



The State of New Hampshire  
**DEPARTMENT OF ENVIRONMENTAL SERVICES**



Thomas S. Burack, Commissioner

February 28, 2008

**Subject: Clarification of Requirements for VOC Analyses**

Dear Sir or Madam:

Since the issuance of the January 30, 2008 letter regarding changes in VOC analytical requirements, questions have been raised concerning portions of the letter by those in the regulated community. In order to address these questions and provide further clarification, the Waste Management Division believed it necessary to provide this follow-up letter.

**1,4-Dioxane**

In the January 30 letter, the Division called for the analysis of 1,4-dioxane in all analytical data for hazardous waste sites, salvage yards and landfills submitted after that date. This volatile organic compound has been included in the Ambient Groundwater Quality Standards since September 2005 at which time the groundwater standard of 3 µg/l was established. Most analytical results submitted to the Division have either failed to analyze for this contaminant or had detection limits one or two orders of magnitude above the standard.

It has come to our attention that the date of the issuance of the letter, January 30, did not provide sufficient time for municipalities to include the cost of this analysis in their 2008 budgets for sampling at landfills and other types of contaminated municipal sites. In response to this fact, the Division has decided to defer the general requirement for analysis of this compound until January 1, 2009. There are several exceptions to this deferral where sampling and analysis for 1,4-dioxane will still be required. Those exceptions are as follows:

- New hazardous waste sites established after January 30;
- Non-petroleum sites which will be receiving a new groundwater management permit during 2008;
- Non-petroleum sites with existing groundwater management permits where the permit requires sampling of public or private water supplies. In such cases, analysis for dioxane will be required for the water supply only;
- Sites with either an existing groundwater management permit or a sampling program where 1,4-dioxane has been identified as a required analyte; and
- Existing hazardous waste sites where 1,1,1-trichloroethane, 1,1-dichloroethane or 1,1-dichloroethylene are present in groundwater.

In all of the above situations, analysis for 1,4-dioxane is required in all submittals to the Division.

DES Web Site: [www.des.nh.gov](http://www.des.nh.gov)

P.O. Box 95, 29 Hazen Drive, Concord, New Hampshire 03302-0095  
Telephone: (603) 271-3644 Fax: (603) 271-2181 TDD Access: Relay NH 1-800-735-2964

For sites where there are a significant number of wells to be sampled, it is recommended that the consultant contact the Division site manager to determine if the analysis for dioxane is warranted for every well.

Non-petroleum sites which will be receiving a renewal of an existing groundwater management permit may have the analytical requirement for dioxane deferred until January 1, 2009 depending upon site conditions. A request for a deferral should be discussed with the Division site manager.

It should be noted that if an existing groundwater management permit calls for a VOC sampling frequency of once a year, once every two years or once in five years, the analysis for dioxane would occur at the next scheduled VOC sampling event in the permit.

For petroleum sites, analysis for 1,4-dioxane will not be required unless the Division site manager believes that historical activities at the site could have resulted in an unpermitted discharge that contained 1,4-dioxane or if it is detected as a TIC. Discharges that could contain 1,4-dioxane include: waste oil, industrial solvents, automotive antifreeze, paints, lacquers, and varnishes.

As mentioned in the January 30 letter, the Division realizes the analysis for 1,4-dioxane is an extra cost item and will consider waiving the requirement to test for this contaminant if two consecutive rounds of sampling fail to detect this chemical above reporting limits.

### **Revised Quantitation Limits**

Please note that the quantitation limits have been revised in the attached VOC Analyte table for the following compounds:

1. Acetone - Groundwater and Drinking Water - 50 µg/l; Soil - 2500mg/kg
2. 1,4-Dioxane - Groundwater and Drinking Water - 3.0 µg/l; Soil - 500mg/kg

### **1,3,5-Trichlorobenzene**

Analysis for 1,3,5-trichlorobenzene will be required for all sites starting no later than January 1, 2009. Prior to that date, analysis for this compound is not required, unless currently required by the Division site manager.

### **1,3-Dichloropropene**

To reflect the Ambient Groundwater Quality Standards, 1,3-Dichloropropene (Mixed Isomers) was established and the associated trans- and cis- isomers which have no AGQS were removed from the VOC list.

### **Chlorotoluene**

To reflect their more common name, the following compounds have been renamed:

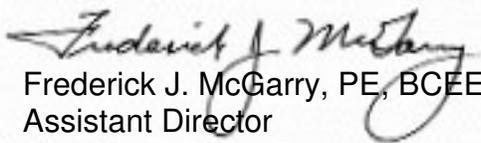
1. Chlorotoluene was renamed to 2-Chlorotoluene
2. 4-Chlorotoluene P-Chloro was renamed to 4-Chlorotoluene

**Petroleum Funds Reimbursement**

The Division is in the process of establishing a usual and customary rate for the additional analyses. In the interim, a budget for the analyses will be necessary for approval by the site manager prior to completing the sampling and analysis.

We hope this letter addresses the questions raised regarding the January 30, 2008 letter. If you have any questions or comments, please do not hesitate to contact George Lombardo, P.E. of the Waste Management Division at (603) 271-3645.

Sincerely,



Frederick J. McGarry, PE, BCEE  
Assistant Director  
Site Remediation Programs

Attachment: Waste Management Division's Full List of Analytes for Volatile Organics  
January 30, 2008 Letter

cc: Michael Wimsatt, P. G., Director, DES Waste Management Division  
Pat Bickford, DES Laboratory Administrator  
George Lombardo, PE, Administrator, ORCB  
Carl Baxter, PE, Administrator, HWRB  
Brandon Kernen, P.G., Drinking Water and Groundwater Bureau  
Mitchell Locker, Drinking Water and Groundwater Bureau



The State of New Hampshire  
**DEPARTMENT OF ENVIRONMENTAL SERVICES**



Thomas S. Burack, Commissioner

January 30, 2008

**Subject: Changes in VOC Analytical Requirements**

Dear Sir or Madam:

The Department of Environmental Services Waste Management Division (WMD) has updated the attached "Full List of Analytes for Volatile Organics" (List). The List includes: revised performance standards for tertiary butyl alcohol (TBA), based on attainable detection limits, and a new compound 1,4-dioxane.

Also, please be aware of these notes and requirements associated with the List:

1. The performance standards identified on the List apply to all soil, groundwater and drinking water samples collected for hazardous waste sites, landfills and petroleum site investigation and remediation.
2. For eligible projects, the Petroleum Cleanup Funds will reimburse for multiple or modified analyses when specifically requested by a WMD site manager. Reimbursement will be in accordance with the applicable unit based rate published by the WMD.
3. This List applies only to soil, groundwater, and drinking water samples obtained for investigation and remediation at contaminated sites. Samples collected for other DES programs, i.e. Wastewater, Watershed Management, and Drinking Water & Groundwater, should continue to be analyzed using the methods designated by the respective program.
4. Detecting concentrations at or below the quantitation limit is not required for all compounds when analyzing highly contaminated groundwater or soil, which often results in high detection limits (e.g., samples collected in the vicinity of the contaminant source area).

However, the analytical method shall be capable of reporting the actual concentration of all critical compounds used to make regulatory decisions. Other compounds may be reported as less than a concentration, provided those compounds are not used in the regulatory decision-making process.

As necessary, the WMD will require a second analysis of a sample to obtain lower detection limits to assess the presence of compounds that were reported with a high detection limit during the initial analysis.

DES Web Site: [www.des.nh.gov](http://www.des.nh.gov)

P.O. Box 95, 29 Hazen Drive, Concord, New Hampshire 03302-0095  
Telephone: (603) 271-3644 Fax: (603) 271-2181 TDD Access: Relay NH 1-800-735-2964

5. From this point forward, the WMD will require all VOC analyses for hazardous waste sites, salvage yards and landfills to include analysis for 1,4-dioxane. For petroleum sites, analysis for 1,4-dioxane will not be required unless the WMD site manager believes that historical activities at the site could have resulted in an unpermitted discharge that contained 1,4-dioxane or if it is detected as a TIC. Discharges that could contain 1,4-dioxane include: waste oil, industrial solvents, automotive antifreeze, paints, lacquers, and varnishes.

Analysis for 1,4-dioxane will require a second VOC analysis, or may require an alternative or modified method, to achieve the required performance standards.

Dioxane may be present in some household products. DES does not regulate normal household use of products that might contain 1,4-dioxane. Therefore, this requirement does not apply to household use and discharge to domestic septic systems as related to homeowner use of cosmetics, detergents and shampoos.

VOC analyses which will be submitted after the date of this notice but where sampling has already been conducted will be exempt from this requirement. Since the analysis for 1,4-dioxane is an extra cost item, The WMD will consider waiving the requirement to test for this chemical if two consecutive rounds of sampling fail to detect this chemical above reporting limits.

6. The WMD requires analyses for ethylene dibromide (1,2-dibromoethane, EDB) at petroleum sites, including salvage yards, which were in existence before 1985 where there has been a release of leaded gasoline. EDB was an additive to leaded gasoline.

This will require a second analysis, or may require an alternative or modified method, to achieve the required performance standards. You must check with the laboratory prior to sampling to obtain appropriate sample collection and analysis instructions. The WMD will consider waiving the requirement to test for this compound if two consecutive rounds of sampling fail to detect the chemical above reporting limits. If requesting reimbursement from the Petroleum Reimbursement Funds, the cost for the additional analyses must be pre-approved by the WMD.

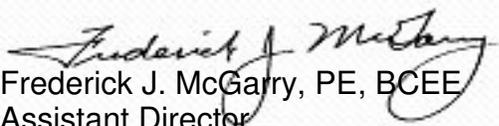
7. In addition to 1,4-dioxane and ethylene dibromide, three other chemicals were identified in the List with an asterisk. For 1,2-Dibromo-3-Chloropropane (Dibromochloropropane), Hexachlorobutadiene, and Bromodichloromethane, at sites where the consultant for the responsible party and the WMD site manager believe that historical activities at the site could have resulted in the release of these compounds, or if the analyte is detected as a TIC, analysis for these compounds will be required and the performance standards noted on the List must be achieved.

The WMD will consider waiving the requirement to test for the chemical if two consecutive rounds of sampling fail to detect the chemical above reporting limits.

8. You must work closely with the laboratory and contact your WMD site manager immediately to discuss investigative findings, sampling requirements, and the necessity of dilution series analysis or alternative analysis methodology for your site. Not all laboratories are capable of completing the required analyses necessary to meet the appropriate quantitation limits; therefore, it is important to communicate the testing requirements to your laboratory prior to implementation of your sampling program.

We welcome your comments as we strive to improve how we investigate and clean up contaminated sites in New Hampshire. If you have any questions or comments, please do not hesitate to contact George Lombardo, P.E. of the Waste Management Division at (603) 271-3645.

Sincerely,



Frederick J. McGarry, PE, BCEE  
Assistant Director  
Site Remediation Programs

Attachment: Waste Management Division's Full List of Analytes for Volatile Organics list

cc: Michael Wimsatt, P. G., Director, DES Waste Management Division  
Pat Bickford, DES Laboratory Administrator  
George Lombardo, PE, Administrator, ORCB  
Carl Baxter, PE, Administrator, HWRB

**NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES  
WASTE MANAGEMENT DIVISION**

**FULL LIST OF ANALYTES FOR VOLATILE ORGANICS**

Compound	CAS#	Quantitation Limit			Compound	CAS#	Quantitation Limit		
		Ground-water ug/L	Drinking Water ug/L	Soil ug/Kg			Ground-water ug/L	Drinking Water ug/L	Soil ug/Kg
Acetone	67-64-1	50	50	2500	Ethylbenzene	100-41-4	5	0.5	100
Benzene	71-43-2	5	0.5	100	<b>*Ethylene dibromide (EDB)</b>	<b>106-93-4</b>	<b>*0.05</b>	<b>*0.05</b>	<b>100</b>
Bromobenzene	108-86-1	5	0.5	100	Ethyl Tertiary-butyl ether (ETBE)	637-92-3	5	0.5	100
Bromochloromethane	74-97-5	5	0.5	100	<b>*Hexachlorobutadiene</b>	<b>87-68-3</b>	<b>*0.5</b>	<b>*0.5</b>	<b>100</b>
<b>*Bromodichloromethane</b>	<b>75-27-4</b>	<b>*0.6</b>	<b>*0.5</b>	<b>100</b>	2-Hexanone	591-78-6	10	10	100
Bromoform	75-25-2	4	0.5	100	Isopropyl benzene	98-82-8	5	0.5	100
Bromomethane	74-83-9	5	0.5	100	p-Isopropyltoluene	99-87-6	5	0.5	100
n-Butylbenzene	104-51-8	5	0.5	100	Methyl ethyl ketone (2-Butanone)	78-93-3	10	10	500
sec-Butylbenzene	135-98-8	5	0.5	100	Methylene chloride	75-09-2	5	0.5	100
tert-Butylbenzene	98-06-6	5	0.5	100	Methyl tertiary-butyl ether (MTBE)	1634-04-4	5	0.5	100
Carbon disulfide	75-15-0	5	0.5	100	Monochlorobenzene	108-90-7	5	0.5	100
Carbon tetrachloride	56-23-5	5	0.5	100	Tertiary amyl methyl ether (TAME)	994-05-8	5	0.5	100
Chloroethane	75-00-3	5	0.5	100	Methyl isobutyl ketone (MIBK)	108-10-1	10	10	500
Chloromethane	74-87-3	3	1.0	100	Naphthalene	91-20-3	5	0.5	100
2-Chlorotoluene	95-49-8	5	0.5	100	n-Propylbenzene	103-65-1	5	0.5	100
4-Chlorotoluene	106-43-4	5	0.5	100	Styrene	100-42-5	5	0.5	100
Dibromochloromethane	124-48-1	5	0.5	100	Tertiary butyl alcohol (TBA)	75-65-0	30	30	2000
<b>*Dibromochloropropane</b>	<b>96-12-8</b>	<b>*0.2</b>	<b>*0.2</b>	<b>100</b>	Tetrachloroethylene (PCE)	127-18-4	5	0.5	100
Dibromomethane	74-95-3	5	0.5	100	1,1,1,2-Tetrachloroethane	630-20-6	5	0.5	100
Dichlorodifluoromethane	75-71-8	5	0.5	100	1,1,2,2-Tetrachloroethane	79-34-5	2	0.5	100
Diethyl ether	60-29-7	5	0.5	100	Tetrahydrofuran	109-99-9	10	10	500
1,2-Dichlorobenzene	95-50-1	5	0.5	100	Toluene	108-88-3	5	0.5	100
1,3-Dichlorobenzene	541-73-1	5	0.5	100	1,2,3-Trichlorobenzene	87-61-6	5	0.5	100
1,4-Dichlorobenzene	106-46-7	5	0.5	100	1,2,4-Trichlorobenzene	120-82-1	5	0.5	100
1,1-Dichloroethane	75-34-3	5	0.5	100	<b>+1,3,5-Trichlorobenzene</b>	<b>108-70-3</b>	<b>5</b>	<b>0.5</b>	<b>100</b>
1,2-Dichloroethane	107-06-2	5	0.5	100	1,1,1-Trichloroethane	71-55-6	5	0.5	100
1,1-Dichloroethylene	75-35-4	5	0.5	100	1,1,2-Trichloroethane	79-00-5	5	0.5	100
cis-1,2-Dichloroethylene	156-59-2	5	0.5	100	Trichloromethane (Chloroform)	67-66-3	5	0.5	100
trans-1,2-Dichloroethylene	156-60-5	5	0.5	100	Trichlorofluoromethane	75-69-4	5	0.5	100
1,2-Dichloropropane	78-87-5	5	0.5	100	Trichloroethylene (TCE)	79-01-06	5	0.5	100
2,2-Dichloropropane	594-20-7	5	0.5	100	1,2,3-Trichloropropane	96-18-4	5	0.5	100
1,1-Dichloropropene	563-58-6	5	0.5	100	1,2,4-Trimethylbenzene	95-63-6	5	0.5	100
<b>*1,3-Dichloropropene (mixed isomers)</b>	<b>542-75-6</b>	<b>5</b>	<b>0.4</b>	<b>100</b>	1,3,5-Trimethylbenzene	108-67-8	5	0.5	100
Diisopropyl ether (DIPE)	108-20-3	5	0.5	100	Vinyl chloride	75-01-4	2	0.5	100
<b>‡1,4-Dioxane</b>	<b>123-91-1</b>	<b>*3</b>	<b>*3.0</b>	<b>500</b>	Xylenes (mixed isomers)	1330-20-7	5	0.5	100

**Notes:**

- When using this list, refer to the Waste Management Division guidance documents regarding sampling and reporting requirements.
- Samples shall be analyzed by an approved EPA analytical method. The method shall be capable of detecting concentrations at or below quantitation limits, except as noted in 4 below.
- The initial samples for a new site or a new discharge at an existing site must be analyzed by an approved EPA method that uses mass spectrometry for positively identifying the compounds.
- For initial samples that exhibit non-listed analytes, the top ten tentatively identified compounds (TICs) must be qualified and, if possible, quantitated. If there are no non-listed analytes present in the chromatogram, this should be noted in the report narrative. Reporting of TICs is not required for residential and commercial On-Premise-Use Heating Oil Facilities sites.
- For the purposes of site closure, the analytical method shall be capable of detecting concentrations at or below the quantitation limits specified on the list.
- \*Those compounds noted with an "\*", may not always be required to be included in an analysis. One or more of these compounds may be included in the analysis if requested by the Waste Management Division site manager.
- ‡1,4-Dioxane will be required at all new hazardous waste sites and sites where a new groundwater management permit will be issued. Monitoring for dioxane at landfill sites where it is not currently analyzed will not be required until January 1, 2009 unless a public or private water supply is included in the sampling program. In those cases, analysis of the water supply for dioxane shall be included. Monitoring for dioxane at other hazardous waste sites shall also be deferred until January 1, 2009 unless the contaminants 1,1,1-trichloroethane, 1,1-dichloroethane and/or 1,1-dichloroethylene are present in groundwater. In those cases, analysis for dioxane shall be included. For further detail, see DES letter dated February 28, 2008.
- +1,3,5-Trichlorobenzene will be required on all analyses starting January 1, 2009.

Revised February 28, 2008

Disclaimer: The New Hampshire Department of Environmental Services (DES) does not assume any liability for failure to follow appropriate sampling and reporting requirements. These sampling and reporting requirements are subject to change and you should consult with your DES Project Manager to ascertain any subsequent revisions.