

**UNDERGROUND STORAGE TANK COMPLIANCE:
WHERE ARE WE HEADED?**

**John A. Mundell
Vice President
Corporate Director, Technical Services
ATEC Associates, Inc.**

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RECENT UST REGULATORY BRIEFS

UST CORRECTIVE ACTION RULE PROPOSED

Last summer the EPA proposed procedures for issuing corrective action orders on leaking USTs. If the proposal is adopted, it would establish administrative procedures for the issuance of corrective action orders for USTs under RCRA section 9003(h), which outlines the agency's response program for petroleum releases.

Under the proposal, administrative procedures in 40 CFR Part 24 would be used when a LUST Trust Fund corrective action order has been issued under RCRA Section 9003(h). Existing rules under this section would also cover administrative hearings. EPA believes that 40 CFR Part 24 will promote immediate responses where corrective actions have not been undertaken. When a LUST Trust Fund corrective action order is issued along with a compliance order under RCRA Section 9006, regulations in 40 CFR Part 22 would be followed.

The rule is being opposed by commenters who state it is inconsistent with RCRA in that RCRA Section 9003(h) does not authorize EPA to use 40 CFR Part 24 hearing procedures in issuing UST corrective action orders and that 40 CFR Part 22 should apply instead. Part 22 procedures allow more extensive discovery, including cross-examination of witnesses and production of documents unlike Part 24.

AST REGS EITHER IN PLACE OR UP AND COMING

Aboveground storage tanks (ASTs) are subject to regulation in a number of states and underground storage tank (UST) owners who are considering ASTs as a way to avoid the financial burdens imposed by regulation of USTs should keep this in mind. Recently, state legislatures have started to enact AST regulations which include financial responsibility and trust fund coverage requirements; design and construction standards; registration provisions; tank testing and leak detection requirements; closure requirements; and spill prevention plan preparation. California, Florida, and Pennsylvania have AST regulations in place.



FINANCIAL RESPONSIBILITY DEADLINES

Petroleum Marketers Owning More Than 1,000 Tanks: January 24, 1989.

Petroleum Marketers Owning 100-999 Tanks: October 26, 1989.

Petroleum Marketers Owning 13-99 Tanks: An EPA-issued interim final rule on May 2, 1990 extended the initial April 26, 1990 deadline by one year to April 26, 1991.

Petroleum Marketers Owning 1-12 Tanks (or less than 100 tanks at one facility, non-marketers with net worths less than \$20 million, and local governments): On October 31, 1990, EPA issued a final rule extending the October 26, 1990 compliance date to October 26, 1991. For all local government entities, however, the new compliance deadline will be one year from the date when EPA publishes a final rule on additional financial assurance mechanisms for meeting the financial responsibility requirements.

CAA AMENDMENTS TO IMPACT PETROLEUM INDUSTRY

The Clean Air Act Amendments will affect UST owners and operators. States in all but marginal ozone non-attainment areas must require the phased installation of Stage II vapor recovery systems on gasoline dispensers at facilities with more than 10,000 gallons per month throughput (or 50,000 gallons in the case of small business independent marketers) by November, 1992. Installation of Stage II systems normally requires that vapor return piping be installed underground, at which time upgrading or replacement of USTs could take place.

November 1, 1992 is the deadline for gasoline sold in certain carbon monoxide non-attainment areas during four winter months to contain at least 2.7 percent oxygenates (e.g., ethanol or MTBE). All gasoline sold in "extreme" and "severe" ozone non-attainment areas must be reformulated gasoline by January 1, 1995.

An alternative fuels program was also established under the law. The program was designed to encourage the use of clean alternative fuels (methanol, ethanol, or other alcohols). The program also requires that commercial and federal government fleets have a certain percentage of vehicles capable of using alternative fuels; a certain number of alternative fuel vehicles to be sold in California under a test program; and in certain cities buses which use alternative fuels.

UST LOANS AND LENDER LIABILITY

In the future, the EPA is expected to address the issue of lender liability as it relates to UST cleanup responsibility. EPA has received several requests for this action following its draft proposal addressing lender liability under the Comprehensive Environmental Response, Compensation and Liability Act.

Industry groups representing petroleum marketers pointed out to EPA that any clarification of Superfund's security interest exemption for lenders would not affect the problems the petroleum marketers and other tank owners have in obtaining UST-related loans. In addition, loan management guidelines that EPA proposes to establish under Superfund could be unnecessarily stringent for UST-related loans.

UST DEADLINE EXTENDED

According to a January 2, 1991 EPA-issued interim final rule, UST owners and operators will have until September 22, 1991 to install automatic leak line detectors on new or existing underground pressurized piping systems without the minimum performance of this detection equipment having to meet the 40 CFR 280.43(a)(3) requirements for a probability of detection of 0.95 and a probability of false alarm of 0.05. Under the modification, owners and operators were still required to equip all pressurized piping with an automatic line leak detector to have either an annual line tightness test conducted or begin conducting monthly monitoring by December 22, 1990. Also, all automatic line leak detectors were still required to detect leak rates of three gallons per hour (gph) at ten pounds per square inch (psi) within one hour as contained in § 280.44(a).

TABLE 1
REMEDIAL TECHNOLOGIES ESTIMATED COSTS

<u>Technology</u>	<u>Cost, \$ Per Ton</u>
Soil Venting	20-50
In-Situ Bioremediation	20-60
Land Farming (unrestricted)	25-60
Solid Phase Bioremediation	50-90
Soil Washing (w/biotreatment)	75-130
Bioslurry Reactors	75-150
Land Farming (restricted)	80-150
Stabilization	80-200
Cement Kilns, etc.	120-175
Solvent Extraction	150-300
Thermal Stripping	150-400
Incineration (on site)	200-400
Incineration (off site)	500-2,000

TABLE 2
ON-SITE ABOVEGROUND SOIL BIOREMEDIATION COSTS

<u>Volume, yd³</u>	<u>\$/yd³</u>
100	300-600
250	120-240
500	60-120
750	40-80
1,000-5,000	30-60
5,000-10,000	20-40

Note: Actual cost dependent on contaminant type, concentration, and amount of pre-design analyses/testing.

State-by-State Summary of Current Hydrocarbon-Contaminated Soil Cleanup Levels January 1990*

<u>State</u>	<u>Parameters</u>	<u>Method</u>	<u>Term</u>	<u>Level</u>	<u>Related Information</u>	<u>References</u>
AL	TPH ^a BTEX ^b Lead	EPA 9071 ^a , Standard Method 503 ^o EPA 5030 or EPA 3810 EPA 8020 or EPA 8240 EPA 239.2	CAL ^r	100 ppm TPH	No further action required if TPH <= 100 ppm and groundwater > 5 feet below the surface or TPH values are <= 10 ppm for all soil samples.	AL Dept. of Env. Mgt. Admin. Code R., Water Quality Program. Sections 335-6-15.26 to 335-6-15.34. Contact: (205) 271-7986.
AK	TPH BTEX HDIC ^c	EPA 418.1 ^p , using Infrared Spectroscopy (IR) EPA 8020 and EPA 5030 or EPA 8240 by GC/MS EPA 8015 by GC	GL ^s RG ^t	100 ppm for diesel, 50 ppm for gasoline total BTEX <= 10 ppm	These are recently proposed soil sampling guidelines developed to provide an enforceable policy framework. HCID method used to identify hydrocarbon type. Samples need only be analyzed for TPH if HCID test indicates the presence of diesel or other non-gasoline fractions.	Petroleum Contaminated Soil Sampling Guidelines. (Draft) AK Dept. of Environmental Conservation. March 1990. Contact: (907) 465-2630.
AZ	TPH BTEX	Modified EPA 8015 for gasoline or modified 418.1 for diesel EPA 8020 or modified EPA 8015 for TEX	GL	100 ppm TPH 130 ppm benzene 200 ppm toluene 68 ppm ethylbenzene 44 ppm xylenes	Non-enforceable, health based guidance levels derived from AZ Dept. of Health recommended groundwater cleanup and action levels. These values represent ten times allowable limits for groundwater.	Contact: (602) 257-6984.
AR	TPH BTEX	EPA 418.1 EPA 8020	RG	None	Remediation goals determined on a case-by-case basis as a function of water quality considerations.	Contact: (501) 562-7444.
CA	TPH TRPH ^d BTEX HVOs ^e	Modified EPA 8015, EPA 5020 for gas, EPA 5030 for diesel EPA 418.1 for diesel EPA 8020 EPA 8010	RG	10-1,000 ppm TPH for gas, 100 to 10,000 ppm TPH for diesel, 0.3-1 ppm benzene, 0.3-50 ppm toluene, 1-50 ppm xylenes, 1-50 ppm ethylbenzene	TPH analytical methods used based on procedure recommended by CA Dept. of Health Services. The analyses performed based on the nature of the contaminant. LUFT Field Manual intended to be used as a tool for developing site-specific cleanup levels as opposed to state-wide remediation goals.	CA LUFT Field Manual, State Water Resources Control Board, Sacramento, CA. November, 1989. Contact: (916) 739-4324.
CO	TPH BTEX	EPA 418.1 or modified EPA 8015 EPA 8020	RG	None	Site-specific remediation goals often to detect limits or level deemed necessary to protect groundwater and minimize potential off-site impacts.	CO House Bill No. 1299, Amendment to Sec. 1, Article 20, Title 8, CO Revised Statutes, Underground Storage Tanks. UST Contact: (303) 331-4830; LUST Contact: (303) 289-5643.
CT	BTEX HVOs	EPA 8020 EPA 8010	GL	50 ppm TPH for gasoline	If the TPH concentration exceeds 50 ppm then EP Toxicity testing for heavy metals must be performed. Soils exceeding EP Toxicity for metals are disposed of as hazardous material. Soils contaminated with fuel oils may be mixed with clean sand to prevent free draining of product and landfilled.	Contact: (203) 566-4630.
DE	TPH BTEX	EPA 418.1 EPA 8020	RG	100 ppm TPH and 10 ppm BTEX for gasoline	DE Division of Air and Waste Management reportedly in the process of developing guidance levels which may be incorporated into existing corrective action process for UST sites.	Contact: (302) 323-4588.

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FL	Not Required		GL	500 ppm TPH	Soils with TPH readings exceeding 500 ppm on organic vapor analysis instruments with flame ionization detectors require remediation. Soils with vapor readings between 10-500 ppm may require cleanup depending on site-specific factors. Lab analysis of soils performed for verification purposes only.	Guidelines for Assessment and Remediation of Petroleum Contaminated Soils. FL Dept. of Environmental Regulation. January, 1989. Contact: (904) 488-3936.
GA	TPH BTEX	EPA 418.1 EPA 602	CS ^u	100-500 ppm TPH total BTEX 20-100 ppm	Soils > 100 ppm TPH or 20 ppm total BTEX must be remediated at sites within 3 miles of public drinking water wells or 1/2 mile from private wells. Remediation of soils in excess of 500 ppm TPH or total BTEX > 100 ppm is required at all other UST corrective action sites.	Rules of GA Dept. of Natural Resources Environmental Protection Division, Chapter 391-3-15, UST Management. December, 1989. Contact: (404) 669-3927.
HI	TPH	EPA 3550 for diesel, EPA 5030 and EPA 8015 or EPA 8020 for gas	RG	50 ppm TPH	A remediation goal of 50 ppm TPH may be applied at sites limited to soil contamination. The agency utilizes state water quality standards to evaluate site-specific environmental and public health risks and determine cleanup requirements at sites where groundwater may be impacted.	Contact: (808) 543-8226.
ID	TPH BTEX EDB ^f	Modified EPA 8015 EPA 503.1, EPA 602 EPA 624, EPA 8020, EPA 8240 EPA 8010	RG	100 ppm TPH for gasoline, 1000 ppm for diesel Individual BTEX values of 1 ppm	Soils with TPH > 100 ppm for gasoline spills and 1000 ppm TPH at diesel sites or individual BTEX concentrations > 1 ppm should be remediated. More stringent goals may be applied in cases where "beneficial" groundwaters may be impacted.	Recommended Cleanup Criteria for Sites Contaminated with Petroleum Released from USTs. ID Water Quality Bureau. June, 1989. UST Contact: (208) 334-5847; LUST Contact: (208) 334-5845.
IL	BTEX	EPA 5030 EPA 8240	CAL	0.025 ppm benzene and total BTEX <= 16.025 ppm	Soil cleanup objectives may only be applied at sites where groundwater is not impacted. Soils meeting these criteria are no longer considered a potential source of groundwater contamination. Soils exhibiting petroleum odors or visibly contaminated must also be removed.	Guidance Manual for Petroleum-Related LUST Cleanups in Illinois. IL Env. Protection Agency, Div. of Pollution Control. May, 1990. UST Contact: (217) 785-5878; LUST Contact: (217) 782-6761.
IN	TPH	EPA 418.1	GL	100 ppm TPH	Cleanup levels are determined on a site-by-site basis. The agency is considering the use of a 100 ppm TPH action level as a screening tool for site investigations.	Contact: (317) 243-5055.
IA	TPH BTEX	EPA 418.1, EPA 8250 EPA 8020, EPA 8240	RG	100 ppm TPH	Soils greater than 100 ppm total volatile or total extractable hydrocarbons (depending on the nature of the contaminant) are considered contaminated and must be remediated. Remediation goals determined on a case-by-case basis.	Contact: (515) 281-8692.
KS	TPH BTEX EDC ^g	Appropriate EPA SW-846 methods	CAL	100 ppm TPH 1.4 ppm benzene 0.8 ppm EDC	TPH is defined as the sum of individual concentrations of toluene, xylenes, ethylbenzene, and MTBE for the purpose of determining cleanup requirements. Soil contaminant levels greater than 1.4 ppm benzene, 0.8 ppm EDC and/or 100 ppm TPH require remediation.	Corrective Action Policy Manual. KS Department of Health and Env., UST Program. October, 1989. Contact: (913) 296-1678.

State-by-State Summary of Current Hydrocarbon-Contaminated Soil Cleanup Levels January 1990*

<u>State</u>	<u>Parameters</u>	<u>Method</u>	<u>Term</u>	<u>Level</u>	<u>Related Information</u>	<u>References</u>
KY	TPH BTEX PAHs ^h	EPA 9070 or EPA 9071 for waste oil EPA 8020 for gasoline EPA 8100 for diesel	RG	Background	Collection of both background and suspected contaminated soil samples are required at all tank removals. The agency normally requires soils to be remediated to background or detection limit.	Guidelines for Site Investigations of Leaking Underground Storage Tank Sites in KY. KY Dept. of Environmental Protection, UST Program. October, 1989. Contact: (502) 564-6716.
LA	BTEX TPH	EPA 8020 for gasoline Modified EPA 8015 (CA)	RG	None	Remediation goals are determined on a site-by-site basis but are comparable to those applied in other states.	Proposed Underground Storage Tank Rules and Regulations. LA Dept. of Environmental Quality, UST Division. May, 1990. Contact: (504) 342-7808.
ME	TPH	Field screening method	RG	20-50 ppm TPH	Remediation goals are determined on a site-by-site basis, however, 20-50 ppm TPH as measured by field instrumentation (H-Nu) are often considered acceptable.	Contact: (207) 289-2651.
MD	TPH BTEX MTBE ⁱ	Modified EPA 418.1 EPA 601, 602, 624 or 625 based on field screening	RG	None	Free-phased product must be removed to background or non-measurable levels. Dissolved contamination may also require removal to an endpoint determined both feasible and cost beneficial.	Contact: (301) 631-3442.
MA	TOVs ^j	Field screening method for gasoline Standard Methods 503B/E or EPA 418.1	RG	10 ppm total volatiles 100 ppm TPH	Gasoline contaminated soils greater than 1,800 ppm TOVs or oil residuals with a weight/weight concentration greater than 300 ppm TPH are regulated as hazardous waste. TOVs are measured as total organic headspace vapors expressed as benzene utilizing a portable PID or FID.	Management Procedures for Excavated Soils Contaminated with Virgin TPH Petroleum Oils. Policy #WSC-89-001 MA Dept. of Env. Protection. June, 1989. UST Contact: (508) 851-9813; LUST Contact: (617) 292-5903.
MI	BTEX PAHs TPH	EPA 602, 8020 or 8240 EPA 8270, 8250 Standard Methods 503 B,503D,503E	CAL	Background, detection limit or risk-based value	One of three options may be selected by RP as cleanup objective: cleanup to background or detection limit; levels that do not pose an unacceptable risk based on standard exposure assumptions; or based on a site-specific assessment of risk.	MI Dept. of Natural Resources. Environmental Contamination Response Activity, Administrative Rules for 1982 PA 307 as passed, May, 1990. UST Contact: (517) 334-7090; LUST Contact: (517) 334-7079.
MN	BTEX TPH Lead	EPA 8015, 8020 EPA 418.1 Appropriate EPA test method	RG	50 ppm TPH	Additional action levels of 10 ppm TPH for gasoline and less than 1 ppm for heavier fuels are used for field screening (using PID) at sites where soils are to be excavated. Laboratory analysis of remaining soils is used to determine if further remedial investigation is required.	Excavation of Petroleum Contaminated Soil. MN Pollution Control Agency, Tanks and Spills Section. April, 1990. Contact: (612) 296-7743.
MS	BTEX TPH	Appropriate EPA test method Standard Methods 503	RG	100 ppm total BTEX for gasoline 100 ppm TPH for diesel	These cleanup levels are typically applied at sites in which there are no "sensitive environmental receptors" such as public or private wells and geologic recharge areas.	Contact: (601) 961-5171.
MO	VOA ^k TPH	EPA 8020 or 8240 (VOA scan) Modified EPA 418.1	GL	10 ppm TPH and 10 ppm total BTEX or VOA for petroleum	Residual contamination levels are reviewed as part of tank closure reporting requirements. Further corrective action may be required depending on site-specific conditions.	UST Guide for Tank Closure. MO Dept. of Natural Resources. June, 1989. UST Contact: (314) 751-7428; LUST Contact: (314) 751-7929.

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MT	BTEX TPH	EPA 8020 for gasoline EPA 8015 or EPA 418.1 or modified EPA 8015 (CA)	GL	100 ppm TPH 10 ppm total BTEX	Contaminant concentrations exceeding these values may trigger further investigation (health based risk assessment) to determine site-specific remediation goals.	1989 Admin. Rules of Montana, Sub-Chapters 5-7, Sections 16.45.401-16.45.701. Contact: (406) 444-5970.
NE	VOA TPH	EPA 624, 601, 602, 8020 or 8024 for gas EPA 418.1 or 3540	RG	None	Remediation goals established on a site-by-site basis. Proposed rules currently under development may include a matrix of cleanup levels for soils based on site-specific criteria.	UST System Site Assessment Protocol for Permanent Closure and Change in Service. NE Dept. of Environmental Control. September, 1989. UST Contact: (402) 471-9465; LUST Contact: (402) 471-4230.
NV	TPH	Modified EPA 8015	GL	100 ppm TPH	Excavation of soils contaminated in excess of 100 ppm TPH may be required depending on site-specific conditions including depth to groundwater, land use and hydrocarbon product type.	Hydrocarbon Spill and Remedial Action Policy. NV Dept. of Conservation and Natural Resources. October, 1987.
NH	BTEX TPH	Modified EPA 8015 EPA 418.1 for diesel	RG	1 ppm BTEX and 10 ppm TPH for gas, 1 ppm BTEX and 100 ppm TPH for all others	More stringent remediation goals may be set depending on site-specific factors. Current goals established using the CA LUFT Field Manual leaching potential analysis for gasoline and diesel using data from NH case histories.	Policy for Management of Soils Contaminated from Spills/Releases of Virgin Petroleum Products. NH Dept. of Environmental Services. June, 1989. Contact: (603) 271-3444.
NJ	VOs ^l SVOs ^m TPH	Appropriate EPA SW-846 method	GL	1 ppm VOs 10 ppm SVOs 100 ppm TPH	Three percent (30,000 ppm) petroleum contaminated soil is classified as hazardous and requires disposal (if not treated) in a hazardous waste facility. PCS exceeding 100 TPH may require cleanup based on the extent of VOs and SVOs present.	Environmental Cleanup Responsibility Act, NJ Dept. of Environmental Protection. Contact: (609) 984-3156.
NM	VOs TPH	EPA 8240 or other FID approved method EPA 418.1	GL	10 ppm benzene 50 ppm aromatics 100 ppm TPH	Soils contaminated with gasoline or lighter hydrocarbons require remediation if benzene concentrations exceed 10 ppm, all detected aromatics exceed 50 ppm, or field measurements (headspace method) are greater than 100 ppm. For diesel and heavier hydrocarbons, TPH levels greater than 100 ppm indicate remediation is necessary.	Draft NM UST Bureau Soils Policy, NM Health and Environmental Dept., Env. Improvement Division (EID). July, 1990. Contact: (505) 827-0188.
NY	VOs SVOs	EPA 8020 EPA 8270	GL	compound specific	Recently proposed soil cleanup rules call for soil guidance values to be calculated for individual compounds using the water partition theory equation ($C_s = f * K_{oc} * C_w$), where C_w is the more stringent NY Dept. of Health groundwater/drinking water standard in ppb, K_{oc} the contaminant-specific partition coefficient, and an assumed organic content (f) of 2.5 percent.	Methodology for Soil Guidance Module (Draft). NY State Dept. of Env. Conservation, Bureau of Spill Response. September, 1989. Contact: (518) 457-4351.
NC	VOs SVOs TPH	EPA 5030 with modified CA method EPA 5030 and 3550 with modified CA method	CAL	10 ppm TPH	Additional analytical methods may be required based on the nature of contaminant. Remediation of soils not required if TPH < 10 ppm. A Site Sensitivity Evaluation (SSE) is performed using a numerical scoring procedure to determine site-specific cleanup levels for sites with contaminated soils > 10 ppm TPH.	Guidelines for Remediation of Soil Contaminated by Petroleum. NC Division of Environmental Management. July, 1990. Contact: (919) 733-8486.

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ND	Not required		—	None	Laboratory analysis of soil samples not normally required unless overexcavation fails to remove residual contamination. Guidance levels under development.	Contact: (701) 224-2366.
OH	VOs SVOs TPH	EPA 8020 EPA 8270 EPA 418.1 (IR method)	RG	Background	All contaminated soils must be remediated to background or detection limits. RPs may propose alternative, site-specific cleanup standards if it can be demonstrated they would result in no adverse impact on any environmental media or pose a threat to human health or local fauna.	Corrective Action Policy and Procedures. Appendix C1, LUST Trust Fund Coop. Agreement, OH Dept. of Commerce. September, 1988. Contact: (614) 752-7938.
OK	BTEX TPH	Appropriate EPA SW-846 method	GL	10 ppm total BTEX 50 ppm TPH	These are temporary action levels established for tank closures and sites where contamination is limited to soils. They are also used to advise RPs if further corrective action may be required.	Contact: (405) 521-3107.
OR	BTEX TPH	EPA 5030 and EPA 8020 or 8240 Modified EPA 418.1	CAL	40-130 ppm TPH for gasoline 100-1000 ppm TPH for diesel	Site-specific target cleanup level is derived from a numerical matrix score based on five evaluation parameters: depth to groundwater; mean annual precipitation; soil type; sensitivity of the uppermost aquifer; potential receptors. These rules are currently undergoing revisions regarding analytical and sampling methods and reporting requirements.	Numeric Soil Cleanup Levels for Motor Fuel and Heating Oil (Draft). OAR 340-122-305 to 340-122-360. July, 1990. Contact: (503) 229-6652.
PA	BTEX TPH	Appropriate EPA SW-846 method	—	None	A computer modeling system is currently under development named Risk Assessment/Fate and Transport (RAFT) intended for use as a tool in the determination of site-specific cleanup levels based on the principles of environmental fate and exposure, exposure assessment and risk assessment.	User's Manual for Risk Assessment/ Fate and Transport (RAFT) Modeling System. PA Dept. of Env. Regulation, Bureau of Waste Management. October, 1989. Contact: (717) 657-4080.
RI	VOCs	Appropriate EPA SW-846 method	GL	50 ppm TPH	Site-specific cleanup goals based on the nature of the contaminant and whether the site is located on commercial or residential property. Laboratory analysis of soils required for VOCs in the case of gasoline spills, naphthalene for diesel, and PAHs for heavier fuels.	Contact: (401) 277-2234.
SC	BTEX TPH	EPA 602 or EPA 8020 EPA 418.1	—	None	Cleanup goals determined on a site-by-site basis. Contaminated soils may not be stockpiled on site. Many landfill operators will not accept soils in excess of 10 ppm total BTEX so much of the material requires pretreatment (incineration) prior to disposal.	Contact: (803) 734-5332.
SD	VOs SVOs	EPA 8200 or 602 for gas, EPA 8100 or 610 for diesel	RG	10 ppm TPH	Regulations require removal of all visibly contaminated soils. Site-specific cleanup levels may be negotiated or the RP can opt to clean to the 10 ppm TPH level.	SD Administrative Rules, Chapter 74:03:28, Underground Storage Tanks. Contact: (605) 773-3351.

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TN	BTEX TPH	Appropriate EPA SW-846 method Modified EPA 418.1 (CA) method	CS	10-500 ppm total BTEX 100-1000 ppm TPH	The contamination plume must be clearly defined in order to apply soil cleanup levels. A site-specific cleanup level is determined based on the highest level of soil permeability observed within the plume and whether groundwater present below the site is classified as a drinking or non-drinking water supply.	Petroleum UST Program Rules 1200-1-15.01 to 1200-1-15.07, Technical Standards and Corrective Action Requirements for Owners and Operators of Petroleum USTs. TN Dept. of Health and Environment. October, 1989. Contact: (615) 741-4081.
TX	BTEX TPH	EPA 8020, 602 EPA 624 EPA 418.1 ASTM ^d D3328-78B	GL	30 ppm total BTEX 100 ppm TPH	Soils do not require remediation if TPH is less than 100 ppm or total BTEX is less than 30 ppm at sites where groundwater is not threatened. Sites involving groundwater contamination are handled on a case-by-case basis.	Contact: (512) 463-7786.
UT	BTEX TPH	EPA 8020, 602 Modified EPA 8015 (CA)	GL	50 ppm TPH	Soil sampling for BTEX is required at gasoline contaminated sites where initial TPH measurements are in excess of 50 ppm. Remediation goals are determined on a site-by-site basis. Soil cleanup levels based on a scoring system of site-specific criteria are under development.	Contact: (801) 538-6752.
VT	TPH	Modified EPA 418.1	GL	20 ppm volatiles	An action or guidance level of 20 ppm total volatile constituents, as measured using a photo ionization device (PID), is used to determine if soils require remediation at sites where groundwater contamination is not a factor. Final remediation goals are determined on a site-by-site basis. Treated soils less than 100 ppm volatiles may be disposed in a landfill.	Contact: (802) 244-8702.
VA	TPH	Modified EPA 418.1	GL	100 ppm TPH	The 100 ppm TPH guidance level is normally applied at UST site closures where it has been determined there is no potential environmental (groundwater) or health-related impact. Sites in excess of 100 ppm TPH require further sampling using appropriate, EPA approved methods based on the nature of the contaminant. Additional testing procedures and cleanup criteria (BTEX) are required for soil disposal.	Petroleum Contaminated Soil Disposal Guidelines. VA Dept. of Waste Management. April, 1990. Contact: (804) 367-6685.
WA	BTEX TPH	EPA 8020 EPA 418.1	RG	0.1 ppm benzene 4.0 ppm toluene 3.0 ppm ethylbenzene 2.0 ppm xylenes 100 ppm TPH for gas, 200 ppm TPH for diesel	Proposed rules would allow for application of these compliance levels or the establishment of alternative site-specific levels using a leaching potential analysis and risk appraisal approach (similar to California's) to estimate the levels of BTEX and TPH that may be left in place.	Interim Underground Petroleum Storage Tank Removal and Remediation Guidelines. (Draft) WA Dept. of Ecology. January, 1990. Contact: (206) 459-6272.

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WV	BTEX TPH	Appropriate EPA SW-846 method Modified EPA 418.1 (CA)	GL	Detection limit for BTEX 100 ppm TPH	Contaminated soils in excess of 100 ppm TPH require corrective action while those less than 100 ppm TPH may be left on site. Additional requirements call for total BTEX to be less than detectable limits in order for the material to be left on site. Sites in which groundwater used as drinking water has been impacted are handled on a case-by-case basis.	Contact: (304) 348-5935.
WI	VOCs TPH	Appropriate EPA SW-846 method Modified EPA 418.1 (CA)	CAL	10 ppm TPH	Wisconsin uses the 10 ppm TPH detection limit for closure of UST sites. Sites with soils exceeding 10 ppm TPH require further analyses (BTEX) to characterize the degree and extent of contamination. Sampling for total lead may also be required depending on the nature of the contaminant.	UST Contact: (608) 267-9725; LUST Contact: (608) 267-7560.
WY	BTEX TPH	Appropriate EPA methods	RG	10-100 ppm TPH	Sites are considered clean when contaminant concentrations are less than 10 ppm TPH for soils located in areas where depth to groundwater is less than 50 feet, and less than 100 ppm TPH where depth to groundwater is greater than 50 feet.	Contact: (307) 777-7081.

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- ^a Total Petroleum Hydrocarbons
 - ^b Benzene, toluene, ethylbenzene, and xylenes.
 - ^c Qualitative hydrocarbon identification by a chromatographic method.
 - ^d Total Recoverable Petroleum Hydrocarbons, synonymous with TPH.
 - ^e Halogenated Volatile Organics including 1,2-dibromoethane and 1,2-dichloroethane.
 - ^f 1,2-dibromomethane
 - ^g 1,2-dichloroethane
 - ^h Polynuclear Aromatic Hydrocarbons
 - ⁱ Methyl Tertiary Butyl Ether
 - ^j Total Organic Volatiles
 - ^k Volatile Organic Aromatics
 - ^l Volatile Organics
 - ^m Semi-volatile Organics
 - ⁿ U.S. EPA Test Methods for Evaluating Solid Waste Physical/Chemical Methods, SW-846.
 - ^o Standard Methods for the Examination of Water and Wastewater. Published jointly by the American Public Health Association, American Water Works Association and Water Pollution Control Federation.
 - ^p EPA Method 418.1 from the Manual of Methods for Chemical Analysis of Water and Waste, EPA 600/4-79-020. "Modified" refers to the use of an extraction procedure provided in the manual. "(CA)" refers to an alternative analytical extraction procedure recommended by the California Dept. of Health Services.
 - ^q American Society for Testing and Materials
 - ^r CAL - Corrective Action Levels are fixed contaminant concentrations which must be achieved for corrective action to be deemed complete by the agency.
 - ^s GL - Guidance (Action) Levels function to dictate the response by the regulatory agency and to advise the responsible party if further corrective action is necessary.
 - ^t RG - Remediation Goals are site-specific endpoint parameters.
 - ^u CS - Soil Cleanup Standards are fixed standards established by law as a rule and are normally compound specific.

*Much of this information has been drawn from an article titled "State-by-State Summary of Cleanup Standards," by Charles E. Bell, University of Massachusetts-Amherst. The article appeared in the November-December, 1990 Soils magazine.