

147SERBSF10,610

147SERBSF10,610

Site Name (Subject): ONE HOUR KORETIZING

Site ID (Document ID): NCD980848667

Document Name (DocType): Correspondence (C)

Report Segment:

Description: General Correspondence, 1984 - 1985

Date of Document: 2/4/1985

Date Received:

Box: *Enter SF and # with no spaces* SF10,610

Access Level: PUBLIC

Division: WASTE MANAGEMENT

Section: SUPERFUND

Program (Document Group): SERB (SERB)

Document Category: FACILITY

Print Report for
Record

Go to New
Blank Record

Go to New Record -
(default to last
record values)

Delete Record

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

DATE FEB 04 1985

SUBJECT: OSC Report, One Hour Koretizing Site, Durham, North Carolina

FROM: Sue Fields, On-Scene Coordinator *Sue Fields*

TO: George Moein, Chief, Emergency Response and Control Section



The One Hour Koretizing Site is located at 4404 Roxboro Road in Durham, NC. The history of the site as reported by the North Carolina Department of Human Resources is as follows:

In 1966, a building was constructed at the site and leased to a convenience store. The septic tank was designed for a one or two bathroom facility. Later, the building was leased to a dry cleaner and operated for approximately four years. In July 1972, the facility was connected to the city sewer system. The facility continued dry cleaning operations until June 1974, and then became a pick-up point only. In December 1983, a resident in the area complained of an odor in their well water to the Durham County Health Department. Subsequent investigation by the county health department revealed the presence of perchloroethylene (PCE) in nine neighborhood drinking water wells and the sand filter of the abandoned septic tank at the dry cleaning business. On June 1, 1984, the EPA Emergency Operations Section Chief was notified and asked for assistance.

On June 5, 1984, I travelled to the site accompanied by several state personnel. Samples were taken from the abandoned septic tank at 4404 Roxboro Road and from several neighborhood drinking water wells.

On June 13, 1984, a Regional Response Team (RRT) meeting was held in Atlanta, GA, to discuss possible activities to mitigate the public health and environmental concerns at the site.

Analysis from samples taken by state personnel showed that the septic tank contained a layer of seemingly pure PCE, as well as heavily contaminated sludge. Also, the state's analytical results showed the extent of private well contamination and the general direction of contaminant flow in the groundwater.

On July 2, 1984, Superfund immediate removal activities commenced onsite. All material in the septic tank was removed and transported to Abco Industries in Roebuck, South Carolina, for incineration. The tank was filled with concrete to prevent surface water from entering and flowing through the sand filter. Thirteen homes were connected to the Durham City water supply.

These activities were completed July 30, 1984, at an extramural cost of \$13,000.

The North Carolina Division of Environmental Management began a groundwater survey in the area on July 16, 1984. EPA's Environmental Response Team provided mobile analytical support to the survey which lasted three weeks. The state also utilized color and color infrared aerial photography provided by EPA to track the plume of contamination.

In August, 1984, the state groundwater section's report was completed. The report showed the plume of contamination in the groundwater and in the soil. Through the Superfund action taken in July, city water has been made available to all residences within the area of contamination. Since no continued threat to public health exists, the RRT was deactivated in October, 1984.

Attachment: The completed site date form is attached.

cc: Henry Hudson

SEP 28 1984



One Hour Koretizing Site, Durham, NC

Sue Fields, OSC

Chuck Pietrosewicz, CDC-EPA Superfund Liaison
John Mann, EPA Groundwater Section
Lon Hesla, EPA Drinking Water Section

Attached is the NC DEM's report on the groundwater survey they performed at the One Hour Koretizing Site. Also, attached is a copy of my memo from our initial meeting about this site.

The situation at the site now is as follows:

- ° All residents with contaminated well water are connected to city water. Reportedly some residents are still using the groundwater at outdoor water spigots for uses other than primary
- ° The DEM survey shows significant contamination of groundwater and soil in a limited area immediately downgradient of the septic tank at the One Hour Koretizing facility at 4404 Foxboro Road.
- ° Two businesses upgradient from the site share a well which is reportedly contaminated with PCE. It is assumed that the contamination is unrelated to the One Hour Koretizing Site since the well is located topographically upgradient of the One Hour Koretizing Site, and the plume from the One Hour site lies in the opposite direction. The Durham County Health Department is currently working to get the businesses connected to city water.

I would appreciate your comments on the current situation at the site including: 1) the use of groundwater at outdoor spigots, 2) the likelihood that the contaminated soil acts as a significant source of contamination to the groundwater, and 3) deactivation of the RRT. Please have your comments to me by October 9, 1984. I have 11" x 17" copies of the figures in DEM's report if you would like to see them. If you have any questions feel free to contact me at X3931.

cc. ✓ Terry Dover, NC Solid & Hazardous Waste Management Branch
Richard Lassiter, NC Division of Environmental Management
Bob Helms, Director, NC Division of Environmental Management
Jan Rogers, EPA Emergency Operations Section



DIVISION OF ENVIRONMENTAL MANAGEMENT
GROUNDWATER SECTION

August 21, 1984

MEMORANDUM

TO: Robert Helms, Director
Division of Environmental Management

FROM: Perry Nelson, Chief *PW*
Groundwater Section

SUBJECT: Report of Investigation of Groundwater Contamination

Attached herewith is the report of investigation of the groundwater contamination in the vicinity of Ryan Street in Durham, Durham County.

1s

Attachment

cc: Page Benton
Robert Van Tilburg

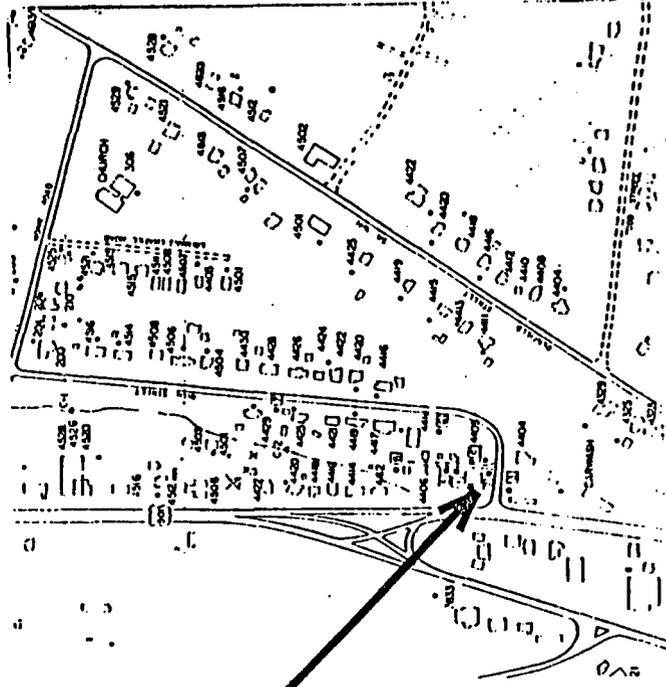
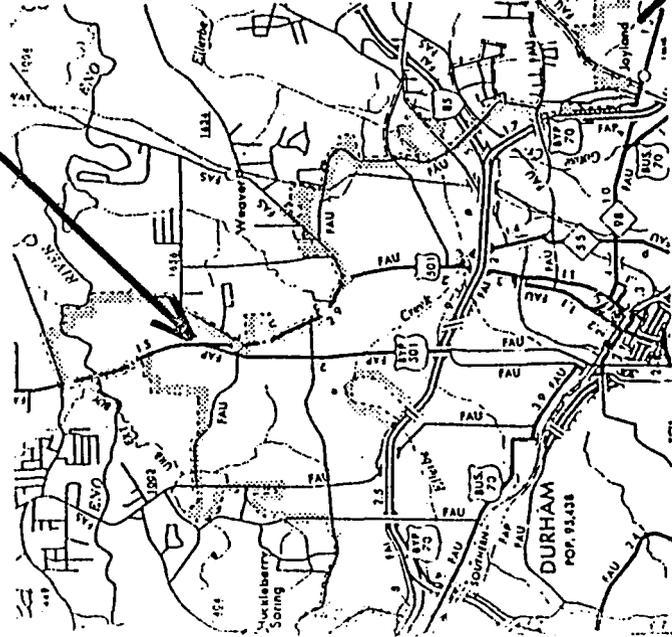
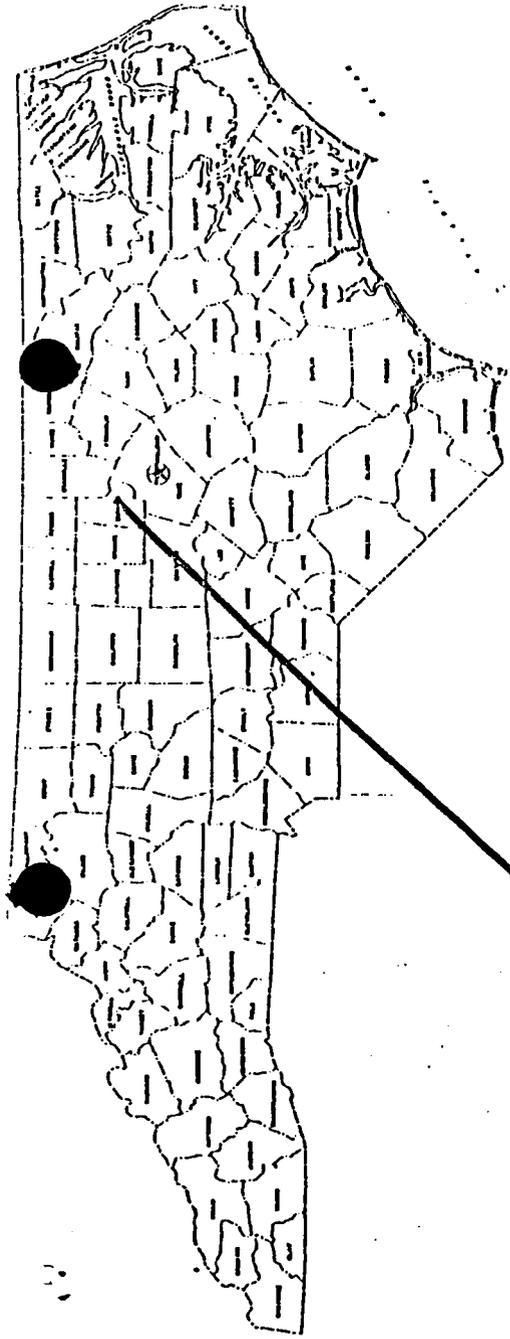


Figure
Ryran Street
Tetrachloroethylene Contamination Investigation
Location Map

One Hour Karetizing
NED 980848667

REPORT OF INVESTIGATION

TETRACHLOROETHYLENE CONTAMINATION

OF

GROUNDWATER SUPPLY

RYAN STREET

DURHAM

DURHAM COUNTY

BY

GROUNDWATER SECTION

DIVISION OF ENVIRONMENTAL MANAGEMENT

AUGUST, 1984

Ryan Street Tetrachloroethylene (PCE)
Investigation

NOTE: An August 1984 DHS lab
ANALYSIS of the Durham
Animal Clinic septic tank
sludge does not indicate
the presence of tetrachloro-
ethylene. For more information
see NCD 981016280
Durham Animal
Clinic

Summary:

A small residential and business area in northern Durham was found to have tetrachloroethylene (PCE) in the groundwater supply. An investigation revealed that the old septic system of a local dry cleaning business was the source of the PCE, which is a commonly used dry cleaning solvent. Groundwater and soil samples were taken from existing wells, creeks, ponds and from newly drilled boreholes and analyzed at State laboratories. The probable extent of the contamination, both in the fractured bedrock and in the overlying saprolite, was determined. The contamination plume was mapped based on PCE concentrations in the samples.

LC
21 Sept 81

Analysis of the investigation results indicated that some protective and remedial actions should be taken. Although it is probably not practical to remove the PCE from the groundwater, it is recommended that:

- (1) all water users in the affected area be connected to the city water supply;
- (2) the contaminated sand filter and associated contaminated soil be removed;
- (3) some consideration be given to removal and treatment of the highly contaminated groundwater in the vicinity of the sand filter;
- (4) monitoring wells be established around the perimeter of the affected area to observe plume movement and attenuation; and
- (5) the groundwater in the affected area be reclassified, and its use as a drinking water source be restricted by the county health department.

Ryan Street Tetrachloroethylene (PCE)
Investigation

Objectives of the Investigation:

The purposes of this investigation are:

- (1) to define the limits of the plume of PCE contamination
- (2) to define the configuration of the plume based on concentrations of PCE in the well water of the area.
- (3) to recommend remedial action

Area Setting:

The Ryan Street area lies in Northern Durham about 1.5 miles south of the Eno River. The affected area is roughly defined by a triangle bordered by Roxboro Road on the west, Monk Street on the north and Denfield Road on the southeast. Ryan Street and Layman's Chapel Road lie within the triangle. There are approximately 100 homes and businesses in the community.

Geologically, the area lies within the Triassic Basin and the subsurface consists of fine grained, tightly bound sands, silts and clays along with some metavolcanics. The Triassic materials are underlain by a highly fractured diabase sill that begins just south of the southern border of the area and extends towards the northeast. This diabase sill is quarried for crushed stone at the Nello Teer quarry located at the northeastern extremity of Denfield Road. Soil and saprolite thicknesses in the area vary from several inches to about 50 feet. Surface drainage consist of a northward flowing intermittent creek between Roxboro Road and Ryan Street.

Although the buildings along Roxboro Road have had city water and sewer services for some time, these services were made available to the remainder of the community in the fall of 1983. At that time, some residents connected to city water. Prior to that date nearly all the houses were supplied with water from 6 inch diameter drilled wells completed into the diabase sill and receiving groundwater from the fractures in the rock. These wells reportedly vary between 50 and 700 feet deep. Several homes had bored wells, reportedly completed 40 to 50 feet deep into the saprolite.

Presently, nearly all homes along Roxboro Road, Ryan Street, Monk Road and Layman's Chapel Road are connected to the city water supply. Many homes along Denfield Street still obtain their water from wells.

Brief History:

1966 -

The building at 4404 Roxboro Road was built and used as a convenient market. The septic system installed included a 900 gallon tank, at the northeast corner of the building, connected to a 40'x 10' sand filter located along the eastern end of the building.

- 2-
- 1968 - The convenient market was closed and the building became a fully operational dry cleaning facility where PCE was used.
- October 1972 - The building became a dry cleaning pick-up point only. No dry cleaning was done on the premises.
- July 7, 1973 - The building was connected to city sewer.
- December 19, 1983 - The Durham County Health Department reported concentrations of PCE in well water samples from 4405 and 4411 Ryan Street. An investigation was begun by DCHD, DHR, and DEM.
- July 2, 1984 - The U.S.E.P.A. pumped the sludge and liquid from the septic tank and filled the tank with concrete. They also connected 13 homes along Ryan & Monk Streets to city water. The septic tank measured approximately 3'2"x8'10"x4'. When pumped, the topmost layer was water (of unknown but apparently low contamination), the second layer was sludge (highly contaminated), and the bottom layer was approximately 8" of nearly pure PCE. If the bottom layer was pure PCE, it totaled about 140 gallons.
- July 12, 1984 - DEM began a full scale investigation of the Ryan Street contamination.

Investigation Procedures:

The investigation was begun on July 12th and 13th when members of the Groundwater Staff from the Raleigh Regional Office and from the Central Office reconnoitered the Ryan Street area, searching for all well data, groundwater data, and geologic data available and locating sampling stations. Meanwhile, all available groundwater analyses for the area were plotted on a base map.

On July 16th, Mr. Jay Quimby from U.S.E.P.A. arrived in Durham with a Photovac portable gas chromatograph. The equipment was set-up at the Northside Sewage Treatment Plant on East Club Street, checked, and calibrated. Two DEM chemist were trained by Quimby to use the equipment. Sampling procedures were discussed and the decision was made to first sample actively used wells on the perimeter of the suspected contaminated area. This would allow the sensitivity range of the machine to be set fairly low (about 2 ppb to 60 ppb) and help prevent saturating the detector by testing a highly contaminated sample. This method would also allow the investigators to define the plume limits early, and work inward toward the source.

The Photovac unit relies on analysis of the volatiles in the air space above the sealed sample after equilibrium is reached between water and air. For this reason, and because the sensitivity was set in the low range, it was decided to check samples suspected to be highly contaminated at the DEM lab in Cary. Also the DEM lab was to be used to double check samples that showed low concen-

trations on the Photovac. Basically, the Photovac unit will detect the presence of PCE but not give an absolutely reliable value for the concentration.

From July 17th to July 25th wells in the area were sampled by drawing off 20 to 25 ml of water from an outside tap. Before taking the sample, the water was allowed to run for 3 to 5 minutes. The sample was put into a 40 ml glass bottle, a septum cap was screwed on, and the sample allowed to react for one hour with the air in the bottle before a 400 ul air sample was drawn from the sample headspace and injected into the Photovac. The concentrations of PCE were standardized using a known concentration of PCE mixed in spring water. The investigators wore nitrile gloves for protection while sampling. Sampling analyses are tabulated in the next section.

On July 23rd, a borehole was hand augured to 9½ feet, just downgradient of the septic tank behind One Hour Koretizing (Hand auger hole #1). A strong PCE odor was noted in the soil and water. Two soil samples and one water sample were taken. The analyses are tabulated in the next section.

The results of the sampling program were reviewed on July 24th. There was much concern that the saprolite and upper groundwater near the septic tank and sand filter was heavily contaminated. Seven power auger holes were drilled to the top of the rock and allowed to fill with the groundwater that lies along the saprolite/rock interface. The water in these holes was sampled on July 30th, and the analyses are tabulated in the next section.

On July 30th the program was again reviewed. It was decided to definitely locate the sand filter and to take several more samples west of Roxboro Road. On July 31st, the sand filter was located by digging and hand augering, soil samples and water samples were taken from the hole, and several more water samples were taken west and north of Ryan Street. The analyses are tabulated in the next section.

Analyses Results:

The results for all analyses are shown on the following tables. Samples were analysed at three laboratories; the Department of Human Resources (DHR) lab, the Division of Environmental Management (DEM) lab, and the Northside Treatment Plant lab (Photovac) where the EPA equipment was housed. The DHR lab used the purge and trap method of extracting PCE from the samples. The DEM lab used the purge and trap, solvent-extraction, and head space methods. The Photovac gas chromatograph used only the head space method.

Two maps were constructed using the analyses. The first shows the plume of contamination in the bedrock aquifer based on analyses of water from wells thought to be completed into the diabase. The outer limits of the plume are based on analyses of well water that showed no detection of PCE. The second map is based on analyses of water and soil samples taken from boreholes drilled by the Groundwater Section's drill crew. These holes were all completed into the saprolite. Water samples were taken by bailing and soil samples were taken during the drilling operations. The second map shows the configuration of the plume in the saprolite.

Analysis of the data indicates that the PCE contamination is extensive in the fracture system of the bedrock, and extends from the source toward the north-

northwest to a line just north of Monk Road. Concentrations of PCE were found to be as high as 7 mg/l in the groundwater. The saprolite plume, although much more highly contaminated, does not appear to extend as far north. PCE concentrations as high as 500 mg/l were found in the groundwater of the saprolite just downgradient of the septic tank, and soil samples from the same area showed PCE concentrations as high as 150 mg/l. Neither plume appeared to extend south of Ryan Street. One well south of the area, at 4308 Roxboro Road, was sampled and found to contain 57 to 135 ug/l PCE. This contamination is thought to have originated from another source, however, and is presently being investigated by DEM and DCHD.

Investigation Problems:

The investigation of the Ryan Street area was carried out under the normal time and money constraints of similar investigations. There are shortcomings that must be noted, however.

- (1) The first major difficulty is that the investigation was carried out with only minimal knowledge of the specifications on any of the wells sampled. Only one well record was available from the area. No well depths, casing depths, or pump or intake settings were definitely known and, given the resources available, were not determined in the field. This shortcoming becomes of more significance when the specific gravity (1.6) of PCE is considered. Since the chemical is heavier than water, it is expected that it will settle towards the bottom of the aquifer and stratify into layers of increasing concentrations with increasing depth. Since the total depths and intake depths of the wells are unknown, it is possible that different layers of PCE concentration were sampled, leading to the construction of an erroneous plume configuration. To offset this error as much as practical, the no-detection limit of the plume is conservatively drawn where evidence from many wells indicates no PCE concentrations. However, it is possible that PCE may be present in the fracture system below the intake levels of the outermost wells. Presently, it is planned to investigate this possible stratification further by sampling and analyzing the water from an abandoned Ryan Street well at specified depth intervals.
- (2) The second difficulty in the investigation is that sampling techniques and procedures were not standardized among the three laboratories involved. Attempts to overcome that problem were made by splitting samples among the labs, and by using the highest concentration values reported, except when there were definite indications that the highest value was probably in error.

Recommended Protective and Remedial Actions:

One remedial action and three protective actions are recommended:

- (1) Removal of the PCE from the groundwater is probably not economically practical because the chemical is in the rock fractures. However, the sand filter and associated contaminated soil near the septic tank should be removed because the PCE concentrations are so much higher than those in the groundwater, it appears the filter and soil are acting as a source of further PCE contamination. In addition, it may be practical to remove and treat the groundwater in the saprolite in the vicinity of the sand filter.

- (2) City water should be made available to all water users along Ryan Street, along Layman's Chapel Road, on both sides of Denfield Street as far north as 4621 Denfield, along Monk Road, and along Roxboro Road as far north as 4622 Roxboro. Users should be strongly encouraged to connect to the city water supply.
- (3) A series of long-term monitoring wells should be placed around the area so that the plume migration and attenuation can be observed. A system of 4 pairs of wells should be used; one well into the shallow rock and one into the deep rock. These wells should be placed immediately south of Ryan Street, near the southern end of Layman's Chapel Road, along the east side of Roxboro Road, and about 300 feet north of Monk Street. These wells should be sampled semi-annually to determine when PCE concentrations occur and to determine changes in PCE concentrations. Plume movement may be deduced from these samples. Additional monitoring wells may be constructed from presently contaminated wells, and semi-annual sampling should also be conducted on these.
- (4) An RS classification should be given to the groundwater underlying the area approximately bounded
 - on the west by the center line of Roxboro Road from the Roxboro Road/ Denfield Road intersection, to the Roxboro Road/Wellington Road intersection,
 - on the southeast by the center line of Denfield Road from the Roxboro Road/Denfield Road intersection to the Hebron Road/Denfield Road intersection,
 - on the north by a line extending northwest from the Hebron Road/Denfield Road intersection joining a line extending eastward from the Roxboro Road/ Wellington Road intersection.

<u>SAMPLING LOCATION</u>	<u>SAMPLING DATE</u>	<u>LAB & ANALYSIS METHOD</u>	<u>PCE CONCENTRATION (ug/l)</u>	<u>COMMENTS</u>
4' Soil Sample from AH#1	7-23-84	DEM EC	150000	
7' Soil Sample from AH#1	7-23-84	DEM EC	19000	
Soil Sample from Sand Filter	7-31-84	DEM GC/MS	2400	
Water Sample from Sand Filter	7-31-84	DEM GC/MS	480	
Pond No.1	7-18-84	Photovac HS	< 2	
Creek No.1	7-19-84	Photovac HS	< 2	
Creek No.2	5-25-84	DHR P/T	< 1	
Auger Hole No.1	7-23-84 7-23-84	Photovac HS DEM P/T	500000 180000	
Auger Hole No.2	7-30-84	Photovac HS	Not Detected	
Auger Hole No.3	7-30-84	Photovac HS	Not Detected	
Auger Hole No.4	7-30-84 7-30-84	Photovac HS DEM P/T	1213 140	
Auger Hole No.5	7-30-84	Photovac HS	403200	
Auger Hole No.6	7-30-84	Photovac HS	304	
Auger Hole No.7	7-30-84	Photovac HS	Not Detected	
Auger Hole No.8	7-30-84 7-30-84	Photovac HS DEM P/T	228 71	

<u>SAMPLING LOCATION</u>	<u>SAMPLING DATE</u>	<u>LAB & ANALYSIS METHOD</u>	<u>PCE CONCENTRATION (ug/l)</u>	<u>COMMENTS</u>
4425 Denfield	6-05-84 7-18-84 8-06-84	DHR P/T Photovac HS Photovac HS	<1.0 4 Not Detected	
4507 Denfield	7-18-84 7-24-84	Photovac HS DEM P/T	Not Detected Not Detected	
4528 Denfield	7-17-84 8-06-84	Photovac HS Photovac HS	Not Detected Not Detected	
4529 Denfield	7-18-84 8-06-84	Photovac HS Photovac HS	4 Not Detected	
4608 Denfield	6-05-84 7-18-84	DHR P/T Photovac HS	<1.0 Not Detected	
4621 Denfield	6-05-84 7-19-84	DHR P/T Photovac HS	<1.0 Not Detected	
4807 Denfield	7-17-84	Photovac HS	Not Detected	
4809 Denfield	7-17-84	Photovac HS	Not Detected	
4811 Denfield	6-05-84	DHR P/T	<1.0	
4528 Denfield	8-06-84	Photovac HS	Not Detected	
4308 Denfield	8-06-84	Photovac HS	Not Detected	On Justice Road
4203 Denfield	8-06-84	Photovac HS	Not Detected	On Justice Road
112 Denfield	8-06-84	Photovac HS	Not Detected	On Justice Road
Church on Justice	8-06-84	Photovac HS	Not Detected	On Justice Road

-CONT.-

<u>SAMPLING LOCATION</u>	<u>SAMPLING DATE</u>	<u>LAB & ANALYSIS METHOD</u>	<u>PCE CONCENTRATION (ug/l)</u>	<u>COMMENTS</u>
4506 Ryan		DHR P/T	1093	
4514 Ryan	5-02-84	DHR P/T	849	
	7-24-84	Photovac HS	6091	
	7-24-84	DEM	1000	
4516 Ryan	7-24-84	Photovac HS	2913	
4308 Roxboro	7-31-84	Photovac HS	135	
	7-31-84	DEM	57	
4404 Roxboro	2-15-84	DHR P/T	3060	Soil Sample
4422 Roxboro	6-05-84	DHR P/T	<1.0	
	7-18-84	Photovac HS	Not Detected	
4512 Roxboro	7-17-84	Photovac HS	Not Detected	
	7-24-84	DEM P/T	Not Detected	
4520 Roxboro	7-18-84	Photovac HS	13	
4528 Roxboro	7-17-84	Photovac HS	Interference in Sample	
4616 Roxboro	5-25-84	DHR P/T	<1.0	
	7-19-84	Photovac HS	Not Detected	
4622 Roxboro	7-19-84	Photovac HS	Not Detected	
4804 Roxboro	7-24-84	Photovac HS	Not Detected	
3821 North Duke	7-30-84	Photovac HS	Not Detected	
3833 North Duke	7-30-84	Photovac HS	Not Detected	

<u>SAMPLING LOCATION</u>	<u>SAMPLING DATE</u>	<u>LAB & ANALYSIS METHOD</u>	<u>PCE CONCENTRATION (ug/l)</u>	<u>COMMENTS</u>
200 Monk		DHR P/T	206	
204 Monk	7-01-84	DHR P/T Photovac HS	50 60	
210 Monk	5-24-84	DHR P/T	<1	
301 Monk	5-24-84 7-19-84 7-24-84	DHR P/T Photovac HS DEM P/T	<1 <2 Not Detected	
306 Monk	5-24-84 7-19-84	DHR P/T Photovac HS	<1 Not Detected	
4501 Laymans Chapel	5-02-84 6-05-84	DHR P/T DHR P/T	Not Detected <1.0	
4525 Laymans Chapel	5-25-84	DHR P/T	83	
4317 Denfield	7-17-84 7-24-84	Photovac HS DEM P/T	Not Detected Not Detected	
4329 Denfield	7-17-84	Photovac HS	Not Detected	
4411 Denfield	7-19-84	Photovac HS	Not Detected	
4415 Denfield	7-19-84 7-24-84	Photovac HS DEM P/T	Not Detected Not Detected	
4416 Denfield	7-17-84	Photovac HS	Not Detected	
4420 Denfield	7-17-84	Photovac HS	Not Detected	

<u>SAMPLING LOCATION</u>	<u>SAMPLING DATE</u>	<u>LAB & ANALYSIS METHOD</u>	<u>PCE CONCENTRATION (ug/l)</u>	<u>COMMENTS</u>
4404 Ryan	1-12-84	DHR P/T	Not Detected	
	6-05-84	DHR P/T	<1.0	
	7-24-84	DEM P/T	Not Detected	
4405 Ryan	12-29-83	DHR P/T	1400	
	1-09-84	DHR P/T	1504	
4411 Ryan	12-13-83	DHR P/T	4404	
4416 Ryan		DHR P/T	2.5	
4417 Ryan	5-25-84	DHR P/T	<1	
4419 Ryan	1-09-84	DHR P/T	1338	
4420 Ryan	5-25-84	DHR P/T	3.5	
	7-24-84	Photovac HS	26	
	7-24-84	DEM P/T	2.9	
4422 Ryan	1-09-84	DHR P/T	2	
4424 Ryan	1-09-84	DHR P/T	5	
4425 Ryan	7-24-84	Photovac HS	7017	
	7-24-84	DEM EC	550	
4429 Ryan	5-02-84	DHR P/T	865	
4501 Ryan		DHR P/T	39	
4504 Ryan		DHR P/T	219	
	7-18-84	Photovac HS	10	

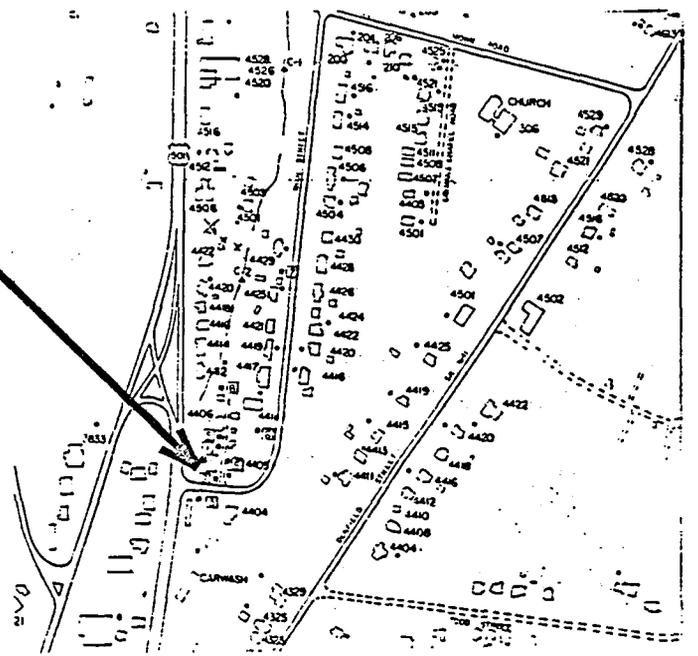
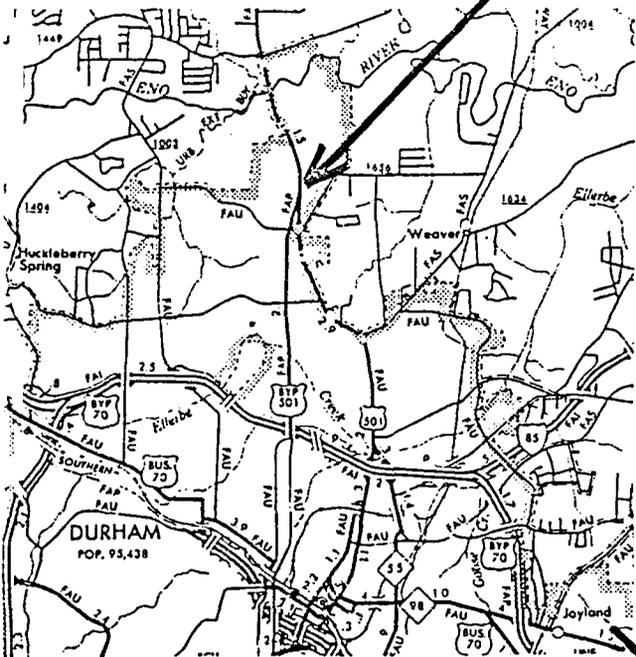
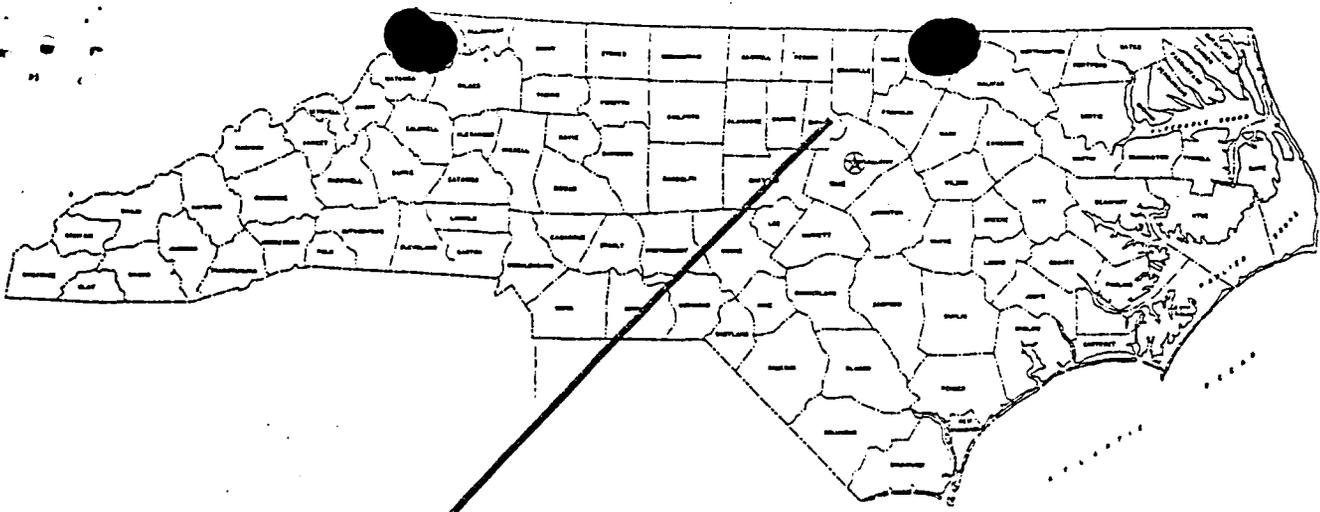
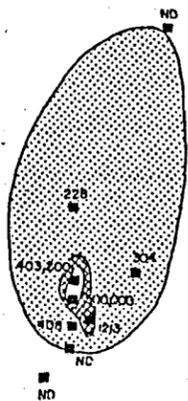


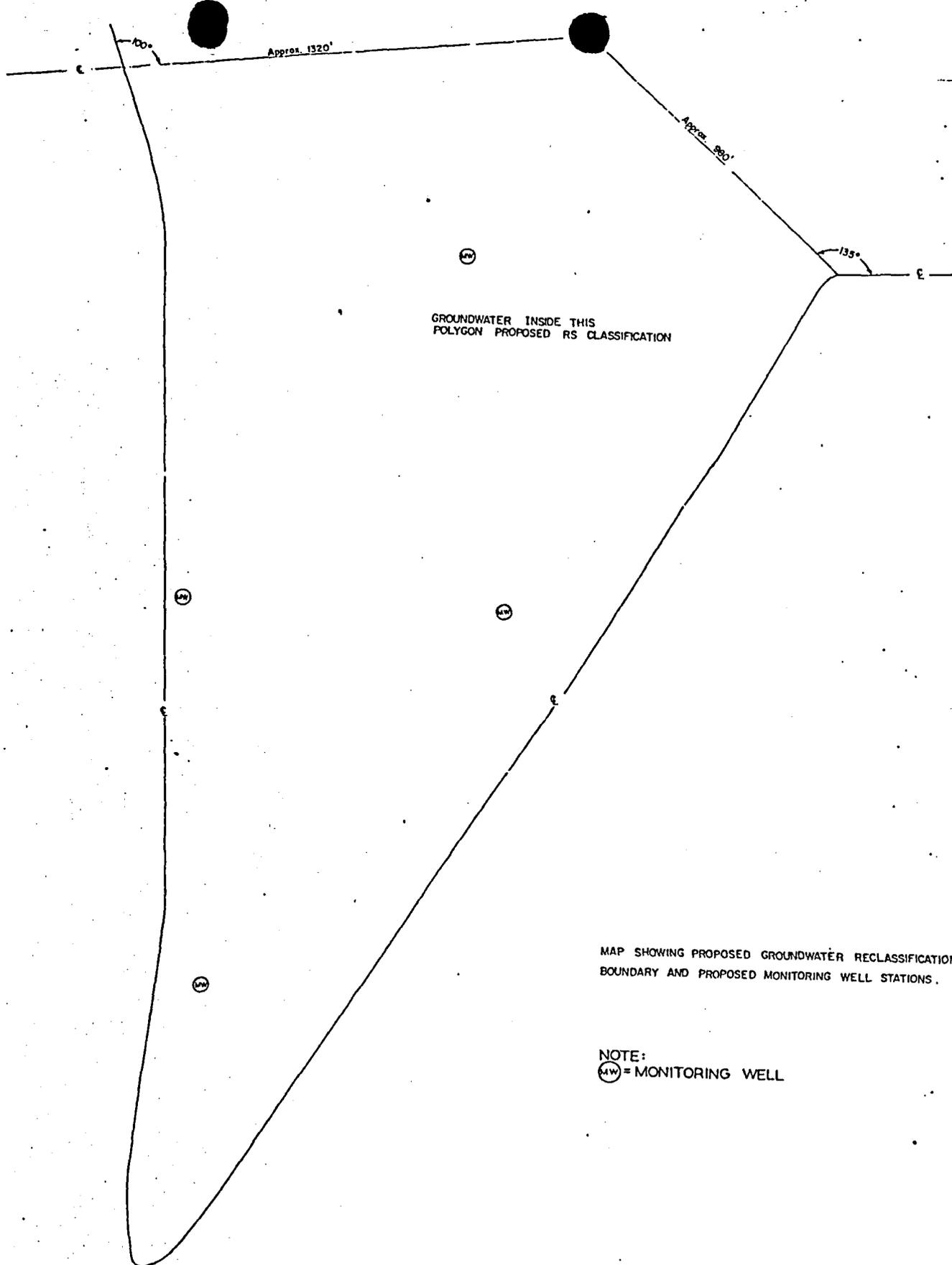
Figure
Ryran Street
Tetrachloroethylene Contamination Investigation
Location Map



Contamination Plume of PCE
in Saprolite

Explanation

- Borehole
- ▣ 100,000 + ug/l PCE
- ▤ 1,000 to 100,000 ug/l PCE
- ▥ 0 to 1,000 ug/l PCE



GROUNDWATER INSIDE THIS
POLYGON PROPOSED RS CLASSIFICATION

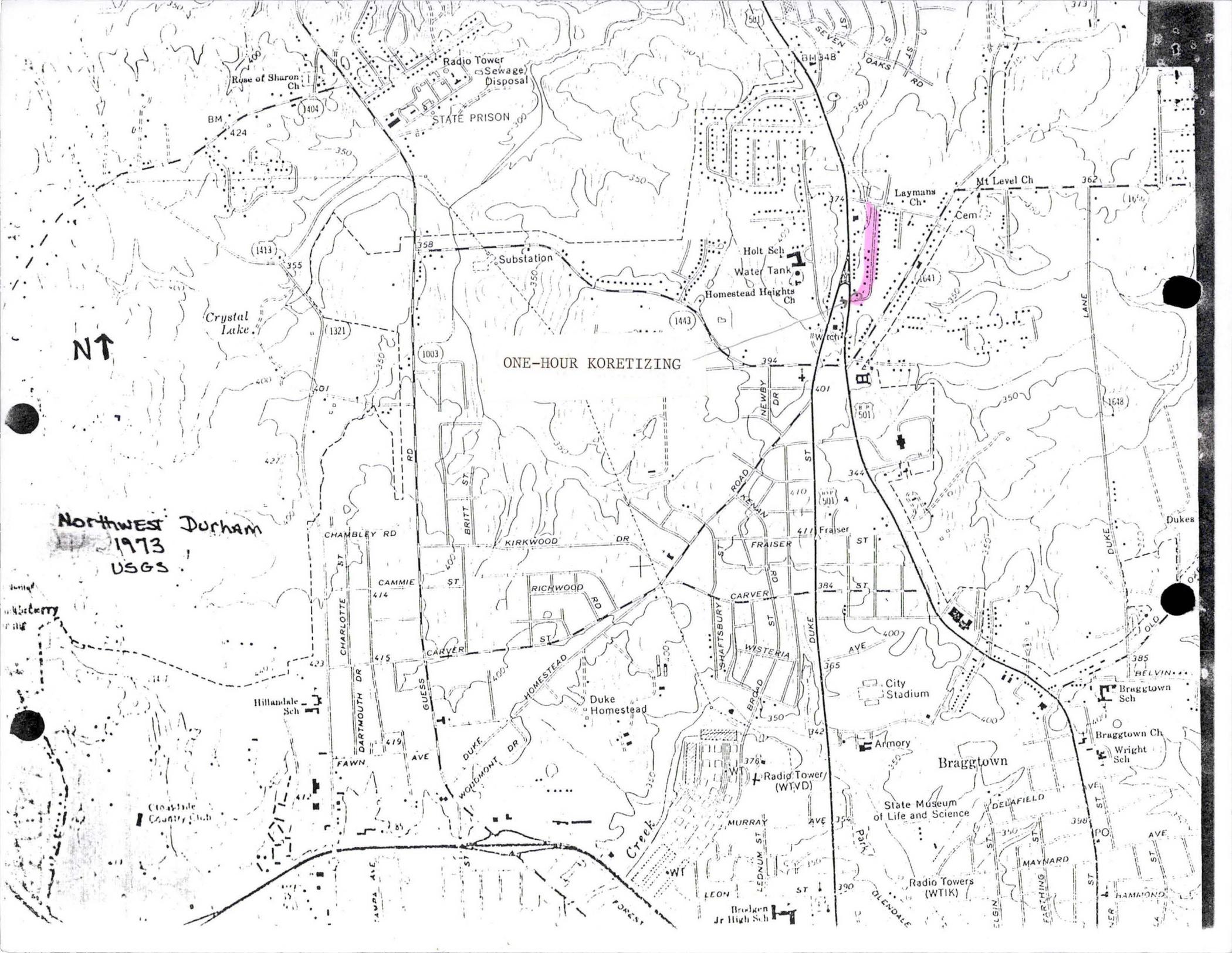
MAP SHOWING PROPOSED GROUNDWATER RECLASSIFICATION
BOUNDARY AND PROPOSED MONITORING WELL STATIONS.

NOTE:
⊙ = MONITORING WELL

NT ↑

Northwest Durham
1973
USGS

ONE-HOUR KORETIZING





Lee

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

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

6 August 1984

M E M O R A N D U M

TO: Charles Rundgren, Head
Water Supply Branch

FROM: Lee Crosby, Chemist *LC*
Solid and Hazardous Waste Management Branch

RE: Riverdale Drive, Durham
NCD980839716

According to EPA On-Scene Coordinator Chuck McPherson (404/881-3931) the engineer firm will be selected by EPA on Tuesday, 14 August 1984. The engineering firm will be one of the following: Dwayne Stewart, W. M. Piatt or E. C. Credle. All engineering firms are located in Durham.

Engineering plans are to be completed by Friday, 14 September 1984.

LC:jj



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

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

6 August 1984

M E M O R A N D U M

TO: Bill Meyer
FROM: Lee Crosby
RE: One Hour Koritizing
Ryan Street, Durham, N. C.
NCD980848667

William Service (DCHD) called on 6 August 1984 to report that DEM field analyses of well water along Denfield showed the presence of tetrachlorethylene. 4425 Denfield and 4529 Denfield show 4 ppb. I believe this data is questionable. If water samples have not been submitted to the DEM laboratory in Cary, samples should be submitted to the DHS laboratory as soon as possible.

Will would like to know who is going to work with him on this little project?

LC:jj

NORTH CAROLINA DEPARTMENT OF NATURAL
RESOURCES AND COMMUNITY DEVELOPMENT

Date 8/1 1984

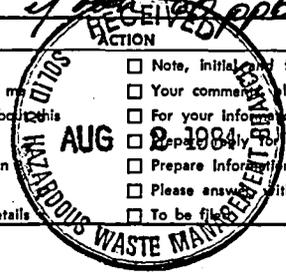
To: Lee Crosby 213 Bath Bldg

From: Gron Wikofson

Remarks: _____

Here is a compilation
of all lab analyses - yours
and ours - from the Ryan
Street PCE site in Durham.
Analyses from "EPA" lab are
questionable if you see opp.

<input type="checkbox"/> Note and file	<input type="checkbox"/> Note, initial and forward
<input type="checkbox"/> Note and return to me	<input type="checkbox"/> Your comments please
<input type="checkbox"/> Note and see me about this	<input type="checkbox"/> For your information
<input type="checkbox"/> For your approval	<input type="checkbox"/> Reply only for my signature
<input type="checkbox"/> Per our conversation	<input type="checkbox"/> Prepare information for me to reply
<input type="checkbox"/> Per your request	<input type="checkbox"/> Please answer with copy to me
<input type="checkbox"/> Return with more details	<input type="checkbox"/> To be filed



ADDRESS	SAMPL DATE LAB	PCE ANALYSIS Ppb	SAMPL DATE LAB	PCE ANALYSIS Ppb	SAMPL DATE LAB	PCE ANALYSIS Ppb	SAMPL DATE LAB	PCE ANALYSIS Ppb
CREEK #1	7-19-84 EPA	< 2						
CREEK #2	5-25-84 DHR	< 1						BEHIND 4925 R/H
CREEK #3								
POND # 1	7-19-84 EPA	< 2						
AH 1	7-23-84 EPA	500000	7-23-84 CARZY	190000				
AH 2	7-30-84 EPA	ND						
AH 3	7-30-84 EPA	ND						
AH 4	7-30-84 EPA	1213						
AH 5	7-30-84 EPA	403200						
AH 6	7-30-84 EPA	304						
AH 7	7-30-84 EPA	ND						
AH 8	7-30-84 EPA	228						
SOIL # 1								
SOIL # 2								
SOIL # 3								
SOIL # 4								

ND = Not Detected

HAZARDOUS WASTE MANIFEST

RECEIVED

Manifest Document Number
 No 76342

Name	I.D. Code	Address	Phone Number (area code & number)	Date Shipped or Accepted
(1) Generator U.S. EPA	NCTMP0001071	345 Courtland St., N.E Atlanta, GA 30365	404-881-3930	84 / 07 / 02 year / month / day
(2) Transporter No. 1 Bryson Industrial Services	SCD000822312	411 Burton Road Lexington, S.C. 29072	803-359-7027	84 / 07 / 02 year / month / day
Transporter No. 2				year / month / day
(3) TSDF ABCO Industries Inc.	SCD070375985	Roebuck, S. C.	803-576-6821	84 / 07 / 03 year / month / day

(1) Generator Item Count		(2) DOT Proper Shipping Name/Hazard Class/ DOT Identification Number	(3) Total Quantity	(4) Weight (pounds)	(5) Waste Code	(6) TSDF Item Check		(7) Quantity by Weight (pounds)
Number	Container Type					Number	Container Type	
1	VACUUM TANKER	Waste, Perchloroethylene UN1897/ORM-A	1x900 gal. (estimated)	9000# (EST)	F002	1	BULK TANK	4160

C. Emergency Response Information: In event of an emergency, phone the Generator at: (404) 881-4062. In event of a spill in South Carolina, call the Department at (803) 758-5531.

D. Special Handling Instructions: NONE

E. Comments: Approval #: VERBAL. Sample # 4879

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

Sue Fields for the EPA Administrator (Signature) Sue Fields OSC (Name and Title) 7/2/84 (Date)

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

Transporter No. 1: James Hall (Signature) James Hall Bryson Industrial (Name) 7-3-84 (Date)

Transporter No. 2: (Signature) (Name) (Date)

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

Jimmy Rollins (Signature) Jimmy Rollins Shift 4162 (Name and Title) 7-3-84 (Date)

IX. DESCRIPTION OF HAZARDOUS WASTES (continued from front)

A. HAZARDOUS WASTES FROM NON-SPECIFIC SOURCES. Enter the four-digit number from 40 CFR Part 261.31 for each listed hazardous waste from non-specific sources your installation handles. Use additional sheets if necessary.

1 F003 23 - 26	2	3	4	5	6
7	8	9	10	11	12

B. HAZARDOUS WASTES FROM SPECIFIC SOURCES. Enter the four-digit number from 40 CFR Part 261.32 for each listed hazardous waste from specific industrial sources your installation handles. Use additional sheets if necessary.

13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30

C. COMMERCIAL CHEMICAL PRODUCT HAZARDOUS WASTES. Enter the four-digit number from 40 CFR Part 261.33 for each chemical substance your installation handles which may be a hazardous waste. Use additional sheets if necessary.

31	32	33	34	35	36
37	38	39	40	41	42
43	44	45	46	47	48

D. LISTED INFECTIOUS WASTES. Enter the four-digit number from 40 CFR Part 261.34 for each listed hazardous waste from hospitals, veterinary hospitals, medical and research laboratories your installation handles. Use additional sheets if necessary.

49	50	51	52	53	54
----	----	----	----	----	----

E. CHARACTERISTICS OF NON-LISTED HAZARDOUS WASTES. Mark "X" in the boxes corresponding to the characteristics of non-listed hazardous wastes your installation handles. (See 40 CFR Parts 261.21 - 261.24.)

1. IGNITABLE (D001)
 2. CORROSIVE (D002)
 3. REACTIVE (D003)
 4. TOXIC (D000)

X. CERTIFICATION

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

SIGNATURE <i>W. Frank Mills Jr.</i>	NAME & OFFICIAL TITLE (type or print) ENVIRONMENTAL W. FRANK MILLS JR - SCIENTIST	DATE SIGNED 10-29-84
----------------------------------------	-----------------------------------------------------------------------------------------	-------------------------

DETACH A

DETACH A

JUL 6 1984



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

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

July 3, 1984

John D. Fletcher, M.D., Director
Durham County Health Department
414 East Main Street
Durham, North Carolina 27701

Dear John:

This letter is a follow-up to our phone conversation two weeks ago regarding medical evaluation of the residents in the vicinity of groundwater contamination with tetrachloroethylene, also known as perchloroethylene (PCE).

As I mentioned, Dr. Taylor and I have researched the acute and chronic toxicity of this chemical. As you may be aware, the primary target organs/systems of concern include neurologic, hepatic, renal, and possibly hematopoietic. It is our recommendation that every resident of this area who relates a history of either acute or chronic consumption of well water known to have been contaminated with PCE be evaluated by his/her personal physician. In addition, it is our recommendation that at least the following ancillary laboratory tests be conducted on these individuals: CBC, urinalysis, and a serum chemistry panel that includes a liver enzyme profile.

If abnormal physical findings and laboratory results are detected in some of these individuals, the differential diagnosis(es) may include toxicity secondary to PCE. Due to the potential legal ramifications of this issue, we suggest that physicians finding any abnormalities in these patients that cannot be attributed to some underlying disease process known not to be associated with, or caused by, exposure to PCE, consider obtaining a consult from one of the physicians associated with the Duke University Occupational Medicine Program. I have discussed this problem with Dr. Woodall Stopford (919-684-6677) who said that he and his staff are willing to medically evaluate the residents and consult with their private physicians.

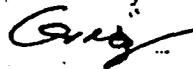
If abnormal physical findings and/or laboratory results which suggest an association with perchloroethylene exposure (especially chronic exposure) are found, a case/control epidemiological study may be indicated. While some may suggest that design and implementation of such a study at this time seems premature until medical evaluation of residents has been conducted, such a study would require conducting a standardized medical history, physical examination, and laboratory profile on each individual. Non-standardized medical evaluation of residents would make the validity of any case/control study results suspect. Unfortunately, our agency does not have the staff or funds at this time to design and implement an epidemiological study using this approach.

Yesterday, I received a call from Mr. Steve Bauman with EPA. He informed me that EPA has a mobile neurotoxicology lab and he was interested in conducting neurophysiologic testing on subjects with a known history of exposure to tetrachloroethylene. I told him that I could support such an investigation only if there was concurrent medical evaluation of the residents and appropriately selected controls for them utilizing the standardized approach discussed above and utilizing those quality control measures necessary for this type of study. He mentioned that EPA had physicians on contract to perform such evaluations, but he didn't know if they were available on short notice, or if adequate funds were available for this type of undertaking. He is supposed to get back in touch with me later this week.

While the possibility of chronic disease secondary to chronic PCE exposure certainly exists, I personally would like to see evidence of disease in a few individuals where there is enough biologic plausibility to suggest that the disease present may be related to PCE toxicity, before launching into design and implementation of a very costly retrospective case/control epidemiologic study requiring standardized medical evaluation and laboratory testing.

I will be glad to review any additional medical information that becomes available on the residents of this area. Please feel free to call me at (919) 733-3410.

Sincerely,



C. Gregory Smith, M.D., M.P.H.
Environmental Epidemiology Branch

CGS/nm

cc: Ronald H. Levine, M.D., M.P.H.
J. N. MacCormack, M.D., M.P.H.
Ted Taylor, Ph.D.

ONE HOUR KORITIZING
Durham, North Carolina
NCD980848667

Lee Crosby
June 1984

Ten residential wells down gradient from a dry cleaner show the presence of tetrachloroethylene. From 1966 until 1972 wastes from the building were treated by a septic tank and sandfilter. Interviews, laboratory analyses and a site visit indicate that the solvent used by the dry cleaner contaminated the sandfilter over 12 years ago and has now contaminated the groundwater.

One Hour Koritizing and the Ryan Street, Monk Street and Layman's Chapel Road area is located in Durham, North Durham County, North Carolina (Attachments 1, 2). One Hour Koritizing, a pick-up point for a locally owned group of dry cleaners is located at 4404 N. Roxboro Road, Durham, N. C. 27705 within the Durham city limits.

The source of contamination is a sandfilter behind One Hour Koritizing which has not been used since 1972 (Attachment 11) when city sewer was connected. Conversations with Terry Cardin owner of One Hour Koritizing, Attorney Jim Cole, Durham County Health Department Sanitarian William Service do not indicate the possibility of another source of tetrachloroethylene, nor do laboratory analyses and a site visit.

Located behind One Hour Koritizing and down gradient from the sandfilter is a residential section on Ryan Street, Monk Street, and Layman's Chapel Road (Attachments 3, 4). Water supplies on these streets consist of 1) drinking water wells only 2) city water with well water as an alternative source 3) city water only (Attachment 5). Although a street sign marks the road east of and parallel to Ryan Street as Layman's Chapel Road, the city map and tax map label it Russell Street.

As outlined through the ownership history, the building at 4404 Roxboro Road was designed and built for a convenience market in 1966 (Attachment 6). The sewage system was designed for a one or two toilet building with no shower or bath. There were also drains from the sink and possibly a floor drain. The system included a holding tank which drained into a sandfilter measuring approximately 40 ft by 10 ft. The system was approved by the county (Attachments 7, 8, 9).

After the convenience market closed, the building was leased to a dry cleaner prior to connecting to the city sewer. According to the current owner, Mr. Cardin, no modifications appear to have been made to the drainage or sewer system and the dry cleaner operated at 4404 Roxboro Road for approximately four years. This was a fully operational dry cleaning facility, as opposed to a pick-up point.

Although dry cleaners use tetrachlorethylene a hazardous waste, this type of operation is essentially non-regulated. According to Terry Cardin, dry cleaners usually have 150 to 200 gallons of tetrachloroethylene on site. The tetrachloroethylene is used to wash clothes in a washing machine (similar to the way conventional washing machines use water). After the tetrachloroethylene is spun out of the washing machine it is recovered, distilled, and reused on-site.

On 28 June 1972 Durham Public Works records show that owner Ed Clements applied for a sewer connection (Attachment 10) which was installed 7 July 1973 (Attachment 11). Service was billed to MCE Company when Mr. Cardin began leasing the building in October 1972 (Attachment 12). The sandfilter was completely disconnected from the building. According to Mr. Cardin, the sink, floor drain and other pipes were connected to the sandfilter system before he purchased the operation in 1973. ^{Clements?}

Geologic conditions of the Ryan Street area are characterized by a highly fractured diabase complex overlying metavolcanics (Attachment 13). The soils are characterized as Iredell and permeability is slow (Attachment 14).

Tetrachloroethylene $\text{Cl}_2 \text{C} = \text{C} \text{Cl}_2$ has a specific gravity which is greater than water and solubility in water is low (Attachment 15). Based on geologic conditions, chemical characteristics of tetrachloroethylene, pumping in the area and sampling drinking water wells rather than monitoring wells, it is not unexpected that contamination levels vary.

Trip Summary

On 20 May 1984 the Ryan Street area was visited by 3012 Geologist Frank Moore, Engineer Chris Bird and Chemist Lee Crosby. Background information was provided by Durham County Health Department Sanitarian William Service. See attachments 16A through 16K for laboratory results for samples taken by William Service and submitted to the N. C. Division of Health Services laboratory for analysis. No samples were taken by 3012 personnel on 20 May 1984.

On 25 May 1984 Lee Crosby sampled seven wells and a creek sample with William Service (DCHD). Samples were submitted to the N. C. Division of Health Services laboratory for analysis. For laboratory results and sampling locations see attachment 17A and 17B and Durham County tax map number 745 (provided to EPA OSC Sue Fields)

On 5 June 1984 N. C. Division of Health Services personnel Larry Perry and Lee Crosby collected seven additional well samples with EPA OSC Sue Fields. For laboratory results and sampling locations see attachment 18 and Durham County tax map number 745 (provided to EPA OSC Sue Fields).

References

In addition to the attachments other documentation and correspondence has been enclosed in the site inspection file.

DRAFT



June 28, 1984
Lee ~~Atford~~ Mittelstadt
Immediately

RALEIGH -- The U.S. Environmental Protection Agency (EPA) will pay the cost ^{of connecting} ~~to connect~~ 14 Durham homes to the city's water system because of contamination found in private drinking wells, state health director Ronald H. Levine announced today. Funds for the project will come from the EPA's Superfund under an immediate removal action plan.

"Our lab analysis of samples from the wells shows contamination from tetrachloroethylene, a drycleaning fluid," Levine said. "The residents of the area have been advised not to use their well water for drinking, cooking, or bathing."

Levine said the source of the contamination appears to be a 900 gallon septic tank at 4404 Roxboro Road in Durham. The septic tank, which has not been used since the building was connected to the city sewer system in 1972, is ^{adjacent} ~~attached~~ to the One-Hour Koretizing building. According to Levine, the EPA will also pay the cost of pumping out the septic tank and filling it with an impermeable material.

"There are approximately 30 homes on Ryan and Monk Streets which are downgradient from the drycleaning shop," Levine said. "All but 14 of these homes have been connected to the city water system. We hope to have the remaining houses on city water within two weeks after the project begins."

Tetra chloroethylene has been known to cause cancer in laboratory mice and ~~has been known to cause~~ liver and kidney damage in humans. For that reason, Levine said, residents of the area who have been using wells for drinking water are being advised to have a medical check-up either by their family physicians or at the local health department.

(more)

N.C.
Levine said personnel from the Groundwater Section of the Department °
of Natural Resources and Community Development are trying to determine how
large an area has been affected by tetrachloroethylene and the concentration
and extent of contamination. Once this evaluation is complete, they will
determine what actions should be taken to correct the ^{groundwater} problem.

###

DRAFT

June , 1984
Lee Alford
Immediately

RALEIGH -- The U.S. Environmental Protection Agency (EPA) will pay the cost ^{of} ~~to~~ connecting 14 Durham homes to the city's water system because of contamination found in private drinking wells, state health director Ronald H. Levine announced today. Funds for the project will come from the EPA's Superfund under an immediate removal action plan.

"Our lab analysis of samples from the wells shows contamination from tetrachloroethylene, a drycleaning fluid," Levine said. "The residents of the area have been advised not to use their well water for drinking, cooking, or bathing."

Levine said the source of the contamination appears to be a 900 gallon septic tank at 4404 Roxboro Road in Durham. The septic tank, ^{located behind the One Hour} ~~which has not been used since the building was connected to the city sewer system in 1972,~~ ^{Koretizing building has not been used since the building was} ~~is attached to the One-Hour Koretizing building.~~ ^{connected to the city sewer system since 1972.} According to Levine, the EPA will also pay the cost of pumping out the septic tank and filling it with an impermeable material.

"There are approximately 30 homes on Ryan and Monk Streets which are downgradient from the drycleaning shop," Levine said. "All but 14 of these homes have been connected to the city water system. We hope to have the remaining houses on city water within two weeks after the project begins."

Tetra chloroethylene has been known to cause cancer in laboratory mice and has been known to cause liver *and* kidney damage in humans. For that reason, Levine said, residents of the area who have been using wells for drinking water are being advised to have a medical check-up either by their family physicians or at the local health department.

(more)

Adjacent

Lee
Chesby

Levine said personnel from the Groundwater Section of the Department of Natural Resources and Community Development are trying to determine how large an area has been affected by tetrachloroethylene and the concentration and extent of ^{groundwater} contamination. Once this evaluation is complete, they will determine what actions should be taken to correct the problem.

LC

###

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

DATE: JUN 20 1984

SUBJECT: RRT Meeting concerning the One Hour Koritizing Site in
Durham, NC

FROM: Sue Fields, OSC *Sue Fields*

TO: Attendees

On June 13, 1984, representatives from EPA, CDC, and North Carolina DNR & DHR met to discuss activities to mitigate the public health and environmental concerns at the One Hour Koritizing site. A summary of the discussions follows:

- °EPA plans to utilize Superfund Immediate Removal funds to remove the source of contamination (septic tank liquid and sludge contaminated with tetrachloroethylene) and connect affected and potentially affected residences to the city water supply.
- °Removal of soil/sand filter contaminated with low levels of tetrachloroethylene (3ppm) is not considered feasible.
- °State groundwater staff to perform survey to determine the extent/degree of groundwater contamination (using their own drill rig).
- °EPA/ERT can provide a GC or Photovac unit and operator to the state for a mobile lab for field sampling.
- °EPA to have infrared aerial photos taken to assist in determining groundwater flow pattern.
- °State can classify the groundwater to restrict use if this becomes necessary.

The meeting was concluded with the understanding that the appropriate state groundwater people would contact Jan Rogers of me to coordinate the EPA/ERT analytical support to be provided. If you have any questions or comments concerning this matter feel free to contact me at (404) 881-3931.

Attendees:

Sue Fields, Jan Rogers, EPA Emergency Operations Section
John Mann, EPA Groundwater Section
Lon Hesla, EPA Drinking Water Section
Chuck Pietrosewicz, CDC-EPA Superfund Liason
Terry Dover, NC Solid & Hazardous Waste Management Branch
Richard Lassiter, NC Division of Environmental Management

North Carolina Department of Human Resources
 Division of Health Services
 Occupational Health Laboratory



ANALYSIS REPORT

Company: One Hour Koritizing
 Address: Ryan Street area
 Service Requested: tetrachloro ethylene
 Sample Taken On: Tuesday, 5 June 1984 By: Terry Dover
 Submitted To Laboratory On: 6 June 1984 By: Terry Dover
 Date of Analysis: 6/11/84 Date Reported: 6/12/84
 Analyzed By: Anne L. Goble

LABORATORY NUMBER	SAMPLE NUMBER	DESCRIPTION	REMARKS and Time SAMPLE Taken	Tetrachloroethylene
				RESULTS IN ppb
403057	001345	ADDRESS One Hour Koritizing 4404 Roxboro Road	STRONG TCE odor 11:15 am sludge from septic tank	*
403058	001346	Oakley Ryan STREET	1:29 pm	<1.0
403059	001347	McNeil 4422 Roxboro Road	1:44 pm	<1.0
403060	001348	4501 Layman's Chapel Road	2:20 pm	<1.0
403061	001349	PARKER 4608 Denfield	2:34 pm	<1.0
403062	001350	WEST 4621 Denfield	2:44 pm	<1.0
403063	001351	PATTERSON 4425 Denfield	3:12 pm	<1.0
403064	001352	4811 Denfield	2:54 pm	<1.0

COMMENTS: *Tetrachloroethylene confirmed by GC/MS analysis, approx. 40% of sludge TCE.

REPORTED BY: John R. Neal
 Chief, Occupational Health Lab

6/15/84

TO PREVENT OR MITIGATE AN IMMEDIATE AND
SIGNIFICANT RISK OF HARM TO HUMAN LIFE
OR HEALTH OR TO THE ENVIRONMENT

I, _____, hereafter referred to as the "Owner," in recognition of the authority of the UNITED STATES OF AMERICA ("the United States") pursuant to the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. 9601 et seq., and the National Contingency Plan 40 CFR Part 300 to prevent or mitigate an immediate and significant risk of harm to human life or health or to the environment posed by the contamination of groundwater at and about the One-Hour Koritizing facility ("the Site") located at 4404 N. Roxboro Road, Durham, North Carolina, grant to the United States, the State of North Carolina ("the State"), their officers, agents, employees and contractors and all private parties acting under the same legal authority, a permit and right-of-entry upon property owned by me and located within the area of contamination from the Site upon the terms and conditions described below.

1. The Owner hereby grants to the United States, the State, their officers, agents, employees and contractors and all private parties acting under the same legal authority, a permit and irrevocable right-of-entry upon property owned by me and located at _____ at any time for the purpose of installing water lines and connecting those lines to plumbing at my residence and to the City water supply system. I understand that the work to be performed will entail installation of a water meter on my property, and running a water line from the meter to my in-house plumbing. A trench will be excavated to install the water line; however, it will be backfilled when the work is completed. Landscaping will be the responsibility of the owner. I also understand that I will be responsible for the payment of monthly water bills at a rate and upon the terms and conditions established by the City of Durham.

2. The Owner understands that the parties exercising this right of entry shall, upon request, present their credentials to a representative of the Owner upon entering the premises, and shall perform their work in such a way to cause as little interference with Owner's activities as is practical under the circumstances and as little damage as possible to Owner's premises. This permit shall remain in effect until all necessary work has been completed and the United States has provided Owner with written notice to this effect.

3. The Owner shall have full right of access to the property subject only to the right of the On-Scene Coordinator to prohibit or restrict access to such property where necessary to protect public health, welfare, or the environment.

4. Owner represents that, in agreeing to this permit and right-of-entry, Owner acts on his/her behalf only, and does not claim to act on behalf of any other person(s) with respect to any right any such other person(s) may have to object to the permit and right-of-entry requested by the United States and the State.

UNITED STATES

By: Susan Fields
Susan Fields
On-Scene Coordinator
United States Environmental
Protection Agency

6/15/84
Date

STATE OF NORTH CAROLINA

By: Terry F. Dover
Terry F. Dover, Eastern Area Supv.
Solid & Hazardous Waste Management Branch

6/18/84
Date

OWNER

By: _____
(title)

Date



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

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

June 14, 1984

MEMORANDUM

TO: O.W. Strickland
FROM: Lee Crosby *LC*
SUBJECT: Status of City Water Connections
One Hour Koritizing/Ryan Street Area
NCD 980848667

Susan Fields (404/881-3931), EPA on-scene Coordinator, plans to coordinate private contractor activities Friday, 15 June 1984.

Before the contractor can provide city water connections, the residents must sign an EPA consent form. The forms will be sent to the Durham County Health Department by 18 June 1984. The forms will also be used to determine the exact number of connections. The City of Durham will be paid for the connections prior to providing them.

LC:dl

STUBBS, COLE, BREEDLOVE, PRENTIS & POE

ATTORNEYS AND COUNSELORS AT LAW
122 EAST PARRISH STREET
POST OFFICE BOX 376
DURHAM, NORTH CAROLINA 27702

JAMES A. COLE, JR.
IRVIN P. BREEDLOVE, JR.
RICHARD F. PRENTIS, JR.
G. JONA POE, JR.
C. THOMAS BIGGS
TERRY D. FISHER

June 14, 1984



TELEPHONE
(919) 682-9331

ALLSTON STUBBS
Of Counsel

Mr. John H. Johnson
Attorney at Law
Chief of Hazardous Law Branch
Office of Regional Counsel
United States Environmental Protection Agency
345 Courtland Street
Atlanta, Georgia 30365

Re: Removal of hazardous substance - 4404 N. Roxboro Road,
Durham, Durham County, North Carolina
Business Owner: The M.C.E. Company, Inc. (One Hour Koretizing)
Property Owner: W. Terry Carden

Dear Mr. Johnson:

Please be advised that this office represents Mr. W. Terry Carden and The M.C.E. Company, Inc., and that Mr. Thomas W. Devine's letter of June 12, 1984 has been directed to my attention for a reply.

Per our telephone conversation this morning, neither Mr. Carden nor The M.C.E. Company, Inc. accepts any responsibility or liability for the hazardous substance located on or about the property known as 4404 North Roxboro Road, Durham, Durham County, North Carolina.

The hazardous substance in question was undoubtedly deposited in a septic tank located on the property prior to the time The M.C.E. Company, Inc. purchased the business, and prior to the time Mr. Carden purchased the real estate. Further, the building had been connected to public sewer facilities before either purchase occurred, and Mr. Carden had no knowledge that a septic tank was located upon the property until notified by County health officials approximately two months ago.

Accordingly, it is our position that neither Mr. Carden nor The M.C.E. Company, Inc. is a "responsible party" required to remove or dispose of the hazardous substance or the septic tank within which it is located.

However, my clients do wish to cooperate with EPA in any reasonable way to eliminate this problem. They are willing to give complete and unrestricted access to the property and will fully cooperate with any employees or agents of EPA. Further, my clients are willing to take any reasonable steps suggested by EPA provided that they are not unduly expensive or oppressive. Their willingness to cooperate should not however be construed as an admission of liability nor as an admission that they are a "responsible party" within the definition of 42 U.S.C. 9601 et seq. (CERCLA).

Mr. John H. Johnson
Page Two
June 14, 1984

It is my sincere hope that EPA will not see fit to join either Mr. Carden or The M.C.E. Company, Inc. as a party to any litigation in this matter, and I look forward to receiving a copy of any statutes, regulations or case citations which might indicate liability on the part of either of my clients under the prevailing facts and circumstances.

With all best wishes, I am

Very truly yours,



James A. Cole, Jr.

JAC, Jr.:jch

cc: ✓ Lee Crosby
Mr. Thomas W. Devine, Director
Gizelle Sutton
Mr. W. Terry Carden
The M.C.E. Company, Inc.

North Carolina Department of Human Resources
 Division of Health Services
 Occupational Health Laboratory

8/8/100/4

ATTACHMENT 18

ANALYSIS REPORT

#403057-403064

Company: One Hour Koritizing
 Address: Ryan Street BECA
 Service Requested: tetrachloroethylene
 Sample Taken On: Tuesday, 5 June 1984 By: Terry Dover
 Submitted To Laboratory On: 6 June 1984 By: Terry Dover
 Date of Analysis: 6/11/84 Date Reported: 6/12/84
 Analyzed By: Anne L. Hobble

LABORATORY NUMBER	SAMPLE NUMBER	DESCRIPTION	REMARKS and Time SAMPLE Taken	Tetrachloroethylene
				RESULTS IN ppb
403057	001345	ADDRESS One Hour Koritizing 4404 Roxboro Road	STRONG TCE odor 11:15 am sludge from septic tank	*
403058	001346	Oakley Ryan Street	1:29 pm	<1.0
403059	001347	McNeil 4422 Roxboro Road	1:44 pm	<1.0
403060	001348	4501 Layman's Chapel Road	2:20 pm	<1.0
403061	001349	PARKER 4608 Denfield	2:34 pm	<1.0
403062	001350	WEST 4621 Denfield	2:44 pm	<1.0
403063	001351	PATERSON 4725 Denfield	3:12 pm	<1.0
403064	001352	4811 Denfield	2:54 pm	<1.0

COMMENTS: *Tetrachloroethylene confirmed by GC/MS analysis, approx. 40% of sludge TCE.

REPORTED BY: John K. Neal
 Chief, Occupational Health Lab

Lii



June 12, 1984

44W-ED

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Terry Cardin
4404 N. Roxboro Road
Durham, North Carolina 27705

RE: One-hour Keritizing Site
Durham, North Carolina

Dear Mr. Cardin:

The United States Environmental Protection Agency is considering spending public funds to take corrective action for the control of releases and threatened releases of hazardous substances at the above-referenced site. This action is being taken pursuant to Section 104 and other provisions of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. 9601 et seq., (CERCLA), unless EPA determines that such action will be done properly by a responsible party. Responsible parties under CERCLA include the current and past owner or operator, and persons who are involved in the disposal or treatment or who arranged for the transportation of hazardous substances for the purpose of treatment or disposal of them at the site. Under Section 107(a) of CERCLA and other laws, responsible parties may be liable for any costs incurred by the government in taking corrective actions at the site. Such costs may include, but may not be limited to, expenditures for investigation, planning, cleanup of the site and enforcement. By this letter, therefore, EPA intends to both notify you of your potential liability with regard to this matter and to encourage you, as a potentially responsible party, to undertake voluntary cleanup activities.

EPA has determined that there have been releases and there is a substantial threat of release of hazardous substances as defined by Section 101(14) of CERCLA from the above-referenced facility. Investigation by EPA and the State of North Carolina revealed the presence of a septic tank contaminated with tetrachloroethylene as well as several homes in the area with drinking water wells contaminated by tetrachloroethylene.

As the current owner/operator of the above referenced site, EPA believes that you may be a responsible party.

This letter is to notify you that EPA is planning to take the following immediate removal action.

Removal and proper disposal of the septic tank and surrounding contaminated soil. Connection of the affected homes in the area to a city water line.

Pursuant to Section 107(a) of CERCLA, where the Agency uses public funds to effectuate the cleanup of the hazardous substance, you may be liable for all necessary costs incurred in cleaning up the site. You should note that undertaking this immediate action may be only part of the overall actions necessary to protect the public health, welfare or the environment. You may be asked to undertake or may be liable for the costs of any additional response actions necessary at this site.

You should notify EPA by telephone within twenty-four (24) hours from the receipt of this letter and provide a written notification thereafter, stating the nature and extent of the corrective measures you may be willing to undertake. Otherwise, EPA will assume that you decline to undertake voluntary site cleanup, and may proceed with any necessary corrective measures. Your letter should indicate the appropriate name, address, and telephone number for further contact with you and include a statement of the types and extent of the activities you may be willing to undertake. Where you are already involved in discussions with state or local authorities, engaged in voluntary action or involved in a lawsuit regarding this site, you should continue that activity and report the status of those discussions or that action in your letter. Please provide a copy of your letter to any other parties involved in those discussions. Your letter should be sent to:

Clezele Sutton
U.S. EPA, Region IV
345 Courtland Street, N.E.
Atlanta, Georgia 30365
404/881-2234

If you need further information, please call Ms. Sutton at 404/881-2234, or Ms. Sue Fields of our Emergency and Potential Response Branch at 404/881-3921.

EPA would like to encourage good faith negotiations between you and the Agency.

The factual and legal discussions contained in this letter are intended solely for notification and edification purposes. They are not intended to, do not, and may not be relied upon as a final Agency position on any matter set forth herein.

Due to the seriousness of the problem at this site and the attendant legal ramifications, the Agency strongly encourages you to submit a written response within the time frame specified herein. We hope that you will give these matters your immediate attention.

Sincerely yours,

Thomas W. Devine, Director
Air and Waste Management Division

cc: Lee Crosby
NC Solid and Hazardous Waste

Mr. Jim Cole, Attorney
Stubbs, Cole, Breadlove, Printice
and Poe
122 East Parrish Street
Durham, NC 27705

bcc: Gene Lucero
Director, Office of Waste Programs Enforcement

Marcia English
Legal Branch
Region IV

Sue Fields
ERRB

GSUTTON:GJB:2234:06/07/84:LEX NO. 24

4AW-ER
Sutton

4AW-ER
Mathis

4AW-ER
Smith

4AW
Devine



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

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

11 June 1984

Mr. Walton Jones
EPA 3012 Regional Project Officer
Air and Hazardous Materials Division
U. S. Environmental Protection Agency
345 Courtland Street, N. E.
Atlanta, Georgia 30365

Subject: Request for Immediate Action

Dear Mr. Jones:

This letter is to confirm my Friday, 1 June 1984 telephone conversations with Camilla Warren and George Moins regarding tetrachloroethylene contamination of drinking water wells down gradient from the following site:

One Hour Koritizing
4404 Roxboro Road
Durham, N. C.
NCD 980848667

The preliminary assessment and site inspection forms, data and photographs have been forwarded to your office.

Seven additional drinking water samples were taken 5 June 1984 with EPA on scene coordinator Sue Fields. Laboratory results determining the extent of contamination are pending.

If you have any questions, please contact Terry Dover or me.

Sincerely,

Lee Crosby

Lee Crosby, Chemist

Solid & Hazardous Waste Management Branch
Environmental Health Section

LC:jj

June 8, 1984

TO: File

FROM: Lee Crosby

RE: Health Monitoring for Residents of the One Hour
Koritizing Area NCD980848667

According to William Service, the Durham County Health Department is planning to offer health screening tests for residents in the Ryan Street area. Monitoring will include blood screening and liver function tests as well as other tests.

ONE HOUR KORITIZING

NCD980848667

Thursday
17 May 1984
Durham County Sanitarian: William Service
contacted Solid & Hazardous Waste
RE: Excavation & Disposal of Sandfilter

Friday
18 May 1984
Lee Crosby met with William Service
at Ryan Street

Monday
21 May 1984
O. W. Strickland and Ted Taylor met with
3012 Personnel

Tuesday
22 May 1984
Letter to EPA 3012 Confirming Telephone
conversation ERRIS listing of One Hour Koritizing

Wednesday
23 May 1984
3012 Committee Review
Bill Meyer Arthur Mouberry Ted Taylor
3012 Personnel

Friday
25 May 1984
Lee Crosby briefed Ted Taylor at Ryan Street.
Ten samples were collected

Wednesday
30 May 1984
Recommendation from Ted Taylor to
O. W. Strickland through J. N. McCormack and
R. H. Levine

Friday
1 June 1984
O. W. Strickland receives recommendation
from Ted Taylor

Friday
1 June 1984
George Moyans of EPA is contacted. On scene
coordinator Sue Fields is assigned to the site.

Monday
4 June 1984
OSC Sue Fields arrives in Raleigh

Tuesday
5 June 1984
Terry Dover, Larry Perry, and Lee Crosby
collected seven additional samples with
EPA OSC Sue Fields.

Wednesday
7 June 1984
N. C. DHR laboratory reports high concentrations
of tetrachloroethylene in septic tank and the
contamination of two additional wells on
Monk Street.

Name	City Water	Date City Water Connected	Well	Lab Analysis	Date Sample Taken
Monk Anderson	No		Yes (hand dug well)	no sample available	
Monk Ortosky	No		Yes		
Laymans Chapel Road					
L-C Road Honeycutt	No		Yes		
4521 - 4505 L-C Road (7 houses)	Yes		No		
4501 L-C Road	No		Yes	not detected	
Laymans Chapel Baptist Church	Yes		Yes (see 306 Monk)		
Roxboro Road					
Creek Sample					
Roxboro Road	No		Yes	not detected	
Roxboro Road Thompson	No		Yes		

Name	City Water	Date City Water Connected	Well	Lab Analysis	Date Sample Taken
4421 Ryan	Yes	before Dec 83			
4425 Ryan Raspberry	Yes	before Dec 83			
4429 Ryan Nicholson (Braswell)	No		Yes	865 ppb	
4501 Ryan Wintrough (Landlord)	Yes	between 12/83 & 5/84	No	39 ppb	
4503 Ryan	Yes	before Dec 1984			
Monk Street					
200 Monk	No		Yes		
204 Monk	No		Yes		
206 Monk	Yes	before Dec 83	No		
210 Monk Bird	Yes	before Dec 83	Yes (alternative H ₂ O source)		
306 Monk	No		Yes (Layman's Chapel Baptist Ch well)		

Name	City Water	Date City Water Connected	Well	Lab Analysis	Date Sample Taken
One-Hour Koritizing 4404 Roxboro Road	Yes	before Dec 1983	No	Tetrachloro- ethylene 3.06 ppm sandfilter 0.056 ppm soil	
4404 Ryan Oakley	No		Yes	not detected	
4416 Ryan Keplinger	Yes	between 12/83 & 5/84	Yes (capped after city H ₂ O)	2.5 ppb	
4420 Ryan Bobbitt	Yes	before Dec 1983	Yes (alternative source)	submitted 25 May 84	
4422 Ryan	Yes	25 May 84	Yes	2 ppb	
4424 Ryan	No		Yes (same as 4422 Ryan)	5 ppb	
4426 Ryan Mangum	Yes	before Dec 1983			
4428 Ryan	Yes	Nov 83			

Name	City Water	Date City Water Connected	Well	Lab Analysis	Date Sample Taken
4430 Ryan	Yes	before Dec 1983			
4504 Ryan 4504 1/2 Unoccupied	No		Yes	219 ppb	
4506 Ryan Hales	No		Yes	1.093 ppm	
Ryan Unoccupied	Yes	before Dec 1983			
4514 Ryan Harden	No		Yes	849 ppb	
4516 Ryan Bynum	Yes	before Dec 1983			
4405 Ryan Family Denistry	Yes	Jan 1983	No	1.504 ppm 1.4 ppm	
4411 Ryan Bunche	Yes	between 12/83 & 5/84	No	4.4 ppm	
4411 1/2 Ryan	No		Yes (same well as 4411 and 4417 Ryan)		
4417 Ryan Stallings	No		Yes		
4419 Ryan	No		Yes	1.338 ppm	



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

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NC	D980848667

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site) One Hour Koritizing		02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER			
03 CITY Durham		04 STATE NC	05 ZIP CODE 27702	06 COUNTY Durham	07 COUNTY CODE 032
09 COORDINATES LATITUDE 36 03 40.0		LONGITUDE 078 54 15.0			
10 TYPE OF OWNERSHIP (Check one) <input checked="" type="checkbox"/> A. PRIVATE <input type="checkbox"/> B. FEDERAL <input type="checkbox"/> C. STATE <input type="checkbox"/> D. COUNTY <input type="checkbox"/> E. MUNICIPAL <input type="checkbox"/> F. OTHER					

III. INSPECTION INFORMATION

01 DATE OF INSPECTION 5 / 20 / 84 <small>MONTH DAY YEAR</small>	02 SITE STATUS <input type="checkbox"/> ACTIVE Facility 1968 | 1972 <input type="checkbox"/> INACTIVE Waste Site <small>BEGINNING YEAR ENDING YEAR</small>	03 YEARS OF OPERATION 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)
 E. STATE F. STATE CONTRACTOR _____ (Name of firm) G. OTHER _____ (Specify)

05 CHIEF INSPECTOR Lee Crosby	06 TITLE Chemist	07 ORGANIZATION NC DHR	08 TELEPHONE NO. (919) 733-2178
09 OTHER INSPECTORS Frank Moore	10 TITLE Geologist	11 ORGANIZATION NC DHR	12 TELEPHONE NO. (919) 733-2178
Chris Bird	Envir. Engineer	NC DHR	() 919 733-2178
William Service	Health Dept. Sanitarian Durham Co.	DCHD	() 919 688-1338
			()
			()

13 SITE REPRESENTATIVES INTERVIEWED Terry Cardin	14 TITLE Owner of One Hour Koritizing	15 ADDRESS 503 Mason Road Post Office Box 317 Durham, N. C. 27702	16 TELEPHONE NO. (919) 682-6177
			()

17 ACCESS GAINED BY (Check one) <input type="checkbox"/> PERMISSION <input type="checkbox"/> WARRANT	18 TIME OF INSPECTION 11:00 a.m.	19 WEATHER CONDITIONS Clear Warm Sunny
------------------------------------------------------------------------------------------------------------	--------------------------------------------	--------------------------------------------------

IV. INFORMATION AVAILABLE FROM

01 CONTACT O. W. Strickland	02 OF (Agency/Organization) Department of Human Resources Solid & Haz. Waste Mgt. Br.	03 TELEPHONE NO. (919) 733-2178
04 PERSON RESPONSIBLE FOR SITE INSPECTION FORM Lee Crosby	05 AGENCY NC DHR	06 ORGANIZATION Solid & Haz. Waste Mgt. Br.
	07 TELEPHONE NO. 919-733-2178	08 DATE 6 / 07 / 84 <small>MONTH DAY YEAR</small>



POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT

PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION

01 STATE | 02 SITE NUMBER
NC | D980848667

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 A. GROUNDWATER CONTAMINATION 02 OBSERVED (DATE: 18 May 1984) POTENTIAL ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

Eighteen homes in a residential section in the Ryan Street area use well water as a source of drinking water (when contamination was detected).

01 B. SURFACE WATER CONTAMINATION 02 OBSERVED (DATE: 18 May 1984) POTENTIAL ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

The source of contamination appears to be a sandfilter located about 1 to 2 feet below the surface. The sandfilter is approximately 10 feet by 40 feet and has a depth of approximately six feet. The septic tank had a strong tetrachloroethylene odor.

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

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

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

01 F. CONTAMINATION OF SOIL 02 OBSERVED (DATE: 18 May 84) POTENTIAL ALLEGED
03 AREA POTENTIALLY AFFECTED: _____ (Acres) 04 NARRATIVE DESCRIPTION

Contamination extends down Ryan Street and onto Monk Street. The distance from One Hour Koritizing is approximately 0.5 miles.

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

18 homes in the area had drinking water wells.

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

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

The sandfilter contamination occured prior to 1972 resident exposure less than 4ppm is possible for the past ten to twelve years. Tetrachloroethylene is detectable by odor at 4ppm.



POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT

PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION

01 STATE 02 SITE NUMBER

NC D980848667

II. HAZARDOUS CONDITIONS AND INCIDENTS (Continued)

01 J. DAMAGE TO FLORA
04 NARRATIVE DESCRIPTION

02 OBSERVED (DATE: _____)

POTENTIAL

ALLEGED

01 K. DAMAGE TO FAUNA
04 NARRATIVE DESCRIPTION (include name(s) of species)

02 OBSERVED (DATE: _____)

POTENTIAL

ALLEGED

01 L. CONTAMINATION OF FOOD CHAIN
04 NARRATIVE DESCRIPTION

02 OBSERVED (DATE: _____)

POTENTIAL

ALLEGED

01 M. UNSTABLE CONTAINMENT OF WASTES
(Spills/Runoff/Standing liquids, Leaking drums)
03 POPULATION POTENTIALLY AFFECTED: _____

02 OBSERVED (DATE: _____)

POTENTIAL

ALLEGED

04 NARRATIVE DESCRIPTION

01 N. DAMAGE TO OFFSITE PROPERTY
04 NARRATIVE DESCRIPTION

02 OBSERVED (DATE: _____)

POTENTIAL

ALLEGED

Contamination has extended off site for approximately 0.5 mile.

01 O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs
04 NARRATIVE DESCRIPTION

02 OBSERVED (DATE: _____)

POTENTIAL

ALLEGED

01 P. ILLEGAL/UNAUTHORIZED DUMPING
04 NARRATIVE DESCRIPTION

02 OBSERVED (DATE: _____)

POTENTIAL

ALLEGED

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

III. TOTAL POPULATION POTENTIALLY AFFECTED: Residential area with 38 homes

IV. COMMENTS

Of these homes, approximately 18 homes used well water as a drinking water source in December 1983.

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



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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NC	D980848667

II. PERMIT INFORMATION

01 TYPE OF PERMIT ISSUED (Check all that apply)	02 PERMIT NUMBER	03 DATE ISSUED	04 EXPIRATION DATE	05 COMMENTS
<input type="checkbox"/> A. NPDES				
<input type="checkbox"/> B. UIC				
<input type="checkbox"/> C. AIR				
<input type="checkbox"/> D. RCRA				
<input type="checkbox"/> E. RCRA INTERIM STATUS				
<input type="checkbox"/> F. SPCC PLAN				
<input type="checkbox"/> G. STATE (Specify)				
<input type="checkbox"/> H. LOCAL (Specify)				
<input type="checkbox"/> I. OTHER (Specify)				
<input checked="" type="checkbox"/> J. NONE				

III. SITE DESCRIPTION

01 STORAGE/DISPOSAL (Check all that apply)	02 AMOUNT	03 UNIT OF MEASURE	04 TREATMENT (Check all that apply)	05 OTHER
<input type="checkbox"/> A. SURFACE IMPOUNDMENT <input type="checkbox"/> B. PILES <input type="checkbox"/> C. DRUMS, ABOVE GROUND <input type="checkbox"/> D. TANK, ABOVE GROUND <input type="checkbox"/> E. TANK, BELOW GROUND <input type="checkbox"/> F. LANDFILL <input type="checkbox"/> G. LANDFARM <input type="checkbox"/> H. OPEN DUMP <input type="checkbox"/> I. OTHER <u>Sandfilter for septic tank</u> <small>(Specify)</small>	_____	_____	<input type="checkbox"/> A. INCENERATION <input type="checkbox"/> B. UNDERGROUND INJECTION <input type="checkbox"/> C. CHEMICAL/PHYSICAL <input type="checkbox"/> D. BIOLOGICAL <input type="checkbox"/> E. WASTE OIL PROCESSING <input type="checkbox"/> F. SOLVENT RECOVERY <input type="checkbox"/> G. OTHER RECYCLING/RECOVERY <input type="checkbox"/> H. OTHER _____ <small>(Specify)</small>	<input type="checkbox"/> A. BUILDINGS ON SITE 06 AREA OF SITE _____ (Acres)

07 COMMENTS

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.
 A disconnected septic tank with a hole allowing surface water into the tank has a strong tetrachloroethylene odor. Laboratory confirmation is pending. The sandfilter showed approximately 3ppm tetrachloroethylene.

V. ACCESSIBILITY

01 WASTE EASILY ACCESSIBLE: YES NO
 02 COMMENTS

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

Laboratory analysis
 William Service
 Terry Cardin



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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NC	D980848667

II. DRINKING WATER SUPPLY

01 TYPE OF DRINKING SUPPLY <i>(Check as applicable)</i>	SURFACE		WELL		02 STATUS			03 DISTANCE TO SITE	
	COMMUNITY	<input checked="" type="checkbox"/>	B. <input type="checkbox"/>	ENDANGERED	AFFECTED	MONITORED	A.	_____ (mi)	
	NON-COMMUNITY	C. <input type="checkbox"/>	D. <input checked="" type="checkbox"/>	A. <input type="checkbox"/>	B. <input type="checkbox"/>	C. <input type="checkbox"/>	B.	_____ (mi)	
				D. <input checked="" type="checkbox"/>	E. <input checked="" type="checkbox"/>	F. <input type="checkbox"/>			

III. GROUNDWATER

01 GROUNDWATER USE IN VICINITY *(Check one)*

A. ONLY SOURCE FOR DRINKING for 10 homes
 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 <u>18 homes</u>		03 DISTANCE TO NEAREST DRINKING WATER WELL <u>25 ft</u> (mi)		
04 DEPTH TO GROUNDWATER _____ (ft)	05 DIRECTION OF GROUNDWATER FLOW <u>South to North</u>	06 DEPTH TO AQUIFER OF CONCERN _____ (ft)	07 POTENTIAL YIELD OF AQUIFER _____ (gpd)	08 SOLE SOURCE AQUIFER <input type="checkbox"/> YES <input type="checkbox"/> NO

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

Area includes drill dug and hand dug wells. Well water is used as the only source of drinking water for some homes and as an alternative source for others.

10 RECHARGE AREA <input type="checkbox"/> YES <input type="checkbox"/> NO COMMENTS	11 DISCHARGE AREA <input type="checkbox"/> YES <input type="checkbox"/> NO COMMENTS
------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------

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
The ⁷ Eng River is located within 2 miles of the	<input type="checkbox"/>	_____ (mi)
Ryan Street area	<input type="checkbox"/>	_____ (mi)
_____	<input type="checkbox"/>	_____ (mi)

V. DEMOGRAPHIC AND PROPERTY INFORMATION

01 TOTAL POPULATION WITHIN	02 DISTANCE TO NEAREST POPULATION
ONE (1) MILE OF SITE A. <u>38 homes</u> NO. OF PERSONS	Residential population is in the contaminated area <u>25 ft.</u> (mi)
TWO (2) MILES OF SITE B. _____ NO. OF PERSONS	
THREE (3) MILES OF SITE C. _____ NO. OF PERSONS	

03 NUMBER OF BUILDINGS WITHIN TWO (2) MILES OF SITE _____	04 DISTANCE TO NEAREST OFF-SITE BUILDING _____ (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)*



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

I. IDENTIFICATION
01 STATE 02 SITE NUMBER
NC D980848667

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

5 - 20 (ft)

04 DEPTH OF CONTAMINATED SOIL ZONE

Unknown (ft)

05 SOIL pH

06 NET PRECIPITATION

(in)

07 ONE YEAR 24 HOUR RAINFALL

(in)

08 SLOPE SITE SLOPE

DIRECTION OF SITE SLOPE TERRAIN AVERAGE SLOPE

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

OTHER

A. _____ (mi)

B. _____ (mi)

12 DISTANCE TO CRITICAL HABITAT (of endangered species)

_____ (mi)

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 AG LAND

Commercial area is adjacent to the residential area.

A. _____ (mi)

B. _____ (mi)

C. _____ (mi)

D. _____ (mi)

14 DESCRIPTION OF SITE IN RELATION TO SURROUNDING TOPOGRAPHY

One Hour Koritizing is located upgradient from the Ryan Street residential section. An intermittent stream flows south to north between Roxboro Road and Ryan Street. The direction of groundwater flow is north towards the ENO River approximately 2 miles from Ryan Street. (USGS map is attached). Fractured bedrock is located close to surface and at the surface in areas.

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

USGS map
Nello Teer Quarry visit
Nello Teer Geologist



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

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NC	D980848667

II. SAMPLES TAKEN

SAMPLE TYPE	01 NUMBER OF SAMPLES TAKEN	02 SAMPLES SENT TO	03 ESTIMATED DATE RESULTS AVAILABLE
GROUNDWATER	20	N. C. Department of Human Resources	12 returned
SURFACE WATER	1		8 expected June 84
WASTE			
AIR			
RUNOFF			
SPILL			
SOIL			
VEGETATION			
OTHER			

III. FIELD MEASUREMENTS TAKEN

01 TYPE	02 COMMENTS

IV. PHOTOGRAPHS AND MAPS

01 TYPE <input type="checkbox"/> GROUND <input type="checkbox"/> AERIAL	02 IN CUSTODY OF <u>N. C. Dept. of Human Resources</u> <small>(Name of organization or individual)</small>
03 MAPS <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	04 LOCATION OF MAPS <u>N. C. Department of Human Resources</u>

V. OTHER FIELD DATA COLLECTED (Provide narrative description)

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



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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NC	D980848667

II. CURRENT OWNER(S) PARENT COMPANY (if applicable)

01 NAME Terry Cardin			02 D+B NUMBER 0			08 NAME			09 D+B NUMBER		
03 STREET ADDRESS (P.O. Box, RFD #, etc.) 503 Mason Road			04 SIC CODE 0			10 STREET ADDRESS (P.O. Box, RFD #, etc.)			11 SIC CODE		
05 CITY Durham		06 STATE NC	07 ZIP CODE 27702			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		
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 Harold Ashworth			02 D+B NUMBER 0			01 NAME			02 D+B NUMBER		
03 STREET ADDRESS (P.O. Box, RFD #, etc.)			04 SIC CODE 0			03 STREET ADDRESS (P.O. Box, RFD #, etc.)			04 SIC CODE		
05 CITY Durham		06 STATE NC	07 ZIP CODE			05 CITY		06 STATE	07 ZIP CODE		
01 NAME Ed Clements			02 D+B NUMBER 0			01 NAME			02 D+B NUMBER		
03 STREET ADDRESS (P.O. Box, RFD #, etc.)			04 SIC CODE 0			03 STREET ADDRESS (P.O. Box, RFD #, etc.)			04 SIC CODE		
05 CITY Durham		06 STATE NC	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)

Jim Cole: attorney for Terry Cardin and One Hour Koritizing
Stubbs, Cole, Breedlove, Printice and Poe
122 East Parrish Street
Durham, N. C. Telephone: (919) 682-9331



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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NC	D980848667

II. CURRENT OPERATOR <small>(Provide if different from owner)</small>				OPERATOR'S PARENT COMPANY <small>(if applicable)</small>			
01 NAME MCE Corporation One Hour Koritizing		02 D+B NUMBER ∅		10 NAME MCE Corporation		11 D+B NUMBER ∅	
03 STREET ADDRESS <small>(P.O. Box, RFD #, etc.)</small>		04 SIC CODE ∅		12 STREET ADDRESS <small>(P.O. Box, RFD #, etc.)</small> Post Office Box 317		13 SIC CODE ∅	
05 CITY Durham	06 STATE NC	07 ZIP CODE		14 CITY Durham, N. C.	15 STATE NC	16 ZIP CODE 27702	
08 YEARS OF OPERATION 1973-present	09 NAME OF OWNER Terry Cardin						

III. PREVIOUS OPERATOR(S) <small>(List most recent first; provide only if different from owner)</small>				PREVIOUS OPERATORS' PARENT COMPANIES <small>(if applicable)</small>			
01 NAME John Chapel		02 D+B NUMBER ∅		10 NAME		11 D+B NUMBER	
03 STREET ADDRESS <small>(P.O. Box, RFD #, etc.)</small> Current address unknown		04 SIC CODE ∅		12 STREET ADDRESS <small>(P.O. Box, RFD #, etc.)</small>		13 SIC CODE	
05 CITY Durham	06 STATE NC	07 ZIP CODE		14 CITY	15 STATE	16 ZIP CODE	
08 YEARS OF OPERATION -1973	09 NAME OF OWNER DURING THIS PERIOD Harold Ashworth						

01 NAME John Chapel		02 D+B NUMBER ∅		10 NAME		11 D+B NUMBER	
03 STREET ADDRESS <small>(P.O. Box, RFD #, etc.)</small> current address unknown		04 SIC CODE ∅		12 STREET ADDRESS <small>(P.O. Box, RFD #, etc.)</small>		13 SIC CODE	
05 CITY Durham,	06 STATE NC	07 ZIP CODE		14 CITY	15 STATE	16 ZIP CODE	
08 YEARS OF OPERATION 1969-1973	09 NAME OF OWNER DURING THIS PERIOD Ed Clements						

01 NAME A convenience market		02 D+B NUMBER		10 NAME		11 D+B NUMBER	
03 STREET ADDRESS <small>(P.O. Box, RFD #, etc.)</small> previously located at		04 SIC CODE		12 STREET ADDRESS <small>(P.O. Box, RFD #, etc.)</small>		13 SIC CODE	
05 CITY 4404 Roxboro Road Durham	06 STATE	07 ZIP CODE		14 CITY	15 STATE	16 ZIP CODE	
08 YEARS OF OPERATION 1966-1969	09 NAME OF OWNER DURING THIS PERIOD Ed Clements						

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

Jim Cole (attorney for One Hour Koritizing and Terry Cardin)



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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NC	D980848667

II. ON-SITE GENERATOR

01 NAME None	02 D+B NUMBER
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 None	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 None	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)

Blank area for sources of information.



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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NC	D980848667

II PAST RESPONSE ACTIVITIES (Continued)

01 <input type="checkbox"/> R. BARRIER WALLS CONSTRUCTED 04 DESCRIPTION	02 DATE _____	03 AGENCY _____
01 <input type="checkbox"/> S. CAPPING/COVERING 04 DESCRIPTION	02 DATE _____	03 AGENCY _____
01 <input type="checkbox"/> T. BULK TANKAGE REPAIRED 04 DESCRIPTION	02 DATE _____	03 AGENCY _____
01 <input type="checkbox"/> U. GROUT CURTAIN CONSTRUCTED 04 DESCRIPTION	02 DATE _____	03 AGENCY _____
01 <input type="checkbox"/> V. BOTTOM SEALED 04 DESCRIPTION	02 DATE _____	03 AGENCY _____
01 <input type="checkbox"/> W. GAS CONTROL 04 DESCRIPTION	02 DATE _____	03 AGENCY _____
01 <input type="checkbox"/> X. FIRE CONTROL 04 DESCRIPTION	02 DATE _____	03 AGENCY _____
01 <input type="checkbox"/> Y. LEACHATE TREATMENT 04 DESCRIPTION	02 DATE _____	03 AGENCY _____
01 <input type="checkbox"/> Z. AREA EVACUATED 04 DESCRIPTION	02 DATE _____	03 AGENCY _____
01 <input type="checkbox"/> 1. ACCESS TO SITE RESTRICTED 04 DESCRIPTION	02 DATE _____	03 AGENCY _____
01 <input type="checkbox"/> 2. POPULATION RELOCATED 04 DESCRIPTION	02 DATE _____	03 AGENCY _____
01 <input type="checkbox"/> 3. OTHER REMEDIAL ACTIVITIES 04 DESCRIPTION	02 DATE _____	03 AGENCY _____

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

--



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

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NC	D980848667

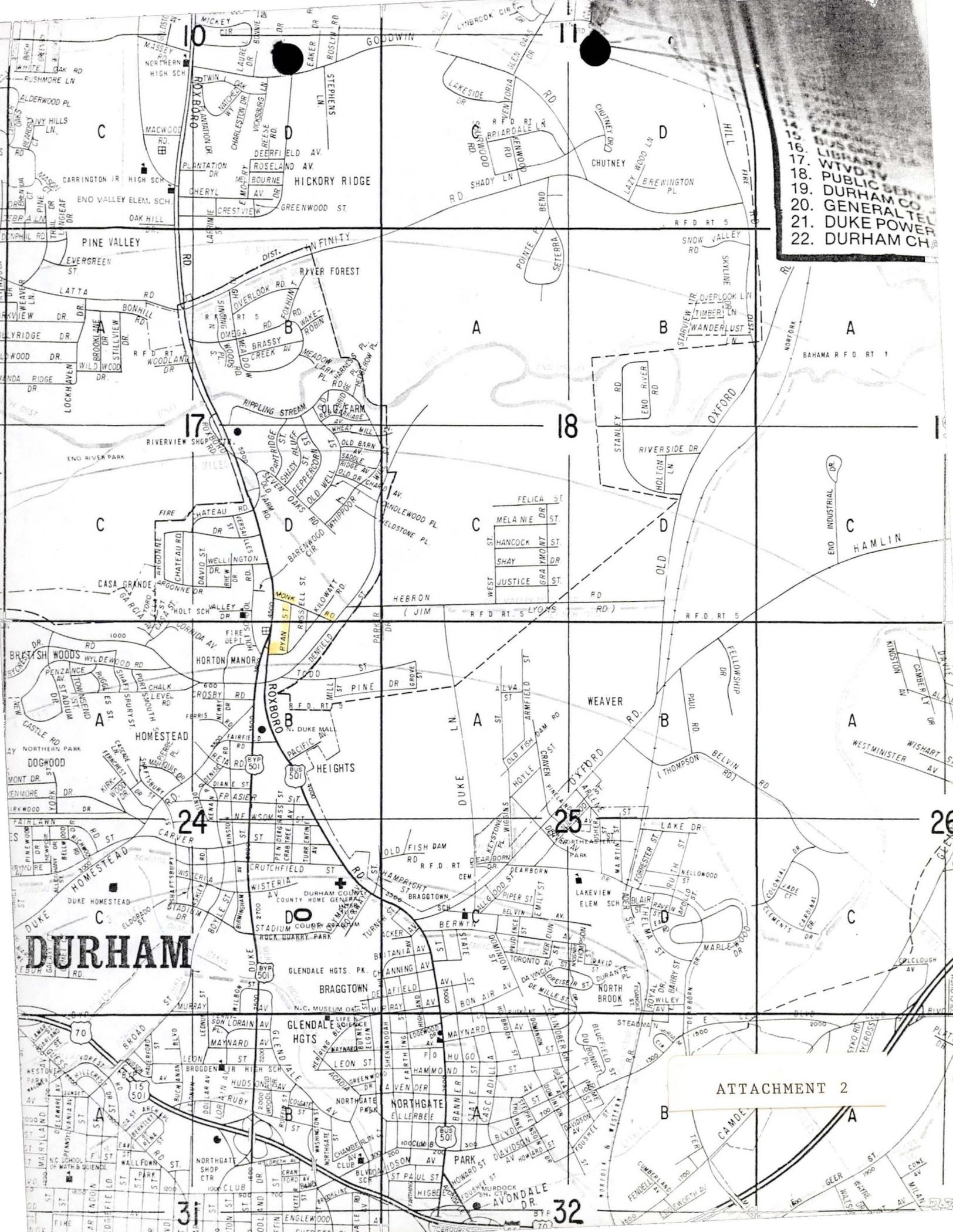
II. ENFORCEMENT INFORMATION

01 PAST REGULATORY/ENFORCEMENT ACTION YES NO

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

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





- 14. ...
- 15. ...
- 16. BUS GARAGE
- 17. WTVB-TV
- 18. PUBLIC SERV.
- 19. DURHAM CO. GENERAL TEL.
- 20. DUKE POWER
- 21. DURHAM CH...
- 22. DURHAM CH...

DURHAM

ATTACHMENT 2

17

18

24

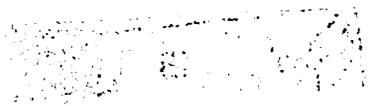
25

31

32

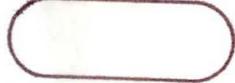
ROXBORO

Well
across street



at the end

One Hour
Koritizing



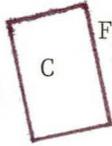
3.06 Sandfilter
0.056 Soil

ND



4404

1.4
4405



Family
Dentistry



4411

4.4



4417



4419



4421



4425



4429

0.036



4501



RYAN STREET



4416



4420



4422

0.002



4424

0.005



4426



4428



4430



4504



4506

1.093



4514

0.849



4516



200



204

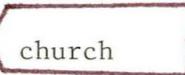
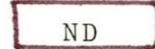


206

ND



210



church



306

Tetrachloroethylene units
are in ppm

ND not dedected

C city water

USS unoccupied service station

P pond

N →



ND

USS



P



ND



USS



ND



C

305

MONK STREET

LAYMAN'S CHAPEL ROAD

ONE HOUR KORITIZING
DURHAM, N. C.
NCD980848667

not to scale
1 June 1984

May 1984

TO: File
FROM: Lee Crosby
RE: Ownership and Operation
One-Hour Koritizing Building
NCD980848667

Jim Cole, Attorney for One-Hour Koritizing and owner Terry Cardin outlined the ownership of the building located at 4404 Roxboro Road in Durham.

1966 Ed Clements built a building at the site and leased it to a 7-11 type store. The septic tank was designed for a one or two bathroom facility.

later: Ed Clements leased the building to a dry cleaner, JJA of Durham operated by Mr. John Chappel for approximately 4 years.

7 July 1972 The facility was connected to the city sewer system.

1973 Ed Clements sold the building to Harold Ashworth of Southern Parts. Chappel continued to operate the dry cleaner.

Oct. 1973 Mr. Cardin's company (known as MCE) purchased the dry cleaning operation, but not the real estate. MCE Company operated the dry cleaner at the site for 8 months. Afterwards the building was used only as a pick-up point.

1977 Mr. Cardin also purchased the real estate.

1984 Mr. Cardin was told of the old septic tank and of the presence of 3.0 ppm tetrachloroethylene in the sandfilter and of the contamination of 10 water wells along Ryan Street, some of which were used as a source of drinking water



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

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

May 30, 1984

MEMORANDUM

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

THROUGH: *JNM (K)*
J. N. MacCormack, M.D., M.P.H., Chief
Epidemiology Section

Ronald H. Levine, M.D., M.P.H. *RHL*

FROM: Ted Taylor, Ph.D., Toxicologist *TT*
Environmental Epidemiology Branch

C. Gregory Smith, M.D., M.P.H. *CHS*
Medical Epidemiologist
Environmental Epidemiology Branch

SUBJECT: Private Wells Contaminated by Perchloroethylene (PCE) in Durham

We have reviewed the available laboratory results and visited the Ryan Street site in Durham County. Analytical results indicate that nine of the eleven sampled wells are contaminated with PCE. The following concentrations have been reported: 0.002 ppm, 0.005 ppm, 0.849 ppm, 0.865 ppm, 1.34 ppm, 1.40 ppm, 1.50 ppm, 3.06 ppm, and 4.40 ppm. Three of the samples also contained dichloroethylene (DCE) and trichloroethylene (TCE). In our judgment, based on available toxicity studies, these concentrations represent a serious level of groundwater contamination which could result in either acute or chronic adverse health effects depending on the duration of exposure, total dose, co-morbidity of the population at risk, etc.

On February 6, 1980, the EPA Office of Drinking Water issued a suggested no adverse response level (SNARL) for PCE. A one-day SNARL of 2.3 ppm, a 10-day SNARL of 0.175 ppm and a longer term SNARL of 0.017 ppm were calculated. The SNARL calculations ignore the possible carcinogenic risk that may result from exposure. The Draft Health Assessment Document for PCE (December 1983) was recently reviewed by the EPA Science Advisory Board. An EPA spokesman indicated that PCE currently could not be classified as a carcinogen because of the limited data. However, there are some scientists who believe that there is almost enough evidence to classify PCE as a probable human carcinogen. If PCE is classified as a carcinogen and acceptable levels are calculated using the typical EPA models, the acceptable levels would probably be even lower than the current long term SNARL that does not take carcinogenic potential into consideration.

In the case of the Ryan Street site, one can readily appreciate that seven of the samples exceed the 10-day SNARL, which addresses acute adverse health effects. Thus, it is our recommendation that the residents who obtain their water from these wells refrain from using it for drinking and bathing purposes. It is our understanding that staff associated with the Durham County Health Department already have personally notified the residents and made this recommendation.

In addition, it is also our understanding that additional water samples have been (and will be in the future) taken to further define the magnitude and severity of groundwater contamination in this area. Based on the information to date, it is unlikely that the residents of this area will be able to use their well water for drinking and bathing purposes in the foreseeable future. The long-term solution to obtaining alternative potable water is to hook up to the city's public water supply system. It is our understanding that emergency funds are available through EPA to hook up to city water in situations where groundwater, serving as a potable water source, has been contaminated and presents a health risk. While we have not detailed the potential acute and chronic health effects that may result from ingesting water contaminated with PCE, we are of the opinion that a risk does exist based on this initial evaluation. Thus, it is our recommendation that the necessary action be taken to provide city water to all of the residents in the affected area.

It may be of interest that in 1977 several halogenated organics were reported to be contaminants in community drinking water wells in Nassau County, New York. Sixteen wells were closed by the health department. Information available to us indicates that the maximum detectable level of PCE in this incident was 0.375 ppm. We are in the process of obtaining additional information on this contamination and the decisions related to it.

We will provide you with additional information on this matter as we receive it.

TT:CGS:lr

cc: John D. Fletcher, M.D., Durham County Health Director
James Summers, Secretary, Natural Resources and Community Development

29 May 1984

TO: File
FROM: Lee Crosby
RE: Geology in the One Hour Koritizing Area
NCD980848667

Jim Sprinkle is a Geologist for Nello Teer Company (919) 682-6191, which operates a rock quarry within one mile of the homes with contaminated well water. According to Frank Moore, 3012 Geologist and Jim Sprinkle, the predominate rock type in the area is a diabase complex with some mata-volcanics. The diabase is high fractured with general jointing with a NW-NE strick and a S to SE dip (45° to vertical). Depth to bedrock is estimated to be as close as 20 feet to the surface.

ATTACHMENT 13

The subsoil is light olive-brown, very clay about 29 inches thick. The underlying material to a depth of 60 inches is variegated green, strong-brown, black, and gray saprolite that crushes to sandy loam.

Iredell soils are medium in natural fertility and low in organic-matter content. **Permeability is slow**, and available **water capacity is high**. The root zone is deep. Shrink-swell potential is high. Depth to the seasonal high water table is more than 1½ feet.

Most of the acreage is forested with mixed hardwoods and loblolly pine. The rest is used for nonfarm purposes and pasture. The soils are fairly well suited to crops, such as small grain and corn. The major limitation is the erosion hazard resulting from runoff, the steep slopes, the slow permeability, the high shrink-swell potential, and the ponding in nearly level areas.

Representative profile of Iredell loam, 2 to 6 percent slopes, in a hardwood forest 5.8 miles north from Durham on U.S. 501, 1.6 miles east on State Road 1639; 100 feet north of road:

- O1—2 inches to 1 inch, undecomposed hardwood forest litter.
 O2—1 inch to 0, black decomposed organic material.
 A11—0 to 2 inches, very dark grayish-brown (10YR 3/2) loam; strong, fine, granular structure; very friable; many fine and medium woody roots; many small black concretions; neutral; abrupt, smooth boundary.
 A12—2 to 7 inches, grayish-brown (2.5Y 5/2) loam; moderate, fine, granular structure; very friable; many fine and medium roots; many small black concretions; neutral; abrupt, smooth boundary.
 B2t—7 to 24 inches, light olive-brown (2.5Y 5/4) clay; coarse, angular blocky structure; very firm, very sticky, very plastic; common medium roots which extend to a depth of 13 inches and become horizontally oriented at that depth; common, thin and medium, discontinuous clay films on faces of peds; common small black concretions; slightly acid; clear, wavy boundary.
 B3—24 to 36 inches, light olive-brown (2.5Y 5/4) clay; massive; very firm, very sticky, very plastic; many, thin, discontinuous clay films on faces of peds; common small black concretions; many partly disintegrated rock fragments containing weatherable minerals; slightly acid; gradual, wavy boundary.
 C—36 to 60 inches, variegated green, strong-brown, black, and gray saprolite that crushes to sandy loam; massive; friable, sticky, plastic; few, thin, discontinuous clay films in vertical cracks; mildly alkaline.

Depth to bedrock is more than 3½ feet. The B horizon is slightly acid to mildly alkaline.

The Ap horizon, if present, is dark grayish brown or olive brown, and the A1 horizon is very dark grayish brown to grayish brown. The B2t horizon is light olive brown or brown. The B3 horizon is light olive brown or light olive gray. The C horizon is commonly variegated green, strong-brown, black, and gray saprolite that crushes to sandy loam or sandy clay loam.

Iredell loam, 2 to 6 percent slopes (lrB).—This moderately well drained soil is on broad ridges on uplands. It has the profile described as representative of the series. Areas are generally elliptical in shape and 2 to 15 acres in size.

Included with this soil in mapping are areas of similar soils that have a surface layer of fine sandy loam or gravelly loam, a few places where stones are on the surface, and a few small areas where the soil is eroded. Also included are areas of similar soils where slopes are less than 2 percent and a few areas of Mecklenburg soils.

This Iredell soil is easy to keep in good tilth. Because the **subsoil is slowly permeable**, however, tillage is restricted after heavy rain. **Infiltration is moderate**, and **runoff is medium**.

This soil is fairly well suited to corn, soybeans, small grain,

hay, and pasture. Erosion resulting from runoff, the permeability, the high shrink-swell potential, and the ponding in nearly level areas are the major concerns in management. Capability unit IIE-3; woodland suitability group 4c2.

Iredell loam, 6 to 10 percent slopes (lrC).—This moderately well drained soil is on narrow side slopes on uplands. It has a surface layer of very dark grayish-brown or dark grayish-brown loam. Its subsoil is light olive-brown very firm clay that is mottled with gray. Areas occur in narrow bands that are roughly rectangular in shape and range from 2 to 25 acres in size.

Included with this soil in mapping are a few gravelly areas where the surface layer is fine sandy loam, a few areas where the soil is eroded, areas of similar soils where slopes are more than 10 percent, and a few places where stones are on the surface. Also included are a few acres of Mecklenburg and Wilkes soils.

This Iredell soil is easy to keep in good tilth. Because the subsoil is slowly permeable, however, tillage is restricted after heavy rain. Infiltration is moderate, and runoff is medium.

The soil is fairly well suited to corn, soybeans, and small grain. It is also suited to hay and pasture. Slope erosion resulting from runoff, the slow permeability, and the high shrink-swell potential are the major concerns in management. Capability unit IIIe-3; woodland suitability group 4c2.

Iredell-Urban land complex, 0 to 6 percent slopes (luB).—This complex consists of Iredell soils and Urban land that is mainly Iredell soil material. About 30 percent of each mapped area is covered by streets, houses, and other structures. About 35 percent is an undisturbed Iredell soil. About 25 percent is an Iredell soil that has been covered with as much as 18 inches of fill material or from which much as two-thirds of the original soil material has been removed. The rest of each mapping unit consists of fill material, 6 inches or more thick, or places where the original soil material has been cut away. The fill material is commonly a mixture of silt, sand, and very plastic clay. Included with this complex in mapping are areas of Mecklenburg and White soils.

This complex will crack when dry and swell when wet. The nearly level areas are ponded during periods of heavy rain. Capability unit unassigned; woodland suitability group unassigned.

Iredell-Urban land complex, 6 to 10 percent slopes (luC).—This complex consists of Iredell soils and Urban



Figure 7.—Townhouses on Iredell loam.

SOIL LEGEND

The first capital letter is the initial one of the soil name. A second capital letter, A, B, C, D, E, or F, shows the slope. Most symbols without a slope letter are those of nearly level soils, but some are for land types that have a considerable range of slope. A final number, 2, in a symbol shows that the soil is eroded.

SYMBOL	NAME	SYMBOL	NAME
A1A	Altavista silt loam, 0 to 2 percent slopes	MFE	Mayodan sandy loam, 15 to 25 percent slopes
A1B	Altavista silt loam, 2 to 6 percent slopes	MrC	Mayodan-Urban land complex, 0 to 10 percent slopes
ApB	Appling sandy loam, 2 to 6 percent slopes	MrD	Mayodan-Urban land complex, 10 to 15 percent slopes
ApC	Appling sandy loam, 6 to 10 percent slopes	MuB	Mecklenburg loam, 2 to 6 percent slopes
Cc	Cartecay and Chewacla soils	MuC	Mecklenburg loam, 6 to 10 percent slopes
CfB	Cecil fine sandy loam, 2 to 6 percent slopes	NaD	Nason silt loam, 10 to 15 percent slopes
CfC	Cecil fine sandy loam, 6 to 10 percent slopes	NaE	Nason silt loam, 15 to 25 percent slopes
CfE	Cecil fine sandy loam, 10 to 25 percent slopes	NoD	Nason stony silt loam, 10 to 15 percent slopes
Ch	Chewacla and Wehadkee soils	PfC	Pinkston fine sandy loam, 2 to 10 percent slopes
Cp	Congaree silt loam	PfE	Pinkston fine sandy loam, 10 to 25 percent slopes
CrB	Creedmoor sandy loam, 2 to 6 percent slopes	Ro	Roanoke silt loam
CrC	Creedmoor sandy loam, 6 to 10 percent slopes	TaE	Tatum gravelly silt loam, 15 to 25 percent slopes
DaB	Davidson clay loam, 2 to 6 percent slopes	Ur	Urban land
DaC	Davidson clay loam, 6 to 10 percent slopes	Wh	Wahee loam, alkaline subsoil variant
GeB	Georgeville silt loam, 2 to 6 percent slopes	WmD	Wedowee sandy loam, 10 to 15 percent slopes
GeC	Georgeville silt loam, 6 to 10 percent slopes	WmE	Wedowee sandy loam, 15 to 25 percent slopes
GeD	Georgeville silt loam, 10 to 15 percent slopes	Wn	Wehadkee silt loam
G1E	Goldston slaty silt loam, 10 to 25 percent slopes	WsB	White Store sandy loam, 2 to 6 percent slopes
G1F	Goldston slaty silt loam, 25 to 45 percent slopes	WsC	White Store sandy loam, 6 to 10 percent slopes
GrB	Granville sandy loam, 2 to 6 percent slopes	WsE	White Store sandy loam, 10 to 25 percent slopes
GrC	Granville sandy loam, 6 to 10 percent slopes	WvC2	White Store clay loam, 2 to 10 percent slopes, eroded
Gu	Gullied land, clayey materials	WvE2	White Store clay loam, 10 to 25 percent slopes, eroded
HeB	Helena sandy loam, 2 to 6 percent slopes	WwC	White Store-Urban land complex, 0 to 10 percent slopes
HeC	Helena sandy loam, 6 to 10 percent slopes	WwE	White Store-Urban land complex, 10 to 25 percent slopes
HrB	Herndon silt loam, 2 to 6 percent slopes	WxE	Wilkes sandy loam, 10 to 25 percent slopes
HrC	Herndon silt loam, 6 to 10 percent slopes		
HsC	Herndon stony silt loam, 2 to 10 percent slopes		
IrB	Iredell loam, 2 to 6 percent slopes		
IrC	Iredell loam, 6 to 10 percent slopes		
IuB	Iredell-Urban land complex, 0 to 6 percent slopes		
IuC	Iredell-Urban land complex, 6 to 10 percent slopes		
LgB	Lignum silt loam, 2 to 6 percent slopes		
MfB	Mayodan sandy loam, 2 to 6 percent slopes		
MfC	Mayodan sandy loam, 6 to 10 percent slopes		
MfD	Mayodan sandy loam, 10 to 15 percent slopes		

WORKS AND FEATURES

- Highways and roads
 - Divided
 - Good motor
 - Poor motor
 - Trail
- Highway markers
 - National Interstate
 - U. S.
 - State or county
- Railroads
 - Single track
 - Multiple track
 - Abandoned
- Bridges and crossings
 - Road
 - Trail
 - Railroad
 - Ferry
 - Ford
 - Grade
 - R. R. over
 - R. R. under
- Buildings
 - School
 - Church
- Mine and quarry
- Gravel pit
- Power line
- Pipeline
- Cemetery
- Dams
- Levee
- Tanks
- Well, oil or gas
- Forest fire or lookout
- Windmill
- Located object

*fine clayey soils on felsic rocks - granite or Carolina slate!
Georgeville - Herndon*

significant in engineering—Continued

Percentage less than 3 inches in diameter passing sieve—				Liquid limit	Plasticity index	Permeability	Available water capacity	Reaction	Shrink-swell potential	Probability of corrosion on— ¹	
No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)							Uncoated steel	Concrete
95-100	95-100	85-100	70-90	Percent <35	NP-7	2.0-6.0	0.10-0.13	5.1-6.5	Low-----	Moderate: texture.	Moderate: texture and reaction.
95-100	95-100	90-100	80-95	25-42	8-20	0.6-2.0	0.10-0.15	5.1-6.0	Low-----		
95-100	95-100	90-100	85-100	55-75	17-35	0.6-2.0	0.10-0.15	5.1-6.0	Low-----		
95-100	95-100	90-100	80-95	20-42	8-20	0.6-2.0	0.10-0.15	5.1-6.0	Low-----		
95-100	95-100	85-100	70-90	<25	NP-7	0.6-2.0	0.10-0.15	4.5-6.0	Low-----		
95-100	95-100	85-95	50-70	-----	NP	2.0-6.0	0.10-0.13	6.1-7.3	Moderate.	High: drainage and texture.	Low.
95-100	95-100	90-100	75-95	60-90	35-65	0.06-0.2	0.15-0.20	6.1-7.3	High-----		
85-100	75-100	50-75	36-49	35-48	15-26	0.06-0.2	0.15-0.20	6.1-7.3	High-----		
95-100	95-100	80-100	60-90	<25	NP-7	2.0-6.0	0.12-0.14	4.5-5.5	Low-----	High: drainage and texture.	High: texture and reaction.
95-100	95-100	90-100	80-95	25-42	8-20	0.6-2.0	0.14-0.16	4.5-5.5	Moderate.		
95-100	95-100	85-100	70-95	45-70	20-40	0.06-0.2	0.15-0.20	4.5-5.5	Moderate.		
95-100	90-100	60-80	30-50	<25	NP-4	2.0-6.0	0.11-0.13	5.1-5.5	Low-----	High: texture.	Moderate: texture and reaction.
95-100	95-100	80-95	36-60	20-45	8-27	0.6-2.0	0.12-0.14	5.1-5.5	Low-----		
98-100	95-100	85-95	50-70	-----	NP	0.6-2.0	0.11-0.13	5.6-6.5	Low-----	High: texture.	Low.
95-100	95-100	90-100	75-95	45-70	22-41	0.06-0.20	0.12-0.14	5.6-6.5	Moderate.		
95-100	95-100	85-100	60-80	25-50	8-25	0.2-0.6	0.12-0.14	5.6-6.5	Moderate.		
95-100	95-100	85-100	70-90	<25	NP-7	2.0-6.0	0.10-0.13	4.5-5.5	Low-----	Moderate: texture.	Moderate: texture and reaction.
95-100	95-100	95-100	85-95	41-65	11-30	0.6-2.0	0.10-0.15	4.5-5.5	Low-----		
95-100	95-100	85-100	70-90	<25	NP-7	0.6-2.0	0.10-0.15	4.5-5.5	Low-----		
95-100	90-100	70-90	40-55	<25	NP-4	2.0-6.0	0.12-0.15	4.5-5.5	Low-----	Low-----	High: texture and reaction.
95-100	95-100	85-100	70-90	<25	NP-7	0.2-0.6	0.10-0.13	4.5-5.5	Low-----	Very high: drainage and texture.	Moderate: texture and reaction.
95-100	95-100	90-100	75-95	45-70	25-41	0.06-0.2	0.10-0.15	4.5-5.5	Moderate.		
95-100	95-100	90-100	80-95	25-42	8-20	0.2-0.6	0.10-0.15	4.5-5.5	Moderate.		
75-100	75-100	50-70	30-50	<25	NP-7	2.0-6.0	0.10-0.13	4.5-5.5	Low-----	Moderate: texture.	Moderate: texture and reaction.
95-100	95-100	95-100	85-95	41-60	11-30	0.6-2.0	0.10-0.15	4.5-5.5	Low-----		
98-100	95-100	85-95	50-70	-----	NP	2.0-6.0	0.11-0.13	<4.5-8.4	Low-----	High: drainage and texture.	Low.
95-100	95-100	85-100	36-60	20-40	8-20	0.2-0.6	0.12-0.14	5.6-8.4	Moderate.		
95-100	95-100	90-100	75-95	45-70	25-41	0.06-0.2	0.12-0.15	5.6-8.4	Moderate.		
95-100	95-100	85-100	36-60	20-40	8-20	0.2-0.6	0.12-0.14	5.6-8.4	Moderate.		
95-100	90-100	60-90	30-50	<25	NP-4	2.0-6.0	0.10-0.12	4.5-5.5	Low-----	High: texture.	Moderate: texture and reaction.
95-100	90-100	75-100	70-95	35-55	20-35	0.6-2.0	0.10-0.14	4.5-5.5	Low-----		
95-100	95-100	85-100	70-90	<25	NP-7	0.6-2.0	0.13-0.15	4.5-5.5	Low-----		
95-100	95-100	85-100	70-90	<25	NP-7	2.0-6.0	0.14-0.15	5.6-6.5	Low-----	High: drainage and texture.	Moderate: texture and reaction.
95-100	95-100	90-100	80-85	25-42	8-20	0.6-2.0	0.16-0.20	5.6-6.5	Low-----		
95-100	95-100	85-100	65-90	35-48	15-26	0.6-2.0	0.16-0.20	5.6-6.5	Low-----		

TABLE 6.—Estimates of soil properties

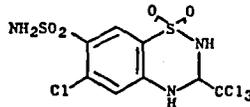
Soil name and map symbols	Flood hazard	Depth to seasonal high water table	Depth to bedrock	Depth from surface of representative profile	USDA texture	Classification	
						Unified	AASHO
Herndon: HrB, HrC, HsC	None	Feet >6	Feet >5	Inches 0-8 8-12 12-34 34-44 44-60	Silt loam Silty clay loam Silty clay Silty clay loam Silt loam	ML, CL-ML CL MH CL ML, CL-ML	A-4 A-4, A-6, A-7 A-7 A-4, A-6, A-7 A-4
Iredell: IrB, IrC, IuB, IuC No valid estimates of Urban land part of IuB and IuC.	None	>1½	>3½	0-7 7-36 36-60	Loam Clay Sandy loam	ML CH SM	A-4 A-7 A-4, A-6
Lignum: LgB	None	>1½	>5	0-9 9-17 17-34 34-46 46	Silt loam Silty clay loam Clay, silty clay Saprolite. Slate.	ML, CL-ML CL CL, ML, MH, CH	A-4 A-4, A-6, A-7 A-7
Mayodan: MfB, MfC, MfD, MfE, MrC, MrD. No valid estimates of Urban land part of MrC and MrD.	None	>6	>5	0-12 12-47 47-60	Sandy loam Sandy clay loam, sandy clay. Sandstone.	SM, SM-SC SC, CL	A-2, A-4 A-4, A-7, A-6
Mecklenburg: MuB, MuC	None	>6	>4	0-5 5-24 24-60	Loam Clay Clay loam, loam	ML CH, CL CL	A-4 A-7 A-4, A-7, A-6
Nason: NaD, NaE, NoD	None	>6	>3½	0-8 8-33 33-47 47	Silt loam Silty clay loam, silty clay. Silt loam Schist.	ML, CL-ML ML, MH ML, CL-ML	A-4 A-7 A-4
Pinkston: PfC, PfE	None	>6	>2½	0-21 21-35 35	Fine sandy loam Weathered sandstone. Sandstone.	SM-SC, SM, ML, CL-ML	A-4
Roanoke: Ro	Frequent; brief.	(⁴)	>5	0-7 7-42 42-51 51-60	Silt loam Clay Silty clay loam Sand and silt.	ML, CL-ML CL, CH CL	A-4 A-7 A-7, A-6
Tatum: ⁵ TaE	None	>6	>3½	0-6 6-34 34-50 50	Gravelly silt loam Silty clay loam, silty clay. Weathered rock. Slate.	SM, SM-SC MH, ML	A-2, A-4 A-7
Urban land: Ur. No valid estimates. Properties too variable.							
Wahee, alkaline subsoil variant: Wh.	Infrequent; very brief.	>1½	>5	0-10 10-16 16-48 48-65	Loam Sandy clay loam Clay Sandy clay loam	ML SC, CL CL, CH SC, CL	A-4 A-4, A-6 A-7 A-4, A-6
Wedowee: WmD, WmE	None	>6	>4	0-9 9-36 36-60	Sandy loam Clay, clay loam Silt loam	SM CL, CH ML, CL-ML	A-2, A-4 A-6, A-7 A-4
Wehadkee: Wn	Very frequent; brief.	(⁴)	>5	0-7 7-46 46-60	Silt loam Silty clay loam Clay loam	ML, CL-ML CL CL	A-4 A-4, A-6, A-7 A-7, A-6

the tongue. mp 147-150°. Sol in 7 parts water, in alcohol; insol in ether, benzene. The aq soln is neutral to litmus. Aq solns are stable and may be sterilized by brief boiling. LD₅₀ i.p. in mice: 70 mg/kg, Dawes, *Brit. J. Pharmacol. Chemother.* 1, 90 (1946).

THERAP CAT: Local anesthetic.

THERAP CAT (VET): Topical anesthetic.

8905. Tetrachlormethiazide. 6-Chloro-3,4-dihydro-3-trichloromethyl-2H-1,2,4-benzothiadiazine-7-sulfonamide 1,1-dioxide; 6-chloro-3,4-dihydro-7-sulfamoyl-3-trichloromethyl-2H-1,2,4-benzothiadiazine 1,1-dioxide; 3-trichloromethylthiochlorothiazide; teclothiazide; PS 207; K 33; Depleil. C₁₁H₇Cl₄N₂O₄S₂; mol wt 415.13. C 23.15%, H 1.70%, Cl 34.17%, N 10.12%, O 15.42%, S 15.45%. Prepn: Close et al., *J. Am. Chem. Soc.* 82, 1132 (1960); Novello et al., *J. Org. Chem.* 25, 970 (1960).



Crystals, mp 300-303° (Close); mp 287° (Novello).

THERAP CAT: Diuretic.

8906. Tetrachloroethane. 1,1,2,2-Tetrachloroethane; sym-tetrachloroethane; acetylene tetrachloride; Cellon; Bonoform. C₂H₂Cl₄; mol wt 167.86. C 14.31%, H 1.20%, Cl 84.49%. Cl₂CHCHCl₂. Manuf by catalytic addition of chlorine to acetylene: Peters, Neumann, *Angew. Chem.* 45, 261 (1932); by chlorination of ethylene: Pye, U.S. pat. 2,752,402 (1956 to Dow); by catalytic chlorination of ethane: Joseph, U.S. pat. 2,752,401 (1956 to Dow); by chlorination of 1,2-dichloroethane: Conrad, U.S. pat. 2,725,412 (1955 to Ethyl Corp.); Fox, U.S. pat. 2,846,484 (1958 to Monsanto). Toxicity: E. Browning, *Toxicity and Metabolism of Industrial Solvents* (Elsevier, New York, 1965) pp 220-229.

Nonflammable, heavy, mobile liquid. Sweetish, suffocating, chloroform-like odor. d₄²⁰ 1.58658. mp -44°. bp₇₆₀ 146.5°. n_D²⁰ 1.49419. Very sparingly sol in water. At 25° one gram dissolves in 350 ml H₂O. Miscible with methanol, ethanol, benzene, ether, petr ether, carbon tetrachloride, chloroform, carbon disulfide, dimethylformamide, oils. Has the highest solvent power of the chlorinated hydrocarbons.

USE: Nonflammable solvent for fats, oils, waxes, resins, cellulose acetate, rubber, copal, phosphorus, sulfur. As solvent in certain types of Friedel-Crafts reactions or phthalic anhydride condensations. In the manuf of paint, varnish, and rust removers. In soil sterilization and weed killer and insecticide formulations. In the determination of theobromine in cacao. As immersion fluid in crystallography. In the biological laboratory to produce pathological changes in gastrointestinal tract, liver, and kidneys. Intermediate in the manuf of trichloroethylene and other chlorinated hydrocarbons having two carbon atoms. *Caution:* Powerful narcotic; liver poison. For symptoms see Carbon Tetrachloride.

8907. Tetrachloroethylene. Perchloroethylene; ethylene tetrachloride; tetrachloroethylene; Nema; Tetracap; Tetropil; Perlene; Ankilostin; Didakene. C₂Cl₄; mol wt 165.85. C 14.48%, Cl 85.52%. Cl₂C=CCl₂. Prepd by Faraday in 1821. Manuf by catalytic oxidation of 1,1,2,2-tetrachloroethane: Ellsworth, Vancamp, U.S. pat. 2,951,103 (1960 to Columbia-Southern Chem.); Feathers, Rogerson, U.S. pat. 3,040,109 (1962 to Pittsburgh Plate-Glass); by catalytic chlorination of acetylene: Thermet, Parvi, U.S. pat. 2,938,931 (1960 to Société d'électrochimie, d'électrometallurgie et des aciéries électriques d'Ugine).

Colorless, nonflammable liq; ethereal odor; d₄¹⁵ 1.6311; d₂₀²⁰ 1.6230. bp 121°. Solidif about -22°. n_D²⁰ 1.5055. Mumford, Phillips, *J. Chem. Soc.* 1950, 75. Sol in about 10,000 vol water; miscible with alcohol, ether, chloroform, benzene. LD₅₀ orally in mice: 8.85 g/kg; lethal concn for mice in air: 6000 ppm. *Handbook of Toxicology* vol. 1, W. S. Spector, Ed. (Saunders, Philadelphia, 1956) pp 290-293, 350-351.

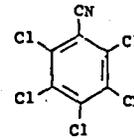
Human Toxicity: Narcotic in high concns. Defatting action on skin can lead to dermatitis.

USE: Dry cleaning; degreasing metals; solvent.

THERAP CAT: Anthelmintic (hookworms and roundworms).

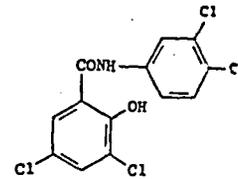
THERAP CAT (VET): Anthelmintic.

8908. Tetrachloroisophthalonitrile. 2,4,6-trichloro-1,3-benzenedicarbonitrile; 1,3-dicyano-2,4,6-trichlorobenzene; DAC-2,787; Daconil; Forturi; Terra mol wt 265.89. C 36.13%, Cl 53.33%, N 10.54%. Battershell et al., Fr. pat. 1,397,521 (1965 to Battershell), C.A. 63, 4212c (1965); Minoru Tashiro, U.S. pat. 2,258,968 (to Showa Denko), C.A. 78, 127 (1967). Fungicidal activity: Turner et al., *Contrib. Amer. Phytopath. Inst.* 22, 303 (1964).



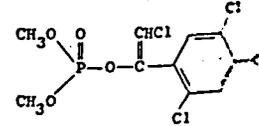
Crystals. d₄²⁵ 1.7. mp 245-247°. Insol in water (LD₅₀ < 0.01 at 40°). Practically insol in water (LD₅₀ reported as 0.6 ppm). Soly in organic solvents: benzene 8%, xylene 8%, cyclohexane 3%, acetone 2%. LD₅₀ orally in rats > 10.0 g/kg, Turner et al. USE: Fungicide, bactericide, nematocide. Agricultural and horticultural fungicide.

8909. 3,3',4',5'-Tetrachlorosalicylanilide. N-(3,4-dichlorophenyl)-2-hydroxybenzamide; C₁₂H₆Cl₄NO₂; mol wt 351.03. C 44.48%, H 1.71%, N 3.99%, O 9.12%. Prepn of piperazine derivatives: Bindler, Model, U.S. pat. 2,703,331 (1955).



Crystals, mp 161°. Fluoresces under ultraviolet light. Practically insol in water. Sol in alkaline soaps and solutions of wetting agents. Sol in many organic solvents. USE: Bacteriostat in formulations of dry soaps, rinses, polishes, shampoos, preservative in textile finishes, certain cellulose esters, cutting oils, coolants. Manuf of thermoplastic articles: Teller, U.S. pat. 2,800,000 (1961 to Weeco Products). *Caution:* Consult local government regulations on use in drugs and cosmetics.

8910. Tetrachlorvinphos. Phosphoric acid (2,4,5-trichlorophenyl)ethyl dimethyl phosphorothioate; (2,4,5-trichlorophenyl)vinyl dimethyl phosphorothioate; chloro-α-(chloromethylene)benzyl phosphorothioate; SD 8447; Dietreen; Gardona; Rabon. C₁₁H₈Cl₃O₃P₂S; mol wt 365.95. C 32.82%, H 2.48%, Cl 38.75%, O 15.95%. Phosphate-type pesticide of low mammalian toxicity. Ramey, U.S. pats. 3,102,842 and 3,553,277 (to Shell). Properties: Whetstone et al., *J. Agr. Sci.* 14, 352 (1966).



mp 97-98°. Vapor pressure at 20° = 4.5 x 10⁻⁴ mm Hg. water: 11 ppm; in xylene: < 15%; 40-50% in benzene at room temp. LD₅₀ (75% wetted powder) 1.5 g/kg orally, C.A. 78, 9332h (1973).

USE: Insecticide. *Caution:* Cholinesterase inhibitor.

29 May 1984

TO: File
FROM Lee Crosby
RE: One-Hour Koritizing
NCD

On 24 May 1984 Frank Moore, Chris Bird and Lee Crosby met with Jim Cole, Attorney for One-Hour Koritizing and owner Terry Cardin to request permission to take samples from the sandfilter and soil behind One-Hour Koritizing. Owner Terry Cardin agreed without reservation.

TO: File
FROM: Lee Crosby
RE: Ed Berry (919/733-2314)

Raleigh Regional Office, Division of Environmental Management, 3800 Barrett Drive, Post Office Box 27687, Raleigh, N. C. 27611-27687

23 May 1984

TO: File
FROM: Lee Crosby
RE: DEM Involvement
One Hour Koritizing
NCD980848667

According to William Service of the Durham County Health Department, Ed Berry of the Division of Environmental Management has made one visit to the Ryan Street site. Service has kept DEM informed of sample result and DEM has provided toxicological data to DCHD.

According to Service, the primary concern of DEM is groundwater contamination and not the contamination of the drinking water wells. Service and Berry have discussed air stripping as a clean-up method.

23 May 1984

TO: File
FROM: Lee Crosby
RE: New Site Status Evaluation
One Hour Koritizing
NCD980848667

On 21 May 1983 DHR Toxicologist Dr. Ted Taylor, Solid and Hazardous Waste Branch Chief O. W. Strickland and 3012 Personnel met to discuss One Hour Koritizing.

Of the 10 drinking water wells which have been sampled by the Durham County Health Department down gradient from the dry cleaners, all show contamination ranging from 39 ppb to 4.4 ppm.

Mr. Strickland recommended that 1) other possible sources of the tetrachloroethylene be identified 2) all wells along Ryan Street be resampled and 3) wells along Monk Street and Laymons Chapel Road be sampled.

Dr. Taylor will gather toxicological data on tetrechloroethylene.

A general review meeting with representatives from the Department of Natural and Economic Resources is scheduled for Thursday, 23 May, 1984.



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

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

22 May 1984

Mr. Jim Cole
Stubbs, Cole
Post Office Box 376
Durham, N. C. 27702

RE: One Hour Koritizing
NCD980848667

Dear Mr. Cole:

In reference to our conversation this morning, employees of the Solid and Hazardous Waste Management Branch are requesting permission to take soil and groundwater samples on property owned by Mr. Terry Cardin at 4404 North Roxboro Road in Durham.

Thank you for your assistance in this matter.

Sincerely,

Lee Crosby, Chemist

Solid & Hazardous Waste Management Branch
Environmental Health Section

LC:jj



Lee

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

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

22 May 1984

Mr. Walton Jones
EPA 3012 Regional Project Officer
Air and Hazardous Materials Division
U. S. Environmental Protection Agency
345 Courtland Street, N.E.
Atlanta, Georgia 30365

RE: One Hour Koritizing
NCD980848667

Dear Mr. Jones:

One-Hour Koritizing on 4404 Roxboro Road in Durham has been added to the ERRIS list. Analysis shows 3.0 ppm in an abandoned sandfilter behind the facility. Of the ten (10) drinking water wells down gradient from the dry cleaner, all show the presence of tetrachloroethylene.

Additional information for ERRIS list addition has been related to EPA 3012 contact Denise Bland.

Sincerely,

Lee Crosby

Lee Crosby, Chemist

Solid & Hazardous Waste Management Branch
Environmental Health Section

LC:jj

17 May 1984

TO: File
FROM: Lee Crosby
RE: One Hour Koritizing
ERRIS List Addition
NCD980848667

Durham County Sanitarian, Will Service (919) 688-1338 called to report that tetrachloroethylene has been detected in soil and sandfilter samples at One-Hour Koritizing (919/477-1243), a dry cleaner located at 4404 Roxboro Road in Durham, N. C. 27704. Prior to 1972 One-Hour Koritizing used well water rather than city water. The current owner, Mr. Cardin has volunteered to excavate. (The dry cleaner is also known as Terry's Martinizing and Koritizing. There are approximately ten locations in Durham).

On-site samples taken from the sandfilter showed 3.0 ppm tetrachloroethane. On-site soil samples showed 56 ppb tetrachloroethane. The occupational health laboratory (John Neal) analyzed the samples.

Seven residential wells also show the presence of tetrachloroethane ranging from 1 ppb. to 4.5 ppm. The closest well showing contamination is 40 feet from One-Hour Koritizing. The furthest well is approximately one-fourth mile from the dry cleaner. Two of the wells are no longer used. Residents are now on city water (hook up is approximately \$1800.) Water samples from other wells will be analyzed.

Soil in the area is clay and retards the movement of tetrachloroethane. Will estimates that the "spill" may have occurred ten years ago.



POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 1 - SITE INFORMATION AND ASSESSMENT

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NC	D980848667

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site) One Hour Koritizing		02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER 4404 Roxboro Road			
03 CITY Durham		04 STATE NC	05 ZIP CODE 27705	06 COUNTY Durham	07 COUNTY CODE 032
09 COORDINATES		08 CONG DIST 02			
LATITUDE 36 03 40.0	LONGITUDE 078 54 15.0				

10 DIRECTIONS TO SITE (Starting from nearest public road)
Travel to Durham on Hwy 70W from Raleigh. Take the 501 N Roxboro Road Exit. One Hour Koritizing is located at 4404 Roxboro Road on the left.

III. RESPONSIBLE PARTIES

01 OWNER (if known) Terry Cardin		02 STREET (Business, mailing, residential) 503 Mason Road, P. O. Box 317			
03 CITY Durham		04 STATE NC	05 ZIP CODE 27702	06 TELEPHONE NUMBER (919) 682-6177 Office	
07 OPERATOR (if known and different from owner)		08 STREET (Business, mailing, residential)			
09 CITY		10 STATE	11 ZIP CODE	12 TELEPHONE NUMBER ()	

13 TYPE OF OWNERSHIP (Check one)
 A. PRIVATE B. FEDERAL: _____ (Agency name) C. STATE D. COUNTY E. MUNICIPAL
 F. OTHER: _____ (Specify) G. UNKNOWN

14 OWNER/OPERATOR NOTIFICATION ON FILE (Check all that apply)
 A. RCRA 3001 DATE RECEIVED: ____/____/____ MONTH DAY YEAR B. UNCONTROLLED WASTE SITE (CERCLA 103 c) DATE RECEIVED: ____/____/____ MONTH DAY YEAR C. NONE

IV. CHARACTERIZATION OF POTENTIAL HAZARD

01 ON SITE INSPECTION BY (Check all that apply)
 YES DATE ____/____/____ MONTH DAY YEAR A. EPA B. EPA CONTRACTOR C. STATE D. OTHER CONTRACTOR
 NO E. LOCAL HEALTH OFFICIAL F. OTHER: _____ (Specify)
 CONTRACTOR NAME(S): _____

02 SITE STATUS (Check one) 03 YEARS OF OPERATION **spill probably occurred**
 A. ACTIVE B. INACTIVE C. UNKNOWN **prior to 1972** UNKNOWN
 BEGINNING YEAR ENDING YEAR

04 DESCRIPTION OF SUBSTANCES POSSIBLY PRESENT, KNOWN, OR ALLEGED
 Durham County Health Department reports 3.0ppm tetrachloroethylene in an abandoned sandfilter at one Hour Koritizing. Water samples show the presence of tetrachloroethane in 9 drinking water wells. Levels range from 1ppb to 4.4ppm

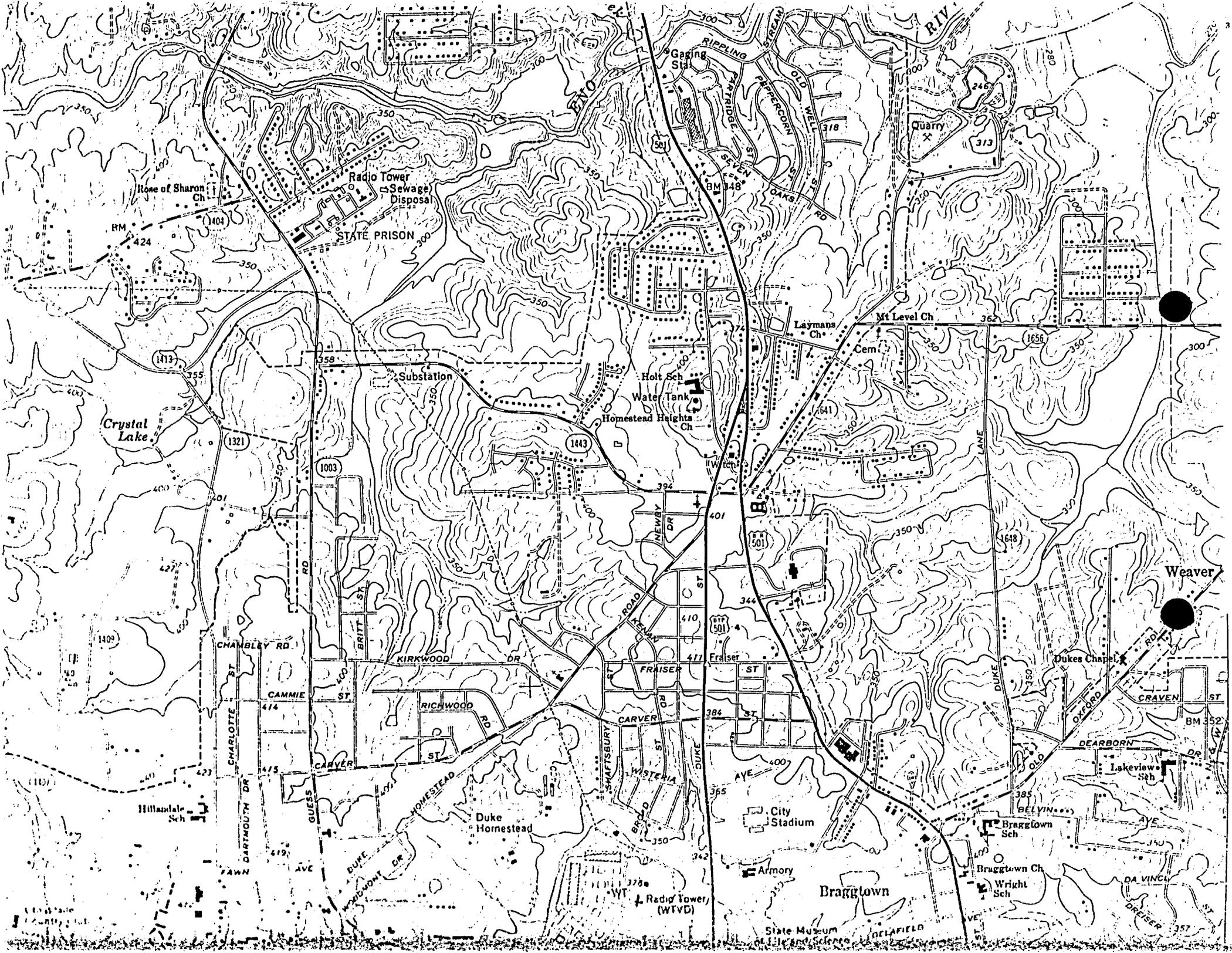
05 DESCRIPTION OF POTENTIAL HAZARD TO ENVIRONMENT AND/OR POPULATION
 According to DHR Toxicologist these levels are well above safe drinking water standards.

V. PRIORITY ASSESSMENT

01 PRIORITY FOR INSPECTION (Check one. If high or medium is checked, complete Part 2 - Waste Information and Part 3 - Description of Hazardous Conditions and Incidents)
 A. HIGH (inspection required promptly) B. MEDIUM (inspection required) C. LOW (inspect on time available basis) D. NONE (No further action needed, complete current disposition form)

VI. INFORMATION AVAILABLE FROM

01 CONTACT William Service		02 OF (Agency/Organization) Durham County Health Dept.		03 TELEPHONE NUMBER (919) 688-1338	
04 PERSON RESPONSIBLE FOR ASSESSMENT O. W. Strickland		05 AGENCY DHR	06 ORGANIZATION Solid & Haz. Waste Mgt. Br.	07 TELEPHONE NUMBER (919) 733-2178	08 DATE 5 17 84 MONTH DAY YEAR



Map Labels:

- Topography:** Contour lines (e.g., 240, 280, 300, 350, 400, 450, 500, 550, 600).
- Water Features:** Crystal Lake, Rippling Stream, Old Mill Creek, Peppercorn Creek, Mt Level Ch, Laymans Ch, Homestead Ch, Holt Sch, Fraiser, Lakeview Sch, Dukes Chapel.
- Infrastructure:** State Prison, Radio Tower, Sewage Disposal, Substation, City Stadium, Armory, State Museum of Life and Science, Braggtown Sch, Wright Sch, Hilldale Sch, Duke Homestead.
- Streets:** US 501, US 1656, Chambley Rd, Kirkwood Dr, Richwood Rd, Carver St, Wisteria St, Duke Ave, Braggtown Ave, Craven St, Dearborn Dr, Da Vinci St, Dreiser St, Charlotte St, Darnouth Dr, Fawn Ave, Britt St, Neway Dr, Shaftsbury Rd, Fraiser St, Carver St, Cammie St, Guess St, Duke Dr, Mount Dr, Oakwood Dr, Belyvin Ave, Braggtown Ave, Craven St, Dearborn Dr, Da Vinci St, Dreiser St.
- Other:** Quarry, Cem, Gaging Sta, BM 348, BM 352, RM 424, RM 404, RM 427, RM 1409, RM 1443, RM 1444, RM 1445, RM 1446, RM 1447, RM 1448, RM 1449, RM 1450, RM 1451, RM 1452, RM 1453, RM 1454, RM 1455, RM 1456, RM 1457, RM 1458, RM 1459, RM 1460, RM 1461, RM 1462, RM 1463, RM 1464, RM 1465, RM 1466, RM 1467, RM 1468, RM 1469, RM 1470, RM 1471, RM 1472, RM 1473, RM 1474, RM 1475, RM 1476, RM 1477, RM 1478, RM 1479, RM 1480, RM 1481, RM 1482, RM 1483, RM 1484, RM 1485, RM 1486, RM 1487, RM 1488, RM 1489, RM 1490, RM 1491, RM 1492, RM 1493, RM 1494, RM 1495, RM 1496, RM 1497, RM 1498, RM 1499, RM 1500.

North Carolina Department of Human Resources
 Division of Health Services
 Occupational Health Laboratory

ANALYSIS REPORT

Company: One Hour Kertizing Area (# 32-00060-1001-5X)
 Address: Ryan Street, Monk STREET, Layman's Chapel Road
 Service Requested: Tetra chloro ethylene
 Sample Taken On: 25 May 1984 By: Lee Crosby
 Submitted To Laboratory On: 25 May 1984 By: Lee Crosby
 Date of Analysis: 5/31/84 - 6/6/84 Date Reported: 6/7/84
 Analyzed By: Anne L. Goble

LABORATORY NUMBER	SAMPLE NUMBER	DESCRIPTION	REMARKS Time	RESULTS IN
112882	001325 -	4420 Ryan St (Babbit)	11:56 am	
112883	001326 -	Creek sample (behind 4425 Ryan)	1:37 pm	
112884	001255 -	CHURCH Well (Monk street)	1:03 pm	
112885	001256 -	301 Monk Street (Ortosky)	12:55 pm	
112886	001257 -	210 Monk Street (Bird)	12:48 pm	
112887	001258	2525 Layman's Chapel (Honeycutt Trailer)	12:38 pm	
112888	001259 -	4616 Roxboro Road (Thompson)	1:20 pm	
112889	001260 -	4417 Ryan Street (Stallings)	1:47 pm	

COMMENTS: SEPTIC TANK
1 ppm dichloroethylene
3 ppm trichloroethylene
33.6 ppm tetrachloroethylene
 ⇒ 0033%
 ⇒ 0297 gal. in a 900 gal tank

REPORTED BY: John R. Neal
 Chief, Occupational Health Lab

DEPT OF HUMAN RESOURCES - DIVISION OF HEALTH SERVICES
 LABORATORY SECTION
 OCCUPATIONAL HEALTH

G C REPORT SHEET

COMPANY: One Hour Koritizing Area

DATE OF ANALYSIS: 6-5-84 / 6-6-84

(#32-00000-1001-5X)

SAMPLE #	ppb								
	Tetrachloro-ethylene		Trichloro-ethylene		Dichloro-ethylene		Chloroform		Dichloro-bromomethane
402882	3.5		<1.0		<1.0		<1.0		<1.0
402883	<1.0		<1.0		<1.0		<1.0		<1.0
402884	<1.0		<1.0		<1.0		<1.0		<1.0
402885	<1.0		<1.0		<1.0		40		<1.0
402886	<1.0		<1.0		<1.0		<1.0		<1.0
02887	83.13		5.17		<1.0		<1.0		<1.0
02888	<1.0		<1.0		<1.0		<1.0		<1.0
02889	<1.0		<1.0		<1.0		100.8		13.48

Health Services
 Laboratory)

North Carolina Department of Human Resources
 Division of Health Services
 Occupational Health Laboratory

ANALYSIS REPORT

Company: One Hour Kertizing Area (# 32-00000-1001-5X)
 Address: Ryan Street, Monk STREET, Layman's Chapel Road
 Service Requested: Tetrachloroethylene
 Sample Taken On: 25 May 1984 By: Lee Crosby
 Submitted To Laboratory On: 25 May 1984 By: Lee Crosby
 Date of Analysis: 5/31/84 - 6/6/84 Date Reported: 6/7/84
 Analyzed By: Anne L. Gottle

LABORATORY NUMBER	SAMPLE NUMBER	DESCRIPTION	REMARKS	RESULTS IN
			Time	
172882	001325 -	4420 Ryan ST (Bobbit)	11:56am	
172883	001326 -	Creek sample (behind 4425 Ryan)	1:37pm	
172884	001255 -	CHURCH Well (Monk street)	1:03pm	
172885	001256 -	301 Monk Street (Ortosky)	12:55pm	
172886	001257 -	210 Monk Street (Bird)	12:48pm	
172887	001258	2525 Layman's Chapel (Honeycutt Trailer)	12:38pm	
172888	001259 -	4616 Roxboro Road (Thompson)	1:20pm	
172889	001260 -	4417 Ryan Street (Stallings)	1:47pm	

COMMENTS:

REPORTED BY: John R. Neal
 Chief, Occupational Health Lab

RESOURCES - DIVISION OF HEALTH SERVICES
 LABORATORY SECTION
 OCCUPATIONAL HEALTH

G C REPORT SHEET

COMPANY: One Hour Koritizing Area

DATE OF ANALYSIS: 6-5-84 / 6-6-84

(#32-00000-1001-5X)

SAMPLE #	ppb								
	Tetrachloro-ethylene		Trichloro-ethylene		Dichloro-ethylene		Chloroform		Dichloro-bromomethane
402882	3.5		<1.0		<1.0		<1.0		<1.0
402883	<1.0		<1.0		<1.0		<1.0		<1.0
402884	<1.0		<1.0		<1.0		<1.0		<1.0
402885	<1.0		<1.0		<1.0		1.0		<1.0
402886	<1.0		<1.0		<1.0		<1.0		<1.0
402887	83.13		5.17		<1.0		<1.0		<1.0
02888	<1.0		<1.0		<1.0		<1.0		<1.0
402889	<1.0		<1.0		<1.0		100.8		13.48

Health Services
 Laboratory)

North Carolina Department of Human Resources
 Division of Health Services
 Occupational Health Laboratory

ANALYSIS REPORT

Company: One Hour Kolorizing Area (# 32-00060-1001-5X)
 Address: Ryan Street, Monk STREET, Layman's Chapel Road
 Service Requested: Tetrachloroethylene
 Sample Taken On: 25 May 1984 By: Lee Crosby
 Submitted To Laboratory On: 25 May 1984 By: Lee Crosby
 Date of Analysis: 5/31/84 - 6/6/84 Date Reported: 6/7/84
 Analyzed By: Anne L. Goble

LABORATORY NUMBER	SAMPLE NUMBER	DESCRIPTION	REMARKS	RESULTS IN
				ppb
			Time	
412882	001325 -	4420 Ryan St (Bobbit)	11:56am	3.5
412883	001326 -	Creek sample (behind 4425 Ryan)	1:37pm	<1.
412884	001255 -	CHURCH Well (Monk street)	1:03pm	<1.
412885	001256 -	301 Monk Street (Ortosky)	12:55pm	<1
412886	001257 -	210 Monk Street (Bird)	12:48pm	<1
412887	001258	(214 Monk aka) (Honeycutt) 2525 Layman's Chapel (Trailer)	12:38pm	83
412888	001259 -	4616 Roxboro Road (Thompson)	1:20pm	<1.
412889	001260 -	4417 Ryan Street (Stallings)	1:47pm	<1.

COMMENTS:

REPORTED BY: John R. Neal
 Chief, Occupational Health Lab

Attachment 17A

DEPARTMENT OF HUMAN RESOURCES - DIVISION OF HEALTH SERVICES
 LABORATORY SECTION
 OCCUPATIONAL HEALTH

G C REPORT SHEET

COMPANY: One Hour Koritizing Area

DATE OF ANALYSIS: 6-5-84 / 6-6-84

(#32-00000-1001-5X)

SAMPLE #	ppb								
	Tetrachloro-ethylene		Trichloro-ethylene		Dichloro-ethylene		Chloroform		Dichloro-bromomethane
402882	3.5		<1.0		<1.0		<1.0		<1.0
402883	<1.0		<1.0		<1.0		<1.0		<1.0
402884	<1.0		<1.0		<1.0		<1.0		<1.0
402885	<1.0		<1.0		<1.0		<1.0		<1.0
402886	<1.0		<1.0		<1.0		<1.0		<1.0
402887	83.13		5.17		<1.0		<1.0		<1.0
402888	<1.0		<1.0		<1.0		<1.0		<1.0
402889	<1.0		<1.0		<1.0		100.8		13.48

FROM THE BARN
TO BIG BUCKS

Women's basketball / page 9

LIFE IS CHEAP IN
THE MIGRANT CAMPS

page 3

JOHN WAYNE
NEEDN'T APPLY

Options / page 16

The North Carolina Independent

VOL. II, NO. 4

Statewide News Biweekly

MARCH 2-15, 1984

Groundwater pollution

Poison spreads as state slumbers

By Ann Morris
© The North Carolina Independent

Every Friday afternoon, Wayne and Betty Stallings load an empty garbage can on the back of their truck, drive across Durham to a friend's house and come home with 30 gallons of water.

They use the water for drinking and cooking, and when their 10-week-old baby needs a bath, Mrs. Stallings heats some in a pot on the stove. There's not enough for washing dishes or showering, so the Stallingses use water from their well, the same well they've used for 10 years.

The problem is that the water in their well is contaminated. Two months ago, the Durham County Health Department discovered a toxic chemical—tetrachloroethylene—in their water, and in the wells of several of their neighbors. Health officials suspect that it came from a nearby dry cleaners, which once used the chemical.

"It just doesn't seem right," Mrs. Stallings says. "We had a perfectly good well, and now we're not even able to drink out of it. It's not our fault."

Stories like the Stallingses' are increasingly common in North Carolina these days, and they may be only the tip of the iceberg.

For years, surface water pollution has been a recognized problem in the state; but pollution of groundwater—the underground water that 60 percent of the state's population drinks—is only now emerging as a major concern.

GROUNDWATER / page 6

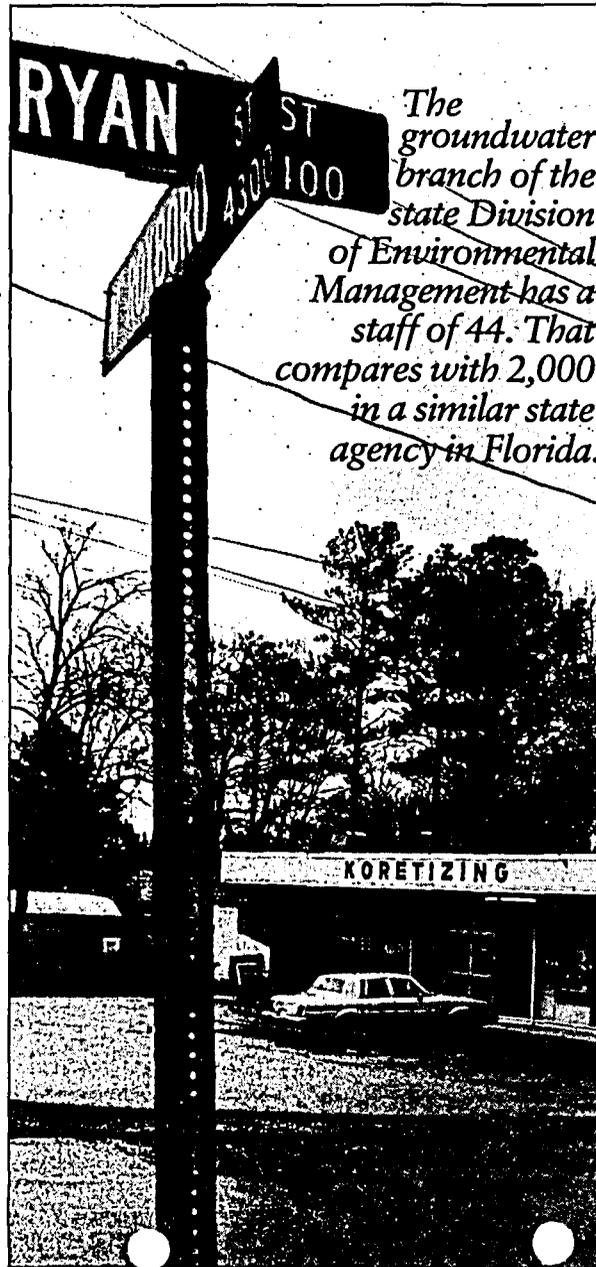


Photo by Alma Blount

The groundwater branch of the state Division of Environmental Management has a staff of 44. That compares with 2,000 in a similar state agency in Florida.

Groundwater

Continued from page 1

Highly industrialized states such as New Jersey and New York have learned the hard way about groundwater contamination. They've dealt with incidents such as the infamous Love Canal, where toxic chemicals contaminated a whole neighborhood.

Nothing like Love Canal has happened in North Carolina, a state still largely rural, and no one has paid much attention to the problem. State government has put its resources into cleaning up the air and surface water, where pollution is easily visible.

And so, as more and more incidents like the Stallingses' occur, there are still more questions than answers about the quality of North Carolina's groundwater. The question of who pays for cleaning it up may be the toughest of all.

For the Stallingses, who live on Ryan Street in North Durham, it's already been tough. While most of their neighbors switched to the city water system as soon as they heard about the contamination, they haven't been able to afford the \$1,000 to hook up to the city system.

They know that exposure to the chemical may cause cancer and liver damage. They're also tired of hauling a trash can full of water every week.

But until the baby gets older and Mrs. Stallings can go back to work, or her husband is hired back on the job he was recently laid off, they won't be able to pay the charges to switch to city water.

Mrs. Stallings doesn't think it's fair: "The city says, in other words, if you don't have the money to hook up, you're just out of luck I guess."

Waiting for bodies?

Groundwater lies anywhere from four to thousands of feet beneath the ground, where it flows slowly in small streams called aquifers. Made up of water from precipitation, streams and lakes that seeps through the soil, groundwater in many places emerges from the ground to mix with surface water.

Normally, groundwater is clean enough to drink: The soil above it filters out natural contaminants—such as the bacteria found in sewage. But when a substance is leaked from an underground tank, there is not enough soil to filter it out before it reaches the groundwater. And soil is no protection against toxic chemicals.

Once groundwater is contaminated, it is very difficult and expensive to clean. The water must be pumped to the surface and run through filters. Because the contamination is invisible, it is hard to be sure that all the water is clean. The contaminants may linger in the soil, and a hard rain can re-contaminate aquifers that have already been cleaned.

How much of North Carolina's groundwater is contaminated?

No one knows. The state simply does not have enough data to size up the problems.

That worries Don Huisingsh, a North Carolina State University professor who recently co-authored a report on the threats to the state's groundwater. Based on information provided by state agencies, the document lists 2,000 toxic pollution sites that are or may be contaminating the groundwater.

His state is behind others in the kind of detailed, on-site ana-

lysis needed to get a handle on the problem," he says. "Other states have always found it to be worse than they thought. I'm afraid when we look here, we'll find more contamination than we expect."

"What do we have to have, a body count, before we go in and check somewhere? If we can allocate \$26 million for a microelectronics center, maybe we can allocate five or 10 or \$15 million to test groundwater."

Huisingsh's report lists several pollution sources that have already contaminated or are threatening the state's groundwater. They include:

- **Abandoned hazardous waste sites.** An imprecise preliminary U.S. Environmental Protection Agency survey lists 627 such North Carolina sites, where toxic chemicals may be leaching down into the groundwater.

- **Sanitary landfills.** There are approximately 150 garbage landfills now operating under the supervision of the N.C. Division of Health Services. There are also an unknown number of abandoned landfills, many of which are unlined and of unknown content, that may also be leaching contaminants into the groundwater.

- **Hazardous and toxic substance spills and leaks.** During 1981, the last year for which data is available, there were 230 spills. Most of these cases were gasoline and fuel-oil truck spills; others were industrial. No one knows how many underground storage tanks there are in North Carolina—the estimated number of buried gasoline and fuel tanks alone is 370,000—and no one knows how many are leaking. There are no statewide requirements for monitoring, tank maintenance or repairs when spills or leaks occur.

- **Surface poundments.** A 1980 state study assessed 657 of the thousands of these pits,

ponds and lagoons which serve as impoundments for industrial, agricultural, mining and municipal wastes. Many of these sites are unlined and unmonitored. At the time of the study, groundwater contamination had already occurred at 28 of these sites, and 197 others showed the potential for severe groundwater pollution.

● **Pesticides.** In the '70s, pesticides were buried in conventional landfills across the state, a procedure now illegal. There are also 350 open dump sites for pesticide containers. Aldicarb, a highly toxic pesticide used for growing tobacco, peanuts, soybeans and other crops, has been detected in the groundwater of several eastern North Carolina counties.

Every county has at least one potential problem site, but some are worse off than others. The Coastal Plain counties in the east are in the most trouble. The water table there is shallow, and the sandy porous soil is a poor filter. Underground aquifers are large and vulnerable to massive contamination. No one knows if there is a large-scale problem in the east, but Huisingh and other experts are urging the state to make it a top priority.

Groundwater in the Piedmont and western counties is deeper and thus better protected, but it is still endangered. A recent study by a water resource specialist at Western Carolina University, for example, found that 70 percent of the wells in Graham, Haywood, Jackson and Macon counties were contaminated by bacteria because of inadequate sewage treatment.

In Durham County, Director of Public Health Dr. John Fletcher says groundwater contamination is one of his primary concerns.

"Right now the only way we find out if groundwater is contaminated is when people bring

it in for a test," he says. "We don't have a monitoring system to pick this up, so we can't tell you the extent of the problem. How severe is it? We have no idea."

But they do know about these incidents: At IBM in the Research Triangle Park, a chemical spill is suspected to cover one square mile and reach a depth of 300 feet. Forgotten underground tanks near Raleigh-Durham Airport have leaked gasoline. Antitermite pesticides contaminated a well used by three families, and county health officials say that leaking septic systems have fouled half the county's wells.

"There are some time bombs out there ticking that are going to blow up on us," says Durham Sanitarian Will Service.

Bad bureaucracy

A large part of the problem, Fletcher and Service agree, is bad bureaucracy. While the county handles all regulation and monitoring of sewage systems, it has no authority over hazardous wastes or toxic chemicals. When there's a spill or leakage of these substances, the state is supposed to take over.

But that's not how it works in practice, they say.

"The state doesn't have enough manpower to do the job," Fletcher says. "There are not enough state people to check out every incident, and certainly not enough to prevent them."

The groundwater branch of the state Division of Environmental Management (DEM) has a staff of 44. That compares with 2,000 in a similar state agency in Florida.

With such meager resources, it's no wonder North Carolina is behind in protecting its groundwater. Now the state is trying to catch up, but the question of staff and funding may well determine how much progress is

made.

In December, the state adopted underground water classifications like those that have long applied to surface water. These new laws give the groundwater branch—for the first time—the power to enforce certain clean-water standards. Now the branch can, for example, hold an industry responsible if it pollutes groundwater that is classified for drinking.

But it takes people to enforce laws.

The groundwater branch is also working on an inventory of groundwater pollution. And they hope to do a study of the state's underground leaking storage tanks. But as yet there is no state money.

DEM's recent \$13.2 million budget request to combat water pollution included no funds for groundwater.

To make matters worse, no one state agency is in charge of the problem. Depending on the contaminant, there are different divisions and even departments within state government involved.

The DEM's groundwater branch, within the Department of Natural Resources and Community Development, comes closest to being in charge, but it has no jurisdiction over solid and hazardous waste—one of the largest threats to groundwater.

That's handled by the Solid and Hazardous Waste Branch of the Division of Health Services—within the Department of Human Resources.

"It's very confusing for an average citizen—or even for me—to figure out who in the state to call," says Durham's Service.

Some areas just fall through the cracks. No state agency regulates hazardous materials, those substances—such as the chemical that contaminated the Stallingses' well—used by compa-

nies in their day-to-day business. Chemicals are regulated by the Solid and Hazardous Waste Branch once they become waste, but not before.

"It's unfortunate, but we don't get involved until it [a contaminant] is already in the ground," says Arthur Mouberry, operations chief of the groundwater branch.

"We can tell you to the exact minute detail where North Carolina's hazardous waste is," says Bill Meyer, an environmental engineer in the Solid and Hazardous Waste Branch, "but for the other 99 percent of toxic chemicals we can't. That's the fallacy—before a spill, these are not regulated."

But even after a spill, there is little or no state money for cleanup. Severe hazardous waste spills may qualify for federal cleanup money, but for smaller problems, the state must turn elsewhere.

If responsibility for the spill can be clearly proven, the state can force the company or individual to pay. But often this doesn't work.

If a company has had many owners over the years, for example, it may be impossible to assign responsibility. Another common headache is an abandoned leaking underground gas tank, where the owner has long since been forgotten.

In such cases, the state tries to work with the county or whoever is willing to clean up the site. But sometimes nothing is done.

The cost of inaction can be high; and right now, much of that cost falls on the victims.

As the Stallingses' neighbor, Paul Jeffries, puts it, "I don't think I should have the choice of paying to tap onto the city system or using polluted water." 

Ann Morris is a staff writer for The Independent.



"What do we have to have, a body count before we go in and check somewhere?"

— Professor Don Huisingh, co-author of groundwater contamination report

STATE LABORATORY OF PUBLIC HEALTH
 DIVISION OF HEALTH SERVICES
 N.C. DEPARTMENT OF HUMAN RESOURCES
 P.O. BOX 28047 - 306 N. WILMINGTON ST., RALEIGH 27611

ORGANIC CHEMICAL ANALYSES - ~~PUBLIC WATER SYSTEM~~

Soil Sample

Complete All Items Above Heavy Line
 (See Instructions on Reverse Side)

1/1/100/4

Name of System: One Hour Keratizing
 Address: Corner Rym + W. Rayboro
Durham, NC ZIP 27704
 County: Durham
 Report To: William Service
 Address: Durham Co. Health Dept.
414 E. Main St., Durham ZIP 27701
 Telephone Number: 1919 688 - 1338
 Collected By: William Service / D. Poe
 Date Collected: 2-15-84 Time: 11:00 ^{AM} _{PM}
 Location of Sampling Point: One Hour Keratizing
 (Address where sample was collected)
 Remarks: Sample # 1

Source of Water:
 Ground Both
 Surface Purchased

Source of Sample:
 Distribution Tap House Tap
 Well Tap

Type of Sample:
 Raw Treated

Type of Treatment:
 None Lime
 Chlorinated Soda Ash
 Fluoridated Polyphosphate
 Filtered Water Softener
 Alum Other

Type of Sample:
 Regular Private
 Check Special

WATER SYSTEM I.D. NUMBER (COPY FROM MAILING LABEL)

□□-□□-□□□

State Drinking Water Parameters (Required)			Optional Parameters (List as needed)		
	Results			Results	
(CHLORINATED HYDROCARBONS:)	Endrin	mg/l	5		
	Lindane	mg/l	4	<u>Tetrachloroethylene</u>	<u>3.06 ppm</u>
	Methoxychlor	mg/l	3		
(CHLOROPHENOXY:)	Toxaphene	mg/l	4		
	2,4-D	mg/l	3		
	2,4,5-TP	mg/l	4		

Date Received 2/16/84 Date Reported 2-22-84 Reported By John R. Neal
 Date Extracted 2/17/84 Date Analyzed 2/20/84 Laboratory Number 1 1012
 Comments: attn: John Neal

ATTACHMENT 16A

STATE LABORATORY OF PUBLIC HEALTH
 DIVISION OF HEALTH SERVICES
 N.C. DEPARTMENT OF HUMAN RESOURCES
 P.O. BOX 28047 - 306 N. WILMINGTON ST., RALEIGH 27611

ORGANIC CHEMICAL ANALYSES - PUBLIC WATER SYSTEM

Complete All Items Above Heavy Line
 (See Instructions on Reverse Side)

Name of System: Nicholson (H-471-8801)
(O-471-3411)

Address: 4429 Ryan St.
Durham, NC ZIP 27704

County: Durham

Report To: William Service

Address: Durham Co. Health Dept.
 ZIP _____

Telephone Number: 1 1688-1338

Collected By: W Service

Date Collected: 5-2-84 Time: 11:10 (AM/PM)

Location of Sampling Point: 4429 Ryan St.
 (Address where sample was collected)

Remarks: Two samples enclosed.

Source of Water:
 Ground () Both
 Surface () Purchased

Source of Sample:
 Distribution Tap () House Tap
 Well Tap

Type of Sample:
 Raw () Treated

Type of Treatment:
 None () Lime
 Chlorinated () Soda Ash
 Fluoridated () Polyphosphate
 Filtered () Water Softener
 Alum () Other

Type of Sample:
 Regular () Private
 Check () Special

WATER SYSTEM I.D. NUMBER (COPY FROM MAILING LABEL)

□ □ - □ □ - □ □ □ □

State Drinking Water Parameters (Required)

Optional Parameters (List as needed)

Results		Results	
(CHLORINATED HYDROCARBONS:)			
Endrin	mg/l	5	
Lindane	mg/l	4	Tetrachloroethylene 0.865 ppm
Methoxychlor	mg/l	3	
Toxaphene	mg/l	4	
(CHLOROPHENOXY:)			
2,4-D	mg/l	3	
2,4,5-TP	mg/l	4	

Date Received 5-4-84 Date Reported 5-17-84 Reported By John L. Neal

Date Extracted _____ Date Analyzed 5-16-84 Laboratory Number 402425

Comments:

402425

STATE LABORATORY OF PUBLIC HEALTH
 DIVISION OF HEALTH SERVICES
 N.C. DEPARTMENT OF HUMAN RESOURCES
 P.O. BOX 28047 - 306 N. WILMINGTON ST., RALEIGH 27611

ORGANIC CHEMICAL ANALYSES - PUBLIC WATER SYSTEM

Complete All Items Above Heavy Line
 (See Instructions on Reverse Side)

4419

Name of System: (~~#4411?~~)
 Address: 4407 Ryan St., 4419
Durham, NC ZIP 27705
 County: Durham
 Report To: William Service
 Address: Durham Co. Health Dept.
414 E. Main St. Durham, NC ZIP 27701
 Telephone Number: 1919 1688 - 1338
 Collected By: William Service
 Date Collected: 1-9-84 Time: 10:00 AM
 Location of Sampling Point: 4407 Ryan St.
 (Address where sample was collected)

Source of Water:
 Ground Both
 Surface Purchased

Source of Sample:
 Distribution Tap House Tap
 Well Tap

Type of Sample:
 Raw Treated

Type of Treatment:
 None Lime
 Chlorinated Soda Ash
 Fluoridated Polyphosphate
 Filtered Water Softener
 Alum Other

Type of Sample:
 Regular Private
 Check Special

WATER SYSTEM I.D. NUMBER (COPY FROM MAILING LABEL)

□ □ - □ □ - □ □ □ □

Remarks:

State Drinking Water Parameters (Required)

Optional Parameters (List as needed)

	Results		Results
(CHLORINATED HYDROCARBONS:)			
Endrin	mg/l	5	
Lindane	mg/l	4	<u>Tetrachloroethylene</u> 1.338 ppm
Methoxychlor	mg/l	3	<u>Trichloroethylene</u> 0.065 ppm
Toxaphene	mg/l	4	<u>Dichloroethylene</u> 0.012 ppm
(CHLOROPHENOXY:)			
2,4-D	mg/l	3	
2,4,5-TP	mg/l	4	

Date Received 1-9-84 Date Reported 1-11-84 Reported By John H. Neal

Date Extracted 1-10-84 Date Analyzed 1-10-84 Laboratory Number 100167

Comments:

#400167

#400165 - 400168

STATE LABORATORY OF PUBLIC HEALTH
DIVISION OF HEALTH SERVICES
N.C. DEPARTMENT OF HUMAN RESOURCES
P.O. BOX 28047 - 306 N. WILMINGTON ST., RALEIGH 27611

ORGANIC CHEMICAL ANALYSES - PUBLIC WATER SYSTEM

Complete All Items Above Heavy Line
(See Instructions on Reverse Side)

4/12/10/2

Name of System: _____

Address: 4422 Ryan St.
Durham, NC ZIP 27705

County: Durham

Report To: William Service

Address: Durham Co. Health Dept.
414 E. Main St., Durham NC ZIP 27701

Telephone Number: 19191688 - 1338

Collected By: William Service

Date Collected: 1-9-84 Time: 10:00 (AM/PM)

Location of Sampling Point: 4422 Ryan St.
(Address where sample was collected)

Remarks: _____

Source of Water:
 Ground Both
 Surface Purchased

Source of Sample:
 Distribution Tap House Tap
 Well Tap

Type of Sample:
 Raw Treated

Type of Treatment:
 None Lime
 Chlorinated Soda Ash
 Fluoridated Polyphosphate
 Filtered Water Softener
 Alum Other

Type of Sample:
 Regular Private
 Check Special

WATER SYSTEM I.D. NUMBER (COPY FROM MAILING LABEL)

□ □ - □ □ - □ □ □

State Drinking Water Parameters (Required)

Optional Parameters (List as needed)

Results			Results		
(CHLORINATED HYDROCARBONS:)					
Endrin	mg/l	5			
Lindane	mg/l	4	Tetrachloroethylene	0.002 ppm	
Methoxychlor	mg/l	3	Dichloroethylene	N.D.	
Toxaphene	mg/l	4	Trichloroethylene	N.D.	
(CHLOROPHENOXY:)					
2,4-D	mg/l	3			
2,4,5-TP	mg/l	4			

Date Received 1-10-84 Date Reported 1-12-84 Reported By Am A. Neal

Date Extracted 1-11-84 Date Analyzed 1-11-84 Laboratory Number 100165

Comments: _____

#400165

#40016

STATE LABORATORY OF PUBLIC HEALTH
DIVISION OF HEALTH SERVICES
N.C. DEPARTMENT OF HUMAN RESOURCES
P.O. BOX 28047 - 306 N. WILMINGTON ST., RALEIGH 27611

ORGANIC CHEMICAL ANALYSES - PUBLIC WATER SYSTEM

Complete All Items Above Heavy Line
(See Instructions on Reverse Side)

Name of System: _____

Address: 4424 Ryan St.
Durham, NC ZIP 27705

County: Durham

Report To: William Service

Address: Durham Co. Health Dept.
414 E. Main St., Durham NC ZIP 27701

Telephone Number: 1919 688 - 1338

Collected By: William Service

Date Collected: 1-9-84 Time: 10:20 ^{AM} _{PM}

Location of Sampling Point: 4424 Ryan St.
(Address where sample was collected)

Remarks: _____

Source of Water:
 Ground () Both
 Surface () Purchased

Source of Sample:
 Distribution Tap () House Tap
 Well Tap

Type of Sample:
 Raw () Treated

Type of Treatment:
 None () Lime
 Chlorinated () Soda Ash
 Fluoridated () Polyphosphate
 Filtered () Water Softener
 Alum () Other

Type of Sample:
 Regular () Private
 Check () Special

WATER SYSTEM I.D. NUMBER (COPY FROM MAILING LABEL)

□ □ - □ □ - □ □ □

State Drinking Water Parameters (Required)			Optional Parameters (List as needed)		
	Results			Results	
(CHLORINATED HYDROCARBONS:)	Endrin	mg/l	5		
	Lindane	mg/l	4	Tetrachloroethylene	0.005 ppm
	Methoxychlor	mg/l	3	Asol	
(CHLOROPHENOXY:)	Toxaphene	mg/l	4	Dichloroethylene	N.D.
	2,4-D	mg/l	3	Trichloroethylene	N.D.
	2,4,5-TP	mg/l	4		

Date Received 1-9-84 Date Reported 1-11-84 Reported By J.M. A. Neal

Date Extracted 1-10-84 Date Analyzed 1-10-84 Laboratory Number 100168

STATE LABORATORY OF PUBLIC HEALTH
 DIVISION OF HEALTH SERVICES
 N.C. DEPARTMENT OF HUMAN RESOURCES
 P.O. BOX 28047 - 306 N. WILMINGTON ST., RALEIGH 27611

ORGANIC CHEMICAL ANALYSES - PUBLIC WATER SYSTEM

Complete All Items Above Heavy Line
 (See Instructions on Reverse Side)

Name of System: Harden (477-2669)

Address: 4514 Ryan St.
Durham, NC ZIP 27704

County: Durham

Report To: William Service

Address: Durham Co. Health Dept.
414 E. Main St., Durham ZIP 27701

Telephone Number: (919) 688-1338

Collected By: William Service

Date Collected: 5-2-84 Time: 11:00 AM
PM

Location of Sampling Point: 4514 Ryan
 (Address where sample was collected)

Remarks: 2 samples collected as requested

Source of Water:
 Ground Both
 Surface Purchased

Source of Sample:
 Distribution Tap House Tap
 Well Tap

Type of Sample:
 Raw Treated

Type of Treatment:
 None Lime
 Chlorinated Soda Ash
 Fluoridated Polyphosphate
 Filtered Water Softener
 Alum Other

Type of Sample:
 Regular Private
 Check Special

WATER SYSTEM I.D. NUMBER (COPY FROM MAILING LABEL)

□ □ - □ □ - □ □ □

State Drinking Water Parameters (Required)

Optional Parameters (List as needed)

	Results		Results
(CHLORINATED HYDROCARBONS:)			
Endrin	mg/l	5	
Lindane	mg/l	4	<u>Tetrachloroethylene</u> <u>0.849 ppm</u>
Methoxychlor	mg/l	3	
(CHLOROPHENOXY:)			
Toxaphene	mg/l	4	
2,4-D	mg/l	3	
2,4,5-TP	mg/l	4	

Date Received 5-4-84 Date Reported 5-17-84 Reported By John H. Neal

Date Extracted _____ Date Analyzed 5-15/16-84 Laboratory Number 402424

Comments:

#402424

STATE LABORATORY OF PUBLIC HEALTH
 DIVISION OF HEALTH SERVICES
 N.C. DEPARTMENT OF HUMAN RESOURCES
 P.O. BOX 28047 - 306 N. WILMINGTON ST., RALEIGH 27611

ORGANIC CHEMICAL ANALYSES - PUBLIC WATER SYSTEM

Complete All Items Above Heavy Line
 (See Instructions on Reverse Side)

Name of System: Family Dentistry
 Address: 4405 Ryan St.
Durham, NC ZIP 27705
 County: Durham
 Report To: William Service
 Address: Durham Co. Health Dept.
414 E. Main St., Durham NC ZIP 27701
 Telephone Number: 8191688 -1338
 Collected By: William Service
 Date Collected: 1-9-83 Time: 10:00 AM
 Location of Sampling Point: _____
 (Address where sample was collected)

Source of Water:
 Ground Both
 Surface Purchased

Source of Sample:
 Distribution Tap House Tap
 Well Tap

Type of Sample:
 Raw Treated

Type of Treatment:
 None Lime
 Chlorinated Soda Ash
 Fluoridated Polyphosphate
 Filtered Water Softener
 Alum Other

Type of Sample:
 Regular Private
 Check Special

WATER SYSTEM I.D. NUMBER (COPY FROM MAILING LABEL)

□ □ - □ □ - □ □ □ □

Remarks:

State Drinking Water Parameters (Required)

Optional Parameters (List as needed)

Results		Results	
(CHLORINATED HYDROCARBONS:)			
Endrin	mg/l	5	
Lindane	mg/l	4	Tetrachloroethylene 1.504 ppm
Methoxychlor	mg/l	3	Dichloroethylene 0.117 ppm
Toxaphene	mg/l	4	Trichloroethylene 0.198 ppm
(CHLOROPHENOXY:)			
2,4-D	mg/l	3	
2,4,5-TP	mg/l	4	

Date Received 1-9-84 Date Reported 1-11-84 Reported By Alm L. Neal

Date Extracted 1-10-84 Date Analyzed 1-10-84 Laboratory Number 100166

Comments:

#400166

STATE LABORATORY OF PUBLIC HEALTH
 DIVISION OF HEALTH SERVICES
 N.C. DEPARTMENT OF HUMAN RESOURCES
 P.O. BOX 28047 - 306 N. WILMINGTON ST., RALEIGH 27611

ORGANIC CHEMICAL ANALYSES - PUBLIC WATER SYSTEM

Complete All Items Above Heavy Line
 (See Instructions on Reverse Side)

Name of System: Michael Koron

Address: 4501 Laymons Chapel Rd.
Durham, NC ZIP 27704

County: Durham

Report To: William Service

Address: Durham Co. Health Dept.
 ZIP _____

Telephone Number: 19191688 - 1338

Collected By: W. Service

Date Collected: 5-2-84 Time: 11:20 AM
PM

Location of Sampling Point: 4501 Laymons Chapel
 (Address where sample was collected)

Remarks: Two samples enclosed

Source of Water:

Ground Both

Surface Purchased

Source of Sample:

Distribution Tap House Tap

Well Tap Well Tap

Type of Sample:

Raw Treated

Type of Treatment:

None Lime

Chlorinated Soda Ash

Fluoridated Polyphosphate

Filtered Water Softener

Alum Other

Type of Sample:

Regular Private

Check Special

WATER SYSTEM I.D. NUMBER (COPY FROM MAILING LABEL)

□ □ - □ □ - □ □ □

State Drinking Water Parameters (Required)

Optional Parameters (List as needed)

Results

Results

(CHLORINATED HYDROCARBONS:)		mg/l	5	(CHLOROPHENOXY:)	
Endrin		mg/l	5	<u>Tetrachloroethylene</u> <u>None Detected</u> <u>(< 10ppb)</u>	
Lindane		mg/l	4		
Methoxychlor		mg/l	3		
Toxaphene		mg/l	4		
(CHLOROPHENOXY:)					
2,4-D		mg/l	3		
2,4,5-TP		mg/l	4		

Date Received 5-4-84 Date Reported 5-17-84 Reported By John R. Neal

Date Extracted _____ Date Analyzed 5-16-84 Laboratory Number 152126

Comments: #402426

STATE LABORATORY OF PUBLIC HEALTH
 DIVISION OF HEALTH SERVICES
 N.C. DEPARTMENT OF HUMAN RESOURCES
 P.O. BOX 28047 - 306 N. WILMINGTON ST., RALEIGH 27611

ORGANIC CHEMICAL ANALYSES - PUBLIC WATER SYSTEM

Complete All Items Above Heavy Line
 (See Instructions on Reverse Side)

1/3/84

Name of System: Oakby

Address: 4404 Ryan St.
Durham, NC ZIP 27704

County: Durham

Report To: William Service

Address: Durham Co. Health Dept.
414 E. Main St., Durham NC ZIP 27701

Telephone Number: 919 688-1338

Collected By: William Service

Date Collected: 1-12-84 Time: 4:00 AM
PM

Location of Sampling Point: 4404 Ryan St.
 (Address where sample was collected)

Remarks:

Source of Water:
 Ground Both
 Surface Purchased

Source of Sample:
 Distribution Tap House Tap
 Well Tap

Type of Sample:
 Raw Treated

Type of Treatment:
 None Lime
 Chlorinated Soda Ash
 Fluoridated Polyphosphat
 Filtered Water Softener
 Alum Other

Type of Sample:
 Regular Private
 Check Special

WATER SYSTEM I.D. NUMBER (COPY FROM MAILING LABEL)

- -

State Drinking Water Parameters (Required)				Optional Parameters (List as needed)			
		Results				Results	
(CHLORINATED HYDROCARBONS:)							
Endrin		mg/l	5	Tetrachloroethylene		<10 ppb	} None Detected
Lindane		mg/l	4	Trichloroethylene		<10 ppb	
Methoxychlor		mg/l	3	Dichloroethylene		<10 ppb	
(CHLOROPHENOXY S:)							
Toxaphene		mg/l	4				
2,4-D		mg/l	3				
2,4,5-TP		mg/l	4				

Date Received 1-16-84 Date Reported 1-16-84 Reported By J. R. Neal

Date Extracted 1-16-84 Date Analyzed 1-16-84 Laboratory Number 400344

Comments: #400344

STATE LABORATORY OF PUBLIC HEALTH
 DIVISION OF HEALTH SERVICES
 N.C. DEPARTMENT OF HUMAN RESOURCES
 P.O. BOX 28047 - 306 N. WILMINGTON ST., RALEIGH 27611

ORGANIC CHEMICAL ANALYSES - Petroleum Prod.

Complete All Items Above Heavy Line
 (See Instructions on Reverse Side)

11/10/2

Name of System: Buncke
4411
~~4417~~ Ryan St

Address: Durham NC
 ZIP 27704

County: Durham

Report To: Phil Woodell

Address: 414 E Main St
Durham NC ZIP 27701

Telephone Number: 1919 688 - 1338

Collected By: Same

Date Collected: 12-13-83 Time: 2:30 ~~PM~~ AM

Location of Sampling Point: _____
 (Address where sample was collected)

Source of Water:
 Ground () Both
 Surface () Purchased

Source of Sample:
 Distribution Tap () House Tap
 Well Tap

Type of Sample:
 Raw () Treated

Type of Treatment:
 None () Lime
 Chlorinated () Soda Ash
 Fluoridated () Polyphosphate
 Filtered () Water Softener
 Alum () Other

Type of Sample:
 Regular () Private
 Check () Special

Remarks:

WATER SYSTEM I.D. NUMBER (COPY FROM MAILING LABEL)
 □ □ - □ □ - □ □ □ □

State Drinking Water Parameters (Required)			Optional Parameters (List as needed)		
	Results			Results	
(CHLORINATED HYDROCARBONS:)	Endrin	mg/l	5	Tetrachloroethylene	4.4 mg/l
	Lindane	mg/l	4		
	Methoxychlor	mg/l	3		
	Toxaphene	mg/l	4		
(CHLOROPHENOXY:)	2,4-D	mg/l	3		
	2,4,5-TP	mg/l	4		

Date Received 12/14/83 Date Reported 12-16-83 Reported By Anne L. Hobble

Date Extracted 12-15-83 Date Analyzed 12-15-83 Laboratory Number 307201

Comments:

#307201

February 6, 1980

SNARL for Tetrachloroethylene
Office of Drinking Water
U.S. Environmental Protection Agency
Washington, D.C. 20460

THE OFFICE OF DRINKING WATER "SNARL" PROGRAM

The Office of Drinking Water provides advice on health effects upon request, concerning unregulated contaminants found in drinking water supplies. This information suggests the level of a contaminant in drinking water at which adverse health effects would not be anticipated with a margin of safety; it is called a SNARL (suggested no adverse response level). Normally values are provided for one-day, 10-day and longer-term exposure periods where available data exist. A SNARL does not condone the presence of a contaminant in drinking water, but rather provides useful information to assist in the setting of control priorities in cases when they have been found.

In the absence of a formal drinking water standard for tetrachloroethylene, the Office of Drinking Water has estimated a suggested no adverse response level (SNARL) following the stress-of-dose-rate concepts in toxicology for non-carcinogenic risk for short and long term exposures. For carcinogenic risk, a range of risk estimates is provided for lifetime exposures using a model and computations from the NAS Report (1979) entitled "Toxicity of Selected Drinking Water Contaminants." However, SNARLs are given on a case-by-case basis in emergency situations such as spills and accidents. The SNARL calculations for short-term and chronic exposures ignore the possible carcinogenic risk that may result from those exposures. In addition, SNARLs usually do not consider the health risk resulting from possible synergistic effects of other chemicals in drinking water, food and air.

SNARLs are not legally enforceable standards; they are not issued as an official regulation, and they may or may not lead ultimately to the issuance of a national standard on Maximum Contamination Level (MCL). The latter must take into account occurrence, relative source contribution factors, treatment technology, monitoring capability, and costs, in addition to health effects. It is quite conceivable that the concentration set for SNARL purposes might differ from an eventual MCL. The SNARLs may also change as additional information becomes available. In short SNARLs are offered as advice to assist those that are dealing with specific contamination situations to protect public health.

General Information and Health Effects

Substantial quantities of tetrachloroethylene are being produced (700 million pounds in the U.S. in 1973). Tetrachloroethylene (perchloroethylene) is used as a dry cleaning and degreasing solvent, heat-transfer medium, and in the manufacture of fluorocarbons. This chemical is slightly soluble in water (0.01% by volume).

Little work has been done to delineate the uptake, distribution, metabolism and excretion patterns following oral exposures to tetrachloroethylene. For our purposes, an assumption is being made that 10% is absorbed via respiration and almost 100% via the gastrointestinal tract, as has been shown for trichloroethylene. Only a small fraction of tetrachloroethylene is metabolized to trichloroacetic acid and/or trichloroethanol. The urinary half-life of tetrachloroethylene is markedly longer (144 hours) than that of trichloroethylene indicating some level of bioaccumulation.

Tetrachloroethylene, like other halogenated hydrocarbons at high doses, has been reported to produce liver and kidney damage and central nervous system disturbances in mammals, including humans. In addition, tetrachloroethylene has been demonstrated to lower the DNA and RNA contents of several organ systems of rats. High concentrations of this chemical result in growth inhibition and mortality as demonstrated in animal inhalation studies.

Investigations of chronic toxicity of tetrachloroethylene in animals have all involved inhalation exposures, with the exception of an assessment of carcinogenesis which involved oral dosing (NCI, 1977). The National Cancer Institute has reported tetrachloroethylene-induced hepatocellular carcinomas in male and female mice, but not in male or female rats.

Schwartz *et al.* (1975) reported that tetrachloroethylene was not teratogenic to rats and Swiss Webster mice after inhalation exposures of 300 ppm for seven hours per day on days six-15 of gestation. Careful examination of their data, however, indicates that there were a number of modest but statistically significant deviations of adverse health effect parameters from control animals, including increased body maternal weights, decreased body weight of mouse fetuses, increased fetal resorptions and increased incidence of split

sternbraes, subcutaneous edema and delayed ossification of skull bones in mouse fetuses. Shunacher et al. (1962) exposed three week old mice for eight hours/day, three days each to 200, 400, 800 and 1600 ppm perchloroethylene. The exposures produced significant mortality and growth inhibition in survivors.

Tetrachloroethylene SNARL

Tetrachloroethylene is a carcinogen in mice, and also causes non-carcinogenic bioeffects at high doses. One-day, 10-day and chronic SNARL values based on non-carcinogenic bioeffects are computed incorporating appropriate factors of safety. Estimates of concentrations projected to increase the lifetime cancer risk by one in 100,000 and one in a 1,000,000 are also provided using the NIS model. The non-carcinogenic SNARL recommendations are made considering the child and other sensitive members of the population.

A one-day SNARL of 2.3 ug/l can be calculated using a study by Xylia (1963). In this study mice were exposed to 200 ppm tetrachloroethylene in air for a period of four hours. Histological examinations of the liver demonstrated fatty infiltration but not cellular necrosis. Even though the exposure levels ranged from 200 to 1600 ppm tetrachloroethylene, the no-adverse-effect level was not established.

Using the method by Olsen and Gehring (1976) whereby the lung/whole body ratios for humans and animals are assumed to be roughly equivalent, the total exposure of 200 ppm (1358 ug/m³) for four hours via inhalation, could be used to determine the one-day SNARL:

$$\frac{(1358 \text{ ug/m}^3)(4 \text{ m}^3/\text{day})(0.30)}{(1 \text{ l/day})(100 \text{ uncertainty factor})(7)} = 2.3 \text{ ug/l}$$

Where:
1/7 = child/adult body weight ratio
0.30 = absorption factor
1 l/day = child's daily water consumption
100 uncertainty factor because of animal experiments
1358 ug/m³ = (200 ppm)(6.79 conversion factor)
4m³ = according to Olsen and Gehring whereby the lung-whole body ratios for humans (adults) and rats (adults) are assigned to be roughly equivalent

An uncertainty factor of 100 was chosen rather than 1,000 even though the SNARL is based upon an animal experiment in which the no-observed-effect level was not identified. It

exposed to tetrachloroethylene in a dry cleaning establishment (Anonymous, 1978). The mother's milk contained perchloroethylene levels up to one mg/l. The child's symptoms vanished when breast feeding was discontinued.

Longer-Term SNARE:

A longer-term SNARE of 20 ug/l (rounded from the computation) can be estimated from a study by Havrotskii et al. (1971). The authors reported increased urinary urobilinogen and pathological changes in the parenchyma of the liver and kidneys of rabbits after inhalation exposure to 100 ug/m³ perchloroethylene for three to four hours/day for seven to 11 months. The calculations for a longer-term SNARE are:

$$\frac{(100 \text{ ug/m}^3)(4 \text{ m}^3/\text{day})(0.30)}{(1 \text{ l/day})(1000 \text{ uncertainty factor})(7)} = 0.017 \text{ ug/l}$$

Where: 100 ug/m³ = observed effect level.
 4m³ = according to Cisen and Gehring whereby the lung-whole body ratio for humans (adults) and rats (adults) are assumed to be roughly equivalent
 0.30 = absorption factor
 1 l/day = child's consumption of drinking water
 1/7 = child/adult body weight ratio.
 1000 = uncertainty factor due to animal study where health effect was observed

Since tetrachloroethylene is considered a carcinogen, at least for mice, and using the risk estimates generated by the National Academy of Sciences (NAS), it is possible to identify that range of tetrachloroethylene concentrations that would increase the risk of one excess cancer per 10⁶ or 10⁵ people exposed over a lifetime. From the NAS model it is estimated that consuming 2 l/day over a lifetime having a tetrachloroethylene concentration of 3.5 ug/l or 35 ug/l would increase the risk by one excess cancer/million exposed or one excess cancer/100,000 exposed, respectively. This is the range of risks where many EPA regulatory values for other carcinogens have been.

These risk extrapolations were based on an assumption that there is no threshold effect level for carcinogens. The state-of-the-art at the present time is such that no experimental tools can accurately define the absolute numbers of excess cancer deaths attributable to tetrachloroethylene in drinking water. Due to biological variability and the number of assumptions required, each of the risk estimating procedures leads to a different value. There is wide variation between these estimates and also in their interpretation. For this

was felt that the index of toxicity, namely fatty infiltration of the liver, is a delicate disorder in itself which is reversible and not life-threatening after a short exposure, therefore an additional margin of safety was not warranted.

The National Academy of Sciences (NAS, 1979) has computed a one-day SNARE of 172 ug/l and 24.5 ug/l for the seven-day SNARE. Calculations used by the NAS to determine a one-day SNARE were based on hepatotoxicity at a dose level of 490 ug/kg body weight given intraperitoneally to the animals. The calculations were made for a 70 kg man and the drinking water was considered to be the sole source of exposure. The seven-day NAS SNARE was calculated by dividing the one-day SNARE value by the appropriate number of days.

The NAS chose to work with data in animals given intraperitoneal injections. The Office of Drinking Water selected an inhalation study in animals for extrapolation of the SNARE and calculated the SNARE for the 10 kg child. Animal studies and a human case history suggest that, in this case, children appear to be a sensitive population which needs to be protected from the adverse health effects.

The Office of Drinking Water 10-day SNARE was calculated using an inhalation study by Savolainen, et al. (1977) in which inhalation exposures of adult male rats to 200 ppm of tetrachloroethylene six hours daily for five days caused diminished brain RNA content. The 10-day SNARE of 175 ug/l was thus determined:

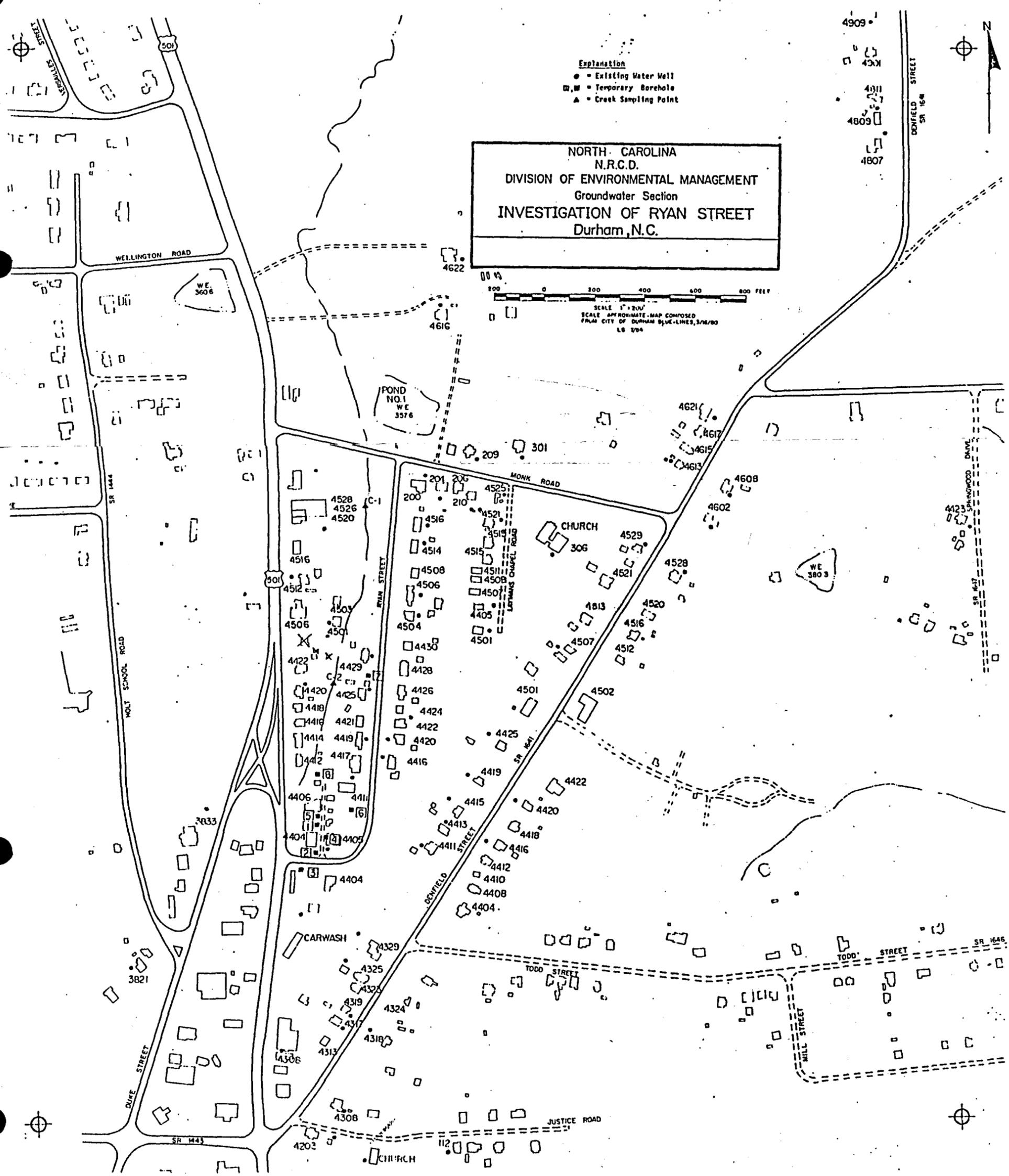
$$\frac{(1353 \text{ ug/m}^3)(6 \text{ m}^3)(0.30)(1)(1)}{(1 \text{ l/day})(1000)} = 175 \text{ ug/l}$$

- where: 1353 ug/m³ = (200 ppm)(6.79 conversion factor)
- 6 m³ = according to Olsen and Gehring whereby the lung-whole body ratio for humans (adults) and rats (adults) are assumed to be roughly equivalent
- 0.30 = absorption factor
- 1 l/day = Child's daily consumption of drinking water
- 1000 = uncertainty factor due to animal experiment where the no-observed-effect level was not identified
- 1/7 = child/adult body weight ratio
- 1/2 = factor to provide for equivalent toxicity on day 10 as noted on day five

As a matter of interest "Medical World News" contained a report of a six week old baby with jaundice and an enlarged liver; the baby was breast fed by a mother who was frequently

reason we report the results of the NRS risk computations, which is a conservative approach, as a range of values from one in 100,000 to one in 1,000,000 incremental risk (risk above background) for a carcinogen. The NRS risk estimates are based on the multistage model concept. "At low dose, the multistage model is often mathematically equivalent to the linear or single hit model. Therefore, its use for extrapolation is consistent with the conservative linear risk estimation. If the precise mechanism of carcinogenesis is represented by a threshold or log-normal dose response relationship, the multistage model may considerably overestimate the risk at low dose levels. However, this possibility cannot be reasonably quantified" (NRS-1979).

In summary, the one-day, ten-day and longer-term SWAEL values for tetrachloroethylene are 2100 ug/l, 175 ug/l and 20 ug/l, respectively, if drinking water is the only source of exposure. The concentrations resulting in a lifetime risk of 10^{-6} and 10^{-5} are 3.5 ug/l and 35 ug/l, respectively, if the contaminated drinking water was consumed over a lifetime. The longer-term SWAEL of 20 ug/l tetrachloroethylene in drinking water may result in excess cancer risk of approximately six in one million, if the exposure was for a lifetime (70 years).



- Explanation**
- Existing Water Well
 - Temporary Borehole
 - ▲ Creek Sampling Point

NORTH CAROLINA
 N.R.C.D.
 DIVISION OF ENVIRONMENTAL MANAGEMENT
 Groundwater Section
INVESTIGATION OF RYAN STREET
 Durham, N.C.

0 200 400 600 800 FEET
 SCALE 1" = 200'
 SCALE APPROXIMATE - MAP COMPOSED
 FROM CITY OF DURHAM BLUE-LINES, 3/16/80
 LS 2784

POND NO. 1
WE 3376

CHURCH
306

CARWASH

CHURCH

4909
4300
4311
4809
4807

4423
SR 1647

WE 3803

SR 1646

WELLINGTON ROAD

MOLT SCHOOL ROAD

DUKE STREET

SR 1443

RYAN STREET

DEWFIELD STREET

MONK ROAD

TODD STREET

JUSTICE ROAD

DEWFIELD STREET
SR 1644

SHANNWOOD DRIVE
SR 1647

TODD STREET

HILL STREET

PRT2173602 4400 N ROXBOR T
NAME: THE M C E CO INC
ADDR: P O BOX 317
DURHAM NC 27702

DESC: RR CODE: 57475
SS # 00-00-0000 LST-CHG-BY: HRE
DOB: 6/00/00 LST-CHG: 8/01/83
ON/DT: 10/29/73 STATUS: ACTIVE
PHONE: 000-000-0000

RATE: INSIDE 1 STAT1: ACTIVE 1 STAT3: BILLED: 1 BOD RATE: 298
TYPE: COMMERCL 2 STAT2: REG-BILL 0 STAT4: OK 1 SS RATE: 191
WTR %: SEW %: CTY-LEAK:

* * M E T E R I N F O R M A T I O N * *

DIALS: 1-DIAL STATUS: OK 0 DIAL PRES RD PREV RD PRES CN PREV CN
TYPE: ROCKWELL 4 READ: 5/03/84 1 29 28 1 1
NUMBR: 1385492
INSTL: 10/73
SIZE: 5/8 IN 1
UNITS: 000 IN/OUT: IN-CITY 1 PLANT: END 5
CONS 2: 1 CONS 3: 1
SIC CODE-1: 7212 SIC CODE-2:

***** BILLING INFORMATION *****

CUR CHG: 5.09 PAYMENTS: .00
PAST DUE: .00 DEBITS: .00
BOD CHG: .03 CREDITS: .00
SS CHG: .00 BALANCE: 5.12
TOTAL BILL: 5.12
CREDIT RATING: 0011001001000000

***** DEPOSIT INFORMATION *****

DEPOSIT
CHRG: .00 DATED 5/16/79
PAID: .00 DATED 5/16/79
BALANCE: .00

WATER AND SEWER ENGINEERING DIVISION
DEPARTMENT OF PUBLIC WORKS
CITY OF DURHAM
APPLICATION FOR WATER AND SEWER SERVICE

DATE June 28, 1972 SERVICE NUMBER 10244 APPL. NO. 650
 SERVICE NUMBER 10245

LOCATION 4400 & 4402 Roxboro Road

APPLICANT'S NAME Ed Clemments

SERVICE:	<u>COST</u>	<u>CREDIT</u>
<input type="checkbox"/> 3/4" X 5/8" Water Connection	_____	_____
<input type="checkbox"/> 5/8" Meter	_____	_____
x- <input checked="" type="checkbox"/> 4" Sewer Connection	<u>\$380.00</u>	<u>39705</u>
<input type="checkbox"/> Paving Cuts - Water _____ Sewer _____	_____	_____
<input type="checkbox"/> Other <u>Frontage Charge</u>	<u>\$350.00</u>	<u>69902</u>
TOTAL	_____	_____

BILLING ADDRESS _____
 METER NUMBER _____ REMARKS _____
 ACCOUNT NUMBER _____

FRONTAGE POLICY
REFUNDS & EXTENSIONS

	<u>WATER</u>	<u>SEWER</u>	<u>CREDIT</u>
EXTENSION PAYMENT	\$ _____	\$ _____	_____
REFUND PAYMENT	\$ _____	\$ _____	_____
REFUND TO <u>City of Durham</u>	\$ _____	\$ <u>350.00</u>	_____
	\$ _____	\$ _____	_____

BLDG. INSP. APPROVAL _____

SIGNATURE J.M. Cable
 DATE 6-28=72

Ed Clements

*Cards sent
6-28-72*

*City sheet
typed 6-28-72*

CITY OF DURHAM, N. C.
Water & Sewer Engineering Div.

Terms: Net Cash

2 - 4" Sewer Connections

\$380.00

CR: 39705

Sewer Frontage Charge

\$350.00

CR: ~~32~~ 69902

W 0 1 5 3 3 JUN 29 72 TOTAL 730.00

4400 & 4402 Roxboro Road

W 0 1 5 3 3 JUN 29 72 TOTAL 730.00

installed 7/7/72

541-4577
Reborah Jones
PO4

Occupational Health Guideline for Tetrachloroethylene*

INTRODUCTION

This guideline is intended as a source of information for employees, employers, physicians, industrial hygienists, and other occupational health professionals who may have a need for such information. It does not attempt to present all data; rather, it presents pertinent information and data in summary form.

SUBSTANCE IDENTIFICATION

- Formula: $CCl_2 = CCl_2$
- Synonyms: Perchloroethylene; perchlorethylene; tetrachlorethylene; perk
- Appearance and odor: Colorless liquid with an odor like chloroform or ether.

PERMISSIBLE EXPOSURE LIMIT (PEL)

The current OSHA standard for tetrachloroethylene is 100 parts of tetrachloroethylene per million parts of air (ppm) averaged over an eight-hour work shift, with a ceiling level of 200 ppm and a maximum acceptable peak of 300 ppm for 5 minutes in any three-hour period. NIOSH has recommended that the permissible exposure limit be reduced to 50 ppm (339 mg/m³) averaged over a work shift of up to 10 hours per day, 40 hours per week, with a ceiling level of 100 ppm (678 mg/m³) averaged over a 15-minute period. The NIOSH Criteria Document for Tetrachloroethylene should be consulted for more detailed information.

HEALTH HAZARD INFORMATION

- Routes of exposure
Tetrachloroethylene can affect the body if it is inhaled or if it comes in contact with the eyes or skin. It can also affect the body if it is swallowed.
- Effects of overexposure
1. Short-term Exposure: Tetrachloroethylene may cause headache, nausea, drowsiness, dizziness, incoordination, and unconsciousness. It may also cause irritation of

the eyes, nose, and throat and flushing of the face and neck. In addition, it might cause liver damage with such findings as yellow jaundice and dark urine. The liver damage may become evident several weeks after the exposure.

2. Long-term Exposure: Prolonged or repeated overexposure to liquid tetrachloroethylene may cause irritation of the skin. It might also cause damage to the liver and kidneys.

3. Reporting Signs and Symptoms: A physician should be contacted if anyone develops any signs or symptoms and suspects that they are caused by exposure to tetrachloroethylene.

• Recommended medical surveillance
The following medical procedures should be made available to each employee who is exposed to tetrachloroethylene at potentially hazardous levels:

1. Initial Medical Examination:
—A complete history and physical examination: The purpose is to detect pre-existing conditions that might place the exposed employee at increased risk, and to establish a baseline for future health monitoring. Examination of the liver and the cardiovascular and neurological systems should be stressed. The skin should be examined for evidence of chronic disorders.

—Liver function tests: Tetrachloroethylene may cause liver damage. A profile of liver function should be obtained by using a medically acceptable array of biochemical tests.

—Urinalysis: Since kidney damage has also been observed from exposure, a urinalysis should be obtained to include at minimum specific gravity, albumin, glucose, and a microscopic on centrifuged sediment.

2. Periodic Medical Examination: The aforementioned medical examinations should be repeated on an annual basis.

• Summary of toxicology
Tetrachloroethylene vapor is a narcotic. Rats did not survive when exposed for longer than 12-18 minutes to 12,000 ppm; when exposed repeatedly to 470 ppm they showed liver and kidney injury. Cardiac arrhythmias

These recommendations reflect good industrial hygiene and medical surveillance practices and their implementation will assist in achieving an effective occupational health program. However, they may not be sufficient to achieve compliance with all requirements of OSHA regulations.

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service Centers for Disease Control
National Institute for Occupational Safety and Health

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

541-4577

Deborah Jay

PO4

Occupational Health Guideline for Tetrachloroethylene*

INTRODUCTION

This guideline is intended as a source of information for employees, employers, physicians, industrial hygienists, and other occupational health professionals who may have a need for such information. It does not attempt to present all data; rather, it presents pertinent information and data in summary form.

SUBSTANCE IDENTIFICATION

- Formula: $CCl_2 = CCl_2$
- Synonyms: Perchloroethylene; perchlorethylene; tetrachlorethylene; perk
- Appearance and odor: Colorless liquid with an odor like chloroform or ether.

PERMISSIBLE EXPOSURE LIMIT (PEL)

The current OSHA standard for tetrachloroethylene is 100 parts of tetrachloroethylene per million parts of air (ppm) averaged over an eight-hour work shift, with a ceiling level of 200 ppm and a maximum acceptable peak of 300 ppm for 5 minutes in any three-hour period. NIOSH has recommended that the permissible exposure limit be reduced to 50 ppm (339 mg/m³) averaged over a work shift of up to 10 hours per day, 40 hours per week, with a ceiling level of 100 ppm (678 mg/m³) averaged over a 15-minute period. The NIOSH Criteria Document for Tetrachloroethylene should be consulted for more detailed information.

HEALTH HAZARD INFORMATION

- Routes of exposure
Tetrachloroethylene can affect the body if it is inhaled or if it comes in contact with the eyes or skin. It can also affect the body if it is swallowed.
- Effects of overexposure
1. *Short-term Exposure:* Tetrachloroethylene may cause headache, nausea, drowsiness, dizziness, incoordination, and unconsciousness. It may also cause irritation of

the eyes, nose, and throat and flushing of the face and neck. In addition, it might cause liver damage with such findings as yellow jaundice and dark urine. The liver damage may become evident several weeks after the exposure.

2. *Long-term Exposure:* Prolonged or repeated overexposure to liquid tetrachloroethylene may cause irritation of the skin. It might also cause damage to the liver and kidneys.

3. *Reporting Signs and Symptoms:* A physician should be contacted if anyone develops any signs or symptoms and suspects that they are caused by exposure to tetrachloroethylene.

• Recommended medical surveillance
The following medical procedures should be made available to each employee who is exposed to tetrachloroethylene at potentially hazardous levels:

1. Initial Medical Examination:

—A complete history and physical examination: The purpose is to detect pre-existing conditions that might place the exposed employee at increased risk, and to establish a baseline for future health monitoring. Examination of the liver and the cardiovascular and neurological systems should be stressed. The skin should be examined for evidence of chronic disorders.

—Liver function tests: Tetrachloroethylene may cause liver damage. A profile of liver function should be obtained by using a medically acceptable array of biochemical tests.

—Urinalysis: Since kidney damage has also been observed from exposure, a urinalysis should be obtained to include at minimum specific gravity, albumin, glucose, and a microscopic on centrifuged sediment.

2. *Periodic Medical Examination:* The aforementioned medical examinations should be repeated on an annual basis.

• Summary of toxicology
Tetrachloroethylene vapor is a narcotic. Rats did not survive when exposed for longer than 12-18 minutes to 12,000 ppm; when exposed repeatedly to 470 ppm they showed liver and kidney injury. Cardiac arrhythmias

These recommendations reflect good industrial hygiene and medical surveillance practices and their implementation will assist in achieving an effective occupational health program. However, they may not be sufficient to achieve compliance with all requirements of OSHA regulations.

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service Centers for Disease Control
National Institute for Occupational Safety and Health

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

attributed to sensitization of the myocardium to epinephrine have been observed with certain other chlorinated hydrocarbons, but exposure to concentrations of 5000 and 10,000 ppm tetrachloroethylene did not produce this phenomenon. Four human subjects were unable to tolerate 5000 ppm in a chamber for 6 minutes. They experienced vertigo, nausea, and mental confusion during the 10 minutes following cessation of exposure. In an industrial exposure to an average concentration of 275 ppm for 3 hours, followed by 1100 ppm for 30 minutes, a worker lost consciousness; there was apparent clinical recovery 1 hour after exposure but the monitored concentration of tetrachloroethylene in the patient's expired air diminished slowly over a 2-week period. Long-term industrial exposures have been reported to cause various neuropathies, such as numbness, trembling, neuritis, and defects of memory. During the second and third post-exposure weeks, the results of liver function tests became abnormal, suggesting that acute exposure had had a significant effect upon the liver. Other instances of liver injury following industrial exposure have been reported. Other effects on humans of inhalation of various concentrations are as follows: 2000 ppm, mild narcosis within 5 minutes; 600 ppm, sensation of numbness around the mouth, dizziness, and some incoordination after 10 minutes. In human experiments, 7-hour exposures at 100 ppm resulted in mild irritation of the eyes, nose, and throat; flushing of the face and neck; headache; somnolence; and slurred speech. Exposure of the skin to the liquid for 40 minutes resulted in a progressively severe burning sensation beginning within 5 to 10 minutes; the result was marked erythema, which subsided after 1 to 2 hours. The liquid sprayed into rabbits' eyes produced immediate pain and blepharospasm; patches of epithelium were lost, but the eyes recovered completely within 2 days.

CHEMICAL AND PHYSICAL PROPERTIES

• Physical data

1. Molecular weight: 165.85
2. Boiling point (760 mm Hg): 121.2 C (250 F)
3. Specific gravity (water = 1): 1.62
4. Vapor density (air = 1 at boiling point of tetrachloroethylene): 5.83
5. Melting point: -22.4 C (-8 F)
6. Vapor pressure at 20 C (68 F): 14 mm Hg
7. Solubility in water, g/100 g water at 20 C (68 F): 0.015
8. Evaporation rate (butyl acetate = 1): 2.8

• Reactivity

1. Conditions contributing to instability: Heat.
2. Incompatibilities: Tetrachloroethylene reacts with strong oxidizers and chemically active metals such as barium, lithium, and beryllium.
3. Hazardous decomposition products: Toxic gases and vapors (such as hydrogen chloride, phosgene, and carbon monoxide) may be released when tetrachloroethylene decomposes.

oethylene decomposes.

4. Special precautions: Liquid tetrachloroethylene will attack some forms of plastics, rubber, and coatings.

• Flammability

1. Not combustible

• Warning properties

1. Odor Threshold: Both May and Stern state that 50 ppm is the odor threshold for tetrachloroethylene.

2. Eye Irritation Level: Grant reports that "exposure to high concentrations of (tetrachloroethylene) vapor causes mild sensation of irritation to the eyes, but serious injury is not likely." The exact concentrations producing irritation are not mentioned by Grant.

Spector, however, reports that after a 20- to 30-minute exposure to 206 to 235 ppm, eye irritation occurs in humans.

Patty reports "very slight irritation of the eyes" among humans at 106 ppm.

3. Other Information: Spector reports that a 10-minute exposure to 513 to 690 ppm produces nose and throat irritation.

4. Evaluation of Warning Properties: Since the odor threshold of tetrachloroethylene is below the permissible exposure limit, and since eye irritation occurs at a concentration only twice the permissible exposure limit, its warning properties are considered to be adequate.

MONITORING AND MEASUREMENT PROCEDURES

• Eight-Hour Exposure Evaluation

Measurements to determine employee exposure are best taken so that the average eight-hour exposure is based on a single eight-hour sample or on two four-hour samples. Several short-time interval samples (up to 30 minutes) may also be used to determine the average exposure level. Air samples should be taken in the employee's breathing zone (air that would most nearly represent that inhaled by the employee).

• Ceiling Evaluation

Measurements to determine employee ceiling exposure are best taken during periods of maximum expected airborne concentrations of tetrachloroethylene. Each measurement should consist of a fifteen (15) minute sample or series of consecutive samples totalling fifteen (15) minutes in the employee's breathing zone (air that would most nearly represent that inhaled by the employee). A minimum of three (3) measurements should be taken on one work shift and the highest of all measurements taken is an estimate of the employee's exposure.

• Peak Above Ceiling Evaluation

Measurements to determine employee peak exposure should be taken during periods of maximum expected airborne concentration of tetrachloroethylene. Each measurement should consist of a 30-minute sample or a series of consecutive samples totalling 30 minutes in the employee's breathing zone (air that would most nearly represent that inhaled by the employee). A minimum of

three measurements should be taken on one work shift and the highest of all measurements taken is an estimate of the employee's exposure.

• Method

Sampling and analyses may be performed by collection of vapors using an adsorption tube with subsequent desorption with carbon disulfide and gas chromatographic analysis. Also, detector tubes certified by NIOSH under 42 CFR Part 84 or other direct-reading devices calibrated to measure tetrachloroethylene may be used. An analytical method for tetrachloroethylene is in the *NIOSH Manual of Analytical Methods*, 2nd Ed., Vol. 3, 1977, available from the Government Printing Office, Washington, D.C. 20402 (GPO No. 017-033-00261-4).

RESPIRATORS

- Good industrial hygiene practices recommend that engineering controls be used to reduce environmental concentrations to the permissible exposure level. However, there are some exceptions where respirators may be used to control exposure. Respirators may be used when engineering and work practice controls are not technically feasible, when such controls are in the process of being installed, or when they fail and need to be supplemented. Respirators may also be used for operations which require entry into tanks or closed vessels, and in emergency situations. If the use of respirators is necessary, the only respirators permitted are those that have been approved by the Mine Safety and Health Administration (formerly Mining Enforcement and Safety Administration) or by the National Institute for Occupational Safety and Health.
- In addition to respirator selection, a complete respiratory protection program should be instituted which includes regular training, maintenance, inspection, cleaning, and evaluation.

PERSONAL PROTECTIVE EQUIPMENT

- Employees should be provided with and required to use impervious clothing, gloves, face shields (eight-inch minimum), and other appropriate protective clothing necessary to prevent repeated or prolonged skin contact with liquid tetrachloroethylene.
- Non-impervious clothing which becomes contaminated with liquid tetrachloroethylene should be removed promptly and not reworn until the tetrachloroethylene is removed from the clothing.
- Clothing wet with liquid tetrachloroethylene should be placed in closed containers for storage until it can be discarded or until provision is made for the removal of tetrachloroethylene from the clothing. If the clothing is to be laundered or otherwise cleaned to remove the tetrachloroethylene, the person performing the operation should be informed of tetrachloroethylene's hazardous properties.

- Employees should be provided with and required to use splash-proof safety goggles where liquid tetrachloroethylene may contact the eyes.

SANITATION

- Skin that becomes contaminated with liquid tetrachloroethylene should be promptly washed or showered with soap or mild detergent and water to remove any tetrachloroethylene.
- Employees who handle liquid tetrachloroethylene should wash their hands thoroughly with soap or mild detergent and water before eating, smoking, or using toilet facilities.

COMMON OPERATIONS AND CONTROLS

The following list includes some common operations in which exposure to tetrachloroethylene may occur and control methods which may be effective in each case:

Operation	Controls
Use as dry cleaning solvent; as degreasing and metal cleaning agent; in vapor degreasing of metal parts	Local exhaust ventilation; general dilution; personal protective equipment
Use as chemical intermediate in production of fluorocarbons, pesticides, and trichloroacetic acid	Process enclosure; local exhaust ventilation; general dilution ventilation
Use as scouring, sizing, desizing, solvent and greaser remover in processing and finishing of textiles	Local exhaust ventilation; general dilution; personal protective equipment
Use as general industrial solvent in rubber, textile, printing, soap, and paint remover industries	Local exhaust ventilation; general dilution; personal protective equipment
Use as extraction agent for vegetable and mineral oils and in pharmaceutical industry; as vermifuge; as laundry treatment for presoaking and as drying medium in metal and wood industries	Local exhaust ventilation; general dilution ventilation; personal protective equipment

NIOSH / OSHA

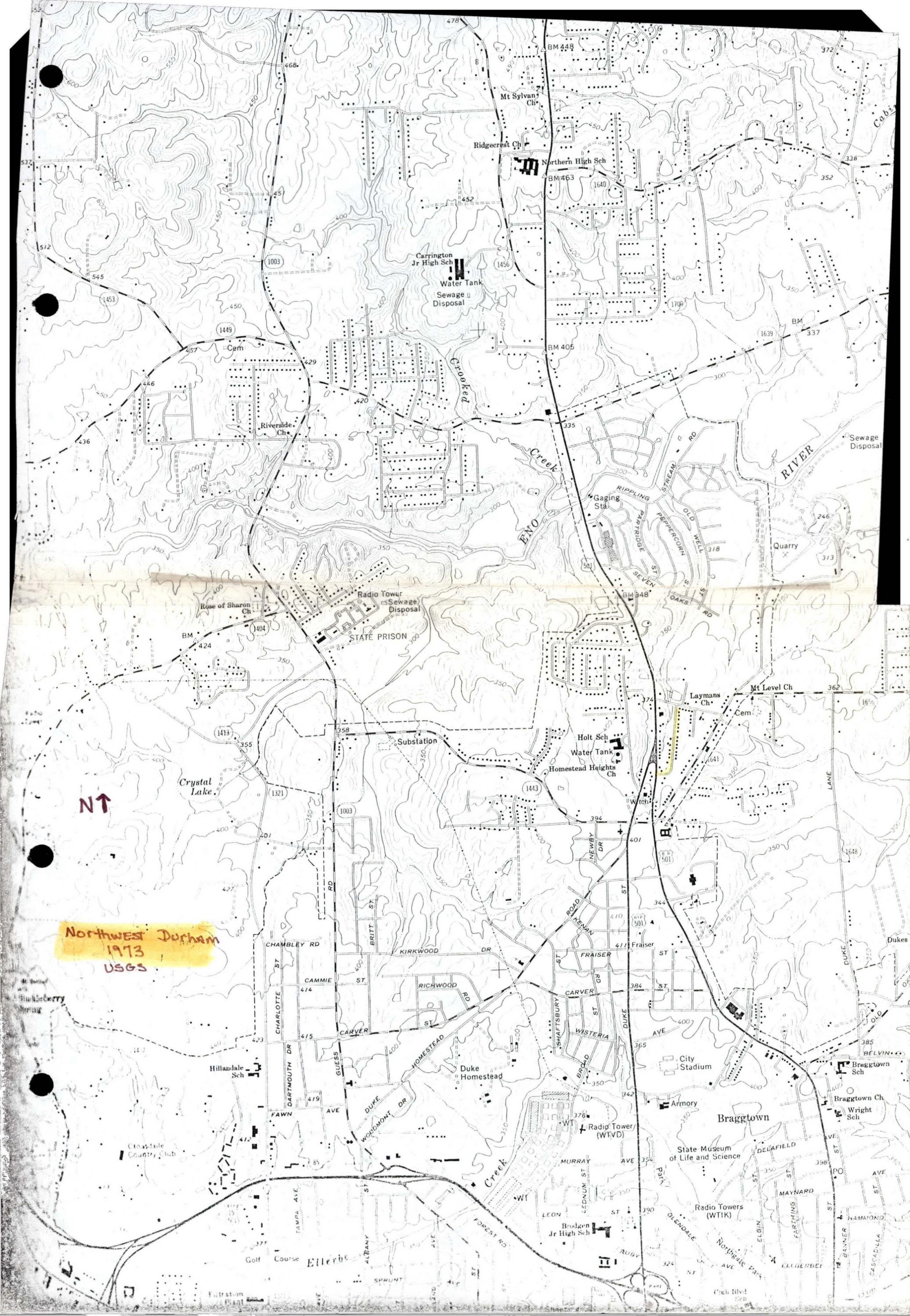
(pocket guide to HAZARDOUS CHEMICALS)

SEPTEMBER 1978

Chemical Name and Formula	Synonyms	Permissible Exposure Limit	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method and Sol (See Table 1)
Tetrachloroethylene CCl ₄ = CCl ₄	Perchloroethylene; Perchloroethylene; Tetrachloroethylene; Perk	100 ppm 200 ppm ceil 300 ppm/5 min/3 hr peak (NIOSH) 50 ppm/TWA 100 ppm ceil	500 ppm	Colorless liquid with an odor like ether or chloroform	MW: 166 BP: 250 F Sol: 0.015% Not combustible	VP: 14 mm MP: -8 F Strong oxidizers, chemically active metals, such as barium, lithium, beryllium	Char; CS ₂ ; GC; J

TETRACHLOROETHYLENE

Personal Protection and Sanitation (See Table 2)	Respirator Selection		Health Hazards			
	Upper Limit	Devices Permitted (See Table 3)	Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: N.A. Remove: Promptly contam non-imperv	500 ppm:	CCROVF/GMOV/SAF/SCBAF Escape: GMOV/SCBA	Inh Ing Con	Irrit eyes, nose, throat; nau; flush face, neck; vertigo, dizz, inco, head; some, eryt; liver	Eye: Irr immed Skin: Soap wash promptly Breath: Art resp Swallow: Ipecac, vomit.	Liver, kidneys, eyes, upper resp sys, CNS



Northwest Durham
1973
USGS

NT ↑

Health Dept.
attn. Mr. Norton

Fee 6.00
Application No. 10041.....

City of Durham *Leptic Lenk*
APPLICATION FOR ~~PLUMBING PERMIT~~

Durham, N. C., Dec. 6, 1966

Permission is requested for ~~plumbing permit~~ as listed below:

For ~~Herbert Cannon~~ *MINUTE MARKET*
At *Rosboro Rd. at Ryan St.* Occupied as *Minute Market*
By *Best Plby Co.* State License No.

No. Water Closets	..... 1	No. Washing Machines	.....
No. Bath Tubs	.....	No. Dishwashers	.....
No. Shower Stalls	.....	No. Floor Drains	..... 1
No. Lavatories	..... 1	No. Urinals	.....
No. Hot Water Heaters	..... 1	No. Drinking Fountains	.....
No. Sinks	.....	No. Slop Sinks	..... 1
No. Laundry Trays	.....	No. Dryers (with drains)	.....

Remarks

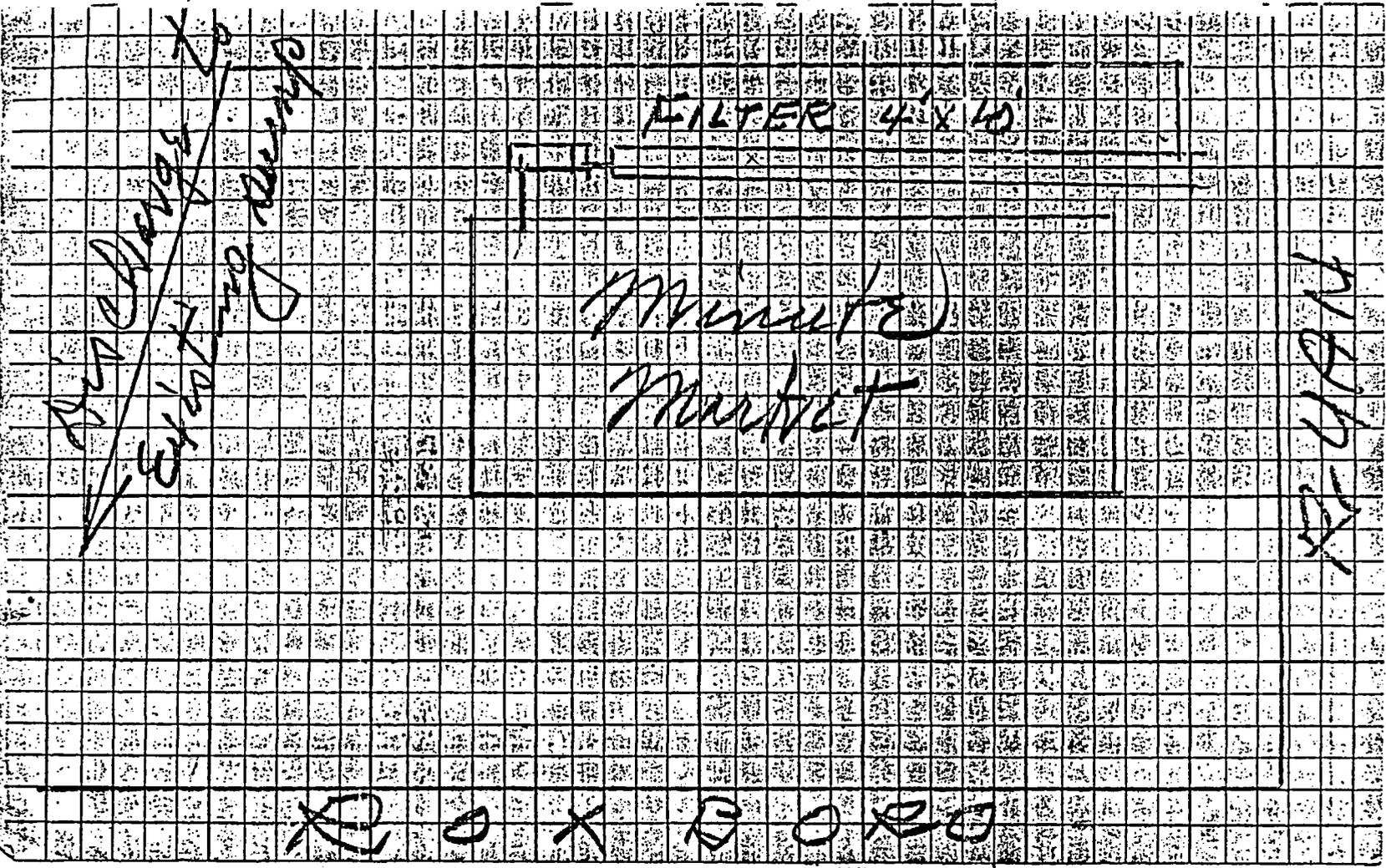
Information concerning location & cost of Water & Sewer Connections Contact Water & Sewer Department.

NOTICE: You are required to report this work at once when ready for inspection. All work to be done according to the City and State laws.

Call Plumbing Inspector at 2-1159.

Carl Ripley
Plumbing Contractor

ATTACHMENT 7



Durham County Health Department

SEPTIC TANK PERMIT

No. 10041 Area City Durham, N. C. December 6, 1966

Owner Minute Market Address

Location of Property Roxboro Road at Ryan Street

PERMISSION is hereby granted to install a Septic Tank and Secondary Treatment system, to receive wastes from fixtures enumerated on Plumbing Permit No. 10041 in accordance with Chapter I, Art. VI, Sections 1 & 5, Durham County Sanitary Code, at the above location, consistent with existing conditions, as described below:

Septic Tank: _____ wide, _____ long, _____ deep (or _____) Dist. Box _____ outlets.

Nitrification Field: _____ lines, _____ Ft. long _____ inches wide, laid to proper grade and depth, using only approved absorbent material.

Sand Filter Trench: _____ x 40' Other _____

NOTE: Installation to be made according to sketch on reverse side; DO NOT cover any part of installation until after final inspection by Health Department.

Plumbing by: Best Plumbing Company

Septic Tank by: *C. W. Morgan*

Inspected by: *C. W. Morgan* Date: 12/16/66 O. D. Ader, M.D., M.P.H. Director

Sand filter trenches are based on sound sanitary engineering practices and are widely used; however, should unforeseen developments make it necessary to alter or abandon the system, this Health Department assumes no responsibility.

By: Chas. V. Morgan Deputy Director

ORIGINAL

Re
Inl
De
NO
be
Call



4404 Roxboro Road
NCD980848667





Bunchi 4.4 ppm
4411 Ryan Street

4417 Ryan Street
Stallings
NCD980848667

Septic Tank & Sandfilter
behind 1 Hour Koritizing



Pipe disconnected from septic
tank
lower pipe leading to sand-
filter



Ryan Street
South North
Down Gradient





Nicholson 0.865 ppm
4429 Ryan Street
NCD980848667



Landlord Wintrough
4501 Ryan Street
0.039 ppm

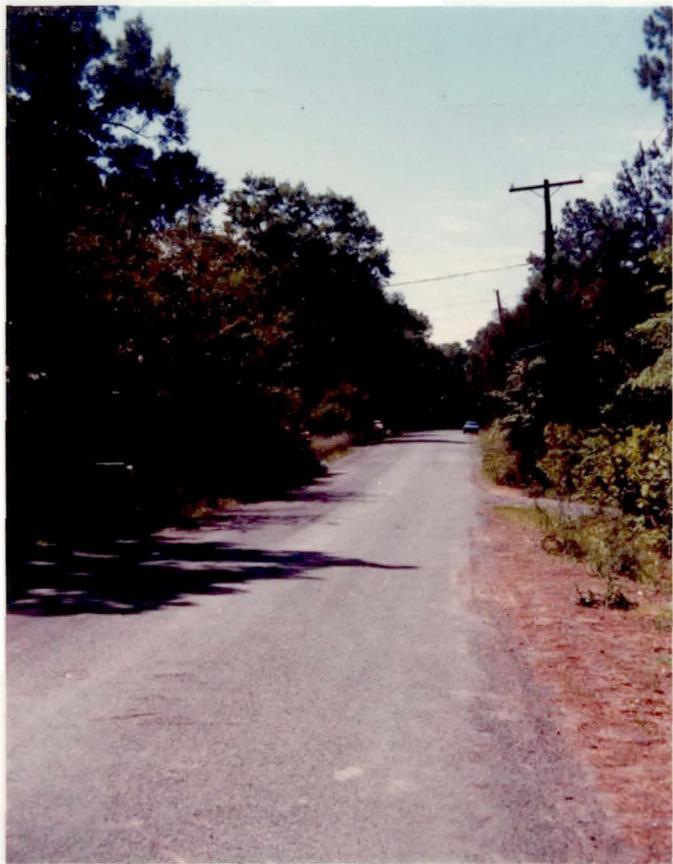


intermittent stream

Winthorough 4501 Ryan Street
0.039 ppm NCD980848667



Hales 4506 Ryan Street
NCD980848667 1.093 ppm



Ryan Street
North to South
Upgradient

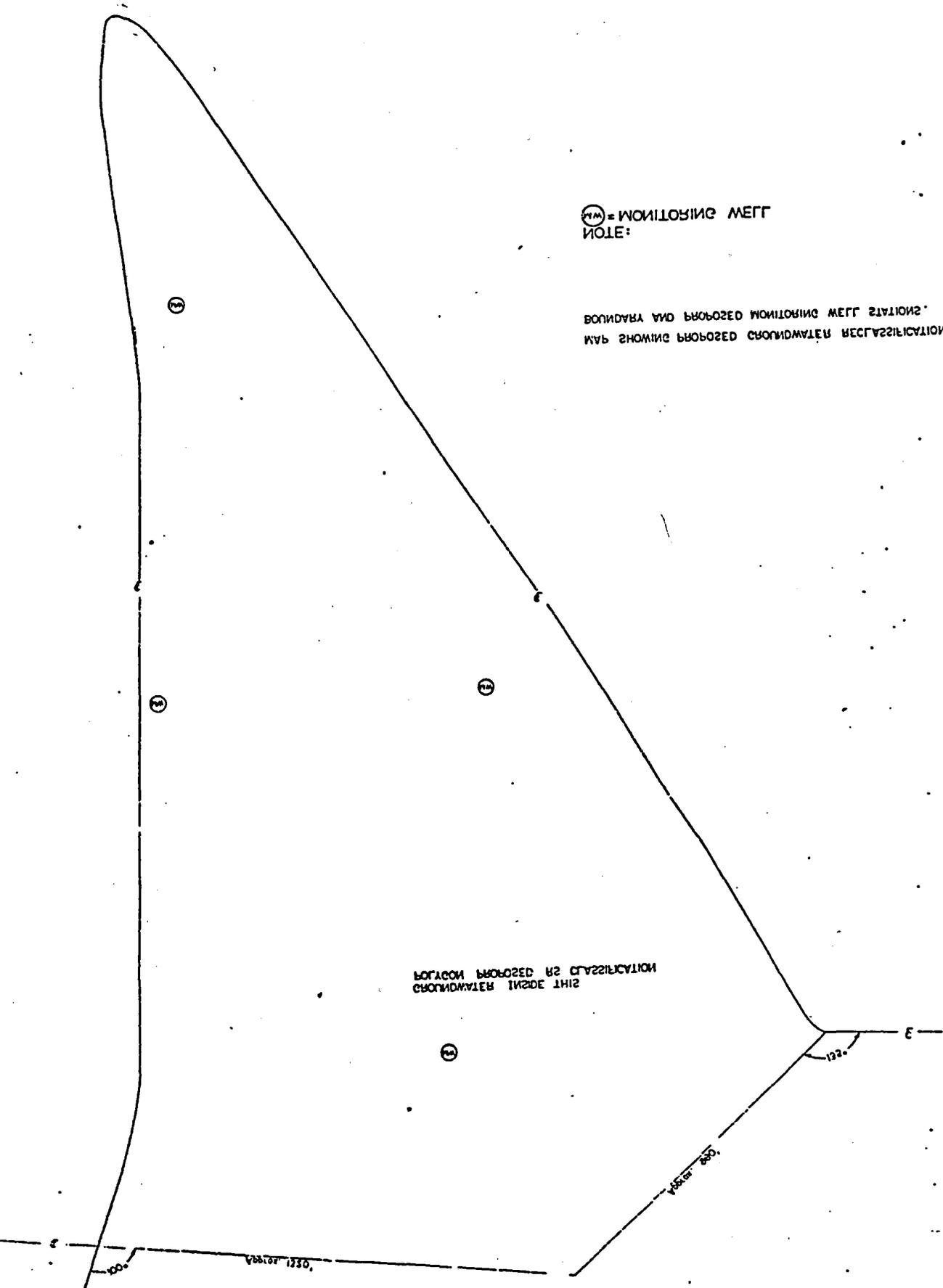


7

⊕ = MONITORING WELL
NOTE:

BOUNDARY AND PROPOSED MONITORING WELL STATIONS.
MAP SHOWING PROPOSED GROUNDWATER RECLASSIFICATION

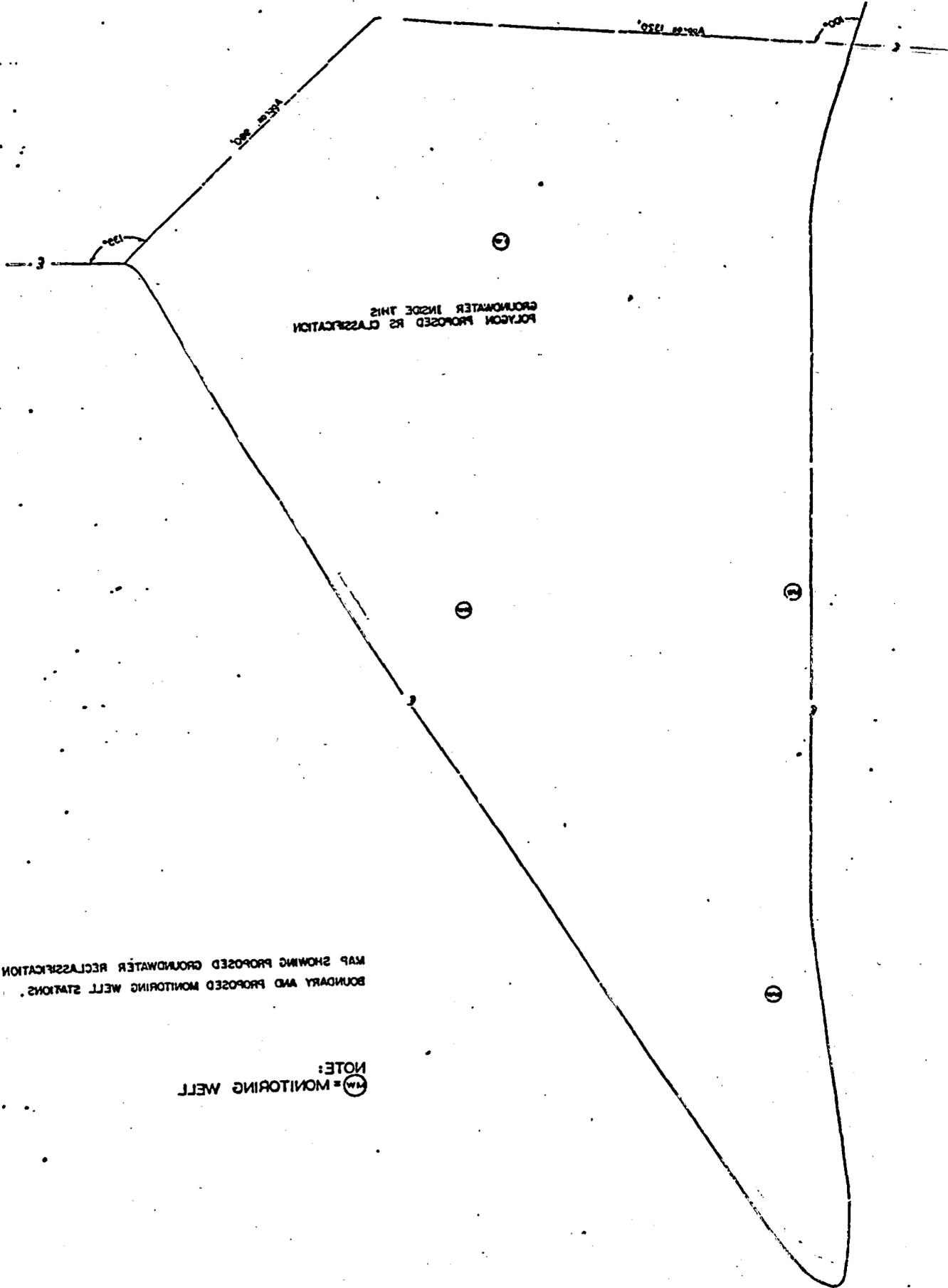
BOUNDARY AND PROPOSED MONITORING WELL STATIONS.
MAP SHOWING PROPOSED GROUNDWATER RECLASSIFICATION



MAP SHOWING PROPOSED GROUNDWATER RECLASSIFICATION
BOUNDARY AND PROPOSED MONITORING WELL STATIONS

NOTE:
⊙ = MONITORING WELL

GROUNDWATER INSIDE THIS
POLYGON PROPOSED RE CLASSIFICATION





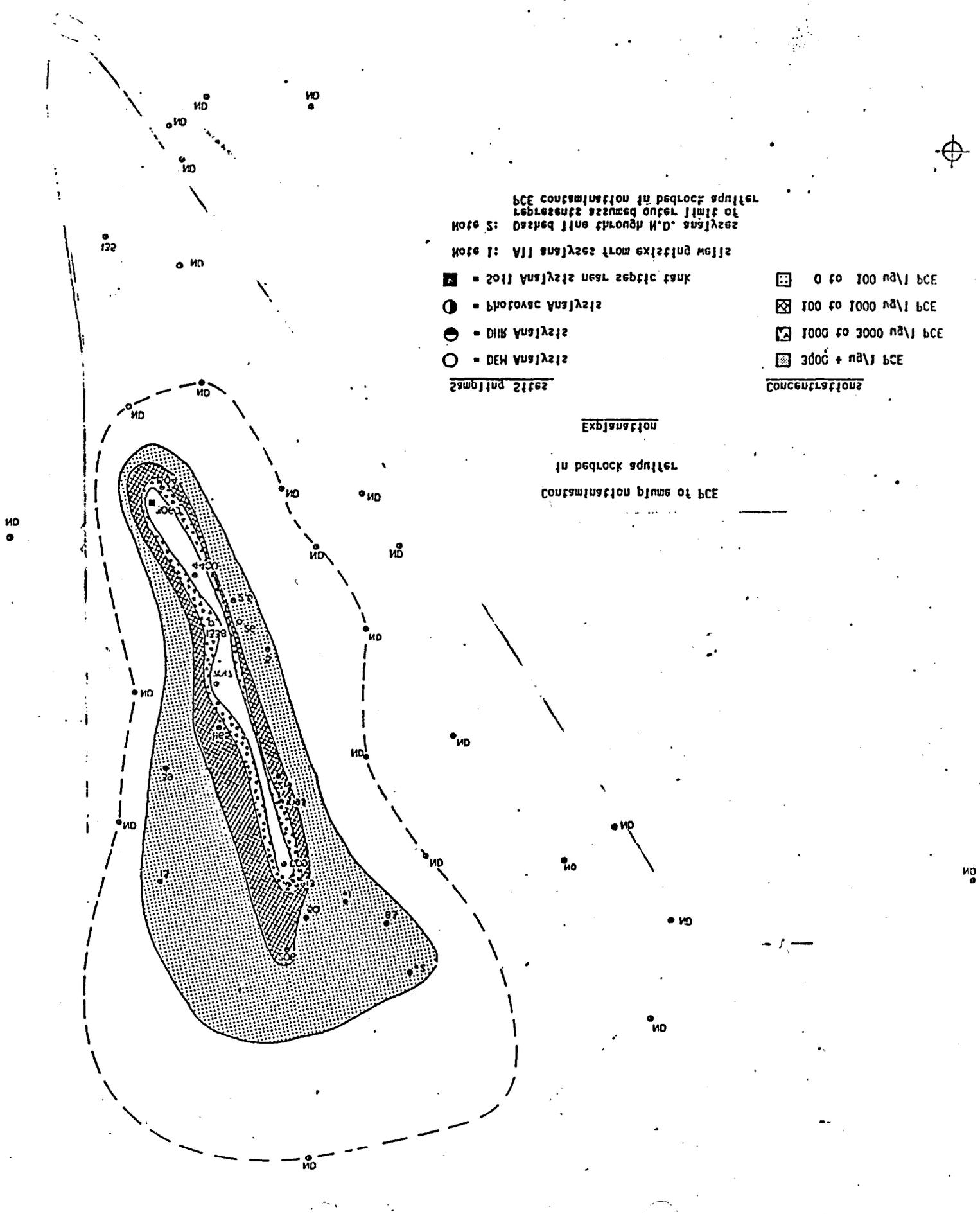
PCE contamination in bedrock aquifer
represented as limit of
contamination through M.D. analyses

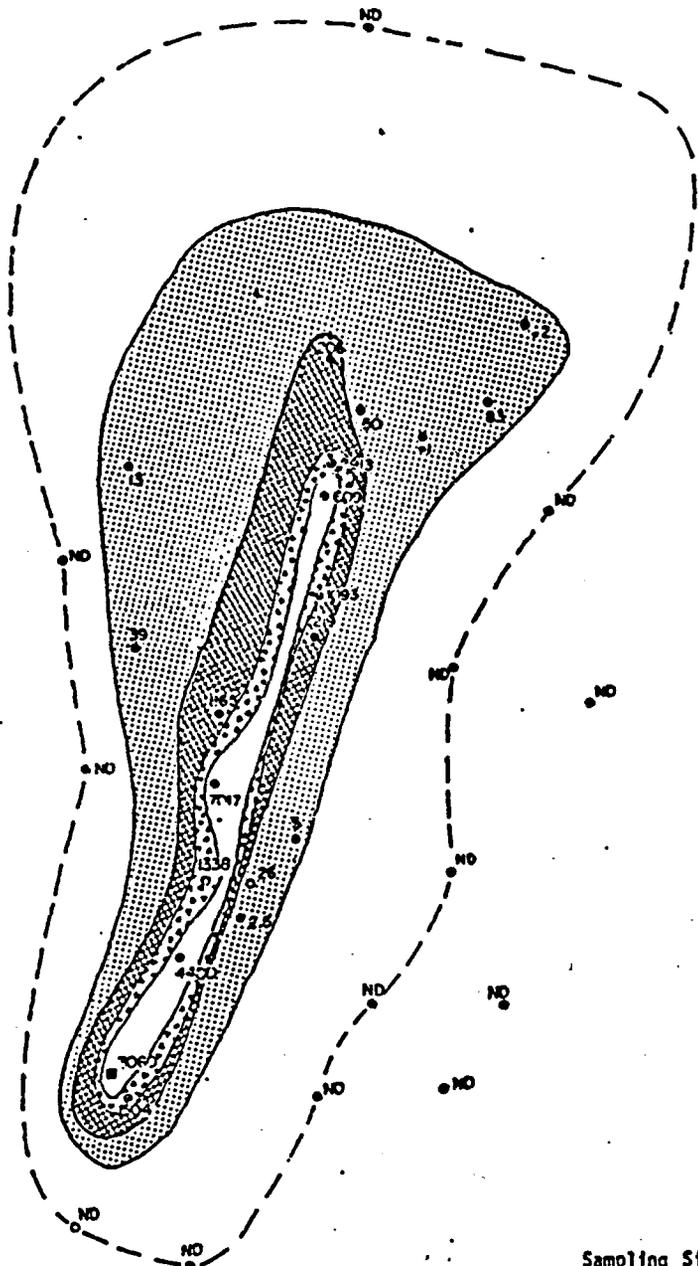
Note 2: Dashed line through M.D. analyses
Note 1: All analyses from existing wells

- = 2011 Analysis near septic tank
 - = Phosphate Analysis
 - = DIB Analysis
 - = DEN Analysis
- | | |
|---|-----------------------|
| ▣ | 0 to 100 ug/l PCE |
| ▤ | 100 to 1000 ug/l PCE |
| ▥ | 1000 to 3000 ug/l PCE |
| ▧ | 3000 + ug/l PCE |
- concentrations

Explanation

in bedrock aquifer
contamination plume of PCE





Contamination plume of PCE
in bedrock aquifer

Explanation

Sampling Sites

- = DEM Analysis
- = DIR Analysis
- ⊙ = Photovac Analysis
- = Soil Analysis near septic tank

Concentrations

- ▣ = 3000 + ug/l PCE
- ▤ = 1000 to 3000 ug/l PCE
- ▥ = 100 to 1000 ug/l PCE
- ▦ = 0 to 100 ug/l PCE

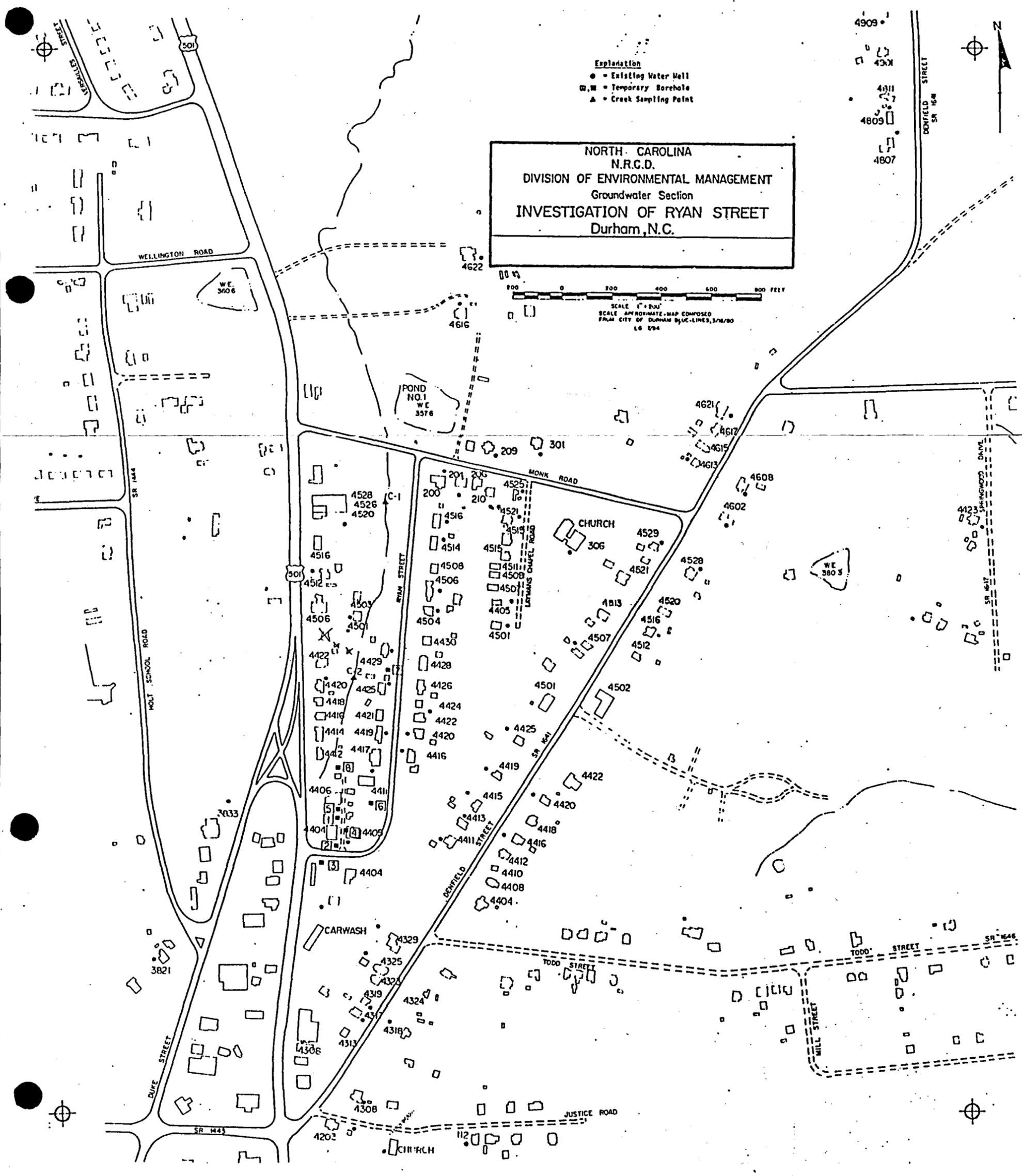
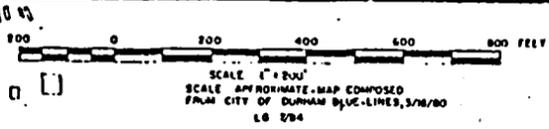
Note 1: All analyses from existing wells

Note 2: Dashed line through N.D. analyses represents assumed outer limit of PCE contamination in bedrock aquifer

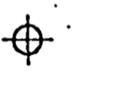


- Explanation
- = Existing Water Well
 - , M = Temporary Borehole
 - ▲ = Creek Sampling Point

NORTH CAROLINA
N.R.C.D.
DIVISION OF ENVIRONMENTAL MANAGEMENT
Groundwater Section
INVESTIGATION OF RYAN STREET
Durham, N.C.



4909
4901
4911
4809
4807



ND not detected
TETRACHLOROETHYLENE UNITS
is reported in ppm

One Hour Koritizing
~ 25% tetrachloroethylene
septic tank
3.06 ppm SANDFILTER
0.056 ppm SOIL adj to SANDFILTER
1.5 Family Dentistry



PREPARED BY ASSOCIATED SURVEYORS GREENSBORO, N. C.

1974

MAP NO. 744

DURHAM OUTSIDE TOWNSHIP

DURHAM COUNTY TAX MAPS

SCALE 1" = 100'

REVISIONS

1975

1976

1977

UNKNOWN
BK. E. PR

781

781

745

315

743

742

ONE HOUR KORTIZING

NCD 980848667

N

317

ND not detected

TERRACHLOROBENZENE UNITS $\mu\text{g}/\text{ppm}$

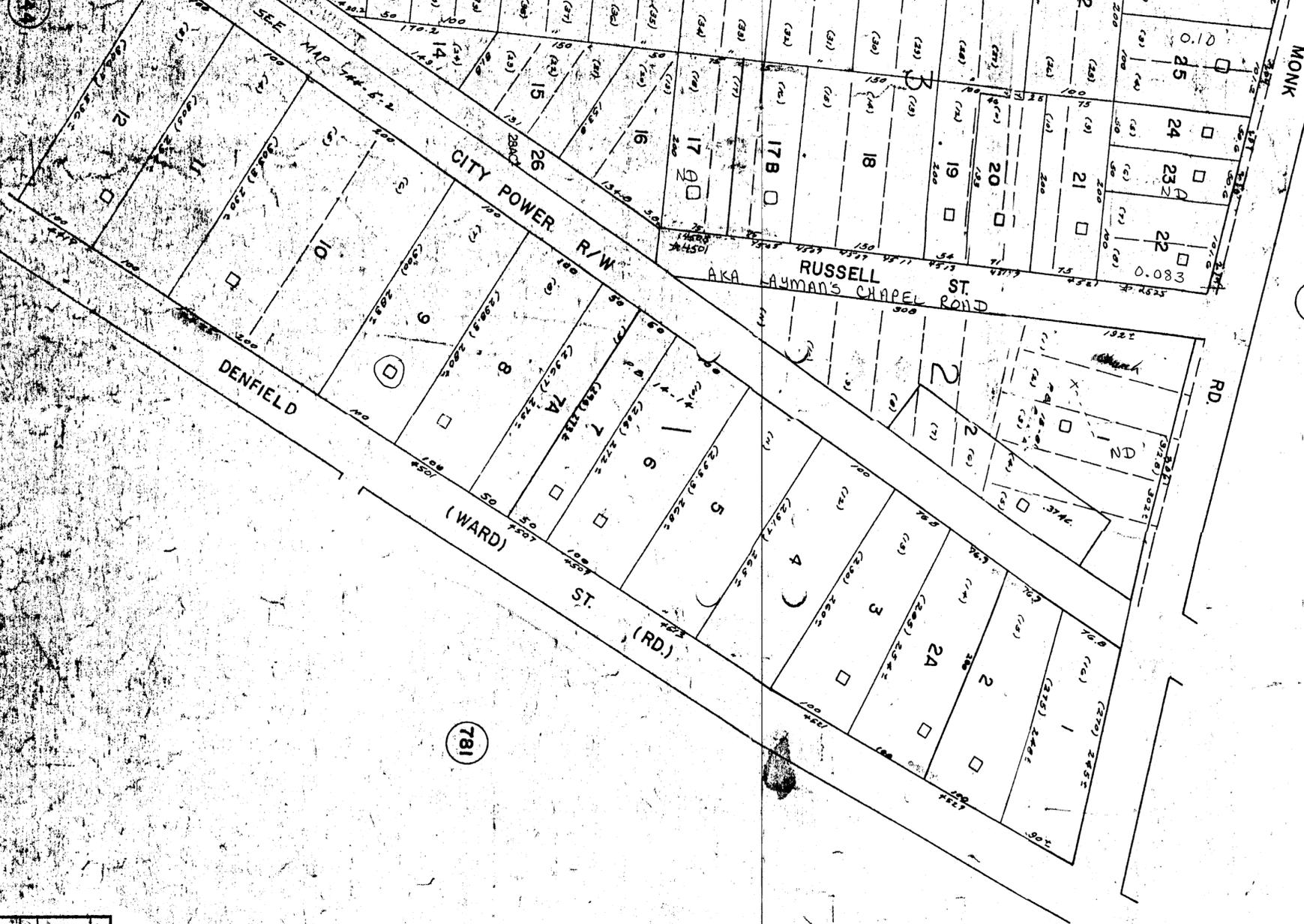
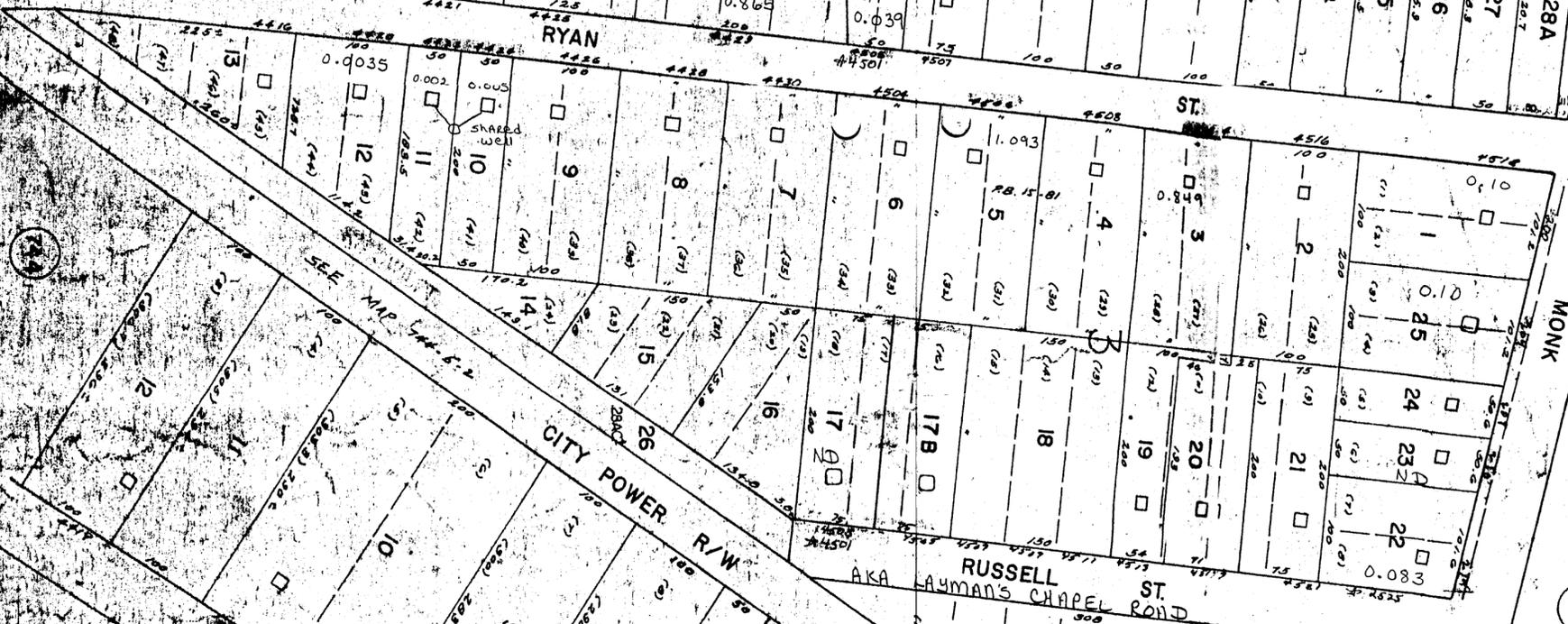
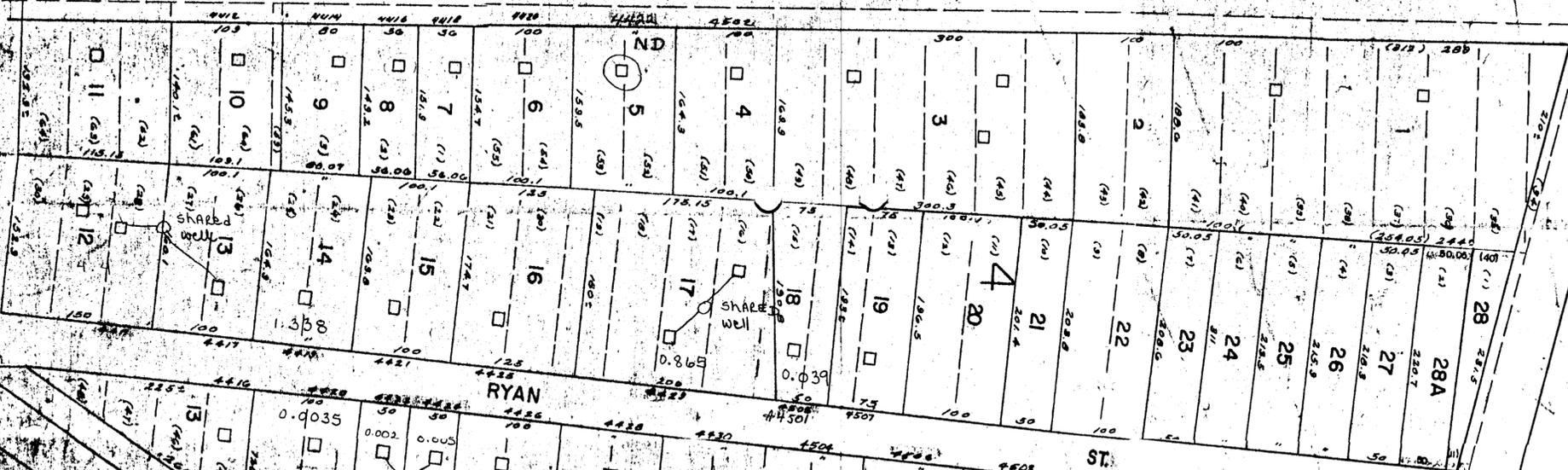
DURHAM

ROXBORO

RD.

U. S. HWY. 501

501



746

781

PREPARED BY ASSOCIATED SURVEYORS GREENSBORO, N. C.

745
 MAP NO.
 DURHAM COUNTY
 TOWNSHIP
 021
 SCALE 1"=100'
 CITY - OU
 DURHAM COUNTY
 TAX MAPS

One Hour Kertizing
NCD 980848667

748

ND not detected

DURHAM ROXBORO RD U.S HWY 501



4616 Roxboro Rd.
ND

10.74 Ac.

1

747

745

DURHAM COUNTY TAX MAP

746

CITY OUT
(02)

SCALE 1"=100

REVISED 1982