TDEC MISC. BKI

TN Department of Environment and Conservation
Environmental Assistance Center -- Nashville

#22.

NFO - FILE

Date: September 25, 2000

To: Commissioner Hamilton, John Leonard, Tracy Carter & Kim Olson

From: Chuck Head Chuck Head 9/25/00

Concerning: Dickson County Landfill/ Trichloroethylene Contamination

The Dickson County Landfill is located southwest of Dickson on Eno Road. The location is denoted on Map 1 (attached). The landfill was originally opened in the early 1960's, well before the advent of the first Solid Waste regulations in 1972. When the Solid waste regulations came into affect, Dickson County applied for a solid waste landfill permit.

In 1991, the Environmental Protection Agency (EPA), CERCLA Group, conducted a Preliminary Assessment/Site Investigation for the Dickson County Landfill. The report indicates that trichloroethylene was detected in the well of Harry and Lavenia Holt (see Map 2, attached). The Holts live on Eno Road less than ½ mile southeast of the landfill. The first well sample analytical results from January 1991 reported 26 parts per billion TCE. Two follow-up samples were taken with the TCE results in the 4 part per billion range. The level of TCE was approximately 4 parts per billion. EPA decided there was no need for further action at this location.

In 1996, the TN Division of Superfund (DSF) was briefly involved with the Dickson County Landfill. At that time, the TN Division of Solid Waste Management (SWM) was working with Dickson County to resolve issues at the older portion of the landfill. Since SWM was working with Dickson County on this matter, it was agreed that SWM would serve as the TN Department of Environment and Conservation (TDEC) lead agency for this project.

In December 1996, the City of Dickson activated its lake/well source(noted on Map 2) near the landfill to supplement their water source. Dickson uses the Piney River as its primary water source. During the dry portions of the year, it is difficult for Dickson to meet demand. The City sampled source water from this well in December 1996, it was discovered to have chlorinated hydrocarbons, dichloromethane and trichloroethylene (TCE). Thirty-two (32) parts per billion of TCE were found in the well on February 24, 1997. The Division of Water Supply (DWS) informed the City of Dickson that the well could not be used as a water source unless the raw water was treated, using aeration to remove the TCE. On April 18, 1997, the City of Dickson decided not to use the well.

On September 21, 2000, Louis Burnett with DWS visited the City of Dickson Water Treatment Plant. During this visit, he investigated any other use of this well. Mr. Burnett discovered that in March 2000, the City decided once again to use this well. Dickson had added aeration to the water treatment process. DWS approved this treatment system in October 1998. The City of Dickson used the well from March 6 to March 19, 2000. At that time, the pump in the well broke. The City has not used the well since then. The well is still usable, pending repair of the pump. DWS has contacted Dickson to determine if source water and finished water for TCE were taken during the March 6 through March 19, 2000 time frame.

SWM is working with Dickson County to resolve problems at the older portion of the landfill. Monitoring wells installed at the landfill indicate that ground water contamination has occurred. The monitoring wells (noted on Map 2) indicate higher than normal levels of Fluoride, Arsenic, Chromium, Zinc and Barium. No volatile organics have been detected in the monitoring wells. However, a nearby spring – Sullivan Spring on the Sullivan property, has been found to be contaminated with TCE, in the 100 to 200 part per billion range. Mr. Sullivan also has a water well. The well was sampled by Dickson County. The well was found to be contaminated with TCE. Dickson County has connected Mr. Sullivan's home to the Dickson Water Supply. Dickson County is developing a plan to cap the landfill and to pump leachate into the City of Dickson waste water treatment system.

Ms. Betty Mekdeci contacted TDEC, throug an e-mail message to me at the Nashville EAC, in early August 2000 inquiring about the number of children born with cleft palates, information regarding the quality of water in the public water supply system, the location of hazardous waste disposal sites, areas with ground water contamination, and companies with air emissions; all in Dickson County. Ms. Mekdeci was referred to the specific Divisions to get this information. I referred Ms. Mekdeci to Bonnie Bashor, TN Department of Health (TDH) for information regarding cleft palate.

I spoke with Bonnie Bashor on September 22, 2000. Bonnie explained that 10 or 11 children born with cleft palate since 1997 have been identified in Dickson County. Two children live northeast of Dickson, one child within three miles of the landfill and seven or eight children live in Dickson County, southwest of the landfill. This number is significantly higher than would be expected given the population of Dickson County. TDH is working with the Center for Disease Control in Atlanta, primarily Dr. Cynthia Moore, to determine if the number of children with cleft palate constitutes a "cluster". Also, TDH has contacted all hospitals in the Dickson area asking for records of children born with cleft palate. If it is determined that a cluster is present, then research work will begin to determine if there is a specific cause such as (1) medication taken during pregnancy, (2) work environment, (3) genetics, (4) exposure, etc. TDH has met with the parents of nine children with cleft palate to answer questions and provide information concerning cleft palate and its causes. This week Dickson County sampled the well of the Piland family (location noted on Map 1). The Pilands live on Baker Road approximately three (3) miles southeast of the Dickson Landfill. The Pilands have a child with cleft palate. TCE was not found in the water from the well.

Ms. Mekdeci is the Director of the Orlando based organization, Birth Defect Research for Children. Ms. Mekdeci has contacted EPA concerning the number of children with cleft palate in the Dickson County area. This has prompted EPA CERCLA to visit the Dickson County Landfill again.

I have attached an article from the Dickson Herald, published on September 22, 2000. The article, written by Kim Conner, has an interview with Ms. Mekdeci and gives the details regarding the number of children born with Cleft Palate in Dickson County since 1997. Accordin to the article 14 children have been born with Cleft Palate since 1997 out of approximately 1700 births. According to the article, cleft palete occurs once in every 1,000 births.

Brenda Apple was contacted by Derrick Matori, EPA CERCLA in Atlanta, concerning the Dickson County landfill approximately two (2) weeks ago. Mr. Matori's call was in response to a call from Ms. Mekdeci regarding the number of children born in Dickson County with cleft palate. Because of the number of children born with cleft palate, EPA plans to visit the site in early October. Mr. Matori has contacted Brenda Apple with DSF about their plans to visit the site. Mr. Matori contacted Brenda because he is the EPA Regional contact for Tennessee in the CERCLA Program. Once Brenda knows the date EPA plans to visit, she will coordinate a meeting with EPA, SWM, DWS and DSF. This will allow an opportunity for all parties to discuss the site and share information before EPA visits the site. SWM remains the lead TDEC agency for the Dickson County Landfill post closure work.

Dicksoncounty-cleftpalate.doc

The Dickson Her

FRI 9/22/00

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A Gannett Newspaper

Study points to cleft defect cluster

Landfill, business could have triggered deformities via chemical solvent release

By KIM CONNER
Staff Writer

A national birth defects research group has identified two major toxins in Dickson County that may be the cause of an inordinate number of cleft deformities.

Toluene and trichloroethylene (TCE), both manmade chemical solvents, are triggers for the birth defect that occurs during the first trimester of pregnancy. Both have been found in Dickson County, said Betty Mekdeci, director of Orlando-based Birth Defect Research for Children.

According to information presented to parents of children with the oral cleft defects, TEC was found in a private well in 1991 and in a public well and the public water supply of Dickson in 1997. The chemical is of main concern because studies have indicated a possible association between TCE in drinking water and increases in oral clefts and other birth defects, Mekdeci said.

"In my opinion, from the documents I have seen, the landfill should be closed," Mekdeci said. "It (the studies) certainly doesn't make you feel good."

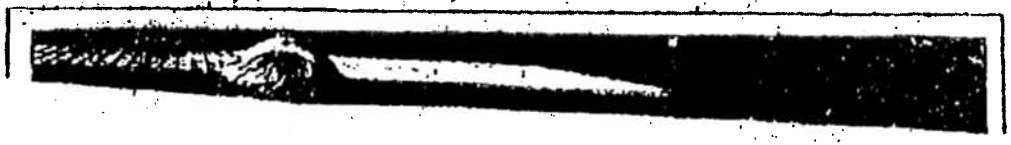
If TCE is found to be the etiology behind the cleft defects, said Mekdeci, "then the likelyhood is that it is causing more."

Though drinking water is thought to be the major conduit for TCE into a pregnant woman's system, more than 50 percent of exposure comes from showering or bathing.

"TCE is lipofilic, it stores up in your body fat," Mekdeci said. "During pregnancy, your body draws down on your reserves and uses that body fat."

Before any potential cause-effect relationship between TCE and the oral cleft cluster in Dickson can be determined, however, the community would have to prove that each mother was "exposed to contaminated water during the first three months of her pregnan-

SEE CLEFT, PAGE A5



Fields turning

Cleft

FROM PAGE A1

ay," said Mekdeci in her report. "The amount of TCE in the water would also have to be high enough to be associated with oral clefts."

"We are aware that there have been minute amounts of TCE found in a spring and have been working towards finding the source," said Jim Lunn, director of the county's sanitary landfill. "As of this point, we have not connected a source back to the landfill."

The second chemical of concern is toluene, an industrial solvent. Quebecor Printing, located in the industrial park, is releasing approximately 1.4 million pounds of toluene into the air each year, according to Mekdeci's report. That amount, however, is within the applicable standards for the company, said Ann O'Brien, director of environmental affairs for the U.S. firm's operations.

"We're in compliance with all state and federal regulations, and that includes the most recent and most stringent MAC standards," she said. "Those [MAC] standards were specifically designed to protect community health."

But neither O'Brien, nor Benoit Brasseur, corporate director of environmental affairs for Quebecor Printing, had been informed of the study, nor had they been told toluene could be a trigger for oral cleft deformities.

Toluene, listed as a developmental toxin, can also cause birth defects. Toluene is heavier than air, Mekdeci said in her report to the parents, so releasing it from a smokestack may mean it's not remaining in the upper air.

According to the Environmental Defense (Fund) scorecard, toluene was the major pollutant discarded in Dickson County in 1997, with almost 1.5 million pounds being released. According to the scorecard, Quebecor ranked 90-100 percent as being the "dirtiest" or "worst" of facilities for total environmental releases; at 100 percent for noncancer risk score for air and water releases; and 90-100 percent for air releases of recognized developmental toxins.

A county resident contacted BDRC in March after she noticed "an unusual number of cases of cleft palate" reported in Dickson County. BDRC sent questionnaires to distribute to the families whose children had been identified and began researching the possible links between cases.

Oral cleft defects are expected at a rate of about 1 per 1,000 births, which would suggest two children born with cleft lip or palates, or both. Since 1997, 14 of the 1,700 children born to parents in Dickson County have had cleft lip or palate.

"This is an 800 percent increase over the expected amount," said Mekdeci. "That is impressive. Though it doesn't mean they all have the same cause, it does raise speculation."

After plotting the locations of each family, Mekdeci said BDRC found they were clustered in the southwestern quadrant of the county.

Oral cleft defects are caused by at least dual factors, Mekdeci said — a genetic predisposition coupled with a triggering factor. The defect, located in the structures of the mouth, is a split or separation in the infant's lip and/or palate. Cleft lip means the two sides of the upper lip did not grow together properly, while a cleft palate is a split or opening in the roof of the mouth.

The defect occurs during the first trimester of pregnancy, usually between the sixth and ninth weeks, Mekdeci explained. During that time, parts of the roof of the mouth and upper lip normally join together. When this joining doesn't take place, a child develops a cleft lip and/or palate.

"With birth defects," said Mekdeci, "the most acute defects happen when there is sudden exposure during the critical weeks for a particular development."

While families that have a history of oral clefts are more likely to have children with the defect, it can also occur in families without such a background.

Researchers believe many factors contribute to oral clefts, with environmental factors interacting with specific genes to interfere with the patterns of normal palate closure and lip development. Besides chemical interactions, scientists are considering reactions to certain drugs, maternal smoking, radiation and vitamin deficiencies as possible triggering agents.

Parents of these children are understandably concerned, Mekdeci said.

"They are coming to grips with the increase in clefts in this community," she said. "Finding these triggers puts a different spin on things."

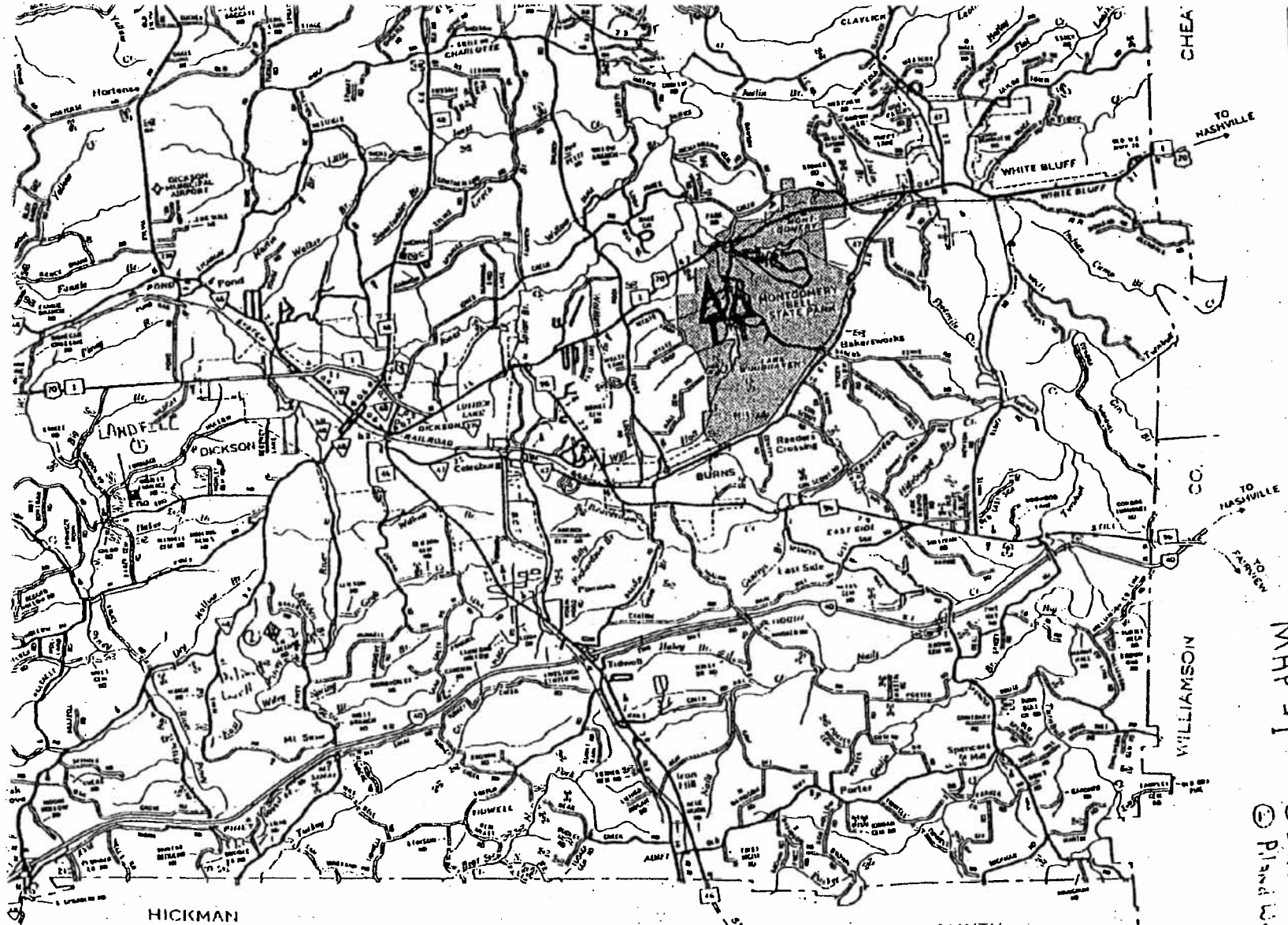
Mekdeci said parents have several choices, including civil litigation and applying for environmental justice grants or Superfund to correct the problem if it is determined. But residents' main objective is to rectify the problem, she said.

"We have to come up with solutions," Mekdeci said. "What kinds of legacy are we going to leave our children if they can't function in normal society?"

The Environmental Protection Agency is slated to investigate the situation within the next month, Mekdeci said.

Oral clefts are among the most common birth defects, with more than 250,000 Americans having a cleft condition. Of those, 25 percent have a cleft palate alone; 25 percent only a cleft lip; and 50 percent having both cleft lip and palate.

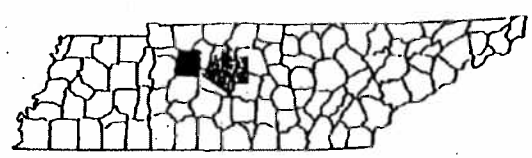
Parents of children in Dickson County who were born with oral clefts should send a letter with contact information to "Information," P.O. Box 411, Burns, TN 37029, or one can send an e-mail message to dicksoncleftinfo@aol.com. Parents are encouraged to make contact so further research can be completed.



MAP #1

① Landfill
② Pond Well

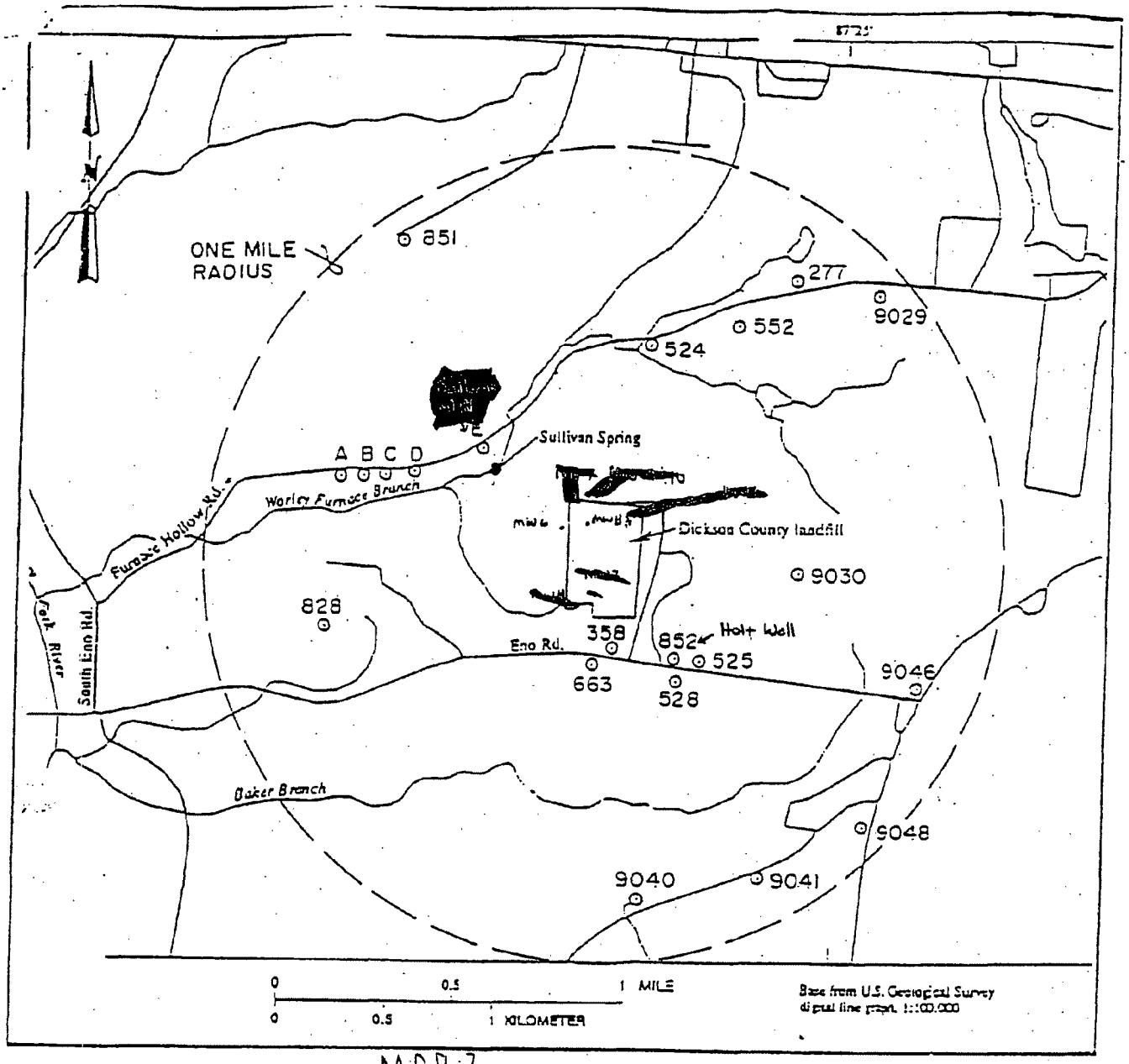
Dickson County



I in the north central part of the state, County was established in 1803. Named of Doctor William Dickson, the county

Tennessee Legislature from 1799-1801. He then served six years as a member of Congress.

Montgomery Bell State Park and State Forest



MAP 2

LEGEND

⊙277 DOMESTIC WELL LOCATION

NOTE: MAP ADAPTED FROM USGS REPORT 96-229

FIGURE 1
SURVEY OF DOMESTIC WELLS WITHIN A
ONE MILE RADIUS OF THE DICKSON COUNTY LANDFILL
(UPDATED AUG. 1996)
PROJECT 143-08

GRIGGS & MALONEY

OCT 19 2000
TENNESSEE DEPT. OF
ENVIRONMENTAL & CONSERVATIO

Table 1: Gr l Water Sampling for Properties Located Near the Dickson C .y Landfills

Site	Well Number	Well/Spring Owner	Well Address	Date Installed	Total Depth	Aquifer Depth	Latitude	Longitude	Use
1	4300851	T. Horner	1135 Wildcat Rd.	06/18/73	160	0	36 04 45	87 26 23	Residential
2	4300277	C. Bradford	Furnace Hollow Rd.	04/18/67	100	85	36 04 41	87 25 12	Residential
3	4300553	G. Donegan	545 Furnace Hollow Rd.	02/24/70	105	100	36 04 34	87 25 19	Residential
4	4300524	P. Evans	583 Furnace Hollow Rd.	07/14/70	80	70	36 04 32	87 25 38	Residential
5	99002519	Dickson Cty Landfill - MW-8A	100 Virgil Bellar Dr.	06/17/99	160	150	36 04 12	87 25 49	Irrigation
6	NA	Kaye Stewart	738/740 Furnace Hollow Rc	Unknown	NA	NA	36 04 16	87 26 06	Residential
7	NA	Sullivan Well	738 Furnace Hollow Rd.	Unknown	NA	NA	36 04 16	87 26 06	Residential
8	4309030	J. Robinson	125 Robinson Rd.	Unknown	140	0	36 04 02	87 25 05	Residential
9	4309023	D.W. Fielder	119 Sullivan Rd.	Unknown	115	115	36 03 53	87 24 45	Residential
10	4309046	D. Donegan	910 Hwy 48 South	Unknown	125	0	36 03 43	87 24 45	Residential
11	4300525	R. Holt	334 Eno Rd.	07/16/70	300	260	36 03 47	87 25 23	Residential
12	4300852	H. Holt	340 Eno Rd.	06/25/73	340	0	36 03 47	87 25 26	Residential
13	4300052	J. Holt	339 Eno Rd.	03/25/64	129	125	36 03 44	87 25 26	Residential
14	4300358	J. Puckett	440 Eno Rd.	07/12/68	160	150	36 03 48	87 25 40	Residential
15	4300663	R. Buchanon	443 Eno Rd.	07/30/71	130	130	36 03 47	87 25 45	Residential
16	4300628	L. Pruitt	590 Eno Rd.	05/11/71	120	120	36 03 48	87 26 28	Residential
17	4309048	W.R. Street	469 Furnace Hollow Rd.	Unknown	155	0	36 03 24	87 24 54	Residential
18	4309040	D.E. Sanders	1915 Jones Creek Rd.	Unknown	110	0	36 03 09	87 25 38	Residential
19	4301385	City of Dickson - DK-21	Unknown	10/20/80	160	143	36 04 13	87 25 05	Municipal
20	NA	Sullivan Spring	738 Furnace Hollow Rd.	NA	0	0	36 04 13	87 26 05	Other
21	Unknown	J. Baggett	140 Baggett Lane	Unknown	Unkwown	Unknown	Unknown	Uknown	Residential
22	NA	Tices Spring	E. Piney Rd.	NA	0	0	NA	NA	Other
23	Unknown	City of Dickson - DK-9	408 Eno Rd.	Unknown	382	87	Unknown	Uknown	Other
24	Unknown	Hampton	797 Furnace Hollow Rd.	Unknown	Unkwown	Unknown	Unknown	Uknown	Residential
25	Unknown	B. Petty	799 Furnace Hollow Rd.	Unknown	Unkwown	Unknown	Unknown	Uknown	Residential
26	Unknown	Randy Buchanon	592 Eno Rd.	Unknown	Unkwown	Unknown	Unknown	Uknown	Residential
27	Unknown	Charles Nixon	915 Furnace Hollow Rd.	Unknown	Unkwown	Unknown	Unknown	Uknown	Residential
28	NA	Redden Spring	Jones Creek Rd.	NA	0	0	NA	NA	Other

NA: Not Applicable.

Table 2: Grou 'ater Sampling Results for Properties Located Near the Dickson ity Landfills

Site	Well/Spring Owner	Sample Date	TCE mg/L	Total VOC's mg/L	Notes
1	T. Horner	10/09/00	BDL	BDL	Current Dozer well.
2	C. Bradford	NA	NA	NA	Not Sampled - Resident Not Home - City Water Connected to Home.
3	G. Donegan	10/09/00	BDL	BDL	
4	P. Evans	10/09/00	BDL	BDL	
5	Dickson Cty Landfill - MW-8A	09/26/00	BDL	BDL	
6	Kaye Stewart	10/09/00	BDL	BDL	Same as Sullivan Well.
7	Sullivan Well	10/09/00	BDL	BDL	Same as Stewart Well.
8	J. Robinson	10/09/00	BDL	BDL	
9	D.W. Fielder	10/10/00	BDL	BDL	
10	D. Donegan	10/09/00	BDL	BDL	
11	R. Holt	NA	NA	NA	Not Sampled - Hand Dug Well - Not Used.
12	H. Holt	10/09/00	0.12	0.1266	TCE and Cis-1,2-Dichloroehene detected
13	J. Holt	10/09/00	BDL	0.0123	Ethylbenzene, Toluene, 1,2,3-Trimethylbenzene ans Xylenes detected
14	J. Puckett	10/09/00	BDL	BDL	
15	R. Buchanon	10/09/00	BDL	BDL	
16	L. Pruitt	10/09/00	BDL	BDL	
17	W.R. Street	NA	NA	NA	Not Sampled - Two wells;One Hand Dug, One Abandoned - Neither Use
18	D.E. Sanders	NA	NA	NA	Not Sampled - Well Inaccessible - Not Used.
19	City of Dickson - DK-21	10/09/00	BDL	BDL	
20	Sullivan Spring	09/20/00	0.16	0.185	
21	J. Baggett	10/10/00	BDL	BDL	
22	Tices Spring	10/10/00	BDL		
23	City of Dickson - DK-9	10/10/00	BDL	BDL	
24	Hampton	10/10/00	BDL	BDL	
25	B. Petty	10/10/00	BDL	BDL	
26	Randy Buchanon	10/09/00	BDL	BDL	
27	Charles Nixon	10/10/00	BDL	BDL	
28	Redden Spring	10/10/00	BDL	BDL	

NA: Not Applicable.
TCE: Trichloroethene.
VOC's: Volatile Organic Compounds.
BDL: Below Detection Limit; The detection limit for TCE is 0.001 mg/L.
The EPA drinking water maximum contaminant level (MCL) for TCE is 0.005 mg/L.

ENVIRONMENTAL
SCIENCE CORP.

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Mt. Juliet, TN 37122
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1-800-767-5859
Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Mr. Keith Barnhill
Gresham, Smith & Partners
1400 Nashville City Center
Nashville, TN 37219

October 16, 2000

Date Received : October 10, 2000
Description : Water - Dickson Co. Landfill
Sample ID : TICES SPRING
Collected By : K Barnhill-J Renher
Collection Date : 10/09/00 12:10

ESC Sample # : L26873-07
ESC Key : GRESH-DICKSON
Site ID :
Project # : 21183.00

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Volatile Organics						
Acetone	BDL	0.050	mg/l	8260B	10/12/00	1
Acrolein	BDL	0.050	mg/l	8260B	10/12/00	1
Acrylonitrile	BDL	0.050	mg/l	8260B	10/12/00	1
Benzene	BDL	0.0010	mg/l	8260B	10/12/00	1
Bromobenzene	BDL	0.0010	mg/l	8260B	10/12/00	1
Bromodichloromethane	BDL	0.0010	mg/l	8260B	10/12/00	1
Bromoform	BDL	0.0010	mg/l	8260B	10/12/00	1
Bromomethane	BDL	0.0010	mg/l	8260B	10/12/00	1
n Butylbenzene	BDL	0.0010	mg/l	8260B	10/12/00	1
sec-Butylbenzene	BDL	0.0010	mg/l	8260B	10/12/00	1
tert-Butylbenzene	BDL	0.0010	mg/l	8260B	10/12/00	1
Carbon tetrachloride	BDL	0.0010	mg/l	8260B	10/12/00	1
Chlorobenzene	BDL	0.0010	mg/l	8260B	10/12/00	1
Chlorodibromomethane	BDL	0.0010	mg/l	8260B	10/12/00	1
Chloroethane	BDL	0.0010	mg/l	8260B	10/12/00	1
2-Chloroethyl vinyl ether	BDL	0.050	mg/l	8260B	10/12/00	1
Chloroform	BDL	0.0050	mg/l	8260B	10/12/00	1
Chloromethane	BDL	0.0010	mg/l	8260B	10/12/00	1
2-Chlorotoluene	BDL	0.0010	mg/l	8260B	10/12/00	1
4-Chlorotoluene	BDL	0.0010	mg/l	8260B	10/12/00	1
1,2-Dibromo-3-Chloropropane	BDL	0.0020	mg/l	8260B	10/12/00	1
1,2-Dibromoethane	BDL	0.0010	mg/l	8260B	10/12/00	1
Dibromomethane	BDL	0.0010	mg/l	8260B	10/12/00	1
1,2-Dichlorobenzene	BDL	0.0010	mg/l	8260B	10/12/00	1
1,3-Dichlorobenzene	BDL	0.0010	mg/l	8260B	10/12/00	1
1,4-Dichlorobenzene	BDL	0.0010	mg/l	8260B	10/12/00	1
Dichlorodifluoromethane	BDL	0.0010	mg/l	8260B	10/12/00	1
1,1-Dichloroethane	BDL	0.0010	mg/l	8260B	10/12/00	1
1,2-Dichloroethane	BDL	0.0010	mg/l	8260B	10/12/00	1
1,1-Dichloroethene	BDL	0.0010	mg/l	8260B	10/12/00	1
cis-1,2-Dichloroethene	BDL	0.0010	mg/l	8260B	10/12/00	1
trans-1,2-Dichloroethene	BDL	0.0010	mg/l	8260B	10/12/00	1
1,2-Dichloropropane	BDL	0.0010	mg/l	8260B	10/12/00	1
1,1-Dichloropropene	BDL	0.0010	mg/l	8260B	10/12/00	1
1,3-Dichloropropane	BDL	0.0010	mg/l	8260B	10/12/00	1
cis-1,3-Dichloropropene	BDL	0.0010	mg/l	8260B	10/12/00	1
trans-1,3-Dichloropropene	BDL	0.0010	mg/l	8260B	10/12/00	1
2,2-Dichloropropane	BDL	0.0010	mg/l	8260B	10/12/00	1

BDL - Below Detection Limit
Det. Limit - Estimated Quantitation Limit(EQL)

Laboratory Certification Numbers:
A2LA - 1461-01, AIHA - 100789, AL - 40660, CA - I-2327, CT- PH-0197, FL - E87487, GA - 923, IN - C-TN-01
KY - 90010, KYUST - 0016, NC - ENV375,DW21704, ND - R-140, SC - 84004, TN - 2006, VA - 00109, WV - 233

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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Mr. Keith Barnhill
Gresham, Smith & Partners
1400 Nashville City Center
Nashville, TN 37219

October 16, 2000

Date Received : October 10, 2000
Description : Water - Dickson Co. Landfill
Sample ID : TICES SPRING
Collected By : K Barnhill-J Renher
Collection Date : 10/09/00 12:10

ESC Sample # : L25873-07
ESC Key : GRESH-DICKSON
Site ID :
Project # : 21183.00

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Di-isopropyl ether	BDL	0.0010	mg/l	8260B	10/12/00	1
Ethylbenzene	0.0021	0.0010	mg/l	8260B	10/12/00	1
Isopropylbenzene	BDL	0.0010	mg/l	8260B	10/12/00	1
p-Isopropyltoluene	BDL	0.0010	mg/l	8260B	10/12/00	1
2-Butanone (MEK)	BDL	0.050	mg/l	8260B	10/12/00	1
Methylene Chloride	BDL	0.0050	mg/l	8260B	10/12/00	1
4-Methyl-2-pentanone (MIBK)	BDL	0.050	mg/l	8260B	10/12/00	1
Methyl tert-butyl ether	BDL	0.0010	mg/l	8260B	10/12/00	1
Naphthalene	BDL	0.0010	mg/l	8260B	10/12/00	1
n-Propylbenzene	BDL	0.0010	mg/l	8260B	10/12/00	1
Styrene	BDL	0.0010	mg/l	8260B	10/12/00	1
1,1,1,2-Tetrachloroethane	BDL	0.0010	mg/l	8260B	10/12/00	1
1,1,2,2-Tetrachloroethane	BDL	0.0010	mg/l	8260B	10/12/00	1
Tetrachloroethene	BDL	0.0010	mg/l	8260B	10/12/00	1
Toluene	0.0012	0.0010	mg/l	8260B	10/12/00	1
1,2,3-Trichlorobenzene	BDL	0.0010	mg/l	8260B	10/12/00	1
1,2,4-Trichlorobenzene	BDL	0.0010	mg/l	8260B	10/12/00	1
1,1,1-Trichloroethane	BDL	0.0010	mg/l	8260B	10/12/00	1
1,1,2-Trichloroethane	BDL	0.0010	mg/l	8260B	10/12/00	1
Trichloroethene	BDL	0.0010	mg/l	8260B	10/12/00	1
Trichlorofluoromethane	BDL	0.0010	mg/l	8260B	10/12/00	1
1,2,3-Trichloropropane	BDL	0.0010	mg/l	8260B	10/12/00	1
1,2,4-Trimethylbenzene	0.0032	0.0010	mg/l	8260B	10/12/00	1
1,3,5-Trimethylbenzene	0.0010	0.0010	mg/l	8260B	10/12/00	1
Vinyl chloride	BDL	0.0010	mg/l	8260B	10/12/00	1
Xylenes, Total	0.0097	0.0030	mg/l	8260B	10/12/00	1
Surrogate Recovery						
Toluene-d8	110		% Rec.	8260B	10/12/00	1
Dibromofluoromethane	98.		% Rec.	8260B	10/12/00	1
4-Bromofluorobenzene	97.		% Rec.	8260B	10/12/00	1

Jimmy Hunt, ESC Representative

BDL - Below Detection Limit
Det. Limit - Estimated Quantitation Limit(EQL)

Laboratory Certification Numbers:
A2LA - 1461-01, AIHA - 100789, AL - 40660, CA - I-2327, CT- PH-0197, FL - E87487, GA - 923, IN - C-TN-01
KY - 90010, KYUST - 0016, NC - ENV375,DW21704, ND - R-140, SC - 84004, TN - 2006, VA - 00109, WV - 233

Note:
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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Mr. Keith Barnhill
Gresham, Smith & Partners
1400 Nashville City Center
Nashville, TN 37219

October 16, 2000

ESC Sample # : L26873-04
ESC Key : GRESH-DICKSON
Site ID :
Project # : 21183.00

Date Received : October 10, 2000
Description : Water - Dickson Co. Landfill
Sample ID : H HOLT WELL
Collected By : K Barnhill-J Renher
Collection Date : 10/09/00 10:15

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Volatile Organics						
Acetone	BDL	0.25	mg/l	8260B	10/13/00	5
Acrolein	BDL	0.25	mg/l	8260B	10/13/00	5
Acrylonitrile	BDL	0.25	mg/l	8260B	10/13/00	5
Benzene	BDL	0.0050	mg/l	8260B	10/13/00	5
Bromobenzene	BDL	0.0050	mg/l	8260B	10/13/00	5
Bromodichloromethane	BDL	0.0050	mg/l	8260B	10/13/00	5
Bromoform	BDL	0.0050	mg/l	8260B	10/13/00	5
Bromomethane	BDL	0.0050	mg/l	8260B	10/13/00	5
n-Butylbenzene	BDL	0.0050	mg/l	8260B	10/13/00	5
sec-Butylbenzene	BDL	0.0050	mg/l	8260B	10/13/00	5
tert-Butylbenzene	BDL	0.0050	mg/l	8260B	10/13/00	5
Carbon tetrachloride	BDL	0.0050	mg/l	8260B	10/13/00	5
Chlorobenzene	BDL	0.0050	mg/l	8260B	10/13/00	5
Chlorodibromomethane	BDL	0.0050	mg/l	8260B	10/13/00	5
Chloroethane	BDL	0.0050	mg/l	8260B	10/13/00	5
2-Chloroethyl vinyl ether	BDL	0.25	mg/l	8260B	10/13/00	5
Chloroform	BDL	0.025	mg/l	8260B	10/13/00	5
Chloromethane	BDL	0.0050	mg/l	8260B	10/13/00	5
2-Chlorotoluene	BDL	0.0050	mg/l	8260B	10/13/00	5
4-Chlorotoluene	BDL	0.0050	mg/l	8260B	10/13/00	5
1,2-Dibromo-3-Chloropropane	BDL	0.010	mg/l	8260B	10/13/00	5
1,2-Dibromoethane	BDL	0.0050	mg/l	8260B	10/13/00	5
Dibromomethane	BDL	0.0050	mg/l	8260B	10/13/00	5
1,2-Dichlorobenzene	BDL	0.0050	mg/l	8260B	10/13/00	5
1,3-Dichlorobenzene	BDL	0.0050	mg/l	8260B	10/13/00	5
1,4-Dichlorobenzene	BDL	0.0050	mg/l	8260B	10/13/00	5
Dichlorodifluoromethane	BDL	0.0050	mg/l	8260B	10/13/00	5
1,1-Dichloroethane	BDL	0.0050	mg/l	8260B	10/13/00	5
1,2-Dichloroethane	BDL	0.0050	mg/l	8260B	10/13/00	5
1,1-Dichloroethene	BDL	0.0050	mg/l	8260B	10/13/00	5
cis-1,2-Dichloroethene	0.0066	0.0050	mg/l	8260B	10/13/00	5
trans-1,2-Dichloroethene	BDL	0.0050	mg/l	8260B	10/13/00	5
1,2-Dichloropropane	BDL	0.0050	mg/l	8260B	10/13/00	5
1,1-Dichloropropene	BDL	0.0050	mg/l	8260B	10/13/00	5
1,3-Dichloropropane	BDL	0.0050	mg/l	8260B	10/13/00	5
cis-1,3-Dichloropropene	BDL	0.0050	mg/l	8260B	10/13/00	5
trans-1,3-Dichloropropene	BDL	0.0050	mg/l	8260D	10/13/00	5
2,2-Dichloropropane	BDL	0.0050	mg/l	8260B	10/13/00	5

BDL - Below Detection Limit
Det. Limit - Estimated Quantitation Limit(EQL)

Laboratory Certification Numbers:
A2LA - 1461-01, AIHA - 100789, AL - 40660, CA - I-2327, CT- PH-0197, FL - E87487, GA - 923, IN - C-TN-01
KY - 90010, KYUST - 0016, NC - ENV375,DW21704, ND - R-140, SC - 84004, TN - 2006, VA - 00109, WV - 233

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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Mr. Keith Barnhill
Gresham, Smith & Partners
1400 Nashville City Center
Nashville, TN 37219

October 16, 2000

Date Received : October 10, 2000
Description : Water - Dickson Co. Landfill
Sample ID : H HOLT WELL
Collected By : K Barnhill-J Renher
Collection Date : 10/09/00 10:15

ESC Sample # : L26873-04
ESC Key : GRESH-DICKSON
Site ID :
Project # : 21183.00

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Di-isopropyl ether	BDL	0.0050	mg/l	8260B	10/13/00	5
Ethylbenzene	BDL	0.0050	mg/l	8260B	10/13/00	5
Isopropylbenzene	BDL	0.0050	mg/l	8260B	10/13/00	5
p-Isopropyltoluene	BDL	0.0050	mg/l	8260B	10/13/00	5
2-Butanone (MEK)	BDL	0.25	mg/l	8260B	10/13/00	5
Methylene Chloride	BDL	0.025	mg/l	8260B	10/13/00	5
4-Methyl-2-pentanone (MIBK)	BDL	0.25	mg/l	8260B	10/13/00	5
Methyl tert-butyl ether	BDL	0.0050	mg/l	8260B	10/13/00	5
Naphthalene	BDL	0.0050	mg/l	8260B	10/13/00	5
n-Propylbenzene	BDL	0.0050	mg/l	8260B	10/13/00	5
Styrene	BDL	0.0050	mg/l	8260B	10/13/00	5
1,1,1,2-Tetrachloroethane	BDL	0.0050	mg/l	8260B	10/13/00	5
1,1,2,2-Tetrachloroethane	BDL	0.0050	mg/l	8260B	10/13/00	5
Tetrachloroethene	BDL	0.0050	mg/l	8260B	10/13/00	5
Toluene	BDL	0.0050	mg/l	8260B	10/13/00	5
1,2,3-Trichlorobenzene	BDL	0.0050	mg/l	8260B	10/13/00	5
1,2,4-Trichlorobenzene	BDL	0.0050	mg/l	8260B	10/13/00	5
1,1,1-Trichloroethane	BDL	0.0050	mg/l	8260B	10/13/00	5
1,1,2-Trichloroethane	BDL	0.0050	mg/l	8260B	10/13/00	5
Trichloroethene	0.12	0.0050	mg/l	8260B	10/13/00	5
Trichlorofluoromethane	BDL	0.0050	mg/l	8260B	10/13/00	5
1,2,3-Trichloropropane	BDL	0.0050	mg/l	8260B	10/13/00	5
1,2,4-Trimethylbenzene	BDL	0.0050	mg/l	8260B	10/13/00	5
1,3,5-Trimethylbenzene	BDL	0.0050	mg/l	8260B	10/13/00	5
Vinyl chloride	BDL	0.0050	mg/l	8260B	10/13/00	5
Xylenes, Total	BDL	0.015	mg/l	8260B	10/13/00	5
Surrogate Recovery						
Toluene-d8	100		% Rec.	8260B	10/13/00	5
Dibromofluoromethane	89.		% Rec.	8260B	10/13/00	5
4-Bromofluorobenzene	87.		% Rec.	8260B	10/13/00	5

Jimmy Hunt, ESC Representative

BDL - Below Detection Limit
Det. Limit - Estimated Quantitation Limit(EQL)

Laboratory Certification Numbers:
AZLA - 1461-01, AIHA - 100789, AL - 40660, CA - I-2327, CT- PH-0197, FL - E87487, GA - 923, IN - C-TN-01
KY - 90010, KYUST - 0016, NC - ENV375,DW21704, ND - R-140, SC - 84004, TN - 2006, VA - 00109, WV - 233

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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Mr. Keith Barnhill
Gresham, Smith & Partners
1400 Nashville City Center
Nashville, TN 37219

October 16, 2000

Date Received : October 10, 2000
Description : Water - Dickson Co. Landfill
Sample ID : J HOLT WELL
Collected By : K Barnhill-J Renher
Collection Date : 10/09/00 10:51

ESC Sample # : L26873-03
ESC Key : GRESH-DICKSON
Site ID :
Project # : 21183.00

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Volatile Organics						
Acetone	BDL	0.050	mg/l	8260B	10/11/00	1
Acrolein	BDL	0.050	mg/l	8260B	10/11/00	1
Acrylonitrile	BDL	0.050	mg/l	8260B	10/11/00	1
Benzene	BDL	0.0010	mg/l	8260B	10/11/00	1
Bromobenzene	BDL	0.0010	mg/l	8260B	10/11/00	1
Bromodichloromethane	BDL	0.0010	mg/l	8260B	10/11/00	1
Bromoform	BDL	0.0010	mg/l	8260B	10/11/00	1
Bromomethane	BDL	0.0010	mg/l	8260B	10/11/00	1
n-Butylbenzene	BDL	0.0010	mg/l	8260B	10/11/00	1
sec-Butylbenzene	BDL	0.0010	mg/l	8260B	10/11/00	1
tert-Butylbenzene	BDL	0.0010	mg/l	8260B	10/11/00	1
Carbon tetrachloride	BDL	0.0010	mg/l	8260B	10/11/00	1
Chlorobenzene	BDL	0.0010	mg/l	8260B	10/11/00	1
Chlorodibromomethane	BDL	0.0010	mg/l	8260B	10/11/00	1
Chloroethane	BDL	0.0010	mg/l	8260B	10/11/00	1
2-Chloroethyl vinyl ether	BDL	0.050	mg/l	8260B	10/11/00	1
Chloroform	BDL	0.0050	mg/l	8260B	10/11/00	1
Chloromethane	BDL	0.0010	mg/l	8260B	10/11/00	1
2-Chlorotoluene	BDL	0.0010	mg/l	8260B	10/11/00	1
4-Chlorotoluene	BDL	0.0010	mg/l	8260B	10/11/00	1
1,2-Dibromo-3-Chloropropane	BDL	0.0020	mg/l	8260B	10/11/00	1
1,2-Dibromoethane	BDL	0.0010	mg/l	8260B	10/11/00	1
Dibromomethane	BDL	0.0010	mg/l	8260B	10/11/00	1
1,2-Dichlorobenzene	BDL	0.0010	mg/l	8260B	10/11/00	1
1,3-Dichlorobenzene	BDL	0.0010	mg/l	8260B	10/11/00	1
1,4-Dichlorobenzene	BDL	0.0010	mg/l	8260B	10/11/00	1
Dichlorodifluoromethane	BDL	0.0010	mg/l	8260B	10/11/00	1
1,1-Dichloroethane	BDL	0.0010	mg/l	8260B	10/11/00	1
1,2-Dichloroethane	BDL	0.0010	mg/l	8260B	10/11/00	1
1,1-Dichloroethene	BDL	0.0010	mg/l	8260B	10/11/00	1
cis-1,2-Dichloroethene	BDL	0.0010	mg/l	8260B	10/11/00	1
trans-1,2-Dichloroethene	BDL	0.0010	mg/l	8260B	10/11/00	1
1,2-Dichloropropane	BDL	0.0010	mg/l	8260B	10/11/00	1
1,1-Dichloropropene	BDL	0.0010	mg/l	8260B	10/11/00	1
1,3-Dichloropropane	BDL	0.0010	mg/l	8260B	10/11/00	1
cis-1,3-Dichloropropene	BDL	0.0010	mg/l	8260B	10/11/00	1
trans-1,3-Dichloropropene	BDL	0.0010	mg/l	8260B	10/11/00	1
2,2-Dichloropropane	BDL	0.0010	mg/l	8260B	10/11/00	1

BDL - Below Detection Limit
Det. Limit - Estimated Quantitation Limit(EQL)

Laboratory Certification Numbers:
A2LA - 1461-01, AIHA - 100789, AL - 40660, CA - I-2327, CT- PH-0197, FL - E87487, GA - 923, IN - C-TN-01
KY - 90010, KYUST - 0016, NC - ENV375,DW21704, ND - R-140, SC - 84004, TN - 2006, VA - 00109, WV - 233

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Est. 1970

REPORT OF ANALYSIS

Mr. Keith Barnhill
Greeham, Smith & Partners
1400 Nashville City Center
Nashville, TN 37219

October 16, 2000

Date Received : October 10, 2000
Description : Water - Dickson Co. Landfill
Sample ID : J HOLT WELL
Collected By : K Barnhill-J Renher
Collection Date : 10/09/00 10:51

ESC Sample # : L26873-03
ESC Key : GRESH-DICKSON
Site ID :
Project # : 21183.00

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Di-isopropyl ether	BDL	0.0010	mg/l	8260B	10/11/00	1
Ethylbenzene	0.0022	0.0010	mg/l	8260B	10/11/00	1
Isopropylbenzene	BDL	0.0010	mg/l	8260B	10/11/00	1
p-Isopropyltoluene	BDL	0.0010	mg/l	8260B	10/11/00	1
2-Butanone (MEK)	BDL	0.050	mg/l	8260B	10/11/00	1
Methylene Chloride	BDL	0.0050	mg/l	8260B	10/11/00	1
4-Methyl-2-pentanone (MIBK)	BDL	0.050	mg/l	8260B	10/11/00	1
Methyl tert-butyl ether	BDL	0.0010	mg/l	8260B	10/11/00	1
Naphthalene	BDL	0.0010	mg/l	8260B	10/11/00	1
n-Propylbenzene	BDL	0.0010	mg/l	8260B	10/11/00	1
Styrene	BDL	0.0010	mg/l	8260B	10/11/00	1
1,1,1,2-Tetrachloroethane	BDL	0.0010	mg/l	8260B	10/11/00	1
1,1,2,2-Tetrachloroethane	BDL	0.0010	mg/l	8260B	10/11/00	1
Tetrachloroethene	BDL	0.0010	mg/l	8260B	10/11/00	1
Toluene	0.0013	0.0010	mg/l	8260B	10/11/00	1
1,2,3-Trichlorobenzene	BDL	0.0010	mg/l	8260B	10/11/00	1
1,2,4-Trichlorobenzene	BDL	0.0010	mg/l	8260B	10/11/00	1
1,1,1-Trichloroethane	BDL	0.0010	mg/l	8260B	10/11/00	1
1,1,2-Trichloroethane	BDL	0.0010	mg/l	8260B	10/11/00	1
Trichloroethene	BDL	0.0010	mg/l	8260B	10/11/00	1
Trichlorofluoromethane	BDL	0.0010	mg/l	8260B	10/11/00	1
1,2,3-Trichloropropane	BDL	0.0010	mg/l	8260B	10/11/00	1
1,2,4-Trimethylbenzene	0.0015	0.0010	mg/l	8260B	10/11/00	1
1,3,5-Trimethylbenzene	BDL	0.0010	mg/l	8260B	10/11/00	1
Vinyl chloride	BDL	0.0010	mg/l	8260B	10/11/00	1
Xylenes, Total	0.0073	0.0030	mg/l	8260B	10/11/00	1
Surrogate Recovery						
Toluene-d8	100		% Rec.	8260B	10/11/00	1
Dibromofluoromethane	100		% Rec.	8260B	10/11/00	1
4-Bromofluorobenzene	83.		% Rec.	8260B	10/11/00	1

Jimmy Hunt, ESC Representative

BDL - Below Detection Limit
Det. Limit - Estimated Quantitation Limit(EQL)

Laboratory Certification Numbers:
A2LA - 1461-01, AIHA - 100789, AL - 40660, CA - I-2327, CT- PH-0197, FL - E87487, GA - 923, IN - C-TN-01
KY - 90010, KYUST - 0016, NC - ENV375,DW21704, ND - R-140, SC - 84004, TN - 2006, VA - 00109, WV - 233

Note:
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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Mr. Keith Barnhill
Gresham, Smith & Partners
1400 Nashville City Center
Nashville, TN 37219

September 29, 2000

Date Received : September 21, 2000
Description : Water - Dickson Co.
Sample ID : SULLIVAN SPRING
Collected By : Barnhill/Repsher
Collection Date : 09/20/00 13:05

ESC Sample # : L25474-01
ESC Key : GRESH-19135.00
Site ID :
Project # : 19135.00

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Chloride	4.4	1.0	mg/l	9056	09/22/00	1
Fluoride	0.14	0.10	mg/l	9056	09/24/00	1
Sulfate	BDL	5.0	mg/l	9056	09/22/00	1
Alkalinity	150	1.0	mg/l	310.2	09/28/00	1
Thallium	BDL	0.0010	mg/l	6020	09/22/00	1
Mercury	BDL	0.00020	mg/l	7470A	09/27/00	1
Antimony	BDL	0.0020	mg/l	6010B	09/22/00	1
Arsenic	BDL	0.0050	mg/l	6010B	09/22/00	1
Barium	0.016	0.0020	mg/l	6010B	09/22/00	1
Beryllium	BDL	0.0020	mg/l	6010B	09/22/00	1
Cadmium	BDL	0.0020	mg/l	6010B	09/22/00	1
Chromium	BDL	0.0020	mg/l	6010B	09/25/00	1
Cobalt	BDL	0.010	mg/l	6010B	09/22/00	1
Copper	BDL	0.010	mg/l	6010B	09/22/00	1
Lead	BDL	0.0050	mg/l	6010B	09/25/00	1
Magnesium	6.5	0.10	mg/l	6010B	09/25/00	1
Nickel	BDL	0.010	mg/l	6010B	09/22/00	1
Potassium	BDL	0.50	mg/l	6010B	09/25/00	1
Selenium	0.0091	0.0050	mg/l	6010B	09/25/00	1
Silver	BDL	0.0020	mg/l	6010B	09/22/00	1
Sodium	2.2	0.50	mg/l	6010B	09/25/00	1
Vanadium	BDL	0.010	mg/l	6010B	09/22/00	1
Zinc	BDL	0.010	mg/l	6010B	09/25/00	1
Volatile Organics						
Acetone	BDL	0.050	mg/l	8260B	09/24/00	1
Acrylonitrile	BDL	0.050	mg/l	8260B	09/24/00	1
Benzene	BDL	0.0010	mg/l	8260B	09/24/00	1
Bromochloromethane	BDL	0.0010	mg/l	8260B	09/24/00	1
Bromodichloromethane	BDL	0.0010	mg/l	8260B	09/24/00	1
Bromoform	BDL	0.0010	mg/l	8260B	09/24/00	1
Bromomethane	BDL	0.0010	mg/l	8260B	09/24/00	1
Carbon disulfide	BDL	0.050	mg/l	8260B	09/24/00	1
Carbon tetrachloride	BDL	0.0010	mg/l	8260B	09/24/00	1
Chlorobenzene	BDL	0.0010	mg/l	8260B	09/24/00	1

BDL - Below Detection Limit
Det. Limit - Estimated Quantitation Limit(EQL)

Laboratory Certification Numbers:
A2LA - 1461-01, AIHA - 100789, AL - 40660, CA - I-2327, CT- PH-0197, FL - E87487, GA - 923, IN - C-TN-01
KY - 90010, KYUST - 0016, NC - ENV375,DW21704, ND - R-140, SC - 84004, TN - 2006, VA - 00109, WV - 233