PROPOSED AMENDMENTS TO THE RULES OF THE DEPARTMENT OF NATURAL RESOURCES ENVIRONMENTAL PROTECTION DIVISION RELATING TO HAZARDOUS SITE RESPONSE, CHAPTER 391-3-19

The Rules of the Department of Natural Resources, Chapter 391-3-19, Hazardous Site Response, are hereby amended and revised, as hereinafter explicitly set forth in the attached amendments and revisions for specific rules, or such subdivisions thereof as may be indicated. These Rules are issued under the authority of the Georgia Hazardous Site Response Act (HSRA), O.C.G.A Section 12-8-90 *et seq.*

391-3-19-.02 Conventions.

(1) **Abbreviations.**

CERCLA – Federal Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended

CFR – Code of Federal Regulations

HSRA – Georgia Hazardous Site Response Act, O.C.G.A. §12-8-90 et seq.

IEUBK – USEPA's Integrated Exposure Uptake Biokinetic Model for Lead in Children

IRIS – USEPA's Integrated Risk Information System

MCL – Maximum Contaminant Levels - Drinking water standards established pursuant to the Safe Drinking Water Act, promulgated at 40 CFR Part 141, Subpart G, including the treatment technique action level concentrations found in 40 CFR 141.80(c).

NCP – The National Oil and Hazardous Substances Pollution Contingency Plan, 40 CFR Part 300
O.C.G.A. – Official Code of Georgia, Annotated

PPRTV – USEPA's Provisional Peer Reviewed Toxicity Values

RAGS, Part A – "Risk Assessment Guidance for Superfund: Volume 1 - Human Health Evaluation Manual (Part A)," USEPA document EPA/540/1-89/002, ~~December 1989~~as amended.

RAGS, Part B – "Risk Assessment Guidance for Superfund: Volume 1 - Human Health Evaluation Manual (Part B, Development of Risk-based Preliminary Remediation Goals)," USEPA document EPA/540/R-92/003, ~~December 1991~~as amended.

RAGS, Part E – "Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment)," USEPA document EPA/540/R-99/005, as amended.

RAGS, Part F – "Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment)," USEPA document EPA/540/R-070/002, as amended.

SARA – Federal Superfund Amendments and Reauthorization Act of 1986, as amended

SW-846 – "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,"

USEPA Publication SW-846

USEPA – United States Environmental Protection Agency

(2) **Definitions.** Unless otherwise defined in this chapter, the definition of all terms included in the HSRA, O.C.G.A. 12-8-90 et seq., as amended, the Georgia Hazardous Waste Management Act (HWMA) O.C.G.A. § 12-8-60 et seq., as amended, and in the Rules for Hazardous Waste Management, Section 391-3-11-.02, shall have the same meaning in this chapter. When used in this chapter, the following terms shall have the meaning given below:

(a) *Approved analytical test method* means SW-846 test methods that have been promulgated, recommended, or otherwise approved by USEPA, or methods approved for use by the Division;

(b) *Conditionally exempt small quantity generator* means a hazardous waste generator who generates 220 pounds or less of hazardous waste in one month;

(c) *Defined release* means any release which is an event which has a known duration of less than 30 consecutive days, which has a known source, and which involves quantities that are known or can be estimated;

(d) *Detection limit* means the practical quantitation limit (PQL), defined as the lowest concentration, for an approved analytical test method and for a given sample matrix, at which the quantity of a regulated substance can be measured with a stated degree of confidence under routine laboratory operating conditions;

(e) *Final receiving facility* means a receiving facility that receives a hazardous waste and from which that hazardous waste will not be reshipped for further off-site management;

(f) *Free product* means any non-aqueous phase liquid that contains a regulated substance and that has accumulated at a groundwater surface, has pooled above a low permeability boundary in an aquifer, or can move freely in the aquifer;

(g) *Ground water* means any subsurface water that is in a zone of saturation;

(h) *Large quantity generator* means a hazardous waste generator who generates 2.2 pounds or more of acute hazardous waste or 2200 pounds or more of hazardous waste in one month;

(i) *Non-residential property* means any real property or portion of a property not currently being used for human habitation or for other purposes with a similar potential for human exposure, at which activities have been or are being conducted that can be categorized in one of the 1987 Standard

Industrial Classification (SIC) major groups 01- 97 inclusive (except the four-digit codes 4941, 8051, 8059, 8062-3, 8069, 8211, 8221-2, 8351, 8661, and 9223). Non-residential property includes all of the contiguous block(s) and lot(s) controlled by the same owner or operator that are vacant land, or that are used in conjunction with such business. For leased properties, non-residential property includes the leasehold and any external tank, surface impoundment, septic system, or any other structure, vessel, contrivance, or unit that provides, or is utilized for the management of regulated substances to or from the leasehold;

(j) *Off-site management* means the movement of hazardous waste beyond the property boundary of the facility where it was generated for disposal, incineration, treatment, storage, burning for energy recovery, recycling and/or reuse at a receiving facility;

(k) *On-site management* means the disposal, incineration, treatment, storage, burning for energy recovery, recycling and/or reuse of self-generated hazardous waste by any large quantity generator before it is shipped for off-site management or discharged from an outfall regulated under the Georgia Water Quality Control Act;

(l) *Out-of-state generator* means any generator outside the State of Georgia that ships hazardous waste to a receiving facility located within the State of Georgia;

(m) *Receiving facility* means a facility that receives hazardous waste for disposal, incineration, treatment, storage, burning for energy recovery, recycling and/or reuse;

(n) *Regulated substance* means any substance defined in the Hazardous Waste Management Act, O.C.G.A. §12-8-62, by the terms "hazardous waste" or "hazardous constituent," or any substance defined in the Hazardous Site Response Act, O.C.G.A. §12-8-92, as "hazardous substance" (all such regulated substances are listed in Appendix I of this Chapter);

(o) *Release* means any intentional or unintentional act or omission resulting in the spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment, including without limitation the abandonment or discarding of barrels, containers, and other closed receptacles, of any hazardous waste, hazardous constituent, or hazardous substance; provided however, that such term shall not include any release which results in exposure to persons solely within a workplace, with respect to a claim which such persons may assert against the employer of such persons; emissions from the engine exhaust of any motor vehicle, rolling stock, aircraft, vessel, or pipeline pumping station; or the normal application of fertilizer;

(p) *Reportable quantity* means the amount of any released regulated substance which causes a site to meet the criteria for listing on the Hazardous Site Inventory pursuant to the screening method provided in Appendix II of this Chapter;

(q) *Reshipped for further off-site management* means when a receiving facility has received hazardous waste and where such hazardous waste has undergone disposal, incineration, treatment, storage, recycling and/or reuse at that receiving facility and the receiving facility subsequently signs the manifest accompanying such hazardous waste to send it to another receiving facility where it will undergo further disposal, incineration, treatment, storage, burning for energy recovery, recycling and/or reuse;

(r) *Residential property* means any property that does not exclusively meet the definition of non-residential property. In addition to recognized residential use, it also includes property used for establishments classified by those SIC codes that are excepted from the definition herein of "non-residential". Also, a portion of non-residential property that is used in part for residential activities, such as a day care center, is defined as residential;

(s) *Responsible party* means any person who has contributed or who is contributing to a release, as defined at O.C.G.A. 12-8-92(9);

(t) *Self-generated hazardous waste* means hazardous waste generated by a large quantity generator or a small quantity generator;

(u) *Shipped for off-site management* means when a generator signs the manifest accompanying a hazardous waste shipment bound for a receiving facility where it will undergo disposal, incineration, treatment, storage, burning for energy recovery, recycling and/or reuse at that facility;

(v) *Site* means that portion of the owner's contiguous property and any other owner's property affected by a release exceeding a reportable quantity;

(w) *Small quantity generator* means a hazardous waste generator who generates greater than 220 pounds but less than 2200 pounds of hazardous waste in one month;

(x) *Soil* means any unconsolidated earth material, together with any unconsolidated plant or animal matter or foreign material that has become incorporated into it, that either consists of, remains within, or comes to be deposited on, native soil or regolith;

(y) *Source material* means any material that includes or contains regulated substances that act or may likely act as a reservoir for migration of regulated substances to groundwater, soil, surface water, or air, or acts as a source for direct exposure;

(z) *Ton of hazardous waste* means a standard short ton (2000 pounds) including any fraction thereof;

(aa) *Wastewate*r means any self-generated hazardous waste that undergoes on-site management in a wastewater treatment facility prior to its discharge from an outfall that is regulated under the Georgia Water Quality Control Act.

(3) **Number and gender.** As used in this chapter, words in the singular also include the plural and words in the masculine gender also include the feminine and vice versa, as the case may require.

(4) **Submittal of documents.** All information required to be submitted to the Director pursuant to this Chapter shall be submitted in such form as may be prescribed by the Director including the submittal of information in electronic format.

391-3-19-.04 Release Notification.

(1) **No duty to sample prior to notification**. Rule 391-3-19-.04(4) requires an owner of real property to notify the Director when a release described in Rule 391-3-19-.04(3) is discovered. An owner of real property is not required to sample prior to such notification. However, any owner of real property where a release has occurred shall furnish to the Director any information which that person may have or reasonably obtain which is relevant to the release when requested by the Director.

(2) **Exclusions.** The following are excluded from the notification requirements of this section:

(a) Any release that, within 30 days of the owner's discovery or of the effective date of these rules, whichever is later, no longer meets any criterion for notification under Rule 391-3-19-.04(3);

(b) Any defined release which is being cleaned-up under emergency response authorities other than the Hazardous Site Response Act where the person responsible for the cleanup remains in compliance with instructions given by the Division or by an on-scene coordinator under the NCP, such exclusion to expire 180 days after the date upon which the release began if at or after that time any of the criteria of Rule 391-3-19-.04(3) are met;

(c) Emissions regulated under the Georgia Air Quality Control Act, O.C.G.A §12-9-1 et seq.;

(d) Releases of substances regulated under the Georgia Asbestos Safety Act, O.C.G.A. §12-2-1 et seq., except for releases at inactive disposal sites that are not in compliance with the performance standards in 40 CFR 61.153;

(e) Point source discharges that are regulated under the Georgia Water Quality Control, O.C.G.A. §12-5-20 et seq.;

(f) Releases of a pesticide which has been registered under the Georgia Pesticide Control Act, O.C.G.A §2-7-50 et seq., when the release consists solely of the use of said pesticide in a manner consistent with its label or labeling;

(g) Releases regulated solely under the Georgia Underground Storage Tank Act, O.C.G.A. §12-13-1 et seq.;

(h) Releases of any petroleum-based fuel, lubricant, or hydraulic fluid;

(i) Releases consisting of treatment or disposal in a unit that is regulated, a permit issued, or rules promulgated, pursuant to the Georgia Hazardous Waste Management Act, O.C.G.A. §12-8-60 et seq., the Georgia Solid Waste Management Act, O.C.G.A. §12-8- 20 et seq., or the Georgia Water Quality Control Act, O.C.G.A. §12-5-20 et seq., provided the Director has been informed, in accordance with requirements in such permit or rules, of any discovery that such releases exceed standards permitted by these statutes and the rule promulgated pursuant to these statutes;

(j) Releases arising from the use of a commercial product that has been manufactured and sold for household use which is used by a private individual in a manner consistent with and incidental to the manufacturer's recommended use of the product;

(k) Releases arising from the application to soil of fertilizers, liming materials, or soil amendments (unless any are used in a manner constituting disposal as defined and regulated in the Rules for Hazardous Waste Management, Chapter 391-3-11);

(l) Release of naturally-occurring radionuclides described in 40 CFR 302.6(c);

(m) Direct radiation and/or releases of radionuclides regulated by the Division under the Georgia Radiation Control Act, O.C.G.A. §31-13 et seq., or by the U.S. Nuclear Regulatory Commission, or any successor agency, under the Atomic Energy Act of 1954, as amended;

(n) Any release to ground water that is discovered solely as a result of detection within a public drinking water system being monitored in accordance with the Rules for Safe Drinking Water, Chapter 391-3-5, provided that the Director is informed of such detection in accordance with the aforementioned Rules; and

(o) Releases that arise from land-disturbing activities involving the extraction and stockpiling of ores and mineral, or involving the removal, stockpiling, and replacement of overburden materials, at any mine permitted under the Georgia Surface Mining Act, O.C.G.A., §12-4-70 et seq.

(p) Any release to soil reported to the Division ~~EPD during development or implementation of an approved~~ by a prospective purchaser ~~corrective action plan submitted~~ pursuant to the Georgia Brownfield Act, O.C.G.A 12-8-200 et seq., unless the Director's approval of the corrective action plan or concurrence with the certification of compliance has been suspended or revoked.

(3) **Release requiring notification.** Any of the following releases, when discovered, are releases that require notification under Rule 391-3-19-.04(4), unless excluded under Rule 391-3-19-.04(2):

(a) Releases to ground water. A release of a regulated substance which causes the concentration in ground water to exceed concentrations given in Table 1 of Appendix III, or for those substances not listed, the highest concentration of any of the following: the detection limit, Secondary Maximum Contaminant levels for Drinking Water listed in Rule 391-3-5, or background;

(b) Releases to soil. A release of a regulated substance which causes the concentration in soil to exceed a concentration in Appendix I; or

(c) Other releases. The discarding or abandonment of a regulated substance in barrels, drums, other containers, tanks, or other storage or transportation vessels, in process units, or in waste management units which have neither a permit nor interim status under the Georgia Hazardous Waste Management Act, O.C.G.A. §12-8-60 et seq., the Georgia Solid Water Management Act, O.C.G.A. §12-8-20 et seq., or the Georgia Water Quality Control Act, O.C.G.A. §12-5-20 et seq.

(4) **Notification requirements.** Within 30 days of discovery by the property owner of a release which requires notification under Rule 391-3-19-.04(3), the property owner shall notify the Director of the release on such forms as specified by the Director. Upon the request of the Director, the property owner shall provide other such information as may be needed to ensure that the criteria of Rule 391-3-19-.05(1) may be accurately evaluated. At the owner's option, the owner may complete the worksheets found in Appendix II of this Chapter to make a preliminary determination that a release may exceed a reportable quantity. If said worksheets indicate that a release exceeding a reportable quantity may have

occurred, the owner may submit the information required under Rule 391-3-19- 05(2) along with the worksheets in lieu of the above notification. In addition, the owner may petition the Director at the time of notification requesting a 90 day deferment of the Director's listing determination pursuant to Rule 391-3-19-.05(1) in order to obtain additional samples, perform a removal, or take other remedial actions, to be followed by submittal of an amended notification. The deferment petition must specify interim measure for any suspected immediate health threat

391-3-19-.06 Corrective Action.

(1) **Applicability.** The requirements of Rule 391-3-19-.06 apply to any person who is a responsible party at a site listed on the Hazardous Site Inventory except as otherwise provided for in Rule 391-3-19-.06(7).

(2) **Classification of sites on the Hazardous Site Inventory.** Upon listing a site on the Hazardous Site Inventory, the Director shall designate the site or any individual property at the site as Class II unless or until he determines that it should be designated as Class I, Class III, Class IV, or Class V pursuant to Rule 391-3-19-.06(2)(a) through (d):

(a) Class I applies to any site or any individual property at a site which:

1. Includes the source of a release to a groundwater drinking water supply that has caused, or is likely to cause, human exposure through drinking water to concentrations of a regulated substance that exceed any of the Type 1 groundwater criteria described in Rule 391-3-19-.07(6)(b);

2. Has had a release which continues to add contaminants to soil, water, or air, or that continues to expand in area or volume;

3. Has had a release of a regulated substance that results in or is likely to result in any of the following:

(i) Bioaccumulation of a regulated substance in flora or fauna that causes adverse toxicological effects or that results in the need to recommend that human consumption be limited;

(ii) Adverse acute or chronic effects to domestic animals, fish, shellfish, or wildlife;

4. Includes an abandoned facility where the potential for exposure to a regulated substance is not controlled through on-site management;

5. Has been classified as Class I pursuant to Rule 391-3-19-.06(6)(b)(4) or (c); or

6. Does not meet any other criteria of Rule 391-3-19-.06(2)(a)but the Director has determined that it nevertheless poses a danger to human health or the environment.

(b) Class III applies to any site or individual property at a site which has been listed on the Hazardous Site Inventory (but not classified as Class IV pursuant to Rule 391-3-19- .06(2)(c)) and which and has been determined by the Director to be in compliance with the Type 3, Type 4 or Type 5 risk reduction standards of Rule 391-3-19-.07.

(c) Class IV applies to any site or individual property at a site which has been listed on the Hazardous Site Inventory and at which corrective action as described in Rule 391-3- 19-.06(7)(a) is being conducted or has been completed.

(d) Class V applies to any site or individual property at a site which has been listed on the Hazardous Site Inventory for which the Director has made a determination pursuant to Rule 391-3-19-.06(6)(b)5 that the site has had a known release needing corrective action and at which corrective action is being performed in compliance with a corrective action plan approved by the Director which will bring the site into compliance with the risk reduction standards. If the Director determines that corrective action is not being performed in compliance with the approved corrective action plan, the site may be reclassified to Class I.

(3) **Compliance status report.**

(a) Any person who is a responsible party for a site on the Hazardous Site Inventory shall submit to the Director a compliance status report that documents the current status of the site with regard to the risk reduction standards of Rule 391-3-19-.07 for all regulated substances associated with each release at the site. The Director shall in writing request the submittal of said report and specify a deadline for submittal based on a priority for submittal to be determined by the Director.

(b) The report required by Rule 391-3-19-.06(3)(a) shall, at a minimum, include the items enumerated below for all regulated substances associated with each release at the site, unless otherwise stated in writing by the Director. This report should be compiled on the basis of site conditions which exist after the completion of any voluntary corrective action taken by the responsible party prior to the submittal of the report. Reports on previous investigations or remedial activities required under other laws or regulations or undertaken voluntarily should be incorporated into the compliance status report when possible.

1. A description of each known source which has contributed or is contributing to a release including:

(i) Source name, number or other descriptor;

(ii) Location of source on a map of scale of 1 inch = 200 feet or less;

(iii) Name of each regulated substance released from each source;

(iv) Chronology of each source of a release; and

(v) If a source is an engineered structure or a waste management unit, a description of the function, design, dimensions, capacity and operation of the source, including as-built construction drawings where available.

2. If a release involves soil contamination, a complete definition of the horizontal and vertical extent of such soil contamination. Satisfactory evidence of a complete definition of the horizontal and vertical extent of soil contamination shall consist of an appropriate number of data points at sufficient locations with concentrations that demonstrate compliance with Type 1 or Type 2 risk reduction standards or that reflect background concentrations. An acceptable determination of background concentrations shall be made from samples that are representative of soil conditions not affected by a release of a regulated

substance. In support of the definition of the extent of soil contamination the compliance report shall describe the following:

(i) General approach used;

(ii) Analytical parameters selected and rationale for selection;

(iii) Location of all sampling points by sample identification number on a map with scale of 1 inch = 200 feet or less and, where applicable, on vertical cross-sections of appropriate number and scale;

(iv) Sampling and analysis procedures including but not limited to:

(I) Sampling equipment and collection techniques;

(II) Field analytical or measurement techniques including make and model of equipment and calibration schedule and type;

(III) Sample handling and preservation techniques;

(IV) Equipment decontamination procedures;

(V) Chain-of-custody procedures; and

(VI) Laboratory analytical techniques, including references to the analytical methods used, if standard, or in cases where standard analytical techniques do not exist,
descriptions of the analytical methods used, including quality assurance and quality control procedures utilized;

(v) A description of any statistical procedures used to evaluate data;

(vi) Procedures used to establish background soil concentrations; and

(vii) Narrative and tabular summary of all pertinent field data and the results of all final laboratory analyses that are supported by sufficient quality assurance/quality control data to validate the results.

3. If a release involves groundwater contamination, a complete definition of the horizontal and vertical extent of groundwater contamination. Satisfactory definition of the horizontal and vertical extent of groundwater contamination shall consist of an appropriate number of data points at sufficient locations with concentrations below those listed in Table 1 of Appendix III or, for those substances not listed, the highest concentration of any of the following: the detection limit, Secondary Maximum Contaminant levels for Drinking Water listed in Rule 391-3-5, or background . An acceptable determination of background concentrations shall be made from samples that are representative of groundwater conditions not affected by a release of a regulated substance.
The compliance status report shall, at a minimum, describe the following:

(i) Analytical parameters selected and rationale for selection;

(ii) A description of the methods used to characterize subsurface geology;

(iii) A description of the methods used to characterize horizontal and vertical groundwater gradients, flow rates, and flow directions;

(iv) A description of the methods used to determine hydraulic conductivities and other pertinent hydrogeological characteristics, including a description of any slug and/or aquifer pumping tests;

(v) A description of groundwater monitoring well locations, and their installation and construction methods, including:

(I) A map with scale of 1 inch = 200 feet or less depicting all existing well locations including a survey of each well's surface reference point and the elevation of its top-of-casing;

(II) Type of well casing material;

(III) Description of well-intake design including screen slot size and length, filter pack materials and length, and method of filter pack emplacement;

(IV) Method used to seal the well from the surface and any other features designed to prevent or minimize downward migration of contaminants along the well annulus; and

(V) Description of the methods and procedures used to develop the wells;

(vi) Description of all sampling and analysis procedures used, including at a minimum:

(I) Procedures and timing for measuring groundwater elevations for each sampling event;

(II) Well evacuation procedures including volume evacuated prior to sampling;

(III) Sample withdrawal techniques, sampling equipment and materials (tubing, rope, pump, etc.);

(IV) Sample handling and preservation techniques;

(V) Procedures for decontaminating sampling equipment between samples and sampling events;

(VI) Chain-of-custody procedures for all phases of sample management; and

(VII) Laboratory analytical techniques, including references to the analytical methods used, if standard, or in cases where standard analytical techniques do not exist, descriptions of the analytical methods used, including quality assurance and quality control procedures utilized.

(vii) A description of procedures used to determine background groundwater quality which is representative of ground water not affected by a release;

(viii) A map with scale of 1 inch = 200 feet or less depicting the horizontal extent of contamination;

(ix) A map with scale of 1 inch = 200 feet or less depicting the potentiometric surface of ground water;

(x) Maps and vertical cross-sections of appropriate scale depicting concentrations for all contaminants superimposed upon site stratigraphic features and monitoring wells; and

(xi) Narrative and tabular summary of all pertinent field data and the results of all final laboratory analyses that are supported by sufficient quality assurance/quality control data to validate the results.

4. A description of any human or environmental receptors who may have been or could be potentially exposed to a release at the site.

5. A description of all properties which are part of the site including the address and location of such property, its legal description, and the property owner's name, address and telephone number.

6. The name, address and telephone number of any other person who may be a responsible party for the site and a description of the type and amount of regulated substances such party may have contributed to a release.

7. A summary of any previous actions taken to eliminate, control, or minimize any potential risk at the site, including actions taken to comply with the risk reduction standards of Rule 391-3-19-.07.

8. If the responsible party certifies pursuant to Rule 391-3-19-.06(4)(c) that the site is not in compliance with any of the risk reduction standards of Rule 391-3-19-.07, the compliance status report may include a proposed corrective action plan that describes the corrective action that the responsible party has determined is necessary to achieve compliance with the applicable risk reduction standards of Rule 391-3-19-.07.

9. If the responsible party certifies pursuant to Rule 391-3-19-.06(4)(c) that the site is in compliance with the Type 3, Type 4 or Type 5 risk reduction standards of Rule 391-3-19- .07, the compliance status report may include a proposed corrective action plan that describes the continuing actions that the responsible party has determined are necessary to achieve or maintain compliance with the Type 3, Type 4 or Type 5 risk reduction standards.

10. Attached to the front of the compliance status report, a concise statement of the findings of the report presented in plain language, immediately followed by the certification required pursuant to Rule 391-3-19-.06(4)(a).

(4) **Certification of compliance with risk reduction standards.**

(a) The compliance status report required by Rule 391-3-19-.06(3) shall include a compliance status certification regarding the responsible party's own determination as to the status of a site or any individual property at a site with regard to the applicable risk reduction standards of Rule 391-3-19-.07 for all regulated substances evaluated by the compliance status report.

(b) The compliance status certification shall be signed by the applicable person described in Items 1 through 4 of Rule 391-3-19-.03(7)(c). Where the compliance status report is submitted for two or more cooperating responsible parties, the certification may be signed by a duly authorized representative of said responsible parties, "duly authorized" having the same meaning as in Item 4 of Rule 391-3-19 .03(7)(c).

(c) Any person signing the certification of compliance required under Rule 391-3-19- 06(4) shall make the following certification:
I certify under penalty of law that this report and all attachments were prepared under my direction in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. Based on my review of the findings of this report with respect to the risk reduction standards of the Rules for Hazardous Site Response, Rule 391-3-19-.07, I have determined that [(choose either of the following statements): 1) This site/property is in compliance with Type 1, Type 2, Type 3, Type 4, or Type 5 risk reduction standards (specify lowest numbered Type that applies, or all applicable types if more than one Type is applicable) or 2) This site/property is not in compliance with any Type risk reduction standards.].

(5) **Public participation.**

(a) Within 7 days after submitting to the Director the compliance status report required pursuant to Rule 391-3-19-.06(3), the responsible party who submits the report shall publish a notice in the legal organ of the local governments in whose jurisdiction the site is located, announcing that such report is available for inspection by the general public. The public notice must include:

1. The name, address and location of the site as it appears on the Hazardous Site Inventory, and, if the plan applies to less than the full site, the street address and owner's name for applicable properties;

2. The following statement: "*The Georgia Environmental Protection Division, Department of Natural Resources, State of Georgia (EPD) has placed this site on the Hazardous Site Inventory pursuant to its authority under the Hazardous Site Response Act and Rules promulgated thereunder. As required by the Rules for Hazardous Site Response, the responsible party for this site was required to investigate the site and submit a compliance status report to EPD summarizing the results of that investigation. EPD is currently reviewing the compliance status report to determine if corrective action is needed for regulated substances that have been released at this site. Before EPD decides whether corrective action is needed, the public has the opportunity to review the compliance status report and provide comments to EPD about the report.";*

3. Announcement of a 30-day public comment period beginning on the date of the published notice, and the name, address and telephone number of an EPD contact person to whom written or oral comments can be made;

4. Name, address and telephone number of the responsible party or its designated contact person; and

5. Location where the report may be viewed and copied.

(b) Within 7 days after submitting to the Director a proposed corrective action plan, or any subsequent revisions thereof, the responsible party who submits the plan shall publish a notice in the legal organ of the local governments in whose jurisdiction the site is located, announcing that such plan is available for inspection by the general public. The public notice must include:

1. The name, address and location of the site as it appears on the Hazardous Site Inventory, and, if the plan applies to less than the full site, the street address and owner's name for applicable properties;

2. The following statement: *"The Georgia Environmental Protection Division, Department of Natural Resources, State of Georgia (EPD) has placed this site on the Hazardous Site Inventory pursuant to its authority under the Hazardous Site Response Act and Rules promulgated thereunder. The Director of EPD has determined that this site needs corrective action and has required the responsible party for this site to submit to EPD a proposed corrective action plan that describes the corrective action the responsible party has determined is necessary to comply with the risk reduction standards of EPD's Rules for Hazardous Site Response. Before EPD decides whether to approve this proposed corrective action plan, the public has the opportunity to review the proposed corrective action and provide comments to EPD about the plan.";*

3. Announcement of a 30-day public comment period beginning on the date of the published notice, and the name, address and telephone number of an EPD contact person to whom written or oral comments can be made;

4. Name, address and telephone number of the responsible party or its designated contact person; and

5. Location where the plan may be viewed and copied.

(c) Where a proposed corrective action plan is submitted at the same time as the compliance status report required under Rule 391-3-19-.06(3), the same procedures as described under Items (a) and (b) above shall be followed, but with the substitution of the following statement for that given in Item (2): *"The Georgia Environmental Protection Division, Department of Natural Resources, State of Georgia (EPD) has placed this site on the Hazardous Site Inventory pursuant to its authority under the Hazardous Site Response Act and Rules promulgated thereunder. As required by the Rules for Hazardous Site Response, the responsible party for the site was required to investigate the site and submit a compliance status report to EPD summarizing the results of that investigation. The responsible party has submitted to EPD, along with the compliance status report, a proposed corrective action plan that describes the corrective action the responsible party has determined is necessary to comply with the risk reduction standards of EPD's Rules for Hazardous Site Response. Before EPD decides whether to approve the proposed corrective action plan, the public has the opportunity to review the compliance status report and proposed corrective action and provide comments to EPD about the report and plan."*

(d) Within 15 days after publishing the public notice required by Rule 391-3-19-.06(5)(a), (b), or (c), the responsible party shall provide the Director with an exact copy of the public notice as it appeared in the paper.

(e) Within 7 days after submitting to the Director either the compliance status report required pursuant to Rule 391-3-19-.06(3), or a proposed corrective action plan, the responsible party shall provide to the county government in the county in which the site is located and to the government of any city in whose jurisdictions the site is located a written notice providing the same information required in Rule 391-3-19-.06(5)(a), (b), or (c) as applicable.

(f) Upon making a determination pursuant to Rule 391-3-19-.06(6) or upon determining that a proposed corrective action plan should be approved, the Director shall publish notice of such determination in the legal organ of the local governments in whose jurisdiction the site is located.

(6) **Determination of the need for corrective action**. Rule 391-3-19-.06(6) applies to any site or individual property at a site listed on the Hazardous Site Inventory.

(a) Any site or individual property at a site that is classified on the Hazardous Site Inventory as Class I, Class III, Class IV or Class V pursuant to Rule 391-3-19-.06(2) shall also be designated by the Director as having a known release needing corrective action.

(b) For any site or individual property at a site listed on the Hazardous Site Inventory, the Director shall review the compliance status certification required by Rule 391-3-19- .06(4) and do the following:

1. If the responsible party certifies that the site or an individual property at the site is in compliance with the Type 1 or Type 2 risk reduction standards of Rule 391-3-19-.07, and the Director concurs with that certification, the Director shall designate the site or property as not needing further action and shall remove the site or property from the Hazardous Site Inventory in accordance with Rule 391-3-19-.05(4).

2. If the responsible party certifies that the site or an individual property at the site is in compliance with the Type 3 or Type 4 risk reduction standards of Rule 391-3-19-.07, and the Director concurs with that certification, the Director shall designate the site or property on the Hazardous Site Inventory as having a known release needing corrective action, reclassify it as Class III, and state on the Inventory that corrective action shall presently consist of those activities needed to maintain compliance with the Type 3 or Type 4 risk reduction standards, including the property notices of Rule 391-3-19-.08(1) and (2). Upon compliance with Rule 391-3-19-.08(4), the Director shall remove the site or property from the Hazardous Site Inventory in accordance with Rule 391-3-19-.05(4).

3. If the responsible party certifies that the site or an individual property at the site is in compliance with the Type 5 risk reduction standards of Rule 391-3-19-.07, and the Director concurs with that certification, the Director shall designate the site or property on the Hazardous Site Inventory as having a known release needing corrective action, reclassify it as Class III, and state on the Inventory that corrective action shall presently consist of those activities needed to maintain compliance with the Type 5 risk reduction standards, including the property notices of Rule 391-3-19-.08(1), (2), and (7). Upon compliance with Rule 391-3-19-.08(7), the Director shall remove the site or property from the inventory.

4. If the responsible party certifies that the site or an individual property at the site is not in compliance with any of the risk reduction standards of Rule 391-3-19-.07, the Director shall reclassify the site as a Class I site and designate the site on the Hazardous Site Inventory as having a known release needing corrective action, whereupon the owner of any property at the site which is not independently in compliance with Type 1 or Type 2 risk reduction standards shall make the property notices required by Rule 391-3-19-.08(1) and (2). If the site or an individual property at the site is a Class V site and the Director determines corrective action is not being conducted in accordance with the approved corrective action plan, the Director may reclassify the site as a Class I site and designate the site in the Hazardous Site Inventory as having a known release needing corrective action, whereupon the owner of

any property at the site which is not independently in compliance with Type 1 or Type 2 risk reduction standards shall make the property notices required by Rule 391-3-19-.08(1) and (2).

5. If the responsible party certifies that the site or an individual property at the site is not in compliance with any of the risk reduction standards of Rule 391-3-19-.07, but corrective action is being performed in compliance with a corrective action plan approved by the Director which will bring the site into compliance with the risk reduction standards, the Director shall reclassify the site or individual property as a Class V site and designate the site or individual property on the Hazardous Site Inventory as having a known release needing corrective action. Upon making such designation, the Director shall also state that corrective action is being performed in compliance with a corrective action plan approved by the Director that will bring the site or individual property into compliance with the risk reduction standards. Upon such designation being made, the owner of any property at the site which is not independently in compliance with Type 1 or Type 2 risk reduction standards shall make the property notices required by Rule 391- 3-19-.08(1) and (2) to the extent that such notices have not already been made.

(c) The Director may reclassify a site or an individual property at a site listed on the Hazardous Site Inventory from Class II to Class I, and designate the site or property as having a known release needing corrective action, if:

1. The responsible party fails to submit or fails to agree to submit the compliance status report within the time specified in Rule 391-3-19-.06(3)(a); or

2. The compliance status report is deficient with respect to the requirements of Rule 391- 3-19-.06(3)(b) and the Director has notified the responsible party in writing of such deficiencies and the responsible party has failed to correct such deficiencies by a deadline to be specified by the Director in writing; or

3. The responsible party certifies pursuant to Rule 391-3-19-.06(4) that the site or an individual property at the site is not in compliance with any of the applicable risk reduction standards of Rule 391-3-19-.07; or

4. The Director does not concur with the responsible party's certification made pursuant to Rule 391-3-19-.06(4) that the site or an individual property at the site is in compliance with the applicable risk reduction standards of Rule 391-3-19-.07.

(d) Upon making a determination pursuant to Rule 391-3-19-.06(6)(a) through (c) that a site has a known release needing corrective action, the Director shall provide the responsible party, and the owner of each property at the site which continues not to comply with either Type 1 or Type 2 risk reduction standards of Rule 391-3-19-.07, with written notice of such determination, including a statement concerning the requirements of Rule 391-3-19-.08.

(e) If the Director determines pursuant to Rule 391-3-19-.06(6)(b) that a site or an individual property at a site listed as Class I or Class V on the Hazardous Site Inventory subsequently comes into compliance with the risk reduction standards of Rule 391-3-19-.07, the Director shall reclassify such site or property in accordance with the provisions of Items 1 through 3 of Rule 391-3-19-.06(6)(b), except that the deed notice provisions of Rule 391-3-19-.08(1) and (2) need not be repeated.

(f) Notwithstanding a previous determination of the Director made pursuant to Rule 391-3-19-.06(6)(a) through (e), the Director may reclassify a site or an individual property at a site listed on the Hazardous Site Inventory as necessary to protect human health and the environment.

(7) **Other corrective actions.**

(a) The requirements of Rule 391-3-19-.06(3) through (5) do not apply to any person who is a responsible party for any of the following at a site or individual property listed on the Hazardous Site Inventory unless Rule 391-3-19-.06(7)(b) applies:

1. Corrective action required by an order of the Director executed before the effective date of these Rules pursuant to O.C.G.A. §12-8-71(b) of the Hazardous Waste Management Act;

2. Corrective action required by an order of the Director executed before the effective date of these Rules pursuant to O.C.G.A. §12-8-96(a) of HSRA;

3. Remedial actions conducted in accordance with a Record of Decision (ROD) under the NCP (referenced at 40 CFR 300.430(f)(5));

4. Remedial actions where compliance is demonstrated with applicable cleanup standards promulgated under the federal Toxic Substances Control Act;

5. Corrective action required by a hazardous waste management facility permit issued by the Director which contains conditions requiring corrective action in accordance with O.C.G.A. §12-8-66(e) of the Hazardous Waste Management Act; or

6. Corrective action and assessment monitoring required by a solid waste handling permit or an order issued by the Director pursuant to the Comprehensive Solid Waste Management Act.

7. Removal actions conducted under the NCP, if the Director determines that additional action is not needed to protect human health and the environment.

(b) Any site or individual property at which corrective action as described in Rule 391-3-19-.06(7)(a) is being conducted or has been completed shall be presumed to be in compliance with Type 5 of the risk reduction standards of Rule 391-3-19-.07(10) upon its listing on the Hazardous Site Inventory, and the requirements of Rule 391-3-19-.06(3) through (5) do not apply to any person who is a responsible party at such site unless:

1. The responsible party elects to certify compliance with other than Type 5 risk reduction standards of Rule 391-3-19-.07, in which case the site or property shall remain on the Hazardous Site Inventory as Class IV until the Director reclassifies it in accordance with 391-3-19-.06(6);

2. The Director determines that such corrective action fails to protect human health and the environment and that additional corrective action is necessary to comply with the risk reduction standards of Rule 391-3-19-.07, in which case the Director may reclassify the site or property in accordance with Rule 391-3-19-.06(6)(f); or

3. The Director determines that such corrective action fails to meet the Type 5 risk reduction standards of Rule 391-3-19-.07(10), in which case the Director may reclassify the site or property pursuant to 391-3-19-.06(6)(f).

(c) For any site described in Rule 391-3-19-.06(7)(a)(5) that is not also described by Item 1, 2, or 3 of Rule 391-3-19-.06(7)(b), the property notice requirements of Rule 391-3-19-.08(1) and (2) shall not apply until the Director makes a determination that corrective action is needed pursuant to the Rules for Hazardous Waste Management, Chapter 391-3- 11.

391-3-19-.07 Risk Reduction Standards.

(1) **Purpose and Scope.** Rule 391-3-19-.07 specifies the information and procedures necessary to demonstrate compliance with requirements under HSRA for corrective action for all regulated substance releases at a site or individual property at a site listed on the Hazardous Site Inventory. All risk reduction standards will, when implemented, provide adequate protection of human health and the environment. Compliance with these requirements does not preclude the requirement to comply with any stricter standards that may be applicable under other state or federal laws or regulations. These risk reduction standards may be applicable, relevant, or appropriate requirements for remedial actions under the NCP.

(2) ~~[reserved].~~**Derivation of health-based criteria.** For a regulated substance that poses a risk to humans the cleanup standards shall be calculated as required under Rules 391-3-19-.07(6), (7), (8), (9) and (10) based on an excess lifetime cancer risk of $1X10^{-5}$ and a hazard quotient of 1.0 for non-carcinogens. For a regulated substance that poses a risk of both cancer and one or more adverse health effects other than cancer, the standards shall be derived for the most sensitive effect.

(a) The standards for groundwater shall be determined using Equation 1 (cancer effects) or Equation 2 (non-cancer risk effects) from RAGS, Part B for ingestion, as modified using RAGS, Part E for dermal contact, and RAGS, Part F for inhalation exposures.

(b) The standards for soil shall be determined using Equation 6 (cancer effects) or Equation 7 (non-cancer risk effects) from RAGS, Part B for ingestion, as modified using RAGS, Part E for dermal contact, and RAGS, Part F for inhalation exposures.

(c) For mutagenic carcinogens, the standards shall be derived using the age dependent adjustment factors in Table 3 of Appendix III.

(3) **Completion of corrective action.** A required corrective action shall be considered complete when it is demonstrated that the site or individual property at a site meets any or a combination of the applicable risk reduction standards described in Rule 391-3-19- .07. ~~All risk reduction standards will, when adequately carried out, assure adequate protection of human health and the environment from potential exposure to land-based releases of regulated substances.~~

(4) ~~**Essential features of acceptable c**~~**Corrective actions considerations.** For corrective action to be in compliance with these standards, the following ~~common~~ elements must be addressed where applicable~~are required~~:

(a) The corrective action shall, at a minimum, provide for the removal and/or treatment of free product to the extent practicable, including considerations such as mobility and recoverability.

(b) No soil remaining in place under Type 1, 2, 3, or 4 risk reduction standards shall exhibit the hazardous waste characteristics of ignitability, corrosivity, or reactivity as defined in 40 CFR 261 Subpart C~~, and the sum of regulated substance concentrations in air-filled soil pore space shall not exceed 1000 parts per million (by weight or volume) as determined using methods approved by the Director~~.

(c) The corrective action shall not allow exposure to concentrations which would cause food chain contamination, damage to soils or to biota in the soils which could impair the use of soils for agricultural or silvicultural purposes, adverse effects on vegetation or wildlife, or the accumulation of vapors in buildings or other structures which pose a threat to human health or the environment.

(d) The corrective action shall protect waters of the State from releases that would cause surface water to experience concentrations of regulated substances in excess of any general criterion specified in the Georgia Rules and Regulations for Water Quality Control at 391-3-6-.03(5) or, if concentration values are not provided in said Rules, concentrations at levels that exhibit acute toxicity to aquatic life as demonstrated pursuant to protocols established by the Director.

(e) If the detection limit and/or the background concentration for a regulated substance is greater than the concentration specified in any risk reduction standard, the greater of the detection limit or background shall be used for determining compliance with the applicable risk reduction standard. "Detection limit" in this context implies the non-fraudulent use of an approved analytical test method that is appropriate for the particular application. Background shall be determined from samples taken from media that are unaffected by a release. Background determinations may consider anthropogenic sources and may also be based on regional background studies accepted by the Division. For radionuclides, background means background radioactivity.

(5) **Multiple property sites.** For sites consisting of more than one property, the Type risk reduction standard that shall apply to each individual property at that site shall be based upon the applicable use scenario for each individual property, i.e., residential or nonresidential.

(6) **Criteria for Type 1 standards.**

(a) Type 1 standards provide for regulated substance concentrations that pose no significant risk on the basis of standardized exposure assumptions and defined risk levels for residential properties. To comply with these standards, ~~all~~ source materials must be removed or decontaminated to the Type 1 media criteria.

(b) Criteria for groundwater. At any point within groundwater that has been affected by a release, concentrations of regulated substances in groundwater samples shall not exceed concentrations given in Table 1 of Appendix III or, for those substances not listed, the background or detection limit concentration. ~~If two or more regulated organic compounds are present in groundwater, their sum in a single sample shall not exceed 10 mg/L if the Table 1 value for each compound is less than 5 mg/L, or, where at least one compound has a Table 1 value greater than or equal to 5 mg/L, the sum of the concentrations shall not exceed the maximum Table 1 value for a detected compound plus 10 mg/L.~~

(c) Criteria for soil. Concentrations at any point above the uppermost groundwater zone in soil that has been affected by a release shall not exceed the concentrations given in Table 2 of Appendix III or, for those substances not listed, the least of the concentrations from Items 1 ~~through 3~~and 2 below:

1. Concentrations which will not cause contamination of groundwater at levels which exceed Type 1 groundwater criteria, determined as the highest of the soil concentrations in Items (i) and~~-~~ (ii~~i~~) below:

(i) Soil concentrations in Appendix I, excluding any values given in square brackets;

(ii) Soil concentrations determined using the equation and default parameters provided in Table 4 of Appendix III. A dilution attenuation factor of 20 may be used unless the Division determines that another value is appropriate to protect human health and the environment. ~~Multiplication of the Type 1 groundwater concentration criteria by a factor of 100;~~

~~(iii) Demonstration through use of the Toxicity Characteristic Leaching Procedure, SW- 846 Method 1311, or other method approved by the Director that a concentration in soil will not generate leachate concentrations that exceed Type 1 groundwater concentration criteria.~~

~~[Note: For substances excluded under Item (i) above and not listed on Table 1 of Appendix III, the concentration under Rule 391-3-19-.07(6)(c)1. shall be considered non-calculable.]~~

2. The lesser of soil concentrations calculated in accordance with Rule 391-3-19-.07(2) using ~~Concentrations which are unlikely to result in any noncancer toxic effects on human health via soil ingestion along with inhalation of volatiles and particulates, determined using Equation 7 of RAGS, Part B, and standard residential exposure assumptions in Table 3 of Appendix III.~~

~~3. Concentrations for which the upper bound on the estimated excess cancer risk is less than or equal to 10^{-5} (10^{-4} for Class C carcinogens) via soil ingestion along with inhalation of volatiles and particulates, determined using Equation 6 of RAGS, Part B, and~~ standard residential exposure assumptions in Table 3 of Appendix III.

[Note: Where concentrations are non-calculable under Items 1~~-3~~ or 2 above, the soil criterion shall be the higher of the background or detection limit concentrations.]

(7) **Criteria for Type 2 standards.**

(a) Type 2 standards provide for regulated substance concentrations that pose no significant risk on the basis of a site-specific risk assessment for residential ~~properties~~land use. To comply with these standards, ~~all~~ source materials must be removed or decontaminated to the Type 2 media criteria.

(b) Criteria for groundwater. At any point within any groundwater that has been affected by a release, concentrations of regulated substances in groundwater ~~samples~~ must not exceed the lesser of the values calculated in accordance with Rule 391-3-19-.07(2) using site-specific exposure factors for the residential use scenario.~~from Items 1 and 2 below or, f~~ For those substances for which neither calculation can be made, the standard shall be the higher of concentrations in Table 1 of Appendix III, background concentrations, or detection limit concentrations.

~~1. Concentrations which are unlikely to result in any noncancer toxic effects on human health via ingestion of, or inhalation of volatiles from, groundwater, determined using Equation 2 from RAGS, Part B, and site-specific exposure factors for the residential use scenario.~~

~~2. Concentrations for which the upper bound on the estimated excess cancer risk is less than 10-5 via ingestion of, and inhalation of volatiles from, groundwater, determined using Equation 1 from RAGS, Part B, and site-specific exposure factors for the residential use scenario.~~

(c) Criteria for soil. Concentrations ~~at any point~~ above the uppermost groundwater zone in soil that has been affected by a release shall not exceed the least of the concentrations in Items 1 through ~~4~~ 3 below, or, for those substances for which none of the calculations can~~not~~ be made, the highest of the concentrations in Table 2 of Appendix III, background concentrations, or detection limit concentrations:

1. Concentrations which will not cause contamination of groundwater at levels which exceed Type 1 or 2 groundwater criteria, whichever is higher, ~~as determined by any laboratory test and/or fate-and-transport model recognized by USEPA and approved by the Director,~~ at a point of exposure defined as any point at which a drinking water well could be installed. These soil concentrations may be determined using a laboratory test and/or fate-and-transport model accepted by the Division. Other site-specific information, such as the age of the release and groundwater concentration trends, may be accepted by the Division to demonstrate that soil concentrations are protective of groundwater criteria.

2. The lesser of soil concentrations calculated in accordance with Rule 391-3-19-.07(2) using ~~Concentrations which are unlikely to result in any noncancer toxic effects on human health via soil ingestion along with inhalation of volatiles and particulates, determined using Equation 7 from RAGS, Part B, and~~ site-specific exposure factors for the residential use scenario.

~~3. Concentrations for which the upper bound on the estimated excess cancer risk is less than 10-5 via soil ingestion along with inhalation of volatiles and particulates, determined using Equation 6 from RAGS, Part B, and site-specific exposure factors for the residential use scenario.~~

~~4~~3. For lead, soil concentrations at the site must not exceed those concentrations that would cause a resident 6-year old child (averaged across preceding 84 months) to have a probability of no greater than 5% of a blood lead level greater than 10 ug/dL as determined by the IEUBK model using site-specific exposure assumptions, including the ingestion of site groundwater as drinking water and the probability of subsurface soils being brought to the land surface. The soil criterion at Item 1 above shall also apply to the Type 2 standard for lead.

(d) Soil Averaging. For soil contaminated with regulated substances at sites where a Type 2 standard is being sought, exposure area averaging using methods recognized by USEPA and approved by the Division may be used to demonstrate that cumulative cancer and non-cancer risks are in compliance with soil criteria derived pursuant to Rule 391-3-19-.07(7)(c). These exposure area averaging methods may include statistical analysis of discrete sampling results or composite sampling methods.
~~The exposure assessments under Items 2 and 3 of Rule 391-3-19-.07(7)(c) above shall be conducted in a manner consistent with USEPA's "Guide lines for Exposure Assessment" (57 FR 104:22888-22938; May 29, 1992).~~

(e) More stringent criteria may be established for a site than are specified under Rule 391-3-19-.07(7)(b) and (c) if the Director or the responsible party determines that it is necessary to protect human health or the environment.

(8) **Criteria for Type 3 standards.**

(a) Type 3 standards provide for regulated substance concentrations that pose no significant risk on the basis of standardized exposure assumptions and defined risk levels for the non-residential use scenario. To comply with Type 3 standards, ~~all~~ source materials must be removed or decontaminated to the Type 3 media criteria.

(b) Type 3 standards are not applicable to residential properties. Type 3 standards are applicable where the responsible party documents that the activities being conducted on the property satisfy the definition for non-residential property at Rule 391-3-19-.02(2).

(c) Criteria for groundwater. ~~The groundwater criteria for Type 3 are the same as for Type 1.~~ At any point within groundwater that has been affected by a release, concentrations of regulated substances in groundwater shall not exceed the MCL or, for those substances not listed, the lesser of concentrations calculated in accordance with Rule 391-3-19-.07(2) using standard non-residential exposure assumptions in Table 3 of Appendix III. If no MCL exists and the calculations cannot be made, the groundwater standard shall be the higher of concentrations in Table 1 of Appendix III, background concentrations or detection limit concentrations.

(d) Criteria for soils.

1. Concentrations at any point above the uppermost groundwater zone in soil that has been affected by a release shall not exceed the ~~higher of:~~
~~(i) C~~concentrations described in Item 1 of Rule 391-3-19-.07(6)(c), based on Type 3 groundwater criteria.

~~(ii) Concentrations listed in Table 2 of Appendix III.~~

~~(iii) For lead, 400 mg/kg.~~

2. Concentrations in surface soil (soil within ~~2 feet~~ one foot of the land surface) shall meet the criteria of Item 1 above and~~, in addition,~~ shall not exceed the lesser of the values calculated in accordance with Rule 391-3-19-.07(2) using standard nonresidential exposure assumptions in Table 3 of Appendix III~~lower of the concentrations defined in items (i) through (iii) below~~. If ~~none of~~ the calculations ~~implied below~~ cannot be made, the surface soil criterion shall be equal to the criterion of Item 1 above. In no event shall compliance with the surface soil criteria be achieved by applying ~~two feet~~one foot of clean soil onto the original land surface.
~~(i) Concentrations which are unlikely to result in any noncancer toxic effects on human health due to ingestion of soil and inhalation of particulates and volatiles, determined using Equation 7 of RAGS, Part B, and standard nonresidential exposure assumptions in Table 3 of Appendix III.~~
~~(ii) Concentrations for which the upper bound on the estimated excess cancer risk is less than or equal to 10-5 (10-4 for Class C carcinogens) for human ingestion of soil and inhalation of particulates and volatiles, determined using Equation 6, RAGS, Part B, and standard nonresidential exposure assumptions in Table 3 of Appendix III.~~
~~(iii) For lead, 400 mg/kg.~~

3. Concentrations in subsurface soil (soil greater than 1 foot from the land surface) shall meet the criterion of Item 1 above and shall not exceed the lesser of the values calculated in accordance with Rule 391-3-19-.07(2) using standard excavation worker exposure assumptions accepted by the

Division. If the calculations cannot be made, the subsurface soil criterion shall be equal to the criterion of Item 1 above.

4. For lead, the standard is 400 mg/kg.

(9) **Criteria for Type 4 standards.**

(a) Type 4 standards provide for regulated substance concentrations that pose no significant risk on the basis of a site-specific risk assessment for ~~the~~ non-residential land use ~~scenario~~. To comply with Type 4 standards, ~~all~~ source materials must be removed or decontaminated to the Type 4 media criteria.

(b) Type 4 standards are not applicable to residential properties. Type 4 standards are applicable where the responsible party documents that the activities being conducted on the property satisfy the definition for non-residential property at Rule 391-3-19-.02(2) and documents that a monitoring program or an environmental covenant executed in accordance with Rule 391-3-19-.08(7) will assure continued compliance with the Type 4 standards.

(c) Criteria for groundwater. Concentrations of regulated substances in groundwater ~~samples~~ must not exceed, at any point ~~within the property boundaries~~ that is not otherwise subject to site-specific groundwater use restrictions in accordance with Rule 391-3-19-.08(7), the lesser of the values calculated in accordance with Rule 391-3-19-.07(2) using site-specific exposure factors for the non-residential use scenario.~~from Items 1 and 2 below or, f~~ For those substances for which neither calculation can be made, the standard shall be the higher of concentrations in Table 1 of Appendix III, background concentrations, or detection limit concentrations.

1. If groundwater use restrictions are utilized, groundwater contaminated with regulated substances in excess of appropriate Type 1 through 4 standards must not migrate beyond the limits of the institutional controls. The responsible party shall demonstrate that such migration will not occur or implement groundwater monitoring to ensure that migration is not occurring, unless the Division determines that monitoring is not needed.~~Concentrations which are unlikely to result in any noncancer toxic effects on human health via ingestion of, or inhalation of volatiles from, groundwater, determined using Equation 2 from RAGS, Part B, and site-specific exposure factors for the non-residential use scenario.~~

~~2. Concentrations for which the upper bound on the estimated excess cancer risk is less than 10^{-5} via ingestion of, and inhalation of volatiles from, groundwater, determined using Equation 1 from RAGS, Part B, and site-specific exposure factors for the nonresidential use scenario.~~

(d) Criteria for soil. Concentrations in soil that has been affected by a release shall not exceed ~~the least of the concentrations in Items 1 and 2~~ the relevant criteria listed below, or, for those substances for which ~~said~~ none of the concentrations can~~not~~ be calculated, the highest of concentrations in Table 2 of Appendix III, background concentrations, or detection limit concentrations:

1. Concentrations in soil ~~at any point~~ above the uppermost groundwater zone ~~which will~~shall not cause contamination of groundwater at levels which exceed Type 3 or 4 groundwater concentration criteria, whichever is higher, ~~as determined by any laboratory test and/or fate-and-transport model recognized by USEPA and approved by the Director,~~ at a point of exposure defined as any point at which a drinking water well could be installed. These soil concentrations may be determined using a laboratory test and/or fate-and-transport model accepted by the Division. Other site-specific information, such as

the age of the release and groundwater concentration trends, may be accepted by the Division to demonstrate that soil concentrations are protective of groundwater criteria.

2. Concentrations in surface soil shall meet the criteria of Item 1 above and shall not exceed the lesser of the values calculated in accordance with Rule 391-3-19-.07(2) using site-specific exposure factors for the nonresidential use scenario.~~lower of the concentrations in Item (i) through (iii) below.~~ The depth of soil considered surface soil may be based upon site-specific exposure factors approved by the Director, or assumed to be ~~the top two feet of~~ soil within one foot of the land surface. In no event shall compliance be achieved by applying clean soil or any other barrier onto surface soil.

~~(i) Concentrations which are unlikely to result in any noncancer toxic effects on human health via soil ingestion along with inhalation of volatiles and particulates, determined using Equation 7 from RAGS, Part B, and site-specific exposure factors for the nonresidential use scenario.~~
~~(ii) Concentrations for which the upper bound on the estimated excess cancer risk is less than 10-5 via soil ingestion along with inhalation of volatiles and particulates, determined using Equation 6 from RAGS, Part B, and site-specific exposure factors for the nonresidential use scenario.~~
~~(iii)~~ For lead ~~at nonresidential sites~~, surface soil concentrations at the site must not exceed concentrations that are determined by the procedures described in Appendix IV. In cases where children frequent the site, soil concentrations may be determined pursuant to Rule 391-3-19-.07(9)(f). ~~In all instances, the soil criterion at Item 1 above shall also apply to the Type 4 standard for lead.~~

3. Concentrations in subsurface soil (soils extending to a specified excavation depth approved by the Director) shall meet the criterion of Item 1 above and shall not exceed the lesser of the values calculated in accordance with Rule 391-3-19-.07(2) using site-specific excavation worker exposure factors approved by the Director. If the calculations cannot be made, the subsurface soil criterion shall be equal to the criterion of Item 1 above.

(i) For lead, subsurface soil concentrations at the site must not exceed concentrations that are determined by the procedures described in Appendix IV, using site-specific excavation worker exposure factors approved by the Director.

(e) Soil Averaging. For soil contaminated with regulated substances at sites where a Type 4 standard is being sought, exposure area averaging using methods recognized by USEPA and approved by the Division may be used to demonstrate that cumulative cancer and non-cancer risks are in compliance with soil criteria derived pursuant to Rule 391-3-19-.07(9)(d). These exposure area averaging methods may include statistical analysis of discrete sampling results or composite sampling methods.~~The exposure assessments under Rule 391-3-19-.07(9)(c) and (d) above shall be conducted in a manner consistent with USEPA's "Guidelines for Exposure Assessment" (57 FR 104:22888-22938; May 29, 1992).~~

(f) More stringent criteria may be established for a site than are specified under Rule 391- 3-19-.07(9)(c) and (d) if the Director or the responsible party determines that it is necessary to protect human health or the environment.

(10) **Criteria for Type 5 Standards.**

(a) Type 5 standards allow, in those instances where application of Type 1-4 standards is not appropriate under present circumstances, the use of measures to control the regulated substances or the property where the regulated substances are located. Such measures may consist of engineering controls such as construction of a fence, placement of a cap, installation of a slurry wall, or stabilization/ solidification/fixation of the waste or waste residues. Under Type 5 standards, removal, decontamination, or treatment are used where appropriate to remove the principal threats at a site. The responsible party has the burden of being able to demonstrate to the satisfaction of the Director that the particular mix of removal, decontamination, treatment and/or control measures is appropriate to eliminate or abate present and future threats to human health and the environment. Institutional controls should not be substituted for active remedial measures unless such active measures are determined not to be practicable.

(b) Compliance with Type 5 standards requires long-term monitoring and maintenance, as appropriate for implemented remedial measures, plus a restrictive covenant provided in accordance with Rule 391-3-19-.08(7).

(c) Compliance with Type 5 standards requires that Type 1, 2, 3, or 4 risk reduction standards, as applicable, be met beyond the boundary of the area for which compliance with Type 5 standards are sought whenever implementation of remedial measures is complete.

(d) Remedial measures designed to achieve compliance with Type 5 standards shall be consistent with the general requirements of Rule 391-3-19-.07(10)(a) and meet all the following performance criteria:

1. Carcinogens. For carcinogens, the measures shall be expected to permanently prevent exposures which exceed the upper bound on an estimated excess cancer risk of 10-5~~ (10-4 for Class C carcinogens)~~ for individual carcinogenic substances and individual exposure pathways. The cumulative excess cancer risk for multiple carcinogenic substances and exposure pathways shall not be greater than 10-5.

2. Systemic toxicants. For systemic toxicants, the measures shall be expected to permanently prevent exposures which exceed the dose to which the human population (including sensitive subgroups) could be exposed on a daily basis without appreciable risk of deleterious effect during a lifetime. Exposures shall not exceed a hazard quotient of one or a hazard index of one. The hazard quotient is the ratio of a single systemic toxicant exposure level for a specified time period to a reference dose for that systemic toxicant derived from the same time period. The hazard index is the sum of the hazard quotients for a single or multiple systemic toxicants which affect the same target organ, or which act by the same method of toxicity through single or multiple media exposure pathways.

3. Air. The measures shall be expected to permanently assure that any emission from the contamination being addressed under these rules does not cause ambient atmospheric concentrations to exceed the lowest of the following concentrations:

(i) NESHAP and NAAQ Standards, and other applicable federal and state standards and guidelines of the USEPA and EPD.

(ii) For residential exposure conditions, concentrations that satisfy Items 1 and 2 of Rule 391-3-19-.07(10)(d) above at exposure points located both at the property boundary and within the contaminated area.

(iii) For non-residential exposure conditions, either OSHA permissible exposure limits, threshold limit values or other criteria applicable to an industrial exposure setting within the property boundary, and concentrations that satisfy Items 1 and 2 of Rule 391-3-19-.07(10)(d) at the property boundary.

4. Groundwater. At a minimum, for all Type 5 cases, free product shall be removed and/or treated to the extent practicable, including considerations such as mobility and recoverability. For groundwater contaminated with regulated substances that the responsible party demonstrates is not appropriate to remove or treat to the Type 1-4 standards, the criteria under Items (i) and (ii) below shall be met.

(i) If all source material and soil is removed, or treated to concentrations that are protective of groundwater as specified in Rule 391- 3-19-.07(6)(c)1. , (7)(c)1. , (8)(d)1.~~(i)~~, (9)(d)1., whichever are applicable, the responsible party shall implement engineering controls, institutional controls, and monitoring for groundwater, unless the Director determines that they are not needed, to ensure:

(I) Groundwater contaminated with regulated substances in excess of the Type 1 through 4 standards will not migrate beyond the limits of the engineering controls, institutional controls and monitoring;

(II) Regulated substances in groundwater will not increase in concentration or toxicity in excess of Type 1 through 4 standards at the limits of engineering and institutional controls and monitoring; and

(III) Exposure to regulated substances in groundwater in concentrations exceeding the Type 1 through 4 standards will not occur.

(ii) If all source material and soil is not removed or treated to concentrations that are protective of groundwater as specified in Rule 391-3-19-.07(6)(c)1., (7)(c)1. , (8)(d)1.~~(i)~~, or (9)(d)1., whichever are applicable, the Director may require the removal or treatment of groundwater ~~shall be implemented~~ at the hydraulically downgradient limit of the engineering controls used to control source material and soil to prevent or eliminate the horizontal and vertical migration of regulated substances in excess of the Type 1 through 4 standards beyond the hydraulically downgradient limit of such engineering controls. Beyond the engineering controls for source material and soil, the responsible party shall implement engineering controls, institutional controls and monitoring for groundwater, unless the Director determines that they are not needed, to ensure that the criteria specified in Items 4. (i)(I)-(III) above are met.

5. Soil. For soil contaminated with regulated substances at sites where a Type 5 standard is being sought, exposure area averaging using methods recognized by USEPA and approved by the Director may be used to demonstrate compliance with soil criteria derived pursuant to this section, provided the engineering and institutional controls for soil will permanently maintain exposure conditions consistent with those used to calculate such criteria.

(e) More stringent criteria may be established for a site than are specified under 391-3- 19-.07(10)(d) if the Director or the responsible party determines that it is necessary to protect human health or the environment.

391-3-19-.08 Property Notices.

(1) **Notices of private property instruments**. This Rule applies to the owner of any property that is included in a site which is listed on the Hazardous Site Inventory and which has been designated as needing corrective action pursuant to Rule 391-3-19-.06(6). The requirements of this paragraph do not apply to the owner of any property at the site where the Director concurs with a demonstration that the property complies, independently of other properties at the site, with either Type 1 or Type 2 risk reduction standards.

(a) From and after the date any owner receives written notice from the Director under Rule 391-3-19-.06(6)(d) that property of such owner that is listed on Hazardous Site Inventory has been designated as needing corrective action, the owner of any such property shall include the following notice in any warranty deed, mortgage, security deed, lease, rental agreement, or other instrument that is thereafter given or caused to be given by the property owner which creates an interest in or grants a use of the property:
"This property has been listed on the state's hazardous site inventory ~~due to a release of a regulated substance~~ and has been designated as needing corrective action due to the presence of hazardous wastes, hazardous constituents, or hazardous substances regulated under state law. ~~in accordance with the Rules for Hazardous Site Response.~~ Contact the property owner or the Georgia Environmental Protection Division for further information concerning this property. This notice is provided in compliance with the Georgia Hazardous Site Response Act."

[Note: The term "instrument that is thereafter given or caused to be given by the property owner which creates an interest in or grants a use of the property" does not include options or contracts to purchase real property.]

(b) Rule 391-3-19-.08(1)(a) shall not apply after filing of the affidavit referred to in Rule 391-3-19-.08(6).

(2**) Affidavit in county deed records.** No later than forty five (45) days from the date the Director issues the written notice pursuant to Rule 391-3-19-.06(6)(d) that a property or part thereof listed on the Hazardous Site Inventory has been designated as needing corrective action, the owner of any such property shall cause to be prepared an affidavit of such fact in recordable form as set forth in O.C.G.A. § 44-2-20 and shall file such affidavit with the clerk of the superior court of each county in which the real property or any part thereof lies. Such affidavit shall be recorded in the clerk's deed records pursuant to O.C.G.A. § 44-2-20. Such affidavit shall include the statement provided in Rule 391-3- 19-.08(1). The requirements of this paragraph do not apply to the owner of any property where the Director concurs with a demonstration that the property complies, independently of other properties at the site, with either Type 1 or Type 2 risk reduction standards.

(3) **Petitions for hearing.** The notices required by Rule 391-3-19-.08(1) and (2) shall be stayed if the property owner files a petition for a hearing in accordance with O.C.G.A. Section 12-8-73 within thirty (30) days of the date the Director issues the written notice pursuant to Rule 391-3-19-.06(6)(d) that the site upon which the property is located needs corrective action.

(4) **Documentation of property notices.** Within thirty (30) days after the recorded affidavit required by Rule 391-3-19-.08(2) is returned by the county clerk to the property owner, the property owner shall submit a copy of such recorded affidavit to EPD.

(5) **Director's affidavit in county deed records.** Where ownership or control of any real property at a site subject to Rule 391-3-19-.08(1) and (2) is involuntarily acquired by a unit of state or local government through bankruptcy, tax delinquency, abandonment, or other circumstances in which the government involuntarily acquires title by virtue of its function as sovereign, the Director shall give thirty (30) days notice to any person who owned, operated, or otherwise controlled activities at the property immediately beforehand that the property is subject to the requirements of Rule 391-3-19-.08 and that, barring said person's contest under Rule 391-3-19-.08(3), the Director shall prepare and file the notice referenced in Rule 391-3-19-.08(2).

(6) **Subsequent affidavits.** If, subsequent to the fil~~l~~ing of the initial affidavit referenced in Rule 391-3-19-.08(2), the Director determines that no further action ~~in~~ is needed, and the property is removed from the Hazardous Site Inventory pursuant to Rule 391-3-19-.05(4), the Director shall notify the property owner in writing of such determination whereupon the property owner may file an additional affidavit with the clerk of superior court attaching a copy of such determination, which shall be restricted to the following declaration:
"This property was listed on the state's hazardous site inventory (HSI) and was designated as needing corrective action. The property has since been determined to meet the delisting requirements of Section 391-3-19-.05(4) of the Rules for Hazardous Site Response~~. No further action is required at this property~~, and it has been removed from the HSI ~~state's hazardous site inventory~~. A copy of the determination is attached hereto, and no further action is required except as noted to maintain compliance. The notice requirements of O.C.G.A. § 12-8-97 no longer apply to this property and prior notices given under this code section are no longer in effect. The property owner or the Georgia Environmental Protection Division may be contacted for further information concerning this property. This notice is provided in compliance with the Georgia Hazardous Site Response Act."

(7) **Environmental covenants.**
The owner of any property at which Type 3, 4 or 5 risk reduction standards of Rule 391-3-19-.07(8),(9), or 10) are being used shall, upon the request of the Director, execute an environmental covenant for such property as provided for in O.C.G.A. § 44-16-1 et seq. The covenant shall be recorded with the clerk of superior court for the county in which the property is located, and a copy shall be provided to any zoning or land use planning authority that has jurisdiction over the property. Such restrictions shall run with the land and be binding on the owner's successors and assigns.

(a) If the Director determines subsequent to the execution and recording of the covenant that the property is in compliance with Type 1 or 2, risk reduction standards and removes the property from the Hazardous Site Inventory, the Director shall so notify the property owner whereupon the covenant may be terminated.

(b) The covenant may include, but not necessarily be limited to, provisions to accomplish the following:

1. Prohibit activities on the property that may substantially interfere with a remedial action, operation and maintenance, long-term monitoring, or other measures necessary to ensure the integrity of the remedial action.

2. Prohibit activities that may result in human exposures above those specified for residential scenarios in Rule 391-3-19-.07(6) and (7) or for nonresidential scenarios at Rule 391-3-19-.07(8) and (9),

whichever scenario is applicable, and activities that would result in the release of a regulated substance which has been remedied in accordance with Rule 391-3-19-.07(10).

3. Allow the Director to enforce the restrictions set forth in the covenant by legal action in a court of appropriate jurisdiction.

4. Require the installation and maintenance of a permanent marker that denotes a Type 5 restriction.

5. Describe uses of the property that are prohibited.

391-3-19-.09 Funding to State and Local Governments from the Hazardous Waste Trust Fund. Amended.

(1) **Purpose and Scope.** This Rule applies to the use of the Hazardous Waste Trust Fund to finance the state and local share of costs associated with the investigation, remediation, post-closure care and maintenance of sites placed on the National Priorities List pursuant to the federal Comprehensive Environmental Response, Compensation and Liability Act of 1980, and on the Hazardous Site Inventory pursuant to the Hazardous Site Response Act. For the purposes of this Rule, *state* means any agency, board, bureau, commission or authority of the State of Georgia. For the purposes of this Rule, *local government* means any county or municipality or consolidated city-county government, any local solid waste management authority, or any regional solid waste management authority, or any regional solid waste management authority created pursuant to O.C.G.A. § 12-8-53 of the Comprehensive Georgia Solid Waste Management Act.

(2) **Eligibility Requirements.** A state or local government may be eligible to receive financial assistance from the Hazardous Waste Trust Fund under this section for eligible costs described in Rule 391-3-19-.09(4)(a) provided that the state or local government meets all the following eligibility requirements:

(a) the site for which financial assistance is requested is a solid waste handling facility as defined by Rule 391-3-4-.01(67) of the Rules for Solid Waste Management and is listed on the National Priorities List or the Hazardous Site Inventory;

(b) the Director has notified the state or local government in writing that they are a responsible party for the site;

(c) the state or local government has entered into a contract with the Director which describes the financial assistance provided and the activities for which the monies shall be used;

(d) the state or local government has established and maintains an accounting system in accordance with the Governmental Accounting Standards Board (GASB);

(e) the state or local government has adopted an authorizing resolution; and

(f) the state or local government has submitted to the Director a completed application for financial assistance on forms as provided by the Director.

(g) the state or local government has submitted to the Director a written statement of the percentage of total costs associated with the actions described in Rule 391-3-19-.09(4)(a) for which a state or local government is liable. Such statement shall also include a description of how such percentage was determined including the results of negotiations with any other responsible parties for the site.

(3) **Financial Assistance.** A state or local government that meets all the eligibility requirements described in Rule 391-3-19-.09(2) may receive financial assistance from the Hazardous Waste Trust Fund as described in Rule 391-3-19-.09(3)(a), (b) and (c). However, total payment of eligible costs from the Hazardous Waste Trust Fund shall in no event exceed $2,000,000 per site.

(a) For state or local governments that have been designated as a responsible party for a site, and that are not the owner of the site, the Director may pay up to 50% of the first $500,000 of eligible costs, as described in Rule 391-3-19-.09(4)(a), and up to 25% of all eligible costs exceeding $500,000.

(b) For state or local governments, excluding counties or municipal corporations, that have been designated as a responsible party for a site, and that are the owner of the site, the Director may pay up to 50% of the first $500,000 of eligible costs, as described in Rule 391-3-19-.09(4)(a), and up to 25% of all eligible costs exceeding $500,000.

(c) For counties or municipal corporations that have been designated as a responsible party for a site and that own or operate such site, the Director shall pay 100% of the first $500,000 of eligible costs, as described in Rule 391-3-19-.09(4)(a), and may pay up to 50% of all eligible costs exceeding $500,000.

(d) In the event that the unencumbered balance of the Hazardous Waste Trust Fund falls below $4.0 million, the Director may suspend the provision of financial assistance to state and local governments as described herein.

(4) **Eligible Costs.** Eligible costs are the percentage of the total costs associated with the actions described in Rule 391-3-19-.09(4)(a) for sites described in Section 391-3-19-.09(2)(a) for which a state or local government may seek financial assistance pursuant to Rule 391-3-19-.09(2).

(a) Only the costs associated with the following actions eligible for payment:

1. Completion and submittal of a compliance status report as required by Rule 391-3-19-.06(3);

2. Certification of compliance with the risk reduction standards as required by Rule 391-3-19-.06(4);

3. Compliance with the public participation requirements required by Rule 391-3-19-.06(5);

4. Corrective action required by an order of the Director issued pursuant to O.C.G.A. §12-8-96 of the Hazardous Site Response Act.;

5. Response required by an order of the EPA Regional Administrator issued pursuant to Sections 104 and 106 of CERCLA. For the purposes of this section, the term *response* shall have the same meaning as that used in section 101(25) of CERCLA;

6. Post-closure care not required by Section 391-3-~~19~~4-.12 of the Rules for Solid Waste Management but which may be required by the Director under an order issued pursuant to the Hazardous Site Response Act; or

7. Corrective action and assessment monitoring required by a solid waste handling permit or an order by the Director pursuant to the Comprehensive Solid Waste Management Act.

(b) The following costs are not eligible for payment:

1. Purchase or routine maintenance of equipment of a durable nature that is expected to have a period of service of one (1) year or more after being put into use site without material impairment of its physical condition, unless the applicant can be adequately demonstrate that the equipment was a total loss and that the loss occurred during the activities for which reimbursement is being requested;

2. Materials or supplies not purchased specifically for the activities for which reimbursement is being requested;

3. Administrative costs associated with filing an application for funding from the Hazardous Waste Trust Fund;

4. Employee salaries and out-of-pocket expenses normally provided for in the applicant's operating budget (i.e.; meals, fuel) and employee fringe benefits;

5. Medical expenses incurred as a result of activities at the site;

6. Legal expenses;

7. Other expenses which the Director determines are not directly related to the investigation, redemption, post-closure care and maintenance of the site;

8. Costs arising as a result of claims for damages filed by third parties against the state or local government or its agents;

9. Costs resulting from releases that occur as a result of violations of state or federal laws, rules or regulations; and

10. Post-closure care required solely by Section 391-3-4-.12 of the Rules for Solid Waste Management.

11. Any costs described in Rule 391-3-19-.09(4)(a) for sites where the state or local government becomes the owner or operator after the site is listed on the Hazardous Site Inventory or the National Priorities List.

12. Any costs described in Rule 391-3-19-.09(4)(a) for sites where the state or local government had knowledge at the time of becoming the owner or operator that a release
of a regulated substance had occurred at such site.

(5) **Application Procedures.** Any state or local government that meets the eligibility requirements under Section 391-3-19-.09(2) and that is seeking financial assistance from the Hazardous Waste Trust Fund shall submit an application on forms as may be approved by the Director.

(a) The Director may determine that an application is incomplete and shall notify the applicant that additional information is required before the application may be further processed or approved.

(b) The Director must approve an application prior to the expenditure of funds from the Hazardous Waste Trust Fund under this Section.

Authority: O.C.G.A. § 12-8-90 et seq.

APPENDIX III
MEDIA TARGET CONCENTRATIONS AND STANDARD EXPOSURE ASSUMPTIONS

Table 1. Groundwater Criteria

CAS #	Regulated Substance/Analyte	Concentration (mg/L)
83329	Acenaphthene	~~2~~ 0.54
67641	Acetone	~~4~~ 14
75058	Acetonitrile	~~0.2~~ 0.13
98862	Acetophenone	~~4~~ 1.9
107028	Acrolein	~~0.7~~ 0.00004
79061	Acrylamide	~~0.0001 (a)~~ 0.0005
107131	Acrylonitrile	~~0.0006 (a)~~ 0.0005
116063	Aldicarb	~~0.007~~ 0.003
309002	Aldrin	~~0.00002 (a)~~ 0.000009
7664417	Ammonia	30
62533	Aniline	~~0.006 (a)~~ 0.13
7440360	Antimony	0.006 ~~(a)~~
~~140578~~	~~Aramite~~	~~0.001 (a)~~
7440382	Arsenic	0.010
1332214	Asbestos (fibers longer than 10 µm)	7 million/liter
7440393	Barium	2
56553	Benz(a)anthracene	~~0.0001~~ 0.0003
71432	Benzene	0.005
92875	Benzidine	~~0.0000002~~ 0.000001
50328	Benzo(a)pyrene	0.0002
205992	Benzo(b)fluoranthene	~~0.0002~~ 0.0025
207089	Benzo(k)fluoranthene	0.025
100447	Benzyl chloride	~~0.0002(a)~~ 0.0009
7440417	Beryllium	0.004
111444	Bis(2-chloroethyl)ether	~~0.00003(a)~~ 0.0001
75252	Bromoform	See Trihalomethanes

CAS #	Regulated Substance/Analyte	Concentration (mg/L)
85687	Butyl benzyl phthalate	~~0.1~~ 0.16
7440439	Cadmium	0.005
63252	Carbaryl	~~0.7~~ 1.9
1563662	Carbofuran	0.04
75150	Carbon disulfide	~~4~~ 0.81
56235	Carbon tetrachloride	0.005
~~57749~~	Chlordane	0.002
12789036		
126998	Chloro-1,3-butadiene, 2-	~~0.7~~ 0.0002
106478	Chloroaniline, p-	~~0.1~~ 0.0037
108907	Chlorobenzene	0.1
510156	Chlorobenzilate	~~0.7~~ 0.0031
124481	Chlorodibromomethane	see Trihalomethanes
67663	Chloroform	see Trihalomethanes
95578	Chlorophenol, 2-	~~0.04~~ 0.091
~~107051~~	~~Chloropropene, 3-~~	~~0.002~~
2921882	Chlorpyrifos	~~0.02~~ 0.0084
7440473	Chromium	0.1
218019	Chrysene	~~0.0002 (a)~~ 0.25
7440508	Copper	1.3
4319773	Cresols	1.5
57125	Cyanide	0.2
110827	Cyclohexane	12.5
72548	DDD	~~0.0001~~ 0.0003
72559	DDE	~~0.0001~~ 0.0005
50293	DDT	~~0.0001~~ 0.0023
75990	Dalapon	0.2
117840	Di-n-octyl phthalate	~~0.7~~ 0.2
2303164	Diallate	~~0.0006 (a)~~ 0.0054
333415	Diazinon	~~0.0006~~ 0.01

CAS #	Regulated Substance/Analyte	Concentration (mg/L)
53703	Dibenz(a,h)anthracene	0.0003
96128	Dibromochloropropane	0.0002
84742	Dibutyl phthalate	~~4~~ 0.9
1918009	Dicamba	~~0.2~~ 0.57
~~541731~~	~~Dichlorobenzene, m-~~	~~0.6~~
95501	Dichorobenzene, ~~o-~~1,2-	0.6
106467	Dichorobenzene, ~~p-~~1,4-	0.075
91941	Dichlorobenzidine, 3,3'-	~~0.00008 (a)~~ 0.0013
75274	Dichlorobromomethane	see Trihalomethanes
75718	Dichlorodifluoromethane	~~1~~ 0.2
75343	Dichloroethane, 1,1-	~~4~~ 0.028
107062	Dichloroethane, 1,2-	0.005
75354	Dichloroethylene, 1,1-	0.007
156592	Dichloroethylene, cis 1,2	0.070
156605	Dichloroethylene, trans-1,2-	0.1
108601	Dichloroisopropyl ether	~~0.3~~ 0.71
120832	Dichlorophenol, 2,4-	~~0.02~~ 0.046
94757	Dicholorphenoxyacetic acid, 2,4-	0.07
78875	Dichloropropane, 1,2-	0.005
542756	Dichloropropene, 1,3-	~~0.002~~ 0.0047
60571	Dieldrin	0.00002~~ (a)~~
84662	Diethyl phthalate	~~5~~ 15
~~123911~~	~~Diethylene dioxide, 1,4-~~	~~0.07 (a)~~
117817	Diethylhexyl phthalate	0.006
60515	Dimethoate	~~0.007~~ 0.044
119904	Dimethoxybenzidine, 3,3'-	~~0.003 (a)~~ 0.0005
~~131113~~	~~Dimethyl phthalate~~	~~400~~
~~57976~~	~~Dimethylbenz(a)anthracene, 7,12-~~	~~0.000001 (a)~~
119937	Dimethylbenzidine, 3,3'-	~~0.000004 (a)~~ 0.00007
105679	Dimethylphenol, 2,4-	~~0.7~~ 0.36

CAS #	Regulated Substance/Analyte	Concentration (mg/L)
99650	Dinitrobenzene, m-	~~0.001 (a)~~ 0.002
51285	Dinitrophenol, 2,4-	~~0.07~~ 0.039
121142	Dinitrotoluene, 2,4-	~~0.00005 (a)~~ 0.0024
606202	Dinitrotoluene, 2,6-	0.0005
88857	Dinoseb	0.007
123911	Dioxane, 1,4-	0.0046
122394	Diphenylamine	~~0.2~~ 1.3
122667	Diphenylhydrazine, 1,2-	~~0.00004 (a)~~ 0.0008
~~2764729~~	~~Diquat [di-cationic form]~~	~~0.02~~
85007	Diquat dibromide	0.02
298044	Disulfoton	~~0.0003~~ 0.0005
115297	Endosulfan (mixed isomers)	~~0.002~~ 0.1
145733	Endothall	0.1
72208	Endrin	0.002
106898	Epichlorohydrin	~~0.04~~ 0.002
110805	Ethoxyethanol, 2-	~~10~~ 0.34
75003	Ethyl Chloride (Chloroethane)	21
60297	Ethyl ether	~~7~~ 3.9
97632	Ethyl methacrylate	~~3~~ 0.63
~~62500~~	~~Ethyl methanesulfonate~~	~~0.000001 (a)~~
100414	Ethylbenzene	0.7
106934	Ethylene dibromide	0.00005
~~52857~~	~~Famphur~~	~~0.001~~
22224926	Fenamiphos	~~0.002~~ 0.0044
206440	Fluoranthene	~~1~~ 0.8
86737	Fluorene	~~1~~ 0.29
~~16984488~~ 7782414	Fluoride, Soluble	4
944229	Fonofos	~~0.01~~ 0.025
50000	Formaldehyde	~~1~~ 0.0043

CAS #	Regulated Substance/Analyte	Concentration (mg/L)
64186	Formic acid	~~70~~ 0.00063
110009	Furan	0.019
76448	Heptachlor	0.0004
1024573	Heptachlor epoxide	0.0002
118741	Hexachlorobenzene	0.001
87683	Hexachlorobutadiene	~~0.001 (a)~~ 0.0014
319846	Hexachlorocyclohexane (alpha)	~~0.000006 (a)~~ 0.00007
319857	Hexachlorocyclohexane (beta)	~~0.00002 (a)~~ 0.0003
608731	Hexachlorocyclohexane, Technical	0.0003
77474	Hexachlorocyclopentadiene	0.05
67721	Hexachloroethane	~~0.001 (a)~~ 0.0033
70304	Hexachlorophene	~~0.01~~ 0.006
193395	Indeno (1,2,3-cd)pyrene	~~0.0004~~ 0.0025
78831	Isobutyl alcohol	~~10~~ 5.9
78591	Isophorone	~~0.1~~ 0.78
98828	Isopropylbenzene (Cumene)	0.45
143500	Kepone	~~0.000002 (a)~~ 0.00004
7439921	Lead	0.015
58899	Lindane	0.0002
121755	Malathion	~~0.2~~ 0.39
7439976	Mercury (inorganic)	0.002
126987	Methacrylonitrile	~~0.004 (a)~~ 0.0019
67561	Methanol	20 ~~(a)~~
16752775	Methomyl	~~0.2~~ 0.5
72435	Methoxychlor	0.04
74839	Methyl bromide	~~0.01~~ 0.0076
74873	Methyl chloride	~~0.003~~ 0.19
78933	Methyl ethyl ketone	~~2~~ 5.6
80626	Methyl methacrylate	~~3~~ 1.4
298000	Methyl parathion	~~0.002~~ 0.0045

CAS #	Regulated Substance/Analyte	Concentration (mg/L)
74953	Methylene bromide	~~0.4~~ 0.0083
75092	Methylene chloride	0.005
108101	Methyl isobutyl ketone	~~2~~ 6.3
924163	N-Nitrosodi-n-butylamine	~~0.000006 (a)~~ 0.00003
621647	N-Nitrosodi-n-propylamine	~~0.000005 (a)~~ 0.0001
55185	N-Nitrosodiethylamine	~~0.0000002(a)~~ 0.000002
62759	N-Nitrosodimethylamine	~~0.0000007(a)~~ 0.000001
10595956	N-Nitrosomethylethylamine	~~0.000002 (a)~~ 0.000007
100754	N-Nitrosopiperidine	~~0.000008 (a)~~ 0.00008
930552	N-Nitrosopyrrolidine	~~0.00002 (a)~~ 0.0004
91203	Naphthalene	~~0.02~~ 0.0061
91598	Naphthylamine, 2-	~~0.00004 (a)~~ 0.0004
7440020	Nickel	~~0.1~~ 0.39
98953	Nitrobenzene	~~0.02~~ 0.0014
~~100027~~	~~Nitrophenol, p-~~	~~0.06~~
1336363	PCBs	0.0005
1910425	Paraquat	~~0.03~~ 0.09
56382	Parathion	~~0.2~~ 0.086
608935	Pentachlorobenzene	~~0.03~~ 0.0032
82688	Pentachloronitrobenzene	~~0.0001~~ 0.0012
87865	Pentachlorophenol	0.001
108952	Phenol	~~4~~ 5.8
298022	Phorate	~~0.007~~ 0.003
7723140	Phosphorus, elemental	~~0.0001~~ 0.0004
~~23950585~~	~~Pronamide~~	~~0.05~~
129000	Pyrene	~~1~~ 0.12
110861	Pyridine	~~0.04~~ 0.02
94597	Safrole	~~0.0001 (a)~~ 0.001
7782492	Selenium	0.05
7440224	Silver	0.1

CAS #	Regulated Substance/Analyte	Concentration (mg/L)
93721	Silvex	0.05
100425	Styrene	0.1
1746016	TCDD,2,3,7,8- [Dioxin]	3×10^{-8} (a)~~(b)~~
13071799	Terbufos	~~0.0009~~ 0.0002
95943	Tetrachlorobenzene, 1,2,4,5-	~~0.01~~ 0.0017
630206	Tetrachloroethane, 1,1,1,2-	~~0.07~~ 0.0057
79345	Tetrachloroethane, 1,1,2,2-	~~0.0002 (a)~~ 0.0008
127184	Tetrachloroethylene	0.005
58902	Tetrachlorophenol, 2,3,4,6-	~~1~~ 0.24
3689245	Tetraethyldithiopyrophosphate	~~0.02~~ 0.0071
7440280	Thallium	0.002~~ (a)~~
108883	Toluene	1
95534	Toluidine, o-	~~0.0001 (a)~~ 0.047
106490	Toluidine,p-	~~0.0002 (a)~~ 0.025
8001352	Toxaphene	0.003
76131	Trichloro-1,2,2-trifluoroethane, 1,1,2-	~~1000~~ 10
120821	Trichlorobenzene, 1,2,4-	0.07
71556	Trichloroethane, 1,1,1-	0.2
79005	Trichloroethane, 1,1,2-	0.005
79016	Trichloroethylene	0.005
75694	Trichlorofluoromethane	~~2~~ 5.2
95954	Trichlorophenol, 2,4,5-	~~4~~ 1.2
88062	Trichlorophenol, 2,4,6-	~~0.03~~ 0.012
93765	Trichlorophenoxyacetic acid, 2,4,5-	~~0.07~~ 0.16
96184	Trichloropropane, 1,2,3-	~~0.04~~ 0.000007
	Trihalomethanes, total	0.08
99354	Trinitrobenzene, 1,3,5-	~~0.002 (a)~~ 0.59
126727	Tris(2,3-dibromopropyl)phosphate	~~0.00003 (a)~~ 0.00007
~~744062~~	~~Vanadium~~	~~0.2~~
75014	Vinyl chloride	0.002

CAS #	Regulated Substance/Analyte	Concentration (mg/L)
1330207	Xylenes (total)	10
7440666	Zinc	~~2~~ 6

(a) ~~The health-based drinking water criterion for this substance/analyte is lower than the lowest currently achievable and available detection limit. According to Rule 391-3-19-.07(4)(e), the detection limit or background will be the Type 1 groundwater concentration criterion for this substance/analyte.~~

~~(b)~~ For the purposes of Rule 391-3-19-.07, all polychlorinated dibenzodioxins and dibenzofurans are collectively considered as one substance, expressed as an equivalent concentration of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD), based on the Toxicity Equivalency Factor approach described in "Recommended Toxicity Equivalence Factors (TEFs) for Human Health Risk Assessments of 2,3,7,8-Tetrachlorodibenze-*p*-dioxin and Dioxin-Like Compounds", ~~"~~U.S. Environmental Protection Agency, December 2010. Where concentrations only of homologous groups are known (isomer-specific data are not available), the ~~Director~~ Division must be consulted to determine an appropriate method for determining 2,3,7,8-TCDD equivalents.

Table 2. Type 1 Soil Criteria

Regulated Substance Analyte	Concentration (mg/kg)
Antimony	~~4~~ 5.4
Arsenic	20
Barium	~~1000~~ 1600
Beryllium	~~2~~ 63
Cadmium	~~2~~ 7.5
Chromium	100
~~Cobalt~~	~~20~~
Copper	~~100~~ 920
Lead	~~75~~ 270
Mercury	~~0.5~~ 2.1
Nickel	~~50~~ 510
Selenium	~~2~~ 5.2
Silver	~~2~~ 16
Thallium	~~2~~ 1
~~Vanadium~~	~~100~~
Zinc	~~100~~ 7500

Table 3: Parameters, Definitions and Standard Assumptions*, to be used in Equations 1, 2, 6, and 7 in RAGS, Part B

Parameters	Definitions (Units)	Values
C	Concentrations in soil (mg/kg) or water (mg/L)	chemical-specific
TR	Target excess individual lifetime cancer risk (unitless)	10^{-5} for Class A and B carcinogens; 10^{-4} for Class C carcinogens
THI	Target hazard index (unitless)	1
SF_o**	Oral cancer slope factor ((mg/kg-day)$^{-1}$)	chemical-specific
SF_i**	Inhalation cancer slope factor ((mg/kg-day)$^{-1}$)	chemical-specific
RfD_o**	Oral chronic reference dose (mg/kg-day)	chemical-specific
RfD_i**	Inhalation chronic reference does (mg/kg-day)	chemical-specific
BW	Adult body weight (kg)	70 kg
AT	Averaging time (yr)	70 yr carcinogens (Equals ED for systemic toxicants
EF	Exposure frequency (days/yr)	350 days/yr residential 250 days/yr non-residential
ED	Exposure duration (yr)	30 yr residential 25 yr non-residential
IR_w	Daily water ingestion rate (liter/day)	2 L/day residential 1 L/day non-residential
IR_{soil}	Soil ingestion rate (mg/day)	114 mg/day residential 50 mg/day non-residential
IR_{air}	Daily inhalation rate (m^3/day)	15 m^3/day residential 20 m^3/day non residential
PEF	Particulate emission factor (m^3/kg)	4.63 X 10^9 m^3/kg
VF	Soil-to-air volatilization factor (m^3/kg)	see derivation below
K	Water-to-air volatilization factor (L/m^3)	0.5 L/m^3

*Standard assumptions are required for Type 1 and Type 3 risk reduction standards.

**Values are to be taken from the current version of IRIS or, if not listed in IRIS, from the current version of PPRTV. Where data are not available from IRIS or PPRTV and appropriate, peer-reviewed data are otherwise available, values may be derived using the procedures described in RAGS, Part A and in consultation with the Director. If a value for only one of the two variables in a variable pair (RfD_o/RfD_i or SF_o/SF_i) is not available for a particular chemical, the term containing that variable in an equation can be ignored or equated to zero. If neither value is available for a variable pair, a concentration cannot be calculated with the equation.

[Continuation of Table 3]

Derivation of VF values (Soil-to-Air Volatilization Factor)

$$VF(m^3/kg) = \frac{(LS \times V \times DH)}{A} \times \frac{(\pi \times \alpha \times T)^{1/2}}{(2 \times D_{ei} \times E \times K_{as} \times 10^{-3} kg/g)}$$

WHERE:

LS	length of side of contaminated area (m)	= 45
V	wind speed in mixing zone (m/s)	= 2.25
DH	diffusion height (m)	= 2
A	area of contamination (cm^2)	= 2.03 x 10^7 (=0.5 acre)
π	pi	= 3.14
α	(cm^2/s)	$= \frac{(D_{ei} \times E)}{E + (\rho_s)(1-E)/K_{as}}$
T	exposure interval (s)	= 7.9 x 10^8 (=25 yr)
ρ_s	density of soil solids (g/cm^3)	= 2.65
OC	soil organic carbon content fraction (unitless)	= 0.02
D_{ei}	effective diffusivity (cm^2/s)	= $D_i x E^{0.33}$
D_i	molecular diffusivity (cm^2/s)	(chemical-specific)
E	total soil porosity (unitless)	= 0.35
K_{as}	soil/air partition coefficient (g soil/cm^3 air)	= (H/K_d) *x* 41
H	Henry's law constant (atm-m^3/mol)	(chemical-specific)
K_d	soil-water partition coefficient (cm^3/g)	= K_{oc} x OC (or chemical specific)
K_{oc}	organic carbon partition coefficient (cm^3/g)	(chemical-specific)

Table 3: Standard Default Exposure Factors for Risk Reduction Standard Calculations

The default exposure factors presented in this table must be utilized for Type 1 and Type 3 risk reduction standard (RRS) calculations. For toxicity assessment, EPD adopts EPA's Office of Solid Waste and Emergency Response (OSWER) recommended hierarchy of toxicity information (OSWER Directive 9285.7-53, 2003). Note that EPA uses this toxicity data hierarchy for the Regional Screening Level (RSL) tables. If a value for only one of the two variables in a variable pair (RfD_o/RfC or SF_o/IUR) is not available for a substance, the term containing that variable in an equation can be omitted or equated to zero. If neither value is available for a variable pair, a concentration cannot be calculated with the RAGS equations unless an appropriate surrogate compound is available for use in assessing its risk. Appropriately selected surrogate compounds may be utilized for regulated substances without toxicity values as accepted by the Division. Dermal toxicity values are to be derived in accordance with the methods described in this table. The risk equations and methodology for deriving the RRS are prescribed in the U.S. EPA's RSL User's Guide.

Exposure Parameter	Symbol	Units	Default Values	Reference[a]
Risk Thresholds:				
Target Risk Level (Cancer Effects)	*TR*	unitless	1E-05	EPD
Target Hazard Quotient (Non-cancer Effects)	*THQ*	unitless	1	EPD
Averaging Time:				
Averaging Time for Carcinogens	AT_c	days	25,550	EPA 1991 (70 years x 365 days/year)
Averaging Time for Non-Carcinogens	AT_{nc}		ED x 365	EPA 1989, 1991
Body Weight:				
Resident Child	*BW*	kg	15	EPA 2011, 2014
Resident Adult			80	EPA 2011, 2014
Non-resident			80	EPA 2011, 2014
Exposure Duration:				
Resident Child	*ED*	years	6	EPA 1991
Resident Adult			20	EPA 2011, 2014
Commercial/Industrial Worker			25	EPA 1991
Excavation Worker			1	EPA 2002
Mutagenic Exposure Duration:				
Resident – Mutagenic Exposure Duration (0-2 years)	ED_{mut}	years	2	EPA 2005
Resident – Mutagenic Exposure Duration (2-6 years)			4	EPA 2005
Resident – Mutagenic Exposure Duration (6-16 years)			10	EPA 2005
Resident – Mutagenic Exposure Duration (16-26 years)			10	EPA 2005

Mutagenic Age-Dependent Adjustment Factors[b]:				
Resident – Mutagenic Age-Dependent Adjustment Factor (0-2 years)	*ADAF*	unitless	10	EPA 2005
Resident – Mutagenic Age-Dependent Adjustment Factor (2-6 years)			3	EPA 2005
Resident – Mutagenic Age-Dependent Adjustment Factor (6-16 years)			3	EPA 2005
Resident – Mutagenic Age-Dependent Adjustment Factor (>16 years)			1	EPA 2005
Exposure Frequency:				
Resident Child	*EF*	days/year	350	EPA 1991
Resident Adult			350	EPA 1991
Commercial/Industrial Worker			250	EPA 1991
Excavation Worker			130	5 days/week for 26 weeks/year
Drinking Water Ingestion Rate:				
Resident Child	IR_w	L/day	0.78	EPA 2011, 2014
Resident Adult			2.5	EPA 2011, 2014
Commercial/Industrial Worker			1	EPA 2011, 2014
Skin Surface Area for Dermal Contact with Water:				
Resident Child	SA_{water}	cm^2	6,365	EPA 2011 (Table 7-9); 2014
Resident Adult			19,652	EPA 2011 (Table 7-9); 2014
Non-resident			3,527	EPA 2011 (Table 7-2); 2014
Exposure Time for Dermal Contact with Water[c]:				
Resident Child	t_{event}	hours/event	0.54	EPA 2011, 2014
Resident Adult			0.71	EPA 2011, 2014
Non-resident			0.54	Professional judgement
Event Frequency for Dermal Contact with Soil and Water:				
Resident and Non-residents	*EV*	unitless	1	EPA 2002 (Exhibit 1-2); 2004
Soil Ingestion Rate:				
Resident Child	IR_s	mg/day	200	EPA 2011 (Table 5-1); 2014
Resident Adult			100	EPA 1991
Commercial/Industrial Worker			100	EPA 1991
Excavation Worker			330	EPA 2002 (Exhibit 1-2)
Skin Surface Area for Dermal Contact with Soil:				
Resident Child	SA_{soil}	cm^2	2,373	EPA 2011 (Table 7-2 and 7-8); 2014
Resident Adult			6,032	EPA 2011 (Tables 7-2 and 7-12); 2014
Non-resident			3,527	EPA 2011 (Table 7-2); EPA 2014
Soil-to-Skin Adherence Factor:				
Resident Child	*AF*	mg/cm^2	0.2	EPA 2004 (Exhibit 3-5)
Resident Adult			0.07	EPA 2004 (Exhibit 3-5)
Non-resident			0.12	EPA 2004 (Exhibit 3-5)
Excavation Worker			0.3	EPA 2002 (Exhibit 1-2)

Gastrointestinal Absorption Factor:				
Residential and Non-residential	GI_{ABS}	unitless	chemical-specific	RSL Table
Dermal Absorption Factor:				
Residential and Non-residential	ABS_d	unitless	chemical-specific	RSL Table
Relative Bioavailability Factor[d]:				
Arsenic and Lead	*RBA*	unitless	0.6	EPA 2007
Exposure Time for Indoor/Outdoor Inhalation Rate:				
Resident	*ET*	hours/day	24	Upper bound of time spent at a residence
Non-resident			8	Average length of work day
Wind Particulate Emission Factor:				
Residential and Non-residential	*PEF*	m^3/day	1.36E+09	EPA 2002 (Exhibit D-2)
Volatilization Factor for Domestic Water Use (K):				
Residential and Non-residential	*K*	L/m^3	0.5	Andelman 1990
Toxicity Values:				
Oral Cancer Slope Factor	SF_o	$(mg/kg\text{-}day)^{-1}$	chemical-specific	EPA 2003; RSL Table (as revised)
Inhalation Unit Risk	*IUR*	$(\mu g/m^3)^{-1}$	chemical-specific	EPA 2003; RSL Table (as revised)
Oral chronic reference dose	RfD_o	mg/kg-day	chemical-specific	EPA 2003; RSL Table (as revised)
Reference Concentration	*RfC*	mg/m^3	chemical-specific	EPA 2003; RSL Table (as revised)
Dermal Cancer Slope Factor	SF_d	$(mg/kg\text{-}day)^{-1}$	chemical-specific	$SF_d = CSF_o \times GI_{abs}$; EPA 2004
Dermal chronic Reference Dose	RfD_d	mg/kg-day	chemical-specific	$RfD_d = RfD_o / GI_{abs}$; EPA 2004

[a] Source:

U.S. EPA 1989. Risk Assessment Guidance for Superfund: Volume I - Human Health Evaluation Manual (RAGS Part A), EPA/540/1-89/002, December 1989

Andelman, J.B. 1990. Total Exposure to Volatile Organic Compounds in Potable Water. Significance and Treatment of Volatile Organic Compounds in Water Supplies, Lewis Publishers: Chelsea, MI, USA, Chapter 20, pp. 485-504

U.S. EPA 1991. Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. OSWER Directive 9285.6-03, March 1991

U.S. EPA 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24, December 2002

U.S. EPA 2003. Human Health Toxicity Values in Superfund Risk Assessments. OSWER Directive 9285.7-53, December 2003

U.S. EPA 2004. Risk Assessment Guidance for Superfund: Volume I - Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) (RAGS Part E) Final. OSWER 9285.7-02EP, July 2004

U.S. EPA 2005. Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens, March 2005

U.S. EPA 2007. Guidance for Evaluating the Oral Bioavailability of Metals in Soils for Use in Human Health Risk Assessment. OSWER 9285.7-80, May 2007 (as amended)

U.S. EPA 2011. Exposure Factors Handbook: 2011 Edition. EPA/600/R-090/052F, September 2011

U.S. EPA 2014. Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER Directive 9200.1-120, February 2014

U.S. EPA. Regional Screening Levels (RSL) for Chemical Contaminants at Superfund Sites. Generic Tables (as amended)

[b]Age-Dependent Adjustment Factors (ADAFs) are to be applied to all regulated substances having a mutagenic mode of action for carcinogenesis when assessing cancer risks from early life exposures (<16 years of age). Such substances are denoted by "M" in the "Mutagen" column of U.S. EPA's Regional Screening Level (RSL) table. For a child resident (0-6 years), the appropriate ADAF adjustment factor for cancer risk estimation is 32 {i.e., ED_{mut} x ADAF or [(2 years x 10) + (4 years x 3)]}. For adults, the ADAF adjustment factor is 40 {i.e., [10 years (age 6-16 years) x 3] + [10 years (age 16-26 years) x 1]}.

[c]For the commercial/industrial worker, the dermal exposure time while bathing/showering was assumed to be equivalent to that of the child resident given the infrequent occurrence of this event in an occupational setting.

[d]Use of EPA's default oral relative bioavailability factors must be utilized when deriving the Type 1 and 3 RRS for soil and does not apply to groundwater. For groundwater, the oral bioavailability factor is 1 (assumed bioavailability of 100%). Site-specific bioavailability assessments for arsenic, lead and other compounds (e.g., PAHs) may be conducted as part of the Type 2 and Type 4 RRS for soil using in vitro and/or in vivo bioavailability test methods approved by EPA. However, note that in the absence of in vivo data, in vitro bioaccessibility on a subset of soil samples is required prior to use in risk assessment. For lead, EPA assumes a default RBA value of 0.6 (60%) in both the ALM and IEUBK models. RBA should not substitute or be confused with the absolute bioavailability values in these models.

Table 4: Equation and Default Values for Calculating Soil Concentrations Pursuant to Rule 391-3-19-.07(6)(c)(1) and 391-3-19-.07(8)(d)(1)

Equation 10 USEPA Soil Screening Guidance: User's Guide (USEPA 1996)	$C_S = C_L\left(K_d + \frac{\theta_w + \theta_a H'}{\rho_b}\right)$			
Parameter	**Symbol**	**Units**	**Default Value**	**Source**
soil concentration pursuant to Rule 391-3-19-.07(6)(c)(1)(ii) and 391-3-19-.07(8)(d)(1)	C_S	mg/kg	calculated	Equation 10 USEPA 1996
target leachate concentration	C_L	mg/L	calculated	*for Rule 391-3-19-.07(6)(c)(1):* C_L = (DAF) x (Type 1 RRS GW) *for Rule 391-3-19-.07(8)(d)(1):* C_L = (DAF) x (Type 3 RRS GW)
dilution attenuation factor	DAF	unitless	20	Rule 391-3-19-.07(6)(c)(1)(ii) USEPA 1996
Type 1 Risk Reduction Standard for Groundwater	Type 1 RRS GW	mg/L	chemical-specific	Rule 391-3-19-.07(6)(b)
Type 3 Risk Reduction Standard for Groundwater	Type 3 RRS GW	mg/L	chemical-specific	Rule 391-3-19-.07(8)(c)
soil-water partition coefficient	K_d	L/kg	chemical-specific	*for organics:* $K_d = K_{oc} \times f_{oc}$ *for inorganics:* USEPA RSL Tables (as amended)
soil organic carbon-water partition coefficient	K_{oc}	L/kg	chemical-specific	USEPA RSL Tables (as amended)
fraction of soil organic carbon	f_{oc}	kg/kg	0.002	USEPA 1996
water-filled soil porosity	θ_w	L_{water}/L_{soil}	0.3	USEPA 1996
air-filled soil porosity	θ_a	L_{air}/L_{soil}	0.13	USEPA 1996
dimensionless Henry's Law Constant	H'	unitless	chemical-specific	USEPA RSL Tables (as amended)
dry soil bulk density	ρ_b	kg/L	1.5	USEPA 1996

References:

USEPA. 1996. Soil Screening Guidance: User's Guide. USEPA Publication 9355.4-23. July.

USEPA. Regional Screening Levels (RSL) for Chemical Contaminants at Superfund Sites. Generic Tables (as amended).

APPENDIX IV
GEORGIA ADULT LEAD MODEL

The "Georgia Adult Lead Model" established by this appendix applies to the protection of workers or other adults as nonresidential sites at which it can be demonstrated that children are not now exposed, nor will become exposed, to lead in soil or soil-derived dust at the site. This lead model attempts to protect against elevated blood lead levels in the unborn fetus of women who spend considerable time at this site. Protection of the blood lead of a hypothetical fetus ensures that any other human receptor at the site will be adequately protected.

The Georgia model ultimately involves only two equations. Equation 1 establishes the average adult blood level that is protective of the fetus, which is an input to Equation 2. Equation 2 calculates the soil cleanup level, the concentration that would generate the average adult blood level indicated in Equation 1.

$$PbB = \frac{PbB_{fetal}}{R \bullet GSD^{1.645}}$$

$$Cs = \left[\frac{PbB - PbB_b}{BSF \bullet (EF / AT)} - (C_w \bullet I_w \bullet A_w) \right] [I_s \bullet A_s]^{-1}$$

All terms found in the above equations are described in Table 1 on the following page.

TABLE 1. Parameters, Definitions, and Default Values to be used in Equation 1 and 2

Parameters	Definitions (Units)	Defaults
PbB_b	Typical blood lead concentration in adults, specifically women of child-bearing age, in the absence of exposures to the site that is being assessed (µg/dL) [baseline]	1.38
PbB_{fetal}	The blood lead goal for the unborn fetus, defined as the concentration which will have a 95% probability of not being exceeded (µg/dL)	10.0
GSD	Geometric standard deviation of blood lead concentration among the exposed adult population, specifically women of child-bearing age (unitless)	2.04
1.645	Value of the exponent used to estimate the 95th percentile from a	1.645

	~~lognormal distribution~~	
~~R~~	~~Constant of proportionality between fetal blood lead concentration at birth and maternal blood lead concentration (unitless)~~	~~0.9~~
~~BSF~~	~~Biokinetic slope factor relating (quasi-steady state) increase in typical adult blood lead concentration to average daily lead update (µg/dL per µg/day)~~	~~0.4~~
~~EF~~	~~Exposure frequency for contact with assessed soils and/or dust derived in part from these soils (number of days of exposure during the year) (days/yr)~~	~~219~~
~~AT~~	~~Averaging time for continuing long term exposures (days/yr)~~	~~365~~
~~C_s~~	~~Soil target concentration; i.e., concentration of lead in soil that is goal for the site (mg/kg)~~	~~To be determined by Eq. 2~~
~~I_s~~	~~Intake rate of soil, predominantly occupational exposures to indoor soil-derived dust rather than outdoor soil (unitless)~~	~~0.05~~
~~A_s~~	~~Absolute gastrointestinal absorption fraction for ingested lead in soil and in dust derived from soil (unitless)~~	~~0.12~~
~~C_w~~	~~Concentration of lead in ground water at site (µg/L); provided, however, when taken together with concentrations of lead in soil shall not exceed a PbB of 10 µg/dL~~	~~See HSRA 391-3-19-.07(9)(c)~~
~~I_w~~	~~Intake rate of water from on-site groundwater (L/day)~~	~~1~~
~~A_w~~	~~Absolute gastrointestinal absorption fraction for lead ingested in drinking water (unitless)~~	~~0.20~~

Standard Adult Lead Model (ALM) for Soil

U.S. EPA's Adult Lead Model provided in this appendix applies to the protection of industrial workers at nonresidential sites at which it can be demonstrated that children are not now exposed, nor will become exposed, to lead in soil or soil-derived dust at the site. U.S. EPA's ALM attempts to protect against elevated blood lead (PbB) levels in the unborn fetus of women who spend considerable time at the site. Protection of the PbB of a hypothetical fetus ensures that any other human receptor at the site will be adequately protected.

The ALM ultimately involves two equations. Equation 1 establishes the average adult PbB level that is protective of the fetus, which is an input to Equation 2. Equation 2 calculates the target soil cleanup level for no more than 5% probability that fetal PbB exceeds the target PbB and the concentration that would generate the average adult PbB level indicated in Equation 1.

$$\mathbf{PbB} = \frac{PbB_{fetal,0.95}}{R*GSD^{1.645}} \qquad \textbf{EQUATION 1}$$

$$C_S = \frac{[([[PbB_{fetal,0.95}/(R*(GSD_i^{1.645})] - PbB_o) - (IR_S*AF_S)^{-1}}{BKSF*(EF/AT)} \qquad \textbf{EQUATION 2}$$

Exposure Variable	Description of Exposure Variable	Units	GSD_i and PbB_0 from Analysis of NHANES 2007-2012
$PbB_{fetal, 0.95}$	95th percentile PbB in fetus	µg/dL	5
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9
BKSF	Biokinetic Slope Factor	µg/dL per µg/day	0.4
GSD_i	Geometric standard deviation PbB	--	1.8
PbB_o	Baseline PbB	µg/dL	0.6
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.05[a]
$AF_{S, D}$	Absorption fraction (same for soil and dust)	--	0.12
$EF_{S, D}$	Exposure frequency (same for soil and dust)	days/year	219[a]
$AT_{S, D}$	Averaging time (same for soil and dust)	days/year	365
C_S	**Soil Lead Target Concentration where PbBt = 5 µg/dL**	**mg/kg**	**Calculated**

[a]Any proposed site-specific value is subject to approval by the Division and should be protective of current and future exposure conditions at a site.

Shaded cells - Based on U.S. EPA May 17, 2017 GSDi and PbB_0 updated estimates (using data from NHANES 2009-2014) for the ALM and IEUBK. These values should be amended based on updates by the U.S. EPA Technical Review Workgroup for Lead – Adult Lead Committee.