dace trickle; S/C Water Supply II (swamp).
Fishing from bank or by wading recommended. Access at US-15/501 and SSR-1324 (Scotland County) bridges.
This reach is not a highly recommended fishing stream.

10-7-2. Lake Andrews
Impoundment of Jordan Creek at river mile 7. Entire pond: 25 acres.
Access to pond subject to private control and fishing for group camps only. No public fishing available.

10-7. Jordan Creek
Headwaters of Lake Andrews to origin: 5 miles; Av. width 8'; 5 acres; E/C Dace trickle; S/C Bathing (swamp).
Fishing from bank or by wading recommended. Access at SSR-1341 and SSR-1343 (Scotland County) bridges.
This small stream supports very limited fishing pressure.

10-8. Creeds Pond
Impoundment of Big Shoe Heel Creek at river mile 19. Entire pond: 75 acres.
Fishing from bank, boat, or by wading recommended. Access via private road off SSR-1427 (Scotland County).
Access to pond subject to private control but fee fishing is permitted. Reputedly good fishing for largemouth and bluegill.

10. Big Shoe Heel Creek
Headwaters of Creeds Pond to Cooley Pond: 5 miles; Av. width 18'; 13 acres; E/C Robin-Warmouth; S/C Water Supply II (swamp).
Fishing from bank or by wading recommended. Access at US-401, SSR-1405, and SSR-1421 (Scotland County) bridges.
This reach provides fair fishing for chain pickerel, redbreast sunfish, and warmouth.

10-10. Cooley Pond
Impoundment of Big Shoe Heel Creek at river mile 25. Entire pond: 25 acres.
Access by private road off SSR-1405 (Scotland County).
Access to pond subject to private control and guest fishing only is permitted.

10. Big Shoe Heel Creek
Cooley Pond to origin: 6 miles; Av. width 5'; 4 acres; E/C Dace trickle; S/C Water Supply II (swamp).
Fishing from bank or by wading recommended. Access at SSR-1411 and SSR-1412 (Scotland County) bridges.
This reach is not highly recommended fishing waters.

11. Bridge Creek
Tributary to Pee Dee River in South Carolina.
South Carolina line to St. Andrews College Lake: 10 miles; Av. width 25'; 30 acres; E/C Robin-Warmouth; S/C Agricultural (swamp).
SWCC (entire creek): 10 contacts; 0.3 fish/hour; 60% sunfish, 40% largemouth.
Fishing from bank or by wading, or small boat in lower reaches, recommended.
Access at SSR-1614, SSR-1615, SSR-1619, SSR-1620, and SSR-1621 (Scotland County) bridges. This reach generally provides fair fishing for chain pickerel, bluegill, warmouth, and some crappie in spite of pollution from Laurinburg.

11-1. Leiths Creek
Tributary to Bridge Creek at river mile 4.
Mouth to Johns Pond: 1 mile; Av. width 18'; 2 acres; E/C Robin-Warmouth; S/C Agricultural (swamp).
Fishing from bank or by wading recommended. Access at US-501 bridge.
This reach generally supports good fishing for redfin pickerel, warmouth, and redbreast sunfish.

11-1-1. Johns Pond
Impoundment of Leiths Creek at river mile 1. Entire pond: 125 acres.
Access via private control off US-501. Access to pond subject to private control but fee fishing is permitted. Boat rentals available. Reputedly good fishing water for largemouth bass and bluegill.

11-1. Leiths Creek
Headwaters of Johns Pond to origin: 8 miles; Av. width 9'; 9 acres; E/C Robin-Warmouth; S/C Agricultural (swamp).
Fishing from bank or by wading recommended. Access at SSR-1609 and SSR-1619 (Scotland County) bridges.
This reach provides good fishing for redbreast sunfish, redfin pickerel, and largemouth bass in spite of residual pollution from Laurinburg.

11-2. St. Andrews College Lake
Impoundment of Bridge Creek at river mile 10. Entire pond: 75 acres.
Access from St. Andrews College campus at Laurinburg.
Access to pond subject to private control and fishing is restricted to college students and their guests.

END

Reference #15

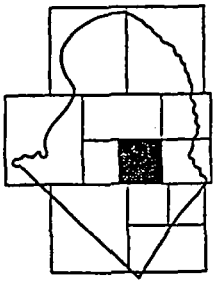
NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

SCOTLAND COUNTY, NORTH CAROLINA
(UNINCORPORATED AREAS)

PANEL 95 OF 175

PANEL LOCATION



COMMUNITY-PANEL NUMBER
370316 0095 B

EFFECTIVE DATE:
DECEMBER 16, 1988

Federal Emergency Management Agency

LEGEND

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD

ZONE A	No base flood elevations determined.
ZONE AE	Base flood elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE A99	To be protected from 100-year flood by Federal flood protection system under construction; no base elevations determined.
ZONE V	Coastal flood with velocity hazard (wave action); no base flood elevations determined.
ZONE VE	Coastal flood with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

ZONE X	Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.

OTHER AREAS

ZONE X	Areas determined to be outside 500-year flood plain.
ZONE D	Areas in which flood hazards are undetermined.

	Flood Boundary
	Floodway Boundary
	Zone D Boundary
	Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones.
513	Base Flood Elevation Line; Elevation in Feet*
D — D	Cross Section Line
(EL 987)	Base Flood Elevation in Feet Where Uniform Within Zone*
RM7X	Elevation Reference Mark
•MI.5	River Mile

*Referenced to the National Geodetic Vertical Datum of 1929

NOTES

This map is for use in administering the National Flood Insurance Program; it does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size, or all planimetric features outside Special Flood Hazard Areas.

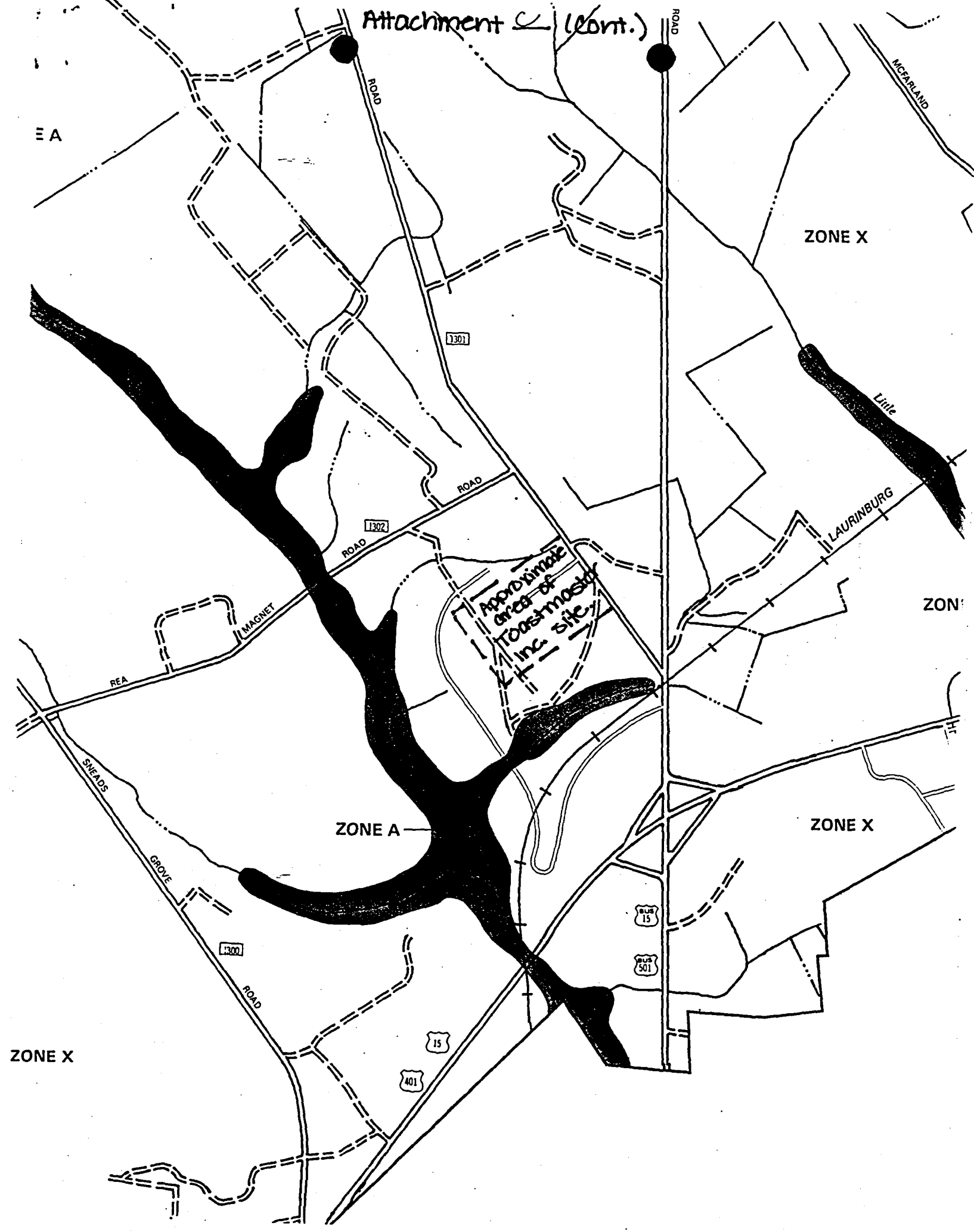
Certain areas not in the Special Flood Hazard Areas may be protected by flood control structures.

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the Federal Emergency Management Agency.

Floodway widths in some areas may be too narrow to show to scale. Refer to Floodway Data Table where floodway width is shown at 1/20 inch.

Coastal base flood elevations apply only landward of the shoreline

Attachment C (cont.)



State of North Carolina
Department of Environment,
Health and Natural Resources
Division of Parks & Recreation

James B. Hunt, Jr., Governor
Jonathan B. Howes, Secretary
Dr. Philip K. McKnelly, Director

Reference #16

RECEIVED
FEB 21 1995

DEHNR

Ms. Ginger Ferguson
Black & Veatch Waste Science, Inc.
1201 Pacific Avenue, Suite 1100
Tacoma, WA 98402-4301

February 14, 1995

SUBJECT: Rare Species, High Quality Natural Communities, and Significant Natural Areas in the Toastmaster, Inc. Project Area in Laurinburg, Scotland County, North Carolina

Dear Ms. Ferguson:

The North Carolina Natural Heritage Program does not have records of known rare species, high quality natural communities, or significant natural areas occurring at the Toastmaster, Inc. site or within a 1-mile radius of the site.

We do, however, have several records further from the project site. Just within the 2-mile radius at Jordan Creek by SR 1429 is a record for Sarvis holly (Ilex amelanchier), which is significantly rare in North Carolina.

Along the 4-mile radius line just east of SR 1424 and along US 401 is an Identified Natural Heritage Priority Area referred to as McIntosh Bay Complex. This natural area is considered to be of National Significance and contains within the 4-mile radius line four rare species. These are: Boykin's lobelia (Lobelia boykinii), a state and federal Candidate species; awned meadow-beauty (Rhexia aristosa), a state Threatened and federal Candidate species; quillwort arrowhead (Sagittaria isoetiformis), a state and federal Endangered species; and netted nutrush (Scleria reticularis), significantly rare in North Carolina.

Located along Gum Swamp Creek on the 4-mile radius line is a record for Canby's bulrush (Schoenoplectus etuberculatus), which is significantly rare in the state.

In Leith Creek about 1.2 miles downstream of the 4-mile radius line is a record for twisted-leaf goldenrod (Solidago tortifolia), which is significantly rare in the state. No other rare species occur within the 15-mile downstream pathway of Leith Creek.

Enclosed is a list of rare species that are known to occur in Scotland County. If suitable habitat for any of these species occurs in the project area, then those species may be present at the project site. If it is necessary to be certain that this site does not contain rare species, a field survey would need to be conducted.

Please contact me at the address below or call me at (919) 733-7701 if you have any questions or need further information.

Sincerely,

Inge Smith

Inge Smith
Information Specialist
Natural Heritage Program

/iks

Enclosures

SCIENTIFIC AND COMMON NAME	STATE PROT.	FED. PROT.	STATE RANK	GLOBAL RANK
*** Scotland County				
** Vertebrates				
AIMOPHILA AESTIVALIS BACHMAN'S SPARROW	SC	C2	S3B,S2	G3
ALLIGATOR MISSISSIPPIENSIS AMERICAN ALLIGATOR	T	T/SA	S3	G5
AMBYSTOMA TIGRINUM TIGER SALAMANDER	T		S2	G5
CHONDESTES GRAMMACUS LARK SPARROW	SR		S1B,SZ	G5
CONDYLURA CRISTATA POP 1 STAR-NOSED MOLE - EASTERN NC POPULATION	SC		S2	G5T2Q
CYPRINELLA ZANEMA POP 2 SANTEE CHUB - COASTAL PLAIN POPULATION	SC		S2	G3?T2
ETHEOSTOMA MARIAE PINEWOODS DARTER	SC	3C	S3	G3
HYLA ANDERSONII PINE BARRENS TREEFROG	SR	3C	S3	G4
LANIUS LUDOVICIANUS LOGGERHEAD SHRIKE	SC	C2	S2B,S3	G4G5
MICRURUS FULVIUS EASTERN CORAL SNAKE	SR		S1	G5
PICOIDES BOREALIS RED-COCKADED WOODPECKER	E	LE	S2	G2
PICOIDES BOREALIS RED-COCKADED WOODPECKER	E	LE	S2	G2
RANA CAPITO CAPITO CAROLINA GOPHER FROG	SC	C2	S2	G4T3
RANA HECKSCHERI RIVER FROG	SC		SH	G5
SCIURUS NIGER EASTERN FOX SQUIRREL	SR		S3	G5
SEMOTILUS LUMBEE SANDHILLS CHUB	SC	3C	S3	G3
** Invertebrates				
HELIOMATA INFULATA RARE SPRING MOTH	SR		SU	G?
HESPERIA ATTALUS SLOSSONAE DOTTED SKIPPER	SR		S1S3	G4T3
HESPERIA MESKEI MESKE'S SKIPPER	SR		S1S2	G3?
INCISALIA IRUS FROSTED ELFIN	SR		S3?	G4
** Vascular plants				
AGALINIS DECEMLOBA PIEDMONT GERARDIA	SR		S2?	G4
AGALINIS LINIFOLIA FLAXLEAF GERARDIA	SR		S2	G3G4
AGALINIS VIRGATA BRANCHED GERARDIA	C		S1	G3G4
ASTRAGALUS MICHAUXII SANDHILLS MILKVETCH	C	C2	S2	G3
CAREX CANESCENS SSP DISJUNCTA SILVERY SEDGE	C		S1	G5T4?

SCIENTIFIC AND COMMON NAME	STATE PROT.	FED. PROT.	STATE RANK	GLOBAL RANK
DANTHONIA EPILIS BOG OATGRASS	C		S1	G3?
ELEOCHARIS ROBBINSII ROBBINS'S SPIKERUSH	C		S2	G4G5
EUPATORIUM LEPTOPHYLLUM LIMESINK DOG-FENNEL	C		S1	G4G5
EUPATORIUM RESINOSUM RESINOUS BONESET	C	C2	S3	G3
GAILLARDIA AESTIVALIS SANDHILLS GAILLARDIA	C		S1	G5
GALACTIA MOLLIS SOFT MILK-PEA	C		S1	G4G5
GNAPHALIUM HELLERI VAR HELLERI HELLER'S RABBIT TOBACCO	SR		S2?	G4T3
ILEX AMELANCHIER SARVIS HOLLY	SR	3C	S3	G3G4
IVA MICROCEPHALA SMALL-HEADED MARSH ELDER	C		S1	G5
KALMIA CUNEATA WHITE WICKY	E-SC	C2	S2	G3
LIATRIS SQUARRULOSA EARLE'S BLAZING STAR	SR		S2	G4G5
LILIUM IRIDOLLAE POT-OF-GOLD LILY	C	C2	S1	G1G2
LINDERA SUBCORIACEA BOG SPICEBUSH	E	C2	S2	G2
LOBELIA BOYKINII BOYKIN'S LOBELIA	C	C2	S1	G2
LUDWIGIA SUFFRUTICOSA SHRUBBY SEEDBOX	SR		S2	G5
LUZIOLA FLUITANS SOUTHERN WATER GRASS	SR		S1	G4G5
LYSIMACHIA ASPERULIFOLIA ROUGH-LEAF LOOSESTRIFE	E	LE	S3	G3
OLDENLANDIA BOSCII BOSC'S BLUET	SR		S1	G5
OXYPOLIS CANBYI CANBY'S COWBANE	E	LE	S1	G2
PANICUM TENERUM SOUTHEASTERN PANIC GRASS	SR		S1	G4
PASPALUM DISSECTUM MUDBANK CROWN GRASS	SR		S1	G4?
PHASEOLUS SINUATUS SANDHILLS BEAN	C		S2	G4T2T3
POLYGALA GRANDIFLORA SHOWY MILKWORT	SR		S1	G5?
POLYGONUM HIRSUTUM HAIRY SMARTWEED	SR		S1	G4G5
POTAMOGETON CONFERVOIDES CONFERVA PONDWEED	C	C2	S1	G5
RHEXIA ARISTOSA AWNED MEADOW-BEAUTY	T	C2	S3	G3
RHUS MICHAUXII MICHAUX'S SUMAC	E-SC	LE	S2	G2
RHYNCHOSPORA TRACYI TRACY'S BEAKSEDGE	SR		S2	G4

SCIENTIFIC AND COMMON NAME	STATE PROT.	FED. PROT.	STATE RANK	GLOBAL RANK
RUELLIA CILIOSA SANDHILLS WILD-PETUNIA	C		S1	G5T?
SAGITTARIA ISOETIFORMIS QUILLWORT ARROWHEAD	SR		S2	G3G5
SALVIA AZUREA AZURE SAGE	SR		S1	G4G5
SCHOENOPLECTUS ETUBERCULATUS CANBY'S BULRUSH	SR		S3	G3G4
SCHOENOPLECTUS SUBTERMINALIS SWAYING BULRUSH	SR		S2	G4G5
SCHWALBEA AMERICANA CHAFFSEED	E	LE	S1	G2
SCLERIA GEORGIANA GEORGIA NUTRUSH	SR		S2	G4
SCLERIA RETICULARIS NETTED NUTRUSH	SR		S2	G3G4
SOLIDAGO TORTIFOLIA TWISTED-LEAF GOLDENROD	SR		S1	G4G5
SOLIDAGO VERNA SPRING-FLOWERING GOLDENROD	E	C2	S3	G3
STYLISMA AQUATICA WATER DAWNFLOWER	SR		S1	G3G4
STYLISMA PICKERINGII VAR PICKERINGII PICKERING'S DAWNFLOWER	E	C2	S2	G4?T2
TOFIELDIA GLABRA CAROLINA ASPHODEL	C	C2	S3	G3
TRIDENS AMBIGUUS PINELAND TRIODIA	SR		S1	G4
TRIDENS CAROLINIANUS CAROLINA TRIODIA	C		S2	G2G3
XYRIS CHAPMANII CHAPMAN'S YELLOW-EYED GRASS	C		S1	G2
XYRIS SCABRIFOLIA ROUGHLEAF YELLOW-EYED-GRASS	C	C2	S1	G2G3
** Nonvascular plants				
CAMPYLOPUS CAROLINAE SAVANNA CAMPYLOPUS	C	C2	S1	G1
** Natural communities				
COASTAL PLAIN BOTTOMLAND HARDWOODS (BLACKWATE			S3	G5T5
COASTAL PLAIN LEVEE FOREST (BLACKWATER SUBTYP			S3	G5T4
COASTAL PLAIN SEMIPERMANENT IMPOUNDMENT			S4	G5
COASTAL PLAIN SMALL STREAM SWAMP (BLACKWATER			S5	G5
CYPRESS SAVANNA			S1	G2?
CYPRESS--GUM SWAMP (BLACKWATER SUBTYPE)			S5	G5T5
MESIC PINE FLATWOODS			S3	G5
PEATLAND ATLANTIC WHITE CEDAR FOREST			S2	G2

SCIENTIFIC AND COMMON NAME	STATE PROT.	FED. PROT.	STATE RANK	GLOBAL RANK
PINE/SCRUB OAK SANDHILL			S3	G4
POND PINE WOODLAND			S4	G4G5
SAND AND MUD BAR			S5	G5
SANDHILL SEEP			S2	G2
SMALL DEPRESSION POCOSIN			S1?	G2?
SMALL DEPRESSION POND			S2	G3
STREAMHEAD POCOSIN			S3	G4
VERNAL POOL			S2	G3
WET PINE FLATWOODS			S3	G3G4
XERIC SANDHILL SCRUB			S4	G5

** Geologic features
CAROLINA BAY

NATURAL HERITAGE ELEMENTS AND SPECIES STATUS CODES

The attached output from the N.C. Natural Heritage Program database is a listing of the elements (rare species, geologic features, natural communities, and special animal habitats) known to occur in your geographic area of interest. The information on this printout is compiled from a variety of sources, including field surveys, museums and herbaria, literature, and personal communications. The database is dynamic, with new records being added and old records being revised as we receive new information. The enclosed list cannot be considered a definitive record of natural heritage elements, and it should not be considered a substitute for field surveys. When this information is used in any document, we request that the printout date be given and that the Natural Heritage Program be credited.

This cover sheet explains the four columns of status codes that are given on the right-hand side of the printout.

STATE PROTECTION

CODE	STATUS	CODE	STATUS
E	Endangered	SR	Significantly Rare
T	Threatened	V	Vulnerable
SC	Special Concern	UNK	Undetermined
C	Candidate	EX	Extirpated
P_	Proposed (E, T, or C)		

Plant statuses are determined by the Plant Conservation Program (N.C. Dept. of Agriculture) and the Natural Heritage Program (N.C. Dept. of Environment, Health, and Natural Resources). E, T, and SC species are protected by state law (the Plant Protection and Conservation Act, 1979); C and SR designations indicate rarity and the need for population monitoring and conservation action, as determined by the Plant Conservation and Natural Heritage Programs.

Animal statuses that indicate state protection (E, T, and SC) are published in "Endangered Wildlife of North Carolina", March 16, 1992, N.C. Nongame and Endangered Wildlife Program. The Significantly Rare, Undetermined, Vulnerable and Extirpated statuses are (for the most part) Natural Heritage Program designations. They indicate rarity and the need for population monitoring and conservation action.

FEDERAL PROTECTION

The current federal status is listed in "Endangered and Threatened Wildlife and Plants, July 15, 1991 (50 CFR 17.11 & 17.12, Department of the Interior). Definitions are taken from the Endangered Species Act of 1973, as amended through the 100th Congress (1988), and the Federal Register, Part VIII, November 21, 1991 (50 CFR 17, Department of the Interior).

CODE	STATUS	DEFINITION
E	Endangered	A taxon which "is in danger of extinction throughout all or a significant portion of its range"
T	Threatened	A taxon "which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range"
P_	Proposed	A taxon which has been proposed for official listing as endangered or threatened
L_	Listed	A taxon which has been officially listed as endangered or threatened
C1	Category 1 ("Candidate 1")	A taxon which is under consideration, and for which there is sufficient information to support listing

C2	Category 2 ("Candidate 2")	A taxon which is under consideration, but for which there is insufficient information to support listing
3A	Category 3A ("Candidate 3A")	A taxon which was formerly under consideration for listing, but for which there is "persuasive evidence of extinction"
3B	Category 3B ("Candidate 3B")	A taxon which was formerly under consideration for listing, but which current taxonomic understanding does not support as a distinct entity meeting the Endangered Species Act's definition of "species"
3C	Category 3C ("Candidate 3C")	A taxon formerly under consideration for listing, but which has been "proven to be more abundant or widespread than previously believed and/or [which is] not subject to any identifiable threat"

GLOBAL AND STATE RANK

These ranks are determined by The Nature Conservancy's system of measuring rarity and threat status. "Global" refers to worldwide and "State" to statewide.

RANK	DEFINITION
G1	Critically imperiled globally because of extreme rarity or otherwise very vulnerable to extinction throughout its range
G2	Imperiled globally because of rarity or otherwise vulnerable to extinction throughout its range
G3	Either very rare and local throughout its range, or found locally in a restricted area
G4	Apparently secure globally, although it may be quite rare in parts of its range (especially at the periphery)
G5	Demonstrably secure globally, although it may be quite rare in parts of its range (especially at the periphery)
GH	Of historical occurrence throughout its range
GX	Believed to be extinct throughout its range
GU	Possibly in peril but status uncertain; more information is needed
G?	Unranked, or rank uncertain
_Q	Of questionable taxonomic status
T_	Status of subspecies or variety; the G rank refers to the species as a whole

State rank codes follow the same definitions, except the words "in the state" should be substituted for "globally" or "throughout its range." Also, there are four additional state ranks:

RANK	DEFINITION
SR	Reported from North Carolina, but without persuasive documentation
_B	Rank of the breeding population in North Carolina; used only for migratory species
_N	Rank of the non-breeding population in North Carolina; used only for migratory species
_Z_	Population is not of significant conservation concern; applies to transitory, migratory species

N.C. Natural Heritage Program
Division of Parks and Recreation
P.O. Box 27687
Raleigh, NC 27611

Reference #17

ENDANGERED & THREATENED SPECIES

of the SOUTHEAST UNITED STATES

"The Red Book"

REGION 4

ATLANTA

GEORGIA

9300991

ENDANGERED AND THREATENED SPECIES

OF THE

SOUTHEASTERN UNITED STATES

(THE RED BOOK)

Introduction Section, Volume 1

Prepared by:

U.S. Fish and Wildlife Service
Southeast Region
Atlanta, Georgia

January 1992

Availability Unlimited
For Sale by Superintendent of Documents
Post Office Box 371954
Pittsburgh, PA 15250-7954

Stock Order Number: 924-003-00000-6

Federally Listed Species by State

NORTH CAROLINA

(E = Endangered; T = Threatened; CH = Critical Habitat determined

Mammals	General Distribution
Bat, gray (Myotis grisescens) - E	Extreme Southwest
Bat, Indiana (Myotis sodalis) - E	West
Bat, Virginia big-eared (Plecotus townsendii virginianus) - E	Avery County
Cougar, eastern (Felis concolor couguar) - E	Entire State
Manatee, West Indian (Trichechus manatus) - E	Coastal waters
Shrew, Dismal Swamp southeastern (Sorex longirostris fisheri) - T	Dismal Swamp; Camden, Gates, Pasquotank, and Perquimans Counties
Squirrel, Carolina northern flying (Glaucomys sabrinus coloratus) - E	Western mountains (Yancy, Buncombe, Haywood, Swain, and Mitchell Counties)
Whale, finback (Balaenoptera physalus) - E	Coastal waters
Whale, humpback (Megaptera novaeangliae) - E	Coastal waters
Whale, right (Balaena glacialis) - E	Coastal waters
Whale, sei (Balaenoptera borealis) - E	Coastal waters
Whale, sperm (Physeter catodon) - E	Coastal waters
Wolf, red (Canis rufus) - E	Dare, Tyrrell Counties (Alligator River National Wildlife Refuge), Great Smoky Mountains National Park

Birds	
Eagle, bald (Haliaeetus leucocephalus) - E	Entire State
Falcon, American peregrine (Falco peregrinus anatum) - E	Western mountains
Falcon, Arctic peregrine (Falco peregrinus tundrius) - T	Entire State
Plover, piping (Charadrius melodus) - T	Coast
Stork, wood (Mycteria americana) - E	Coast
Tern roseate (Sterna dougallii dougallii) - E	Coast
Warbler, Bachman's (Vermivora bachmanii) - E	East
Warbler, Kirtland's (Dendroica kirtlandii) - E	Northwest, Central, Southeast
Woodpecker, ivory-billed (Campephilus principalis) - E	Southeast
Woodpecker, red-cockaded (Picoides [=Dendrocopos] borealis) - E	East

Plants	General Distribution
Amaranthus pumilus Seabeach amaranth - T	Atlantic coastal plain beaches
Echinacea laevigata (smooth coneflower) - E	Durham, Granville Counties
Cardamine micranthera (Small-anthered bittercress) - E	Stokes and Forsyth Counties
Geum radiatum (Spreading avens) - E	Ashe, Avery, Transylvania Watauga, Buncombe, and Yancey Counties
Hedyotis purpurea var. montana (Roan Mountain bluet) - E	Ashe, Watauga, Avery, and Mitchell Counties
Helianthus schweinitzii (Schweinitz's sunflower) - (E)	Stanly, Cabarrus, Union Mecklenberg, Rowan Counties
Helonias bullata (Swamp pink) - T	Jackson, Transylvania, Henderson Counties
Hexastylis maniflora (Dwarf-flowered heartleaf) - T	Cleveland, Catawba, Burke, Rutherford, and Lincoln Counties
Hudsonia montana (mountain golden heather) - T,CH	Burke and McDowell Counties
Isotria medeoloides (small whorled pogonia) - E	Macon and Henderson Counties
Liatris helleri (Heller's blazing star) - T	Ashe, Avery, Caldwell, Burke Counties
Lindera melissifolia (pondberry) - E	Bladen County
Lysimachia asperulaefolia (rough-leaved loosestrife) - E	Carteret, Scotland, Cumberland, Bladen, Brunswick, Pender, and Hoke, and Onslow Counties
Oxypolis canbyi (Canby's dropwort) - E	Scotland County
Ptilimnium nodosom (harperella) - E	Granville and Chatham Counties
Rhus michauxii (Michaux's sumac) - E	Davie, Durham, Franklin, Hoke, Johnston, Lincoln, Mecklenberg, Moore, Orange, Richmond, Robeson, Scotland, Wake, Wilson Counties
Sagittaria fasiculata (bunched arrowhead) - E	Henderson County

Reference #18

WATER QUALITY PROGRESS IN NORTH CAROLINA

1986-1987 / 305B REPORT

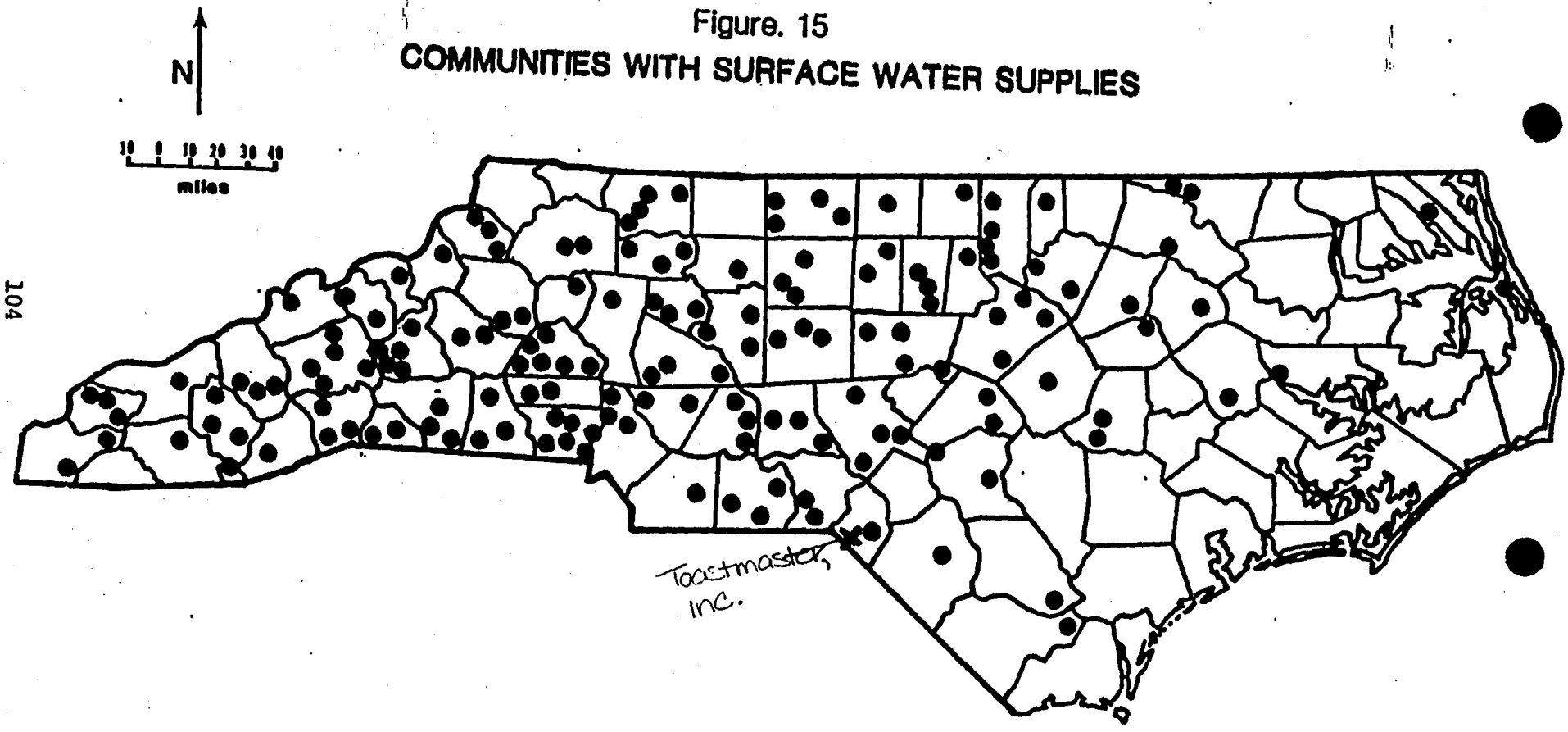
JULY, 1988 • REPORT NO. 88-02

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES
AND COMMUNITY DEVELOPMENT

DIVISION OF ENVIRONMENTAL MANAGEMENT

Figure. 15

COMMUNITIES WITH SURFACE WATER SUPPLIES



i

Reference #19

TOASTMASTER
LATITUDE 34:48:10 LONGITUDE 79:27:42 1983 POPULATION

KM	0.00-.400	.400-.810	.810-1.60	1.60-3.20	3.20-4.80	4.80-6.40	SECTOR TOTALS
S 1	0	0	0	0	0	0	0
S 2	0	0	0	0	0	0	0
S 3	0	0	0	800	0	0	800
S 4	0	0	0	0	524	1117	1641
S 5	0	0	0	4064	5841	767	10672
S 6	0	0	693	0	1094	0	1787
S 7	0	0	0	0	0	0	0
S 8	0	0	0	0	0	0	0
RING TOTALS	0	0	693	4864	7459	1884	14900

```
press RETURN to continue
MENU: Geodata Handling Data List procedures
[redacted]in parentheses)          ([redacted])
or a command: HELP, HELP option, BACK, CLEAR, EXIT, TUTOR
GEMS> exit

Type YES to confirm the EXIT command; type NO to restart GEMS
GEMS> yes
$ logout
 HTW          logged out at 15-FEB-1995 11:15:19.96
 Itemized resource charges, for this session, follow:

NODE: VAXTM1
ACCT: 9040                          START TIME:     15-FEB-1995 11:14:15.74
PROJ: GEMS0001                      FINISH TIME:    15-FEB-1995 11:15:19.96
USER: HTW                           BILLING PERIOD:950201
UIC:  [000710,000012]               WEEKDAY:        WEDNESDAY
BAUD:                               TERMINAL PORT:  VTA2470

DESCRIPTION OF CHARGE                QUANTITY                EXPENDITURE
-----------------------------------------------------------------------------

  ALL CHARGE LEVELS
    300  baud            (Seconds)          64                    0.0000
    CPU TIME             (Seconds)          3                    0.4983
                                                              -----------
    TOTAL FOR THIS SESSION                                 $     0.4983

** Note:  This total reflects the charges for this process only,
          subprocesses created during this session are accounted for
          separately
CLR PAD

NO CARRIER
```

Reference #20

BLACK & VEATCH Waste Science, Inc.

TELEPHONE MEMORANDUM

USEPA
Toastmaster, Inc.
Toastmaster employees

BVWS Project 52012.496
BVWS File
February 21, 1995
10:30

To: receptionist
Company: Laurinburg Chamber of Commerce
Phone No.: (910) 276-7420

Recorded by: Ginger Ferguson

The receptionist informed me that Toastmaster (Ingraham Time Division) employs approximately 550 people.