

ATTACHMENT 1

**State Response Summary
for the
2006 Survey of State Experiences with Petroleum and Hazardous
Substance Releases at LUST Sites, Heating Oil Tanks, and Out
of Service Tanks
(December 2006)**

**A Project of the New England Interstate
Water Pollution Control Commission (NEIWPCC)
116 John Street
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1. State Standards for Specific Gasoline Additives/Blends

Definitions:

- **Action level:** The level at which some type of remediation or investigation must be undertaken.
- **Cleanup level:** The goal for remediation.
- **Drinking water standard:** The level that drinking water supplies must not exceed (primary, secondary, advisory).

1-1. Does your state have action levels, cleanup levels, or drinking water standards for MtBE? (See Attachment 2 - “State Standard Summaries” for details on state responses.)

<input type="checkbox"/> Yes	41	2003 - 42	
<input type="checkbox"/> No	8	2003 - 7	
<input type="checkbox"/> Don't know	1	2003 - 1	proposed -

1-2. Does your state have action levels, cleanup levels, or drinking water standards for *tertiary*-butyl alcohol (TBA)? (See Attachment 2 - “State Standard Summaries” for details on state responses.)

<input type="checkbox"/> Yes	15	2003 - 7	
<input type="checkbox"/> No	35	2003 - 40	
<input type="checkbox"/> Don't know	0	2003 - 3	proposed

1-3. Does your state have action levels, cleanup levels, or drinking water standards for Ethanol? (See Attachment 2 - “State Standard Summaries” for details on state responses.)

<input type="checkbox"/> Yes	7	2003 - 4	
<input type="checkbox"/> No	42	2003 - 46	
<input type="checkbox"/> Don't know	1		

1-4. Does your state have action levels, cleanup levels, or drinking water standards for *tert*-amyl methyl ether (TAME)? (See Attachment 2 - “State Standard Summaries” for details on state responses.)

<input type="checkbox"/> Yes	11	2003 - 4
<input type="checkbox"/> No	39	2003 - 45
<input type="checkbox"/> Don't know	0	2003 - Proposed - 1

1-5. Does your state have action levels, cleanup levels, or drinking water standards for ethyl *tertiary*-butyl ether (ETBE)? (See Attachment 2 - “State Standard Summaries” for details on state responses.)

<input type="checkbox"/> Yes	10	2003 - 3
<input type="checkbox"/> No	40	2003 - 45
<input type="checkbox"/> Don't know	0	2003 - Proposed - 2

1-6. Does your state have action levels, cleanup levels, or drinking water standards for diisopropyl ether (DIPE)? (See Attachment 2 - “State Standard Summaries” for details on state responses.)

<input type="checkbox"/> Yes	11	2003 - 6
<input type="checkbox"/> No	39	2003 - 42
<input type="checkbox"/> Don't know	0	2003 - Proposed - 2

1-7. Does your state enforce the federal MCL for ethylene dibromide (EDB) (0.05 ppb) or does it have separate action levels, cleanup levels, or drinking water standards? (See Attachment 2 - “State Standard Summaries” for details on state responses.)

<input type="checkbox"/> Yes	33
<input type="checkbox"/> No	13
<input type="checkbox"/> Don't know	3

The following states have cleanup/actions levels in addition to and/or other than the federal MCL of 0.05 ppb:

DE – soil action level – 0.01 ppm

FL – GW and soil cleanup levels – 0.02 ppm

ID – soil action level - 0.00010 ppm

MA – CL gw1 = 0.02mg/L CL GW2=2.0mg/L CL Soil =0.1mg/Kg

ME - Maine maximum exposure guideline (drinking water) for EDB is 0.2 ppb
MI – soil action level – 1 ppb; soil cleanup level – 20 ppb
MO – soil cleanup level – 0.00047 ppm
MS – soil cleanup level – 0.751 ppm
NH – soil cleanup level - 0.1 ppm
NJ – GW cleanup level - 0.03 ppb
NM – GW action and cleanup levels – 0.1 ppb
NY – GW cleanup level - 0.0006 ppm; DW primary health-based – 50 ppb
OR - GW cleanup level - 0.00064 ppb; soil cleanup level – 0.00740 ppm
RI – GW action level – 0.025 ppb; soil cleanup level – 0.0005 ppm

1-8. Does your state enforce the federal MCL for 1,2 dichloroethane (1,2 DCA) (5 ppb) or does it have separate action levels, cleanup levels, or drinking water standards? (See Attachment 2 - “State Standard Summaries” for details on state responses.)

Yes 37
 No 11
 Don’t know 2

The following states have cleanup/actions levels in addition to and/or other than the federal MCL of 5 ppb:

AK – soil CL – 0.01 ppm
AZ – soil AL and CL - 2.5 ppm
CO – DW 1°HB - 0.38 ppb
CT – GW CL and 1°HB – 1 ppb
DE – GW AL – 9.4 ppb; soil AL – 0.4 ppm
FL – GW CL – 3 ppb; soil CL – 0.01 ppm
ID – soil AL – 0.008 ppm
IN – soil AL & CL– 0.024 ppm
MA - AL Soil = 0.1mg/kg; CL S1 = 10 mg/kg; CL S2 = 90.0mg.kg
ME – GW AL – 2 ppb; GW CL and 1°HB – 4 ppb.
MI – soil AL& CL – 15000 ppb
MN - 1°HB – 4 ppb
MT – GW AL & CL and 1°HB – 4 ppb
NC – GW AL - .38 ppb; soil AL – 0.00180 ppm
NH – soil CL – 0.08 ppm
NJ – GW CL and 1°HB – 2 ppb; soil CL – 1 ppm
NM – GW AL & CL – 10 ppb
NY – GW CL – 0.6 ppb; soil CL – 0.1 ppm
RI - GA areas GB areas: GW CL - 110 ppb leachability CL soil - 2.3 ppm
TN – GW CL – 0.005

VT - GW AL – 1 ppb
WA – soil CL – 11 ppm; 1°HB – 0.481 ppb

1-9. Does your state enforce the federal MCL for lead (15 ppb) or does it have separate action levels, cleanup levels, or drinking water standards? (See Attachment 2 - “State Standard Summaries” for details on state responses.)

Yes 38
 No 8
 - Don't know 2

The following states have cleanup/actions levels in addition to and/or other than the federal MCL of 15 ppb:

AK – soil CL – 400 ppm
AL – soil AL & CL – 4.43000 ppm
AZ – soil AL & CL – 400 ppm; 1°HB - 50 ppb
CO – GW AL, CL, and 1°HB –50 ppb
DE – soil AL & CL – 400 ppm
HI – GW AL & CL – 5.6 ppb; soil AL & CL – 400 ppm
ID – soil AL – 50 ppm
IL – GW AL & CL – 7.5 ppb; soil AL & CL – 0.00750; 1°HB & state advisory: 7.5 ppb; 2° taste/odor – 100 ppb
IN – soil AL & CL – 81 ppm
MA - AL GW1 =.02mg/l AL GW2 =.01mg/l AL Soil = 300mg/kg CL soil 300 ppm
MI – GW AL & 1°HB– 4 ppb; soil AL – 99999.99 ppm
MN – soil AL – 300 ppm
MO - soil AL – 260 ppm
MT – GW AL – 0.1 ppb
NC – soil AL – 270 ppm
NH – soil CL – 400 ppm
NJ – GW CL – 5 ppb
NM - GW CL – 5 ppb
NY - GW CL – 25 ppb; 1°HB – 50 ppb
OR – soil AL – 400 ppm
PA - GW AL & CL – 5 ppb; soil AL & CL – 450 ppm
RI – GW AL – 7.5 ppb; soil AL – 0.04 ppm
VT – GW AL - 1.5 ppb; soil AL – 400 ppm
WA – soil CL – 250 ppm
WI - soil CL –50 ppm

1-10. Does your state have action levels, cleanup levels, or drinking water standards for *tertiary-butyl formate* (TBF)?

Yes 4

NC - Although no specific standards have been established for this chemical, a violation occurs if the constituent is even detected. Therefore, action levels, cleanup levels and drinking water standards will become the detection limit.

NJ - No standard, however, compounds (non-carcinogens) that don't have specific or interim specific Ground Water Quality Standards default to 100 ppb.

NY – Primary health-based is 50 ppb. The action levels are any amount of contamination and the cleanup levels are site specific for both groundwater and soil. The drinking water standard for TBF is regulated as an Unspecified Organic Contaminant (UOC).

OR - If detected, the cleanup level is established as 1 in a million cancer risk and/or a hazard index of 1.

VT – GW AL is 1 ppb.

1-11. Does your state have action levels, cleanup levels, or drinking water standards for ethyl *tertiary-butyl alcohol* (ETBA)?

Yes 4

NC - Although no specific standards have been established for this chemical, a violation occurs if the constituent is even detected. Therefore, action levels, cleanup levels and drinking water standards will become the detection limit.

NY - The action levels are any amount of contamination and the cleanup levels are site specific for both groundwater and soil. The drinking water standard for ETBA is regulated as an Unspecified Organic Contaminant (UOC).

OR - If detected, the cleanup level is established as 1 in a million cancer risk and/or a hazard index of 1.

SC – GW AL – 240 ppb. Cleanup levels are site-specific risk-based values.

1-12. Does your state have action levels, cleanup levels, or drinking water standards for *tert-amyl alcohol* (TAA)?

Yes 3

NY, NC, and SC provided the same answers for TAA as those for ETBA.

1-13a. Has your state recently changed any of these standards for the following compounds since 2003? The following are “yes” answers for each compound:

MtBE 11
 TBA 6
 Ethanol 4
 Tame 5
 ETBE 5
 DIPE 5

The “Compiled 2006 Survey Results,” Attachment 4, provides details as to which states made changes and what they were.

1-14a. Is your state considering making any change(s) with regard to state action levels, cleanup levels, or drinking water standards for the following additives, oxygenates, or other fuel constituents?

Additive/Blend	Yes	No	Don't know
MtBE	5	36	9
TBA	8	30	12
Ethanol	4	32	14
TAME	8	31	11
ETBE	7	32	11
DIPE	7	32	11
EDB	4	35	11
1,2 DCA	2	36	12
Lead	3	36	11
TBF	3	34	13
ETBA	3	34	13
TAA	2	35	13

1-14b. If yes, what is the proposed change(s)?

AL - The UST program will be modifying guidance and levels in 2007 to be consistent with the Department's new risk-based guidance.

CO – Not evaluated yet.

DE - Plan to finalize TBA and TAME action levels and to develop action levels for ETBE and DIPE. No decision yet on ethanol.

IA - Adding MtBE as a chemical of concern under the state's RBCA program.

MA – Cleanup levels.

MD – Develop action levels for TBA and TAME.

MI - Target Detection Limit (TDL) lowered from 1.0 to 0.05 ppb for residential drinking water pathway. Other pathway criteria lowered as well. See Op Memo No. 1, attachment 2 on Web at www.michigan.gov/deqrrd

MT – Unknown at this time.

NC – Still under research and discussion.

NJ - Lead: SPLP leachate standard of 65 ppb 1,2-DCA: 0.0005 ppm soil TBA: 0.2 ppm soil.

NY - Developing statewide cleanup levels for TBA, EtOH, TAME, ETBE, DIPE..

OR - changes may be considered based upon EPA new guidelines for assessing risk from early-life exposures.

SC – Action levels are desired.

VT - Considering the need to set standards for the alcohols and ethers in fuel. A decision on this should be made before 2008.

1-15. Who are the people in your state that regulators from other states can contact to find out how action levels, cleanup levels, and drinking water standards for any of the analytes in this survey were determined?

See Attachment 3 - “Contact List for State LUST Site Action Levels, Cleanup Levels, and Drinking Water Standards.”

1-16. What fuel blends are used in your state to replace MtBE?

- | | |
|-------------------------------------|-----------|
| <input type="checkbox"/> Ethanol | 37 |
| <input type="checkbox"/> Other | 1 [Maine] |
| <input type="checkbox"/> Don't Know | 12 |

1-17a. If MtBE is banned in your state, do you have data that show any continuing usage of MtBE or other ethers? In some states MtBE is still being used.

- | | |
|-------------------------------------|----|
| <input type="checkbox"/> Yes | 4 |
| <input type="checkbox"/> No | 26 |
| <input type="checkbox"/> Don't know | 13 |

Comments:

HI – No. The oil companies claim they never added it to gasoline here, but some may have come over in shipment. We currently use E10 (10% ethanol) gasoline in HI. Historically,

MtBE was not required in Hawaii, but we still see some concentrations of MtBE at a few LUST sites here. Some still as high as GW 7000 ppb.

ME – Yes. A sample is taken from every load of gasoline that comes into our marine terminals. Tests are done. The data is collected by Melissa Morrill in the Bureau of Air Quality, (207) 287-6102 and published.

MI – No. Comment: We had one MtBE refinery in Detroit that shut down its processor in 2002. At that time, it was expected that pipeline carryover would contribute to continuing MTBE presence, tho' it was expected to decline over time.

MT – YES. Comment: Current sampling program indicates low concentrations (<1 percent by volume) are still present . Additional fuel testing will occur to help Montana DEQ determine what "deminimus" concentration of MTBE will be allowed in motor fuels in the state.

NJ – Yes. NJDEP's ban on MtBE is not effective until January 2009, so MtBE currently remains present in gasoline.

NY – Yes. MTBE has been detected at recent spill sites and in gasoline product being offered for sale.

2. Fuel Blend/Additive Analysis

2-1a. Do you receive information on the composition of fuels used in your state?

- | | |
|-------------------------------------|----|
| <input type="checkbox"/> Yes | 11 |
| <input type="checkbox"/> No | 38 |
| <input type="checkbox"/> Don't know | 1 |

Some states noted that they don't actually receive data from other sources but know where to go to get it if they want it (e.g., weights and measures.)

2-1b. If yes, what are your sources?

- | | |
|---|----|
| • Suppliers | 3 |
| • Distributors | 2 |
| • State agencies (primarily weights and measures) | 10 |
| • Other | 2 |

Comments:

MT - Current research by Dr. Jim Weaver, USEPA ORD. The DEQ PRS and the Montana Department of Transportation (Weights and Measures) will continue to monitor the composition of motor fuels to determine levels of oxygenates in use.

NH - We collect data ourselves periodically. U.S. EPA also collects a limited amount of data on fuel as part of its RFG program.

2-2a. Please indicate whether your state requires sampling and analysis of groundwater at LUST sites for the additives listed in the following table. (Boxes contain totals of state responses for each category.)

GW	MTBE	TBA	EtOH	TAME	ETBE	DIPE	EDB	1,2-DCA	Lead	TBF	ETBA	TAA
No sampling required	1	20	21	21	22	21	18	14	8	29	29	29
All suspected releases	18	5	1	4	4	4	6	9	6	1	1	1
Site-specific	15	18	25	18	18	18	21	20	28	12	12	13
Gasoline only	32	9	6	8	7	8	10	14	15	1	1	1
Heating Oil	4	1	0	1	1	1	1	1	0	0	0	0
Jet Fuel	9	2	0	2	1	1	1	3	4	0	0	0
Diesel Fuel	8	2	0	2	2	2	2	2	2	0	0	0
Aviation	13	2	0	2	1	1	3	5	6	0	0	0
Don't Know	0	1	1	1	1	1	1	0	0	4	4	3

2003 results for MtBE, TBA, EtOH, TAME, ETBE, and DIPE were very similar for comparable categories. The 2006 survey added categories of site-specific, no sampling required, and aviation fuel.

2-2b. Please click to indicate whether your state requires sampling and analysis of soil at LUST sites for the additives listed in the following table. (Boxes contain totals of state responses for each category.)

Soil	MTBE	TBA	EtOH	TAME	ETBE	DIPE	EDB	1,2-DCA	Lead	TBF	ETBA	TAA
No sampling required	8	25	27	26	26	25	20	20	9	31	31	31
All suspected releases	15	2	1	2	2	2	7	5	5	1	1	1
Site-specific	15	17	16	16	16	16	16	18	30	10	10	10
Gasoline only	21	5	4	5	5	6	8	10	10	1	1	1
Heating Oil	23	1	0	1	1	1	2	2	0	0	0	0
Jet Fuel	7	0	0	0	0	0	2	4	3	0	0	0
Diesel Fuel	7	1	0	1	1	1	3	3	1	0	0	0
Aviation	11	0	0	0	0	0	3	5	5	0	0	0
Don't Know	0	1	1	1	1	1	1	0	0	3	3	0

2003 results for MtBE, TBA, EtOH, TAME, ETBE, and DIPE were very similar for comparable categories. The 2006 survey added categories of site-specific, no sampling required, and aviation fuel.

2-3a How often, during sampling events at your LUST sites, are groundwater samples analyzed for each of the following compounds?

(Boxes contain totals of state responses for each category.)

Percent	MTBE	TBA	EtOH	TAME	ETBE	DIPE	EDB	1,2-DCA	Lead	TBF	ETBA	TAA
Don't Know	5	8	12	8	9	9	7	10	8	11	11	5
0	0	16	18	20	20	18	11	6	6	31	31	31
1-20%	6	15	13	12	13	14	11	15	20	4	4	5
21-40%	2	1	1	1	0	0	1	1	3	0	0	0
41-60%	2	2	1	1	1	1	0	0	3	0	0	0
61-89%	3	0	0	0	0	0	2	2	3	0	0	0
81-100%	31	6	1	5	5	6	12	10	4	1	1	1

2003 results for this question.

Percentage	MtBE	TBA	EtOH	TAME	EtBE	DIPE	Other oxygenates
0 - 20%	3	9	7	7	7	7	6
20 - 40%							
40 - 60%	1	1					
60 - 80%	2		1				
80 - 100%	41	10	3	7	7	8	

2-3b How often, during sampling events at your LUST sites, are soil samples analyzed for each of the following compounds?

(Boxes contain totals of state responses for each category.)

Percent	MTBE	TBA	Ethanol	TAME	ETBE	DIPE	EDB	1,2-DCA	Lead	TBF	ETBA	TAA
Don't know	6	9	10	9	9	9	8	8	8	12	12	11
0%	7	23	23	24	24	23	16	17	6	31	31	31
1-20%	7	9	10	7	8	8	11	9	21	3	3	4
21-40%	3	2	0	2	1	1	2	2	4	0	0	0
41-60%	1	1	1	1	1	1	0	0	2	0	0	0
61-80%	3	1	0	1	1	1	2	1	3	0	0	0
81-100%	23	3	1	3	3	4	9	10	3	1	1	1

2-4a If your state conducts analysis for additives in *groundwater*, indicate what detection limit (in ppb) you are using for each method and analyte. (Boxes show states and DLs.)

Method Groundwater	MTBE	TBA	EtOH	TAME	ETBE	DIPE	EDB	1,2-DCA
Don't know	16	21	22	21	21	20	18	17
US EPA SW-846 Method 8020/8021 (GC/PID)	AL-20 FL, TX, WV-5 MT, VA-2 NY, RI, VT-1 OH, WY-40	WY-2200		WY-130	WY-190	WY-1200	RI-1	FL, RI-1
US EPA SW-846 Method 8240/8260 (GC/MS)	AL, NE-20 AR, CT, MD, ME, MT, RI, VT -1 CO, KS, VA-2 FL, GA, MI, MO, PA, SC, TX-5 IA-15 MA-70 OH, WY-40 TN-0.2	CO, MI, MO-50, CT-200, KS-4, MD-1, ME, RI- 10, MT, SC-5, VA-15 VT-20 WY-2200	CT-200, MD-1, MI, MO-1000, NC-40 NY, RI-100 SC-5 VT-20 WY-130	CO, MI, SC-5, CT-10, MD, ME, MT, RI, VT-1, MO-50 VA-2	CO, MI, MO, SC-5. CT-10, MD, ME, RI,, VT-1, RI, VT-1, VA-2 WY-190	CO, MI, SC-5, CT-10, MD, MT, RI,, VT-1, MO-50, VA-2 WY-1200	CO-2 CT,MD, ME, MT, RI, - 1, MA-700, MI-0.05, MO-5, VA-2	AR, CT, FL, MD, MI, MT, NY, RI, VT -1, CO, VA-2, GA, MA, MO, PA, SC-5 KS-0.05 TN-0.02
A combination of 8020/21 and 8240/60	AL, OK-20, KY-50, NM-1 OH-40							NM-1
USEPA Drinking Water Method 524 (GC/MS)	MD-0.05 MT, VT-0.5	MD-0.05	MD-0.05	MD-0.05	MD-0.05	MD-0.05	KS-0.005, MD-0.05, MT, VT- 0.5 PA-0.06	MD-0.05 VT-0.5
A combination of 502/524	CT-0.5, RI-0.14	CT-10		CT-0.5,	CT-0.5	CT-0.5	AL, CT- 0.05,	AL-5 CT-0.5, RI-0.11

SW-846 Method 8011							AL-0.05, FL, SC- 0.02, GA, TN, VA-0.01 MT-0.1	AL, MT-5
US EPA Method 504							AL-0.05, FL, NC, VA-0.02, MT-0.1 NM, RI- 0.01 VT-0.025	AL, MT-5
Other	NE-QA1-20ppb		MT-SW-846 8015B 1ppb					

Comments:

CO - DLs are dependent upon presence of other components in sample at high concentrations and the laboratory dilution practice. Also TBA DLs are characteristically higher than the other components.

DE - Typical MTBE detection limit is 0.2 ppb, typical TBA is 10 ppb. We specify allowable methods, but we do not specify a DL in our guidance documents, but if DLs are higher than our action levels, we assume that the contaminant is present, unless a lower detection limit can be achieved. Most commonly see 8260 for the oxygenates. EDB and EDC -- 8260. EDB 8011 to get low enough detection limits.

HI - The minimum detection limits must be lower than the applicable HIDOH action levels as previously specified.

KS - Our goal for reporting limits is one order of magnitude below the risk level. This is not always attainable. We require reporting of the Practical Quantitation Limit (PQL) on all lab data. The PQL varies by lab method, laboratory, and sample characteristics.

KY - An alternative water source has to be supplied if MtBE is in drinking water > 50 ug/l.

MA - DEP does not recognize Detection limits. only speak in terms of reporting limits which = lowest analytical standard. The lowest # you can report is the reporting limit.

ME - The State environmental and health lab does not do ethanol, EDB, or 1,2 DCA analyses. Limits are quantitation limits.

MI - See Op Memo No. 2. Attachment 1 on the web at www.michigan.gov/deqrrd

MN - Laboratories are at a minimum required to meet the applicable cleanup levels for all compounds.

MO - Currently changing lab method for EDB from 8240/8260 to 8011.

NC - Detection limits are to be at or below the action level for the constituent of concern or the level established by the NC Laboratory certification requirements.

NH - Typically we require that the lab is able to detect the ambient groundwater quality standard (AGQS) for each of the compounds. We haven't enforced this policy to date for EDB, which would require another separate analysis (instead of 8260B).

NJ DEP does not have a state laboratory. (2) Method Detection and Reporting Limits or Practical Quantitation Limits are laboratory dependent. The NJDEP does not establish the MDL or PQL for these methods.

NV - This question is unclear. (1) Nevada State does not perform this analysis. (2) In which detection limit are interested? Reporting Limit? (It varies among sample because of the background concentration of interfering compounds in the sample matrix).

OH - Varies by lab, we require the minimum detection limit to be below our action levels.
OK - US EPA SW-846 Method 8020/8021 MtBE analysis is used for screening purposes only. If a hit exceeding 20 ppb is reported, the sample is then analyzed by Method 8260.
RI - Our state does not conduct analysis for the LUST program. We require RP's to hire labs and they can be from in state or out of state. The reporting limits given for MTBE, EDB and 12DCA are those reported on many labs.
VA - In our Alternate Water Supply program, DEQ's contractor uses Method 504 for EDB, not Method 8011. However, our staff in the regional offices typically requires consultants to run Method 8011 when they request EDB results.
VT - Analysis not always required for alcohols and ethers.
WA - Have no set detection limits or PQLs. Detection limits vary from lab to lab as well as sample to sample (or instrument to instrument). The state does laboratory accreditation, but again, each lab and their detection limits vary.
WY - Detection limits need to be low enough to detect cleanup level for remediation program.

3. Site Assessment

3-1. Are you using the U.S. EPA TRIAD or similar expedited site-characterization approaches?

<input type="checkbox"/> Yes	10
<input type="checkbox"/> No	22
<input type="checkbox"/> Most of the time	2
<input type="checkbox"/> Rarely	15
<input type="checkbox"/> Don't know	1

3-2. Do you use advanced site characterization technologies (e.g., MIPS, geophysical investigation)?

<input type="checkbox"/> Yes	12
<input type="checkbox"/> No	10
<input type="checkbox"/> Most of the time	1
<input type="checkbox"/> Rarely	26
<input type="checkbox"/> Don't know	0

Comments:

CO – Yes, in complex geological settings, questionable responsible parties with comingled plumes, or situations that cannot be explained during normal assessment practices.

CT – Yes, at especially complex sites.

DE - Rarely, but with increasing frequency of use. We are more likely to use MIPS on state-lead sites than consultants are on RP-lead sites.

FL – Yes, when our usual methods are not working.

KS – Yes, for sites where we are going to install a remedial system, a 3-D site characterization is conducted at each source area in the saturated and unsaturated zones. Continuous core sampling and electro-conductivity logs are performed to determine lithology.

ME – Yes, for site-specific decisions, often on sites with large numbers of contaminated bedrock drinking well sites or when replacing drinking water supply wells. We are using borehole geophysics commonly in bedrock site investigations.

MN – Yes, with corrective actions.

MT – Rarely. MIPS has limited analytical accuracy and cannot detect lower soil concentrations of some constituents. Cone penetrometer (CPT) studies are very useful for characterizing subsurface stratigraphy.

NC – Rarely. Considered innovative technology and must have prior committee approval for state reimbursement or incident manager approval if responsible party is funding the site characterization.

NJ – Yes. Based on site-specific conditions including hydrogeologic and non-hydrogeologic conditions.

NM – Yes, in large areas and/or intense contamination.

NY – Yes, when site conditions warrant.

OK – Rarely. Occasionally, resistivity tomography is used at LUST sites. We are using gamma ray logging more and more to identify more permeable horizons in the soil profile at LUST sites.

PA – Yes, if groundwater contamination is present in complex geologic conditions.

SC – Rarely, but we are currently implementing changes that will increase the reliance on MIPS and geophysical methodologies.

VT – Yes, these techniques are used some of the time on an as needed basis and as recommended by the contractor in consultation with the state.

WA – Rarely. GPR or magnetometer surveys are used when appropriate or needed to find product lines or more frequently to look for unknown USTs on the site.

3-3. Do you consider diving plumes in developing your site-assessment strategy or conceptual site model?

<input type="checkbox"/> Yes	19
<input type="checkbox"/> No	5
<input type="checkbox"/> Site-specific	25
<input type="checkbox"/> Don't know	0

3-4. Do you conduct vertical characterization of ground water (multilevel sampling) at LUST sites?

<input type="checkbox"/> Yes	11
<input type="checkbox"/> No	9
<input type="checkbox"/> Site-specific	29
<input type="checkbox"/> Don't know	0

Comments on questions 3-3 and 3-4:

AL – Site-specific. Vertical extent determinations are required. Various approaches can be used.

DE - 3-4, Can be site-specific depending on hydrologic setting.

GA - It is limited to sites where a diving plume might impact a drinking water well.

HI - 80% of our LUST sites are near the coast and not threatening drinking water. For more serious sites, we have seen multi-level sampling wells.

IA – Site specific. Vertical characterization of groundwater is typically used in Iowa by consultants to determine whether aquifers used as drinking water sources are protected from contaminated surficial aquifers.

ME - In very rare circumstances would we do this, but we make sure to sample deep wells to look for diving plumes.

MT - Serious concerns with the type of multi-level sampling device used. Cross-contamination and well material permeation and diffusion are concerns when monitoring for low ppb levels of contaminants.

NE - We require an evaluation of vertical migration by the construction of at least one more deeply screened well if a water supply well is of sufficient proximity or pumping capacity to influence the plume or if a downgradient recharge area exists.

NJ - 3-3, Dissolved petroleum-derived contaminant plumes must be delineated vertically unless justification otherwise is provided. In some situations, based on site-specific conditions, the NJDEP may grant a variance from the vertical delineation requirement.

NV - These consideration are done less than more often.

PA – Yes, we routinely require well packer testing and well screening to isolate groundwater aquifers.

UT – Yes, in areas with known vertical gradients.

VA - These characterizations are more likely to be seen at high risk sites.

VT - 3-D characterization is performed in environments where it would be expected or when receptors are considered to be at risk.

WA - Most of the groundwater site assessments at LUST sites do not include multi-level sampling. For LUST sites with larger ground water plumes traveling off the property, multi-level sampling is often used to help complete feasibility studies for selected sites.

3-5. Do you conduct vertical characterizations of ground water at LUST sites because of the potential for "diving" plumes?

<input type="checkbox"/> Yes	10
<input type="checkbox"/> No	9
<input type="checkbox"/> Site-specific	30
<input type="checkbox"/> Don't know	0

Comments:

CT - Vertical characterization of contaminated sites is good practice regardless of the potential for a diving plume.

MT - Site-specific determination made based on knowledge of local aquifer and presence or absence of vertical gradients.

NE - We require an evaluation of vertical migration by the construction of at least one more deeply screened well if a water supply well is of sufficient proximity or pumping capacity to influence the plume or if a downgradient recharge area exists.

NH -We've seen vertical stratification of MtBE plumes and this has required more complex and expensive site investigations.

NJ - Vertical delineation of dissolved petroleum-derived contaminant plumes is required based on site-specific hydrogeologic and non-hydrogeologic conditions.

NV - With low recharge rates in Nevada, this is not conducted often unless site-specific information suggests otherwise.

WA - If we know of products/contaminants that are DNAPLs at a LUST site, then we require vertical characterization. We don't require that for site assessments, but may for site characterization to assist in remedy selection.

3-6. If you conduct vertical characterizations of ground water, can you estimate the percentage of plumes that actually dive, out of total plumes characterized?

- | | |
|----------------------------------|-----------|
| <input type="checkbox"/> 1-25% | 17 states |
| <input type="checkbox"/> 26-50% | 1 |
| <input type="checkbox"/> 56-75% | 0 |
| <input type="checkbox"/> 76-100% | 1 |

3-7a. Do you see constituents other than MtBE in diving plumes in your state?

- | | |
|---|-----------|
| <input type="checkbox"/> Yes | 14 states |
| <input type="checkbox"/> No | 3 |
| <input type="checkbox"/> Most of the time | 0 |
| <input type="checkbox"/> Rarely | 8 |
| <input type="checkbox"/> Don't know | 22 |

3-7b. If so, what kind?

DE - Benzene, oxygenates other than MTBE, many gasoline volatiles.

FL - Benzene, Ethylbenzene, Toluene, Xylenes

GA - BTEX in areas with downward hydraulic gradients.

IN - If the plume is diving, the BTEX follows along until it attenuates.

KS - TBA

ME - TAME

MI - Some TAME and some DIPE

MO - Sometimes see naphthalene dive

NC - EDB and occasionally 1,2 - DCA. Others not routinely tested.

NH -ETBE and TAME probably behave in a similar fashion as MtBE. The ETBE and TAME plumes that we have observed to date are much weaker and less numerous so there has not been much opportunity to study their behavior.

NJ - TBA, benzene, xylenes and chlorinated organic compounds.

NM - BTEX

NV - Chlorinated solvents - in the case of waste oil tanks.

NY - BTEX and other oxygenates.

SC - BTEX, EDB, and 1,2-DCA

VT - Chlorinated solvents, and other non-halogenated VOCs found at deeper depths.

WI - PVOCs

3-8. What size screened interval do you typically use in your state?

- | | |
|-------------------------------------|----|
| <input type="checkbox"/> 2 ft. | 1 |
| <input type="checkbox"/> 5 ft. | 5 |
| <input type="checkbox"/> 10 ft. | 31 |
| <input type="checkbox"/> 20 ft. | 5 |
| <input type="checkbox"/> Other | 4 |
| <input type="checkbox"/> Don't know | 3 |

Comments:

AR - Intervals range from 2' +HI - 5' above and 5' below GW level is standard. screened interval for MWs.

KY - A 10' screened interval is typical for monitoring wells (but multilevel sampling or characterization for diving plumes is not conducted).

ME - We use geoprobe (direct push) techniques with a field lab to do extensive site characterizations. So the verticle profiling is done with a geoprobe boring, not classical monitoring wells.

NC - 10 to 15' inland, 2-15' coastal

NY - Site-specific

VT - At 3-D characterization sites, the well screen interval is shortened to 1-5', depending on the satuated thickness of the aquifer.

WA - There is no set screened interval typically used in Washington State. At LUST sites, the well screens are often placed so they intersect the static water level for water table aquifers.

WY - Site-specific

3-9. Please rank the primary cause(s) of plume diving in your state.

- Don't know -8

Well drawdown.

- #1 14 states
- #2 6
- #3 2
- #4 4

Recharge/discharge areas

- #1 9 states
- #2 9
- #3 9

#4 2

Stratigraphy

#1 7 states

#2 5

#3 6

#4 7

Localized landscape

#1 5 states

#2 6

#3 7

#4 4

3-10. If you do vertical characterizations of groundwater, have you identified any problems with cross contamination?

Yes 16

No 13

Don't know 17

Comments:

CO - Not aware of this situation occurring.

NE - To my knowledge, there has been no cross contamination. Since most of the sites we assess have been on the backlog list for several years, we wouldn't be able to observe any difference.

OK - We believe that cross contamination within aquifers and between separate water horizons, probably occurs too often. But, I cannot think of a site where vertical characterization of groundwater was conducted.

TX - The program does not conduct vertical characterizations of groundwater. WA - Site-specific. If vertical characterization is being done, the state recommends drilling individual wells rather than nested wells, as well as not drilling through a highly contaminated shallow aquifer to sample a deeper aquifer due to cross contamination.

WY - MtBE has rarely been found in Wyoming and is not the driving force for cleanup.

3-11. If MtBE has been out of the gasoline in your state since 2005 or earlier, have you observed a noticeable decrease in MtBE groundwater contamination in subsequent site assessments and analyses?

Yes 10

No 12

Still in gas 12

Don't know 11

Comments:

- AK** - MtBE was used only for a short time in Alaska. It is not a common contaminant.
- DE** - Out of gasoline in Delaware between April and May 2006. Rapid decrease in TBE levels in some sites, but not in others.
- HI** - There was not a lot of MtBE o begin with.
- MD** – MtBE just removed from gas in 2006.
- ME** - Since MtBE went back to approx. 2-4% of gasoline in 1999, we have had few large extended MTBE plumes affecting public water supplies or entire neighborhoods like we had in 1998 and before. We still have MTBE problems, but they are fewer.
- MT** - No noticeable decrease in MtBE contamination statewide. However, verification trends are difficult to monitor on a statewide basis.
- NH** - MtBE was predominately removed from gas in March/April/May of 2006, depending on the terminal supplying the gasoline. We have already seen a significant decline in MtBE contamination in existing monitoring wells located immediately adjacent to USTs.
- NV** - We regularly find MtBE at LUST sites. It is our understanding that gasoline may contain 0.3% MtBE (vol.) as per USEPA and CA Air Resource Control Bd. mandate and from 2-9% may be used an as fuel octane booster due to MtBE's high octane rating.
- RI** - MtBE has been out of gasoline only since spring 2006, and we have noticed decreasing MtBE in groundwater at some sites.
- TX** - MtBE is only banned in nonattainment areas of Texas. Changes in MtBE concentrations through time have not been evaluated.
- VT** - MtBE ban comes into effect in our state beginning in 2007.

3-12. If your state cleanup decisions are risk-based, do you use drinking water wells or groundwater as your receptor?

- Drinking water 10
- Groundwater 5
- Both 31
- Other 1
- Don't know 1

Comments:

- DE** - Also use property boundary as a point-of-compliance for determining cleanup levels.
- GA** - We also consider surface water bodies and protect them to In-Stream Water Quality Standards.
- HI** – Also surface water.
- ME** - Unfortunately, the first time we know about some problems is when we get a call from somebody who says their water smells and tastes like gasoline.
- MI** - Plus we use other receptors as well, such as surface water bodies, utility corridors, etc.
- MO** - Use existing or potential future wells.
- NY** - Our state does not have a formal RBCA program.
- RI** - We do not use RBCA - we use groundwater standards.
- SC** - Groundwater may also be considered a receptor if it is within an established wellhead protection area.
- VA** - Surface waters and utilities are also considered to be receptors.
- VT** - We have Groundwater Enforcement Standards that drive site closure but not usually site cleanup decisions. Drinking water wells are one of the primary receptors used in making cleanup decisions. Groundwater can be considered as a receptor on rare occasions.

WA – We consider all groundwater as a potential drinking water supply, with some exceptions such as low flow (< 0.5 gpm) or high (naturally occurring) total dissolved solids. There might be risk-based decisions made at specific sites.

3-13a. Of the fuel blends/additives that you sample and analyze in groundwater, what were the percent detections at all open-incident LUST sites during 2005? *(Report these percentages only if your state has data for a given constituent throughout 2005.)*

Blend/ Additive	All suspected releases (%)	Gasoline only (%)	Heating oil (%)	Jet fuel (%)	Diesel fuel (%)	Aviation gasoline/ motor-racing fuels (%)
MtBE	AL-90; HI-5; MD-98 MT-10; NH-45; SC-71.8; TX-95; UT-50; VT-80 2006 Avg. 61% 2003 Avg. 54%	AL-90; DE-80 HI – 10; KS-80; MT-10 NH-95; OH-25; OK-50; VT-95 2006 Avg. 59% 2003 Avg. 60%	MT-1 NH-5; VT-20	MT-1	MT-1; NH-5; VT-30	MT-1
TBA	NH-40	DE-40; MD-50 NH-80				
Ethanol						
TAME	NH-20	DE-15; MD-30 NH-45				
ETBE	NH-2	MD-20; NH-5				
DIPE	NH-1	MD-20; NH-2				
EDB	NH-2; SC-48	DE-5; MD-10; NH-5				
1,2-DCA	NH-5	DE-5; MD-10; NH-5				
Lead	AL-30; HI-5; NH-2	AL-30; DE-5; HI-15; MD-5; NH-5				HI-10

Comments:

DE - We don't routinely sample for TAME and TBA until site reaches the investigation phase.

NE - During 2005, we found MTBE at approximately 5% of our new Tier 1 investigation sites.

NH - We also find chlorinated compounds fairly frequently in #6 fuel oil sites. I wasn't sure that fuel oil covered #6 so it doesn't show up in that category.

OK - Based on only those LUST sites sampled to date. Includes sites with reported MtBE levels exceeding 20 ppb in groundwater. Not all LUST sites have been sampled for MtBE.

SC - Hard data.

3-13b. Of the fuel blends/additives that you sample and analyze in soil, what were the percent detections at all open-incident LUST sites during 2005? *(Report these percentages only if your state has data for a given constituent throughout 2005.)*

Blend/ Additive	All suspected releases (%)	Gasoline only (%)	Heating oil (%)	Jet fuel (%)	Diesel fuel (%)	Aviation gasoline/ motor-racing fuels (%)
MtBE	AL-90; HI-5; MD-40; MT-10; NV-20; TX-95; UT-50; VT-80	AL-90; DE-80; HI-10; MT-1; NV-20; OH-25; VT-95	MT-1; VT-20	MT-1	MT-1; VT-30	MT-1
TBA		DE-10; MD-10				
Ethanol						
TAME		DE-10; MD-5				
ETBE		MD-5				
DIPE		MD-5				
EDB		DE-5; MD-5				
1,2-DCA		DE-5; MD-5				
Lead	HI-5	DE-5; HI-10; MD-3				

Comments:

DE - We don't routinely analyze for TAME and TBA until site reaches investigation phase.

NV - Only for those cases when MTBE analysis in soil was conducted.

TX - Soil data is not tracked in the program database; however, an estimate of soil impacts has been provided based on known groundwater impacts.

WA - Only require testing for MTBE, EDB, 1-2 DCA, and lead at LUST sites with gasoline or AV Gas releases only.

WY - Do not analyze soil samples for fuel additives except lead. Statistics for lead are not readily available.

3-14 Of your groundwater LUST sites, how often do fuel blend/additive levels exceed your action levels (if you have action levels)? (Boxes contain totals of state responses for each category.)

Percent (of time)	MTBE	TBA	Ethanol	TAME	ETBE	DIPE	EDB	1,2-DCA
No action level	6	18	21	19	20	19	13	13
1-20%	9	2	1	5	3	3	12	12
21-40%	3	3	0	0	0	0	0	0
41-60%	8	0	0	0	0	0	1	0
61-80%	7	1	0	0	0	0	0	0
81-100%	3	0	0	0	0	0	0	0
Don't know	9	14	19	17	18	19	18	18

[2003 results for this question.](#)

Percent (of time)	MtBE	TBA	EtOH	TAME	EtBE	DIPE
0 - 20%	16	5	2	4	4	4
20 - 40%	5					
40 - 60%	6	1		1		
60 - 80%	6	1				
80 - 100%	9					
Don't know	5	2	3	3	3	3

Comments:

DE - This information is for gasoline releases only. We don't analyze for TAME and TBA until the site reaches the investigation stage.

KY - The UST Branch staff do not recall an alternative supply needed because of MtBE contamination being above action levels.

OK - 50%-60% of Oklahoma LUST sites screened have MtBE levels that exceed a "level of interest" of 20 ppb. Have no action levels or levels of interest for other additives.

VA - VDEQ action levels are site-specific and based on risk.

WY - Oxygenates are rarely found in Wyoming and do not drive cleanups; therefore, these statistics are not readily available.

3-15. In your experience, what has been the highest concentration in groundwater of a fuel blend/additive in the hot spot/core of a plume and at the receptor?

MtBE

State	Hotspot (ppb)	Receptor (ppb)	Distance (ft)
CO	460	1,400	100
CT	20,000,000	20,000	200
DE	110,000	13,000	1,000
HI	12,000	7,000	25
IA	27,045	0	1,100
KS	500,000	5,000	3,000
MD	600,000	10,000	
ME	6,500	680	500
MI	12,500	1,500	5
MT	30	33	1,200
NC		50	15
NE	38,610		
NH	3,0033,60	12,200	100
NJ	9,750,000	33,400	160
NV	100,000		
NY	2,000,000	50,000	2,000
OH	130	0	150
OK	350		
RI	1,000,000	800	1,700
SC	1,100,000	2	180
TN	0	887	0
TX	2,000,000		
VA	1,240,000	1,270	150
VT	650,000	100,000	50
WA	7,150	0	0

TBA

State	Hotspot (ppb)	Receptor (ppb)	Distance (ft)
DE	55,000	5,300	500
IA	100	5	1,320
KS	100,000		
MD	6,000	3,000	
NH	210,000	2,300	50
NY	500,000	10,000	2,000
RI	110,000	266	1,700
SC	30,000		
VT	811		

Ethanol

State	Hotspot (ppb)	Receptor (ppb)	Distance (ft)
DE	2,600,000		
NY	50,000	25	1,000
SC	134,000		

TAME

State	Hotspot (ppb)	Receptor (ppb)	Distance (ft)
DE	26,000	1,410	1,000
MD	2,000	200	
NH	19,500	850	400
NY	20,000	20,000	2,000
RI	5,200	9	1,700
SC	9,480		
VT	20,300		

ETBE

State	Hotspot (ppb)	Receptor (ppb)	Distance (ft)
MD	2,500	100	
NH	12,200	2	100
NY	100	10	100
SC	1,000		
VT	622		

DIPE

State	Hotspot (ppb)	Receptor (ppb)	Distance (ft)
MD	2,000	60	
NH	102		
NY	100	10	1,000
SC	4,100		
TN	0	5.9	3,000
VT	296		

EDB

State	Hotspot (ppb)	Receptor (ppb)	Distance (ft)
KS	2,500	1	
MD	2,000	60	
MS	140		
NH	600	0	1,100
NY	10	3	1,000
SC	6,100	2.06	265
TN	1.9	2.3	250

1,2 DCA

State	Hotspot (ppb)	Receptor (ppb)	Distance (ft)
MD	1,000	60	
MS	130		
NY	10	5	1,000
SC	760	12	568
VA	3,060	128	165

Lead

State	Hotspot (ppb)	Receptor (ppb)	Distance (ft)
HI	800,000		
NY	5	0	100
VA	0.113	0.011	165

TBF

State	Hotspot (ppb)	Receptor (ppb)	Distance (ft)
SC	20,800		

ETBA

State	Hotspot (ppb)	Receptor (ppb)	Distance (ft)
SC	34,500		

TAA

State	Hotspot (ppb)	Receptor (ppb)	Distance (ft)
NY	2,500	200	1,000
SC	389,000		

Comments:

DE - Highest MTBE ever observed in a monitoring well 1,100,000 ppb. Highest MTBE at a receptor (domestic well) 25,000 ppb. Highest TBA observed in groundwater -- 1,970,000 ppb.

HI - This was at a site with heavy clay and gasoline free product in MWs on-site. 12 ppm MtBE onsite and up to 7ppm off-site.

NH - EDB in the Ashland Avery wellfield municipal well is assumed to be from a large gasoline spill but was never confirmed. The data reported (0.17) is from the Ashland well incident. No lead receptor data reported because it is difficult to distinguish between lead in plumbing and lead from a site. In my opinion the high lead levels that we observed are from plumbing..

NJ - Most recent 2006 results indicate 73,000 ppb MtBE at the source area; 1,200 ppb at receptor 160 feet from source area; and 3,300 ppb in receptor located 800 feet downgradient of source area.

NM - We have seen MTBE in groundwater hotspots and receptors in the 100s of thousands ppb.

OK - This was a one-time occurrence and has not been duplicated since. Except for this particular site, the highest recorded concentration of MtBE is approximately 40mg/L.

RI - Data from Pascoag.

TN - Sections with zeroes (MtBE, DIPE) mean this is a new case, information not known at this time. The DIPE answer is a suspected UST site may not be source based on other data.

TX - MTBE concentrations at the receptor are not tracked in the program database.

VA - Additional info with and without receptors:

MTBE: 1,800,000 at core; impact expected at 870; impact expected at 870 feet (none yet)

MTBE: 985,300 ppb at core; 911 ppb at receptor; 400 feet

MTBE: 538,000 ppb at core; TBA: 263,000 ppb at core – no receptor
 MTBE: 1,060 ppb in a supply well, 40 feet from source (concentration not reported)
 MTBE: 345,077 ppb at core; 32 ppb in the supply well; approximately 130 feet
 MTBE: 753,000 ppb at core; 726 ppb in the supply well; approximately 900 feet

4. Drinking Water Impacts

4-1a. Does your state drinking water program require routine analysis for any of the following blends/additives in public (community and non-community) water supply wells? (Boxes contain totals of state responses for each category.)

	MtBE	TBA	EtOH	TAME	ETBE	DIPE	EDB	1,2DCA	Lead	TBF	ETBA	TAA
Yes	21	6	2	5	4	4	19	18	30	1	2	1
No	8	23	26	21	23	22	8	9	4	24	24	24
Not required, but analyzed	8	0	0	0	0	0	3	0	1	1	0	0
Don't know	10	17	18	19	19	19	17	19	13	19	19	20

Comments:

DE - Public Health will provide info to DNREC occasionally, if public wells exceed MCLs for petro-related compounds, or if they sample domestic wells and have detects. Detects of petro compounds below MCLs in public wells will probably not get reported to Tanks Management Branch.

IA - Only if we are alerted by Water Supply.

KS - The drinking water program alerts us to any hits on VOCs.

MI - We don't regularly seek out this information unless warranted by site specific conditions. Occasionally our local health departments inform us of their findings as well, more on a non-routine basis.

NC - I believe they check for MtBE, EDB and 1,2 DCA.

RI - very rarely.

TN - Only if reported by the municipality.

TX - The drinking water program notifies the LUST program when these compounds are detected if the potential source appears to be a UST.

VT - Routinely for MtBE, occasionally for lead, one time analysis for EDB in 1990s.

4-1b. If you answered yes to any of the compounds above, does your LUST program routinely review these data from the drinking water program?

- Routinely 9
- Occasionally 24
- Never 6
- Don't know 1

4-2. Do you inform the state drinking water program when there is a reported fuel spill in a source water protection area?

- Yes 27
- Sometimes 13
- No 3
- Don't know 4

Comments:

CO - Database accessed through website.

DE - Depends on concentrations, distances.

IA - Consultants are required to send notification to DNR Water Supply. However, this notification is not dependent upon whether contamination is present in a source water protection area.

KY - All releases are reported in one system and all programs have access to the data and the nature of the release.

NC - Informally

NJ - Based on site-specific and surrounding area conditions.

OK - Such a release is taken into consideration as a part of our risk-based assessment of the site, but the state drinking water program is not informed. Owner of the public water supply is notified if the water supply is threatened or directly impacted.

TN - We provide the source water program with a copy of our database upon request. There are ongoing developments among programs to share information through a GIS mapping system.

UT - We are still developing our process for identifying releases within source protection zones, not all zones have been digitized. UST facilities within SWP zones are flagged in the UST Database.

VT - Depending on the severity of the spill.

4-3 Do you receive information from the water program, utilities, or other water supply sources concerning detection of petroleum contaminants in public or private water supplies?

- Yes 22
- Sometimes 22
- No 1
- Public supplies only 1
- Don't know 1

Comments:

DE - Not necessarily for all detects, but they would likely notify if petroleum-constituents exceed an MCL.

HI - Annual reports.

KY - The UST program receives information only if the source of the contamination is from a regulated UST system.

NC – Informally.

OK - Petroleum release information reporting is required.

TN - Typically only reported by municipality.

TX - The LUST program is notified by the agency's drinking water program when a public well is impacted. The LUST program is typically notified by private-well owners or local government/water supply sources when a private well is impacted.

VT - The state water supply division provides reports of compliance monitoring positive detections of petroleum constituents in public water systems. Also, if a private or public water supply sample is analyzed at the state health laboratory and there is a positive detection.

WA - Especially if they exceed drinking water standards and/or the water tastes or smells unusual.

4-4. Do you share monitoring well information (perhaps to see where a plume is traveling) with your state drinking water program?

- | | |
|-------------------------------------|----|
| <input type="checkbox"/> Yes | 16 |
| <input type="checkbox"/> Sometimes | 25 |
| <input type="checkbox"/> No | 5 |
| <input type="checkbox"/> Don't know | 1 |

Comments:

CO - Database accessed through website.

DE - If there is a specific request for that information, we would provide it.

HI - In cases of gross contamination above drinking water aquifers.

IA - Consultants send notifications to DNR Water Supply. These notifications include plume maps.

NJ - Based on site-specific and surrounding area conditions.

NM, OH – On request.

RI - Only if a public well is imminently threatened.

TN - If impact or threat to well exists.

TX - The LUST program does not directly share monitor well data with the drinking water program; however, the information is available for review as needed in the LUST case files.

UT – When it's significant.

VT - When a public water supply is at risk or has been impacted, site investigation findings are shared with the drinking water program.

WA - It varies from site to site. More of the data collected by Ecology is becoming available electronically via the web and various GIS mapping programs (or data) shared by both Ecology and State Dept of Health.

4-5. Does your program give cleanup priority to sites located in source water protection areas?

- | | |
|-------------------------------------|----|
| <input type="checkbox"/> Yes | 34 |
| <input type="checkbox"/> Sometimes | 7 |
| <input type="checkbox"/> No | 5 |
| <input type="checkbox"/> Don't know | 1 |

Comments:

DE - It would depend on contaminant concentrations. We are an RP-lead state. We would push an RP to investigate and remediate quicker if the site were in a source water protect area or wellhead protect area, or we would take over sooner if the RP was not responding promptly enough.

MI - In theory, when funding is sufficient and available.

NC - A release, located within 500 ft. of surface water, whose groundwater contaminants exceed applicable surface water standards by a factor of 10 is considered an intermediate risk release.

OK - Depends on the receptors and completed pathways for contaminant migration in the risk-based assessment of the site.

RI - Responsible parties of all sites have to investigate and clean up their sites according to timetables that begin when a release is discovered. There are not low priority sites that sit and wait.

VT - Only if the water supply is felt to be at significant risk.

WA - Close proximity to well head protection areas is a factor in prioritizing sites for state attention. Much of the cleanup work is done independently without Ecology oversight.

4-6. Approximately how many public and private drinking water wells in your state have been contaminated by MtBE at any level?

(Boxes contain totals of state responses for each category.)

Don't know - 15

# of wells	Private wells	Public Community Wells	Public non-community wells
None	8	10	12
1-10	7	9	6
11-50	4	8	2
51-100	3	1	1
101-150	0	0	5
151-200	2	2	0
201-300	1	1	0
301-400	2	0	0
401-500	0	0	0
501-700	3	0	1
701-900	0	0	0
More than 900	2	1	0
Private based on estimate 26, actual 7			
Public community based on estimate 23, actual 10			
Public non-community based on estimate 22, actual 6			

Comments:

DE - Don't know actual numbers for PWs or the split between comm and non-com wells. There are approx. 1000 public wells in the state, about 600 of which are comm wells. Based on three different sampling studies –2001Public Health sampling -- 13% detects of MTBE; 2002 DNREC/Public Health sampling -- 36% detects of MTBE, 2001 USGS sampling -- 57% detects of MTBE in public wells.

HI - I have not heard of MtBE found in any drinking water wells in Hawaii. The contaminant we see primarily in drinking water are pesticides in sub-ppb range and some solvents near military bases here. As far as I know, there have been no gasoline contamination incidents.

KY - The Division of Water may track this information but the UST Branch is not aware of any public or private wells affected by MtBE contamination.

MI - We are working on corrections to our data base and are unable to obtain that info for this survey.

NC - Between 300-400 wells total estimate.

NV - Databases are not maintained for private and public noncommunity wells; however, given the low incidence in public wells (none of which exceeded action levels), and the great depths of most drinking water wells in Nevada, it may be reasonable to assume no impact for the others.

RI - Estimate for private wells (151-200). Actual numbers for community wells is 34 and non-community is 30.

TN - 1 municipal well with MtBE. Tennessee UST does not differentiate between community or non-community. The answer is a total in the range of 1-10 combining community and non-community public wells.

TX - The number of private wells impacted with MTBE is a rough estimate (51-100). It is based on the current number of private water wells with point-of-use treatment provided by state funds. The total number of private wells ever impacted with MTBE is unknown.

4-7. Are you aware of any impacts to public or private wells in your state by fuel blends/additives other than MtBE? (Boxes show number of states with impacts.)

	TBA	EtOH	TAME	ETBE	DIPE	EDB	1,2DCA	Lead
Private wells	4	0	3	0	0	4	3	2
Public community wells	3	0	1	1	2	2	4	0
Public non-community wells	1	0	0	0	0	1	0	0
Don't know	32	41	37	38	39	35	37	38

Comments:

AL - The public well EDB detection may have been due to agricultural activities and not fuels.

DE - We know there have been detections in different types of wells. Don't know number of wells impacted by each chemical.

NC - Impacts to water supply wells have occurred from DIPE, IPE, EDB. 1,2-DCA and lead but we cannot distinguish among we types and cannot provide numbers.

RI - These detections were at the one very impacted well at Pascoag.

VA - VDEQ is aware of impacts of TBA, TAME, ETBE, DIPE, EDB, 1,2 DCA, Lead, and TAA to drinking water wells but is unable to quantify impacts.

VT - TBA is not commonly measured for in community system testing. We are only aware of one system as it was monitored next to a LUST site. Could not separate by community vs non-community.

WA - Domestic wells in Washington State have been impacted by EDB, but the source was pesticide use (soil fumigant), not from a LUST site.

4-8. How many private well users have you provided with bottled water or point-of-use treatment because of blends/additive problems?

(See Compiled Result for specifics.)

<input type="checkbox"/> None	10
<input type="checkbox"/> 1-10	6
<input type="checkbox"/> 11-50	2
<input type="checkbox"/> 51-100	3
<input type="checkbox"/> 101-500	7
<input type="checkbox"/> >500	5
<input type="checkbox"/> Don't know	14

Comments:

CT - Whenever a drinking water action level is exceeded, CT DEP takes prompt action to provide bottled water and ultimately a GAC filter until such time an RP has been determined.

DE - Probably close to 100.

RI - Bottled water was in many cases a temporary solution until a public water line could be provided.

TN - Bottled water or filtration in last 6 months (1-10).

TX - This is a very rough estimate (51-100). It is based on the current number of private water wells with point-of-use treatment provided by state funds. The total number of private wells ever having bottled water or treatment provided is unknown.

VT - This is the number of homes/businesses, not the number of users in the households.

4-9. How many private wells have been replaced with a new well or public water?

(See Compiled Result for specifics.)

<input type="checkbox"/> None	7
<input type="checkbox"/> 1-10	9
<input type="checkbox"/> 11-50	5
<input type="checkbox"/> 51-100	3
<input type="checkbox"/> 101-500	9
<input type="checkbox"/> Don't know	13

Comments:

CT - Except for 1 or 2 new well replacements, all have been public water line connections.

DE - Will be over 100 soon, due to ongoing well replacements.

IA - Uncertain if any wells have been replaced with additives being the driver.
NC - Don't track this information, but >500.
OK - Not possible to track this information so response is only an estimate.
TN - In last 6 months.
TX - The LUST program is unaware of any private wells that have been replaced due specifically to additive problems.
VA - This estimate (100-500) includes wells contaminated by petroleum from all types of tanks (regulated and unregulated).
WA - No wells replaced due to fuel additives. Hundreds have been replaced due to EDB contamination associated with pesticide application.

5. Remediation

5-1a. Are you finding LUST sites where MtBE has been remediated but where TBA remains at unacceptable levels?

<input type="checkbox"/> Yes	3
<input type="checkbox"/> No	11
<input type="checkbox"/> Don't know	34

Comments:

CO, HI, RI, TX - TBA not analyzed for in most situations.
FL - TBA is not in our list of "petroleum products contaminants of concern" which is the list of chemicals for which analysis of samples is performed during the course of site rehabilitation.
IA - No action levels for MTBE or TBA.
PA - TBA is not analyzed for due to not having a cleanup level or toxicity data to support a specific level.
VA - VDEQ has no cleanup levels for TBA. Virginia has risk-based closures and does not track additives unless a drinking water well has been impacted.

5-1b. If so, does it delay site closure?

<input type="checkbox"/> Yes	4
<input type="checkbox"/> No	0
<input type="checkbox"/> Don't know	10
<input type="checkbox"/> N/A	17

Comments:

MI - We have 1,356 facilities with historical MTBE groundwater impacts greater than 40 ppb. In addition, Michigan has 1,220 facilities with historical MTBE in groundwater requiring corrective action.
OK - Have not separately treated MtBE at LUST sites. If present, MtBE would be treated in conjunction with BTEX components of released fuel but levels of MtBE are not tracked.

5-2a. Have you completed remediations at any LUST sites with EDB and/or 1,2 DCA contamination?

- Yes 8
- No 22
- Don't know 17

5-2b. What technology(s) did you use?

FL - Pump & Treat, Air Sparge/soil vapor extraction (SVE)

ID - These contaminants were remediated along with the primary risk drivers (benzene).

KS - Air Sparge/SVE

ME - Soil removal, pump and treat, SVE, air sparging

NJ - Natural remediation and groundwater monitoring

NH - SVE/AS is being used at some sites with EDB and DCA but it was implemented for the purpose of addressing the heavily contaminated source area and any reduction in these compounds would be a side benefit.

NM - Pump & Treat, SVE

NY - Pump & Treat

VA - SVE/AS is being used at some sites with EDB and DCA but it was implemented for the purpose of addressing the heavily contaminated source area and any reduction in these compounds would be a side benefit.

WA - I don't believe EDB or 1,2 DCA contamination was the the driver in any cleanups associated with fuel additives.

5-2c. Did this approach work?

FL - Yes. We do not have a database of technical information of which technologies were used at sites and which contaminants were present at sites that we can query to determine which technologies had successfully remediated EDB or DCA.

KS – Yes

ME - Yes

NJ - Remediation is still ongoing.

NM – Yes

NY - Yes

5-3a. Do you have any sites with EDB or 1,2 DCA remediation in progress?

- Yes 11
- No 21
- Don't know 15

5-3b. What technology(s) are you using?

AZ - Chemical oxidation using sodium persulfate, sodium hydroxide, hydrogen peroxide, and Regenox.

FL - Pump & Treat, Air Sparge/SVE

KS - Air Sparge/SVE and PWS treatment with carbon

MT - SVE

NC - Air Sparge/SVE

NJ - Natural remediation and groundwater monitoring

SC - Air sparge, soil vapor extraction, chemical oxidation, enhanced bioremediation, pump & treat

5-3c. Does this approach appear to be working?

AZ - Too early to say.

FL - Yes

KS - Yes

MT - Don't know

NC - No

NJ - Yes

SC - All methods show very poor results for EDB reduction as compared to BTEX or MTBE. In some cases where some reductions are taking place, more data is needed to determine if the reductions can be sustained.

TX - At the LUST sites impacted with 1,2 DCA, remediation of the source has not yet been attempted. At this time, point-of-contact treatment with carbon is being used successfully.

5-4. If a UST discharges into a surface water body, is this incorporated into the total maximum daily load (TMDL) for that water body?

- Yes 7
- No 17
- Don't know 23

Comments:

AL - This would be dependent on the chemical of concern for that TMDL for that water body.

HI - We could consult with Clean Water Branch of HDOH, but has not happened recently.

ID - No discharges are impacting surface water.

KS - UST discharges into a surface water body are not allowed.

KY - TMDL is monitored by the Division of Water.

NE - Assuming you mean a discharge from a LUST remediation system, there are no TMDLs written for petroleum constituents in Nebraska.

OK - I believe it would be incorporated into the TMDL for that water body, but this scenario has not occurred so the situation has yet to be addressed. The Oklahoma Water Resources Board would be brought in because of such a scenario.

OR - No, although it may indirectly be included as background but not as a specific source.

RI - If a UST discharges, it is not in our program.

TN - We do have surface water criteria for cleanup but it is not factored into the TMDL.

VT - The discharge must meet State Water Quality Limits.

5-5. If there have been any ethanol releases (E10, E85 or neat) in your state, have you observed any fate and transport characteristics?

- | | |
|--|---|
| <input type="checkbox"/> Cosolvency (i.e., increase over expected BTEX concentrations) | 2 |
| <input type="checkbox"/> Anaerobic groundwater characteristics | 2 |
| <input type="checkbox"/> Methane gas generation | 2 |
| <input type="checkbox"/> Remobilization of NAPL | 1 |
| <input type="checkbox"/> Other | 1 |

NH - DES is observing increased concentrations of benzene near UST systems. We believe that this is caused by ethanol present in vapor releases from the tanks. Evidence of this was observed at one site where 710 ppb of ethanol was detected.

- | | |
|--|----|
| <input type="checkbox"/> No | 8 |
| <input type="checkbox"/> No ethanol releases | 15 |

CT - Awaiting report for our first known E10 release.

HI - We just started using E10 this year but have not seen any large scale effects. Not many new releases reported this year. maybe 60 and not many large scale.

KS - Methane gas, anaerobic groundwater

MI - Cosolvency, remobilization of NAPL

MN - Anaerobic groundwater, methane gas

NH - DES is observing increased concentrations of benzene near UST systems. We believe that this is caused by ethanol present in vapor releases from the tanks. Evidence of this was observed at one site where 710 ppb of ethanol was detected.

RI - Recent possible release, not enough information available yet to have observed any of the requested characteristics.

VA - Cosolvency. Bulk ethanol release investigation showed that BTEX levels did not decline until ethanol degraded.

5-6a. Does your state close a cleanup site with "measurable levels" of NAPL?

- Yes 21
- No 24
- Don't know 2

5-6b. If yes, what is the "measurable level" that typically permits closure to proceed?

- Sheen 4
- 1/8" 3
- Unrecoverable 9
- Other 7

AR – site-specific

FL - .01 foot

HI - Only if BTEX and PAHs are ND or well below action levels and no other receptors.

IA - <.01 foot

MO – Maximum extent practicable.

NV – 0.5 inch.

TX - Unrecoverable or impractical to recover.

- Don't know 2

5-6c. Can closure be granted above the "measurable level"?

- Yes 22
- No 21
- Don't know 0

5-6d. If yes, under what circumstances?

AK - We offer conditional closures based on site-specific factors. NAPL conditional closure levels may vary site to site.

AL - This would be very rare and a site specific risk-based decision.

AR - No threat to sensitive receptors and NAPL plume is "stable".

CA - removed to extent practicable.

DE - When it is sufficiently demonstrated that NAPL is stable, not contributing to daughter plumes, and "reasonable" recovery efforts fail to recover remaining NAPL.

FL - A site with residual soil contamination or groundwater contamination above cleanup target levels can only receive No Further Action if there are institutional controls (deed restrictions) on the property.

HI - Non-drinking water threatened, no surface water nearby or other vulnerable receptors, and heavily weathered product with no BTEX, PAHs, solvents or metals. Rare but has been done here.

IA - Following NAPL recovery activities, a site may be closed if product does not return in a monitoring well in excess of .02 ft for a period of one year.

MD - Cleanup feasibility and risk study.

MN - Low risks at site

MO – site-specific criteria.

NC - No receptors and removal is technically and economically infeasible. FP thickness must be < .01 foot and dissolved contamination must not exceed the gross contaminant levels determined by the program.

ND - No identifiable receptors.

NE - Cleanup to a less stringent level could be allowed if the RP submits acceptable rationale based on a technological, risk, or economic analysis. Regulations require the clean up of "readily removable contaminants (e.g., free product)." RBCA guidelines define free product as "measurable (> or = 0.01 feet) petroleum product thickness" not including a sheen

NV - If a risk-based analysis was performed showing no vulnerable receptors and a fate and transport analysis performed showing that there was little potential for migration.

OH - When the product is determined to be unrecoverable.

OK - If there is not a significant enough level of risk to human health, safety or the environment presented by the occurrence of free product, or a lack of potential receptors, a case can be closed with residual product remaining.

OR - If the plume is stable and groundwater has no reasonably likely beneficial use.

PA - If the contamination remains onsite and is not detected offsite.

TX - Closure can be granted when recoverable NAPL is still present if there are no receptors and the plume is stable.

VA - Documentation must be presented that the product is unrecoverable over time using multiple methods of product recovery.

VT - Sites with LNAPL remain open, and if no other option works passive free product bailing is the remediation of choice.

WI - All other remedies have been attempted but failed.

5-7. Provide an estimate of the percentage (%) of groundwater-impacted LUST sites in your state with measurable levels of free product at the time of site closure.

- Don't Know 5
- None 23
- 1-10% 16
- 11-25% 3
- 26-40% 0
- 41-60% 0
- 61-80% 0
- 81-100% 0

Comments:

FL - I am not aware that our state has yet made a determination that free product is technically impracticable to remove and have allowed the product to remain while the site qualifies for closure with a No Further Action with Conditions.

KY - UST regulations to not allow closure of a site with measurable levels of free product.

OK - A likely estimate is 2%-4%.

VA - VDEQ does not track this circumstance but anticipates that the percentage is very small.

WA - Ecology won't close LUST sites with measurable free product.

5-8. Which free-product removal technologies have you found to be the most effective?

- Don't know 1
- Excavation 34
- Hand bailing 15
- Skimmers 23
- SVE 32
- Pump and treat 17
- Multiphase extraction 35
- Chemical oxidation 4
- Thermal remediation 1
- Borehole passive 1
- Other: 3

NV – Vacuum-assisted skimming

OK - Surfactant Flush

VA – Vac Truck

Comments:

CO - Methodology selection is dependent upon the volume (thickness and horizontal extent) of NAPL present.

FL - Based on off-the-top-of-the-head guesstimate based on general experience and not hard data. We do not have a database of cleanup technologies that were used at sites with different amounts of contamination that we can query.

KS, MI - Depends on the site conditions.

MO - Effectiveness of techniques is very site-specific.

RI - Excavation is most effective for heavier oils, SVE is effective for gasoline.

TX - Depending on the type of product, product thickness, depth to groundwater, etc., we have found each of the treatment technologies marked above to be effective. If conditions are favorable, we typically use dual-phase extraction.

6. Remediation Cost Impacts

6-1. Please indicate the percentage of sites where MtBE has had a noticeable impact on the cost of remediation. (Note that these percentages are estimates based on state program experience.)

Don't know 22 states 2003 Survey – 12 states

Percentage of Sites	Affect of MTBE on Cleanup Costs
WI, NM, NE, TN, AR, MS. IA, ND, WY-100% AL-3%, CO-10%, FL-60%; HI-89%, MA-15%, MO-95%, MT-85%, NH-5%, OH-75%, RI-30%, TX-99%, VT-50%	States with percentages of sites with No Increase in Cost 21 states 2003 Survey – 12 states
AL - 94%, CO – 89%, CT, OH-20%, DE-30%, FL, NH-35%, HI, MT-10%, LA, RI-15%, MA-35%, MO-5%	States with percentages of sites with Small Increase in Cost (< 20% more) 13 states 2003 Survey –18 states
NY-100%, AL, CO, HI, TX -1%, CT-60%, DE-30%, FL-10%, ME-50%, MA-41%, NH-25%, OH-5%, RI-40%, VT-20%	States with percentages of sites with Significant Increase in Cost (20 – 50%) 14 states 2003 Survey –13 states
MD-100%, AL-1%, CT-20%, DE-15%, FL-4%, MA-8%, NH-25%, RI-10%, VT-5%	States with percentages of sites with Very Significant Increase in Cost (50 – 100%) 9 states 2003 Survey –15 states
AL, FL, MA, VT -1%, DE-10%, NH-20%, RI-5%	States with percentages of sites where Cost More Than Doubled 7 states 2003 Survey –11 states

Comments:

CO - Remediation of MTBE is only required when there is an actual or definite potential of impact to a receptor, therefore increased costs, if any, are usually small (monitoring related).

FL - These responses are based on off-the-top-of-the-head guesstimates based on general experience. We do not have a database of technologies used at sites and types of contaminants present at various stages of remediation.

IA - MtBE is not evaluated for risk, nor has its presence appeared to impact cleanup of other contaminants.

ME - We have many sites where MTBE is the only contaminant.
MI - Don't know the percentage of sites, but it increases costs significantly.
MO - Benzene is almost always the driver for the sites where groundwater is contaminated, not MtBE.
NC - This data is not tracked.
NM - MtBE is the driver in only a handful of sites.
NV - Such cost-related information is not readily separated out or tracked by either our LUST or State Petroleum Fund programs.
OH - MtBE is found in only about one quarter to one third of all release sites in Ohio. Most of the time the MtBE is at relatively low levels and does not drive the cost of corrective action.
OK - Until this year, MtBE has not yet been a regulated constituent. Therefore, MtBE occurrences have been remediated in conjunction with BTEX components requiring cleanup at LUST sites.
SC - Because MtBE plumes are commonly larger than BTEX plumes, it is reason to conclude that the cleanup costs would be higher; however, we have no way to determine how much higher those costs are.
TX - Most sites in the LUST program requiring remediation of MtBE also require remediation due to other petroleum compounds. In these situations, the MTBE remediation does not appear to increase the overall costs.
VT - These are estimates!!!
WY - We rarely find MtBE in Wyoming. MtBE does not drive cleanups in Wyoming.

6-2. Have other gasoline blends/additives had a noticeable impact on the cost of remediation in your state? (Boxes show numbers of states.)

Additive/Blend	Yes	No	Don't know
TBA	7	25	14
Ethanol	1	29	16
TAME	2	31	13
ETBE	2	31	12
DIPE	2	30	12
EDB	5	26	15
1,2DC	6	25	16
Lead	6	25	15
TBF	1	29	15
ETBA	1	29	16
TAA	1	29	15

Comments:

- AL** - Lead treatment in water discharges increases costs. Yes to lead.
- CO** - OPS requires remediation of 1EDB and 1,2-DCA if they are associated with product from a regulated tank. Yes to 1,2 DCE.
- DE** - TBA is a major problem at some sites. We also see a lot of TAME, but it is at the same sites as MtBE, and dealt with in the same way. Ethanol is an unknown yet, Yes to TBA.
- IA** - These additives are not evaluated for risk, nor have they had noticeable impact on the cost of remediating other chemicals of concern.
- KY, TX** - UST regulations do not require analyses for these compounds.
- MO** - To date, none of remediation projects have been designed and "driven" by the additives. This may be partially due to the fact that the majority of LUST cleanups were undertaken before additives were included in the Chemicals of Concern.
- NC** - Not tracked in this detail.
- OK** - Have no data on this type of impact to remediation activities.
- SC** - Because EDB and 1,2 DCA plumes are sometimes larger than BTEX plumes and more difficult to treat, it is reason to conclude that the cleanup costs will be higher.
- WY** - Oxygenates are rarely found in Wyoming and do not drive cleanups in Wyoming.

6-3. If costs of cleaning up blends/additives have increased, what factors have driven them up?

- Don't Know 15
- Longer Plume 20
- Difficult to air strip 13
- Inefficiency carbon 11
- Substance recalcitrance 15
- Monitoring frequency 6
- Monitoring period 16
- More monitoring wells 13
- Other: 5

- AL** - Inefficiency of treatment technology for lead discharges.
- CO** - 1,2-DCA at a few sites.
- DE** - Thickness of plumes, necessity for multilevel wells.
- VA** - Addressing impacted or threatened water supplies via replacement wells or public water supply connections.
- VT** - Point of entry treatment systems and air discharge treatment systems.

Comments:

- ÅL** - Lead is the chemical that has increased treatment costs more so than any other listed chemicals.
- FL** - Our "longer plume" response only applies to MtBE because we are not monitoring for the other oxygenates and do not have experience with cleanup challenges associated with the other oxygenates.
- KY** - UST regulations do not require analyses for these compounds.

7. Vapor-Intrusion Pathway

7-1. Is vapor intrusion a concern at LUST sites in your state?

- Yes 41
- No 6
- Don't know 1

Comments:

DE - If a site has vapor problems, it can't be dealt with under our RBCA program until the vapor issue is permanently mitigated.

FL - We are not routinely monitoring for vapors that might enter buildings except in limited cases in which it is clear that there are problems identified. Since we do not monitor vapors in the subsurface it is unknown if there is a problem at LUST sites.

HI - Basements are rare. Most houses have crawl spaces underneath, and we have tradewinds 15-25 mph about 75% of the year. Zero windspeed days are very rare. Also a majority of clay soil.

NV - What is meant by "concern"? If it means concerned that cases NV closed with soil and groundwater cleanup criteria are a risk for vapor intrusion, then no. If you mean that vapor intrusion may require evaluation, then yes.

RI - Vapor intrusion is a concern at a few sites with offsite migration of high concentrations and a high water table.

SC - Although the vapor-intrusion pathway is evaluated for each site, this pathway rarely drives the level of cleanup needed.

TX - Vapor concerns are handled on a case-by-case basis. In general, they tend to result from improperly functioning utility lines and are resolved once the utility line has been repaired.

7-2a. Does your state have guidance/policy for evaluating the vapor-intrusion pathway?

- Yes 28 states 2003 26 states
- No 20
- Don't know 0

Comments:

CO - We have had general guidance to assess the groundwater and soil vapor to indoor air pathways since 1999, although expanded and more detailed guidance is planned for 2007.

KY - Division of Waste Management is currently organizing a workgroup to discuss VI guidance.

NJ - DEP updated (March 2007) Vapor Intrusion Guidance, including New Method LLTO-15 may be found at www.state.nj.us/dep/srp.

NV - Upcoming state guidance is intended to address that the readily used guidance from EPA is not applicable to LUST sites: Interstate Technology & Regulatory Council Vapor Intrusion Team (2007) Vapor Intrusion Pathway: A Practical Guideline. USEPA.

TX - Vapor concerns are handled on a case-by-case basis. In general, they tend to result from improperly functioning utility lines and are resolved once the utility line has been repaired.

VT - We are working on updating our vapor intrusion guidance to focus more on modeling, vapor monitoring, and less on indoor air monitoring.

WA - The vapor intrusion guidance is currently being written.

7-2b. If not, is your state considering implementing vapor-intrusion pathway guidance?

- Yes 10
- No 7
- Don't know 4

7-2c. If your state is considering implementing vapor-intrusion pathway guidance, what is the anticipated time frame for implementation?

AK – Summer 2007

AZ – 2008

DE - Late 2007 to mid 2008

FL - Maybe by 2008 but this could be delayed significantly

IL – 2007

KY - Unknown

MT, NV – 1 - 2 years

SD – 12 months [early 2008]

WA – Within the next 12 months [late 2007]

7-3. If state guidance for the vapor-intrusion pathway exists on the Internet, please provide the Web address:

State	Vapor Intrusion Guidance Websites
AL	www.adem.state.al.us Our current guidance is included with the Alabama Risk-Based Corrective Action Guidance for USTs November 2001. Additional guidance will be developed in the future.
CO	http://oil.state.co.us
HI	http://www.hawaii.gov/health/environmental/hazard/eal2005.html
IA	http://www.iowadnr.com/land/ust/adminrulesindex.html Guidance is currently available in hardcopy only. Link is for UST/LUST administrative rules.
ID	The vapor intrusion pathway guidance is contained in an appendix of the IDEQ Risk Evaluation Manual
MA	http://www.mass.gov/dep/cleanup/laws/prop_gw2.htm

ME <http://www.state.me.us/dep/rwm/petroleum/pdf/inhalexp.pdf>

MI www.michigan.gov/deqrrd See Op Memo No. 1 Attachment 7 Soil Inhalation for Ambient Air Criteria

MN <http://www.pca.state.mn.us/publications/c-prp4-01a.pdf>

MO <http://www.dnr.mo.gov/env/hwp/tanks/tanks.htm>

NE [www.deq.state.ne.us/Publications/Petroleum Remediation Program/Guidance Documents/RBCA guidance](http://www.deq.state.ne.us/Publications/Petroleum%20Remediation%20Program/Guidance%20Documents/RBCA%20guidance)

NH http://des.nh.gov/orcb/doclist/pdf/vapor_intrusion.pdf

NJ www.state.nj.us/dep/srp

NY <http://www.dec.state.ny.us/website/der/guidance/vapor/>

OH <http://www.com.state.oh.us/sfm/bust>

OR <http://www.deq.state.or.us/wmc/tank/documents/RBDM03Final.pdf>

PA <http://www.depweb.state.pa.us/landrecwaste/cwp/view.asp?A=1243&Q=465335>

SC http://www.scdhec.gov/eqc/lwm/forms/RBCA_01.pdf SC Risk-Based Corrective Action Guidelines

TN www.state.tn.us/environment/ust

WY In the process of updating/revising all guidance documents. As soon as the guidance document is revised, it will be put on our website at: <http://deq.state.wy.us/shwd/stp>.

8. Hazardous Substance USTs

8-1. How many federally regulated hazardous substance (non-petroleum) USTs are registered in your state?

Don't know/No answer 18

State	Number	Comments
AL	189	
CO	305	
CT	200	active USTs
DE	2	98 registered:, 2 in use, 96 removed or abandoned
FL	199	199 registered, 158 closed or removed, 1 out of service, 40 active regulated
IA		Questions should be directed to the State Fire Marshall's Office.
ID	35	only 2 active.
KS	4	
KY	364	
LA	0	
MD	16	
ME	171	source: EPA EOY FY06 Activities Report
MI	1,724	active and closed non-petroleum USTs
MN	458	includes both active and closed tanks "registered" in state
MS	50	
MT	1	
NC	228	temporarily closed or active
ND	28	
NE	28	
NH	21	
NJ	6,600	
NY	367	
OH	400	approximate number
OR	426	includes both active and closed tanks
PA	71	
RI	18	
SC	17	active tanks; there have been many more tanks registered and subsequently properly closed.
SD	7	
VA	932	122 are active
VT	16	
WA	817	active hazardous substance tanks. not including closed tanks

WI	927	56 in use, 4 temporary out of service, 867 closed
WV	186	
WY	29	

8-2a. Has your state developed guidance/regulations for hazardous substance USTs?

- Yes 32
- No 8
- Don't know 7

Comments:

CO - OPS regulates petroleum USTs/ASTs and hazardous substance USTs, although OPS only regulates the cleanup from petroleum USTs/ASTs. CDPHE regulates cleanup from hazardous substance tanks.

CT - State requirements for hazardous substance tanks are the same as the federal requirements with the additional requirement that the USTs must be removed at the end of their life expectancy.

IL - Regulations for cleanup.

KS, SC, WV – Same as federal regs.

KY - The same procedures apply for all regulated UST systems.

MT - Rules mirror 240 CFR- 280.42, require double wall.

NH - The petroleum UST rules also applies to hazardous substance tanks.

OK - Guidance is regulated by the Oklahoma Department of Environmental Quality.

RI - The UST regulations include hazardous substances.

TX - No specific guidance for hazardous substance USTs has been developed; standard program guidance is used. The standard program guidance can be found at the following web addresses: <http://www.tceq.state.tx.us/nav/cleanups/pst.html>, or <http://www.tceq>

WA - Have to meet all requirements for USTs

8-2b. If yes, and this information is on a state website, please provide the address.

State	Website
AL	www.adem.state.al.us
CO	http://oil.cdle.state.co.us
CT	www.dep.state.ct.us/wst/ust/regsust.pdf
DE	http://www.dnrec.state.de.us/dnrec2000/Divisions/AWM/ust/Regs/ust_regs.asp New Draft regs: http://www.dnrec.state.de.us/dnrec2000/Divisions/AWM/ust/UST%20Regs/Draft%20UST%20Regulations%20April%202007.pdf
FL	www.dep.state.fl.us/waste/categories/tanks
HI	http://www.hawaii.gov/health/environmental/waste/ust/tgm.html

IL	epa.state.il.us	regulations for cleanup
KY	www.waste.ky.gov	The same procedures apply for all regulated UST systems.
MA	www.mass.gov/dep/toxics/hazmatma.htm	
ME	http://www.maine.gov/sos/cec/rules/06/096/096c695.doc	
MI	www.michigan.gov/deqwhmd	see part 111
MN	http://www.pca.state.mn.us/cleanup/pubs/stortanksfs.html	
MO	http://www.dnr.mo.gov/env/hwp/tanks/tanks.htm	
MS	www.deq.state.ms.us	
MT	http://www.deq.mt.gov/UST/ustRules.asp	Rules mirror 240 CFR- 280.42, require double wall.
NC	http://ust.ehnr.state.nc.us/main.html	
NE	www.sfm.ne.gov	See regulations for USTs--Title 159
NH	http://des.nh.gov/rules/envwm1401.pdf	
NJ	www.state.nj.us/dep/srp/bust	
NM	www.nmenv.state.nm.us	
NY	http://www.dec.state.ny.us/website/der/bulkstor/	
PA	http://www.depweb.state.pa.us/landrecwaste/cwp/view.asp?a=1240&Q=453778&landrecwasteNav= 31016 	
RI	www.dem.ri.gov	
SC		exactly like the federal regulations
SD	http://www.state.sd.us/denr/DES/Ground/groundprg.htm	
TX	http://www.tceq.state.tx.us/nav/cleanups/pst.html , or http://www.tceq	
VA	www.deq.virginia.gov/tanks/pdf/usttech.pdf	
VT	http://www.anr.state.vt.us/dec/wastediv/ust/ust_regs.htm	
WY	http://deq.state.wy.us/shwd/stp	Found in Water Quality Rules and Regulations, Chapter 17, Section 17

8-3. How frequently are hazardous substance USTs inspected in your state?

State

- AL** About once every 3 years
- CO** Routinely; the goal is each tank every 18 months.
- CT** Same frequency as petroleum USTs
- DE** 2 hazardous substance tanks remain - one last inspected in 1999, one in 2001
- FL** Annually
- HI** Goal is at least once every two years
- KS** Every 4 years
- KY** Compliance Section supervisor said that hazardous substance USTs are being inspected at a rate that meets the 2005 Energy Act requirements.
- MD** Once every three years
- MN** Estimate 1 time every 9 years
- MO** Once every three years
- MT** 3 yrs
- NC** About once every 5 years
- ND** Every three years.
- NE** 6.8 years
- NH** Every 18 months
- NJ** Every three years
- NV** Our hazardous waste branch performs RCRA inspections of facilities storing hazardous waste.
- NY** Goal is once every three years. Depending on the area of the state, this goal may not be met.
- OH** Once every 3-6 years.
- OK** Hazardous substances, other than petroleum fuel product, are regulated by state agencies other than the OCC/PSTD.
- OR** Our goal is once every three years.
- RI** They have all been inspected since 1998.
- SC** Approximately once every 13 months.
- SD** once every three years.
- TX** Hazardous substance USTs are inspected at the same frequency as PSTs.
- VA** Inspected on a 4.4 year frequency with all tanks.
- WA** Currently about once every 5 years, same as petroleum USTs. After 8/07, we plan to move to once every 3 years for UST inspections, including hazardous substance tanks (pending approval/reauthorization of our tanks program and an annual tank fee increase to fund additional inspection staff.
- WI** Annually.
- WV** Same as petroleum USTs
- WY** Every 3 years.

8-4. How many releases were reported from hazardous substance USTs in your state between 2000 and 2005?

State

AK	0
AL	1
CO	Releases from hazardous substance tanks are reported to CDPHE.
DE	2
FL	0
HI	Very few. Less than 5.
IL	Total releases reported is 980 since 1984
MD	0
ME	6
MT	0
NC	6
ND	0
NH	1
NV	0
OH	9
OR	0
RI	0
SC	0
SD	0
TX	The type of substance released is not available in the LUST program database; however, the number of hazardous substance releases would be a very small percentage of the total number of LUST releases.
VA	0
WI	0
WV	0
WY	0

8-5. How many of these releases have had free-product plumes?

Answers to this question are either “none” or “don’t know.”

8-6. What types of hazardous substances have been released from USTs?

AL	solvents
DE	hexane, benzene, (toluene, xylene, TCE, PCE, MEK prior to 2000)
ME	hydrochloric acid, sodium hypochlorite

- MI** cleaning solvents, TCE, etc
- NC** ethylene glycol
- TX** Although the type of hazardous substance released is not available in the LUST program database, substances such as acetone, toluene, and isopropyl alcohol are some of the hazardous substances known to have been released.
- VT** sodium hypochlorite

8-7. Do you feel your state has adequately addressed hazardous substance UST release prevention and cleanup?

- Yes 34
- No 3
- Don't know 9

Comments:

MN - Unable to do frequent inspections.

NC - We do adequately address releases from hazardous substance tanks, but we DO NOT adequately address prevention of releases. To adequately address prevention, we should inspect these tanks at least once every 2 to 3 years.

OH - State lacks the statutory authority to regulate corrective action for hazardous substance releases.

9. Heating Oil Tanks

9-1. How many heating oil tanks are there in your state?

State:

CT	4,156	
HI	200	
KS	14	
LA	0	
MD	3,500	
ME	400,000	home heating oil tanks.
MN	3,000	
MT	93	
NC	250,000	Estimate by the NC Petroleum Marketer in the early '90s
NE	932	
NH	More than 100,000	heating oil tanks are likely to be present in NH.
NM	No heating oil tanks	in state
NY	11,000	
OR	500,000	
RI	1,222	
VA	400,000	Estimate given by an official about 8 years ago.
VT	20,000	
WA	126,740	From the 2000 census of the number of homes heated with fuel oil. Number of tanks is probably less. The state doesn't keep numbers of residential or commercial heating oil USTs.
WI	45,732	31,028 closed, 13,186 in-use, 1,465 abandoned, 53 temporary out of service

Comments:

HI - Releases from heating oil tanks are overseen by HIDOH HEER Office, as our section can only do regulated USTs. Not many residential heating oil tanks, but the most common owner/operators are hotels and military.

9-2. Which types and sizes of heating oil tanks are regulated in your state?

State	Residential (gallons >)	Industrial/commercial/institutional (gallons >)	Comments
AR		1,320	
CT			Residential heating fuel UST's are regulated upon release or through local ordinances. Non-residential USTs >2,100 gallons are required to be registered, tested, and removed at the end of their life expectancy.
DE	1,100 gallons	1,100	>1,100 gal to be registered, fees collected above 2,000 gallons. Any heating oil tank that has a release is regulated.
FL		30,001	Only applies to USTs with capacities greater than 30,000 gallons
KS		111	
ME	No volume exemptions	No volume exemptions	
MT	1,100	all	Residential or Farm: Any tank installed after April 27, 1995 or over 1100 gallons
NJ		2,000	Industrial/commercial/institutional heating oil USTs are regulated at sites with and aggregate capacity of greater than 2000 gallons.
NY	1,100	1,100	NY regulates tanks storing heating oil if the tank itself is 1,100 gallons or larger or once the site capacity exceeds 1,100 gallons of other petroleum products. For residential facilities it would typically be if they have the individual tank of 1,100
RI	1,100	No minimum	
VT		42,000	
WA		1,100	

Comments:

AL - Not regulated under the UST regulations. A release from a heating oil tank would be a violation of the Alabama Water Pollution Control Act.

CO - Heating oil tanks are exempt from regulations

KY - The UST Branch does not regulate heating fuel tanks (these are regulated by the Superfund Branch).

MA - Compliance is locally regulated. Leaking tanks are locally and state regulated

MI - Underground storage tanks greater than 1100 gallons are regulated in Michigan

NC - The term 'regulated' is specifically designated as regulated under 15A NCAC 2N. NC has registration, cleanup and fee requirements for some tanks that are not 'regulated' by federal law.

NE - No matter the size, all tanks have some regulation. The preventive regulations belong to the Nebraska State Fire Marshal. Cleanup regulations belong to DEQ. Very few preventive requirements apply to heating oil tanks with capacity of 1,100 gallons.

NV - Non-leaking heating oil tanks are not registered or regulated by our state.

OK - Oklahoma follows the federal heating oil tank exclusion. Tanks storing heating oil that was not being used on the premises would be regulated.

OR - The installation of heating oil tanks is regulated by the local fire district. Cleanups are overseen by the state environmental agency.

PA - Heating oil tanks are not regulated in PA. Therefore the number of tanks for both residential and commercial are unknown. Owners are subject to liability if a release occurs.

TX - Tanks used for storing heating oil for consumptive use on the premises where stored are exempt from regulation under the LUST rules (30TAC334).

VA - There is no regulation of heating oil tanks except by ICC Codes at the local level.

Heating oil at suppliers (not consumed on premises) is fully regulated as UST

WI - 45732 31,028 Closed 13,186 In-use 1,465 Abandon 53 Temporary out of service

WY - Heating oil tanks are not regulated in Wyoming.

9-3. Indicate in the table below the types of regulatory requirements that heating oil tanks must meet in your state. (Boxes indicate total number of states for each category.)

	Registration	Construction permit	Corrosion protection	Spill containment	Overfill prevention	Leak detection	Closure	Notification of release	Cleanup requirements
Residential									
Don't know	9	13	8	10	9	8	8	6	5
Not required	25	21	27	27	26	29	24	10	11
Required	10	7	8	5	7	4	11	27	27
Industrial									
Don't know	6	11	5	7	6	5	5	3	2
Not required	21	20	23	23	23	23	17	8	9
Required	18	11	15	13	14	13	21	32	32

9-4. Does your state have a fund to cover cleanups of releases from heating oil tanks?

- Yes UST fund 18
- Yes other type of Fund 5
- No 21
- Don't know 2

Comments:

DE - They may be included in "First Fund" if they qualify as an orphan tank, or if RP qualifies under inability to pay.

NC - We have state funds for petroleum UST cleanups, these funds are the Commercial Fund and the Non-commercial Fund. The Non-commercial Fund is used for heating oil USTs. They are considered separate funds and are not used interchangeably.

NJ - State UST Fund provides grants and loans to qualified UST owners/operators based on specific eligibility requirements. Only costs in excess of any homeowner and/or environmental liability insurance coverage is considered.

WA - The state manages a heating oil tank cleanup fund on behalf of heating oil distributors. Homeowners must sign up for coverage (which is free) to obtain the coverage. There are various requirements to qualify for coverage. See: <http://www.plia.wa.gov>.

9-5. If you use your state UST fund for heating oil cleanup, what percentage of the fund is used for this purpose?

DE - Heating oil tanks were not yet regulated at the time that you had to apply to get into our reimbursement fund.

KS – estimate less than 1%

ME – estimate less than 10%

MN – less than 10-30%

MT - An average of 3% per year since 2002

NE - An exact percentage is probably not possible to know, but it would be very low (<1%?).

NJ - Approximately 25% of total funds awarded are for heating oil UST cleanups.

NY - 27% of the sites funded are for heating oil cleanup. The percentage of the total funding is not easily obtainable.

OK – 0%

PA - 1%

VA – 27%

VT - Approaching 20%

WI – 0.5%

9-6. If you don't have a fund to clean up heating oil releases, how are heating oil cleanups paid for?

Answers were primarily responsible party and private insurance, additionally, owner operator, emergency response fund.

DE - There is a special fund for those who can demonstrate inability to pay or orphan tank sites.

9-7. If your state cleans up heating oil tank releases, what percentage of all your UST releases come from heating oil tanks?

CT - 5 to 10% If the State spends money it must seek cost recovery.

DE – 45%

ID - <2%

KS - estimate less than 1%

ME - estimate less than 10%

MN – 10-30%

NC – 24%

ND - <5%

NH - <10%

NJ - approximately 76%

RI – 27% The state does not clean up the releases, responsible parties do.

UT - very small portion, estimate at less than 1%

VA – 59%

WI – 9.5%

10. Out of Service Tanks

10-1. What is the number of USTs in your state with the following categories of out-of-service tanks?

Tank status	Number tanks/State	Hard data	Est.	Don't know
Temporarily closed legal)	AL-3159	X		total 8
	CO-241	X		
	CT-382	X		
	DE-71	X		
	FL-1118	X		
	HI-93	X		
	IA-329	X	X	
	ID-201	X		
	KS-782	X		
	KY-936	X		
	MD-5	X		
	ME-179		X	
	MI-381	X		
	MN-247	X		
	MO-901			
	MS-600	X		
	MT-84	X		
	NE-128	X		
	NC-424	X		
	ND-135	X		
	NH-101	X		
	NM-214	X		
	NV-126	X		
	*NY-1349	X		
	OH-294	X		
	OK-2020	X		
	OR-138	X		
	PA-1278	X		
	RI-20	X		
	SC-312	X		
	SD-164	X		
	TN-1013	X	X	
	TX-915 *		X	
	UT-130			
	VA-592	X		
	VT-99	X		
	WA-420		X	
	WI-115			
	WV-1343	X		
	WY-61			

Permanently closed (closed in place or closed and removed) (legal)	AL-29033	X		total 7
	CO-21497	X		
	CT-21492	X		
	DE-10262	X		
	FL-199610	X		
	HI-5964	X		
	IA-22442	X		
	ID-10222	X		
	KS-19614	X		
	KY-36323	X		
	MD-28496	X		
	ME-38256	X		
	MI-19255		X	
	MN-39224	X		
	MO-28	X		
	MS-22			
	MT-10869	X		
	NE-14268		X	
	NC-29424	X		
	ND-7683	X		
	NH-15559	X	X	
	NJ-56000			
	NM-38	X	X	
	NV-7464			
	NY-61141 *	X		
	OH-315	X		
	OK-24691			
	OR-25	X		
	PA-63066	X		
	RI-7465	X	X	
	SC-11821 *			
	SD-6685	X		
	TN-34507 *	X		
	TX *-39517	X	X	
UT-12000		X		
VA-56827	X			
VT-5912	X			
WA-34629	X			
WI-64548		X		
WV-18955				
WY-4293	X			

Orphaned / Abandoned (out of service but not properly closed with or without known responsible party)	CO-13 sites		X	total 26
	CT-430		X	
	FL-568	X		
	KS-65	X		
	KY-179	X		
	MD-20		X	
	MN-728	X		
	MS-100		X	
	NE-1769	X		
	NC-1259	X	X	
	NH-25			
	OR-153	X		
	PA-300	X		
	RI-18	X		
	SC-33	X		
	TX *-1890	X	X	
	UT- 300		X	
	VT - 20		X	
	WA-79	X		
	WI-2024		X	
WV-456				
WY-0	X			

Comments:

AL - These values are from a 1/5/2007 query.

CO - 21,497 permanently closed regulated USTs at 8,843 facilities; 241 temporarily closed regulated USTs at 108 facilities. Abandoned = active with date last used before 12/1/05

IA – As of January 2007.

IL - This information should be gathered from a different agency (Office of the State Fire Marshal).

KY - The number of tanks, not sites, are tracked.

ME – Tanks going in and out of service are a big problem for regulators, tank owners who take tanks out of service without following requirements, and for reopening.

MI - Removed from ground: 17,961 (estimated) Closed in ground: 1,294 (estimated) Change in service: 27 (estimated)

MN - Based on tank notification.

NC - No. of temp closed tanks (legal closure) - 424 No. of perm closed tanks (legal closure) - 29,424 No. of out of service tanks not properly closed - 1,259

NJ - Permanently closed tanks include all Federally-regulated USTs; does not include heating oil USTs.

NM - Sites with temporarily closed tanks: 86, Total number of tanks temporarily closed: 214. Number of sites with tanks closed in place: 12. Number of tanks permanently closed in place:38.

* **NY**- The numbers show the number of tanks in the state database and do not include the number of tanks in 5 delegated counties.

OK - We have many tanks registered that we classify as abandoned however there are many more not registered with the OCC.

* **SC** - Data on permanently closed tanks is not a guess, the data pool that supports this answer has not been subject to QA/QC efforts for early (1988-1994) entries.

SD - 164 "tanks" temporarily closed, 242 "tanks" abandoned in place, and 6443 "tanks" removed. Twelve "tanks" are in unknown status.

* **TN** – historical numbers

* **TX** - These numbers are facilities. In addition there are 6938 sites with both active USTs and USTs that have been properly removed from service—facilities where some of the tanks have been permanently removed from service.

VA - Some facilities have both temporarily closed tanks AND permanently closed tanks.

VT - 99 temporarily out of service or permanently out of service. Of those, 31 are double-walled and can stay in the ground more than a year. We know of 20 abandoned USTs. We know there are more, but we don't know how many more.

WA - Numbers do not include closures in process but not completed (1355 tanks)

WY - Wyoming does not consider any regulated tank to be orphaned. Wyoming goes after the legal owner of a tank to comply with the regulations. Because Wyoming pays for remediation at eligible sites in compliance, there is little incentive for a tank owner to abandon.

10-2. How are temporarily closed tanks monitored in your state to ensure that they remain in compliance with requirements?

State

Monitoring

AL - They are inspected on a routine basis to verify upkeep of corrosion protection, etc.

AZ - Administratively tracked and inspected periodically..

CO - Assuming the tanks have been upgraded. If the tanks contain free product, then release detection and cathodic protection systems must be maintained. If the tanks are empty (< 1” of liquid), then the cathodic protection system must be maintained.

CT - Tanks temporarily closed longer than 12 months (90 days at Fire Marshals discretion) that do not meet the new tank standards or upgrade requirements must be removed.

DE - Compliance inspections.

FL - They are inspected annually by our contracted county inspectors.

HI - 12 month temporary closure tracked by UST compliance inspectors.

IA - They are subject to bi-annual inspection. They are also monitored by our tanks section for annual tank fees and are required to retain FR.

ID - Contact owner and make sure that site is secure and proper records are kept.

KS - Facility inspection.

KY - They are inspected like all other tanks.

MD - Owner required to notify the Department. Department performs spot checks.

ME - Require annual inspection by certified installer or inspector just like in-service facility.

MN - Resources prevent monitoring of these tanks, unless they are at sites with other active USTs.

MO - Inspection every three years.

MS - They are monitored during routine inspections.

MT - State inspections.

NC - Temporarily closed tank are routinely inspection for compliance with federal and state requirements.

NE - Owners are contacted by field inspectors, periodically.

NH - DES inspects all tank systems including temporarily out of service tanks. A tank that is out of service must still maintain its leak detection and corrosion protection equipment. DES does not allow tanks to remain temporarily out of service indefinitely. DES has issued orders to remove tanks that are out of service and are not in compliance with the rules and has the ability to remove tanks using the state contractor.

NJ - Visual inspection and tank registration updates.

NM - Temporarily closed tanks can only remain so for a year. We inspect every facility in the State every 1.3 years. Inspections determine compliance.

NV - Regular compliance inspections to ensure continuing leak detection and release prevention.

NY - Tanks are considered active until the tank is permanently closed. As such we continue to inspect these facilities the same as active facilities.

OH - They are maintained on our on-site inspection list. There is also a permit requirement if they intend to be out of service > 1 year.

OK - The fuel inspectors check the tanks while performing inspections in that area. We find it difficult to contact owners regarding issues, especially maintaining CP, when the station is out of use.

OR - During site inspections.

PA - Must continue inspection requirements.

RI - State inspection before return to use or owner submits test results and compliance information.

SC - Inspection about every 13 months.

SD - Inspected once every three years.

TN - By inspection.

TX - Temporary out-of-service tanks are not targeted any differently than in-service tanks during normal inspection cycles. Each region makes risk-based evaluations of facilities to determine which sites should be targeted for inspection.

UT - Annual inspections.

VA - VA UST Regulation 9 VAC 25-580 requires permits from local code officials. As active USTs, they are part of the normal UST inspection rotation.

VT - They have the same requirements as in-service USTs unless they are pumped dry.

WA - These tanks/sites are subject to inspections as are operational tanks. The owners must pay annual tank fees and maintain corrosion protection, and if product is still in tanks they must continue release detection and providing insurance.

WI - Annual inspection.

WV - We are working them into the three-year inspection rotation.

WY - We track CP test dates in the same way we track CP test dates at operational tanks, and we periodically inspect tanks.

10-3. Does your state have a program to remove orphaned/abandoned tanks?

- Yes 17
- No 30
- Don't know 0

Comments:

AZ - Municipal and County Tank Closure Program.

KY - Most are covered by the Small Tank Owner Tank Removal Account. The account has an income limit.

NC - State trust fund money can be spent to hire a state contractor to perform closures. on tanks that may pose an imminent hazard to human health or the environment.

WA - The state receives \$50,000 per year from EPA to address abandoned tanks. We also have state funds to address these tanks if high enough priority, but no "program" to removed abandoned tanks.

10-4. How many LUST sites in your state are being redeveloped for another use through a brownfields program?

AI - 10-15

AZ - Exact number is unknown. A few. Arizona is pushing a Route 66 initiative focusing on identifying and remediating UST sites. To date, a few sites have been redeveloped and a couple cities along the Route 66 have been awarded Brownfields grants.

CO - 5 to 10 sites.

DE Don't know the number, but there are LUST sites that have been redeveloped for use through the brownfields program.

FL - Three USTfield sites.

HI - Just a few at this time.

ID - About 6.

MD - 14

ME - 12 Not through EPA Brownfields program, but Maine's counterpart for smaller sites, Voluntary Remediation Action Program (VRAP).

MN - Approximately 2,400. The program to remove abandoned tanks is run by the Department of Commerce.

MT - None. A number of formerly used service stations are being evaluated for future funding through Petroleum Brownfields. Some of these facilities may receive funding through local grants and revolving fund loans.

NC - Approximately 120.

NH - 13

NM - 0

NV - 1

OR - 2

PA - 20

RI – 25 This number reflects all Brownfields sites with tanks to date and most of them are heating oil tanks.

SC - The redevelopment of several sites has already been completed. However, this is a time-consuming process and there is no requirement for the state to be notified once the redevelopment is completed. The number of sites is not known at this time.

TN - 1

TX - There is one LUST site being redeveloped for another use through the state brownfields program. The number of LUST sites being redeveloped through local brownfields programs is unknown.

UT - 2 currently in the process.

VA - 3 or 4 sites were officially redeveloped through the Brownsfields program; many other petroleum-contaminated sites have been redeveloped but not under the “Brownfield” moniker.

VT - Approximately 10.

11. Ethanol

11-1. Is E85 fuel used in your state?

- | | |
|-------------------------------------|----|
| <input type="checkbox"/> Yes | 34 |
| <input type="checkbox"/> No | 10 |
| <input type="checkbox"/> Don't know | 4 |

Comments:

AL - There is an E85 station in Hoover, AL. Used by local government vehicles.

MI - Not yet, but Michigan has 3 completed ethanol plants with 3 more under construction. The Governor wants 1000 new ethanol stations by the end of 2008.

MT - There is currently only one E-85 facility in the Montana.

OK - Only minor use of E85 fuel in Oklahoma at this time.

PA - Approximately six E85 registered tanks.

WA - There is one commercial station in Washington that sells E-85 in Kennewick, WA. Fleets at Fort Lewis (Army) and McChord (Air Force) are using E-85, but it is not available to the public.

11-2a. Do you know of any E85 releases into the environment in your state?

- | | |
|-------------------------------------|----|
| <input type="checkbox"/> Yes | 2 |
| <input type="checkbox"/> No | 41 |
| <input type="checkbox"/> Don't know | 5 |

11-3a. Have there been any ethanol releases in your state?

- Yes 14
- No 13
- Don't know 19

11-3b. If yes, please describe volume released and status of cleanup:

DE - At least three E10 releases of up to several hundred gallons. All are currently in investigation phase. One site has free product recovery in progress.

KS - Several 1000 gal. Investigation complete. Site monitored.

MD - Small liquid E10 releases.

MI - Ethanol is the oxygenate of choice-so most releases will have around a 10% ethanol component Michigan has over 9000 open releases so the potential volume is great.

MN - Status unknown at this time.

MO - There have been a few E10 releases.

MT - 1200 gallon surface spill from a rail car derailment in 2006 in Missoula.

NY - Volumes range up to 500 gallons. Nearly all of them have been advanced to closure.

RI - We have just found ethanol in the groundwater during an investigation, so little is known.

SD - Amount varies and occur mainly at production facilities.

VA - Potentially thousands of gallons of ethanol, denatured with gasoline, were lost due to a slow leak from a bulk plant. Ethanol took several years to dissipate. Pilot tests with Dual Phase Extraction resulted in a frothy mess due to the ethanol.

VT - No ethanol in our state that we know of. It may be coming in 2007. Most likely there hasn't been but we are not always aware if ethanol is in the fuel.

WA - There have been releases of E-10 at some stations, but no "neat" ethanol releases that I am aware of.

11-4a. Has your state identified any compatibility/functionality issues with the storage and use of gasolines that contain:

E10

- Yes 4
- No 31
- Don't know 11

E85

- Yes 10
- No 20

Describe:

CO -- E85 tends to promote corrosion of soft metals.

DE – Yes, through research, No through our own experience as yet. Delaware probably has the most stringent requirements in the US for E85 tank.

HI - Just the usual hydroscopic problems at the distribution racks, and service stations.

IA - Our concerns can best be viewed on our website at <http://www.iowadnr.com/land/ust/technicalresources/ethanol.html>.

KS - There is abundant information available on equipment that is not compatible with E85. Our regulations require that equipment and material stored be compatible.

MI - Worried that station owners won't consider compatibility issues before filling tanks with E-85. Not all e-85 tanks are registering as required. UL has withdrawn certification for UST system compatibility with E-85.

MN - Research is continuing. Some dispenser parts are not compatible.

MO - Same concerns as other states, but have not identified any releases directly attributable to material incompatibility with ethanol blends.

MT - No evidence of a release but there is not enough data at the present time to draw a conclusion.

NC – Yes, but issues not based on actual cause of release studies. Based on literature, UL actions/decisions and NEIWPC documents, etc.

NE - To date no issues have been encountered and the State Fire Marshal inspects for compatibility and provides guidance for monitoring systems storing > 10% ethanol.

NH - Older fiberglass tanks and gasket incompatibility issues. Mobilization of sludge and residuals from USTs. Accumulation and swelling of water phase in tanks.

NY - While we have not seen any significant impacts at this time, we have seen a small increase in spills in areas that are using ethanol but do not have any direct evidence that they are connected.

OH - There is no accrediting organization that will certify dispensers for E85 to my knowledge.

OK - Use of ethanol-blended fuel is so minor at this time, compatibility issues have not yet been a problem.

OR - Not specifically but we are aware of concerns.

SC - Aluminum components as well as any other soft metals, such as nozzles and drop tubes. ATG probes that are not designed for ethanol have issues. Older fiberglass tanks and certain lined tanks.

TX - Compatibility/functionality issues have been identified; however, none outside the norm found.

WA - Becoming aware of compatibility issues of ethanol and USTs, primarily from literature/EPA/other states. We have not seen these issues here in Washington to date, at least that we are aware of. Again, very little E-85 is sold here.

12. Miscellany

12-1. Rank the primary ways releases are identified/reported in your state. (Note: these rankings are primarily based on the experience and professional opinions of the state respondent.)

Number of states ranking tank removal as:		#1	33
		#2	8
		#3	5
		#4	2
		#5	0
		#6	0
Number of states ranking sight or smell as:		#1	2
		#2	6
		#3	10
		#4	11
		#5	8
		#6	2
Number of states ranking drinking water impact as:		#1	0
		#2	2
		#3	3
		#4	10
		#5	23
		#6	0
Number of states ranking property transfer as:		#1	10
		#2	19
		#3	11
		#4	5
		#5	0
		#6	0
Number of states ranking leak-detection method as:		#1	8
		#2	12
		#3	12
		#4	11
		#5	1
		#6	0
Number of states ranking "other" as:		#1	2
	MD - #1-Daily inventory records	#2	2
	NM , #2-Department yearly inspection	#3	1
	OK - #2-Construction activities	#4	0

(utilities)			
SC - #3-routine compliance inspections. Also during cleanup/investigation of known release and citizen complaints.		#5	0
WY - #1-MSA; Additional Site Assessment, Subsurface Investigation.		#6	0

Comments:

FL – Verified by leak autopsy data - #1 sight or smell, #2 tank removal, #3 leak detection, #4 property transfer, #5 – drinking water.

KY - Tank removal is the primary reporting method. Samples analyzed for property transfers have identified releases to the environment also.

MT - The greatest number of reportable releases are spills and overfills, which are typically identified by sight at the time of the spill.

12-2. Rank the following leak-detection methods that appear to you to be the most successful at detecting *tank* leaks. (Note: these rankings are primarily based on the experience and professional opinions of the state respondent.)

Number of states ranking automatic tank gauges as:				#1	13
				#2	10
				#3	8
				#4	3
				#5	1
				#6	0
				#7	0
Number of states ranking inventory control as:				#1	4
				#2	3
				#3	7
				#4	7
				#5	3
				#6	6
				#7	0
Number of states ranking interstitial monitoring as:				#1	17
				#2	8
				#3	4
				#4	2
				#5	2
				#6	0
				#7	0
Number of states ranking SIR as:				#1	1
				#2	1
				#3	6
				#4	8
				#5	9
				#6	1
				#7	3
Number of states ranking groundwater monitoring as:				#1	2
				#2	4
				#3	5
				#4	4
				#5	5
				#6	5
				#7	1

Number of states ranking soil-vapor monitoring as:				#1	0
				#2	2
				#3	3
				#4	3
				#5	3
				#6	2
				#7	9
Number of states ranking tank test as:				#1	6
				#2	11
				#3	9
				#4	3
				#5	3
				#6	1
				#7	1
Number of states answering " Don't know "					10

Comments:

AL - Very few tank releases are reported to ADEM. Most releases appear to be from piping and/or connections.

DE - Ranking varies depending on skills of operator.

MN - In the process of gathering data.

MO - Tank leaks are so rare that there is an insufficient universe of releases with which to answer this question.

MT - Groundwater and soil vapor monitoring are only used for leak detection at under 5% of UST sites in MT. We have had very few leaks from upgraded tanks in recent years.

NC - Only ATG and interstitial monitoring are relatively successful. Others are not reliable and are not ranked.

NE - You don't define "successful". Do you mean total numbers or the ability of method to work as intended? These are estimates. Very few release are discovered and reported by release-detection methods.

NY - Based on the methods typically used in NY - we have lots of interstitial and not a lot of SIR or wells.

OK - Response from PSTD Compliance Dept.

SC - #1. Routine compliance inspections are more successful than all of these combined. Do not remember an interstitial monitoring report of a release...NOR a failure of a double-walled tank. Vapor and water monitoring are little used.

TX - There is not current indication that any one method is superior to another when each is properly utilized. Tank testing is not recognized as an ongoing leak-detection method. Inventory control is not by itself a leak detection method.

WA - We have no data to be able to answer this question. I would guess that ATGs and tank tests are the most successful - at least at detecting the potential for a release.

12-3. Rank the following leak-detection methods that appear to you to be the most successful at detecting *pip*ing leaks. (Note: these rankings are primarily based on the experience and professional opinions of the state respondent.)

Number of states ranking mechanical LLD as:			#1	7
			#2	10
			#3	11
			#4	5
			#5	1
			#6	0
			#7	0
			#8	0
Number of states ranking electronic LLD as:			#1	12
			#2	14
			#3	7
			#4	5
			#5	0
			#6	0
			#7	0
			#8	0
Number of states ranking inventory control as:			#1	2
			#2	3
			#3	6
			#4	3
			#5	6
			#6	6
			#7	6
			#8	1
Number of states ranking SIR as:			#1	0
			#2	3
			#3	1
			#4	3
			#5	9
			#6	9
			#7	2
			#8	4

Number of states ranking interstitial monitoring as:			#1	14
			#2	4
			#3	6
			#4	5
			#5	2
			#6	2
			#7	1
			#8	1
Number of states ranking groundwater monitoring as:			#1	0
			#2	0
			#3	4
			#4	3
			#5	8
			#6	8
			#7	5
			#8	1
Number of states ranking soil-vapor monitoring as:			#1	0
			#2	0
			#3	3
			#4	2
			#5	5
			#6	5
			#7	2
			#8	8
Number of states ranking pipng test as:			#1	13
			#2	8
			#3	7
			#4	6
			#5	2
			#6	2
			#7	0
			#8	0
Number of states answering "don't know"				9

Comments:

SC - #1. Compliance inspections.

TX - Hydrostatic line testing appears to be the most reliable method. Mechanical line leak detectors are only for detecting gross leaks. Otherwise, there is no current indication that any one of the methods is superior to the others.

12-4. Please indicate how often new releases requiring corrective

Facility Type	Don't know	1-25%	26-50%	51-75%	76-100%
Retail motor fuel facilities	7	4	5	11	20
Non-retail motor fuel facilities (e.g., commercial fleet fueling, public works)	7	33	5	0	1
Other facility (e.g., non-motor fuel)	10	30	2	2	1

action in your state fall in the following three categories of

facility. (Boxes show total number of state responses to each category and based primarily on professional experience and estimates.)

Comments:

- CO - 245 confirmed releases from 12/1/05 forward.
- DE – Specifically, Retail: 40%, Non-retail: 20%, Other: 40% (last category is primarily heating oil sites)
- FL - Verified by leak autopsy data - Retail: 20-50%, Non-retail: 1-25%, Other: 1-25%
- MI - Many of Michigan's "new" releases are discovered through Baseline Environmental Assessments that are conducted at the time a property transfers.
- MO - Frequency of releases coincides with universe of facilities. (i.e., 75-80% of UST facilities are retail; they experience 75-80% of the releases.)
- NY - The percentages above reflect the total number of releases (petroleum and non-petroleum) including those not from USTs.
- SC - Guess....80% retail facilities.

12-5a. Does your state have a Pay-for-Performance (PFP) program?

- Yes 17
- No 30
- Don't know 0

Comments:

- DE - PFP just getting started. Contractors chosen, contracts being signed.
- KY - Currently, only a few sites have gone through this process.
- MI - In the past, Michigan had a PFP program that was moderately successful, covering investigation and cleanup.
- OK - Program is eligible only for Indemnity Fund eligible cases.
- PA - The PFP program in PA is administered by the USTIF Insurance Fund corrective action cleanups.
- VA - Virginia allows PFP, but VDEQ does not have specific guidelines.
- WA - There is no state cleanup fund for LUSTs. WA requires all UST to have financial responsibility to cover the costs of UST releases.

12-5b. If so, is this program eligible for:

- All sites? 13
- State lead sites only? 3

Comments:

FL - We use PFP on some of the eligible sites that we are paying for, and we do not care whether responsible parties use PFP on sites they are paying for. I suspect some of them are but we are not privy to this information.

**12-5c. If so, for what phase of the cleanup does your state use PFP?
(indicate all that apply)**

- Investigation 9
- Cleanup 17
- Monitoring 4

Comments:

DE - Tank removal/abandonment and Investigation are separate contracts - not PFP.

12-6. If you have a PFP program, for what percentage of your sites do you use PFP?

- 1-25% 13
- 26-50% 0
- 51-75% 0
- 76-100% 2
- Don't know 5

Comments:

DE - No sites have entered the PFP program yet.

FL - PFP on eligible program sites is voluntary. Most cleanup contractors prefer to use our preapproval program instead of PFP

MI - We tried it on about 6 sites.

NM - All sites that go to remediation are required to include PFP in their proposals.

NC - 4 sites, voluntary program

OK - There have been no recent approval of PFP contracts. All in-place PFP contracts are three to four years old.

VA - Less than 1%.

VT - A small percentage of all sites but more than 50% of sites going into corrective action.

12-7. Have your UST leak prevention rules addressed MtBE vapor releases?

- Yes 5
- No 38
- Don't know 4

Comments:

DE - We believe that our new draft regulations will take care of MTBE vapor releases.

12-8a. Do you have sites (whether or not a cleanup is required) where vapor releases are believed to be the source of contamination?

- Yes 16
- No 13
- Don't know 18

12-8b. If yes, how many?

DE - Probably 5-10. Information not tracked.

ME - Have had several in past when Maine had 11-15% MTBE RFG.

NH - About 200 sites. This is based on where we believe vapor releases are the primary source of the contamination. It is highly likely that there are multiple sources of leaks at these sites (spill buckets, pre-existing spills, etc.).

OK - Only 2 - 4 across the state. This is an estimate. We do not track contamination source or implemented remediation technologies.

VT - 50 (estimate). Many sites in MNA have vapor releases which are discovered by groundwater monitoring and then verified by an on site inspection.

12-9. Does your program perceive fuel blends/additives other than MtBE (e.g., EtOH, TBA, TAME, ETBE, DIPE, EDB, 1,2 DCA) to be a concern based on the breakdown in the following table?

	TBA	TAME	ETBE	DIPE	EDB/1,2DCA
Current problem	7	7	4	6	10
Impending problem	1	2	1	0	1
Potential or unknown problem	9	8	9	9	7
Not a problem	6	7	7	8	8
Problem unknown because of a lack of information	16	15	18	16	12
Don't know	9	9	9	9	10

END