250-RICR-140-30-1

TITLE 250 – DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

CHAPTER 140 – WASTE AND MATERIALS MANAGEMENT

SUBCHAPTER 30 – SITE REMEDIATION

PART 1 – Rules and Regulations for the Investigation and Remediation of Hazardous Material Releases

1.1 Authority

Under the authority of R.I. Gen. Laws Chapters 42-35, 23-19.1, 23-19.14, 46-12, 46-13.1, R.I. Gen. Laws § 42-17.1-2, and particularly R.I. Gen. Laws §§ 23-19.1-6, 23-19.1-10.3, 23-19.1-11.1, 46-12-3, and 46-12-5, the following Rules and Regulations are promulgated to administer these chapters for the investigation and remediation of contamination resulting from the unpermitted Release of Hazardous Materials, and shall be construed to be consistent with other Departmental regulations and the regulations of federal agencies.

1.2 Purpose

A. The purpose of these regulations is to create an integrated program requiring reporting, investigation and remediation of Contaminated-Sites in order to eliminate and/or control threats to human health and the environment in a timely and cost-effective manner. To ensure consistency and certainty in the process, clean up objectives for soil and groundwater have been developed to manage the risks to human health and the environment, and are to be applied in a manner consistent with the current and reasonably expected future use of the contaminated property.

B. It has been and shall be the policy of the State to require Performing Parties to investigate, evaluate and remediate both existing and new unpermitted sources of pollutants, which will or may likely adversely affect human health or impact the waters, including groundwater of the State.

C. Functions

1. The primary functions of the Department pursuant to these Rules and Regulations are to regulate the investigation and remediation of contamination resulting from Releases of Hazardous Materials; the granting, denial, suspension or revocation of approvals and permits for remediation of that contamination; and the granting, denial, suspension,

revocation or approval of the plans and specifications for the installation of any equipment for such remediation.

2. These regulations are intended to minimize environmental hazards resulting from the unpermitted Release of Hazardous Materials. These regulations are not designed to address aesthetic considerations after risk-based remediation is complete. To the extent that nuisance conditions persist after human health and environmental risks have been eliminated, any disputes concerning these nuisance issues will continue to be addressed through other appropriate legal venues.

3. These regulations are also not intended to duplicate regulatory requirements at sites involving lead contamination, and that meet the definition of a “Regulated Facility”, as defined in 216-RICR-50-15-3, "Lead Poisoning Prevention", administered by the R.I. Department of Health. Direct exposure issues associated with lead contaminated soil may be remediated using measures consistent with the requirements of the Department of Health’s “Lead Poisoning Prevention”, 216-RICR-50-15-3.

D. Environmental Justice and Public Involvement:

1. Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, English language proficiency, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. The Department has established this goal for the review of the investigation and remediation of properties with actual or suspected contamination in all communities and for all persons across this State. It will be achieved when everyone enjoys a fair share of environmental benefits and the same degree of protection from environmental and health hazards, as well as equal access to the decision-making process to help ensure a healthy environment in which to live, learn, and work.

2. As properties are investigated and cleaned up, the Department will promote public participation based on the beliefs that individuals should have a timely, meaningful way to participate in decisions that impact them, and that public participation in its best form is an ongoing, two-way process that benefits both the public and the agency. The Department defines public participation as people getting timely and accurate information, being heard at meaningful times, and if interested, contributing to the development of workable solutions. The public often holds diverse views and the Department will strive to ensure that diverse voices are heard.

3. The Department's objective is to provide for proactive consideration of environmental justice concerns in order to help ensure that all communities have a strong voice in environmental decision-making relative to the investigations and remediation of property regardless of race, color national origin, English language proficiency, or income.

4. The program(s) established under these regulations will be implemented in an efficient and effective manner to support the proper clean-up of contaminated sites while recognizing the need for re-investment, and redevelopment of contaminated properties, including those sites in our urban communities. Investors and developers must see a clear, predictable process for interacting with both the Department and communities around the properties undergoing investigation and clean-up. Care must be taken to effectively address community concerns without imposing additional administrative process and delays into projects whenever possible.

1.3 Incorporated Materials

A. These regulations hereby adopt and incorporate 40 C.F.R. § 300 (2018) by reference, not including any further editions or amendments thereof and only to the extent that the provisions therein are not inconsistent with these regulations.

B. These regulations hereby adopt and incorporate the Environmental Protection Agency’s "Risk Assessment Guidance for Superfund"(1989) by reference, not including any further editions or amendments thereof and only to the extent that the provisions therein are not inconsistent with these regulations.

C. These regulations hereby adopt and incorporate the Environmental Protection Agency’s EPA/630/R-92/001, February 1992, "Framework for Ecological Risk Assessment" by reference, not including any further editions or amendments thereof and only to the extent that the provisions therein are not inconsistent with these regulations.

1.4 Definitions

A. For the purpose of these Rules and Regulations, the following terms shall have the following meanings:

1. "Active well" means a well-equipped and capable of producing potable water which has been used for this purpose within the last 2 years.

2. "All appropriate inquiries" or "AAI" means the process of conducting due diligence or an ASTM Phase I Environmental Site Assessment to

determine prior uses and ownership of a property and assess conditions at the property that may be indicative of Releases or threatened Releases of hazardous substances at, on, in, or to the property as defined by 40 C.F.R. § 312.

3. "Aquifer" means a geologic formation, group of formations, or part of a formation capable of yielding a significant amount of groundwater to wells, springs or Surface Water.

4. "Asbestos" means any material consisting of the following materials: actinolite, amosite, anthophylite, chrysotile, crocidolite or tremolite.

5. "Authorized representative" means any individual employed by any Person, including all forms of private, governmental and commercial entities included there under, in a position to commit the resources of that Person and bind that Person to any responsibilities and/or liabilities set forth under these regulations.

6. "Background" means the ambient concentrations of Hazardous Substances present in the environment that have not been influenced by human activities, or the ambient concentrations of Hazardous Substances consistently present in the environment in the vicinity of the Contaminated-Site which are the result of human activities unrelated to Releases at the Contaminated-Site.

7. "Bedrock" means the continuous solid rock that underlies gravel, soil or other surficial material, including any fractured zones within said rock.

8. "Bona fide prospective purchaser" means an intentional purchaser of a Contaminated-Site, who had documented their intent to purchase the property in writing and who has offered to pay fair market value for the property in the contaminated state. Any former Owner, former Operator or other Person who is otherwise a Responsible Party or any Person who had more than ten percent (10%) equitable or other legal interest in any property impacted by the Contaminated-Site or any of the operations related to the contamination cannot be considered as a Bona Fide Prospective Purchaser. Parties meeting these requirements above as a Bona Fide Prospective Purchaser may petition the Department prior to property purchase, for a certificate to formalize their exemption status under R.I. Gen. Laws § 23-19.14-7.

9. "Carcinogenic substance" means any substance defined as a carcinogen or suspected carcinogen by federal agencies and for which a quantitative health risk extrapolation is available.

10. "CERCLA" means the federal Comprehensive Environmental Response, Compensation and Liability Act (Superfund), 42 U.S.C. § 9601 *et. seq*.

11. "Child care facility" means any person, firm, corporation, association or agency who, on a regular or irregular basis, receives any child under the age of sixteen (16) years, for the purpose of care and/or supervision, not in a home or residence, apart from his parent or guardian for any part of a twenty-four (24) hour day irrespective of compensation or reward as subject to regulation by the Rhode Island Department of Children, Youth and Families. It shall include child care programs that are offered to employees at the worksite.

12. "Clean soil" means soil that has not been impacted, contaminated, adversely affected, or subject to a Release of Hazardous Materials, State or federally defined Hazardous Waste, petroleum, asbestos, PCB's, radioactive materials, or solid waste.

    a. Soil meeting:

        (1) The Department's Method 1 – Residential Direct Exposure Criteria Table 1, § 1.9.2(C)(2) of this Part, and,

        (2) The TPH direct exposure, and leachability criteria of 500 ppm, and,

        (3) Meeting all other State, and federal requirements specific to petroleum, asbestos, radioactive material, PCB's, solid waste, and other criteria as determined by the Director;

    b. Shall be deemed "Clean Soil" as defined above. For cases where naturally occurring background levels of arsenic or beryllium may exceed the above standards of §§ 1.4(A)(12)(a)((1)) through ((3)) of this Part, the Department may be petitioned to make a site specific background determination for compliance with the regulatory definition.

13. "Container" means any portable device in which a material is stored, transported, treated, disposed of or otherwise handled.

14. "Contaminated-site" means any Source Area or series of Source Areas that have not reached final resolution under this Part. A Contaminated-Site may include unimpacted land between multiple Source Areas in close proximity to one another. A Contaminated-Site shall be considered to be independent of property lines.

15. "Department" means the Department of Environmental Management.

16. "Direct exposure criteria" means the concentrations of Hazardous Substances in soil protective of human health and the environment from exposures including but not limited to ingestion as identified in Table 1, § 1.9.2(C)(2) of this Part or any other Direct Exposure Criteria approved by the Director pursuant to §§ 1.9.2(D) or 1.9.4 of this Part.

17. "Director" means the Director of the Department of Environmental Management, or that Director's designee.

18. "Emergency" or "short-term response action" means any activities undertaken immediately following the discovery of a Release of Hazardous Material in order to completely or partially contain, clean up or treat the Released material and/or remove an Imminent Hazard if it exists.

19. "Environmental justice" means the fair treatment and meaningful involvement of all people regardless of race, color, national origin, English language proficiency, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

20. "Environmental justice focus areas" means areas defined by United States Census block groups that are in the highest fifteen percent (15%) of all Census block groups in Rhode Island with respect to the percent population identified as racial minorities or the highest fifteen percent (15%) of Rhode Island census block groups with respect to percent population with income identified as being twice the federal poverty level or below (utilizing the most recent and readily available data from the United States Census).

21. "Environmentally sensitive area" means any of the following areas:

    a. Areas which provide habitat for Federally endangered or threatened species as determined by the U.S. Department of Fish and Wildlife;

    b. Areas which provide habitat for State endangered or threatened species as determined by the Department through the Natural Heritage Program;

    c. Surface Water classified A, B or C by the Department or Wetlands;

    d. Coastal areas designated as Type 1 Conservation Areas or Type 2 Low-Intensity Use by the Rhode Island Coastal Resources Management Council;

e. Tidal waters classified SA by the Department;

f. State parks, management areas, wildlife areas or marine sanctuaries; or,

g. Natural areas owned or operated by government agencies or not-for-profit organizations for the purposes of preserving the natural character of the property.

22. "Excess lifetime cancer risk" means the estimated probability that an individual's exposure to a substance could result in cancer.

23. "Facility" means all contiguous land, structures and other appurtenances and improvements on the land used for treating, storing or disposing of Hazardous Waste.

24. "Free liquid" means Liquid which readily separates from the solid portion of a material under ambient temperature and pressure.

25. "GA" or "GAA area" means any area having a Groundwater classification of GA or GAA, in accordance with the Department's "Groundwater Quality Rules". The terms “GA” and “GAA” may be used interchangeably throughout this Part.

26. "GA groundwater objectives" means the concentrations of Hazardous Substances in Groundwater protective of human health and the environment which are identified in Table 3, § 1.9.3(F)(4) of this Part or any other GA Groundwater Objective approved by the Director pursuant to § 1.9.4 of this Part.

27. "GA leachability criteria" means the concentrations of Hazardous Substances in soil identified in Table 2, § 1.9.2(C)(3) of this Part or any other GA Leachability Criteria approved by the Director pursuant to §§ 1.9.2(D) or 1.9.4 of this Part.

28. "GB area" means any area having a Groundwater classification of GB, in accordance with the Department's "Groundwater Quality Rules."

29. "GB groundwater objectives" means the concentrations of Hazardous Substances in Groundwater protective of human health and the environment which are identified in Table 4, § 1.9.3(F)(5) of this Part or any other GB Groundwater Objective approved by the Director pursuant to §§ 1.9.3(G) or 1.9.4 of this Part.

30. "GB leachability criteria" means the concentrations of Hazardous Substances in soil identified in Table 2, § 1.9.2(C)(3) of this Part or any other GB Leachability Criteria approved by the Director pursuant to §§ 1.9.2(D) or 1.9.4 of this Part.

31. "Groundwater" means water found underground which completely fills the open spaces between particles of sand, gravel, clay, silt and Bedrock fractures. The zone of materials filled with groundwater is called the zone of saturation.

32. "Hazard index" means the calculation of the potential for non-cancer health effects as a result of exposure to one or more Hazardous Substances with the same or similar modes of toxic action or toxic endpoints.

33. "Hazardous material" means any material or combination or mixture of materials containing any Hazardous Substance. Hazardous Material does not include Petroleum as defined in these regulations (i.e., virgin petroleum products).

34. "Hazardous substance" means any substance designated as such pursuant to 40 C.F.R. § 300.5, incorporated above at § 1.3(A) of this Part. Hazardous Substance also includes any material that meets the definition of Hazardous Waste. Hazardous Substance shall not include, for the purposes of these regulations, asbestos or radioactive materials.

35. "Hazardous waste" means any material defined as such waste pursuant to the Department's "Rules and Regulations for Hazardous Waste Management," Subchapter 10 Part 1 of this Chapter.

36. "Imminent hazard" means a Release of Hazardous Material meeting any of the following criteria:

    a. The Release poses an immediate and substantial threat or risk of acute or chronic adverse effect on human health;

    b. The Release poses a threat or risk of harm, which could cause immediate destruction or significant adverse impact on an Environmentally Sensitive Area or the contamination of a wellhead protection area or other drinking water source;

    c. The Release poses an immediate threat of fire or explosion. Further factors to consider when evaluating Releases resulting in a threat of fire and explosion shall include:

(1) The ignitability of the Hazardous Material, and the mixture resulting from the Release of the Hazardous Material;

(2) The reactivity of the Hazardous Material, and the mixture resulting from the Release of the Hazardous Material;

(3) The potential incompatibility of the Hazardous Material, and the mixture resulting from the Release of the Hazardous Material, with other materials which can reasonably be expected to be stored or handled in the area of the Release; and

(4) The potential impacts of a fire and/or explosion; and

d. The Release may be influenced by site-specific factors which have the potential to lead to an imminent threat to human health or the environment.

37. "Impoundment" or "Surface impoundment" means a natural topographic depression or man-made excavation, or diked area formed primarily of earthen materials (although it may be lined with man-made materials), which is designed to hold an accumulation of liquids, solids or materials containing free liquids, and which is not a well. Examples of impoundments include holding, storage, settling and aeration pits, ponds, and lagoons.

38. "Incompatible materials" means materials which are unsuitable for:

a. Placement in a particular device or management at a Contaminated-Site or facility because those materials may cause corrosion or decay of containment materials; or

b. Commingling with another material under uncontrolled conditions because the commingling might produce heat or pressure, fire or explosion, violent reaction, toxic dusts, mists, fumes or gases or flammable fumes or gases.

39. “Industrial/commercial activity” means any activity related to the commercial production, distribution, manufacture or sale of goods or services, or any other activity which is not a traditional Residential Activity as defined by § 1.4(A)(68) of this Part including activities related to outdoor recreational areas with restrictions in place to limit potential exposure.

40. “Industrial/commercial direct exposure criteria” means the concentrations identified in the Industrial/Commercial column of Table 1, § 1.9.2(C)(2) of this Part or any other Industrial/Commercial Direct Exposure Criteria approved by the Director pursuant to §§ 1.9.2(D) or 1.9.4 of this Part.

41. "Inorganic hazardous substance" means any Hazardous Substance which is not an Organic Hazardous Substance.

42. "Interim letter of compliance" or "ILOC" means a letter may be issued by the Office of Waste Management, as an interim step to a Letter of Compliance, for Contaminated-Sites that have implemented all active remedial measures required (including but not limited to completing all physical components and construction as required in the Remedial Approval Letter), and in the opinion of the Department, entered a long-term monitoring or operational and maintenance phase of a clean-up approved by the Office. An Interim Letter of Compliance shall not be considered a Letter of Compliance. The Office reserves the right to require additional remedial measures, should it become apparent that the remedial objectives of the clean up will not be achieved.

43. "Leachability criteria" means the concentrations of Hazardous Substances protective of GA/GAA and GB Areas, as appropriate, and the environment which are identified in Table 2, § 1.9.2(C)(3) of this Part or any other GA Leachability Criteria approved by the Director pursuant to §§ 1.9.2(D) or 1.9.4 of this Part.

44. "Letter of compliance" or "LOC" means a letter will be issued by the Office of Waste Management for Contaminated-Sites that have completed a full site assessment or a Site Investigation Report (per § 1.8 of this Part) approved by the Department documenting all known and suspected Releases, and completed all Remedial Action work required by the Office to address the remedial objectives for the site, including institutional controls (if applicable).

45. "Liquid" means any material that expresses as separable Liquid by weight thirty percent (30%) or more of the material when exposed to a vacuum of 3/4 atmosphere for thirty (30) minutes.

46. "Manifest" means the Rhode Island Uniform Hazardous Waste Manifest provided by the Department or any other manifest approved by the United States Environmental Protection Agency for identifying, at a minimum, the quantity, composition, type and the origin, routing and destination of Hazardous Waste from the point of generation, to the point of treatment, storage, or disposal.

47. "Method 1" means the determination of appropriate soil and groundwater objectives based on the concentrations of Hazardous Substances identified in Table 1 and 2, §§ 1.9.2(C)(2) and (3) of this Part, Table 3 and 4, §§ 1.9.3(F)(4) and (5) of this Part.

48. "Method 2" means the determination of appropriate soil and groundwater objectives based on the concentrations of Hazardous Substances developed using site-specific factors in accordance with §§ 1.9.2(D) and 1.9.3(G) of this Part.

49. "Method 3" means the determination of appropriate remedial objectives based on the concentrations of Hazardous Substances developed in accordance with §§ 1.9.4 and 1.9.5 of this Part.

50. "No further action" or "NFA Letter" means a letter will be issued by the Office of Waste Management for properties that have undergone a limited, or focused site investigation, and completed all Remedial Action work required by the Office to address only the identified or limited areas of concern.

51. "Non-aqueous phase liquid" or "NAPL" means an organic compound present at a concentration such that it exists as a separate phase in equilibrium with water. Said definition may apply to Light Non-Aqueous Phase Liquids (LNAPL), and/or Dense Non-Aqueous Phase Liquids (DNAPL).

52. "Operator" means the Person who is responsible for the operation of the activities at the Contaminated-Site. For the purposes of these regulations, Persons who create or maintain a security interest in land by making loans, administering loans or participating in the financial workout of defaulted loans are not Operators, and such acts of themselves are not considered participation in management of a Contaminated-Site. Activities that are considered appropriate activities of a secured lender include, without limitation:

    a. Requiring or conducting site assessments on a Contaminated-Site; and

    b. Collecting income and rents from the site to the extent that such funds are not inappropriately diverted from being utilized toward remediation of the Contaminated-Site.

53. "Organic hazardous substance" means any Hazardous Substance containing the element carbon.

54. "Overburden" means the material present in the ground above bedrock.

55. "Owner" means the Person who owns the Contaminated-Site or part of the Contaminated-Site.

56. "PCB" or "PCBs" means any chemical substance that is limited to the biphenyl molecule that has been chlorinated to varying degrees or any combination of substances which contains such substance.

57. "Performing party" or "Parties" means any Bona Fide Prospective Purchaser, Responsible Party, voluntary party or any other party (or parties) conducting an investigation of and/or Remediation at a Contaminated-Site.

58. "Person" means an individual, trust, firm, joint stock company, corporation (including a government corporation), partnership, association, the Federal Government or any agency or sub-division thereof, a state, municipality, commission, political sub-division of a state, or any interstate body.

59. "Petroleum" means any virgin petroleum product including the following products:

    a. Unused distillate and residual oil including but not limited to gasoline, aviation fuels, kerosene, diesel, and heating oils; and

    b. Unused crankcase oil, lubricants, hydraulic oils, penetrant oils, tramp oils, quench oils, and other industrial oils.

60. "Public water supply system" means a system for the provision to the public of piped water for human consumption, provided such a system has at least fifteen (15) service connections or regularly serves an average of at least twenty-five (25) individuals daily at least sixty (60) days out of the year.

61. "RCRA" means the Federal Resource Conservation and Recovery Act, 42 U.S.C. § 6901 (2018).

62. "Recreational facility for public use" means a building or place, owned or controlled by a government agency or not-for-profit entity, that provides the public the opportunity to engage in active and/or passive recreation. The payment of a membership fee or other user fee shall not be determinative for said building or place to be deemed a recreational facility for public use. The terms active recreation and passive recreation shall be interpreted broadly and are defined as follows:

a. Active Recreation:

(1) Generally sports related and may be defined as activities that combine one or more of the following features:

(AA) Formally organized teams and leagues,

(BB) Require specialized sports equipment, or

(CC) Are held at developed recreation sites, facilities, or fields.

(2) Moderate to high intensity structured recreation use, in many cases requiring some modification of natural landforms and the provision of service facilities (parking areas, restrooms, visitor centers).

(3) Requires constructed facilities for structured or unstructured recreation such as sports fields, play areas, golf courses, swimming pools, skating rinks, boat docks, equestrian centers.

b. Passive Recreation:

(1) Activities that may be performed individually, may require little or no specialized equipment, or can be engaged in at sites that are undeveloped or minimally developed. Examples include hiking, biking, horseback riding, picnicking, swimming at salt or fresh water beaches, and nature viewing. These activities take place at a variety of sites dispersed throughout the state including bikeways, trails, parks, beaches and management areas.

(2) Involves existing natural resources, has minimal impacts, and does not require significant facilities. Examples include: hiking, horseback riding, cross-country skiing, fishing, canoeing, picnicking, nature viewing, or bicycling. The purchase or preservation of undeveloped open space without active promotion of the use of the property for either active or passive recreation, or the development of parking areas for increased access to existing recreational areas, shall not constitute a Recreational Facility for Public Use under these regulations.

63. "Release" means as defined in 40 C.F.R. § 300.5, incorporated above at § 1.3(A) of this Part, for purposes of the Remediation Regulations.

    a. A release shall exclude any of the following:

        (1) Any Release from a process, activity or Contaminated-Site allowed under a permit, license or approval by any regulatory process or legal authority;

        (2) Any Release of Hazardous Materials solely derived from common household materials and occurring at the household; or

        (3) Any Release that is completely contained within an area or structure designed and engineered to contain such materials.

    b. Release shall also include an actual or potential threat of Release. Concentrations of PCBs greater than 10 micrograms/100 cm^2, as measured by a standard wipe test, on any surface shall constitute a Release. The Director may determine that an area with PCB contamination at concentrations lower than specified above requires investigation and/or remediation due to site-specific circumstances.

64. "Remedial decision letter" means a formal, written communication from the Department that approves a site investigation, identifies the preferred remedial alternative and authorizes the development of a remedial action work plan in order to achieve the objectives of environmental clean-up.

65. "Remediation" means the act of implementing, operating and maintaining a Remedy or Remedial Action.

66. "Remediation regulations" means the “Rules and Regulations for the Investigation and Remediation of Hazardous Material Releases.”

67. "Remedy" or "Remedial action" means those actions taken to rectify the effects of a Release of Hazardous Material, so that it does not cause a significant risk to present or future public health or welfare, or the environment.

68. "Residential activity" means any activity related to a

    a. residence or dwelling, including but not limited to a house, apartment, or condominium, or

b. school, day care center, playground, or Recreational Facility for Public Use.

69. "Residential direct exposure criteria" means the concentrations identified in the Residential column of Table 1, § 1.9.2(C)(2) of this Part or any other Residential Direct Exposure Criteria approved by the Director pursuant to §§ 1.9.2(D) or 1.9.4 of this Part.

70. "Responsible party" or "parties" means

a. Any or all of the following Persons:

(1) The Owner or Operator of a Vessel, Transport Vehicle, or a Contaminated-Site at which there is a known or suspected Release;

(2) Any Person who, at the time of storage or disposal of any Hazardous Material, owned or operated a Contaminated-Site at which there is a known or suspected Release;

(3) Any Person who, by contract, agreement, or otherwise, directly or indirectly, arranged for the disposal of Hazardous Material at a Contaminated-Site at which there has been a known or suspected Release;

(4) Any Person who accepts or accepted any Hazardous Materials for transport to disposal or treatment facilities or Contaminated-Sites selected by such Person and from which location there is a Release or a threatened Release of Hazardous Materials which causes the incurrence of response costs;

(5) Any Person who otherwise caused or is legally responsible for a Release of Hazardous Materials from a Vessel, Transport Vehicle or operation at a Contaminated-Site; and

(6) The Person or legal entity controlling a Contaminated-Site, Transport Vehicle, Vessel or activity that contains or led to a known or suspected Release.

(7) Responsible Party shall also mean any and all combinations of the abovementioned Persons.

b. The following parties are not Responsible Parties and shall not be held liable for costs or damages associated with a Release of Hazardous Materials:

(1) Persons otherwise liable who can establish by a preponderance of the evidence that the Release or threat of Release of Hazardous Materials and the damages resulting there from were caused solely by an act of God or an act of war;

(2) Persons who are defined as Bona Fide Prospective Purchasers of a Contaminated-Site and have entered a settlement or remedial agreement with the Department related to the same Contaminated-Site;

(3) Persons who are not Operators and who act solely as custodial receivers or who can establish by a preponderance of evidence that they are an innocent land Owner and the Release or threat of Release were caused solely by an act or omission of a third party other than an employer or agent of the defendant, or whose act or omission occurs in connection with a contractual relationship, existing directly or indirectly, with the defendant if the defendant establishes:

(AA) That it exercised due diligence in the acquisition of the Contaminated-Site at the time of purchase and exercised due care with respect to the Hazardous Material concerned, taking into consideration the characteristics of such Hazardous Material, in light of the facts and circumstances; and

(BB) That it took precautions against foreseeable acts, or omissions of any such third party and the consequences that could foresee ably result from such acts or omissions; and

(4) Persons who maintain indicia of ownership solely to protect a security interest in land and are not Operators.

c. For the purposes of this definition, a secured lender is not deemed an Owner or an Operator if in order to protect its security interest the secured lender accepts title to a Contaminated-Site through foreclosure, or by accepting the deed to the Contaminated-Site in lieu of foreclosure, and meeting the following requirements:

(1) The secured lender can demonstrate that no act of the secured lender or its agent(s), after accepting title, caused or contributed to a Release of Hazardous Materials;

(2) The secured lender provides notification, if required, pursuant to § 1.6.1 of this Part if notification had not previously been provided to the Department;

(3) The secured lender does not acquire property which presents an Imminent Hazard, or in the event of discovery of an Imminent Hazard subsequent to foreclosure, the secured lender takes appropriate action pursuant to § 1.7 of this Part to stop, minimize or remove the imminent threat;

(4) The secured lender provides the Department and its agents with access to the Contaminated-Site; and

(5) The secured lender acts diligently to sell or otherwise divest itself of ownership or possession of the Contaminated-Site in a timely manner. For the first eighteen (18) months after accepting or taking title, the secured lender is presumptively assumed to be actively seeking to divest the property. In this period, it is the burden of the Department to demonstrate that the lender is not pursuing reasonable good faith efforts. For the time period after eighteen (18) months of accepting or taking title, the burden shifts to the secured lender to affirmatively demonstrate that it has undertaken, and continues to undertake, good faith efforts to sell the property.

71. "School" means any residential or non-residential school building, public, private or charter, of any city or town or community educational system regulated, directly or secondarily, by the board of regents for elementary and secondary education or the Department of elementary and secondary education or any other state education board or local city or town school board or school committee or other legal educational subdivision acting under it. The term "school" or "schools" includes, but is not limited to, school playgrounds, school administration buildings, indoor school athletic facilities, school gymnasiums, school locker rooms, and similar school buildings. It does not include institutions of higher education or child-care facilities as regulated by the Department of Children, Youth and Families.

72. "Sediment" means the unconsolidated inorganic and organic material that is suspended in and is being transported by Surface Water, or has settled out of Surface Water.

73. "Source area" means the horizontal and vertical extent of natural or man-made media impacted by a Release of Hazardous Materials or causing a Release of Hazardous Materials at concentrations in excess of the reportable concentrations described in §§ 1.6.1(C) and (D) of this Part, and determined by the Department to pose a potential threat to human health and the environment. For purposes of these regulations, sanitary landfills licensed under the Department's "Rules and Regulations for Solid Waste Management Facilities and Organic Waste Management Facilities" (Subchapter 05 Part 1 of this Chapter) on or after 18 June 1992 are not Source Areas.

74. "Surface water" means any body of water open to the atmosphere including brooks, streams, rivers, ponds, lakes, bays or wetlands.

75. "Tank" means a stationary device designed to contain an accumulation of Hazardous Material which is constructed primarily of non-earthen materials which provide structural support.

76. "Transport vehicle" means a motor vehicle, trailer or rail car used for the transportation of cargo by any mode. Each cargo-carrying body (trailer, railroad freight car, etc.) is a separate Transport Vehicle.

77. "Treatment" means any method, technique, or process, including neutralization or incineration, designed to change the physical, chemical, or biological character or composition of any Hazardous Material.

78. "Underground injection control system" means any active or inactive system or structure used for the subsurface discharge of commercial or industrial wastewater.

79. "Vadose zone" means the full extent of the soil column existing above the elevation of Groundwater for the purposes of the Remediation Regulations.

80. "Vessel" means any boat or watercraft whether moved by oars, paddles, sails, or other power mechanism, inboard or outboard, or any other boat or structure floating upon the water whether or not capable of self locomotion, including house boats, barges and similar floating objects.

81. "Well" means a bored, drilled, or driven shaft or a dug hole, with a depth that is greater than its largest surface dimension, through which groundwater has flowed, flows, or may flow under natural or induced pressure and that has been modified for purposes of obtaining water.

82. "Wellhead protection area" means a three-dimensional zone, designated by the Director and delineated pursuant to the Department's "Groundwater Quality Rules," surrounding a well or wellfield supplying a public water supply system, through which water will move toward and reach such well or wellfield.

83. "Wetland" means any area that is inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas.

84. "40 C.F.R." means that section or subsection of the Code of Federal Regulations, Title 40, Protection of Environment, Chapter I, Environmental Protection Agency. References to the Administrator, appearing therein, shall be interpreted as referring to the Director.

1.5 Prohibitions, Management, Inspections, and Analytical Methods

1.5.1 Prohibition on Unpermitted Release or Disposal

No Person shall release any Hazardous Material in any manner which may impact the classification or uses of the land, ground water, or Surface Water without complying with all applicable Rules and Regulations.

1.5.2 Management of Unpermitted Releases

A. Any Responsible Party who discovers or is notified of the potential unpermitted disposal, release or presence of Hazardous Materials released from, present on, or originating from its operations or property shall immediately initiate investigations and actions as specified in §§ 1.6 through 1.13 of this Part.

B. Sites listed on the National Priorities List shall comply with the requirements of the National Contingency Plan, 40 C.F.R. § 300, incorporated above at § 1.3(A) of this Part. Said sites shall also comply with these regulations where applicable or relevant and appropriate, or more stringent than EPA requirements, including, but not limited to, the requirements of § 1.9 of this Part.

1.5.3 Additional Compliance

Any action taken pursuant to the requirements of these regulations shall be done in compliance with all applicable environmental statutes and regulations. Nothing in these regulations shall be construed to limit the authority of the Department to act pursuant to other existing statutes and regulations.

1.5.4 Inspections; Right of Entry

A. For purposes of enforcement of these regulations, the Director may:

1. Enter any place the Director has reason to believe Hazardous Materials are generated, used, stored, treated, or disposed of, and which may have contributed to a Release;

2. Inspect any place, material, vessel or transport vehicle that the Director has reason to believe is associated with a Release of Hazardous Material;

3. Obtain samples of any material, from any vessel or transport vehicle or place, which the Director has reason to believe was Released, is or was contaminated by a Release, or is otherwise associated with a Release, of Hazardous Material; and

4. Inspect and copy records, reports, information, or test results kept or maintained at any place, on any vessel or transport vehicle, that the Director has reason to believe is associated with a Release of Hazardous Material.

1.5.5 Analytical Methods

To the extent that laboratory analysis is utilized pursuant to § 1.6 of this Part, the analytical protocol shall be consistent with the specified methods listed in § 1.16 of this Part. Equivalent or alternative methods may be used throughout any other phase of the management of a Contaminated-Site with specific prior written approval from the Director.

1.6 Notification

1.6.1 Notification of Release

A. A Responsible Party shall notify the Department, in writing in both hard copy and electronic format (as specified by the Department), of the discovery of any Release in accordance with the requirements of this rule which was not previously reported to the Department by any Responsible Party. Any Release which requires notification pursuant to this rule shall be reported no later than 15 days after the discovery of the Release.

B. Exemptions from Notification

1. Any Release that is solely the result of an underground injection control system or a leaking underground storage tank is exempt from the reporting requirements of the Remediation Regulations.

C. Reportable Concentrations for Soil

1. For those concentrations of Hazardous Substances which are in excess of any of the soil objectives as specified in Tables 1 or 2, §§ 1.9.2(C)(2) or (3) of this Part, as appropriate, or which are not specified in Tables 1 or 2, §§ 1.9.2(C)(2) or (3) of this Part and are in an amount and concentration which present a significant potential to cause an acute or chronic adverse effect on human health or the environment, the Responsible Party shall provide notification to the Office of Waste Management consistent with § 1.6.2 of this Part except as otherwise provided in this Part.

2. Notification of a Release for soil is not required provided that all of the following site conditions are met:

   a. The Release has impacted an area currently limited to Industrial or Commercial Activity;

   b. The reasonably foreseeable future use of the property impacted by the Release is limited to Industrial/Commercial Activity;

   c. The groundwater underlying the site is classified as a GB area;

   d. There are no well head protection areas or active wells known to the Performing Party or their representatives within 500 feet;

   e. The Hazardous Substances of concern are listed in Tables 1 and 2, §§ 1.9.2(C)(2) and (3) of this Part, and are at concentrations which are below the industrial or commercial Direct Exposure Criteria, and below the GB leachability criteria as listed in those tables, respectively;

   f. There are no GA/GAA areas within 500 feet of the Release;

   g. The abutting properties are used for Industrial/Commercial Activity; and

   h. There is no physical boundary of any wetland or surface water within 500 feet of the Release.

D. Reportable Concentrations for Groundwater

1. Responsible Parties that have had a Release which has impacted or threatens to impact groundwater shall notify the Department when:

   a. Any Hazardous Substance in groundwater is at a concentration which exceeds any of the groundwater objectives for the

Hazardous Substance as specified in Tables 3 and 4, §§ 1.9.3(F)(4) and (5) of this Part, as appropriate; or

b. Any Hazardous Substance in groundwater which is not specified in Tables 3 or 4, §§ 1.9.3(F)(4) or (5) of this Part is in an amount and concentration which presents a significant potential to cause an acute or chronic adverse effect on human health or the environment; or

c. A Responsible Party has reasonable cause to believe that a discharge or Release has occurred which may result in an exceedance of any appropriate groundwater objective.

1.6.2 Contents of Notification

A. For any Release of Hazardous Materials which triggers notification pursuant to § 1.6.1 of this Part the written notification shall include, but not necessarily be limited to, all of the following information (a form is on the Department's Office of Waste Management Site Remediation web page at http://www.dem.ri.gov/pubs/forms/hwreleas.pdf which may be used as the notification submittal for all Releases except for those Releases posing an Imminent Hazard):

1. The names, addresses and telephone numbers of: the Person notifying the Department of the Release; the Owner(s) and Operator(s) of any properties impacted by the Release or of the vessel where the Release has occurred; any other Responsible Parties; and the contact Person at the impacted area or vessel where the Release has occurred;

2. The city/town, street address, legal description (plat and lot) and the general location of the area impacted by the Release;

3. The date of and the circumstances leading to and surrounding the discovery of the Release;

4. An identification of the Hazardous Material Released, the approximate concentrations of Hazardous Substances in the Released material and the approximate quantity of the Hazardous Material Released;

5. An initial estimate of the source of the Release and the extent of contamination resulting from the Release;

6. Measures taken or proposed to be taken in response to the Release as of the time of notification;

7. Any other relevant information relating to the potential for environmental impacts and other factors evaluated in determining whether or not the Release presents an Imminent Hazard, including but not limited to:

   a. A determination as to whether a Release of Hazardous Material has the potential to adversely impact any wetland or surface water; and

   b. A determination as to whether the extent of Hazardous Material contamination in soil or groundwater is within 500 feet of a surface water or wetland;

8. A determination as to whether the Release impacts an area utilized for Residential Activity, industrial commercial activity, or both;

9. An identification of the underlying groundwater classification, and if the classification is GB, the distance to the nearest GA/GAA area; and

10. An indication of whether a background determination consistent with § 1.9.6 of this Part will be performed and submitted subsequent to notification.

1.7 Emergency or Short-Term Response

1.7.1 Emergency or Short-Term Response Actions

A. The Responsible Party shall immediately notify the Department with the information outlined in § 1.6.2 of this Part and take appropriate action to stop or minimize a Release of Hazardous Material posing an Imminent Hazard and/or any on-going spill of Hazardous Material at the time of discovery.

B. All Emergency or Short-Term Response Actions undertaken by the Responsible Party shall be conducted in a manner which is protective of human health and the environment.

C. No Emergency or Short-Term Response Action undertaken by the Responsible Party may be conducted in a manner which increases the potential for harm, either short-term or long-term, to human health or the environment.

1.7.2 Treatment Actions

All Emergency or Short-Term Response Actions which include the treatment of Hazardous Material or of substances contaminated by a Release of Hazardous Material shall be approved by the Director prior to initiation.

1.7.3 Duration

A. The duration of Emergency or Short-Term Response Actions involving the treatment of Hazardous Material or of substances contaminated by a Release of Hazardous Material will be determined on an incident-specific basis by the Department.

B. The duration of any portion of an approved Emergency or Short-Term Response Action involving Hazardous Waste treatment is limited to less than twenty-four (24) hours from the time of discovery of the Release.

1.7.4 Emergency Permits

A. In cases where on-site treatment of Hazardous Waste is necessary to remove the Imminent Hazard, and it is anticipated to take longer than twenty-four (24) hours, Responsible Parties shall obtain an Emergency Permit prior to initiating the treatment actions proposed as part of that response.

B. Emergency Permit applications shall be submitted in both hard copy and electronic format (as specified by the Department) and shall include the manner and location of all proposed treatment operations.

C. Application for an Emergency Permit may be made orally with a written application following no later than forty-eight (48) hours after the discovery of the Release.

D. Emergency Permits may be granted orally with a written permit subsequently issued.

1.7.5 Emergency Permit Duration

Emergency Permits shall not exceed ninety (90) days in duration.

1.7.6 Public Notice Requirements

A. Emergency Permit Requirements: All Emergency Permits will be accompanied by a public notice published in a local newspaper of largest regional circulation. The Responsible Party will write that notice in a block ad format and be responsible for its publication. A final copy of the public notice shall be submitted and approved by the Department prior to publication. The notice shall be published within ten (10) days of the Release.

B. The notice shall contain, at a minimum, the following information:

1. The name and address of the Responsible Party receiving the permit;

2. A brief description of the Hazardous Wastes involved;

3. A brief description of the treatment action and/or other actions authorized by the permit;

4. The name and address of the permitting agency; and

5. The duration and effective dates of the permit.

C. General: The Performing Party shall notify all abutting property owners, tenants, easement holders, the municipality, and any community well suppliers associated with any well head protection areas which encircle the Contaminated-Site, that the Emergency or Short-Term Response Action is complete and make available to them the findings of the Emergency or Short-Term Response Report submitted per § 1.7.9 of this Part.

D. For Emergency or Short-Term Response Actions approved under § 1.7 of this Part, compliance with § 1.7.6 of this Part shall constitute full Public Involvement, except for locations identified in § 1.8.7(A)(3) of this Part. Locations specifically identified in § 1.8.7(A)(3) of this Part shall also meet the additional Public Involvement requirements of § 1.8.7 of this Part.

1.7.7 Cessation Orders

The Director may order, via an Immediate Compliance Order or Order to Cease and Desist, the immediate cessation of any Emergency or Short-Term Response Action without process if the Director has reason to believe that the termination of that response action is necessary to protect human health or the environment. An order may also be issued if the Director finds that the Responsible Party has not complied with the terms and conditions of an Emergency Permit, or if the known or suspected Imminent Hazard has been removed.

1.7.8 Monitoring and Evaluation

In all cases where an Emergency or Short-Term Response Action is initiated, the Responsible Party shall, throughout the implementation of that action, monitor and evaluate the performance, effectiveness and completeness of the action in abating, preventing or eliminating contamination and, more specifically, the Imminent Hazard. The Director may require the submittal of progress reports on a specified schedule throughout the Emergency or Short-Term Response Action.

1.7.9 Emergency or Short-Term Response Report:

A. Following the completion of any Emergency or Short-Term Response Action, the Responsible Party undertaking the action shall prepare an Emergency or Short-

Term Response Report providing a detailed summary of all investigations and activities taken in response to the Release. This report shall be submitted to the Department in both hard copy and electronic format (as specified by the Department) within thirty days of completion of the Emergency or Short-Term Response Action.

B. The Emergency or Short-Term Response Report shall contain, where applicable, at least the following information:

1. The basis for the determination of whether the Release presented an Imminent Hazard;

2. The design specifications of any physical structures built or installed as part of the response;

3. A site plan showing the areal extent of the Release and noting all treatment units, pertinent structures, areas, and/or other aspects of the Release and Emergency or Short-Term Response Action;

4. Documentation of any off-site migration of Released material including notation of any factors, such as weather conditions, which may have caused or aggravated this migration;

5. The locations of all samples, including those from monitoring activities, taken and the results of the analysis of those samples;

6. The manifests, receipts and/or bills of lading for any Hazardous Material or material contaminated by the Release;

7. The nature, concentrations and extent of residual contamination. In cases where the Responsible Party considers the Emergency or Short-Term Response Action as the final remedy, the Responsible Party shall demonstrate compliance with § 1.9 of this Part, and

8. In cases where an Emergency Permit was issued, evidence that Public Notice was issued pursuant to the requirements of § 1.7.6 of this Part.

1.7.10 Certification Requirements

A. The Emergency or Short-Term Response Report and all associated progress reports shall include the following statements signed by an authorized representative of the party specified:

1. A statement signed by an authorized representative of the Person who prepared the Emergency or Short-Term Response Report certifying the

accuracy of the information contained in that report to the best of their knowledge.

2. A statement signed by the Responsible Party responsible for the submittal of the Emergency or Short-Term Response Report certifying that the report is a complete and accurate representation of the circumstances known about the Release and the subsequent response activities to the best of their knowledge.

1.7.11 Following review of the Emergency or Short-Term Response Report, the Department shall either issue

A. A No-Further Action Letter (NFA), if only localized areas of concern have been satisfactorily addressed, or

B. A Letter of Compliance (LOC)/Interim Letter of Compliance (ILOC), if the site has been adequately assessed and/or deemed compliant, or

C. A letter notifying the Responsible Parties that additional investigation, remedial actions, are required under §§ 1.8, 1.9, and 1.10 of this Part (as applicable).

1.8 Site Investigation

1.8.1 Site Investigation

A. The Director may require a Performing Party for any Contaminated-Site to conduct, in a specified amount of time, an investigation of the Contaminated-Site to adequately assess the nature and extent of contamination, and to evaluate and design a proposed remedy. The Director shall base the decision to require the investigation on the available information regarding the mobility, toxicity and volume of the Hazardous Material Released and the resultant potential for harm to human health or the environment.

B. The Site Investigation shall determine the nature and extent of the Contaminated-Site and the actual and potential impacts of the Release. Remedial alternatives shall be considered and data generated during the Site Investigation shall be in such a form and substance as to aid in the selection of a remedy for the Contaminated-Site that is protective of both human health and the environment.

C. The scope of the Site Investigation shall be tailored to specific conditions and circumstances at the site under investigation using professional judgment. The Remedial Investigation may be conducted in phases which may focus on specific Releases, Source Areas or exposure pathways.

D. A Performing Party shall complete a site investigation in accordance with § 1.8 of this Part, as required by the Director, and submit a site investigation report in both hard copy and electronic format (as specified by the Department) for review and approval.

E. Whenever a site that is known to be contaminated or is suspected of being contaminated based upon its past use is considered for possible reuse as the location of a School, Child-Care Facility, or as a Recreational Facility for Public Use that supports existing or proposed Active Recreation, the Performing Party must complete All Appropriate Inquiries (AAI), as defined in these regulations, and conduct the public notification and public involvement processes required by § 1.8.7(A)(3) of this Part prior to the initiation of the Site Investigation. In addition, the Performing Party is hereby required to post a sign at the Contaminated Site in accordance with the specific sign requirements detailed in this section.

F. The Performing Party shall post signs at all Contaminated-Sites located in Environmental Justice Focus Areas to inform local residents about the project. When deemed appropriate signs will be required to be posted in a language (or languages) other than English. Signs shall be:

1. At least four (4) feet by six (6) feet in size;

2. Posted for at least thirty (30) days minimum and from a date one week prior to the initiation of field work for the Site Investigation to a date at least one week following the issuance of either an Interim Letter of Compliance or Letter of Compliance or other official communication from the Department that no further action is necessary, or for a twelve (12) month maximum period,

3. Maintained in legible condition by the Performing Party;

4. Clearly visible from the nearest public highway/road; and

5. Include the name/phone number/address of an individual from whom any interested person may obtain information about the site or remediation and any web site address containing such information.

1.8.2 Site Investigation Work Plan

Upon formal written notification from the Department that a Site Investigation is necessary, the Performing Party may develop, and submit to the Department for review, comment, guidance and approval, a work plan detailing the specific objectives of the Site Investigation, the data that is necessary to meet those objectives, and the methods which will be used to collect that data. Unless otherwise specified by the Director, submittal of the Site Investigation Work Plan

is voluntary. If the Performing Party elects to submit a Site Investigation Work Plan to the Department, that work plan shall be submitted in both hard copy and electronic format (as specified by the Department).

1.8.3 Site Investigation Scope

A. The Site Investigation Report shall contain the following information on the Contaminated-Site where the spill or Release occurred, as appropriate:

1. A list of specific objectives of the Site Investigation identifying all data collected to completely characterize the Contaminated-Site, the Release, the impacts of the Release and to select a remedy;

2. All information previously reported in a Notification of Release required by § 1.6.1 of this Part and an Emergency and Short-Term Response Report required by § 1.7.9 of this Part, if applicable. The Performing Party may elaborate and expand on any and all information found in those reports. The Performing Party shall correct any incorrect information or interpretations contained in those reports prior to their incorporation into the Site Investigation Report;

3. Documentation of any past incidents or releases (fires, spills, explosions, leaks, etc.);

4. A list of past Owners and Operators at the Contaminated-Site including their past uses of the property, a sequencing of property transfers and time periods of occupancy to the extent that this information is available;

5. All previously existing environmental information which characterizes the Contaminated-Site and all information that led to the discovery of a Contaminated-Site;

6. A description of the current uses and zoning of the Contaminated-Site including a brief statement on each active operation performed therewith, a description of the processes employed, a list of all wastes generated, a list of all Hazardous Materials handled, and a statement summarizing any Residential Activity on the Contaminated-Site;

7. A locus map showing the location of the Contaminated-Site using the U.S. Geological Survey 7.5 minute quadrangle map or a copy of a section of that U.S.G.S. map;

8. A site plan, drawn to scale, showing the locations of all buildings, activities and structures on the Contaminated-Site including, but not limited to:

a. A North arrow;

b. Wells;

c. Underground injection control systems, septic tanks, underground storage tanks, piping and other underground structures;

d. Outdoor Hazardous Material storage and handling areas, and extent of paved areas;

e. The location of all environmental samples previously taken at the Contaminated-Site;

f. All waste management and disposal areas, active and/or historical; and

g. Property lines;

9. A general characterization of the property surrounding the area affected by the Release including, but not limited to:

a. The location and distance to any surface water bodies within five hundred (500) feet of the Contaminated-Site;

b. The location and distance to any Environmentally Sensitive Areas within five hundred (500) feet of the Contaminated-Site;

c. The actual sources of potable water for all properties immediately abutting the Contaminated-Site;

d. The location and distance to all public water supplies which have been active within the previous 2 years and within one (1) mile of the Contaminated-Site;

e. A determination as to whether the Release impacts any off-site area utilized for residential or industrial or commercial property or both; and

f. A determination of the underlying groundwater classification and if the classification is GB, the distance to the nearest GA/GAA area;

10. Classifications of surface water and ground water at or surrounding the Contaminated-Site which could be potentially impacted by the Release of Hazardous Materials;

11. A description of the contamination resulting from the Release including, but not limited to:

    a. Free liquids on the surface;

    b. Concentrations of Hazardous Substances which can be shown to present an actual or potential threat to human health, including, but not limited to, any concentrations of Hazardous Substances in excess of any of the remedial objectives listed in Tables 1 or 2, §§ 1.9.2(C)(2) or (3) of this Part, or Tables 3 or 4, §§ 1.9.3(F)(4)(or (5) or 1.13 of this Part;

    c. A determination/opinion as to whether the Release of Hazardous Material has the potential to adversely impact an Environmentally Sensitive Area;

    d. Contamination of man-made structures;

    e. Odors or stained soil;

    f. Stressed vegetation;

    g. The presence of excavated or stockpiled material and an estimate of its total volume;

    h. Environmental sampling locations, sampling procedures and copies of the results of any analytical testing undertaken at the Contaminated-Site; and

    i. A list of the Hazardous Substances at the Contaminated-Site;

12. The concentration gradients of Hazardous Substances throughout the Contaminated-Site for each media impacted by the Release of Hazardous Materials;

13. The methodology and results of any investigation conducted to determine background concentrations of Hazardous Substances identified at the Contaminated-Site (for arsenic in soil - see § 1.13 of this Part);

14. A listing and evaluation of the site-specific hydrogeological properties that could influence the migration of Hazardous Substances throughout and away from the Contaminated-Site, including but not limited to, where appropriate:

    a. The depth to groundwater;

b. The presence and effects of both the natural and man-made barriers to and conduits for contaminant migration;

c. A characterization of the bedrock; and

d. The groundwater contours, flow rates and gradients throughout the Contaminated-Site;

15. A characterization of the topography and surface water and run-off flow patterns, including the flooding potential, of the Contaminated-Site;

16. The potential for Hazardous Substances from the Contaminated-Site to volatilize and any and all potential impacts of the volatilization to structures within the Contaminated-Site;

17. The potential for entrainment of Hazardous Substances from the Contaminated-Site by wind or erosion actions;

18. Detailed protocols for all fate and transport models used in the Site Investigation;

19. A complete list of all samples taken, the location of all samples, parameters tested for and analytical methods used during the Site Investigation;

20. Construction plans and development procedures for all monitoring wells. Well construction shall be consistent with the requirements of the Groundwater Quality Rules;

21. Procedures for the handling, storage and disposal of wastes derived from and during the investigation if such procedures deviate from the Department's Guidelines for the Management of Investigation Derived Waste (Policy Memo 95-01) which can be found on the Department's Office of Waste Management Site Remediation web page at http://www.dem.ri.gov/programs/wastemanagement/site-remediation/#geninfo);

22. A quality assurance and quality control evaluation summary report for sample handling and analytical procedures, including, but not necessarily limited to, chain-of-custody procedures and sample preservation techniques;

23. A detailed explanation of how the Public Involvement requirements set forth in § 1.8.7 of this Part were met.

24. Any other site-specific factor that the Director has reason to believe is necessary to make an accurate decision as to the appropriate Remedial Action to be taken at the Contaminated-Site.

1.8.4 Development of Remedial Alternatives

A. The Site Investigation Report shall contain a section proposing remedial alternatives. This section shall contain a minimum of two remedial alternatives other than the no action/natural attenuation alternative unless this requirement is waived by the Department. It should be clear in this section which of these alternatives is most preferable. Cost effectiveness, and permanency of the remedial alternatives may be used to support the selection of the preferred alternative.

B. All alternatives shall be supported by relevant data contained in the Site Investigation Report and consistent with the current and reasonably foreseeable land usage, and documentation of the following:

1. Compliance with §§ 1.9 and 1.13 of this Part;

2. Technical feasibility of the preferred remedial alternative;

3. Compliance with state and local laws and regulations, or other public concerns; and

4. The ability of the Performing Party to perform the preferred remedial alternative.

1.8.5 Certification Requirements

A. The Site Investigation Report and all associated progress reports shall include the following statements signed by an authorized representative of the party specified:

1. A statement signed by an authorized representative of the Person who prepared the Site Investigation Report certifying the completeness and accuracy of the information contained in that report to the best of their knowledge; and

2. A statement signed by the Performing Party responsible for the submittal of the Site Investigation Report certifying that the report is a complete and accurate representation of the Contaminated-Site and the Release and contains all known facts surrounding the Release to the best of their knowledge.

1.8.6 Progress Reports

Unless otherwise specified by the Director, the Performing Party shall during the implementation of the Site Investigation, submit periodic progress reports in both hard copy and electronic format (as specified by the Department) on the status of the investigation and interim reports on any milestones achieved in the project.

1.8.7 Public Involvement

A. Public Notice: Public Notice is required at two (2) points during the Site Investigation.

1. Prior to conducting Site Investigation field activities at a known Contaminated-Site, the Performing Party shall notify all abutting property owners, tenants, easement holders, and the municipality that investigation activities are about to occur; and

2. When the Site Investigation is deemed complete, the Department will issue a program letter confirming that the Performing Party has adequately assessed the nature and extent of contamination at the Contaminated-Site. Prior to the formal Department approval of the Site Investigation Report (in the form of a Remedial Decision Letter), the Performing Party shall notify all abutting property owners, tenants, easement holders, the municipality, and any community well suppliers associated with any well head protection areas which encircle the Contaminated-Site, that the investigation is complete and provide them with the findings of the investigation and any proposed remedial alternative which includes on-site treatment and/or containment of Hazardous Materials as part of the final remedy.

3. Whenever a site that is known to be contaminated or is suspected of being contaminated based upon its past use is considered for possible reuse as the location of a School, Child-Care Facility, or as a Recreational Facility for Public Use that supports existing or proposed Active Recreation, the person proposing such reuse shall, prior to the establishment of a final scope of investigation for the site and after the completion of All Appropriate Inquiries, hold a public meeting for the purposes of obtaining information about conditions at the site and the environmental history at the site that may be useful in establishing the scope of the investigation of the site and/or establishing the objectives for the environmental clean-up of the site. The public meeting shall be held in the city or town in which the site is located; public notice shall be given of the meeting at least ten (10) business days prior to the meeting; public notice of the meeting shall be provided to all abutting property owners, tenants, easement holders and

the municipality; the public meeting shall be conducted in a manner consistent with the requirements in § 1.8.7(C) of this Part regarding Community Meetings; and following the meeting, the record of the meeting shall be open for a period of not less than ten (10) and not more than twenty (20) business days for the receipt of public comment. The results of All Appropriate Inquiries, analysis and the public meeting, including the comment period, shall be documented in a written report submitted to the Department in both hard copy and electronic format (as specified by the Department) within 72 hours of the meeting.

a. No work (remediation or construction), shall be permitted at the property until the public meeting and comment period regarding the site's proposed reuse has closed except where the Director determines that such work is necessary to mitigate or prevent:

(1) An imminent threat to human health, public safety or the environment; or

(2) Off-site migration of known or suspected contamination.

b. The public notice, meeting and comment period required by this section shall be in addition to any other requirements for public notice and comment relating to the investigation or remedy of the site and may be made part of another meeting pertaining to the site provided that the minimum standards established by this section for notice and comment are met. Any investigation or remediation undertaken prior to the completion of the public comment period shall be limited to measures necessary to define and/or mitigate the imminent threat and/or off-site migration.

B. Fact Sheets and Enhanced Communication

1. For Contaminated-Sites located in Environmental Justice Focus Areas, the Performing Party shall prepare a site specific fact sheet presenting the known history of the site, the suspected contamination (based on both historical uses and existing environmental information), the point in the process where the Contaminated-Site is and the expected path moving forward, and the Department’s contact information for the site. Draft fact sheets shall be submitted to the Department in both hard copy and electronic format (as specified by the Department) along with a proposed communications plan on how to effectively disseminate the information in the community around the Contaminated-Site. Said materials shall be submitted to the Department prior to the commencement of the public notice specified in § 1.8.7(A) of this Part. Information to be provided to the

community shall include, at a minimum, the final approved site specific fact sheet and informational materials about the Department and the Department's Site Remediation and Brownfields program, which will be provided by the Department. When appropriate, such materials will be required to be provided in a language (or languages) other than English. After review and approval, the Performing Party shall implement the communications plan.

C. Community Meetings

1. Whenever requested by twenty-five (25) persons, or by a governmental subdivision or agency, or by an association having not less than twenty-five (25) members, who are either located near a Contaminated-Site or are potential users of the Contaminated-Site after redevelopment, an initial community meeting will be held. The request for said community meeting shall be submitted in writing to the Performing Party and the Department. The purpose of the meeting is to:

    a. Disseminate information about the Department's Site Remediation program and the specific Contaminated-Site of interest;

    b. Document community comments and concerns about the investigation, clean-up, and reuse of the Contaminated-Site; and

    c. Engage in a dialogue with the public about the Contaminated-Site.

2. Community meetings will be organized by the Performing Party and will be accessible to those who wish to attend (considering public transportation and access for disabled). All meetings will be held at a time and place convenient to all participants. An atmosphere of "equal participation" among all involved should be established – avoiding panels, head tables, or auditorium presentations. Translation assistance for non-English speakers shall be provided by the Performing Party when appropriate.

3. A written summary of all public meetings must be submitted to the Department in both hard copy and electronic format (as specified by the Department) by the Performing Party within 72 hours of the meeting. At a minimum, the written meeting summary must:

    a. Identify the main issues of concern to the community, including efforts at the meeting to draw out local knowledge about the Contaminated-Site, concerns about the investigation and clean-up, and any concerns about the reuse plan;

b. Document requests by the community for a continued dialog, including the requested form and frequency; and

c. Formulate a proposed response to the issues raised through specific, clear action items and schedules.

D. Information Repositories

1. When the Department receives a request to make information more available in the community, the Department may require the Performing Party to establish an informational repository in the community near the Contaminated-Site in accordance with the following requirements:

a. The information repository shall contain all documents, reports, data, and information deemed necessary by the Department to fulfill the purposes for which the repository is established.

b. The information repository shall be located and maintained at a location chosen by the Performing Party. If the Department finds the location unsuitable for the purposes and persons for which it was established, due to problems with the location, hours of availability, access, or other relevant considerations, then the Department shall specify a more appropriate site.

c. The Performing Party shall be responsible for maintaining and updating the repository with appropriate information throughout a time period specified by the Department. The Performing Party may close the repository when either an Interim Letter of Compliance or final Letter of Compliance is issued for the site, or, after petitioning the Department, if the Department determines that there is no longer a need to maintain the repository in the community.

d. The Department may require the Performing Party to create an electronic repository in lieu of or in addition to a repository located in the community.

E. Public Involvement Plans

1. The Performing Party shall develop, and submit to the Department for review and approval in both hard copy and electronic format (as specified by the Department), a site-specific public involvement plan for any Contaminated-Site for which the Department has received a Notification of Release and for which a minimum of twenty-five (25) residents, local officials or other interested parties have requested, in writing and in the form of a petition, that a formal process be set up for their participation in

cleanup planning. The Public Involvement Plan shall address all relevant and applicable requirements of §§ 1.8.7(A) through (D) of this Part.

1.8.8 Site Investigation Report

A. A completed Site Investigation Report shall contain all the information set forth in §§ 1.8.3, 1.8.4 and 1.8.5 of this Part as necessary and appropriate to meet the goals of the Site Investigation. The Site Investigation Report shall be submitted to the Department, in both hard copy and electronic format (as specified by the Department), with the Site Investigation Submission Checklist (§ 1.20 of this Part) for review and approval upon completion (the Checklist can also be found on the Department's Office of Waste Management Site Remediation Program web page at http://www.dem.ri.gov/programs/wastemanagement/site-remediation/#process). If the Site Investigation Report is deemed unacceptable by the Department, the Department will identify the reasons why the report is unacceptable and direct the Performing Party to correct the deficiencies.

B. All sources of information and assumptions presented in the Site Investigation Report and any other report incorporated therein shall be properly referenced and documented.

1.8.9 Remedy Selection

A. Upon completion of the Site Investigation Report the Director shall issue a Remedial Decision Letter, identifying the preferred remedial alternative. All preferred remedial alternatives which include on-site treatment and/or containment of Hazardous Materials as part of the final Contaminated-Site remedy shall be subject to public notice as specified in § 1.8.7 of this Part, and shall be subject to public review and comment regarding the technical feasibility of such preferred remedial alternative prior to issuance of the Remedial Decision Letter. If none of the proposed remedial alternatives are acceptable, the Director shall require the Performing Party to consider other remedial alternatives.

B. The Director's decision regarding the appropriateness of the site remedy shall be based upon the information contained within the decision record for the Contaminated-Site. The decision record shall include the following:

1. A finalized Site Investigation Report, specifically § 1.8.4 of this Part; and

2. A final response, approved by the Department, to substantive public comments required by § 1.8.7 of this Part. If the responses to comment are prepared by the Performing Party, the responses shall be approved by the Department in order for the responses to be considered final.

1.9 Risk Management

1.9.1 Remedial Objectives

A. The appropriate remedial objectives for all Hazardous Substances in all impacted media at a Contaminated-Site shall be consistent with this rule so as to manage the actual or potential risks to human health and the environment by ensuring that the following requirements are met:

1. The remedial objective for each carcinogenic substance does not exceed a 1 X 10^{-6} excess lifetime cancer risk level and the cumulative excess lifetime cancer risk posed by the Contaminated-Site does not exceed 1 X 10^{-5};

2. The remedial objective for each non-carcinogenic substance does not exceed a Hazard Index of 1 and the cumulative Hazard Index posed by the Contaminated-Site does not exceed 1 for any target organ;

3. The remedial objective will not significantly contribute to adverse effects to any Environmentally Sensitive Areas at or in the vicinity of the Contaminated-Site;

4. The remedial objective will be protective of the natural resources of the State, including but not limited to groundwater; and

5. The remedial objective shall address the requirements of § 1.9.7 of this Part.

B. Specific requirements for the development and application of concentration-based soil and groundwater objectives are presented throughout the remainder of this section. Concentration-based soil and groundwater objectives may consider background conditions.

1.9.2 Soil Objectives

A. Unless otherwise specified in these regulations, soil contaminated as a result of a Release of Hazardous Materials shall be remediated in a manner which meets the direct exposure and leachability criterion for each Hazardous Substance established in Tables 1 and 2, §§ 1.9.2(C)(2) and (3), 1.9.2(D) or 1.9.4 of this Part; or the background concentration of the Hazardous Substance as established by § 1.9.6 of this Part. All soil objectives shall be consistent with §§ 1.9.1 and 1.9.2(B) of this Part.

B. General Requirements for Soil Objectives:

1. General Requirements for Direct Exposure Criteria:

    a. With respect to any Hazardous Substance in soil at a Contaminated-Site, the Director may approve the application of a direct exposure criterion provided it is demonstrated to the satisfaction of the Director that the application of such direct exposure criterion at the Contaminated-Site will be protective of current and reasonably foreseeable future human exposure.

    b. Regardless of the method employed for determining the direct exposure criterion, the residential direct exposure criterion shall be applied throughout the vadose zone for each Hazardous Substance in soil, except as otherwise provided in this rule.

    c. The industrial/commercial direct exposure criterion may be applied to a depth of at least 2 feet below ground surface for each Hazardous Substance in soil if all of the following conditions are met:

        (1) The Contaminated-Site is currently limited to Industrial/Commercial Activity;

        (2) Access to the property containing the Contaminated-Site is limited to individuals working at or temporarily visiting the subject parcel;

        (3) The current and reasonably foreseeable future human exposure to soils at the Contaminated-Site is not expected to occur beyond a depth of 2 feet below ground surface; and

        (4) An environmental land usage restriction consistent with § 1.9.9 of this Part is in effect with respect to the property, or to the portion of the property containing the Contaminated-Site; such an environmental land usage restriction shall ensure that the property or restricted portion thereof is not used for any Residential Activity in the future and that any future use of the property or restricted portion thereof is limited to industrial/commercial activity.

2. General Requirements for Leachability Criteria:

    a. With respect to any Hazardous Substance in soil at a Contaminated-Site, the Director may approve a leachability criterion provided it is demonstrated to the satisfaction of the Director that

the application of such leachability criterion at the Contaminated-Site is protective of the following:

(1) The actual and potential uses of the groundwater at the Contaminated-Site by ensuring that, at a minimum, the leachability criterion will not contribute to an exceedance of the applicable groundwater objective for the Hazardous Substance as described in § 1.9.3 of this Part; and

(2) Surface water at or in the vicinity of the Contaminated-Site from potential migration of groundwater.

b. Regardless of the method employed for determining the leachability criterion, the GA leachability criterion shall be applied throughout the vadose zone for each Hazardous Substance in soil, except as otherwise provided in this rule.

c. The GB leachability criterion may be applied throughout the vadose zone for each substance in soil if both of the following conditions are met:

(1) The GB groundwater objective is applicable to the groundwater of concern underlying and downgradient of the Contaminated-Site in accordance with § 1.9.3 of this Part; and

(2) The application of the GB leachability criterion will not contribute to actual or potential impacts to surface water and/or sediments as described in the policies and regulations of the Office of Water Resources.

3. Method Requirements for Soil Objectives:

a. For each of the Hazardous Substances at a Contaminated-Site, the Director shall approve the application of a Method 1 Soil Objective established in § 1.9.2(C) of this Part provided that the application of the Method 1 Soil Objective is consistent with §§ 1.9.1 and 1.9.2(A) of this Part and the objective is specified in Tables 1 and 2, §§ 1.9.2(C)(2) and (3) of this Part, as appropriate.

b. If no Method 1 Soil Objective has been promulgated for one or more Hazardous Substances in soil at a Contaminated-Site, then the following options are available:

(1) Method 2 may be used to develop soil objectives for the Contaminated-Site as described in § 1.9.2(D) of this Part. Method 2 Soil Objectives may be used alone or in combination with other Method 1 Soil Objectives. A combined Method 1 and Method 2 approach shall be considered to result in Method 2 Soil Objectives; or

(2) Method 3 may be used to develop soil objectives for the Contaminated-Site as described in § 1.9.4 of this Part.

c. If a Method 1 Soil Objective has been promulgated for one or more Hazardous Substances in soil at a Contaminated-Site, then the following options are available:

(1) The Performing Party may only propose Method 2 to develop leachability criteria, as described in § 1.9.2(D) of this Part. Method 2 Leachability Criteria may be used alone or in combination with other Method 1 Leachability Criteria. A combined Method 1 and Method 2 approach shall be considered to result in Method 2 Soil Objectives; or

(2) Method 3 may be used to develop soil objectives for the Contaminated-Site as described in § 1.9.4 of this Part.

d. For Hazardous Substances in soil that are determined by either the Department or the Performing Party to have a potential to significantly contribute to adverse effects to any Environmentally Sensitive Area at or in the vicinity of the Contaminated-Site, a Method 3 Ecological Risk Assessment shall be performed in accordance with § 1.9.5 of this Part.

4. Soil Objectives for Total Petroleum Hydrocarbons (TPH):

a. Although not a single Hazardous Substance, TPH can be useful as an indicator of potential adverse impacts to human health from a Release of Hazardous Materials. TPH Soil Objectives shall be applied to a Contaminated-Site for which jurisdiction has been established through the discovery of a Release as described in § 1.6 of this Part. The Department will utilize these objectives for non-virgin petroleum/weathered petroleum situations as they occur at Contaminated-Sites.

b. Accordingly, the Department shall require that soil objectives for TPH as described in this Rule be applied to a Contaminated-Site in conjunction with soil objectives for the Hazardous Substances

established pursuant to this section. The Director shall approve the application of the functional equivalent of a direct exposure criterion and leachability criterion for TPH provided that the application of the criteria is consistent with §§ 1.9.1 and 1.9.2(A) of this Part. The Performing Party shall apply the soil objectives for TPH described below.

(1) The following shall be considered the Method 1 Direct Exposure Criteria for TPH, subject to the provided requirements:

(AA) The Method 1 Residential TPH Direct Exposure Criterion shall be 500 ppm; or

(BB) The Method 1 Residential TPH Direct Exposure Criterion may be 1000 ppm contingent upon field-verification by Department Personnel to ensure that short-term risks are managed appropriately prior to approval as a final remedial objective; and The Method 1 Industrial/Commercial TPH Direct Exposure Criterion shall be 2500 ppm.

(2) The following shall be considered the Method 1 Leachability Criteria for TPH, subject to the provided requirements:

(AA) The Method 1 GA TPH Leachability Criterion shall be 500 ppm; or

(BB) The Method 1 GA TPH Leachability Criterion may be 1000 ppm and may be field-verified at the discretion of the Department to ensure that short-term risks are managed appropriately prior to approval as a final remedial objective; and

(CC) The Method 1 GB TPH Leachability criterion shall be 2500 ppm.

c. For clarity, any reference to concentrations of Hazardous Substances in the following rules shall be considered by the Department to be in addition to the appropriate concentrations of TPH as described herein: §§ 1.9.2, 1.9.4, 1.9.6, 1.9.8(A), 1.9.9 and 1.9.10 of this Part.

C. Method 1 Soil Objectives:

1. Unless otherwise prohibited by the Director, the Method 1 Soil Objectives specified in Tables 1 and 2, §§ 1.9.2(C)(2) and (3) of this Part may be applied to a Contaminated-Site provided that the conditions set forth in §§ 1.9.1 and 1.9.2(A) of this Part are met.

    a. Method 1 Direct Exposure Criteria: The Method 1 Direct Exposure Criteria are listed in Table 1, § 1.9.2(C)(2) of this Part.

    b. Method 1 Leachability Criteria:

        (1) The Method 1 Leachability Criteria are listed in Table 2, § 1.9.2(C)(3) of this Part.

        (2) With respect to the Method 1 Leachability Criteria for inorganic Hazardous Substances, the Performing Party shall conduct a laboratory test that demonstrates that the inorganic Hazardous Substance will not leach to groundwater at levels which exceed the applicable groundwater objective for the inorganic Hazardous Substance. Accordingly, the resulting leachate concentration shall not exceed the leachability criteria for the associated inorganic Hazardous Substance listed in Table 2, § 1.9.2(C)(3) of this Part.

        (3) The Performing Party may perform the Synthetic Precipitation Leaching Procedure (SPLP; EPA Method 1312), § 1.16(E) of this Part, the Toxicity Characteristic Leaching Procedure (TCLP; EPA Method 1311), § 1.16(F) of this Part, or other procedures pre-approved by the Department to estimate potential leaching of inorganic Hazardous Substances at the Contaminated-Site.

2. Table 1

DIRECT EXPOSURE CRITERIA		
Substance	**Residential (mg/kg)**	**Industrial/Commercial (mg/kg)**
Volatile Organics		
Acetone	7,800	10,000

DIRECT EXPOSURE CRITERIA		
Substance	**Residential (mg/kg)**	**Industrial/Commercial (mg/kg)**
Benzene	2.5	200
Bromodichloromethane	10	92
Bromoform	81	720
Bromomethane	0.8	2900
Carbon tetrachloride	1.5	44
Chlorobenzene	210	10,000
Chloroform	1.2	940
Dibromochloromethane	7.6	68
1,2- Dibromo-3-chloropropane (DBCP)	0.5	4.1
1,1-Dichloroethane	920	10,000
1,2-Dichloroethane	0.9	63
1,1-Dichloroethene	0.2	9.5
cis-1,2-Dichloroethene	630	10,000
Trans-1,2-Dichloroethene	1,100	10,000
1,2-Dichloropropane	1.9	84
Ethylbenzene	71	10,000

DIRECT EXPOSURE CRITERIA		
Substance	**Residential (mg/kg)**	**Industrial/Commercial (mg/kg)**
Ethylene dibromide (EDB)	0.01	0.07
Isopropyl benzene	27	10,000
Methyl ethyl ketone	10,000	10,000
Methyl isobutyl ketone	1200	10,000
Methyl tertiary-butyl ether (MTBE)	390	10,000
Methylene chloride	45	760
Styrene	13	190
1,1,1,2-Tetrachloroethane	2.2	220
1,1,2,2-Tetrachloroethane	1.3	29
Tetrachloroethene	12	110
Toluene	190	10,000
1,1,1-Trichloroethane	540	10,000
1,1,2-Trichloroethane	3.6	100
Trichloroethene	13	520
Vinyl chloride	0.02	3.0
Xylenes (Total)	110	10,000

DIRECT EXPOSURE CRITERIA		
Substance	**Residential (mg/kg)**	**Industrial/Commercial (mg/kg)**
Semivolatiles		
Acenaphthene	43	10,000
Acenaphthylene	23	10,000
Anthracene	35	10,000
Benzo(a)anthracene	0.9	7.8
Benzo(a)pyrene[a]	0.4	0.8
Benzo(b)fluoranthene	0.9	7.8
Benzo(g,h,i)perylene	0.8	10,000
Benzo(k)fluoranthene	0.9	78
1,1-Biphenyl	0.8	10,000
Bis(2-ethylhexyl)phthalate	46	410
Bis(2-chloroethyl)ether	0.6	5.2
Bis(2-chloroisopropyl)ether	9.1	82
4-Chloroaniline (p-)	310	8200
2-Chlorophenol	50	10,000
Chrysene	0.4	780

DIRECT EXPOSURE CRITERIA		
Substance	**Residential (mg/kg)**	**Industrial/Commercial (mg/kg)**
Dibenzo(a,h)anthracene[a]	0.4	0.8
1,2-Dichlorobenzene (o-DCB)	510	10,000
1,3-Dichlorobenzene (m-DCB)	430	10,000
1,4-Dichlorobenzene (p-DCB)	27	240
3,3-Dichlorobenzidine	1.4	13
2,4-Dichlorophenol	30	6,100
2,4-Dimethyl phenol	1,400	10,000
Diethyl phthalate	340	10,000
Dimethyl phthalate	1,900	10,000
2,4-Dinitrophenol	160	4,100
2,4-Dinitrotoluene	0.9	8.4
Fluoranthene	20	10,000
Fluorene	28	10,000
Hexachlorobenzene	0.4	3.6
Hexachlorobutadiene	8.2	73
Hexachloroethane	46	410

DIRECT EXPOSURE CRITERIA		
Substance	**Residential (mg/kg)**	**Industrial/Commercial (mg/kg)**
Indeno(1,2,3-cd)pyrene	0.9	7.8
2-Methyl naphthalene	123	10,000
Naphthalene	54	10,000
Pentachlorophenol	5.3	48
Phenanthrene	40	10,000
Phenol	6,000	10,000
Pyrene	13	10,000
1,2,4-Trichlorobenzene	96	10,000
2,4,5-Trichlorophenol	330	10,000
2,4,6-Trichlorophenol	58	520
Pesticides/PCBs		
Chlordane	0.5	4.4
Dieldrin	0.04	0.4
Polychlorinated biphenyls (PCBs)[b]	10	10
Inorganics		
Antimony	10	820

DIRECT EXPOSURE CRITERIA		
Substance	**Residential (mg/kg)**	**Industrial/Commercial (mg/kg)**
Arsenic[c]	7.0	7.0
Barium	5,500	10,000
Beryllium[c]	1.5	1.5
Cadmium	39	1,000
Chromium III (Trivalent)	1,400	10,000
Chromium VI (Hexavalent)	390	10,000
Copper	3,100	10,000
Cyanide	200	10,000
Lead[d]	150	500
Manganese	390	10,000
Mercury	23	610
Nickel	1,000	10,000
Selenium	390	10,000
Silver	200	10,000
Thallium	5.5	140

DIRECT EXPOSURE CRITERIA		
Substance	**Residential (mg/kg)**	**Industrial/Commercial (mg/kg)**
Vanadium	550	10,000
Zinc	6,000	10,000
[a] Estimated quantitation limits.		
[b] Direct Exposure Criteria for PCBs consistent with the Toxic Substance Control Act (TSCA)		
[c] Background Levels of Priority Pollutant Metals In Rhode Island Soils, T. O'Connor, RIDEM – Standard set @ statistical 95% upper confidence limit of natural background data across State. For arsenic, see also Section 12.0		
[d] Direct Exposure Criteria for Lead consistent with the Rhode Island Department of Health Lead Poisoning Prevention regulations, 216-RICR-50-15-3		

3.Table 2

LEACHABILITY CRITERIA		
Substance	**GA Leachability (mg/kg except as otherwise noted)**	**GB Leachability (mg/kg)**
Volatile Organics		
Benzene	0.2	4.3
Carbon tetrachloride	0.4	5.0

LEACHABILITY CRITERIA		
Chlorobenzene	3.2	100
1,2-Dichloroethane	0.1	2.3
1,1-Dichloroethene	0.7	0.7
cis-1,2-Dichloroethene	1.7	60
Trans-1,2-Dichloroethene	3.3	92
1,2-Dichloropropane	0.1	70
Ethylbenzene	27	62
Ethylene dibromide (EDB)	5E-04	-
Methyl–tertiary-butyl-ether (MTBE)	0.9	100
Styrene	2.9	64
Tetrachloroethene	0.1	4.2
Toluene	32	54
1,1,1-Trichloroethane	11	160
1,1,2-Trichloroethane	0.1	-
Trichloroethene	0.2	20
Vinyl chloride	0.3	-
Xylenes	540	-
Semivolatiles		

LEACHABILITY CRITERIA		
Benzo(a)pyrene	240	-
Dichlorobenzene (all isomers)	41	-
Diethylhexyl phthalate	120	-
Napthalene	0.8	-
Pentachlorophenol	7.1	-
1,2,4-Trichlorobenzene	140	-
Pesticides/PCBs		
Chlordane	1.4	-
Polychlorinated biphenyls (PCBs)[a]	10.0	10.0
Inorganics		
Antimony (TCLP/SPLP)	0.05	-
Barium (TCLP/SPLP)	23	
Beryllium (TCLP/SPLP)	0.03	
Cadmium (TCLP/SPLP)	0.03	-
Chromium (TCLP/SPLP)	1.1	-
Cyanide (TCLP/SPLP)	2.4	-
Lead (TCLP/SPLP)	0.04	-
Mercury (TCLP/SPLP)	0.02	-

LEACHABILITY CRITERIA		
Nickel (TCLP/SPLP)	1	-
Selenium (TCLP/SPLP)	0.6	-
Thallium (TCLP/SPLP)	0.005	-
"-"	No Method 1 GB Leachability Criteria promulgated	
[a]	Leachability criteria for PCBs consistent with the Toxic Substance Control Act (TSCA)	

D. Method 2 Soil Objectives

1. Method 2 allows for the consideration of limited site-specific information to modify Method 1 Soil Objectives or to calculate soil objectives for Hazardous Substances not listed in Table 1 or 2, §§ 1.9.2(C)(2) or (3) of this Part. For the purposes of these regulations, a Method 2 Soil Objective shall refer to any soil objective which addresses site-specific conditions established pursuant to this Part and in accordance with the appropriate information presented in §§ 1.17 and 1.18 of this Part.

2. The Department reserves the right to require the development of Method 2 Soil Objectives based on complicated conditions at a Contaminated-Site, including, but not limited to potential adverse impacts to adjacent surface water bodies or other potential impacts to human health and/or the environment.

3. Method 2 Soil Objectives shall be consistent with §§ 1.9.1, and 1.9.2(B) of this Part and shall meet all of the following conditions in §§ 1.9.2(D)(3)(a) through (d) of this Part listed below:

    a. Direct Exposure Criteria shall only be developed under Method 2 for those Hazardous Substances which are not specified under Method 1 in Table 1, § 1.9.2(C)(2) of this Part. Method 2 Direct Exposure Criteria shall be developed using the default assumptions provided in § 1.17 of this Part. The chemical-specific inputs used to develop the Method 2 Direct Exposure Criteria are subject to the approval of the Director for each proposed application;

b. Method 2 Soil Objectives shall be developed for Hazardous Substances on the basis of the following assumptions and procedures:

(1) Based upon non-cancer health risk, a concentration of the Hazardous Substance associated with 100% of the Reference Dose shall be calculated consistent with residential or Industrial/Commercial Activity as appropriate pursuant to § 1.9.2(B)(1) of this Part using the algorithm specific to the ingestion pathway provided in § 1.17 of this Part. For a Contaminated-Site which impacts one or more properties utilized for any Residential Activity, a concentration of the Hazardous Substance associated with acute ingestion and the inhalation pathway shall also be calculated using the appropriate algorithms in § 1.17 of this Part;

(2) A concentration of the Hazardous Substance associated with an Excess Lifetime Cancer Risk equal to no more than one excess cancer case in one million people exposed to the Hazardous Substance shall be calculated consistent with residential or Industrial/Commercial Activity as appropriate pursuant to § 1.9.2(B)(1) of this Part using the algorithm specific to the ingestion pathway provided in § 1.17 of this Part. For a Contaminated-Site which impacts one or more properties utilized for any Residential Activity, a concentration of the Hazardous Substance associated with the inhalation pathway shall be calculated using the appropriate algorithm in § 1.17 of this Part;

(3) For a Contaminated-Site impacting one or more properties utilized for any Residential Activity, the soil saturation concentration (Csat) of the Hazardous Substance above which pure liquid-phase contaminant is expected in the vadose zone shall be calculated using the equation provided in § 1.17 of this Part and appropriate chemical-specific and/or soil specific data collected from the Contaminated-Site;

(4) For each concentration of Hazardous Substance calculated consistent with residential or Industrial/Commercial Activity as appropriate pursuant to § 1.9.2(B)(1) of this Part, the lowest non-zero concentration estimated in §§ 1.9.2(D)(3)(b)

((1)) through ((3)) of this Part shall be the Method 2 Direct Exposure Criterion for the Hazardous Substance;

(5) Considering the groundwater classification at the Contaminated-Site, the Method 2 Leachability Criterion shall be developed utilizing a Department-approved leaching model or test method which demonstrates that the concentrations of the Hazardous Substance in soil at a Contaminated-Site now and in the reasonably foreseeable future will result in compliance with all applicable groundwater objectives for that Hazardous Substance. Therefore, the Department shall approve the target groundwater objective for each Hazardous Substance established in accordance with this Section prior to the development of the associated Method 2 Leachability Criterion.

(6) Specifically, Method 2 Leachability Criteria shall be determined by performing the following:

(AA) Method 2 Leachability Criteria for Organic Hazardous Substances: The Performing Party may provide a leaching-to-groundwater compliance demonstration with a Department-approved fate and transport model such as that discussed in § 1.18 of this Part which incorporates site-specific information such as physical and chemical properties of the Hazardous Substances including, but not limited to toxicity and mobility, source quantity, subsurface hydrogeological conditions and net precipitation; and

(BB) Method 2 Leachability Criteria for Inorganic Hazardous Substances: The Performing Party shall conduct a laboratory test consistent with that described in § 1.9.2(B)(2) of this Part. The Performing Party may develop a Method 2 Leachability Criterion for an inorganic Hazardous Substance by calculating a site-specific dilution/attenuation factor using the algorithm in § 1.18.7 of this Part to be multiplied by the appropriate groundwater objective;

(7) A site-specific background concentration of the Hazardous Substance in soil may be calculated and considered for the Hazardous Substance pursuant to § 1.9.6 of this Part; and

(8) The Practical Quantitation Limit (PQL) of the Hazardous Substance using an appropriate analytical method for quantifying the concentration of the chemical in soil may be calculated and considered;

c. If the development of a Method 2 Soil Objective results in a concentration of a Hazardous Substance which exceeds any Upper Concentration Limit as described in § 1.9.7 of this Part, then the Department reserves the right to require that the modification be adjusted downward to a concentration which prevents the exceedance; and

d. The development of Method 2 Soil Objectives shall be based upon information which is scientifically justified and completely documented with site data collected from the Contaminated-Site. At a minimum, Method 2 Soil Objective development shall be documented with sufficient information to allow the Director to evaluate the following factors:

(1) The appropriateness and validity of any chemical-specific and/or site-specific input parameters used;

(2) Whether the calculations were correctly performed;

(3) The potential for soils at the Contaminated-Site to pose a significant risk to human health and the environment after the proposed Method 2 Soil Objectives are applied to the Contaminated-Site as part of a Remedial Action; and

(4) Background levels for the applicable Hazardous Substances, if determined.

1.9.3 Groundwater Objectives

A. Unless otherwise specified in these regulations or otherwise provided by the Director, groundwater contaminated as a result of a Release of Hazardous Materials located in a GA/GAA area shall be remediated to a concentration which meets the groundwater objective for each Hazardous Substance established in § 1.9.3(F)(2) of this Part and specified in Table 3, §§ 1.9.3(F)(4) or 1.9.4 of this Part; the Department's "Groundwater Quality Rules," or the background concentration of the Hazardous Substance. Any Method 3 GA Groundwater Objective which deviates from the Method 1 GA Groundwater Objective shall meet the requirements of the Groundwater Quality Rules.

B. Groundwater contaminated as a result of a Release of Hazardous Materials located in a GB area shall be remediated to a concentration which meets the groundwater objective for each Hazardous Substance established in § 1.9.3(F)(3) of this Part and specified in Table 4 §§ 1.9.3(F)(5), 1.9.3(G)(1) or 1.9.4 of this Part; or the background concentration of the Hazardous Substance.

C. All groundwater objectives shall be consistent with §§ 1.9.1 and 1.9.3(D) of this Part.

D. General Requirements for Groundwater Objectives:

1. General Requirements for GA Groundwater Objectives:

a. GA Groundwater Objectives may not be set at levels, except within an approved discharge zone or residual zone (as provided for in the Department's "Groundwater Quality Rules") which will adversely affect the groundwater as a source of potable water or which will adversely affect other beneficial uses of groundwater, including but not to be limited to recreational, agricultural and industrial uses and the preservation of fish and wildlife habitat through the maintenance of surface water quality; and

b. GA Groundwater Objectives may not be set at levels which exceed or have reasonable potential to cause exceedance of surface water quality standards established by the Department's "Water Quality Regulations," and amendments thereto.

2. General Requirements for GB Groundwater Objectives:

a. The GB Groundwater Objectives shall be applied in the restoration of the State's groundwater resources which are not for use as current or potential sources of drinking water. GB Groundwater Objectives shall be based on the potential for volatile organic compounds found or suspected in GB areas to volatilize from the groundwater and migrate to indoor air. These GB Groundwater Objectives are based on controlling the threat to human health from the inhalation of these Hazardous Substances.

b. The GB Groundwater Objectives shall be applied to the restoration of groundwater in GB Areas under the control of the Performing Party, provided that the Department determines that the following conditions apply to the contaminated groundwater:

(1) The extent and nature of the groundwater contamination does not pose a substantial likelihood of exceeding a surrounding GA Groundwater Objective;

(2) The extent and nature of the groundwater contamination does not pose a substantial likelihood of adversely affecting current uses of groundwater, surface water resources or surrounding properties as they exist at the time that the site investigation work is conducted (i.e., adverse off-site impacts are eliminated or effectively mitigated);

(3) The groundwater of concern is not located in a designated buffer zone around a licensed solid waste management facility and specific exceedances are acknowledged as part of the operating permit; and

(4) The groundwater of concern does not pose a significant threat to the classification and/or actual and potential uses of the surface water bodies in the vicinity of the Contaminated-Site consistent with the policies and regulations of the Office of Water Resources, or to human health and the environment.

E. Method Requirements for Groundwater Objectives:

1. Method Requirements for GA Groundwater Objectives

a. For each of the Hazardous Substances at a Contaminated-Site, the Director shall approve the application of a Method 1 GA Groundwater Objective established in § 1.9.3(F)(2) of this Part provided that the application of the Method 1 GA Groundwater Objective is consistent with §§ 1.9.1 and 1.9.3(D) of this Part and the objective is specified in Table 3, § 1.9.3(F)(4) of this Part.

b. The Performing Party may develop groundwater objectives under Method 3, as described in § 1.9.4 of this Part. Groundwater objectives developed using Method 3 may be used alone or in combination with other Method 1 Groundwater Objectives. A combined Method 1 and Method 3 approach shall be considered to result in Method 3 GA Groundwater Objectives.

2. Method Requirements for GB Groundwater Objectives:

a. For each of the Hazardous Substances at the Contaminated-Site, the Director shall approve the application of a Method 1 GB

Groundwater Objective established in § 1.9.3(F)(3)(a) of this Part provided that the Method 1 GB Groundwater Objective is consistent with § 1.9.1 of this Part (Remedial Objectives), § 1.9.3(D) of this Part and the objective as specified in Table 4, § 1.9.3(F)(5) of this Part.

b. The following options are also available to the Performing Party with respect to GB Groundwater Objective development

(1) Method 2 may be used to develop groundwater objectives for the Contaminated-Site as described in § 1.9.3(G) of this Part (Method 2 GB Groundwater Objectives). Method 2 GB Groundwater Objectives may be used alone or in combination with Method 1 GB Groundwater Objectives. A combined Method 1 and Method 2 approach shall be considered to result in Method 2 GB Groundwater Objectives.

(2) Method 3 may be used to develop groundwater objectives for the Contaminated-Site as described in § 1.9.4 of this Part; or

(3) The Method 1 GA Groundwater Objectives as specified in Table 3, § 1.9.3(F)(4) of this Part may be used for those Hazardous Substances not included in Table 4, § 1.9.3(F)(5) of this Part.

c. For Hazardous Substances in groundwater that are determined by either the Department or the Performing Party to significantly contribute to adverse effects to any Environmentally Sensitive Area at or in the vicinity of the Contaminated-Site, a Method 3 Ecological Risk Assessment shall be performed in accordance with § 1.9.5 of this Part (Ecological Protection).

F. Method 1 Groundwater Objectives:

1. Unless otherwise prohibited by the Director, the Method 1 Groundwater Objectives may be applied to a Contaminated-Site provided that the conditions set forth in § 1.9.1 of this Part (Remedial Objectives) and § 1.9.3(D) of this Part (General Requirements for Groundwater Objectives).

2. Method 1 GA Groundwater Objectives:

a. Groundwater which is classified as a GA/GAA area is categorized as or presumed to be suitable for drinking water use without

treatment, and is subject to the GA Groundwater Objectives listed in Table 3, § 1.9.3(F)(4) of this Part, and the Department's "Groundwater Quality Rules," Part 150-05-3 of this Title.

3. Method 1 GB Groundwater Objectives:

   a. Groundwater which is classified as a GB area is presumed not suitable for use as a current or potential source of drinking water, and is subject to the GB Groundwater Objectives listed in Table 4, § 1.9.3(F)(5) of this Part.

4. Table 3: GA Groundwater Objectives

GA Groundwater Objectives	
Substance	**GA Groundwater Objective (mg/l)**
Volatile Organics	
Benzene	0.005
Carbon tetrachloride	0.005
Chlorobenzene	0.1
1,2-Dibromo-3-chloropropane (DBCP)	0.0002
1,2-Dichloroethane	0.005
1,1-Dichloroethene	0.007
cis-1,2-Dichlorothene	0.07
trans-1,2-Dichloroethene	0.1
1,2-Dichloropropane	0.005
Ethylbenzene	0.7

Ethylene dibromide (EDB)	0.00005
Methyl tertiary-butyl ether (MTBE)	0.04
Methylene chloride	0.005
Styrene	0.1
Tetrachloroethene	0.005
Toluene	1
1,1,1-Trichloroethane	0.2
1,1,2-Trichloroethane	0.005
Trichloroethene (TCE)	0.005
Trihalomethanes (Total)	0.08
Vinyl chloride	0.002
Xylenes (Total)	10
Semivolatiles	
Benzo(a)pyrene	0.0002
o-Dichlorobenzene	0.6
m-Dichlorobenzene	0.6
p-Dichlorobenzene	0.075
Diethylhexyl phthalate	0.006
Hexachlorobenzene	0.001

Naphthalene	0.10
Pentachlorophenol	0.001
1,2,4-Trichlorobenzene	0.07
Pesticides/PCBs	
Chlordane	0.002
Polychlorinated biphenyls (PCBs)	0.0005
Inorganics	
Antimony	0.006
Arsenic	0.01
Barium	2
Beryllium	0.004
Cadmium	0.005
Chromium (Total)	0.1
Cyanide	0.2
Lead	0.015
Mercury	0.002
Nickel	0.1
Selenium	0.05
Thallium	0.002

5. Table 4: GB Groundwater Objectives

GB Groundwater Objectives	
Substance	**GB Groundwater Objective (mg/l)**
Benzene	0.14
Carbon Tetrachloride	0.07
Chlorobenzene	3.2
1,2-Dibromo-3-chloropropane (DBCP)	0.002
1,2-Dichloroethane	0.11
1,1-Dichloroethene	0.007
cis-1,2-Dichloroethene	2.4
trans-1,2-Dichloroethene	2.8
1,2-Dichloropropane	3.0
Ethylbenzene	1.6
Styrene	2.2
Methyl Tertiary-Butyl Ether (MTBE)	5.0
Tetrachloroethene	0.15
Toluene	1.7
1,1,1-Trichloroethane	3.1

Trichloroethene	0.54
Vinyl Chloride	0.002

G. Method 2 GB Groundwater Objectives:

1. Method 2 allows for the consideration of limited site-specific information to modify Method 1 GB Groundwater Objectives or to calculate GB Groundwater Objectives for Hazardous Substances in groundwater not listed in Table 4, § 1.9.3(F)(5) of this Part, but which have the potential to volatilize. For the purposes of these regulations, a Method 2 GB Groundwater Objective shall refer to any groundwater objective which has addressed site-specific conditions pursuant to this rule and in accordance with the appropriate information presented in § 1.19 of this Part. The Department reserves the right to require the development of Method 2 GB Groundwater Objectives based on complicated conditions at the Contaminated-Site such as potential adverse impacts to adjacent surface water bodies, potential adverse impacts to surrounding GA/GAA areas or other potential impacts to human health and/or the environment.

2. Method 2 GB Groundwater Objectives may be developed for Hazardous Substances which do not have promulgated Method 1 GB Groundwater Objectives listed in Table 4, § 1.9.3(F)(5) of this Part, or when conditions at the Contaminated-Site deviate significantly from the conservative assumptions used to calculate the Method 1 GB Groundwater Objectives as discussed in § 1.19 of this Part, provided that the resulting Method 2 GB Groundwater Objective is based on detailed site-specific information.

3. Method 2 GB Groundwater Objectives shall be consistent with §§ 1.9.1 and 1.9.3(D) of this Part and shall meet all of the following conditions in §§ 1.9.3(G)(3)(a) through (d) of this Part listed below.

   a. The Method 2 GB Groundwater Objective shall be based, at a minimum, on the following:

      (1) A scientifically acceptable volatilization model such as that described in § 1.19 of this Part; or

      (2) Transport and fate modeling that incorporates site-specific information on the Hazardous Substances, hydrogeological conditions at the Contaminated-Site, current and reasonably foreseeable building conditions, and which demonstrates that contamination will not infiltrate to indoor air and result in

significant risk of harm to human health or the environment; and/or

(3) Soil gas characterization data, indoor air characterization data, and data resulting from field investigation activities conducted at and proximate to the Contaminated-Site;

b. The Method 2 GB Groundwater Objectives shall not result in indoor or ambient air concentrations which pose a significant risk of harm to human health or the environment;

c. If the development of a Method 2 GB Groundwater Objective results in a concentration of a Hazardous Substance which exceeds any Upper Concentration Limit as described in § 1.9.7 of this Part, then the Department reserves the right to require that the modification be adjusted downward to a concentration which prevents the exceedance; and

d. Method 2 GB Groundwater Objectives shall be scientifically justified and sufficiently documented to demonstrate that the developed objectives are protective against migration of Hazardous Substances into indoor air or any other site-specific considerations. At a minimum, Method 2 GB Groundwater Objective development shall be documented with sufficient information to allow the Director to evaluate the following:

(1) The appropriateness and validity of any chemical-specific and/or site-specific input parameters used;

(2) Whether the calculations, modeling or sampling were correctly performed;

(3) The potential for groundwater at the Contaminated-Site to pose significant risk to human health and the environment after the proposed Method 2 GB Groundwater Objectives are applied to the Contaminated-Site as part of a Remedial Action; and

(4) Background levels for the applicable Hazardous Substances, if determined.

1.9.4 Method 3 Remedial Objectives:

A. Advanced approval of the Director shall be required prior to proposed use of Method 3 Remedial Objectives.

B. Advanced approval of all Owners shall be required prior to proposed use of Method 3 Remedial Objectives.

C. A $20,000 application fee shall be submitted to the Department at the time the Performing Party requests review and/or approval of a proposed risk assessment for Method 3 Remedial Objectives. The Director may also require a Performing Party to reimburse the Department for costs, and expenses incurred, including but not limited to contractor support services, as part of accepting proposals to utilize Method 3 Remedial Objectives at a Contaminated Site. Final approval shall be at the discretion of the Director.

D. Method 3 Remedial Objectives allow for a site-specific risk assessment to be conducted by the Performing Party on either a voluntary basis, or as required by the Director, subject to requirements of § 1.9.1 of this Part, and to the extent appropriate to §§ 1.9.2(B) and 1.9.3(D) of this Part.

E. Site-specific human health risk assessments shall be conducted only after review and approval of a Human Health Risk Assessment Workplan, submitted in both hard copy and electronic format (as specified by the Department), by the Department. The methodology proposed in the Human Health Risk Assessment Workplan shall be consistent with scientifically acceptable risk assessment practices and the fundamentals of risk assessment under EPA's "Risk Assessment Guidance for Superfund," incorporated above at § 1.3(B) of this Part. The Human Health Risk Assessment Report, when completed according to the approved workplan, shall propose remedial objectives for all impacted environmental media, as appropriate.

F. In addition, in reviewing the site-specific Method 3 Remedial Objectives derived pursuant to this rule, the Director may evaluate the following factors:

1. The potential for any remaining Hazardous Substances to pose a significant threat to human health or the environment;

2. Correct application of the approved methodology;

3. The management of risk relative to any remaining contamination;

4. Background levels for the applicable Hazardous Substances; and

5. Circumstances related to the practicality of remediation.

G. Method 3 Remedial Objectives shall also be utilized to develop remedial objectives which are protective of Environmentally Sensitive Areas. To the extent that remedial objectives protective of Environmentally Sensitive Areas are

required by the Director, the Performing Party shall develop such remedial objectives in accordance with § 1.9.5 of this Part.

H. If any Method 3 Remedial Objective results in an exceedance of any Upper Concentration Limit as described in § 1.9.7 of this Part, then the Department reserves the right to require that the Method 3 Remedial Objective be adjusted downward to a concentration which prevents the exceedance.

1.9.5 Ecological Protection

A. Based on information provided in the Notification, Site Investigation or any other source, if a Release of Hazardous Materials has the potential to adversely impact an Environmentally Sensitive Area, then the Director may require the following, including but not limited to:

1. An Ecological Risk Assessment, conducted in accordance with EPA/630/R-92/001 "Framework for Ecological Risk Assessment," incorporated above at § 1.3(C) of this Part, or functional equivalent. The Ecological Risk Assessment shall be conducted only after Department review and approval of an Ecological Risk Assessment Workplan, submitted in both hard copy and electronic format (as specified by the Department); and

2. An Ecological Risk Assessment Report, submitted in both hard copy and electronic format (as specified by the Department), which proposes remedial objectives demonstrated to mitigate any risks to the impacted media identified in the Ecological Risk Assessment. Soil objectives which result from the Ecological Risk Assessment Report shall be considered Method 3 Soil Objectives.

1.9.6 Background Concentrations for Soil:

A. Sampling of Hazardous Substances in background areas may be conducted to distinguish concentrations related to the Contaminated-Site from concentrations of Hazardous Substances not related to activities at the Contaminated-Site or to support the development of soil objectives under the provisions of § 1.9.2 of this Part.

B. For purposes of defining background concentrations, samples shall be collected from areas that have the same characteristics as the soil at the Contaminated-Site, and meet the definition of background.

C. In order to evaluate or justify available data for the purposes of defining background concentrations, a Performing Party shall use a statistical method which is appropriate for the distribution of each Hazardous Substance and such

method shall utilize a minimum of twenty (20) samples. If the distribution of the Hazardous Substance data is inappropriate for statistical methods based on a normal distribution, then the data may be transformed. If the distributions of individual Hazardous Substances differ, more than one statistical method may be required at a Contaminated-Site.

1. Based on the statistically significant number of samples previously evaluated by the Department and on file to make the background determination for arsenic across the state, the requirements of § 1.13 of this Part shall apply to evaluate arsenic in soil.

D. For purposes of estimating background concentrations, values below the method detection limit shall be assigned a value equal to one-half of the method detection limit. Measurements above the method detection limit, but below the practical quantitation limit shall be assigned a value equal to the method detection limit. The Department may approve the use of alternate statistical procedures for handling data below the method detection limit or practical quantitation limit.

1.9.7 Upper Concentration Limits

A. Upper Concentration Limits in soil, sediments, and water are concentrations of Hazardous Substances, or petroleum which, if exceeded, may demarcate a transition between contaminated environmental media and waste in the environment. Upper Concentration Limits are not clean-up standards. Upper Concentration Limits may not be applicable to soil which has been immobilized as part of an approved remedial response action.

B. All remedial objectives shall address the following concentrations or conditions:

1. The presence of non-aqueous phase liquids (NAPL) in any environmental medium shall be considered a condition that exceeds Upper Concentration Limits;

2. The Upper Concentration Limit for TPH in soil is 30,000 ppm;

3. The Upper Concentration Limit for any Hazardous Substance in soil is 10,000 ppm; and

4. Table 5, § 1.9.7(B)(5) of this Part lists the Upper Concentration Limits in GB groundwater that are protective against potential explosive conditions due to the volatilization of Hazardous Substances in groundwater to structures where human exposures cannot be reasonably expected to occur (§ 1.19 of this Part).

5. Table 5: Upper Concentration Limits for GB Groundwater

Upper Concentration Limits for GB Groundwater	
Substance	**GB Groundwater UCL (mg/l)**
Benzene	18
Chlorobenzene	56
1,2-Dichloroethane	670
1,1-Dichloroethene	23
cis-1,2-Dichloroethene	69
trans-1,2-Dichloroethene	79
1,2-Dichloropropane	140
Ethylbenzene	16
Styrene	50
Toluene	21
1,1,1-Trichloroethane	68
Trichloroethene	87

1.9.8 Points of Compliance:

A. Points of Compliance for Soils:

1. The points of compliance for soils are points where the soil objectives established under §§ 1.9.2 or 1.9.4 of this Part shall be attained. For soil objectives based on direct exposure to humans engaged in residential or industrial/commercial activities, the point of compliance shall be established in the soils throughout the Contaminated-Site, except as otherwise specified in § 1.9.2(B)(1) of this Part (General Requirements for

Direct Exposure Criteria). For soil objectives based on protection of GA/GAA or GB areas, the points of compliance shall be established throughout the Contaminated-Site in a manner consistent with § 1.9.2(B)(2) of this Part (General Requirements for Leachability Criteria).

2. For a contiguous volume of contaminated soil which is determined to pose risks associated with direct exposure to humans engaged in residential and industrial/commercial activities, separate and distinct points of compliance may be proposed, provided that such points of compliance are consistent with § 1.9.2(B)(1) of this Part (General Requirements for Direct Exposure Criteria) and are demonstrated to ensure protection of both residential and industrial/commercial activities. Such points of compliance are subject to the approval of the Director.

3. The Performing Party shall take affirmative steps to manage the Contaminated-Site such that the Contaminated-Site does not impact property which is not within the control of Performing Party, by ensuring that, at a minimum, the following requirements are met:

   a. The concentration of any Hazardous Substance in soil does not exceed the Method 1 Residential Direct Exposure Criterion as described in § 1.9.2 of this Part (Soil Objectives) and as specified in Table 1, § 1.9.2(C)(2) of this Part at any point beyond the control of the Performing Party;

   b. The Direct Exposure Criteria which is applied to the full areal extent which is under the control of the Performing Party does not present threats to human health and the environment at any point within that control pursuant to §§ 1.9.1, 1.9.2 or 1.9.4 of this Part (Remedial Objectives, Soil Objectives, and Method 3 Remedial Objectives) as appropriate; and

   c. The Performing Party shall provide formal written documentation to the Department demonstrating the Performing Party's control over the full areal extent of the Method 1 Residential Direct Exposure Criterion exceedance including, but not limited to the following, as appropriate:

      (1) Documented acceptance of any residential direct exposure criterion developed pursuant to § 1.9.4 of this Part (Method 3 Remedial Objectives) and all supporting documentation used in their derivation from all land Owners whose property is impacted by the Release; and

(2) An environmental land usage agreement entered into by all impacted land Owners pursuant to § 1.9.9 of this Part (Institutional Controls), if the exposure assumptions made in the development of the Method 3 Remedial Objective are such that they need to be institutionally maintained in order to guarantee long-term protection of human health and the environment.

4. For a Contaminated-Site that is determined to actually or potentially impact GA/GAA and GB areas, separate and distinct points of compliance for soils may be proposed, provided that such points of compliance are consistent with § 1.9.2(B)(2) of this Part (General Requirements for Leachability Criteria) and are demonstrated to ensure compliance with both GA and GB Groundwater Objectives.

5. Points of compliance for soils based on impacts to Environmentally Sensitive Areas shall be established throughout the Contaminated-Site or as determined in the ecological risk assessment performed in accordance with § 1.9.5 of this Part (Ecological Protection).

B. Points of Compliance for Groundwater:

1. Points of Compliance with the GA Groundwater Objectives

a. Any point where the groundwater quality is monitored or where groundwater is withdrawn for use, excepting points within a discharge zone or residual zone approved pursuant to the Department's "Groundwater Quality Rules," Part 150-05-3 of this Title, may be used to determine compliance with the groundwater objectives for the area. Points of compliance with GA Groundwater Objectives may be on, or in close downgradient proximity to, the Contaminated-Site.

2. Points of Compliance with the GB Groundwater Objectives:

a. Points of compliance with GB Groundwater Objectives shall be established at locations which provide ample warning prior to groundwater flow into, under and around structures. Specifically:

(1) Points of compliance with the GB Groundwater Objectives shall be established along a line situated approximately thirty (30) feet (or any other appropriate and hydrologically defensible distance approved by the Director) laterally from any facility structure boundary, including, but not limited to

utility conduits and structures such as sewer lines and pump houses;

(2) These points of compliance shall be situated along this line in a manner consistent with the groundwater flow direction;

(3) The spacing between points of compliance on the line will depend on site-specific information such as size of the structure, and shall be managed in such a way as to provide sufficient information regarding any potential impacts from contaminated groundwater volatilizing to indoor air;

(4) These points of compliance may be in addition to points of compliance designated for source control activities; and

(5) The Department reserves the right to require additional or separate points of compliance based on site-specific circumstances;

b. The Performing Party shall take affirmative steps to eliminate migration of any Hazardous Substance in groundwater to a GB area which is not under the control of the Performing Party, by ensuring that, at a minimum, the following requirements are met:

(1) The concentration of the Hazardous Substance in groundwater does not exceed the Method 1 GB Groundwater Objective as specified in Table 4, § 1.9.3(F)(5) of this Part at any point beyond the control of the Performing Party; and

(2) The GB Groundwater Objective which is applied to the full areal extent which is under the control of the Performing Party does not present threats to human health and the environment at any point within that control pursuant to §§ 1.9.1, 1.9.3(D), 1.9.3(G) or 1.9.4 of this Part (Remedial Objectives, General Requirements for Groundwater Objectives, Method 2 GB Groundwater Objectives, Method 3 Remedial Objectives), as appropriate;

c. The Performing Party shall provide formal written documentation to the Department demonstrating the Performing Party's control over the full areal extent of the Method 1 GB Groundwater Objective exceedance including, but not limited to the following, as appropriate:

(1) Documented acceptance of the GB Groundwater Objectives and all supporting documentation used in their derivation from all land Owners whose property is impacted by the Release; and

(2) An environmental land usage agreement entered into by all impacted land Owners pursuant to § 1.9.9 of this Part (Institutional Controls), if the exposure assumptions made in the development of the GB Groundwater Objectives are such that they need to be institutionally maintained in order to guarantee long-term protection of human health and the environment.

d. Points of compliance for groundwater based on impacts to Environmentally Sensitive Areas shall be established throughout the Contaminated-Site or as determined in the ecological risk assessment performed in accordance with § 1.9.5 of this Part (Ecological Protection).

1.9.9 Institutional Controls

A. Performing Parties shall institute environmental land usage restrictions for all properties subject to final decisions which result in levels of Hazardous Substances greater than those protective against direct exposure associated with residential land usage; or are subject to final decisions under a variance pursuant to § 1.14.3 of this Part (Variances) relating to a remedial objective pursuant to these regulations; or are subject to any final decisions based solely or in part on the limitation of reasonably foreseeable exposures to Hazardous Substances in any media; or are subject to institutional controls required under § 1.13.6 of this Part.

B. The Owner(s) of the Contaminated-Site shall document their concurrence with this restriction by recording an Environmental Land Usage Restriction, and filing it with the Department. The standard format for this agreement can be found on the Department's Office of Waste Management Site Remediation web page at http://www.dem.ri.gov/programs/wastemanagement/site-remediation/#process The executed Environmental Land Usage Restriction shall run with the land, as recorded on the title(s) to the property (or properties) on which the Contaminated-Site is situated, and shall be binding on all Owners, successors and/or assigns. This notice, and the associated restrictions and controls shall be subject to approval by the Director and shall include provisions to accomplish all of the following:

1. Prohibit activities on the Contaminated-Site that may interfere with a Remedial Action and its operation and maintenance, long-term monitoring or other measures necessary to assure the integrity of the Remedial Action;

2. Prohibit activities that may result in human exposure to levels of Hazardous Substances that exceed the concentrations that have been determined to be protective of human health, or that may result in a Release of Hazardous Materials which was contained as part of the remediation;

3. Require prior notice to the Department of the Owner's intent to convey any interest in the Contaminated-Site. A conveyance of title, an easement, or other interest in the property or portion of the property shall not be consummated by the Owner without complete and full disclosure of the plans and procedures, and adequate and complete provision for the continued operation of the remedy and the prevention of Releases and exposures as described in § 1.9.9(B)(2) of this Part;

4. Grant to the Department and its designated representatives the right to enter the property at reasonable times for the purpose of monitoring compliance with the Remedial Action; and

5. Describe the restrictions placed on the property and/or the allowable uses of the property.

C. A copy of the final, recorded notice shall be submitted to the Department within fifteen (15) days of the date that it is entered into the Land Evidence Records.

1.9.10 Compliance Sampling:

A. A Contaminated-Site is considered by the Director to be compliant with the Remediation Regulations when it is demonstrated that the appropriate remedial objectives have been met at all Source Areas within the Contaminated-Site. This rule specifies procedures for determining compliance with the appropriate soil objectives and groundwater objectives applied to the Contaminated-Site. Compliance procedures with all other remedial objectives shall be determined on a site-specific basis. § 1.13 of this Part specifies requirements specific to arsenic in soil.

1. Compliance with the Soil Objectives:

a. All Performing Parties have, unless otherwise specified by the Director, two (2) alternatives for determining compliance with soil objectives. These alternatives are:

(1) A Performing Party may propose in the Remedial Action Work Plan to verify compliance by taking not less than twenty samples for laboratory analysis. This shall be accomplished by a representative sampling program used to characterize the distribution and concentration of Hazardous Substances at the former Source Area. The analytical results of all samples taken using this approach, including any and all specific samples which may be specified and/or taken by the Department, shall be below the appropriate soil objective in order for the Source Area to be considered compliant with these Regulations; or

(2) A Performing Party may propose in the Remedial Action Work Plan to verify compliance by geometrically gridding the former Source Area and taking not less than twenty compliance samples for laboratory analysis at the intersecting points of the grid. If a Performing Party utilizes this criteria they may also propose a statistical analysis methodology for determining compliance. The Department reserves the right to take or require additional compliance samples as warranted, and the statistical evaluation shall account for all samples taken. The methodology shall meet the following criteria:

(AA) No single sample result exceeds the soil objective by a factor of five (5);

(BB) No more than 10% of the individual sample results exceed the soil objective; and

(CC) No single sample result exceeds any Upper Concentration Limit as defined by § 1.9.7 of this Part.

(DD) No compliance sampling plan shall be accepted that includes sample results outside the former Source Area in the statistical evaluation of results.

2. Compliance with the Groundwater Objectives:

a. Compliance with the groundwater objectives shall be determined through laboratory analysis of representative samples used to characterize the distribution and concentration of Hazardous Substances migrating from the Contaminated-Site. The analytical results of all samples taken using this approach shall be below the

appropriate groundwater objective in order for the Contaminated-Site to be considered compliant with these Regulations.

1.9.11 Remedial Objective Approvals

A. All remedial objectives shall be approved by the Department at one of two points in the site management process. These are:

1. § 1.8.4 of this Part; or

2. § 1.10.2 of this Part (Remedial Objectives).

1.10 Remedial Action Work Plan

1.10.1 Remedial Action Work Plan:

A. The Performing Party for a Contaminated-Site where Remedial Action is found to be necessary under these regulations shall prepare and submit in both hard copy and electronic format (as specified by the Department) to the Department for review and approval a Remedial Action Work Plan documenting how the proposed Remedial Action will be implemented. The Remedial Action Work Plan shall be submitted along with the required fee per § 1.11.2 of this Part. The Director shall base the decision to require Remedial Action on the information available on the mobility, toxicity and volume of the Hazardous Material released and the resulting potential for harm to human health and the environment.

B. The Performing Party may prepare and submit a limited Remedial Action Work Plan for interim or partial Remedial Actions, if deemed appropriate by the Department. Limited or partial Remedial Action Work Plans shall be submitted in both hard copy and electronic format (as specified by the Department) and shall contain appropriate assurances that a more complete scope of activities will be evaluated as the Contaminated-Site is investigated and characterized.

C. A Performing Party shall complete a Remedial Action work plan in accordance with § 1.10 of this Part, as required by the Director, and submit said report for review and approval.

1.10.2 Remedial Objectives

A. The Remedial Action Work Plan shall present a Remedial Action which addresses remedial objectives for all impacted media at the Contaminated-Site in a manner consistent with § 1.9 of this Part (Risk Management), including, as appropriate, the following:

1. Groundwater Objectives: The Performing Party shall propose a remedial objective for all Hazardous Substances found to have actual or potential impacts on groundwater.

2. Surface Water and Sediment Objectives: The Performing Party shall propose a remedial objective for all Hazardous Substances found to have actual or potential impacts on surface water and/or sediments, that is consistent with the actual and potential uses of the surface water and/or sediment in the impacted area, and the policies and regulations of the Office of Water Resources as found in Chapter 150 of this Title;

3. Soil Objectives: The Performing Party shall propose a remedial objective for all Hazardous Substances and TPH found to have actual or potential impacts on soil that is consistent with the actual and potential uses of the land in the impacted area. The remedial objective for soil shall also take into account the potential for the Hazardous Substances to leach into groundwater and/or surface water from these impacted soils and, subsequently, should be consistent with the actual and potential uses of the ground water and/or surface water in the impacted area and the policies and regulations as found in Chapter 150 of this Title and all other appropriate regulatory authority for that resource; and

4. Air Objectives: The Performing Party shall propose a remedial objective for all Hazardous Substances found to have actual or potential impacts on air quality, whether the impact is from gaseous or particulate emissions and/or entrainment on soil. That air objective shall be consistent with the requirements of the Rhode Island Clean Air Act, R.I. Gen. Laws Chapter 23-23 and rules and regulations as found in Chapter 120 of this Title.

B. The remedial objectives for each media should be expressed, wherever possible or appropriate, as a residual concentration of Hazardous Material or Hazardous Substance. However, for Remedial Actions which include no action/natural attenuation or combinations of engineering and institutional controls which involve containment of contaminated media, the Remedial Action Work Plan shall demonstrate that the proposed Remedial Action will address the remedial objectives for all impacted media at the Contaminated-Site in a manner consistent with § 1.9.1 of this Part (Remedial Objectives). Department approval of this demonstration shall serve as the Remedial Objective Approval pursuant to § 1.9.11 of this Part (Remedial Objective Approvals). This demonstration may be in addition to the documentation of compliance with § 1.9 of this Part (Risk Management) required by § 1.8.4 of this Part (Development of Remedial Alternatives).

C. The remedial objectives shall also consider and manage any short-term risks to human health and the environment associated with the Remedial Action implementation.

D. The Performing Party shall estimate the time period necessary to meet all appropriate remedial objectives for groundwater, surface water, sediment, soil and air. In every case, a Remedial Action should be designed, whenever practicable, as a permanent solution to meet the remedial objectives for Hazardous Substances in all affected media in the shortest time frame feasible.

1.10.3 Proposed Remedy

A. The Remedial Action Work Plan shall clearly explain the proposed remedy and justify the ability of the remedy to meet the remedial objectives. For remedies that include on-site treatment and/or containment of contaminated media, the Remedial Action Work Plan shall include the best management practices proposed to:

1. Prevent the infiltration/migration of Hazardous Substances at levels harmful to human health or the environment;

2. Prevent direct contact with Hazardous Substances at levels harmful to human health and the environment;

3. Eliminate volatilization and entrainment of Hazardous Substances; and

4. Minimize and manage surface runoff from the area including during and after the Remedial Action. The plan shall identify all locations of existing and/or proposed infiltration systems.

1.10.4 Remediation of Impacted Groundwater

The Remedial Action Work Plan shall clearly explain how impacted groundwater will be remediated. Remediation of groundwater shall meet the requirements of the Department's "Groundwater Quality Rules," as well as the requirements of § 1.9 of this Part. Any Remedial Action Work Plan which includes the proposal of a discharge zone and/or a residual zone shall submit the required proposals and meet the required demonstrations of the Department's "Groundwater Quality Rules," Part 150-05-3 of this Title, respectively.

1.10.5 Limited Design Investigation

The Director may require the Performing Party to include a proposed Limited Design Investigation in the Remedial Action Work Plan in order to gather information necessary for the design and construction of a specific remedy. The

Performing Party may also propose to include a Limited Design Investigation in the Remedial Action Work Plan in order to gather information necessary for the design and construction of a specific remedy. Activities proposed as part of this Limited Design Investigation shall meet the requirements of § 1.8 of this Part.

1.10.6 Points of Compliance

The Remedial Action Work Plan shall clearly indicate the locations, for each impacted medium where Hazardous Substances will be measured in order to determine if the remedial objectives have been met. These points will be designated Points of Compliance. Remedial Actions will be initially focused on meeting remedial objectives set for the Contaminated-Site, and compliance shall be measured throughout that Contaminated-Site. The Points of Compliance shall be managed in a manner consistent with § 1.9.8 of this Part. § 1.13 of this Part specifies requirements unique to arsenic in soil.

1.10.7 Proposed Schedule for Remediation

The Remedial Action Work Plan shall include a proposed schedule for implementing the proposed Remedial Action.

1.10.8 Contractors and/or Consultants

The Performing Party shall include the names, addresses and telephone numbers of the contact Persons of any contractors or consultants hired to implement or operate the remedy proposed in the Remedial Action Work Plan. The responsibilities of each consultant and/or contractor shall be clearly explained. If the actual consultant or contractor has not been determined at the time of application, the expected duties of each company shall be explained and the Department shall be notified as soon as the specific companies are selected.

1.10.9 Site Plan

The Remedial Action Work Plan shall include a site plan. The site plan submitted as part of the Site Investigation, conducted pursuant to § 1.8.3(A)(6) of this Part, shall be amended to include any further information available to the Performing Party, and the locations of all proposed remedial units and monitoring points. The Points of Compliance shall also be clearly marked on the site plan.

1.10.10 Design Standards and Technical Specification

A. The Remedial Action Work Plan shall include all design standards and technical specifications necessary for the design of the proposed remedy. Design standards and technical specifications will include, where appropriate:

1. Identification of the materials of construction of all portions of the remedy;

2. The type of equipment to be used, including unit capacity and dimensions;

3. The results of any laboratory or pilot-scale tests conducted to determine the effectiveness of the proposed Remedial Action; and

4. Any manufacturer's literature and/or technical guidance documents on the construction, implementation and/or operation of proposed units.

5. These portions of the Remedial Action Work Plan shall be prepared under the supervision of a Registered Professional Engineer in the State of Rhode Island, and stamped by that engineer prior to submittal.

1.10.11 Set-up Plans

The Remedial Action Work Plan shall explain any pre-operational staging or construction requirements which shall be completed prior to the installation and operation of the proposed Remedial Actions. These pre-operational staging or construction activities may include the installation of pads, liners, or berms; any intrusive activities; or any Contaminated-Site contouring or grading which may be necessary. The Set-Up Plan shall show how any construction or staging activities will be done in a manner in compliance with any applicable laws, Rules and Regulations.

1.10.12 Effluent Disposal

The Remedial Action Work Plan shall include specific plans for the management and disposal of any products or by-products from the proposed Remedial Action. This section shall also identify what regulations shall be complied with during, and what permits or approvals shall be obtained prior to, any planned effluent disposal actions.

1.10.13 Contingency Plan

A. The Remedial Action Work Plan shall include a Contingency Plan which clearly explains the procedures to be followed and the Persons to be notified in the event of an unexpected incident involving Hazardous Materials at the Contaminated-Site. The Contingency Plan shall include, at a minimum, the following information:

1. The names and telephone numbers of all emergency coordinators;

2. All emergency response procedures and arrangements; and

3. A description of the procedures necessary for the prevention of ignition and/or reaction of any flammable material or reactive materials, where appropriate.

B. The Contingency Plan shall be available at the Contaminated-Site at all times during the implementation and operation of the Remedial Action.

1.10.14 Operating Log

A. The Remedial Action Work Plan shall include a proposed Operating Log which clearly and completely records activities on-site and shows how the implementation and operation of the Remedial Action is progressing. This Operating Log shall include, at a minimum, the following information:

1. Time periods of operation of the remedial unit and approximate flow rates;

2. Records of any analyses conducted as part of the Remedial Action;

3. Instances of implementation of the Contingency Plan; and

4. An inspection plan designed to insure the proper operation of the proposed remedial unit. Operating treatment units shall be inspected at least weekly unless an alternative inspection frequency is approved by the Director.

B. Documentation of these inspections and any problems found and/or repairs made shall be included.

C. The Operating Log shall be readily available at the Contaminated-Site during implementation and operation of the Remedial Action. A copy of this log shall be submitted to the Department annually unless an alternative submittal frequency is approved by the Director for the duration of the active operation of the treatment unit.

D. The Operating Log shall be kept for at least three (3) years following completion of the Remedial Action.

1.10.15 Security Procedures

The Remedial Action Work Plan shall include a description of the security procedures proposed to prevent unknowing access to the Contaminated-Site or key features identified at the Contaminated-Site. This section shall include descriptions of any natural boundaries or any existing or proposed walls or fences surrounding the Contaminated-Site. Means to control entry to the

Contaminated-Site or key features identified at the Contaminated-Site shall also be clearly explained.

1.10.16 Shut-Down, Closure and Post-Closure Requirements

The Remedial Action Work Plan shall contain a section outlining the procedures required to shut-down and close the remedial units. This section shall also outline any proposed post-closure activities, including monitoring and/or institutional controls restricting future land usage at the Contaminated-Site. All post-closure groundwater monitoring shall be done in accordance with a program meeting the requirements of the Department's "Groundwater Quality Rules," Part 150-05-3 of this Title.

1.10.17 Institutional Controls and Notices

The Remedial Action Work Plan shall indicate a methodology for providing notice to the general community, and contain specific plans and implementation procedures for land usage restrictions, restrictions on the use of groundwater on the Contaminated-Site, and institutional controls in accordance with § 1.9.9 of this Part for all Remedial Actions that are not determined by the Director to provide a permanent solution.

1.10.18 Compliance Determination

The Remedial Action Work Plan shall include a section outlining the procedures to be employed in order to demonstrate that the remedial objectives for the Contaminated-Site have been met. Such compliance determination shall be proposed in a manner consistent with § 1.9.10 of this Part.

1.10.19 Certification Requirements

A. The Remedial Action Work Plan and all associated progress reports shall include the following statements signed by an authorized representative of the party specified:

1. A statement signed by an authorized representative of the Person who prepared the Remedial Action Work Plan certifying the accuracy of the information contained in that report to the best of their knowledge; and

2. A statement signed by an authorized representative of the Performing Party responsible for the submittal of the Remedial Action Work Plan certifying that the report is a complete and accurate representation of the Contaminated-Site and the Release and contains all known facts surrounding the Release to the best of their knowledge.

1.11 Remedial Action Approvals

1.11.1 Remedial Action Approvals

A. The Performing Party shall receive approval of the Remedial Action Work Plan from the Director prior to initiating any activities contained therein.

B. Remedial Action Approvals that include the treatment of Hazardous Waste at the Contaminated-Site will be in the form of a Temporary Remedial Action Permit subject to the requirements and conditions of R.I. Gen. Laws § 23-19.1-10.3, Emergency and Temporary Permits. The Performing Party shall have a Temporary Remedial Action Permit throughout the period that Hazardous Waste is being treated.

C. Approvals for Remedial Actions that include the remediation of impacted groundwater in GA/GAA areas to remedial objectives other than those listed in Table 3, § 1.9.3(F)(4) of this Part shall obtain a Groundwater Quality Certification pursuant to the requirements of the Department's "Groundwater Quality Rules," Part 150-05-3 of this Title.

D. The Director may issue conditions to the Remedial Action Approval when the Director finds that those conditions are necessary to protect human health and the environment. Conditions may include, but not necessarily be limited to, requirements that the Performing Party provide financial assurances that the Remedial Action will continue.

1.11.2 Remedial Action Approval Application Fees

The application fee for Remedial Action Approvals shall be one thousand ($1,000.00) dollars.

1.11.3 Change in Ownership, Administration and/or Location

A. At least thirty (30) days prior to any change in Ownership of the Contaminated-Site or a change in Operator of the Remedial Action, the Performing Party shall notify the Director of the proposed change.

B. Remedial Action Approvals shall be voidable whenever there is a change in Ownership of the Contaminated-Site or a change in Operator of the Remedial Action.

1.11.4 Remedial Action Approval Modifications

A. The Performing Party shall apply to the Director for approval of any modifications that the Performing Party finds necessary during the design, construction or implementation of the remedy.

B. The Director may require modification of a permit or approval if there is reason to believe that the remedy is not working as anticipated.

C. The Director may require a new Remedial Action Work Plan in cases where the Director determines that the proposed modifications substantially alter any process or the results of the remedy.

1.11.5 Revocation or Suspension of Permits and Approvals

A. The Director may order the immediate cessation of any Remedial Action whenever the Director determines that a Performing Party is not in compliance with all of the appropriate Rules and Regulations established by the Department, or that the Performing Party is not performing the Remedial Action in conformance with approved plans or conditions of a permit or approval.

B. The Director may, in lieu of revocation or suspension of the permit or approval issued to the Performing Party, order that Performing Party to take whatever corrective action is needed to secure compliance with the Rules and Regulations established by the Department.

1.12 Remedial Action

1.12.1 Operational Requirements

These rules apply to all Performing Parties conducting any Remedial Action activities. A Performing Party shall complete Remedial Action, as required by the Director.

1.12.2 Proper Operation and Maintenance

The Performing Party shall operate and maintain all portions, activities and/or operations in accordance with all the terms and conditions of its Remedial Action Approval, and all other applicable laws and regulations. The Department shall be notified in writing immediately if the Performing Party suspects or has reason to believe that any of the remedial objectives will not be met.

1.12.3 Operating Records

The Performing Party shall maintain an operating log as specified in § 1.10.14 of this Part or as otherwise specified by the Director in the Remedial Action Approval.

1.12.4 Personnel Training

The Performing Party shall maintain a Personnel training program as specified in the Remedial Action Approval.

1.12.5 Progress Reports

A. The Performing Party shall submit progress reports at least quarterly. The reports shall clearly explain all activities specified in the Remedial Action Approval which have been initiated or which have been completed.

B. Progress reports shall also include the results of all sampling and analysis conducted at the Contaminated-Site.

C. After completion of the Remedial Action, the results of all post-closure monitoring shall be submitted to the Director.

1.12.6 Effluent Disposal

The Performing Party shall dispose of all treated effluent, products and/or byproducts from the proposed Remedial Action in the manner specified in the Remedial Action Approval and in compliance with any other applicable Rules and Regulations.

1.12.7 Initiator

A. The Performing Party shall comply with all applicable rules of § 10-1.7 of this Chapter as amended, for all Hazardous Waste shipments that they initiate.

B. The Performing Party shall comply with the requirements of the Solid Waste Regulations, Subchapter 05 of this Chapter, as amended, for all solid waste shipments that they initiate.

1.12.8 Security

The Performing Party shall maintain a Contaminated-Site security program equivalent to that specified in the Remedial Action Approval.

1.12.9 Closure and Post Closure

The Performing Party shall close the Remedial Action and maintain all post-closure requirements as specified in the Remedial Action Approval. Compliance with the Remedial Action Approval shall be documented in a Closure Report submitted to the Department for review and approval.

1.13 Special Requirements for Managing Arsenic in Soil

§ 1.13 of this Part shall only apply for the investigation and remediation of Source Area(s) involving only exceedances of the contaminant arsenic. All other exceedances and reportable contaminants of concern shall be addressed as required elsewhere in these regulations.

1.13.1 Background

A. Arsenic is a naturally occurring element in soil. Because background levels for arsenic across the state have been determined to be above the calculated risk-based value, per § 1.9.1 of this Part, the Method 1 Residential, and Industrial/Commercial Exposure Criterion are set at 7.0 ppm. This value represents the 95th percent upper confidence limit when natural background data across the state are statistically evaluated. Based on the numerous samples evaluated by the Department in making this determination, and the prevalence of arsenic in the environment, the special requirements of § 1.13 of this Part shall apply to address arsenic in soil.

B. Plan and Approval Requirements

1. The Performing Party shall:

a. Notify the Department of the Release in accordance with § 1.6 of this Part;

b. Obtain property Owner approval to complete all investigation and remedial work required;

c. Public Notice - Provide public notice to all abutters prior to commencing remedial measures required by § 1.13.4 of this Part. Public notice shall include, at a minimum, proposed remedial measures to be implemented under § 1.13.4 of this Part, approximate schedule, and contact information of the Performing Party. For Contaminated-Sites where exceedances of the arsenic standard is the only known contaminant of concern, public notice under this provision shall constitute full Public Involvement, as otherwise required by § 1.8.7 of this Part, except for locations identified in § 1.8.7(A)(3) of this Part.

d. Implement and complete the applicable remedial measures required by § 1.13.4 of this Part.

e. Prior Department approval shall not be required for remedial measures implemented under §§ 1.13.4(B)(1) through (6) of this

Part, and §§ 1.13.4(C)(1) through (4) of this Part. Prior plan approval shall be required for implementing all other proposed remedial measures under these rules.

f. File a post-closure report in both hard copy and electronic format (as specified by the Department) with the Department. The report shall document:

(1) All analytical results,

(2) Sampling dates,

(3) Sample locations with depths,

(4) Performing Party certification specifying the specific remedial measures completed (i.e. Rule #), and date,

(5) Performing Party certification that public notice to abutters was completed, and

(6) Details of institutional controls required (ELUR's per § 1.13.6 of this Part if required).

1.13.2 Sampling Requirements

A. The Performing Party shall ensure that the number, location, depth, and distribution of arsenic samples taken as part of the site investigation are adequate to properly characterize the site, the Release, and all specific areas of concern. The Performing Party shall ensure an appropriate rationale has been utilized for selecting sample locations.

B. Minimum Sampling Frequency: The following number of samples, at a minimum, shall be collected and analyzed for arsenic * to evaluate site conditions against the standard. Additional samples may be required based upon site-specific conditions.

Site Size (acres)	**Minimum of Site Samples Required**
1 acre or less	8 samples minimum
1 to 5 acres	8 samples + 2 per additional acre over 1st acre
Greater than 5 acres	16 samples + 1 per additional acre

	over 5th acre
*Given the statistically significant number of arsenic samples on file at the Department and evaluated to make the background determination for arsenic across the state, the requirements herein have been set to evaluate site-specific arsenic conditions against the standard, in lieu of the minimum 20 samples required per § 1.9.6 of this Part.	

1.13.3 Determining Compliance with the Standard

A. Given the statistically significant number of arsenic samples evaluated by the Department across the state to determine natural background levels, the following procedures may be utilized for evaluating data collected in accordance with §§ 1.13.2(A) and (B) of this Part, to determine compliance with the 7.0 ppm Method 1 Direct Exposure Criterion for arsenic. Site arsenic conditions meeting all these requirements shall be deemed consistent with state background levels, and hence be non-jurisdictional for arsenic:

1. No individual sample result from the data set shall be greater than fifteen (15) ppm,

2. No greater than 25% of sample results from the data set shall exceed 7.0 ppm, and

3. The average of all sample results shall be 7.0 ppm or less.

B. The laboratory method reporting limit shall be set at or below the standard (i.e. no greater than 7.0 ppm). Analytical results indicating “non-detect”, shall be evaluated at half the method reporting limit value when determining compliance with the standard above. A Performing Party may address exceedances of § 1.13.3(A)(1) of this Part, and then re-evaluate compliance with the standard.

1.13.4 Remedial Options for Jurisdictional Arsenic Releases Above 7.0 ppm

A. When arsenic is jurisdictional, the following remedial options may be utilized to address the arsenic Release. The Performing Party shall maintain adequate dust control measures, and ensure soils are kept sufficiently moist and damp during soil disturbance activities.

B. Average Source Area arsenic levels between 7 and 15 ppm:

1. Excavation and removal of all contaminated soils with elevated arsenic levels, with proposed confirmation sampling to determine compliance with the standard.

2. Encapsulation of existing soils with four inches (4”) minimum of Clean Soil that has arsenic levels less than 7.0 ppm, preventing erosion with adequate vegetation and/or mulch, and recording of an appropriate Environmental Land Usage Restriction (ELUR if required per § 1.13.6 of this Part) to maintain said engineering controls.

3. Encapsulation of existing soils with six inches (6”) minimum of mulch, and recording of an appropriate Environmental Land Usage Restriction (ELUR if required per § 1.13.6 of this Part) to maintain said engineering controls.

4. Encapsulation of existing soils with a minimum of two inches (2”) of asphalt, concrete pavers, or concrete, and recording of an appropriate ELUR to maintain said engineering controls (if required per § 1.13.6 of this Part).

5. Soil blending or tilling of wet/damp soil, with re-sampling per § 1.13.2 of this Part to determine compliance with the standard.

6. Phytoremediation with re-sampling per § 1.13.2 of this Part to determine compliance with the standard.

7. A site-specific remediation plan that has been reviewed and approved in writing by the Department.

C. Source Area arsenic levels between 15 - 43 ppm:

1. Excavation and removal of all contaminated soils with elevated levels of arsenic, with proposed confirmation sampling to determine compliance with the standard.

2. Encapsulation of existing soils with six inches (6”) of Clean Soil, preventing erosion with adequate vegetation and/or mulch, and recording of an appropriate ELUR to maintain said engineering controls (if required per § 1.13.6 of this Part).

3. Encapsulation of existing soils with four inches (4”) of gravel with a minimum of two inches (2”) of asphalt, concrete pavers or concrete, and recording of an appropriate ELUR to maintain said engineering controls (if required per § 1.13.6 of this Part).

4. Encapsulation of existing soils with four inches (4”) of Clean Soil over a geo-fabric material with minimum puncture strength of 120 lbs., and burst strength of 400 psi, and recording of an appropriate ELUR to maintain said engineering controls (if required per § 1.13.6 of this Part).

5. Soil blending or tilling of wet/damp soil, with re-sampling per § 1.13.2 of this Part to determine compliance with the standard.

6. A site-specific remediation plan that has been reviewed and approved in writing by the Department. Capping alternatives proposed shall include measures equivalent to the protectiveness outlined above.

D. Source Area arsenic levels above 43 ppm:

1. Excavation and removal of all contaminated soils with elevated levels of arsenic, with proposed confirmation sampling to determine compliance with the standard.

2. Encapsulation of existing soils with two feet (2'") of Clean Soil, preventing erosion with adequate vegetation and/or mulch, and recording of an appropriate ELUR to maintain said engineering controls.

3. Encapsulation of existing soils with six inches (6") of Clean Soil (as sub-base) with a minimum of four inches (4") of asphalt or concrete, and recording of an appropriate ELUR to maintain said engineering controls.

4. Encapsulation of existing soils with one foot (1') of Clean Soil over a geo-fabric material with minimum puncture strength of 120 lbs., and burst strength of 400 psi, and recording of an appropriate ELUR to maintain said engineering controls.

5. A site-specific remediation plan that has been reviewed and approved in writing by the Department. Capping alternatives proposed shall include a two-foot (2') soil cap, or equivalent.

1.13.5 Certification Requirements for Sites Formerly Jurisdictional

An Owner of a Contaminated-Site formerly jurisdictional under this Part for arsenic in soil (as the only contaminant of concern), may record on the property title a completed Release Form which can be found on the Department's Office of Waste Management Site Remediation Program web page to certify compliance with the current arsenic standard if they meet the requirements of § 1.13.3 of this Part, after forwarding said release form to the Department. This rule applies to sites where a previously approved remedy required the recording of an ELUR on the title to address arsenic in soil.

1.13.6 Institutional Control Requirements – Environmental Land Usage Restrictions, and Owner Notification Requirements

A. The following institutional control requirements shall be required to maintain capping and engineering controls, at Contaminated-Sites where jurisdictional arsenic is the only remaining contaminant of concern above standards.

1. Residential Properties with Four (4) Units or Less

   a. Property Owners shall maintain all capping and engineering controls required under § 1.13.4 of this Part.

   b. Property Owners of sites remediated under §§ 1.13.4(B) or (C) of this Part, shall be required to comply with R.I. Gen. Laws Chapter 5-20.8 (Real Estate Disclosures), and at the time of any property transfer, provide the buyer with a copy of the post closure report required in § 1.13.1(B)(1)(f) of this Part.

   c. Property Owners of sites remediated under § 1.13.4(D) of this Part, shall record on the property deed, an ELUR approved by the Department.

2. Residential Properties with Five (5) units or more, and Recreational Properties

   a. Property Owners shall maintain all capping and engineering controls required under § 1.13.4 of this Part.

   b. Property Owners of sites remediated under §§ 1.13.4(B) or (C) of this Part, shall be required to comply with R.I. Gen. Laws Chapter 5-20.8 (Real Estate Disclosures), and at the time of any property transfer, provide the buyer with a copy of the post closure report required in § 1.13.1(B)(5)(f) of this Part, and notify them of inspection requirements applicable per § 1.13.6(A)(2)(c) of this Part.

   c. The Owner shall perform annual inspection of all capping and engineering controls for three (3) consecutive years following completion of the remedy. The Owner shall file the results of said inspection with the Department's Office of Waste Management, and indicate compliance with the requirements of the remedy, or note any deficiencies and include a schedule to return to compliance.

   d. Property Owners of sites remediated under § 1.13.4(D) of this Part, shall record on the property deed, an ELUR approved by the Department.

3. Industrial/Commercial Properties

a. Property Owners shall maintain all capping and engineering controls required under § 1.13.4 of this Part.

b. Prior to submission of the site post closure report, required by § 1.13.1(B)(1)(f) of this Part, the property Owner shall record on the property deed, an ELUR approved by the Department, to maintain required capping and engineering controls.

1.14 Variances and Extensions

1.14.1 Applications

An applicant may apply to the Director for a variance from or extension to any of these Rules and Regulations. The Director may require the collection and/or submission of information the Director deems necessary to fully evaluate such application.

1.14.2 Extensions

The Director may upon request, issue an extension to any of the time tables and schedules required by these regulations in the form of a variance.

1.14.3 Variances

A. The Director may upon application, issue a variance under this rule when compliance with these Rules and Regulations would cause unreasonable or undue hardship to the applicant, provided the applicant can also present substantial evidence that the issuance of a variance will, at a minimum:

1. Provide protection to human health and the environment equivalent to that which is provided by these regulations;

2. Not result in exceedances of applicable remedial objectives as described in § 1.9 of this Part beyond the control of the Performing Party;

3. Not endanger the public health and safety;

4. Not significantly interfere with the public use and enjoyment of any recreational resource;

5. Not significantly adversely impact any surface water or any groundwater, or cause contamination of any drinking water supply or tributary thereto; and

6. Not violate any provisions of any pertinent federal or state statutes, rules or regulations regarding air, land or water resources.

B. In determining whether the applicant has met these requirements, the Director may consider background conditions. Other conditions which the Director will take into consideration when evaluating a request for a variance will include, but not be limited to, groundwater classification, contaminant migration pathways, mobility and toxicity of constituents of concern, volume of contamination, institutional controls and the resulting risk to human health and the environment.

C. The Director reserves the right to limit the effective time period for a variance.

1.14.4 Department's Evidence

The Department, through its authorized agents, may present evidence to the Director relative to any application or request for an extension or variance.

1.14.5 Remonstrant

Remonstrants who have been notified, as required by this rule, may present evidence to the Director relative to any application or request for an extension or variance it submits for approval or modification.

1.14.6 Decision

The Director may grant or deny the variance after hearing provided, however, that the variance may be subject to such terms and conditions as the Director may deem necessary to protect the public health and safety, and the environment.

1.15 Penalties and Appeals

1.15.1 Penalties

Administrative penalties may be assessed for any violation of these regulations and will be calculated based on the methodology specified in the Department of Environmental Management Rules and Regulations for Assessment of Administrative Penalties, Part 130-00-1 of this Title.

1.15.2 Appeals

Any Person affected by a decision of the Director pursuant to these regulations may, in accordance with the Administrative Rules of Practice and Procedure for the Department of Environmental Management, Part 20-00-1 of this Title, file a claim for an adjudicatory hearing to review the decision. The party appealing a

Department decision bears the burden of proving that they comply with the requirements of the Rules and Regulations herein and that the denial by the Department was arbitrary and capricious or characterized by an abuse of discretion.

1.16 Analytical Methods for Reporting

A. Volatile Organic Compounds - EPA Method 8240, 8260, and 5035

B. Semi-Volatile Organic Compounds - EPA Method 8270

C. PCB/Pesticides - EPA Method 8080

D. Inorganics - Compound Specific Applicable EPA Method

Compound	**EPA Method**
Antimony	6010, 6020, 7040, 7041, 7062
Arsenic	6010, 6020, 7060, 7061, 7062, 7063
Beryllium	6010, 6020, 7090, 7091
Cadmium	6010, 6020, 7130, 7131
Chromium III	Subtract Chromium VI from Total Chromium
Chromium VI	7195, 7196, 7197, 7198, 7199
Total Chromium	6010, 6020, 7190, 7191
Copper	6010, 6020, 7210, 7211
Cyanide	9010, 9012, 9013, 9213
Lead	6010, 6020, 7420, 7421
Manganese	6010, 6020, 7460, 7461
Mercury	7470, 7471, 7472

Nickel	6010, 6020, 7520, 7521
Selenium	6010, 7740, 7741, 7742
Silver	6010, 6020, 7760, 7761
Zinc	6010, 6020, 7950, 7951

E. Synthetic Precipitation Leaching Procedure (SPLP) - EPA Method 1312

F. Toxicity Characteristic Leaching Procedure (TCLP) - EPA Method 1311

1.17 Method 2 Direct Exposure Criteria

1.17.1 Method 2 Direct Exposure Criteria

A. Ingestion

1. Residential Activity

a. Carcinogenic Substances - Residential Ingestion Algorithm for Carcinogens in Soil

$$C = \left(\frac{RISK \times AT \times CF}{CPSo \times EF} \right) x \left(\frac{BW_a \times BW_c}{BW_a \times ED_c \times IRS_c + BW_c \times ED_a \times IRS_a} \right)$$

b. Non-Carcinogenic Substances - Residential Ingestion Algorithm for Non-Carcinogens in Soil

$$C = \left(\frac{HI \times RfD_o \times CF}{EF} \right) x \left(\frac{BW_c \times AT_c}{ED_c \times IRS_c} \right)$$

c. Acute Toxicity - Acute Ingestion Algorithm for Soil

$$C = \left(\frac{TDHA \times IR_{at\text{-}w}}{IR_{at\text{-}s} \times CF_{AT}} \right)$$

1.17.2 Residential Default Input Parameters

A. Method 2 Residential Default Values

ORAL INGESTION			
TERM	**DESCRIPTION**	**UNITS**	**VALUE**
C	Concentration of Contaminant in Soil	mg/kg	Calculated
CPSo	Carcinogenic Potency Slope Factor (Oral)	$(mg/kg/d)^{-1}$	Chemical Specific
RfDo	Reference Dose (Oral)	mg/kg/d	Chemical Specific
RISK	Target Cancer Risk Level	Dimensionless	1 E-06
HI	Hazard Index	Dimensionless	1.0
BW_a	Body Weight (Adult)	kg	70
BW_c	Body Weight (Child Ages 1-6)	kg	15
AT	Averaging Time (Carcinogens)	yr	70
AT_c	Averaging Time (Child Ages 1-6)	yr	6
IRS_a	Soil Ingestion (Adult)	mg/d	100
IRS_c	Soil Ingestion (Child Ages 1-6)	mg/d	200
CF	Conversion Factor	mg-d/kg-yr	3.65 E08*
EF	Exposure Frequency	d/yr	350
ED_a	Exposure Duration (Adult)	yr	24

ED_c	Exposure Duration (Child Ages 1-6)	yr	6
ORAL ACUTE TOXICITY			
TDHA	Ten Day Health Advisory (10 kg Child)	mg/l	Chemical Specific
IR_{at-w}	Ingestion Rate of Water	l/d	1
IR_{at-s}	Ingestion Rate of Soil	g/d	1
CF_{at}	Conversion Factor (Acute Toxicity)	kg/g	1 E-03

1. Industrial/Commercial Activity

   a. Carcinogenic Substances - Industrial/Commercial Algorithm for Carcinogens in Soil

$$C = \left(\frac{RISK \; x \; AT \; x \; CF}{CPSo \; x \; EF} \right) x \left(\frac{BW_a}{ED \; x \; IRS_a} \right)$$

   b. Non-Carcinogenic Substances - Industrial/Commercial Ingestion Algorithm for Carcinogens in soil

$$C = \left(\frac{HI \; x \; RfD_o \; x \; CF}{EF} \right) x \left(\frac{BW_a \; x \; AT_a}{ED \; x \; IRS_a} \right)$$

1.17.3 Industrial/Commercial Default Input Parameters

A. Method 2 Industrial/Commercial Default Values

Industrial/Commercial Default Input Parameters			
TERM	**DESCRIPTION**	**UNITS**	**VALUE**
C	Concentration of Contaminant in Soil	mg/kg	Calculated
CPSo	Carcinogenic Potency Slope Factor (Oral)	$(mg/kg/d)^{-1}$	Chemical

Industrial/Commercial Default Input Parameters			
			Specific
RfDo	Reference Dose (Oral)	mg/kg/d	Chemical Specific
RISK	Target Cancer Risk Level	Dimensionless	1 E-06
HI	Hazard Index	Dimensionless	1
BW_a	Body Weight (Adult)	kg	70
AT	Averaging Time (Carcinogens)	yr	70
AT_a	Averaging Time, Adult (Non-carcinogens)	yr	25
IRS_a	Soil Ingestion Rate (Adult)	mg/d	50
EF	Exposure Frequency	d/yr	250
ED	Exposure Duration	yr	25
CF	Conversion Factor	mg-d/kg-yr	3.65 E08*

B. Inhalation

1. The Residential inhalation concentration shall be calculated using the following equations and the appropriate default input values:

a. Carcinogenic Substances - Inhalation Algorithm for Carcinogens in Soil

$$C = \frac{RISK \ x \ AT \ x \ 365 \ d/yr}{URF \ x \ 1000 \ \mu g/mg \ x \ EF \ x \ ED \ x \left[\frac{1}{VF} + \frac{1}{PEF} \right] x \ TA}$$

b. Non-Carcinogenic Substances - Inhalation Algorithm for Non-Carcinogens in Soil

$$C = \frac{HI \, x \, AT \, x \, 365 d/yr}{EF \, x \, ED \, x \left[\frac{1}{RfC} \, x \left(\frac{1}{VF} + \frac{1}{PEF} \right) \right] x \, TA}$$

c. Volatilization Factor - Volatilization Factor Algorithm

$$VF \, (\, m^3 / kg \,) = (\, Q/C \,) \, x \, \frac{(\, 3.14 \, x \, \alpha \, x \, T \,)^{1/2}}{(\, 2 \, x \, D_{ei} \, x \, P_a \, x \, K_{as} \,)} \, x \, 10^{-4} \, m^2 / cm^2$$

$$Where : \quad \alpha = \frac{D_{ei} \, x \, P_a}{P_a + (\, \rho_s \,) (\, 1 - P_a \,) / K_{as}}$$

1.17.4 Residential Default Input Parameters

INHALATION			
TERM	**DESCRIPTION**	**UNITS**	**VALUE**
C	Concentration of Contaminant in Soil	mg/kg	Calculated
RISK	Target Cancer Risk Level (Carcinogens)	Dimensionless	10^{-6}
HI	Hazard Index (Noncarcinogens)	Dimensionless	1
AT	Averaging Time (Carcinogens)	years	70
AT	Averaging Time (Noncarcinogens)	years	30
URF	Inhalation Unit Risk Factor (Carcinogens)	$(\mu g/m^3)^{-1}$	Chemical Specific
RfC	Inhalation Reference Concentration	mg/m^3	Chemical

	(Noncarcinogens)		Specific
EF	Exposure Frequency	days/year	350
ED	Exposure Duration	years	30
VF	Soil-To-Air Volatilization Factor	m^3/kg	Chemical Specific
PEF	Particulate Emission Factor	m^3/kg	4.51×10^9
TA	Time Adjustment Factor	Dimensionless	1

1.17.5 Default Input Parameters

A. Volatilization Factor

Volatilization Factor			
TERM	**DESCRIPTION**	**UNITS**	**VALUE**
VF	Soil-To-Air Volatilization Factor	m^3/kg	Calculated
(Q/C)	Inverse Of The Mean Concentration At The Center Of A 0.5 Acre Square Source	g/m^2-s per kg/m^3	101.8
T	Exposure Interval	seconds	7.9×10^8
D_{ei}	Effective Diffusivity	cm^2/s	$D_i(P_a^{3.33}/P_t^2)$
P_a	Air-Filled Soil Porosity	Dimensionless	P_t-Θβ
P_t	Total Soil Porosity	Dimensionless	$1-(\beta/\rho_s)$
Θ	Soil Moisture Content	cm^3-water/g-soil	0.1 (10%)

β	Soil Bulk Density	g/cm^3	1.5
ρ_s	True Soil Density Or Particle Density	g/cm^3	2.65
K_{as}	Soil-Air Partition Coefficient	$g\text{-}soil/cm^3\text{-}air$	$(H/K_d) \times 41$
D_i	Diffusivity In Air	cm^2/s	Chemical Specific
H	Henry's Law Constant	$atm\text{-}m^3/mol$	Chemical Specific
K_d	Soil-Water Partition Coefficient	cm^3/g	$K_{oc} \times OC$
K_{oc}	Organic Carbon Partition Coefficient	cm^3/g	Chemical Specific
OC	Organic Carbon Content Of Soil	fraction	0.02 (2%)

1. Soil Saturation Limit (Csat) - Soil Saturation Limit Algorithm for Unsaturated Soils (Csat)

$$C_{sat} = (K_d \, x \, S \, x \, n_m) + (S \, x \, \Theta_m)$$

1.17.6 Soil Saturation (C_{sat}) Default Input Parameters

A. Soil Saturation (C_{sat}) Default Input Parameters

TERM	DESCRIPTION	UNITS	VALUE
C_{sat}	Soil Saturation Concentration	mg/kg	Calculated
K_d	Soil-Water Partition Coefficient	L/kg	Chemical Specific/ or K_{oc} * OC
K_{oc}	Organic Carbon Partition Coefficient	L/kg	Chemical

			Specific
OC	Organic Carbon Content Of Surface Soil	%	2
S	Solubility	mg/L-water	Chemical Specific
n_m	Soil Moisture Content	Weight Fraction	0.1
Θ_m	Soil Moisture Content	L-water/ kg-soil	0.1

B. § 1.17 of this Part was also utilized for the development of Method 1 Direct Exposure Criteria.

1.18 Method 2 Leachability Criteria

Method 2 Leachability Criteria for Organic Hazardous Substances: The Method 1 Leachability Criteria were derived utilizing the SESOIL and AT123D models (available from General Science Services Corporation) to simulate the transport of organic Hazardous Substances and estimate levels of soil contamination which are protective of the appropriate groundwater objectives. The following tables provide the inputs to the models which were used to estimate the Method 1 Leachability Criteria for organic substances.

1.18.1 SESOIL Climate Input Parameters General

Station Name - Providence WSO AP (Green State Airport)		
TERM	**UNITS**	**VALUE**
Latitude	Degrees	41.733
Longitude	Degrees	71.433
Number of Years of Climate Data	Years	1

Number of Years of Simulation	Years	5

1.18.2 SESOIL Climate Input Parameters by Month

A. Initial evapotranspiration set to zero; SESOIL approximates evapotranspiration using the water budget method (mass balance).

TERM	UNITS	OCT	NOV	DEC	JAN	FEB	MAR
Air Temperature	°C	12.330	6.720	0.280	-1.560	-1.110	2.720
Cloud Cover Fraction	fraction	0.500	0.600	0.600	0.600	0.600	0.600
Relative Humidity	fraction	0.750	0.700	0.750	0.700	0.700	0.700
Short Wave Albedo	-	0.180	0.190	0.270	0.290	0.330	0.290
Evapotranspiration*	cm/day	0.000	0.000	0.000	0.000	0.000	0.000
Rainfall Depth (Precipitation)	cm	9.010	10.980	11.170	10.170	9.500	10.670
Mean Storm Duration	days	0.560	0.530	0.560	0.560	0.600	0.570
Number of Storms per Month	-	4.390	5.720	6.000	5.660	5.260	5.890
Length of Rainy Season Within Month	days	30.400	30.400	30.400	30.400	30.400	30.400
SESOIL CLIMATE INPUT PARAMETERS BY MONTH (CONTINUED)							
TERM	**UNITS**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**
Air Temperature	°C	8.170	13.28	18.44	21.61	20.94	17.33

TERM	UNITS	OCT	NOV	DEC	JAN	FEB	MAR
			0	0	0	0	0
Cloud Cover Fraction	fraction	0.600	0.600	0.600	0.500	0.500	0.500
Relative Humidity	fraction	0.700	0.700	0.750	0.800	0.800	0.800
Short Wave Albedo	-	0.190	0.180	0.180	0.180	0.180	0.180
Evapotranspiration*	cm/day	0.000	0.000	0.000	0.000	0.000	0.000
Rainfall Depth (Precipitation)	cm	10.590	9.060	7.370	7.490	9.900	8.620
Mean Storm Duration	days	0.540	0.470	0.370	0.310	0.390	0.420
Number of Storms per Month	-	5.600	5.830	5.190	4.750	5.220	4.500
Length of Rainy Season Within Month	days	30.400	30.400	30.400	30.400	30.400	30.400

1.18.3 Sesoil Soil Input Parameters

TERM	UNITS	VALUE
Soil Name	-	-
Soil Bulk Density	g/cm^3	1.50
Intrinsic Permeability	cm^2	1.50E-07
Soil Disconnetedness Index	-	7.50

Effective Porosity	-	0.300
Organic Carbon Content (Subsurface Soil)	%	0.100
Cation Exchange Coefficient (Capacity)	milli eq. 100g dry soil	0.000
Freundlich Equation Exponent	-	1.00

1.18.4 SESOIL Application Input Parameters

A. LC* = the back-calculated leachability criterion. This value can be converted to a mass concentration by the following:

(ug/cm^2)(1/Soil Bulk Density)(1/Layer Thickness)(mg/1000ug)(1000g/kg) = Leachability Criterion (mg/kg)

TERM	**UNITS**	**VALUE**
Number of Years	years	1
Number of Soil Layers	layers	3
Application Area of Compartment	cm^2	0.10E+07
Latitude of the Site (Application Area)	Degrees	41.733002
Loading Type - (1) Spill - Instantaneous or (0) Steady Application - Continuous	-	0
Loading Unit - (1) Mass per Unit Area or (0) Concentration	-	0
Initial Chemical Concentration Given (1) or Not Given (0)	-	0

TERM	UNITS	VALUE		
Layer Number	-	1	2	3
Depths (Layer Thickness)	cm	0.10E+03	0.10E+03	0.10E+03
Number of Sublayers/Layer	-	1	1	1
Ph of Each Layer	-	default	default	default
Intrinsic Permeability of Each Layer	cm^2	1.5E-7	1.5E-7	1.5E-7
Liquid Biodegradation (KDEL Ratios)	-	-	1.00	1.00
Solid Biodegradation (KDES Ratios)	-	-	1.00	1.00
Organic Carbon (OC) Content Ratios for Lower Layers	-	-	1.00	1.00
Cation Exchange Coefficient (CEC) Ratios for Lower Layers	-	-	1.00	1.00
Freundich (FRN) Ratio	-	-	1.00	1.00
Adsorption (ADS) Ratio	-	-	1.00	1.00
Pollutant Load Entering Each Layer	$\mu g/cm^2$	0.00	LC*	0.00
Initial Pollutant Concentration for Any Sublayer	µg/g (ppm)	-	-	-
Mass Transformed	$\mu g/cm^2$	0.00	0.00	0.00
Sink	$\mu g/cm^2$	0.00	0.00	0.00
Ligand Input Mass	$\mu g/cm^2$	0.00	0.00	0.00

TERM	UNITS	VALUE		
Volatilization Index	-	0.20	0.20	0.20
Surface Runoff Participation Index	-	0.00	-	-
Ratio Pollutant Concentration in Rain to Pollutant Maximum Solubility in Water	-	0.00	-	-
Modified Summers Model Used (1) or Not (0) for Groundwater Concentration	-	0		

1.18.5 SESOIL Chemical Specific Input Parameters for all Chemicals

TERM	UNITS	VALUE
Base Hydrolysis Constant	l/mol-day	0.00
Acid Hydrolysis Constant	l/mol-day	0/00
Biodegradation Rate in Moisture	1/day	0.00
Biodegradation Rate on Soil	1/day	0.00
Ligand-Pollutant Stability Constant	-	0.00
No. Moles Ligand/Mole Pollutant	-	0.00
Ligand Molecular Weight	g/mole	0.00

1.18.6 AT123D Input Parameters

TERM	UNITS	VALUE
No. of Points in X-Direction	-	1

TERM	UNITS	VALUE
No. of Points in Y-Direction	-	1
No. of Points in Z-Direction	-	1
No. of Roots: No. of Series Terms	-	400
No. of Beginning Time Step	-	13
No. of Ending Time Step	-	61 *
No. of Time Intervals for Printed Out Solution	-	1
Instantaneous Source Control = 0 for Instant Source	-	1
Source Condition Control = 0 for Steady Source	-	60
Intermittent Output Control = 0 No Such Output	-	1
Case Control = 1 Thermal, = 2 for Chemical, = 3 RAD	-	2
Aquifer Depth, = 0.0 for Infinite Deep	m	0
Aquifer Width, = 0.0 for Infinite Wide	m	0
Begin Point of X-Source Location	m	-5
End Point of X-Source Location	m	5
Begin Point of Y-Source Location	m	-5
End Point of Y-Source Location	m	5
Begin Point of Z-Source Location	m	0
End Point of Z-Source Location	m	0

TERM	UNITS	VALUE
Hydraulic Conductivity	m/hr	0.53
Hydraulic Gradient	-	0.005
Longitudinal Dispersivity	m	20
Lateral Dispersivity	m	2
Vertical Dispersivity	m	2
X Dimension	m	15
Y Dimension	m	0
Z Dimension	m	0
61 * = The SESOIL program only allows a maximum time interval run of 19 months. Sixty-one months (5 years of simulation) was the total time interval used to determine the maximum groundwater impact.		

1.18.7 Method 2 Leachability Criteria for Inorganic Hazardous Substances

A. Site-Specific Dilution Factor Algorithm

$$DF = 1 + (Kid/IL)(1 - F_{adj})$$

SITE-SPECIFIC DILUTION FACTOR			
TERM	**DESCRIPTION**	**UNITS**	**VALUE**
DF	Site-specific dilution factor		Calculated
K	Hydraulic conductivity of the unconsolidated aquifer underlying the Release area	ft/yr	15000
I	Horizontal hydraulic gradient	ft/ft	0.005

SITE-SPECIFIC DILUTION FACTOR			
D	Distance	ft	15
I	Infiltration rate	ft/yr	2.0
L	Length of the Release area parallel to the direction of groundwater flow	ft	50
F_{adj}	Background concentration for groundwater divided by the appropriate groundwater objective for the Hazardous Substance, or, where the background concentration for groundwater cannot be quantified, 1/2 the minimum detection limit for the Hazardous Substance divided by the appropriate groundwater objective for the Hazardous Substance.		Chemical - Specific

1.19 Method 2 GB Groundwater Objectives

A. Method 2 GB Groundwater Objective Algorithm and Input Parameters

1. GB Groundwater Objective Algorithm

$$C_w = \frac{(C_a)(T)(WS)}{(VP)(MW)(16.04)}$$

TERM	DESCRIPTION	UNITS	VALUE
C_w	Water Concentration	mg/L	Calculated
C_a	Air Concentration	mg/L	Chemical Specific PEL*
T	Temperature of groundwater	°K	293
WS	Solubility	mg/L-water	Chemical Specific

VP	Vapor Pressure	mm Hg	Chemical Specific
MW	Molecular Weight	g/mole	Chemical Specific

B. Permissible Exposure Limit (PEL)

1. The time-weighted average concentration in air that shall not be exceeded during any 8-hour shift of a 40-hour work week.

C. The PELs were developed by the Occupational Safety and Health Administration (OSHA) to protect workers from "a wide variety of health effects that could cause material impairment of health or functional capacity. This includes protection against catastrophic effects such as cancer, cardiovascular, liver, and kidney damage; lung diseases, as well as more subtle effects resulting in central nervous system damage, narcosis, respiratory effects, and sensory irritation".

D. The Upper Concentration Limits for GB areas were calculated using the above algorithm and an air concentration Ca set equal to 10% of the Lower Explosive Limit (10% LEL) which is defined as ten percent (10%) of the concentration of a compound in air below which a flame will not propagate if the mixture is ignited.

1.20 Site Investigation Report (SIR) Checklist

A. The following information shall be completed and submitted with the SIR

1. Contact Name
2. Contact Address
3. Contact Telephone
4. Site Name
5. Site Address

B. Office Use Only

1. Site Investigation Report (SIR) Site
2. Project Code

3. SIR Submittal Date

4. Checklist Submittal Date

C. Directions: The box to the left of each item listed below is for the administrative review of the SIR submission and is for RIDEM Use Only. Under each item listed below, cross-reference the specific sections and pages in the SIR that provide detailed information that addresses each stated requirement. Failure to include cross-references shall delay review and approval. If an item is not applicable, simply state that it is not applicable and provide an explanation in the SIR.

1. § 1.8.3(A)(1) of this Part - List specific objectives of the SIR related to characterization of the Release, impacts of the Release and remedy.

2. § 1.8.3(A)(2) of this Part - Include information reported in the Notification of Release. A copy of the Release notification form should be included in the SIR. Include information relating to short-term response, if applicable.

3. § 1.8.3(A)(3) of this Part - Include documentation of any past incidents or Releases.

4. § 1.8.3(A)(4) of this Part - Include list of prior property Owners and Operators, as well as sequencing of property transfers and time periods of occupancy.

5. § 1.8.3(A)(5) of this Part - Include previously existing environmental information which characterizes the Contaminated-Site and all information that led to the discovery of the Contaminated-Site.

6. § 1.8.3(A)(6) of this Part - Include current uses and zoning of the Contaminated-Site, including brief statements of operations, processes employed, waste generated, Hazardous Materials handled, and any residential activities on the site, if applicable. (This section should be linked to the specific objectives section demonstrating how the compounds of concern in the investigation are those that are used or may have been used on the site or are those that may have impacted the site from an off-site source.)

7. § 1.8.3(A)(7) of this Part - Include a locus map showing the location of the site using US Geological Survey 7.5-min quadrangle map or a copy of a section of that USGS map.

8. § 1.8.3(A)(8) of this Part - Include a site plan, to scale, showing:

    a. Buildings

b. Activities

c. Structures

d. North Arrow

e. Wells

f. UIC Systems, septic tanks, UST, piping and other underground structures

g. Outdoor Hazardous Materials storage and handling areas

h. Extent of paved areas

i. Location of environmental samples previously taken with analytical results

j. Waste management and disposal areas

k. Property Lines

9. § 1.8.3(A)(9) of this Part - Include a general characterization of the property surrounding the area including, but not limited to:

a. Location and distance to any surface water bodies within 500 ft of the site.

b. Location and distance to any Environmentally Sensitive Areas within 500 ft. of the site.

c. Actual sources of potable water for all properties immediately abutting the site.

d. Location and distance to all public water supplies, which have been active within the previous 2 years and within one mile of the site.

e. Determination as to whether the Release impacts any off-site area utilized for residential or industrial/commercial property or both.

f. Determination of the underlying groundwater classification and if the classification is GB, the distance to the nearest GA area.

10. § 1.8.3(A)(10) of this Part - Include classifications of surface and ground water at and surrounding the site that could be impacted by a Release.

11. § 1.8.3(A)(11) of this Part - Include a description of the contamination from the Release, including:

    a. Free liquids on the surface

    b. LNAPL and DNAPL

    c. Concentrations of Hazardous Substances which can be shown to present an actual or potential threat to human health and any concentrations in excess of any of the remedial objectives; (reference § 1.13 of this Part).

    d. Impact to Environmentally Sensitive Areas

    e. Contamination of man-made structures

    f. Odors or stained soil

    g. Stressed vegetation

    h. Presence of excavated or stockpiled material and an estimate of its total volume

    i. Environmental sampling locations, procedures and copies of the results of any analytical testing at the site

    j. List of Hazardous Substances at the site

    k. Discuss if the contamination falls outside of the jurisdiction of the Remediation Regulations, including but not limited to USTs, UICs, and wetlands.

12. § 1.8.3(A)(12) of this Part - Include the concentration gradients of Hazardous Substances throughout the site for each media impacted by the Release.

13. § 1.8.3(A)(13) of this Part - Include the methodology and results of any investigation conducted to determine background concentrations of Hazardous Substances identified at the Contaminated-Site (see § 1.13 of this Part).

14. § 1.8.3(A)(14) of this Part. Include a listing and evaluation of the site specific hydrogeological properties which could influence the migration of Hazardous Substances throughout and away from the site, including but not limited to, where appropriate:

a. Depth to GW

b. Presence and effects of both the natural and man-made barriers to and conduits for contaminant migration.

c. Characterization of bedrock

d. Groundwater contours, flow rates and gradients throughout the site.

15. § 1.8.3(A)(15) of this Part - Include a characterization of the topography, surface water and run-off flow patterns, including the flooding potential, of the site.

16. § 1.8.3(A)(16) of this Part - Include the potential for Hazardous Substances from the site to volatilize and any and all potential impacts of the volatilization to structures within the site.

17. § 1.8.3(A)(17) of this Part - Include the potential for entrainment of Hazardous Substances from the site by wind or erosion actions.

18. § 1.8.3(A)(18) of this Part - Include detailed protocols for all fate and transport models used in the Site Investigation.

19. § 1.8.3(A)(19) of this Part - Include a complete list of all samples taken, the location of all samples, parameters tested for and analytical methods used during the Site Investigation. (Be sure to include the samples locations and analytical results on a site figure).

20. § 1.8.3(A)(20) of this Part - Include construction plans and development procedures for all monitoring wells. Well construction shall be consistent with the requirements of the Groundwater Quality Rules.

21. § 1.8.3(A)(21) of this Part - Include procedures for the handling, storage and disposal of wastes derived from and during the investigation.

22. § 1.8.3(A)(22) of this Part - Include a quality assurance and quality control evaluation summary report for sample handling and analytical procedures, including, but not limited to, chain-of-custody procedures and sample preservation techniques.

23. § 1.8.3(A)(23) of this Part - Include any other site-specific factor, that the Director believes, is necessary to make an accurate decision as to the appropriate Remedial Action to be taken at the site.

24. § 1.8.4 of this Part - Include Remedial Alternatives. The Site Investigation Report shall contain a minimum of 2 remedial alternatives other than no

action/natural attenuation alternative, unless this requirement is waived by the Department. It should be clear which of these alternatives is most preferable. All alternatives shall be supported by relevant data contained in the Site Investigation Report and consistent with the current and reasonably foreseeable land usage, and documentation of the following:

a. Compliance with § 1.9 of this Part;

b. Technical feasibility of the preferred remedial alternative;

c. Compliance with federal, state and local laws or other public concerns; and

d. The ability of the Performing Party to perform the preferred remedial alternative.

25. § 1.8.5 of this Part - The Site Investigation Report and all associated progress reports shall include the following statements signed by an authorized representative of the party specified:

a. A statement signed by an authorized representative of the Person who prepared the Site Investigation Report certifying the completeness and accuracy of the information contained in that report to the best of their knowledge; and

b. A statement signed by the Performing Party responsible for the submittal of the Site Investigation Report certifying that the report is a complete and accurate representation of the site and the Release and contains all known facts surrounding the Release to the best of their knowledge.

26. § 1.8.6 of this Part - If the Site Investigation is not complete, include a schedule for the submission of periodic progress reports on the status of the investigation and interim reports on any milestones achieved in the project.

27. § 1.8.7 of this Part - Be prepared to implement public notice requirements per §§ 1.8.7 and 1.8.9 of this Part when the Department deems the Site Investigation Report to be complete.

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TITLE 250 - DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

CHAPTER 140 - WASTE AND MATERIALS MANAGEMENT

SUBCHAPTER 30 - SITE REMEDIATION

PART 1 - RULES AND REGULATIONS FOR THE INVESTIGATION AND REMEDIATION OF HAZARDOUS MATERIAL RELEASES

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