

Survey of State Experiences with MTBE Contamination at LUST Sites (August 2000)

**A Project of the New England Interstate Water Pollution Control Commission
(NEIWPCC)**

I. State MTBE Standards - Questions 1a.-1c.

1a. Does your state have action levels, cleanup levels, or drinking water standards for MTBE?

Yes AL, AZ, CA, CT, DE, FL, HI, ID, IN, KS, LA, ME, MD, MA, MI, MN, MO, MT, NH, NJ, NM, NY, NV, NC, ND, OH, OK, OR, PA, RI, SC, UT, TX, VT, VA, WA (proposed), WI, WY

No AR, AK, CO, GA, IL, IA, KY, MS, NE, PR, SD, TN, WV

**1b. If yes, please fill in the appropriate box(es) with levels and applicable units.
(See table on next page.)**

Medium	Action Level(s)	Cleanup Level(s)	Drinking Water Standard			
			Primary (health-based)	Secondary (taste & odor)	EPA advisory	State (or other) advisory
Soil	AL- .082ppm; CT- 2000µg/L or 20ppm; FL- 200ppb; HI- 5ppb; IN- above EQLs; LA- 20ppm; MD- site specific; MA -10 lbs or 0.3mg/kg; MT - 0.1- 0.3mg/Kg (based on depth to GW); NC- 0.92mg/kg; OH - soil type & depth dependent: Tier 1 530- 3800ppb; OR- 0.16mg/Kg ; UT- 0.3mg/Kg; VA- >detection limit;	AL, LA- RB; CT- 2000 µg/L or 20ppm; FL- 200ppb; HI- 5ppb; IN- 350ppb; MD- site specific; MA- 0.3µg/g; MI- 800ppb; MO- 60- 280ppm; NH- 0.13ppm; NJ- 3.1ppm NM- RB; NY- 200µg/kg or 10µg/L for TCLP extract; NC- 0.92mg/Kg* ; OH- same as action level; OR- 0.16mg/Kg; PA- 2mg/Kg; RI *; UT- 0.3mg/Kg; VA- site specific/risk				

Groundwater	KS, OR - 20µg/L; RI - GA :20ppb; VT, OH -40ppb; AL - .020ppm; CT -20ppb; CT -100µg/L; FL -50ppb; IN -above EQLs; LA -0.52ppm; ME -25ppb; MD -site specific; MA -10lbs. or 0.07mg/L; NV -200µg/L & 20µg/L; NH -13µg/L; NM 100ppb; NC -200µg/L; OK -0.020 mg/L; SC -40ppb; UT -0.2mg/L; VA ->detection limit; WA -20ppb; WI -12µg/L; WY -200µg/L	AL, LA -RB; KS, OR - 20µg/L; MI, VT, OH -40ppb; RI, GA -40ppb, GB :5000ppb; CT -100µg/L; FL -50ppb; HI -20ppb; IN -45ppb; ME -35ppb; MD -site specific; MA -70µg/L; MO -40-400ppb potable/nonpot.; MT -30µg/L; NV -200µg/L, NH -13µg/L; NJ -70ppb NM -100ppb; NY -10µg/L; NC -200µg/L; PA -20µg/L; SC -site specific; UT -0.07mg/L; VA -site specific/risk based; WA -20ppb; WI -60µg/L; WY -200µg/L;	CA -13ppb; ME -35ppb; MA -70µg/L; NH -13µg/L; NJ -70ppb NY -50µg/L; TX -240ppb;	CA -5ppb; MA -70µg/L; MO ; NH - 20µg/L; TX -15ppb;	MO ; MD, MA, NC, ND, OR, UT -20-40µg/L; OH -40ppb;	CT -70ppb; MA, MN -70µg/L; NC, WY -200µg/L; OH, RI, SC, VT -40ppb; IL -20-40ppb; MT -30µg/L; VA -20µg/L;
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RB=risk-based

Comments:

- AZ** Soil cleanup level - 320ppm (res.), 3,300ppm(nonres.); DW standard - 35ppb (state health-based guidance for DW use, not enforceable).
- CT** Levels depend on GW classifications.
- DE** Action levels: soil - tier 0, 130 ppb; tier 1, based on distance to POE. GW - 180 ppb at <50' to POE. Cleanup levels: soil - action level or risk-based (site-specific). GW - risk-based. DW standard - primary (health-based) under development by DOH (aiming at 10 ppb). Secondary - <20-40 ppb.
- ID** Action levels: soil - 0.6mg/Kg; GW - variable. Cleanup levels: soil - 52µ/L; GW - 52, 261, 511 µ/L. The state lab and other private labs that test public water supplies have been asked to report any MTBE detections to the water supply operators. They can do this as part of their testing.
- IL** In process of developing a standard.
- KS** Re: cleanup levels, treat any impacted receptor.
- LA** action and cleanup levels.
- ME** For soil, use gasoline range organics only.
- NV** We utilize modified 8015 only to evaluate soils. Our soil action level is 100mg/Kg TPH by that method. RE. GW: 200µg/L is the action level. 20µg/L is the action level if there is a sensitive environment or complete pathway.
- NC*** Or alternate site-specific levels based on RB analysis.
- RI** Note: GA & GB are GW classifications. GA is GW that can be used for DW w/out treatment. GB is GW that cannot (it is presumed) be used for DW w/out treatment.
- WY** NOTE 1: Site specific soil cleanup level for MTBE is determined from an environmental fate/transport and environmental risk assessment model contained in the WY Water Quality Rules and Regs, Chapter 17, Appendix A, Procedures for Establishing Environmental Restoration Standards for LUST remediation Actions. Model is similar to ASTM RBCA model.

1c. Which of the above levels/standards is enforceable by law?

- ID, UT, NH** All;
- IN, MN, ND, TX** none;
- MI, PA, RI** Cleanup levels;
- NV, OR** Both the action and cleanup levels are enforceable by law.
- AL** all are RB guidelines;
- AZ** soil cleanup levels;
- CA** Both are contained in regulations administered by the CA Dept. of Health Services.
- CT** Action and cleanup levels are enforceable through Remediation Standard Regs.
- DE** DW standard will be enforceable for Public Wells. Cleanup standards, action levels are enforceable through regs, tech. guidance, etc. Cleanup levels are derived through either a screening level or site-specific RBCA process.
- FL** Both soil and GW;
- HI** MTBE action levels are guidance;

- KS** Informal standard is not enforceable by law;
- ME** Primary standard for public water supplies by Bureau of Health cleanup level can be enforced by MDEP, but have discretion and authority to vary from cleanup level to account for feasibility.
- MD** EPA Advisory and site-specific levels as incorporated into the corrective action plan are enforceable.
- MA** All of the above cleanup levels are regulatory enforceable and must be met in order to achieve a permanent solution.
- MO** These are essentially target levels. Tank o/os are required to conduct corrective action to levels prescribed by MDNR and in a manner shown to be protective of human health, safety, & the env.
- MT** 30µg/L-GW standard specified in “Water Quality Circular #7”-legally enforceable GW cleanup standard.
- NJ** MCL
- NM** UST regs cover soil and GW; DW is under NM Water Quality Control Comm.
- NY** The NYS Dept. of Health DW standard of 50µg/L for MTBE, regulated as an Unspecified Organic Contaminant (UOC), is enforceable by law.
- NC** All of the above levels are enforceable by law except the EPA advisory level.
- OH** both soil and GW;
- OK** The action level is established in our rules (no statute). The OK DEQ would regulate and establish DW standards.
- SC** Action level and site-specific target level.
- VT** cleanup level and state advisory.
- VA** Action levels listed above are reporting requirements; the 20µg/L DW advisory is an advisory level from the VA Health Dept. to the DEQ.
- WA** Both, once the proposed rule is final.
- WI** the enforcement standard - 60µg/L.
- WY** All standards in Chapter 17 are enforceable by law.

Please expand on this information if you have additional comments.

- AZ** Aquifer WQ standards require that the level to which water is remediated must not impair WQ for existing or foreseeable future uses, cause a violation of a standard for state navigable waters, or endanger public health for DW uses.
- AR** We impose a 200 µ/L health standard for DW purposes, but our authority to do so is weak.
- CT** Most urbanized areas have a groundwater classification of GB. Standards for MTBE in GB areas are 20ppm and no free product. There is no standard in GB areas for GW, although concentrations of 5,000ppb in GW may exceed volatilization criteria.
- MA** The cleanup standards for releases are regulatory enforceable under the MA Contingency Plan (MCP, 310 CMR 40.000 and MA General Law, Chapter 21E. These standards must be met to achieve a permanent solution at all sites in MA. PRPs must evaluate the feasibility of achieving

background and at a minimum must achieve a level of no significant risk. If background is not feasible, the MCP allows flexibility in the RB cleanup endpoints, a condition of no significant risk. All endpoints are RB and may result in restricting certain uses of a property. Activity and use limitations may be utilized to restrict certain uses and prevent unacceptable exposure to chemical contaminants. DEP has set 3 methods of risk characterization for determining endpoints-Methods 1, 2, and 3. Method 1 is a direct comparison of promulgated numbers for the most common compounds. Method 2 allows for some modifications of the method 1 numbers. Method 3 determines cumulative site risk, based on site-specific data. Surrounding receptors (e.g., a residence) and exposure pathways (e.g., indoor air) are important factors in evaluating risk and site cleanup.

- MO** MENDER does not require cleanup to pristine but will focus on corrective action efforts that minimize future contribution of source materials to GW cont. and, as needed, will require that additional measures be taken towards overall cleanup to the extent technically practicable and economically feasible.
- MT** Tier I RBCA RBSLs for soil: soil is 0-2 ft and: <10 ft. to GW=0.1mg/Kg, 10-20 ft. to GW=0.2 mg/Kg, >20 ft. to GW=0.3 mg/Kg; soil is >2 ft. and: <10 ft. to GW=0.1 mg/Kg, 10-20 ft. to GW=0.1 mg/Kg, >20 ft. to GW=0.3 mg/Kg.
- NY** Re. action levels: Discovery of any levels of MTBE in soil/GW will trigger investigation of source and “trends.”
- NV** Please see our web page at www.state.nv.us/NDEP and click on “corrective actions.” Then find our “NDEP Oxygenated Fuel Corrective Action Guidance.”
- OH** Tier I action/cleanup levels listed in state regs. Tier II action/cleanup levels not listed in state regs. Are calculated using site-specific information.
- RI** RE. soil cleanup levels: The LUST program does not enforce compliance concentrations for soil, but the DEM’s Site Remediation program does. Their standards are: Direct exposure - Res. 390ppm, comm./ind. 10,000ppm ; Leachability - GA area 0.9ppm, GB area 100ppm.
- SC** The action level was established in 1995 by the state toxicologist. Because of the high solubility of MTBE in water, soil sampling is not conducted.
- UT** Our cleanup policy allows us to use MCLs, or in the absence, other applicable standards.
- OR** The soil and GW cleanup levels listed above are for the “leaching to GW” and “GW ingestion” exposure pathways, respectively and are generic RB concentrations. Site-specific target levels may be calculated.
- VT** We have a “GW Enforcement Standard” of 40ppb for MTBE. The Enforcement Standard is a goal NOT a cleanup requirement. Actual cleanup levels are site specific.
- WI** DW standards for public wells are the fed MCLs. DW standards for private wells are the PAL and ES levels. For MTBE, PAL is 12 µg/L, and the enforcement standard is 60µg/L.

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A Project of the New England Interstate Water Pollution Control Commission (NEIWPCC)

I. State MTBE Standards - Questions 2a.-2b.

2a. Has your state recently changed any of these standards?

Yes AL, CT, DE, FL, IN, LA, ME, MI, MN, MO, MT, NH, NM, NY, OR, WA

No AZ, AR, CA, GA, HI, ID, IL, KS, KY, MD, MA, MS, NE, NJ, NV, NC, ND, OH, OK, PA, PR, RI, SC, SD, UT, TX, VT, VA, WI, WY

2b. If yes, what was the change, and why was it made?

AL Establishing action limits for soil and GW for use in the RB program.

CT DW standard changed from 100ppb to 70ppb.

DE 3/99 - recent development of risk-based program "DERBCAP." Program established first numbers for MTBE.

FL Two years ago we changed the 50ppb GW standard to 35ppb but then changed it back when further evaluation called the basis for the change into question.

IN Non-rule Policy.

LA The screening values increased from the former values of 0.68ppm for soil and 0.018ppm for GW. These original risk-based standards, promulgated Dec. 20, 1998 as the LDEQ Risk Eval./ Corrective Action Program (RECAP), used an interim EPA-NCEA value for RfDo taken from EPA Region 9 tables. When RECAP was revised on June 20, 2000, the RfDo value had been withdrawn from the 2000 EPA Region 9 tables, so a route to route extrapolation using the RfDi from IRIS was used. The RfDo value increased and as a result, the action level also increased to the present levels.

ME Primary DW standard adopted by regulation & legislative resolve in 1999 (from 50ppb) because of legislative mandate and public concern.

MI lowered numbers from: 240ppb to 40ppb GW and 4,800ppb to 800ppb soil.

MN DOH recently (within last 12 mos.) determined the health-based value (HBV) of 70µg/L for MTBE. This is advisory only.

MO MDNR has begun focusing cleanup standards from upper to lower (40ppp-20ppb) taste and odor thresholds, as established in EPA's Dec. 1997 DW Advisory for GW cleanups, to be more conservative toward protecting health, safety, and env.

MT 30µg/L MTBE GW cleanup standard established Nov. 1999 pursuant to EPA DW Health

Advisory.

NH Changes were made on MAY 4, 2000. Soil from 2ppm to 0.13ppm, GW from 70 µg/L to 13 µg/L, DW from 70 µg/L to 13 µg/L(primary) and 20 µg/L(secondary). 1999 legislation required the development of new standards.

NM soil - incorporated RBDM in Feb. 2000.

NY DEC adopted an Ambient (surface & GW) Water Quality Guidance Value of 10µg/L for MTBE in April 2000. DEC previously did not have a value for MTBE. The guidance value is health based, devised to protect sources of potable water.

OR MTBE cleanup levels were reduced. For example, the GW cleanup level was reduced from 180ppb (µg/L) to 20ppb.

WA see proposed standards above.

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I. State MTBE Standards - Questions 3., 3a.,3b.

3. Is your state considering making a change?

Yes AZ, CT, DE, ID, IL, IN, IA, MI, MS, MO, NE, NY, NC, MD, OK, WA

No AL, AR, FL, GA, KS, LA, ME, MA, MN, MT, NH, NJ, NV, ND, OH, OR, PA, PR, RI, SC, UT, TX, VA, WV, WI, WY

Don't know AK, CA, CO, HI, KY, SD, TX

Comments

KY Division of Water is presently compiling data.

3a. If yes, what is the proposed change?

.NC Lowering the GW standard to 11.6µg/L.

OK Change "action level" to "level of concern." This is to avoid opening cases on just MTBE and problems with false positives.

WA see proposed standards above.

3b. If yes, will it require legislation?

No IN, NE, WA,

Enabling IL, MI,

Other:

AZ Rule docket opened for adoption of an enforceable numeric standard.

DE Public Health will propose MCL as a change in or addition to drinking water regulations. Then there will be a chance for public comment before the reg. changes are finalized.

ID Policy guidance change.

MO guidance revision.

NY, NC rule making process.

OK Proposed rule change.

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I. State MTBE Standards - Questions 4a.-4b.

4a. Would a federal MCL for MTBE affect your state's LUST remediation process?

Yes AL, AR, CO, FL, GA, ID, IL, IA, KY, LA, ME, MD, MA, MI, MS, MO, NE, NV, NH, NJ, NY, OK, OR, PA, PR, RI, SC, SD, TN, TX, UT, VT, WA, WV, WI, WY

No IN, IA, KS, MN, NC, VA

Don't know AZ, CA, CT, DE, HI, MT, NM, ND, OH

Probably AK

4b. If yes, how?

AL MCLs are typically used for the cleanup goal for the ingestion pathway.

AK Might be adopted as state action/cleanup level

AR It would automatically be adopted/enforceable.

CO Would include MTBE on list of chemicals of concern.

DE It may not make a difference as to whether we have a state or federal MCL. LUST remediation normally doesn't remediate down to an MCL in DE, but we do require DW to reach an MCL if one exists. Remediation standards are risk-based. State or federal MCL would apply to actual well impacts. Exceeding an MCL makes an RP responsible for remediating or replacing a DW supply - enforceable.

FL If the MCL was lower than our current standard we would have to clean up to the MCL level.

GA Would probably lead to additional and more costly corrective actions. Some sites previously closed may need to be reopened.

ID Reduce the action level and most stringent cleanup level, potentially increasing costs to RPs and the state insurance fund.

IL Must be more or as stringent as federal law.

IA A federal MCL will likely result in a requirement for MTBE plumes and risk to be assessed at LUST sites and remediation required where necessary. In fact, establishment of a federal MCL is extremely important to our ability to "sell" or justify an MTBE cleanup.

KY Empirical data suggest that MTBE plumes are costly and more difficult to remediate because of longer plumes, MTBE's low Henry's law constant, etc. The remediation process would be longer and more costly.

LA The MCL would become our action level.

ME If higher than state's, would have pressure from oil industry to follow suit. If lower, pressure from anti-MTBE advocates to lower standard.

- MD** Assist with impacted sites on setting cleanup goals.
- MA** MA DEP maintains state program approval. If a federally mandated MCL were enacted, DEP would have to evaluate the MCL mandate for state program approval and remediation process endpoints.
- MI** GW number defaults to DW standards.
- MN** Would not affect the process, however, depending on the concentration of the MCL, it could change the number of remedial sites.
- MO** It would allow the state to establish a firm target, protective WQ standards, and would provide a fundamental basis of legal support for cleanup activity requirements. It would help minimize confusion over what the target should be. It should mean that sufficient evaluation of the risk of MTBE has been completed to warrant establishment of an MCL.
- MS** Since state does not have a cleanup standard now, an MCL would become a driving force for cleanups and affect how much money is spent on sites.
- MT** Not sure at this time. The current cleanup standard does apply to impacted public and private wells. However, a federal MCL would provide stronger legal support for the state GW cleanup standard when we attempt to use it as a DW cleanup standard.
- NE** It would probably result in cleanup levels being established.
- NV** Our action level was derived by a process in our regulations that can be used when no MCL is available. If a federal MCL were available, that numerical standard would replace our current action level.
- NH** If EPA set a standard, NH would likely adopt the standard and replace the present one, unless the EPA standard was well above that of NH.
- NJ** If the MCL was lowered below state's MTBE MCL, cleanup criteria would be more stringent.
- NY, VT** Only if it was lower than state's values for MTBE.
- NC** Would change the level at which alternate sources of DW are supplied.
- OK** Assessment would probably require more monitoring wells just for delineation of where MTBE is found. A few sites may require more extensive and costly remediation when public water supplies are threatened. There is too little data to quantify these affects.
- OR** State cleanup level would have to be at least as protective as federal MCL.
- PA, UT** The state would have to change its cleanup standards, since they are based on federal MCLs.
- RI** A standard lower than 40ppb would mean more sites, higher investigation and remediation costs, etc., and vice versa if the standard were higher than 40ppb.
- SC** If the federal MCL is less than 40 ppb, the state would adopt the federal MCL.
- SD** provide a basis for value.
- TN** would allow rule change to include MTBE in cleanup levels.
- TX** Currently, MTBE drives a requirement for actual remediation at sites only when existing DW wells are impacted or imminently threatened.
- WA** We consider federal MCLs when making cleanup decisions.
- WV** MTBE does not drive cleanups currently.
- WI** the state's MCLs (not enforcement standards) apply to public wells. Public wells that may be

impacted by MTBE from LUST are not required to monitor for MTBE. When a fed MCL exists, it becomes the ES in WI. So, if an MTBE MCL is promulgated, there will be parity between public and private wells.

WY state requires LUST remediation projects to achieve cleanup to MCL values, if established by EPA.

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II. MTBE Analysis - Questions 5a.-5f.

5a. Does your state require sampling and analysis for MTBE in groundwater at LUST sites?

Yes AL, AR, CA, CT, DE, FL, HI, ID, IN, IA, KS, LA, ME, MD, MA, MI, MN, MO, MT, NE, NV, NH, NM, NJ, NY, NC, ND, OH, OK, OR, PA, RI, SC, SD, TN, TX, UT, VT, VA, WV, WI, WY

No AK, AZ, CO, GA, IL, KY, MS, PR, WA

Comments

AZ, GA Request only.

KY Only for sites w/nearby DW wells.

MA Under MA Bd. of Fire Prevention regs (527 CMR 9.00), o/os are required to measure for the presence of contamination during or immediately after removal or closure of an UST. To avoid enforcement and meet performance standards MA has set by policy, PRPs should document UST removal/closure process, the assessment performed, and the decisions made in determining whether or not testing for MTBE and other contaminants would be necessary and why.

OK some.

WA starting in 2001.

5b. Does your state require sampling and analysis for MTBE in soil at LUST sites?

Yes AL, AZ, CA, CT, DE, FL, HI, ID, IA, LA, MA, MI, MN, MO, MT, NE, NH, NJ, NM, NY, NC, OH, PA, RI, TN, UT, WV, WI, WY

No AK, AR, CO, GA, IL, IN, KS, KY, ME, MD, MS, ND, NV, OK, OR, PR, SC, SD, TX, VT, VA, WA

Comments:

AK This year, for the first time, AK is having RPs look at MTBE in certain selected monitoring wells. If it appears to be a problem, will expand efforts to look for MTBE.

GA Request only.

ME Do require sometimes if needed to determine source or timing of contamination.

MA See 5a.

MD case by case for soil.

WA starting in 2001.

5c. If yes to either question 5a or 5b,

For all suspected releases?

Soil DE, IA, MA, MN, MO, MT, NH, NM, WV, WI

Groundwater AR, DE, IA, KS, MD, MA, MN, MO, MT, NV, NH, NM, SC, WV, WI

Gasoline only?

Soil AL, AZ, CA, CT, FL, HI, ID, LA, MI, MO, MT, NE, NJ, NY, NC, OH, PA, RI, TN, UT, WA, WY,

Groundwater AL, CA, CT, DE, FL, GA*, HI, ID, IN, KS, LA, MI, MO, MT, NE, NV, NY, RI, ND, OH, OK (some), OR, PA, SD, TN, TX, UT, VA, WA, WY

Other?

AZ kerosene, jet fuel, diesel, heavy fuel, used oil

DE kerosene, jet fuels, aviation gas, used oil. Not at sites where diesel or heating oil tanks only (required at all sites where we would normally analyze for other volatiles such as BTEX).

KS Effluent at SVE systems and Air sparging systems.

ME Require at all gasoline releases and all releases where source is in question.

MT waste oil spills and other non-LUST petroleum releases.

NE Case-by-case determination.

NM at all sites until rules out.

NY Occasionally fuel oil spills are sampled for MTBE.

OH Analysis required (soil & GW) for waste oil and used oil releases.

RI VOC analysis is required for all petroleum products #2 fuel and lighter, so MTBE is reported for all light products.

UT used oil release into soil and GW.

TX unknown substances releases.

VT some heating oil and diesel release sites.

VA depends on reason for suspecting release.

Comments:

AL not currently required in a closure suite assessment.

GA (5c) GW only since it leaches quickly out of soil.

MA To meet DEP policy and performance standards, PRPs are expected to analyze for MTBE at any site where MTBE is suspected to be located in either soil or GW.

OK MTBE should only be sampled at gasoline-release sites where a water-supply well exists in a cross- or down-gradient direction. EPA method 8021 should be used initially, and if the concentration appears greater than 0.020 mg/L a subsequent sample must be analyzed by EPA method 8260A to rule out false positives.

NV not for new oil or hydraulic fluid.

5d. If yes to either question 5a or 5b, when did your state initiate testing for MTBE?

AL 1995;

AZ soil, April 1996; gw, January 15, 1999 (effective date of LUST site characterization manual).
AR April 25, 1997;
CA at UST release sites, 1997
CT 1989;
DE Required in March 1999 at time of removals, investigations, retrofits, etc. Phased in shortly thereafter at existing LUST sites. Some sites had MTBE requirement 2-3 years before this, depending on project officer.
FL February 1990 for GW, September 1997 for soil.
GA March 2000;
HI January 1, 2000;
ID August 1996;
IN 1993;
IA July 1, 1999;
KS 1991;
KY 2000;
LA GW-July 1997, soil-December 1998.
ME 1986;
MD RP sites mid 90s, state-lead sites 1989.
MA Analysis has been conducted since October 1, 1993, the inception of the revised MA cleanup regs (inception date of RB cleanup standards for all chemicals). For petroleum-contaminated sites, DEP recommended testing for MTBE since early 1991.
MI 1996;
MN since program initiated in 1987;
MO Approximately 1992. Formally began requiring MTBE analysis at tank sites in 1996.
MT 1995-96;
NE June 1999;
NV October 1998 thru June 1999 we phased it in.
NH late 1980s;
NJ September 1990
NM GW-1990;
NY August 1992, with the implementation of Stars Memo #1 Petroleum Contaminated Soils Guidance Policy.
NC 1989;
ND 2000;
OH March 31, 1999;
OK May 1999;
OR April 1996 (interim guidance) - project managers began requiring MTBE testing. November 1998 (rule revisions).
PA August 1, 1996;

RI In the late 1980s;
SC June 1995;
SD 1999;
TN August 1996;
TX 1990;
UT 1995;
VT 1991;
VA within the last 3 years.
WA beginning in 2001;
WV For several years, but the response has been inconsistent.
WI 1990;
WY January 1999;

5e. Approximately how many sites were closed before MTBE analysis was required?

CA 13,000;
DE 830 sites that had gasoline releases.
FL Very few before MTBE testing of GW.
GA 4,300;
HI 600;
ID 654;
IL 9,000;
IN 250;
IA 2,136;
KS very few;
LA 900;
MD 5,400;
MA More than 1,350 LUST sites were closed as of October 1993.
MI 3,900;
MN none;
MO 3,000;
MT Approx. 1,440 releases were resolved by January 1996 prior to routine sampling for MTBE.
NE 2,300;
NV Don't know, would estimate approx. 2,000 prior to October 1998.
ND 725;
OH 15,000;
OR 403 gasoline-impacted GW sites closed as of April 1, 1996.
PA 1,922;
SC 1,100;
TN 324+;
TX 11,000;
UT 2,300;

VT 200;
 VA 4,000+;
 WA 3,000;
 WY approx. 350

Don't know AL, AZ, AR, CT, KY, ME, NH, NM, NY, NC, NJ, OK, RI, SD, WV, WI

**5f. If yes to either question 5a or 5b, how often is analysis requested for MTBE?
 (Please check appropriate box.)**

Percentage	Soil	Groundwater
0 - 20% of the time?	NV (only as part of soil disposal), VT, VA	OK
20 - 40%	MD	OR
40 - 60%	NC, RI	RI
60 - 80%	FL(all pet.), ID	DE, FL (all pet.), ID, SD
80 - 100%	AL, AZ, CA, CT, DE, FL (gasoline), HI, IA, LA, MA, MI, MN, MO, MT, NE, NH, NJ, NM, NY, OH, PA, TN, UT, WV, WI, WY	AL, AZ, AR, CA, CT, FL (gasoline), GA (vol.), HI, IN, IA, KS, LA, ME, MD, MA, MI, MN, MO, MT, NE, NV, NH, NJ, NM, NY, NC, ND, OH, PA, SC, TN, UT, TX, VT, VA, WV, WI, WY

Please indicate if these percentages are based on:

Hard data AZ (since analysis requested), DE, IA, KS, NH, NJ, MI, MN, NE, OH, PA, SC, UT,

Estimates AR, CA, CT, FL, GA, HI, ID, IN, LA, ME, MD, MA, MO, MT, NV, NM, NC, OK, OR, RI, SD, TX, VT, VA, WV, WY

Comments:

- CA** This testing is due to statutory requirements, but complete data is not yet available.
- DE** For soil and GW, if gas, av-gas, jet fuel, kerosene, used oil tanks present (not diesel or heating). If tier 0 levels are exceeded, tier 1 must include at least one water sample. GW - semi-hard data, based on % of tier 0 gasoline releases that must move to tier 1 investigation.
- IA** MTBE must be analyzed for all samples collected at LUST sites.
- KY** Have not assembled data.
- MO** Situation specific: For example, waste oil releases are not required to test for MTBE. However, a volatile scan is required at first. Generally, sampling of water is only required when water is encountered on-site, or if water supply wells are in close proximity, or if off-site contamination is suspect. Analysis for BTEX and MTBE is mandatory.
- NY** Hard data for state-funded cleanup project testing, Estimate for RP-funded cleanup project testing.
- NJ** 80-100% in soil for all gasoline LUSTs; 80-100% in GW for all gasoline USTs w/GW monitoring.
- OR** This is an estimate but based on actual database figures that indicate 28% of our UST releases involve gasoline impacts to GW. As DEQ project managers review UST cleanup sites, they are requiring MTBE data on all gasoline-impacted GW sites, but we have not tabulated the actual number of sites where MTBE has been specifically required.
- TX** 100% if gasoline or an unknown substance.

Survey of State Experiences with MTBE Contamination at LUST Sites (August 2000)

A Project of the New England Interstate Water Pollution Control Commission
(NEIWPCC)

II. MTBE Analysis - Questions 6a.-6c.

6a. What analytical method(s) is (are) used for MTBE analysis? (Check as many as apply.)

Method	Soil	Groundwater
US EPA SW-846 Method 8020/8021 (GC/PID)	AL, AZ, CA, CO, DE, FL, GA, HI, ID, KY, MA, MI, MN, NE (8021); CT, MD, MT, NM, NY, RI, VT, VA, WV	AL, AZ, AR, CA, CO, DE, FL, GA, HI, ID, KS, KY, MA, MI, MN, NE (8021); MD, NH, NM, NY, NC, ND, RI, SC (until 3/00); CT, SD, TX, VT, VA, WV(currently)
US EPA SW-846 Method 8240/8260 (GC/MS)	AL, AZ, CA, CO, DE, FL, GA, HI, ID, IL, IN, IA, KY, MA, MI, MN, MO, NE (8260); CT, MD, NV, NH, NJ, NM, NY, NC, PA, RI, TN, UT, VA, WA, WV	AL, AZ, AR, CA, CO, DE, FL, GA, HI, ID, IN, IA, KS, KY, MA, MI, MN, MO, NE (8260); ME (mon.wells), NH, NM, NY, NC; MD, PA, RI, MT, SC, TN, CT, UT, NV, VT, VA, WA, WV (planned)
A combination of 8020/21 and 8240/60	AK, CA, CO, CT, DE, KY, LA, MA, MI, MO, MT, NM, OH, OR, RI, WI, WY	AK, CA, CO, DE, KS, KY, LA, MD, MA, MI, MO, NM, NC, OH, OK (see 5c); CT, OR, RI, MT, TX, WI, WY (project)
US EPA Drinking Water Method 502 (GC/PID)	CA*, ID, MA	CA*, DE*, ID, KS, MD, MA, NY
US EPA Drinking Water Method 524 (GC/MS)	CA*, CT, ID, IN, MA, MO	AL, CA*, DE*, ID, IL, IN, KS, ME*, MA, MO, NH, NY; CT, MD, MT, NJ, PA, RI*, VT, WY(final)
A combination of 502/524	CA*, MA,	CA*, DE*, KS, MD, MA
ASTM D4815	CA, DE, MA	CA, DE, IL, MA
Other (please specify)		

***DW only**

Other:

FL, NY, NC USEPA 602 for GW.

- AZ** D5790-95, SM 6210D, SM 6200B.
- CA** Other methods are permissible, pending approval by CA Dept. of health Services.
- MA** DEP prefers the use of its quantitative and qualitative VPH&EPH approach for assessing the risk associated with hydrocarbons.
- MN** soil-MDH 466, GW-MDH 465.
- MO** OA-1 & OA-2 (mod.8015) for soil and GW.
- NJ** 624 w/MTBE, TBA, and library search.
- NC** 6210D for GW.

Comments:

- DE** ASTM D4815 allowed but hasn't been used.
- GA** 1st method accepted, 2nd is recommended.
- HI** Second method for confirmation.
- IA** Specifically, 8260B. GC/MS version of Iowa Methods OA-1 and OA-2 are also acceptable methods.
- VA** DEQ UST program may accept additional methods.

6b. Do the labs in your state charge extra to test for MTBE?

- Yes** AL, AK, CA, CO, HI, IA, NE, VA, WA, WV
- No** AR, CT, DE, ID, IN, KS, LA, ME, MA, MN, MO, MT, NE, NV, NH, NM, ND, OK, RI, SC, SD, TN, UT, VT, WI
- Some** NE, NC, OR
- Don't know** FL, GA, IL, KY, MD, MI, MS, NJ, NY, OH, PA, TX, WY,

Comments:

- AZ** extra cost for 8021; no extra cost for 8260 or others.
- MA** No, as long as the VPH analytical method is used to concurrently identify and quantitate individual concentrations of target analytes, which includes MTBE analysis.

6c. If yes, what is the additional cost beyond the typical BTEX analysis?

- AL** \$10/sample;
- CO** An additional \$12 is allowed for reimbursement from the state fund.
- IA** about \$50/sample;
- NE** <\$50;
- NY** Our standby lab contracts are bid based on having MTBE included as a target analyte (for state-funded projects). Unknown for RP testing.
- VA** approx. \$10/sample;
- WA** \$40
- Don't know** AK, AZ, CA, HI, NC

Comments:

- CA** varies widely across the state.

Survey of State Experiences with MTBE Contamination at LUST Sites (August 2000)

A Project of the New England Interstate Water Pollution Control Commission (NEIWPCC)

III. MTBE Site Assessment - Questions 7a.-7d.

7a. Do you have UST sites where MTBE has been detected in soil or groundwater, but where no release has been documented (e.g., through a leak detection method)?

Yes AL, AK, CT, DE, GA, ID, IL, IN, ME, MD, MI, MO, NV, NH, NJ, NY, NC, OR, PA, RI, SC, VT, VA, WA, WI,

No AR, HI, KS, LA, MA, MN, ND, OH, OK, PR, UT, TX

Don't know AL, AZ, CA, FL, IA, KY, MS, MT, NE, NM, SD, TN, WV, WY

Comments:

DE Sites where LD did not trigger (e.g., ATGs, LLDs, inventory, no record of spills), but soil and/or GW contaminated.

MN Presence of MTBE constitutes a release.

MT We are not testing soil and GW at non-release sites.

7b. If yes to question 7a, how many such sites?

CT several documented;

GA <5;

IN very few;

MO at least one;

NH >20;

VT most of our sites;

VA 25+;

WA approx. 50

Don't know AL, AK, DE, ID, IL, ME, MD, MI, NV, NJ, NY, NC, OR, PA, RI, SC, WI,

7c. In such cases, what part(s) of the UST system is (are) implicated most often (e.g., piping joints, vapor recovery)?

Don't know AL, AK, FL, GA, ID, IL, NH, OR, PA, VA, WA, WI

NC, ME, piping joints

CT surface spills, vapor recovery.

DE Leaky sumps mostly. Vapor lines in a few.

- IN** piping joints, lines, USTs.
- MD** Piping, sumps, vapor recovery.
- MO** Piping, fill ports, dispenser drips are all the usual suspects.
- NV** piping joints, o-ring/gaskets/seals.
- NJ** vapor recovery, sumps, spill buckets
- NH** Surface spills and spill buckets most likely.
- NY** overfills and spill bucket to tank gaskets/seals.
- RI** Most often suspected related to spills and overfills.
- SC** #1- dispenser,
#2 - tank pit.
- VT** spill/overflow buckets, piping.

7d. What types of tanks/piping are implicated most often?

Don't know AL, AK, CT, DE, FL, GA, ID, IL, MO, NJ, PA, OR, VA, WA, WI,

IN, NC, SC steel;

ME all types. Survey of State Experiences with MTBE Contamination at LUST Sites (August 2000)

MD fiberglass and flex piping.

NV single-walled piping.

NH During the sale of its NH stations, Exxon detected releases near its tanks. The tanks were all FRP. The MTBE may have permeated through the tanks or there may be spill bucket problems.

NY Overfilled tanks w/spill bucket on fill but not “stick” line/ports.

RI old steel;

VT unprotected steel

Survey of State Experiences with MTBE Contamination at LUST Sites (August 2000)

A Project of the New England Interstate Water Pollution Control Commission (NEIWPCC)

III. MTBE Site Assessment - Questions 8a.-8b.

8a. Are you finding MTBE contamination that you are unable to attribute to an UST release?

Yes AL, AR, AK, CT, DE, GA, HI, ID, ME, MD, MI, MO, MT, NH, NJ, NY, NC, ND, PA, RI, SC, VT, VA, WA,

No FL, IN, KS, LA, MA, MN, NV, OK, OR, PR, TN, TX, UT, WI, WY

Don't know AZ, CA, CO, IL, IA, KY, MS, NE, NM, OH, SD, WV

Comments:

MT 1 or 2 cases only, probably from unreported <25 gal. spills.

8b. If yes, have you documented other sources (e.g., ASTs, spills, accidents, dispensers) and are they significant? Please explain.

AL ASTs, bulk terminals, petroleum pipelines.

AR Suspect runoff and washout is responsible, but no hard data.

CT all of the above plus car accidents, leaks from car fuel tanks, dumping old gas, heating fuel releases.

DE Dispensers are the most significant, so far, but we haven't been looking for long and don't officially regulate ASTs, spills, accidents. Two large AST releases with MTBE recently identified. Dispensers not shutting off during refueling.

GA Too soon to evaluate.

HI MTBE detected in GW at a recycling business. The MTBE level was below non-DW guidelines (200ppb).

ID remains unresolved.

ME overfills, leaking gas tanks in gravel driveways, fuel storage in 1-gallon containers for small engines/backyard mechanics.

MD surface spills, ASTs, poor housekeeping.

MI ASTs, spills, dispensers.

MO ASTs are prevalent in MO. Transport and automobile accidents and general domestic household gasoline use/misuse (improper disposal have all been attributed to water contamination.

MT <25 gal. unreported releases at UST sites. Montana

NH spills, improper use and disposal of gasoline, leaks in vapor recovery systems.

NY DEC Snapshot MTBE Survey identified sources of MTBE-contaminated GW spills as: UST-46%, piping-26%, not identified-20%, fiberglass UST-2%, AST-1%, and other (overfills, homeowner, housekeeping, etc.)-5%.

- NC** ASTs and in some cases home heating oil tanks (rare but a few), also unknown sources believed to be spills.
- RI** no documented sources. requires cleanup at AST sites, many have MTBE contamination.
- SC** ASTs, surface spills, and some unknown source (e.g., killing ants w/gasoline).
- VT** surface spills, but not very significant as concentrations are typically quite low.
- VA** no documented sources. Surface spills are suspected in a number of cases.
- WA** pipelines, bulk plants

Survey of State Experiences with MTBE Contamination at LUST Sites (August 2000)

A Project of the New England Interstate Water Pollution Control Commission
(NEIWPCC)

III. MTBE Site Assessment - Questions 9a.-9b.

9a. Approximately how often is MTBE detected in soil/groundwater at gasoline-contaminated LUST sites?

Please indicate whether your percentages are based on:

Hard data IA, KS, MA, NE, NH, OR, SC, UT, VT, WA, WY

Estimates AL, AZ, AR, CO, CT, DE, GA, IN, LA, ME, MD, MI, MN, MS, MO, MT, NV, NJ, NM, NC, ND, OK, SD, TN, TX, VT, VA, WV, WI,

Percentage	Soil	Groundwater
0 - 20% of the time?	CO, HI, MA, MS, NE, OH, WI, WY	CO, HI, IN, MA, MS, NE, ND, OH, OK, WI, WY
20 - 40%	AL, ID (est.), MI, NM, NJ, NY, UT,	AR, NY, UT, WA
40 - 60%	MT	ID (hard), IA-59%, MI, MT, SC (51% as of 6/30/00); OR, SD,
60 - 80%	DE, IA-62%, LA, MN, MO, NH - all sites (70%); MD, NC, RI, TN, WV	AL, AZ, DE, GA, LA, MN, MO, NH - all sites (70%); ME, NJ, NM, NV, TN, TX, WV,
80 - 100%	FL, NH-new sites; CT, VT-when looked for;	FL, KS, NH-new sites; CT, MD, NC, RI, VT, VA,

Comments:

- AK** We are just beginning to collect data. No good numbers at this time.
- CA** Don't know - insufficient statewide data at present for either soil or groundwater (i.e., reporting is currently incomplete).
- IL** Don't require analysis for MTBE. Only in a few cases do we have RPs look for it, and only on a voluntary basis.
- IA** Data collected between July 1, 1999 through December 17, 1999. Responses are based on per site basis, rather than per sample. Quantitation level set at 0.015 mg/kg soil, and 15 µ/L.
- KY** Have not assembled data.
- MA** % based on hard data, with a notification threshold of 70µg/L in GW and 300 µg/L in soil.
- MI** We just began tracking.
- MT** Some fraction of the MTBE present at release sites may be a function of daily unreported small spills. We have not tested non-release sites or resolved release sites for the presence of

MTBE.

NY soil is estimate, GW is DEC snapshot survey of state fund projects through Oct. 1998.

9b. Of the groundwater sites, how often do MTBE levels exceed 20 ppb?

0 - 20% of the time

HI, ND, OH, OK, WA, WI, WY

20 - 40%

AR, MN, OR, TX

40 - 60%

AZ, AL, IA, ME, MT, NM, TN

60 - 80%

ID, IN, MO, NE, NV, NH, NY, SC, VA, NJ

80 - 100%

CT, DE, FL, KS, LA, MD, MA, NC, RI, VT

Don't know

CA, CO, GA, MI, MS, PA, SD, UT, WV

Please indicate whether your percentages are based on:

Hard data

AZ, CT, HI, ID, IA, KS, MA, NE, NH, NY, OR, SC, WA, WY

Estimates

AL, AR, DE (80%), IN, ME, MD, MN, MO, MT, NV, NJ, NM, NC, ND, OK, RI, TN, TX, VT, VA, WI,

Comments:

MA Since the notification threshold is 70µg/L, all the MTBE GW sites exceed 20ppb.

MT Have not reviewed all data from MTBE-impacted sites or conducted a complete survey to determine number of MTBE-impacted sites.

Survey of State Experiences with MTBE Contamination at LUST Sites (August 2000)

A Project of the New England Interstate Water Pollution Control Commission
(NEIWPCC)

III. MTBE Site Assessment - Question 10.

10. Of nongasoline-contaminated sites, do any of the following fuel types have MTBE levels above 20 ppb in groundwater or soil? Check all that apply. Please provide the approximate number of sites for each category.

Jet fuel 1 state

Heating oil 7 states

Diesel fuel 7 states

Other nongasoline petroleum products kerosene, K-1 Used Oil, used oil/waste oil

Don't know 36 states

Comments:

CT approx. 30 heating oil, approx. 10 diesel fuel.

MT We have some mixed diesel/gasoline sites, primary source of MTBE is probably the gasoline.

NV diesel approx. 5-10, used/waste oil approx.20.

NY has <5 heating oil and <5 diesel, very few above 20ppb.

NC 20 heating, 20 diesel.

RI none found yet.

VA heating oil 5-100 sites; diesel 2-5 sites.

WY no to all.

Survey of State Experiences with MTBE Contamination at LUST Sites (August 2000)

A Project of the New England Interstate Water Pollution Control Commission (NEIWPCC)

III. MTBE Site Assessment - Questions 11a.-11c.

11a. Do you investigate your MTBE plumes differently from BTEX plumes because of the potential for “diving” plumes?

Yes KS, ME, NJ, VT

No AZ, AR, CO, FL, GA, ID, IA, KY, LA, MA, MI, MN, MS, NV, NM, OH, PR, SC, SD, UT, TN, TX, WA, WV, WI, WY

Sometimes AL, CA, CT, DE, IN, MD, MO, MT, NE, NH, NY, NC, OR, RI, VA

Don't know HI, IL, OK, PA

Comments:

DE Depends on site and project officer -”learning curve.”

MN Always check for diving plumes no matter what the contaminant is.

NE Depends on the presence or absence of receptors.

NV unlikely due to low annual recharge.

11b. If yes, do you require three-dimensional characterization of MTBE plumes?

Yes AL, CT, IN, KS, ME, MD, MI, MO, MT, NE, NH, NJ, NY, OR, RI, SC, VT

No VA

Comments:

CA Based on anecdotal reporting, the answer is sometimes, yes.

DE Sometimes, depends on project officer.

NH In most cases, however, plumes are being characterized 2-dimensionally even though the rules require otherwise.

11c. If yes, how often?

Occasionally AL, CT, IN, KS, ME, MD, MO, MT, NH, NY, OR, RI, VT

Most of the time MI, NE, NJ

Always SC

CA Frequency undetermined.

DE Depending on project officer: occasionally and most of the time.

KS Where lithology/potential for induced gradient w/mile of receptor.

Comments:

MT If a vertical gradient is apparent, we will require nested wells to verify whether a “diving” plume exists.

Survey of State Experiences with MTBE Contamination at LUST Sites (August 2000)

A Project of the New England Interstate Water Pollution Control Commission
(NEIWPCC)

III. MTBE Site Assessment - Questions 12a.-12b.

12a. What is the average range of MTBE concentrations in the core of a plume?

0 - 100 ppb	HI, MN, ND, WI
100 - 500	FL, ME, TX, WY
500 - 1,000	AL, IN, KS, NM, RI, TN, VA,
1,000 - 10,000	AZ, AR, CT, DE, ID, KS, MA, MT, NV, NH, NJ (estimated), NC, SC, VT,
10,000 - 50,000	LA, MD
50,000 - 250,000	NY
Higher?	
Don't know	CA, CO, GA, IL, IA, KY, MS, MI, MO, OH, OK, OR, PA, SD, UT, WA, WV

12b. What is the average range of MTBE concentrations detected at receptors?

0 - 100 ppb	AL, AR, CT, DE, FL, GA, HI, ID, IL, IN, KS, ME, MN, MT, NV, NH, NJ, NM, NY, NC, OR, RI, SC, TN, TX, VT, VA, WI, WY,
100 - 500	MA
500 - 1,000	MD
1,000 - 10,000	DE
10,000 - 50,000	
50,000 - 250,000	
Higher?	
Don't know	AZ, CA, CO, IA, KY, LA, MI, MS, MO, NE, ND, OH, OK, PA, SD, UT, WA, WV

Survey of State Experiences with MTBE Contamination at LUST Sites (August 2000)

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III. MTBE Site Assessment - Question 13.

13. What is your worst MTBE concentration at an impacted receptor?

< 1,000 ppb	AL, AZ, GA, HI, ID, IN, MN, MT, NE, NV, NM, ND, OR, UT, WY
1,000 - 10,000	CT, IL, ME, NH, NJ, RI, SC, TX, VT, VA, WA, WI,
10,000 - 50,000	DE, NY, OK
50,000 - 250,000	MI
250,000 - 1,000,000	AR, KS, MD, NC
higher?	
Don't know	CA, FL, CO, IA, KY, LA, MA, MS, MO, NE, OH, PA, SD, TN, WV
Comments:	
DE	25ppm in a domestic well.
MI	140,000ppb.
MT	Ronan MTBE site - 30µg/L in a surface stream.

Survey of State Experiences with MTBE Contamination at LUST Sites (August 2000)

A Project of the New England Interstate Water Pollution Control Commission (NEIWPCC)

III. MTBE Site Assessment - Question 14a.-14d.

14a. Have you tracked MTBE plume lengths from gasoline releases?

Yes AZ (based on ongoing survey of LUST site data), CT, DE, IL, KS, ME, MD, MA, MT, NH, NJ, NY, NC, PA, RI, OR, VT, VA, WI, WY

No AL, AR, CA, CO, FL, GA, HI, ID, IN, IA, KY, LA, MI, MN, MO, MS, NE, NV, ND, OH, OK, SC, TN, TX, UT, WA, WV

Don't know NM, SD

Comments:

CT Currently performing a study of all documented bedrock well contamination to determine bedrock plume distance from release source.

DE Estimated from project officers, and not usually based on 3-D characterization or completely defining extent of plum.

FL Our individual assessment reports would have this info., but it hasn't been "tracked" in a database.

ME Haven't tracked all of them, but of the 5-10 worst ones, they are >500 ft.

MN Plume length determination required at each site, however, these have not been tabulated for MTBE.

MT Represents only a small # of well-defined MTBE sites.

14b. If yes, please indicate your average MTBE plume lengths.

10 - 50 feet

50 - 100

100 - 250 DE (estimated 200-300 ft), MD, NH, RI, VT, WY

250 - 500 AZ, CT (overburden), IL, KS, ME, MT, NY, NC

>500 WI

Don't know MA, NJ, OR, PA, VA

Comments:

MT Average only, not based on hard data and applies to a small number of well-defined sites.

14c. Are these plumes longer than typical BTEX plumes?

Often 15 states

Sometimes 11 states

Comments:

VT sometimes, particularly in bedrock.

14d. Please indicate the maximum length of any MTBE plume observed in your state.

50 - 250 feet

250 - 500 WY

500 - 1000 CT, IN, WV

1000 - 5000 AZ, AR, DE, IL, ME, MT, NV - (3,000+), NH, NJ, NC, OR, RI, SC (2,200), VT, VA, WI

If greater than 5000, please explain:

KS excess of 1 mile.

MA Observed at several sites across the state. Plumes this size are primarily related to the amount of gasoline released, soil types, depth to GW, fractures in the bedrock, GW gradient, and receptors (e.g., well with significant drawdown.)

NY East Patchogue, LI. MTBE plume over 6,000 feet. Spill due to a service station gasoline release. For more info. see: <http://www.epa.gov/ada/patchogue.html>.

Comments:

DE Max. 2,000 ft, several approx. 1,000 ft.

MT 2,000+ ft.

Don't know AL, CO, FL, MD, MN, MS, ND, OH, OK, PA, WA

Survey of State Experiences with MTBE Contamination at LUST Sites (August 2000)

A Project of the New England Interstate Water Pollution Control Commission (NEIWPCC)

III. MTBE Site Assessment - Question 15a.-15b.

15a. Does your state drinking water program require routine analysis for MTBE?

Yes AK, CA, CT, DE, FL, IL, IN, KS, KY, ME, MD, MA, MS, MO, MT, NE, NH, NJ, NY, RI, SC, TX, VT, VA

No AZ, AR, AL, CO, GA, HI, ID, IA, LA, MI, MN, NV, NC, ND, OK, OR, PA, PR, TN, UT, WA, WV, WI, WY

Don't know NM, OH, SD,

Comments:

IL Required on finished water;

IN voluntary basis;

KY For more info., contact Pete Goodman, Branch Manager, GW Branch, Div. of Water, at (502) 564-3410.

MN Not required but it's part of the routine VOC scan.

OH BUSTR does require analysis for their regulated releases. The OH EPA has regulatory oversight for this. Not sure if they require.

WY we're the only non-SDWA primacy state.

15b. If yes, when was MTBE analysis initiated?

AK 6 months ago.

CA Phased in starting during the late 1990s. Not all public water supplies have been tested for MTBE yet.

CT 1990.

DE PWs - June 2000. Can also sample domestic wells for MTBE when requested.

FL 1993.

IL last 2 or 3 years.

KS 1991.

ME 1993-95.

MD 1995.

MA For private wells - October 1, 1993, public - DEP has published guidelines since 1997 and required testing as of June 9, 1999.

MN not required, but MTBE analysis was added in 1989.

MO about 1995.

MS About 3 yrs. ago.

MT late 1999.

NE spring 2000.

NH Definitely by 1988, based on readily accessible data. Possibly earlier.

NY mid-1998 for PW supplies serving >10,000 people.

RI Has been incidentally reported w/required VOC analysis since the late 1980s.

SC Jan. 2000.

TX 1993.

VT 1991, but not required until 2000.

VA unknown.

Survey of State Experiences with MTBE Contamination at LUST Sites (August 2000)

A Project of the New England Interstate Water Pollution Control Commission
(NEIWPCC)

III. MTBE Site Assessment - Question 16a.-16c.

16a. Approximately how many public and private drinking water wells in your state have been contaminated by MTBE at any level? (Public wells are defined by groundwater supply systems that serve 25 or more households.)

Don't know AK, AZ, CA, CO, KY, LA, MI, NM, NJ, OH, PR, SD, TN, WA, WV, WY

# of wells	Private	Public
0	HI, MS, ND	FL, HI, ID, MS, ND
1-10	AL, GA, ID, IN, IA, MA, UT, NV, OR	AR, AL, GA, IN, MN, MO, NE, NC, OK, PA, RI, NV, OR, TX-9, VA, WI-2
11-20	AR	IA, SC (17);
21-30	SC-20 (3 irrigation)	MA
31-40	DE, MO, NC	KS-38; DE
If greater than 40, provide an estimate	KS-75; ME-approx. 400; MD->229; NH->250; NY-866; PA; RI-60; VT-approx. 175; VA-200+; WI-96	CT-255; ME-125; MD-66; NH-172; NY-47; VT-44;

Comments:

- CA** The testing of CA's public DW systems for MTBE is a phased process. Many public water systems have not yet been tested. There is no statewide program for testing MTBE in private wells, so this data will probably not be forthcoming in the near future.
- DE** Public wells: 38 out of the first 210 public wells sampled had MTBE detected. There are approximately 1000 public water supply wells in the state total.
- IL** 4 public wells closed, 26 impacted.
- ME** In a 1998 study, a random sampling was conducted of 951 private wells of which 150 (15%) had MTBE concentrations >0.1ppb (95% confidence level). Using these data, ME projected that somewhere between 37,000 to 50,000 private wells in the state were contaminated with >0.1ppb MTBE.
- MO** 32 private, 4 public.
- NY** From DEC Snapshot Survey of State-Funded Projects (data through Oct. 1998).
- VA** These are sites where DEQ is currently providing point-of-use treatment.

16b. At what contaminant level would you or the responsible party replace a private well or provide point-of-use treatment?

- AL** 20ppb, maybe less if concentrations are increasing;

AR Any level;
CT 70ppb;
DE Variable, often about 10 ppb, definitely <20-40 ppb;
FL >20ppb;
GA Case-by-case determination;
IL IEPA advisory is 20-40ppb;
IN above EQLs;
IA We are considering using 20-40 µ/L based on EPA's health advisory.
KS any detect;
LA 0.52ppm;
ME 25ppb;
MD replacement: site specific, point-of-use-treatment: >20ppb.
MA Equal to or greater than 70µg/L, depending on the use of the well.
MI 40ppb;
MN when MTBE >70µg/L;
MO 20ppb;
MT Any detectable concentration. This is because of the potential long-term impacts from other gasoline constituents that may follow.
NV 20-40ppb range likely.
NH >13ppb;
NJ 70ppb; RP may choose to address at lower concentration.
NY 10ppb or lower if sample results indicate an upward trend.
NC 11.6ppb, based on state toxicologist's recommendations.
OK Usually only if it becomes an odor or taste issue, but we have not encountered this situation.
OR 20ppb;
PA Any level above detection.
RI Bottled water would be provided initially if 40ppb was exceeded or if more monitoring data is needed to determine if the standard will be exceeded. Filters are used for a longer term or higher concentration solution.
SC If impact is > detection limit.
VT replace-site specific, treatment-40ppb.
VA >detection limit;
WA 20ppb;
WV MCL;
WI at ES of 60µg/L
Don't know AK, AZ, CA, CO, HI, ID, IA, KY, MS, NE, NM, ND, OH, SD, TN, UT, WY

Comments:

CA These decisions are made locally in compliance with both UST and DW regs.

16c. At what contaminant level would you or the responsible party replace a

public well or provide water treatment?

- CT** 70ppb;
- DE** RP (if identified) will be responsible for replacing well or treating well to MCL. The proposed MCL is 10ppb.
- FL** >20ppb;
- GA** Case-by-case determination;
- IN** above EQLs;
- KS** eventually, any detect >20µ/L until we catch up;
- LA** 0.52ppm;
- ME** 25ppb;
- MD** replacement: site specific, water treatment: >20ppb;
- MA** Equal to or greater than 70µg/L, depending on the use of the well.;
- MI** 40ppb;
- MN** when MTBE >70µg/L;
- MO** 20ppb;
- MT** We have not yet dealt with an impacted PWS well that is currently in use. Our legally enforceable limit is 30µg/L. However, the dept. may choose to require treatment at lower concentrations.
- NV** 20-40ppb range likely.
- NH** >13ppb if shown to remain above that level for an extended period of time.
- NJ** 70ppb; RP may choose to address at lower concentration.
- NY** 10ppb or lower if sample results indicate an upward trend.
- NC** same as above;
- OK** Usually only if it becomes an odor or taste issue, but we have not encountered this situation. Treatment or replacing the water supply is based on BTEX contamination.
- OR** 20ppb;
- PA** Any level above detection.
- RI** The DOH deals w/PW. I believe MTBE is not a regulated contaminant (or it has not been) and the DOH could only make recommendations to the public systems regarding MTBE.
- SC** If impact is > detection limit.
- TX** The Public DW program would recommend an alternate source or water treatment id MTBE is reliably and consistently measured above 240ppb in the DW supply entry point (not the well).
- VT** replace-site specific, treatment-any level except for transient systems.
- VA** > health advisory of 20µg/L;
- WA** 20ppb;
- WV** MCL;
- WI** 20µg/L
- Don't know** AL, AK, AZ, AR, CA, CO, HI, ID, IL, IA, KY, MS, MT, NE, NM, ND, OH, SD, TN, UT, WY

Survey of State Experiences with MTBE Contamination at LUST Sites (August 2000)

A Project of the New England Interstate Water Pollution Control Commission
(NEIWPCC)

IV. MTBE Remediation - Question 17a.-17b.

17a. How often does MTBE drive the cleanup or investigation activities at LUST sites?

Never AK, AZ, CO, GA, IA, KY, NM, ND, OK, PR, SD, TN, WV, WY
Less than 20% AL, AR, FL, HI, ID, IL, IN, KS, LA, MA, MN, MO, MT, NE, NC, OH, OR, RI, SC, UT, VA, WI
20 - 40% DE, VT
40 - 60% ME, NH
60 - 80% CT, MD, NJ (estimated), NV
Greater than 80% CA, NY
Don't know MI, MS, PA, TX, WA

Comments:

KS Once for part of a remedial system (deep O2 sparge, 6 MTBE only treatment systems).
KY No cleanup levels for MTBE.
NY at LUST sites where MTBE is confirmed in soil and GW.

17b. If MTBE is not the primary driver of remediation, what is?

BTEX/free product AL, AZ, AK, CT, DE, FL, GA, HI, ID, IN, IA, KS, KY, LA, ME, MD, MI, MN, MS, MO, MT, NJ, NM, OH, OR, PR, RI, SC, SD, TN, TX, UT, VT, VA, WA, WV, WI, WY
Risk to receptors AR, CO, CT, DE, GA, IL, IA, KS, MD, MI, MN, MT, NE, NV, NH, NJ, NM, NC, ND, OK, SC, TX, UT, VT, VA, WV

Other:

DE Threat of lawsuits due to off-site property impacts.
KY PAH, total lead.
ME also gasoline range organics (GRO).
NJ Decreasing GW contaminant levels required.
NY Technically we address free product and risk to receptors, not specifically BTEX.

Comments:

CO Receptors include the property boundary.
MA See question 1c.
SC Action level of benzene (5ppb) and Naphthalene (25ppb).

Survey of State Experiences with MTBE Contamination at LUST Sites (August 2000)

A Project of the New England Interstate Water Pollution Control Commission (NEIWPCC)

IV. MTBE Remediation - Question 18.

18. What percentage of your LUST sites is undergoing remediation for MTBE?

- 0%** AZ, AK, GA, IA, KY, MS, NE, ND, OK, TN
- AL** approx. 25%;
- CT** approx. 50%;
- DE** If MTBE exists at site, usually along with BTEX, 50% in active remediation.
- FL** 15% (estimate). Most sites are eligible for funding assistance, and we are cleaning them up in priority order and cannot afford to work on more than that much at once.
- IL** 2%;
- IN** 5-10%;
- KS** 20% of LUST sites in remediation, 87% w/MTBE contamination;
- ME** 40-60%;
- MD** 70-80%;
- MA** <10%;
- MI** 20-40%;
- MN** 0-20% (not sure);
- MO** >37%;
- NV** approx. 80%, all sites where MTBE is present at concentrations the action level.
- NH** 4% (not including RNA and soil removal sites-based on random sampling). Note: many sites are remediated via soil removals. These are not currently undergoing remediation, because the removals are finished quickly.
- NM** MTBE is remediated w/BTEX.
- NY** 25-50% (estimate);
- OH** <1%;
- SC** 79% (149 out of 189 cases currently in active corrective action have MTBE documented).
- TX** About 10% (700 sites) of currently open sites are undergoing remediation for MTBE and other COCs.
- UT** <1%;
- WI** <1%;
- WY** 7% (to date)
- Don't know** AR, CA, CO, HI, ID, LA, MT, NJ, NC, OR, PA, RI, SD, VT, VA, WA, WV,

Comments:

CA Statewide reporting on items 18-19 is incomplete.

Survey of State Experiences with MTBE Contamination at LUST Sites (August 2000)

A Project of the New England Interstate Water Pollution Control Commission (NEIWPCC)

IV. MTBE Remediation - Question 19a.-19b.

19a. What percentage of your LUST remediation cases is at sites where MTBE is the only concern?

0% AZ, AK, CO, GA, HI, IL, IA, KY, MN, MS, NE, ND, OK, SD, TN, TX, WV, WY

ID, NV approx. 1%;

IN, UT >1%;

AL approx. 5%;

DE 20-30% of gasoline sites;

FL <5%;

ME 30-40%;

MD 20%;

MA <10%;

MO approx. 20%;

MT <5%;

NH 0% (not including RNA or POE-only sites);

NC <5%;

OH, OR <1%;

RI Don't know but very small;

SC 0.5% (only 1 release);

VT <20%;

VA <10%;

WI <1%

Don't know AR, CA, CT, LA, MI, NM, NJ, NY, PA, WA,

Comments:

DE Threat of lawsuit is a potential driver.

IL Once we adopt legislation to regulate MTBE, this # will change.

KS 0% with MTBE as only concern, all have BTEX. 6 MTBE only treatment systems w/2 additional in installation.

19b. How many sites does this represent?

0% AZ, AK, NE, NH

FL 500-1,000;

ID approx. 4;

IN >100;
MD >500;
MA <100;
MO approx. 280;
MT <75;
NC, NV approx. 3;
OH <10;
OR <50;
SC 189;
UT 1;
VT 50-100;
WI 2
Don't know AR, AL, CT, DE, RI

Comments:

IL We have 20,000 LUST sites, with 11,000 still open.
NY At least 193 spills have impacted approximately 866 private water supply wells, requiring alternate water supplies. MTBE is the primary concern at these sites.

Survey of State Experiences with MTBE Contamination at LUST Sites (August 2000)

A Project of the New England Interstate Water Pollution Control Commission
(NEIWPCC)

IV. MTBE Remediation - Question 20.

20. What technologies have been used to remediate MTBE in soil and groundwater? Which have shown success? Please answer using the chart.

Don't know AR, CO, FL, GA, HI, IA, KY, LA, MI, MN, NE, NC, ND, OH, PA, TN, UT, WA, WV, WI

None MS

Medium	Technology	Successful		Unsuccessful	
		Number	Percent	Number	Percent
Soil	Soil Vapor Extraction	AL, CA, DE, MD, MO, NH, NJ, SD, -10; KS-92; NY-505; OR-2; VA-12; WY-12	DE-60; MT-approx. 20; VT-approx. 80; VA-50; WY-ongoing	DE-5, NH	DE-35
	Low Temperature Thermal Desorption	CT; DE-10; NY-1;	CT-excavation most successful; DE-80;		
	Biodegradation	DE-3, IL-2, NY-59; AL, MO, NH, SD	DE-<10; VT-approx. 10;		
	Other (specify)	KS, -dig/land farm-6; MO-land farm. & BIOX, ORC (in situ); NY-excav/disposal -578, other-24; VA-soil ex; WY - multiphase ext. - 6	MT - landfarming approx. 60; VA-soil ex-90; WY-ongoing		

Medium	Technology	Successful		Unsuccessful	
		Number	Percent	Number	Percent
Groundwater	Point-of-Use Treatment (e.g., carbon, air stripping)	MO, NH, NJ, CA, MD, OK; CT-100; DE-20; IL-1; IN-2; KS-18; ME-750; NY-866; OR-1; TX-50	CT-98; DE-90; ME-100; OK-100; TX-approx. 0.2; VT-5;	NH	
	Pump and Treat	AL, CA, MD, MO, NH, NJ, RI; AZ-1; DE-10; IN-14; KS-5; NY-371	AZ-100; DE-80; VT-10	NH	
	Air Sparging/SVE	ID, MD, MO, NJ, NH, RI, SD; DE-10; IN-1; KS-65; NY-176; ME-1-2; SC-4; OR-2; WY-10	DE-70; ME-15; MT-approx.40; SC-7; VT-20; WY-ongoing	ME-5-10; NH,	ME-85;
	Biosparging	AZ-1; DE-2; MO; NY-11	AZ-100; DE-40; MT-<1;	DE-1; VA-1;	DE-30;
	Bioreactor	NY-9;		DE-1	DE-100;
	Natural Attenuation	MO; NH, RI, CA, AL, SD, NJ; DE-3; IN-2; KS>1000; NY-172; SC-55	CA-esp. dispersion; DE-75; MT-<11; SC-93; VT-30;	DE-1; NH	DE-25
	Dual-Phase Extraction/ Multi-Phase Extraction	AL, CA, MD, MO, NH, NJ, RI; DE-5; IN-2; KS-4; NV-1; NY-200; OR-1; TX-180; VA-14; WY-6	DE-80; MT-approx. 20; NV-approx. 1; TX-approx. 0.8; VT-20; VA-75;	DE-1; NV-0; NH;	DE-20
	Soil Excavation	AL, CA, MD, MO, NH, NJ, RI, SD; DE-3; KS-6; ME->100;	DE-60; ME-100 (if site excavated soon after spill); MT-5-10; VT-10	DE-2; NH,	DE-20;
	Other (please specify)	ID-1 peroxide oxidation; IL-UV light; IN-biox; KS-4orc; MO-Hi Vac & enhanced fluid recovery, ORC, BIOX; NV-AS/VES/H2O7-approx. 12; overpurg+H2O7-2; NY-73;	NV-AS/VES/H2O7 (4%), overpurg+H2O7 (1%); VT-5;		

Comments:

- CT** hard data not available. Based on experience and estimates.
- ID** Use SVE, air sparging (most common), soil excavation. No info. on how successful.
- IL** We have very limited info., so success info. is really unknown at this time.
- KS** don't consider natural attenuation remedial. All of our sites in remediation that don't have free product show a reduction in MTBE concentration over time. These are variable and

fluctuate greatly. The most recent data with % reduction from system start-up to current levels indicate a general reduction over the life of the system. Smallest decrease in non-FP sites is 18% reduction. Many are in excess of 90%. 16 sites w/initial concentrations ranging from a high of 3,872 µ/L to lows in 10s have gone to ND. Most of our sites are SVE/AS with digout when feasible. This does not necessarily indicate successful remediation as we have not compared these results with sites in monitoring/nat. attenuation. We do find MTBE in SVE effluent so it has to be at least somewhat effective. On those sites that we have analyzed for TBA, the TBA/MTBE ratios have been at 1:1. This would also indicate attenuation as TBA at these levels with MTBE indicate breakdown of MTBE to TBA. Whether this is due to the remedial effort is yet to be determined. Again, we have not compared with those sites in monitoring (RNA/MNA). The remedial percent reduction over time is significant though.

- MA** Results are not totaled at this time; however, most of these technologies and others are used to cleanup sites around the state.
- MN** We don't have this data because few/no cleanups are done on solely MTBE plumes.
- MO** MDNR has only recently begun to track remedial strategies at sites. Insufficient information exists on the frequency of use and success. MDNR is flexible in considering alternative corrective action technologies, and upon acceptance of documentation of completion of cleanup activities, will issue a "no further action" letter. We see some of these technologies working better than others (e.g., EFR and Hi-Vac Extraction technologies are showing promise).
- NY** The above answers are approximate numbers of sites where remedial technology is being used. Many of these are long-term, ongoing actions that are difficult to determine whether successful or unsuccessful at this time.
- OH** No track record to compare numbers/technology/success.
- SC** The chart includes data for completed cases. Air sparging, SVE, biodegradation, soil excavation, and oxygen reducing compounds have all reduced the mass of BTEX and MTBE by 75% or more at over 100 releases.
- WI** Remediation at MTBE sites has just started.

Survey of State Experiences with MTBE Contamination at LUST Sites (August 2000)

**A Project of the New England Interstate Water Pollution Control Commission
(NEIWPC)**

IV. MTBE Remediation - Questions 21a.-21b.

21a. Does your state require analysis for MTBE in the effluent stream from soil vapor extraction or air stripping systems?

- Yes** DE (depending on who wrote the air permit), KS, ME, MD, MI, MN, MO, NY, WY
- No** AL, AZ, AR, CO, CT, GA (voluntary), HI, ID, IL, IN, IA, KY, LA, MA, MS, MT, NE, NH, NM, NC, OK, OR, RI, SC, TN, UT, TX, VT, VA
- Sometimes** CA, FL (SVE=yes, air stripping=no.)

Don't know NV, ND, OH, PA, SD, WV, WI

Comments:

- MA** Because it is a Licensed Site Professional's requirement to meet certain performance standards for achieving a permanent solution at a site, this would be one way to measure the performance of the remedial system.
- NY** Yes for air stripping. SVE: field instrument readings for hydrocarbon vapor concentrations.
- TN** Don't know about nonattainment city programs.

21b. If yes, what percent reduction in MTBE mass are you seeing?

- DE** Not sure if this question refers to mass removal from the ground or mass removal from the air stream. Thermox or Catox normally takes 95% or more from the airstream. Carbon seems variable. Not sure if the question applies to what percent of the mass of MTBE we can get out of the ground by SVE.
- KS** See above, up to 100%.
- ME** Air stripping of water achieves 95-99% reduction.
- MD** >95%.
- MN** Unmeasurably small;
- MO** Not tracked or readily quantified, but are seeing reports measuring "pounds of hydrocarbons/volatiles" removed during Hi Vac Extraction...and consider this successful.
- NY** From air stripping systems: 70-80% reduction, SVE is unknown.
- WY** systems are being constructed now.

Survey of State Experiences with MTBE Contamination at LUST Sites (August 2000)

A Project of the New England Interstate Water Pollution Control Commission (NEIWPCC)

IV. MTBE Remediation - Questions 22a.-22b.

22a. Are you taking any extra steps to make sure MTBE is not migrating beyond standard monitoring parameters (e.g., installing deeper wells, multi-level sampling)?

- Yes** AL, CT, DE, IN, KS, ME, MD, MA, MN, MO, MT, NH, NJ, NY, NC, OR, RI, SC, VT
- No** AK, AZ, AR, CO, FL, GA, HI, ID, IA, KY, LA, MI, MS, NE, NV, ND, OH, OK, PA, PR, SD, TN, TX, UT, VA, WV, WI, WY
- Don't know** IL, NM

22b. If yes, what kinds of steps?

- AL** multi-level sampling;
- CT** Require multi-level wells if DW supplies are in the area.
- DE** Multilevel wells, nested wells, wells farther downgradient to define extent of MTBE plume,

not just BTEX plume. Gradually adding additional downgradient monitoring wells, multi-level wells to older sites.

- IN** deep wells, nested wells;
- KS** Deep wells to the base of the aquifer or to known permeability channels when conducive lithology, potential for induced gradient, and source area within a 1 mile radius. Intercept wells. Routine sampling of receptors when source is within one mile.
- ME** Sampling at greater depths.
- MD** sentinel wells.
- MA** If a risk exists to receptors, the PRP must undertake response actions to mitigate the risk. Conditions such as substantial release migration and imminent hazards must be addressed and the risks must be removed.
- MN** determine 3-D extent of plumes;
- MO** Source control, Hi-Vac Extraction, free product recovery, pit and trench dewatering, expedited assessment and response activities, etc.
- MT** Install nested wells at some sites to look for diving plumes.
- NH** Shorter screens, multi-level wells.
- NJ** Deeper wells.
- NY** vertical profiling (deeper wells, multi-level wells).
- NC** Deeper wells and wells at edge of plume (just started).
- OR** We have required deeper wells and additional wells located further downgradient (than would have been required for BTEX alone) on some sites involving MTBE.
- RI** More wells, greater distance from source, rarely deep wells.
- SC** Sampling of receptors has been increased to 1,000-foot radius, and downgradient samples can be sent to a certified lab to verify field screening results before wells are installed.
- VT** Conceptual models.
- VA** DEQ case managers may require this info. if needed.

Survey of State Experiences with MTBE Contamination at LUST Sites (August 2000)

**A Project of the New England Interstate Water Pollution Control Commission
(NEIWPCC)**

IV. MTBE Remediation - Questions 23a.-23c.

23a. Has your state closed any sites where MTBE has been detected?

Yes AL, AR, CA, CT, DE, FL, ID, IL, IA, KS, LA, ME, MD, MA, MI, MN, MO, MT, NE, NV, NH, NJ, NM, NY, NC, OH, OR, RI, SC, SD, TN, TX, UT, VT, VA, WV, WI

No GA, MS, PR, WY

Don't know AZ, CO, HI, IN, KY, ND, PA

23b. If yes, please provide an estimated percentage of MTBE sites closed in comparison with the total number of sites contaminated with MTBE.

AL 10%;
CT 50%;
DE 65%;
KS 1/1600;
ME 20%;
MD 20%;
MA 20%;
MN 30%;
NE 25%;
NH 7%;
NY 10%;
NC 15%;
OH <5%;
NV approx. 8%;
SC >5%;
TX 17%;

Comments:

DE 65% of the MTBE sites have MTBE below our actions levels. The other 35% go on to further investigation and/or remediation.
FL A lot of sites we haven't even tried to clean up because of priority funding. Also, a lot of sites w/MTBE we haven't been able to complete cleanup because there may be other chemicals that are more responsible for the challenge than MTBE.

23c. How many sites does this represent?

CT 1,000;
DE 20;
MD approx. 160;
MA 75;
MN approx. 2,000;
MT 1 site but there are probably others;
NE approx. 8;
NV approx. 20;
NH 71;
TX approx. 1,500;
VT approx. 700;

Don't know AR, AL, ID, IL, IA, LA, ME, MI, MO, NJ, NM, NY, NC, OH, OR, RI, SC, SD, TN, UT, VA, WV, WI,

Comments:

- CA** no statewide data available.
- DE** Number based on soil samples recently tracked in database from 30 sites where MTBE was analyzed. 20 sites had MTBE but fell below action levels for MTBE only, or for MTBE and other constituents.

Survey of State Experiences with MTBE Contamination at LUST Sites (August 2000)

**A Project of the New England Interstate Water Pollution Control Commission
(NEIWPCC)**

IV. MTBE Remediation - Questions 24a.-24b.

24a. Has your state remediated to closure any sites with MTBE contamination?

- Yes** AL, AR, CA, CT, DE, FL, ID, KS, ME, MD, MA, MI, MN, MO, MT, NV, NH, NJ, NY, NC, RI, SC, SD, TN, TX, VT, VA, WV
- No** GA, IL, KY, LA, MS, ND, OK, OR, PR, UT, WI, WY
- Don't know** AZ, CO, HI, IN, IA, NE, OH, PA

Comments:

- TN** not based on presence of MTBE.
- TX** yes, but MTBE was virtually never the driver at these sites.

24b. If yes, approximately how many?

- 1 -10** ID, KS, NH, MT, RI
- 11 - 20** NV
- 21 - 30** DE, ME, MN, NC
- 31 - 40** MA, NY

If greater than 40, please provide an estimate:

- FL** About 4,700 sites w/reported discharges have been cleaned up. We estimate that 80%, or 3,700 may have had MTBE.
- MD** 60-70.
- SC** 59.
- VT** approx.100;
- VA** 200+;
- Don't know** AL, AR, CA, CT, MI, MO, NJ, SD, TN, TX, WV

Survey of State Experiences with MTBE Contamination at LUST Sites (August 2000)

A Project of the New England Interstate Water Pollution Control Commission (NEIWPCC)

IV. MTBE Remediation - Questions 25a.-25b.

25a. How many previously closed sites have been reopened because of post-closure detection of MTBE?

- AL** 1;
CT approx. 20;
KS 1;
ME 10-40;
MD very few.
MO <12;
MT 1 site in an “inactive” status is being monitored for MTBE;
NH 0; anticipate reopening >5 due to recent Exxon submissions;
NY <7;
OH 3;
NV 1;
VT approx. 10;
None AK, AZ, AR, DE, CO, GA, HI, ID, IL, IN, IA, KY, LA, MA, MI, MN, MS, NE, NM, NC, ND, OK, RI, SC, SD, TN, UT, OR, TX, VA, WV, WI, WY, NJ

Don't know CA, FL

25b. If you've had to reopen any, please provide examples of reasons why.

- AL** Detection of previously unknown off-site contamination.
CT Unknown in most cases. Some due to poor site characterization. Some from new releases.
KS impacted public well.
ME New spills and new private wells contaminated.
MD New impact to domestic well.
MO Phase II Env. Assessment identified MTBE in GW on a restaurant property that has previously been a gas station but had successfully completed closure a number of years earlier. An active station was identified as the likely source. However, the owner of the active station disputed the findings. The dispute warranted additional sampling by the previous owner of the closed station to confirm closure sampling-these activities are pending.
MT BTEX constituents met state standards, but MTBE concentrations exceeded state standard.
NH Exxon property transfer SEA. Revised DW standard for MTBE.
NY Post closure detection's above cleanup levels; impact to receptor which leads to identification of previously closed spill; reexamination of closed sites in light of new guidelines.
OH Phase II performed on previously closed sites under older corrective action rule that did not require MTBE analysis.
VT impacted receptors, property transactions.

Survey of State Experiences with MTBE Contamination at LUST Sites (August 2000)

A Project of the New England Interstate Water Pollution Control Commission (NEIWPCC)

IV. MTBE Remediation - Questions 26a.-26b.

26a. Is your state taking a more aggressive role in NAPL recovery to prevent MTBE plumes from migrating off site?

Yes AL, AZ, CT, MI, MO, MT, NV, NY, RI, WY

No AK, AR, CO, DE, FL, GA, HI, ID, IA, KS, KY, LA, ME, MD, MA, MN, MS, NE, NH, NC, ND, OH, OK, OR, PA, PR, SC, SD, TN, TX, UT, VT, VA, WV

Don't know CA, IL, IN, NJ, NM, WI

Comments:

ME, MD, NH,

NC, VT, VA We have typically tried to recover NAPL in the past; therefore, no change.

DE Same as before. FP recovery always required to extent practicable. Stress source removal.

FL More aggressive w/NAPL, but not for that reason.

KS Always take an aggressive role in NAPL recovery, however, it is not an easy task. SVE has been most effective by far.

MA The goal has always been the same: No NAPL - reduce all contamination concentrations to a condition of no significant risk.

NJ Product recovery required in all situations.

26b. If yes, in what way?

AL More use of high vac mobile equipment.

AZ Initiate free product removal/abatement measures as soon as possible after confirmation of release and presence of free product.

CT 1) More aggressive stance when a spill is reported.
2) Enforcement actions.

MI Free product recovery and source removal.

MO Source removal focuses more attention on saturated soils and free product recovery efforts early on in the release, more aggressive remedial strategies as opposed to those options that do not address source control.

MT We are focusing more effort and petroleum fund dollars on rapid source removal to shorten the cleanup life of projects and minimize the size of MTBE plumes.

NV Quicker onset of corrective actions; aggressive removal of free product, concurrent deployment of hydrogen peroxide around dissolved plume perimeters.

NY full site delineation; use of Hi Vac extraction.

RI We require aggressive free product recovery. It is often an immediate abatement procedure, but not specifically just because of MTBE.

VT If NAPL is present at a site, we almost always require some form of corrective action.

VA Always require RPs to remove free product to the extent practicable.

WY We always have removed floating product first before using air sparging/SVE, multi-phase, etc.

Survey of State Experiences with MTBE Contamination at LUST Sites (August 2000)

A Project of the New England Interstate Water Pollution Control Commission
(NEIWPCC)

IV. MTBE Remediation - Questions 27a.-27c.

27a. Has MTBE had a noticeable impact on the cost of remediation in your state?

Yes CA, CT, DE, IN, KS, ME, MD, MA, NH, NJ, NY, PA, RI, VT, VA, WY,

No AL, AK, AR, CO, FL, GA, HI, IL, IA, KY, LA, MI, MN, MO, MS, NE, NM, ND, OK, OR, PR, SC, SD, TN, UT, WV

Don't know AZ, ID, MT, NC, OH, NV, TX, WI

Comments:

GA We anticipate it will if USEPA sets MCLs.

ID Most cleanups paid for by Pet, Storage Tank Fund. They would have the cost data.

IL Not yet, but once proposed cleanup numbers are adopted, the answer will be yes.

KS Not so much with the cost of remediation. Only one site has a portion of the remedial system for MTBE only and that is a deep O2 sparge \$200,000. The additional costs are primarily for additional assessment, number of sites that need to be addressed due to wellhead protection, analytical, and treatment systems. These costs are significant though. +\$5,000,000 over the next few years.

MA Results not quantified.

MO No, but it appears inevitable and certain to happen.

MT Too early to tell. We have very few MTBE-only sites, and costs associated w/MTBE are not separated from BTEX costs. I have one site where MTBE is the driver.

OH Not enough data currently to make a determination.

27b. If yes, please indicate the percentage of the sites that fall into each category.

Percentage of Sites	Affect of MTBE on Cleanup Costs
AL-50; CT-70; DE-10; ME-5; MT-95; NH-25; NY-15; RI-40; SC-77; VT-50	No increased cost
AL-50; CT-20; DE-35; IN; ME-5; MT-4; NH-40; NY-15; OR-<1; RI-40; SC-20; TX; VT-40; VA; WY-7	Small increase in cost (< 20% more)
CT-5; DE-40; ME-30; MT-<1; NH-20; NY-20; RI-20; SC-3; VT-5	Significant increase in cost (20 - 50%)
CT-5; DE-10; ME-30; NH-10; NY-25; VT-3	Very significant increase in cost (50 - 100%)
DE-5; ME-30; NH-5; NY-25; VT-2	Cost more than doubled
100%	
Comments:	
CA	no statewide data available.
ME	estimates.
NJ	no hard data available
NY	gross estimates.

27c. If costs have increased, what factors have driven them up (e.g., longer plume, difficulty to air strip, inefficiency of carbon)?

- AL** Longer plumes, high concentrations;
- CT** Cost is dependent on GW classifications and remediation standard.
- DE** Longer plumes, increased characterization costs, treatment to remove MTBE from water, well impacts.
- IN** longer and deeper plumes mean higher site investigation costs;
- KS** Potential for impact to receptor at greater distance (1 mile vs. ¼ mile) has increased cost by additional remediation, however all are BTEX sites as well. Both carbon and air stripping have been successful for our treatment systems. These systems themselves, however, are quite expensive.
- ME** Longer plume, inefficiency of carbon, MTBE-only sites. SC - longer plume.
- MD** Longer time to cleanup, efficiency of treatment, longer plumes.
- MA** Typically, facility operators who refuse to cleanup sites sooner have to deal with larger plume sizes that contribute to increased costs for MTBE remediation. In addition, facility operators who fail to maintain adequate leak detection, spill and overflow protection, corrosion protection, and good inventory control typically have to deal with these higher costs for the overall site.
- MT** longer plume, no biodegradation, inefficiency of air sparging and other technologies being used.
- NV** Inefficiency of carbon. We believe our costs have increased approx. 10-30%. More than anything, the presence of MTBE helps shape the remedial action (i.e., we do little pump and treat w/carbon anymore).
- NH** all the factors listed above;
- NY** All of the above plus more receptor impacts.
- RI** longer treatment time.
- TX** probably a combination of all three factors (above).
- VT** increased sampling costs, difficulty to air strip, duration of site monitoring, duration of impact.
- VA** longer plumes have led to an increased # of impacted WS wells which, in turn, has driven up costs of providing alternate water supplies.
- WY** longer plume/treatment areas and longer remediation time.

**Survey of State Experiences with MTBE
Contamination at LUST Sites (August 2000)**

**A Project of the New England Interstate Water Pollution Control Commission
(NEIWPC)**

IV. MTBE Remediation - Questions 28a.-28c.

28a. Any increased cleanup costs associated with MTBE remediation?

Yes AL, CA, ID, IL, KS, ME, NH, TX, UT

No AK, AZ, AR, CO, CT, FL, GA, HI, IN, IA, KY, LA, MD, MA, MI, MN, MS, MT, NE, NV, NY, NC, ND, OK, OR, PR, SC, TN, VT, VA, WY

Don't know MO, NM, OH, PA, RI, SD, WV, WI

Comments:

DE State fund cleanups are limited to sites that applied in late 1980s. This is a small percentage of sites in the state. We pay on state fund sites whether MTBE involved or not. Sites not in the fund must have private insurance or be able to self insure.

MA Fund is activated when account falls below the minimum balance and is terminated when the funds in the account reach a maximum. Because DEP has strict cleanup standards, the MA state fund is aware that dollars must be spent until RB standards are met. The fund, therefore, sets strict reimbursement schedules that must be met to be eligible for reimbursement. Only certain costs are eligible for reimbursement.

NJ state does not have a fund.

NC Data has been collected and presented to the NC General Assembly to estimate the potential increase in costs, but no action as of now for increases in revenue to cover costs.

TX Cost projections are currently under development that factor in increased assessment and remediation costs for MTBE.

VT Not more than planned. Our fund has always considered the costs.

28b. Sites reopened for additional investigation, cleanup, and closure?

Yes AL, CA, DE, KS, ME, MA, NH

No AK, AZ, AR, CO, CT, FL, HI, ID, IL, IN, IA, KY, LA, MI, MN, MS, MT, NE, NV, NY, NC, ND, OK, OR, PR, SC, TN, TX, UT, VT, VA, WY

Don't know MD, MO, NM, OH, PA, RI, SD, WV, WI

Comments:

DE Each site is eligible for one cleanup. If it can be reasonable shown that the MTBE comes from the original release that was investigated and closed earlier, we will pay. If there is clearly a new release on top of an older release that has already been investigated, cleaned up, and closed, we can deny payment, or pay only part.

MA The fund would reimburse all facilities deemed eligible for reimbursement as approved by the fund's cleanup board.

VT some sites reopened due to MTBE but very few.

28c. Existing open sites where MTBE has been detected and additional MTBE-targeted investigation/cleanup is required?

Yes AL, AZ, CA, DE, FL, IL, IN, KS, ME, MA, NH, OK, UT

No AK, AR, CO, CT, HI, IA, KY, LA, MI, MN, MS, MT, NE, NV, NY, NC, OR, PR, SC, TN, VT, VA, WY

Don't know ID, MD, MO, NM, ND, OH, PA, RI, SD, WV, WI

Comments:

MA As long as the facility operator is deemed eligible by the board and as long as the costs are eligible for reimbursement under the program.

Survey of State Experiences with MTBE Contamination at LUST Sites (August 2000)

A Project of the New England Interstate Water Pollution Control Commission (NEIWPCC)

IV. MTBE Remediation - Questions 29a.-29c.

29a. Does your state use risk-based decision making (RBDM) in corrective action?

Yes AL, AK, AZ, AR, CA, CO, CT, DE, FL, GA, HI, ID, IL, IA, KS, LA, ME, MD, MA, MI, MN, MO, MS (on a limited basis), MT, NE, NV, NH, NJ, NM, NC, ND, OH, OK, OR, PA, SC, SD, TN, TX, UT, VT, VA, WY

No IN, KY, NY, PR, RI, WI

Sometimes WV

Comments:

MO Legislative changes made recently will see more RBDM considerations.

NY No, but risk is a tool for corrective action determinations.

TN through use of site-specific standard request.

29b. If yes, does the process account for MTBE?

Yes AL, AZ, AR, CA, CT, DE, FL, HI, ID, IL, KS, LA, ME, MD, MA, MI, MN, MO, MT, NV, NH, NJ, NM, NC, OH, OR, PA, SC, TX, UT, VT, VA, WV, WY

No AK, CO, GA, IA, MS, NE, ND, OK, SD, TN

Comments:

AK Need better toxicological data for MTBE.

FL Not in a manner different from other chemicals.

IL Once cleanup #s are adopted.

MO Generally, RBDM methodologies are not well fitted for use with substances like MTBE that do not conform to the commonly inherent models and assumptions employed. MDNR is looking closely at this issue to ensure MTBE doesn't get overlooked.

29c. If yes, how?

AR, AL, ID One of the chemicals of concern.

AZ Currently, only if a receptor is impacted on a site-specific basis.

CA This is detailed in : "Final Draft Guidelines for Investigation and Cleanup of MTBE and Other Oxygenates" check web site.

CT GW classifications.

DE We established a pseudo-reference dose based on taste and odor thresholds and back-calculated action levels based on the same parameters used to calculate other chemicals of concern, except we did not model biodegradation (turned off that part of model). Used Tier 2 Tool Kit for Chemical Releases (GSI), have a fate and transport component (distance to receptor) for Tier 1 and 2 analysis, used a conservative coastal plain model for both coastal plain and piedmont sites and divided the resulting action level derived by this method by half

to be more conservative. The number is less rigidly used than for other chemicals of concern- we can go more or less conservative on a site-specific basis. Appended to the end of this questionnaire is a brief description of how Delaware derived its action levels for MTBE. [Contact NEIWPC for info.](#)

- LA** At gasoline LUST sites, soil and GW are analyzed for MTBE. If detection levels exceed action levels, risk analysis must be completed. If MTBE levels exceed RB standards, remediation to those standards is required.
- ME** We prioritize sites for remediation where we have receptors, whether contaminant is GRO, BTEX, or MTBE. We are more aggressive on MTBE sites and will not allow natural attenuation on these sites.
- MD** The potential for MTBE to continue to migrate after source removal is part of the site decision-making process.
- MA** MA DEP developed MTBE RB cleanup standards for each category of soil and GW. These numbers can be compared to lab results.
- MI** Tier 1 RB screening levels for all receptors w/calculation of Tier 2 site-specific target limits.
- MN** [??? can't read]
- MO** Focus on surrounding land use, future property use, receptors, and ecologically sensitive areas, along with soil leach characteristics of MTBE, aesthetic concerns, etc. Focus on source removal and free product recovery as the first step.
- MT** GW cleanup standard is specified. Soil standard is based on soil to GW leaching potential model to determine soil concentration that will not exceed 30µg/L in GW.
- NV** On a site-by-site basis, the contaminant concentrations and distribution are viewed against the local hydrogeology and position of receptors.
- NH** Look-up table standards for soil and GW are used in remedial decision making.
- NJ** Delineation to GW criteria. GW contamination must show decreasing trend, no receptor impacts, and institutional control placed to insure no future impact.
- NM** Within the soil plume, looked at for leaching potential.
- NC** health-based levels.
- OH** Via RBCA modeling.
- SC** MTBE is treated as a chemical of concern W/an action level of 40ppb. Assessments must define the horizontal and vertical extent of each chemical of concern.
- UT** MTBE is treated like any other chemical when developing cleanup levels. We use an Oral reference dose of 0.005mg/Kg-day, the only one available at the time of our process development and taken from EPA Region 3. We use an inhalation ref. dose of 0.857mg/Kg-day taken from EPA IRIS 1998.
- TX** We do not have published MTBE action levels or target concentrations. However, where DW wells are impacted or imminently threatened, additional assessment and remediation may be required.
- VT** it is a COC.
- OR** MTBE is considered a potential COC at all gasoline sites, and the Dept. has established soil and GW standards that apply for various exposure pathways.
- VA** Risk-based endpoints for pet. constituents (including MTBE) are determined for each site. RPs are required to meet these endpoints.
- WV** evaluated during process through risk assessment.
- WY** Considers both fate/transport component and env. risk assessment using WY model in Chapter 17.

Survey of State Experiences with MTBE Contamination at LUST Sites (August 2000)

A Project of the New England Interstate Water Pollution Control Commission
(NEIWPCC)

IV. MTBE Remediation - Questions 30a.-30b.

30a. After groundwater is treated, how clean does your effluent need to be for discharge to a sanitary sewer and/or storm sewer?

- AL** Not a required sampling parameter.
- AR** Acute exposure biomonitoring standard.
- CT** 1000ppb sanitary, 70ppb storm.
- DE** 5 ppb for discharge to a storm sewer. May vary by utility company for discharge to POTW. Will probably be changed from 5 ppb to 10 ppb when an MCL is established.
- FL** sanitary sewer - depends on sewer authority, storm sewer - 50ppb.
- GA** Generally, DW quality.
- HI** State standards (and NPDES) do not address MTBE levels in effluent.
- IL** Local sanitary districts may set and regulate MTBE effluent.
- IN** MTBE not tested.
- IA** No MTBE limit established.
- KS** All of the water from our treatment systems goes into distribution. Only one system has effluent >ND and that is typically <10ug/L. (influent concentration >100-400)
- ME** It depends on what can be negotiated w/the WWTP. Policy has been to use BAT, which is usually <2ppb.
- MD** 5ppm benzene, 10ppm TPH, no number for MTBE at present.
- MA** <100 µg/L.
- MI** Permitted discharge limits.
- MN** compound-specific.
- MO** Established in permit - generally 20ppb.
- MT** 30µg/L.
- NV** 20µg/L MTBE.
- NH** Sanitary - varies w/POTW requirements, storm - 13ppb.
- NJ** Sanitary sewer - case by case, determined by receiving authority; Storm sewer - 85% removal efficiency minimum. Shellfish bed areas must meet 70ppb (based on toxicity testing).
- NY** sanitary sewers: 50ppm, storm sewers: 10ppb.
- NC** 33.6mg/L.
- OH** federal MCLs for BTEX & PNAs. < or equal to 40ppb for MTBE.
- OK** You would need to ask the OKDEQ, but I am not aware they have established any levels for MTBE.

- OR** 20ppb.
- RI** varies depending on where the sewer discharges.
- SC** Generally, 40ppb, but may be higher if a sanitary sewer and the POTW can accept a higher level.
- TX** Storm sewer requirements are set by entity or municipality. There are no requirements for MTBE storm sewer discharges.
- UT** determined by sanitary sewer districts. For storm sewers, it is generally MCLs.
- VT** 5ppb Benzene, 50ppb total BTEX.
- VA** [LC ??] for MTBE;
- Don't know** AZ, CA, CO, ID, LA, NE, NM, ND, PA, PR, SD, TN, WI

30b. How was this number determined and by whom?

- AZ** local municipality determines.
- AR** state NPDES program
- CT** DEP and state DOH. Health-based and odor.
- DE** Discussion between Surface Water Discharge Branch and UST Branch. We told them what we would feel comfortable with. We checked with nearby states to see what concentrations they were allowing, and adopted a more conservative number.
- FL** Consistent w/GW standard.
- GA** Local water authority.
- HI** Before granting a permit, best professional judgment would be used to determine what criteria the permitter should be testing.
- ME** Policy decision determined by George Seel and Peter Eremite.
- MD** federal limits.
- MA** This number is typically required by EPA NPDES permit exclusion for discharges to storm/surface water. Standards may be lower if set by a municipal WWTP.
- MI** Depends on discharge permits.
- MN** Don't know.
- MO** EPA's 1997 DW Advisory's lowest recommended levels.
- MT** Same GW cleanup standard would apply to discharge of treated GW.
- NV** Via our regulatory process. Our stormwater is routed to where our DW comes from (surface waters). As such, we utilized an order of magnitude reduction on our primary action level.
- NY** Sanitary sewers determined by POTW capabilities, storm sewers by DEC guidelines.
- NC** Division of WQ.
- OH** USEPA Advisory.
- OR** Capability of GW treatment systems demonstrated to meet GW cleanup goal of 20ppb.
- RI** sanitary sewer: sewer agencies; storm sewer: DEM RIPDES program.
- SC** Based on action level by the state toxicologist and the operating permit for the treatment facility.
- UT** By the Utah Division of Water Quality.
- VA** EPA.
- VT** Wastewater Mgmt. Division/NPDES.

Survey of State Experiences with MTBE Contamination at LUST Sites (August 2000)

A Project of the New England Interstate Water Pollution Control Commission
(NEIWPCC)

V. Other Oxygenates - Question 31.

31. Do you analyze for any of the following gasoline oxygenates?

	Most of the time	Occasionally	Never	Analytical method	# of sites where detected
Ethanol	ME,	CA, CO, MA, ND, NV, OR, SC, VA KS - in process of analytical @ 70 confirmed sites.	36 states	KS -8015&8260; MO-8260; NV-azeotropic; OR-8260A; SC-EPA 8260B;	KS -3 sites, 0 detects; NV≈2; SC-2;
TBA	KS-all treatment systems; CT, IA, ME, NJ	CA, CO, DE, MA, MT, NV, NH, NY, NC, OR, SC, TN, VT, WI, VA KS-source areas for treatment systems;	31 states	IA-Option 8260B or GC/MS version of IA Methods OA-1 & OA-2; KS -8015&8260; DE, ME, MO, NV, NH, NY, NC, VT-8260; SC-EPA 8260B; CT-524; OR-8260A; NJ - 624, 524	DE - just beginning but appears to be quite a few; IA-22; KS-all where MTBE detected; NC - pending; MD - 3, EPA BP, Amoco study; MT, VT-0; NV≈10; NH - none, analyses just started SC-5;
TAME	KS-all treatment systems; CT, IA, ME	CA, CO, DE, MA, MO*, NV, NH, NC, OR, SC, TN, VA; KS-as above	31 states	DE, NC-8260; CT-524; IA-as above; KS - 8015&8260; NV-8260; OR-8260A; SC, NH- 8260B;	DE-few; IA-22; NV≈6; NH->20 NC-pending; SC-2;
ETBE	KS-all treatment systems; CT, IA, ME	KS-as above; NC; CA, CO, MA, MO, NV, OR, SC, TN,	34 states	CT-524; IA-as above; KS -8015&8260; NV-8260; NC 8260; OR-8260A; SC-EPA 8260B;	IA-33; ME-1; NV≈6; NC-pending; SC-0;
DIPE	KS-all treatment systems; CT, IA, ME, NC,	CA, CO, MA, MO, NV, OR, SC, TN, VA KS-as above	33 states	CT-524; IA-as above; KS -8015&8260; NV-8260; NC 6210D, 602, 8260; OR-8260A; SC-EPA 8260B;	IA-13; ME-2; NV≈6; NC- unknown; SC-5;
Other		MO-EDB, SC-ETBA, TAA, TBF;		SC-EPA 8260B	SC: ETBA-5, TAA-4, TBF-0;

Comments:

- CA** Sometimes regional and local agencies may require this, as appropriate.
- CO** Occasionally analyze for oxygenates, but is owner's choice.
- DE** Once a project goes beyond tier 0 (into investigation), we have recently started requiring at least one-time sampling for TBA and TAME. Sites currently in monitoring or corrective action are supposed to do it at least once (recent change). If it is detected, additional sampling will be required at the site in the future.
- IL** Occasionally by special set of circumstances.
- MO** MO's state env. lab uses a GC/MS running a specific target list under 8260. MDNR's current guidance that o/os are to follow requires OA-1/OA-2 (Mod. 8015) and requires whole fractional standards rather than GRO and DRO standards. * Tame is not currently on the target list but could be requested.
- NV** except for ethanol, other oxygenates generally present at sites where we looked.
- NH** TAME is present in gas up to 4.5% and has been detected in private wells.
- NY** For TBA, 8260 purge and trap may not be appropriate method.
- WA** not currently on a routine basis.
- WI** TBA is reported as detected but not quantified.

Survey of State Experiences with MTBE Contamination at LUST Sites (August 2000)

**A Project of the New England Interstate Water Pollution Control Commission
(NEIWPCC)**

V. Other Oxygenates - Questions 32a.-32c.

32a. Do you monitor for ethanol in groundwater?

Yes KS, MA, ME, ND, SC

No AL, AK, AZ, AR, CO, CT, DE, FL, GA, HI, ID, IL, IN, IA, KY, LA, MD, MI, MN, MS, MO, MT, NE, NV, NH, NM, NY, NC, OH, OK, PA, PR, RI, SD, TN, TX, UT, VT, VA, WA, WV, WI, WY

Sometimes CA, OR

Don't know NONE

Comments:

- DE** Only Getty stations are using ethanol. We would require monitoring at a Getty station for any release that could have occurred within the past 2-3 years.
- SD** Will be required if it is determined to be a chemical of concern, but not normally.
- VA** We do not typically look for ethanol in GW. The case manager may, however, require this info.

32b. Do you have any ethanol-contaminated LUST sites?

Yes CA, CO, MA, SC, SD, VA, WA

No DE, ME, MS, ND, WY

Don't know AL, AK, AZ, AR, CT, FL, GA, HI, ID, IL, IN, IA, KY, LA, MD, MI, MN, MO, MT, NE, NV, NH, NJ, NM, NY, NC, OH, OK, OR, PA, RI, TN, TX, UT, VT, WV, WI,

Comments:

KS We have identified 70 sites that have sold a 10% EtOH mix. We have delivery dates, amounts sold, and have cross-referenced with known release dates. We are in the process of adding EtOH analytical to these sites. Six of these are in active remediation and analytical on 3 of those sites has been inconclusive for EtOH. (ND for all 3)...don't know why. We expect to have additional information very soon and will share it when we get it.

MN Do not measure for it, but it is probably present in GW (ethanol state).

NH Probably, there are a number of number of Getty sites that use gasohol.

32c. If yes, how many?

MA 6;

SC 2;

SD <10;

VA <5;

Don't know CA, CO, WA

Survey of State Experiences with MTBE Contamination at LUST Sites (August 2000)

**A Project of the New England Interstate Water Pollution Control Commission
(NEIWPC)**

VI. Other - Questions 33a.-33d.

33a. Do you use GIS in remedial action decision making?

Yes AL, AZ, CA, CO, DE, FL, ID, IL, IN, IA, KS, LA, ME, MA, MI, MT, NH, NJ, NY, NC, OK, OR, PR, RI, SC, UT, VT, VA, WA, WI

No AK, AR, CT, GA, HI, KY, MD, MN, MS, MO, NE, NV, NM, ND, OH, PA, SD, TN, TX, WV, WY

Comments:

KS We used to use it, but it has been mostly ineffective. I'm sure that the technology has gotten much better and we will start using it again.

33b. If yes, how (e.g., wellhead protection program)?

ID, LA, MI,

NC, PR, RI, WA WHP.

AL, VT WHP, proximity to receptors.

AZ WHP - locations of LUST plumes relative to registered wells & WQ in superfund areas.

CA We are developing a GIS that will contain data on hydrogeologically vulnerable aquifers and

the location of UST release, among other things.

- CO** Primarily for coordinating multiple remediations, comingling plumes, etc.
- DE** WHP requirements for double-walled tank systems, proximity of other contaminant sites, utilities, modeling efforts.
- FL** WHP prioritization of sites.
- IL** Correlate known potential sources to computer-modeled recharge areas.
- IN** Have only just started. Some LUST sites being entered.
- IA** GIS is sometimes used to locate receptors such as DW wells and surface waters in relation to LUST sites.
- ME** We make GIS site maps to keep track of remediation data.
- MA** All public wells, WHP areas, ACEC, coastal zones, potentially productive aquifers, DW source areas, medium and high yield aquifers, drainage basins and watersheds, open space, and many issues are all mapped and available to the public and consultant communities.
- MI** Source water protection program
- MT** Receptor surveys are completed w/GIS. GIS is accessed through our state Natural Resources Information System.
- NH** WHP and locating all contaminated sites.
- NJ** Part of institutional control tracking.
- NY** Master habitat database in use.
- OK** We are just at the beginning stages of implementing GIS.
- OR** GIS is used to identify public WS located within 1/4 mile of leaking USTs or operating USTs. Highest priority sites are being sampled by the OR Health Div. and analyzed by the DEQ. Results will be available in Nov. 2000. GIS data is also routinely used to inventory potential pollution sources in the WHP program.
- SC** WHP and determination of risk based on distance between LUST and public wells. GIS was used to predict UST facilities that would be affected by flooding during last year's hurricane season.
- UT** Identification of water rights, wells, and points of dispersion.
- VA** location of leaking tank sites.
- WI** 100' from private wells, 1,000' from public wells - by Administrative code.

33c. If no, is your state interested in developing GIS?

Yes AK, AR, CT, GA, KY, MD, MO, MS, NE, NV, NM, NY, ND, OH, PA, SD, TN, TX, WY

Don't know HI

Comments:

- DE** Interested in adding additional information layers with minimum of hand-typed data entry.
- NY** New system currently under development: EQuis+GIS key.

33d. What information is available on your GIS system?

LUST sites AL, AZ, CA, DE, CO, ID, IL, IN, IA, KS, ME, MA, MI, MN, MO, MS, MT, NH, NJ, OK, OR, PR, RI, SC, SD, UT, VT, VA, WA, WI, WY (early stages),

Public/private well locations AL, AZ, CA, CT, DE, ID, IL, IN, IA, KS, ME, MD, MA, MI, MN, MO, MS, MT, NH, NJ, NC, ND, OR, PA, PR, RI, SC, SD, UT, VT, VA, WI, WA, WY

Wellhead protection areas CT, DE, IL, IN, LA, ME, MA, MI, MN, MS, MO, MT, NH, NC, ND, OR, PA, PR, RI, SC, SD, VT, WA

Recharge areas AZ, CA, CT, DE, IL, IN, LA, MA, MO, RI, TX

Analytical data for LUST sites AZ, DE, ME, NH (planning), NJ (pending), VT, WY (planning phase)

Screened intervals of wells CT, IL, IN, ME, NH (planning)

Dry cleaners AZ, DE, IL, NH, SC, OR, WI

ASTs DE, ID, IL, IN, ME, MI, MN, NH, ND, OK, SC, SD, OR, VA

Superfund sites AZ, DE, ID, IL, IN, LA, ME, MN, MO, MT, NH, NJ, NC, OR, RI, SC, SD, TX, UT, VT, WA, WI, WY

Groundwater aquifers AZ, CT, DE, ID, IL, IN, LA, ME, MA, MN, MT, NH, ND, OR, RI, SD, WA, WY

Other:

ND, VA USTs.

AZ UST facilities, landfills, land use in urban areas, WWTPs, etc.

CA Pipeline locations. Note: This GIS is under development. It is not yet complete or statewide, but we are working toward that goal.

DE Haz. waste sites, solid waste sites, tire piles, historical sites, parks, greenbelts, etc. GIS is a major department initiative at this time.

IL geologic coverage, aquifer sensitivity, RCRA sites, CERCLA, landfills.

LA, MO numerous other data sets.

MA See list 33b.

NH UST sites, all HW generators.

PR Point Sources.

TX public water supply sources.

VT USTs, wetlands, surface water, RCRA facilities.

WI spills, deed restrictions, GW use restrictions.

WY RCRA sites, point sources of pollution.

AR, HI, KY Don't know

Comments:

AL The ADEM is currently working with the AL Geological Survey to develop area reports on CD ROM, which included: soil types, geology, public wells, AST/UST sites, other contaminant sites, etc.

DE Just beginning adding analytical data for LUST sites. Have entered last 2 years of data for any sites with a 4 or 5 priority ranking (ranking is 1-5), 4=GW contamination confined to site, but high levels of dissolved-phase product and/or free-phase product; 5=high levels of dissolved and free-phased product in GW, dissolved and/or free-phase product in the GW is confirmed off-site. ASTs in GIS only if have dealt with a release at an AST facility.

SD Most of this is still developmental.

Survey of State Experiences with MTBE Contamination at LUST Sites (August 2000)

A Project of the New England Interstate Water Pollution Control Commission
(NEIWPCC)

VI. Other - Question 34.

34. What kind of information could your program use to better deal with MTBE issues (e.g., compatibility, leak detection, remediation technologies, site characterization, costs)?

MTBE Remediation technologies success	22 states
Toxicity data for MTBE	3 states
Site characterization	13 states
Risk characterization	1 state
Transport and time limitations on soil SVE prior to GW impact.	1 state
Bioaugmentation conditions & bioremediation requirements, time, efficacy.	1 state
GW remediation technologies, efficacies, costs.	5 states
A nationally respected MCL. The lack of a standard means some argument each time a risk assessment is done.	1 state
Leak detection	4 states
Private well locations	1 state
Compatibility	8 states
Compatibility of water main gaskets in contaminated GW.	1 state
Release prevention	1 state
Attenuation of oxygenates	2 states
Health risks posed by oxygenates	4 states
Federal DW standard for MTBE.	7 states
Information sharing with other states that have implemented RBDM/corrective action for MTBE-contaminated sites.	1 state
Technical data relative to blending of gasoline w/MTBE, distribution of gasoline w/MTBE, gasoline enhancement (octane) relative to oxygenates.	No re- sponse
Renewed effort at federal AST regulation (leak detection, CP, spill and overflow, release response, corrective action).	1 state
Cleanup cost breakdowns (MTBE incremental costs).	5 states
Activated carbon - MTBE specifications.	1 state
Analytical issues (oxygenates.	1 state
Ethanol	2 states

GIS database info for prioritizing sites.	1 state
A collection of case incidents documenting the impact of small releases of MTBE (from gasoline) to help states in educational/outreach efforts to the public and UST o/os.	1 state
Disburse CA & NE state experiences to other states. Many states seem unaware or uninformed of the wealth of information available from severely impacted RFD states. This is probably a function of state staff turnover and daily time constraints. EPA needs to provide more holistic assistance and not just respond to political pressures of the moment.	No response
A hard look at alternatives to MTBE.	1 state
Technically feasible and cost-effective remediation technologies for MTBE (alone and in conjunction w/other typical petroleum hydrocarbon COCs). ..	1 state
Migration pathway characterization from overburden to bedrock.	1 state
Bedrock characterization and remediation.	1 state
Unknown sources at operating LUST sites.	1 state