OPERATION/CONSTRUCTION MANAGERS

CIVIL/SANITARY ENGINEERS

Municipal Services Engineering Company, P.A.

PO Box 97, Garner, North Carolina 27529 (919) 772-5393

PO Box 349, Boone, North Carolina 28607 (828) 262-1767

October 31, 2001

Mr. Mark Poindexter
Solid Waste Section
Division of Waste Management
North Carolina Department of Environment and Natural Resources
401 Oberlin Road, Suite 150
Raleigh, NC 27605



Re: Groundwater Assessment and Corrective Measures
Alexander County Landfill
MESCO Project No. G01002.0

Dear Mr. Poindexter:

## Introduction

On behalf of Alexander County, Municipal Engineering Services Co., P.A. (MESCO) has completed an initial groundwater assessment work plan developed for the Alexander County Closed Sanitary Landfill located near Taylorsville, North Carolina. This report is completed in response to concerns raised by the County and the Solid Waste Section on the issue of leachate migration contaminating the aquifer in the landfill area. The purpose of this report is to characterize the extent of migration, and to make recommendations in order to improve the monitoring capability of the existing system.

## Site Description

### Location

The landfill site is located approximately 6 miles to the south of Taylorsville, and 3 miles to the east of Taylorsville Beach. Found in the vicinity of the site are the Oxford Dam created in 1927 by Duke Power, and the Lake Hickory—a artificial reservoir created following the completion of the dam. The Catawba River flows eastward from the toe of the Oxford Dam, and later turns its course to the south and continues into Iredell County. The landfill site sits directly to the north of the Catawba River, which is believed to be the primary zone of discharge for the regional aquifer. Feeding into the Catawba River are two tributaries bounding eastern and western sides of the landfill area. On the eastern side is an unnamed tributary of the Catawba River, while on the western side is the Little River, which itself is a tributary of the Catawba River.

### Geology and Hydrogeology

The Alexander County Landfill is located in the Piedmont physiographic and Inner Piedmont geologic provinces that are characterized by gently rolling hills with moderately sloped valleys. The landfill has approximately 110 feet of relief, and the aquifer at the site consists of three layers of formations; the uppermost unconsolidated regolith, the underlying fractured rock layer, and the highly weathered rock layer found between the two. The regolith consists of soil composed of tan to orange clayey silty, coarse to find sand, and saprolite produced by in-place weathering of interlayed schist and gneiss. The groundwater typically occurs 20 to 40 feet below ground surface, but shallow groundwater is found in the draws or near the drainage features. Although water is typically found within highly weathered rock or underlying fractured bedrock, it is occasionally found in the unconsolidated formation. Groundwater flow at the site generally follows the overall topography; the primary direction of flow is to the south, while the groundwater on the western portion of the landfill area flows west to southwesterly and the groundwater on the northern side flows westward.

### Site History

The Alexander County Landfill can be divided into two portions; the western portion was closed prior to October 9, 1991, while the eastern portion was closed and capped in mid-1999. Prior to the cap closure, this area was used to accept municipal solid waste. The southeastern part of the western portion of the landfill is currently utilized for accepting construction and demolition (C&D) waste since 1998, and the County is planning to utilize the remainder of the western portion for future C&D cells.* The transfer station was built in 1998 directly to the southwest of the current C&D cell, and is connected with the scale house through access road that runs across the closed landfill.

The site currently has 14 monitoring wells being sampled semiannually. Originally, four monitoring wells numbered from MW-1 through MW-4 were installed in 1990 by Trigon Engineering. Five additional wells (MW-1A, and MW-5 through MW-8) and one replacement well (MW-4R to replace MW-4) were later installed in 1994 by GAI Consultants. In 2000, seven additional wells were installed by Graham & Currie under the supervision of MESCO in areas downgradient of the then-existing monitoring wells to assess the extent of leachate migration. Plate 2 shows the locations of all of the monitoring wells mentioned herein. In addition to the groundwater monitoring wells, five surface water sampling points (SW-1 through SW-5) are placed at the locations shown in Plate 3, but usually SW-1 and SW-4 are not sampled due to dryness. ←

## Detection Trend

### Overall Trend

A complete list of volatile organic compounds (VOCs) detected at the Alexander County Landfill site since 1994 is provided in Table 1. Table 2 provides a summary of detections in each monitoring well. The overall detection history at the site can be characterized by its frequent

*The cells labeled Phase 1, Phase 3 and Phase 4 in Plate 1 are currently accepting waste. The Phase 2 will start accepting waste once these three cells reach their capacity.

detections of 1,1-dichloroethane (1,1DCA), cis-1,2-dichloroethylene (cDCE), and benzene. These three compounds have been consistently detected in the 7-year sampling history at the majority of the existing monitoring wells. Figure 1, 2 and 3 show the geographical variance in the levels of these compounds in the June-2001 sampling event. Shown in Figure 1 are the levels of cDCE at the monitoring well locations. Figure 1 shows that, though cDCE in general are found at the majority of the well locations, the area to the immediate east of the transfer station depicts the highest concentrations of cDCE, while the area north of the landfill depicts the lowest. 1,1DCA (Figure 2) shows a trend similar to that of cDCE with its overall concentrations being relatively lower. The only exceptions are 1) the highest concentration of 1,1DCA is found in the north area where the levels of cDCE are found lowest, and 2) levels of 1,1DCA have shown a significant decline in the area east of the transfer station where levels of cDCE are still high Levels of benzene (Figure 3), while showing a similar trend, are generally lower than those of 1,1DCA or cDCE. 1,4-Dichlorobenzene, as Figure 4 depicts, is detected only in MW-3, MW-11 and MW-12. With the exception of one-time detection of 1,4-Dichlorobenzene in MW-2 in the December 1999 sampling, no other monitoring wells have ever shown a detection of this compound.

## Area of MW-1 and MW-1A

Shown in Figure 5 are time-series plots for three indicator VOCs detected in MW-1. It is depicted in Figure 5 that cDCE has constantly detected with its levels fluctuating between 15 and 20 ug/L. 1,1DCA and benzene have been continuously detected since the November-1999 sampling event, and their levels do not appear to show a declining trend. MW-1A, on the other hand, only shows three historical VOC detections[†] none of which exceeded regulatory standard, and it did not detect any VOCs in the past two sampling events. This evidence suggests that, though the contamination in MW-1 is still present, the plume has not reached the property boundary at which MW-1A is located.

Though MW-1A has a relatively clean sampling history, the well is occasionally found to have little water available for sampling. Because this well is currently use as the only background well for the entire portion of this landfill site, this situation should be remedied. We therefore recommend an additional background well be installed in order to ensure availability of background sample should MW-1A fail to provide sufficient amount of water sample for the future sampling events.

## Area of MW-8 and MW-15

The area west of the scale house and to the immediate north of the western section of the closed landfill is currently monitored with two monitoring wells (MW-8 and MW-15). 1,1DCA had been consistently detected in MW-8 up to December 1999, and has not been detected thereafter (Figure 12). One-time detections of chloroethane, cDCE and trichloroethylene were cited in the December 1997 sampling event, but these compounds were no longer detected in the subsequent sampling events. Though carbon disulfide is detected occasionally, all the detections occur in the summer months, thus the detections of this compound is likely not associated with leachate migration. Detection of carbon disulfide with seasonal variance is usually associated with microbial activities in subsurface, for carbon disulfide is a known by-product of the actions of microorganisms.

[†] one-time detection of 11DCA on 12/3/1997, and two xylene detections on 12/3/1997 and 11/18/1998

Currently, carbon disulfide is the only compound detected in MW-8 on a regular basis. No other VOCs have been detected since December 1999.

Detection trend of MW-15 does not necessarily follow that of MW-8. Though the intent of MW-15 was to monitor the area hydraulically downgradient of MW-8, levels of 1,1DCA and benzene were found higher in MW-15 than in MW-8. In fact, the level of 1,1DCA was found highest in MW-15 in the latest June-2001 sampling event. This may suggest that MW-8 and MW-15 do not share the same contaminant source, even though the potentiometric map depicts a momentum of flow from MW-8 toward MW-15. In order to alleviate this situation, an additional monitoring well is necessary in the area north of MW-15 to determine the extent of northerly plume migration. This will also allow us to determine more reliably the direction of groundwater flow in this area by having three points of references.

## Area of MW-2 and MW-14

MW-2 was only sampled successively up to May 1996, and December 1999.‡ Up to 1996, the well had showed detections of 1,1DCA, cDCE, chloroethane, benzene and trichloroethylene (TCE) with levels showing a declining trend. Results of the last conducted sampling event of December 1999 showed only two VOC detections (1,1DCA and cDCE). MW-14, on the other hand, has gone through two sampling events after its installation, and so far has shown detections of only 1,1DCA and cDCE. These findings suggest that the levels of VOCs have been sufficiently reduced over the duration of 7 years owning to natural attenuation. If this natural attenuation continues at the level currently observed, the concentrations of 1,1DCA and cDCE in this area will eventually be declined to a desirable level. Nevertheless, an additional monitoring well farther downgradient of MW-14 can be used as a conservative measure, and also to track the current location of the plume fringe in this particular locale.

## Area of MW-6 and MW-13

MW-6 has historically shown only a few VOC detections none of which exceeded regulatory standard. The detected constituents are limited to carbon disulfide and 1,1DCA in the recent sampling events. No trace metals were detected in MW-6 above regulatory standard. MW-13 has so far detected no VOCs other than carbon disulfide, reassuring that the contaminant plume has not migrated passed the location of this monitoring well. Given these observations, we see no indication of advancement of leachate migration in this area, thus no additional monitoring well will be necessary.

## Area of MW-5 and MW-10

Figure 10 shows time-series plots of three VOCs that are commonly detected in MW-5 (*i.e.* 1,1DCA, cDCE and benzene). The figure depicts consistent detections of 1,1DCA over the entire 7-year sampling history. After its peak in June 1998, the levels seem to have slightly declined, yet have not reached below detection limit in the subsequent sampling events. In addition, MW-5

‡MW-2 is currently used only for water level measurement due to its casing damage.

started to frequently detect cDCE and benzene starting with the December 1997 sampling event. In contrast to these findings on MW-5, MW-10 has shown no detection of indicator VOCs (see Table 2). The only VOC detection ever cited in MW-10 is of carbon disulfide in the latest sampling of June 2001.

It is reassuring that no contaminants are found in MW-10, which is located hydraulically downgradient of MW-5. However, due to a general lack of piezometric data in this area,[§] we cannot rule out the possibility that a portion of groundwater may migrate eastward into the drainage feature east of the landfill property. It is therefore our recommendation to install an additional monitoring well to the east to southeast of the current location of MW-5 near the drainage feature. In addition to obtaining the chemistry data, this well will also provide us with a means to more reliably determine the direction of flow.

It is also important to note that, SW-3—a surface water sampling point located in the drainage feature—detected 1,1DCA with a level comparable to the level in MW-5.[¶] This strongly indicates that the leachate has already discharged into this drainage feature, which may necessitate the need to have an additional monitoring well on the east side of the creek in order to detect farther migration of the leachate beyond this point.

## Area of MW-4R and MW-9

Levels of 1,1DCA and cDCE have shown little fluctuations in MW-4R over the last 7 years (Figure 9). Accompanying the detections of 1,1DCA and cDCE are less frequent detections of benzene, chloroethane, and carbon disulfide (see Table 2). Carbon disulfide was detected only in the summer sampling events, and was never detected in winter. This trend is consistent with the remainder of the monitoring wells that showed frequent detections of carbon disulfide. In addition, alpha-BHC was detected several times between in 1997 and 1998. This may indicate a release of insecticide in this area as BHCs, inclusive of alpha, beta and gamma isomers, are used almost exclusively as insecticide. MW-9, on the other hand, only shows detections of 1,1DCA and cDCE whose levels show decrease between the latest two sampling events. Levels of 1,1DCA and cDCE also drop from 5.2 ug/L to ND, and 15 ug/L to 11 ug/L, respectively, between MW-4R and MW-9, indicative of an occurrence of natural attenuation with distance.

Migration of benzene appears to be limited in this area. Although benzene was detected in MW-4R in the June-2001 sampling event, so far it has not been detected in MW-9. Overall, the migration of benzene appears to occur at a much slower pace than the migration of aliphatic compounds such as 1,1DCA or cDCE. This may be explained by the fact that benzene, and other aromatic compounds in general, has a $K_{oc}$ value much higher than the value of the aliphatic counterparts. Generally, a compound with a higher $K_{oc}$ travels faster than a compound with a lower $K_{oc}$.

These findings indicate that 1,1DCA and cDCE are going through a natural attenuation process as evidenced by their reduced concentrations in the downgradient well (MW-9). This, coupled with the fact that the detection rate of aromatic compounds (especially benzene) are very low in these two monitoring wells, assures us that the extent of the leachate migration is relatively limited in

[§] At least three points of reference are necessary to determine flow direction by means of triangulation

[¶] 11DCA was detected at 9 $\mu$L at SW-3 while it was detected at 12 $\mu$L in MW-5 in the June-2001 sampling event.

this area. Nevertheless, an additional monitoring well in the area downgradient of MW-9 should be installed to proactively detect any farther migration of the leachate plume.

## Area around Transfer Station

Monitoring wells located in areas near the transfer station show a distinct trend in terms of types of VOCs detected, their historical trends, and their locational variance. MW-3—the well located to the immediate south of the current C&D cell—has shown detections of the key aliphatic compounds (1,1DCA, cDCE, chloroethane) plus 1,2-dichloropropane (1,2DCP). 1,2DCP was consistently detected during the baseline sampling in 1994 through 1995, but was detected only once thereafter. No other monitoring wells at the site have ever detected 1,2DCP. Also unique in MW-3 are the detections of BTEX compounds, *i.e.* benzene, toluene, ethylbenzene and xylene. BTEX compounds are commonly used as indicators for a release of gasoline, and the detections of BTEX compounds in MW-3 indicate that there may have been a release of gasoline or petroleum-laden materials in the area upgradient of MW-3. The fact that 1,2DCP is also used as a lead scavenger in the production of unleaded gasoline agrees with this speculation. However, this release was probably of short-term, and occurred prior to the inception of the monitoring, as the levels of the BTEX compounds had only declined since their detections in the first baseline sampling event.

Levels of cDCE in MW-3, on the other hand, have been showing a steady rise through present, while the levels of all the other detected aliphatic compounds have already declined below detection limit (Figure 7). What especially strikes as odd is the fact that the levels of 1,1DCA has already dropped to non-detects while cDCE is showing an increasing trend. It has been commonly observed that, if 1,1DCA and cDCE are released from the same source, they usually exhibit similar trends as they possess chemical properties that are fairly comparable. This implies that the release of cDCE may either have originated from a source different from that of the other detected compounds, or may have occurred more subsequently than the release of the other VOCs.

Though MW-11—the well downgradient of MW-3—bears similarity to MW-3 in terms of detected compounds, some compounds, especially 11DCA, cDCE and 1,4-dichlorobenzene were found with levels higher in MW-11 than in MW-3 in the June-2001 sampling event. This is very unlikely should the landfill be the only source of these compounds. The above assertion that there is another source of the contaminants should therefore be evaluated.

The comparison of trends between MW-7 and MW-12—the wells located on the west side of the transfer station—appears to show resemblance to that between MW-3 and MW-11 in the sense that both 11DCA and cDCE are higher in the downgradient well than in the upgradient well. In addition to 11DCA and cDCE, concentration of benzene was also found higher in the downgradient well (MW-12). Furthermore, two compounds, namely dichloromethane and 1,4-dichlorobenzene (14DCB), were found in MW-12, but were not detected in MW-7 in the June sampling event. In MW-7, dichloromethane was detected only up to 1995, and 14DCB was never detected. Currently, MW-3, MW-11 and MW-12 are the only monitoring wells that detect 14DCB on a consistent basis. 14DCB is a chemical commonly used to deodorize restrooms or waste containers. Because of the fact that only the wells around the transfer station have detected 14DCB, the transfer station is the most likely source of this compound. Thus, use of chemicals at the transfer station facility needs to be determined in order to identify the point of release of this chemical.

Because of the evidence for a suspected release of chemical(s) from the transfer station, the area south of the transfer station needs to be monitored for a possible contaminant migration. The area downgradient of the septic field, in particular, needs to be monitored with a monitoring well once its location is identified.

## Conclusion and Recommendations

Monitoring wells at the Alexander County Landfill site in general exhibits trends characterized by their frequent detections of 1,1-dichloroethane (1,1DCA), cis-1,2-dichloroethylene (cDCE), and benzene. Detections of VOCs other than these three compounds were cited in the early part of the sampling history, but their levels have declined below detectable levels.

It is important to note that chlorinated aliphatic compounds, especially those with more than two chloride ions in the structure, have tendency to get transformed to 1,1DCA or cDCE by losing a chloride ion, and this transformation process takes place more readily than other possible transformations. 1,1DCA and cDCE, on the other hand, tend to be more persistent in the environment, thus are less likely to be degraded if other degradable compounds are available to the microorganisms. 1,1DCA and cDCE can therefore be good indicators for use in detecting the plume fringes. In much the same way, should the levels of 1,1DCA and cDCE show a sign of decrease, it is an indication that most of the available carbon sources have been effectively consumed, and the process of natural degradation is nearing its final stage. It is therefore an effective way to use 1,1DCA and cDCE as parameters indicative of leachate plume migration at this particular site. In conjunction with 1,1DCA and cDCE, benzene can be used as an additional indicator parameter because of its site-wide detection trend and its relative persistence in the environment.

Areas around the transfer station show consistent detections of 1,4-dichlorobenzene (1,4DCB), leading to the speculation that the release of this contaminant may have originated from the transfer station. As this compound is commonly used in deodorant for restrooms or waste containers, use of any products at the transfer station that may contain any type of deodorant need to be determined. In addition to 1,4DCB, elevated levels of cDCE and benzene found in monitoring wells in the vicinity of the transfer station also support the possibility of the transfer station releasing chemicals into the environment. Occasionally, halogenated compounds (i.e. compounds with chloride or bromide ion(s) in the structure) can be introduced into groundwater through septic systems through the use of cleaner and/or disinfectant. Thus, the location of the septic tank at the transfer station also needs to be determined in order to help identify the point(s) of release at the facility, and one or more monitoring wells need to be installed in order to monitor a release of contaminants originating from the transfer station.

Evidence for a release of gasoline, or petroleum-laden material(s) has been found in MW-3. Detections of BTEX compounds, as well as 1,2-dichloropropane which is commonly used in unleaded gasoline, were cited in the monitoring well. Levels of the BTEX compounds, however, have already dropped below detection limit except for benzene, which is known to be more persistent than the rest of the BTEX compounds.

In summary, we recommend the following actions to be taken in order to improve the monitoring capability of the Alexander County Landfill facility.

- ❑ Install seven (7) additional monitoring wells downgradient of several of the existing monitoring wells and the transfer station. The locations of the proposed monitoring wells are shown in the enclosed Plate 1.

- ❑ Inspect the transfer station and log use of chemicals at the facility. The location of the septic tank also needs to be determined.

- ❑ Continue to monitor migration of leachate plume with use of 1,1DCA, cDCE and benzene as indicator parameters.

Since all of the currently detected compounds fall under the list of Appendix I constituents, we do not see the need to initiate site-wide Appendix II monitoring. However, temporal Appendix II monitoring on MW-3, MW-11 and MW-12 may become necessary should the levels of the compounds detected in these particular wells continue to show increase.

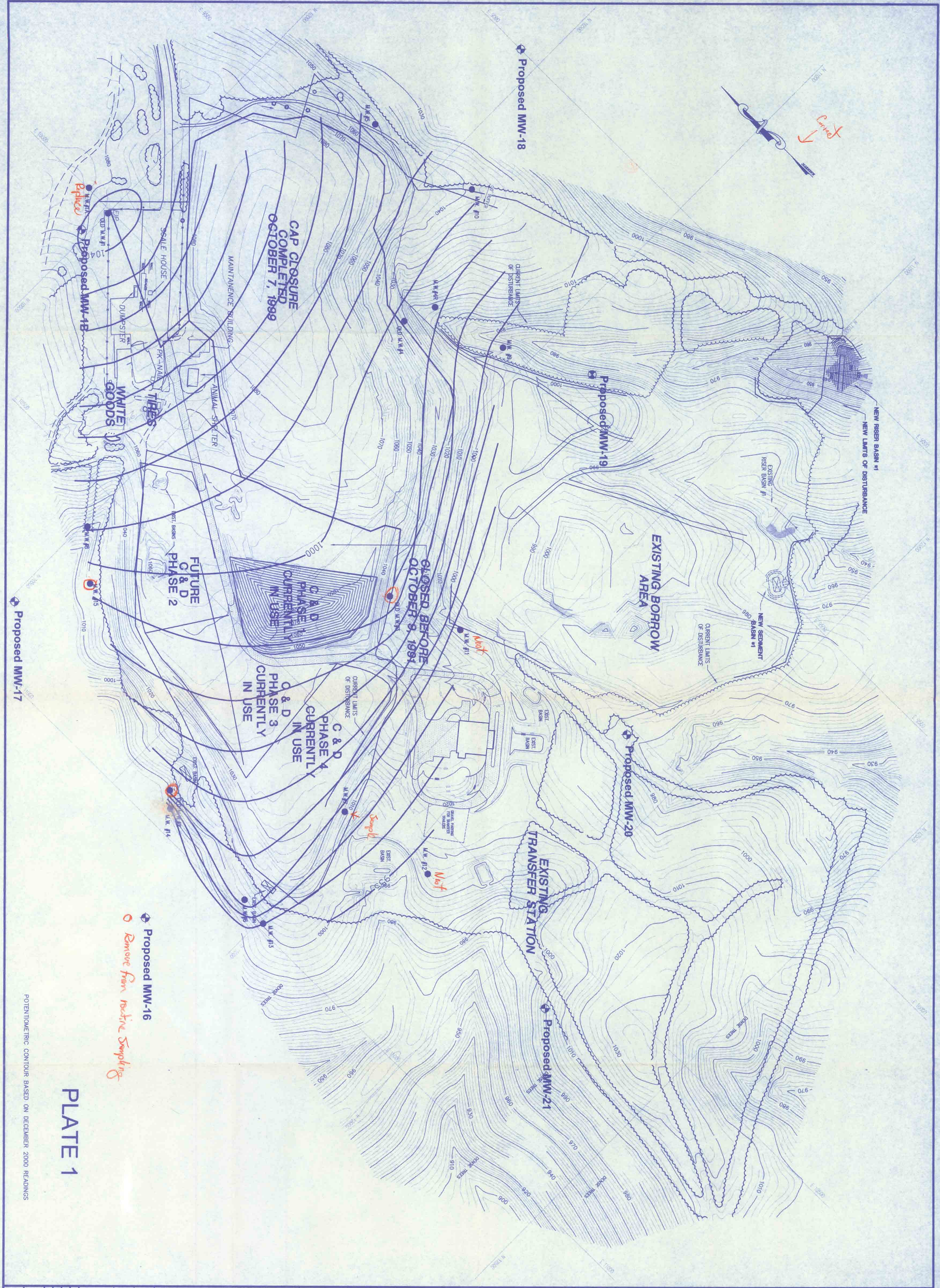
The landfill is scheduled for next sampling in December 2001. If you have any questions regarding this report, please contact either myself or Wayne Sullivan at (919) 772-5393.

Sincerely,
MUNICIPAL ENGINEERING SERVICES CO., P.A.

Kohei Yoshida, Hydrogeologist
kyoshida@mesco.com

Enclosures

cc: Mr. Rick French, Alexander County
Wayne Sullivan, Municipal Engineering
Dr. Edward Custer, P. G.




| SCALE: | 1" = 100' |
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| DATE: | 10/25/2001 |
| DRAWN BY: | L. HAMPTON |
| CHKD. BY: | M. SULLIVAN |
| PROJECT NUMBER | |
| DRAWING NO. | G01002.0 |
| SHEET NO. | |

| DATE | BY | REV. | DESCRIPTION |
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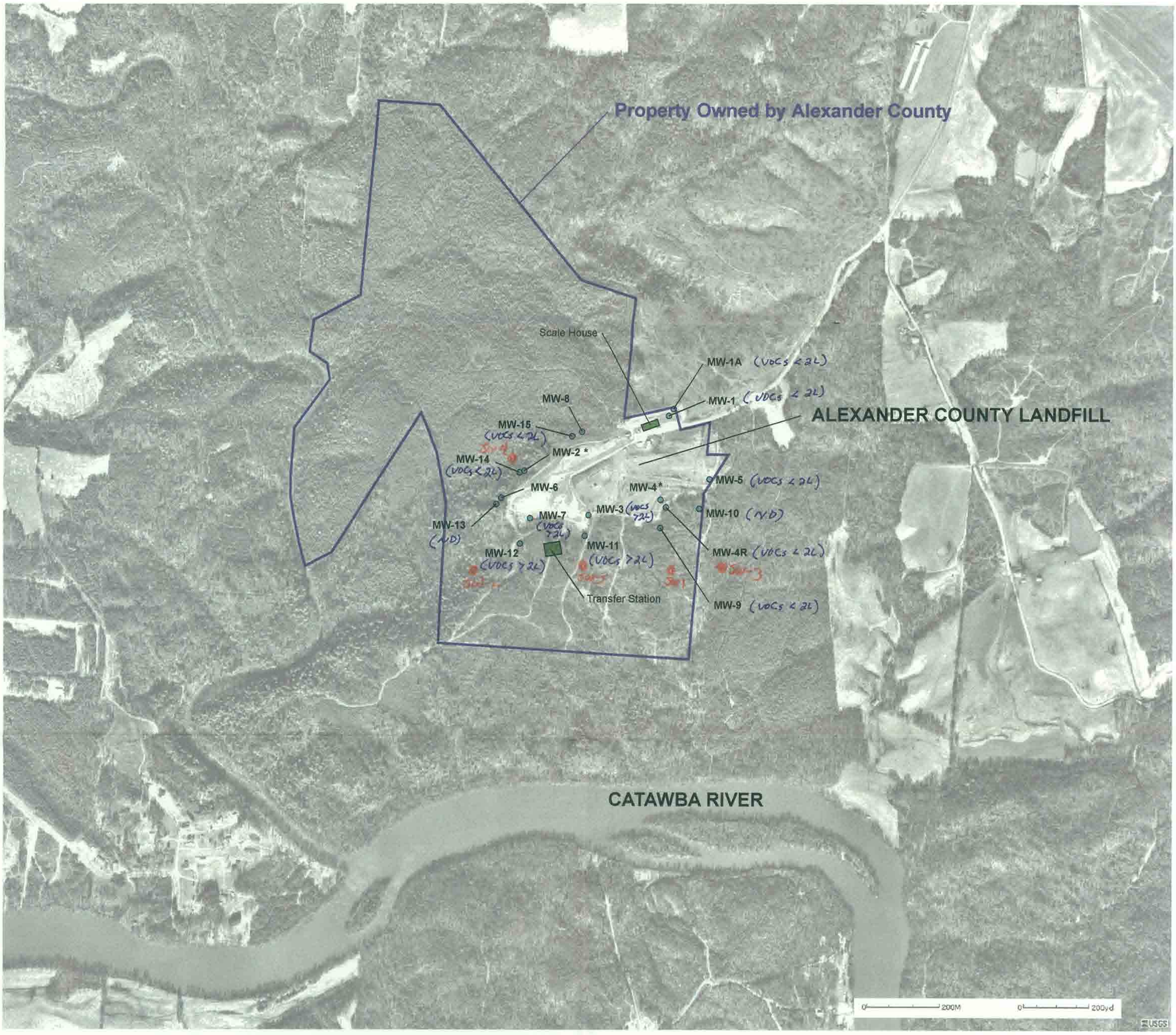
GENERAL SITE MAP WITH POTENTIOMETRIC CONTOUR

**MUNICIPAL SOLID WASTE LANDFILL FACILITY**
**ALEXANDER COUNTY**
**TAYLORSVILLE, NC**

Municipal Services Engineering Company, P.A.
P.O. BOX 97 GARNER, N.C. 27529 (919) 772-5393
P.O. BOX 349 BOONE, N.C. 28607 (828) 262-1767




MW-1 —— Monitoring Well

NOTE

1. This aerial photograph is as of 1993, and does not show the transfer station that is presently located near the southwestern boundary of the landfill (*approximately midway between MW-11 and MW-12* shown on this map).

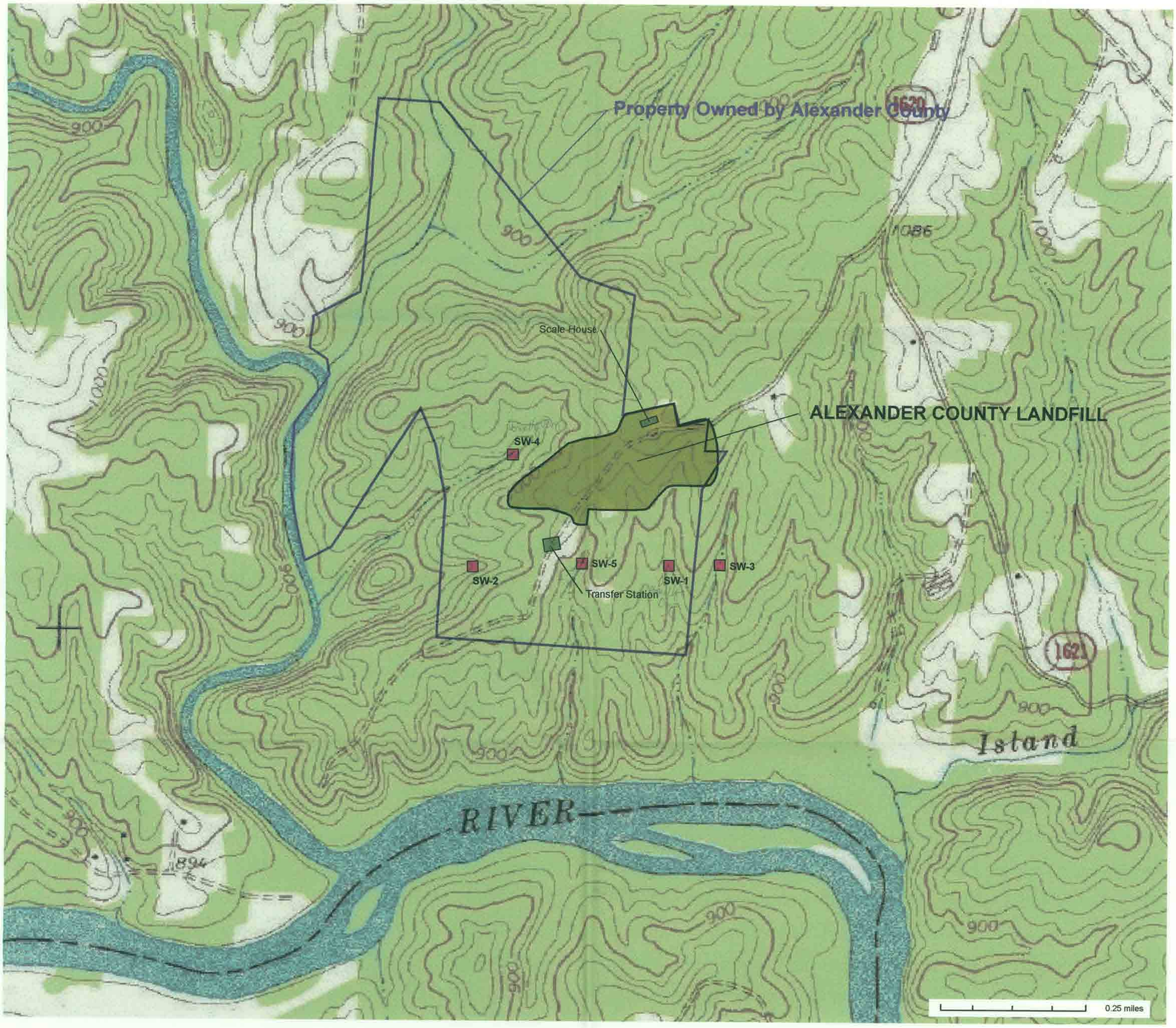
2. The property boundaries shown in this map are approximate, thus should not be used for any other purposes than intended herein.

3. MW-2 and MW-4 are no longer on the monitoring network, thus not to be sampled.

* concentration of VOCs based on 12-27-01 data

**Aerial Photograph with Property Boundaries and Monitoring Well Locations**
**Alexander County Landfill, Taylorsville, North Carolina**

**PLATE 2**




SW-3 —— Surface Water Monitoring Point

SW1
SW2 > Graded out

Shift SW4 downstream
For surface water sampling

**NOTE**

1. The property boundaries shown in this map are approximate, thus should not be used for any other purposes than intended herein.
2. This quad map is provided courtesy of USGS.

**Topographical Map with Surface Water Sampling Locations**
**Alexander County Landfill, Taylorsville, North Carolina**

**PLATE 3**

Table 1. Exceedance Scan for All Historical VOC Detections, Alexander County Landfill

| Well ID | Parameter Name [1] | Sample Date | Result | Unit | PQL [2] | MCL [3] | Exceedance |
|---|---|---|---|---|---|---|---|
| **MW-1** | | | | | | | |
| MW-1 | 1,1-Dichloroethane | 10/01/94 | 19 | ug/l | 5 | 700 | |
| MW-1 | 1,1-Dichloroethane | 01/31/95 | 17 | ug/l | 5 | 700 | |
| MW-1 | 1,1-Dichloroethane | 02/15/95 | 17 | ug/l | 5 | 700 | |
| MW-1 | 1,1-Dichloroethane | 03/07/95 | 15 | ug/l | 5 | 700 | |
| MW-1 | 1,1-Dichloroethane | 12/06/95 | 13 | ug/l | 5 | 700 | |
| MW-1 | 1,1-Dichloroethane | 05/07/96 | 16 | ug/l | 5 | 700 | |
| MW-1 | 1,1-Dichloroethane | 11/11/96 | 15 | ug/l | 5 | 700 | |
| MW-1 | 1,1-Dichloroethane | 06/24/97 | 22 | ug/l | 5 | 700 | |
| MW-1 | 1,1-Dichloroethane | 12/03/97 | 19 | ug/l | 2 | 700 | |
| MW-1 | 1,1-Dichloroethane | 06/04/98 | 19 | ug/l | 5 | 700 | |
| MW-1 | 1,1-Dichloroethane | 11/18/98 | 15.1 | ug/l | 2 | 700 | |
| MW-1 | 1,1-Dichloroethane | 05/13/99 | 20 | ug/l | 5 | 700 | |
| MW-1 | 1,1-Dichloroethane | 12/06/99 | 18 | ug/l | 5 | 700 | |
| MW-1 | 1,1-Dichloroethane | 5/17/00 | 17 | ug/l | 5 | 700 | |
| MW-1 | 1,1-Dichloroethane | 12/12/00 | 17 | ug/l | 5 | 700 | |
| MW-1 | 1,1-Dichloroethane | 6/13/01 | 15 | ug/l | 5 | 700 | |
| **MW-1** | **Benzene** | **11/18/98** | **3** | **ug/l** | **2** | 1 | 2 |
| **MW-1** | **Benzene** | **05/13/99** | **5.7** | **ug/l** | **5** | 1 | 4.7 |
| **MW-1** | **Benzene** | **12/06/99** | **5.7** | **ug/l** | **5** | 1 | 4.7 |
| **MW-1** | **Benzene** | **6/13/01** | **5.9** | **ug/l** | **5** | 1 | 4.9 |
| MW-1 | BHC, gamma | 11/18/98 | 0.055 | ug/l | 0.05 | 0.2 | |
| MW-1 | Bis(2-ethylhexyl) phthalate | 12/03/97 | 13 | ug/l | 10 | - | |
| MW-1 | Carbon disulfide | 06/24/97 | 33 | ug/l | 5 | - | |
| MW-1 | Carbon disulfide | 05/13/99 | 7.5 | ug/l | 5 | - | |
| MW-1 | Carbon disulfide | 5/17/00 | 18 | ug/l | 5 | - | |
| MW-1 | Carbon disulfide | 6/13/01 | 18 | ug/l | 5 | - | |
| MW-1 | Chloroethane | 12/03/97 | 2 | ug/l | 2 | - | |
| MW-1 | Chloroethane | 11/18/98 | 5.7 | ug/l | 2 | - | |
| MW-1 | cis-1,2-Dichloroethene | 11/18/98 | 4.9 | ug/l | 2 | 70 | |
| MW-1 | cis-1,2-Dichloroethene | 05/13/99 | 8.3 | ug/l | 5 | 70 | |
| MW-1 | cis-1,2-Dichloroethene | 12/06/99 | 8.7 | ug/l | 5 | 70 | |
| MW-1 | cis-1,2-Dichloroethene | 5/17/00 | 7.8 | ug/l | 5 | 70 | |
| MW-1 | cis-1,2-Dichloroethene | 12/12/00 | 9.7 | ug/l | 5 | 70 | |
| MW-1 | cis-1,2-Dichloroethene | 6/13/01 | 9.5 | ug/l | 5 | 70 | |
| **MW-1A** | | | | | | | |
| MW-1A | 1,1-Dichloroethane | 12/03/97 | 2 | ug/l | 1 | 700 | |
| MW-1A | Xylene | 12/03/97 | 3 | ug/l | 1 | 530 | |
| MW-1A | Xylene | 11/18/98 | 7.4 | ug/l | 2 | 530 | |

Table 1. Exceedance Scan for All Historical VOC Detections, Alexander County Landfill

| Well ID | Parameter Name [1] | Sample Date | Result | Unit | PQL [2] | MCL [3] | Exceedance |
|---|---|---|---|---|---|---|---|
| **MW-2** | | | | | | | |
| MW-2 | 1,1-Dichloroethane | 10/01/94 | 33 | ug/l | 5 | 700 | |
| MW-2 | 1,1-Dichloroethane | 01/31/95 | 26 | ug/l | 5 | 700 | |
| MW-2 | 1,1-Dichloroethane | 02/15/95 | 26 | ug/l | 5 | 700 | |
| MW-2 | 1,1-Dichloroethane | 03/07/95 | 26 | ug/l | 5 | 700 | |
| MW-2 | 1,1-Dichloroethane | 12/06/95 | 19 | ug/l | 5 | 700 | |
| MW-2 | 1,1-Dichloroethane | 05/06/96 | 11 | ug/l | 5 | 700 | |
| MW-2 | 1,1-Dichloroethane | 12/06/99 | 12 | ug/l | 5 | 700 | |
| MW-2 | 1,4-Dichlorobenzene | 12/06/99 | 5.1 | ug/l | 5 | 75 | |
| **MW-2** | **Benzene** | **02/15/95** | **5** | **ug/l** | **5** | **1** | **4** |
| **MW-2** | **Benzene** | **03/07/95** | **5** | **ug/l** | **5** | **1** | **4** |
| **MW-2** | **Benzene** | **12/06/95** | **5** | **ug/l** | **5** | **1** | **4** |
| MW-2 | Chloroethane | 10/01/94 | 22 | ug/l | 10 | - | |
| MW-2 | Chloroethane | 01/31/95 | 20 | ug/l | 10 | - | |
| MW-2 | Chloroethane | 02/15/95 | 20 | ug/l | 10 | - | |
| MW-2 | Chloroethane | 03/07/95 | 22 | ug/l | 10 | - | |
| MW-2 | Chloroethane | 12/06/95 | 14 | ug/l | 10 | - | |
| MW-2 | cis-1,2-Dichloroethene | 01/31/95 | 5 | ug/l | 5 | 70 | |
| MW-2 | cis-1,2-Dichloroethene | 02/15/95 | 6 | ug/l | 5 | 70 | |
| MW-2 | cis-1,2-Dichloroethene | 03/07/95 | 6 | ug/l | 5 | 70 | |
| MW-2 | cis-1,2-Dichloroethene | 12/06/95 | 6 | ug/l | 5 | 70 | |
| MW-2 | cis-1,2-Dichloroethene | 05/06/96 | 5 | ug/l | 5 | 70 | |
| MW-2 | cis-1,2-Dichloroethene | 12/06/99 | 13 | ug/l | 5 | 70 | |
| **MW-2** | **Trichloroethylene** | **10/01/94** | **5** | **ug/l** | **5** | **2.8** | **2.2** |
| **MW-2** | **Trichloroethylene** | **01/31/95** | **6** | **ug/l** | **5** | **2.8** | **3.2** |
| **MW-2** | **Trichloroethylene** | **02/15/95** | **6** | **ug/l** | **5** | **2.8** | **3.2** |
| **MW-2** | **Trichloroethylene** | **03/07/95** | **6** | **ug/l** | **5** | **2.8** | **3.2** |
| **MW-2** | **Trichloroethylene** | **12/06/95** | **6** | **ug/l** | **5** | **2.8** | **3.2** |
| **MW-3** | | | | | | | |
| MW-3 | 1,1-Dichloroethane | 10/01/94 | 22 | ug/l | 5 | 700 | |
| MW-3 | 1,1-Dichloroethane | 01/31/95 | 13 | ug/l | 5 | 700 | |
| MW-3 | 1,1-Dichloroethane | 02/15/95 | 18 | ug/l | 5 | 700 | |
| MW-3 | 1,1-Dichloroethane | 03/07/95 | 13 | ug/l | 5 | 700 | |
| MW-3 | 1,1-Dichloroethane | 12/07/95 | 9 | ug/l | 5 | 700 | |
| MW-3 | 1,1-Dichloroethane | 05/06/96 | 9 | ug/l | 5 | 700 | |
| MW-3 | 1,1-Dichloroethane | 11/11/96 | 8.8 | ug/l | 5 | 700 | |
| MW-3 | 1,1-Dichloroethane | 06/24/97 | 5.2 | ug/l | 5 | 700 | |
| MW-3 | 1,1-Dichloroethane | 12/03/97 | 6 | ug/l | 1 | 700 | |
| MW-3 | 1,2,4-Trimethylbenzene | 12/03/97 | 5 | ug/l | 1 | - | |
| MW-3 | 1,2,4-Trimethylbenzene | 05/13/99 | 5.8 | ug/l | 5 | - | |

**Table 1.** Exceedance Scan for All Historical VOC Detections, Alexander County Landfill

| Well ID | Parameter Name [1] | Sample Date | Result | Unit | PQL [2] | MCL [3] | Exceedance |
|---|---|---|---|---|---|---|---|
| **MW-3** | **1,2-Dichloropropane** | **10/01/94** | **11** | **ug/l** | **5** | **0.56** | **10.44** |
| **MW-3** | **1,2-Dichloropropane** | **01/31/95** | **6** | **ug/l** | **5** | **0.56** | **5.44** |
| **MW-3** | **1,2-Dichloropropane** | **02/15/95** | **9** | **ug/l** | **5** | **0.56** | **8.44** |
| **MW-3** | **1,2-Dichloropropane** | **03/07/95** | **7** | **ug/l** | **5** | **0.56** | **6.44** |
| **MW-3** | **1,2-Dichloropropane** | **12/03/97** | **2** | **ug/l** | **1** | **0.56** | **1.44** |
| MW-3 | 1,3,5-Trimethylbenzene | 12/03/97 | 2 | ug/l | 1 | - | |
| MW-3 | 1,4-Dichlorobenzene | 12/07/95 | 6 | ug/l | 5 | 75 | |
| MW-3 | 1,4-Dichlorobenzene | 11/11/96 | 5.2 | ug/l | 5 | 75 | |
| MW-3 | 1,4-Dichlorobenzene | 12/03/97 | 8 | ug/l | 1 | 75 | |
| MW-3 | 1,4-Dichlorobenzene | 06/04/98 | 7.6 | ug/l | 5 | 75 | |
| MW-3 | 1,4-Dichlorobenzene | 11/18/98 | 4.6 | ug/l | 2 | 75 | |
| MW-3 | 1,4-Dichlorobenzene | 05/13/99 | 7.4 | ug/l | 5 | 75 | |
| MW-3 | 1,4-Dichlorobenzene | 12/06/99 | 7.7 | ug/l | 5 | 75 | |
| MW-3 | 1,4-Dichlorobenzene | 5/17/2000 | 7.6 | ug/l | 5 | 75 | |
| MW-3 | 1,4-Dichlorobenzene | 12/11/2000 | 7.4 | ug/l | 5 | 75 | |
| MW-3 | 1,4-Dichlorobenzene | 6/12/2001 | 6.6 | ug/l | 5 | 75 | |
| **MW-3** | **Benzene** | **10/01/94** | **9** | **ug/l** | **5** | **1** | **8** |
| **MW-3** | **Benzene** | **01/31/95** | **8** | **ug/l** | **5** | **1** | **7** |
| **MW-3** | **Benzene** | **02/15/95** | **9** | **ug/l** | **5** | **1** | **8** |
| **MW-3** | **Benzene** | **03/07/95** | **6** | **ug/l** | **5** | **1** | **5** |
| **MW-3** | **Benzene** | **05/06/96** | **9** | **ug/l** | **5** | **1** | **8** |
| **MW-3** | **Benzene** | **11/11/96** | **11** | **ug/l** | **5** | **1** | **10** |
| **MW-3** | **Benzene** | **06/24/97** | **8.3** | **ug/l** | **5** | **1** | **7.3** |
| **MW-3** | **Benzene** | **12/03/97** | **10** | **ug/l** | **1** | **1** | **9** |
| **MW-3** | **Benzene** | **06/04/98** | **8.8** | **ug/l** | **5** | **1** | **7.8** |
| **MW-3** | **Benzene** | **11/18/98** | **5.7** | **ug/l** | **2** | **1** | **4.7** |
| **MW-3** | **Benzene** | **05/13/99** | **7.9** | **ug/l** | **5** | **1** | **6.9** |
| **MW-3** | **Benzene** | **12/06/99** | **11** | **ug/l** | **5** | **1** | **10** |
| **MW-3** | **Benzene** | **5/17/2000** | **9.5** | **ug/l** | **5** | **1** | **8.5** |
| **MW-3** | **Benzene** | **12/11/2000** | **10** | **ug/l** | **5** | **1** | **9** |
| **MW-3** | **Benzene** | **6/12/2001** | **13** | **ug/l** | **5** | **1** | **12** |
| MW-3 | BHC, alpha | 12/03/97 | 0.12 | ug/l | 0.05 | - | |
| MW-3 | Carbon disulfide | 06/24/97 | 6.6 | ug/l | 5 | - | |
| MW-3 | Carbon disulfide | 11/18/98 | 6.7 | ug/l | 2 | - | |
| MW-3 | Carbon disulfide | 5/17/2000 | 22 | ug/l | 5 | - | |
| MW-3 | Carbon disulfide | 12/11/2000 | 29 | ug/l | 10 | - | |
| MW-3 | Carbon disulfide | 6/12/2001 | 26 | ug/l | 5 | - | |
| MW-3 | Chloroethane | 10/01/94 | 12 | ug/l | 10 | - | |
| MW-3 | Chloroethane | 01/31/95 | 10 | ug/l | 10 | - | |
| MW-3 | Chloroethane | 02/15/95 | 12 | ug/l | 10 | - | |
| MW-3 | Chloroethane | 11/11/96 | 10 | ug/l | 10 | - | |
| MW-3 | Chloroethane | 12/03/97 | 12 | ug/l | 1 | - | |
| MW-3 | Chloroethane | 11/18/98 | 9.7 | ug/l | 2 | - | |
| MW-3 | cis-1,2-Dichloroethene | 10/01/94 | 12 | ug/l | 5 | 70 | |
| MW-3 | cis-1,2-Dichloroethene | 01/31/95 | 7 | ug/l | 5 | 70 | |

Table 1. Exceedance Scan for All Historical VOC Detections, Alexander County Landfill

| Well ID | Parameter Name [1] | Sample Date | Result | Unit | PQL [2] | MCL [3] | Exceedance |
|---|---|---|---|---|---|---|---|
| MW-3 | cis-1,2-Dichloroethene | 02/15/95 | 13 | ug/l | 5 | 70 | |
| MW-3 | cis-1,2-Dichloroethene | 03/07/95 | 10 | ug/l | 5 | 70 | |
| MW-3 | cis-1,2-Dichloroethene | 12/07/95 | 10 | ug/l | 5 | 70 | |
| MW-3 | cis-1,2-Dichloroethene | 05/06/96 | 13 | ug/l | 5 | 70 | |
| MW-3 | cis-1,2-Dichloroethene | 11/11/96 | 12 | ug/l | 5 | 70 | |
| MW-3 | cis-1,2-Dichloroethene | 06/24/97 | 14 | ug/l | 5 | 70 | |
| MW-3 | cis-1,2-Dichloroethene | 12/03/97 | 17 | ug/l | 1 | 70 | |
| MW-3 | cis-1,2-Dichloroethene | 06/04/98 | 17 | ug/l | 5 | 70 | |
| MW-3 | cis-1,2-Dichloroethene | 11/18/98 | 15.8 | ug/l | 2 | 70 | |
| MW-3 | cis-1,2-Dichloroethene | 05/13/99 | 20 | ug/l | 5 | 70 | |
| MW-3 | cis-1,2-Dichloroethene | 12/06/99 | 21 | ug/l | 5 | 70 | |
| MW-3 | cis-1,2-Dichloroethene | 5/17/00 | 20 | ug/l | 5 | 70 | |
| MW-3 | cis-1,2-Dichloroethene | 12/11/00 | 26 | ug/l | 5 | 70 | |
| MW-3 | cis-1,2-Dichloroethene | 6/12/01 | 25 | ug/l | 5 | 70 | |
| MW-3 | Cumene | 12/03/97 | 2 | ug/l | 1 | - | |
| **MW-3** | **Dichloromethane** | **10/01/94** | **24** | **ug/l** | **10** | **5** | **19** |
| **MW-3** | **Dichloromethane** | **02/15/95** | **14** | **ug/l** | **10** | **5** | **9** |
| MW-3 | Ethylbenzene | 12/03/97 | 3 | ug/l | 1 | 29 | |
| MW-3 | Ethylbenzene | 11/18/98 | 2 | ug/l | 2 | 29 | |
| **MW-3** | **Heptachlor** | **12/03/97** | **0.1** | **ug/l** | **0.05** | **0.008** | **0.092** |
| MW-3 | Methyl methacrylate | 12/03/97 | 35 | ug/l | 1 | - | |
| MW-3 | Methyl tert-butyl ether | 12/03/97 | 14 | ug/l | 1 | - | |
| MW-3 | Naphthalene | 12/03/97 | 7 | ug/l | 1 | 21 | |
| MW-3 | Naphthalene | 04/30/98 | 4.6 | ug/l | 2 | 21 | |
| **MW-3** | **Tetrachloroethylene** | **12/03/97** | **1** | **ug/l** | **1** | **0.7** | **0.3** |
| MW-3 | Toluene | 05/06/96 | 8 | ug/l | 5 | 1000 | |
| MW-3 | Toluene | 06/24/97 | 7.6 | ug/l | 5 | 1000 | |
| MW-3 | Toluene | 12/03/97 | 2 | ug/l | 1 | 1000 | |
| **MW-3** | **Trichloroethylene** | **02/15/95** | **5** | **ug/l** | **5** | **2.8** | **2.2** |
| **MW-3** | **Trichloroethylene** | **12/03/97** | **4** | **ug/l** | **1** | **2.8** | **1.2** |
| **MW-3** | **Vinyl chloride** | **12/03/97** | **2** | **ug/l** | **1** | **0.015** | **1.985** |
| MW-3 | Xylene | 10/01/94 | 34 | ug/l | 5 | 530 | |
| MW-3 | Xylene | 01/31/95 | 20 | ug/l | 5 | 530 | |
| MW-3 | Xylene | 02/15/95 | 24 | ug/l | 5 | 530 | |
| MW-3 | Xylene | 03/07/95 | 22 | ug/l | 5 | 530 | |
| MW-3 | Xylene | 12/07/95 | 19 | ug/l | 5 | 530 | |
| MW-3 | Xylene | 05/06/96 | 34 | ug/l | 5 | 530 | |
| MW-3 | Xylene | 06/24/97 | 23 | ug/l | 5 | 530 | |
| MW-3 | Xylene | 12/03/97 | 11 | ug/l | 1 | 530 | |
| MW-3 | Xylene | 06/04/98 | 23 | ug/l | 5 | 530 | |

Table 1. Exceedance Scan for All Historical VOC Detections, Alexander County Landfill

| Well ID | Parameter Name [1] | Sample Date | Result | Unit | PQL [2] | MCL [3] | Exceedance |
|---|---|---|---|---|---|---|---|
| MW-3 | Xylene | 11/18/98 | 12.8 | ug/l | 2 | 530 | |
| MW-3 | Xylene | 05/13/99 | 11 | ug/l | 5 | 530 | |
| **MW-4** | | | | | | | |
| MW-4 | 1,1-Dichloroethane | 10/01/94 | 14 | ug/l | 5 | 700 | |
| MW-4 | 1,1-Dichloroethane | 12/03/97 | 16 | ug/l | 1 | 700 | |
| MW-4 | 1,4-Dichlorobenzene | 12/03/97 | 3 | ug/l | 1 | 75 | |
| **MW-4** | **Benzene** | **12/03/97** | **4** | **ug/l** | **1** | **1** | **3** |
| MW-4 | Chloroethane | 12/03/97 | 7 | ug/l | 1 | - | |
| MW-4 | cis-1,2-Dichloroethene | 10/01/94 | 8 | ug/l | 5 | 70 | |
| MW-4 | cis-1,2-Dichloroethene | 12/03/97 | 20 | ug/l | 1 | 70 | |
| **MW-4** | **Trichloroethylene** | **12/03/97** | **3** | **ug/l** | **1** | **2.8** | **0.2** |
| **MW-4R** | | | | | | | |
| MW-4R | 1,1-Dichloroethane | 10/01/94 | 14 | ug/l | 5 | 700 | |
| MW-4R | 1,1-Dichloroethane | 01/31/95 | 17 | ug/l | 5 | 700 | |
| MW-4R | 1,1-Dichloroethane | 02/15/95 | 17 | ug/l | 5 | 700 | |
| MW-4R | 1,1-Dichloroethane | 03/07/95 | 14 | ug/l | 5 | 700 | |
| MW-4R | 1,1-Dichloroethane | 12/06/95 | 11 | ug/l | 5 | 700 | |
| MW-4R | 1,1-Dichloroethane | 05/06/96 | 13 | ug/l | 5 | 700 | |
| MW-4R | 1,1-Dichloroethane | 11/11/96 | 16 | ug/l | 5 | 700 | |
| MW-4R | 1,1-Dichloroethane | 06/24/97 | 13 | ug/l | 5 | 700 | |
| MW-4R | 1,1-Dichloroethane | 06/04/98 | 10 | ug/l | 5 | 700 | |
| MW-4R | 1,1-Dichloroethane | 11/18/98 | 10.1 | ug/l | 2 | 700 | |
| MW-4R | 1,1-Dichloroethane | 05/13/99 | 15 | ug/l | 5 | 700 | |
| MW-4R | 1,1-Dichloroethane | 12/06/99 | 18 | ug/l | 5 | 700 | |
| MW-4R | 1,1-Dichloroethane | 5/17/00 | 12 | ug/l | 5 | 700 | |
| MW-4R | 1,1-Dichloroethane | 12/11/00 | 15 | ug/l | 5 | 700 | |
| MW-4R | 1,1-Dichloroethane | 6/13/01 | 13 | ug/l | 5 | 700 | |
| **MW-4R** | **Benzene** | **11/18/98** | **2.3** | **ug/l** | **2** | **1** | **1.3** |
| **MW-4R** | **Benzene** | **6/13/01** | **5.6** | **ug/l** | **5** | **1** | **4.6** |
| MW-4R | BHC, alpha | 12/03/97 | 0.1 | ug/l | 0.05 | - | |
| MW-4R | BHC, alpha | 04/30/98 | 0.066 | ug/l | 0.05 | - | |
| MW-4R | BHC, alpha | 11/18/98 | 0.39 | ug/l | 0.05 | - | |
| MW-4R | BHC, gamma | 11/18/98 | 0.11 | ug/l | 0.05 | 0.2 | |
| MW-4R | Carbon disulfide | 06/24/97 | 5.5 | ug/l | 5 | - | |
| MW-4R | Carbon disulfide | 05/13/99 | 5.9 | ug/l | 5 | - | |
| MW-4R | Carbon disulfide | 5/17/00 | 30 | ug/l | 5 | - | |
| MW-4R | Carbon disulfide | 6/13/01 | 11 | ug/l | 5 | - | |

Table 1. Exceedance Scan for All Historical VOC Detections, Alexander County Landfill

| Well ID | Parameter Name [1] | Sample Date | Result | Unit | PQL [2] | MCL [3] | Exceedance |
|---|---|---|---|---|---|---|---|
| MW-4R | Chloroethane | 05/06/96 | 13 | ug/l | 10 | - | |
| MW-4R | Chloroethane | 11/18/98 | 7.6 | ug/l | 2 | - | |
| MW-4R | cis-1,2-Dichloroethene | 10/01/94 | 10 | ug/l | 5 | 70 | |
| MW-4R | cis-1,2-Dichloroethene | 01/31/95 | 12 | ug/l | 5 | 70 | |
| MW-4R | cis-1,2-Dichloroethene | 02/15/95 | 12 | ug/l | 5 | 70 | |
| MW-4R | cis-1,2-Dichloroethene | 03/07/95 | 10 | ug/l | 5 | 70 | |
| MW-4R | cis-1,2-Dichloroethene | 12/06/95 | 7 | ug/l | 5 | 70 | |
| MW-4R | cis-1,2-Dichloroethene | 05/06/96 | 10 | ug/l | 5 | 70 | |
| MW-4R | cis-1,2-Dichloroethene | 11/11/96 | 16 | ug/l | 5 | 70 | |
| MW-4R | cis-1,2-Dichloroethene | 06/24/97 | 18 | ug/l | 5 | 70 | |
| MW-4R | cis-1,2-Dichloroethene | 06/04/98 | 18 | ug/l | 5 | 70 | |
| MW-4R | cis-1,2-Dichloroethene | 05/13/99 | 16 | ug/l | 5 | 70 | |
| MW-4R | cis-1,2-Dichloroethene | 12/06/99 | 16 | ug/l | 5 | 70 | |
| MW-4R | cis-1,2-Dichloroethene | 5/17/00 | 14 | ug/l | 5 | 70 | |
| MW-4R | cis-1,2-Dichloroethene | 12/11/00 | 15 | ug/l | 5 | 70 | |
| MW-4R | cis-1,2-Dichloroethene | 6/13/01 | 19 | ug/l | 5 | 70 | |

**MW-5**

| Well ID | Parameter Name | Sample Date | Result | Unit | PQL | MCL | Exceedance |
|---|---|---|---|---|---|---|---|
| MW-5 | 1,1-Dichloroethane | 10/01/94 | 11 | ug/l | 5 | 700 | |
| MW-5 | 1,1-Dichloroethane | 01/31/95 | 12 | ug/l | 5 | 700 | |
| MW-5 | 1,1-Dichloroethane | 02/15/95 | 8 | ug/l | 5 | 700 | |
| MW-5 | 1,1-Dichloroethane | 03/07/95 | 7 | ug/l | 5 | 700 | |
| MW-5 | 1,1-Dichloroethane | 12/07/95 | 14 | ug/l | 5 | 700 | |
| MW-5 | 1,1-Dichloroethane | 05/06/96 | 16 | ug/l | 5 | 700 | |
| MW-5 | 1,1-Dichloroethane | 11/11/96 | 16 | ug/l | 5 | 700 | |
| MW-5 | 1,1-Dichloroethane | 06/24/97 | 15 | ug/l | 5 | 700 | |
| MW-5 | 1,1-Dichloroethane | 12/03/97 | 19 | ug/l | 1 | 700 | |
| MW-5 | 1,1-Dichloroethane | 06/04/98 | 22 | ug/l | 5 | 700 | |
| MW-5 | 1,1-Dichloroethane | 11/18/98 | 11.2 | ug/l | 2 | 700 | |
| MW-5 | 1,1-Dichloroethane | 05/13/99 | 15 | ug/l | 5 | 700 | |
| MW-5 | 1,1-Dichloroethane | 12/06/99 | 13 | ug/l | 5 | 700 | |
| MW-5 | 1,1-Dichloroethane | 5/17/00 | 10 | ug/l | 5 | 700 | |
| MW-5 | 1,1-Dichloroethane | 12/11/00 | 11 | ug/l | 5 | 700 | |
| MW-5 | 1,1-Dichloroethane | 6/13/01 | 12 | ug/l | 5 | 700 | |
| **MW-5** | **Benzene** | **12/03/97** | **4** | **ug/l** | **1** | **1** | **3** |
| **MW-5** | **Benzene** | **06/04/98** | **5.6** | **ug/l** | **5** | **1** | **4.6** |
| **MW-5** | **Benzene** | **11/18/98** | **2.5** | **ug/l** | **2** | **1** | **1.5** |
| **MW-5** | **Benzene** | **6/13/01** | **6.1** | **ug/l** | **5** | **1** | **5.1** |
| MW-5 | Carbon disulfide | 06/24/97 | 36 | ug/l | 5 | - | |
| MW-5 | Carbon disulfide | 5/17/00 | 17 | ug/l | 5 | - | |
| MW-5 | Carbon disulfide | 6/13/01 | 54 | ug/l | 5 | - | |
| MW-5 | Chloroethane | 12/03/97 | 2 | ug/l | 1 | - | |
| MW-5 | cis-1,2-Dichloroethene | 12/03/97 | 4 | ug/l | 1 | 70 | |
| MW-5 | cis-1,2-Dichloroethene | 06/04/98 | 8.3 | ug/l | 5 | 70 | |

Table 1. Exceedance Scan for All Historical VOC Detections, Alexander County Landfill

| Well ID | Parameter Name [1] | Sample Date | Result | Unit | PQL [2] | MCL [3] | Exceedance |
|---|---|---|---|---|---|---|---|
| MW-5 | cis-1,2-Dichloroethene | 05/13/99 | 7.4 | ug/l | 5 | 70 | |
| MW-5 | cis-1,2-Dichloroethene | 12/11/00 | 7.2 | ug/l | 5 | 70 | |
| MW-5 | cis-1,2-Dichloroethene | 6/13/01 | 13 | ug/l | 5 | 70 | |
| MW-5 | Naphthalene | 03/23/98 | 4.6 | ug/l | 2 | 21 | |
| **MW-5** | **Tetrachloroethylene** | **12/03/97** | **1** | **ug/l** | **1** | **0.7** | **0.3** |
| **MW-5** | **Trichloroethylene** | **12/03/97** | **4** | **ug/l** | **1** | **2.8** | **1.2** |
| **MW-6** | | | | | | | |
| MW-6 | BHC, beta | 12/03/97 | 0.06 | ug/l | 0.05 | - | |
| MW-6 | Carbon disulfide | 06/24/97 | 61 | ug/l | 5 | - | |
| MW-6 | Carbon disulfide | 12/03/97 | 6 | ug/l | 1 | - | |
| MW-6 | Carbon disulfide | 5/17/00 | 18 | ug/l | 5 | - | |
| MW-6 | Carbon disulfide | 6/12/01 | 41 | ug/l | 5 | - | |
| MW-6 | Chloroethane | 12/03/97 | 1 | ug/l | 1 | - | |
| MW-6 | cis-1,2-Dichloroethene | 11/18/98 | 6.5 | ug/l | 2 | 70 | |
| MW-6 | cis-1,2-Dichloroethene | 12/06/99 | 11 | ug/l | 5 | 70 | |
| MW-6 | cis-1,2-Dichloroethene | 12/11/00 | 7.6 | ug/l | 5 | 70 | |
| MW-6 | cis-1,2-Dichloroethene | 6/12/01 | 13 | ug/l | 5 | 70 | |
| **MW-7** | | | | | | | |
| MW-7 | 1,1-Dichloroethane | 10/01/94 | 16 | ug/l | 5 | 700 | |
| MW-7 | 1,1-Dichloroethane | 01/31/95 | 26 | ug/l | 5 | 700 | |
| MW-7 | 1,1-Dichloroethane | 02/15/95 | 29 | ug/l | 5 | 700 | |
| MW-7 | 1,1-Dichloroethane | 03/07/95 | 25 | ug/l | 5 | 700 | |
| MW-7 | 1,1-Dichloroethane | 12/06/95 | 25 | ug/l | 5 | 700 | |
| MW-7 | 1,1-Dichloroethane | 05/06/96 | 26 | ug/l | 5 | 700 | |
| MW-7 | 1,1-Dichloroethane | 11/11/96 | 16 | ug/l | 5 | 700 | |
| MW-7 | 1,1-Dichloroethane | 06/24/97 | 19 | ug/l | 5 | 700 | |
| MW-7 | 1,1-Dichloroethane | 12/03/97 | 17 | ug/l | 1 | 700 | |
| MW-7 | 1,1-Dichloroethane | 06/04/98 | 14 | ug/l | 5 | 700 | |
| MW-7 | 1,1-Dichloroethane | 11/18/98 | 8.8 | ug/l | 2 | 700 | |
| MW-7 | 1,1-Dichloroethane | 05/13/99 | 13 | ug/l | 5 | 700 | |
| MW-7 | 1,1-Dichloroethane | 12/06/99 | 17 | ug/l | 5 | 700 | |
| MW-7 | 1,1-Dichloroethane | 5/17/00 | 15 | ug/l | 5 | 700 | |
| MW-7 | 1,1-Dichloroethane | 12/12/00 | 15 | ug/l | 5 | 700 | |
| MW-7 | 1,1-Dichloroethane | 6/13/01 | 15 | ug/l | 5 | 700 | |
| **MW-7** | **Benzene** | **12/03/97** | **2** | **ug/l** | **1** | **1** | **1** |
| **MW-7** | **Benzene** | **6/13/01** | **6** | **ug/l** | **5** | **1** | **5** |
| MW-7 | BHC, alpha | 11/18/98 | 0.63 | ug/l | 0.05 | - | |

**Table 1.** Exceedance Scan for All Historical VOC Detections, Alexander County Landfill

| Well ID | Parameter Name [1] | Sample Date | Result | Unit | PQL [2] | MCL [3] | Exceedance |
|---|---|---|---|---|---|---|---|
| MW-7 | Carbon disulfide | 06/24/97 | 66 | ug/l | 5 | - | |
| MW-7 | Carbon disulfide | 12/03/97 | 3 | ug/l | 1 | - | |
| MW-7 | Carbon disulfide | 05/13/99 | 8 | ug/l | 5 | - | |
| MW-7 | Carbon disulfide | 5/17/00 | 5.4 | ug/l | 5 | - | |
| MW-7 | Carbon disulfide | 12/12/00 | 13 | ug/l | 10 | - | |
| MW-7 | Carbon disulfide | 6/13/01 | 16 | ug/l | 5 | - | |
| MW-7 | Chloroethane | 01/31/95 | 11 | ug/l | 10 | - | |
| MW-7 | Chloroethane | 02/15/95 | 11 | ug/l | 10 | - | |
| MW-7 | Chloroethane | 12/06/95 | 11 | ug/l | 10 | - | |
| MW-7 | Chloroethane | 12/03/97 | 3 | ug/l | 1 | - | |
| MW-7 | cis-1,2-Dichloroethene | 12/03/97 | 3 | ug/l | 1 | 70 | |
| MW-7 | cis-1,2-Dichloroethene | 11/18/98 | 2.7 | ug/l | 2 | 70 | |
| MW-7 | cis-1,2-Dichloroethene | 5/17/00 | 5.7 | ug/l | 5 | 70 | |
| MW-7 | cis-1,2-Dichloroethene | 12/12/00 | 7 | ug/l | 5 | 70 | |
| MW-7 | cis-1,2-Dichloroethene | 6/13/01 | 7.5 | ug/l | 5 | 70 | |
| **MW-7** | **Dichloromethane** | **10/01/94** | **24** | **ug/l** | **10** | **5** | **19** |
| **MW-7** | **Dichloromethane** | **01/31/95** | **29** | **ug/l** | **10** | **5** | **24** |
| **MW-7** | **Dichloromethane** | **02/15/95** | **26** | **ug/l** | **10** | **5** | **21** |
| **MW-7** | **Dichloromethane** | **03/07/95** | **11** | **ug/l** | **10** | **5** | **6** |
| **MW-7** | **Dichloromethane** | **12/06/95** | **20** | **ug/l** | **10** | **5** | **15** |
| MW-7 | Methyl tert-butyl ether | 12/03/97 | 2 | ug/l | 1 | - | |
| **MW-8** | | | | | | | |
| MW-8 | 1,1-Dichloroethane | 10/01/94 | 10 | ug/l | 5 | 700 | |
| MW-8 | 1,1-Dichloroethane | 01/31/95 | 8 | ug/l | 5 | 700 | |
| MW-8 | 1,1-Dichloroethane | 02/15/95 | 11 | ug/l | 5 | 700 | |
| MW-8 | 1,1-Dichloroethane | 03/07/95 | 11 | ug/l | 5 | 700 | |
| MW-8 | 1,1-Dichloroethane | 12/06/95 | 8 | ug/l | 5 | 700 | |
| MW-8 | 1,1-Dichloroethane | 05/06/96 | 12 | ug/l | 5 | 700 | |
| MW-8 | 1,1-Dichloroethane | 11/11/96 | 9 | ug/l | 5 | 700 | |
| MW-8 | 1,1-Dichloroethane | 06/24/97 | 11 | ug/l | 5 | 700 | |
| MW-8 | 1,1-Dichloroethane | 12/03/97 | 14 | ug/l | 1 | 700 | |
| MW-8 | 1,1-Dichloroethane | 06/04/98 | 12 | ug/l | 5 | 700 | |
| MW-8 | 1,1-Dichloroethane | 11/18/98 | 7.7 | ug/l | 2 | 700 | |
| MW-8 | 1,1-Dichloroethane | 05/13/99 | 9.3 | ug/l | 5 | 700 | |
| MW-8 | 1,1-Dichloroethane | 12/06/99 | 8.1 | ug/l | 5 | 700 | |
| MW-8 | BHC, alpha | 04/30/98 | 0.073 | ug/l | 0.05 | - | |
| MW-8 | BHC, alpha | 11/18/98 | 0.068 | ug/l | 0.05 | - | |
| MW-8 | BHC, gamma | 11/18/98 | 0.063 | ug/l | 0.05 | 0.2 | |
| MW-8 | Carbon disulfide | 06/24/97 | 19 | ug/l | 5 | - | |
| MW-8 | Carbon disulfide | 06/04/98 | 8 | ug/l | 5 | - | |
| MW-8 | Carbon disulfide | 05/13/99 | 6.2 | ug/l | 5 | - | |
| MW-8 | Carbon disulfide | 6/12/01 | 16 | ug/l | 5 | - | |

Table 1. Exceedance Scan for All Historical VOC Detections, Alexander County Landfill

| Well ID | Parameter Name [1] | Sample Date | Result | Unit | PQL [2] | MCL [3] | Exceedance |
|---|---|---|---|---|---|---|---|
| MW-8 | Chloroethane | 12/03/97 | 7 | ug/l | 1 | - | |
| MW-8 | cis-1,2-Dichloroethene | 12/03/97 | 2 | ug/l | 1 | 70 | |
| MW-8 | Trichloroethylene | 12/03/97 | 1 | ug/l | 1 | 2.8 | |
| **MW-9** | | | | | | | |
| MW-9 | 1,1-Dichloroethane | 12/11/00 | 5.2 | ug/l | 5 | 700 | |
| MW-9 | cis-1,2-Dichloroethene | 12/11/00 | 15 | ug/l | 5 | 70 | |
| MW-9 | cis-1,2-Dichloroethene | 6/13/01 | 11 | ug/l | 5 | 70 | |
| **MW-10** | | | | | | | |
| MW-10 | Carbon disulfide | 6/12/01 | 71 | ug/l | 5 | - | |
| **MW-11** | | | | | | | |
| MW-11 | 1,1-Dichloroethane | 12/11/00 | 11 | ug/l | 5 | 700 | |
| MW-11 | 1,1-Dichloroethane | 6/12/01 | 10 | ug/l | 5 | 700 | |
| MW-11 | 1,4-Dichlorobenzene | 6/12/01 | 6.9 | ug/l | 5 | 75 | |
| **MW-11** | **Benzene** | **12/11/00** | **5.2** | **ug/l** | **5** | **1** | **4.2** |
| **MW-11** | **Benzene** | **6/12/01** | **7.8** | **ug/l** | **5** | **1** | **6.8** |
| MW-11 | Carbon disulfide | 6/12/01 | 15 | ug/l | 5 | - | |
| MW-11 | cis-1,2-Dichloroethene | 12/11/00 | 28 | ug/l | 5 | 70 | |
| MW-11 | cis-1,2-Dichloroethene | 6/12/01 | 50 | ug/l | 5 | 70 | |
| **MW-12** | | | | | | | |
| MW-12 | 1,1-Dichloroethane | 12/11/00 | 17 | ug/l | 5 | 700 | |
| MW-12 | 1,1-Dichloroethane | 6/13/01 | 17 | ug/l | 5 | 700 | |
| MW-12 | 1,4-Dichlorobenzene | 12/11/00 | 6.3 | ug/l | 5 | 75 | |
| MW-12 | 1,4-Dichlorobenzene | 6/13/01 | 5.6 | ug/l | 5 | 75 | |
| **MW-12** | **Benzene** | **12/11/00** | **7** | **ug/l** | **5** | **1** | **6** |
| **MW-12** | **Benzene** | **6/13/01** | **8.2** | **ug/l** | **5** | **1** | **7.2** |
| MW-12 | Chloroethane | 6/13/01 | 11 | ug/l | 10 | - | |
| MW-12 | cis-1,2-Dichloroethene | 12/11/00 | 10 | ug/l | 5 | 70 | |
| MW-12 | cis-1,2-Dichloroethene | 6/13/01 | 10 | ug/l | 5 | 70 | |

**Table 1.** Exceedance Scan for All Historical VOC Detections, Alexander County Landfill

| Well ID | Parameter Name [1] | Sample Date | Result | Unit | PQL [2] | MCL [3] | Exceedance |
|---|---|---|---|---|---|---|---|
| **MW-12** | **Dichloromethane** | **12/11/00** | **13** | **ug/l** | **5** | **5** | **8** |
| **MW-12** | **Dichloromethane** | **6/13/01** | **10** | **ug/l** | **5** | **5** | **5** |
| **MW-13** | | | | | | | |
| MW-13 | Carbon disulfide | 6/12/01 | 15 | ug/l | 5 | - | |
| **MW-14** | | | | | | | |
| MW-14 | 1,1-Dichloroethane | 12/12/00 | 9.4 | ug/l | 5 | 700 | |
| MW-14 | 1,1-Dichloroethane | 6/13/01 | 9.5 | ug/l | 5 | 700 | |
| MW-14 | cis-1,2-Dichloroethene | 12/12/00 | 11 | ug/l | 5 | 70 | |
| MW-14 | cis-1,2-Dichloroethene | 6/13/01 | 12 | ug/l | 5 | 70 | |
| **MW-15** | | | | | | | |
| MW-15 | 1,1-Dichloroethane | 12/11/00 | 27 | ug/l | 5 | 700 | |
| MW-15 | 1,1-Dichloroethane | 6/12/01 | 41 | ug/l | 5 | 700 | |
| **MW-15** | **Benzene** | **6/12/01** | **5.3** | **ug/l** | **5** | **1** | **4.3** |
| MW-15 | Carbon disulfide | 6/12/01 | 21 | ug/l | 5 | - | |
| **SW-2** | | | | | | | |
| SW-2 | 1,1-Dichloroethane | 12/07/95 | 12 | ug/l | 5 | 700 | |
| **SW-3** | | | | | | | |
| SW-3 | 1,1-Dichloroethane | 10/01/94 | 9 | ug/l | 5 | 700 | |
| SW-3 | Bromomethane | 05/13/99 | 11 | ug/l | 10 | - | |
| **SW-5** | | | | | | | |
| SW-5 | 1,1-Dichloroethane | 12/03/97 | 7 | ug/l | 1 | 700 | |
| SW-5 | Carbon disulfide | 12/12/00 | 150 | ug/l | 10 | - | |
| SW-5 | Carbon disulfide | 6/13/01 | 6.6 | ug/l | 5 | - | |
| SW-5 | Chloroethane | 12/03/97 | 2 | ug/l | 1 | - | |
| SW-5 | cis-1,2-Dichloroethene | 12/03/97 | 2 | ug/l | 1 | 70 | |

Table 1. Exceedance Scan for All Historical VOC Detections, Alexander County Landfill

| Well ID | Parameter Name [1] | Sample Date | Result | Unit | PQL [2] | MCL [3] | Exceedance |
|---|---|---|---|---|---|---|---|
| SW-5 | Trichloroethylene | 12/03/97 | 1 | ug/l | 1 | 2.8 | |

[1] Table only contains detected constituents.

[2] PQL = Practical Quantitation Limit

[3] MCL = Maximum Contaminant Level (North Carolina Groundwater Standard)

**Table 2.** Detection Summary
Alexander County Landfill

**MW-1**

| Date | Inorganic Constituent Analyzed | Inorganic Constituent Detection | Inorganic Constituent Exceedance | Organic Constituent Analyzed | Organic Constituent Detection | Organic Constituent Exceedance | Detected Inorganic: Antimony, total | Detected Inorganic: Barium, total | Detected Inorganic: Cadmium, total |
|---|---|---|---|---|---|---|---|---|---|
| 10/01/1994 | 15 | 2 | 0 | 47 | 1 | 0 | | | |
| 01/31/1995 | 15 | 1 | 0 | 47 | 1 | 0 | | | |
| 02/15/1995 | 15 | 0 | 0 | 47 | 1 | 0 | | | |
| 03/07/1995 | 15 | 2 | 0 | 47 | 1 | 0 | | | |
| 12/06/1995 | 15 | 0 | 0 | 47 | 1 | 0 | | | |
| 05/07/1996 | 16 | 1 | 0 | 47 | 1 | 0 | | | |
| 11/11/1996 | 15 | 5 | 0 | 47 | 1 | 0 | | x | |
| 06/24/1997 | 15 | 6 | 0 | 47 | 2 | 0 | | x | x |
| 12/03/1997 | 19 | 7 | 0 | 211 | 3 | 0 | | x | |
| 03/23/1998 | 2 | 1 | 0 | 5 | 0 | 0 | | | |
| 04/30/1998 | 2 | 0 | 0 | 5 | 0 | 0 | | | |
| 06/04/1998 | 17 | 6 | 0 | 52 | 1 | 0 | | x | |
| 11/18/1998 | 16 | 4 | 0 | 186 | 5 | 1 | | x | |
| 05/13/1999 | 17 | 4 | 0 | 56 | 4 | 1 | | x | |
| 12/06/1999 | 16 | 4 | 0 | 47 | 3 | 1 | | x | |
| 05/17/2000 | 15 | 6 | 0 | 47 | 3 | 0 | x | x | |
| 12/12/2000 | 17 | 6 | 0 | 63 | 2 | 0 | | x | |
| 06/13/2001 | 15 | 4 | 0 | 47 | 4 | 1 | | x | |
| **Subtotal** | **257** | **59** | **0** | **1095** | **34** | **4** | | | |

NOTE: O = Compound detected above regulatory standard x = Compound detected below regulatory standard

**Table 2.** Detection Summary
Alexander County Landfill

**MW-1**

| Date | Detected Inorganic | | | | | | | | Detected VOC | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Chromium, total | Cobalt, total | Copper, total | Lead, total | Mercury | Nickel, total | Vanadium | Zinc, total | 1,1-Dichloroethane | BHC, gamma |
| 10/01/1994 | x | | | | | | | x | x | |
| 01/31/1995 | x | | | | | | | | x | |
| 02/15/1995 | | | | | | | | | x | |
| 03/07/1995 | x | | | | | | | x | x | |
| 12/06/1995 | | | | | | | | | x | |
| 05/07/1996 | | | | | | | | x | x | |
| 11/11/1996 | x | x | | | | | x | x | x | |
| 06/24/1997 | x | x | x | | | | | x | x | |
| 12/03/1997 | x | x | x | x | | | x | x | x | |
| 03/23/1998 | | | | | x | | | | | |
| 04/30/1998 | | | | | | | | | | |
| 06/04/1998 | x | x | | x | | | x | x | x | |
| 11/18/1998 | x | x | | | | | x | | x | x |
| 05/13/1999 | | x | | | | x | | x | x | |
| 12/06/1999 | | x | | | | x | | x | x | |
| 05/17/2000 | x | x | | | | x | | x | x | |
| 12/12/2000 | x | x | x | | | x | | x | x | |
| 06/13/2001 | x | | | | | x | | x | x | |
| **Subtotal** | | | | | | | | | | |

NOTE: O = Compound detected above regulatory standard x = Compound detected below regulatory standard

**Table 2.** Detection Summary
Alexander County Landfill

**MW-1**

| Date | Benzene | Bis(2-ethylhexyl) phthalate | Detected VOC<br>Carbon disulfide | Chloroethane | cis-1,2-Dichloroethene |
|---|---|---|---|---|---|
| 10/01/1994 | | | | | |
| 01/31/1995 | | | | | |
| 02/15/1995 | | | | | |
| 03/07/1995 | | | | | |
| 12/06/1995 | | | | | |
| 05/07/1996 | | | | | |
| 11/11/1996 | | | | | |
| 06/24/1997 | | | x | | |
| 12/03/1997 | | x | | x | |
| 03/23/1998 | | | | | |
| 04/30/1998 | | | | | |
| 06/04/1998 | | | | | |
| 11/18/1998 | O | | | x | x |
| 05/13/1999 | O | | x | | x |
| 12/06/1999 | O | | | | x |
| 05/17/2000 | | | x | | x |
| 12/12/2000 | | | | | x |
| 06/13/2001 | O | | x | | x |
| **Subtotal** | | | | | |

NOTE: O = Compound detected above regulatory standard    x = Compound detected below regulatory standard

**Table 2.** Detection Summary
Alexander County Landfill

**MW-1A**

| Date | Inorganic Constituent | | | Organic Constituent | | | Detected Inorganic | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Analyzed | Detection | Exceedance | Analyzed | Detection | Exceedance | Arsenic, total | Barium, total | Beryllium, total | Chromium, total |
| 10/01/1994 | 15 | 8 | 3 | 47 | 0 | 0 | | x | | O |
| 01/31/1995 | 15 | 8 | 3 | 47 | 0 | 0 | | x | x | O |
| 02/15/1995 | 15 | 7 | 2 | 47 | 0 | 0 | | x | | O |
| 03/07/1995 | 15 | 3 | 0 | 47 | 0 | 0 | | | | x |
| 12/06/1995 | 15 | 2 | 0 | 47 | 0 | 0 | | | | x |
| 05/07/1996 | 16 | 3 | 0 | 47 | 0 | 0 | | | | x |
| 11/11/1996 | 15 | 6 | 0 | 47 | 0 | 0 | | x | | |
| 06/24/1997 | 15 | 4 | 0 | 47 | 0 | 0 | | x | | x |
| 12/03/1997 | 19 | 10 | 2 | 211 | 2 | 0 | | x | x | O |
| 03/23/1998 | 2 | 1 | 1 | 5 | 0 | 0 | | | | |
| 04/30/1998 | 2 | 1 | 1 | 5 | 0 | 0 | | | | |
| 06/04/1998 | 17 | 10 | 4 | 52 | 0 | 0 | | x | x | O |
| 11/18/1998 | 16 | 9 | 3 | 62 | 1 | 0 | | x | x | O |
| 12/11/2000 | 17 | 11 | 4 | 63 | 0 | 0 | x | x | x | O |
| 06/13/2001 | 15 | 10 | 1 | 47 | 0 | 0 | x | x | x | O |
| **Subtotal** | **209** | **93** | **24** | **821** | **3** | **0** | | | | |

NOTE: O = Compound detected above regulatory standard x = Compound detected below regulatory standard

**Table 2.** Detection Summary
Alexander County Landfill

**MW-1A**

| Date | Detected Inorganic | | | | | | | Detected VOC | |
|---|---|---|---|---|---|---|---|---|---|
| | Cobalt, total | Copper, total | Lead, total | Mercury | Nickel, total | Vanadium | Zinc, total | 1,1-Dichloroethane | Xylene |
| 10/01/1994 | x | x | O | | O | x | x | | |
| 01/31/1995 | x | | O | | O | x | x | | |
| 02/15/1995 | x | | O | | x | x | x | | |
| 03/07/1995 | x | | | | | | x | | |
| 12/06/1995 | x | | | | | | | | |
| 05/07/1996 | x | | | | | | x | | |
| 11/11/1996 | x | x | x | | | x | x | | |
| 06/24/1997 | x | | | | | | x | | |
| 12/03/1997 | x | x | O | x | x | x | x | x | x |
| 03/23/1998 | | | | O | | | | | |
| 04/30/1998 | | | | O | | | | | |
| 06/04/1998 | x | x | O | O | O | x | x | | |
| 11/18/1998 | x | x | O | | O | x | x | | x |
| 12/11/2000 | x | x | O | O | O | x | x | | |
| 06/13/2001 | x | x | x | | x | x | x | | |
| **Subtotal** | | | | | | | | | |

NOTE: O = Compound detected above regulatory standard x = Compound detected below regulatory standard

**Table 2.** Detection Summary
Alexander County Landfill

**MW-2**

| Date | Inorganic Constituent Analyzed | Inorganic Constituent Detection | Inorganic Constituent Exceedance | Organic Constituent Analyzed | Organic Constituent Detection | Organic Constituent Exceedance | Detected Inorganic: Barium, total | Detected Inorganic: Cadmium, total | Detected Inorganic: Chromium, total | Detected Inorganic: Cobalt, total |
|---|---|---|---|---|---|---|---|---|---|---|
| 10/01/1994 | 15 | 8 | 2 | 47 | 3 | 1 | x | x | O | x |
| 01/31/1995 | 15 | 2 | 0 | 47 | 4 | 1 | | | x | x |
| 02/15/1995 | 15 | 3 | 0 | 47 | 5 | 2 | | | x | x |
| 03/07/1995 | 15 | 1 | 0 | 47 | 5 | 2 | | | | x |
| 12/06/1995 | 15 | 1 | 0 | 47 | 5 | 2 | | | | x |
| 05/06/1996 | 16 | 2 | 0 | 47 | 2 | 0 | | | | x |
| 12/06/1999 | 16 | 10 | 1 | 47 | 3 | 0 | x | O | x | x |
| **Subtotal** | **107** | **27** | **3** | **329** | **27** | **8** | | | | |

NOTE: O = Compound detected above regulatory standard x = Compound detected below regulatory standard

**Table 2.** Detection Summary
Alexander County Landfill

**MW-2**

| Date | Detected Inorganic: Copper, total | Lead, total | Mercury | Nickel, total | Vanadium | Zinc, total | Detected VOC: 1,1-Dichloroethane | 1,4-Dichlorobenzene | Benzene |
|---|---|---|---|---|---|---|---|---|---|
| 10/01/1994 | x | O | | | x | x | x | | |
| 01/31/1995 | | | | | | | x | | |
| 02/15/1995 | | | | | | x | x | | O |
| 03/07/1995 | | | | | | | x | | O |
| 12/06/1995 | | | | | | | x | | O |
| 05/06/1996 | | | | | | x | x | | |
| 12/06/1999 | x | x | x | x | x | x | x | x | |
| **Subtotal** | | | | | | | | | |

NOTE: O = Compound detected above regulatory standard    x = Compound detected below regulatory standard

**Table 2.** Detection Summary
Alexander County Landfill

**MW-2**

| Date | Detected VOC Chloroethane | Trichloroethylene | cis-1,2-Dichloroethene |
|---|---|---|---|
| 10/01/1994 | x | O | |
| 01/31/1995 | x | O | x |
| 02/15/1995 | x | O | x |
| 03/07/1995 | x | O | x |
| 12/06/1995 | x | O | x |
| 05/06/1996 | | | x |
| 12/06/1999 | | | x |
| **Subtotal** | | | |

NOTE: O = Compound detected above regulatory standard   x = Compound detected below regulatory standard

**Table 2.** Detection Summary
Alexander County Landfill

**MW-3**

| Date | Inorganic Constituent | | | Organic Constituent | | | Detected Inorganic | | |
|---|---|---|---|---|---|---|---|---|---|
| | Analyzed | Detection | Exceedance | Analyzed | Detection | Exceedance | Antimony, total | Barium, total | Beryllium, total |
| 10/01/1994 | 15 | 2 | 1 | 47 | 7 | 3 | | x | |
| 01/31/1995 | 15 | 5 | 2 | 47 | 6 | 2 | | | |
| 02/15/1995 | 15 | 3 | 1 | 47 | 8 | 4 | | | |
| 03/07/1995 | 15 | 3 | 1 | 47 | 5 | 2 | | | |
| 12/07/1995 | 15 | 1 | 0 | 47 | 4 | 0 | | | |
| 05/06/1996 | 16 | 2 | 0 | 47 | 5 | 1 | | | |
| 11/11/1996 | 15 | 7 | 1 | 47 | 5 | 1 | | x | |
| 06/24/1997 | 15 | 7 | 1 | 47 | 6 | 1 | | x | |
| 12/03/1997 | 19 | 9 | 3 | 211 | 20 | 6 | | x | x |
| 03/23/1998 | 2 | 0 | 0 | 5 | 0 | 0 | | | |
| 04/30/1998 | 2 | 0 | 0 | 5 | 1 | 0 | | | |
| 06/04/1998 | 17 | 8 | 2 | 52 | 4 | 1 | | x | |
| 11/18/1998 | 16 | 9 | 3 | 186 | 7 | 1 | | x | x |
| 05/13/1999 | 17 | 8 | 3 | 56 | 5 | 1 | | x | |
| 12/06/1999 | 16 | 6 | 1 | 47 | 3 | 1 | | x | |
| 05/17/2000 | 15 | 5 | 0 | 47 | 4 | 1 | | x | |
| 12/11/2000 | 17 | 6 | 0 | 63 | 4 | 1 | x | x | |
| 06/12/2001 | 15 | 4 | 0 | 47 | 4 | 1 | | x | |
| **Subtotal** | **257** | **85** | **19** | **1095** | **99** | **26** | | | |

NOTE: O = Compound detected above regulatory standard x = Compound detected below regulatory standard

**Table 2.** Detection Summary
Alexander County Landfill

**MW-3**

| Date | Detected Inorganic | | | | | | | Detected VOC |
|---|---|---|---|---|---|---|---|---|
| | Chromium, total | Cobalt, total | Copper, total | Lead, total | Nickel, total | Vanadium | Zinc, total | 1,1-Dichloroethane |
| 10/01/1994 | | | | | O | | | x |
| 01/31/1995 | x | x | | O | O | | x | x |
| 02/15/1995 | x | x | | | O | | | x |
| 03/07/1995 | x | x | | | O | | | x |
| 12/07/1995 | | x | | | | | | x |
| 05/06/1996 | | x | | | x | | | x |
| 11/11/1996 | x | x | | x | O | x | x | x |
| 06/24/1997 | x | x | x | | O | x | x | x |
| 12/03/1997 | O | x | x | O | O | x | x | x |
| 03/23/1998 | | | | | | | | |
| 04/30/1998 | | | | | | | | |
| 06/04/1998 | x | x | x | O | O | x | x | |
| 11/18/1998 | O | x | x | O | O | x | x | |
| 05/13/1999 | O | x | x | O | O | x | x | |
| 12/06/1999 | x | x | x | O | x | | | |
| 05/17/2000 | x | x | | | x | | x | |
| 12/11/2000 | x | x | | | x | | x | |
| 06/12/2001 | x | | | | x | | x | |
| **Subtotal** | | | | | | | | |

NOTE: O = Compound detected above regulatory standard     x = Compound detected below regulatory standard

**Table 2.** Detection Summary
Alexander County Landfill

**MW-3**

| Date | Detected VOC: 1,2,4-Trimethylbenzene | 1,2-Dichloropropane | 1,3,5-Trimethylbenzene | 1,4-Dichlorobenzene | BHC, alpha | Benzene | Carbon disulfide |
|---|---|---|---|---|---|---|---|
| 10/01/1994 | | O | | | | O | |
| 01/31/1995 | | O | | | | O | |
| 02/15/1995 | | O | | | | O | |
| 03/07/1995 | | O | | | | O | |
| 12/07/1995 | | | | x | | | |
| 05/06/1996 | | | | | | O | |
| 11/11/1996 | | | | x | | O | |
| 06/24/1997 | | | | | | O | x |
| 12/03/1997 | x | O | x | x | x | O | |
| 03/23/1998 | | | | | | | |
| 04/30/1998 | | | | | | | |
| 06/04/1998 | | | | x | | O | |
| 11/18/1998 | | | | x | | O | x |
| 05/13/1999 | x | | | x | | O | |
| 12/06/1999 | | | | x | | O | |
| 05/17/2000 | | | | x | | O | x |
| 12/11/2000 | | | | x | | O | x |
| 06/12/2001 | | | | x | | O | x |
| **Subtotal** | | | | | | | |

NOTE: O = Compound detected above regulatory standard    x = Compound detected below regulatory standard

**Table 2.** Detection Summary
Alexander County Landfill

**MW-3**

| Date | Detected VOC | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Chloroethane | Cumene | Dichloromethane | Ethylbenzene | Heptachlor | Methyl methacrylate | Methyl tert-butyl ether | Naphthalene |
| 10/01/1994 | x | | O | | | | | |
| 01/31/1995 | x | | | | | | | |
| 02/15/1995 | x | | O | | | | | |
| 03/07/1995 | | | | | | | | |
| 12/07/1995 | | | | | | | | |
| 05/06/1996 | | | | | | | | |
| 11/11/1996 | x | | | | | | | |
| 06/24/1997 | | | | | | | | |
| 12/03/1997 | x | x | | x | O | x | x | x |
| 03/23/1998 | | | | | | | | |
| 04/30/1998 | | | | | | | | x |
| 06/04/1998 | | | | | | | | |
| 11/18/1998 | x | | | x | | | | |
| 05/13/1999 | | | | | | | | |
| 12/06/1999 | | | | | | | | |
| 05/17/2000 | | | | | | | | |
| 12/11/2000 | | | | | | | | |
| 06/12/2001 | | | | | | | | |
| **Subtotal** | | | | | | | | |

NOTE: O = Compound detected above regulatory standard    x = Compound detected below regulatory standard

**Table 2.** Detection Summary
Alexander County Landfill

**MW-3**

| Date | Detected VOC | | | | | |
|---|---|---|---|---|---|---|
| | **Tetrachloroethylene** | **Toluene** | **Trichloroethylene** | **Vinyl chloride** | **Xylene** | **cis-1,2-Dichloroethene** |
| 10/01/1994 | | | | | x | x |
| 01/31/1995 | | | | | x | x |
| 02/15/1995 | | | O | | x | x |
| 03/07/1995 | | | | | x | x |
| 12/07/1995 | | | | | x | x |
| 05/06/1996 | | x | | | x | x |
| 11/11/1996 | | | | | | x |
| 06/24/1997 | | x | | | x | x |
| 12/03/1997 | O | x | O | O | x | x |
| 03/23/1998 | | | | | | |
| 04/30/1998 | | | | | | |
| 06/04/1998 | | | | | x | x |
| 11/18/1998 | | | | | x | x |
| 05/13/1999 | | | | | x | x |
| 12/06/1999 | | | | | | x |
| 05/17/2000 | | | | | | x |
| 12/11/2000 | | | | | | x |
| 06/12/2001 | | | | | | x |
| **Subtotal** | | | | | | |

NOTE: O = Compound detected above regulatory standard    x = Compound detected below regulatory standard

**Table 2.** Detection Summary
Alexander County Landfill

**MW-4**

| Date | Inorganic Constituent | | | Organic Constituent | | | Detected Inorganic | | | Detected VOC |
|---|---|---|---|---|---|---|---|---|---|---|
| | Analyzed | Detection | Exceedance | Analyzed | Detection | Exceedance | Barium, total | Chromium, total | Cobalt, total | 1,1-Dichloroethane |
| 10/01/1994 | 15 | 3 | 0 | 47 | 2 | 0 | x | x | x | x |
| 12/03/1997 | 0 | 0 | 0 | 77 | 6 | 2 | | | | x |
| **Subtotal** | **15** | **3** | **0** | **124** | **8** | **2** | | | | |

| Date | Detected VOC | | | | |
|---|---|---|---|---|---|
| | 1,4-Dichlorobenzene | Benzene | Chloroethane | Trichloroethylene | cis-1,2-Dichloroethene |
| 10/01/1994 | | | | | x |
| 12/03/1997 | x | O | x | O | x |

NOTE: O = Compound detected above regulatory standard x = Compound detected below regulatory standard

**Table 2.** Detection Summary
Alexander County Landfill

**MW-4R**

| Date | Inorganic Constituent | | | Organic Constituent | | | Detected Inorganic | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Analyzed | Detection | Exceedance | Analyzed | Detection | Exceedance | Antimony, total | Barium, total | Beryllium, total | Cadmium, total |
| 10/01/1994 | 15 | 9 | 3 | 47 | 2 | 0 | | x | | x |
| 01/31/1995 | 15 | 7 | 3 | 47 | 2 | 0 | | | x | |
| 02/15/1995 | 15 | 6 | 0 | 47 | 2 | 0 | | | | x |
| 03/07/1995 | 15 | 5 | 0 | 47 | 2 | 0 | | | x | |
| 12/06/1995 | 15 | 3 | 0 | 47 | 2 | 0 | | | | x |
| 05/06/1996 | 16 | 4 | 0 | 47 | 3 | 0 | | | | x |
| 11/11/1996 | 15 | 6 | 1 | 47 | 2 | 0 | | x | | O |
| 06/24/1997 | 15 | 7 | 0 | 47 | 3 | 0 | | x | | x |
| 12/03/1997 | 19 | 10 | 2 | 134 | 1 | 0 | | x | x | O |
| 03/23/1998 | 2 | 2 | 0 | 5 | 0 | 0 | | | | |
| 04/30/1998 | 2 | 0 | 0 | 5 | 1 | 0 | | | | |
| 06/04/1998 | 17 | 9 | 1 | 52 | 2 | 0 | | x | | O |
| 11/18/1998 | 16 | 8 | 0 | 186 | 5 | 1 | | x | | x |
| 05/13/1999 | 17 | 7 | 0 | 56 | 3 | 0 | | x | | x |
| 12/06/1999 | 16 | 5 | 0 | 47 | 2 | 0 | | x | | x |
| 05/17/2000 | 15 | 8 | 0 | 47 | 3 | 0 | x | x | | |
| 12/11/2000 | 17 | 7 | 0 | 63 | 2 | 0 | x | x | | |
| 06/13/2001 | 15 | 4 | 0 | 47 | 4 | 1 | | x | | |
| **Subtotal** | **257** | **107** | **10** | **1018** | **45** | **2** | | | | |

NOTE: O = Compound detected above regulatory standard x = Compound detected below regulatory standard

**Table 2.** Detection Summary
Alexander County Landfill

**MW-4R**

| Date | Chromium, total | Cobalt, total | Copper, total | Cyanide, total | Lead, total | Mercury | Nickel, total | Selenium, total | Silver, total |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Detected Inorganic | | | | | |
| 10/01/1994 | O | x | x | | O | | O | | |
| 01/31/1995 | O | x | | | O | | O | | |
| 02/15/1995 | x | x | | | | | x | | |
| 03/07/1995 | x | x | | | | | | | |
| 12/06/1995 | | x | | | | | x | | |
| 05/06/1996 | | x | | | | | x | | |
| 11/11/1996 | | x | | | x | | | | |
| 06/24/1997 | x | x | x | | | | | | |
| 12/03/1997 | x | x | x | | O | | x | | |
| 03/23/1998 | | | | x | | x | | | |
| 04/30/1998 | | | | | | | | | |
| 06/04/1998 | x | x | x | | x | x | | | |
| 11/18/1998 | x | x | x | | x | | | | |
| 05/13/1999 | x | x | | | x | | x | | |
| 12/06/1999 | | x | | | | | x | | |
| 05/17/2000 | x | x | x | | | | x | | x |
| 12/11/2000 | x | x | | | | | x | x | |
| 06/13/2001 | | x | | | | | x | | |
| **Subtotal** | | | | | | | | | |

NOTE: O = Compound detected above regulatory standard x = Compound detected below regulatory standard

**Table 2.** Detection Summary
Alexander County Landfill

**MW-4R**

| Date | Detected Inorganic | | Detected VOC | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Vanadium | Zinc, total | 1,1-Dichloroethane | BHC, alpha | BHC, gamma | Benzene | Carbon disulfide | Chloroethane | cis-1,2-Dichloroethene |
| 10/01/1994 | x | x | x | | | | | | x |
| 01/31/1995 | x | x | x | | | | | | x |
| 02/15/1995 | x | x | x | | | | | | x |
| 03/07/1995 | x | x | x | | | | | | x |
| 12/06/1995 | | | x | | | | | | x |
| 05/06/1996 | | x | x | | | | | x | x |
| 11/11/1996 | x | x | x | | | | | | x |
| 06/24/1997 | x | x | x | | | | x | | x |
| 12/03/1997 | x | x | | x | | | | | |
| 03/23/1998 | | | | | | | | | |
| 04/30/1998 | | | | x | | | | | |
| 06/04/1998 | x | x | x | | | | | | x |
| 11/18/1998 | x | x | x | x | x | O | | x | |
| 05/13/1999 | | x | x | | | | x | | x |
| 12/06/1999 | | x | x | | | | | | x |
| 05/17/2000 | | x | x | | | | x | | x |
| 12/11/2000 | | x | x | | | | | | x |
| 06/13/2001 | | x | x | | | O | x | | x |
| **Subtotal** | | | | | | | | | |

NOTE: O = Compound detected above regulatory standard x = Compound detected below regulatory standard

**Table 2.** Detection Summary
Alexander County Landfill

**MW-5**

| Date | Inorganic Constituent | | | Organic Constituent | | | Detected Inorganic | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Analyzed | Detection | Exceedance | Analyzed | Detection | Exceedance | Antimony, total | Arsenic, total | Barium, total | Beryllium, total |
| 10/01/1994 | 15 | 11 | 6 | 47 | 1 | 0 | | | O | x |
| 01/31/1995 | 15 | 9 | 4 | 47 | 1 | 0 | | | x | x |
| 02/15/1995 | 15 | 9 | 3 | 47 | 1 | 0 | | | x | x |
| 03/07/1995 | 15 | 9 | 4 | 47 | 1 | 0 | | | x | x |
| 12/07/1995 | 15 | 7 | 3 | 47 | 1 | 0 | | | | x |
| 05/06/1996 | 16 | 7 | 3 | 47 | 1 | 0 | | | | x |
| 11/11/1996 | 15 | 9 | 1 | 47 | 1 | 0 | | | x | x |
| 06/24/1997 | 15 | 7 | 1 | 47 | 2 | 0 | | | x | x |
| 12/03/1997 | 19 | 11 | 3 | 211 | 6 | 3 | | x | x | x |
| 03/23/1998 | 2 | 0 | 0 | 5 | 1 | 0 | | | | |
| 04/30/1998 | 2 | 0 | 0 | 5 | 0 | 0 | | | | |
| 06/04/1998 | 17 | 11 | 3 | 52 | 3 | 1 | | x | x | x |
| 11/18/1998 | 16 | 12 | 5 | 186 | 2 | 1 | | x | O | x |
| 05/13/1999 | 17 | 10 | 3 | 56 | 2 | 0 | | x | x | x |
| 12/06/1999 | 16 | 7 | 0 | 47 | 1 | 0 | | | x | |
| 05/17/2000 | 15 | 10 | 3 | 47 | 2 | 0 | | x | x | x |
| 12/11/2000 | 17 | 11 | 3 | 63 | 2 | 0 | x | x | x | x |
| 06/13/2001 | 15 | 11 | 3 | 47 | 4 | 1 | x | x | x | x |
| **Subtotal** | **257** | **151** | **48** | **1095** | **33** | **7** | | | | |

NOTE: O = Compound detected above regulatory standard x = Compound detected below regulatory standard

| Date | Detected Inorganic | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Cadmium, total | Chromium, total | Cobalt, total | Copper, total | Lead, total | Nickel, total | Silver, total | Thallium, total | Vanadium |
| 10/01/1994 | x | O | x | O | O | O | x | | x |
| 01/31/1995 | | O | x | x | O | O | | | x |
| 02/15/1995 | | O | x | x | O | O | | | x |
| 03/07/1995 | | O | x | x | O | O | | | x |
| 12/07/1995 | | O | x | | O | O | | | x |
| 05/06/1996 | | O | x | | O | O | | | x |
| 11/11/1996 | x | x | x | | O | | | x | x |
| 06/24/1997 | | O | x | x | | | | | x |
| 12/03/1997 | x | O | x | x | O | O | | | x |
| 03/23/1998 | | | | | | | | | |
| 04/30/1998 | | | | | | | | | |
| 06/04/1998 | x | O | x | x | O | O | | | x |
| 11/18/1998 | x | O | x | O | O | O | | x | x |
| 05/13/1999 | | O | x | x | O | O | | | x |
| 12/06/1999 | | x | x | x | | x | | | x |
| 05/17/2000 | | O | x | x | O | O | | | x |
| 12/11/2000 | | O | x | x | O | O | | | x |
| 06/13/2001 | | O | x | x | O | O | | | x |
| **Subtotal** | | | | | | | | | |

NOTE: O = Compound detected above regulatory standard x = Compound detected below regulatory standard

**Table 2.** Detection Summary
Alexander County Landfill

**MW-5**

| Date | Detected VOC cis-1,2-Dichloroethene |
|---|---|
| 10/01/1994 | |
| 01/31/1995 | |
| 02/15/1995 | |
| 03/07/1995 | |
| 12/07/1995 | |
| 05/06/1996 | |
| 11/11/1996 | |
| 06/24/1997 | |
| 12/03/1997 | x |
| 03/23/1998 | |
| 04/30/1998 | |
| 06/04/1998 | x |
| 11/18/1998 | |
| 05/13/1999 | x |
| 12/06/1999 | |
| 05/17/2000 | |
| 12/11/2000 | x |
| 06/13/2001 | x |
| **Subtotal** | |

NOTE: O = Compound detected above regulatory standard x = Compound detected below regulatory standard

**Table 2.** Detection Summary
Alexander County Landfill

**MW-5**

| Date | Zinc, total | Detected VOC 1,1-Dichloroethane | Benzene | Carbon disulfide | Chloroethane | Naphthalene | Tetrachloroethylene | Trichloroethylene |
|---|---|---|---|---|---|---|---|---|
| 10/01/1994 | O | x | | | | | | |
| 01/31/1995 | O | x | | | | | | |
| 02/15/1995 | x | x | | | | | | |
| 03/07/1995 | O | x | | | | | | |
| 12/07/1995 | x | x | | | | | | |
| 05/06/1996 | x | x | | | | | | |
| 11/11/1996 | x | x | | | | | | |
| 06/24/1997 | x | x | | x | | | | |
| 12/03/1997 | x | x | O | | x | | O | O |
| 03/23/1998 | | | | | | x | | |
| 04/30/1998 | | | | | | | | |
| 06/04/1998 | x | x | O | | | | | |
| 11/18/1998 | x | x | O | | | | | |
| 05/13/1999 | x | x | | | | | | |
| 12/06/1999 | x | x | | | | | | |
| 05/17/2000 | x | x | | x | | | | |
| 12/11/2000 | x | x | | | | | | |
| 06/13/2001 | x | x | O | x | | | | |
| **Subtotal** | | | | | | | | |

NOTE: O = Compound detected above regulatory standard x = Compound detected below regulatory standard

**Table 2.** Detection Summary
Alexander County Landfill

**MW-6**

| Date | Inorganic Constituent Analyzed | Inorganic Constituent Detection | Inorganic Constituent Exceedance | Organic Constituent Analyzed | Organic Constituent Detection | Organic Constituent Exceedance | Detected Inorganic: Barium, total | Detected Inorganic: Beryllium, total | Detected Inorganic: Chromium, total | Detected Inorganic: Cobalt, total |
|---|---|---|---|---|---|---|---|---|---|---|
| 10/01/1994 | 15 | 4 | 1 | 47 | 0 | 0 | x | | O | |
| 01/31/1995 | 15 | 3 | 0 | 47 | 0 | 0 | | | x | x |
| 02/15/1995 | 15 | 2 | 0 | 47 | 0 | 0 | | | x | x |
| 03/07/1995 | 15 | 6 | 1 | 47 | 0 | 0 | x | | O | x |
| 12/06/1995 | 15 | 3 | 0 | 47 | 0 | 0 | | | x | x |
| 05/06/1996 | 16 | 4 | 1 | 47 | 0 | 0 | | | x | x |
| 11/11/1996 | 15 | 5 | 0 | 47 | 0 | 0 | x | | x | x |
| 06/24/1997 | 15 | 4 | 0 | 47 | 1 | 0 | x | | | x |
| 12/03/1997 | 19 | 10 | 3 | 211 | 3 | 0 | x | x | O | x |
| 03/23/1998 | 2 | 1 | 1 | 5 | 0 | 0 | | | | |
| 04/30/1998 | 2 | 1 | 1 | 5 | 0 | 0 | | | | |
| 06/04/1998 | 17 | 10 | 3 | 52 | 0 | 0 | x | x | O | x |
| 11/18/1998 | 16 | 9 | 3 | 186 | 1 | 0 | x | x | O | x |
| 05/13/1999 | 17 | 9 | 2 | 56 | 0 | 0 | x | | O | x |
| 12/06/1999 | 16 | 8 | 0 | 47 | 1 | 0 | x | | x | x |
| 05/17/2000 | 15 | 7 | 0 | 47 | 1 | 0 | x | | x | x |
| 12/11/2000 | 17 | 9 | 0 | 63 | 1 | 0 | x | | x | x |
| 06/12/2001 | 15 | 5 | 0 | 47 | 2 | 0 | x | | x | x |
| **Subtotal** | **257** | **100** | **16** | **1095** | **10** | **0** | | | | |

NOTE: O = Compound detected above regulatory standard x = Compound detected below regulatory standard

**Table 2.** Detection Summary
Alexander County Landfill

**MW-6**

| Date | Detected Inorganic | | | | | | | Detected VOC | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Copper, total | Lead, total | Mercury | Nickel, total | Silver, total | Vanadium | Zinc, total | BHC, beta | Carbon disulfide | Chloroethane |
| 10/01/1994 | | x | | | | | x | | | |
| 01/31/1995 | | x | | | | | | | | |
| 02/15/1995 | | | | | | | | | | |
| 03/07/1995 | | x | | | | x | x | | | |
| 12/06/1995 | | | | x | | | | | | |
| 05/06/1996 | | | O | x | | | | | | |
| 11/11/1996 | | | | | | x | x | | | |
| 06/24/1997 | | | | | | x | x | | x | |
| 12/03/1997 | x | O | x | O | | x | x | x | x | x |
| 03/23/1998 | | | O | | | | | | | |
| 04/30/1998 | | | O | | | | | | | |
| 06/04/1998 | x | O | O | x | | x | x | | | |
| 11/18/1998 | x | O | | O | | x | x | | | |
| 05/13/1999 | x | x | O | x | | x | x | | | |
| 12/06/1999 | x | | x | x | | x | x | | | |
| 05/17/2000 | x | | | x | | x | x | | x | |
| 12/11/2000 | x | | x | x | x | x | x | | | |
| 06/12/2001 | | | | x | | | x | | x | |
| **Subtotal** | | | | | | | | | | |

NOTE: O = Compound detected above regulatory standard x = Compound detected below regulatory standard

**Table 2.** Detection Summary
Alexander County Landfill

**MW-6**

| Date | Detected VOC<br>cis-1,2-Dichloroethene |
|---|---|
| 10/01/1994 | |
| 01/31/1995 | |
| 02/15/1995 | |
| 03/07/1995 | |
| 12/06/1995 | |
| 05/06/1996 | |
| 11/11/1996 | |
| 06/24/1997 | |
| 12/03/1997 | |
| 03/23/1998 | |
| 04/30/1998 | |
| 06/04/1998 | |
| 11/18/1998 | x |
| 05/13/1999 | |
| 12/06/1999 | x |
| 05/17/2000 | |
| 12/11/2000 | x |
| 06/12/2001 | x |
| **Subtotal** | |

NOTE: O = Compound detected above regulatory standard    x = Compound detected below regulatory standard

**Table 2.** Detection Summary
Alexander County Landfill

**MW-7**

| Date | Inorganic Constituent | | | Organic Constituent | | | Detected Inorganic | | |
|---|---|---|---|---|---|---|---|---|---|
| | Analyzed | Detection | Exceedance | Analyzed | Detection | Exceedance | Antimony, total | Barium, total | Beryllium, total |
| 10/01/1994 | 15 | 3 | 0 | 47 | 2 | 1 | | x | |
| 01/31/1995 | 15 | 3 | 0 | 47 | 3 | 1 | | | |
| 02/15/1995 | 15 | 3 | 0 | 47 | 3 | 1 | | | |
| 03/07/1995 | 15 | 5 | 0 | 47 | 2 | 1 | | | x |
| 12/06/1995 | 15 | 0 | 0 | 47 | 3 | 1 | | | |
| 05/06/1996 | 16 | 0 | 0 | 47 | 1 | 0 | | | |
| 11/11/1996 | 15 | 7 | 0 | 47 | 1 | 0 | | x | x |
| 06/24/1997 | 15 | 7 | 0 | 47 | 2 | 0 | | x | x |
| 12/03/1997 | 19 | 8 | 0 | 211 | 6 | 1 | | x | x |
| 03/23/1998 | 2 | 0 | 0 | 5 | 0 | 0 | | | |
| 04/30/1998 | 2 | 0 | 0 | 5 | 0 | 0 | | | |
| 06/04/1998 | 17 | 8 | 0 | 52 | 1 | 0 | | x | x |
| 11/18/1998 | 16 | 7 | 0 | 186 | 3 | 0 | | x | x |
| 05/13/1999 | 17 | 9 | 1 | 56 | 2 | 0 | | x | x |
| 12/06/1999 | 16 | 9 | 0 | 47 | 1 | 0 | | x | x |
| 05/17/2000 | 15 | 5 | 0 | 47 | 3 | 0 | x | x | |
| 12/12/2000 | 17 | 3 | 0 | 63 | 3 | 0 | | x | |
| 06/13/2001 | 15 | 3 | 0 | 47 | 4 | 1 | | x | |
| **Subtotal** | **257** | **80** | **1** | **1095** | **41** | **7** | | | |

NOTE: O = Compound detected above regulatory standard x = Compound detected below regulatory standard

**Table 2.** Detection Summary
Alexander County Landfill

**MW-7**

| Date | Detected Inorganic | | | | | | | Detected VOC | |
|---|---|---|---|---|---|---|---|---|---|
| | Chromium, total | Cobalt, total | Copper, total | Lead, total | Nickel, total | Vanadium | Zinc, total | 1,1-Dichloroethane | BHC, alpha |
| 10/01/1994 | x | | | | | | x | x | |
| 01/31/1995 | x | x | | | | | x | x | |
| 02/15/1995 | x | x | | | | | x | x | |
| 03/07/1995 | x | x | | | | x | x | x | |
| 12/06/1995 | | | | | | | | x | |
| 05/06/1996 | | | | | | | | x | |
| 11/11/1996 | x | x | | x | | x | x | x | |
| 06/24/1997 | x | x | x | | | x | x | x | |
| 12/03/1997 | x | x | x | x | | x | x | x | |
| 03/23/1998 | | | | | | | | | |
| 04/30/1998 | | | | | | | | | |
| 06/04/1998 | x | x | x | x | | x | x | x | |
| 11/18/1998 | x | x | x | | | x | x | x | x |
| 05/13/1999 | O | x | x | x | x | x | x | x | |
| 12/06/1999 | x | x | x | x | x | x | x | x | |
| 05/17/2000 | x | | | | x | | x | x | |
| 12/12/2000 | x | | | | | | x | x | |
| 06/13/2001 | x | | | | | | x | x | |
| **Subtotal** | | | | | | | | | |

NOTE: O = Compound detected above regulatory standard x = Compound detected below regulatory standard

**Table 2.** Detection Summary
Alexander County Landfill

**MW-7**

| Date | Benzene | Carbon disulfide | Chloroethane | Detected VOC<br>Dichloromethane | Methyl tert-butyl ether | cis-1,2-Dichloroethene |
|---|---|---|---|---|---|---|
| 10/01/1994 | | | | O | | |
| 01/31/1995 | | | x | O | | |
| 02/15/1995 | | | x | O | | |
| 03/07/1995 | | | | O | | |
| 12/06/1995 | | | x | O | | |
| 05/06/1996 | | | | | | |
| 11/11/1996 | | | | | | |
| 06/24/1997 | | x | | | | |
| 12/03/1997 | O | x | x | | x | x |
| 03/23/1998 | | | | | | |
| 04/30/1998 | | | | | | |
| 06/04/1998 | | | | | | |
| 11/18/1998 | | | | | | x |
| 05/13/1999 | | x | | | | |
| 12/06/1999 | | | | | | |
| 05/17/2000 | | x | | | | x |
| 12/12/2000 | | x | | | | x |
| 06/13/2001 | O | x | | | | x |
| **Subtotal** | | | | | | |

NOTE: O = Compound detected above regulatory standard    x = Compound detected below regulatory standard

**Table 2.** Detection Summary
Alexander County Landfill

**MW-8**

| Date | Inorganic Constituent | | | Organic Constituent | | | Detected Inorganic | | |
|---|---|---|---|---|---|---|---|---|---|
| | Analyzed | Detection | Exceedance | Analyzed | Detection | Exceedance | Antimony, total | Barium, total | Cadmium, total |
| 10/01/1994 | 15 | 2 | 0 | 47 | 1 | 0 | | | |
| 01/31/1995 | 15 | 3 | 0 | 47 | 1 | 0 | | | |
| 02/15/1995 | 15 | 3 | 0 | 47 | 1 | 0 | | | |
| 03/07/1995 | 15 | 2 | 0 | 47 | 1 | 0 | | | |
| 12/06/1995 | 15 | 1 | 0 | 47 | 1 | 0 | | | |
| 05/06/1996 | 16 | 1 | 1 | 47 | 1 | 0 | | | |
| 11/11/1996 | 15 | 4 | 0 | 47 | 1 | 0 | | x | x |
| 06/24/1997 | 15 | 5 | 0 | 47 | 2 | 0 | | x | |
| 12/03/1997 | 19 | 7 | 0 | 211 | 4 | 0 | | x | |
| 03/23/1998 | 2 | 1 | 1 | 5 | 0 | 0 | | | |
| 04/30/1998 | 2 | 1 | 1 | 5 | 1 | 0 | | | |
| 06/04/1998 | 17 | 7 | 1 | 52 | 2 | 0 | | x | |
| 11/18/1998 | 16 | 5 | 0 | 186 | 3 | 0 | | x | |
| 05/13/1999 | 17 | 5 | 0 | 56 | 2 | 0 | | x | |
| 12/06/1999 | 16 | 5 | 0 | 47 | 1 | 0 | | x | |
| 05/17/2000 | 15 | 8 | 0 | 47 | 0 | 0 | x | x | |
| 12/12/2000 | 17 | 8 | 1 | 63 | 0 | 0 | | x | |
| 06/12/2001 | 15 | 6 | 0 | 47 | 1 | 0 | | x | |
| **Subtotal** | **257** | **74** | **5** | **1095** | **23** | **0** | | | |

NOTE: O = Compound detected above regulatory standard x = Compound detected below regulatory standard

**Table 2.** Detection Summary
Alexander County Landfill

**MW-8**

| Date | Detected Inorganic | | | | | | | | Detected VOC |
|---|---|---|---|---|---|---|---|---|---|
| | Chromium, total | Cobalt, total | Copper, total | Lead, total | Mercury | Nickel, total | Vanadium | Zinc, total | 1,1-Dichloroethane |
| 10/01/1994 | x | | | | | | | x | x |
| 01/31/1995 | x | x | | | | | | x | x |
| 02/15/1995 | x | x | | | | | | x | x |
| 03/07/1995 | x | x | | | | | | | x |
| 12/06/1995 | | | | | | | | x | x |
| 05/06/1996 | | | | | O | | | | x |
| 11/11/1996 | | | | | | | x | x | x |
| 06/24/1997 | x | | x | | | | x | x | x |
| 12/03/1997 | x | x | x | x | | | x | x | x |
| 03/23/1998 | | | | | O | | | | |
| 04/30/1998 | | | | | O | | | | |
| 06/04/1998 | x | x | | x | O | | x | x | x |
| 11/18/1998 | x | x | | | | | x | x | x |
| 05/13/1999 | x | x | | | x | x | | | x |
| 12/06/1999 | x | | x | | x | | | x | x |
| 05/17/2000 | x | x | x | | | x | x | x | |
| 12/12/2000 | x | x | x | | O | x | x | x | |
| 06/12/2001 | x | x | | | | x | x | x | |
| **Subtotal** | | | | | | | | | |

NOTE: O = Compound detected above regulatory standard x = Compound detected below regulatory standard

**Table 2.** Detection Summary
Alexander County Landfill

**MW-8**

| Date | Detected VOC: BHC, alpha | BHC, gamma | Carbon disulfide | Chloroethane | Trichloroethylene | cis-1,2-Dichloroethene |
|---|---|---|---|---|---|---|
| 10/01/1994 | | | | | | |
| 01/31/1995 | | | | | | |
| 02/15/1995 | | | | | | |
| 03/07/1995 | | | | | | |
| 12/06/1995 | | | | | | |
| 05/06/1996 | | | | | | |
| 11/11/1996 | | | | | | |
| 06/24/1997 | | | x | | | |
| 12/03/1997 | | | | x | x | x |
| 03/23/1998 | | | | | | |
| 04/30/1998 | x | | | | | |
| 06/04/1998 | | | x | | | |
| 11/18/1998 | x | x | | | | |
| 05/13/1999 | | | x | | | |
| 12/06/1999 | | | | | | |
| 05/17/2000 | | | | | | |
| 12/12/2000 | | | | | | |
| 06/12/2001 | | | x | | | |
| **Subtotal** | | | | | | |

NOTE: O = Compound detected above regulatory standard x = Compound detected below regulatory standard

**Table 2.** Detection Summary
Alexander County Landfill

**MW-9**

| Date | Inorganic Constituent Analyzed | Inorganic Constituent Detection | Inorganic Constituent Exceedance | Organic Constituent Analyzed | Organic Constituent Detection | Organic Constituent Exceedance | Detected Inorganic: Barium, total | Beryllium, total | Chromium, total | Cobalt, total |
|---|---|---|---|---|---|---|---|---|---|---|
| 12/11/2000 | 17 | 8 | 0 | 63 | 2 | 0 | x | | x | x |
| 06/13/2001 | 15 | 8 | 0 | 47 | 1 | 0 | x | x | x | x |
| **Subtotal** | **32** | **16** | **0** | **110** | **3** | **0** | | | | |

| Date | Detected Inorganic: Copper, total | Nickel, total | Selenium, total | Vanadium | Zinc, total | Detected VOC: 1,1-Dichloroethane | cis-1,2-Dichloroethene |
|---|---|---|---|---|---|---|---|
| 12/11/2000 | x | x | x | x | x | x | x |
| 06/13/2001 | x | x | | x | x | | x |

NOTE: O = Compound detected above regulatory standard  x = Compound detected below regulatory standard

**Table 2.** Detection Summary
Alexander County Landfill

**MW-10**

| Date | Inorganic Constituent Analyzed | Inorganic Constituent Detection | Inorganic Constituent Exceedance | Organic Constituent Analyzed | Organic Constituent Detection | Organic Constituent Exceedance | Detected Inorganic: Barium, total | Detected Inorganic: Chromium, total | Detected Inorganic: Copper, total | Detected Inorganic: Nickel, total |
|---|---|---|---|---|---|---|---|---|---|---|
| 12/11/2000 | 17 | 6 | 0 | 63 | 0 | 0 | x | x | x | x |
| 06/12/2001 | 15 | 5 | 0 | 47 | 1 | 0 | x | x | | x |
| **Subtotal** | **32** | **11** | **0** | **110** | **1** | **0** | | | | |

| Date | Detected Inorganic: Tin, total | Detected Inorganic: Vanadium | Detected Inorganic: Zinc, total | Detected VOC: Carbon disulfide |
|---|---|---|---|---|
| 12/11/2000 | x | | x | |
| 06/12/2001 | | x | x | x |

NOTE: O = Compound detected above regulatory standard x = Compound detected below regulatory standard

**Table 2.** Detection Summary
Alexander County Landfill

**MW-11**

| Date | Inorganic Constituent | | | Organic Constituent | | | Detected Inorganic | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Analyzed | Detection | Exceedance | Analyzed | Detection | Exceedance | Arsenic, total | Barium, total | Beryllium, total | Chromium, total |
| 12/11/2000 | 17 | 10 | 3 | 63 | 3 | 1 | x | x | x | O |
| 06/12/2001 | 15 | 10 | 3 | 47 | 5 | 1 | | x | x | O |
| **Subtotal** | **32** | **20** | **6** | **110** | **8** | **2** | | | | |

| Date | Detected Inorganic | | | | | | | Detected VOC | |
|---|---|---|---|---|---|---|---|---|---|
| | Cobalt, total | Copper, total | Lead, total | Nickel, total | Thallium, total | Vanadium | Zinc, total | 1,1-Dichloroethane | 1,4-Dichlorobenzene |
| 12/11/2000 | x | x | O | O | | x | x | x | |
| 06/12/2001 | x | x | O | O | x | x | x | x | x |

| Date | Detected VOC | | |
|---|---|---|---|
| | Benzene | Carbon disulfide | cis-1,2-Dichloroethene |
| 12/11/2000 | O | | x |
| 06/12/2001 | O | x | x |

NOTE: O = Compound detected above regulatory standard x = Compound detected below regulatory standard

**Table 2.** Detection Summary
Alexander County Landfill

**MW-12**

| Date | Inorganic Constituent Analyzed | Inorganic Constituent Detection | Inorganic Constituent Exceedance | Organic Constituent Analyzed | Organic Constituent Detection | Organic Constituent Exceedance | Detected Inorganic: Arsenic, total | Barium, total | Beryllium, total | Chromium, total |
|---|---|---|---|---|---|---|---|---|---|---|
| 12/11/2000 | 17 | 11 | 4 | 63 | 5 | 2 | x | O | x | O |
| 06/13/2001 | 15 | 9 | 2 | 47 | 6 | 2 | | x | x | O |
| **Subtotal** | **32** | **20** | **6** | **110** | **11** | **4** | | | | |

| Date | Detected Inorganic: Cobalt, total | Copper, total | Lead, total | Mercury | Nickel, total | Vanadium | Zinc, total | Detected VOC: 1,1-Dichloroethane | 1,4-Dichlorobenzene |
|---|---|---|---|---|---|---|---|---|---|
| 12/11/2000 | x | x | O | x | O | x | x | x | x |
| 06/13/2001 | x | x | x | | O | x | x | x | x |

| Date | Detected VOC: Benzene | Chloroethane | Dichloromethane | cis-1,2-Dichloroethene |
|---|---|---|---|---|
| 12/11/2000 | O | | O | x |
| 06/13/2001 | O | x | O | x |

NOTE: O = Compound detected above regulatory standard     x = Compound detected below regulatory standard

**Table 2.** Detection Summary
Alexander County Landfill

**MW-13**

| Date | Inorganic Constituent Analyzed | Inorganic Constituent Detection | Inorganic Constituent Exceedance | Organic Constituent Analyzed | Organic Constituent Detection | Organic Constituent Exceedance | Detected Inorganic: Antimony, total | Barium, total | Beryllium, total | Chromium, total |
|---|---|---|---|---|---|---|---|---|---|---|
| 12/11/2000 | 17 | 9 | 0 | 63 | 0 | 0 | x | x | | x |
| 06/12/2001 | 15 | 9 | 2 | 47 | 1 | 0 | | x | x | O |
| **Subtotal** | **32** | **18** | **2** | **110** | **1** | **0** | | | | |

| Date | Detected Inorganic: Cobalt, total | Copper, total | Lead, total | Nickel, total | Tin, total | Vanadium | Zinc, total | Detected VOC: Carbon disulfide |
|---|---|---|---|---|---|---|---|---|
| 12/11/2000 | x | x | | x | x | x | x | |
| 06/12/2001 | x | x | O | x | | x | x | x |

NOTE: O = Compound detected above regulatory standard    x = Compound detected below regulatory standard

**Table 2.** Detection Summary
Alexander County Landfill

**MW-14**

| Date | Inorganic Constituent Analyzed | Inorganic Constituent Detection | Inorganic Constituent Exceedance | Organic Constituent Analyzed | Organic Constituent Detection | Organic Constituent Exceedance | Detected Inorganic: Barium, total | Chromium, total | Cobalt, total | Copper, total |
|---|---|---|---|---|---|---|---|---|---|---|
| 12/12/2000 | 17 | 7 | 0 | 63 | 2 | 0 | x | x | x | x |
| 06/13/2001 | 15 | 8 | 0 | 47 | 2 | 0 | x | x | x | x |
| **Subtotal** | **32** | **15** | **0** | **110** | **4** | **0** | | | | |

| Date | Detected Inorganic: Nickel, total | Thallium, total | Vanadium | Zinc, total | Detected VOC: 1,1-Dichloroethane | cis-1,2-Dichloroethene |
|---|---|---|---|---|---|---|
| 12/12/2000 | x | | x | x | x | x |
| 06/13/2001 | x | x | x | x | x | x |

NOTE: O = Compound detected above regulatory standard    x = Compound detected below regulatory standard

**Table 2.** Detection Summary
Alexander County Landfill

**MW-15**

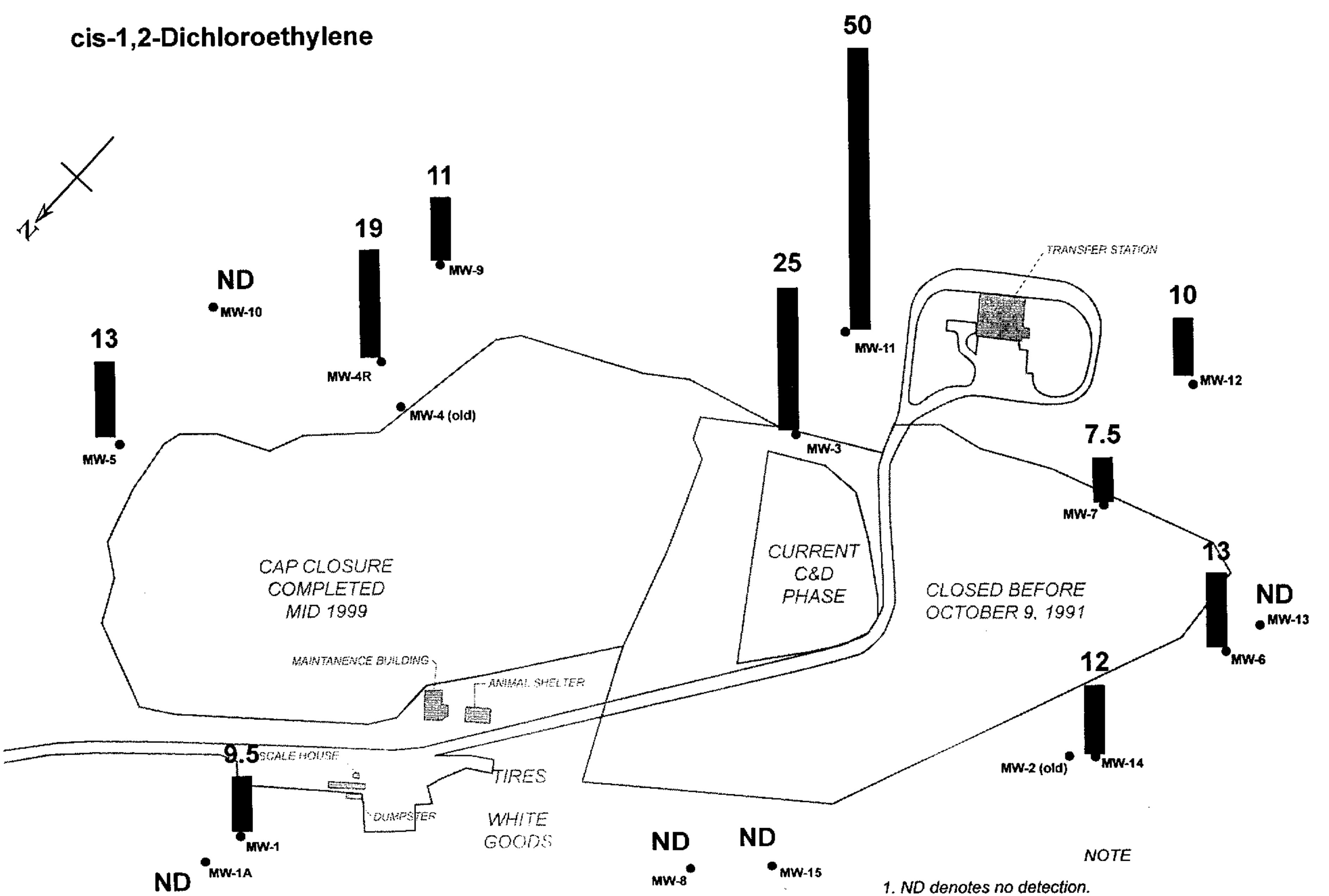
| Date | Inorganic Constituent Analyzed | Inorganic Constituent Detection | Inorganic Constituent Exceedance | Organic Constituent Analyzed | Organic Constituent Detection | Organic Constituent Exceedance | Detected Inorganic: Antimony, total | Arsenic, total | Barium, total | Beryllium, total |
|---|---|---|---|---|---|---|---|---|---|---|
| 12/11/2000 | 17 | 8 | 0 | 63 | 1 | 0 | | | x | |
| 06/12/2001 | 15 | 11 | 2 | 47 | 3 | 1 | x | x | x | x |
| **Subtotal** | **32** | **19** | **2** | **110** | **4** | **1** | | | | |

| Date | Detected Inorganic: Chromium, total | Cobalt, total | Copper, total | Lead, total | Mercury | Nickel, total | Vanadium | Zinc, total | Detected VOC: 1,1-Dichloroethane |
|---|---|---|---|---|---|---|---|---|---|
| 12/11/2000 | x | x | x | | x | x | x | x | x |
| 06/12/2001 | O | x | x | O | | x | x | x | x |

| Date | Detected VOC: Benzene | Carbon disulfide |
|---|---|---|
| 12/11/2000 | | |
| 06/12/2001 | O | x |

NOTE: O = Compound detected above regulatory standard    x = Compound detected below regulatory standard

**Figure 1.** Map Showing Concentrations of Frequently Detected VOCs (June, 2001)




NOTE

1. ND denotes no detection.
2. All concentrations are expressed in ug/L.
3. Concentrations are taken from June 2001 sampling event.

Figure 2. Map Showing Concentrations of Frequently Detected VOCs (June, 2001)

## 1,1-Dichloroethane

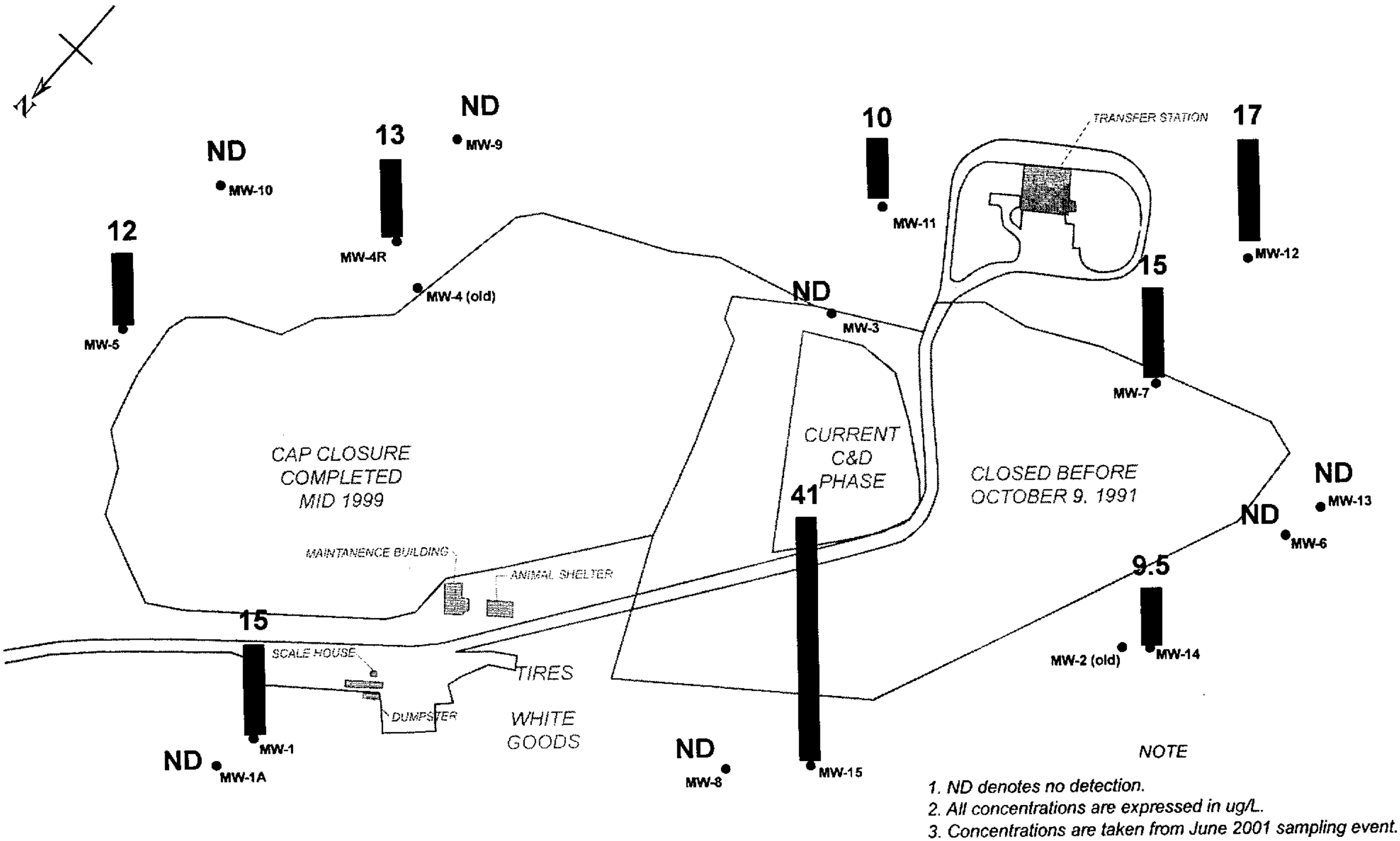


Figure 3. Map Showing Concentrations of Frequently Detected VOCs (June, 2001)

## Benzene

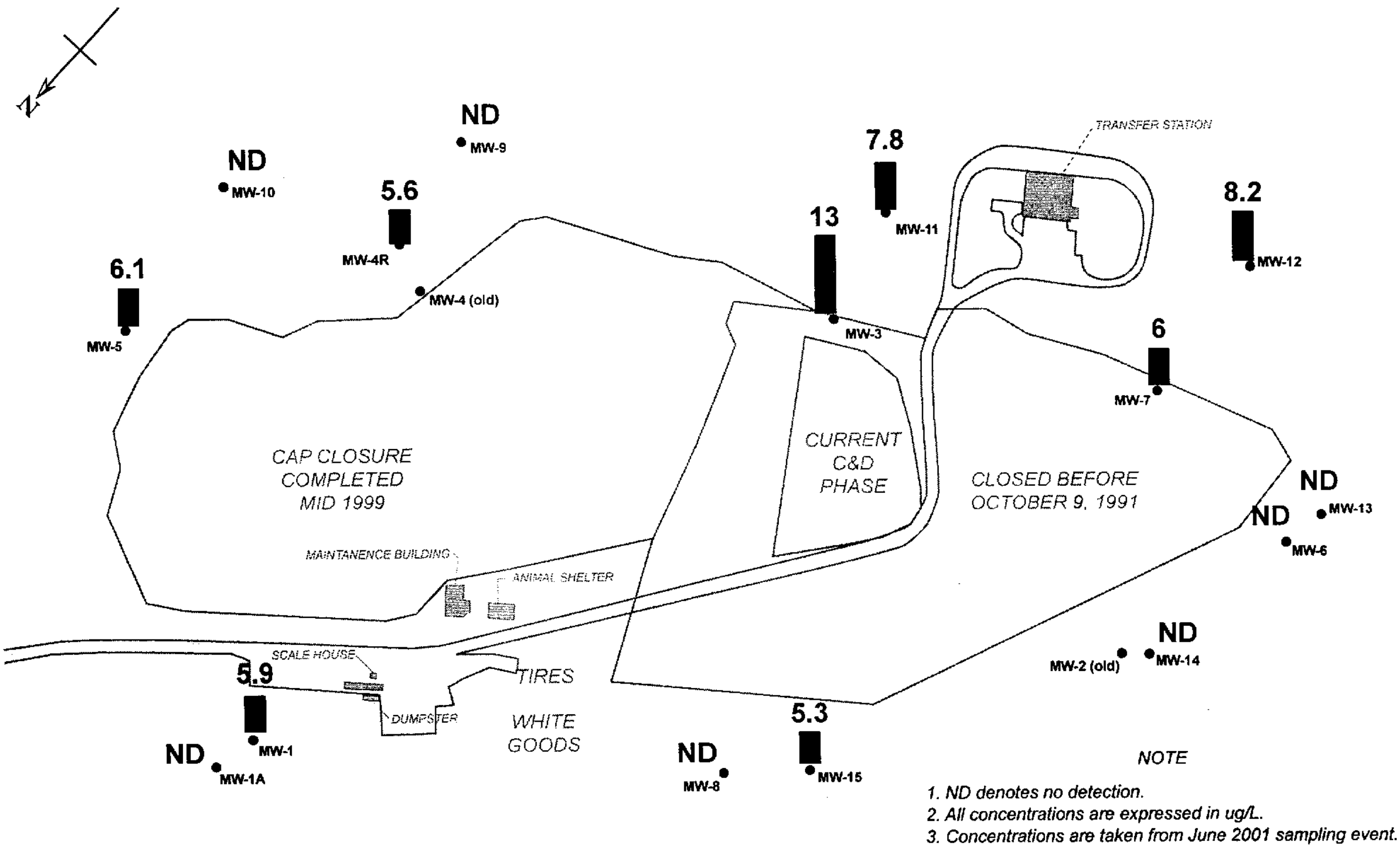
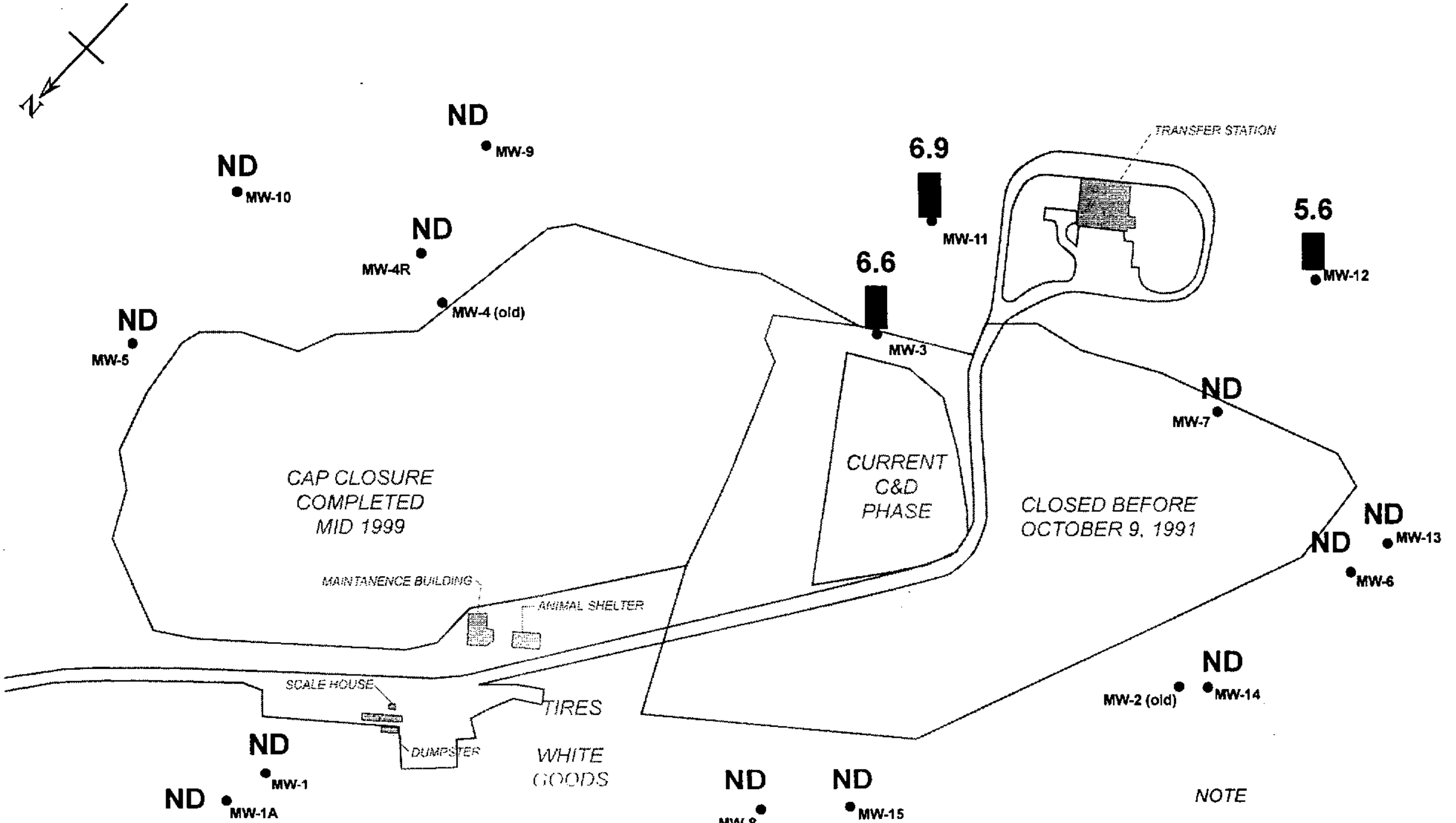


Figure 4. Map Showing Concentrations of Frequently Detected VOCs (June, 2001)

## 1,4-Dichlorobenzene




NOTE

1. ND denotes no detection.
2. All concentrations are expressed in ug/L.
3. Concentrations are taken from June 2001 sampling event.

**Figure 5.** Indicator VOCs Detected in MW-1

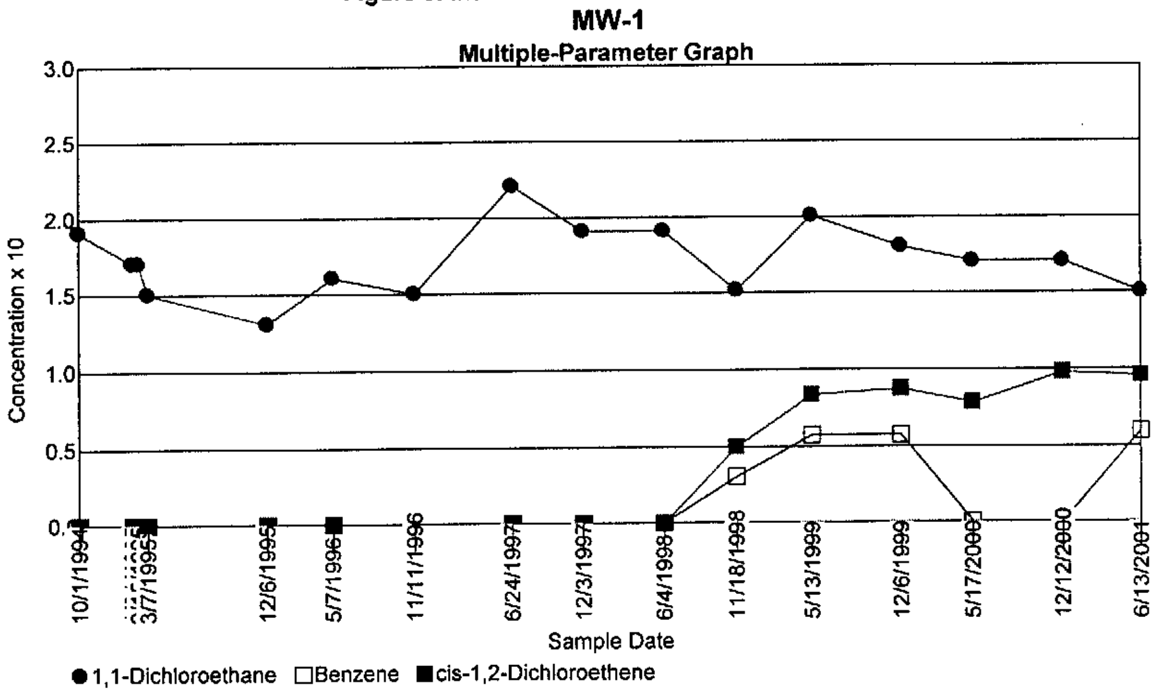
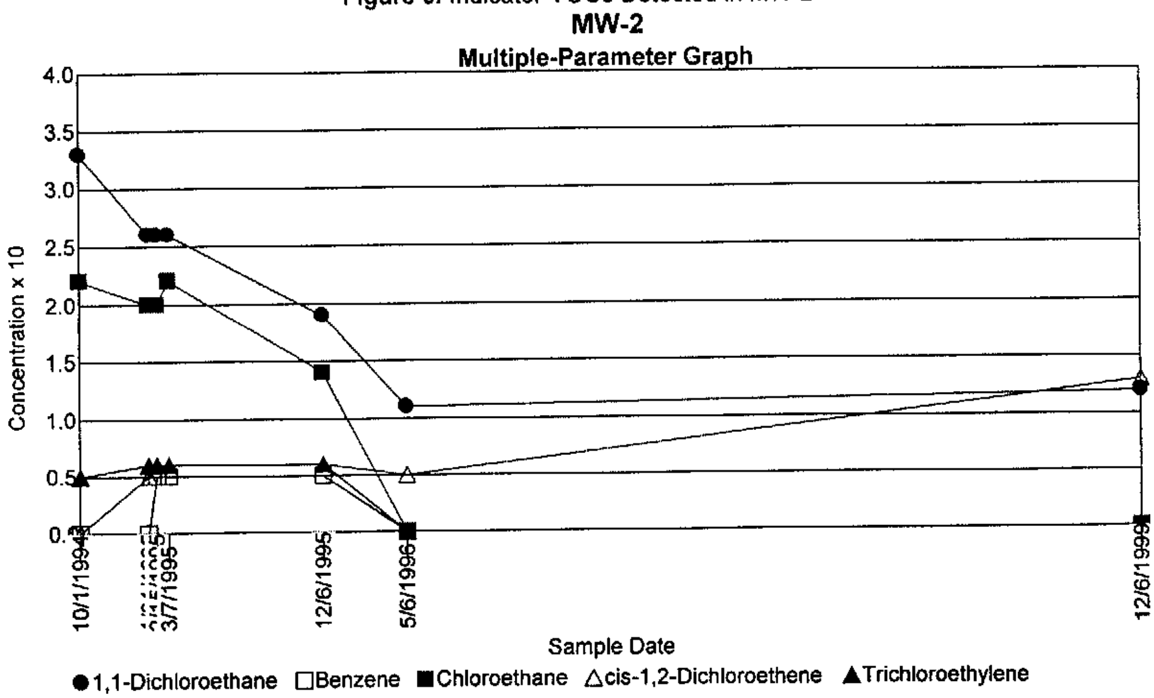



**Figure 6.** Indicator VOCs Detected in MW-2




NOTE: Non-detects replaced with zero

**Figure 7.** Aliphatic Compounds Detected in MW-3

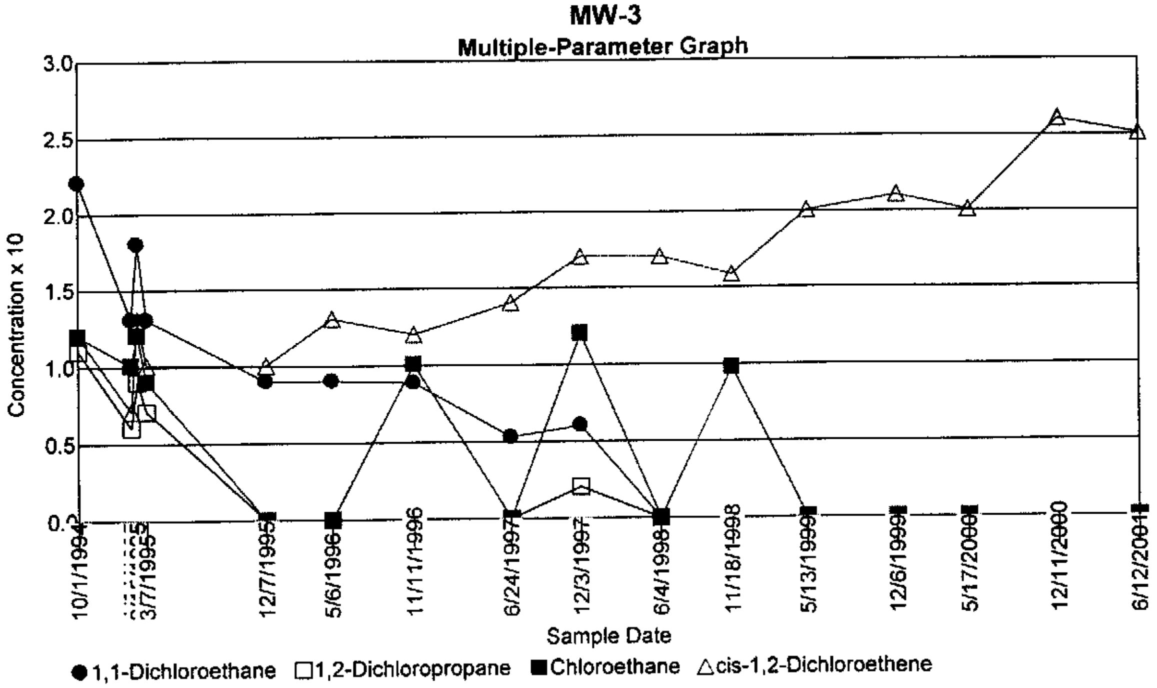
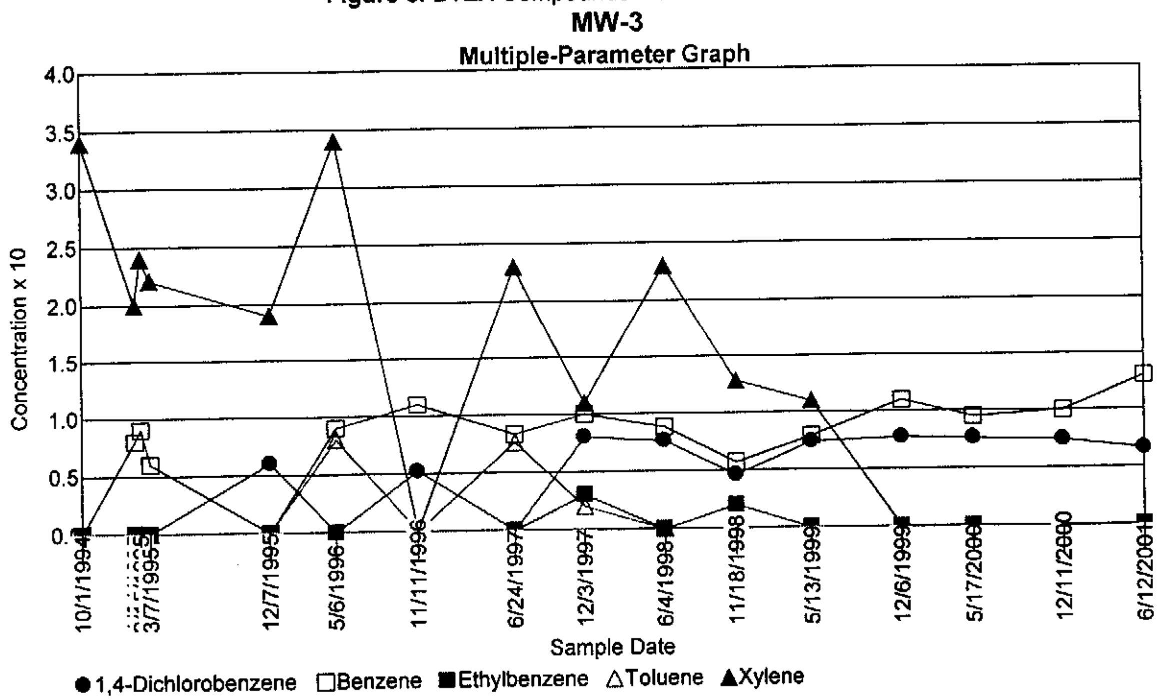



**Figure 8.** BTEX Compounds Detected in MW-3




NOTE: Non-detects replaced with zero

**Figure 9.** Indicator VOCs Detected in MW-4R

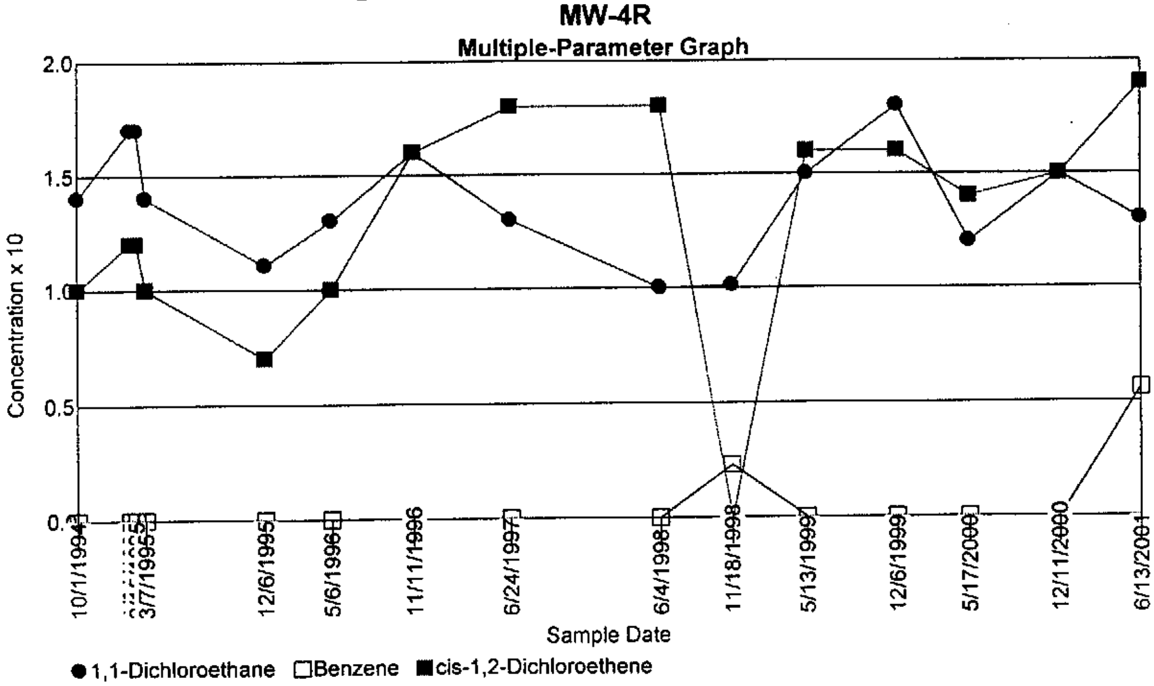
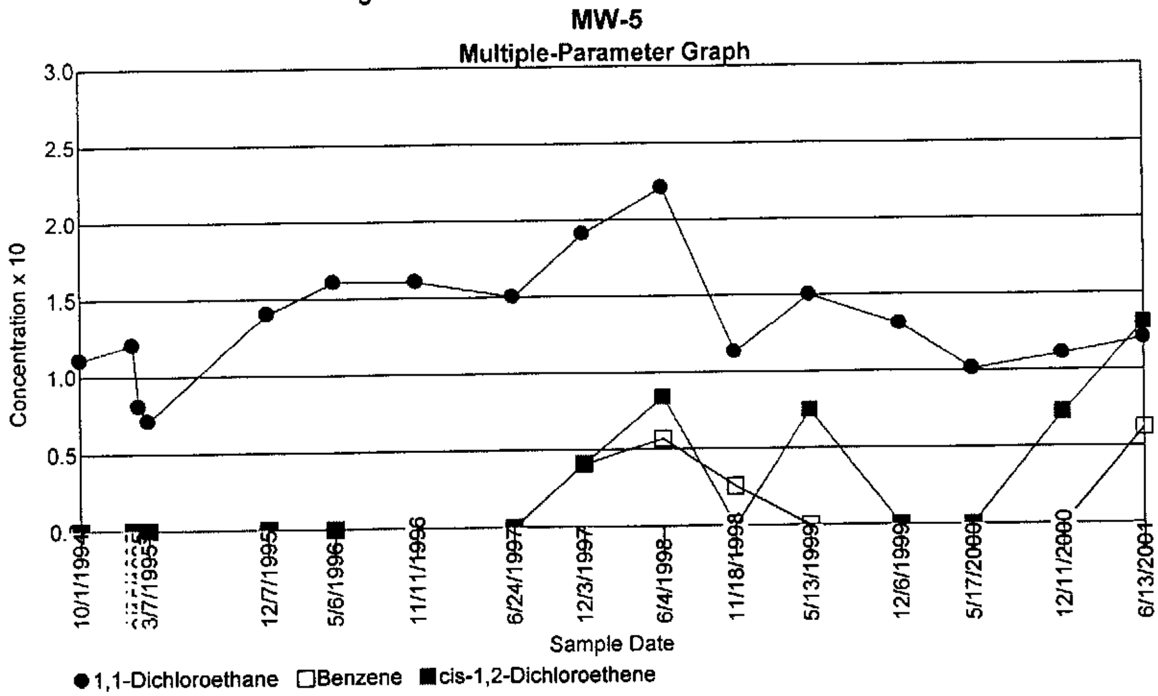



**Figure 10.** Indicator VOCs Detected in MW-5




NOTE: Non-detects replaced with zero

**Figure 11.** Indicator VOCs Detected in MW-7

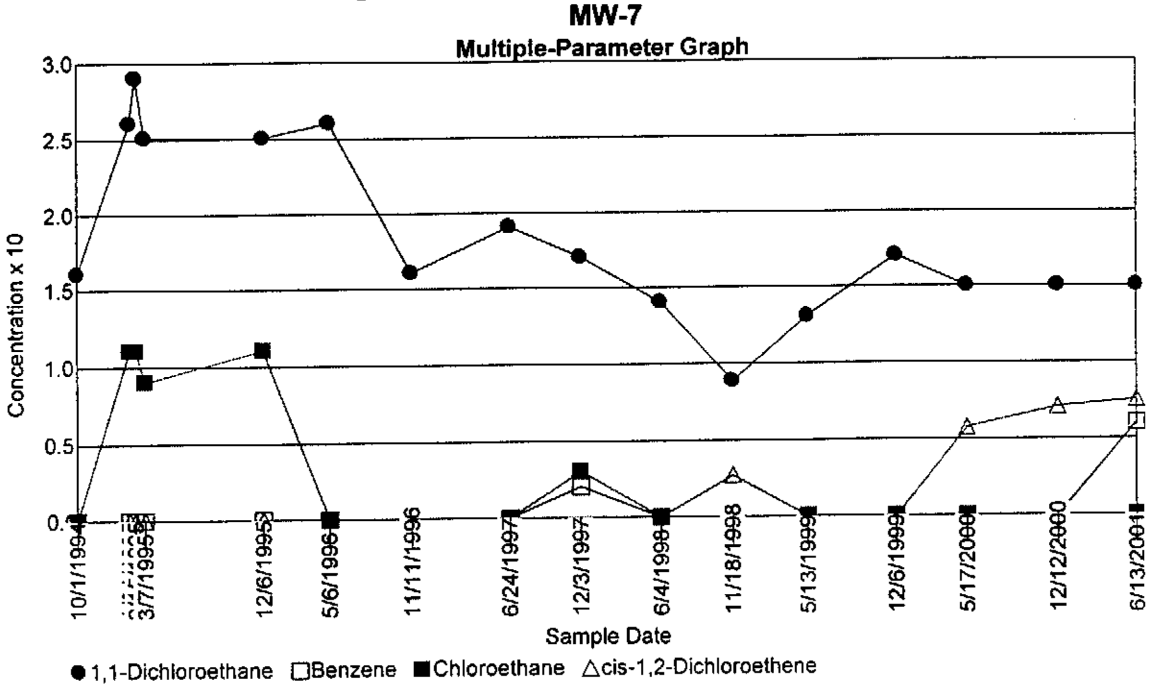
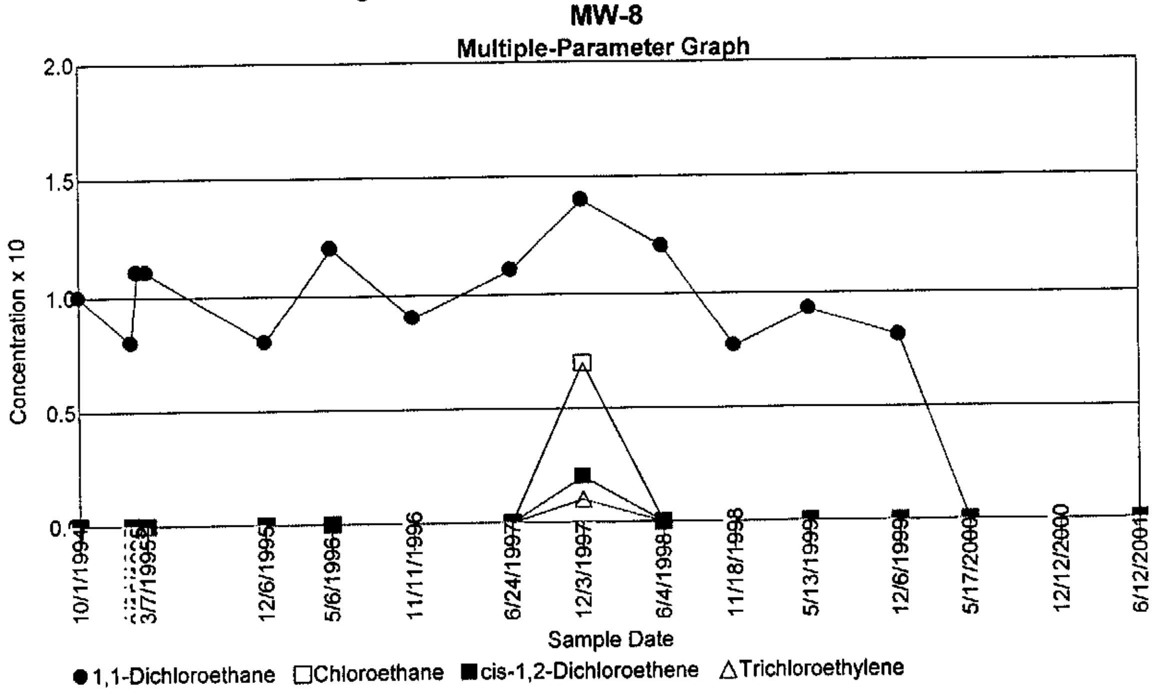



**Figure 12.** Indicator VOCs Detected in MW-8




NOTE: Non-detects replaced with zero

Time-Series Plots for Indicator VOCs

Figure 13. Levels of 1,1-Dichloroethane in Monitoring Wells near Transfer Station

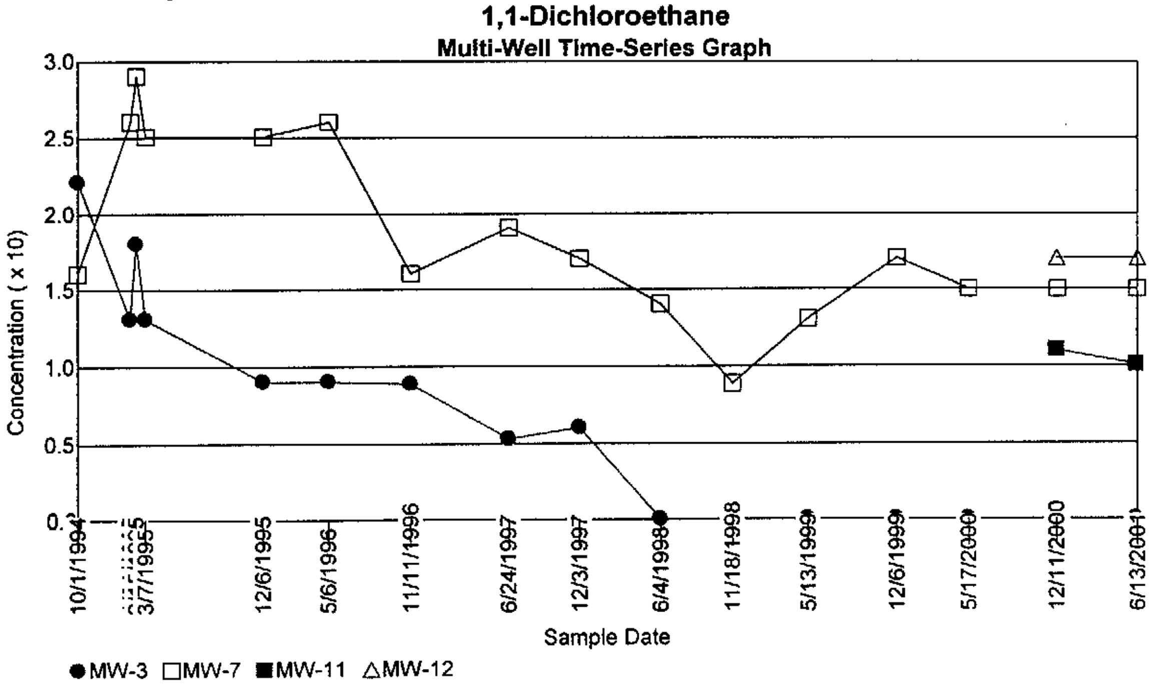
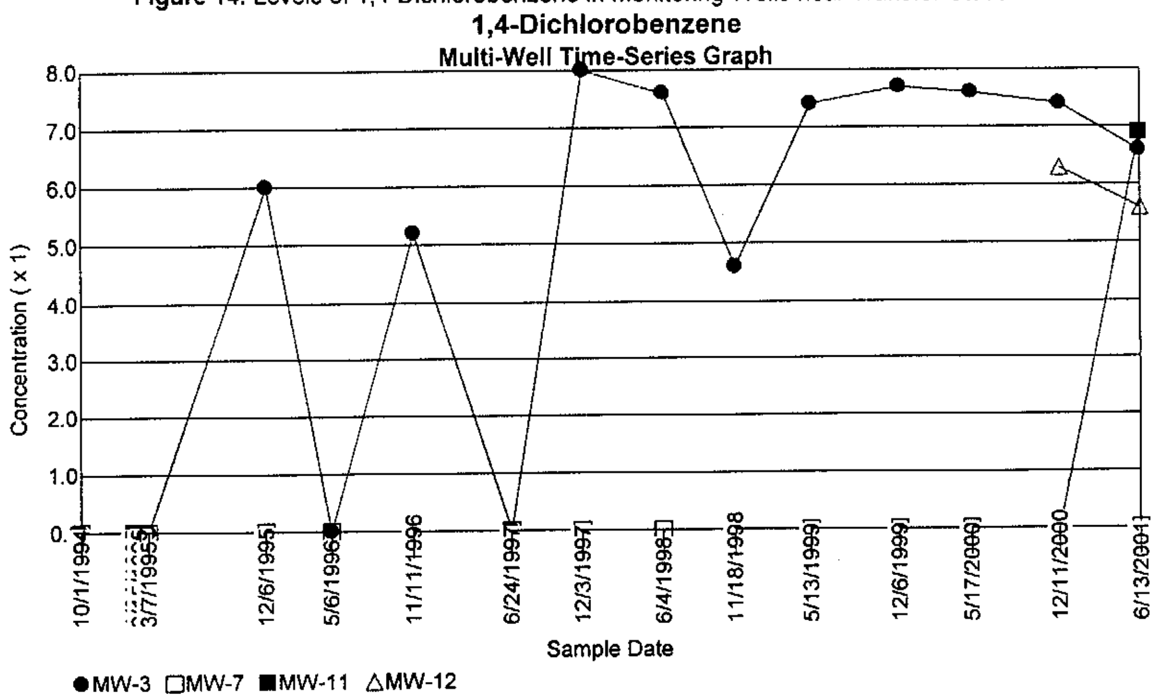



Figure 14. Levels of 1,4-Dichlorobenzene in Monitoring Wells near Transfer Station




NOTE: Non-detects replaced with zero

Figure 15. Levels of Benzene Detected in Monitoirng Wells near Transfer Station

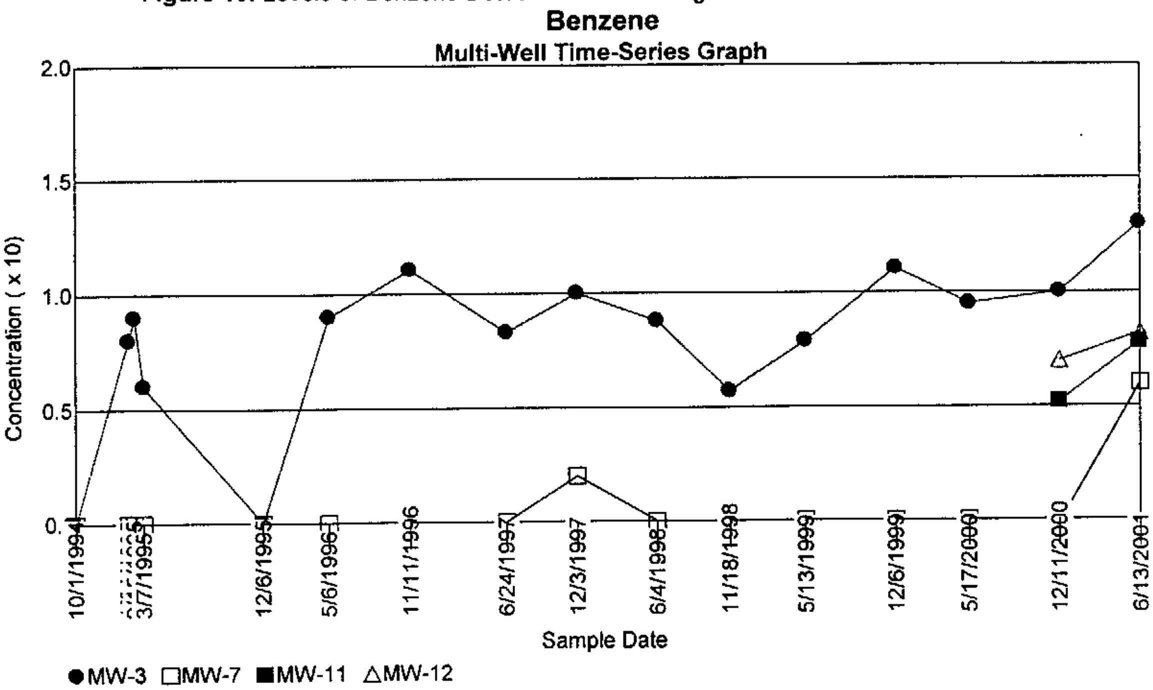
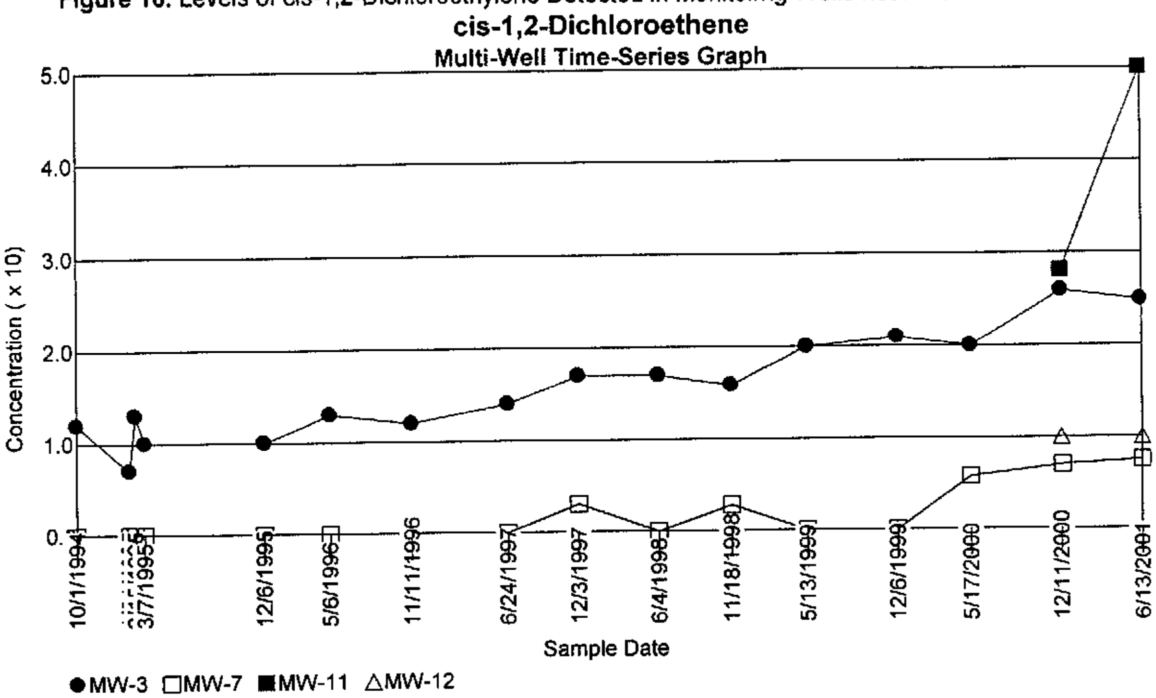
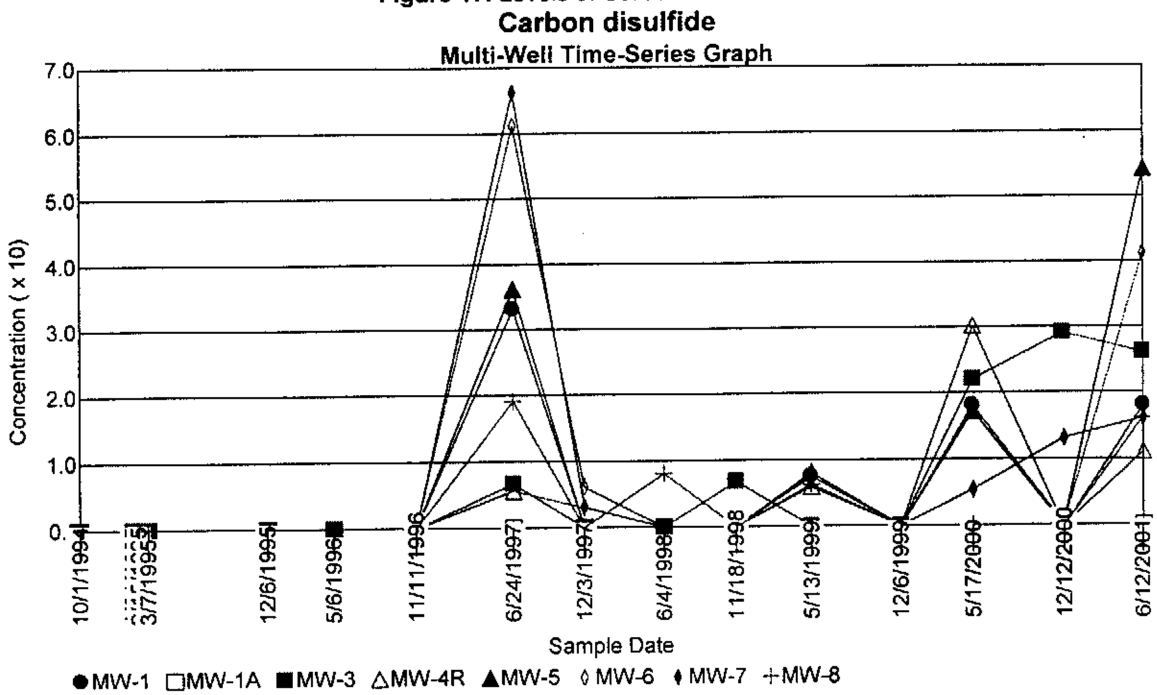



Figure 16. Levels of cis-1,2-Dichloroethylene Detected in Monitoirng Wells near Transfer Station




NOTE: Non-detects replaced with zero

**Figure 17.** Levels of Carbon Disulfide




NOTE: Non-detects replaced with zero

ATSDR

# 1,1-DICHLOROETHANE

## CAS # 75-34-3



**This fact sheet answers the most frequently asked health questions (FAQs) about 1,1-dichloroethane. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.**

**HIGHLIGHTS: 1,1-Dichloroethane is used to make other chemicals and to dissolve and remove grease. Breathing very high levels can affect your heart and animal studies have seen kidney disease from long-term exposure to high levels in air. 1,1-Dichloroethane has been found in at least 248 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).**

### What is 1,1-dichloroethane?

(Pronounced 1,1-dī′ klôr′ ō ĕth′ ān′)

1,1-Dichloroethane is a colorless, oily liquid with a sweet odor. It evaporates easily at room temperature and burns easily. It does not occur naturally in the environment.

In the past, 1,1-dichloroethane was used as a surgical anesthetic, but it is no longer used this way. Today it is used primarily to make other chemicals, to dissolve substances such as paint, varnish, and finish removers, and to remove grease.

### What happens to 1,1-dichloroethane when it enters the environment?

- 1,1-Dichloroethane is released from industrial processes primarily to the air.
- 1,1-Dichloroethane evaporates from water rapidly into the air.
- It can also be found in the air as a breakdown product of another chemical, 1,1,1-trichloroethane.
- 1,1-Dichloroethane does not dissolve easily in water.
- Small amounts of 1,1-dichloroethane released to soil can evaporate into the air or move into groundwater.
- It is not known how long it stays in soil.
- 1,1-Dichloroethane is not expected to build up in the body tissues of animals.

### How might I be exposed to 1,1-dichloroethane?

- Breathing air containing it from industrial releases or hazardous waste sites.
- Drinking contaminated tap water.
- Touching soil containing it.
- Touching contaminated materials in the workplace.

### How can 1,1-dichloroethane affect my health?

Very limited information is available on the effects of 1,1-dichloroethane on people's health. The chemical was discontinued as a surgical anesthetic when effects on the heart, such as irregular heart beats, were reported.

Studies in animals have shown that 1,1-dichloroethane can cause kidney disease after long-term exposure to high levels in air. Delayed growth was seen in the offspring of animals who breathed high concentrations of the chemical during pregnancy.

## How likely is 1,1-dichloroethane to cause cancer?

The Department of Health and Human Services (DHHS), the International Agency for Research on Cancer (IARC), and the EPA have not classified 1,1-dichloroethane for carcinogenicity.

1,1-Dichloroethane caused cancer in one study in which rats and mice were fed large doses of the chemical for their lifetimes.

## Is there a medical test to show whether I've been exposed to 1,1-dichloroethane?

Tests are available that measure 1,1-dichloroethane in urine, blood, breath, and body tissues. These tests aren't available at most doctors' offices, but can be done at a special laboratory that has special equipment.

The tests must be done soon after exposure occurs, because most of the 1,1-dichloroethane that is taken into the body leaves within 2 days. In addition, these tests cannot tell you when you were exposed, or whether health effects will occur.

## Has the federal government made recommendations to protect human health?

The EPA requires that spills or accidental releases into the environment of 1,000 pounds or more of 1,1-dichloroethane be reported to the EPA.

The Occupational Safety and Health Administration (OSHA) has set an occupational exposure limit of 400 milligrams of 1,1-dichloroethane per cubic meter of air (400 $mg/m^3$) for an 8-hour workday, 40-hour workweek.

The National Institute for Occupational Safety and Health (NIOSH) and the American Conference of Governmental Industrial Hygienists (ACGIH) recommend the same exposure limit in air.

NIOSH currently recommends that a level of 12,150 $mg/m^3$ be considered immediately dangerous to life and health. This is the exposure level of 1,1-dichloroethane that is likely to cause permanent health problems or death.

The federal recommendations have been uipdated as of July 1999.

## Glossary

Anesthetic: A substance used to cause numbness.
Carcinogenicity: Ability to cause cancer.
CAS: Chemical Abstracts Service.
Evaporate: To change into a vapor or gas.
Milligram (mg): One thousandth of a gram.

## Source of Information

Agency for Toxic Substances and Disease Registry. 1990. Toxicological profile for 1,1-dichloroethane. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Animal testing is sometimes necessary to find out how toxic substances might harm people or to treat those who have been exposed. Laws today protect the welfare of research animals and scientists must follow strict guidelines.

**Where can I get more information?** For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-639-6359. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

# ATSDR

# 1,2-DICHLOROETHENE
## CAS # 540-59-0, 156-59-2, and 156-60-5

Agency for Toxic Substances and Disease Registry ToxFAQs September 1997

**This fact sheet answers the most frequently asked health questions (FAQs) about 1,2-dichloroethene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.**

**HIGHLIGHTS: Exposure to 1,2-dichloroethene occurs mainly in workplaces where it is made or used. Breathing high levels of 1,2-dichloroethene can make you feel nauseous, drowsy, and tired. *cis*-1,2-Dichloroethene has been found in at least 146 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA). *trans*-1,2-Dichloroethene was found in at least 563 NPL sites. 1,2-Dichloroethene was found at 336 sites, but the isomer (*cis*- or *trans*-) was not specified.**

### What is 1,2-dichloroethene?
(Pronounced 1,2-dī-klôr′ ō-ĕth′ēn)

1,2-Dichloroethene, also called 1,2-dichloroethylene, is a highly flammable, colorless liquid with a sharp, harsh odor. It is used to produce solvents and in chemical mixtures. You can smell very small amounts of 1,2-dichloroethene in air (about 17 parts of 1,2-dichloroethene per million parts of air [17 ppm]).

There are two forms of 1,2-dichloroethene; one is called *cis*-1,2-dichloroethene and the other is called *trans*-1,2-dichloroethene. Sometimes both forms are present as a mixture.

### What happens to 1,2-dichloroethene when it enters the environment?

- 1,2-Dichloroethene evaporates rapidly into air.
- In the air, it takes about 5-12 days for half of it to break down.
- Most 1,2-dichloroethene in the soil surface or bodies of water will evaporate into air.
- 1,2-Dichloroethene can travel through soil or dissolve in water in the soil. It is possible that it can contaminate groundwater.
- In groundwater, it takes about 13-48 weeks to break down.
- There is a slight chance that 1,2-dichloroethene will break down into vinyl chloride, a different chemical which is believed to be more toxic than 1,2-dichloroethene.

### How might I be exposed to 1,2-dichloroethene?

- Breathing 1,2-dichloroethene that has leaked from hazardous waste sites and landfills.
- Drinking contaminated tap water or breathing vapors from contaminated water while cooking, bathing, or washing dishes.
- Breathing 1,2-dichloroethene, touching it, or touching contaminated materials in the workplace.

### How can 1,2-dichloroethene affect my health?

Breathing high levels of 1,2-dichloroethene can make you feel nauseous, drowsy, and tired; breathing very high levels can kill you.

When animals breathed high levels of *trans*-1,2-dichloroethene for short or longer periods of time, their livers and lungs were damaged and the effects were more severe with longer exposure times. Animals that breathed very high levels of *trans*-1,2-dichloroethene had damaged hearts.

Animals that ingested extremely high doses of *cis*- or *trans*-1,2-dichloroethene died.

Lower doses of *cis*-1,2-dichloroethene caused effects on the blood, such as decreased numbers of red blood cells, and also effects on the liver.

The long-term (365 days or longer) human health effects after exposure to low concentrations of 1,2-dichloroethene aren't known. One animal study suggested that an exposed fetus may not grow as quickly as one that hasn't been exposed.

Exposure to 1,2-dichloroethene hasn't been shown to affect fertility in people or animals.

## How likely is 1,2-dichloroethene to cause cancer?

The EPA has determined that *cis*-1,2-dichloroethene is not classifiable as to its human carcinogenicity.

No EPA cancer classification is available for *trans*-1,2-dichloroethene.

## Is there a medical test to show whether I've been exposed to 1,2-dichloroethene?

Tests are available to measure concentrations of the breakdown products of 1,2-dichloroethene in blood, urine, and tissues. However, these tests aren't used routinely to determine whether a person has been exposed to this compound. This is because after you are exposed to 1,2-dichloroethene, the breakdown products in your body that are detected with these tests may be the same as those that come from exposure to other chemicals. These tests aren't available in most doctors' offices, but can be done at special laboratories that have the right equipment.

## Has the federal government made recommendations to protect human health?

The EPA has set the maximum allowable level of *cis*-1,2-dichloroethene in drinking water at 0.07 milligrams per liter of water (0.07 mg/L) and *trans*-1,2-dichloroethene at 0.1 mg/L.

The EPA requires that any spills or accidental release of 1,000 pounds or more of 1,2-dichloroethene must be reported to the EPA.

The Occupational Health Safety and Health Administration (OSHA) has set the maximum allowable amount of 1,2-dichloroethene in workroom air during an 8-hour workday in a 40-hour workweek at 200 parts of 1,2-dichloroethene per million parts of air (200 ppm).

## Glossary

Carcinogenicity: Ability of a substance to cause cancer.

CAS: Chemical Abstracts Service.

Fertility: Ability to reproduce.

Ingest: To eat or drink something.

Milligram (mg): One thousandth of a gram.

ppm: Parts per million.

Solvent: A chemical that can dissolve other substances.

## Source of Information

This ToxFAQs information is taken from the 1996 Toxicological Profile for 1,2-Dichloroethene produced by the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services, Public Health Service in Atlanta, GA.

Animal testing is sometimes necessary to find out how toxic substances might harm people and how to treat people who have been exposed. Laws today protect the welfare of research animals and scientists must follow strict guidelines.

**Where can I get more information?** For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-639-6359. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATSDR

# 1,4-DICHLOROBENZENE

## CAS # 106-46-7



**This fact sheet answers the most frequently asked health questions (FAQs) about 1,4-dichlorobenzene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.**

**HIGHLIGHTS: Exposure to 1,4-dichlorobenzene happens mostly from breathing high levels in indoor air or workplace air. Extremely high exposures can cause dizziness, headaches, and liver problems. 1,4-Dichlorobenzene has been found in at least 281 of 1,467 National Priorities List sites identified by the Environmental Protection Agency (EPA).**

### What is 1,4-dichlorobenzene?

(Pronounced 1,4-dī′ klôr′ ō bĕn′ zēn′)

1,4-Dichlorobenzene is a chemical used to control moths, molds, and mildew, and to deodorize restrooms and waste containers. It is also called para-DCB or p-DCB. Other names include Paramoth, Para crystals, and Paracide reflecting its widespread use to kill moths.

At room temperature, p-DCB is a white solid with a strong, pungent odor. When exposed to air, it slowly changes from a solid to a vapor. It is the vapor that acts as a deodorizer or insect killer. Most people recognize the odor as the smell of mothballs, and can smell p-DCB in the air at very low levels. Most p-DCB in our environment comes from its use in moth repellent products and in toilet deodorizer blocks.

### What happens to 1,4-dichlorobenzene when it enters the environment?

- ❑ In air, it breaks down to harmless products in about a month.
- ❑ It does not dissolve easily in water.
- ❑ It is not easily broken down by soil organisms.
- ❑ It evaporates easily from water and soil, so most is found in the air.
- ❑ It is taken up and retained by plants and fish.

### How might I be exposed to 1,4-dichlorobenzene?

- ❑ Breathing indoor air in public restrooms and homes that use p-DCB as a deodorizer.
- ❑ Breathing air around some mothballs (check the label).
- ❑ Breathing workplace air where p-DCB is manufactured.
- ❑ Drinking contaminated water around hazardous waste sites.
- ❑ Eating foods such as pork, chicken, and eggs that are contaminated with p-DCB from its use as an odor control product in animal stalls.
- ❑ Eating fish from contaminated waters.

### How can 1,4-dichlorobenzene affect my health?

There is no evidence that moderate use of common household products that contain p-DCB will result in harmful effects to your health. Harmful effects, however, may occur from high exposures. Very high usage of p-DCB products in the home can result in dizziness, headaches, and liver problems. Some of the patients who developed these symptoms had been using the products for months or even years after they first began to feel ill.

Workers breathing high levels of p-DCB (1,000 times more than levels in deodorized rooms) have reported painful irritation of the nose and eyes. There are cases of people who have eaten p-DCB products regularly for months to years because of its sweet taste. These people had skin blotches and lower numbers of red blood cells.

## How likely is 1,4-dichlorobenzene to cause cancer?

The Department of Health and Human Services (DHHS) has determined that p-DCB may reasonably be anticipated to be a carcinogen. There is no direct evidence that p-DCB can cause cancer in humans. However, animals given very high levels in water developed liver and kidney tumors.

## How can 1,4-dichlorobenzene affect children?

Children are exposed to p-DCB in many of the same ways that adults are. Children may be at higher risk, due to accidental exposures such as swallowing p-DCB used in the home in mothballs or toilet bowl deodorant blocks. There is very little information on how children react to p-DCB exposure, but children would probably show the same effects as adults.

No studies in people or animals show that p-DCB crosses the placenta or can be found in fetal tissues. Based on other similar chemicals, it is possible that this could occur. There is no credible evidence that p-DCB causes birth defects. One study found dichlorobenzenes in breast milk, but p-DCB has not been specifically measured.

## How can families reduce the risk of exposure to 1,4-dichlorobenzene?

You should not let children play with or drink toilet bowl water because it may contain p-DCB. Do not let children rub mothballs or cleaners containing p-DCB on their skin. Pesticides, bathroom deoderizers, and mothballs containg p-DCB should be stored out of reach of young children. Always store household chemicals in their original containers. Never store them in containers children would find attractive to eat or drink from, such as old soda bottles.

## Is there a medical test to show whether I've been exposed to 1,4-dichlorobenzene?

Tests are available to measure your exposure to p-DCB. The most common test measures a breakdown product of p-DCB called 2,5-dichlorophenol in urine and blood. If there is 2,5-dichlorophenol in the urine, it indicates that the person was exposed to p-DCB within the previous day or two. The test that measures p-DCB in your blood is less common.

## Has the federal government made recommendations to protect human health?

The EPA has set a maximum contaminant level of 75 micrograms of p-DCB per liter of drinking water (75 μg/L).

p-DCB is also an EPA-registered pesticide. Manufacturers must provide certain information to EPA for it to be used as a pesticide.

The Occupational Safety and Health Administration (OSHA) has set a maximum level of 75 parts of p-DCB per million parts air in the workplace (75 ppm) for an 8-hour day, 40-hour workweek.

## Source of Information

Agency for Toxic Substances and Disease Registry (ATSDR). 1998. Toxicological profile for 1,4-dichlorobenzene. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Animal testing is sometimes necessary to find out how toxic substances might harm people and how to treat people who have been exposed. Laws today protect the welfare of research animals and scientists must follow strict guidelines.

**Where can I get more information?** For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone:1-888-422-8737, FAX: 404-639-6359. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

# BENZENE

## CAS # 71-43-2

Agency for Toxic Substances and Disease Registry ToxFAQs September 1997

**This fact sheet answers the most frequently asked health questions (FAQs) about benzene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.**

**HIGHLIGHTS: Benzene is a widely used chemical formed from both natural processes and human activities. Breathing benzene can cause drowsiness, dizziness, and unconsciousness; long-term benzene exposure causes effects on the bone marrow and can cause anemia and leukemia. Benzene has been found in at least 813 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).**

### What is benzene?

(Pronounced bĕn′zēn′)

Benzene is a colorless liquid with a sweet odor. It evaporates into the air very quickly and dissolves slightly in water. It is highly flammable and is formed from both natural processes and human activities.

Benzene is widely used in the United States; it ranks in the top 20 chemicals for production volume. Some industries use benzene to make other chemicals which are used to make plastics, resins, and nylon and synthetic fibers. Benzene is also used to make some types of rubbers, lubricants, dyes, detergents, drugs, and pesticides. Natural sources of benzene include volcanoes and forest fires. Benzene is also a natural part of crude oil, gasoline, and cigarette smoke.

### What happens to benzene when it enters the environment?

- Industrial processes are the main source of benzene in the environment.
- Benzene can pass into the air from water and soil.
- It reacts with other chemicals in the air and breaks down within a few days.
- Benzene in the air can attach to rain or snow and be carried back down to the ground.
- It breaks down more slowly in water and soil, and can pass through the soil into underground water.
- Benzene does not build up in plants or animals.

### How might I be exposed to benzene?

- Outdoor air contains low levels of benzene from tobacco smoke, automobile service stations, exhaust from motor vehicles, and industrial emissions.
- Indoor air generally contains higher levels of benzene from products that contain it such as glues, paints, furniture wax, and detergents.
- Air around hazardous waste sites or gas stations will contain higher levels of benzene.
- Leakage from underground storage tanks or from hazardous waste sites containing benzene can result in benzene contamination of well water.
- People working in industries that make or use benzene may be exposed to the highest levels of it.
- A major source of benzene exposures is tobacco smoke.

### How can benzene affect my health?

Breathing very high levels of benzene can result in death, while high levels can cause drowsiness, dizziness, rapid heart rate, headaches, tremors, confusion, and unconsciousness. Eating or drinking foods containing high levels of benzene can cause vomiting, irritation of the stomach, dizziness, sleepiness, convulsions, rapid heart rate, and death.

The major effect of benzene from long-term (365 days or longer) exposure is on the blood. Benzene causes harmful effects on the bone marrow and can cause a decrease in red blood cells leading to anemia. It can also cause excessive bleeding and can affect the immune system, increasing the chance for infection.

Some women who breathed high levels of benzene for many months had irregular menstrual periods and a decrease in the size of their ovaries. It is not known whether benzene exposure affects the developing fetus in pregnant women or fertility in men.

Animal studies have shown low birth weights, delayed bone formation, and bone marrow damage when pregnant animals breathed benzene.

## How likely is benzene to cause cancer?

The Department of Health and Human Services (DHHS) has determined that benzene is a known human carcinogen. Long-term exposure to high levels of benzene in the air can cause leukemia, cancer of the blood-forming organs.

## Is there a medical test to show whether I've been exposed to benzene?

Several tests can show if you have been exposed to benzene. There is test for measuring benzene in the breath; this test must be done shortly after exposure. Benzene can also be measured in the blood, however, since benzene disappears rapidly from the blood, measurements are accurate only for recent exposures.

In the body, benzene is converted to products called metabolites. Certain metabolites can be measured in the urine. However, this test must be done shortly after exposure and is not a reliable indicator of how much benzene you have been exposed to, since the metabolites may be present in urine from other sources.

## Has the federal government made recommendations to protect human health?

The EPA has set the maximum permissible level of benzene in drinking water at 0.005 milligrams per liter (0.005 mgL). The EPA requires that spills or accidental releases into the environment of 10 pounds or more of benzene be reported to the EPA.

The Occupational Safety and Health Administration (OSHA) has set a permissible exposure limit of 1 part of benzene per million parts of air (1 ppm) in the workplace during an 8-hour workday, 40-hour workweek.

## Glossary

Anemia: A decreased ability of the blood to transport oxygen.

Carcinogen: A substance with the ability to cause cancer.

CAS: Chemical Abstracts Service.

Chromosomes: Parts of the cells responsible for the development of hereditary characteristics.

Metabolites: Breakdown products of chemicals.

Milligram (mg): One thousandth of a gram.

Pesticide: A substance that kills pests.

## Source of Information

This ToxFAQs information is taken from the 1997 Toxicological Profile for Benzene (update) produced by the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services, Public Health Service in Atlanta, GA.

Animal testing is sometimes necessary to find out how toxic substances might harm people and how to treat people who have been exposed. Laws today protect the welfare of research animals and scientists must follow strict guidelines.

**Where can I get more information?** For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-639-6359. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATSDR

AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

# TOLUENE

## CAS # 108-88-3

Division of Toxicology ToxFAQs™ February 2001

**This fact sheet answers the most frequently asked health questions (FAQs) about toluene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.**

**HIGHLIGHTS: Exposure to toluene occurs from breathing contaminated workplace air, in automobile exhaust, some consumer products paints, paint thinners, fingernail polish, lacquers, and adhesives. Toluene affects the nervous system. Toluene has been found at 959 of the 1,591 National Priority List sites identified by the Environmental Protection Agency**

### What is toluene?

Toluene is a clear, colorless liquid with a distinctive smell. Toluene occurs naturally in crude oil and in the tolu tree. It is also produced in the process of making gasoline and other fuels from crude oil and making coke from coal.

Toluene is used in making paints, paint thinners, fingernail polish, lacquers, adhesives, and rubber and in some printing and leather tanning processes.

### What happens to toluene when it enters the environment?

- Toluene enters the environment when you use materials that contain it. It can also enter surface water and groundwater from spills of solvents and petrolieum products as well as from leasking underground storage tanks at gasoline stations and other facilities.
- When toluene-containing products are placed in landfills or waste disposal sites, the toluene can enter the soil or water near the waste site.
- Toluene does not usually stay in the environment long.
- Toluene does not concentrate or buildup to high levels in animals.

### How might I be exposed to toluene?

- Breathing contaminated workplace air or automobile exhaust.
- Working with gasoline, kerosene, heating oil, paints, and lacquers.
- Drinking contaminated well-water.
- Living near uncontrolled hazardous waste sites containing toluene products.

### How can toluene affect my health?

Toluene may affect the nervous system. Low to moderate levles can cause tiredness, confusion, weakness, drunken-type actions, memory loss, nausea, loss of appetite, and hearing and color vision loss. These symptoms usually disappear when exposure is stopped.

Inhaling High levels of toluene in a short time can make you feel light-headed, dizzy, or sleepy. It can also cause unconsciousness, and even death.

High levels of toluene may affect your kidneys.

### How likely is toluene to cause cancer?

Studies in humans and animals generally indicate that toluene does not cause cancer.

The EPA has determined that the carcinogenicity of toluene can not be classified.

### How can toluene affect children?

It is likely that health effects seen in children exposed to toluene will be similar to the effects seen in adults.
Some studies in animals suggest that babies may be more sensitive than adults.

Breathing very high levels of toluene during pregnancy can result in children with birth defects and retard mental abilities, and growth. We do not know if toluene harms the unborn child if the mother is exposed to low levels of toluene during pregnancy.

### How can families reduce the risk of exposure to toluene?

❑ Use toluene-containing products in well-ventilated areas.

❑ When not in use, toluene-containing products should be tightly covered to prevent evaporation into the air.

### Is there a medical test to show whether I've been exposed to toluene?

There are tests to measure the level of toluene or its breakdown products in exhaled air, urine, and blood. To determine if you have been exposed to toluene, your urine or blood must be checked within 12 hours of exposure. Several other chemicals are also changed into the same breakdown products as toluene, so some of these tests are not specific for toluene.

### Has the federal government made recommendations to protect human health?

EPA has set a limit of 1 milligram per liter of drinking water (1 mg/L).

Discharges, releases, or spills of more than 1,000 pounds of toluene must be reported to the National Response Center.

The Occupational Safety and Health Administration has set a limit of 200 parts toluene per million of workplace air (200 ppm).

### Source of Information

Agency for Toxic Substances and Disease Registry (ATSDR). 2000. Toxicological Profile for Toluene. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

**Where can I get more information?** For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-639-6359. ToxFAQs™ Internet address is http://www.atsdr.cdc.gov/toxfaq.html . ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

# XYLENE
## CAS # 1330-20-7

Agency for Toxic Substances and Disease Registry ToxFAQs September 1996

**This fact sheet answers the most frequently asked health questions (FAQs) about xylene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.**

**SUMMARY: Exposure to xylene occurs in the workplace and when you use paint, gasoline, paint thinners and other products that contain it. People who breathe high levels may have dizziness, confusion, and a change in their sense of balance. This substance has been found in at least 658 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).**

### What is xylene?

(Pronounced zī′lēn)

Xylene is a colorless, sweet-smelling liquid that catches on fire easily. It occurs naturally in petroleum and coal tar and is formed during forest fires. You can smell xylene in air at 0.08–3.7 parts of xylene per million parts of air (ppm) and begin to taste it in water at 0.53–1.8 ppm.

Chemical industries produce xylene from petroleum. It's one of the top 30 chemicals produced in the United States in terms of volume.

Xylene is used as a solvent and in the printing, rubber, and leather industries. It is also used as a cleaning agent, a thinner for paint, and in paints and varnishes. It is found in small amounts in airplane fuel and gasoline.

### What happens to xylene when it enters the environment?

- ❑ Xylene has been found in waste sites and landfills when discarded as used solvent, or in varnish, paint, or paint thinners.
- ❑ It evaporates quickly from the soil and surface water into the air.
- ❑ In the air, it is broken down by sunlight into other less harmful chemicals.
- ❑ It is broken down by microorganisms in soil and water.
- ❑ Only a small amount of it builds up in fish, shellfish, plants, and animals living in xylene-contaminated water.

### How might I be exposed to xylene?

- ❑ Breathing xylene in workplace air or in automobile exhaust.
- ❑ Breathing contaminated air.
- ❑ Touching gasoline, paint, paint removers, varnish, shellac, and rust preventatives that contain it.
- ❑ Breathing cigarette smoke that has small amounts of xylene in it.
- ❑ Drinking contaminated water or breathing air near waste sites and landfills that contain xylene.
- ❑ The amount of xylene in food is likely to be low.

### How can xylene affect my health?

Xylene affects the brain. High levels from exposure for short periods (14 days or less) or long periods (more than 1 year) can cause headaches, lack of muscle coordination, dizziness, confusion, and changes in one's sense of balance. Exposure of people to high levels of xylene for short periods can also cause irritation of the skin, eyes, nose, and throat; difficulty in breathing; problems with the lungs; delayed reaction time; memory difficulties; stomach discomfort; and possibly changes in the liver and kidneys. It can cause unconsciousness and even death at very high levels.

Studies of unborn animals indicate that high concentrations of xylene may cause increased numbers of deaths, and delayed growth and development. In many instances, these same concentrations also cause damage to the mothers. We do not know if xylene harms the unborn child if the mother is exposed to low levels of xylene during pregnancy.

## How likely is xylene to cause cancer?

The International Agency for Research on Cancer (IARC) has determined that xylene is not classifiable as to its carcinogenicity in humans.

Human and animal studies have not shown xylene to be carcinogenic, but these studies are not conclusive and do not provide enough information to conclude that xylene does not cause cancer.

## Is there a medical test to show whether I've been exposed to xylene?

Laboratory tests can detect xylene or its breakdown products in exhaled air, blood, or urine. There is a high degree of agreement between the levels of exposure to xylene and the levels of xylene breakdown products in the urine. However, a urine sample must be provided very soon after exposure ends because xylene quickly leaves the body. These tests are not routinely available at your doctor's office.

## Has the federal government made recommendations to protect human health?

The EPA has set a limit of 10 ppm of xylene in drinking water.

The EPA requires that spills or accidental releases of xylenes into the environment of 1,000 pounds or more must be reported.

The Occupational Safety and Health Administration (OSHA) has set a maximum level of 100 ppm xylene in workplace air for an 8-hour workday, 40-hour workweek.

The National Institute for Occupational Safety and Health (NIOSH) and the American Conference of Governmental Industrial Hygienists (ACGIH) also recommend exposure limits of 100 ppm in workplace air.

NIOSH has recommended that 900 ppm of xylene be considered immediately dangerous to life or health. This is the exposure level of a chemical that is likely to cause permanent health problems or death.

## Glossary

Evaporate: To change from a liquid into a vapor or a gas.

Carcinogenic: Having the ability to cause cancer.

CAS: Chemical Abstracts Service.

ppm: Parts per million.

Solvent: A liquid that can dissolve other substances.

## References

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for xylenes (update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

**Where can I get more information?** For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone:1-888-422-8737, FAX: 404-639-6359. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.