

Administrative Procedures – Emergency Rule Filing

Instructions:

In accordance with Title 3 Chapter 25 of the Vermont Statutes Annotated and the “Rule on Rulemaking” (CVR 04-000-001) adopted by the Office of the Secretary of State, this emergency filing will be considered complete upon filing and acceptance of these forms with the Office of the Secretary of State, the Legislative Committee on Administrative Rules and a copy with the Chair of the Interagency Committee on Administrative Rules.

All forms requiring a signature shall be original signatures of the appropriate adopting authority or authorized person, and all filings are to be submitted at the Office of the Secretary of State, no later than 3:30 pm on the last scheduled day of the work week.

The data provided in text areas of these forms will be used to generate a notice of rulemaking in the portal of “Proposed Rule Postings” online, and the newspapers of record if the rule is marked for publication. Publication of notices will be charged back to the promulgating agency.

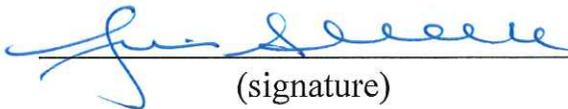
This emergency rule may remain in effect for a total of 180 days from the date it first takes effect.

Certification Statement: As the adopting Authority of this rule (see 3 V.S.A. § 801(b)(11) for a definition), I believe there exists an imminent peril to public health, safety or welfare, requiring the adoption of this emergency rule.

The nature of the peril is as follows (*PLEASE USE ADDITIONAL SHEETS IF SPACE IS INSUFFICIENT*). The Vermont Department of Health has issued a Drinking Water Health Advisory for five per- and polyfluorinated alkyl substances. The Agency has identified several wells in Pownal that exceed the Health Advisory.

I approve the contents of this filing entitled:

Investigation and Remediation of Contaminated Properties Rule


(signature)

, on 01/07/19
(date)

Printed Name and Title:

RECEIVED BY: _____

- Coversheet
- Adopting Page
- Economic Impact Analysis
- Environmental Impact Analysis
- Strategy for Maximizing Public Input
- Scientific Information Statement (if applicable)
- Incorporated by Reference Statement (if applicable)
- Clean text of the rule (Amended text without annotation)
- Annotated text (Clearly marking changes from previous rule)

Emergency Rule Coversheet
Julie S. Moore, Secretary
Agency of Natural Resources

Emergency Rule Coversheet

1. TITLE OF RULE FILING:

Investigation and Remediation of Contaminated Properties Rule

2. ADOPTING AGENCY:

Agency of Natural Resources

3. PRIMARY CONTACT PERSON:

(A PERSON WHO IS ABLE TO ANSWER QUESTIONS ABOUT THE CONTENT OF THE RULE).

Name: Chuck Schwer

Agency: Agency of Natural Resources

Mailing Address: 1 National Life Drive, Davis 1,
Montpelier, Vermont 05620

Telephone: 802 249 - 5324 Fax: -

E-Mail:

Web URL(*WHERE THE RULE WILL BE POSTED*):

<http://dec.vermont.gov/commissioners-office/pfoa>

4. SECONDARY CONTACT PERSON:

(A SPECIFIC PERSON FROM WHOM COPIES OF FILINGS MAY BE REQUESTED OR WHO MAY ANSWER QUESTIONS ABOUT FORMS SUBMITTED FOR FILING IF DIFFERENT FROM THE PRIMARY CONTACT PERSON).

Name: Diane Sherman

Agency: Agency of Natural Resources

Mailing Address: 1 National Life Drive, Davis 2,
Montpelier, Vermont 05620

Telephone: 802 505 - 0125 Fax: -

E-Mail: diane.sherman@vermont.gov

5. RECORDS EXEMPTION INCLUDED WITHIN RULE:

(DOES THE RULE CONTAIN ANY PROVISION DESIGNATING INFORMATION AS CONFIDENTIAL; LIMITING ITS PUBLIC RELEASE; OR OTHERWISE EXEMPTING IT FROM INSPECTION AND COPYING?) No

IF YES, CITE THE STATUTORY AUTHORITY FOR THE EXEMPTION:

PLEASE SUMMARIZE THE REASON FOR THE EXEMPTION:

6. LEGAL AUTHORITY / ENABLING LEGISLATION:

(THE SPECIFIC STATUTORY OR LEGAL CITATION FROM SESSION LAW INDICATING WHO THE ADOPTING ENTITY IS AND THUS WHO THE SIGNATORY SHOULD BE. THIS SHOULD BE A SPECIFIC CITATION NOT A CHAPTER CITATION).

10 V.S.A. § 6603

7. EXPLANATION OF HOW THE RULE IS WITHIN THE AUTHORITY OF THE AGENCY:

SECTION 6603 OF TITLE 10 OF THE VERMONT STATUTES ANNOTATED ASSIGNS THE AGENCY OF NATURAL RESOURCES WITH THE RESPONSIBILITY TO ADOPT RULES IMPLEMENTING THE PROVISIONS OF THE CHAPTER, INCLUDING THE DEFINITION OF HAZARDOUS MATERIAL IN 10 V.S.A. § 6602(16). THE DEFINITION OF HAZARDOUS MATERIAL INCLUDES A SUBSTANCE THAT THE AGENCY LISTS IN ITS RULE WHICH POSES A RISK TO HUMAN HEALTH OR OTHER LIVING ORGANISMS WHEN RELEASED.

8. CONCISE SUMMARY (150 WORDS OR LESS):

This emergency rule proposes to maintain the listing of five per- and polyfluorinated alkyl substances (PFAS) as hazardous materials currently listed in the Investigation and Remediation of Contaminated Properties Rule via emergency rule while a permanent rule amendment is developed. The PFAS are: perfluorooctanoic acid (PFOA), perfluorooctane sulfonic acid (PFOS), perfluorohexane sulfonic acid (PFHxS), perfluoroheptanoic acid (PFHpA), and perfluorononanoic acid (PFNA).

9. EXPLANATION OF WHY THE RULE IS NECESSARY:

The Vermont Department of Health has issued a cumulative Drinking Water Health Advisory of 20 parts per trillion for five PFAS. The Agency has identified several wells in Pownal, Vermont that exceed the Drinking Water Health Advisory. This emergency rule is necessary to list these PFAS as hazardous materials in order to ensure that releases are appropriately responded to and that impacted persons receive an alternate source of water while a permanent rule amendment is developed.

10. EXPLANATION OF HOW THE RULE IS NOT ARBITRARY:

The listing of five PFAS as hazardous materials is based on the Vermont Department of Health's establishment of a cumulative Drinking Water Health Advisory for the substances identifying a risk to human health.

11. LIST OF PEOPLE, ENTERPRISES AND GOVERNMENT ENTITIES AFFECTED BY THIS RULE:

Emergency Rule Coversheet

Those affected by this emergency rule include members of the public as consumers of drinking water in the State. In addition, individuals and entities engaged in the following classes of activities, to the extent they use PFAS, may be impacted by this emergency rule: wire coating facilities; semi-conductor manufacturing; battery manufacturing; users of firefighting foams; solid waste landfills; electroplaters; specialty and performance coatings; capacitor manufacturing; aircraft turbine manufacturing; impregnated/coated paper products; plastic injection molding; plastic extrusion; paint manufacturers; car washes; and tanneries.

12. BRIEF SUMMARY OF ECONOMIC IMPACT (150 WORDS OR LESS):

The identification of a substance as a hazardous material is used to help determine when there has been a release of a substance that poses a risk to human health or other organisms. PFAS are associated with numerous adverse health effects. According to the Centers for Disease Control and Prevention, "some studies in people show that certain PFAS may affect growth, learning and behavior of infants and older children; lower a woman's chance of getting pregnant; interfere with the body's natural hormones, increase cholesterol levels, affect the immune system, and increase the risk of cancer." This rule does not prevent the use of PFAS in certain industrial processes; instead, it requires investigation and corrective action when a release of PFAS is identified. Investigation and corrective actions carry a cost, but there is also positive economic impact from avoiding the public's exposure to PFAS in drinking water and associated adverse health effects.

13. A HEARING IS NOT SCHEDULED .

14. HEARING INFORMATION

(THE FIRST HEARING SHALL BE NO SOONER THAN 30 DAYS FOLLOWING THE POSTING OF NOTICES ONLINE).

IF THIS FORM IS INSUFFICIENT TO LIST THE INFORMATION FOR EACH HEARING PLEASE ATTACH A SEPARATE SHEET TO COMPLETE THE HEARING INFORMATION NEEDED FOR THE NOTICE OF RULEMAKING.

Date:

Time: AM

Emergency Rule Coversheet

Street Address:

Zip Code:

Date:

Time: AM

Street Address:

Zip Code:

15. DEADLINE FOR COMMENT (NO EARLIER THAN 7 DAYS FOLLOWING LAST HEARING):

16. EMERGENCY RULE EFFECTIVE: 01/08/2019

17. EMERGENCY RULE WILL REMAIN IN EFFECT UNTIL

(A DATE NO LATER THAN 180 DAYS FOLLOWING ADOPTION OF THIS EMERGENCY RULE):

07/07/2019

18. NOTICE OF THIS EMERGENCY RULE SHOULD NOT BE PUBLISHED IN THE WEEKLY NOTICES OF RULEMAKING IN THE NEWSPAPERS OF RECORD.

19. KEYWORDS (PLEASE PROVIDE AT LEAST 3 KEYWORDS OR PHRASES TO AID IN THE SEARCHABILITY OF THE RULE NOTICE ONLINE).

PFAS

Hazardous material

PFOA

PFOS

PFHxS

PFHpA

PFNA

Administrative Procedures – Adopting Page

Instructions:

This form must accompany each filing made during the rulemaking process:

Note: To satisfy the requirement for an annotated text, an agency must submit the entire rule in annotated form with proposed and final proposed filings. Filing an annotated paragraph or page of a larger rule is not sufficient. Annotation must clearly show the changes to the rule.

When possible the agency shall file the annotated text, using the appropriate page or pages from the Code of Vermont Rules as a basis for the annotated version. New rules need not be accompanied by an annotated text.

1. TITLE OF RULE FILING:

Investigation and Remediation of Contaminated Properties Rule

2. ADOPTING AGENCY:

Agency of Natural Resources

3. TYPE OF FILING (*PLEASE CHOOSE THE TYPE OF FILING FROM THE DROPDOWN MENU BASED ON THE DEFINITIONS PROVIDED BELOW*):

- **AMENDMENT** - Any change to an already existing rule, even if it is a complete rewrite of the rule, it is considered an amendment as long as the rule is replaced with other text.
- **NEW RULE** - A rule that did not previously exist even under a different name.
- **REPEAL** - The removal of a rule in its entirety, without replacing it with other text.

This filing is **AN AMENDMENT OF AN EXISTING RULE** .

4. LAST ADOPTED (*PLEASE PROVIDE THE SOS LOG#, TITLE AND EFFECTIVE DATE OF THE LAST ADOPTION FOR THE EXISTING RULE*):

Emergency Rule: Secretary of State Log #18-E05, Investigation and Remediation of Contaminated Properties Rule, July 11, 2018

Permanent Rule: Secretary of State Log #17-004, Investigation and Remediation of Contaminated Properties Rule, July 27, 2017

Administrative Procedures – Economic Impact Analysis

Instructions:

In completing the economic impact analysis, an agency analyzes and evaluates the anticipated costs and benefits to be expected from adoption of the rule; estimates the costs and benefits for each category of people enterprises and government entities affected by the rule; compares alternatives to adopting the rule; and explains their analysis concluding that rulemaking is the most appropriate method of achieving the regulatory purpose.

Rules affecting or regulating schools or school districts must include cost implications to local school districts and taxpayers in the impact statement, a clear statement of associated costs, and consideration of alternatives to the rule to reduce or ameliorate costs to local school districts while still achieving the objectives of the rule (see 3 V.S.A. § 832b for details).

Rules affecting small businesses (excluding impacts incidental to the purchase and payment of goods and services by the State or an agency thereof), must include ways that a business can reduce the cost or burden of compliance or an explanation of why the agency determines that such evaluation isn't appropriate, and an evaluation of creative, innovative or flexible methods of compliance that would not significantly impair the effectiveness of the rule or increase the risk to the health, safety, or welfare of the public or those affected by the rule.

1. TITLE OF RULE FILING:

Investigation and Remediation of Contaminated Properties Rule

2. ADOPTING AGENCY:

Agency of Natural Resources

3. CATEGORY OF AFFECTED PARTIES:

LIST CATEGORIES OF PEOPLE, ENTERPRISES, AND GOVERNMENTAL ENTITIES POTENTIALLY AFFECTED BY THE ADOPTION OF THIS RULE AND THE ESTIMATED COSTS AND BENEFITS ANTICIPATED:

Members of the public who consume drinking water in the State will benefit from avoiding exposure to PFAS in drinking water.

Individuals and entities engaged in the following classes of activities, to the extent the activities involve PFAS and result in the release of PFAS into the environment, may experience costs associated with investigation and corrective actions: wire coating

Economic Impact Analysis

facilities; semi-conductor manufacturing; battery manufacturing; users of firefighting foams; solid waste landfills; electroplaters; specialty and performance coatings; capacitor manufacturing; aircraft turbine manufacturing; impregnated/coated paper products; plastic injection molding; plastic extrusion; paint manufacturers; car washes; and tanneries.

4. IMPACT ON SCHOOLS:

INDICATE ANY IMPACT THAT THE RULE WILL HAVE ON PUBLIC EDUCATION, PUBLIC SCHOOLS, LOCAL SCHOOL DISTRICTS AND/OR TAXPAYERS CLEARLY STATING ANY ASSOCIATED COSTS:

Some schools may use floor waxes containing PFAS. The Agency has completed a pilot study at several schools to determine whether PFAS is in the schools' drinking water supplies and has been working with schools where PFAS has been detected to conduct site investigation and implement corrective actions. The Agency is working on an expansion of the pilot program to other schools. To the extent a release of PFAS into the environment is identified, a school may experience costs associated with investigation and corrective actions.

5. ALTERNATIVES: *CONSIDERATION OF ALTERNATIVES TO THE RULE TO REDUCE OR AMELIORATE COSTS TO LOCAL SCHOOL DISTRICTS WHILE STILL ACHIEVING THE OBJECTIVE OF THE RULE.*

With its pilot study, the Agency has worked with several schools to determine if PFAS is present in the schools' drinking water supplies. The Agency is working on an expansion of the pilot program to other schools. While a school may experience costs associated with investigation and corrective actions in relationship to an identified release, the Agency considers cost-effectiveness and flexibility using a case-by-case analysis in the cleanup decision-making process.

6. IMPACT ON SMALL BUSINESSES:

INDICATE ANY IMPACT THAT THE RULE WILL HAVE ON SMALL BUSINESSES (EXCLUDING IMPACTS INCIDENTAL TO THE PURCHASE AND PAYMENT OF GOODS AND SERVICES BY THE STATE OR AN AGENCY THEREOF):

To the extent a small business conducts one or more of the class of activities identified above, and to the extent the activities involve PFAS and result in a

Economic Impact Analysis

release of PFAS into the environment, the business may experience costs associated with investigation and corrective actions.

7. SMALL BUSINESS COMPLIANCE: *EXPLAIN WAYS A BUSINESS CAN REDUCE THE COST/BURDEN OF COMPLIANCE OR AN EXPLANATION OF WHY THE AGENCY DETERMINES THAT SUCH EVALUATION ISN'T APPROPRIATE.*

Small business can reduce their costs of compliance by avoiding practices that could result in a release of PFAS into the environment. While the rule does not contain a distinction for the size of a business, the Agency considers cost-effectiveness and flexibility using a case-by-case analysis in the cleanup decision-making process.

8. COMPARISON:

COMPARE THE IMPACT OF THE RULE WITH THE ECONOMIC IMPACT OF OTHER ALTERNATIVES TO THE RULE, INCLUDING NO RULE ON THE SUBJECT OR A RULE HAVING SEPARATE REQUIREMENTS FOR SMALL BUSINESS:

Listing hazardous materials is used to help determine when there has been a release of a chemical or substance that poses a risk to human health or other organisms. The listing of the five PFAS as hazardous materials is based on the Vermont Department of Health's establishment of a cumulative Drinking Water Health Advisory for the substances. An alternative of not listing, or only listing some of the five, PFAS would not be protective of human health and would not provide the positive economic impacts from avoiding the public's exposure to PFAS in drinking water. Additionally, the statutory criteria for identifying hazardous materials does not include consideration of economic impacts but rather is focused on risk to human health and other living organisms.

This emergency rule enables an appropriate response to releases of PFAS through investigation and corrective action. While the rule does not contain a distinction for the size of a business, the Agency does consider cost-effectiveness and flexibility using a case-by-case analysis in the cleanup decision-making process.

9. SUFFICIENCY: *EXPLAIN THE SUFFICIENCY OF THIS ECONOMIC IMPACT ANALYSIS.*

This economic impact analysis provides the Agency's best assessment of the economic impact of this emergency rule based on the information available.

Administrative Procedures – Environmental Impact Analysis

Instructions:

In completing the environmental impact analysis, an agency analyzes and evaluates the anticipated environmental impacts (positive or negative) to be expected from adoption of the rule; compares alternatives to adopting the rule; explains the sufficiency of the environmental impact analysis.

Examples of Environmental Impacts include but are not limited to:

- Impacts on the emission of greenhouse gases
- Impacts on the discharge of pollutants to water
- Impacts on the arability of land
- Impacts on the climate
- Impacts on the flow of water
- Impacts on recreation
- Or other environmental impacts

1. TITLE OF RULE FILING:

Investigation and Remediation of Contaminated Properties Rule

2. ADOPTING AGENCY:

Agency of Natural Resources Agency of Natural Resources

3. GREENHOUSE GAS: *EXPLAIN HOW THE RULE IMPACTS THE EMISSION OF GREENHOUSE GASES (E.G. TRANSPORTATION OF PEOPLE OR GOODS; BUILDING INFRASTRUCTURE; LAND USE AND DEVELOPMENT, WASTE GENERATION, ETC.):*

None anticipated

4. WATER: *EXPLAIN HOW THE RULE IMPACTS WATER (E.G. DISCHARGE / ELIMINATION OF POLLUTION INTO VERMONT WATERS, THE FLOW OF WATER IN THE STATE, WATER QUALITY ETC.):*

The focus of the Investigation and Remediation of Contaminated Properties Rule is on addressing releases of hazardous materials into the environment. This emergency rule proposes to list five PFAS as hazardous material to enable investigation and corrective actions and to reduce the public's exposure to PFAS. Corrective actions may enable groundwater to be available for drinking water and other uses.

5. LAND: *EXPLAIN HOW THE RULE IMPACTS LAND (E.G. IMPACTS ON FORESTRY, AGRICULTURE ETC.):*

Environmental Impact Analysis

To the extent a corrective action results in a reduction or removal of PFAS, land may become available for a range of uses including agriculture and residential development.

6. **RECREATION:** *EXPLAIN HOW THE RULE IMPACT RECREATION IN THE STATE:*
None anticipated

7. **CLIMATE:** *EXPLAIN HOW THE RULE IMPACTS THE CLIMATE IN THE STATE:*
None anticipated

8. **OTHER:** *EXPLAIN HOW THE RULE IMPACT OTHER ASPECTS OF VERMONT'S ENVIRONMENT:*
None anticipated

9. **SUFFICIENCY:** *EXPLAIN THE SUFFICIENCY OF THIS ENVIRONMENTAL IMPACT ANALYSIS.*

This environmental impact analysis provides the Agency's best assessment of the environmental impact of this emergency rule based on the information available.

Administrative Procedures – Public Input

Instructions:

In completing the public input statement, an agency describes the strategy prescribed by ICAR to maximize public input, what it did do, or will do to comply with that plan to maximize the involvement of the public in the development of the rule.

This form must accompany each filing made during the rulemaking process:

1. TITLE OF RULE FILING:

Investigation and Remediation of Contaminated Properties Rule

2. ADOPTING AGENCY:

Agency of Natural Resources

3. PLEASE DESCRIBE THE STRATEGY PRESCRIBED BY ICAR TO MAXIMIZE PUBLIC INVOLVEMENT IN THE DEVELOPMENT OF THE PROPOSED RULE:

As this is an emergency rule that was not filed with ICAR, ICAR has not prescribed a strategy for public involvement.

4. PLEASE LIST THE STEPS THAT HAVE BEEN OR WILL BE TAKEN TO COMPLY WITH THAT STRATEGY:

In light of the potential health impacts from PFAS exposure and need for the State to respond to PFAS detected in Pownal and other locations, the Agency does not view a public comment period as practicable in association with this emergency rule. The Agency has engaged in a pre-permanent rulemaking public comment period to take comments related to permanent changes to the Investigation and Remediation of Contaminated Properties Rule and intends to engage in a robust public process in association with the permanent rulemaking.

5. BEYOND GENERAL ADVERTISEMENTS, PLEASE LIST THE PEOPLE AND ORGANIZATIONS THAT HAVE BEEN OR WILL BE INVOLVED IN THE DEVELOPMENT OF THE PROPOSED RULE:

Notice of this rulemaking will be e-mailed to persons or entities that commented on the prior revisions to the rule and trade organizations or affected businesses in the following sectors: private and public drinking water consumers; wire coating facilities; semi-conductor manufacturing; battery manufacturing; users of firefighting foams; solid waste landfills; electroplaters; specialty and performance coatings; capacitor manufacturing; aircraft turbine manufacturing; impregnated/coated paper products; plastic injection molding; plastic extrusion; paint manufacturers; car washes; and tanneries.

Administrative Procedures – Scientific Information

THIS FORM IS ONLY REQUIRED WHEN INCORPORATING MATERIALS BY REFERENCE. PLEASE REMOVE PRIOR TO DELIVERY IF IT DOES NOT APPLY TO THIS RULE FILING:

Instructions:

In completing the Scientific Information Statement, an agency shall provide a brief summary of the scientific information including reference to any scientific studies upon which the proposed rule is based, for the purpose of validity.

1. TITLE OF RULE FILING:

Investigation and Remediation of Contaminated Properties Rule

2. ADOPTING AGENCY:

Agency of Natural Resources

3. BRIEF EXPLANATION OF SCIENTIFIC INFORMATION:

The Agency received a memo from the Vermont Department of Health (VDH) summarizing the health effects from five PFAS and identifying a cumulative Drinking Water Health Advisory of 20 parts per trillion for five PFAS. VDH conducted an extensive assessment of the literature available on PFAS, using its Drinking Water Guidance process including specific guidance on toxicity values and grouping chemicals, provided the Agency with an updated Health Advisory. The Agency defers to VDH with respect to its expertise in toxicology and risk assessment.

4. CITATION OF SOURCE DOCUMENTATION OF SCIENTIFIC INFORMATION:

Memorandum regarding the Drinking Water Health Advisory for Five PFAS (per- and polyfluorinated alkyl substances), Vermont Department of Health, dated July 10, 2018, available on the internet at:

http://www.healthvermont.gov/sites/default/files/documents/pdf/ENV_DW_PFAS_HealthAdvisory.pdf

Untiled document serving as the Vermont Department of Health Drinking Water Guidance, Vermont Department of Health, dated November 26, 2018, available on the internet at:

www.healthvermont.gov/sites/default/files/documents/pdf/ENV_ECP_GeneralScreeningValues_Water.pdf

Drinking Water Health Advisory for Perfluorooctanoic Acid (PFOA). 822-R-16-005. U.S. Environmental Protection Agency Office of Water (4304T) Health and Ecological Criteria Division, Washington, D.C. EPA, 2016, available at:

https://www.epa.gov/sites/production/files/2016-05/documents/pfoa_health_advisory_final-plain.pdf

Health Effects Support Document for Perfluorooctanoic Acid (PFOA). 822-R-16-003. U.S. Environmental Protection Agency Office of Water (4304T) Health and Ecological Criteria Division, Washington, D.C. EPA, 2016, available at:

https://www.epa.gov/sites/production/files/2016-05/documents/pfoa_hesd_final-plain.pdf

Drinking Water Health Advisory for Perfluorooctanesulfonic Acid (PFOS). 822-R-16-004. U.S. Environmental Protection Agency Office of Water (4304T) Health and Ecological Criteria Division, Washington, D.C. EPA, 2016, available at:

https://www.epa.gov/sites/production/files/2016-05/documents/pfos_health_advisory_final-plain.pdf

Health Effects Support Document for Perfluorooctanesulfonic Acid (PFOS). 822-R-16-00. U.S. Environmental Protection Agency Office of Water (4304T) Health and Ecological Criteria Division, Washington, D.C. EPA, 2016, available at:

https://www.epa.gov/sites/production/files/2016-05/documents/pfos_hesd_final_508.pdf

Draft Toxicological Profile for Perfluoroalkyls, 2018. U.S. Department of Health and Human Services, Public Health Service Agency for Toxic Substances and Disease Registry, June 2018, available at:

<https://www.atsdr.cdc.gov/toxprofiles/tp200.pdf>

Additional references may be seen in Memorandum regarding the Drinking Water Health Advisory for Five PFAS (per- and polyfluorinated alkyl substances) in the references section.

5. INSTRUCTIONS ON HOW TO OBTAIN COPIES OF THE SOURCE DOCUMENTS OF THE SCIENTIFIC INFORMATION FROM THE AGENCY OR OTHER PUBLISHING ENTITY:

The documents above are available on the internet at the addresses identified above or are available from the Agency of Natural Resources by contacting the Waste Management and Protection Division at 802-249-5324.

**INVESTIGATION AND REMEDIATION
OF CONTAMINATED PROPERTIES RULE**

**STATE OF VERMONT
AGENCY OF NATURAL RESOURCES
DEPARTMENT OF ENVIRONMENTAL
CONSERVATION
WASTE MANAGEMENT AND PREVENTION
DIVISION**

**Emergency Rule
Effective Date: January 8, 2019**

Contents

SUBCHAPTER 1. GENERAL PROVISIONS 4

 § 35-101. AUTHORITY AND PURPOSE 4

 § 35-102. RELEASE PROHIBITION; REPORTING; EMERGENCY RESPONSE..... 4

 § 35-103. SEVERABILITY 5

 § 35-104. SIGNATORIES..... 5

 §35-105. DELIVERABLES 5

 §35-106. HAZARDOUS MATERIAL LISTING..... 5

SUBCHAPTER 2. DEFINITIONS..... 6

 § 35-201. DEFINITIONS 6

SUBCHAPTER 3. SITE INVESTIGATION..... 12

 § 35-301. REQUIREMENT TO PERFORM SITE INVESTIGATION.....12

 § 35-302. CONCEPTUAL SITE MODEL.....12

 § 35-303. SITE INVESTIGATION WORK PLAN13

 § 35-304. SITE INVESTIGATION WORK PLAN; SECRETARY REVIEW AND DETERMINATION14

 § 35-305. SITE INVESTIGATION REPORT14

 § 35-306. REVIEW OF SITE INVESTIGATION REPORT.....19

SUBCHAPTER 4. RESPONSE ACTIONS; RELEASES OF HEATING FUELS..... 20

 § 35-401. APPLICABILITY 20

 § 35-402. INVESTIGATION; SOIL REMOVAL AND DRINKING WATER 20

 § 35-403. INVESTIGATION AND SOIL REMOVAL REPORT 20

 § 35-404. RESPONSE TO REPORT.....21

 § 35-405. ADDITIONAL SITE INVESTIGATION21

 § 35-406. ADDITIONAL SITE INVESTIGATION WORK PLAN; APPROVAL AND IMPLEMENTATION..... 22

 § 35-407. ADDITIONAL SITE INVESTIGATION REPORT SUBMISSION AND REVIEW 22

SUBCHAPTER 5 CORRECTIVE ACTION 23

 § 35-501. EXEMPTIONS FROM CORRECTIVE ACTION 23

 § 35-502. OBJECTIVES OF CORRECTIVE ACTION..... 23

 § 35-503. EVALUATION OF CORRECTIVE ACTION ALTERNATIVES 24

 § 35-504. SECRETARY EVALUATION OF CORRECTIVE ACTION ALTERNATIVES 26

 § 35-505. CORRECTIVE ACTION PLAN..... 27

 § 35-506. CORRECTIVE ACTION PLAN REVIEW; PUBLIC NOTICE; FINAL DECISION 29

§ 35-507.	CORRECTIVE ACTION CONSTRUCTION COMPLETION REPORT	31
§ 35-508.	REVIEW AND FINAL DECISION OF CORRECTIVE ACTION CONSTRUCTION COMPLETION REPORT.....	31
§ 35-509.	LONG TERM MONITORING.....	32
§ 35-510.	NON-HAZARDOUS WASTE CONTAMINATED SOIL.....	33
§ 35-511.	SITE GENERATED HAZARDOUS WASTES	36
§ 35-512.	DEVELOPMENT SOILS.....	37
SUBCHAPTER 6. INSTITUTIONAL CONTROLS.....		39
§ 35-601.	INSTITUTIONAL CONTROL PLAN.....	39
§ 35-602.	NOTICE TO THE LAND RECORDS.	40
§ 35-603.	DEED RESTRICTION/ENVIRONMENTAL EASEMENT.	40
SUBCHAPTER 7. SITE CLOSURE		43
§ 35-701.	SITE MANAGEMENT ACTIVITIES COMPLETE	43
§ 35-702.	CERTIFICATE OF COMPLETION	45
SUBCHAPTER 8. REQUESTS FOR REIMBURSEMENT FOR MUNICIPAL WATER LINE EXTENSIONS FROM THE PETROLEUM CLEANUP OR ENVIRONMENTAL CONTENGENCY FUNDS.....		46
§ 35-801.	REIMBURSEMENT OF MUNICIPALITIES TO PROVIDE ALTERNATE WATER SUPPLIES 46	
APPENDIX A. ENVIRONMENTAL MEDIA STANDARDS.....		49
§ 35-APX-A1.	SOIL SCREENING VALUES.....	49
§ 35-APX-A2.	VAPOR INTRUSION VALUES.....	49
§ 35-APX-A3.	SEDIMENT VALUES.....	49
APPENDIX B. ESTABLISHMENT OF BACKGROUND CONCENTRATIONS.....		50
§ 35-APX-B1.	ESTABLISHMENT OF SITE-SPECIFIC BACKGROUND LEVELS	50
APPENDIX C. SITE MANAGEMENT WAIVERS.....		52
§ 35-APX-C1.	TECHNICAL IMPRACTICALITY.....	52
APPENDIX D. HAZARDOUS MATERIAL LISTING		54
§ 35-APX-D1.	HAZARDOUS MATERIAL LISTING	54

SUBCHAPTER 1. GENERAL PROVISIONS

§ 35-101. AUTHORITY AND PURPOSE

- (a) Authority. This rule is adopted by the Secretary of the Agency of Natural Resources pursuant to the authority granted by 10 V.S.A. § 6603(1) and 6604d.
- (b) Purpose. This rule is intended to protect public health and the environment by establishing procedures and requirements for conducting investigations and corrective actions at properties where a release of hazardous materials has occurred. This includes procedures for identifying hazardous material contamination to environmental media including soil, groundwater, surface water, and air, as well as requirements for source treatment, removal, or containment, long term monitoring and institutional controls.

§ 35-102. RELEASE PROHIBITION; REPORTING; EMERGENCY RESPONSE

- (a) Release prohibition. The release of hazardous materials into the surface or groundwater, or onto the land of the state is prohibited.
- (b) Releases and suspected releases. Any person required by 10 V.S.A. § 6617 shall immediately report a release or suspected release as indicated by the following:
 - (1) A release of hazardous material, excluding petroleum;
 - (2) A release of any petroleum product that exceeds 2 gallons;
 - (3) A release of any petroleum product that is less than or equal to 2 gallons and poses a potential or actual threat to human health or the environment; or
 - (4) The detection of non-aqueous phase petroleum liquid (NAPL) at a thickness greater than 0.01'.

Note: Reporting under subsection (b) of this section must be directed to:
Monday through Friday, 7:45 AM to 4:30 PM; Waste Management & Prevention
Division at (802) 828-1138.

At all other times including State holidays: Department of Public Safety Division of
Emergency Management and Homeland Security at (800) 641-5005.

- (c) Emergency response.
 - (1) Notwithstanding the site investigation and corrective action requirements of this rule, the Secretary may require an emergency response pursuant to 10 V.S.A. § 1283 when the Secretary determines that a release may cause an immediate and serious threat of harm to human health or the environment.
 - (2) When undertaking emergency responses pursuant to this subsection, notification to the potentially responsible party (PRP) pursuant to 10 V.S.A. § 1283 in advance of undertaking emergency response is not required, unless:

- (A) The Secretary determines that there is need for additional investigation of the release to determine the impact to sensitive receptors and to human health and that it is appropriate for the PRP to conduct the investigation; or
 - (B) The Secretary determines that an additional response is necessary to address short-term impacts to sensitive receptors, impact to human health, and that it is appropriate for the PRP to conduct the additional response.
- (3) The Secretary shall conduct or direct the PRP to conduct a limited site investigation to determine if the release requires further site investigation or corrective action. As used in this subsection, “limited site investigation” means the steps the Secretary deems necessary to determine whether additional site investigation or corrective action is necessary to respond to the release of hazardous materials.

§ 35-103. SEVERABILITY

The provisions of any section of this rule are severable. If any provision of this rule is invalid or if any application of this rule to any person or circumstance is invalid, the invalidity shall not affect other provisions or applications that can be given effect without the invalid provision or application.

§ 35-104. SIGNATORIES

All deliverables required by § 35-102(c)(3) (emergency response; limited site investigation); § 35-303 (site investigation work plan), § 35-305 (site investigation report); § 35-403(response actions; releases of heating fuels; investigation and soil removal report); §35-405 (additional site investigation); § 35-407(a) (response actions; releases of heating fuels; additional site characterization report); § 35-503 (evaluation of corrective action alternatives); § 35-505 (corrective action plan); § 35-507 (corrective action construction completion report); and § 35-509(b) (long term monitoring report) shall be prepared, signed, and certified by an environmental professional. Reports shall be signed with the following certification:

“I certify under penalty of perjury that I am an environmental professional and that all content contained within this deliverable is to the best of my knowledge true and correct.”

§35-105. DELIVERABLES

All deliverables shall be submitted electronically via text searchable PDF. Paper copies are to be submitted only upon request of the Secretary. Raw data and any other supporting documentation shall be made available upon request by the Secretary.

§35-106. HAZARDOUS MATERIAL LISTING

Pursuant to 10 V.S.A. § 6602(16)(A)(iv) any chemical or substance listed in Appendix D is a hazardous material.

SUBCHAPTER 2. DEFINITIONS

§ 35-201. DEFINITIONS

As used in this rule,

- (1) “Aboveground storage tank” or “AST” means any tank, other than an underground storage tank, used to store any of the following petroleum products: gasoline, diesel, kerosene, used oil, or heating oil.
- (2) “Agency” means the Vermont Agency of Natural Resources.
- (3) “Analytical detection limit” means the minimum concentration of a hazardous material that can be quantified consistently and reliably using methods approved by EPA or another method approved by the Secretary.
- (4) “Analysis” or “analyze” means to test for the presence of hazardous materials using a standard US EPA method or an alternative approved by the Secretary.
- (5) “Area of contamination” means a defined area on the site where hazardous waste is present and environmental media standards are exceeded due to the release.
- (6) “Background” means naturally occurring constituents where the concentration detected in the environmental medium sampled is attributable to natural occurrence and not influenced by site related or other anthropogenic activities.
- (7) “Brownfield” means real property, the expansion, redevelopment, or reuse of which may be complicated by the presence, or perceived presence of, a hazardous material. “Brownfield” does not include any of the following:
 - (A) A facility that is the subject of a planned or ongoing removal action under CERCLA.
 - (B) A facility that is listed as a CERCLA site or is proposed for listing.
 - (C) A facility that is the subject of any State or federal administrative or court order under any of the following authorities:
 - (i) 33 U.S.C. § 1251 et seq. (federal Water Pollution Control Act) or 10 V.S.A. chapter 47 (water pollution control);
 - (ii) 15 U.S.C. § 2601 et seq. (Toxic Substances Control Act);
 - (iii) 42 U.S.C. § 300f et seq. (Safe Drinking Water Act) or 10 V.S.A. chapter 56 (public water supply).
 - (D) A facility that is subject to either of the following:
 - (i) corrective action under 42 U.S.C. § 6924(u) or 6928(h);
 - (ii) corrective action permit or order issued or modified to require the implementation of corrective measures.
 - (E) A land disposal unit in regard to which both of the following apply:
 - (i) a closure notification under subtitle C of 42 U.S.C. § 6921 et seq. has been submitted;
 - (ii) closure requirements have been specified in a closure plan or permit.
 - (F) A facility that is subject to the jurisdiction, custody, or control of any instrumentality of the United States, except for land held in trust by the United States for an Indian tribe.

- (G) A portion of a facility to which both the following apply:
 - (i) a release of polychlorinated biphenyls has occurred;
 - (ii) is subject to remediation under 15 U.S.C. § 2601 et seq. (Toxic Substances Control Act).
- (H) A portion of a facility for which assistance for response activity has been obtained under subtitle I of 42 U.S.C. § 6991 et seq. (Solid Waste Disposal Act) from the Leaking Underground Storage Tank Trust Fund established under 26 U.S.C. § 9508.
- (8) “BRELLA” means Brownfields Reuse and Environmental Liability Limitation Act.
- (9) “Category four underground storage tank” means any underground storage tank with equal to or less than 1100 gallons that is either a farm or residential motor fuel tank or a fuel oil storage tank used for on-premises heating.
- (10) “Compliance point” means
 - (A) any point of present use of groundwater, including use as a public water supply or potable water supply;
 - (B) the boundary of a Class I, Class II, or Class IV groundwater area;
 - (C) zone two of a public water source protection area;
 - (D) any point at the boundary of the property where the activity is located; and
 - (E) any point established in an approved corrective action plan established to evaluate a release’s impact on a sensitive receptor.
- (11) “Conceptual Site Model” or “CSM” is a written and illustrative representation of the physical, chemical, and biological processes that control the transport, migration, and actual and potential impacts of contamination (in soil, air, groundwater, surface water or sediments) to sensitive receptors.
- (12) “Contaminated” means the presence of any hazardous material in soil, groundwater, soil gas, air, sediment, surface water, construction or excavation debris, or any other material at a concentration that has the potential to adversely affect human health or the environment. “Contaminated” does not include naturally occurring substances at background levels.
- (13) “Deed restriction” or “environmental easement” means a legal restriction on a property that grants a real property interest to the state to enforce maintenance requirements, monitoring requirements, or land use restrictions.
- (14) “Development soil” means unconsolidated mineral and organic matter overlying bedrock that contains PAHs, arsenic, or lead in concentrations that:
 - (A) exceed the relevant soil screening level for residential soil;
 - (B) when managed in accordance with § 35-512 or the Vermont Solid Waste Management Rule:
 - (i) pose no greater risk than the Agency-established soil screening value for the intended reuse of the property; and
 - (ii) pose no unreasonable risk to human health through a dermal, inhalation, or ingestion exposure pathway;
 - (C) do not leach compounds at concentrations that exceed groundwater enforcement standards; and

- (D) do not result in an exceedance of Vermont groundwater enforcement standards.
- (15) “Direct contact” means the ability of a human to have direct contact with contaminants or naturally occurring compounds in environmental media including soils, groundwater, surface water, sediment and air via incidental ingestion, dermal contact, inhalation of vapors, or fugitive dust.
- (16) “Engineered control” means any physical barrier, system, technology, or method that removes or reduces exposure to a hazardous material in environmentally isolated or inaccessible to sensitive receptors.
- (17) “Environmental media” means components of the natural environment including air, water, soil, and bedrock.
- (18) “Environmental media standards” means numeric or narrative criteria adopted by the Secretary to protect human health and the environment.
- (19) “Environmental professional” means a person who possesses the following education, training, and experience:
 - (A) A current professional engineer’s or professional geologist’s license or registration from a state, tribe, or U.S. territory (or the Commonwealth of Puerto Rico) and the equivalent of three years of relevant fulltime experience;
 - (B) A license or certification by the federal government, a state, tribe, or U.S. territory (or the Commonwealth of Puerto Rico) to perform environmental site work equivalent to that required by this rule and have the equivalent of three years of relevant fulltime experience;
 - (C) A baccalaureate or higher degree from an accredited institution of higher education in a discipline of engineering, geology, hydrogeology, or an applicable science and the equivalent of five years of relevant fulltime experience; or
 - (D) The equivalent of ten years of relevant fulltime experience.
- (20) “Emergency response” means a response action to a situation that may cause immediate and serious threat of harm to human health or the environment.
- (21) “Groundwater” means water below the land surface in a zone of saturation.
- (22) “Hazardous material”
 - (A) means all petroleum and toxic, corrosive, or other chemicals and related sludge included in any of the following:
 - (i) any substance defined in section 101(14) of the federal Comprehensive Environmental Response, Compensation and Liability (CERCLA) Act of 1980;
 - (ii) petroleum, including crude oil or any fraction thereof;
 - (iii) hazardous wastes as defined by the Vermont Hazardous Waste Management Regulations; or
 - (iv) a chemical or substance that, when released, poses a risk to human health or other living organisms and that is listed by this rule.
 - (B) Does not include herbicides and pesticides when applied consistent with good practice conducted in conformity with federal, state, and

- local laws and regulations and according to manufacturer's instructions.
- (23) "Hazardous waste" means any waste subject to regulation as hazardous waste under the Vermont Hazardous Waste Management Regulations.
 - (24) "Heating fuel" means heating oil, kerosene, or other dyed diesel fuel that is not used to propel a motor vehicle and which is typically used to heat a structure. Includes any blend of petroleum and biodiesel used to heat a structure.
 - (25) "Impervious surface" means those manmade surfaces, including paved and unpaved roads, parking areas, roofs, driveways, and walkways, from which precipitation runs off rather than infiltrates
 - (26) "Institutional controls" means non-engineered instruments, such as administrative and legal controls, that help minimize the potential for exposure to a hazardous material or protect the integrity of a remedy.
 - (27) "Land record notice" means a notice on a property land record that informs individuals of the presence of residual subsurface contamination at a site.
 - (28) "Non-aqueous phase liquid" or "NAPL" means a liquid solution contaminant that does not dissolve in or easily mix with water, such as oil, gasoline, coal tar, or chlorinated solvents. A NAPL may be denser than water, sinking below the water table, or lighter than water, floating on the water table.
 - (29) "Non-hazardous waste contaminated soil" means soils that are contaminated with hazardous materials at concentrations above the Soil Screening Values but that are not themselves hazardous wastes under the Vermont Hazardous Waste Management Rule.
 - (30) "Polyencapsulation" means the treatment of petroleum contaminated soil by stockpiling on plastic sheeting and covering the stockpile with plastic sheeting.
 - (31) "Potable water supply" means the source, treatment, and conveyance equipment used to provide water used or intended to be used for human consumption, including drinking, washing, bathing, the preparation of food, or laundering. This definition does not include any internal piping or plumbing, except for mechanical systems, such as pump stations and storage tanks or lavatories, that are located inside a building or structure and that are integral to the operation of a potable water system. This definition also does not include a potable water supply that is subject to regulation as a public water supply.
 - (32) "Potentially Responsible Party" or "PRP" means any individual or organization, potentially liable under 10 V.S.A. §6615.
 - (33) "Public water source protection area" means a surface and subsurface area from or through which contaminants are reasonably likely to reach a public water system source.
 - (34) "Public water system" means:
 - (A) any system, or combination of systems owned or controlled by a person, which provides drinking water through pipes or other constructed conveyances to the public and which:
 - (i) has at least 15 service connections; or
 - (ii) serves an average of at least 25 individuals for at least 60 days a year.
 - (B) any part of a piped system which does not provide drinking water, if

- use of such a part could affect the quality or quantity of the drinking water supplied by the system. Public water system shall also mean a system which bottles drinking water for public distribution and sale.
- (35) “Receiving site” means a location approved by the Secretary where excavated development soils are disposed in accordance with this rule.
- (36) “Recognized environmental condition” means the presence or likely presence of a hazardous material at a property:
- (A) due to a release;
 - (B) under conditions indicative of a release to the environment; or
 - (C) under conditions that pose a material threat of a future release to the environment.
- (37) “Release” means any intentional or unintentional action or omission resulting in the spilling, leaking, pumping, pouring, emitting, emptying, dumping, or disposing of hazardous materials into the surface or groundwaters, or onto the lands in the State, or into waters outside the jurisdiction of the State when damage may result to the public health, lands, waters, or natural resources within the jurisdiction of the State.
- (38) “Residual contamination” means hazardous material that remains in environmental media after a release has occurred and corrective action has been completed.
- (39) “Secretary” means the Secretary of the Vermont Agency of Natural Resources or the Secretary’s duly authorized representative.
- (40) “Sensitive receptor” means any natural or human-constructed feature that may be adversely affected by a hazardous material and includes public health, public water sources, sources of water for potable water supplies, groundwater, surface waters, wetlands, soils, sensitive ecological areas, outdoor and indoor air, and enclosed spaces such as basements, sewers, and subsurface utilities.
- (41) “Site” means the area where a release is known or suspected to have occurred, including the extent of contamination resulting from the release. A site may not be limited by legal property boundaries.
- (42) “Spill” means a release which can be investigated and remediated within a short time frame and where long term management is not expected or required.
- (43) “Substantial completion” means:
- (A) the site is enrolled in the BRELLA program; and
 - (B) the property has a remediation system constructed in accordance with an approved corrective action plan; and
 - (i) the remediation system is operating as designed following implementation of corrective action;
 - (ii) the institutional controls for the property have not been finalized; or
 - (iii) long term monitoring is necessary to determine whether remedial objectives are being achieved.
- (44) “Surface water” includes all rivers, streams, creeks, brooks, reservoirs, ponds, lakes, springs and all bodies of surface waters, artificial or natural, which are

- contained within, flow through or border upon the State or any portion of it.
- (45) “Surface soil” means soil present at 0-6 inches below ground surface.
- (46) “Survey benchmark” means a feature on a site to which the surveyed elevation of all monitoring wells and site features are referenced.
- (47) “Suspected release” means when there is knowledge, information, or evidence that a release has likely occurred. In addition, an exceedance of an environmental media standard shall be presumed to be a suspected release and shall be reported pursuant to § 35-102(b).
- (48) “Underground Storage Tank” or “UST” means any one or combination of tanks, including underground pipes connected to it or them, which is or has been used to contain an accumulation of regulated substances, and the volume of which, including the volume of the underground pipes connected to it or them, is 10 percent or more beneath the surface of the ground. Provided, however, that the following are excluded from the definition of "underground storage tanks" established under this section:
- (A) septic tanks and manure storage tanks;
 - (B) flow through process tanks permitted under chapter 47 of this title and tanks regulated by chapter 159 of this title;
 - (C) stormwater or wastewater collection systems;
 - (D) storage tanks situated in an underground area if the tank is upon or above the area floor;
 - (E) pipeline facilities regulated by the federal Natural Gas Pipeline Safety Act (49 U.S.C. App. 1671 et seq.), the Hazardous Liquid Pipeline Safety Act (49 U.S.C. App. 2001 et seq.) or an intrastate pipeline regulated under State laws similar to the foregoing; and
 - (F) liquid petroleum gas storage tanks, used predominantly for the storage of propane, propylene, butane, and butylenes, regulated by the Vermont Fire Prevention and Building Code.
- (49) “US EPA” means United States Environmental Protection Agency.
- (50) “Vapor intrusion” means the migration of volatile chemicals from contaminated environmental media into a building, subsurface conduit or structure.
- (51) “Volatile Organic Compound (VOC) field screening instrument” means a photoionization detector, flame ionization detector, field portable gas chromatograph/mass spectrometer or another portable instrument approved by the Secretary as a part of a work plan.
- (52) “Water table” means the top of the saturated zone where the fluid pressure equals the atmospheric pressure.

SUBCHAPTER 3. SITE INVESTIGATION

§ 35-301. REQUIREMENT TO PERFORM SITE INVESTIGATION.

- (a) Unless an action is taken as an emergency response pursuant to § 35-102(c) or has been investigated as a heating oil fuel release and has satisfied the Secretary's requirements under Subchapter 4, a person who may be liable for the release or suspected release of a hazardous material as established in 10 V.S.A. § 6615 shall conduct a site investigation in accordance with the requirements of this chapter.
- (b) A PRP shall provide the Secretary with a site investigation work plan within 30 days of the release or discovery of the release. The Secretary may establish, in writing, an alternative timeframe for providing a work plan.

§ 35-302. CONCEPTUAL SITE MODEL

- (a) The CSM shall be developed during the preparation of the investigation workplan required by § 35-303.
- (b) The CSM shall identify the following or identify how the information will be obtained in the context of the site investigation:
 - (1) Source of the release;
 - (2) The characteristics of engineered structures, subsurface infrastructure, tanks and containers present or known or suspected to have been present at the site, from which or through which the suspected contaminants may have been released, transported, or may impact a sensitive receptor;
 - (3) Historical land uses;
 - (4) Sources and contaminants;
 - (A) Identify all potential hazardous materials and all potential and actual sources of a release;
 - (B) Identify all hazardous material phases (e.g. NAPL, sorbed to matrix, dissolved in groundwater or soil moisture, and in vapors in the vadose zone);
 - (C) Identify all hazardous material physical properties; and
 - (D) If known, an estimate of the amount of hazardous material mass on the site.
 - (5) Geology. A brief description of regional and site-specific soils and bedrock. Boring logs, well logs and groundwater confining layers shall be included, if available and have not been previously submitted to the Secretary. If applicable, values for soil bulk density, porosity, fraction organic content, pH and reduction-oxidation potential, shall be included. If available include geologic maps, fracture trace maps, geophysical data, and cross sections;
 - (6) Hydrogeology. Describe regional and site-specific hydrogeology, horizontal and vertical groundwater flow gradients and direction, and an assessment of the potential for preferential pathways and multiple aquifers. If available, hydraulic conductivity, transmissivity, and other parameters shall be included;

- (7) Contaminant fate and transport. Describe the hazardous material distribution, migration pathways, the amount of migration occurring, the predicted migration of the contamination over time, and if available, the adsorption, desorption, absorption, and retardation of the hazardous material, and naturally occurring degradation processes. If historic groundwater quality data have been collected, estimate the duration of groundwater contamination to determine if groundwater reclassification is warranted according to the Groundwater Protection Rule and Strategy;
- (8) Receptor Study and Evaluation. Identify all potentially threatened sensitive receptors and complete exposure pathways. A list of the names and addresses of impacted or threatened third parties shall be included, if applicable. Compare all measured concentrations of hazardous materials with applicable environmental media standards; and
- (9) Potential exposure pathways from all potentially impacted media.

§ 35-303. SITE INVESTIGATION WORK PLAN

- (a) Applicability. This section applies to any release that is not fully investigated pursuant to:
 - (1) § 35-102(c) (emergency response); or
 - (2) Subchapter 4 (response action; heating fuel).
- (b) Purpose and objectives of a site investigation work plan are to:
 - (1) Identify the source, degree, and spatial extent of contamination in all impacted or potentially impacted environmental media;
 - (2) Identify pathways that are conveying or could convey hazardous materials to different sensitive receptors;
 - (3) Identify sensitive receptors that have been or may be impacted by the release based upon an evaluation of pathways;
 - (4) Identify the need to conduct further investigation or corrective action based on results of site characterization data gathered to date;
 - (5) Develop the Conceptual Site Model in accordance with §35-302; and
 - (6) Identify data gaps that must be addressed to confirm the site conceptual model or evaluate corrective actions.
- (c) General requirements.
 - (1) A site investigation work plan shall be submitted to the Secretary no later than 30 days of the date the Secretary was notified of a release, unless the Secretary agrees to an alternate schedule.
 - (2) A site investigation work plan shall be approved by the Secretary prior to the initiation of on-site work.
- (d) Minimum content. A site investigation shall, at a minimum, include:

- (1) Site information. Table of names, addresses, email addresses and phone numbers of the following:
 - (A) Property owner and operator; and
 - (B) Any person or entity who released a hazardous material at the site.
- (2) Current use or uses of the property;
- (3) Uses of properties adjacent to the site;
- (4) Site description. A physical and environmental description of the site;
- (5) Site characterization strategy. This strategy shall address known data gaps and include contaminant characterization methods, sampling locations and methods, and the rationale for that strategy;
- (6) Identification of analytical methods;
- (7) A list of consultant standard operating procedures to be used during the site investigation, which shall be submitted to the Secretary upon request;
- (8) A CSM and a description on how the site investigation will gather information to further develop and refine the CSM;
- (9) A discussion of how investigation-derived waste will be managed, which shall be in accordance with §35-505(5)(C);
- (10) A quality assurance and quality control (QA/QC) plan;
- (11) Maps. At a minimum, a vicinity map in accordance with §35-305(b)(13)(A) and a site map in accordance with §35-305(b)(13)(B) showing proposed environmental media sampling locations shall be included;
- (12) Latitude/longitude of the site, as close as possible to the known or suspected release location or locations, referenced to the WGS1984 coordinate system (Mercator), in decimal degrees. Minimum acceptable accuracy is plus-or-minus 15 feet;
- (13) Estimated costs, if requested by the Secretary;
- (14) A site investigation work plan implementation schedule; and
- (15) Signature. A site investigation work plan shall be signed by the environmental professional in accordance with § 35-104.

§ 35-304. SITE INVESTIGATION WORK PLAN; SECRETARY REVIEW AND DETERMINATION

- (a) The Secretary shall only approve, in writing, a site investigation work plan upon finding the investigation will:
 - (1) Aid in determining the degree and extent, and fate and transport of contamination at the Site; and
 - (2) Characterize any threat that may exist to a sensitive receptor.
- (b) A PRP shall implement an approved site investigation work plan no later than 60 days from the date of the Secretary's approval, unless an alternate implementation timeline is approved by the Secretary.

§ 35-305. SITE INVESTIGATION REPORT

- (a) The site investigation report shall be submitted to the Secretary within 90 days of receipt of final laboratory data, or within an alternate schedule approved by the Secretary.

- (b) A site investigation report shall include the following:
- (1) Executive summary. A site investigation report shall include an executive summary of the site investigation, consisting of a summary of findings, conclusions, and recommendations based upon the data collected during the site investigation.
 - (2) Site information. Table of names, addresses, email addresses and phone numbers of the following:
 - (A) Property owner and operator; and
 - (B) Any person who released a hazardous material at the site.
 - (3) Current use or uses of the property.
 - (4) Uses of properties adjacent to the site.
 - (5) Site description. A physical and environmental description of the site.
 - (6) Latitude/longitude of the site, as close as possible to the known or suspected release location or locations, referenced to the WGS1984 coordinate system (Mercator), in decimal degrees. Minimum acceptable accuracy is plus-or-minus 15 feet.
 - (7) Property history. Past and present land use, waste storage or disposal areas, potential sources of contamination, and hazardous waste and hazardous materials disposal practices, including any associated EPA ID numbers. The property history section shall include a description of current and historic property uses in the surrounding area. A list of all recognized environmental conditions should be provided if an ASTM Phase I or Phase II Environmental Site Assessment has been completed. Presentation may include copies of historic maps (including Sanborn Fire Insurance Maps, town maps) and copies of town directories.
 - (8) Site contaminant background. A description of all known releases of hazardous materials, including the following information:
 - (A) The date and a description of each release, if known, the discovery date of each release, the location of each release, and the PRP for each release;
 - (B) The date each release was reported to the Secretary;
 - (C) A description of response actions taken for each release;
 - (D) A list of any previous environmental investigations and reports (including Phase I Environmental Site Assessments) pertinent to the site relating to a release of hazardous materials, including a summary of findings;
 - (E) A copy of any previous investigation or report relating to a release of hazardous materials, if not already on file with the Secretary; and
 - (F) A list of governmental records reviewed relating to the site.
 - (9) Work plan protocol deviations. Any deviations from the approved work plan shall be identified and discussed.
 - (10) Sample-collection documentation. Documentation of the sample location and method of collection in accordance with the approved work plan.
 - (11) Contaminated media characterization. Analytical results shall be tabulated and compared to the applicable environmental media standard located in Appendix A and the following, unless a site specific risk assessment was conducted pursuant to 35-505(b)(12) or a site specific background study was performed in accordance with Appendix B:

- (A) Soil. Soil sample results shall be compared to the Soil Screening Values for the appropriate residential or industrial scenario. The Vermont Screening Levels (VSL) are for residential scenarios. In the absence of a VSL, the EPA Regional Screening Value shall be used. For industrial scenarios, the industrial EPA Regional Screening Value shall be used. The VT DEC Background Soil Concentration values are to be used when the Background value for benzo(a)pyrene (TEQ) or arsenic is greater than the VSL.
 - (B) Groundwater. Sample results shall be compared to the Vermont Groundwater Quality Standards (Vermont Groundwater Enforcement Standard or Health Advisory).
 - (C) Drinking water. Sample results shall be compared to the applicable Vermont Health Advisory, Vermont Action Levels, or EPA Maximum Contaminant Levels (MCLs).
 - (D) Surface water. Sample results shall be compared to the Vermont Water Quality Standards; and if applicable, compared to the respective Vermont Health Advisory, Vermont Action Levels, or EPA Maximum Contaminant Levels (MCLs).
 - (E) Sediment. Sample results shall be compared to the Threshold Effect Concentration (TEC) and Probable Effects Concentration (PEC) for sediments.
 - (F) Soil gas and indoor air. Soil gas and indoor air shall be compared to:
 - (i) the most recent EPA Vapor Intrusion Screening Value, EPA Regional Screening Levels; or
 - (ii) the Vermont Department of Health Risk Based Residential and Industrial Air Screening Level where available. See Appendix A.
 - (G) Any site-specific health advisory, Soil Screening Value, developed by the Vermont Department of Health when a standard does not exist for a hazardous material.
- (12) A site-specific risk assessment that includes use of chemical and endpoint specific toxicity values and site-specific exposure assumptions may be performed for both current and potential future site uses. A site-specific risk assessment shall follow standard USEPA risk assessment methodology.
- (13) Maps. All maps shall include the location of the site, physical and environmental features, the Vermont Department of Environmental Conservation Hazardous Site number, legend, graphical scale bar, and a base map source reference. All maps shall be accurate and to scale. The following maps shall be included:
- (A) Vicinity map (or sensitive receptor map). Prepared using the Vermont Agency of Natural Resources online Natural Resource Atlas, Waste Management Theme as a base map including property boundary lines, surrounding land use, buildings, street names, sensitive receptors identified in § 35-302(b)(8), surface water bodies, chemical storage or process areas, waste storage and disposal areas, floor drains, drywells and hazardous materials within 1,000 feet of the site. Alternative base maps may be used if pre-approved by the Secretary.
 - (B) Site map. A site investigation map shall include:

- (i) surface topography spot elevations or contours;
 - (ii) property boundary lines;
 - (iii) environmental media sample locations;
 - (iv) contaminant source areas, including former or current tank locations, release areas, or waste disposal locations;
 - (v) engineered structures, including asphalt parking surfaces, concrete sidewalks, drainage ways, diversion ditches, drain tiles, manholes, lined areas, leachate collection systems, septic systems, sewer lines, drywells; and
 - (vi) survey benchmark. A permanent and recoverable site feature shall be assigned as the site survey benchmark. The use of the top of monitoring well risers, road box covers, or concrete pads as a benchmark is prohibited.
- (C) Groundwater flow direction map. The groundwater flow direction map shall include the location of all monitoring points and data collected to create groundwater elevation contours. Multiple maps may be needed to show groundwater flow in different aquifers. A groundwater flow direction map will not be required if the site investigation did not include the installation of groundwater monitoring wells.
- (D) Contaminant distribution map. A contaminant distribution map shall include the location of all monitoring points and, as required by the Secretary, concentration of any hazardous material at that monitoring point. As applicable, based on the site-specific geology and distribution of contaminants, isopleths shall be used to indicate the approximate location of compound-specific contaminant plumes that exceed the applicable environmental media standard. Multiple maps may be required to illustrate multiple contaminants or multiple aquifers. Maps solely depicting total contaminants (e.g. total VOCs) will not be accepted. At sites where isopleth maps are not appropriate, contaminant concentrations shall be plotted on the maps adjacent to the sampling points.
- (14) Discussion. The discussion shall include a descriptive analysis of how the data gathered further refines the CSM, how the CSM has been updated, and how the site investigation work plan objectives in § 35-303(b) have been met. The discussion shall also establish that the data collected are suitable to determine the existing and future exposure to sensitive receptors and, the need for further characterization. Only data that meets quality assurance quality control (QA/QC) criteria will be accepted. A discussion of data which doesn't meet QA/QC criteria shall be included. The report shall evaluate if the data demonstrates that groundwater contamination is confined to the same property where the release occurred and if not, if it will recede to the property boundary within the timeline established in the Vermont Groundwater Protection Rule and Strategy.
- (15) Data presentation. All collected data shall be organized in a narrative, tabular, and graphical form, data shall be presented on maps and cross sections when appropriate. All detected hazardous material concentrations shall be reported. Detection limits shall be provided along with analytical results. Hazardous materials

that are not detected shall be reported as non-detect. Detection limits shall be below the environmental media standards.

- (16) QA/QC sample results. At a minimum, a trip blank, a method blank and a duplicate sample will be required. If field analytical methods are approved in the work plan, the Secretary may require that a subset of samples be analyzed at a fixed base laboratory. Additional QA/QC samples (e.g. field blanks) may be required by the Secretary depending on the complexity of the investigation or sampling methods used. Any deviations from QA/QC procedures or acceptable limits shall be identified and discussed. Only data that meets quality assurance quality control (QA/QC) criteria specified in the QA/QC Plan will be accepted.
- (17) Investigation-derived waste. All investigation derived waste generated during the site investigation shall be managed in accordance with § 35-505(a)(5)(C). A discussion of how the investigation derived waste was managed shall be included in the site investigation report.
- (18) Conclusions and recommendations. The site investigation report shall include a discussion of the findings of the investigation that substantiate the revised CSM, and, specifically, the risk that hazardous materials pose to identified sensitive receptors. Further this section shall identify completed exposure pathways, data gaps, and potential corrective actions. The PRP shall make recommendations on proposed monitoring and frequency and need for further investigation, corrective action, or site closure. If additional data collection is necessary in order to identify an appropriate corrective action, then additional site investigation will be required.
- (19) Signature and certification. A site investigation report shall be certified by the environmental professional that it was conducted in accordance with the approved workplan and signed in accordance with § 35-104.
- (20) Standard operating procedures. A list of consultant standard operating procedures (SOPs) that were used during site investigation shall be listed in the report and provided to the Secretary upon request.
- (21) Appendices.
 - (A) Monitoring well and soil boring logs. At a minimum, logs shall include a description and discussion of monitoring well, soil boring and test pit installation. Logs shall include well boring or test pit location with latitude and longitude. In addition, logs shall include the installation method, blow count data, elevation, total depth, depth to groundwater, soil or rock descriptions, well construction, hole backfill, or sealing information, odors noted, and field screening results.
 - (B) Photographic documentation. Color images showing work performed at the site (UST closure, soil stockpiles, etc.) and pertinent site or vicinity features shall be included as an appendix. Each photographic presentation shall include the date and time, location, and orientation.
 - (C) Field notes. Copies of the original field notes shall be attached as an appendix and the field notes shall contain the following minimum content: the date the work was performed, name of the person conducting the work, tasks completed, date, documentation of weather conditions, sampling timeline with locations, sampling logs, field monitoring results, and calibration information for each type of field analytical equipment.

- (D) Laboratory results. A copy of the laboratory results, chains of custody documentation and all QA/QC data, as specified in the approved work plan shall be included.
- (E) Calculations. All calculations, such as contaminant mass or volume, travel and migration time, natural attenuation, and groundwater gradients. If computer modeling is conducted, a reference to the model used, the data inputs, and data output package shall be included.
- (F) If a quantitative human health risk assessment is conducted, the full risk assessment report, including summary tables and electronic copies of calculating spreadsheets, shall be included.
- (G) Hydrogeologic cross sections. When requested by the Secretary or approved in a work plan.

§ 35-306. REVIEW OF SITE INVESTIGATION REPORT

- (a) The Secretary shall review the site investigation report for completeness with the requirements of 35-305(b).
- (b) After determining that the site investigation report contains all the information required in §35-305(b), the Secretary shall, in writing notify the PRP:
 - (1) The site investigation report has adequately defined the scope and extent of contamination and risks to sensitive receptors have been appropriately managed. The site is potentially eligible to be closed in accordance with Subchapter 7.
 - (2) The site investigation report has not adequately defined the scope and extent of contamination or risk to sensitive receptors and the PRP shall submit a supplemental site investigation work plan to address data gaps or other deficiencies identified by the Secretary;
 - (3) The site investigation report has not met the objectives in the approved workplan or is incomplete, and will be returned to the PRP for revisions and resubmittal; or
 - (4) The site investigation report has adequately defined the scope and extent of contamination but risks to sensitive receptors have not been appropriately managed. The PRP shall develop a corrective action plan in accordance with Subchapter 5.

SUBCHAPTER 4. RESPONSE ACTIONS; RELEASES OF HEATING FUELS

§ 35-401. APPLICABILITY

This subchapter applies to the release of heating fuel from a category four underground storage tank used for storage of heating fuel.

§ 35-402. INVESTIGATION; SOIL REMOVAL AND DRINKING WATER

- (a) Soil removal. Following approval from the Secretary, a PRP shall remove impacted soil in the area where a release of heating oil occurred until VOC field screening instrument readings are below 10 ppmv. Post excavation soil samples shall be collected to document removal of contamination or to characterize soil contamination remaining in place. If removal of soil is not possible due to physical constraints, the PRP shall:
 - (1) Collect and analyze a soil sample of soils remaining in place from the area determined to be the most contaminated by field measurements; and
 - (2) If groundwater is encountered, collect and analyze a groundwater sample from the excavation area.
- (b) Bedrock. Soil excavation shall be extended to the soil bedrock interface to determine if impacted soil is present unless:
 - (1) the vertical extent of contaminated soil is delineated and determined to be adequately separated from the bedrock surface; or
 - (2) excavation to bedrock is physically impossible or a confining soil layer is present, in which case the PRP shall collect a water sample from all drinking water supply wells drilled into bedrock within 200 feet of the release.
- (c) Drinking water. If a drinking water supply well is located anywhere on the property or an off-site property within 200 feet of the release, a sample shall be collected from the public water system or potable water supply for appropriate laboratory analysis.
- (d) Vapor intrusion. If there is any building within 30 feet of the release, indoor air shall be screened with a VOC field screening instrument.
- (e) Surface waters. If visual observations or VOC field screening instrument readings indicate that a release may have impacted surface water then the PRP shall immediately take measures to abate any continuing release to surface water and remove to the extent possible any product in the water.

§ 35-403. INVESTIGATION AND SOIL REMOVAL REPORT

Within 30 days of receipt of laboratory data, or an alternate timeframe approved in writing by the Secretary a PRP shall provide the Secretary a report that contains the following:

- (1) Site description, in accordance with § 35-305(b)(5);
- (2) Property history, in accordance with § 35-305(b)(7);
- (3) Results of contaminated environmental media characterization, in accordance with § 35-305(b)(11);
- (4) Maps, in accordance with § 35-305(b)(13)(A) and 35-305(b)(13)(B).;
- (5) Data presentation, in accordance with § 35-305(b)(15);
- (6) Conclusions and recommendations, in accordance with §35-305(b)(18);
- (7) Photographic documentation in accordance with §35-305(b)(21)(B);
- (8) Copies of laboratory reports, in accordance with §35-305(b)(21)(D);
- (9) Waste disposal documentation, in accordance with § 35-505(5)(C) and 35-507(b)(14);
and
- (10) Recommendations for closure or additional release characterization.

§ 35-404. RESPONSE TO REPORT

The Secretary shall respond, in writing, to the investigation and reporting required by this section, as follows:

- (1) No further work is required;
- (2) An additional site investigation in accordance with §35-405 is necessary;
- (3) A site investigation in accordance with Subchapter 3 or corrective action in accordance with Subchapter 5 is required; or
- (4) The report is incomplete and will be returned to the PRP and the environmental professional for revision and resubmission.

§ 35-405. ADDITIONAL SITE INVESTIGATION

If required by the Secretary under § 35-404(2) of this section, a PRP shall prepare an additional site investigation work plan and provide it to the Secretary for review and approval prior to implementation. At a minimum, the additional site investigation work plan shall include:

- (1) Soil borings and soil samples.
 - (A) Soil borings shall be advanced to below the water table within the former UST location or AST release area and in the downgradient direction.
 - (B) A representative number of borings shall be advanced to define the extent of the impact to soil.
 - (C) Soil samples shall be collected for analysis. Samples shall be collected for laboratory analysis from the water table if non-detect, or from the location of the highest VOC field screening instrument result. If the water table is not encountered and soil contamination above 10 ppm is present, the boring shall be advanced 5 feet beyond the depth of non-detect readings as measured with a VOC field screening instrument, or until refusal.
- (2) Installation of monitoring wells. If VOC field instrument screening results exceed 10 ppmv in any boring at or above the water table, the PRP shall install monitoring wells sufficient to determine the extent of impacts to groundwater and groundwater

flow direction. Groundwater samples shall be collected for appropriate laboratory analysis.

- (3) Surface water and sediment. Representative samples shall be collected for laboratory analysis to determine whether there are exceedances of environmental media standards in surface water and sediment.

§ 35-406. ADDITIONAL SITE INVESTIGATION WORK PLAN; APPROVAL AND IMPLEMENTATION

- (a) Final determination on additional site investigation work plan. The Secretary shall only approve an additional site investigation work plan if the work plan is designed to adequately characterize the degree and extent of the release and provide information sufficient to evaluate the impact of the release on any sensitive receptor. The Secretary's final decision under this section shall be made in writing.
- (b) Implementation of additional site investigation. Upon approval, a PRP shall implement the approved additional site investigation work plan within 30 days of the date of approval or an alternate timeframe approved by the Secretary. The work plan shall be implemented under the supervision of an environmental professional.

§ 35-407. ADDITIONAL SITE INVESTIGATION REPORT SUBMISSION AND REVIEW

- (a) An additional site investigation report shall be submitted within 90 days of receipt of laboratory data or in accordance with an alternate schedule approved by the Secretary. The additional site investigation report shall include the components of a site investigation report, as required by § 35-305, and that were approved in the additional site investigation work plan.
- (b) Upon review of the additional site investigation report, the Secretary shall, in writing, notify the PRP that:
 - (1) The additional site investigation has adequately defined the scope and extent of contamination and risks to sensitive receptors have been appropriately managed. The site will be closed in accordance with Subchapter 7;
 - (2) The additional site investigation has not adequately defined the scope and extent of contamination and the PRP is required to investigate the site in accordance with Subchapter 3;
 - (3) The additional site investigation report is inadequate and will be returned to the PRP and the environmental professional for revisions; or
 - (4) The additional site investigation has adequately defined the scope and extent of contamination but risks to sensitive receptors have not been appropriately managed. The PRP shall develop a corrective action plan in accordance with Subchapter 5.

SUBCHAPTER 5 CORRECTIVE ACTION

§ 35-501. EXEMPTIONS FROM CORRECTIVE ACTION

Exemptions. The following are exempt from the corrective action requirements of this Subchapter:

- (1) An emergency response performed pursuant to § 35-102(c), provided no corrective action is required after the emergency response is completed;
- (2) A response action to address the release of heating fuels pursuant to Subchapter 4;
- (3) A Resource Conservation and Recovery Act (RCRA) corrective action taken pursuant to 10 V.S.A. § 6606, the Vermont Hazardous Waste Management Regulations, and 40 C.F.R. Part 264 Subpart F;
- (4) Releases remediated under CERCLA; and
- (5) An approved site investigation report which concludes all the following:
 - (A) that there are no exceedances of any applicable Vermont Groundwater Quality Standards (Vermont Groundwater Enforcement Standards or Vermont Health Advisory) at drinking water sources, vapor intrusion is not occurring and there are no other impacts that may present a threat to human health or the environment;
 - (B) groundwater contamination is confined to the same property where the release occurred;
 - (C) a demonstration that contamination will not migrate at concentrations exceeding standards, given the current data that is available, and concentrations are stable or declining;
 - (D) the hazardous material release has been addressed through a removal of a limited amount of source material;
 - (E) the site investigation demonstrates that there are no direct contact threats; and
 - (F) the Secretary has approved an institutional control plan that meets the requirements of Subchapter 6.

§ 35-502. OBJECTIVES OF CORRECTIVE ACTION

All corrective actions shall be designed to mitigate the impact of hazardous materials to sensitive receptors to the maximum extent practicable. A corrective action shall accomplish this by implementing the following approaches, in order of priority:

- (1) Treatment of environmental media to the maximum extent practicable, or to levels where the risk may be managed via engineered controls or institutional controls;
- (2) Removal and proper disposal of environmental media impacted by hazardous materials;
- (3) Use of engineered and other controls to contain hazardous materials and to mitigate impacts to environmental media and sensitive receptors; and
- (4) Use of institutional controls to mitigate exposure to sensitive receptors.

§ 35-503. EVALUATION OF CORRECTIVE ACTION ALTERNATIVES

- (a) Evaluation required. At sites that are not exempt in accordance with § 35-501 or subsection (b) of this section the PRP shall evaluate corrective action alternatives prior to submitting a corrective action plan to the Secretary.
- (b) Exemption. A PRP may submit a corrective action plan without conducting an evaluation of corrective action alternatives pursuant to this section, provided all the following have been demonstrated to the satisfaction of the Secretary:
 - (1) The site investigation report demonstrates that there are no impacts to drinking water sources, vapor intrusion is not occurring, and there are no other impacts that present a threat to human health;
 - (2) For impacted groundwater, the site investigation report demonstrates that the groundwater contamination is confined to the property where the release occurred on or will recede to the property boundary within the timeline established in the Vermont Groundwater Protection Rule and Strategy;
 - (3) Except when the hazardous material can be addressed through a removal of a limited amount of source material, the site investigation demonstrates that there are no direct contact threats to sensitive receptors; and
 - (4) A corrective action plan will document that the proposed remedy, with respect to the hazardous material in question, has been utilized at other sites and has been demonstrated to be reliable, cost effective, and effective in addressing remediation of the hazardous material.
 - (5) For Development Soil receiving sites, all requirements in §35-512 have been met, and a corrective action plan which addresses potential direct contact with development soils by the public, including capping and land use restrictions, has been approved by the Secretary.
- (c) Identification of corrective action alternatives. The PRP shall identify corrective action alternatives that will eliminate exposure pathways to sensitive receptors. The number and type of alternatives to be considered shall be determined by taking into account the scope, characteristics, and complexity of the problem being addressed. At each site, at least the following alternatives shall be considered:
 - (1) An alternative that reduces the toxicity, mobility, or volume of the hazardous materials released to the extent feasible. This alternative shall minimize the need for long term management at the site; and
 - (2) An alternative that involves little or no treatment but controls impacts to sensitive receptors through engineered controls, containment, long term monitoring, and institutional controls.
- (d) Evaluation of corrective action alternatives. For each proposed cleanup alternative, the PRP shall evaluate and document the following:

- (1) Compliance with legal requirements. Alternatives shall be evaluated to determine whether the PRP can obtain all federal, state, and local permits for the proposed alternative as well as describe how the alternative will meet those regulatory requirements.
- (2) Overall protection of human health and the environment. Alternatives shall be assessed to determine whether they can adequately protect human health and the environment, by either eliminating, reducing, or controlling exposures to levels established by the corrective action objectives consistent with § 35-502. Overall protection of sensitive receptors shall also assess long-term effectiveness and permanence, short-term effectiveness, and compliance with federal, state, and local laws.
- (3) Long-term effectiveness and permanence. Alternatives shall be assessed for long-term effectiveness and permanence. Factors that shall be considered include the following:
 - (A) Adequacy and reliability of the proposed alternative such as containment systems and institutional controls that are necessary to manage treatment residuals and untreated waste. This factor addresses the uncertainties and risks associated with long term management of the remedy.
- (4) Reducing toxicity, mobility, or volume through treatment. The degree to which alternatives reduce toxicity, mobility, or volume shall be assessed, including how treatment is used to address the principal threats posed by the site. Factors that shall be considered include the following:
 - (A) The treatment or recycling processes the alternatives employ and materials they will treat;
 - (B) The amount of hazardous materials that will be destroyed, treated, or recycled;
 - (C) The degree of expected reduction in toxicity, mobility, or volume of the hazardous materials due to treatment or recycling and the specification of which reduction(s) are occurring;
 - (D) The degree to which rebound of contaminants may occur;
 - (E) The type and quantity of residual contamination that will remain following treatment, considering the toxicity, mobility, propensity to bioaccumulate, and persistence of such hazardous materials and their constituents; and
 - (F) The degree to which treatment reduces the inherent hazards posed by principal threats at the site.
- (5) Short-term effectiveness. The short-term impacts of alternatives shall be assessed by considering the following:
 - (A) Short-term risks that might be posed to sensitive receptors during implementation of an alternative;
 - (B) Potential impacts to workers during corrective action and the effectiveness and reliability of protective measures; and
 - (C) Potential environmental impacts of the corrective action and the effectiveness and reliability of mitigation measures during implementation.
- (6) Implementability. The relative degree of difficulty in implementing the alternatives shall be assessed by considering the following:

- (A) Technical feasibility, including technical difficulties and uncertainty associated with construction and operation of a corrective action, the reliability of the technology, ease of undertaking additional corrective actions, and the ability to monitor the corrective action's effectiveness;
 - (B) Administrative feasibility, including activities needed to coordinate with other offices and agencies and the need to obtain any necessary approvals and permits; and
 - (C) Availability of services and materials, including the adequate off-site treatment, storage capacity, and disposal capacity and services; the availability of necessary equipment and subcontractors, and any necessary additional resources.
- (7) Cost. The types of costs that shall be assessed include the following:
- (A) Capital costs;
 - (B) Annual operation and maintenance (O&M) costs; and
 - (C) Net present value of capital and O&M costs.
- (8) Environmental impact and sustainability. Include a discussion of waste generation and disposal requirements, as well as a discussion of methods to implement best management practices to reduce the environmental impact of the proposed remedies in accordance with EPA guidance or ASTM Standard Guide for Greener Cleanups.
- Note: EPA guidance materials may be found at: <https://www.epa.gov/greenercleanups>
- (9) Community acceptance. This assessment includes determining which components of the alternatives interested persons in the community may support, have reservations about, or oppose. The Secretary may require a public comment period and informational meeting on the alternatives or consider community acceptance in the context of public input on the corrective action plan.
- (e) Minimum elements. The PRP shall provide the Secretary with a report that contains the following:
- (1) An executive summary of the corrective action alternatives considered, including a recommended alternative based criteria in subsection (d) of this section.
 - (2) A proposal for any site-specific background standards that the PRP proposes to apply to the site in accordance with Appendix B.
 - (3) A proposal for any waiver that the PRP proposes to apply to the site in accordance with Appendix C.
 - (4) A detailed evaluation of the criteria established under subsection (d) of this section for each remedial option selected under subsection (c) of this section.
 - (5) A detailed justification for the selected remedy.

§ 35-504. SECRETARY EVALUATION OF CORRECTIVE ACTION ALTERNATIVES

- (a) The Secretary shall evaluate each corrective action alternative presented in the evaluation of corrective action alternative report utilizing the criteria of § 35-503(d).
- (b) The Secretary shall provide a written response to the PRP that:

- (1) Approves the corrective action alternative recommended in the report;
 - (2) Approves an alternate alternative that was considered but not recommended;
 - (3) Requires additional alternative be evaluated;
 - (4) Requires additional analysis of one of the alternatives reviewed as a part of the report; or
 - (5) The report is inadequate and will be returned to the PRP and the environmental professional for revisions.
- (c) The PRP shall, within 30 days of the Secretary's response, provide the Secretary with a response to any comment provided by the Secretary including a revised corrective action alternative or a corrective action plan for the selected alternative.

§ 35-505. CORRECTIVE ACTION PLAN

A corrective action plan shall include the following:

- (1) Executive summary. An executive summary that includes a description of the contamination, a review of the results of the investigation, remediation and remedial objectives, a summary of the alternatives considered, a description of the chosen corrective action technology, a statement of site operations and monitoring activities, and an estimate of the duration of the remedial action.
- (2) Public notice. A list shall be included of the persons who will receive notice under § 35-506(a)(1), including contact names, addresses, email addresses, and phone numbers. A parcel boundary map shall be included showing all such parcels.
- (3) Performance standards.
 - (A) A discussion of how the corrective action achieves the corrective action objectives identified in § 35-502.
 - (B) A list of environmental media standards that apply to the site.
 - (C) A map identifying the compliance points that will be used to monitor compliance with the environmental media standards.
 - (D) A narrative explanation as to why these compliance points were chosen.
 - (E) A narrative explanation as to how any corrective action will ensure that there are no completed pathways that would result in an impact to a sensitive receptor.
 - (F) An estimate of the contaminant mass or volume, expected removal rates, and the estimated duration of the remediation.
 - (G) A list of all local, state, and federal permits required for the project, and the contacts necessary to obtain these permits.
- (4) Remedial construction plan. For any corrective action involving construction of a treatment system, engineered system, including a cap, a containment system, or any other control that requires an engineered design, include:
 - (A) Detailed plans and specifications of the corrective action remedial design and related calculations.
 - (B) A Vermont licensed professional engineer's signature of review of the remedial system design.
- (5) Waste management plan.

- (A) A discussion of any waste material that will be generated by the corrective action, including a hazardous waste determination.
- (B) A plan for managing contaminated soil in accordance with § 35-510, §35-511, or §35-512.
- (C) Investigation and remediation derived wastes shall be managed and disposed as follows:
 - (i) If the waste meets the definition of hazardous waste, the waste shall be managed in accordance with the Vermont Hazardous Waste Management Regulations.
 - (ii) If the waste contains polychlorinated biphenyls (PCBs), it shall be managed in accordance with the Toxic Substance Control Act (TSCA), provided the PCBs are present at concentrations in excess of 50 parts per million (ppm). The waste also shall be managed as a hazardous waste in accordance with the Vermont Hazardous Waste Management Regulations (VT01 hazardous waste code). If PCBs are present at concentrations below 50 ppm, the waste is not regulated by the VHWMRs but may still require management under TSCA.
 - (iii) If the waste does not meet the criteria of subdivisions (i) or (ii) of this subsection, then the waste shall be disposed of:
 - (I) in accordance with the Solid Waste Management Rules, or
 - (II) under a waste management plan approved as a part of the site investigation work plan, provided no investigation and remediation derived waste with a hazardous material above an environmental standard is transported beyond the site.
 - (iv) Petroleum contaminated purge water from groundwater monitoring wells and equipment decontamination water may be returned to the ground within the area where it was extracted.
 - (v) Non-petroleum, non-hazardous waste contaminated purge water may be returned to the ground within the area where it was extracted, if approved by the Secretary.
- (6) Implementation schedule. A corrective action plan shall include an implementation schedule that contains milestones for implementing the corrective action and dates for when those milestones will be reached.
- (7) Corrective action maintenance plan. The corrective action plan shall include a long-term monitoring plan in accordance with § 35-509. The plan shall describe:
 - (A) How any engineered solution will be monitored and maintained to ensure that it continues to operate as designed;
 - (B) How any institutional controls will be monitored and maintained;
 - (C) At the request of the Secretary, a cost estimate for the implementation of the corrective action maintenance plan and a financial responsibility instrument to assure the implementation of the corrective action stewardship plan. Financial assurance under this rule shall be accomplished in the same manner as financial assurance under 40 C.F.R. Part 264 Subpart H;

- (D) A discussion of the operation and maintenance of any active remedial option after its construction until it attains performance standards established in subsection (3) of this section; and
- (E) A discussion of how any treatment system will be deconstructed or decommissioned prior to remedial objectives have been met.
- (8) Institutional Control Plan. The corrective action plan shall include an institutional control plan in accordance with § 35-601, unless the corrective action does not leave any residual contamination in place that exceeds any applicable environmental media standards.
- (9) Redevelopment and Reuse Plan. If applicable, the corrective action plan shall include the redevelopment and reuse plan for the property following implementation of the corrective action. Changes or modifications to this plan may require an amendment to the corrective action plan to ensure that sensitive receptors are not adversely impacted.
- (10) Quality Assurance and Quality Control (QA/QC) Plan. The corrective action plan shall contain the following:
 - (A) A list of the Standard Operating Procedures (SOPs) appropriate to the technologies being proposed for the corrective action. The SOP's shall be provided to the Secretary upon request.
 - (B) A Quality Assurance/Quality Control plan. What methods will be employed to ensure the validity and accuracy of the data and technologies implemented.
- (11) Cost Estimate.
 - (A) Applicability. A corrective action plan shall include a cost estimate if State or federal funding will be utilized, if the project is enrolled in the BRELLA program, or if requested by the Secretary,
 - (B) Contents. A cost estimate shall be broken down by task, materials, labor costs, sub-contractor costs, and equipment costs. Estimates for sub-contractors shall also be itemized into labor, materials, and equipment costs. Lump-sum estimates will not be accepted. The cost estimate shall contain a separate itemized cost estimate for Corrective Action Plan implementation and system operations and maintenance (O&M).
- (12) An updated set of maps as per § 35-305(b)(13).
- (13) Tabular, time series summaries of contaminant concentrations by medium in accordance with §35-305(b)(15).
- (14) Cross-sections of the contaminated zone depicting well or boring depths, soil stratigraphy, recent soil contaminant concentrations, and recent water levels as appropriate to site-specific conditions.
- (15) A list of all proposed contractors, sub-contractors, including contacts, email addresses, addresses and phone numbers.

§ 35-506. CORRECTIVE ACTION PLAN REVIEW; PUBLIC NOTICE; FINAL DECISION

- (a) Complete corrective action plan.
 - (1) Upon a determination by the Secretary that the corrective action plan is complete, a PRP shall provide notice of the corrective action plan to all property owners

- impacted by the release and to all impacted adjoining property owners, on a form provided by the Secretary.
- (2) The Secretary will post a copy of the proposed corrective action plan electronically for public comment.
- (b) Review of corrective action. The Secretary shall only approve a corrective action plan upon finding:
- (1) That the corrective action plan demonstrates that the proposed corrective action meets the criteria of § 35-502 (corrective action objectives), and § 35-505 and the proposed corrective action:
- (A) ensures that no sensitive receptor will be adversely impacted by the corrective action; or
- (B) that the corrective action is an interim measure that addresses a portion of the release and that further corrective action is planned to ensure that no sensitive receptor will be adversely impacted.
- (c) Public notice.
- (1) The Secretary shall electronically provide all interested persons with notice of the draft approval of a corrective action plan.
- (2) Interested persons shall have 30 days from the date of notice to comment on the draft approved corrective action plan and approval.
- (3) Any interested person may request a public informational meeting within 14 days of the date of notice. The Secretary shall provide notice to interested persons of a public informational meeting at least 14 days in advance of the meeting.
- (4) After the close of the comment period, the Secretary shall consider comments prior to issuing a final approval to a corrective action plan. A final approval shall be accompanied by a response to comments made during the comment period.
- (5) The Secretary shall provide notice to interested persons of the approved corrective action plan.
- (d) The Secretary will approve, in writing, the corrective action plan, if § 35-506(a) has been met.
- (e) Corrective action plan. The corrective action plan shall be implemented within 90 days of the approval or in accordance with a schedule approved by the Secretary.
- (f) Amendments to a corrective action plan.
- (1) Major amendments. All amendments that do not meet the definition of minor amendments to the corrective action plan shall be considered major amendments. Major amendments shall be noticed in the same manner as required by subsection (b) of this section. .
- (2) Minor amendments. Minor amendments to a corrective action are amendments that do not change the remedial approach or design in the approved corrective action

plan. The PRP shall notify the Secretary and the Secretary shall approve the amendment prior to implementing the minor amendment.

§ 35-507. CORRECTIVE ACTION CONSTRUCTION COMPLETION REPORT

- (a) A corrective action completion report shall be submitted within 90 days of completing the construction of any remedy, as applicable, or in accordance with the schedule approved in the corrective action plan.
- (b) A corrective action completion report shall include the following elements when applicable:
 - (1) Corrective Action Objectives;
 - (2) Description of work performed;
 - (3) Description of remedial system installed;
 - (4) Certification that the remedial system was installed in accordance with the approved Corrective Action Plan;
 - (5) A description of any field-based amendments to the corrective action and a justification for them;
 - (6) Site plans reflecting post-CAP implementation conditions;
 - (7) Mechanical system layout and list of major components with serial numbers;
 - (8) Piping, control, and instrumentation diagrams along with any modifications to the O&M chapters of the corrective action plan for the installed system;
 - (9) Photo documentation, including:
 - (A) contamination encountered during the corrective action;
 - (B) the installed remedy; and
 - (C) the site before and after implementation of the CAP.
 - (10) Initial remedial system operation data, including:
 - (A) Flow rate;
 - (B) Pressure or vacuum radius of influence;
 - (C) Contaminant removal rates; and
 - (D) Treatment system influent and effluent sample results.
 - (11) Documentation that the site has been stabilized, physical hazards have been minimized, restored to the restoration plan included in the approved corrective plan;
 - (12) Recovery or injection well boring logs;
 - (13) Copies of all federal, state, and local permits;
 - (14) Waste disposal manifests and bills of lading;
 - (15) Applicable inspection results including building, zoning, plumbing, and electrical;
 - (16) Recommendations for additional work; and
 - (17) A certification that the activities were performed in accordance with the Corrective Action Plan.

§ 35-508. REVIEW AND FINAL DECISION OF CORRECTIVE ACTION CONSTRUCTION COMPLETION REPORT

- (a) The Secretary shall review the corrective action completion report and determine whether the corrective action conforms to the CAP approved by the Secretary.

- (b) If the Secretary concludes that the corrective action undertaken by the PRP fails to implement the approved CAP, the Secretary may require a supplemental corrective action completion report, additional investigation, or additional corrective action at the site.

§ 35-509. LONG TERM MONITORING

- (a) All sampling points shall be monitored at a frequency defined in the approved CAP. Any adjustment shall be approved by the Secretary in writing.
- (b) The long-term monitoring report, including analytical results, shall be submitted to the Secretary no later than 45 days from the receipt of analytical results from the laboratory or within an alternate schedule approved by the Secretary, except in the following circumstances, in which case the results shall be reported immediately:
 - (1) Drinking water supply laboratory analytical results which report an exceedance of the groundwater enforcement standards shall be submitted verbally within 24 hours and written analytical results shall be provided to the Secretary within five business days.
 - (2) Indoor air quality laboratory analytical results that report an exceedance of vapor intrusion target indoor air concentrations shall be submitted verbally within 24 hours and written analytical results shall be provided to the Secretary within five business days.
- (c) If site conditions have changed such that the monitoring work plan cannot be carried out as originally approved, then the Secretary shall be notified immediately.
- (d) The Secretary may modify the number of wells sampled or frequency of sampling based on data collected through the site investigation, through long term monitoring, and the Secretary's understanding of site conditions.
- (e) A long-term monitoring report shall include the following:
 - (1) Updated executive summary. Brief summary of findings, conclusions, and recommendations based upon the data collected during the monitoring event.
 - (2) An updated CSM in accordance with § 35-302.
 - (3) Contaminated media characterization in accordance with § 35-305(b)(11).
 - (4) Updated site maps in accordance with § 35-305(b)(13).
 - (5) Documentation of the sample location and method in accordance with the consultant's standard operating procedures (SOP). Justification for deviations from the SOPs shall be described.
 - (6) Any deviations from the approved work plan shall be identified and justified.
 - (7) A descriptive analysis of how the data gathered supports the CSM, and whether the corrective action objectives continue to be achieved. The discussion must also establish that the data collected are suitable to determine the risk posed by the hazardous materials, the need for further characterization, and the potential remedial actions. Only data that passes Quality Assurance/Quality Control criteria will be acceptable.

- (8) All collected data shall be organized in narrative, tabular, and graphical form, including maps and cross sections. Graphs of hazardous material concentration versus time; including results from discontinued monitoring locations. All detected hazardous material concentrations shall be reported. Detection limits shall be provided along with analytical results. Detection limits shall be below the environmental media standards. Hazardous materials that are not detected shall be reported as 'ND'.
- (9) NAPL recovery results, when applicable.
- (10) Field screening results from contaminated stockpiled soils in tabular format, with a map showing the locations of the screened samples and the stockpile location in reference to other pertinent physical features including buildings, roadways, and surface water bodies.
- (11) A description of the current condition of the monitoring network, any maintenance activities conducted since the last monitoring event, and any required maintenance that must be completed with a schedule to complete the work.
- (12) Observable changes in site and neighboring property conditions which may affect site management. These changes may include change in property use, change in property occupancy, water supply changes, and construction.
- (13) Any observable changes to the property that conflict with any institutional controls developed as part of the response to contamination.
- (14) Documentation of the handling of any investigation and remediation derived waste, which shall be dealt with in accordance with § 35-505(5)(c).
- (15) A discussion of the findings of the investigation that substantiate the revised CSM, and, specifically, the risk hazardous materials pose to identified receptors, completed exposure pathways, the identification of data gaps, potentially appropriate corrective actions, proposed monitoring frequency, and need for further investigation, additional corrective action, or site closure.
- (16) The report shall be signed by an environmental professional and certified in accordance with § 35-104.

§ 35-510. NON-HAZARDOUS WASTE CONTAMINATED SOIL

- (a) Except as provided in subsection (d) of this section, off site stockpiling of any contaminated soil is prohibited.
- (b) On-site treatment; non-hazardous waste petroleum contamination in soil – polyencapsulation:
 - (1) Excavated and stockpiled soils shall be completely contained or encapsulated within a polyethylene plastic liner, which shall be a minimum thickness of 6 mils or another containment method determined by the Secretary to be equally protective.
 - (2) The integrity of the polyethylene liner shall be maintained throughout treatment.
 - (3) The soils shall remain polyencapsulated on-site until vapor levels are non-detectable (< 1 parts per million by volume (ppmv) headspace) using a field screening instrument, and there is no olfactory or visual evidence of contamination. Aerating the soil pile to accelerate remediation is prohibited.

- (4) No additional soil may be added to the existing soil stockpile, unless approved by the Secretary.
 - (5) Polyencapsulated soils shall be periodically monitored at a frequency defined in an approved corrective action plan to track the rate of biodegradation and to ensure the integrity of the soil pile.
 - (6) The location of the polyencapsulated soil shall be in an area where:
 - (A) there are no public water systems or potable water supplies within a minimum 300-foot radius. This limit may need to be extended if water supplies are shown to be hydraulically downgradient;
 - (B) There are no sensitive environments including a stream, river, lake, pond, state or federally listed threatened or endangered species or habitat, wetland, floodplain, Class I or II groundwater, residence, property boundary, or other similar areas, within 100 feet of the treatment location;
 - (C) The treatment location is not within zone one or two of a groundwater source protection area;
 - (7) Public access to the location where polyencapsulated soils are stockpiled shall be prohibited through posting no trespassing and other means;
 - (8) If the landowner of the property where polyencapsulated soils are stockpiled is different from soil generator, written approval for the soil treatment that also grants access for the Secretary, has been obtained before treatment begins;
 - (9) The location where polyencapsulated soils are stockpiled shall be depicted on the site map; and
 - (10) Failure to adequately maintain polyencapsulated soil piles will result in a new release subject to investigation and corrective action.
 - (11) Thin-spreading. The following requirements shall be met prior to thin-spreading non-hazardous petroleum contaminated soil stockpiles:
 - (A) Vapor levels are less than 1.0 parts ppmv when measured with a VOC field screening instrument;
 - (B) Soils contain no olfactory or visual evidence of contamination;
 - (C) Confirmatory lab samples as required by the approved corrective action plan;
 - (D) Results of laboratory analysis shall be below SSVs;
 - (E) There are no public water systems or potable water supplies within a 300-foot radius of the location where soils are thin-spread. This limit may need to be extended if water supplies are shown to be hydraulically downgradient;
 - (F) There are no sensitive environments including a stream, river, lake, pond, state or federally listed threatened or endangered species or designated or identified habitat, wetland, floodplain, Class I groundwater zone, residence, property boundary, or other similar areas, within 100 feet of the treatment location;
 - (G) The thin-spread location is not within zone one or two of a groundwater source protection area; and
 - (H) Thinspreading has been approved by the Secretary.
- (c) Additional on-site treatment options for non-hazardous contaminated soil shall be approved by the Secretary.

- (d) Off-site treatment; non-hazardous waste petroleum contamination in soil. The off-site treatment of soil under this section shall be preapproved by the Secretary prior to the shipment off-site. The local municipality shall be notified in writing of the polyencapsulated soil. If applicable, local permits have been obtained. In addition to meeting the requirements of subsection (b) of this section, the PRP shall provide the Secretary with the following:
 - (1) The amount of soil that is to be transported to the off-site location; and
 - (2) The latitude and longitude of the exact location where the soil was stockpiled.

- (e) On-site soil management. Non-hazardous contaminated soil may be managed on the site where the release occurred and within the area of contamination, provided all the following have been demonstrated:
 - (1) The proposed management area meets the siting criteria of subsection (b)(6) of this section;
 - (2) Management will occur above the seasonal high water table;
 - (3) An engineered soil cap shall be installed following the management to eliminate contact risk. The engineered soil cap shall be:
 - (A) If not covered by an impervious surface, a minimum of 18" thick; or
 - (B) If covered by an impervious surface, 6" thick of fill or sub-base material under the impervious surface.
 - (C) Alternate cap thicknesses may be utilized, providing additional institutional controls are placed on the property to ensure protection of human health and the environment, and pre-approval is granted by the Secretary.
 - (4) The engineered soil cap shall be clearly marked with a material that distinguishes the divide between the non-hazardous contaminated soils and the clean backfill;
 - (5) Soils managed under this subsection shall be shown not to be a risk to groundwater, by appropriate sampling method.
 - (6) A draft institutional control plan has been included part of the corrective action plan.

- (f) Off-site management.
 - (1) Non-hazardous contaminated soil may be treated or disposed at the following locations:
 - (A) An in-state or out of state solid waste disposal facility;
 - (B) An in-state or out of state treatment facility; or
 - (C) As provided in § 35-512 for development soils.
 - (2) Non-hazardous contaminated soil may be temporarily stockpiled at an offsite location providing pre-approval is granted by the Secretary, and the following criteria are met:
 - (A) Excavated and stockpiled soils shall be completely contained or encapsulated within a polyethylene plastic liner, which shall be a minimum thickness of 6 mils or another containment method determined by the Secretary to be equally protective.
 - (B) The integrity of the polyethylene liner shall be maintained.

- (C) No additional soil may be added to the existing soil stockpile, unless approved by the Secretary.
 - (D) The location of the polyencapsulated soil shall be in an area where:
 - (i) there are no public water systems or potable water supplies within a minimum 300-foot radius. This limit may need to be extended if water supplies are shown to be hydraulically downgradient;
 - (ii) There are no sensitive environments including a stream, river, lake, pond, state or federally listed threatened or endangered species or identified or designated habitat, wetland, floodplain, Class I or II groundwater, residence, property boundary, or other similar areas, within 100 feet of the stockpile location; and
 - (iii) The stockpile location is not within zone one or two of a groundwater source protection area.
 - (E) Public access to the location where polyencapsulated soils are stockpiled shall be prohibited through posting no trespassing and other means;
 - (F) If the landowner of the property where polyencapsulated soils are stockpiled is different from soil generator, written approval for the soil stockpile that also grants access for the Secretary, has been obtained before stockpiling begins;
 - (G) The location where polyencapsulated soils are stockpiled shall be depicted on the site map;
 - (H) Failure to adequately maintain polyencapsulated soil piles will result in a new release subject to investigation and corrective action;
 - (I) Soils may only be temporarily stockpiled for up to 90 days, or under an alternate schedule approved by the Secretary; and
 - (J) Temporary stockpiling may not occur between December 1st and April 1st.
- (3) For soils that meet the levels established for urban background in Appendix B of this Rule, those soils may be managed in an area designated as urban within the ANR Atlas.

§ 35-511. SITE GENERATED HAZARDOUS WASTES

- (a) Site generated hazardous waste shall be managed in accordance with the Vermont Hazardous Waste Management Rules unless managed in an area of contamination under the approval of the Secretary.
- (b) Contained-in determination. On-site media that contain listed hazardous waste identified in the Vermont Hazardous Waste Management Regulations shall be managed as hazardous waste until the media no longer contains the waste. This may be demonstrated by providing the Secretary with data demonstrating that:
 - (1) The source of the contamination is known and meets the definition of a listed waste;
 - (2) The media of concern does not contain hazardous constituents in concentrations that exceed the characteristic hazardous waste concentrations;
 - (3) The media of concern has been appropriately characterized by representative sampling;

- (4) Concentrations of contaminants do not present a threat to human health or the environment at final disposition; and
 - (5) Concentrations of the listed waste do not exceed federal land disposal restrictions.
- (c) Prior to managing hazardous wastes under subsection (b) of this section, the Secretary shall determine that the elements of (b)(1) – (5) have been met.

§ 35-512. DEVELOPMENT SOILS.

- (a) A person who applies to manage development soils under this section shall have completed a site investigation pursuant to Subchapter 3 of this rule prior to the excavation of the development soils. In addition to the requirements contained in Subchapter 3, a work plan shall be submitted for approval which includes the following:
- (1) Soil sample collection methods, which shall consist of one of the following methods:
 - (A) Discrete sampling methodology in a grid pattern. The sampling grid shall be appropriately scaled in order to cover the entire proposed area of excavation, and sample points shall be co-located in areas of concern;
 - (B) Application of Incremental Sampling Methodology consistent with the Interstate Technology and Regulatory Council's (ITRC) Incremental Sampling Methodology (February 2012); or
 - (C) Other soil characterization methods, as approved by the Secretary
 - (2) If soil is proposed to be disposed of in accordance with §35-512(b)(3)(receiving site), the number and location of soil samples that will be analyzed using Synthetic Precipitation Leaching Procedure (EPA Method 1312) (SPLP). The number of locations shall be based on the volume of soils planned for management and there shall be minimum one sample for every 200 tons of soil. Samples shall be taken from the soils most likely to leach contaminants and from the most impacted soil locations based on laboratory analysis, field screening, and visual and olfactory evidence.
- (b) Disposal of Development Soils. Upon a determination by the Secretary, in writing, that the soils proposed for management are development soils, those soils may be disposed at:
- (1) A categorical solid waste facility that is permitted to receive development soils;
 - (2) A solid waste facility for use as alternate daily cover; or
 - (3) An approved receiving site that meets the requirements of subsection (c) of this section.
- (c) Receiving site.
- (1) The receiving site shall meet the siting requirements established in § 35-510(b)(6);
 - (2) Prior to receiving development soils, a work plan shall be submitted for approval which includes the following:
 - (A) Soil sample collection methods which shall consist of one of the following methods:

- (i) Discrete sampling methodology in a grid pattern. The sampling grid shall be appropriately scaled in order to cover the entire area proposed for deposition of development soils and shall include information regarding seasonal groundwater elevations determined through subsurface characterization; or
 - (ii) Application of Incremental Sampling Methodology consistent with ITRC Incremental Sampling Methodology (February, 2012) and shall include information regarding seasonal groundwater elevations determined through subsurface characterization.
- (B) The address of the proposed receiving site location and the GIS coordinates of the area where the development soils are proposed to be disposed.
- (3) The receiving site shall have concentrations of arsenic, lead, and PAH's that are equal to or greater than the concentrations from the site undergoing redevelopment.
- (4) Receiving sites that have concentrations of arsenic, lead and PAH's in excess of industrial risk-based standards will be required to conduct a site investigation in accordance with Subchapter 3.
- (5) The receiving site has an approved institutional control plan in accordance with § 35-601 that addresses potential direct contact with development soils by the public, including appropriate capping and establishment of land use restrictions.

SUBCHAPTER 6. INSTITUTIONAL CONTROLS

§ 35-601. INSTITUTIONAL CONTROL PLAN

- (a) Purpose. The purpose of an institutional control plan is to identify a series of institutional controls to ensure the protection of human health and the environment.
- (b) Acceptable Alternate Institutional Controls. In addition to the institutional controls identified in § 35-602 and § 35-603, the following institutional controls may be acceptable when included as a part of an institutional control plan approved by the Secretary:
 - (1) Zoning Ordinances. Zoning ordinances that place restrictions on uses of an area where the property (e.g. zoning an area commercial or industrial or limits subsurface excavation) is located may be considered as a part of an institutional control plan. Institutional control plans shall address how long term reporting on zoning ordinances will take place to ensure that future modifications to ordinances or bylaws do not allow uses to adversely affect human health or the environment.
 - (2) Water Ordinances. Water ordinances that require all homeowners to be connected to a public community water supply when service is available may be an acceptable institutional control for groundwater use restrictions. Institutional control plans shall address how long-term reporting on water ordinances will take place to ensure that future modifications to ordinances or bylaws do not allow uses to adversely impact human health or the environment.
 - (3) Groundwater reclassification. Groundwater reclassifications may be an acceptable institutional control for groundwater use restrictions.
 - (4) Judicially approved controls. Judicial controls may be an acceptable short-term institutional control. The institutional control plan shall identify how the judicially approved controls will allow the control to survive changes to property ownership or other transfers of the property.
- (c) Approval of institutional control plan. The Secretary shall approve an institutional control plan providing the following are demonstrated:
 - (1) The PRP has identified all residual contamination that remains in-place on the property;
 - (2) The PRP has identified what restrictions are necessary to ensure that exposure pathways are not created by uses or activities that take place on the property;
 - (3) The PRP has identified a control or controls that address the restrictions identified in subsection (c)(2) of this section; and
 - (4) The PRP has identified a long term monitoring program to ensure that the controls continue to be effective until the contamination no longer poses an unacceptable impact to human health or the environment.

§ 35-602. NOTICE TO THE LAND RECORDS.

- (a) Purpose. The purpose of a notice to the land records is to inform present and future property owners of the presence of residual subsurface contamination at the property, and applicable land use restrictions.
- (b) Applicability. A Notice to the Land Records is an acceptable institutional control when corrective actions have addressed any exposure pathway to a sensitive receptor but residual contamination above applicable environmental media standards may be present on site.
- (c) Minimum Elements. At a minimum, all notices to the land record shall contain:
 - (1) A brief description of the release of hazardous materials;
 - (2) A brief description of the corrective action that took place on the site;
 - (3) What hazardous materials remain on the site and the location of those hazardous materials; and
 - (4) A description of the necessary property use restrictions to ensure that no further exposure to hazardous materials takes place.
 - (5) The following language shall be included:
“If a person fails to follow the use restrictions contained within this notice the person may be liable for further site investigation, remediation, and penalties pursuant to the Vermont Waste Management Act, 10 V.S.A. chapter 159.”
- (d) Filing. A PRP shall file an approved notice to the land records within one week of its approval and shall provide a copy to the Secretary, including the recorder stamp, book, and page number, of the recorded notice to the land record within one week of its recording.

§ 35-603. DEED RESTRICTION/ENVIRONMENTAL EASEMENT.

- (a) Purpose. The purpose of a deed restriction is to place legally enforceable land use restrictions on a property to prevent exposure to any hazardous material left on the property and to ensure the protectiveness of any corrective action at the property.
- (b) Applicability. The Secretary may require the use of a deed restriction in the following situations:
 - (1) When long term maintenance or monitoring of the corrective action or property use restrictions are required;
 - (2) When active remedial infrastructure must remain in place in order to prevent contamination from posing a risk to human health or the environment;
 - (3) When a Technical Impracticality (TI) Waiver has been granted by the Secretary in accordance with Appendix E; or
 - (4) When groundwater contamination remains, or is projected to remain at the site above the Vermont Groundwater Enforcement Standards at a compliance point in

accordance with the timeline established in the Vermont Groundwater Protection Rule and Strategy.

- (c) Minimum Elements:
 - (1) A legal description of the site property;
 - (2) A description of the release, corrective action, and statement of the need for a deed restriction on the property;
 - (3) A grant of access to the Agency of Natural Resources to the property for any reason related to the purpose of the easement, including monitoring of the site, monitoring of the land use controls, planning future corrective action;
 - (4) Restrictions on future uses of the property or portions of the property to prevent receptors from being exposed to any residual contamination that remains on the property and to ensure the effectiveness of any corrective action;
 - (5) A process for enforcing the terms of the easement; and
 - (6) A map of where restricted areas are located on the property in recordable form, unless the restrictions apply to the property without restriction.

- (d) Filing. A PRP shall file an approved deed restriction and all exhibits within one week of its approval and shall provide a copy, including the recorder stamp, book, and page number, of the recorded deed restriction within one week of its recording.

§35-604. LAND USE RESTRICTIONS WITHIN A CERTIFICATE OF COMPLETION

- (a) Purpose. The Secretary may establish land use restrictions within a certificate of completion upon closure of a site enrolled in BRELLA pursuant 10 V.S.A. Chapter 159. The purpose of these restrictions is to ensure the ongoing effectiveness of response actions taken at the site.

- (b) Applicability. The Secretary may restrict future uses of a property as a part of a certificate of completion in any of the following situations:
 - (1) When long term maintenance or monitoring of the corrective action or property use restrictions are required;
 - (2) When active remedial infrastructure must remain in place in order to prevent contamination from posing a risk to human health or the environment;
 - (3) When a Technical Impracticality (TI) Waiver has been granted by the Secretary in accordance with Appendix E; or
 - (4) When groundwater contamination remains or is projected to remain at the site above the Vermont Groundwater Enforcement Standards at a compliance point in accordance with the timeline established in the Vermont Groundwater Protection Rule and Strategy.

- (c) Minimum Elements. At a minimum, a certificate shall be issued to include the following items:

- (1) A legal description of the site property;
 - (2) A description of the release, corrective action, and statement of the need for a land use restrictions on the property;
 - (3) Access to Agency of Natural Resources personnel to access the site at all reasonable times to inspect compliance with the land use restrictions identified herein, as well as to assess the need for, planning, or implementing additional response actions at or near the site;
 - (4) Restrictions on future uses of the property or portions of the property to prevent receptors from being exposed to any residual contamination that remains on the property and to ensure the effectiveness of any corrective action; and
 - (5) A map of where restricted areas are located on the property in recordable form, unless the restrictions apply to the property without restriction.
- (d) Recording. The PRP shall record a certificate of completion and all supporting documentation and exhibits with the land records of the municipality or municipalities in which the site is located. Such recording shall be made within one week of the date of issuance of the certificate of completion. Within one week of the date of recording, the PRP shall provide a copy of the recorded and stamped certificate of completion and all recorded documents with the Agency, which includes the book and page number of where those documents were recorded.

SUBCHAPTER 7. SITE CLOSURE

§ 35-701. SITE MANAGEMENT ACTIVITIES COMPLETE

- (a) Effect of site management activity complete designation (SMAC). The SMAC designation means no additional work related to the identified release or releases is required at the time the designation is issued. A SMAC designation shall not release the PRP or parties from any past or future liability associated with the release or releases identified as a part of the response, or from any contamination discovered after the site receives this designation. A SMAC designation does not prevent the Secretary from reassessing the site in light of the reasons stated in subsection (e) of this section, a change in environmental media standards, identification of new or emerging contaminants of concern that require additional responses, new information, or a change in condition that shows sensitive receptors are at risk from the release.
- (b) Request for a SMAC designation. In order to obtain a SMAC designation, the PRP or the Secretary shall submit a request for a SMAC designation that summarizes the site investigation, corrective action undertaken at the site and documents all the following:
- (1) The source area or areas were removed, remediated, or adequately controlled.
 - (2) Hazardous material data trends collected from site specific environmental media demonstrate that concentrations are stable, falling, or are not detectable.
 - (3) Groundwater enforcement standards as adopted in the Groundwater Protection Rule and Strategy have been met at compliance points established for the site, and groundwater has been reclassified in accordance with the Groundwater Protection Rule and Strategy, if necessary.
 - (4) No hazardous materials associated with the site are present in drinking water supplies at concentrations in excess of Vermont Groundwater Quality Standards (Vermont Groundwater Enforcement Standards or Vermont Health Advisory).
 - (5) Active remedial activities associated with the site have been completed.
 - (6) Soil standards have been met at compliance points or, if soil standards have not been met, then a corrective action plan has been implemented with approved engineering and institutional controls to prevent contact to contaminated soils.
 - (7) Vermont water quality standards have been achieved at all surface water compliance points established for the site.
 - (8) Sediment evaluation has been completed and remediation is not required.
 - (9) Migration of hazardous materials from soil to groundwater is not occurring at a concentration which will result in an exceedance of the Vermont Groundwater Enforcement Standards.
 - (10) No completed vapor intrusion pathway exists.
 - (11) The site has been properly closed following the corrective action, including:
 - (A) All groundwater monitoring wells have been properly closed in accordance with the Vermont Water Supply Rule or an alternate plan has been approved by the Secretary for maintaining the monitoring wells. The Secretary shall be notified of the closure of the monitoring wells.

- (B) Abandoned water supply wells and monitoring wells have been properly closed in accordance with the Vermont Water Supply Rule.
 - (C) All site remedial infrastructure or monitoring points have been closed in a manner to prevent impacts to the environment or human health.
 - (D) Contaminated soils have been properly treated or disposed of in accordance with § 35-510, § 35-511, or § 35-512.
- (12) Any outstanding or overdue balances owed to the State (e.g. PCF deductible, Environmental Contingency Fund (ECF) cost recovery, penalties, fines) have been paid to the satisfaction of the Secretary.
- (13) Injection wells have been closed in accordance with the Underground Injection Control Rule.
- (14) All required institutional controls, engineered controls, and inspection plans are in place and copies have been provided to the Secretary.
- (15) All documentation required by this rule has been submitted to and approved by the Secretary.
- (c) Issuance of SMAC designation. If the Secretary determines that all of the requirements of subsection (b) of this section have been met, the Secretary may issue a SMAC designation for the site.
- (d) SMAC as notice to the land records. A copy of the SMAC designation shall be recorded in municipal land records in the municipality where the site is located.
- (1) The PRP shall within 10 days of recording provide the Secretary a copy of the recorded SMAC letter with the recorder's stamps.
 - (2) SMAC letters shall include a copy of the site map showing properly decommissioned historical monitoring points, original source area(s), and the approximate extents of residual contamination.
- (e) Reopening of SMAC designation. The Secretary shall return the site to active status on finding any of the following:
- (1) previous remedial activities that are found to have been inadequate;
 - (2) new information is discovered regarding the time, extent, amount, type, or nature of materials released;
 - (3) new information is discovered regarding the migration of the hazardous materials, health effects of the hazardous materials, or site conditions;
 - (4) the Secretary identifies errors or omissions in any of the investigation, or corrective action plan, or their associated implementation;
 - (5) a new hazardous material is listed or identified that requires a response by the PRP;
 - (6) additional releases occur;
 - (7) a condition of the SMAC designation was not completed;
 - (8) a requirement of the institutional control plan or necessary reporting was not followed; or
 - (9) any other condition that presents a threat of unreasonable exposure to humans or the environment from a hazardous material that was released from the site.

§ 35-702. CERTIFICATE OF COMPLETION

- (a) Eligibility for Certificate of Completion. A PRP shall not obtain a certificate of completion unless all the following have been established:
- (1) The PRP meets the eligibility requirements identified in 10 V.S.A. § 6645; and has been accepted into the BRELLA program;
 - (2) The Secretary determines that all work required pursuant to 10 V.S.A. Chapter 159, Subchapter 3 has been completed; and
 - (3) The Secretary determines that the requirements of this section have been met.
- (b) Application for certificate of completion. A PRP may request the Secretary issue a certificate of completion by filing an application in the same manner as required by § 35-701(b).
- (c) Review of request for certificate of completion. The Secretary shall review a request for a certificate of completion in the same manner as § 35-701(c).
- (d) Review of request for certificate of completion on substantial completion. A PRP may request that the Secretary issue a certificate of completion based on substantial completion of the corrective action. Issuance of a certificate of completion under this subsection is only eligible for persons who entered the BRELLA program as a prospective purchaser and only the following elements of the corrective action remain uncompleted at the time the application for a certificate of completion is filed with the Secretary:
- (1) When the Secretary has determined that long term monitoring is a component of the corrective action but the long term monitoring has not been completed; or
 - (2) When the Secretary has required institutional controls but the institutional controls have not yet been recorded at the time of the request.
- (e) Failure to comply with condition subsequent on substantial completion. A certificate of completion issued on substantial completion is contingent upon the PRP completing the conditions subsequent in a timeframe identified by the Secretary. If the PRP fails to do so the certificate of completion shall be void and the PRP shall be required to reapply for a certificate of completion.

SUBCHAPTER 8. REQUESTS FOR REIMBURSEMENT FOR MUNICIPAL WATER LINE EXTENSIONS FROM THE PETROLEUM CLEANUP OR ENVIRONMENTAL CONTINGENCY FUNDS

§ 35-801. REIMBURSEMENT OF MUNICIPALITIES TO PROVIDE ALTERNATE WATER SUPPLIES

- (a) Applicability. This section shall apply when the following apply:
- (1) there has been a release of a hazardous material;
 - (2) the construction or expansion of or connection to a municipal water line eliminates a sensitive receptor's exposure to a hazardous material; and
 - (3) the work is performed by a municipality and meets the requirements of this section.
- (b) Source of funds. When the release is predominately gasoline, fuel oil, or the release of another petroleum product that would potentially be eligible for reimbursement from the fund established under 10 V.S.A. § 1941 then the reimbursement shall be made from the Petroleum Cleanup Fund; all other reimbursements shall be made from the Contingency Fund established pursuant to 10 V.S.A. § 1283.
- (c) Prohibition on Reimbursement.
- (1) Reimbursements from the Petroleum Cleanup Fund shall be limited to the reimbursement caps established in 10 V.S.A. § 1941(a)(1) and shall only be for uninsured costs.
 - (2) Reimbursements from the Contingency Fund shall be limited to the caps established in 10 V.S.A. § 1283(b) or an amount established by the Secretary taking into consideration the current fund balance and known and estimated future obligations on the fund, whichever is lesser.
 - (3) Where there is a potentially responsible party who has refused to reimburse a municipality for the extension of a municipal water line, the Secretary may condition reimbursement on the successful recovery of funds from that responsible party.
- (d) Requirements for reimbursement.
- (1) The municipality has applied for all necessary permits required for the project, including public drinking water supply permits.
 - (2) Municipality shall submit a cost estimate for review and approval by the Secretary for all work proposed for reimbursement. If an evaluation of corrective action alternatives, including cost effectiveness compared to water treatment or well replacement, has not been completed prior to the final design of a municipal water line extension, the Secretary may require such an analysis prior to approval of the preliminary approval or prior to the construction of the water line extension.

- (3) Prior to bidding on a construction project that may encounter contaminated media an environmental professional shall, at a minimum, provide the Secretary with the following:
 - (A) Identify any land uses that may have resulted in the release of hazardous materials on the route of the municipal water line extension. Identification shall be confined to a review of records at the Agency and municipal records.
 - (B) If sampling is necessary, submit a plan to conduct limited sampling to estimate the costs associated with management of contaminated soil and groundwater when installing the municipal water line.
 - (C) Soil management plan. This plan shall include work procedures, treatment, and disposal locations for contaminated soil encountered during the construction process. Contaminated soils shall be backfilled during construction unless it is clearly documented that the soils are geotechnically unsuitable or cannot be replaced within the excavation. Contaminated soils to be backfilled, shall be placed at the bottom of the trench with at least 18" of uncontaminated soil used for closing the trench.
 - (D) Groundwater management plan. If contaminated groundwater is expected to be encountered, the municipality shall have an environmental professional develop a plan for the treatment of contaminated groundwater. Treatment methods may include re-injection through an infiltration basin, filtration through activated carbon, air stripping, pumping to fractionation tanks, or disposal to a wastewater treatment plant (with appropriate permission from the plant owner and Wastewater Management Division).

- (e) Approval of prebid preliminary investigation. Prior to implementing any work proposed for reimbursement, the Secretary shall approve the prebid preliminary investigation. The Secretary may require additional investigation and work as a part of the approval. The Secretary may disprove any cost associated with a request provided there is a reasonable basis for the disapproval. If an evaluation of corrective action alternatives has not been completed prior to the construction of a municipal water line extension, the Secretary may require such an analysis prior to approval of the prebid preliminary investigation.

- (f) Final reimbursement request. As a part of any request for reimbursement, a municipality shall provide the Secretary, at a minimum, the following information:
 - (1) The results of any investigation, sampling, and field work that took place as a part of the investigation.
 - (2) Receipts for any waste discovered and disposed during the municipal water line extension.
 - (3) Documentation, such as as-builts and certificate of completions, that the constructed municipal water line extension was constructed per the applicable permit requirements.

- (4) The amount requested for reimbursement, including detailed supporting information such as contracts to perform work, detailed invoices from contractors, and other similar information.
 - (5) The Secretary may require additional documentation to support the request for reimbursement.
- (g) Approval of final reimbursement request. Prior to reimbursing a municipality for the extension of a municipal water line the Secretary shall approve the final reimbursement request. The Secretary may require additional documentation to support the request for reimbursement. The Secretary may disprove any cost associated with a request provided there is a reasonable basis for the disapproval.

APPENDIX A. ENVIRONMENTAL MEDIA STANDARDS.

§ 35-APX-A1. SOIL SCREENING VALUES

§ 35-APX-A2. VAPOR INTRUSION VALUES

§ 35-APX-A3. SEDIMENT VALUES

Appendix A - § 35-APX-A1 - Soil Screening Values
(see notes at end of table)

Analyte	CAS Number	EPA Regional Screening Levels (TR=1E-06, HQ=1.0)		Vermont Screening Levels (TR=1E-06, HQ=1.0)	VT DEC Background Soil Concentrations	
		Resident Soil (mg/kg)	Industrial Soil (mg/kg)	Resident Soil (mg/kg)	Rural (mg/kg)	Urban (mg/kg)
Acephate	30560-19-1	62	260			
Acetaldehyde	75-07-0	11	49			
Acetochlor	34256-82-1		16,000	1,270		
Acetone	67-64-1		670,000	39,900		
Acetone Cyanohydrin	75-86-5	2,800,000	12,000,000			
Acetonitrile	75-05-8	810	3,400			
Acetophenone	98-86-2	7,800	120,000			
Acetylaminofluorene, 2-	53-96-3	0.14	0.6			
Acrolein	107-02-8	0.14	0.6			
Acrylamide	79-06-1	0.24	4.6			
Acrylic Acid	79-10-7	99	420			
Acrylonitrile	107-13-1	0.25	1.1			
Adiponitrile	111-69-3	8,500,000	36,000,000			
Alachlor	15972-60-8	9.7	41			
Aldicarb	116-06-3	63	820			
Aldicarb Sulfone	1646-88-4	63	820			
Aldrin	309-00-2		0.18	0.0202		
Allyl Alcohol	107-18-6	3.5	15			
Allyl Chloride	107-05-1	0.72	3.2			
Aluminum	7429-90-5		1,100,000	75,600		
Aluminum Phosphide	20859-73-8	31	470			
Ametryn	834-12-8	570	7,400			
Aminobiphenyl, 4-	92-67-1	0.026	0.11			
Aminophenol, m-	591-27-5	5,100	66,000			
Aminophenol, p-	123-30-8	1,300	16,000			
Amitraz	33089-61-1	160	2,100			
Ammonium Sulfamate	7773-06-0	16,000	230,000			
Amyl Alcohol, tert-	75-85-4	82	340			
Aniline	62-53-3	95	400			
Anthraquinone, 9,10-	84-65-1	14	57			
Antimony (metallic)	7440-36-0		470	27.1		
Antimony Pentoxide	1314-60-9	39	580			
Antimony Tetroxide	1332-81-6	31	470			
Antimony Trioxide	1309-64-4	280,000	1,200,000			
Arsenic, Inorganic	7440-38-2					16
Arsine	7784-42-1	0.27	4.1			
Asulam	3337-71-1	3,200	41,000			
Atrazine	1912-24-9	2.4	10			
Auramine	492-80-8	0.62	2.6			
Avermectin B1	65195-55-3	25	330			
Azinphos-methyl	86-50-0	190	2500			
Azobenzene	103-33-3	5.6	26			
Azodicarbonamide	123-77-3	8,600	40,000			
Barium	7440-39-3		220,000	11,700		
Barium Chromate	10294-40-3	0.3	6.2			
Benfluralin	1861-40-1	23,000	350,000			
Benomyl	17804-35-2		41,000	121		
Bensulfuron-methyl	83055-99-6	13,000	160,000			
Bentazon	25057-89-0	1,900	25,000			
Benzaldehyde	100-52-7	170	820			
Benzene	71-43-2		5.1	0.442		
Benzenediamine-2-methyl sulfate, 1,4-	6369-59-1	5.4	23			
Benzenethiol	108-98-5	78	1200			
Benzidine	92-87-5	0.00053	0.01			
Benzoic Acid	65-85-0	250,000	3,300,000			
Benzo-trichloride	98-07-7	0.053	0.25			
Benzyl Alcohol	100-51-6	6,300	82,000			
Benzyl Chloride	100-44-7	1.1	4.8			
Beryllium and compounds	7440-41-7		2,300	36.0		

Appendix A - § 35-APX-A1 - Soil Screening Values
(see notes at end of table)

Analyte	CAS Number	EPA Regional Screening Levels (TR=1E-06, HQ=1.0)		Vermont Screening Levels (TR=1E-06, HQ=1.0)	VT DEC Background Soil Concentrations	
		Resident Soil (mg/kg)	Industrial Soil (mg/kg)	Resident Soil (mg/kg)	Rural (mg/kg)	Urban (mg/kg)
Bifenox	42576-02-3	570	7,400			
Biphenthrin	82657-04-3	950	12,000			
Biphenyl, 1,1'-	92-52-4	47	200			
Bis(2-chloro-1-methylethyl) ether	108-60-1		47,000	2,920		
Bis(2-chloroethoxy)methane	111-91-1	190	2500			
Bis(2-chloroethyl)ether	111-44-4	0.23	1			
Bis(chloromethyl)ether	542-88-1	0.000083	0.00036			
Bisphenol A	80-05-7	3,200	41,000			
Boron And Borates Only	7440-42-8		230,000	15,300		
Boron Trichloride	10294-34-5	160,000	2,300,000			
Boron Trifluoride	7637-07-2	3,100	47,000			
Bromate	15541-45-4		4.7	0.559		
Bromo-2-chloroethane, 1-	107-04-0	0.026	0.11			
Bromobenzene	108-86-1	290	1,800			
Bromochloromethane	74-97-5		630	129		
Bromodichloromethane	75-27-4	0.29	1.3			
Bromoform	75-25-2	19	86			
Bromomethane	74-83-9	6.8	30			
Bromophos	2104-96-3	390	5,800			
Bromoxynil	1689-84-5		16,000	2.81		
Bromoxynil Octanoate	1689-99-2	1,600	23,000			
Butadiene, 1,3-	106-99-0	0.058	0.26			
Butanol, N-	71-36-3	7,800	120,000			
Butyl alcohol, sec-	78-92-2	130,000	1,500,000			
Butylate	2008-41-5	3,900	58,000			
Butylated hydroxyanisole	25013-16-5	2,700	11,000			
Butylated hydroxytoluene	128-37-0	150	640			
Butylbenzene, n-	104-51-8	3,900	58,000			
Butylbenzene, sec-	135-98-8	7,800	120,000			
Butylbenzene, tert-	98-06-6	7,800	120,000			
Cacodylic Acid	75-60-5	1,300	16,000			
Cadmium (Diet)	7440-43-9		980	7.15		
Calcium Chromate	13765-19-0	0.3	6.2			
Caprolactam	105-60-2	31,000	400,000			
Captafol	2425-06-1	3.6	15			
Captan	133-06-2	240	1000			
Carbaryl	63-25-2		82,000	331		
Carbofuran	1563-66-2	320	4,100			
Carbon Disulfide	75-15-0	770	3,500			
Carbon Tetrachloride	56-23-5		2.9	0.247		
Carbonyl Sulfide	463-58-1	67	280			
Carbosulfan	55285-14-8	630	8,200			
Carboxin	5234-68-4	6,300	82,000			
Ceric oxide	1306-38-3	1,300,000	5,400,000			
Chloral Hydrate	302-17-0	7,800	120,000			
Chloramben	133-90-4	950	12,000			
Chloranil	118-75-2	1.3	5.7			
Chlordane	12789-03-6	1.7	7.7			
Chlordecone (Kepone)	143-50-0	0.054	0.23			
Chlorfenvinphos	470-90-6	44	570			
Chlorimuron, Ethyl-	90982-32-4	1,300	16,000			
Chlorine	7782-50-5	0.18	0.78			
Chlorine Dioxide	10049-04-4	2,300	34,000			
Chlorite (Sodium Salt)	7758-19-2	2,300	35,000			
Chloro-1,1-difluoroethane, 1-	75-68-3	54,000	230,000			
Chloro-1,3-butadiene, 2-	126-99-8	0.01	0.044			
Chloro-2-methylaniline HCl, 4-	3165-93-3	1.2	5			
Chloro-2-methylaniline, 4-	95-69-2	5.4	23			
Chloroacetaldehyde, 2-	107-20-0	2.6	12			

Appendix A - § 35-APX-A1 - Soil Screening Values
(see notes at end of table)

Analyte	CAS Number	EPA Regional Screening Levels (TR=1E-06, HQ=1.0)		Vermont Screening Levels (TR=1E-06, HQ=1.0)	VT DEC Background Soil Concentrations	
		Resident Soil (mg/kg)	Industrial Soil (mg/kg)	Resident Soil (mg/kg)	Rural (mg/kg)	Urban (mg/kg)
Chloroacetophenone, 2-	532-27-4	43,000	180,000			
Chloroaniline, p-	106-47-8	2.7	11			
Chlorobenzene	108-90-7		1,300	273		
Chlorobenzilate	510-15-6	4.9	21			
Chlorobenzoic Acid, p-	74-11-3	1,900	25,000			
Chlorobenzotrifluoride, 4-	98-56-6	210	2,500			
Chlorobutane, 1-	109-69-3	3,100	47,000			
Chlorodifluoromethane	75-45-6	49,000	210,000			
Chloroethanol, 2-	107-07-3	1,600	23,000			
Chloroform	67-66-3	0.32	1.4			
Chloromethane	74-87-3	110	460			
Chloromethyl Methyl Ether	107-30-2	0.02	0.089			
Chloronitrobenzene, o-	88-73-3	1.8	7.7			
Chloronitrobenzene, p-	100-00-5	9	38			
Chlorophenol, 2-	95-57-8	390	5,800			
Chloropicrin	76-06-2	2	8.2			
Chlorothalonil	1897-45-6	180	740			
Chlorotoluene, o-	95-49-8	1600	23000			
Chlorotoluene, p-	106-43-4	1600	23000			
Chlorozotocin	54749-90-5	0.0023	0.0096			
Chlorpropham	101-21-3	13,000	160,000			
Chlorpyrifos	2921-88-2	63	820			
Chlorpyrifos Methyl	5598-13-0	630	8,200			
Chlorsulfuron	64902-72-3	3,200	41,000			
Chlorthal-dimethyl	1861-32-1	630	8,200			
Chlorthiophos	60238-56-4	51	660			
Chromium(III), Insoluble Salts	16065-83-1		1,800,000	41,900		
Chromium(VI)	18540-29-9		6.3	0.0945		
Clofentezine	74115-24-5	820	11,000			
Cobalt	7440-48-4		350	22.9		
Copper	7440-50-8	3,100	47,000			
Cresol, m-	108-39-4	3,200	41,000			
Cresol, o-	95-48-7	3,200	41,000			
Cresol, p-	106-44-5	6,300	82,000			
Cresol, p-chloro-m-	59-50-7	6,300	82,000			
Cresols	1319-77-3	6,300	82,000			
Crotonaldehyde, trans-	123-73-9	0.37	1.7			
Cumene	98-82-8	1,900	9,900			
Cupferron	135-20-6	2.5	10			
Cyanazine	21725-46-2	0.65	2.7			
Cyanides						
~Calcium Cyanide	592-01-8	78	1,200			
~Copper Cyanide	544-92-3	390	5,800			
~Cyanide (CN-)	57-12-5	23	150			
~Cyanogen	460-19-5	78	1,200			
~Cyanogen Bromide	506-68-3	7,000	110,000			
~Cyanogen Chloride	506-77-4	3,900	58,000			
~Hydrogen Cyanide	74-90-8	23	150			
~Potassium Cyanide	151-50-8	160	2,300			
~Potassium Silver Cyanide	506-61-6	390	5,800			
~Silver Cyanide	506-64-9	7,800	120,000			
~Sodium Cyanide	143-33-9	78	1,200			
~Thiocyanates	NA	16	230			
~Thiocyanic Acid	463-56-9	16	230			
~Zinc Cyanide	557-21-1	3,900	58,000			
Cyclohexane	110-82-7	6,500	27,000			
Cyclohexane, 1,2,3,4,5-pentabromo-6-chloro-	87-84-3	24	100			
Cyclohexanone	108-94-1	28,000	130,000			
Cyclohexene	110-83-8	310	3,100			

Appendix A - § 35-APX-A1 - Soil Screening Values
(see notes at end of table)

Analyte	CAS Number	EPA Regional Screening Levels (TR=1E-06, HQ=1.0)		Vermont Screening Levels (TR=1E-06, HQ=1.0)	VT DEC Background Soil Concentrations	
		Resident Soil (mg/kg)	Industrial Soil (mg/kg)	Resident Soil (mg/kg)	Rural (mg/kg)	Urban (mg/kg)
Cyclohexylamine	108-91-8	16,000	230,000			
Cyfluthrin	68359-37-5	1,600	21,000			
Cyhalothrin	68085-85-8	320	4,100			
Cypermethrin	52315-07-8	630	8,200			
Cyromazine	66215-27-8	470	6,200			
DDD	72-54-8	2.3	9.6			
DDE, p,p'-	72-55-9	2	9.3			
DDT	50-29-3	1.9	8.5			
Dalapon	75-99-0	1,900	25,000			
Daminozide	1596-84-5	30	130			
Decabromodiphenyl ether, 2,2',3,3',4,4',5,5',6,6'-(BDE-209)	1163-19-5	440	3,300			
Demeton	8065-48-3	2.5	33			
Di(2-ethylhexyl)adipate	103-23-1	450	1,900			
Diallate	2303-16-4	8.9	38			
Diazinon	333-41-5	44	570			
Dibenzothiophene	132-65-0	780	12,000			
Dibromo-3-chloropropane, 1,2-	96-12-8		0.064	0.00327		
Dibromobenzene, 1,3-	108-36-1	31	470			
Dibromobenzene, 1,4-	106-37-6	780	12,000			
Dibromochloromethane	124-48-1	8.3	39			
Dibromoethane, 1,2-	106-93-4	0.036	0.16			
Dibromomethane (Methylene Bromide)	74-95-3	24	99			
Dibutyltin Compounds	NA	19	250			
Dicamba	1918-00-9	1,900	25,000			
Dichloro-2-butene, 1,4-	764-41-0	0.0021	0.0094			
Dichloro-2-butene, cis-1,4-	1476-11-5	0.0074	0.032			
Dichloro-2-butene, trans-1,4-	110-57-6	0.0074	0.032			
Dichloroacetic Acid	79-43-6	11	46			
Dichlorobenzene, 1,2-	95-50-1	1,800	9,300			
Dichlorobenzene, 1,4-	106-46-7	2.6	11			
Dichlorobenzidine, 3,3'-	91-94-1	1.2	5.1			
Dichlorobenzophenone, 4,4'-	90-98-2	570	7,400			
Dichlorodifluoromethane	75-71-8	87	370			
Dichloroethane, 1,1-	75-34-3	3.6	16			
Dichloroethane, 1,2-	107-06-2		2	0.175		
Dichloroethylene, 1,1-	75-35-4	230	1,000			
Dichloroethylene, 1,2-cis-	156-59-2		2,300	146		
Dichloroethylene, 1,2-trans-	156-60-5		23,000	1,460		
Dichlorophenol, 2,4-	120-83-2	190	2,500			
Dichlorophenoxy Acetic Acid, 2,4-	94-75-7	700	9,600			
Dichlorophenoxybutyric Acid, 4-(2,4-	94-82-6	510	6,600			
Dichloropropane, 1,2-	78-87-5	1	4.4			
Dichloropropane, 1,3-	142-28-9	1,600	23,000			
Dichloropropanol, 2,3-	616-23-9	190	2,500			
Dichloropropene, 1,3-	542-75-6	1.8	8.2			
Dichlorvos	62-73-7	1.9	7.9			
Dicrotophos	141-66-2	6.3	82			
Dicyclopentadiene	77-73-6	1.3	5.4			
Dieldrin	60-57-1	0.034	0.14			
Diethanolamine	111-42-2	130	1,600			
Diethylene Glycol Monobutyl Ether	112-34-5	1,900	24,000			
Diethylene Glycol Monoethyl Ether	111-90-0	3,800	48,000			
Diethylformamide	617-84-5	78	1,200			
Diethylstilbestrol	56-53-1	0.0016	0.0066			
Difenzoquat	43222-48-6	5,100	66,000			
Di-flubenzuron	35367-38-5	1,300	16,000			
Difluoroethane, 1,1-	75-37-6	48,000	200,000			
Dihydrosafrole	94-58-6	9.9	45			

Appendix A - § 35-APX-A1 - Soil Screening Values
(see notes at end of table)

Analyte	CAS Number	EPA Regional Screening Levels (TR=1E-06, HQ=1.0)		Vermont Screening Levels (TR=1E-06, HQ=1.0)	VT DEC Background Soil Concentrations	
		Resident Soil (mg/kg)	Industrial Soil (mg/kg)	Resident Soil (mg/kg)	Rural (mg/kg)	Urban (mg/kg)
Diisopropyl Ether	108-20-3	2,200	9,400			
Diisopropyl Methylphosphonate	1445-75-6	6,300	93,000			
Dimethipin	55290-64-7	1,300	16,000			
Dimethoate	60-51-5	13	160			
Dimethoxybenzidine, 3,3'-	119-90-4	0.34	1.4			
Dimethyl methylphosphonate	756-79-6	320	1,400			
Dimethylamino azobenzene [p-]	60-11-7	0.12	0.5			
Dimethylaniline HCl, 2,4-	21436-96-4	0.94	4			
Dimethylaniline, 2,4-	95-68-1	2.7	11			
Dimethylaniline, N,N-	121-69-7	160	2,300			
Dimethylbenzidine, 3,3'-	119-93-7	0.049	0.21			
Dimethylformamide	68-12-2	2,600	15,000			
Dimethylhydrazine, 1,1-	57-14-7	0.057	0.24			
Dimethylhydrazine, 1,2-	540-73-8	0.00088	0.0041			
Dimethylphenol, 2,4-	105-67-9	1,300	16,000			
Dimethylphenol, 2,6-	576-26-1	38	490			
Dimethylphenol, 3,4-	95-65-8	63	820			
Dimethylvinylchloride	513-37-1	1.1	4.8			
Dinitro-o-cresol, 4,6-	534-52-1	5.1	66			
Dinitro-o-cyclohexyl Phenol, 4,6-	131-89-5	130	1,600			
Dinitrobenzene, 1,2-	528-29-0	6.3	82			
Dinitrobenzene, 1,3-	99-65-0	6.3	82			
Dinitrobenzene, 1,4-	100-25-4	6.3	82			
Dinitrophenol, 2,4-	51-28-5	130	1,600			
Dinitrotoluene Mixture, 2,4/2,6-	NA	0.8	3.4			
Dinitrotoluene, 2,4-	121-14-2	1.7	7.4			
Dinitrotoluene, 2,6-	606-20-2	0.36	1.5			
Dinitrotoluene, 2-Amino-4,6-	35572-78-2	150	2,300			
Dinitrotoluene, 4-Amino-2,6-	19406-51-0	150	2,300			
Dinitrotoluene, Technical grade	25321-14-6	1.2	5.1			
Dinoseb	88-85-7	63	820			
Dioxane, 1,4-	123-91-1		24	2.52		
Dioxins						
~Hexachlorodibenzo-p-dioxin, Mixture	NA	0.0001	0.00047			
TCDD, 2,3,7,8-	1746-01-6		0.000022	0.0000233		
Diphenamid	957-51-7	1,900	25,000			
Diphenyl Sulfone	127-63-9	51	660			
Diphenylamine	122-39-4	1,600	21,000			
Diphenylhydrazine, 1,2-	122-66-7	0.68	2.9			
Diquat	85-00-7	140	1,800			
Direct Black 38	1937-37-7	0.076	0.32			
Direct Blue 6	2602-46-2	0.073	0.31			
Direct Brown 95	16071-86-6	0.081	0.34			
Disulfoton	298-04-4	2.5	33			
Dithiane, 1,4-	505-29-3	780	12,000			
Diuron	330-54-1	130	1,600			
Dodine	2439-10-3	250	3,300			
EPTC	759-94-4	2,000	29,000			
Endosulfan	115-29-7	470	7,000			
Endothall	145-73-3	1,300	16,000			
Endrin	72-20-8	19	250			
Epichlorohydrin	106-89-8	19	82			
Epoxybutane, 1,2-	106-88-7	160	670			
Ethanol, 2-(2-methoxyethoxy)-	111-77-3	2,500	33,000			
Ethephon	16672-87-0	320	4,100			
Ethion	563-12-2	32	410			
Ethoxyethanol Acetate, 2-	111-15-9	2,600	14,000			
Ethoxyethanol, 2-	110-80-5	5,200	47,000			
Ethyl Acetate	141-78-6	620	2,600			

Appendix A - § 35-APX-A1 - Soil Screening Values
(see notes at end of table)

		EPA Regional Screening Levels (TR=1E-06, HQ=1.0)		Vermont Screening Levels (TR=1E-06, HQ=1.0)	VT DEC Background Soil Concentrations	
Analyte	CAS Number	Resident Soil (mg/kg)	Industrial Soil (mg/kg)	Resident Soil (mg/kg)	Rural (mg/kg)	Urban (mg/kg)
Ethyl Acrylate	140-88-5	47	210			
Ethyl Chloride (Chloroethane)	75-00-3	14,000	57,000			
Ethyl Ether	60-29-7	16,000	230,000			
Ethyl Methacrylate	97-63-2	1,800	7,600			
Ethyl-p-nitrophenyl Phosphonate	2104-64-5	0.63	8.2			
Ethylbenzene	100-41-4		25	2.21		
Ethylene Cyanohydrin	109-78-4	4,400	57,000			
Ethylene Diamine	107-15-3	7,000	110,000			
Ethylene Glycol	107-21-1	130,000	1,600,000			
Ethylene Glycol Monobutyl Ether	111-76-2	6,300	82,000			
Ethylene Oxide	75-21-8	0.18	0.79			
Ethylene Thiourea	96-45-7	5.1	51			
Ethyleneimine	151-56-4	0.0027	0.012			
Ethylphthalyl Ethyl Glycolate	84-72-0	190,000	2,500,000			
Fenamiphos	22224-92-6	16	210			
Fenpropathrin	39515-41-8	1,600	21,000			
Fenvalerate	51630-58-1	1,600	21,000			
Fluometuron	2164-17-2	820	11,000			
Fluoride	16984-48-8	3,100	47,000			
Fluorine (Soluble Fluoride)	7782-41-4	4,700	70,000			
Fluridone	59756-60-4	5,100	66,000			
Flurprimidol	56425-91-3	1,300	16,000			
Flusilazole	85509-19-9	44	570			
Flutolanil	66332-96-5	3,800	49,000			
Fluvalinate	69409-94-5	630	8,200			
Folpet	133-07-3	160	660			
Fomesafen	72178-02-0	2.9	12			
Fonofos	944-22-9	130	1,600			
Formaldehyde	50-00-0	17	73			
Formic Acid	64-18-6	29	120			
Fosetyl-AL	39148-24-8	190,000	2,500,000			
Furans						
~Dibenzofuran	132-64-9	73	1,000			
~Furan	110-00-9	73	1,000			
~Tetrahydrofuran	109-99-9	18,000	94,000			
Furazolidone	67-45-8	0.14	0.6			
Furfural	98-01-1	210	2,600			
Furium	531-82-8	0.36	1.5			
Furmecyclox	60568-05-0	18	77			
Glufosinate, Ammonium	77182-82-2	25	330			
Glutaraldehyde	111-30-8	110,000	480,000			
Glycidyl	765-34-4	23	210			
Glyphosate	1071-83-6	6,300	82,000			
Guanidine	113-00-8	780	12,000			
Guanidine Chloride	50-01-1	1,300	16,000			
Haloxyfop, Methyl	69806-40-2	3.2	41			
Heptachlor	76-44-8	0.13	0.63			
Heptachlor Epoxide	1024-57-3	0.07	0.33			
Hexabromobenzene	87-82-1	160	2,300			
Hexabromodiphenyl ether, 2,2',4,4',5,5'- (BDE-153)	68631-49-2	13	160			
Hexachlorobenzene	118-74-1		0.96	0.0918		
Hexachlorobutadiene	87-68-3	1.2	5.3			
Hexachlorocyclohexane, Alpha-	319-84-6	0.086	0.36			
Hexachlorocyclohexane, Beta-	319-85-7	0.3	1.3			
Hexachlorocyclohexane, Gamma- (Lindane)	58-89-9	0.57	2.5			
Hexachlorocyclohexane, Technical	608-73-1	0.3	1.3			
Hexachlorocyclopentadiene	77-47-4	1.8	7.5			
Hexachloroethane	67-72-1	1.8	8			

Appendix A - § 35-APX-A1 - Soil Screening Values
(see notes at end of table)

Analyte	CAS Number	EPA Regional Screening Levels (TR=1E-06, HQ=1.0)		Vermont Screening Levels (TR=1E-06, HQ=1.0)	VT DEC Background Soil Concentrations	
		Resident Soil (mg/kg)	Industrial Soil (mg/kg)	Resident Soil (mg/kg)	Rural (mg/kg)	Urban (mg/kg)
Hexachlorophene	70-30-4	19	250			
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	121-82-4		28	3.49		
Hexamethylene Diisocyanate, 1,6-	822-06-0	3.1	13			
Hexamethylphosphoramide	680-31-9	25	330			
Hexane, N-	110-54-3	610	2,500			
Hexanedioic Acid	124-04-9	130,000	1,600,000			
Hexanone, 2-	591-78-6	200	1,300			
Hexazinone	51235-04-2	2,100	27,000			
Hexythiazox	78587-05-0	1,600	21,000			
Hydramethylnon	67485-29-4	19	250			
Hydrazine	302-01-2	0.23	1.1			
Hydrazine Sulfate	10034-93-2	0.23	1.1			
Hydrogen Chloride	7647-01-0	28,000,000	120,000,000			
Hydrogen Fluoride	7664-39-3	3,100	47,000			
Hydrogen Sulfide	7783-06-4	2,800,000	12,000,000			
Hydroquinone	123-31-9	9	38			
Imazalil	35554-44-0	820	11,000			
Imazaquin	81335-37-7	16,000	210,000			
Imazethapyr	81335-77-5	16,000	210,000			
Iodine	7553-56-2	780	12,000			
Iprodione	36734-19-7	2,500	33,000			
Iron	7439-89-6		820,000	53,500		
Isobutyl Alcohol	78-83-1	23,000	350,000			
Isophorone	78-59-1	570	2,400			
Isopropalin	33820-53-0	1,200	18,000			
Isopropanol	67-63-0	5,600	24,000			
Isopropyl Methyl Phosphonic Acid	1832-54-8	6,300	82,000			
Isoxaben	82558-50-7	3,200	41,000			
JP-7	NA	430,000,000	1,800,000,000			
Lactofen	77501-63-4	130	1,600			
Lead Compounds						
~Lead Chromate	7758-97-6	0.3	6.2			
~Lead Phosphate	7446-27-7	82	380			
~Lead acetate	301-04-2	64	270			
~Lead and Compounds	7439-92-1	400	800		41	111
~Lead subacetate	1335-32-6	64	270			
~Tetraethyl Lead	78-00-2	0.0078	0.12			
Lewisite	541-25-3	0.39	5.8			
Linuron	330-55-2	130	1,600			
Lithium	7439-93-2	160	2,300			
MCPA	94-74-6	32	410			
MCPB	94-81-5	630	8,200			
MCPP	93-65-2	63	820			
Malathion	121-75-5	1,300	16,000			
Maleic Anhydride	108-31-6	6,300	80,000			
Maleic Hydrazide	123-33-1	32,000	410,000			
Malononitrile	109-77-3	6.3	82			
Mancozeb	8018-01-7	1,900	25,000			
Maneb	12427-38-2	320	4,100			
Manganese (Non-diet)	7439-96-5		26,000	1,170		
Mephosfolan	950-10-7	5.7	74			
Mepiquat Chloride	24307-26-4	1,900	25,000			
Mercury Compounds						
~Mercuric Chloride (and other Mercury salts)	7487-94-7	23	350			
Mercury (elemental)	7439-97-6		46	10.9		
~Methyl Mercury	22967-92-6	7.8	120			
~Phenylmercuric Acetate	62-38-4	5.1	66			
Merphos	150-50-5	2.3	35			
Merphos Oxide	78-48-8	1.9	25			

Appendix A - § 35-APX-A1 - Soil Screening Values
(see notes at end of table)

Analyte	CAS Number	EPA Regional Screening Levels (TR=1E-06, HQ=1.0)		Vermont Screening Levels (TR=1E-06, HQ=1.0)	VT DEC Background Soil Concentrations	
		Resident Soil (mg/kg)	Industrial Soil (mg/kg)	Resident Soil (mg/kg)	Rural (mg/kg)	Urban (mg/kg)
Metalaxyl	57837-19-1	3,800	49,000			
Methacrylonitrile	126-98-7	7.5	100			
Methamidophos	10265-92-6	3.2	41			
Methanol	67-56-1	120,000	1,200,000			
Methidathion	950-37-8	63	820			
Methomyl	16752-77-5	1,600	21,000			
Methoxy-5-nitroaniline, 2-	99-59-2	11	47			
Methoxychlor	72-43-5	320	4,100			
Methoxyethanol Acetate, 2-	110-49-6	110	510			
Methoxyethanol, 2-	109-86-4	330	3,500			
Methyl Acetate	79-20-9	78,000	1,200,000			
Methyl Acrylate	96-33-3	150	610			
Methyl Ethyl Ketone (2-Butanone)	78-93-3		190,000	26,000		
Methyl Hydrazine	60-34-4	0.14	0.62			
Methyl Isobutyl Ketone (4-methyl-2-pentanone)	108-10-1	33,000	140,000			
Methyl Isocyanate	624-83-9	4.6	19			
Methyl Methacrylate	80-62-6	4,400	19,000			
Methyl Parathion	298-00-0	16	210			
Methyl Phosphonic Acid	993-13-5	3,800	49,000			
Methyl Styrene (Mixed Isomers)	25013-15-4	320	2,600			
Methyl methanesulfonate	66-27-3	5.5	23			
Methyl tert-Butyl Ether (MTBE)	1634-04-4	47	210			
Methyl-1,4-benzenediamine dihydrochloride, 2-	615-45-2	19	250			
Methyl-5-Nitroaniline, 2-	99-55-8	60	260			
Methyl-N-nitro-N-nitrosoguanidine, N-	70-25-7	0.065	0.28			
Methylaniline Hydrochloride, 2-	636-21-5	4.2	18			
Methylarsonic acid	124-58-3	630	8,200			
Methylbenzene,1-4-diamine monohydrochloride, 2-	74612-12-7	13	160			
Methylbenzene-1,4-diamine sulfate, 2-	615-50-9	5.4	23			
Methylcholanthrene, 3-	56-49-5	0.0055	0.1			
Methylene Chloride	75-09-2	57	1,000			
Methylene-bis(2-chloroaniline), 4,4'-	101-14-4	1.2	23			
Methylene-bis(N,N-dimethyl) Aniline, 4,4'-	101-61-1	12	50			
Methylenebisbenzenamine, 4,4'-	101-77-9	0.34	1.4			
Methylenediphenyl Diisocyanate	101-68-8	850,000	3,600,000			
Methylstyrene, Alpha-	98-83-9	5,500	82,000			
Metolachlor	51218-45-2	9,500	120,000			
Metribuzin	21087-64-9	1,600	21,000			
Metsulfuron-methyl	74223-64-6	16,000	210,000			
Mineral oils	8012-95-1	230,000	3,500,000			
Mirex	2385-85-5	0.036	0.17			
Molinate	2212-67-1	130	1,600			
Molybdenum	7439-98-7		5,800	382		
Monochloramine	10599-90-3	7,800	120,000			
Monomethylaniline	100-61-8	130	1,600			
Myclobutanil	88671-89-0	1,600	21,000			
N,N'-Diphenyl-1,4-benzenediamine	74-31-7	19	250			
Naled	300-76-5	160	2,300			
Naphtha, High Flash Aromatic (HFAN)	64742-95-6	2,300	35,000			
Naphthylamine, 2-	91-59-8	0.3	1.3			
Napropamide	15299-99-7	6,300	82,000			
Nickel Acetate	373-02-4	670	8,100			
Nickel Carbonate	3333-67-3	670	8,100			
Nickel Carbonyl	13463-39-3	820	11,000			
Nickel Hydroxide	12054-48-7	820	11,000			
Nickel Oxide	1313-99-1	840	12,000			
Nickel Refinery Dust	NA	820	11,000			
Nickel Soluble Salts	7440-02-0		22,000	980		
Nickel Subsulfide	12035-72-2	0.41	1.9			

Appendix A - § 35-APX-A1 - Soil Screening Values
(see notes at end of table)

		EPA Regional Screening Levels (TR=1E-06, HQ=1.0)		Vermont Screening Levels (TR=1E-06, HQ=1.0)	VT DEC Background Soil Concentrations	
Analyte	CAS Number	Resident Soil (mg/kg)	Industrial Soil (mg/kg)	Resident Soil (mg/kg)	Rural (mg/kg)	Urban (mg/kg)
Nickelocene	1271-28-9	670	8,100			
Nitrate	14797-55-8	130,000	1,900,000			
Nitrite	14797-65-0	7,800	120,000			
Nitroaniline, 2-	88-74-4	630	8,000			
Nitroaniline, 4-	100-01-6	27	110			
Nitrobenzene	98-95-3	5.1	22			
Nitrocellulose	9004-70-0	190,000,000	2,500,000,000			
Nitrofurantoin	67-20-9	4,400	57,000			
Nitrofurazone	59-87-0	0.42	1.8			
Nitroglycerin	55-63-0	6.3	82			
Nitroguanidine	556-88-7	6,300	82,000			
Nitromethane	75-52-5	5.4	24			
Nitropropane, 2-	79-46-9	0.014	0.06			
Nitroso-N-ethylurea, N-	759-73-9	0.0045	0.085			
Nitroso-N-methylurea, N-	684-93-5	0.001	0.019			
Nitroso-di-N-butylamine, N-	924-16-3	0.099	0.46			
Nitroso-di-N-propylamine, N-	621-64-7	0.078	0.33			
Nitrosodiethanolamine, N-	1116-54-7	0.19	0.82			
Nitrosodiethylamine, N-	55-18-5	0.00081	0.015			
Nitrosodimethylamine, N-	62-75-9	0.002	0.034			
Nitrosodiphenylamine, N-	86-30-6	110	470			
Nitrosomethylethylamine, N-	10595-95-6	0.02	0.091			
Nitrosomorpholine [N-]	59-89-2	0.081	0.34			
Nitrosopiperidine [N-]	100-75-4	0.058	0.24			
Nitrosopyrrolidine, N-	930-55-2	0.26	1.1			
Nitrotoluene, m-	99-08-1	6.3	82			
Nitrotoluene, o-	88-72-2	3.2	15			
Nitrotoluene, p-	99-99-0	34	140			
Nonane, n-	111-84-2	11	72			
Norflurazon	27314-13-2	2,500	33,000			
Octabromodiphenyl Ether	32536-52-0	190	2500			
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	2691-41-0		57,000	3,860		
Octamethylpyrophosphoramidate	152-16-9	130	1,600			
Oryzalin	19044-88-3	3,200	41,000			
Oxadiazon	19666-30-9	320	4,100			
Oxamyl	23135-22-0	1,600	21,000			
Oxyfluorfen	42874-03-3	190	2,500			
Paclbutrazol	76738-62-0	820	11,000			
Paraquat Dichloride	1910-42-5	280	3,700			
Parathion	56-38-2	380	4,900			
Pebulate	1114-71-2	3,900	58,000			
Pendimethalin	40487-42-1	2,500	33,000			
Pentabromodiphenyl Ether	32534-81-9	160	2,300			
Pentabromodiphenyl ether, 2,2',4,4',5- (BDE-99)	60348-60-9	6.3	82			
Pentachlorobenzene	608-93-5	63	930			
Pentachloroethane	76-01-7	7.7	36			
Pentachloronitrobenzene	82-68-8	2.7	13			
Pentachlorophenol	87-86-5		4	0.504		
Pentaerythritol tetranitrate (PETN)	78-11-5		570	127		
Pentane, n-	109-66-0	810	3,400			
Perchlorates						
~Ammonium Perchlorate	7790-98-9	55	820			
~Lithium Perchlorate	7791-03-9	55	820			
Perchlorate and Perchlorate Salts	14797-73-0		820	53.5		
~Potassium Perchlorate	7778-74-7	55	820			
~Sodium Perchlorate	7601-89-0	55	820			
Perfluorobutane Sulfonate	375-73-5	1,600	23,000			
Perfluorooctanic Acid	335-67-1			0.30		

Appendix A - § 35-APX-A1 - Soil Screening Values
(see notes at end of table)

		EPA Regional Screening Levels (TR=1E-06, HQ=1.0)		Vermont Screening Levels (TR=1E-06, HQ=1.0)	VT DEC Background Soil Concentrations	
Analyte	CAS Number	Resident Soil (mg/kg)	Industrial Soil (mg/kg)	Resident Soil (mg/kg)	Rural (mg/kg)	Urban (mg/kg)
Permethrin	52645-53-1	3,200	41,000			
Phenacetin	62-44-2	250	1,000			
Phenmedipham	13684-63-4	16,000	210,000			
Phenol	108-95-2	19,000	250,000			
Phenol, 2-(1-methylethoxy)- Methylcarbamate, (Baygon, Propoxur)	114-26-1		3,300	82.2		
Phenothiazine	92-84-2	32	410			
Phenylenediamine, m-	108-45-2	380	4,900			
Phenylenediamine, o-	95-54-5	12	49			
Phenylenediamine, p-	106-50-3	12,000	160,000			
Phenylphenol, 2-	90-43-7	280	1,200			
Phorate	298-02-2	13	160			
Phosgene	75-44-5	0.31	1.3			
Phosmet	732-11-6	1,300	16,000			
Phosphates, Inorganic						
~Aluminum metaphosphate	13776-88-0	3,800,000	57,000,000			
~Ammonium polyphosphate	68333-79-9	3,800,000	57,000,000			
~Calcium pyrophosphate	7790-76-3	3,800,000	57,000,000			
~Diammonium phosphate	7783-28-0	3,800,000	57,000,000			
~Dicalcium phosphate	7757-93-9	3,800,000	57,000,000			
~Dimagnesium phosphate	7782-75-4	3,800,000	57,000,000			
~Dipotassium phosphate	7758-11-4	3,800,000	57,000,000			
~Disodium phosphate	7558-79-4	3,800,000	57,000,000			
~Monoaluminum phosphate	13530-50-2	3,800,000	57,000,000			
~Monoammonium phosphate	7722-76-1	3,800,000	57,000,000			
~Monocalcium phosphate	7758-23-8	3,800,000	57,000,000			
~Monomagnesium phosphate	7757-86-0	3,800,000	57,000,000			
~Monopotassium phosphate	7778-77-0	3,800,000	57,000,000			
~Monosodium phosphate	7558-80-7	3,800,000	57,000,000			
~Polyphosphoric acid	8017-16-1	3,800,000	57,000,000			
~Potassium triphosphate	13845-36-8	3,800,000	57,000,000			
~Sodium acid pyrophosphate	7758-16-9	3,800,000	57,000,000			
~Sodium aluminum phosphate (acidic)	7785-88-8	3,800,000	57,000,000			
~Sodium aluminum phosphate (anhydrous)	10279-59-1	3,800,000	57,000,000			
~Sodium aluminum phosphate (tetrahydrate)	10305-76-7	3,800,000	57,000,000			
~Sodium hexametaphosphate	10124-56-8	3,800,000	57,000,000			
~Sodium polyphosphate	68915-31-1	3,800,000	57,000,000			
~Sodium trimetaphosphate	7785-84-4	3,800,000	57,000,000			
~Sodium triphosphate	7758-29-4	3,800,000	57,000,000			
~Tetrapotassium phosphate	7320-34-5	3,800,000	57,000,000			
~Tetrasodium pyrophosphate	7722-88-5	3,800,000	57,000,000			
decahydrogenoctaorthophosphate (dihydrate)	15136-87-5	3,800,000	57,000,000			
~Tricalcium phosphate	7758-87-4	3,800,000	57,000,000			
~Trimagnesium phosphate	7757-87-1	3,800,000	57,000,000			
~Tripotassium phosphate	7778-53-2	3,800,000	57,000,000			
~Trisodium phosphate	7601-54-9	3,800,000	57,000,000			
Phosphine	7803-51-2	23	350			
Phosphoric Acid	7664-38-2	3,000,000	29,000,000			
Phosphorus, White	7723-14-0	1.6	23			
Phthalates						
Bis(2-ethylhexyl)phthalate	117-81-7		160	20.7		
~Butyl Benzyl Phthalate	85-68-7	290	1,200			
~Butylphthalyl Butylglycolate	85-70-1	63,000	820,000			
~Dibutyl Phthalate	84-74-2	6,300	82,000			
~Diethyl Phthalate	84-66-2	51,000	660,000			
~Dimethylterephthalate	120-61-6	7,800	120,000			
~Octyl Phthalate, di-N-	117-84-0	630	8,200			
~Phthalic Acid, P-	100-21-0	63,000	820,000			
~Phthalic Anhydride	85-44-9	130,000	1,600,000			

Appendix A - § 35-APX-A1 - Soil Screening Values
(see notes at end of table)

		EPA Regional Screening Levels (TR=1E-06, HQ=1.0)		Vermont Screening Levels (TR=1E-06, HQ=1.0)	VT DEC Background Soil Concentrations	
Analyte	CAS Number	Resident Soil (mg/kg)	Industrial Soil (mg/kg)	Resident Soil (mg/kg)	Rural (mg/kg)	Urban (mg/kg)
Picloram	1918-02-1	4,400	57,000			
Picramic Acid (2-Amino-4,6-dinitrophenol)	96-91-3	6.3	82			
Picric Acid (2,4,6-Trinitrophenol)	88-89-1	57	740			
Pirimiphos, Methyl	29232-93-7	630	8,200			
Polybrominated Biphenyls	59536-65-1	0.018	0.077			
Polychlorinated Biphenyls (PCBs)						
~Aroclor 1016	12674-11-2	4.1	27			
~Aroclor 1221	11104-28-2	0.2	0.83			
~Aroclor 1232	11141-16-5	0.17	0.72			
~Aroclor 1242	53469-21-9	0.23	0.95			
~Aroclor 1248	12672-29-6	0.23	0.95			
~Aroclor 1254	11097-69-1		0.97	0.120		
~Aroclor 1260	11096-82-5	0.24	0.99			
~Aroclor 5460	11126-42-4	35	440			
~Heptachlorobiphenyl, 2,3,3',4,4',5,5'- (PCB 189)	39635-31-9	0.13	0.52			
~Hexachlorobiphenyl, 2,3',4,4',5,5'- (PCB 167)	52663-72-6	0.12	0.51			
~Hexachlorobiphenyl, 2,3,3',4,4',5'- (PCB 157)	69782-90-7	0.12	0.5			
~Hexachlorobiphenyl, 2,3,3',4,4',5- (PCB 156)	38380-08-4	0.12	0.5			
~Hexachlorobiphenyl, 3,3',4,4',5,5'- (PCB 169)	32774-16-6	0.00012	0.00051			
~Pentachlorobiphenyl, 2',3,4,4',5- (PCB 123)	65510-44-3	0.12	0.49			
~Pentachlorobiphenyl, 2,3',4,4',5- (PCB 118)	31508-00-6	0.12	0.49			
~Pentachlorobiphenyl, 2,3,3',4,4'- (PCB 105)	32598-14-4	0.12	0.49			
~Pentachlorobiphenyl, 2,3,4,4',5- (PCB 114)	74472-37-0	0.12	0.5			
~Pentachlorobiphenyl, 3,3',4,4',5- (PCB 126)	57465-28-8	0.000036	0.00015			
~Polychlorinated Biphenyls (high risk)	1336-36-3		0.94	0.114		
~Tetrachlorobiphenyl, 3,3',4,4'- (PCB 77)	32598-13-3	0.038	0.16			
~Tetrachlorobiphenyl, 3,4,4',5- (PCB 81)	70362-50-4	0.012	0.048			
Polymeric Methylene Diphenyl Diisocyanate (PMDI)	9016-87-9	850,000	3,600,000			
Polynuclear Aromatic Hydrocarbons (PAHs)					0.026	0.58
~Acenaphthene	83-32-9	3,600	45,000			
~Anthracene	120-12-7	18,000	230,000			
~Benz[a]anthracene	56-55-3	0.16	2.9			
~Benzo(j)fluoranthene	205-82-3	0.42	1.8			
~Benzo[a]pyrene	50-32-8			0.076/1.54 ¹		
~Benzo[b]fluoranthene	205-99-2	0.16	2.9			
~Benzo[k]fluoranthene	207-08-9	1.6	29			
~Chloronaphthalene, Beta-	91-58-7	4,800	60,000			
~Chrysene	218-01-9	16	290			
~Dibenz[a,h]anthracene	53-70-3	0.016	0.29			
~Dibenzo(a,e)pyrene	192-65-4	0.042	0.18			
~Dimethylbenz(a)anthracene, 7,12-	57-97-6	0.00046	0.0084			
~Fluoranthene	206-44-0	2,400	30,000			
~Fluorene	86-73-7	2,400	30,000			
~Indeno[1,2,3-cd]pyrene	193-39-5	0.16	2.9			
~Methylnaphthalene, 1-	90-12-0	18	73			
~Methylnaphthalene, 2-	91-57-6	240	3,000			
~Naphthalene	91-20-3		17	1.42		
~Nitropyrene, 4-	57835-92-4	0.42	1.8			
~Pyrene	129-00-0	1,800	23,000			
Potassium Perfluorobutane Sulfonate	29420-49-3	1,300	16,000			
Prochloraz	67747-09-5	3.6	15			
Profuralin	26399-36-0	470	7,000			
Prometon	1610-18-0	950	12,000			
Prometryn	7287-19-6	250	3,300			
Propachlor	1918-16-7	820	11,000			
Propanil	709-98-8	320	4,100			
Propargite	2312-35-8	1,300	16,000			
Propargyl Alcohol	107-19-7	160	2,300			

Appendix A - § 35-APX-A1 - Soil Screening Values
(see notes at end of table)

Analyte	CAS Number	EPA Regional Screening Levels (TR=1E-06, HQ=1.0)		Vermont Screening Levels (TR=1E-06, HQ=1.0)	VT DEC Background Soil Concentrations	
		Resident Soil (mg/kg)	Industrial Soil (mg/kg)	Resident Soil (mg/kg)	Rural (mg/kg)	Urban (mg/kg)
Propazine	139-40-2	1,300	16,000			
Propham	122-42-9	1,300	16,000			
Propiconazole	60207-90-1	820	11,000			
Propionaldehyde	123-38-6	75	310			
Propyl benzene	103-65-1	3,800	24,000			
Propylene	115-07-1	2,200	9,300			
Propylene Glycol	57-55-6	1,300,000	16,000,000			
Propylene Glycol Dinitrate	6423-43-4	390,000	1,600,000			
Propylene Glycol Monomethyl Ether	107-98-2	41,000	370,000			
Propylene Oxide	75-56-9	2.1	9.7			
Propyzamide	23950-58-5	4,700	62,000			
Pyridine	110-86-1	78	1,200			
Quinalphos	13593-03-8	32	410			
Quinoline	91-22-5	0.18	0.77			
Quizalofop-ethyl	76578-14-8	570	7,400			
Refractory Ceramic Fibers	NA	43,000,000	180,000,000			
Resmethrin	10453-86-8	1,900	25,000			
Ronnel	299-84-3	3,900	58,000			
Rotenone	83-79-4	250	3,300			
Safrole	94-59-7	0.55	10			
Selenious Acid	7783-00-8	390	5,800			
Selenium	7782-49-2		5,800	382		
Selenium Sulfide	7446-34-6	390	5,800			
Sethoxydim	74051-80-2	5,700	74,000			
Silica (crystalline, respirable)	7631-86-9	4,300,000	18,000,000			
Silver	7440-22-4		5,800	247		
Simazine	122-34-9	4.5	19			
Sodium Acifluorfen	62476-59-9	820	11,000			
Sodium Azide	26628-22-8	310	4,700			
Sodium Dichromate	10588-01-9	0.3	6.2			
Sodium Diethyldithiocarbamate	148-18-5	2	8.5			
Sodium Fluoride	7681-49-4	3,900	58,000			
Sodium Fluoroacetate	62-74-8	1.3	16			
Sodium Metavanadate	13718-26-8	78	1,200			
Sodium Tungstate	13472-45-2	63	930			
Sodium Tungstate Dihydrate	10213-10-2	63	930			
Stirofos (Tetrachlorovinphos)	961-11-5	23	96			
Strontium Chromate	7789-06-2	0.3	6.2			
Strontium, Stable	7440-24-6	47,000	700,000			
Strychnine	57-24-9	19	250			
Styrene	100-42-5	6,000	35,000			
Styrene-Acrylonitrile (SAN) Trimer	NA	190	2,500			
Sulfolane	126-33-0	63	820			
Sulfonylbis(4-chlorobenzene), 1,1'-	80-07-9	51	660			
Sulfur Trioxide	7446-11-9	1,400,000	6,000,000			
Sulfuric Acid	7664-93-9	1,400,000	6,000,000			
Sulfurous acid, 2-chloroethyl 2-[4-(1,1-dimethylethyl)phenoxy]-1-methylethyl ester	140-57-8	22	92			
TCMTB	21564-17-0	1,900	25,000			
Tebuthiuron	34014-18-1	4,400	57,000			
Temphos	3383-96-8	1,300	16,000			
Terbacil	5902-51-2	820	11,000			
Terbufos	13071-79-9	2	29			
Terbutryn	886-50-0	63	820			
Tetrabromodiphenyl ether, 2,2',4,4'- (BDE-47)	5436-43-1	6.3	82			
Tetrachlorobenzene, 1,2,4,5-	95-94-3	23	350			
Tetrachloroethane, 1,1,1,2-	630-20-6	2	8.8			
Tetrachloroethane, 1,1,2,2-	79-34-5	0.6	2.7			
Tetrachloroethylene	127-18-4		100	1.46		

Appendix A - § 35-APX-A1 - Soil Screening Values
(see notes at end of table)

Analyte	CAS Number	EPA Regional Screening Levels (TR=1E-06, HQ=1.0)		Vermont Screening Levels (TR=1E-06, HQ=1.0)	VT DEC Background Soil Concentrations	
		Resident Soil (mg/kg)	Industrial Soil (mg/kg)	Resident Soil (mg/kg)	Rural (mg/kg)	Urban (mg/kg)
Tetrachlorophenol, 2,3,4,6-	58-90-2	1,900	25,000			
Tetrachlorotoluene, p- alpha, alpha, alpha-	5216-25-1	0.035	0.16			
Tetraethyl Dithiopyrophosphate	3689-24-5	32	410			
Tetrafluoroethane, 1,1,1,2-	811-97-2	100,000	430,000			
Tetryl (Trinitrophenylmethylnitramine)	479-45-8	160	2,300			
Thallic Oxide	1314-32-5	1.6	23			
Thallium (I) Nitrate	10102-45-1	0.78	12			
Thallium (Soluble Salts)	7440-28-0		12	0.764		
Thallium Acetate	563-68-8	0.78	12			
Thallium Carbonate	6533-73-9	1.6	23			
Thallium Chloride	7791-12-0	0.78	12			
Thallium Selenite	12039-52-0	0.78	12			
Thallium Sulfate	7446-18-6	1.6	23			
Thifensulfuron-methyl	79277-27-3	820	11,000			
Thiobencarb	28249-77-6	630	8,200			
Thiodiglycol	111-48-8	5,400	79,000			
Thiofanox	39196-18-4	19	250			
Thiophanate, Methyl	23564-05-8	5,100	66,000			
Thiram	137-26-8	320	4,100			
Tin	7440-31-5	47,000	700,000			
Titanium Tetrachloride	7550-45-0	140,000	600,000			
Toluene	108-88-3		47,000	4,640		
Toluene-2,4-diisocyanate	584-84-9	6.4	27			
Toluene-2,5-diamine	95-70-5	3	13			
Toluene-2,6-diisocyanate	91-08-7	5.3	22			
Toluidine, o- (Methylaniline, 2-)	95-53-4	34	140			
Toluidine, p-	106-49-0	18	77			
Total Petroleum Hydrocarbons (Aliphatic High)	NA	230,000	3,500,000			
Total Petroleum Hydrocarbons (Aliphatic Low)	NA	520	2,200			
Total Petroleum Hydrocarbons (Aliphatic Medium)	NA	96	440			
Total Petroleum Hydrocarbons (Aromatic High)	NA	2,500	33,000			
Total Petroleum Hydrocarbons (Aromatic Low)	NA	82	420			
Total Petroleum Hydrocarbons (Aromatic Medium)	NA	110	600			
Toxaphene	8001-35-2	0.49	2.1			
Tralomethrin	66841-25-6	470	6,200			
Tri-n-butyltin	688-73-3	23	350			
Triacetin	102-76-1	5,100,000	66,000,000			
Triadimefon	43121-43-3	1,900	25,000			
Triallate	2303-17-5	1,000	15,000			
Triasulfuron	82097-50-5	630	8,200			
Tribenuron-methyl	101200-48-0	510	6,600			
Tribromobenzene, 1,2,4-	615-54-3	390	5,800			
Tributyl Phosphate	126-73-8	60	260			
Tributyltin Compounds	NA	19	250			
Tributyltin Oxide	56-35-9	19	250			
Trichloro-1,2,2-trifluoroethane, 1,1,2-	76-13-1	40,000	170,000			
Trichloroacetic Acid	76-03-9	7.8	33			
Trichloroaniline HCl, 2,4,6-	33663-50-2	19	79			
Trichloroaniline, 2,4,6-	634-93-5	1.9	25			
Trichlorobenzene, 1,2,3-	87-61-6	63	930			
Trichlorobenzene, 1,2,4-	120-82-1	24	110			
Trichloroethane, 1,1,1-	71-55-6	8,100	36,000			
Trichloroethane, 1,1,2-	79-00-5	1.1	5			
Trichloroethylene	79-01-6		6	0.442		
Trichlorofluoromethane	75-69-4	23,000	350,000			
Trichlorophenol, 2,4,5-	95-95-4	6,300	82,000			
Trichlorophenol, 2,4,6-	88-06-2	49	210			
Trichlorophenoxyacetic Acid, 2,4,5-	93-76-5	630	8,200			
Trichlorophenoxypropionic acid, -2,4,5	93-72-1	510	6,600			

Appendix A - § 35-APX-A1 - Soil Screening Values
(see notes at end of table)

Analyte	CAS Number	EPA Regional Screening Levels (TR=1E-06, HQ=1.0)		Vermont Screening Levels (TR=1E-06, HQ=1.0)	VT DEC Background Soil Concentrations	
		Resident Soil (mg/kg)	Industrial Soil (mg/kg)	Resident Soil (mg/kg)	Rural (mg/kg)	Urban (mg/kg)
Trichloropropane, 1,1,2-	598-77-6	390	5,800			
Trichloropropane, 1,2,3-	96-18-4		0.11	0.00324		
Trichloropropene, 1,2,3-	96-19-5	0.73	3.1			
Tricresyl Phosphate (TCP)	1330-78-5	1,300	16,000			
Tridiphane	58138-08-2	190	2,500			
Triethylamine	121-44-8	120	480			
Triethylene Glycol	112-27-6	130,000	1,600,000			
Trifluoroethane, 1,1,1-	420-46-2	15,000	62,000			
Trifluralin	1582-09-8	90	420			
Trimethyl Phosphate	512-56-1	27	110			
Trimethylbenzene, 1,2,3-	526-73-8		210	264 (Sum of isomers)		
Trimethylbenzene, 1,2,4-	95-63-6		240			
Trimethylbenzene, 1,3,5-	108-67-8		12,000			
Trimethylpentene, 2,4,4-	25167-70-8	780	12,000			
Trinitrobenzene, 1,3,5-	99-35-4	2,200	32,000			
Trinitrotoluene, 2,4,6-	118-96-7		96	12.0		
Triphenylphosphine Oxide	791-28-6	1,300	16,000			
Tris(1,3-Dichloro-2-propyl) Phosphate	13674-87-8	1,300	16,000			
Tris(1-chloro-2-propyl)phosphate	13674-84-5	630	8,200			
Tris(2,3-dibromopropyl)phosphate	126-72-7	0.28	1.3			
Tris(2-chloroethyl)phosphate	115-96-8	27	110			
Tris(2-ethylhexyl)phosphate	78-42-2	170	720			
Tungsten	7440-33-7	63	930			
Uranium (Soluble Salts)	NA		3,500	45.9		
Urethane	51-79-6	0.12	2.3			
Vanadium Pentoxide	1314-62-1	460	2,000			
Vanadium and Compounds	7440-62-2		5,800	2.88		
Vernolate	1929-77-7	78	1,200			
Vinclozolin	50471-44-8	1,600	21,000			
Vinyl Acetate	108-05-4	910	3,800			
Vinyl Bromide	593-60-2	0.12	0.52			
Vinyl Chloride	75-01-4	0.059	1.7			
Warfarin	81-81-2	19	250			
Xylene, P-	106-42-3	560	2,400			
Xylene, m-	108-38-3	550	2,400			
Xylene, o-	95-47-6	650	2,800			
Xylenes	1330-20-7		2,500	575		
Zinc Phosphide	1314-84-7	23	350			
Zinc and Compounds	7440-66-6		350,000	22,900		
Zineb	12122-67-7	3,200	41,000			
Zirconium	7440-67-7	6.3	93			

Notes:

- The USEPA values listed are reflective of the Regional Screening Levels (RSL) Summary Table May 2016.
- The Agency will be using EPA Regional Screening Levels (RSLs) and Vermont Screening Levels (VSLs) for residential soil concentrations. The VSLs and the RSLs employ a hazard index of 1 and are based on a de minimus incremental lifetime carcinogenic risk of one in one million (10⁻⁶) and assume a 70 year residential exposure duration. For industrial soil scenarios, the industrial EPA RSL must be used. The VT DEC Background Soil Concentration values are to be used when the background value for benzo(a)pyrene (TEQ) or arsenic is greater than the VSL.
- The VT DEC Background Soil Concentrations for Polynuclear Aromatic Hydrocarbons are expressed as the TEQ value for Benzo[a]pyrene.

Key:

† = Contains residential and industrial B(a)P soil screening values

Blank cell = no screening level (EPA Residential RSLs not shown when VSL Residential value is present)

NA = not applicable

Appendix A - § 35-APX-A2. Vapor Intrusion Values
(see notes at end of table)

Analyte	CAS Number	EPA Regional Air Screening Levels (TR=1E-06, HQ=1.0)		Vermont Air Screening Levels (TR=1E-06, HQ=1.0)		Vapor Intrusion Screening Values - Sub-slab Soil Gas		Vapor Intrusion Screening Values - Groundwater	
		Resident Air (µg/m3)	Industrial Air (µg/m3)	Resident Air (µg/m3)	Industrial Air (µg/m3)	Residential (µg/m3)	Industrial (µg/m3)	Residential (µg/L)	Industrial (µg/L)
Acetaldehyde	75-07-0	1.3	5.6			43	190	670	2,900
Acetone	67-64-1	32.000	140.000			1,100,000	4,500,000	35,000,000	150,000,000
Acetone Cyanohydrin	75-86-5	2.1	8.8						
Acetonitrile	75-05-8	63	260			2,100	8,800	69,000	290,000
Acetylaminofluorene, 2-	53-96-3	0.0022	0.0094						
Acrolein	107-02-8	0.021	0.088			0.7	2.9	6.4	27
Acrylamide	79-06-1	0.01	0.12						
Acrylic Acid	79-10-7	1.0	4.4			35	150	150,000	630,000
Acrylonitrile	107-13-1	0.041	0.18			1.4	6.0	12	54
Adiponitrile	111-69-3	6.3	26						
Aldrin	309-00-2	0.00057	0.0025			0.019	0.083	0.92	4.0
Allyl Alcohol	107-18-6	0.1	0.44			3.5	15	980	4,100
Allyl Chloride	107-05-1	0.47	2			16	68	1.6	7.0
Aluminum	7429-90-5	5.2	22						
Aminobiphenyl, 4-	92-67-1	0.00047	0.002						
Ammonia	7664-41-7	100	440			3,500	15,000	210,000	890,000
Amyl Alcohol, tert-	75-85-4	3.1	13			100	440	11,000	45,000
Aniline	62-53-3	1	4.4						
Antimony Trioxide	1309-64-4	0.21	0.88						
Arsenic, inorganic	7440-38-2	0.00065	0.0029						
Arsine	7784-42-1	0.052	0.22						
Auramine	492-80-8	0.011	0.049						
Azinphos-methyl	86-50-0	10	44						
Azobenzene	103-33-3	0.091	0.4			3.0	13	160	720
Azodicarbonamide	123-77-3	0.0073	0.031						
Barium	7440-39-3	0.52	2.2						
Barium Chromate	10294-40-3	0.0000068	0.000082						
Benzene*	71-43-2			0.13	1.05	4.3	35	0.92	7.4
Benzidine	92-87-5	0.000015	0.00018						
Benzyl Chloride	100-44-7	0.057	0.25			1.9	8.3	6.4	28
Beryllium and compounds	7440-41-7	0.0012	0.0051						
Biphenyl, 1,1'-	92-52-4	0.42	1.8			14	58	75	320
Bis(2-chloroethyl)ether	111-44-4	0.0085	0.037			0.28	1.2	27	120
Bis(chloromethyl)ether	542-88-1	0.00045	0.0002			0.0015	0.0066	0.00025	0.0011
Boron And Borates Only	7440-42-8	21	88						
Boron Trichloride	10294-34-5	21	88			700	2,900		
Boron Trifluoride	7637-07-2	14	57			450	1,900		
Bromo-2-chloroethane, 1-	107-04-0	0.0047	0.02			0.16	0.68	0.23	1.0
Bromobenzene	108-86-1	63	260			2,100	8,800	1,300	5,400

Appendix A - § 35-APX-A2. Vapor Intrusion Values
(see notes at end of table)

Analyte	CAS Number	EPA Regional Air Screening Levels (TR=1E-06, HQ=1.0)		Vermont Air Screening Levels (TR=1E-06, HQ=1.0)		Vapor Intrusion Screening Values - Sub-slab Soil Gas		Vapor Intrusion Screening Values - Groundwater	
		Resident Air (µg/m3)	Industrial Air (µg/m3)	Resident Air (µg/m3)	Industrial Air (µg/m3)	Residential (µg/L)	Industrial (µg/L)	Residential (µg/L)	Industrial (µg/L)
Bromochloromethane	74-97-5	42	180			1,400	5,800	1,100	4,700
Bromodichloromethane	75-27-4	0.076	0.33			2.5	11	1.5	6.3
Bromoform	75-25-2	2.6	11			85	370	230	990
Bromomethane	74-83-9	5.2	22			170	730	24	100
Butadiene, 1,3-	106-99-0	0.094	0.41			3.1	14	0.042	0.18
Butyl alcohol, sec-	78-92-2	31,000	130,000			1,000,000	4,400,000	NVT	NVT
Butylated hydroxyanisole	25013-16-5	49	220						
Cadmium (Water)	7440-43-9	0.0016	0.0068						
Calcium Chromate	13765-19-0	0.0000068	0.000082						
Caprolactam	105-60-2	2.3	9.6						
Captan	2425-06-1	0.065	0.29						
Captan	133-06-2	4.3	19						
Carbon Disulfide	75-15-0	730	3,100			24,000	100,000	1,800	7,700
Carbon Tetrachloride	56-23-5	0.47	2.0			16	68	0.66	2.9
Carbonyl Sulfide	463-58-1	100	440			3,500	15,000	4.2	18
Ceric oxide	1306-38-3	0.94	3.9						
Chlordane	12789-03-6	0.028	0.12			0.94	4.1	NVT	NVT
Chlordecone (Kepone)	143-50-0	0.00061	0.0027						
Chlorine	7782-50-5	0.15	0.64			5.2	22	12	52
Chlorine Dioxide	10049-04-4	0.21	0.88			7.0	29		
Chloro-1,1-difluoroethane, 1-	75-68-3	52,000	220,000			1,700,000	7,300,000	400,000	NVT
Chloro-1,3-butadiene, 2-	126-99-8	0.0094	0.041			0.31	1.4	0.0068	0.03
Chloro-2-methylaniline, 4-	95-69-2	0.036	0.16						
Chloroacetophenone, 2-	532-27-4	0.031	0.13						
Chlorobenzene	108-90-7	52	220			1,700	7,300	730	3,100
Chlorobenzilate	510-15-6	0.091	0.4						
Chlorobenzotrifluoride, 4-	98-56-6	310	1,300			10,000	44,000	220	930
Chlorodifluoromethane	75-45-6	52,000	220,000			1,700,000	7,300,000	40,000	170,000
Chloroform	67-66-3	0.12	0.53			4.1	18	1.3	5.5
Chloromethane	74-87-3	94	390			3,100	13,000	340	1,400
Chloromethyl Methyl Ether	107-30-2	0.0041	0.018			0.14	0.59	0.33	1.4
Chloronitrobenzene, o-	88-73-3	0.01	0.044						
Chloronitrobenzene, p-	100-00-5	2.1	8.8						
Chloropicrin	76-06-2	0.42	1.8			14	58	5.0	21
Chlorothalonil	1897-45-6	3.2	14			32			
Chlorozotocin	54749-90-5	0.000041	0.00018						
Chromium(VI)	18540-29-9	0.000012	0.00015						
Cobalt	7440-48-4	0.00031	0.0014						
Coke Oven Emissions	8007-45-2	0.0016	0.02						

Appendix A - § 35-APX-A2. Vapor Intrusion Values
(see notes at end of table)

Analyte	CAS Number	EPA Regional Air Screening Levels (TR=1E-06, HQ=1.0)		Vermont Air Screening Levels (TR=1E-06, HQ=1.0)		Vapor Intrusion Screening Values - Sub-slab Soil Gas		Vapor Intrusion Screening Values - Groundwater	
		Resident Air (µg/m3)	Industrial Air (µg/m3)	Resident Air (µg/m3)	Industrial Air (µg/m3)	Residential (µg/m3)	Industrial (µg/m3)	Residential (µg/L)	Industrial (µg/L)
Cresol, m-	108-39-4	630	2,600						
Cresol, o-	95-48-7	630	2,600						
Cresol, p-	106-44-5	630	2,600						
Cresols	1319-77-3	630	2,600						
Cumene	98-82-8	420	1,800			14,000	58,000	1,900	7,800
Cupferron	135-20-6	0.045	0.19						
Cyanides									
~Cyanide (CN-)	57-12-5	0.83	3.5			28	120	0.84	3.5
~Hydrogen Cyanide	74-90-8	0.83	3.5			28	120	230	960
Cyclohexane	110-82-7	6,300	26,000			210,000	880,000	1,600	6,800
Cyclohexanone	108-94-1	730	3,100			24,000	100,000	4,300,000	18,000,000
Cyclohexene	110-83-8	1,000	4,400			35,000	150,000	900	3,800
DDD	72-54-8	0.041	0.18						
DDE, p,p'-	72-55-9	0.029	0.13			0.96	4.2	NVT	NVT
DDT	50-29-3	0.029	0.13						
Daminozide	1596-84-5	0.55	2.4						
Dibromo-3-chloropropane, 1,2-	96-12-8	0.0017	0.002			0.0056	0.068	0.058	0.70
Dibromoethane, 1,2-	106-93-4	0.0047	0.02			0.16	0.68	0.32	1.4
Dibromomethane (Methylene Bromide)	74-95-3	4.2	18			140	580	210	870
Dichloro-2-butene, 1,4-	764-41-0	0.0067	0.0029			0.022	0.097	0.0019	0.0084
Dichloro-2-butene, cis-1,4-	1476-11-5	0.0067	0.0029			0.022	0.097	0.047	0.20
Dichloro-2-butene, trans-1,4-	110-57-6	0.0067	0.0029			0.022	0.097	0.047	0.20
Dichlorobenzene, 1,2-	95-50-1	210	880			7,000	29,000	5,300	22,000
Dichlorobenzene, 1,4-	106-46-7	0.26	1.1			8.5	37	5.0	22
Dichlorobenzidine, 3,3'-	91-94-1	0.0083	0.036						
Dichlorodifluoromethane	75-71-8	100	440			3,500	15,000	12	51
Dichloroethane, 1,1-	75-34-3	1.8	7.7			58	260	12	51
Dichloroethane, 1,2-	107-06-2	0.11	0.47			3.6	16	3.7	16
Dichloroethylene, 1,1-	75-35-4	210	880			7,000	29,000	280	1,200
Dichloropropane, 1,2-	78-87-5	0.28	1.2			9.4	41	4.0	18
Dichloropropene, 1,3-	542-75-6	0.7	3.1				100		36
Dichlorvos	62-73-7	0.034	0.15						
Dicyclopentadiene	77-73-6	0.31	1.3			10	44	0.14	0.60
Dieldrin	60-57-1	0.0061	0.0027						
Diesel Engine Exhaust	NA	0.0094	0.041						
Diethanolamine	111-42-2	0.21	0.88						
Diethylene Glycol Monobutyl Ether	112-34-5	0.10	0.44						
Diethylene Glycol Monoethyl Ether	111-90-0	0.31	1.3						
Diethylstilbestrol	56-53-1	0.00028	0.00012						

Appendix A - § 35-APX-A2. Vapor Intrusion Values
(see notes at end of table)

Analyte	CAS Number	EPA Regional Air Screening Levels (TR=1E-06, HQ=1.0)		Vermont Air Screening Levels (TR=1E-06, HQ=1.0)		Vapor Intrusion Screening Values - Sub-slab Soil Gas		Vapor Intrusion Screening Values - Groundwater	
		Resident Air (µg/m3)	Industrial Air (µg/m3)	Resident Air (µg/m3)	Industrial Air (µg/m3)	Residential (µg/m3)	Industrial (µg/m3)	Residential (µg/L)	Industrial (µg/L)
Difluoroethane, 1,1-	75-37-6	42,000	180,000			1,400,000	5,800,000	65,000	270,000
Dihydrosofaole	94-58-6	0.22	0.94			7.2	31	430	1,900
Diisopropyl Ether	108-20-3	730	3,100			24,000	100,000	7,000	29,000
Dimethylamino azobenzene [p-]	60-11-7	0.0022	0.0094						
Dimethylformamide	68-12-2	31	130			1,000	4,400	23,000,000	97,000,000
Dimethylhydrazine, 1,1-	57-14-7	0.0021	0.0088			0.07000	0.29	6.5	27
Dimethylhydrazine, 1,2-	540-73-8	0.00018	0.00077			0.00058	0.0026	6.200	27
Dimethylvinylchloride	513-37-1	0.22	0.94			7.2	31	0.048	0.21
Dinitrotoluene, 2,4-	121-14-2	0.032	0.14						
Dioxane, 1,4-	123-91-1	0.56	2.5			19	82	5,100	22,000
Dioxins									
~Hexachlorodibenzo-p-dioxin, Mixture	NA	0.0000022	0.0000094						
~TCDD, 2,3,7,8-	1746-01-6	0.00000074	0.0000032			0.0000025	0.000011	0.000036	0.00016
Diphenylhydrazine, 1,2-	122-66-7	0.013	0.056						
Direct Black 38	1937-37-7	0.00002	0.00088						
Direct Blue 6	2602-46-2	0.00002	0.00088						
Direct Brown 95	16071-86-6	0.00002	0.00088						
Epichlorohydrin	106-89-8	1.0	4.4			35	150	840	3,500
Epoxybutane, 1,2-	106-88-7	21	88			700	2,900	4,500	19,000
Ethoxyethanol Acetate, 2-	111-15-9	63	260			2,100	8,800	990,000	4,200,000
Ethoxyethanol, 2-	110-80-5	210	880			7,000	29,000	21,000,000	90,000,000
Ethyl Acetate	141-78-6	73	310			2,400	10,000	22,000	93,000
Ethyl Acrylate	140-88-5	8.3	35			280	1,000	1,100	93,000
Ethyl Chloride (Chloroethane)	75-00-3	10,000	44,000			350,000	1,500,000	32,000	140,000
Ethyl Methacrylate	97-63-2	310	1,300			10,000	44,000	29,000	120,000
Ethylbenzene	100-41-4	1.1	4.9			37	160	6.3	28
Ethylene Glycol	107-21-1	420	1,800						
Ethylene Glycol Monobutyl Ether	111-76-2	1,700	7,000						
Ethylene Oxide	75-21-8	0.032	0.14			1.1	4.6	7.5	33
Ethylene Thiourea	96-45-7	0.22	0.94						
Ethyleneimine	151-56-4	0.00015	0.00065			0.0049	0.022	0.30	1.3
Fluoride	16984-48-8	14	57						
Fluorine (Soluble Fluoride)	7782-41-4	14	57						
Formaldehyde	50-00-0	0.22	0.94			7.2	31	22,000	93,000
Formic Acid	64-18-6	0.31	1.3			10	44	63,000	260,000
Furfural	98-01-1	52	220			1,700	7,300	640,000	2,700,000
Furium	531-82-8	0.0065	0.029						
Furmecyclo	60568-05-0	0.33	1.4						
Glutaraldehyde	111-30-8	0.083	0.35						

Appendix A - § 35-APX-A2. Vapor Intrusion Values
(see notes at end of table)

Analyte	CAS Number	EPA Regional Air Screening Levels (TR=1E-06, HQ=1.0)		Vermont Air Screening Levels (TR=1E-06, HQ=1.0)		Vapor Intrusion Screening Values - Sub-slab Soil Gas		Vapor Intrusion Screening Values - Groundwater	
		Resident Air (µg/m3)	Industrial Air (µg/m3)	Resident Air (µg/m3)	Industrial Air (µg/m3)	Residential (µg/m3)	Industrial (µg/m3)	Residential (µg/L)	Industrial (µg/L)
Glycidyl	765-34-4	1.0	4.4			35	150	50,000	210,000
Heptachlor	76-44-8	0.0022	0.0094			0.072	0.31	0.48	2.1
Heptachlor Epoxide	1024-57-3	0.0011	0.0047			0.036	0.16	4.3	19
Hexachlorobenzene	118-74-1	0.0061	0.027			0.20	0.89	0.22	0.94
Hexachlorobutadiene	87-68-3	0.13	0.56			4.3	19	0.64	2.8
Hexachlorocyclohexane, Alpha-	319-84-6	0.0016	0.0068						
Hexachlorocyclohexane, Beta-	319-85-7	0.0053	0.023						
Hexachlorocyclohexane, Gamma- (Lindane)	58-89-9	0.0091	0.04						
Hexachlorocyclohexane, Technical	608-73-1	0.0055	0.024						
Hexachlorocyclopentadiene	77-47-4	0.21	0.88			7.0	29	4.6	19
Hexachloroethane	67-72-1	0.26	1.1			8.5	37	3.7	16
Hexamethylene Diisocyanate, 1,6-	822-06-0	0.01	0.044			0.35	1.5	5.3	22
Hexane, N-	110-54-3	730	3,100			24,000	100,000	16	65
Hexanone, 2-	591-78-6	31	130			1,000	4,400	15,000	63,000
Hydrazine	302-01-2	0.00057	0.0025			0.019	0.083	46	200
Hydrazine Sulfate	10034-93-2	0.00057	0.0025						
Hydrogen Chloride	7647-01-0	21	88			700	2,900	0.00000029	0.0000012
Hydrogen Fluoride	7664-39-3	15	61			490	2,000	3,800	16,000
Hydrogen Sulfide	7783-06-4	2.1	8.8			70	290	7.4	31
Isophorone	78-59-1	2,100	8,800						
Isopropanol	67-63-0	210	880			7,000	29,000	1,300,000	5,500,000
JP-7	NA	310	1,300						
Lead Compounds									
~Lead Chromate	7758-97-6	0.0000068	0.000082						
~Lead Phosphate	7446-27-7	0.23	1						
~Lead acetate	301-04-2	0.23	1						
~Lead and Compounds	7439-92-1	0.15							
~Lead subacetate	1335-32-6	0.23	1						
Maleic Anhydride	108-31-6	0.73	3.1						
Mercury Compounds									
~Mercuric Chloride (and other Mercury salts)	7487-94-7	0.31	1.3						
~Mercury (elemental)	7439-97-6	0.31	1.3			10	44	2.1	8.6
Methacrylonitrile	126-98-7	31	130			1,000	4,400	5,100	22,000
Methanol	67-56-1	21,000	88,000			700,000	2,900,000	200,000,000	840,000,000
Methoxy-5-nitroaniline, 2-	99-59-2	0.2	0.88						
Methoxyethanol Acetate, 2-	110-49-6	1	4.4			35	150	170,000	720,000
Methoxyethanol, 2-	109-86-4	21	88			700	880	2,900,000	
Methyl Acrylate	96-33-3	21	88			700	2,900	4,300	18,000
Methyl Ethyl Ketone (2-Butanone)	78-93-3	5,200	22,000			170,000	730,000	3,700,000	15,000,000

Appendix A - § 35-APX-A2. Vapor Intrusion Values
(see notes at end of table)

Analyte	CAS Number	EPA Regional Air Screening Levels (TR=1E-06, HQ=1.0)		Vermont Air Screening Levels (TR=1E-06, HQ=1.0)		Vapor Intrusion Screening Values - Sub-slab Soil Gas		Vapor Intrusion Screening Values - Groundwater	
		Resident Air (µg/m3)	Industrial Air (µg/m3)	Resident Air (µg/m3)	Industrial Air (µg/m3)	Residential (µg/m3)	Industrial (µg/m3)	Residential (µg/L)	Industrial (µg/L)
Methyl Hydrazine	60-34-4	0.0028	0.012			0.094	0.41	40	180
Methyl Isobutyl Ketone (4-methyl-2-pentanone)	108-10-1	3,100	13,000			100,000	440,000	980,000	4,100,000
Methyl Isocyanate	624-83-9	1	4.4			35	150	28	120
Methyl Methacrylate	80-62-6	730	3,100			24,000	10,000	100,000	430,000
Methyl Styrene (Mixed Isomers)	25013-15-4	42	180			1,400	5,800	920	3,900
Methyl methanesulfonate	66-27-3	0.1	0.44						
Methyl tert-Butyl Ether (MTBE)	1634-04-4	11	47			360	1,600	690	3,000
Methyl-N-nitro-N-nitrosoguanidine, N-	70-25-7	0.0012	0.0051						
MethylAniline Hydrochloride, 2-	636-21-5	0.076	0.33						
Methylcholanthrene, 3-	56-49-5	0.00016	0.0019						
Methylene Chloride	75-09-2	100	1,200			3,400	41,000	1,100	14,000
Methylene-bis(2-chloroaniline), 4,4'-	101-14-4	0.0024	0.029						
Methylene-bis(N,N-dimethyl) Aniline, 4,4'-	101-61-1	0.22	0.94						
Methylenedibenzeneamine, 4,4'-	101-77-9	0.0061	0.027						
Methylenediphenyl Disocyanate	101-68-8	0.63	2.6						
Mirex	2385-85-5	0.00055	0.0024			0.018	0.080	0.017	0.073
Naphtha, High Flash Aromatic (HFAN)	64742-95-6	100	440						
Nickel Carbonyl	13463-39-3	0.011	0.047			0.36	1.6	0.00081	0.0035
Nitroaniline, 2-	88-74-4	0.052	0.22						
Nitroaniline, 4-	100-01-6	6.3	26						
Nitrobenzene	98-95-3	0.07	0.31			2.3	10	160	680
Nitrofurazone	59-87-0	0.0076	0.033						
Nitromethane	75-52-5	0.32	1.4			11	46	500	2,200
Nitropropane, 2-	79-46-9	0.001	0.0045			0.035	0.15	0.38	1.7
Nitroso-N-ethylurea, N-	759-73-9	0.00013	0.0016						
Nitroso-N-methylurea, N-	684-93-5	0.00003	0.00036						
Nitroso-di-N-butylamine, N-	924-16-3	0.0018	0.0077			0.058		3.3	
Nitroso-di-N-propylamine, N-	621-64-7	0.0014	0.0061						
Nitrosodiethanolamine, N-	1116-54-7	0.0035	0.015						
Nitrosodiethylamine, N-	55-18-5	0.000024	0.00029						
Nitrosodimethylamine, N-	62-75-9	0.000072	0.00088			0.0024		0.97	
Nitrosodiphenylamine, N-	86-30-6	1.1	4.7						
Nitrosomethylethylamine, N-	10595-95-6	0.00045	0.0019			0.015		7.6	
Nitrosomorpholine [N-]	59-89-2	0.0015	0.0065						
Nitrosopiperidine [N-]	100-75-4	0.001	0.0045						
Nitrosopyrrolidine, N-	930-55-2	0.0046	0.02						
Nonane, n-	111-84-2	21	88			700	2,900	0.34	1.4
Pentane, n-	109-66-0	1,000	4,400			35,000	150,000	30	130
Phenacetin	62-44-2	4.5	19						

Appendix A - § 35-APX-A2. Vapor Intrusion Values
(see notes at end of table)

Analyte	CAS Number	EPA Regional Air Screening Levels (TR=1E-06, HQ=1.0)		Vermont Air Screening Levels (TR=1E-06, HQ=1.0)		Vapor Intrusion Screening Values - Sub-slab Soil Gas		Vapor Intrusion Screening Values - Groundwater	
		Resident Air (µg/m3)	Industrial Air (µg/m3)	Resident Air (µg/m3)	Industrial Air (µg/m3)	Residential (µg/m3)	Industrial (µg/m3)	Residential (µg/L)	Industrial (µg/L)
Phosgene	75-44-5	0.31	1.3			10	44	0.70	2.9
Phosphine	7803-51-2	0.31	1.3			10	44	0.31	1.3
Phosphoric Acid	7664-38-2	10	44						
Phthalic Anhydride	85-44-9	21	88						
Polybrominated Biphenyls	59536-65-1	0.00033	0.0014						
Polychlorinated Biphenyls (PCBs)									
-Aroclor 1016	12674-11-2	0.14	0.61			4.7	20	17	75
-Aroclor 1221	11104-28-2	0.0049	0.022			0.16	0.72	0.53	2.3
-Aroclor 1232	11141-16-5	0.0049	0.022			0.16	0.72	0.16	0.72
-Aroclor 1242	53469-21-9	0.0049	0.022			0.16	0.72	0.35	1.5
-Aroclor 1248	12672-29-6	0.0049	0.022			0.16	0.72	0.27	1.2
-Aroclor 1254	11097-69-1	0.0049	0.022			0.16	0.72	0.43	1.9
-Aroclor 1260	11096-82-5	0.0049	0.022			0.16	0.72	0.36	1.6
-Heptachlorobiphenyl, 2,3',4,4',5,5'- (PCB 189)	39635-31-9	0.0025	0.011			0.085	0.37	NVT	NVT
-Hexachlorobiphenyl, 2,3',4,4',5,5'- (PCB 167)	52663-72-6	0.0025	0.011			0.085	0.37	0.91	NVT
-Hexachlorobiphenyl, 2,3',4,4',5'- (PCB 157)	69782-90-7	0.0025	0.011			0.085	0.37	0.39	NVT
-Hexachlorobiphenyl, 2,3',4,4',5'- (PCB 156)	38380-08-4	0.0025	0.011			0.085	0.37	0.44	1.9
-Hexachlorobiphenyl, 3,3',4,4',5,5'- (PCB 169)	32774-16-6	0.000025	0.000011			0.085	0.00037	0.00091	0.0040
-Pentachlorobiphenyl, 2',3,4,4',5'- (PCB 123)	65510-44-3	0.0025	0.011			0.085	0.37	0.33	1.4
-Pentachlorobiphenyl, 2,3',4,4',5'- (PCB 118)	31508-00-6	0.0025	0.011			0.085	0.37	0.22	0.95
-Pentachlorobiphenyl, 2,3',4,4',5'- (PCB 105)	32598-14-4	0.0025	0.011			0.085	0.37	0.22	0.96
-Pentachlorobiphenyl, 2,3,4,4',5'- (PCB 114)	74472-37-0	0.0025	0.011			0.085	0.37	0.68	3.0
-Pentachlorobiphenyl, 3,3',4,4',5'- (PCB 126)	57465-28-8	0.0000074	0.0000032			0.000025	0.00011	0.00010	0.00042
-Polychlorinated Biphenyls (high risk)	1336-36-3	0.0049	0.021						
-Polychlorinated Biphenyls (low risk)	1336-36-3	0.028	0.12						
-Polychlorinated Biphenyls (lowest risk)	1336-36-3	0.14	0.61						
-Tetrachlorobiphenyl, 3,3',4,4'- (PCB 77)	32598-13-3	0.0074	0.032						
-Tetrachlorobiphenyl, 3,4,4',5'- (PCB 81)	70362-50-4	0.0025	0.011			0.0085	0.037	0.028	0.12
Polymeric Methylene Diphenyl Diisocyanate (PMDI)	9016-87-9	0.63	2.6						
Polynuclear Aromatic Hydrocarbons (PAHs)									
-Benz[<i>a</i>]anthracene	56-55-3	0.0092	0.11			0.31	NVT	NVT	NVT
-Dimethylbenz[<i>a</i>]anthracene, 7,12-	57-97-6	0.00014	0.00017						
-Naphthalene*	91-20-3			0.03	0.24	1.0	8.0	3.5	28
Propionaldehyde	123-38-6	8.3	35			280	1,200	4,300	18,000
Propyl benzene	103-65-1	1,000	4,400			35,000	150,000	4,700	20,000
Propylene	115-07-1	3,100	13,000			100,000	440,000	480	2,000
Propylene Glycol Dinitrate	6423-43-4	0.28	1.2						
Propylene Glycol Monomethyl Ether	107-98-2	2,100	8,800			70,000	290,000	95,000,000	400,000,000
Propylene Oxide	75-56-9	0.76	3.3			25	110	400	1,700

Appendix A - § 35-APX-A2. Vapor Intrusion Values
(see notes at end of table)

Analyte	CAS Number	EPA Regional Air Screening Levels (TR=1E-06, HQ=1.0)		Vermont Air Screening Levels (TR=1E-06, HQ=1.0)		Vapor Intrusion Screening Values - Sub-slab Soil Gas		Vapor Intrusion Screening Values - Groundwater	
		Resident Air (µg/m3)	Industrial Air (µg/m3)	Resident Air (µg/m3)	Industrial Air (µg/m3)	Residential (µg/m3)	Industrial (µg/m3)	Residential (µg/L)	Industrial (µg/L)
Safrole	94-59-7	0.016	0.19						
Selenium Sulfide	7446-34-6	21	88						
Silica (crystalline, respirable)	7631-86-9	3.1	13						
Sodium Dichromate	10588-01-9	0.000068	0.000082						
Sodium Fluoride	7681-49-4	14	57						
Strontium Chromate	7789-06-2	0.000068	0.000082						
Styrene	100-42-5	1000	4400			35,000	150,000	17,000	72,000
Sulfolane	126-33-0	2.1	8.8						
Sulfur Trioxide	7446-11-9	1	4.4			35	150		
Sulfuric Acid	7664-93-9	1	4.4						
Sulfurous acid, 2-chloroethyl 2-[4-(1,1-dimethylethyl)phenoxy]-1-methylethyl ester	140-57-8	0.4	1.7						
Tetrachloroethane, 1,1,1,2-	630-20-6	0.38	1.7			13	55	7.2	32
Tetrachloroethane, 1,1,2,2-	79-34-5	0.048	0.21			1.6	7.0	6.0	26
Tetrachloroethylene*	127-18-4			0.63	5.11	21	170	1.5	12
Tetrafluoroethane, 1,1,1,2-	811-97-2	83,000	350,000			2,800,000	12,000,000	61,000	260,000
Titanium Tetrachloride	7550-45-0	0.1	0.44			3.5	15		
Tetrahydrofuran	109-99-9	2,100	8,800			70,000	290,000	1,100,000	4,800,000
Toluene	108-88-3	5,200	22,000			170,000	730,000	33,000	14,000
Toluene-2,4-diisocyanate	584-84-9	0.0083	0.035			0.28	1.2	18	77
Toluene-2,6-diisocyanate	91-08-7	0.0083	0.035			0.28	1.2	18	77
Toluidine, o- (Methylaniline, 2-)	95-53-4	0.055	0.24						
Toxaphene	8001-35-2	0.0088	0.038						
Trichloro-1,2,2-trifluoroethane, 1,1,2-	76-13-1	31000	130000			1,000,000	4,400,000	2,200	9,200
Trichlorobenzene, 1,2,4-	120-82-1	2.1	8.8			70	290	78	330
Trichloroethane, 1,1,1-	71-55-6	5,200	22,000			170,000	730,000	12,000	49,000
Trichloroethane, 1,1,2-	79-00-5	0.18	0.77			5.8	26	9.1	40
Trichloroethylene*	79-01-6			0.2	0.70	6.7	23	0.82	2.9
Trichlorophenol, 2,4,6-	88-06-2	0.91	4						
Trichloropropane, 1,2,3-	96-18-4	0.31	1.3			10	44	43	180
Trichloropropene, 1,2,3-	96-19-5	0.31	1.3			10	44	0.43	1.8
Triethylamine	121-44-8	7.3	31			240	1,000	2,100	8,700
Trifluoroethane, 1,1,1-	420-46-2	21,000	88,000			700,000	2,900,000	660	2,800
Trimethylbenzene, 1,2,3-	526-73-8	5.2	22			170	730	69	290
Trimethylbenzene, 1,2,4-	95-63-6	7.3	31			240	1,000	57	240
Tris(2,3-dibromopropyl)phosphate	126-72-7	0.0043	0.019			0.14	0.62	4.8	21
Urethane	51-79-6	0.0035	0.042						
Vanadium Pentoxide	1314-62-1	0.00034	0.0015						
Vinyl Acetate	108-05-4	210	880			7,000	29,000	17,000	70,000
Vinyl Bromide	593-60-2	0.088	0.38			2.9	13	0.24	1.0

Appendix A - § 35-APX-A2. Vapor Intrusion Values
(see notes at end of table)

Analyte	CAS Number	EPA Regional Air Screening Levels (TR=1E-06, HQ=1.0)		Vermont Air Screening Levels (TR=1E-06, HQ=1.0)		Vapor Intrusion Screening Values - Sub-slab Soil Gas		Vapor Intrusion Screening Values - Groundwater	
		Resident Air (µg/m3)	Industrial Air (µg/m3)	Resident Air (µg/m3)	Industrial Air (µg/m3)	Residential (µg/m3)	Industrial (µg/m3)	Residential (µg/L)	Industrial (µg/L)
Vinyl Chloride*	75-01-4	100	440	0.11	1.86	3.7	62	1.3	2.2
Xylenes	1330-20-7	100	440	0.11	1.86	3,500	15,000	700	2,900

Notes:

1. The USEPA values listed are reflective of the Regional Screening Levels (RSLs) Summary Table May 2016.
2. The Vermont Air Screening Levels were developed by the Vermont Department of Health (VDH). The VDH risk based worker indoor air concentrations were generated by combining current toxicity values (e.g. inhalation reference concentrations and inhalation unit risks) with a hypothetical worker exposure scenario using standard point estimate risk assessment procedures to derive an estimate of the concentration of each individual chemical in air that corresponds to a fixed level of risk i.e., a Hazard Quotient of 0.1 for noncarcinogenic (systemic) effects or an incremental lifetime carcinogenic risk of one in one million. Considering current local work practices, a hypothetical Worker was assumed to be on-site 10 hours each work day, 250 days per year for 30 years. A 70 year lifetime was assumed.
3. The VI Screening Values for soil gas and groundwater were calculated from USEPA RSL indoor air values using the USEPA Vapor Intrusion Screening Level Calculator. The shallow soil gas concentration is the target indoor air concentration divided by the generic attenuation factor for soil gas. Target groundwater concentrations were calculated based on an ambient groundwater temperature of 15° C.
4. For the five analytes denoted with an asterix (*), the vapor intrusion screening values for sub-slab soil gas and groundwater were calculated based on their respective VDH residential or worker target air screening levels.

Key:

- Blank cell - no screening level (EPA RSLs not shown when VDH values are present)
- NTV - not sufficiently volatile and/or toxic to pose inhalation risk in selected exposure scenario for the indicated medium
- NA = not applicable

Appendix A - § 35-APX-A3
Sediment Values

Recommended Sediment Quality Guidelines for the Protection of Aquatic Biota in Freshwater Ecosystems			
Analyte	TEC	PEC	Notes
Metals (in mg/kg - ppm DW)			
Arsenic	9.79	33	1,2
Cadmium	0.99	4.98	1,2
Chromium	43.4	111	1,2
Copper	31.6	149	1,2
Lead	35.8	128	1,2
Mercury	0.18	1.06	1,2,4
Nickel	22.7	48.6	1,2
Zinc	121	459	1,2
Polycyclic Aromatic Hydrocarbons (in µg/kg - ppb DW)			
Anthracene	57.2	845	1,3
Fluorene	77.4	536	1,3
Naphthalene	176	561	1,3
Phenanthrene	204	1,170	1,3
Benz(a)anthracene	108	1,050	1,3
Benzo(a)pyrene	150	1,450	1,3,4
Chrysene	166	1,290	1,3
Dibenz(a,h)anthracene	33	1,3	
Fluoranthene	423	2,230	1,3
Pyrene	195	1,520	1,3
Total PAHs	1,610	22,800	1,3
Polychlorinated Biphenyls (in µg/kg – ppb DW)			
Total PCBs	59.8	676	1,3,4
Organochlorine Pesticides (in µg/kg – ppb DW)			
Chlordane	3.24	17.6	1,3,4
Dieldrin	1.9	61.8	1,3,4
Sum DDD	4.88	28	1,3,4
Sum DDE	3.16	31.3	1,3,4
Sum DDT	4.16	62.9	1,3,4
Total DDTs	5.28	572	1,3,4
Endrin	2.22	207	1,3
Heptachlor Epoxide	2.47	16	1,3
Lindane (gamma-BHC)	2.37	4.99	1,3

Notes: **TEC** = Threshold Effect Concentration, **PEC** = Probable Effects Concentration, **DW** = dry weight

1. Consensus-Based Sediment Quality Guidelines (SQGs) from: MacDonald D.D., Ingersoll C.G. and Berger T.A. 2000. Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems. Archives of Environmental Contamination and Toxicology 39(1). 20-31.
2. SQGs for metals are based on bulk (unsorted) sediment concentrations. Concentrations of metals in sediments can be normalized on percent fines for the purpose of inter-site comparisons but not for comparisons to these SQGs.
3. The SQGs for organics are derived from samples normalized to 1 percent total organic carbon (TOC) in the sediment. The SQGs presented here are based on an assumed TOC of 1 percent. If site specific data show organic carbon content to be significantly different from 1 percent, concentrations should be normalized to 1 percent TOC (divide the site concentration by the percent TOC) prior to comparison with the SQGs in this table. If non site-specific TOC data are available, assume 1 percent TOC.
4. Included on USEPA's list of important persistent, bioaccumulative, toxic compounds (PBTs).

APPENDIX B. ESTABLISHMENT OF BACKGROUND CONCENTRATIONS

§ 35-APX-B1. ESTABLISHMENT OF SITE-SPECIFIC BACKGROUND LEVELS

- (a) Purpose. A PRP may conduct a site-specific background study when there is reason to believe that the contamination present is naturally occurring. An approved site-specific background concentration will take the place of an adopted environmental media standard.
- (b) Sampling plan. A sampling and monitoring plan shall be prepared by an environmental professional that will produce data representative of the site at and around the area of interest. The plan shall identify, at a minimum, the following:
 - (1) the number of monitoring points that will be sampled to establish a statistically defensible data set that will substantiate the validity of the background concentrations;
 - (2) the location and depth of monitoring points, which shall be selected so as to be geologically and geochemically similar to the area of interest and to be unaffected by current and historic activities at the site, including by being hydrogeologically up-gradient of such activities if possible;
 - (3) the number and frequency of the samples to be taken from the monitoring points and any existing sources of data for the media for which a background standard is proposed, including water for potable water supplies, public water sources, or non-potable wells or springs;
 - (4) the sampling methodology;
 - (5) the contaminants of concern to be analyzed in the samples that are collected;
 - (6) the analytical methods to be used in conducting the sample analysis;
 - (7) identification of whether samples obtained prior to the approval of the monitoring plan will be used as data points and, if so, the sampling date, location, method of analysis for each of the samples to be used; and
 - (8) a quality assurance/quality control plan for sample collection, testing, and analysis.
- (c) Review of sampling plan. The information required by subsection (b) of this section may be included in a site investigation work plan submitted under Subchapter 3. The Secretary may request additional information from an applicant when the Secretary determines that the sampling and monitoring plan may not provide data representative of the background conditions at and around the area of interest.
- (d) Report on background investigation. Following the Secretary's approval of the sampling and monitoring plan and the completion of sampling, the person seeking to establish a site-specific background standard shall report on the following as a part of their site investigation report required by § 35-305:

- (1) All sampling results and data collected pursuant to the approved monitoring and sampling plan.
 - (2) An analysis of all data collected pursuant to the approved monitoring and sampling plan.
 - (3) Any discrepancies between the approved sampling and monitoring plan and the sampling completed for the area of interest.
 - (4) A proposed background concentration of all substances for which the person seeks to establish background standard and a justification for each concentration. The justification may include statistical analysis.
 - (5) Additional information the Secretary determines is necessary to approve or deny the proposed background groundwater concentrations.
- (e) Site-specific standard. Following submission of the proposed background concentrations to the Secretary, the Secretary shall approve or deny the request.

APPENDIX C. SITE MANAGEMENT WAIVERS

§ 35-APX-C1. TECHNICAL IMPRACTICALITY.

- (a) Purpose. A technical impracticality (TI) waiver is a mechanism to manage risks to human health and the environment in situations where there is no readily available technology to complete remediation and achieve compliance with the applicable environmental media standards within a reasonable timeframe. A TI waiver does not waive the requirements to delineate the nature and extent of the release of pollutants, to remediate continuing sources of pollution, or to address potential risks to receptors.
- (b) Applicability. A TI waiver may be considered as a part of § 35-503. TI waivers may be considered for any of the following:
 - (1) The Secretary determines that there are non-aqueous phase liquids that cannot be contained or removed;
 - (2) The Secretary determines that there is only one response action for the activity and it cannot obtain other necessary permits;
 - (3) The Secretary determines that remediation has taken place to reduce in concentration hazardous materials in environmental media and the plume has been controlled to the extent practical based on an evaluation of reliable and innovative technologies; or
 - (4) The Secretary determines that achieving compliance with the applicable criteria is technically impracticable as determined using Directive No. 9234.2-25 issued September 1993 by the U.S. Environmental Protection Agency's Office of Solid Waste and Emergency Response.
- (c) Prohibition. A TI waiver is prohibited in the following circumstances:
 - (1) situations where the Secretary determines that active remediation is necessary to control the migration of a plume or materially reduce the concentration of a hazardous material; or
 - (2) after approval of a TI waiver there would continue to be unmanaged exposure to human health receptors.
- (d) Technical impracticality waiver documentation. For any PRP proposing a TI waiver, the site investigation report prepared under § 35-305 shall, in addition to all other requirements, contain the following materials:
 - (1) A proposal for the environmental standard or standards that the PRP is seeking a TI waiver for;
 - (2) A proposed TI zone for purposes of implementing the waiver that documents the following:
 - (A) The plume is not increasing in size or concentration in a manner which would alter the risk assumptions associated with the TI waiver request or the extent of the TI Zone;
 - (B) The plume is not increasing at compliance points at the TI Zone boundary.

- (3) Documentation that all necessary permits have been applied for, made best efforts to obtain, and were denied;
- (4) Documentation that the site has been adequately characterized including the nature and three-dimensional extent of the contamination;
- (5) Any potential changes in contaminant concentrations will not pose a risk to human health or the environment;
- (6) Documentation that potential exposure pathways threatening human health and the environment from contaminated environmental media have been identified and appropriately managed;
- (7) Documentation that all data gaps have been identified and evaluated for significance (a significant data gap would be one that limits the ability to formulate a single scientifically defensible interpretation of environmental conditions or potential risks, or that may affect the choice of remedial approach);
- (8) An evaluation showing the remedial restoration times using active remedial treatments. All assumptions and the degree of uncertainty associated with any model shall be thoroughly discussed;
- (9) An evaluation showing natural attenuation, based on monitoring subsequent to source remediation, has shown that contaminated environmental media will not achieve remedial criteria within a reasonable timeframe. All assumptions and the degree of uncertainty associated with any model shall be thoroughly discussed;
- (10) An estimate the cost of remedial alternatives. Cost estimates shall include the present worth of construction, operation, and maintenance costs; and
- (11) An evaluation of implementing remediation alternatives for plume containment or for reduction of the concentration of hazardous materials in the plume.

Note: When conducting a TI waiver analysis as a part of an evaluation of cleanup options, the Agency recommends review of the following guidance documents in preparing a request for a TI waiver:

Technical Impracticability: Guidance for Evaluating Technical Impracticability of Ground-Water Restoration, September 1993. USEPA OSWER Directive 9234.2-25

[Technical Impracticability Guidance for Groundwater](#), December 2013. New Jersey Department of Environmental Protection.

[Draft Guidance for Applying Technical Impracticability of Groundwater](#), February 2014. Connecticut Department of Energy and Environmental Protection.

Chapter 12 Vermont Groundwater Protection Rule and Strategy

APPENDIX D. HAZARDOUS MATERIAL LISTING

§ 35-APX-D1. HAZARDOUS MATERIAL LISTING

Pursuant to 10 V.S.A. § 6602(16)(A)(iv) any chemical or substance listed in the following table is a hazardous material.

CAS Number	Chemical Name
335-67-1	perfluorooctanoic acid (PFOA)
1763-23-1	perfluoro-octane sulfonic acid (PFOS);
355-46-4	perfluorohexane sulfonic acid (PFHxS);
375-85-9	perfluoroheptanoic acid (PFHpA)
375-95-1	perfluorononanoic acid (PFNA)

INVESTIGATION AND REMEDIATION OF CONTAMINATED PROPERTIES RULE

STATE OF VERMONT AGENCY OF NATURAL RESOURCES DEPARTMENT OF ENVIRONMENTAL CONSERVATION WASTE MANAGEMENT AND PREVENTION DIVISION

~~Final Adopted Rule~~ Emergency Rule

Effective Date: ~~July 27, 2017~~ January 8, 2019

Contents

SUBCHAPTER 1. GENERAL PROVISIONS	4
§ 35-101. AUTHORITY AND PURPOSE	4
§ 35-102. RELEASE PROHIBITION; REPORTING; EMERGENCY RESPONSE	4
§ 35-103. SEVERABILITY	5
§ 35-104. SIGNATORIES	5
§35-105. DELIVERABLES	5
§35-106. HAZARDOUS MATERIAL LISTING	5
SUBCHAPTER 2. DEFINITIONS	6
§ 35-201. DEFINITIONS	6
SUBCHAPTER 3. SITE INVESTIGATION	12
§ 35-301. REQUIREMENT TO PERFORM SITE INVESTIGATION	12
§ 35-302. CONCEPTUAL SITE MODEL	12
§ 35-303. SITE INVESTIGATION WORK PLAN	13
§ 35-304. SITE INVESTIGATION WORK PLAN; SECRETARY REVIEW AND DETERMINATION	14
§ 35-305. SITE INVESTIGATION REPORT	14
§ 35-306. REVIEW OF SITE INVESTIGATION REPORT	19
SUBCHAPTER 4. RESPONSE ACTIONS; RELEASES OF HEATING FUELS	20
§ 35-401. APPLICABILITY	20
§ 35-402. INVESTIGATION; SOIL REMOVAL AND DRINKING WATER	20
§ 35-403. INVESTIGATION AND SOIL REMOVAL REPORT	20
§ 35-404. RESPONSE TO REPORT	21
§ 35-405. ADDITIONAL SITE INVESTIGATION	21
§ 35-406. ADDITIONAL SITE INVESTIGATION WORK PLAN; APPROVAL AND IMPLEMENTATION	22
§ 35-407. ADDITIONAL SITE INVESTIGATION REPORT SUBMISSION AND REVIEW	22
SUBCHAPTER 5 CORRECTIVE ACTION	23
§ 35-501. EXEMPTIONS FROM CORRECTIVE ACTION	23
§ 35-502. OBJECTIVES OF CORRECTIVE ACTION	23
§ 35-503. EVALUATION OF CORRECTIVE ACTION ALTERNATIVES	24
§ 35-504. SECRETARY EVALUATION OF CORRECTIVE ACTION ALTERNATIVES	26
§ 35-505. CORRECTIVE ACTION PLAN	27
§ 35-506. CORRECTIVE ACTION PLAN REVIEW; PUBLIC NOTICE; FINAL DECISION	29

§ 35-507.	CORRECTIVE ACTION CONSTRUCTION COMPLETION REPORT	31
§ 35-508.	REVIEW AND FINAL DECISION OF CORRECTIVE ACTION CONSTRUCTION COMPLETION REPORT.....	31
§ 35-509.	LONG TERM MONITORING.....	32
§ 35-510.	NON-HAZARDOUS WASTE CONTAMINATED SOIL.....	33
§ 35-511.	SITE GENERATED HAZARDOUS WASTES	36
§ 35-512.	DEVELOPMENT SOILS.....	37
SUBCHAPTER 6. INSTITUTIONAL CONTROLS.....		39
§ 35-601.	INSTITUTIONAL CONTROL PLAN.....	39
§ 35-602.	NOTICE TO THE LAND RECORDS.	40
§ 35-603.	DEED RESTRICTION/ENVIRONMENTAL EASEMENT.	40
SUBCHAPTER 7. SITE CLOSURE		43
§ 35-701.	SITE MANAGEMENT ACTIVITIES COMPLETE	43
§ 35-702.	CERTIFICATE OF COMPLETION	45
SUBCHAPTER 8. REQUESTS FOR REIMBURSEMENT FOR MUNICIPAL WATER LINE EXTENSIONS FROM THE PETROLEUM CLEANUP OR ENVIRONMENTAL CONTINGENCY FUNDS.....		46
§ 35-801.	REIMBURSEMENT OF MUNICIPALITIES TO PROVIDE ALTERNATE WATER SUPPLIES 46	
APPENDIX A.	ENVIRONMENTAL MEDIA STANDARDS.....	49
§ 35-APX-A1.	SOIL SCREENING VALUES.....	49
§ 35-APX-A2.	VAPOR INTRUSION VALUES.....	49
§ 35-APX-A3.	SEDIMENT VALUES.....	49
APPENDIX B.	ESTABLISHMENT OF BACKGROUND CONCENTRATIONS.....	50
§ 35-APX-B1.	ESTABLISHMENT OF SITE-SPECIFIC BACKGROUND LEVELS	50
APPENDIX C.	SITE MANAGEMENT WAIVERS.....	52
§ 35-APX-C1.	TECHNICAL IMPRACTICALITY.....	52
<u>APPENDIX D.</u>	<u>HAZARDOUS MATERIAL LISTING</u>	<u>54</u>
§ 35-APX-D1.	<u>HAZARDOUS MATERIAL LISTING</u>	<u>54</u>

SUBCHAPTER 1. GENERAL PROVISIONS

§ 35-101. AUTHORITY AND PURPOSE

- (a) Authority. This rule is adopted by the Secretary of the Agency of Natural Resources pursuant to the authority granted by 10 V.S.A. § 6603(1) and 6604d.
- (b) Purpose. This rule is intended to protect public health and the environment by establishing procedures and requirements for conducting investigations and corrective actions at properties where a release of hazardous materials has occurred. This includes procedures for identifying hazardous material contamination to environmental media including soil, groundwater, surface water, and air, as well as requirements for source treatment, removal, or containment, long term monitoring and institutional controls.

§ 35-102. RELEASE PROHIBITION; REPORTING; EMERGENCY RESPONSE

- (a) Release prohibition. The release of hazardous materials into the surface or groundwater, or onto the land of the state is prohibited.
- (b) Releases and suspected releases. Any person required by 10 V.S.A. § 6617 shall immediately report a release or suspected release as indicated by the following:
 - (1) A release of hazardous material, excluding petroleum;
 - (2) A release of any petroleum product that exceeds 2 gallons;
 - (3) A release of any petroleum product that is less than or equal to 2 gallons and poses a potential or actual threat to human health or the environment; or
 - (4) The detection of non-aqueous phase petroleum liquid (NAPL) at a thickness greater than 0.01'.

Note: Reporting under subsection (b) of this section must be directed to:
Monday through Friday, 7:45 AM to 4:30 PM; Waste Management & Prevention
Division at (802) 828-1138.

At all other times including State holidays: Department of Public Safety Division of
Emergency Management and Homeland Security at (800) 641-5005.

- (c) Emergency response.
 - (1) Notwithstanding the site investigation and corrective action requirements of this rule, the Secretary may require an emergency response pursuant to 10 V.S.A. § 1283 when the Secretary determines that a release may cause an immediate and serious threat of harm to human health or the environment.
 - (2) When undertaking emergency responses pursuant to this subsection, notification to the potentially responsible party (PRP) pursuant to 10 V.S.A. § 1283 in advance of undertaking emergency response is not required, unless:

- (A) The Secretary determines that there is need for additional investigation of the release to determine the impact to sensitive receptors and to human health and that it is appropriate for the PRP to conduct the investigation; or
 - (B) The Secretary determines that an additional response is necessary to address short-term impacts to sensitive receptors, impact to human health, and that it is appropriate for the PRP to conduct the additional response.
- (3) The Secretary shall conduct or direct the PRP to conduct a limited site investigation to determine if the release requires further site investigation or corrective action. As used in this subsection, “limited site investigation” means the steps the Secretary deems necessary to determine whether additional site investigation or corrective action is necessary to respond to the release of hazardous materials.

§ 35-103. SEVERABILITY

The provisions of any section of this rule are severable. If any provision of this rule is invalid or if any application of this rule to any person or circumstance is invalid, the invalidity shall not affect other provisions or applications that can be given effect without the invalid provision or application.

§ 35-104. SIGNATORIES

All deliverables required by § 35-102(c)(3) (emergency response; limited site investigation); § 35-303 (site investigation work plan), § 35-305 (site investigation report); § 35-403(response actions; releases of heating fuels; investigation and soil removal report); §35-405 (additional site investigation); § 35-407(a) (response actions; releases of heating fuels; additional site characterization report); § 35-503 (evaluation of corrective action alternatives); § 35-505 (corrective action plan); § 35-507 (corrective action construction completion report); and § 35-509(b) (long term monitoring report) shall be prepared, signed, and certified by an environmental professional. Reports shall be signed with the following certification:

“I certify under penalty of perjury that I am an environmental professional and that all content contained within this deliverable is to the best of my knowledge true and correct.”

§35-105. DELIVERABLES

All deliverables shall be submitted electronically via text searchable PDF. Paper copies are to be submitted only upon request of the Secretary. Raw data and any other supporting documentation shall be made available upon request by the Secretary.

§35-106. HAZARDOUS MATERIAL LISTING

Pursuant to 10 V.S.A. § 6602(16)(A)(iv) any chemical or substance listed in Appendix D is a hazardous material.

SUBCHAPTER 2. DEFINITIONS

§ 35-201. DEFINITIONS

As used in this rule,

- (1) “Aboveground storage tank” or “AST” means any tank, other than an underground storage tank, used to store any of the following petroleum products: gasoline, diesel, kerosene, used oil, or heating oil.
- (2) “Agency” means the Vermont Agency of Natural Resources.
- (3) “Analytical detection limit” means the minimum concentration of a hazardous material that can be quantified consistently and reliably using methods approved by EPA or another method approved by the Secretary.
- (4) “Analysis” or “analyze” means to test for the presence of hazardous materials using a standard US EPA method or an alternative approved by the Secretary.
- (5) “Area of contamination” means a defined area on the site where hazardous waste is present and environmental media standards are exceeded due to the release.
- (6) “Background” means naturally occurring constituents where the concentration detected in the environmental medium sampled is attributable to natural occurrence and not influenced by site related or other anthropogenic activities.
- (7) “Brownfield” means real property, the expansion, redevelopment, or reuse of which may be complicated by the presence, or perceived presence of, a hazardous material. “Brownfield” does not include any of the following:
 - (A) A facility that is the subject of a planned or ongoing removal action under CERCLA.
 - (B) A facility that is listed as a CERCLA site or is proposed for listing.
 - (C) A facility that is the subject of any State or federal administrative or court order under any of the following authorities:
 - (i) 33 U.S.C. § 1251 et seq. (federal Water Pollution Control Act) or 10 V.S.A. chapter 47 (water pollution control);
 - (ii) 15 U.S.C. § 2601 et seq. (Toxic Substances Control Act);
 - (iii) 42 U.S.C. § 300f et seq. (Safe Drinking Water Act) or 10 V.S.A. chapter 56 (public water supply).
 - (D) A facility that is subject to either of the following:
 - (i) corrective action under 42 U.S.C. § 6924(u) or 6928(h);
 - (ii) corrective action permit or order issued or modified to require the implementation of corrective measures.
 - (E) A land disposal unit in regard to which both of the following apply:
 - (i) a closure notification under subtitle C of 42 U.S.C. § 6921 et seq. has been submitted;
 - (ii) closure requirements have been specified in a closure plan or permit.
 - (F) A facility that is subject to the jurisdiction, custody, or control of any instrumentality of the United States, except for land held in trust by the United States for an Indian tribe.

- (G) A portion of a facility to which both the following apply:
 - (i) a release of polychlorinated biphenyls has occurred;
 - (ii) is subject to remediation under 15 U.S.C. § 2601 et seq. (Toxic Substances Control Act).
- (H) A portion of a facility for which assistance for response activity has been obtained under subtitle I of 42 U.S.C. § 6991 et seq. (Solid Waste Disposal Act) from the Leaking Underground Storage Tank Trust Fund established under 26 U.S.C. § 9508.
- (8) “BRELLA” means Brownfields Reuse and Environmental Liability Limitation Act.
- (9) “Category four underground storage tank” means any underground storage tank with equal to or less than 1100 gallons that is either a farm or residential motor fuel tank or a fuel oil storage tank used for on-premises heating.
- (10) “Compliance point” means
 - (A) any point of present use of groundwater, including use as a public water supply or potable water supply;
 - (B) the boundary of a Class I, Class II, or Class IV groundwater area;
 - (C) zone two of a public water source protection area;
 - (D) any point at the boundary of the property where the activity is located; and
 - (E) any point established in an approved corrective action plan established to evaluate a release’s impact on a sensitive receptor.
- (11) “Conceptual Site Model” or “CSM” is a written and illustrative representation of the physical, chemical, and biological processes that control the transport, migration, and actual and potential impacts of contamination (in soil, air, groundwater, surface water or sediments) to sensitive receptors.
- (12) “Contaminated” means the presence of any hazardous material in soil, groundwater, soil gas, air, sediment, surface water, construction or excavation debris, or any other material at a concentration that has the potential to adversely affect human health or the environment. “Contaminated” does not include naturally occurring substances at background levels.
- (13) “Deed restriction” or “environmental easement” means a legal restriction on a property that grants a real property interest to the state to enforce maintenance requirements, monitoring requirements, or land use restrictions.
- (14) “Development soil” means unconsolidated mineral and organic matter overlying bedrock that contains PAHs, arsenic, or lead in concentrations that:
 - (A) exceed the relevant soil screening level for residential soil;
 - (B) when managed in accordance with § 35-512 or the Vermont Solid Waste Management Rule:
 - (i) pose no greater risk than the Agency-established soil screening value for the intended reuse of the property; and
 - (ii) pose no unreasonable risk to human health through a dermal, inhalation, or ingestion exposure pathway;
 - (C) do not leach compounds at concentrations that exceed groundwater enforcement standards; and

- (D) do not result in an exceedance of Vermont groundwater enforcement standards.
- (15) “Direct contact” means the ability of a human to have direct contact with contaminants or naturally occurring compounds in environmental media including soils, groundwater, surface water, sediment and air via incidental ingestion, dermal contact, inhalation of vapors, or fugitive dust.
- (16) “Engineered control” means any physical barrier, system, technology, or method that removes or reduces exposure to a hazardous material in environmentally isolated or inaccessible to sensitive receptors.
- (17) “Environmental media” means components of the natural environment including air, water, soil, and bedrock.
- (18) “Environmental media standards” means numeric or narrative criteria adopted by the Secretary to protect human health and the environment.
- (19) “Environmental professional” means a person who possesses the following education, training, and experience:
- (A) A current professional engineer’s or professional geologist’s license or registration from a state, tribe, or U.S. territory (or the Commonwealth of Puerto Rico) and the equivalent of three years of relevant fulltime experience;
- (B) A license or certification by the federal government, a state, tribe, or U.S. territory (or the Commonwealth of Puerto Rico) to perform environmental site work equivalent to that required by this rule and have the equivalent of three years of relevant fulltime experience;
- (C) A baccalaureate or higher degree from an accredited institution of higher education in a discipline of engineering, geology, hydrogeology, or an applicable science and the equivalent of five years of relevant fulltime experience; or
- (D) The equivalent of ten years of relevant fulltime experience.
- (20) “Emergency response” means a response action to a situation that may cause immediate and serious threat of harm to human health or the environment.
- (21) “Groundwater” means water below the land surface in a zone of saturation.
- (22) “Hazardous material”
- (A) means all petroleum and toxic, corrosive, or other chemicals and related sludge included in any of the following:
- (i) any substance defined in section 101(14) of the federal Comprehensive Environmental Response, Compensation and Liability (CERCLA) Act of 1980;
- (ii) petroleum, including crude oil or any fraction thereof;
- (iii) hazardous wastes as defined by the Vermont Hazardous Waste Management Regulations; or
- (iv) a chemical or substance that, when released, poses a risk to human health or other living organisms and that is listed by this rule.
- (B) Does not include herbicides and pesticides when applied consistent with good practice conducted in conformity with federal, state, and

- local laws and regulations and according to manufacturer's instructions.
- (23) "Hazardous waste" means any waste subject to regulation as hazardous waste under the Vermont Hazardous Waste Management Regulations.
- (24) "Heating fuel" means heating oil, kerosene, or other dyed diesel fuel that is not used to propel a motor vehicle and which is typically used to heat a structure. Includes any blend of petroleum and biodiesel used to heat a structure.
- (25) "Impervious surface" means those manmade surfaces, including paved and unpaved roads, parking areas, roofs, driveways, and walkways, from which precipitation runs off rather than infiltrates
- (26) "Institutional controls" means non-engineered instruments, such as administrative and legal controls, that help minimize the potential for exposure to a hazardous material or protect the integrity of a remedy.
- (27) "Land record notice" means a notice on a property land record that informs individuals of the presence of residual subsurface contamination at a site.
- (28) "Non-aqueous phase liquid" or "NAPL" means a liquid solution contaminant that does not dissolve in or easily mix with water, such as oil, gasoline, coal tar, or chlorinated solvents. A NAPL may be denser than water, sinking below the water table, or lighter than water, floating on the water table.
- (29) "Non-hazardous waste contaminated soil" means soils that are contaminated with hazardous materials at concentrations above the Soil Screening Values but that are not themselves hazardous wastes under the Vermont Hazardous Waste Management Rule.
- (30) "Polyencapsulation" means the treatment of petroleum contaminated soil by stockpiling on plastic sheeting and covering the stockpile with plastic sheeting.
- (31) "Potable water supply" means the source, treatment, and conveyance equipment used to provide water used or intended to be used for human consumption, including drinking, washing, bathing, the preparation of food, or laundering. This definition does not include any internal piping or plumbing, except for mechanical systems, such as pump stations and storage tanks or lavatories, that are located inside a building or structure and that are integral to the operation of a potable water system. This definition also does not include a potable water supply that is subject to regulation as a public water supply.
- (32) "Potentially Responsible Party" or "PRP" means any individual or organization, potentially liable under 10 V.S.A. §6615.
- (33) "Public water source protection area" means a surface and subsurface area from or through which contaminants are reasonably likely to reach a public water system source.
- (34) "Public water system" means:
- (A) any system, or combination of systems owned or controlled by a person, which provides drinking water through pipes or other constructed conveyances to the public and which:
- (i) has at least 15 service connections; or
- (ii) serves an average of at least 25 individuals for at least 60 days a year.
- (B) any part of a piped system which does not provide drinking water, if

- use of such a part could affect the quality or quantity of the drinking water supplied by the system. Public water system shall also mean a system which bottles drinking water for public distribution and sale.
- (35) “Receiving site” means a location approved by the Secretary where excavated development soils are disposed in accordance with this rule.
- (36) “Recognized environmental condition” means the presence or likely presence of a hazardous material at a property:
- (A) due to a release;
 - (B) under conditions indicative of a release to the environment; or
 - (C) under conditions that pose a material threat of a future release to the environment.
- (37) “Release” means any intentional or unintentional action or omission resulting in the spilling, leaking, pumping, pouring, emitting, emptying, dumping, or disposing of hazardous materials into the surface or groundwaters, or onto the lands in the State, or into waters outside the jurisdiction of the State when damage may result to the public health, lands, waters, or natural resources within the jurisdiction of the State.
- (38) “Residual contamination” means hazardous material that remains in environmental media after a release has occurred and corrective action has been completed.
- (39) “Secretary” means the Secretary of the Vermont Agency of Natural Resources or the Secretary’s duly authorized representative.
- (40) “Sensitive receptor” means any natural or human-constructed feature that may be adversely affected by a hazardous material and includes public health, public water sources, sources of water for potable water supplies, groundwater, surface waters, wetlands, soils, sensitive ecological areas, outdoor and indoor air, and enclosed spaces such as basements, sewers, and subsurface utilities.
- (41) “Site” means the area where a release is known or suspected to have occurred, including the extent of contamination resulting from the release. A site may not be limited by legal property boundaries.
- (42) “Spill” means a release which can be investigated and remediated within a short time frame and where long term management is not expected or required.
- (43) “Substantial completion” means:
- (A) the site is enrolled in the BRELLA program; and
 - (B) the property has a remediation system constructed in accordance with an approved corrective action plan; and
 - (i) the remediation system is operating as designed following implementation of corrective action;
 - (ii) the institutional controls for the property have not been finalized; or
 - (iii) long term monitoring is necessary to determine whether remedial objectives are being achieved.
- (44) “Surface water” includes all rivers, streams, creeks, brooks, reservoirs, ponds, lakes, springs and all bodies of surface waters, artificial or natural, which are

- contained within, flow through or border upon the State or any portion of it.
- (45) “Surface soil” means soil present at 0-6 inches below ground surface.
- (46) “Survey benchmark” means a feature on a site to which the surveyed elevation of all monitoring wells and site features are referenced.
- (47) “Suspected release” means when there is knowledge, information, or evidence that a release has likely occurred. In addition, an exceedance of an environmental media standard shall be presumed to be a suspected release and shall be reported pursuant to § 35-102(b).
- (48) “Underground Storage Tank” or “UST” means any one or combination of tanks, including underground pipes connected to it or them, which is or has been used to contain an accumulation of regulated substances, and the volume of which, including the volume of the underground pipes connected to it or them, is 10 percent or more beneath the surface of the ground. Provided, however, that the following are excluded from the definition of "underground storage tanks" established under this section:
- (A) septic tanks and manure storage tanks;
 - (B) flow through process tanks permitted under chapter 47 of this title and tanks regulated by chapter 159 of this title;
 - (C) stormwater or wastewater collection systems;
 - (D) storage tanks situated in an underground area if the tank is upon or above the area floor;
 - (E) pipeline facilities regulated by the federal Natural Gas Pipeline Safety Act (49 U.S.C. App. 1671 et seq.), the Hazardous Liquid Pipeline Safety Act (49 U.S.C. App. 2001 et seq.) or an intrastate pipeline regulated under State laws similar to the foregoing; and
 - (F) liquid petroleum gas storage tanks, used predominantly for the storage of propane, propylene, butane, and butylenes, regulated by the Vermont Fire Prevention and Building Code.
- (49) “US EPA” means United States Environmental Protection Agency.
- (50) “Vapor intrusion” means the migration of volatile chemicals from contaminated environmental media into a building, subsurface conduit or structure.
- (51) “Volatile Organic Compound (VOC) field screening instrument” means a photoionization detector, flame ionization detector, field portable gas chromatograph/mass spectrometer or another portable instrument approved by the Secretary as a part of a work plan.
- (52) “Water table” means the top of the saturated zone where the fluid pressure equals the atmospheric pressure.

SUBCHAPTER 3. SITE INVESTIGATION

§ 35-301. REQUIREMENT TO PERFORM SITE INVESTIGATION.

- (a) Unless an action is taken as an emergency response pursuant to § 35-102(c) or has been investigated as a heating oil fuel release and has satisfied the Secretary's requirements under Subchapter 4, a person who may be liable for the release or suspected release of a hazardous material as established in 10 V.S.A. § 6615 shall conduct a site investigation in accordance with the requirements of this chapter.
- (b) A PRP shall provide the Secretary with a site investigation work plan within 30 days of the release or discovery of the release. The Secretary may establish, in writing, an alternative timeframe for providing a work plan.

§ 35-302. CONCEPTUAL SITE MODEL

- (a) The CSM shall be developed during the preparation of the investigation workplan required by § 35-303.
- (b) The CSM shall identify the following or identify how the information will be obtained in the context of the site investigation:
 - (1) Source of the release;
 - (2) The characteristics of engineered structures, subsurface infrastructure, tanks and containers present or known or suspected to have been present at the site, from which or through which the suspected contaminants may have been released, transported, or may impact a sensitive receptor;
 - (3) Historical land uses;
 - (4) Sources and contaminants;
 - (A) Identify all potential hazardous materials and all potential and actual sources of a release;
 - (B) Identify all hazardous material phases (e.g. NAPL, sorbed to matrix, dissolved in groundwater or soil moisture, and in vapors in the vadose zone);
 - (C) Identify all hazardous material physical properties; and
 - (D) If known, an estimate of the amount of hazardous material mass on the site.
 - (5) Geology. A brief description of regional and site-specific soils and bedrock. Boring logs, well logs and groundwater confining layers shall be included, if available and have not been previously submitted to the Secretary. If applicable, values for soil bulk density, porosity, fraction organic content, pH and reduction-oxidation potential, shall be included. If available include geologic maps, fracture trace maps, geophysical data, and cross sections;
 - (6) Hydrogeology. Describe regional and site-specific hydrogeology, horizontal and vertical groundwater flow gradients and direction, and an assessment of the potential for preferential pathways and multiple aquifers. If available, hydraulic conductivity, transmissivity, and other parameters shall be included;

- (7) Contaminant fate and transport. Describe the hazardous material distribution, migration pathways, the amount of migration occurring, the predicted migration of the contamination over time, and if available, the adsorption, desorption, absorption, and retardation of the hazardous material, and naturally occurring degradation processes. If historic groundwater quality data have been collected, estimate the duration of groundwater contamination to determine if groundwater reclassification is warranted according to the Groundwater Protection Rule and Strategy;
- (8) Receptor Study and Evaluation. Identify all potentially threatened sensitive receptors and complete exposure pathways. A list of the names and addresses of impacted or threatened third parties shall be included, if applicable. Compare all measured concentrations of hazardous materials with applicable environmental media standards; and
- (9) Potential exposure pathways from all potentially impacted media.

§ 35-303. SITE INVESTIGATION WORK PLAN

- (a) Applicability. This section applies to any release that is not fully investigated pursuant to:
 - (1) § 35-102(c) (emergency response); or
 - (2) Subchapter 4 (response action; heating fuel).
- (b) Purpose and objectives of a site investigation work plan are to:
 - (1) Identify the source, degree, and spatial extent of contamination in all impacted or potentially impacted environmental media;
 - (2) Identify pathways that are conveying or could convey hazardous materials to different sensitive receptors;
 - (3) Identify sensitive receptors that have been or may be impacted by the release based upon an evaluation of pathways;
 - (4) Identify the need to conduct further investigation or corrective action based on results of site characterization data gathered to date;
 - (5) Develop the Conceptual Site Model in accordance with §35-302; and
 - (6) Identify data gaps that must be addressed to confirm the site conceptual model or evaluate corrective actions.
- (c) General requirements.
 - (1) A site investigation work plan shall be submitted to the Secretary no later than 30 days of the date the Secretary was notified of a release, unless the Secretary agrees to an alternate schedule.
 - (2) A site investigation work plan shall be approved by the Secretary prior to the initiation of on-site work.
- (d) Minimum content. A site investigation shall, at a minimum, include:

- (1) Site information. Table of names, addresses, email addresses and phone numbers of the following:
 - (A) Property owner and operator; and
 - (B) Any person or entity who released a hazardous material at the site.
- (2) Current use or uses of the property;
- (3) Uses of properties adjacent to the site;
- (4) Site description. A physical and environmental description of the site;
- (5) Site characterization strategy. This strategy shall address known data gaps and include contaminant characterization methods, sampling locations and methods, and the rationale for that strategy;
- (6) Identification of analytical methods;
- (7) A list of consultant standard operating procedures to be used during the site investigation, which shall be submitted to the Secretary upon request;
- (8) A CSM and a description on how the site investigation will gather information to further develop and refine the CSM;
- (9) A discussion of how investigation-derived waste will be managed, which shall be in accordance with §35-505(5)(C);
- (10) A quality assurance and quality control (QA/QC) plan;
- (11) Maps. At a minimum, a vicinity map in accordance with §35-305(b)(13)(A) and a site map in accordance with §35-305(b)(13)(B) showing proposed environmental media sampling locations shall be included;
- (12) Latitude/longitude of the site, as close as possible to the known or suspected release location or locations, referenced to the WGS1984 coordinate system (Mercator), in decimal degrees. Minimum acceptable accuracy is plus-or-minus 15 feet;
- (13) Estimated costs, if requested by the Secretary;
- (14) A site investigation work plan implementation schedule; and
- (15) Signature. A site investigation work plan shall be signed by the environmental professional in accordance with § 35-104.

§ 35-304. SITE INVESTIGATION WORK PLAN; SECRETARY REVIEW AND DETERMINATION

- (a) The Secretary shall only approve, in writing, a site investigation work plan upon finding the investigation will:
 - (1) Aid in determining the degree and extent, and fate and transport of contamination at the Site; and
 - (2) Characterize any threat that may exist to a sensitive receptor.
- (b) A PRP shall implement an approved site investigation work plan no later than 60 days from the date of the Secretary's approval, unless an alternate implementation timeline is approved by the Secretary.

§ 35-305. SITE INVESTIGATION REPORT

- (a) The site investigation report shall be submitted to the Secretary within 90 days of receipt of final laboratory data, or within an alternate schedule approved by the Secretary.

- (b) A site investigation report shall include the following:
- (1) Executive summary. A site investigation report shall include an executive summary of the site investigation, consisting of a summary of findings, conclusions, and recommendations based upon the data collected during the site investigation.
 - (2) Site information. Table of names, addresses, email addresses and phone numbers of the following:
 - (A) Property owner and operator; and
 - (B) Any person who released a hazardous material at the site.
 - (3) Current use or uses of the property.
 - (4) Uses of properties adjacent to the site.
 - (5) Site description. A physical and environmental description of the site.
 - (6) Latitude/longitude of the site, as close as possible to the known or suspected release location or locations, referenced to the WGS1984 coordinate system (Mercator), in decimal degrees. Minimum acceptable accuracy is plus-or-minus 15 feet.
 - (7) Property history. Past and present land use, waste storage or disposal areas, potential sources of contamination, and hazardous waste and hazardous materials disposal practices, including any associated EPA ID numbers. The property history section shall include a description of current and historic property uses in the surrounding area. A list of all recognized environmental conditions should be provided if an ASTM Phase I or Phase II Environmental Site Assessment has been completed. Presentation may include copies of historic maps (including Sanborn Fire Insurance Maps, town maps) and copies of town directories.
 - (8) Site contaminant background. A description of all known releases of hazardous materials, including the following information:
 - (A) The date and a description of each release, if known, the discovery date of each release, the location of each release, and the PRP for each release;
 - (B) The date each release was reported to the Secretary;
 - (C) A description of response actions taken for each release;
 - (D) A list of any previous environmental investigations and reports (including Phase I Environmental Site Assessments) pertinent to the site relating to a release of hazardous materials, including a summary of findings;
 - (E) A copy of any previous investigation or report relating to a release of hazardous materials, if not already on file with the Secretary; and
 - (F) A list of governmental records reviewed relating to the site.
 - (9) Work plan protocol deviations. Any deviations from the approved work plan shall be identified and discussed.
 - (10) Sample-collection documentation. Documentation of the sample location and method of collection in accordance with the approved work plan.
 - (11) Contaminated media characterization. Analytical results shall be tabulated and compared to the applicable environmental media standard located in Appendix A and the following, unless a site specific risk assessment was conducted pursuant to 35-505(b)(12) or a site specific background study was performed in accordance with Appendix B:

- (A) Soil. Soil sample results shall be compared to the Soil Screening Values for the appropriate residential or industrial scenario. The Vermont Screening Levels (VSL) are for residential scenarios. In the absence of a VSL, the EPA Regional Screening Value shall be used. For industrial scenarios, the industrial EPA Regional Screening Value shall be used. The VT DEC Background Soil Concentration values are to be used when the Background value for benzo(a)pyrene (TEQ) or arsenic is greater than the VSL.
 - (B) Groundwater. Sample results shall be compared to the Vermont Groundwater Quality Standards (Vermont Groundwater Enforcement Standard or Health Advisory).
 - (C) Drinking water. Sample results shall be compared to the applicable Vermont Health Advisory, Vermont Action Levels, or EPA Maximum Contaminant Levels (MCLs).
 - (D) Surface water. Sample results shall be compared to the Vermont Water Quality Standards; and if applicable, compared to the respective Vermont Health Advisory, Vermont Action Levels, or EPA Maximum Contaminant Levels (MCLs).
 - (E) Sediment. Sample results shall be compared to the Threshold Effect Concentration (TEC) and Probable Effects Concentration (PEC) for sediments.
 - (F) Soil gas and indoor air. Soil gas and indoor air shall be compared to:
 - (i) the most recent EPA Vapor Intrusion Screening Value, EPA Regional Screening Levels; or
 - (ii) the Vermont Department of Health Risk Based Residential and Industrial Air Screening Level where available. See Appendix A.
 - (G) Any site-specific health advisory, Soil Screening Value, developed by the Vermont Department of Health when a standard does not exist for a hazardous material.
- (12) A site-specific risk assessment that includes use of chemical and endpoint specific toxicity values and site-specific exposure assumptions may be performed for both current and potential future site uses. A site-specific risk assessment shall follow standard USEPA risk assessment methodology.
- (13) Maps. All maps shall include the location of the site, physical and environmental features, the Vermont Department of Environmental Conservation Hazardous Site number, legend, graphical scale bar, and a base map source reference. All maps shall be accurate and to scale. The following maps shall be included:
- (A) Vicinity map (or sensitive receptor map). Prepared using the Vermont Agency of Natural Resources online Natural Resource Atlas, Waste Management Theme as a base map including property boundary lines, surrounding land use, buildings, street names, sensitive receptors identified in § 35-302(b)(8), surface water bodies, chemical storage or process areas, waste storage and disposal areas, floor drains, drywells and hazardous materials within 1,000 feet of the site. Alternative base maps may be used if pre-approved by the Secretary.
 - (B) Site map. A site investigation map shall include:

- (i) surface topography spot elevations or contours;
 - (ii) property boundary lines;
 - (iii) environmental media sample locations;
 - (iv) contaminant source areas, including former or current tank locations, release areas, or waste disposal locations;
 - (v) engineered structures, including asphalt parking surfaces, concrete sidewalks, drainage ways, diversion ditches, drain tiles, manholes, lined areas, leachate collection systems, septic systems, sewer lines, drywells; and
 - (vi) survey benchmark. A permanent and recoverable site feature shall be assigned as the site survey benchmark. The use of the top of monitoring well risers, road box covers, or concrete pads as a benchmark is prohibited.
- (C) Groundwater flow direction map. The groundwater flow direction map shall include the location of all monitoring points and data collected to create groundwater elevation contours. Multiple maps may be needed to show groundwater flow in different aquifers. A groundwater flow direction map will not be required if the site investigation did not include the installation of groundwater monitoring wells.
- (D) Contaminant distribution map. A contaminant distribution map shall include the location of all monitoring points and, as required by the Secretary, concentration of any hazardous material at that monitoring point. As applicable, based on the site-specific geology and distribution of contaminants, isopleths shall be used to indicate the approximate location of compound-specific contaminant plumes that exceed the applicable environmental media standard. Multiple maps may be required to illustrate multiple contaminants or multiple aquifers. Maps solely depicting total contaminants (e.g. total VOCs) will not be accepted. At sites where isopleth maps are not appropriate, contaminant concentrations shall be plotted on the maps adjacent to the sampling points.
- (14) Discussion. The discussion shall include a descriptive analysis of how the data gathered further refines the CSM, how the CSM has been updated, and how the site investigation work plan objectives in § 35-303(b) have been met. The discussion shall also establish that the data collected are suitable to determine the existing and future exposure to sensitive receptors and, the need for further characterization. Only data that meets quality assurance quality control (QA/QC) criteria will be accepted. A discussion of data which doesn't meet QA/QC criteria shall be included. The report shall evaluate if the data demonstrates that groundwater contamination is confined to the same property where the release occurred and if not, if it will recede to the property boundary within the timeline established in the Vermont Groundwater Protection Rule and Strategy.
- (15) Data presentation. All collected data shall be organized in a narrative, tabular, and graphical form, data shall be presented on maps and cross sections when appropriate. All detected hazardous material concentrations shall be reported. Detection limits shall be provided along with analytical results. Hazardous materials

that are not detected shall be reported as non-detect. Detection limits shall be below the environmental media standards.

- (16) QA/QC sample results. At a minimum, a trip blank, a method blank and a duplicate sample will be required. If field analytical methods are approved in the work plan, the Secretary may require that a subset of samples be analyzed at a fixed base laboratory. Additional QA/QC samples (e.g. field blanks) may be required by the Secretary depending on the complexity of the investigation or sampling methods used. Any deviations from QA/QC procedures or acceptable limits shall be identified and discussed. Only data that meets quality assurance quality control (QA/QC) criteria specified in the QA/QC Plan will be accepted.
- (17) Investigation-derived waste. All investigation derived waste generated during the site investigation shall be managed in accordance with § 35-505(a)(5)(C). A discussion of how the investigation derived waste was managed shall be included in the site investigation report.
- (18) Conclusions and recommendations. The site investigation report shall include a discussion of the findings of the investigation that substantiate the revised CSM, and, specifically, the risk that hazardous materials pose to identified sensitive receptors. Further this section shall identify completed exposure pathways, data gaps, and potential corrective actions. The PRP shall make recommendations on proposed monitoring and frequency and need for further investigation, corrective action, or site closure. If additional data collection is necessary in order to identify an appropriate corrective action, then additional site investigation will be required.
- (19) Signature and certification. A site investigation report shall be certified by the environmental professional that it was conducted in accordance with the approved workplan and signed in accordance with § 35-104.
- (20) Standard operating procedures. A list of consultant standard operating procedures (SOPs) that were used during site investigation shall be listed in the report and provided to the Secretary upon request.
- (21) Appendices.
 - (A) Monitoring well and soil boring logs. At a minimum, logs shall include a description and discussion of monitoring well, soil boring and test pit installation. Logs shall include well boring or test pit location with latitude and longitude. In addition, logs shall include the installation method, blow count data, elevation, total depth, depth to groundwater, soil or rock descriptions, well construction, hole backfill, or sealing information, odors noted, and field screening results.
 - (B) Photographic documentation. Color images showing work performed at the site (UST closure, soil stockpiles, etc.) and pertinent site or vicinity features shall be included as an appendix. Each photographic presentation shall include the date and time, location, and orientation.
 - (C) Field notes. Copies of the original field notes shall be attached as an appendix and the field notes shall contain the following minimum content: the date the work was performed, name of the person conducting the work, tasks completed, date, documentation of weather conditions, sampling timeline with locations, sampling logs, field monitoring results, and calibration information for each type of field analytical equipment.

- (D) Laboratory results. A copy of the laboratory results, chains of custody documentation and all QA/QC data, as specified in the approved work plan shall be included.
- (E) Calculations. All calculations, such as contaminant mass or volume, travel and migration time, natural attenuation, and groundwater gradients. If computer modeling is conducted, a reference to the model used, the data inputs, and data output package shall be included.
- (F) If a quantitative human health risk assessment is conducted, the full risk assessment report, including summary tables and electronic copies of calculating spreadsheets, shall be included.
- (G) Hydrogeologic cross sections. When requested by the Secretary or approved in a work plan.

§ 35-306. REVIEW OF SITE INVESTIGATION REPORT

- (a) The Secretary shall review the site investigation report for completeness with the requirements of 35-305(b).
- (b) After determining that the site investigation report contains all the information required in §35-305(b), the Secretary shall, in writing notify the PRP:
 - (1) The site investigation report has adequately defined the scope and extent of contamination and risks to sensitive receptors have been appropriately managed. The site is potentially eligible to be closed in accordance with Subchapter 7.
 - (2) The site investigation report has not adequately defined the scope and extent of contamination or risk to sensitive receptors and the PRP shall submit a supplemental site investigation work plan to address data gaps or other deficiencies identified by the Secretary;
 - (3) The site investigation report has not met the objectives in the approved workplan or is incomplete, and will be returned to the PRP for revisions and resubmittal; or
 - (4) The site investigation report has adequately defined the scope and extent of contamination but risks to sensitive receptors have not been appropriately managed. The PRP shall develop a corrective action plan in accordance with Subchapter 5.

SUBCHAPTER 4. RESPONSE ACTIONS; RELEASES OF HEATING FUELS

§ 35-401. APPLICABILITY

This subchapter applies to the release of heating fuel from a category four underground storage tank used for storage of heating fuel.

§ 35-402. INVESTIGATION; SOIL REMOVAL AND DRINKING WATER

- (a) Soil removal. Following approval from the Secretary, a PRP shall remove impacted soil in the area where a release of heating oil occurred until VOC field screening instrument readings are below 10 ppmv. Post excavation soil samples shall be collected to document removal of contamination or to characterize soil contamination remaining in place. If removal of soil is not possible due to physical constraints, the PRP shall:
 - (1) Collect and analyze a soil sample of soils remaining in place from the area determined to be the most contaminated by field measurements; and
 - (2) If groundwater is encountered, collect and analyze a groundwater sample from the excavation area.
- (b) Bedrock. Soil excavation shall be extended to the soil bedrock interface to determine if impacted soil is present unless:
 - (1) the vertical extent of contaminated soil is delineated and determined to be adequately separated from the bedrock surface; or
 - (2) excavation to bedrock is physically impossible or a confining soil layer is present, in which case the PRP shall collect a water sample from all drinking water supply wells drilled into bedrock within 200 feet of the release.
- (c) Drinking water. If a drinking water supply well is located anywhere on the property or an off-site property within 200 feet of the release, a sample shall be collected from the public water system or potable water supply for appropriate laboratory analysis.
- (d) Vapor intrusion. If there is any building within 30 feet of the release, indoor air shall be screened with a VOC field screening instrument.
- (e) Surface waters. If visual observations or VOC field screening instrument readings indicate that a release may have impacted surface water then the PRP shall immediately take measures to abate any continuing release to surface water and remove to the extent possible any product in the water.

§ 35-403. INVESTIGATION AND SOIL REMOVAL REPORT

Within 30 days of receipt of laboratory data, or an alternate timeframe approved in writing by the Secretary a PRP shall provide the Secretary a report that contains the following:

- (1) Site description, in accordance with § 35-305(b)(5);
- (2) Property history, in accordance with § 35-305(b)(7);
- (3) Results of contaminated environmental media characterization, in accordance with § 35-305(b)(11);
- (4) Maps, in accordance with § 35-305(b)(13)(A) and 35-305(b)(13)(B).;
- (5) Data presentation, in accordance with § 35-305(b)(15);
- (6) Conclusions and recommendations, in accordance with §35-305(b)(18);
- (7) Photographic documentation in accordance with §35-305(b)(21)(B);
- (8) Copies of laboratory reports, in accordance with §35-305(b)(21)(D);
- (9) Waste disposal documentation, in accordance with § 35-505(5)(C) and 35-507(b)(14);
and
- (10) Recommendations for closure or additional release characterization.

§ 35-404. RESPONSE TO REPORT

The Secretary shall respond, in writing, to the investigation and reporting required by this section, as follows:

- (1) No further work is required;
- (2) An additional site investigation in accordance with §35-405 is necessary;
- (3) A site investigation in accordance with Subchapter 3 or corrective action in accordance with Subchapter 5 is required; or
- (4) The report is incomplete and will be returned to the PRP and the environmental professional for revision and resubmission.

§ 35-405. ADDITIONAL SITE INVESTIGATION

If required by the Secretary under § 35-404(2) of this section, a PRP shall prepare an additional site investigation work plan and provide it to the Secretary for review and approval prior to implementation. At a minimum, the additional site investigation work plan shall include:

- (1) Soil borings and soil samples.
 - (A) Soil borings shall be advanced to below the water table within the former UST location or AST release area and in the downgradient direction.
 - (B) A representative number of borings shall be advanced to define the extent of the impact to soil.
 - (C) Soil samples shall be collected for analysis. Samples shall be collected for laboratory analysis from the water table if non-detect, or from the location of the highest VOC field screening instrument result. If the water table is not encountered and soil contamination above 10 ppm is present, the boring shall be advanced 5 feet beyond the depth of non-detect readings as measured with a VOC field screening instrument, or until refusal.
- (2) Installation of monitoring wells. If VOC field instrument screening results exceed 10 ppmv in any boring at or above the water table, the PRP shall install monitoring wells sufficient to determine the extent of impacts to groundwater and groundwater

flow direction. Groundwater samples shall be collected for appropriate laboratory analysis.

- (3) Surface water and sediment. Representative samples shall be collected for laboratory analysis to determine whether there are exceedances of environmental media standards in surface water and sediment.

§ 35-406. ADDITIONAL SITE INVESTIGATION WORK PLAN; APPROVAL AND IMPLEMENTATION

- (a) Final determination on additional site investigation work plan. The Secretary shall only approve an additional site investigation work plan if the work plan is designed to adequately characterize the degree and extent of the release and provide information sufficient to evaluate the impact of the release on any sensitive receptor. The Secretary's final decision under this section shall be made in writing.
- (b) Implementation of additional site investigation. Upon approval, a PRP shall implement the approved additional site investigation work plan within 30 days of the date of approval or an alternate timeframe approved by the Secretary. The work plan shall be implemented under the supervision of an environmental professional.

§ 35-407. ADDITIONAL SITE INVESTIGATION REPORT SUBMISSION AND REVIEW

- (a) An additional site investigation report shall be submitted within 90 days of receipt of laboratory data or in accordance with an alternate schedule approved by the Secretary. The additional site investigation report shall include the components of a site investigation report, as required by § 35-305, and that were approved in the additional site investigation work plan.
- (b) Upon review of the additional site investigation report, the Secretary shall, in writing, notify the PRP that:
 - (1) The additional site investigation has adequately defined the scope and extent of contamination and risks to sensitive receptors have been appropriately managed. The site will be closed in accordance with Subchapter 7;
 - (2) The additional site investigation has not adequately defined the scope and extent of contamination and the PRP is required to investigate the site in accordance with Subchapter 3;
 - (3) The additional site investigation report is inadequate and will be returned to the PRP and the environmental professional for revisions; or
 - (4) The additional site investigation has adequately defined the scope and extent of contamination but risks to sensitive receptors have not been appropriately managed. The PRP shall develop a corrective action plan in accordance with Subchapter 5.

SUBCHAPTER 5 CORRECTIVE ACTION

§ 35-501. EXEMPTIONS FROM CORRECTIVE ACTION

Exemptions. The following are exempt from the corrective action requirements of this Subchapter:

- (1) An emergency response performed pursuant to § 35-102(c), provided no corrective action is required after the emergency response is completed;
- (2) A response action to address the release of heating fuels pursuant to Subchapter 4;
- (3) A Resource Conservation and Recovery Act (RCRA) corrective action taken pursuant to 10 V.S.A. § 6606, the Vermont Hazardous Waste Management Regulations, and 40 C.F.R. Part 264 Subpart F;
- (4) Releases remediated under CERCLA; and
- (5) An approved site investigation report which concludes all the following:
 - (A) that there are no exceedances of any applicable Vermont Groundwater Quality Standards (Vermont Groundwater Enforcement Standards or Vermont Health Advisory) at drinking water sources, vapor intrusion is not occurring and there are no other impacts that may present a threat to human health or the environment;
 - (B) groundwater contamination is confined to the same property where the release occurred;
 - (C) a demonstration that contamination will not migrate at concentrations exceeding standards, given the current data that is available, and concentrations are stable or declining;
 - (D) the hazardous material release has been addressed through a removal of a limited amount of source material;
 - (E) the site investigation demonstrates that there are no direct contact threats; and
 - (F) the Secretary has approved an institutional control plan that meets the requirements of Subchapter 6.

§ 35-502. OBJECTIVES OF CORRECTIVE ACTION

All corrective actions shall be designed to mitigate the impact of hazardous materials to sensitive receptors to the maximum extent practicable. A corrective action shall accomplish this by implementing the following approaches, in order of priority:

- (1) Treatment of environmental media to the maximum extent practicable, or to levels where the risk may be managed via engineered controls or institutional controls;
- (2) Removal and proper disposal of environmental media impacted by hazardous materials;
- (3) Use of engineered and other controls to contain hazardous materials and to mitigate impacts to environmental media and sensitive receptors; and
- (4) Use of institutional controls to mitigate exposure to sensitive receptors.

§ 35-503. EVALUATION OF CORRECTIVE ACTION ALTERNATIVES

- (a) Evaluation required. At sites that are not exempt in accordance with § 35-501 or subsection (b) of this section the PRP shall evaluate corrective action alternatives prior to submitting a corrective action plan to the Secretary.
- (b) Exemption. A PRP may submit a corrective action plan without conducting an evaluation of corrective action alternatives pursuant to this section, provided all the following have been demonstrated to the satisfaction of the Secretary:
 - (1) The site investigation report demonstrates that there are no impacts to drinking water sources, vapor intrusion is not occurring, and there are no other impacts that present a threat to human health;
 - (2) For impacted groundwater, the site investigation report demonstrates that the groundwater contamination is confined to the property where the release occurred on or will recede to the property boundary within the timeline established in the Vermont Groundwater Protection Rule and Strategy;
 - (3) Except when the hazardous material can be addressed through a removal of a limited amount of source material, the site investigation demonstrates that there are no direct contact threats to sensitive receptors; and
 - (4) A corrective action plan will document that the proposed remedy, with respect to the hazardous material in question, has been utilized at other sites and has been demonstrated to be reliable, cost effective, and effective in addressing remediation of the hazardous material.
 - (5) For Development Soil receiving sites, all requirements in §35-512 have been met, and a corrective action plan which addresses potential direct contact with development soils by the public, including capping and land use restrictions, has been approved by the Secretary.
- (c) Identification of corrective action alternatives. The PRP shall identify corrective action alternatives that will eliminate exposure pathways to sensitive receptors. The number and type of alternatives to be considered shall be determined by taking into account the scope, characteristics, and complexity of the problem being addressed. At each site, at least the following alternatives shall be considered:
 - (1) An alternative that reduces the toxicity, mobility, or volume of the hazardous materials released to the extent feasible. This alternative shall minimize the need for long term management at the site; and
 - (2) An alternative that involves little or no treatment but controls impacts to sensitive receptors through engineered controls, containment, long term monitoring, and institutional controls.
- (d) Evaluation of corrective action alternatives. For each proposed cleanup alternative, the PRP shall evaluate and document the following:

- (1) Compliance with legal requirements. Alternatives shall be evaluated to determine whether the PRP can obtain all federal, state, and local permits for the proposed alternative as well as describe how the alternative will meet those regulatory requirements.
- (2) Overall protection of human health and the environment. Alternatives shall be assessed to determine whether they can adequately protect human health and the environment, by either eliminating, reducing, or controlling exposures to levels established by the corrective action objectives consistent with § 35-502. Overall protection of sensitive receptors shall also assess long-term effectiveness and permanence, short-term effectiveness, and compliance with federal, state, and local laws.
- (3) Long-term effectiveness and permanence. Alternatives shall be assessed for long-term effectiveness and permanence. Factors that shall be considered include the following:
 - (A) Adequacy and reliability of the proposed alternative such as containment systems and institutional controls that are necessary to manage treatment residuals and untreated waste. This factor addresses the uncertainties and risks associated with long term management of the remedy.
- (4) Reducing toxicity, mobility, or volume through treatment. The degree to which alternatives reduce toxicity, mobility, or volume shall be assessed, including how treatment is used to address the principal threats posed by the site. Factors that shall be considered include the following:
 - (A) The treatment or recycling processes the alternatives employ and materials they will treat;
 - (B) The amount of hazardous materials that will be destroyed, treated, or recycled;
 - (C) The degree of expected reduction in toxicity, mobility, or volume of the hazardous materials due to treatment or recycling and the specification of which reduction(s) are occurring;
 - (D) The degree to which rebound of contaminants may occur;
 - (E) The type and quantity of residual contamination that will remain following treatment, considering the toxicity, mobility, propensity to bioaccumulate, and persistence of such hazardous materials and their constituents; and
 - (F) The degree to which treatment reduces the inherent hazards posed by principal threats at the site.
- (5) Short-term effectiveness. The short-term impacts of alternatives shall be assessed by considering the following:
 - (A) Short-term risks that might be posed to sensitive receptors during implementation of an alternative;
 - (B) Potential impacts to workers during corrective action and the effectiveness and reliability of protective measures; and
 - (C) Potential environmental impacts of the corrective action and the effectiveness and reliability of mitigation measures during implementation.
- (6) Implementability. The relative degree of difficulty in implementing the alternatives shall be assessed by considering the following:

- (A) Technical feasibility, including technical difficulties and uncertainty associated with construction and operation of a corrective action, the reliability of the technology, ease of undertaking additional corrective actions, and the ability to monitor the corrective action's effectiveness;
 - (B) Administrative feasibility, including activities needed to coordinate with other offices and agencies and the need to obtain any necessary approvals and permits; and
 - (C) Availability of services and materials, including the adequate off-site treatment, storage capacity, and disposal capacity and services; the availability of necessary equipment and subcontractors, and any necessary additional resources.
- (7) Cost. The types of costs that shall be assessed include the following:
- (A) Capital costs;
 - (B) Annual operation and maintenance (O&M) costs; and
 - (C) Net present value of capital and O&M costs.
- (8) Environmental impact and sustainability. Include a discussion of waste generation and disposal requirements, as well as a discussion of methods to implement best management practices to reduce the environmental impact of the proposed remedies in accordance with EPA guidance or ASTM Standard Guide for Greener Cleanups.
- Note: EPA guidance materials may be found at: <https://www.epa.gov/greenercleanups>
- (9) Community acceptance. This assessment includes determining which components of the alternatives interested persons in the community may support, have reservations about, or oppose. The Secretary may require a public comment period and informational meeting on the alternatives or consider community acceptance in the context of public input on the corrective action plan.
- (e) Minimum elements. The PRP shall provide the Secretary with a report that contains the following:
- (1) An executive summary of the corrective action alternatives considered, including a recommended alternative based criteria in subsection (d) of this section.
 - (2) A proposal for any site-specific background standards that the PRP proposes to apply to the site in accordance with Appendix B.
 - (3) A proposal for any waiver that the PRP proposes to apply to the site in accordance with Appendix C.
 - (4) A detailed evaluation of the criteria established under subsection (d) of this section for each remedial option selected under subsection (c) of this section.
 - (5) A detailed justification for the selected remedy.

§ 35-504. SECRETARY EVALUATION OF CORRECTIVE ACTION ALTERNATIVES

- (a) The Secretary shall evaluate each corrective action alternative presented in the evaluation of corrective action alternative report utilizing the criteria of § 35-503(d).
- (b) The Secretary shall provide a written response to the PRP that:

- (1) Approves the corrective action alternative recommended in the report;
 - (2) Approves an alternate alternative that was considered but not recommended;
 - (3) Requires additional alternative be evaluated;
 - (4) Requires additional analysis of one of the alternatives reviewed as a part of the report; or
 - (5) The report is inadequate and will be returned to the PRP and the environmental professional for revisions.
- (c) The PRP shall, within 30 days of the Secretary's response, provide the Secretary with a response to any comment provided by the Secretary including a revised corrective action alternative or a corrective action plan for the selected alternative.

§ 35-505. CORRECTIVE ACTION PLAN

A corrective action plan shall include the following:

- (1) Executive summary. An executive summary that includes a description of the contamination, a review of the results of the investigation, remediation and remedial objectives, a summary of the alternatives considered, a description of the chosen corrective action technology, a statement of site operations and monitoring activities, and an estimate of the duration of the remedial action.
- (2) Public notice. A list shall be included of the persons who will receive notice under § 35-506(a)(1), including contact names, addresses, email addresses, and phone numbers. A parcel boundary map shall be included showing all such parcels.
- (3) Performance standards.
 - (A) A discussion of how the corrective action achieves the corrective action objectives identified in § 35-502.
 - (B) A list of environmental media standards that apply to the site.
 - (C) A map identifying the compliance points that will be used to monitor compliance with the environmental media standards.
 - (D) A narrative explanation as to why these compliance points were chosen.
 - (E) A narrative explanation as to how any corrective action will ensure that there are no completed pathways that would result in an impact to a sensitive receptor.
 - (F) An estimate of the contaminant mass or volume, expected removal rates, and the estimated duration of the remediation.
 - (G) A list of all local, state, and federal permits required for the project, and the contacts necessary to obtain these permits.
- (4) Remedial construction plan. For any corrective action involving construction of a treatment system, engineered system, including a cap, a containment system, or any other control that requires an engineered design, include:
 - (A) Detailed plans and specifications of the corrective action remedial design and related calculations.
 - (B) A Vermont licensed professional engineer's signature of review of the remedial system design.
- (5) Waste management plan.

- (A) A discussion of any waste material that will be generated by the corrective action, including a hazardous waste determination.
- (B) A plan for managing contaminated soil in accordance with § 35-510, §35-511, or §35-512.
- (C) Investigation and remediation derived wastes shall be managed and disposed as follows:
 - (i) If the waste meets the definition of hazardous waste, the waste shall be managed in accordance with the Vermont Hazardous Waste Management Regulations.
 - (ii) If the waste contains polychlorinated biphenyls (PCBs), it shall be managed in accordance with the Toxic Substance Control Act (TSCA), provided the PCBs are present at concentrations in excess of 50 parts per million (ppm). The waste also shall be managed as a hazardous waste in accordance with the Vermont Hazardous Waste Management Regulations (VT01 hazardous waste code). If PCBs are present at concentrations below 50 ppm, the waste is not regulated by the VHWMRs but may still require management under TSCA.
 - (iii) If the waste does not meet the criteria of subdivisions (i) or (ii) of this subsection, then the waste shall be disposed of:
 - (I) in accordance with the Solid Waste Management Rules, or
 - (II) under a waste management plan approved as a part of the site investigation work plan, provided no investigation and remediation derived waste with a hazardous material above an environmental standard is transported beyond the site.
 - (iv) Petroleum contaminated purge water from groundwater monitoring wells and equipment decontamination water may be returned to the ground within the area where it was extracted.
 - (v) Non-petroleum, non-hazardous waste contaminated purge water may be returned to the ground within the area where it was extracted, if approved by the Secretary.
- (6) Implementation schedule. A corrective action plan shall include an implementation schedule that contains milestones for implementing the corrective action and dates for when those milestones will be reached.
- (7) Corrective action maintenance plan. The corrective action plan shall include a long-term monitoring plan in accordance with § 35-509. The plan shall describe:
 - (A) How any engineered solution will be monitored and maintained to ensure that it continues to operate as designed;
 - (B) How any institutional controls will be monitored and maintained;
 - (C) At the request of the Secretary, a cost estimate for the implementation of the corrective action maintenance plan and a financial responsibility instrument to assure the implementation of the corrective action stewardship plan. Financial assurance under this rule shall be accomplished in the same manner as financial assurance under 40 C.F.R. Part 264 Subpart H;

- (D) A discussion of the operation and maintenance of any active remedial option after its construction until it attains performance standards established in subsection (3) of this section; and
- (E) A discussion of how any treatment system will be deconstructed or decommissioned prior to remedial objectives have been met.
- (8) Institutional Control Plan. The corrective action plan shall include an institutional control plan in accordance with § 35-601, unless the corrective action does not leave any residual contamination in place that exceeds any applicable environmental media standards.
- (9) Redevelopment and Reuse Plan. If applicable, the corrective action plan shall include the redevelopment and reuse plan for the property following implementation of the corrective action. Changes or modifications to this plan may require an amendment to the corrective action plan to ensure that sensitive receptors are not adversely impacted.
- (10) Quality Assurance and Quality Control (QA/QC) Plan. The corrective action plan shall contain the following:
 - (A) A list of the Standard Operating Procedures (SOPs) appropriate to the technologies being proposed for the corrective action. The SOP's shall be provided to the Secretary upon request.
 - (B) A Quality Assurance/Quality Control plan. What methods will be employed to ensure the validity and accuracy of the data and technologies implemented.
- (11) Cost Estimate.
 - (A) Applicability. A corrective action plan shall include a cost estimate if State or federal funding will be utilized, if the project is enrolled in the BRELLA program, or if requested by the Secretary,
 - (B) Contents. A cost estimate shall be broken down by task, materials, labor costs, sub-contractor costs, and equipment costs. Estimates for sub-contractors shall also be itemized into labor, materials, and equipment costs. Lump-sum estimates will not be accepted. The cost estimate shall contain a separate itemized cost estimate for Corrective Action Plan implementation and system operations and maintenance (O&M).
- (12) An updated set of maps as per § 35-305(b)(13).
- (13) Tabular, time series summaries of contaminant concentrations by medium in accordance with §35-305(b)(15).
- (14) Cross-sections of the contaminated zone depicting well or boring depths, soil stratigraphy, recent soil contaminant concentrations, and recent water levels as appropriate to site-specific conditions.
- (15) A list of all proposed contractors, sub-contractors, including contacts, email addresses, addresses and phone numbers.

§ 35-506. CORRECTIVE ACTION PLAN REVIEW; PUBLIC NOTICE; FINAL DECISION

- (a) Complete corrective action plan.
 - (1) Upon a determination by the Secretary that the corrective action plan is complete, a PRP shall provide notice of the corrective action plan to all property owners

- impacted by the release and to all impacted adjoining property owners, on a form provided by the Secretary.
- (2) The Secretary will post a copy of the proposed corrective action plan electronically for public comment.
- (b) Review of corrective action. The Secretary shall only approve a corrective action plan upon finding:
- (1) That the corrective action plan demonstrates that the proposed corrective action meets the criteria of § 35-502 (corrective action objectives), and § 35-505 and the proposed corrective action:
- (A) ensures that no sensitive receptor will be adversely impacted by the corrective action; or
- (B) that the corrective action is an interim measure that addresses a portion of the release and that further corrective action is planned to ensure that no sensitive receptor will be adversely impacted.
- (c) Public notice.
- (1) The Secretary shall electronically provide all interested persons with notice of the draft approval of a corrective action plan.
- (2) Interested persons shall have 30 days from the date of notice to comment on the draft approved corrective action plan and approval.
- (3) Any interested person may request a public informational meeting within 14 days of the date of notice. The Secretary shall provide notice to interested persons of a public informational meeting at least 14 days in advance of the meeting.
- (4) After the close of the comment period, the Secretary shall consider comments prior to issuing a final approval to a corrective action plan. A final approval shall be accompanied by a response to comments made during the comment period.
- (5) The Secretary shall provide notice to interested persons of the approved corrective action plan.
- (d) The Secretary will approve, in writing, the corrective action plan, if § 35-506(a) has been met.
- (e) Corrective action plan. The corrective action plan shall be implemented within 90 days of the approval or in accordance with a schedule approved by the Secretary.
- (f) Amendments to a corrective action plan.
- (1) Major amendments. All amendments that do not meet the definition of minor amendments to the corrective action plan shall be considered major amendments. Major amendments shall be noticed in the same manner as required by subsection (b) of this section. .
- (2) Minor amendments. Minor amendments to a corrective action are amendments that do not change the remedial approach or design in the approved corrective action

plan. The PRP shall notify the Secretary and the Secretary shall approve the amendment prior to implementing the minor amendment.

§ 35-507. CORRECTIVE ACTION CONSTRUCTION COMPLETION REPORT

- (a) A corrective action completion report shall be submitted within 90 days of completing the construction of any remedy, as applicable, or in accordance with the schedule approved in the corrective action plan.
- (b) A corrective action completion report shall include the following elements when applicable:
 - (1) Corrective Action Objectives;
 - (2) Description of work performed;
 - (3) Description of remedial system installed;
 - (4) Certification that the remedial system was installed in accordance with the approved Corrective Action Plan;
 - (5) A description of any field-based amendments to the corrective action and a justification for them;
 - (6) Site plans reflecting post-CAP implementation conditions;
 - (7) Mechanical system layout and list of major components with serial numbers;
 - (8) Piping, control, and instrumentation diagrams along with any modifications to the O&M chapters of the corrective action plan for the installed system;
 - (9) Photo documentation, including:
 - (A) contamination encountered during the corrective action;
 - (B) the installed remedy; and
 - (C) the site before and after implementation of the CAP.
 - (10) Initial remedial system operation data, including:
 - (A) Flow rate;
 - (B) Pressure or vacuum radius of influence;
 - (C) Contaminant removal rates; and
 - (D) Treatment system influent and effluent sample results.
 - (11) Documentation that the site has been stabilized, physical hazards have been minimized, restored to the restoration plan included in the approved corrective plan;
 - (12) Recovery or injection well boring logs;
 - (13) Copies of all federal, state, and local permits;
 - (14) Waste disposal manifests and bills of lading;
 - (15) Applicable inspection results including building, zoning, plumbing, and electrical;
 - (16) Recommendations for additional work; and
 - (17) A certification that the activities were performed in accordance with the Corrective Action Plan.

§ 35-508. REVIEW AND FINAL DECISION OF CORRECTIVE ACTION CONSTRUCTION COMPLETION REPORT

- (a) The Secretary shall review the corrective action completion report and determine whether the corrective action conforms to the CAP approved by the Secretary.

- (b) If the Secretary concludes that the corrective action undertaken by the PRP fails to implement the approved CAP, the Secretary may require a supplemental corrective action completion report, additional investigation, or additional corrective action at the site.

§ 35-509. LONG TERM MONITORING

- (a) All sampling points shall be monitored at a frequency defined in the approved CAP. Any adjustment shall be approved by the Secretary in writing.
- (b) The long-term monitoring report, including analytical results, shall be submitted to the Secretary no later than 45 days from the receipt of analytical results from the laboratory or within an alternate schedule approved by the Secretary, except in the following circumstances, in which case the results shall be reported immediately:
 - (1) Drinking water supply laboratory analytical results which report an exceedance of the groundwater enforcement standards shall be submitted verbally within 24 hours and written analytical results shall be provided to the Secretary within five business days.
 - (2) Indoor air quality laboratory analytical results that report an exceedance of vapor intrusion target indoor air concentrations shall be submitted verbally within 24 hours and written analytical results shall be provided to the Secretary within five business days.
- (c) If site conditions have changed such that the monitoring work plan cannot be carried out as originally approved, then the Secretary shall be notified immediately.
- (d) The Secretary may modify the number of wells sampled or frequency of sampling based on data collected through the site investigation, through long term monitoring, and the Secretary's understanding of site conditions.
- (e) A long-term monitoring report shall include the following:
 - (1) Updated executive summary. Brief summary of findings, conclusions, and recommendations based upon the data collected during the monitoring event.
 - (2) An updated CSM in accordance with § 35-302.
 - (3) Contaminated media characterization in accordance with § 35-305(b)(11).
 - (4) Updated site maps in accordance with § 35-305(b)(13).
 - (5) Documentation of the sample location and method in accordance with the consultant's standard operating procedures (SOP). Justification for deviations from the SOPs shall be described.
 - (6) Any deviations from the approved work plan shall be identified and justified.
 - (7) A descriptive analysis of how the data gathered supports the CSM, and whether the corrective action objectives continue to be achieved. The discussion must also establish that the data collected are suitable to determine the risk posed by the hazardous materials, the need for further characterization, and the potential remedial actions. Only data that passes Quality Assurance/Quality Control criteria will be acceptable.

- (8) All collected data shall be organized in narrative, tabular, and graphical form, including maps and cross sections. Graphs of hazardous material concentration versus time; including results from discontinued monitoring locations. All detected hazardous material concentrations shall be reported. Detection limits shall be provided along with analytical results. Detection limits shall be below the environmental media standards. Hazardous materials that are not detected shall be reported as 'ND'.
- (9) NAPL recovery results, when applicable.
- (10) Field screening results from contaminated stockpiled soils in tabular format, with a map showing the locations of the screened samples and the stockpile location in reference to other pertinent physical features including buildings, roadways, and surface water bodies.
- (11) A description of the current condition of the monitoring network, any maintenance activities conducted since the last monitoring event, and any required maintenance that must be completed with a schedule to complete the work.
- (12) Observable changes in site and neighboring property conditions which may affect site management. These changes may include change in property use, change in property occupancy, water supply changes, and construction.
- (13) Any observable changes to the property that conflict with any institutional controls developed as part of the response to contamination.
- (14) Documentation of the handling of any investigation and remediation derived waste, which shall be dealt with in accordance with § 35-505(5)(c).
- (15) A discussion of the findings of the investigation that substantiate the revised CSM, and, specifically, the risk hazardous materials pose to identified receptors, completed exposure pathways, the identification of data gaps, potentially appropriate corrective actions, proposed monitoring frequency, and need for further investigation, additional corrective action, or site closure.
- (16) The report shall be signed by an environmental professional and certified in accordance with § 35-104.

§ 35-510. NON-HAZARDOUS WASTE CONTAMINATED SOIL

- (a) Except as provided in subsection (d) of this section, off site stockpiling of any contaminated soil is prohibited.
- (b) On-site treatment; non-hazardous waste petroleum contamination in soil – polyencapsulation:
 - (1) Excavated and stockpiled soils shall be completely contained or encapsulated within a polyethylene plastic liner, which shall be a minimum thickness of 6 mils or another containment method determined by the Secretary to be equally protective.
 - (2) The integrity of the polyethylene liner shall be maintained throughout treatment.
 - (3) The soils shall remain polyencapsulated on-site until vapor levels are non-detectable (< 1 parts per million by volume (ppmv) headspace) using a field screening instrument, and there is no olfactory or visual evidence of contamination. Aerating the soil pile to accelerate remediation is prohibited.

- (4) No additional soil may be added to the existing soil stockpile, unless approved by the Secretary.
 - (5) Polyencapsulated soils shall be periodically monitored at a frequency defined in an approved corrective action plan to track the rate of biodegradation and to ensure the integrity of the soil pile.
 - (6) The location of the polyencapsulated soil shall be in an area where:
 - (A) there are no public water systems or potable water supplies within a minimum 300-foot radius. This limit may need to be extended if water supplies are shown to be hydraulically downgradient;
 - (B) There are no sensitive environments including a stream, river, lake, pond, state or federally listed threatened or endangered species or habitat, wetland, floodplain, Class I or II groundwater, residence, property boundary, or other similar areas, within 100 feet of the treatment location;
 - (C) The treatment location is not within zone one or two of a groundwater source protection area;
 - (7) Public access to the location where polyencapsulated soils are stockpiled shall be prohibited through posting no trespassing and other means;
 - (8) If the landowner of the property where polyencapsulated soils are stockpiled is different from soil generator, written approval for the soil treatment that also grants access for the Secretary, has been obtained before treatment begins;
 - (9) The location where polyencapsulated soils are stockpiled shall be depicted on the site map; and
 - (10) Failure to adequately maintain polyencapsulated soil piles will result in a new release subject to investigation and corrective action.
 - (11) Thin-spreading. The following requirements shall be met prior to thin-spreading non-hazardous petroleum contaminated soil stockpiles:
 - (A) Vapor levels are less than 1.0 parts ppmv when measured with a VOC field screening instrument;
 - (B) Soils contain no olfactory or visual evidence of contamination;
 - (C) Confirmatory lab samples as required by the approved corrective action plan;
 - (D) Results of laboratory analysis shall be below SSVs;
 - (E) There are no public water systems or potable water supplies within a 300-foot radius of the location where soils are thin-spread. This limit may need to be extended if water supplies are shown to be hydraulically downgradient;
 - (F) There are no sensitive environments including a stream, river, lake, pond, state or federally listed threatened or endangered species or designated or identified habitat, wetland, floodplain, Class I groundwater zone, residence, property boundary, or other similar areas, within 100 feet of the treatment location;
 - (G) The thin-spread location is not within zone one or two of a groundwater source protection area; and
 - (H) Thinspreading has been approved by the Secretary.
- (c) Additional on-site treatment options for non-hazardous contaminated soil shall be approved by the Secretary.

- (d) Off-site treatment; non-hazardous waste petroleum contamination in soil. The off-site treatment of soil under this section shall be preapproved by the Secretary prior to the shipment off-site. The local municipality shall be notified in writing of the polyencapsulated soil. If applicable, local permits have been obtained. In addition to meeting the requirements of subsection (b) of this section, the PRP shall provide the Secretary with the following:
- (1) The amount of soil that is to be transported to the off-site location; and
 - (2) The latitude and longitude of the exact location where the soil was stockpiled.
- (e) On-site soil management. Non-hazardous contaminated soil may be managed on the site where the release occurred and within the area of contamination, provided all the following have been demonstrated:
- (1) The proposed management area meets the siting criteria of subsection (b)(6) of this section;
 - (2) Management will occur above the seasonal high water table;
 - (3) An engineered soil cap shall be installed following the management to eliminate contact risk. The engineered soil cap shall be:
 - (A) If not covered by an impervious surface, a minimum of 18" thick; or
 - (B) If covered by an impervious surface, 6" thick of fill or sub-base material under the impervious surface.
 - (C) Alternate cap thicknesses may be utilized, providing additional institutional controls are placed on the property to ensure protection of human health and the environment, and pre-approval is granted by the Secretary.
 - (4) The engineered soil cap shall be clearly marked with a material that distinguishes the divide between the non-hazardous contaminated soils and the clean backfill;
 - (5) Soils managed under this subsection shall be shown not to be a risk to groundwater, by appropriate sampling method.
 - (6) A draft institutional control plan has been included part of the corrective action plan.
- (f) Off-site management.
- (1) Non-hazardous contaminated soil may be treated or disposed at the following locations:
 - (A) An in-state or out of state solid waste disposal facility;
 - (B) An in-state or out of state treatment facility; or
 - (C) As provided in § 35-512 for development soils.
 - (2) Non-hazardous contaminated soil may be temporarily stockpiled at an offsite location providing pre-approval is granted by the Secretary, and the following criteria are met:
 - (A) Excavated and stockpiled soils shall be completely contained or encapsulated within a polyethylene plastic liner, which shall be a minimum thickness of 6 mils or another containment method determined by the Secretary to be equally protective.
 - (B) The integrity of the polyethylene liner shall be maintained.

- (C) No additional soil may be added to the existing soil stockpile, unless approved by the Secretary.
 - (D) The location of the polyencapsulated soil shall be in an area where:
 - (i) there are no public water systems or potable water supplies within a minimum 300-foot radius. This limit may need to be extended if water supplies are shown to be hydraulically downgradient;
 - (ii) There are no sensitive environments including a stream, river, lake, pond, state or federally listed threatened or endangered species or identified or designated habitat, wetland, floodplain, Class I or II groundwater, residence, property boundary, or other similar areas, within 100 feet of the stockpile location; and
 - (iii) The stockpile location is not within zone one or two of a groundwater source protection area.
 - (E) Public access to the location where polyencapsulated soils are stockpiled shall be prohibited through posting no trespassing and other means;
 - (F) If the landowner of the property where polyencapsulated soils are stockpiled is different from soil generator, written approval for the soil stockpile that also grants access for the Secretary, has been obtained before stockpiling begins;
 - (G) The location where polyencapsulated soils are stockpiled shall be depicted on the site map;
 - (H) Failure to adequately maintain polyencapsulated soil piles will result in a new release subject to investigation and corrective action;
 - (I) Soils may only be temporarily stockpiled for up to 90 days, or under an alternate schedule approved by the Secretary; and
 - (J) Temporary stockpiling may not occur between December 1st and April 1st.
- (3) For soils that meet the levels established for urban background in Appendix B of this Rule, those soils may be managed in an area designated as urban within the ANR Atlas.

§ 35-511. SITE GENERATED HAZARDOUS WASTES

- (a) Site generated hazardous waste shall be managed in accordance with the Vermont Hazardous Waste Management Rules unless managed in an area of contamination under the approval of the Secretary.
- (b) Contained-in determination. On-site media that contain listed hazardous waste identified in the Vermont Hazardous Waste Management Regulations shall be managed as hazardous waste until the media no longer contains the waste. This may be demonstrated by providing the Secretary with data demonstrating that:
 - (1) The source of the contamination is known and meets the definition of a listed waste;
 - (2) The media of concern does not contain hazardous constituents in concentrations that exceed the characteristic hazardous waste concentrations;
 - (3) The media of concern has been appropriately characterized by representative sampling;

- (4) Concentrations of contaminants do not present a threat to human health or the environment at final disposition; and
 - (5) Concentrations of the listed waste do not exceed federal land disposal restrictions.
- (c) Prior to managing hazardous wastes under subsection (b) of this section, the Secretary shall determine that the elements of (b)(1) – (5) have been met.

§ 35-512. DEVELOPMENT SOILS.

- (a) A person who applies to manage development soils under this section shall have completed a site investigation pursuant to Subchapter 3 of this rule prior to the excavation of the development soils. In addition to the requirements contained in Subchapter 3, a work plan shall be submitted for approval which includes the following:
- (1) Soil sample collection methods, which shall consist of one of the following methods:
 - (A) Discrete sampling methodology in a grid pattern. The sampling grid shall be appropriately scaled in order to cover the entire proposed area of excavation, and sample points shall be co-located in areas of concern;
 - (B) Application of Incremental Sampling Methodology consistent with the Interstate Technology and Regulatory Council's (ITRC) Incremental Sampling Methodology (February 2012); or
 - (C) Other soil characterization methods, as approved by the Secretary
 - (2) If soil is proposed to be disposed of in accordance with §35-512(b)(3)(receiving site), the number and location of soil samples that will be analyzed using Synthetic Precipitation Leaching Procedure (EPA Method 1312) (SPLP). The number of locations shall be based on the volume of soils planned for management and there shall be minimum one sample for every 200 tons of soil. Samples shall be taken from the soils most likely to leach contaminants and from the most impacted soil locations based on laboratory analysis, field screening, and visual and olfactory evidence.
- (b) Disposal of Development Soils. Upon a determination by the Secretary, in writing, that the soils proposed for management are development soils, those soils may be disposed at:
- (1) A categorical solid waste facility that is permitted to receive development soils;
 - (2) A solid waste facility for use as alternate daily cover; or
 - (3) An approved receiving site that meets the requirements of subsection (c) of this section.
- (c) Receiving site.
- (1) The receiving site shall meet the siting requirements established in § 35-510(b)(6);
 - (2) Prior to receiving development soils, a work plan shall be submitted for approval which includes the following:
 - (A) Soil sample collection methods which shall consist of one of the following methods:

- (i) Discrete sampling methodology in a grid pattern. The sampling grid shall be appropriately scaled in order to cover the entire area proposed for deposition of development soils and shall include information regarding seasonal groundwater elevations determined through subsurface characterization; or
 - (ii) Application of Incremental Sampling Methodology consistent with ITRC Incremental Sampling Methodology (February, 2012) and shall include information regarding seasonal groundwater elevations determined through subsurface characterization.
- (B) The address of the proposed receiving site location and the GIS coordinates of the area where the development soils are proposed to be disposed.
- (3) The receiving site shall have concentrations of arsenic, lead, and PAH's that are equal to or greater than the concentrations from the site undergoing redevelopment.
- (4) Receiving sites that have concentrations of arsenic, lead and PAH's in excess of industrial risk-based standards will be required to conduct a site investigation in accordance with Subchapter 3.
- (5) The receiving site has an approved institutional control plan in accordance with § 35-601 that addresses potential direct contact with development soils by the public, including appropriate capping and establishment of land use restrictions.

SUBCHAPTER 6. INSTITUTIONAL CONTROLS

§ 35-601. INSTITUTIONAL CONTROL PLAN

- (a) Purpose. The purpose of an institutional control plan is to identify a series of institutional controls to ensure the protection of human health and the environment.
- (b) Acceptable Alternate Institutional Controls. In addition to the institutional controls identified in § 35-602 and § 35-603, the following institutional controls may be acceptable when included as a part of an institutional control plan approved by the Secretary:
 - (1) Zoning Ordinances. Zoning ordinances that place restrictions on uses of an area where the property (e.g. zoning an area commercial or industrial or limits subsurface excavation) is located may be considered as a part of an institutional control plan. Institutional control plans shall address how long term reporting on zoning ordinances will take place to ensure that future modifications to ordinances or bylaws do not allow uses to adversely affect human health or the environment.
 - (2) Water Ordinances. Water ordinances that require all homeowners to be connected to a public community water supply when service is available may be an acceptable institutional control for groundwater use restrictions. Institutional control plans shall address how long-term reporting on water ordinances will take place to ensure that future modifications to ordinances or bylaws do not allow uses to adversely impact human health or the environment.
 - (3) Groundwater reclassification. Groundwater reclassifications may be an acceptable institutional control for groundwater use restrictions.
 - (4) Judicially approved controls. Judicial controls may be an acceptable short-term institutional control. The institutional control plan shall identify how the judicially approved controls will allow the control to survive changes to property ownership or other transfers of the property.
- (c) Approval of institutional control plan. The Secretary shall approve an institutional control plan providing the following are demonstrated:
 - (1) The PRP has identified all residual contamination that remains in-place on the property;
 - (2) The PRP has identified what restrictions are necessary to ensure that exposure pathways are not created by uses or activities that take place on the property;
 - (3) The PRP has identified a control or controls that address the restrictions identified in subsection (c)(2) of this section; and
 - (4) The PRP has identified a long term monitoring program to ensure that the controls continue to be effective until the contamination no longer poses an unacceptable impact to human health or the environment.

§ 35-602. NOTICE TO THE LAND RECORDS.

- (a) Purpose. The purpose of a notice to the land records is to inform present and future property owners of the presence of residual subsurface contamination at the property, and applicable land use restrictions.
- (b) Applicability. A Notice to the Land Records is an acceptable institutional control when corrective actions have addressed any exposure pathway to a sensitive receptor but residual contamination above applicable environmental media standards may be present on site.
- (c) Minimum Elements. At a minimum, all notices to the land record shall contain:
 - (1) A brief description of the release of hazardous materials;
 - (2) A brief description of the corrective action that took place on the site;
 - (3) What hazardous materials remain on the site and the location of those hazardous materials; and
 - (4) A description of the necessary property use restrictions to ensure that no further exposure to hazardous materials takes place.
 - (5) The following language shall be included:
“If a person fails to follow the use restrictions contained within this notice the person may be liable for further site investigation, remediation, and penalties pursuant to the Vermont Waste Management Act, 10 V.S.A. chapter 159.”
- (d) Filing. A PRP shall file an approved notice to the land records within one week of its approval and shall provide a copy to the Secretary, including the recorder stamp, book, and page number, of the recorded notice to the land record within one week of its recording.

§ 35-603. DEED RESTRICTION/ENVIRONMENTAL EASEMENT.

- (a) Purpose. The purpose of a deed restriction is to place legally enforceable land use restrictions on a property to prevent exposure to any hazardous material left on the property and to ensure the protectiveness of any corrective action at the property.
- (b) Applicability. The Secretary may require the use of a deed restriction in the following situations:
 - (1) When long term maintenance or monitoring of the corrective action or property use restrictions are required;
 - (2) When active remedial infrastructure must remain in place in order to prevent contamination from posing a risk to human health or the environment;
 - (3) When a Technical Impracticality (TI) Waiver has been granted by the Secretary in accordance with Appendix E; or
 - (4) When groundwater contamination remains, or is projected to remain at the site above the Vermont Groundwater Enforcement Standards at a compliance point in

accordance with the timeline established in the Vermont Groundwater Protection Rule and Strategy.

- (c) Minimum Elements:
 - (1) A legal description of the site property;
 - (2) A description of the release, corrective action, and statement of the need for a deed restriction on the property;
 - (3) A grant of access to the Agency of Natural Resources to the property for any reason related to the purpose of the easement, including monitoring of the site, monitoring of the land use controls, planning future corrective action;
 - (4) Restrictions on future uses of the property or portions of the property to prevent receptors from being exposed to any residual contamination that remains on the property and to ensure the effectiveness of any corrective action;
 - (5) A process for enforcing the terms of the easement; and
 - (6) A map of where restricted areas are located on the property in recordable form, unless the restrictions apply to the property without restriction.
- (d) Filing. A PRP shall file an approved deed restriction and all exhibits within one week of its approval and shall provide a copy, including the recorder stamp, book, and page number, of the recorded deed restriction within one week of its recording.

§35-604. LAND USE RESTRICTIONS WITHIN A CERTIFICATE OF COMPLETION

- (a) Purpose. The Secretary may establish land use restrictions within a certificate of completion upon closure of a site enrolled in BRELLA pursuant 10 V.S.A. Chapter 159. The purpose of these restrictions is to ensure the ongoing effectiveness of response actions taken at the site.
- (b) Applicability. The Secretary may restrict future uses of a property as a part of a certificate of completion in any of the following situations:
 - (1) When long term maintenance or monitoring of the corrective action or property use restrictions are required;
 - (2) When active remedial infrastructure must remain in place in order to prevent contamination from posing a risk to human health or the environment;
 - (3) When a Technical Impracticality (TI) Waiver has been granted by the Secretary in accordance with Appendix E; or
 - (4) When groundwater contamination remains or is projected to remain at the site above the Vermont Groundwater Enforcement Standards at a compliance point in accordance with the timeline established in the Vermont Groundwater Protection Rule and Strategy.
- (c) Minimum Elements. At a minimum, a certificate shall be issued to include the following items:

- (1) A legal description of the site property;
 - (2) A description of the release, corrective action, and statement of the need for a land use restrictions on the property;
 - (3) Access to Agency of Natural Resources personnel to access the site at all reasonable times to inspect compliance with the land use restrictions identified herein, as well as to assess the need for, planning, or implementing additional response actions at or near the site;
 - (4) Restrictions on future uses of the property or portions of the property to prevent receptors from being exposed to any residual contamination that remains on the property and to ensure the effectiveness of any corrective action; and
 - (5) A map of where restricted areas are located on the property in recordable form, unless the restrictions apply to the property without restriction.
- (d) Recording. The PRP shall record a certificate of completion and all supporting documentation and exhibits with the land records of the municipality or municipalities in which the site is located. Such recording shall be made within one week of the date of issuance of the certificate of completion. Within one week of the date of recording, the PRP shall provide a copy of the recorded and stamped certificate of completion and all recorded documents with the Agency, which includes the book and page number of where those documents were recorded.

SUBCHAPTER 7. SITE CLOSURE

§ 35-701. SITE MANAGEMENT ACTIVITIES COMPLETE

- (a) Effect of site management activity complete designation (SMAC). The SMAC designation means no additional work related to the identified release or releases is required at the time the designation is issued. A SMAC designation shall not release the PRP or parties from any past or future liability associated with the release or releases identified as a part of the response, or from any contamination discovered after the site receives this designation. A SMAC designation does not prevent the Secretary from reassessing the site in light of the reasons stated in subsection (e) of this section, a change in environmental media standards, identification of new or emerging contaminants of concern that require additional responses, new information, or a change in condition that shows sensitive receptors are at risk from the release.
- (b) Request for a SMAC designation. In order to obtain a SMAC designation, the PRP or the Secretary shall submit a request for a SMAC designation that summarizes the site investigation, corrective action undertaken at the site and documents all the following:
- (1) The source area or areas were removed, remediated, or adequately controlled.
 - (2) Hazardous material data trends collected from site specific environmental media demonstrate that concentrations are stable, falling, or are not detectable.
 - (3) Groundwater enforcement standards as adopted in the Groundwater Protection Rule and Strategy have been met at compliance points established for the site, and groundwater has been reclassified in accordance with the Groundwater Protection Rule and Strategy, if necessary.
 - (4) No hazardous materials associated with the site are present in drinking water supplies at concentrations in excess of Vermont Groundwater Quality Standards (Vermont Groundwater Enforcement Standards or Vermont Health Advisory).
 - (5) Active remedial activities associated with the site have been completed.
 - (6) Soil standards have been met at compliance points or, if soil standards have not been met, then a corrective action plan has been implemented with approved engineering and institutional controls to prevent contact to contaminated soils.
 - (7) Vermont water quality standards have been achieved at all surface water compliance points established for the site.
 - (8) Sediment evaluation has been completed and remediation is not required.
 - (9) Migration of hazardous materials from soil to groundwater is not occurring at a concentration which will result in an exceedance of the Vermont Groundwater Enforcement Standards.
 - (10) No completed vapor intrusion pathway exists.
 - (11) The site has been properly closed following the corrective action, including:
 - (A) All groundwater monitoring wells have been properly closed in accordance with the Vermont Water Supply Rule or an alternate plan has been approved by the Secretary for maintaining the monitoring wells. The Secretary shall be notified of the closure of the monitoring wells.

- (B) Abandoned water supply wells and monitoring wells have been properly closed in accordance with the Vermont Water Supply Rule.
 - (C) All site remedial infrastructure or monitoring points have been closed in a manner to prevent impacts to the environment or human health.
 - (D) Contaminated soils have been properly treated or disposed of in accordance with § 35-510, § 35-511, or § 35-512.
- (12) Any outstanding or overdue balances owed to the State (e.g. PCF deductible, Environmental Contingency Fund (ECF) cost recovery, penalties, fines) have been paid to the satisfaction of the Secretary.
- (13) Injection wells have been closed in accordance with the Underground Injection Control Rule.
- (14) All required institutional controls, engineered controls, and inspection plans are in place and copies have been provided to the Secretary.
- (15) All documentation required by this rule has been submitted to and approved by the Secretary.
- (c) Issuance of SMAC designation. If the Secretary determines that all of the requirements of subsection (b) of this section have been met, the Secretary may issue a SMAC designation for the site.
- (d) SMAC as notice to the land records. A copy of the SMAC designation shall be recorded in municipal land records in the municipality where the site is located.
- (1) The PRP shall within 10 days of recording provide the Secretary a copy of the recorded SMAC letter with the recorder's stamps.
 - (2) SMAC letters shall include a copy of the site map showing properly decommissioned historical monitoring points, original source area(s), and the approximate extents of residual contamination.
- (e) Reopening of SMAC designation. The Secretary shall return the site to active status on finding any of the following:
- (1) previous remedial activities that are found to have been inadequate;
 - (2) new information is discovered regarding the time, extent, amount, type, or nature of materials released;
 - (3) new information is discovered regarding the migration of the hazardous materials, health effects of the hazardous materials, or site conditions;
 - (4) the Secretary identifies errors or omissions in any of the investigation, or corrective action plan, or their associated implementation;
 - (5) a new hazardous material is listed or identified that requires a response by the PRP;
 - (6) additional releases occur;
 - (7) a condition of the SMAC designation was not completed;
 - (8) a requirement of the institutional control plan or necessary reporting was not followed; or
 - (9) any other condition that presents a threat of unreasonable exposure to humans or the environment from a hazardous material that was released from the site.

§ 35-702. CERTIFICATE OF COMPLETION

- (a) Eligibility for Certificate of Completion. A PRP shall not obtain a certificate of completion unless all the following have been established:
- (1) The PRP meets the eligibility requirements identified in 10 V.S.A. § 6645; and has been accepted into the BRELLA program;
 - (2) The Secretary determines that all work required pursuant to 10 V.S.A. Chapter 159, Subchapter 3 has been completed; and
 - (3) The Secretary determines that the requirements of this section have been met.
- (b) Application for certificate of completion. A PRP may request the Secretary issue a certificate of completion by filing an application in the same manner as required by § 35-701(b).
- (c) Review of request for certificate of completion. The Secretary shall review a request for a certificate of completion in the same manner as § 35-701(c).
- (d) Review of request for certificate of completion on substantial completion. A PRP may request that the Secretary issue a certificate of completion based on substantial completion of the corrective action. Issuance of a certificate of completion under this subsection is only eligible for persons who entered the BRELLA program as a prospective purchaser and only the following elements of the corrective action remain uncompleted at the time the application for a certificate of completion is filed with the Secretary:
- (1) When the Secretary has determined that long term monitoring is a component of the corrective action but the long term monitoring has not been completed; or
 - (2) When the Secretary has required institutional controls but the institutional controls have not yet been recorded at the time of the request.
- (e) Failure to comply with condition subsequent on substantial completion. A certificate of completion issued on substantial completion is contingent upon the PRP completing the conditions subsequent in a timeframe identified by the Secretary. If the PRP fails to do so the certificate of completion shall be void and the PRP shall be required to reapply for a certificate of completion.

SUBCHAPTER 8. REQUESTS FOR REIMBURSEMENT FOR MUNICIPAL WATER LINE EXTENSIONS FROM THE PETROLEUM CLEANUP OR ENVIRONMENTAL CONTINGENCY FUNDS

§ 35-801. REIMBURSEMENT OF MUNICIPALITIES TO PROVIDE ALTERNATE WATER SUPPLIES

- (a) Applicability. This section shall apply when the following apply:
- (1) there has been a release of a hazardous material;
 - (2) the construction or expansion of or connection to a municipal water line eliminates a sensitive receptor's exposure to a hazardous material; and
 - (3) the work is performed by a municipality and meets the requirements of this section.
- (b) Source of funds. When the release is predominately gasoline, fuel oil, or the release of another petroleum product that would potentially be eligible for reimbursement from the fund established under 10 V.S.A. § 1941 then the reimbursement shall be made from the Petroleum Cleanup Fund; all other reimbursements shall be made from the Contingency Fund established pursuant to 10 V.S.A. § 1283.
- (c) Prohibition on Reimbursement.
- (1) Reimbursements from the Petroleum Cleanup Fund shall be limited to the reimbursement caps established in 10 V.S.A. § 1941(a)(1) and shall only be for uninsured costs.
 - (2) Reimbursements from the Contingency Fund shall be limited to the caps established in 10 V.S.A. § 1283(b) or an amount established by the Secretary taking into consideration the current fund balance and known and estimated future obligations on the fund, whichever is lesser.
 - (3) Where there is a potentially responsible party who has refused to reimburse a municipality for the extension of a municipal water line, the Secretary may condition reimbursement on the successful recovery of funds from that responsible party.
- (d) Requirements for reimbursement.
- (1) The municipality has applied for all necessary permits required for the project, including public drinking water supply permits.
 - (2) Municipality shall submit a cost estimate for review and approval by the Secretary for all work proposed for reimbursement. If an evaluation of corrective action alternatives, including cost effectiveness compared to water treatment or well replacement, has not been completed prior to the final design of a municipal water line extension, the Secretary may require such an analysis prior to approval of the preliminary approval or prior to the construction of the water line extension.

- (3) Prior to bidding on a construction project that may encounter contaminated media an environmental professional shall, at a minimum, provide the Secretary with the following:
- (A) Identify any land uses that may have resulted in the release of hazardous materials on the route of the municipal water line extension. Identification shall be confined to a review of records at the Agency and municipal records.
 - (B) If sampling is necessary, submit a plan to conduct limited sampling to estimate the costs associated with management of contaminated soil and groundwater when installing the municipal water line.
 - (C) Soil management plan. This plan shall include work procedures, treatment, and disposal locations for contaminated soil encountered during the construction process. Contaminated soils shall be backfilled during construction unless it is clearly documented that the soils are geotechnically unsuitable or cannot be replaced within the excavation. Contaminated soils to be backfilled, shall be placed at the bottom of the trench with at least 18" of uncontaminated soil used for closing the trench.
 - (D) Groundwater management plan. If contaminated groundwater is expected to be encountered, the municipality shall have an environmental professional develop a plan for the treatment of contaminated groundwater. Treatment methods may include re-injection through an infiltration basin, filtration through activated carbon, air stripping, pumping to fractionation tanks, or disposal to a wastewater treatment plant (with appropriate permission from the plant owner and Wastewater Management Division).
- (e) Approval of prebid preliminary investigation. Prior to implementing any work proposed for reimbursement, the Secretary shall approve the prebid preliminary investigation. The Secretary may require additional investigation and work as a part of the approval. The Secretary may disprove any cost associated with a request provided there is a reasonable basis for the disapproval. If an evaluation of corrective action alternatives has not been completed prior to the construction of a municipal water line extension, the Secretary may require such an analysis prior to approval of the prebid preliminary investigation.
- (f) Final reimbursement request. As a part of any request for reimbursement, a municipality shall provide the Secretary, at a minimum, the following information:
- (1) The results of any investigation, sampling, and field work that took place as a part of the investigation.
 - (2) Receipts for any waste discovered and disposed during the municipal water line extension.
 - (3) Documentation, such as as-builts and certificate of completions, that the constructed municipal water line extension was constructed per the applicable permit requirements.

- (4) The amount requested for reimbursement, including detailed supporting information such as contracts to perform work, detailed invoices from contractors, and other similar information.
 - (5) The Secretary may require additional documentation to support the request for reimbursement.
- (g) Approval of final reimbursement request. Prior to reimbursing a municipality for the extension of a municipal water line the Secretary shall approve the final reimbursement request. The Secretary may require additional documentation to support the request for reimbursement. The Secretary may disprove any cost associated with a request provided there is a reasonable basis for the disapproval.

APPENDIX A. ENVIRONMENTAL MEDIA STANDARDS.

§ 35-APX-A1. SOIL SCREENING VALUES

§ 35-APX-A2. VAPOR INTRUSION VALUES

§ 35-APX-A3. SEDIMENT VALUES

Appendix A - § 35-APX-A1 - Soil Screening Values
(see notes at end of table)

Analyte	CAS Number	EPA Regional Screening Levels (TR=1E-06, HQ=1.0)		Vermont Screening Levels (TR=1E-06, HQ=1.0)	VT DEC Background Soil Concentrations	
		Resident Soil (mg/kg)	Industrial Soil (mg/kg)	Resident Soil (mg/kg)	Rural (mg/kg)	Urban (mg/kg)
Acephate	30560-19-1	62	260			
Acetaldehyde	75-07-0	11	49			
Acetochlor	34256-82-1		16,000	1,270		
Acetone	67-64-1		670,000	39,900		
Acetone Cyanohydrin	75-86-5	2,800,000	12,000,000			
Acetonitrile	75-05-8	810	3,400			
Acetophenone	98-86-2	7,800	120,000			
Acetylaminofluorene, 2-	53-96-3	0.14	0.6			
Acrolein	107-02-8	0.14	0.6			
Acrylamide	79-06-1	0.24	4.6			
Acrylic Acid	79-10-7	99	420			
Acrylonitrile	107-13-1	0.25	1.1			
Adiponitrile	111-69-3	8,500,000	36,000,000			
Alachlor	15972-60-8	9.7	41			
Aldicarb	116-06-3	63	820			
Aldicarb Sulfone	1646-88-4	63	820			
Aldrin	309-00-2		0.18	0.0202		
Allyl Alcohol	107-18-6	3.5	15			
Allyl Chloride	107-05-1	0.72	3.2			
Aluminum	7429-90-5		1,100,000	75,600		
Aluminum Phosphide	20859-73-8	31	470			
Ametryn	834-12-8	570	7,400			
Aminobiphenyl, 4-	92-67-1	0.026	0.11			
Aminophenol, m-	591-27-5	5,100	66,000			
Aminophenol, p-	123-30-8	1,300	16,000			
Amitraz	33089-61-1	160	2,100			
Ammonium Sulfamate	7773-06-0	16,000	230,000			
Amyl Alcohol, tert-	75-85-4	82	340			
Aniline	62-53-3	95	400			
Anthraquinone, 9,10-	84-65-1	14	57			
Antimony (metallic)	7440-36-0		470	27.1		
Antimony Pentoxide	1314-60-9	39	580			
Antimony Tetroxide	1332-81-6	31	470			
Antimony Trioxide	1309-64-4	280,000	1,200,000			
Arsenic, Inorganic	7440-38-2					16
Arsine	7784-42-1	0.27	4.1			
Asulam	3337-71-1	3,200	41,000			
Atrazine	1912-24-9	2.4	10			
Auramine	492-80-8	0.62	2.6			
Avermectin B1	65195-55-3	25	330			
Azinphos-methyl	86-50-0	190	2500			
Azobenzene	103-33-3	5.6	26			
Azodicarbonamide	123-77-3	8,600	40,000			
Barium	7440-39-3		220,000	11,700		
Barium Chromate	10294-40-3	0.3	6.2			
Benfluralin	1861-40-1	23,000	350,000			
Benomyl	17804-35-2		41,000	121		
Bensulfuron-methyl	83055-99-6	13,000	160,000			
Bentazon	25057-89-0	1,900	25,000			
Benzaldehyde	100-52-7	170	820			
Benzene	71-43-2		5.1	0.442		
Benzenediamine-2-methyl sulfate, 1,4-	6369-59-1	5.4	23			
Benzenethiol	108-98-5	78	1200			
Benzidine	92-87-5	0.00053	0.01			
Benzoic Acid	65-85-0	250,000	3,300,000			
Benzo-trichloride	98-07-7	0.053	0.25			
Benzyl Alcohol	100-51-6	6,300	82,000			
Benzyl Chloride	100-44-7	1.1	4.8			
Beryllium and compounds	7440-41-7		2,300	36.0		

Appendix A - § 35-APX-A1 - Soil Screening Values
(see notes at end of table)

Analyte	CAS Number	EPA Regional Screening Levels (TR=1E-06, HQ=1.0)		Vermont Screening Levels (TR=1E-06, HQ=1.0)	VT DEC Background Soil Concentrations	
		Resident Soil (mg/kg)	Industrial Soil (mg/kg)	Resident Soil (mg/kg)	Rural (mg/kg)	Urban (mg/kg)
Bifenox	42576-02-3	570	7,400			
Biphenthrin	82657-04-3	950	12,000			
Biphenyl, 1,1'-	92-52-4	47	200			
Bis(2-chloro-1-methylethyl) ether	108-60-1		47,000	2,920		
Bis(2-chloroethoxy)methane	111-91-1	190	2500			
Bis(2-chloroethyl)ether	111-44-4	0.23	1			
Bis(chloromethyl)ether	542-88-1	0.000083	0.00036			
Bisphenol A	80-05-7	3,200	41,000			
Boron And Borates Only	7440-42-8		230,000	15,300		
Boron Trichloride	10294-34-5	160,000	2,300,000			
Boron Trifluoride	7637-07-2	3,100	47,000			
Bromate	15541-45-4		4.7	0.559		
Bromo-2-chloroethane, 1-	107-04-0	0.026	0.11			
Bromobenzene	108-86-1	290	1,800			
Bromochloromethane	74-97-5		630	129		
Bromodichloromethane	75-27-4	0.29	1.3			
Bromoform	75-25-2	19	86			
Bromomethane	74-83-9	6.8	30			
Bromophos	2104-96-3	390	5,800			
Bromoxynil	1689-84-5		16,000	2.81		
Bromoxynil Octanoate	1689-99-2	1,600	23,000			
Butadiene, 1,3-	106-99-0	0.058	0.26			
Butanol, N-	71-36-3	7,800	120,000			
Butyl alcohol, sec-	78-92-2	130,000	1,500,000			
Butylate	2008-41-5	3,900	58,000			
Butylated hydroxyanisole	25013-16-5	2,700	11,000			
Butylated hydroxytoluene	128-37-0	150	640			
Butylbenzene, n-	104-51-8	3,900	58,000			
Butylbenzene, sec-	135-98-8	7,800	120,000			
Butylbenzene, tert-	98-06-6	7,800	120,000			
Cacodylic Acid	75-60-5	1,300	16,000			
Cadmium (Diet)	7440-43-9		980	7.15		
Calcium Chromate	13765-19-0	0.3	6.2			
Caprolactam	105-60-2	31,000	400,000			
Captafol	2425-06-1	3.6	15			
Captan	133-06-2	240	1000			
Carbaryl	63-25-2		82,000	331		
Carbofuran	1563-66-2	320	4,100			
Carbon Disulfide	75-15-0	770	3,500			
Carbon Tetrachloride	56-23-5		2.9	0.247		
Carbonyl Sulfide	463-58-1	67	280			
Carbosulfan	55285-14-8	630	8,200			
Carboxin	5234-68-4	6,300	82,000			
Ceric oxide	1306-38-3	1,300,000	5,400,000			
Chloral Hydrate	302-17-0	7,800	120,000			
Chloramben	133-90-4	950	12,000			
Chloranil	118-75-2	1.3	5.7			
Chlordane	12789-03-6	1.7	7.7			
Chlordecone (Kepone)	143-50-0	0.054	0.23			
Chlorfenvinphos	470-90-6	44	570			
Chlorimuron, Ethyl-	90982-32-4	1,300	16,000			
Chlorine	7782-50-5	0.18	0.78			
Chlorine Dioxide	10049-04-4	2,300	34,000			
Chlorite (Sodium Salt)	7758-19-2	2,300	35,000			
Chloro-1,1-difluoroethane, 1-	75-68-3	54,000	230,000			
Chloro-1,3-butadiene, 2-	126-99-8	0.01	0.044			
Chloro-2-methylaniline HCl, 4-	3165-93-3	1.2	5			
Chloro-2-methylaniline, 4-	95-69-2	5.4	23			
Chloroacetaldehyde, 2-	107-20-0	2.6	12			

Appendix A - § 35-APX-A1 - Soil Screening Values
(see notes at end of table)

Analyte	CAS Number	EPA Regional Screening Levels (TR=1E-06, HQ=1.0)		Vermont Screening Levels (TR=1E-06, HQ=1.0)	VT DEC Background Soil Concentrations	
		Resident Soil (mg/kg)	Industrial Soil (mg/kg)	Resident Soil (mg/kg)	Rural (mg/kg)	Urban (mg/kg)
Chloroacetophenone, 2-	532-27-4	43,000	180,000			
Chloroaniline, p-	106-47-8	2.7	11			
Chlorobenzene	108-90-7		1,300	273		
Chlorobenzilate	510-15-6	4.9	21			
Chlorobenzoic Acid, p-	74-11-3	1,900	25,000			
Chlorobenzotrifluoride, 4-	98-56-6	210	2,500			
Chlorobutane, 1-	109-69-3	3,100	47,000			
Chlorodifluoromethane	75-45-6	49,000	210,000			
Chloroethanol, 2-	107-07-3	1,600	23,000			
Chloroform	67-66-3	0.32	1.4			
Chloromethane	74-87-3	110	460			
Chloromethyl Methyl Ether	107-30-2	0.02	0.089			
Chloronitrobenzene, o-	88-73-3	1.8	7.7			
Chloronitrobenzene, p-	100-00-5	9	38			
Chlorophenol, 2-	95-57-8	390	5,800			
Chloropicrin	76-06-2	2	8.2			
Chlorothalonil	1897-45-6	180	740			
Chlorotoluene, o-	95-49-8	1600	23000			
Chlorotoluene, p-	106-43-4	1600	23000			
Chlorozotocin	54749-90-5	0.0023	0.0096			
Chlorpropham	101-21-3	13,000	160,000			
Chlorpyrifos	2921-88-2	63	820			
Chlorpyrifos Methyl	5598-13-0	630	8,200			
Chlorsulfuron	64902-72-3	3,200	41,000			
Chlorthal-dimethyl	1861-32-1	630	8,200			
Chlorthiophos	60238-56-4	51	660			
Chromium(III), Insoluble Salts	16065-83-1		1,800,000	41,900		
Chromium(VI)	18540-29-9		6.3	0.0945		
Clofentezine	74115-24-5	820	11,000			
Cobalt	7440-48-4		350	22.9		
Copper	7440-50-8	3,100	47,000			
Cresol, m-	108-39-4	3,200	41,000			
Cresol, o-	95-48-7	3,200	41,000			
Cresol, p-	106-44-5	6,300	82,000			
Cresol, p-chloro-m-	59-50-7	6,300	82,000			
Cresols	1319-77-3	6,300	82,000			
Crotonaldehyde, trans-	123-73-9	0.37	1.7			
Cumene	98-82-8	1,900	9,900			
Cupferron	135-20-6	2.5	10			
Cyanazine	21725-46-2	0.65	2.7			
Cyanides						
~Calcium Cyanide	592-01-8	78	1,200			
~Copper Cyanide	544-92-3	390	5,800			
~Cyanide (CN-)	57-12-5	23	150			
~Cyanogen	460-19-5	78	1,200			
~Cyanogen Bromide	506-68-3	7,000	110,000			
~Cyanogen Chloride	506-77-4	3,900	58,000			
~Hydrogen Cyanide	74-90-8	23	150			
~Potassium Cyanide	151-50-8	160	2,300			
~Potassium Silver Cyanide	506-61-6	390	5,800			
~Silver Cyanide	506-64-9	7,800	120,000			
~Sodium Cyanide	143-33-9	78	1,200			
~Thiocyanates	NA	16	230			
~Thiocyanic Acid	463-56-9	16	230			
~Zinc Cyanide	557-21-1	3,900	58,000			
Cyclohexane	110-82-7	6,500	27,000			
Cyclohexane, 1,2,3,4,5-pentabromo-6-chloro-	87-84-3	24	100			
Cyclohexanone	108-94-1	28,000	130,000			
Cyclohexene	110-83-8	310	3,100			

Appendix A - § 35-APX-A1 - Soil Screening Values
(see notes at end of table)

Analyte	CAS Number	EPA Regional Screening Levels (TR=1E-06, HQ=1.0)		Vermont Screening Levels (TR=1E-06, HQ=1.0)	VT DEC Background Soil Concentrations	
		Resident Soil (mg/kg)	Industrial Soil (mg/kg)	Resident Soil (mg/kg)	Rural (mg/kg)	Urban (mg/kg)
Cyclohexylamine	108-91-8	16,000	230,000			
Cyfluthrin	68359-37-5	1,600	21,000			
Cyhalothrin	68085-85-8	320	4,100			
Cypermethrin	52315-07-8	630	8,200			
Cyromazine	66215-27-8	470	6,200			
DDD	72-54-8	2.3	9.6			
DDE, p,p'-	72-55-9	2	9.3			
DDT	50-29-3	1.9	8.5			
Dalapon	75-99-0	1,900	25,000			
Daminozide	1596-84-5	30	130			
Decabromodiphenyl ether, 2,2',3,3',4,4',5,5',6,6'-(BDE-209)	1163-19-5	440	3,300			
Demeton	8065-48-3	2.5	33			
Di(2-ethylhexyl)adipate	103-23-1	450	1,900			
Diallate	2303-16-4	8.9	38			
Diazinon	333-41-5	44	570			
Dibenzothiophene	132-65-0	780	12,000			
Dibromo-3-chloropropane, 1,2-	96-12-8		0.064	0.00327		
Dibromobenzene, 1,3-	108-36-1	31	470			
Dibromobenzene, 1,4-	106-37-6	780	12,000			
Dibromochloromethane	124-48-1	8.3	39			
Dibromoethane, 1,2-	106-93-4	0.036	0.16			
Dibromomethane (Methylene Bromide)	74-95-3	24	99			
Dibutyltin Compounds	NA	19	250			
Dicamba	1918-00-9	1,900	25,000			
Dichloro-2-butene, 1,4-	764-41-0	0.0021	0.0094			
Dichloro-2-butene, cis-1,4-	1476-11-5	0.0074	0.032			
Dichloro-2-butene, trans-1,4-	110-57-6	0.0074	0.032			
Dichloroacetic Acid	79-43-6	11	46			
Dichlorobenzene, 1,2-	95-50-1	1,800	9,300			
Dichlorobenzene, 1,4-	106-46-7	2.6	11			
Dichlorobenzidine, 3,3'-	91-94-1	1.2	5.1			
Dichlorobenzophenone, 4,4'-	90-98-2	570	7,400			
Dichlorodifluoromethane	75-71-8	87	370			
Dichloroethane, 1,1-	75-34-3	3.6	16			
Dichloroethane, 1,2-	107-06-2		2	0.175		
Dichloroethylene, 1,1-	75-35-4	230	1,000			
Dichloroethylene, 1,2-cis-	156-59-2		2,300	146		
Dichloroethylene, 1,2-trans-	156-60-5		23,000	1,460		
Dichlorophenol, 2,4-	120-83-2	190	2,500			
Dichlorophenoxy Acetic Acid, 2,4-	94-75-7	700	9,600			
Dichlorophenoxy)butyric Acid, 4-(2,4-	94-82-6	510	6,600			
Dichloropropane, 1,2-	78-87-5	1	4.4			
Dichloropropane, 1,3-	142-28-9	1,600	23,000			
Dichloropropanol, 2,3-	616-23-9	190	2,500			
Dichloropropene, 1,3-	542-75-6	1.8	8.2			
Dichlorvos	62-73-7	1.9	7.9			
Dicrotophos	141-66-2	6.3	82			
Dicyclopentadiene	77-73-6	1.3	5.4			
Dieldrin	60-57-1	0.034	0.14			
Diethanolamine	111-42-2	130	1,600			
Diethylene Glycol Monobutyl Ether	112-34-5	1,900	24,000			
Diethylene Glycol Monoethyl Ether	111-90-0	3,800	48,000			
Diethylformamide	617-84-5	78	1,200			
Diethylstilbestrol	56-53-1	0.0016	0.0066			
Difenzoquat	43222-48-6	5,100	66,000			
Di-flubenzuron	35367-38-5	1,300	16,000			
Difluoroethane, 1,1-	75-37-6	48,000	200,000			
Dihydrosafrole	94-58-6	9.9	45			

Appendix A - § 35-APX-A1 - Soil Screening Values
(see notes at end of table)

		EPA Regional Screening Levels (TR=1E-06, HQ=1.0)		Vermont Screening Levels (TR=1E-06, HQ=1.0)	VT DEC Background Soil Concentrations	
Analyte	CAS Number	Resident Soil (mg/kg)	Industrial Soil (mg/kg)	Resident Soil (mg/kg)	Rural (mg/kg)	Urban (mg/kg)
Diisopropyl Ether	108-20-3	2,200	9,400			
Diisopropyl Methylphosphonate	1445-75-6	6,300	93,000			
Dimethipin	55290-64-7	1,300	16,000			
Dimethoate	60-51-5	13	160			
Dimethoxybenzidine, 3,3'-	119-90-4	0.34	1.4			
Dimethyl methylphosphonate	756-79-6	320	1,400			
Dimethylamino azobenzene [p-]	60-11-7	0.12	0.5			
Dimethylaniline HCl, 2,4-	21436-96-4	0.94	4			
Dimethylaniline, 2,4-	95-68-1	2.7	11			
Dimethylaniline, N,N-	121-69-7	160	2,300			
Dimethylbenzidine, 3,3'-	119-93-7	0.049	0.21			
Dimethylformamide	68-12-2	2,600	15,000			
Dimethylhydrazine, 1,1-	57-14-7	0.057	0.24			
Dimethylhydrazine, 1,2-	540-73-8	0.00088	0.0041			
Dimethylphenol, 2,4-	105-67-9	1,300	16,000			
Dimethylphenol, 2,6-	576-26-1	38	490			
Dimethylphenol, 3,4-	95-65-8	63	820			
Dimethylvinylchloride	513-37-1	1.1	4.8			
Dinitro-o-cresol, 4,6-	534-52-1	5.1	66			
Dinitro-o-cyclohexyl Phenol, 4,6-	131-89-5	130	1,600			
Dinitrobenzene, 1,2-	528-29-0	6.3	82			
Dinitrobenzene, 1,3-	99-65-0	6.3	82			
Dinitrobenzene, 1,4-	100-25-4	6.3	82			
Dinitrophenol, 2,4-	51-28-5	130	1,600			
Dinitrotoluene Mixture, 2,4/2,6-	NA	0.8	3.4			
Dinitrotoluene, 2,4-	121-14-2	1.7	7.4			
Dinitrotoluene, 2,6-	606-20-2	0.36	1.5			
Dinitrotoluene, 2-Amino-4,6-	35572-78-2	150	2,300			
Dinitrotoluene, 4-Amino-2,6-	19406-51-0	150	2,300			
Dinitrotoluene, Technical grade	25321-14-6	1.2	5.1			
Dinoseb	88-85-7	63	820			
Dioxane, 1,4-	123-91-1		24	2.52		
Dioxins						
~Hexachlorodibenzo-p-dioxin, Mixture	NA	0.0001	0.00047			
TCDD, 2,3,7,8-	1746-01-6		0.000022	0.0000233		
Diphenamid	957-51-7	1,900	25,000			
Diphenyl Sulfone	127-63-9	51	660			
Diphenylamine	122-39-4	1,600	21,000			
Diphenylhydrazine, 1,2-	122-66-7	0.68	2.9			
Diquat	85-00-7	140	1,800			
Direct Black 38	1937-37-7	0.076	0.32			
Direct Blue 6	2602-46-2	0.073	0.31			
Direct Brown 95	16071-86-6	0.081	0.34			
Disulfoton	298-04-4	2.5	33			
Dithiane, 1,4-	505-29-3	780	12,000			
Diuron	330-54-1	130	1,600			
Dodine	2439-10-3	250	3,300			
EPTC	759-94-4	2,000	29,000			
Endosulfan	115-29-7	470	7,000			
Endothall	145-73-3	1,300	16,000			
Endrin	72-20-8	19	250			
Epichlorohydrin	106-89-8	19	82			
Epoxybutane, 1,2-	106-88-7	160	670			
Ethanol, 2-(2-methoxyethoxy)-	111-77-3	2,500	33,000			
Ethephon	16672-87-0	320	4,100			
Ethion	563-12-2	32	410			
Ethoxyethanol Acetate, 2-	111-15-9	2,600	14,000			
Ethoxyethanol, 2-	110-80-5	5,200	47,000			
Ethyl Acetate	141-78-6	620	2,600			

Appendix A - § 35-APX-A1 - Soil Screening Values
(see notes at end of table)

		EPA Regional Screening Levels (TR=1E-06, HQ=1.0)		Vermont Screening Levels (TR=1E-06, HQ=1.0)	VT DEC Background Soil Concentrations	
Analyte	CAS Number	Resident Soil (mg/kg)	Industrial Soil (mg/kg)	Resident Soil (mg/kg)	Rural (mg/kg)	Urban (mg/kg)
Ethyl Acrylate	140-88-5	47	210			
Ethyl Chloride (Chloroethane)	75-00-3	14,000	57,000			
Ethyl Ether	60-29-7	16,000	230,000			
Ethyl Methacrylate	97-63-2	1,800	7,600			
Ethyl-p-nitrophenyl Phosphonate	2104-64-5	0.63	8.2			
Ethylbenzene	100-41-4		25	2.21		
Ethylene Cyanohydrin	109-78-4	4,400	57,000			
Ethylene Diamine	107-15-3	7,000	110,000			
Ethylene Glycol	107-21-1	130,000	1,600,000			
Ethylene Glycol Monobutyl Ether	111-76-2	6,300	82,000			
Ethylene Oxide	75-21-8	0.18	0.79			
Ethylene Thiourea	96-45-7	5.1	51			
Ethyleneimine	151-56-4	0.0027	0.012			
Ethylphthalyl Ethyl Glycolate	84-72-0	190,000	2,500,000			
Fenamiphos	22224-92-6	16	210			
Fenpropathrin	39515-41-8	1,600	21,000			
Fenvalerate	51630-58-1	1,600	21,000			
Fluometuron	2164-17-2	820	11,000			
Fluoride	16984-48-8	3,100	47,000			
Fluorine (Soluble Fluoride)	7782-41-4	4,700	70,000			
Fluridone	59756-60-4	5,100	66,000			
Flurprimidol	56425-91-3	1,300	16,000			
Flusilazole	85509-19-9	44	570			
Flutolanil	66332-96-5	3,800	49,000			
Fluvalinate	69409-94-5	630	8,200			
Folpet	133-07-3	160	660			
Fomesafen	72178-02-0	2.9	12			
Fonofos	944-22-9	130	1,600			
Formaldehyde	50-00-0	17	73			
Formic Acid	64-18-6	29	120			
Fosetyl-AL	39148-24-8	190,000	2,500,000			
Furans						
~Dibenzofuran	132-64-9	73	1,000			
~Furan	110-00-9	73	1,000			
~Tetrahydrofuran	109-99-9	18,000	94,000			
Furazolidone	67-45-8	0.14	0.6			
Furfural	98-01-1	210	2,600			
Furium	531-82-8	0.36	1.5			
Furmecyclox	60568-05-0	18	77			
Glufosinate, Ammonium	77182-82-2	25	330			
Glutaraldehyde	111-30-8	110,000	480,000			
Glycidyl	765-34-4	23	210			
Glyphosate	1071-83-6	6,300	82,000			
Guanidine	113-00-8	780	12,000			
Guanidine Chloride	50-01-1	1,300	16,000			
Haloxyfop, Methyl	69806-40-2	3.2	41			
Heptachlor	76-44-8	0.13	0.63			
Heptachlor Epoxide	1024-57-3	0.07	0.33			
Hexabromobenzene	87-82-1	160	2,300			
Hexabromodiphenyl ether, 2,2',4,4',5,5'- (BDE-153)	68631-49-2	13	160			
Hexachlorobenzene	118-74-1		0.96	0.0918		
Hexachlorobutadiene	87-68-3	1.2	5.3			
Hexachlorocyclohexane, Alpha-	319-84-6	0.086	0.36			
Hexachlorocyclohexane, Beta-	319-85-7	0.3	1.3			
Hexachlorocyclohexane, Gamma- (Lindane)	58-89-9	0.57	2.5			
Hexachlorocyclohexane, Technical	608-73-1	0.3	1.3			
Hexachlorocyclopentadiene	77-47-4	1.8	7.5			
Hexachloroethane	67-72-1	1.8	8			

Appendix A - § 35-APX-A1 - Soil Screening Values
(see notes at end of table)

Analyte	CAS Number	EPA Regional Screening Levels (TR=1E-06, HQ=1.0)		Vermont Screening Levels (TR=1E-06, HQ=1.0)	VT DEC Background Soil Concentrations	
		Resident Soil (mg/kg)	Industrial Soil (mg/kg)	Resident Soil (mg/kg)	Rural (mg/kg)	Urban (mg/kg)
Hexachlorophene	70-30-4	19	250			
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	121-82-4		28	3.49		
Hexamethylene Diisocyanate, 1,6-	822-06-0	3.1	13			
Hexamethylphosphoramide	680-31-9	25	330			
Hexane, N-	110-54-3	610	2,500			
Hexanedioic Acid	124-04-9	130,000	1,600,000			
Hexanone, 2-	591-78-6	200	1,300			
Hexazinone	51235-04-2	2,100	27,000			
Hexythiazox	78587-05-0	1,600	21,000			
Hydramethylnon	67485-29-4	19	250			
Hydrazine	302-01-2	0.23	1.1			
Hydrazine Sulfate	10034-93-2	0.23	1.1			
Hydrogen Chloride	7647-01-0	28,000,000	120,000,000			
Hydrogen Fluoride	7664-39-3	3,100	47,000			
Hydrogen Sulfide	7783-06-4	2,800,000	12,000,000			
Hydroquinone	123-31-9	9	38			
Imazalil	35554-44-0	820	11,000			
Imazaquin	81335-37-7	16,000	210,000			
Imazethapyr	81335-77-5	16,000	210,000			
Iodine	7553-56-2	780	12,000			
Iprodione	36734-19-7	2,500	33,000			
Iron	7439-89-6		820,000	53,500		
Isobutyl Alcohol	78-83-1	23,000	350,000			
Isophorone	78-59-1	570	2,400			
Isopropalin	33820-53-0	1,200	18,000			
Isopropanol	67-63-0	5,600	24,000			
Isopropyl Methyl Phosphonic Acid	1832-54-8	6,300	82,000			
Isoxaben	82558-50-7	3,200	41,000			
JP-7	NA	430,000,000	1,800,000,000			
Lactofen	77501-63-4	130	1,600			
Lead Compounds						
~Lead Chromate	7758-97-6	0.3	6.2			
~Lead Phosphate	7446-27-7	82	380			
~Lead acetate	301-04-2	64	270			
~Lead and Compounds	7439-92-1	400	800		41	111
~Lead subacetate	1335-32-6	64	270			
~Tetraethyl Lead	78-00-2	0.0078	0.12			
Lewisite	541-25-3	0.39	5.8			
Linuron	330-55-2	130	1,600			
Lithium	7439-93-2	160	2,300			
MCPA	94-74-6	32	410			
MCPB	94-81-5	630	8,200			
MCPP	93-65-2	63	820			
Malathion	121-75-5	1,300	16,000			
Maleic Anhydride	108-31-6	6,300	80,000			
Maleic Hydrazide	123-33-1	32,000	410,000			
Malononitrile	109-77-3	6.3	82			
Mancozeb	8018-01-7	1,900	25,000			
Maneb	12427-38-2	320	4,100			
Manganese (Non-diet)	7439-96-5		26,000	1,170		
Mephosfolan	950-10-7	5.7	74			
Mepiquat Chloride	24307-26-4	1,900	25,000			
Mercury Compounds						
~Mercuric Chloride (and other Mercury salts)	7487-94-7	23	350			
Mercury (elemental)	7439-97-6		46	10.9		
~Methyl Mercury	22967-92-6	7.8	120			
~Phenylmercuric Acetate	62-38-4	5.1	66			
Merphos	150-50-5	2.3	35			
Merphos Oxide	78-48-8	1.9	25			

Appendix A - § 35-APX-A1 - Soil Screening Values
(see notes at end of table)

Analyte	CAS Number	EPA Regional Screening Levels (TR=1E-06, HQ=1.0)		Vermont Screening Levels (TR=1E-06, HQ=1.0)	VT DEC Background Soil Concentrations	
		Resident Soil (mg/kg)	Industrial Soil (mg/kg)	Resident Soil (mg/kg)	Rural (mg/kg)	Urban (mg/kg)
Metalaxyl	57837-19-1	3,800	49,000			
Methacrylonitrile	126-98-7	7.5	100			
Methamidophos	10265-92-6	3.2	41			
Methanol	67-56-1	120,000	1,200,000			
Methidathion	950-37-8	63	820			
Methomyl	16752-77-5	1,600	21,000			
Methoxy-5-nitroaniline, 2-	99-59-2	11	47			
Methoxychlor	72-43-5	320	4,100			
Methoxyethanol Acetate, 2-	110-49-6	110	510			
Methoxyethanol, 2-	109-86-4	330	3,500			
Methyl Acetate	79-20-9	78,000	1,200,000			
Methyl Acrylate	96-33-3	150	610			
Methyl Ethyl Ketone (2-Butanone)	78-93-3		190,000	26,000		
Methyl Hydrazine	60-34-4	0.14	0.62			
Methyl Isobutyl Ketone (4-methyl-2-pentanone)	108-10-1	33,000	140,000			
Methyl Isocyanate	624-83-9	4.6	19			
Methyl Methacrylate	80-62-6	4,400	19,000			
Methyl Parathion	298-00-0	16	210			
Methyl Phosphonic Acid	993-13-5	3,800	49,000			
Methyl Styrene (Mixed Isomers)	25013-15-4	320	2,600			
Methyl methanesulfonate	66-27-3	5.5	23			
Methyl tert-Butyl Ether (MTBE)	1634-04-4	47	210			
Methyl-1,4-benzenediamine dihydrochloride, 2-	615-45-2	19	250			
Methyl-5-Nitroaniline, 2-	99-55-8	60	260			
Methyl-N-nitro-N-nitrosoguanidine, N-	70-25-7	0.065	0.28			
Methylaniline Hydrochloride, 2-	636-21-5	4.2	18			
Methylarsonic acid	124-58-3	630	8,200			
Methylbenzene, 1-4-diamine monohydrochloride, 2-	74612-12-7	13	160			
Methylbenzene-1,4-diamine sulfate, 2-	615-50-9	5.4	23			
Methylcholanthrene, 3-	56-49-5	0.0055	0.1			
Methylene Chloride	75-09-2	57	1,000			
Methylene-bis(2-chloroaniline), 4,4'-	101-14-4	1.2	23			
Methylene-bis(N,N-dimethyl) Aniline, 4,4'-	101-61-1	12	50			
Methylenebisbenzenamine, 4,4'-	101-77-9	0.34	1.4			
Methylenediphenyl Diisocyanate	101-68-8	850,000	3,600,000			
Methylstyrene, Alpha-	98-83-9	5,500	82,000			
Metolachlor	51218-45-2	9,500	120,000			
Metribuzin	21087-64-9	1,600	21,000			
Metsulfuron-methyl	74223-64-6	16,000	210,000			
Mineral oils	8012-95-1	230,000	3,500,000			
Mirex	2385-85-5	0.036	0.17			
Molinate	2212-67-1	130	1,600			
Molybdenum	7439-98-7		5,800	382		
Monochloramine	10599-90-3	7,800	120,000			
Monomethylaniline	100-61-8	130	1,600			
Myclobutanil	88671-89-0	1,600	21,000			
N,N'-Diphenyl-1,4-benzenediamine	74-31-7	19	250			
Naled	300-76-5	160	2,300			
Naphtha, High Flash Aromatic (HFAN)	64742-95-6	2,300	35,000			
Naphthylamine, 2-	91-59-8	0.3	1.3			
Napropamide	15299-99-7	6,300	82,000			
Nickel Acetate	373-02-4	670	8,100			
Nickel Carbonate	3333-67-3	670	8,100			
Nickel Carbonyl	13463-39-3	820	11,000			
Nickel Hydroxide	12054-48-7	820	11,000			
Nickel Oxide	1313-99-1	840	12,000			
Nickel Refinery Dust	NA	820	11,000			
Nickel Soluble Salts	7440-02-0		22,000	980		
Nickel Subsulfide	12035-72-2	0.41	1.9			

Appendix A - § 35-APX-A1 - Soil Screening Values
(see notes at end of table)

		EPA Regional Screening Levels (TR=1E-06, HQ=1.0)		Vermont Screening Levels (TR=1E-06, HQ=1.0)	VT DEC Background Soil Concentrations	
Analyte	CAS Number	Resident Soil (mg/kg)	Industrial Soil (mg/kg)	Resident Soil (mg/kg)	Rural (mg/kg)	Urban (mg/kg)
Nickelocene	1271-28-9	670	8,100			
Nitrate	14797-55-8	130,000	1,900,000			
Nitrite	14797-65-0	7,800	120,000			
Nitroaniline, 2-	88-74-4	630	8,000			
Nitroaniline, 4-	100-01-6	27	110			
Nitrobenzene	98-95-3	5.1	22			
Nitrocellulose	9004-70-0	190,000,000	2,500,000,000			
Nitrofurantoin	67-20-9	4,400	57,000			
Nitrofurazone	59-87-0	0.42	1.8			
Nitroglycerin	55-63-0	6.3	82			
Nitroguanidine	556-88-7	6,300	82,000			
Nitromethane	75-52-5	5.4	24			
Nitropropane, 2-	79-46-9	0.014	0.06			
Nitroso-N-ethylurea, N-	759-73-9	0.0045	0.085			
Nitroso-N-methylurea, N-	684-93-5	0.001	0.019			
Nitroso-di-N-butylamine, N-	924-16-3	0.099	0.46			
Nitroso-di-N-propylamine, N-	621-64-7	0.078	0.33			
Nitrosodiethanolamine, N-	1116-54-7	0.19	0.82			
Nitrosodiethylamine, N-	55-18-5	0.00081	0.015			
Nitrosodimethylamine, N-	62-75-9	0.002	0.034			
Nitrosodiphenylamine, N-	86-30-6	110	470			
Nitrosomethylethylamine, N-	10595-95-6	0.02	0.091			
Nitrosomorpholine [N-]	59-89-2	0.081	0.34			
Nitrosopiperidine [N-]	100-75-4	0.058	0.24			
Nitrosopyrrolidine, N-	930-55-2	0.26	1.1			
Nitrotoluene, m-	99-08-1	6.3	82			
Nitrotoluene, o-	88-72-2	3.2	15			
Nitrotoluene, p-	99-99-0	34	140			
Nonane, n-	111-84-2	11	72			
Norflurazon	27314-13-2	2,500	33,000			
Octabromodiphenyl Ether	32536-52-0	190	2500			
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	2691-41-0		57,000	3,860		
Octamethylpyrophosphoramidate	152-16-9	130	1,600			
Oryzalin	19044-88-3	3,200	41,000			
Oxadiazon	19666-30-9	320	4,100			
Oxamyl	23135-22-0	1,600	21,000			
Oxyfluorfen	42874-03-3	190	2,500			
Paclbutrazol	76738-62-0	820	11,000			
Paraquat Dichloride	1910-42-5	280	3,700			
Parathion	56-38-2	380	4,900			
Pebulate	1114-71-2	3,900	58,000			
Pendimethalin	40487-42-1	2,500	33,000			
Pentabromodiphenyl Ether	32534-81-9	160	2,300			
Pentabromodiphenyl ether, 2,2',4,4',5- (BDE-99)	60348-60-9	6.3	82			
Pentachlorobenzene	608-93-5	63	930			
Pentachloroethane	76-01-7	7.7	36			
Pentachloronitrobenzene	82-68-8	2.7	13			
Pentachlorophenol	87-86-5		4	0.504		
Pentaerythritol tetranitrate (PETN)	78-11-5		570	127		
Pentane, n-	109-66-0	810	3,400			
Perchlorates						
~Ammonium Perchlorate	7790-98-9	55	820			
~Lithium Perchlorate	7791-03-9	55	820			
Perchlorate and Perchlorate Salts	14797-73-0		820	53.5		
~Potassium Perchlorate	7778-74-7	55	820			
~Sodium Perchlorate	7601-89-0	55	820			
Perfluorobutane Sulfonate	375-73-5	1,600	23,000			
Perfluorooctanic Acid	335-67-1			0.30		

Appendix A - § 35-APX-A1 - Soil Screening Values
(see notes at end of table)

		EPA Regional Screening Levels (TR=1E-06, HQ=1.0)		Vermont Screening Levels (TR=1E-06, HQ=1.0)	VT DEC Background Soil Concentrations	
Analyte	CAS Number	Resident Soil (mg/kg)	Industrial Soil (mg/kg)	Resident Soil (mg/kg)	Rural (mg/kg)	Urban (mg/kg)
Permethrin	52645-53-1	3,200	41,000			
Phenacetin	62-44-2	250	1,000			
Phenmedipham	13684-63-4	16,000	210,000			
Phenol	108-95-2	19,000	250,000			
Phenol, 2-(1-methylethoxy)- Methylcarbamate, (Baygon, Propoxur)	114-26-1		3,300	82.2		
Phenothiazine	92-84-2	32	410			
Phenylenediamine, m-	108-45-2	380	4,900			
Phenylenediamine, o-	95-54-5	12	49			
Phenylenediamine, p-	106-50-3	12,000	160,000			
Phenylphenol, 2-	90-43-7	280	1,200			
Phorate	298-02-2	13	160			
Phosgene	75-44-5	0.31	1.3			
Phosmet	732-11-6	1,300	16,000			
Phosphates, Inorganic						
~Aluminum metaphosphate	13776-88-0	3,800,000	57,000,000			
~Ammonium polyphosphate	68333-79-9	3,800,000	57,000,000			
~Calcium pyrophosphate	7790-76-3	3,800,000	57,000,000			
~Diammonium phosphate	7783-28-0	3,800,000	57,000,000			
~Dicalcium phosphate	7757-93-9	3,800,000	57,000,000			
~Dimagnesium phosphate	7782-75-4	3,800,000	57,000,000			
~Dipotassium phosphate	7758-11-4	3,800,000	57,000,000			
~Disodium phosphate	7558-79-4	3,800,000	57,000,000			
~Monoaluminum phosphate	13530-50-2	3,800,000	57,000,000			
~Monoammonium phosphate	7722-76-1	3,800,000	57,000,000			
~Monocalcium phosphate	7758-23-8	3,800,000	57,000,000			
~Monomagnesium phosphate	7757-86-0	3,800,000	57,000,000			
~Monopotassium phosphate	7778-77-0	3,800,000	57,000,000			
~Monosodium phosphate	7558-80-7	3,800,000	57,000,000			
~Polyphosphoric acid	8017-16-1	3,800,000	57,000,000			
~Potassium triphosphate	13845-36-8	3,800,000	57,000,000			
~Sodium acid pyrophosphate	7758-16-9	3,800,000	57,000,000			
~Sodium aluminum phosphate (acidic)	7785-88-8	3,800,000	57,000,000			
~Sodium aluminum phosphate (anhydrous)	10279-59-1	3,800,000	57,000,000			
~Sodium aluminum phosphate (tetrahydrate)	10305-76-7	3,800,000	57,000,000			
~Sodium hexametaphosphate	10124-56-8	3,800,000	57,000,000			
~Sodium polyphosphate	68915-31-1	3,800,000	57,000,000			
~Sodium trimetaphosphate	7785-84-4	3,800,000	57,000,000			
~Sodium triphosphate	7758-29-4	3,800,000	57,000,000			
~Tetrapotassium phosphate	7320-34-5	3,800,000	57,000,000			
~Tetrasodium pyrophosphate	7722-88-5	3,800,000	57,000,000			
decahydrogenoctaorthophosphate (dihydrate)	15136-87-5	3,800,000	57,000,000			
~Tricalcium phosphate	7758-87-4	3,800,000	57,000,000			
~Trimagnesium phosphate	7757-87-1	3,800,000	57,000,000			
~Tripotassium phosphate	7778-53-2	3,800,000	57,000,000			
~Trisodium phosphate	7601-54-9	3,800,000	57,000,000			
Phosphine	7803-51-2	23	350			
Phosphoric Acid	7664-38-2	3,000,000	29,000,000			
Phosphorus, White	7723-14-0	1.6	23			
Phthalates						
Bis(2-ethylhexyl)phthalate	117-81-7		160	20.7		
~Butyl Benzyl Phthalate	85-68-7	290	1,200			
~Butylphthalyl Butylglycolate	85-70-1	63,000	820,000			
~Dibutyl Phthalate	84-74-2	6,300	82,000			
~Diethyl Phthalate	84-66-2	51,000	660,000			
~Dimethylterephthalate	120-61-6	7,800	120,000			
~Octyl Phthalate, di-N-	117-84-0	630	8,200			
~Phthalic Acid, P-	100-21-0	63,000	820,000			
~Phthalic Anhydride	85-44-9	130,000	1,600,000			

Appendix A - § 35-APX-A1 - Soil Screening Values
(see notes at end of table)

		EPA Regional Screening Levels (TR=1E-06, HQ=1.0)		Vermont Screening Levels (TR=1E-06, HQ=1.0)	VT DEC Background Soil Concentrations	
Analyte	CAS Number	Resident Soil (mg/kg)	Industrial Soil (mg/kg)	Resident Soil (mg/kg)	Rural (mg/kg)	Urban (mg/kg)
Picloram	1918-02-1	4,400	57,000			
Picramic Acid (2-Amino-4,6-dinitrophenol)	96-91-3	6.3	82			
Picric Acid (2,4,6-Trinitrophenol)	88-89-1	57	740			
Pirimiphos, Methyl	29232-93-7	630	8,200			
Polybrominated Biphenyls	59536-65-1	0.018	0.077			
Polychlorinated Biphenyls (PCBs)						
~Aroclor 1016	12674-11-2	4.1	27			
~Aroclor 1221	11104-28-2	0.2	0.83			
~Aroclor 1232	11141-16-5	0.17	0.72			
~Aroclor 1242	53469-21-9	0.23	0.95			
~Aroclor 1248	12672-29-6	0.23	0.95			
~Aroclor 1254	11097-69-1		0.97	0.120		
~Aroclor 1260	11096-82-5	0.24	0.99			
~Aroclor 5460	11126-42-4	35	440			
~Heptachlorobiphenyl, 2,3,3',4,4',5,5'- (PCB 189)	39635-31-9	0.13	0.52			
~Hexachlorobiphenyl, 2,3',4,4',5,5'- (PCB 167)	52663-72-6	0.12	0.51			
~Hexachlorobiphenyl, 2,3,3',4,4',5'- (PCB 157)	69782-90-7	0.12	0.5			
~Hexachlorobiphenyl, 2,3,3',4,4',5- (PCB 156)	38380-08-4	0.12	0.5			
~Hexachlorobiphenyl, 3,3',4,4',5,5'- (PCB 169)	32774-16-6	0.00012	0.00051			
~Pentachlorobiphenyl, 2',3,4,4',5- (PCB 123)	65510-44-3	0.12	0.49			
~Pentachlorobiphenyl, 2,3',4,4',5- (PCB 118)	31508-00-6	0.12	0.49			
~Pentachlorobiphenyl, 2,3,3',4,4'- (PCB 105)	32598-14-4	0.12	0.49			
~Pentachlorobiphenyl, 2,3,4,4',5- (PCB 114)	74472-37-0	0.12	0.5			
~Pentachlorobiphenyl, 3,3',4,4',5- (PCB 126)	57465-28-8	0.000036	0.00015			
~Polychlorinated Biphenyls (high risk)	1336-36-3		0.94	0.114		
~Tetrachlorobiphenyl, 3,3',4,4'- (PCB 77)	32598-13-3	0.038	0.16			
~Tetrachlorobiphenyl, 3,4,4',5- (PCB 81)	70362-50-4	0.012	0.048			
Polymeric Methylene Diphenyl Diisocyanate (PMDI)	9016-87-9	850,000	3,600,000			
Polynuclear Aromatic Hydrocarbons (PAHs)					0.026	0.58
~Acenaphthene	83-32-9	3,600	45,000			
~Anthracene	120-12-7	18,000	230,000			
~Benz[a]anthracene	56-55-3	0.16	2.9			
~Benzo(j)fluoranthene	205-82-3	0.42	1.8			
~Benzo[a]pyrene	50-32-8			0.076/1.54 ¹		
~Benzo[b]fluoranthene	205-99-2	0.16	2.9			
~Benzo[k]fluoranthene	207-08-9	1.6	29			
~Chloronaphthalene, Beta-	91-58-7	4,800	60,000			
~Chrysene	218-01-9	16	290			
~Dibenz[a,h]anthracene	53-70-3	0.016	0.29			
~Dibenzo(a,e)pyrene	192-65-4	0.042	0.18			
~Dimethylbenz(a)anthracene, 7,12-	57-97-6	0.00046	0.0084			
~Fluoranthene	206-44-0	2,400	30,000			
~Fluorene	86-73-7	2,400	30,000			
~Indeno[1,2,3-cd]pyrene	193-39-5	0.16	2.9			
~Methylnaphthalene, 1-	90-12-0	18	73			
~Methylnaphthalene, 2-	91-57-6	240	3,000			
~Naphthalene	91-20-3		17	1.42		
~Nitropyrene, 4-	57835-92-4	0.42	1.8			
~Pyrene	129-00-0	1,800	23,000			
Potassium Perfluorobutane Sulfonate	29420-49-3	1,300	16,000			
Prochloraz	67747-09-5	3.6	15			
Profuralin	26399-36-0	470	7,000			
Prometon	1610-18-0	950	12,000			
Prometryn	7287-19-6	250	3,300			
Propachlor	1918-16-7	820	11,000			
Propanil	709-98-8	320	4,100			
Propargite	2312-35-8	1,300	16,000			
Propargyl Alcohol	107-19-7	160	2,300			

Appendix A - § 35-APX-A1 - Soil Screening Values
(see notes at end of table)

Analyte	CAS Number	EPA Regional Screening Levels (TR=1E-06, HQ=1.0)		Vermont Screening Levels (TR=1E-06, HQ=1.0)	VT DEC Background Soil Concentrations	
		Resident Soil (mg/kg)	Industrial Soil (mg/kg)	Resident Soil (mg/kg)	Rural (mg/kg)	Urban (mg/kg)
Propazine	139-40-2	1,300	16,000			
Propham	122-42-9	1,300	16,000			
Propiconazole	60207-90-1	820	11,000			
Propionaldehyde	123-38-6	75	310			
Propyl benzene	103-65-1	3,800	24,000			
Propylene	115-07-1	2,200	9,300			
Propylene Glycol	57-55-6	1,300,000	16,000,000			
Propylene Glycol Dinitrate	6423-43-4	390,000	1,600,000			
Propylene Glycol Monomethyl Ether	107-98-2	41,000	370,000			
Propylene Oxide	75-56-9	2.1	9.7			
Propyzamide	23950-58-5	4,700	62,000			
Pyridine	110-86-1	78	1,200			
Quinalphos	13593-03-8	32	410			
Quinoline	91-22-5	0.18	0.77			
Quizalofop-ethyl	76578-14-8	570	7,400			
Refractory Ceramic Fibers	NA	43,000,000	180,000,000			
Resmethrin	10453-86-8	1,900	25,000			
Ronnel	299-84-3	3,900	58,000			
Rotenone	83-79-4	250	3,300			
Safrole	94-59-7	0.55	10			
Selenious Acid	7783-00-8	390	5,800			
Selenium	7782-49-2		5,800	382		
Selenium Sulfide	7446-34-6	390	5,800			
Sethoxydim	74051-80-2	5,700	74,000			
Silica (crystalline, respirable)	7631-86-9	4,300,000	18,000,000			
Silver	7440-22-4		5,800	247		
Simazine	122-34-9	4.5	19			
Sodium Acifluorfen	62476-59-9	820	11,000			
Sodium Azide	26628-22-8	310	4,700			
Sodium Dichromate	10588-01-9	0.3	6.2			
Sodium Diethyldithiocarbamate	148-18-5	2	8.5			
Sodium Fluoride	7681-49-4	3,900	58,000			
Sodium Fluoroacetate	62-74-8	1.3	16			
Sodium Metavanadate	13718-26-8	78	1,200			
Sodium Tungstate	13472-45-2	63	930			
Sodium Tungstate Dihydrate	10213-10-2	63	930			
Stirofos (Tetrachlorovinphos)	961-11-5	23	96			
Strontium Chromate	7789-06-2	0.3	6.2			
Strontium, Stable	7440-24-6	47,000	700,000			
Strychnine	57-24-9	19	250			
Styrene	100-42-5	6,000	35,000			
Styrene-Acrylonitrile (SAN) Trimer	NA	190	2,500			
Sulfolane	126-33-0	63	820			
Sulfonylbis(4-chlorobenzene), 1,1'-	80-07-9	51	660			
Sulfur Trioxide	7446-11-9	1,400,000	6,000,000			
Sulfuric Acid	7664-93-9	1,400,000	6,000,000			
Sulfurous acid, 2-chloroethyl 2-[4-(1,1-dimethylethyl)phenoxy]-1-methylethyl ester	140-57-8	22	92			
TCMTB	21564-17-0	1,900	25,000			
Tebuthiuron	34014-18-1	4,400	57,000			
Temphos	3383-96-8	1,300	16,000			
Terbacil	5902-51-2	820	11,000			
Terbufos	13071-79-9	2	29			
Terbutryn	886-50-0	63	820			
Tetrabromodiphenyl ether, 2,2',4,4'- (BDE-47)	5436-43-1	6.3	82			
Tetrachlorobenzene, 1,2,4,5-	95-94-3	23	350			
Tetrachloroethane, 1,1,1,2-	630-20-6	2	8.8			
Tetrachloroethane, 1,1,2,2-	79-34-5	0.6	2.7			
Tetrachloroethylene	127-18-4		100	1.46		

Appendix A - § 35-APX-A1 - Soil Screening Values
(see notes at end of table)

Analyte	CAS Number	EPA Regional Screening Levels (TR=1E-06, HQ=1.0)		Vermont Screening Levels (TR=1E-06, HQ=1.0)	VT DEC Background Soil Concentrations	
		Resident Soil (mg/kg)	Industrial Soil (mg/kg)	Resident Soil (mg/kg)	Rural (mg/kg)	Urban (mg/kg)
Tetrachlorophenol, 2,3,4,6-	58-90-2	1,900	25,000			
Tetrachlorotoluene, p- alpha, alpha, alpha-	5216-25-1	0.035	0.16			
Tetraethyl Dithiopyrophosphate	3689-24-5	32	410			
Tetrafluoroethane, 1,1,1,2-	811-97-2	100,000	430,000			
Tetryl (Trinitrophenylmethylnitramine)	479-45-8	160	2,300			
Thallic Oxide	1314-32-5	1.6	23			
Thallium (I) Nitrate	10102-45-1	0.78	12			
Thallium (Soluble Salts)	7440-28-0		12	0.764		
Thallium Acetate	563-68-8	0.78	12			
Thallium Carbonate	6533-73-9	1.6	23			
Thallium Chloride	7791-12-0	0.78	12			
Thallium Selenite	12039-52-0	0.78	12			
Thallium Sulfate	7446-18-6	1.6	23			
Thifensulfuron-methyl	79277-27-3	820	11,000			
Thiobencarb	28249-77-6	630	8,200			
Thiodiglycol	111-48-8	5,400	79,000			
Thiofanox	39196-18-4	19	250			
Thiophanate, Methyl	23564-05-8	5,100	66,000			
Thiram	137-26-8	320	4,100			
Tin	7440-31-5	47,000	700,000			
Titanium Tetrachloride	7550-45-0	140,000	600,000			
Toluene	108-88-3		47,000	4,640		
Toluene-2,4-diisocyanate	584-84-9	6.4	27			
Toluene-2,5-diamine	95-70-5	3	13			
Toluene-2,6-diisocyanate	91-08-7	5.3	22			
Toluidine, o- (Methylaniline, 2-)	95-53-4	34	140			
Toluidine, p-	106-49-0	18	77			
Total Petroleum Hydrocarbons (Aliphatic High)	NA	230,000	3,500,000			
Total Petroleum Hydrocarbons (Aliphatic Low)	NA	520	2,200			
Total Petroleum Hydrocarbons (Aliphatic Medium)	NA	96	440			
Total Petroleum Hydrocarbons (Aromatic High)	NA	2,500	33,000			
Total Petroleum Hydrocarbons (Aromatic Low)	NA	82	420			
Total Petroleum Hydrocarbons (Aromatic Medium)	NA	110	600			
Toxaphene	8001-35-2	0.49	2.1			
Tralomehrin	66841-25-6	470	6,200			
Tri-n-butyltin	688-73-3	23	350			
Triacetin	102-76-1	5,100,000	66,000,000			
Triadimefon	43121-43-3	1,900	25,000			
Triallate	2303-17-5	1,000	15,000			
Triasulfuron	82097-50-5	630	8,200			
Tribenuron-methyl	101200-48-0	510	6,600			
Tribromobenzene, 1,2,4-	615-54-3	390	5,800			
Tributyl Phosphate	126-73-8	60	260			
Tributyltin Compounds	NA	19	250			
Tributyltin Oxide	56-35-9	19	250			
Trichloro-1,2,2-trifluoroethane, 1,1,2-	76-13-1	40,000	170,000			
Trichloroacetic Acid	76-03-9	7.8	33			
Trichloroaniline HCl, 2,4,6-	33663-50-2	19	79			
Trichloroaniline, 2,4,6-	634-93-5	1.9	25			
Trichlorobenzene, 1,2,3-	87-61-6	63	930			
Trichlorobenzene, 1,2,4-	120-82-1	24	110			
Trichloroethane, 1,1,1-	71-55-6	8,100	36,000			
Trichloroethane, 1,1,2-	79-00-5	1.1	5			
Trichloroethylene	79-01-6		6	0.442		
Trichlorofluoromethane	75-69-4	23,000	350,000			
Trichlorophenol, 2,4,5-	95-95-4	6,300	82,000			
Trichlorophenol, 2,4,6-	88-06-2	49	210			
Trichlorophenoxyacetic Acid, 2,4,5-	93-76-5	630	8,200			
Trichlorophenoxypropionic acid, -2,4,5	93-72-1	510	6,600			

Appendix A - § 35-APX-A1 - Soil Screening Values
(see notes at end of table)

Analyte	CAS Number	EPA Regional Screening Levels (TR=1E-06, HQ=1.0)		Vermont Screening Levels (TR=1E-06, HQ=1.0)	VT DEC Background Soil Concentrations	
		Resident Soil (mg/kg)	Industrial Soil (mg/kg)	Resident Soil (mg/kg)	Rural (mg/kg)	Urban (mg/kg)
Trichloropropane, 1,1,2-	598-77-6	390	5,800			
Trichloropropane, 1,2,3-	96-18-4		0.11	0.00324		
Trichloropropene, 1,2,3-	96-19-5	0.73	3.1			
Tricresyl Phosphate (TCP)	1330-78-5	1,300	16,000			
Tridiphane	58138-08-2	190	2,500			
Triethylamine	121-44-8	120	480			
Triethylene Glycol	112-27-6	130,000	1,600,000			
Trifluoroethane, 1,1,1-	420-46-2	15,000	62,000			
Trifluralin	1582-09-8	90	420			
Trimethyl Phosphate	512-56-1	27	110			
Trimethylbenzene, 1,2,3-	526-73-8		210	264 (Sum of isomers)		
Trimethylbenzene, 1,2,4-	95-63-6		240			
Trimethylbenzene, 1,3,5-	108-67-8		12,000			
Trimethylpentene, 2,4,4-	25167-70-8	780	12,000			
Trinitrobenzene, 1,3,5-	99-35-4	2,200	32,000			
Trinitrotoluene, 2,4,6-	118-96-7		96	12.0		
Triphenylphosphine Oxide	791-28-6	1,300	16,000			
Tris(1,3-Dichloro-2-propyl) Phosphate	13674-87-8	1,300	16,000			
Tris(1-chloro-2-propyl)phosphate	13674-84-5	630	8,200			
Tris(2,3-dibromopropyl)phosphate	126-72-7	0.28	1.3			
Tris(2-chloroethyl)phosphate	115-96-8	27	110			
Tris(2-ethylhexyl)phosphate	78-42-2	170	720			
Tungsten	7440-33-7	63	930			
Uranium (Soluble Salts)	NA		3,500	45.9		
Urethane	51-79-6	0.12	2.3			
Vanadium Pentoxide	1314-62-1	460	2,000			
Vanadium and Compounds	7440-62-2		5,800	2.88		
Vernolate	1929-77-7	78	1,200			
Vinclozolin	50471-44-8	1,600	21,000			
Vinyl Acetate	108-05-4	910	3,800			
Vinyl Bromide	593-60-2	0.12	0.52			
Vinyl Chloride	75-01-4	0.059	1.7			
Warfarin	81-81-2	19	250			
Xylene, P-	106-42-3	560	2,400			
Xylene, m-	108-38-3	550	2,400			
Xylene, o-	95-47-6	650	2,800			
Xylenes	1330-20-7		2,500	575		
Zinc Phosphide	1314-84-7	23	350			
Zinc and Compounds	7440-66-6		350,000	22,900		
Zineb	12122-67-7	3,200	41,000			
Zirconium	7440-67-7	6.3	93			

Notes:

- The USEPA values listed are reflective of the Regional Screening Levels (RSL) Summary Table May 2016.
- The Agency will be using EPA Regional Screening Levels (RSLs) and Vermont Screening Levels (VSLs) for residential soil concentrations. The VSLs and the RSLs employ a hazard index of 1 and are based on a de minimus incremental lifetime carcinogenic risk of one in one million (10⁻⁶) and assume a 70 year residential exposure duration. For industrial soil scenarios, the industrial EPA RSL must be used. The VT DEC Background Soil Concentration values are to be used when the background value for benzo(a)pyrene (TEQ) or arsenic is greater than the VSL.
- The VT DEC Background Soil Concentrations for Polynuclear Aromatic Hydrocarbons are expressed as the TEQ value for Benzo[a]pyrene.

Key:

† = Contains residential and industrial B(a)P soil screening values

Blank cell = no screening level (EPA Residential RSLs not shown when VSL Residential value is present)

NA = not applicable

Appendix A - § 35-APX-A2. Vapor Intrusion Values
(see notes at end of table)

Analyte	CAS Number	EPA Regional Air Screening Levels (TR=1E-06, HQ=1.0)		Vermont Air Screening Levels (TR=1E-06, HQ=1.0)		Vapor Intrusion Screening Values - Sub-slab Soil Gas		Vapor Intrusion Screening Values - Groundwater	
		Resident Air (µg/m3)	Industrial Air (µg/m3)	Resident Air (µg/m3)	Industrial Air (µg/m3)	Residential (µg/m3)	Industrial (µg/m3)	Residential (µg/L)	Industrial (µg/L)
Acetaldehyde	75-07-0	1.3	5.6			43	190	670	2,900
Acetone	67-64-1	32.000	140.000			1,100,000	4,500,000	35,000,000	150,000,000
Acetone Cyanohydrin	75-86-5	2.1	8.8						
Acetonitrile	75-05-8	63	260			2,100	8,800	69,000	290,000
Acetylaminofluorene, 2-	53-96-3	0.0022	0.0094						
Acrolein	107-02-8	0.021	0.088			0.7	2.9	6.4	27
Acrylamide	79-06-1	0.01	0.12						
Acrylic Acid	79-10-7	1.0	4.4			35	150	150,000	630,000
Acrylonitrile	107-13-1	0.041	0.18			1.4	6.0	12	54
Adiponitrile	111-69-3	6.3	26						
Aldrin	309-00-2	0.00057	0.0025			0.019	0.083	0.92	4.0
Allyl Alcohol	107-18-6	0.1	0.44			3.5	15	980	4,100
Allyl Chloride	107-05-1	0.47	2			16	68	1.6	7.0
Aluminum	7429-90-5	5.2	22						
Aminobiphenyl, 4-	92-67-1	0.00047	0.002						
Ammonia	7664-41-7	100	440			3,500	15,000	210,000	890,000
Amyl Alcohol, tert-	75-85-4	3.1	13			100	440	11,000	45,000
Aniline	62-53-3	1	4.4						
Antimony Trioxide	1309-64-4	0.21	0.88						
Arsenic, Inorganic	7440-38-2	0.00065	0.0029						
Arsine	7784-42-1	0.052	0.22						
Auramine	492-80-8	0.011	0.049						
Azinphos-methyl	86-50-0	10	44						
Azobenzene	103-33-3	0.091	0.4			3.0	13	160	720
Azodicarbonamide	123-77-3	0.0073	0.031						
Barium	7440-39-3	0.52	2.2						
Barium Chromate	10294-40-3	0.0000068	0.000082						
Benzene*	71-43-2			0.13	1.05	4.3	35	0.92	7.4
Benzidine	92-87-5	0.000015	0.00018						
Benzyl Chloride	100-44-7	0.057	0.25			1.9	8.3	6.4	28
Beryllium and compounds	7440-41-7	0.0012	0.0051						
Biphenyl, 1,1'-	92-52-4	0.42	1.8			14	58	75	320
Bis(2-chloroethyl)ether	111-44-4	0.0085	0.037			0.28	1.2	27	120
Bis(chloromethyl)ether	542-88-1	0.00045	0.0002			0.0015	0.0066	0.00025	0.0011
Boron And Borates Only	7440-42-8	21	88						
Boron Trichloride	10294-34-5	21	88			700	2,900		
Boron Trifluoride	7637-07-2	14	57			450	1,900		
Bromo-2-chloroethane, 1-	107-04-0	0.0047	0.02			0.16	0.68	0.23	1.0
Bromobenzene	108-86-1	63	260			2,100	8,800	1,300	5,400

Appendix A - § 35-APX-A2. Vapor Intrusion Values
(see notes at end of table)

Analyte	CAS Number	EPA Regional Air Screening Levels (TR=1E-06, HQ=1.0)		Vermont Air Screening Levels (TR=1E-06, HQ=1.0)		Vapor Intrusion Screening Values - Sub-slab Soil Gas		Vapor Intrusion Screening Values - Groundwater	
		Resident Air (µg/m3)	Industrial Air (µg/m3)	Resident Air (µg/m3)	Industrial Air (µg/m3)	Residential (µg/L)	Industrial (µg/L)	Residential (µg/L)	Industrial (µg/L)
Bromochloromethane	74-97-5	42	180			1,400	5,800	1,100	4,700
Bromodichloromethane	75-27-4	0.076	0.33			2.5	11	1.5	6.3
Bromoform	75-25-2	2.6	11			85	370	230	990
Bromomethane	74-83-9	5.2	22			170	730	24	100
Butadiene, 1,3-	106-99-0	0.094	0.41			3.1	14	0.042	0.18
Butyl alcohol, sec-	78-92-2	31,000	130,000			1,000,000	4,400,000	NVT	NVT
Butylated hydroxyanisole	25013-16-5	49	220						
Cadmium (Water)	7440-43-9	0.0016	0.0068						
Calcium Chromate	13765-19-0	0.0000068	0.000082						
Caprolactam	105-60-2	2.3	9.6						
Captan	2425-06-1	0.065	0.29						
Captan	133-06-2	4.3	19						
Carbon Disulfide	75-15-0	730	3,100			24,000	100,000	1,800	7,700
Carbon Tetrachloride	56-23-5	0.47	2.0			16	68	0.66	2.9
Carbonyl Sulfide	463-58-1	100	440			3,500	15,000	4.2	18
Ceric oxide	1306-38-3	0.94	3.9						
Chlordane	12789-03-6	0.028	0.12			0.94	4.1	NVT	NVT
Chlordecone (Kepone)	143-50-0	0.00061	0.0027						
Chlorine	7782-50-5	0.15	0.64			5.2	22	12	52
Chlorine Dioxide	10049-04-4	0.21	0.88			7.0	29		
Chloro-1,1-difluoroethane, 1-	75-68-3	52,000	220,000			1,700,000	7,300,000	400,000	NVT
Chloro-1,3-butadiene, 2-	126-99-8	0.0094	0.041			0.31	1.4	0.0068	0.03
Chloro-2-methylaniline, 4-	95-69-2	0.036	0.16						
Chloroacetophenone, 2-	532-27-4	0.031	0.13						
Chlorobenzene	108-90-7	52	220			1,700	7,300	730	3,100
Chlorobenzilate	510-15-6	0.091	0.4						
Chlorobenzotrifluoride, 4-	98-56-6	310	1,300			10,000	44,000	220	930
Chlorodifluoromethane	75-45-6	52,000	220,000			1,700,000	7,300,000	40,000	170,000
Chloroform	67-66-3	0.12	0.53			4.1	18	1.3	5.5
Chloromethane	74-87-3	94	390			3,100	13,000	340	1,400
Chloromethyl Methyl Ether	107-30-2	0.0041	0.018			0.14	0.59	0.33	1.4
Chloronitrobenzene, o-	88-73-3	0.01	0.044						
Chloronitrobenzene, p-	100-00-5	2.1	8.8						
Chloropicrin	76-06-2	0.42	1.8			14	58	5.0	21
Chlorothalonil	1897-45-6	3.2	14			32			
Chlorozotocin	54749-90-5	0.000041	0.00018						
Chromium(VI)	18540-29-9	0.000012	0.00015						
Cobalt	7440-48-4	0.00031	0.0014						
Coke Oven Emissions	8007-45-2	0.0016	0.02						

Appendix A - § 35-APX-A2. Vapor Intrusion Values
(see notes at end of table)

Analyte	CAS Number	EPA Regional Air Screening Levels (TR=1E-06, HQ=1.0)		Vermont Air Screening Levels (TR=1E-06, HQ=1.0)		Vapor Intrusion Screening Values - Sub-slab Soil Gas		Vapor Intrusion Screening Values - Groundwater	
		Resident Air (µg/m3)	Industrial Air (µg/m3)	Resident Air (µg/m3)	Industrial Air (µg/m3)	Residential (µg/m3)	Industrial (µg/m3)	Residential (µg/L)	Industrial (µg/L)
Cresol, m-	108-39-4	630	2,600						
Cresol, o-	95-48-7	630	2,600						
Cresol, p-	106-44-5	630	2,600						
Cresols	1319-77-3	630	2,600						
Cumene	98-82-8	420	1,800			14,000	58,000	1,900	7,800
Cupferron	135-20-6	0.045	0.19						
Cyanides									
~Cyanide (CN-)	57-12-5	0.83	3.5			28	120	0.84	3.5
~Hydrogen Cyanide	74-90-8	0.83	3.5			28	120	230	960
Cyclohexane	110-82-7	6,300	26,000			210,000	880,000	1,600	6,800
Cyclohexanone	108-94-1	730	3,100			24,000	100,000	4,300,000	18,000,000
Cyclohexene	110-83-8	1,000	4,400			35,000	150,000	900	3,800
DDD	72-54-8	0.041	0.18						
DDE, p,p'-	72-55-9	0.029	0.13			0.96	4.2	NVT	NVT
DDT	50-29-3	0.029	0.13						
Daminozide	1596-84-5	0.55	2.4						
Dibromo-3-chloropropane, 1,2-	96-12-8	0.0017	0.002			0.0056	0.068	0.058	0.70
Dibromoethane, 1,2-	106-93-4	0.0047	0.02			0.16	0.68	0.32	1.4
Dibromomethane (Methylene Bromide)	74-95-3	4.2	18			140	580	210	870
Dichloro-2-butene, 1,4-	764-41-0	0.0067	0.0029			0.022	0.097	0.0019	0.0084
Dichloro-2-butene, cis-1,4-	1476-11-5	0.0067	0.0029			0.022	0.097	0.047	0.20
Dichloro-2-butene, trans-1,4-	110-57-6	0.0067	0.0029			0.022	0.097	0.047	0.20
Dichlorobenzene, 1,2-	95-50-1	210	880			7,000	29,000	5,300	22,000
Dichlorobenzene, 1,4-	106-46-7	0.26	1.1			8.5	37	5.0	22
Dichlorobenzidine, 3,3'-	91-94-1	0.0083	0.036						
Dichlorodifluoromethane	75-71-8	100	440			3,500	15,000	12	51
Dichloroethane, 1,1-	75-34-3	1.8	7.7			58	260	12	51
Dichloroethane, 1,2-	107-06-2	0.11	0.47			3.6	16	3.7	16
Dichloroethylene, 1,1-	75-35-4	210	880			7,000	29,000	280	1,200
Dichloropropane, 1,2-	78-87-5	0.28	1.2			9.4	41	4.0	18
Dichloropropene, 1,3-	542-75-6	0.7	3.1				100		36
Dichlorvos	62-73-7	0.034	0.15						
Dicyclopentadiene	77-73-6	0.31	1.3			10	44	0.14	0.60
Dieldrin	60-57-1	0.0061	0.0027						
Diesel Engine Exhaust	NA	0.0094	0.041						
Diethanolamine	111-42-2	0.21	0.88						
Diethylene Glycol Monobutyl Ether	112-34-5	0.10	0.44						
Diethylene Glycol Monoethyl Ether	111-90-0	0.31	1.3						
Diethylstilbestrol	56-53-1	0.00028	0.00012						

Appendix A - § 35-APX-A2. Vapor Intrusion Values
(see notes at end of table)

Analyte	CAS Number	EPA Regional Air Screening Levels (TR=1E-06, HQ=1.0)		Vermont Air Screening Levels (TR=1E-06, HQ=1.0)		Vapor Intrusion Screening Values - Sub-slab Soil Gas		Vapor Intrusion Screening Values - Groundwater	
		Resident Air (µg/m3)	Industrial Air (µg/m3)	Resident Air (µg/m3)	Industrial Air (µg/m3)	Residential (µg/m3)	Industrial (µg/m3)	Residential (µg/L)	Industrial (µg/L)
Difluoroethane, 1,1-	75-37-6	42,000	180,000			1,400,000	5,800,000	65,000	270,000
Dihydrosofrole	94-58-6	0.22	0.94			7.2	31	430	1,900
Diisopropyl Ether	108-20-3	730	3,100			24,000	100,000	7,000	29,000
Dimethylamino azobenzene [p-]	60-11-7	0.0022	0.0094						
Dimethylformamide	68-12-2	31	130			1,000	4,400	23,000,000	97,000,000
Dimethylhydrazine, 1,1-	57-14-7	0.0021	0.0088			0.07000	0.29	6.5	27
Dimethylhydrazine, 1,2-	540-73-8	0.00018	0.00077			0.00058	0.0026	6.200	27
Dimethylvinylchloride	513-37-1	0.22	0.94			7.2	31	0.048	0.21
Dinitrotoluene, 2,4-	121-14-2	0.032	0.14						
Dioxane, 1,4-	123-91-1	0.56	2.5			19	82	5,100	22,000
Dioxins									
~Hexachlorodibenzo-p-dioxin, Mixture	NA	0.0000022	0.0000094						
~TCDD, 2,3,7,8-	1746-01-6	0.00000074	0.0000032			0.0000025	0.000011	0.000036	0.00016
Diphenylhydrazine, 1,2-	122-66-7	0.013	0.056						
Direct Black 38	1937-37-7	0.00002	0.00088						
Direct Blue 6	2602-46-2	0.00002	0.00088						
Direct Brown 95	16071-86-6	0.00002	0.00088						
Epichlorohydrin	106-89-8	1.0	4.4			35	150	840	3,500
Epoxybutane, 1,2-	106-88-7	21	88			700	2,900	4,500	19,000
Ethoxyethanol Acetate, 2-	111-15-9	63	260			2,100	8,800	990,000	4,200,000
Ethoxyethanol, 2-	110-80-5	210	880			7,000	29,000	21,000,000	90,000,000
Ethyl Acetate	141-78-6	73	310			2,400	10,000	22,000	93,000
Ethyl Acrylate	140-88-5	8.3	35			280	1,000	1,100	93,000
Ethyl Chloride (Chloroethane)	75-00-3	10,000	44,000			350,000	1,500,000	32,000	140,000
Ethyl Methacrylate	97-63-2	310	1,300			10,000	44,000	29,000	120,000
Ethylbenzene	100-41-4	1.1	4.9			37	160	6.3	28
Ethylene Glycol	107-21-1	420	1,800						
Ethylene Glycol Monobutyl Ether	111-76-2	1,700	7,000						
Ethylene Oxide	75-21-8	0.032	0.14			1.1	4.6	7.5	33
Ethylene Thiourea	96-45-7	0.22	0.94						
Ethyleneimine	151-56-4	0.00015	0.00065			0.0049	0.022	0.30	1.3
Fluoride	16984-48-8	14	57						
Fluorine (Soluble Fluoride)	7782-41-4	14	57						
Formaldehyde	50-00-0	0.22	0.94			7.2	31	22,000	93,000
Formic Acid	64-18-6	0.31	1.3			10	44	63,000	260,000
Furfural	98-01-1	52	220			1,700	7,300	640,000	2,700,000
Furium	531-82-8	0.0065	0.029						
Furmecyclo	60568-05-0	0.33	1.4						
Glutaraldehyde	111-30-8	0.083	0.35						

Appendix A - § 35-APX-A2. Vapor Intrusion Values
(see notes at end of table)

Analyte	CAS Number	EPA Regional Air Screening Levels (TR=1E-06, HQ=1.0)		Vermont Air Screening Levels (TR=1E-06, HQ=1.0)		Vapor Intrusion Screening Values - Sub-slab Soil Gas		Vapor Intrusion Screening Values - Groundwater	
		Resident Air (µg/m3)	Industrial Air (µg/m3)	Resident Air (µg/m3)	Industrial Air (µg/m3)	Residential (µg/m3)	Industrial (µg/m3)	Residential (µg/L)	Industrial (µg/L)
Glycidyl	765-34-4	1.0	4.4			35	150	50,000	210,000
Heptachlor	76-44-8	0.0022	0.0094			0.072	0.31	0.48	2.1
Heptachlor Epoxide	1024-57-3	0.0011	0.0047			0.036	0.16	4.3	19
Hexachlorobenzene	118-74-1	0.0061	0.027			0.20	0.89	0.22	0.94
Hexachlorobutadiene	87-68-3	0.13	0.56			4.3	19	0.64	2.8
Hexachlorocyclohexane, Alpha-	319-84-6	0.0016	0.0068						
Hexachlorocyclohexane, Beta-	319-85-7	0.0053	0.023						
Hexachlorocyclohexane, Gamma- (Lindane)	58-89-9	0.0091	0.04						
Hexachlorocyclohexane, Technical	608-73-1	0.0055	0.024						
Hexachlorocyclopentadiene	77-47-4	0.21	0.88			7.0	29	4.6	19
Hexachloroethane	67-72-1	0.26	1.1			8.5	37	3.7	16
Hexamethylene Diisocyanate, 1,6-	822-06-0	0.01	0.044			0.35	1.5	5.3	22
Hexane, N-	110-54-3	730	3,100			24,000	100,000	16	65
Hexanone, 2-	591-78-6	31	130			1,000	4,400	15,000	63,000
Hydrazine	302-01-2	0.00057	0.0025			0.019	0.083	46	200
Hydrazine Sulfate	10034-93-2	0.00057	0.0025						
Hydrogen Chloride	7647-01-0	21	88			700	2,900	0.00000029	0.0000012
Hydrogen Fluoride	7664-39-3	15	61			490	2,000	3,800	16,000
Hydrogen Sulfide	7783-06-4	2.1	8.8			70	290	7.4	31
Isophorone	78-59-1	2,100	8,800						
Isopropanol	67-63-0	210	880			7,000	29,000	1,300,000	5,500,000
JP-7	NA	310	1,300						
Lead Compounds									
~Lead Chromate	7758-97-6	0.0000068	0.000082						
~Lead Phosphate	7446-27-7	0.23	1						
~Lead acetate	301-04-2	0.23	1						
~Lead and Compounds	7439-92-1	0.15							
~Lead subacetate	1335-32-6	0.23	1						
Maleic Anhydride	108-31-6	0.73	3.1						
Mercury Compounds									
~Mercuric Chloride (and other Mercury salts)	7487-94-7	0.31	1.3						
~Mercury (elemental)	7439-97-6	0.31	1.3			10	44	2.1	8.6
Methacrylonitrile	126-98-7	31	130			1,000	4,400	5,100	22,000
Methanol	67-56-1	21,000	88,000			700,000	2,900,000	200,000,000	840,000,000
Methoxy-5-nitroaniline, 2-	99-59-2	0.2	0.88						
Methoxyethanol Acetate, 2-	110-49-6	1	4.4			35	150	170,000	720,000
Methoxyethanol, 2-	109-86-4	21	88			700	880	2,900,000	
Methyl Acrylate	96-33-3	21	88			700	2,900	4,300	18,000
Methyl Ethyl Ketone (2-Butanone)	78-93-3	5,200	22,000			170,000	730,000	3,700,000	15,000,000

Appendix A - § 35-APX-A2. Vapor Intrusion Values
(see notes at end of table)

Analyte	CAS Number	EPA Regional Air Screening Levels (TR=1E-06, HQ=1.0)		Vermont Air Screening Levels (TR=1E-06, HQ=1.0)		Vapor Intrusion Screening Values - Sub-slab Soil Gas		Vapor Intrusion Screening Values - Groundwater	
		Resident Air (µg/m3)	Industrial Air (µg/m3)	Resident Air (µg/m3)	Industrial Air (µg/m3)	Residential (µg/m3)	Industrial (µg/m3)	Residential (µg/L)	Industrial (µg/L)
Methyl Hydrazine	60-34-4	0.0028	0.012			0.094	0.41	40	180
Methyl Isobutyl Ketone (4-methyl-2-pentanone)	108-10-1	3,100	13,000			100,000	440,000	980,000	4,100,000
Methyl Isocyanate	624-83-9	1	4.4			35	150	28	120
Methyl Methacrylate	80-62-6	730	3,100			24,000	10,000	100,000	430,000
Methyl Styrene (Mixed Isomers)	25013-15-4	42	180			1,400	5,800	920	3,900
Methyl methanesulfonate	66-27-3	0.1	0.44						
Methyl tert-Butyl Ether (MTBE)	1634-04-4	11	47			360	1,600	690	3,000
Methyl-N-nitro-N-nitrosoguanidine, N-	70-25-7	0.0012	0.0051						
MethylAniline Hydrochloride, 2-	636-21-5	0.076	0.33						
Methylcholanthrene, 3-	56-49-5	0.00016	0.0019						
Methylene Chloride	75-09-2	100	1,200			3,400	41,000	1,100	14,000
Methylene-bis(2-chloroaniline), 4,4'-	101-14-4	0.0024	0.029						
Methylene-bis(N,N-dimethyl) Aniline, 4,4'-	101-61-1	0.22	0.94						
Methylenedibenzeneamine, 4,4'-	101-77-9	0.0061	0.027						
Methylenediphenyl Disocyanate	101-68-8	0.63	2.6						
Mirex	2385-85-5	0.00055	0.0024			0.018	0.080	0.017	0.073
Naphtha, High Flash Aromatic (HFAN)	64742-95-6	100	440						
Nickel Carbonyl	13463-39-3	0.011	0.047			0.36	1.6	0.00081	0.0035
Nitroaniline, 2-	88-74-4	0.052	0.22						
Nitroaniline, 4-	100-01-6	6.3	26						
Nitrobenzene	98-95-3	0.07	0.31			2.3	10	160	680
Nitrofurazone	59-87-0	0.0076	0.033						
Nitromethane	75-52-5	0.32	1.4			11	46	500	2,200
Nitropropane, 2-	79-46-9	0.001	0.0045			0.035	0.15	0.38	1.7
Nitroso-N-ethylurea, N-	759-73-9	0.00013	0.0016						
Nitroso-N-methylurea, N-	684-93-5	0.00003	0.00036						
Nitroso-di-N-butylamine, N-	924-16-3	0.0018	0.0077			0.058		3.3	
Nitroso-di-N-propylamine, N-	621-64-7	0.0014	0.0061						
Nitrosodiethanolamine, N-	1116-54-7	0.0035	0.015						
Nitrosodiethylamine, N-	55-18-5	0.000024	0.00029						
Nitrosodimethylamine, N-	62-75-9	0.000072	0.00088			0.0024		0.97	
Nitrosodiphenylamine, N-	86-30-6	1.1	4.7						
Nitrosomethylethylamine, N-	10595-95-6	0.00045	0.0019			0.015		7.6	
Nitrosomorpholine [N-]	59-89-2	0.0015	0.0065						
Nitrosopiperidine [N-]	100-75-4	0.001	0.0045						
Nitrosopyrrolidine, N-	930-55-2	0.0046	0.02						
Nonane, n-	111-84-2	21	88			700	2,900	0.34	1.4
Pentane, n-	109-66-0	1,000	4,400			35,000	150,000	30	130
Phenacetin	62-44-2	4.5	19						

Appendix A - § 35-APX-A2. Vapor Intrusion Values
(see notes at end of table)

Analyte	CAS Number	EPA Regional Air Screening Levels (TR=1E-06, HQ=1.0)		Vermont Air Screening Levels (TR=1E-06, HQ=1.0)		Vapor Intrusion Screening Values - Sub-slab Soil Gas		Vapor Intrusion Screening Values - Groundwater	
		Resident Air (µg/m3)	Industrial Air (µg/m3)	Resident Air (µg/m3)	Industrial Air (µg/m3)	Residential (µg/m3)	Industrial (µg/m3)	Residential (µg/L)	Industrial (µg/L)
Phosgene	75-44-5	0.31	1.3			10	44	0.70	2.9
Phosphine	7803-51-2	0.31	1.3			10	44	0.31	1.3
Phosphoric Acid	7664-38-2	10	44						
Phthalic Anhydride	85-44-9	21	88						
Polybrominated Biphenyls	59536-65-1	0.00033	0.0014						
Polychlorinated Biphenyls (PCBs)									
-Aroclor 1016	12674-11-2	0.14	0.61			4.7	20	17	75
-Aroclor 1221	11104-28-2	0.0049	0.022			0.16	0.72	0.53	2.3
-Aroclor 1232	11141-16-5	0.0049	0.022			0.16	0.72	0.16	0.72
-Aroclor 1242	53469-21-9	0.0049	0.022			0.16	0.72	0.35	1.5
-Aroclor 1248	12672-29-6	0.0049	0.022			0.16	0.72	0.27	1.2
-Aroclor 1254	11097-69-1	0.0049	0.022			0.16	0.72	0.43	1.9
-Aroclor 1260	11096-82-5	0.0049	0.022			0.16	0.72	0.36	1.6
-Heptachlorobiphenyl, 2,3',4,4',5,5'- (PCB 189)	39635-31-9	0.0025	0.011			0.085	0.37	NVT	NVT
-Hexachlorobiphenyl, 2,3',4,4',5,5'- (PCB 167)	52663-72-6	0.0025	0.011			0.085	0.37	0.91	NVT
-Hexachlorobiphenyl, 2,3',4,4',5'- (PCB 157)	69782-90-7	0.0025	0.011			0.085	0.37	0.39	NVT
-Hexachlorobiphenyl, 2,3',4,4',5'- (PCB 156)	38380-08-4	0.0025	0.011			0.085	0.37	0.44	1.9
-Hexachlorobiphenyl, 3,3',4,4',5,5'- (PCB 169)	32774-16-6	0.000025	0.000011			0.085	0.00037	0.00091	0.0040
-Pentachlorobiphenyl, 2',3,4,4',5'- (PCB 123)	65510-44-3	0.0025	0.011			0.085	0.37	0.33	1.4
-Pentachlorobiphenyl, 2,3',4,4',5'- (PCB 118)	31508-00-6	0.0025	0.011			0.085	0.37	0.22	0.95
-Pentachlorobiphenyl, 2,3',4,4',5'- (PCB 105)	32598-14-4	0.0025	0.011			0.085	0.37	0.22	0.96
-Pentachlorobiphenyl, 2,3,4,4',5'- (PCB 114)	74472-37-0	0.0025	0.011			0.085	0.37	0.68	3.0
-Pentachlorobiphenyl, 3,3',4,4',5'- (PCB 126)	57465-28-8	0.0000074	0.0000032			0.000025	0.00011	0.00010	0.00042
-Polychlorinated Biphenyls (high risk)	1336-36-3	0.0049	0.021						
-Polychlorinated Biphenyls (low risk)	1336-36-3	0.028	0.12						
-Polychlorinated Biphenyls (lowest risk)	1336-36-3	0.14	0.61						
-Tetrachlorobiphenyl, 3,3',4,4'- (PCB 77)	32598-13-3	0.0074	0.0032						
-Tetrachlorobiphenyl, 3,4,4',5'- (PCB 81)	70362-50-4	0.00025	0.0011			0.0085	0.037	0.028	0.12
Polymeric Methylene Diphenyl Diisocyanate (PMDI)	9016-87-9	0.63	2.6						
Polynuclear Aromatic Hydrocarbons (PAHs)									
-Benz[<i>a</i>]anthracene	56-55-3	0.0092	0.11			0.31	NVT	NVT	NVT
-Dimethylbenz[<i>a</i>]anthracene, 7,12-	57-97-6	0.000014	0.00017						
-Naphthalene*	91-20-3			0.03	0.24	1.0	8.0	3.5	28
Propionaldehyde	123-38-6	8.3	35			280	1,200	4,300	18,000
Propyl benzene	103-65-1	1,000	4,400			35,000	150,000	4,700	20,000
Propylene	115-07-1	3,100	13,000			100,000	440,000	480	2,000
Propylene Glycol Dinitrate	6423-43-4	0.28	1.2						
Propylene Glycol Monomethyl Ether	107-98-2	2,100	8,800			70,000	290,000	95,000,000	400,000,000
Propylene Oxide	75-56-9	0.76	3.3			25	110	400	1,700

Appendix A - § 35-APX-A2. Vapor Intrusion Values
(see notes at end of table)

Analyte	CAS Number	EPA Regional Air Screening Levels (TR=1E-06, HQ=1.0)		Vermont Air Screening Levels (TR=1E-06, HQ=1.0)		Vapor Intrusion Screening Values - Sub-slab Soil Gas		Vapor Intrusion Screening Values - Groundwater	
		Resident Air (µg/m3)	Industrial Air (µg/m3)	Resident Air (µg/m3)	Industrial Air (µg/m3)	Residential (µg/m3)	Industrial (µg/m3)	Residential (µg/L)	Industrial (µg/L)
Safrole	94-59-7	0.016	0.19						
Selenium Sulfide	7446-34-6	21	88						
Silica (crystalline, respirable)	7631-86-9	3.1	13						
Sodium Dichromate	10588-01-9	0.000068	0.000082						
Sodium Fluoride	7681-49-4	14	57						
Strontium Chromate	7789-06-2	0.000068	0.000082						
Styrene	100-42-5	1000	4400			35,000	150,000	17,000	72,000
Sulfolane	126-33-0	2.1	8.8						
Sulfur Trioxide	7446-11-9	1	4.4			35	150		
Sulfuric Acid	7664-93-9	1	4.4						
Sulfurous acid, 2-chloroethyl 2-[4-(1,1-dimethylethyl)phenoxy]-1-methylethyl ester	140-57-8	0.4	1.7						
Tetrachloroethane, 1,1,1,2-	630-20-6	0.38	1.7			13	55	7.2	32
Tetrachloroethane, 1,1,2,2-	79-34-5	0.048	0.21			1.6	7.0	6.0	26
Tetrachloroethylene*	127-18-4			0.63	5.11	21	170	1.5	12
Tetrafluoroethane, 1,1,1,2-	811-97-2	83,000	350,000			2,800,000	12,000,000	61,000	260,000
Titanium Tetrachloride	7550-45-0	0.1	0.44			3.5	15		
Tetrahydrofuran	109-99-9	2,100	8,800			70,000	290,000	1,100,000	4,800,000
Toluene	108-88-3	5,200	22,000			170,000	730,000	33,000	14,000
Toluene-2,4-diisocyanate	584-84-9	0.0083	0.035			0.28	1.2	18	77
Toluene-2,6-diisocyanate	91-08-7	0.0083	0.035			0.28	1.2	18	77
Toluidine, o- (Methylaniline, 2-)	95-53-4	0.055	0.24						
Toxaphene	8001-35-2	0.0088	0.038						
Trichloro-1,2,2-trifluoroethane, 1,1,2-	76-13-1	31000	130000			1,000,000	4,400,000	2,200	9,200
Trichlorobenzene, 1,2,4-	120-82-1	2.1	8.8			70	290	78	330
Trichloroethane, 1,1,1-	71-55-6	5,200	22,000			170,000	730,000	12,000	49,000
Trichloroethane, 1,1,2-	79-00-5	0.18	0.77			5.8	26	9.1	40
Trichloroethylene*	79-01-6			0.2	0.70	6.7	23	0.82	2.9
Trichlorophenol, 2,4,6-	88-06-2	0.91	4						
Trichloropropane, 1,2,3-	96-18-4	0.31	1.3			10	44	43	180
Trichloropropene, 1,2,3-	96-19-5	0.31	1.3			10	44	0.43	1.8
Triethylamine	121-44-8	7.3	31			240	1,000	2,100	8,700
Trifluoroethane, 1,1,1-	420-46-2	21,000	88,000			700,000	2,900,000	660	2,800
Trimethylbenzene, 1,2,3-	526-73-8	5.2	22			170	730	69	290
Trimethylbenzene, 1,2,4-	95-63-6	7.3	31			240	1,000	57	240
Tris(2,3-dibromopropyl)phosphate	126-72-7	0.0043	0.019			0.14	0.62	4.8	21
Urethane	51-79-6	0.0035	0.042						
Vanadium Pentoxide	1314-62-1	0.00034	0.0015						
Vinyl Acetate	108-05-4	210	880			7,000	29,000	17,000	70,000
Vinyl Bromide	593-60-2	0.088	0.38			2.9	13	0.24	1.0

Appendix A - § 35-APX-A2. Vapor Intrusion Values
(see notes at end of table)

Analyte	CAS Number	EPA Regional Air Screening Levels (TR=1E-06, HQ=1.0)		Vermont Air Screening Levels (TR=1E-06, HQ=1.0)		Vapor Intrusion Screening Values - Sub-slab Soil Gas		Vapor Intrusion Screening Values - Groundwater	
		Resident Air (µg/m3)	Industrial Air (µg/m3)	Resident Air (µg/m3)	Industrial Air (µg/m3)	Residential (µg/m3)	Industrial (µg/m3)	Residential (µg/L)	Industrial (µg/L)
Vinyl Chloride*	75-01-4	100	440	0.11	1.86	3.7	62	1.3	2.2
Xylenes	1330-20-7	100	440	0.11	1.86	3,500	15,000	700	2,900

Notes:

1. The USEPA values listed are reflective of the Regional Screening Levels (RSLs) Summary Table May 2016.
2. The Vermont Air Screening Levels were developed by the Vermont Department of Health (VDH). The VDH risk based worker indoor air concentrations were generated by combining current toxicity values (e.g. inhalation reference concentrations and inhalation unit risks) with a hypothetical worker exposure scenario using standard point estimate risk assessment procedures to derive an estimate of the concentration of each individual chemical in air that corresponds to a fixed level of risk i.e., a Hazard Quotient of 0.1 for noncarcinogenic (systemic) effects or an incremental lifetime carcinogenic risk of one in one million. Considering current local work practices, a hypothetical Worker was assumed to be on-site 10 hours each work day, 250 days per year for 30 years. A 70 year lifetime was assumed.
3. The VI Screening Values for soil gas and groundwater were calculated from USEPA RSL indoor air values using the USEPA Vapor Intrusion Screening Level Calculator. The shallow soil gas concentration is the target indoor air concentration divided by the generic attenuation factor for soil gas. Target groundwater concentrations were calculated based on an ambient groundwater temperature of 15° C.
4. For the five analytes denoted with an asterix (*), the vapor intrusion screening values for sub-slab soil gas and groundwater were calculated based on their respective VDH residential or worker target air screening levels.

Key:

- Blank cell - no screening level (EPA RSLs not shown when VDH values are present)
- NTV - not sufficiently volatile and/or toxic to pose inhalation risk in selected exposure scenario for the indicated medium
- NA = not applicable

Appendix A - § 35-APX-A3
Sediment Values

Recommended Sediment Quality Guidelines for the Protection of Aquatic Biota in Freshwater Ecosystems			
Analyte	TEC	PEC	Notes
Metals (in mg/kg - ppm DW)			
Arsenic	9.79	33	1,2
Cadmium	0.99	4.98	1,2
Chromium	43.4	111	1,2
Copper	31.6	149	1,2
Lead	35.8	128	1,2
Mercury	0.18	1.06	1,2,4
Nickel	22.7	48.6	1,2
Zinc	121	459	1,2
Polycyclic Aromatic Hydrocarbons (in µg/kg - ppb DW)			
Anthracene	57.2	845	1,3
Fluorene	77.4	536	1,3
Naphthalene	176	561	1,3
Phenanthrene	204	1,170	1,3
Benz(a)anthracene	108	1,050	1,3
Benzo(a)pyrene	150	1,450	1,3,4
Chrysene	166	1,290	1,3
Dibenz(a,h)anthracene	33	1,3	
Fluoranthene	423	2,230	1,3
Pyrene	195	1,520	1,3
Total PAHs	1,610	22,800	1,3
Polychlorinated Biphenyls (in µg/kg – ppb DW)			
Total PCBs	59.8	676	1,3,4
Organochlorine Pesticides (in µg/kg – ppb DW)			
Chlordane	3.24	17.6	1,3,4
Dieldrin	1.9	61.8	1,3,4
Sum DDD	4.88	28	1,3,4
Sum DDE	3.16	31.3	1,3,4
Sum DDT	4.16	62.9	1,3,4
Total DDTs	5.28	572	1,3,4
Endrin	2.22	207	1,3
Heptachlor Epoxide	2.47	16	1,3
Lindane (gamma-BHC)	2.37	4.99	1,3

Notes: **TEC** = Threshold Effect Concentration, **PEC** = Probable Effects Concentration, **DW** = dry weight

1. Consensus-Based Sediment Quality Guidelines (SQGs) from: MacDonald D.D., Ingersoll C.G. and Berger T.A. 2000. Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems. Archives of Environmental Contamination and Toxicology 39(1). 20-31.
2. SQGs for metals are based on bulk (unsorted) sediment concentrations. Concentrations of metals in sediments can be normalized on percent fines for the purpose of inter-site comparisons but not for comparisons to these SQGs.
3. The SQGs for organics are derived from samples normalized to 1 percent total organic carbon (TOC) in the sediment. The SQGs presented here are based on an assumed TOC of 1 percent. If site specific data show organic carbon content to be significantly different from 1 percent, concentrations should be normalized to 1 percent TOC (divide the site concentration by the percent TOC) prior to comparison with the SQGs in this table. If non site-specific TOC data are available, assume 1 percent TOC.
4. Included on USEPA's list of important persistent, bioaccumulative, toxic compounds (PBTs).

APPENDIX B. ESTABLISHMENT OF BACKGROUND CONCENTRATIONS

§ 35-APX-B1. ESTABLISHMENT OF SITE-SPECIFIC BACKGROUND LEVELS

- (a) Purpose. A PRP may conduct a site-specific background study when there is reason to believe that the contamination present is naturally occurring. An approved site-specific background concentration will take the place of an adopted environmental media standard.
- (b) Sampling plan. A sampling and monitoring plan shall be prepared by an environmental professional that will produce data representative of the site at and around the area of interest. The plan shall identify, at a minimum, the following:
 - (1) the number of monitoring points that will be sampled to establish a statistically defensible data set that will substantiate the validity of the background concentrations;
 - (2) the location and depth of monitoring points, which shall be selected so as to be geologically and geochemically similar to the area of interest and to be unaffected by current and historic activities at the site, including by being hydrogeologically up-gradient of such activities if possible;
 - (3) the number and frequency of the samples to be taken from the monitoring points and any existing sources of data for the media for which a background standard is proposed, including water for potable water supplies, public water sources, or non-potable wells or springs;
 - (4) the sampling methodology;
 - (5) the contaminants of concern to be analyzed in the samples that are collected;
 - (6) the analytical methods to be used in conducting the sample analysis;
 - (7) identification of whether samples obtained prior to the approval of the monitoring plan will be used as data points and, if so, the sampling date, location, method of analysis for each of the samples to be used; and
 - (8) a quality assurance/quality control plan for sample collection, testing, and analysis.
- (c) Review of sampling plan. The information required by subsection (b) of this section may be included in a site investigation work plan submitted under Subchapter 3. The Secretary may request additional information from an applicant when the Secretary determines that the sampling and monitoring plan may not provide data representative of the background conditions at and around the area of interest.
- (d) Report on background investigation. Following the Secretary's approval of the sampling and monitoring plan and the completion of sampling, the person seeking to establish a site-specific background standard shall report on the following as a part of their site investigation report required by § 35-305:

- (1) All sampling results and data collected pursuant to the approved monitoring and sampling plan.
 - (2) An analysis of all data collected pursuant to the approved monitoring and sampling plan.
 - (3) Any discrepancies between the approved sampling and monitoring plan and the sampling completed for the area of interest.
 - (4) A proposed background concentration of all substances for which the person seeks to establish background standard and a justification for each concentration. The justification may include statistical analysis.
 - (5) Additional information the Secretary determines is necessary to approve or deny the proposed background groundwater concentrations.
- (e) Site-specific standard. Following submission of the proposed background concentrations to the Secretary, the Secretary shall approve or deny the request.

APPENDIX C. SITE MANAGEMENT WAIVERS

§ 35-APX-C1. TECHNICAL IMPRACTICALITY.

- (a) Purpose. A technical impracticality (TI) waiver is a mechanism to manage risks to human health and the environment in situations where there is no readily available technology to complete remediation and achieve compliance with the applicable environmental media standards within a reasonable timeframe. A TI waiver does not waive the requirements to delineate the nature and extent of the release of pollutants, to remediate continuing sources of pollution, or to address potential risks to receptors.
- (b) Applicability. A TI waiver may be considered as a part of § 35-503. TI waivers may be considered for any of the following:
- (1) The Secretary determines that there are non-aqueous phase liquids that cannot be contained or removed;
 - (2) The Secretary determines that there is only one response action for the activity and it cannot obtain other necessary permits;
 - (3) The Secretary determines that remediation has taken place to reduce in concentration hazardous materials in environmental media and the plume has been controlled to the extent practical based on an evaluation of reliable and innovative technologies; or
 - (4) The Secretary determines that achieving compliance with the applicable criteria is technically impracticable as determined using Directive No. 9234.2-25 issued September 1993 by the U.S. Environmental Protection Agency's Office of Solid Waste and Emergency Response.
- (c) Prohibition. A TI waiver is prohibited in the following circumstances:
- (1) situations where the Secretary determines that active remediation is necessary to control the migration of a plume or materially reduce the concentration of a hazardous material; or
 - (2) after approval of a TI waiver there would continue to be unmanaged exposure to human health receptors.
- (d) Technical impracticality waiver documentation. For any PRP proposing a TI waiver, the site investigation report prepared under § 35-305 shall, in addition to all other requirements, contain the following materials:
- (1) A proposal for the environmental standard or standards that the PRP is seeking a TI waiver for;
 - (2) A proposed TI zone for purposes of implementing the waiver that documents the following:
 - (A) The plume is not increasing in size or concentration in a manner which would alter the risk assumptions associated with the TI waiver request or the extent of the TI Zone;
 - (B) The plume is not increasing at compliance points at the TI Zone boundary.

- (3) Documentation that all necessary permits have been applied for, made best efforts to obtain, and were denied;
- (4) Documentation that the site has been adequately characterized including the nature and three-dimensional extent of the contamination;
- (5) Any potential changes in contaminant concentrations will not pose a risk to human health or the environment;
- (6) Documentation that potential exposure pathways threatening human health and the environment from contaminated environmental media have been identified and appropriately managed;
- (7) Documentation that all data gaps have been identified and evaluated for significance (a significant data gap would be one that limits the ability to formulate a single scientifically defensible interpretation of environmental conditions or potential risks, or that may affect the choice of remedial approach);
- (8) An evaluation showing the remedial restoration times using active remedial treatments. All assumptions and the degree of uncertainty associated with any model shall be thoroughly discussed;
- (9) An evaluation showing natural attenuation, based on monitoring subsequent to source remediation, has shown that contaminated environmental media will not achieve remedial criteria within a reasonable timeframe. All assumptions and the degree of uncertainty associated with any model shall be thoroughly discussed;
- (10) An estimate the cost of remedial alternatives. Cost estimates shall include the present worth of construction, operation, and maintenance costs; and
- (11) An evaluation of implementing remediation alternatives for plume containment or for reduction of the concentration of hazardous materials in the plume.

Note: When conducting a TI waiver analysis as a part of an evaluation of cleanup options, the Agency recommends review of the following guidance documents in preparing a request for a TI waiver:

Technical Impracticability: Guidance for Evaluating Technical Impracticability of Ground-Water Restoration, September 1993. USEPA OSWER Directive 9234.2-25

[Technical Impracticability Guidance for Groundwater](#), December 2013. New Jersey Department of Environmental Protection.

[Draft Guidance for Applying Technical Impracticability of Groundwater](#), February 2014. Connecticut Department of Energy and Environmental Protection.

Chapter 12 Vermont Groundwater Protection Rule and Strategy

APPENDIX D. HAZARDOUS MATERIAL LISTING

§ 35-APX-D1. HAZARDOUS MATERIAL LISTING

Pursuant to 10 V.S.A. § 6602(16)(A)(iv) the Secretary any chemical or substance listed in the following table is a hazardous material.

<u>CAS Number</u>	<u>Chemical Name</u>
<u>335-67-1</u>	<u>perfluorooctanoic acid (PFOA)</u>
<u>1763-23-1</u>	<u>perfluoro-octane sulfonic acid (PFOS);</u>
<u>355-46-4</u>	<u>perfluorohexane sulfonic acid (PFHxS);</u>
<u>375-85-9</u>	<u>perfluoroheptanoic acid (PFHpA)</u>
<u>375-95-1</u>	<u>perfluorononanoic acid (PFNA)</u>