

## Form #3

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SECRET  
U.S. DEPARTMENT OF STATE

TITLE OF RULE BEING PROPOSED:\_\_\_\_\_

  
Authorized Signature

## QUESTIONNAIRE

*(Please include a copy of this form with each filing of your rule: Notice of Public Hearing or Comment Period; Proposed Rule, and if needed, Emergency and Modified Rule.)*

DATE: July 29, 2011

TO: LEGISLATIVE RULE-MAKING REVIEW COMMITTEE

FROM: (Agency Name, Address & Phone No.) Department of Environmental Protection

601 57th Street

Charleston, WV 25304

LEGISLATIVE RULE TITLE: Voluntary Remediation and Redevelopment Rule

1. Authorizing statute(s) citation Chapter 22, Article 22

2. a. Date filed in State Register with Notice of Hearing or Public Comment Period:

June 10, 2011

b. What other notice, including advertising, did you give of the hearing?

Included notice on the WVDEP web page through the Public Information Office.

c. Date of Public Hearing(s) *or* Public Comment Period ended:

July 12, 2011

d. Attach list of persons who appeared at hearing, comments received, amendments, reasons for amendments.

Attached     X     No comments received

- e. Date you filed in State Register the agency approved proposed Legislative Rule following public hearing: (be exact)

July 29, 2011

- f. Name, title, address and phone/fax/e-mail numbers of agency person(s) to receive all *written correspondence* regarding this rule: (Please type)

Ken Ellison, Director

601 57th Street

Charleston, WV 25304

(304) 926-0455, fax (304) 926-0457, email - Ken.W.Ellison@wv.gov

- g. **IF DIFFERENT FROM ITEM 'f'**, please give Name, title, address and phone number(s) of agency person(s) who wrote and/or has responsibility for the contents of this rule: (Please type)

Don Martin, Asst. Director

Lawrence P. Sirinek, Ph.D., Env. Toxicologist

601 57th Street

131A Peninsula Ave.

Charleston, WV 25304

Wheeling, WV 26003

304-926-0499, ext 1275

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Lawrence.P.Sirinek@wv.gov

3. If the statute under which you promulgated the submitted rules requires certain findings and determinations to be made as a condition precedent to their promulgation:

- a. Give the date upon which you filed in the State Register a notice of the time and place of a hearing for the taking of evidence and a general description of the issues to be decided.

N/A

b. Date of hearing or comment period: \_\_\_\_\_

\_\_\_\_\_

c. On what date did you file in the State Register the findings and determinations required together with the reasons therefor?

\_\_\_\_\_

d. Attach findings and determinations and reasons:

Attached \_\_\_\_\_

# **DEPARTMENT OF ENVIRONMENTAL PROTECTION**

## **BRIEFING DOCUMENT**

**Rule Title: Voluntary Remediation and Redevelopment Rule**

**A. AUTHORITY: W.Va. Code §22-22-3**

**B. SUMMARY OF RULE:**

The rule establishes the eligibility, procedures, standards, and legal documents required for voluntary and brownfield cleanups.

**C. STATEMENT OF CIRCUMSTANCES WHICH REQUIRE RULE:**

This proposed rule amendment updates the toxicological profiles used in developing the De Minimis risk-based cleanup standards table and incorporates some minor changes that will be consolidated with this proposal. The table is used extensively during risk-based clean-ups to determine whether or not environmental contamination at a site being evaluated under the rule, exceeds levels that would be protective of human health. The De Minimis revisions are a result of updates in toxicity criteria, including those included in the IRIS database, and additional updates incorporated from secondary sources (see 60CSR3.8.1), in the absence of IRIS values. A number of these replaced values that were obtained from Health Effects Assessment Summary Tables (HEAST) which was last updated in 1997 and is no longer supported. In addition to changes in toxicity criteria, the revised de minimis values were derived using an updated algorithm to calculate exposure via the inhalation pathway. Consistent with the dosimetry methodologies used to derive inhalation toxicity criteria, the method is based upon exposure concentration rather than the previous intake-based calculations. As the relevant USEPA guidance was released subsequent to the previous de minimis update, this revision provided the first opportunity to incorporate the newer calculation. The proposed standards also incorporate revisions in the physicochemical parameters used in their calculation. The physicochemical terms were updated from the Oak Ridge National Laboratory (ORNL) Risk Assessment Information System (RAIS) database. In addition to the changes indicated above, the revised de minimis standards incorporate USEPA guidance on evaluating risk to carcinogens acting via a mutagenic mode of action.

**D. FEDERAL COUNTERPART REGULATIONS - INCORPORATION BY REFERENCE/DETERMINATION OF STRINGENCY:**

There is no federal counterpart regulation, thus no determination of stringency is required.

**E. CONSTITUTIONAL TAKINGS DETERMINATION:**

**In accordance with §22-1A-1 and 3(c), the Secretary has determined that this rule will not result in taking of private property within the meaning of the Constitutions of West Virginia and the United States of America.**

**F. CONSULTATION WITH THE ENVIRONMENTAL PROTECTION ADVISORY COUNCIL:**

**At its meeting on June 2, 2011, the Environmental Protection Advisory Council reviewed this rule and there were no questions presented regarding it. (See attached minutes of Council's meeting).**

APPENDIX B  
**FISCAL NOTE FOR PROPOSED RULES**

Rule Title: 60CSR3 – "Voluntary Remediation and Redevelopment Rule"

Type of Rule: ☒ Legislative ☐ Interpretive ☐ Procedural

Agency: WV Department of Environmental Protection

Address: Division of Land Restoration  
601 57th Street  
Charleston, WV 25304

Phone Number: 304-926-0455 Email: Ken.W.Ellison@wv.gov

**Fiscal Note Summary**

Summarize in a clear and concise manner what impact this measure  
will have on costs and revenues of state government.

This proposed rule amends Table 60 - 3B, the De Minimis Table and incorporates some minor changes that will be consolidated with this proposal. The table is used extensively during risk-based clean-ups to determine whether or not environmental contamination at a site being evaluated under the rule, exceeds levels that would be protective of human health. The de minimus revisions are necessary because the toxicological profiles for many chemicals in the federal IRIS database have been revised, which necessitates changes to the De Minimis table.  
The proposed rule amendments will have no impact on costs and revenues of state government.

**Fiscal Note Detail**

Show over-all effect in Item 1 and 2 and, in Item 3, give an explanation of  
Breakdown by fiscal year, including long-range effect.

| FISCAL YEAR                 |                                           |                                        |                                           |
|-----------------------------|-------------------------------------------|----------------------------------------|-------------------------------------------|
| Effect of Proposal          | Current<br>Increase/Decrease<br>(use "-") | Next<br>Increase/Decrease<br>(use "-") | Fiscal Year<br>(Upon Full Implementation) |
| 1. Estimated Total Cost     | 0.00                                      | 0.00                                   | 0.00                                      |
| Personal Services           |                                           |                                        |                                           |
| Current Expenses            |                                           |                                        |                                           |
| Repairs & Alterations       |                                           |                                        |                                           |
| Assets                      |                                           |                                        |                                           |
| Other                       |                                           |                                        |                                           |
| 2. Estimated Total Revenues | 0.00                                      | 0.00                                   | 0.00                                      |

Rule Title: \_\_\_\_\_

Rule Title: 60CSR3 - "Voluntary Remediation and Redevelopment Rule"

3. **Explanation of above estimates (including long-range effect):**  
Please include any increase or decrease in fees in your estimated total revenues.

The proposed amendments to the provisions of the Voluntary Remediation and Redevelopment Rule will cause no increase or decrease in fees.

### MEMORANDUM

Please identify any areas of vagueness, technical defects, reasons the proposed rule would not have a fiscal impact, and/or any special issues not captured elsewhere on this form.

The proposed amendments will not have any immediate or overall fiscal impact on state government.

Date: 4/27/11

Signature of Agency Head or Authorized Representative

Ken Olson

TITLE 60  
LEGISLATIVE RULE  
DEPARTMENT OF ENVIRONMENTAL PROTECTION, SECRETARY'S OFFICE

SERIES 3  
VOLUNTARY REMEDIATION AND REDEVELOPMENT RULE

**§60-3-1. General.**

1.1. Scope. -- This legislative rule establishes the eligibility, procedures, standards and legal documents required for voluntary and brownfield cleanups.

1.2. Authority. -- W. Va. Code §22-22-3.

1.3. Filing Date. -- June 5, 2009.

1.4. Effective Date. -- June 5, 2009.

**§60-3-2. Definitions. Terms defined in the Act are accorded the same definition in this rule.**

Unless the context in which used clearly requires a different meaning, the definitions contained in W. Va. Code §22-22-2 and § 22-22B-2 shall apply to the terms in this rule in addition to the definitions expressly set forth in this rule. For ease of reference, some of the statutory definitions are repeated in this section.

2.1. Abandoned Property. -- Real property for which the current owner cannot be determined or cannot be located or property which has been forfeited to or acquired by the state for the nonpayment of taxes pursuant to state law.

2.2. Act. -- The Voluntary Remediation and Redevelopment Act, W. Va. Code §22-22-1 et seq.

2.3. Analytical Expenses. -- Those direct costs associated with laboratory analysis of samples associated with a voluntary remediation.

2.4. Anthropogenic Background. -- Concentrations of chemicals that are present in

the environment due to human activities unrelated to operation at the site.

2.5. Applicable Standards. -- Standards described in section 9 of this rule. Such standards include any exposure controls used at a site to meet the acceptable risk level for that site, at the time of the remediation or in the future.

2.6. Applicant. -- A person who is applying or has applied to participate in the voluntary remediation program.

2.7. Brownfield. -- Any industrial or commercial property which is abandoned or not being actively used by the owner as of the effective date of this article, but shall not include any site subject to a unilateral enforcement order under §104 through §106 of the Comprehensive Environmental Response, Compensation and Liability Act, 94 Stat. 2779, 42 U.S.C. §9601, as amended, or which has been listed or proposed to be listed by the United States environmental protection agency on the priorities list of Title I of said act, or subject to a unilateral enforcement order under §3008 or §7003 of the Resource Conservation Recovery Act" or any unilateral enforcement order for corrective action under ~~this chapter~~ Chapter 22 of the West Virginia Code.

2.8. Brownfield Applicant. -- A person who is applying or has applied to participate in the voluntary remediation for a Brownfield property and:

2.8.a. Who is seeking or has obtained a site assessment loan from the Brownfields Revolving Fund; or

2.8.b. Who will use funds from the State of West Virginia or any county or

municipality thereof, or brownfields grant funds from USEPA in the assessment or remediation of the property.

2.9. Carcinogen. -- Any substance which can cause cancer.

2.10. Cumulative Site Risk. -- The summation of risks to a human receptor or ecological receptor from one or more contaminants released at the site over a period of time.

2.11. ~~Day or Day Calendar~~. -- The 24-hour period between 12:00 A.M. - 12:00 A.M.

2.12. De Minimis Risks. -- Those risks that are so trivial that they would not require remediation under this rule.

2.13. Ecological Receptors of Concern. -- Specific ecological communities, populations, or individual organisms protected by federal, state or local laws and regulations or those local populations which provide important natural or economic resources, functions and values.

2.14. Ecosystem. -- An integrated, self-functioning system consisting of interactions among both the biotic community and abiotic environment within a specified location in space and time. Sizes of ecosystems may vary considerably.

2.15. Endangered and Threatened Species. -- Any plant or animal species identified as endangered or threatened pursuant to federal, state, or local laws.

2.16. Engineering Controls. -- Remedial actions directed exclusively toward containing or controlling the migration of contaminants through the environment. These include, but are not limited to, slurry walls, liner systems, caps, leachate collection systems, and groundwater recovery trenches.

2.17. Exposure. -- Contact of an organism with a chemical or physical agent. Exposure is quantified as the amount of the agent available at the exchange boundaries of the organism

(e.g., skin, lungs, gut) and available for absorption.

2.18. Exposure Factors. -- Values used to estimate exposure in risk assessment, such as the number of days per week that exposure is expected to occur, or the amount of contaminated media that a person might incidentally ingest per day.

2.19. Exposure Pathway. -- A complete exposure pathway consists of a source or release from a source, a transport/exposure medium (e.g., air) or media (in cases of intermediate transfer), an exposure point, and an exposure route.

2.20. Exposure Route. -- The way a chemical or physical agent comes in contact with a receptor (e.g., by eating [ingestion], breathing [inhalation], or touching [dermal contact]).

2.21. Fate and Transport. -- The behavior and movement of a chemical through an environmental ~~media~~medium.

2.22. Free product refers to a regulated substance that is present as a nonaqueous phase liquid (e.g., liquid not dissolved in water). These substances include liquid petroleum products such as gasoline, kerosene, diesel fuel, or oil, and any hazardous substance either listed in Section 101(14) of CERCLA or defined as such under RCRA. For petroleum hydrocarbons, the term nonaqueous phase liquid includes both liquid phase and residual phase hydrocarbons. Liquid phase product is capable of flowing downward and/or laterally into wells or excavations. Typically it exists as a pool or mound floating on the water table or resting on an impermeable soil layer. Residual phase product does not generally flow as a liquid; it occurs as globules within fractures or pores of soil or bedrock.

2.23. Gross Remediation Costs. -- The direct costs associated with remediation of a site and paid by the remediator. Gross remediation costs include the fees paid to the licensed remediation specialist, and contractors,

equipment expenses and rental, disposal costs, permit fees, remediation site personnel costs, and all other expenses directly related to achieving applicable standards at the site.

2.24. Habitat. -- The area or type of environment in which an organism or biological population naturally lives or is found.

2.25. Hazard Index. -- The sum of the hazard quotients for multiple substances and/or multiple exposure pathways.

2.26. Hazard Quotient. -- The value which quantifies noncarcinogenic risk for one chemical for one receptor population over a specified exposure period. The hazard quotient is equal to the ratio of a chemical-specific intake to the reference dose.

2.27. Hourly Rate. -- The gross annual salary (excluding benefits paid to an employee) divided by 2080.

2.28. Implementability. -- The technical and administrative feasibility of an action as well as the availability of needed goods and services.

2.29. Inactive property. -- Real property that has previously been used for commercial or industrial purposes but is no longer actively used for such purposes.

2.30. Industrial Land Use. -- Land used for commercial establishments, manufacturing plants, public utilities, mining, distribution of goods or services, administration of business activities, research and development facilities, warehousing, shipping, transport, remanufacturing, stockpiling of raw materials, storage, repair and maintenance of commercial machinery or equipment, and waste management.

2.31. Institutional Controls. -- Legal or contractual restrictions on property use that remain effective after the remedial action is completed and are used to meet applicable standards. The term may include, but is not limited to, deed and water use restrictions.

2.32. Land Use Covenant. -- Is an environmental covenant within the meaning of W. Va. Code § 22-22B-2(4), and is a servitude ~~which is agreed to by the owner of the property~~ arising out of remediation projects that attain and demonstrate continuing compliance with site-specific standards for any contaminants at the site, ~~and which meets the requirements of Section 13 of this rule and which is agreed to by the owner of the property.~~

2.33. Leaching Potential. -- The potential for soluble constituents to be dissolved and filter through the soil by a percolating fluid.

2.34. LOAEL or Lowest Observed Adverse Effect Level. -- The lowest concentration or dose evaluated in a test that causes statistically significant adverse effects in experimental trials.

2.35. LRS or Licensed Remediation Specialist. -- An individual certified by the secretary pursuant to rules adopted under Section 3 of Article 22 as qualified to perform professional services and to supervise the remediation of contaminated sites.

2.36. --Natural Background. -- --Ambient concentrations of chemicals that are present in the environment and have not been influenced by humans (e.g., iron, manganese).

2.37. NOAEL or No Observed Adverse Effect Level. -- The highest concentration or dose evaluated in a test that does not cause statistically significant adverse effects in experimental trials.

2.38. New Information. -- Any information obtained directly or indirectly by the department from any person after issuance of a certificate of completion, but does not include information the department has received in the application for participation in the voluntary remediation program, including any site assessment, during the execution of the voluntary remediation agreement or any work plan developed under such an agreement, or other information available to department under the voluntary remediation program prior to the execution of

the certificate of completion. Information that does not qualify as new information may be considered by the secretary along with new information if necessary, to determine whether any of the conditions for reopening set out in section 16 of this rule, have occurred.

2.39. No Further Action. -- A site is eligible to receive a Certificate of Completion on the basis of site assessment sampling or sampling data developed under a Voluntary Remediation Agreement which demonstrates that the site meets all applicable standards.

2.40. Operator. -- The person responsible for the overall operation of a facility site. For purposes of this rule, a person who executes a voluntary remediation agreement with the secretary may be deemed an operator for the purpose of carrying out the activities required by the agreement.

2.41. Potential to Migrate. -- Refers to the ability of contaminants to migrate from a source or soil to groundwater.

2.42. Primary Employee. -- A voluntary remediation project manager, engineer or scientist employed by the secretary in negotiating, facilitating, overseeing or confirming a voluntary remediation project. The term does not include secretaries, paralegals, clerks, technicians or others who serve to support the activities of the primary employee.

2.43. Prime Rate. -- The base rate on corporate loans posted by at least 75% of the nation's 30 largest banks.

2.44. Probabilistic Risk Assessment. -- A risk assessment performed using a mathematical technique that produces a distribution of values for a calculated term by solving for that term in successive iterations. Each successive iteration requires the selection of a single input value from defined distribution(s) for each of the terms used to derive the calculated term.

2.45. Readily Apparent Harm. -- If any one of the following criteria are observed at the site, then readily apparent harm is found:

2.45.a. Visual evidence of stressed biota attributable to the release at the site, including, but not limited to, fish kills or abiotic conditions; or

2.45.b. Visible presence of oil, tar, or other non-aqueous phase contaminant in soil over an area equal to or greater than two acres, or over an area equal to or greater than 1,000 square feet in sediment.

2.46. Reasonably Anticipated Future Use. -  
- Potential future land and water uses which have a credible chance of occurrence.

2.47. ~~Reasonably~~ Reasonable Potential. -- A scenario with a credible chance of occurrence without considering extreme or ~~essentially~~ highly unlikely circumstances.

2.48. Receptors (Human). -- Humans potentially exposed to contaminants released from the Site.

2.49. Remedial Action. -- To ~~cleanup~~ Cleanup, mitigate, correct, abate, minimize, eliminate, control and contain or prevent a release of a contaminant into the environment in order to protect the present or future public health, safety, welfare, or the environment, including preliminary actions to study or assess the release.

2.50. Reopener. -- One or more of the grounds for setting aside some or all of a certificate of completion and reopening a voluntary agreement that is specified in section 16 of this rule.

2.51. Residential Land Use. -- Any real property or portion thereof which is used for housing of human beings. This term includes property used for schools, day care centers, nursing homes, or other residential-style facilities or recreational areas.

2.52. Revolving Fund. -- The Brownfields Revolving Fund established in W.Va. Code §22-22-6(b).

2.53. Risk-based Concentrations. -- Concentration levels developed by the secretary for individual chemicals that correspond to a specific incremental cancer risk level of  $1 \times 10^{-6}$  for residential land use and  $1 \times 10^{-5}$  for industrial land use or a hazard quotient of 1. These concentrations are to be used ~~with the~~ as De Minimis Standards.

2.54. Saturation Concentration. -- The maximum possible quantity of a substance which can ~~dissolve into solution of a standard volume of a specific solvent given liquid (e.g., water) under standard conditions of a given temperature and pressure.~~

2.55. Secretary. -- The secretary of the Department of Environmental Protection or such other person to whom the secretary has delegated authority or duties pursuant to this rule.

2.56. Site. -- Any property or portion thereof which contains or may contain contaminants and is eligible to participate in the voluntary remediation program as provided under this article.

2.57. Site Assessment. -- Characterization of a site through an evaluation of its physical and environmental ~~characteristicse~~ context, (e.g., subsurface geology, soil properties and structures, hydrology, and surface characteristics) to determine if a release has occurred, the levels of the chemical(s) of concern in environmental media, and the likely physical distribution of the chemical(s) of concern. The site assessment collects data as needed on ground water and surface water quality, land and resource use, potential receptors and generates information to support remedial action decisions.

2.58. Site Assessment Costs. -- Costs incurred in connection with site assessment activities including but not limited to: waste disposal costs, professional fees and expenses of those evaluating contamination, the cost of identifying a site history and prior land use, the costs of archaeological investigations, and

attorneys fees incurred in evaluating a site or negotiating a voluntary remediation agreement.

2.59. Systemic Toxicant. -- A harmful substance or agent that may enter the body and injure an organ or organ system and having an effect other than causing cancer. Most chemicals that produce systemic toxicity do not cause a similar degree of toxicity in all organs but usually demonstrate major toxicity to one or two organs.

2.60. Total Dissolved Solids. -- All material that passes through the standard glass fiber filter as provided in the current edition of Standard Methods for the Examination of Water and Wastewater.

2.61. Trade Secrets. -- Any information protected from disclosure under W. Va. Code §29B-1-4(1).

2.62. Trophic Level. -- The biological energy transfer level; the position in a trophic pyramid or food chain.

2.63. Voluntary Remediation. -- A series of measures that are self-initiated by a person to identify and address potential sources of contamination of property and to establish that the property complies with applicable remediation standards. Brownfield remediation is a subset of voluntary remediation.

2.64. Voluntary Remediation Program. -- The program for the voluntary assessment and remediation of sites under the Act.

2.65. Weight-of-Evidence Approach. -- The process by which measurement endpoints are related to an assessment endpoint to evaluate whether a significant risk of harm is posed to the environment. The approach is planned and initiated at the problem formulation stage and results are integrated at the risk characterization stage.

### §60-3-3. Eligibility.

3.1. Eligibility criteria for voluntary remediation program. -- Any site is eligible to

participate in the voluntary remediation program except the following:

3.1.a. Any site that is subject to a unilateral order issued by the U.S. Environmental Protection Agency pursuant to §§104 through 106 of the Comprehensive Environmental Response, Compensation and Liability Act;

3.1.b. Any site that has been listed or proposed to be listed on the National Priorities List developed by the U.S. Environmental Protection Agency pursuant to Title I of the Comprehensive Environmental Response, Compensation and Liability Act; unless it provided that any site that has been formally delisted by the Environmental Protection Agency is eligible to participate in the voluntary remediation program;

3.1.c. Any site that is subject to a unilateral enforcement order under §3008 or §7003 of the Resource Conservation and Recovery Act;

3.1.d. Any site that is subject to a unilateral enforcement order for corrective action issued pursuant to any provision of Chapter 22 of the West Virginia Code; or

3.1.e. Any site where the release which is subject to remediation was created through gross negligence or willful misconduct by the applicant.

3.2. Eligibility Criteria for Brownfield Sites. -- A site may participate in the voluntary remediation program as a brownfields property if the following conditions are satisfied and the applicant qualifies as a brownfield applicant under this rule:

3.2.a. The site meets the requirements of subsection 3.1 of this rule;

3.2.b. The applicant did not cause or contribute to contamination on the site; and

3.2.c. The site meets either of the following criteria:

3.2.c.1. As of July 1, 1996, the site is an industrial or commercial property which is abandoned; or

3.1.c.2. As of July 1, 1996, the site is an industrial or commercial property that is not being actively used by the owner.

3.3. Eligibility Determination. In deciding the acceptability of an application the secretary shall determine whether the eligibility criteria of this section have been satisfied.

3.4. Appeal of Rejection of Application.

3.4.a. The applicant may appeal the rejection of the application by filing a notice of appeal with the Environmental Quality Board in accordance with the provisions of W. Va. Code §22B-1-7.

3.4.b. For purpose of this appeal, the record of proceedings as referenced in §22B-1-7 shall consist of the application, all correspondence between the secretary and the applicant relating to the application and other documents and correspondence in the applicable files of the secretary relating to this matter.

#### **§60-3-4. Application to Participate in Voluntary Remediation Program.**

4.1. Pre-application Conference for Brownfield Applicants. A brownfield applicant shall confer with the secretary and, if a loan is being requested, comply with the loan procedures contained in section 15 of this rule before submitting an application to participate in the voluntary remediation program.

4.1.a. The conference with the secretary shall include a discussion of the condition of the site, the potential future use of the site, the amount of public funds and private funds to be used at the site, and the amount of any loan that will be requested.

4.1.b. A brownfield applicant may submit the information listed in section 4.1.a via writing or electronic transmission and that

written submission shall satisfy the obligation to confer with the secretary.

4.2. Contents of Application. Any person who desires to participate in the voluntary remediation program shall submit to the secretary of the Department of Environmental Protection ~~an application on a form provided by the secretary, a hardcopy and electronic application~~ which shall contain, at a minimum, the following information:

4.2.a. The applicant's name. This shall include the applicant's legal name and any other aliases or other names by which the applicant is known or under which the applicant does business;

4.2.b. The applicant's address. This shall include the current address at which the applicant can be reached by mail, and in the event that post office delivery is not feasible, the applicant shall also provide a description of his/her current address that will enable the secretary to locate the applicant;

4.2.c. The applicant's financial capabilities. This shall include, but is not limited to, information that demonstrates the applicant has, or has secured access to, financial resources that are adequate to successfully complete the voluntary remediation and satisfy any contractual obligations entered into by the applicant that relate to the voluntary remediation;

4.2.d. The applicant's technical capabilities. This shall include, at a minimum, information that the applicant is or has contracted with a licensed remediation specialist to perform the work required;

4.2.e. For brownfield applicants, a Notice of Intent to Remediate in accordance with subsection 7.1 of this rule, and a certification that he/she, his/her spouse or other member of his/her immediate family did not cause or contribute to the contamination on the property;

4.2.f. A general description of the site. This shall include, at a minimum, the following:

4.2.f.1. A written description of the site that includes any city, county, and street addresses, and adjacent landmarks, buildings, waterways, former uses or other identifying information;

4.2.f.2. The deed book number and deed-page number of the site property;

4.2.f.3. County tax map references;

4.2.f.4. Geographic information system data adequate to accurately delineate the voluntary remediation site. All spatial data submitted by the applicant will be in one of three coordinate systems:

4.2.f.4.A. Universal transverse mercator (UTM) zone 17 NAD datum. (Preferred);

4.2.f.4.B. Geographic (Latitude and Longitude); or

4.2.f.4.C. State plane coordinates NAD 27 datum.

4.2.f.5. All geo-graphic information system location data will have a horizontal accuracy within 12.2 meters (40 feet) in accordance with the US Department of the Interior US Geologic Survey National Map Accuracy Standards;

4.2.f.6. Any other identifying information that will serve to clearly and concisely identify the property;

4.2.f.7. Information of which the applicant is aware concerning the nature and extent of any known contamination at the site and immediately contiguous to the site, or wherever the contamination came to be located;

4.2.f.8. Information demonstrating the applicant's legal right to perform the work required for participation in the program (e.g., title report, deed, or access agreement).

4.2.f.9. Where an application covers two or more non-contiguous locations, this information shall be provided for each location.

4.2.g. A site assessment prepared by a licensed remediation specialist ~~which~~ and includes information that identifies all actual or potential contaminants reasonably expected to be at and near the site, the nature and extent of the contamination, and potential receptors and pathways for contaminant migration. In no case, however, may an application be denied on the grounds that the site assessment is inadequate if the site assessment satisfies the requirements contained in W. Va. Code §22-22-4(e). Where the secretary determines that additional site assessment information is necessary, the submission of such additional information may be addressed in the voluntary remediation agreement.

4.2.h. An applicant may appeal the secretary's rejection of an application to the Environmental Quality Board in accordance with W. Va. Code §22B-1-7.

4.2.i. Other information as requested by the secretary.

#### 4.3. Application Fee.

4.3.a. Each applicant shall pay an application fee in accordance with this section. The fee is to be submitted at the time the application is filed in the form of a check payable to the Voluntary Remediation Administrative Fund.

4.3.b. Should the applicant withdraw the application ~~at anytime~~ prior to the determination of eligibility by the secretary, the applicant shall receive a refund of one-half the application fee paid.

4.3.c. If the secretary rejects the application and applicant does not re-submit a revised application within 25 days, the secretary shall refund one-half the application fee within 30 days of the rejection of the application.

4.3.d. The application fee to be paid shall be calculated based upon the points assigned to the property using the following criteria:

4.3.d.1. Size of Property. The total square feet of surface area of the property to be covered by the application, rounded to the nearest 1,000 square feet. For properties less than 1 acre, the assigned points are 10; for properties of one acre or more but less than 5 acres, the assigned points are 20; for properties of 5 acres or more, the assigned points are 30;

4.3.d.2. Years of Operation. The number of years that the property was operated for any non-residential activity. Partial years of operation should be treated as complete years of operation. For properties operated 10 years or less, the assigned points are 10; for properties operated more than 10 years but less than 20, the assigned points are 20; and for properties operated 20 years or more, the assigned points are 30.

4.3.d.3. NAICS Code. Using the North American Industry Classification System published by the U.S. Office of Management and Budget as it applies to the activities that have been conducted on the property, if the property falls within NAICS Subsector Codes 316 (Leather and Allied Product Manufacturing), 322 (Paper Manufacturing), 324 (Petroleum and Coal Products Manufacturing), 325 (Chemical Manufacturing), 326 (Plastics and Rubber Products Manufacturing), 331 (Primary Metal Manufacturing), 332 (Fabricated Metal Products Manufacturing), 333 (Machinery Manufacturing), 334 (Computer and Electronic Product Manufacturing), 335 (Electrical Equipment, Appliance, and Component Manufacturing), 336 (Transportation Equipment Manufacturing), or 339 (Miscellaneous Manufacturing), the assigned points are 30; if the property falls within NAICS Subsector Codes, 113 Forestry and Logging, 211 (Oil and Gas Extraction), 212 (Mining (except Oil and Gas)), 213 (Supporting Activities for Mining), 221 (Utilities), 311 (Food Manufacturing), 312

(Beverage and Tobacco Product Manufacturing), 313 (Textile Mills), 314 (Textile Product Mills), 315 (Apparel Manufacturing), 321 (Wood Product Manufacturing), 323 (Printing and Related Support Activities), 327 (Nonmetallic Mineral Product Manufacturing), 337 (Furniture and Related Product Manufacturing), 486 (Pipeline Transportation), 448 (Support Activities for Transportation), 511 (Publishing Industries), or 562 (Waste Management and Remediation Services), the assigned points are 20, and if the property falls within any other NAICS Subsector Code, the assigned points are 10. If any activity falls in more than one of these groupings, the category which results in the greatest number of points being assigned shall be used;

4.3.d.4. For any of these criteria, if the correct category is not known, the category resulting in the greatest number of points shall be assumed to apply;

4.3.d.5. Applying the criteria described above, where the total number of points is 30 or 40, the application fee shall be \$1,000; 50 or 60, the application fee shall be \$3,000; and 70, 80 or 90, the application fee shall be \$5,000; and

4.3.d.6. If the application covers 2 or more non-contiguous locations, the application fee shall be \$5,000, provided that the locations under consideration display similar contaminant profiles and similar surface and subsurface characteristics. Similar surface/subsurface characteristics shall be construed to be limited to upland, riparian/wetland, karst or other similar land forms as approved by the secretary. If any of the individual locations includes a surface area greater than 2 acres, a separate application and fee must be submitted for that site.

4.4. Confidentiality. -- Information obtained by the department pursuant to this rule shall be available to the public unless the secretary certifies such information to be confidential. The secretary may make such certification where any person shows, to the satisfaction of the secretary, that the information

or parts thereof, if made public, would divulge methods, processes or activities entitled to protection as trade secrets.

4.5. Action on Application. -- The secretary shall act upon all applications within 45 days of receipt, unless an extension of time is mutually agreed upon between the secretary and the applicant, and confirmed in writing. The secretary may approve the application, reject the application, or accept the application subject to correction. The applicant shall be given a reasonable amount of time to make corrections specified by the secretary.

### **§60-3-5. Licensed Remediation Specialists.**

5.1. Professional Responsibilities of Licensed Remediation Specialists.

5.1.a. Any individual who wishes to practice as a licensed remediation specialist in the state of West Virginia must hold a valid remediation specialist license. Each individual shall have the burden of demonstrating to the secretary's satisfaction that he or she meets the requirements for licensing.

5.1.b. It is the licensed remediation specialist's duty to protect the safety, health and welfare of the public in the performance of his or her professional duties. If he or she is unable to meet this duty, the licensed remediation specialist may either sever the relationship with the client or employer or refuse professional responsibility for the work plan, report or design. If the relationship is severed, the applicant shall notify the division within 72 hours of the severing of the relationship.

5.1.c. Specific areas of professional responsibility of the licensed remediation specialist are as follows:

5.1.b.c.1. The licensed remediation specialist is responsible for any release of contaminants during assessment and remediation activities undertaken pursuant to and contemplated in the approved remediation agreement, work plans or reports. The act of moving contaminants within a site in the course

of remediation activities shall not be considered to be a release;

5.1.b.c.2. Where a release of contaminants in excess of those identified in the work plan occurs at the site during remediation activities, the licensed remediation specialist shall immediately notify the division unless the release does not exceed reportable quantities found in 40 CFR Part 302;

5.1.b.c.3. A licensed remediation specialist shall only perform assignments for which the specialist is qualified by training and experience in those specific technical fields;

5.1.b.c.4. A licensed remediation specialist shall be objective in work plans, reports and opinions and avoid any conflict of interest with employer, clients and suppliers;

5.1.b.c.5. A licensed remediation specialist shall not solicit or accept gratuities, directly or indirectly from contractors, agents or other parties dealing directly with the employer or client in regard to professional services being performed at the work site;

5.1.b.c.6. A licensed remediation specialist shall not accept any type of bribe; falsify or permit misrepresentation of professional qualifications; intentionally provide false information to the secretary; or knowingly associate with one who is engaging in business or professional practices of fraudulent or dishonest nature; and

5.1.b.c.7. A licensed remediation specialist shall not charge any special fees above usual and customary professional rates for being licensed.

—5.1.ed. The secretary may revoke a license; suspend a license for not more than five years; or impose lesser sanctions as appropriate for acts or omissions in violations of this rule or W. Va. Code §22-22.

5.2. Application for licensure. -- Any individual who wishes to obtain a license to practice as a licensed remediation specialist

must submit a complete and accurate application to the secretary on forms supplied by the secretary. An application fee, as specified in Table 60-3A of this rule, shall be submitted with the application. In order to qualify for the licensed remediation specialist examination, the applicant must demonstrate to the secretary that the following eligibility requirements have been met:

5.2.a. Minimum Education Requirements: All individuals applying for a license shall meet the requirements of one of the following tracks:

5.2.a.1. Standard Track: The individual has earned a baccalaureate, masters, or doctorate degree from an accredited educational institution in one of the following areas: biology, chemistry, earth sciences, environmental sciences, geology, hydrogeology, microbiology, soil sciences, toxicology, scientific subdisciplines of public health, risk assessment, ~~or~~ hazardous waste management, engineering, or in a curriculum determined to be equivalent by the secretary. The charter or accreditation of the recognized educational institution must have been effective as of the date the individual's degree(s) was granted; or

5.2.a.2. Alternative Track: The individual has earned at least a high school diploma, but does not meet the requirements for the standard track.

5.2.b. Minimum Experience Requirements: Each individual shall demonstrate to the secretary's satisfaction that he or she meets the requirements for relevant professional experience. Qualifying relevant professional experience must be work of a professional grade and character that indicates the individual is competent to perform professional services pursuant to the requirements of the Act.

5.2.b.1. Relevant professional experience shall include, at a minimum, practical knowledge of the following:

5.2.b.1.A. Remediation activities;

5.2.b.1.B. Procedures necessary to remediate a site;

5.2.b.1.C. Management of contaminants at a site, including, but not limited to:

5.2.b.1.C.1. Site investigation;

5.2.b.1.C.2. Health and safety protocol; and

5.2.b.1.C.3. Quality assurance.

5.2.b.1.D. Feasibility studies; and

5.2.b.1.E. Remedial design.

5.2.b.2. Standard Track: The individual must have six years of relevant professional experience, one of which is supervisory or project management related.

5.2.b.3. Alternative Track: The individual must have ten years of relevant professional experience, one of which is supervisory or project management related.

5.2.b.4. In addition to the practical knowledge criteria pursuant to paragraph 5.2.b.1 of this rule, the secretary will also consider the following criteria in evaluating whether an individual's remediation and practical experience, considered both individually and collectively, constitute sufficient relevant professional experience:

5.2.b.4.A. Proficiency;

5.2.b.4.B. Broad knowledge of the various remediation technologies;

5.2.b.4.C. Number of individuals and disciplines of other professionals supervised or coordinated;

5.2.b.4.D. Duration of employment;

5.2.b.4.E. Nature of work performed (including, but not limited to, whether such experience includes work at sites where subsurface investigations have occurred); and

5.2.b.4.F. Any other factors the secretary deems relevant.

5.2.b.5. The individual applying for licensing shall also provide the secretary with three professional references, each of which, at a minimum, address the individual's range of practical knowledge and professional experience with regard to providing professional services under the Act.

5.2.b.6. Work performed during a period of full-time undergraduate study at an educational institution is considered part of the educational program and is not considered acceptable professional experience; provided, however, that the secretary may accept work performed for periods of at least two and one half consecutive months per calendar year when not enrolled as a full-time student, during, or incidental to, undergraduate education as relevant professional experience if the individual did not receive college credits for that work.

5.2.c. Credits: Individuals who have earned degrees from recognized educational institutions in addition to those required to meet the minimum educational requirements set forth in 5.2.a. may request that the secretary credit some or all of that additional education toward the requirements for relevant professional experience in accordance with the following:

5.2.c.1. Standard Track: One year credit for each master's degree, and two years credit for a doctorate degree, if the degrees are from a recognized educational institution in one of the academic areas identified in 5.2.a.1;

5.2.c.2. Alternative Track: One-half year credit for each associate's degree in

one of the academic areas identified in 5.2.a.1;  
and

5.2.c.3. The secretary will grant to an individual up to two years maximum credit for additional education under the Standard Track; or up to one year maximum credit for additional education under the Alternate Track.

5.3. Licensing Examination: The secretary shall be responsible for implementing the following requirements, at a minimum, of the licensed remediation specialist examination:

5.3.a. Frequency and Scheduling: The secretary shall administer a licensing examination at least every six months to all individuals who have met the requirements for licensure. Examinations shall be held at the time(s) and location(s) set by the secretary. The secretary shall provide public notice at least 15 days prior to the application due date for the next scheduled examination;

5.3.b. Examination Format/Content: Examinations shall test the individual's overall regulatory understanding, and overall technical understanding. Overall regulatory understanding means an understanding of the relevant West Virginia Department of Environmental Protection regulations and related written policies and Federal environmental regulations. Overall technical understanding means demonstrating an understanding of basic concepts and methods in those scientific and technical fields related to assessment, containment, and remediation actions;

5.3.c. The secretary shall prepare the licensing examination;

5.3.d. The secretary shall initially develop a minimum of three separate examinations. No single examination shall be repeated until the other two examinations have been given;

5.3.e. After any of the individual examinations have been used twice, the secretary shall prepare a minimum of three new examinations;

5.3.f. An individual may take an examination only if the applicable examination fee established by the secretary has been paid. The examination fee, as specified in Table 60-3A of this rule, shall be submitted after an applicant's eligibility to take the exam has been confirmed with the application. Payment shall be made in full by check or money order payable to the West Virginia Department of Environmental Protection. The examination fee is non-refundable, except in the following circumstances:

5.3.f.1. An individual whose failure to appear for the examination is found, by the secretary, to be due to circumstances beyond the individual's reasonable control, shall receive a refund or may request that the application be held open until the individual can take a subsequent examination that occurs within two years of the date the secretary approved the individual's written application.

5.3.g. Examination Procedures and Rules: Each individual shall present some form of photographic identification prior to taking the test. The secretary shall identify whether he or she may use any books, notes, memoranda, scratch paper, non-programmable calculators, or other materials during the examination. No individual may discuss the examination or other procedures, and no individual may make copies of the examination;

5.3.h. The secretary shall establish the passing score prior to administering the examination;

5.3.i. Examination Results: The secretary shall grade the examinations, and the results shall be mailed to each individual within 30 days of the examination. The examination papers will not be returned to the individual;

5.3.j. Reapplication for Examination: Individuals who fail to achieve a passing score on the examination may take a subsequent examination subject to the following procedures:

5.3.j.1. An individual shall be allowed to take a subsequent examination that is scheduled to occur on a date not more than two years after the date the secretary approved the individual's written application, upon receipt by the secretary of the following items:

5.3.j.1.A. A letter stating the individual's intention to take the subsequent examination; and

5.3.j.1.B. The appropriate examination fee;

5.3.j.2. Individuals who seek to take a subsequent examination that is scheduled for a date that is greater than two years after the date the secretary approved the individual's written application must submit the following:

5.3.j.2.A. Licensing application as per the procedures set forth in 5.2; and

5.3.j.2.B. The full application fee described in 5.2 prior to taking the examination.

5.3.k. Waiver of Examination. -- If an individual requests a waiver of the examination for licensure as a Remediation Specialist, the application shall include any and all information that the applicant desires to be considered including but not limited to relevant licenses and certifications. The secretary may issue a one time waiver of the examination for the purpose of submitting an application for a Voluntary Remediation Agreement. This waiver shall only be valid for six months after the effective date of the rule. No remediation workplan shall be implemented unless and until the Remediation Specialist has passed the examination. However, to be eligible for a waiver, these individuals shall meet all other requirements for licensing, including, but not limited to, education, relevant professional experience, and practical knowledge;

5.3.k.1. An examination fee must be submitted regardless of whether the applicant is requesting a waiver of the examination.

5.3.l. Reciprocity. A licensed remediation specialist in another state may be licensed as a remediation specialist in West Virginia without examination provided that the licensing state recognizes West Virginia licensure.

5.3.l.1. An examination fee must be submitted regardless of whether reciprocity applies.

#### 5.4. License renewal.

5.4.a. A licensed remediation specialist in good standing may have his/her license renewed every two years. A renewal application filed in accordance with all appropriate time frames which includes the appropriate license renewal fee found in Table 60-3A will be considered a complete renewal application. A renewal application shall include evidence of continuing education in the environmental remediation field. Such evidence may include two education credits from a US EPA-approved course or any other equivalent experience acceptable to the secretary.

5.4.b. The secretary will provide a license renewal notice to the licensed remediation specialist 90 days prior to his or her license expiration. Any individual who fails to renew their license may not continue to practice as a licensed remediation specialist after the day of license expiration. Any individual who fails to renew their license within 30 days of the expiration must reapply for examination and is subject to the same requirements as a new applicant.

5.4.c. An individual who has completed in a timely manner all of the license renewal requirements will receive a renewed license and may continue to practice as a licensed remediation specialist prior to receiving the renewed license by registered mail.

5.4.d. Where there has been an application timely filed for renewal of a license and the secretary determines that grounds exist for non-renewal of the license, the secretary shall follow the same procedure for suspension

or revocation of licenses in subsection 5.5 of this rule and, pending a final decision by the secretary on such renewal, the license shall remain in effect.

5.5. Suspension and Revocation of Licenses. The provisions set forth in this subsection shall be in addition to and shall not limit the procedures regarding enforcement orders contained in W. Va. Code §22-22-12.

5.5.a. Criteria for suspension or revocation of license. A license issued to a licensed remediation specialist may be suspended or revoked for the following reasons:

5.5.a.1. For fraud by the licensed remediation specialist in the license application process;

5.5.a.2. For fraud or intentional misrepresentation by the licensed remediation specialist in the performance of any work required in a work plan or pursuant to a voluntary remediation agreement;

5.5.a.3. For any act by the licensed remediation specialist in violation of this rule; or

5.5.a.4. Any circumstances that justify revocation of a license under this rule may also justify the non-renewal of such license.

5.5.b. Issuance of Notice of Intent -- If the secretary finds that sufficient grounds exist to suspend or revoke the license of a licensed remediation specialist, prior to the suspension or revocation, the secretary shall notify the licensed remediation specialist of the secretary's intent to suspend or revoke the license. The secretary shall provide the licensed remediation specialist with a Notice of Intent to Suspend or Revoke by certified mail, return receipt requested. The Notice shall set forth the specific reasons for the proposed suspension or revocation and shall state that the licensed remediation specialist may request an informal conference or a contested case hearing as provided in W. Va. Code §29A-5-1 on the proposed suspension or revocation. The purpose of the informal conference and the contested case hearing is to determine the rights,

duties, interests and privileges of the licensed remediation specialist. The secretary may appoint an impartial hearing officer to conduct an informal conference or contested case hearing.

5.5.c. Request for Informal Conference or Contested Case Hearing. -- The licensed remediation specialist has 30 calendar days from the receipt of the notice to make a written request for an informal conference or contested case hearing. A request is deemed served on the day it is deposited in the United States mail. Failure to respond will result in the imposition of the proposed suspension or revocation. The licensed remediation specialist shall have a right to an informal conference prior to a formal hearing. The licensed remediation specialist may request an informal conference or a contested case hearing, but the request for and holding of an informal conference does not preclude the licensed remediation specialist from requesting a contested case hearing following the disposition reached in the informal conference.

5.5.c.1. The issuance of a notice of intent to suspend or revoke the license of a licensed remediation specialist shall not prevent the licensed remediation specialist from rendering services under the voluntary remediation program pending a final decision from the secretary following an informal conference and, if requested, a contested case hearing.

5.5.d. In all proceedings under this section, the licensed remediation specialist may be represented by counsel. All notice required by this rule shall be sent to counsel in the same manner as is required to be provided to the licensed remediation specialist.

5.5.e. Informal conference. -- If an informal conference is requested within the thirty day period, the secretary shall schedule the conference to be held within 30 days in accordance with the following requirements:

5.5.e.1. The secretary shall notify the licensed remediation specialist and the

primary representative of the Department of Environmental Protection who was involved in the decision to suspend or revoke the licensed remediation specialist's license of the time and place of the informal conference. In scheduling the location of the informal conference, the compliance officer shall consider the location of the licensed remediation specialist's business and any particular sites that may have given rise to the decision to revoke or suspend;

5.5.e.2. The secretary shall notify the licensed remediation specialist of the informal conference at least 15 calendar days prior to the date of the informal conference; and

5.5.e.3. The secretary may continue the informal conference upon the agreement of the licensed remediation specialist or for good cause shown.

5.5.f. Informal Conference Procedures. An informal conference, as provided by these regulations, is intended to be an informal discussion of the facts which gave rise to the issuance of the decision to suspend or revoke a license. The secretary shall conduct the conference in the following manner:

5.5.f.1. The secretary shall be guided by, but need not strictly apply, the West Virginia Rules of Civil Procedure and West Virginia Rules of Evidence;

5.5.f.2. A record of the informal conference is not required but any party may request that a record be made at that party's expense. Any other ~~party~~ parties to the conference may obtain copies of the record at ~~his~~ their expense;

5.5.f.3. During an informal conference the licensed remediation specialist may submit to the secretary any evidence or demonstration of mitigating circumstances as to why the secretary should alter the decision to suspend or revoke the license; and

5.5.f.4. At any review proceedings which may occur later, no evidence as to any oral statement made by one party at the informal

conference may be introduced as evidence by another party, nor may any statement be used to impeach a witness, unless the statement is or was available as competent evidence independent of its introduction during the informal conference.

## 5.6. Written Decision.

5.6.a. If the licensed remediation specialist and the secretary are able to reach an agreement, the secretary shall prepare a written decision signed by the licensed remediation specialist and the secretary implementing the decision reached in the informal conference.

5.6.b. If the licensed remediation specialist and the secretary are unable to reach an agreement, within 30 calendar days following the informal conference, the secretary shall issue and furnish to the licensed remediation specialist a written decision affirming, modifying or dismissing the initial proposal to suspend or revoke the license and give the specific reasons for the decision. The notice of decision by the secretary shall be sent to the licensed remediation specialist by certified mail return receipt requested.

5.6.c. Within 30 calendar days of the receipt of the secretary's written decision, the licensed remediation specialist may demand a formal hearing as provided herein to determine the rights and privileges of the licensed remediation specialist. The licensed remediation specialist must serve a request in writing upon the secretary within 30 days of receipt of the written decision. A request is deemed served on the day it is deposited in the United States mail. Failure to request a formal hearing on the written decision within the time specified shall cause the decision to become a final unappealable order of the secretary.

5.7. Contested Cases, Right to a Formal Hearing. As set forth above, within thirty (30) calendar days after notification of a written decision rendered as a result of an informal conference, the licensed remediation specialist may request a formal hearing before the secretary in accordance with the Administrative

Procedures Act, W. Va. Code §29A-5-1 et seq. If requested the secretary shall grant the request and schedule a contested case hearing.

5.8. Appeals. An appeal from any final order or ruling entered in a contested case in accordance with these regulations shall be to the Circuit Court of Kanawha County in accordance with the provisions of the Administrative Procedures Act, W. Va. Code §29A-5-1 et. seq.

5.9. Alternative Procedure. When imminent or substantial harm is threatened or posed at a voluntary remediation site which in the secretary's opinion is attributable to the negligence or incompetence of the licensed remediation specialist at the site, the secretary may, in lieu of the Notice of Intent under subdivision 5.5.b. of this rule, issue an order in accordance with W. Va. Code §22-22-12(a)(1). If a request for reconsideration is filed as provided in W. Va. Code §22-22-12(b), the secretary shall conduct a contested case hearing within ten days of the filing of such request.

#### **§60-3-6. Voluntary Remediation Agreement.**

6.1. Any person who desires to participate in the voluntary remediation program shall execute a voluntary remediation agreement with the secretary of the Department of Environmental Protection. The agreements contained in Appendix 60-3A and 60-3B meet the requirements of this section. Additional provisions and modifications consistent with this rule may be agreed to by the applicant and the secretary. Except as provided in subsection 6.4 of this rule, the Voluntary Remediation Agreement shall provide for the following:

6.1.a. The services of a licensed remediation specialist for the supervision of all activities described in the agreement, including the supervision of remediation contractors;

6.1.b. The recovery of all reasonable costs incurred by the Department of Environmental Protection attributable to the implementation of the agreement in excess of fees submitted with the permit application. Recoverable costs shall include the following:

6.1.b.1. Costs incurred in review and oversight of work plans and reports submitted pursuant to the agreement;

6.1.b.2. Costs incurred as the result of field activities attributable to the agreement;

6.1.b.3. Such other costs incurred by the Department of Environmental Protection in implementing and overseeing activities under the agreement;

6.1.b.4. All recoverable costs shall be billed against any deposit and subsequently by separate invoice; and

6.1.b.5. Recoverable costs shall be determined by the number of hours worked under the agreement by each primary employee multiplied by 2.5 times the hourly rate of each such employee and then adding the direct expenses incurred by each such employee.

6.1.c. A schedule for the payment of recoverable costs;

6.1.d. A description of any work plan or report that is to be submitted under the agreement for review by the secretary, including the final report which shall provide all information necessary to verify that all work contemplated by the agreement has been completed: provided, however, that at the discretion of the applicant, work plans describing the work to be performed at the site may be submitted for approval by the secretary with the execution of the agreement;

6.1.e. The identification of appropriate tasks, deliverables and schedules for the submission of any work plans and other deliverables and for the performance of the remediation;

6.1.f. A listing of all environmental statutes and rules for which compliance is mandated;

6.1.g. A listing of the technical standards as determined in the guidance

document to be applied in evaluating the site assessment, the work plans and reports, with reference to the proposed future land use to be achieved;

6.1.h. A listing of the applicable standards to be achieved at the site;

6.1.i. Where applicable, a description of any engineering or institutional controls and any land use covenant to be imposed for the property;

6.1.j. The reopening of the voluntary remediation agreement upon consent of the parties or the occurrence of one or more of the conditions described in section 16 of the Act;

6.1.k. The modification of the voluntary remediation agreement upon the agreement of the parties; and

6.1.l. Field adjustments which achieve equal performance may be implemented by the licensed remediation specialist provided he or she notifies the division within 15 days.

6.2. The voluntary agreement shall recognize the right of the applicant to terminate the agreement, in its sole discretion, upon 15 days advance written notice of termination to the Department of Environmental Protection and shall include provisions for the recovery of costs incurred by the Department of Environmental Protection before the notice of termination is issued.

6.3. The voluntary remediation agreement may provide a mechanism for alternate dispute resolution between the parties to the agreement, including, but not limited to arbitration or mediation of any disputes under the agreement.

6.4. For a site where the applicant intends to demonstrate that the site meets all applicable standards without further remediation, in lieu of the requirements of subsection 6.1 of this rule, the voluntary remediation agreement shall provide for the following:

6.4.a. The payment of an agreed sum to cover all reasonable costs incurred by the Department of Environmental Protection attributable to the agreement in excess of fees submitted with the permit application;

6.4.b. A listing of all environmental statutes and rules for which compliance is mandated;

6.4.c. A listing of the technical standards as determined in the guidance document that are applied in evaluating the site assessment with reference to the proposed future land use to be achieved;

6.4.d. A listing of the applicable standards to be achieved at the site;

6.4.e. The reopening of the agreement upon the occurrence of one or more of the conditions described in section 16 of this rule; and

6.4.f. Where applicable, a description of any engineering or institutional controls and any land use covenant to be imposed for the property.

6.5. The voluntary remediation agreement shall reflect the secretary's determination of eligibility in accordance with section 3 of this rule.

6.6. At the discretion of the applicant, the voluntary remediation agreement may address all or only a portion of a site. At the discretion of the secretary the voluntary remediation agreement may cover two or more non-contiguous sites; provided that the sites display similar contaminant profiles and similar surface and subsurface characteristics. Similar surface and subsurface characteristics shall be construed to be limited to upland, riparian/wetland, karst or other similar land forms as approved by the secretary.

6.7. Where the applicant is a person other than the current owner of the site, and the voluntary remediation agreement contemplates the imposition of a land use covenant as

provided in section 13 of this rule, the agreement shall have appended to it a provision signed by the current owner(s) of the site authorizing and agreeing to cooperate in the execution and filing of a land use covenant in accordance with the voluntary remediation agreement.

6.8. Upon execution of the voluntary remediation agreement by the parties, the secretary shall not initiate any enforcement action against the applicant or any person described in section 18 of the Act for the contamination that is the subject of the agreement, unless there is an imminent threat to the public. ~~Upon final adoption of this rule, the secretary intends to issue a policy statement to the effect that~~ The secretary shall not initiate an ~~no enforcement action shall be initiated against~~ any applicant from the time the application is filed until the voluntary remediation agreement is signed so long as the applicant acts in good faith to negotiate a reasonable agreement.

6.9. At the applicant's discretion, he or she may in the interest of minimizing environmental contamination and promoting effective cleanups, begin cleanup of soil and groundwater before the voluntary remediation agreement is approved provided that he or she notifies the secretary.

**§60-3-7. Public Involvement/Public Notification.** -- Except to the extent incorporated by reference in subdivision 7.12.b, the requirements of subsections 7.1 through 7.8 of this section shall apply only to brownfield applicants as that term is defined in section 2 of this rule. The provisions of subsections 7.9 through 7.12 of this section shall be applicable only to applicants who are not brownfield applicants.

7.1. Notice of Intent to Remediate. -- All brownfield applicants shall file a Notice of Intent to Remediate a brownfield site with the secretary. This notice shall be in addition to the duty to confer required by section 4.1 of this rule. The notice shall be part of and filed with the application to perform a brownfield remediation.

7.1.a. The Notice of Intent to Remediate shall contain, to the extent known, the following:

7.1.a.1. The name and business address of the brownfield applicant, including street address or route number;

7.1.a.2. Geographic location of site and any name by which the site is locally known;

7.1.a.3. Current and former uses of site;

7.1.a.4. Proposed future use of site;

7.1.a.5. Present and suspected contaminants on site;

7.1.a.6. Proposed methods to remediate the site;

7.1.a.7. Proposed methods to control possible health exposure;

7.1.a.8. Location/address where interested persons may review the notice;

7.1.a.9. Name, address and telephone number of brownfield applicant contact for questions from interested individuals; and

7.1.a.10. Name, address and telephone number of Department of Environmental Protection contact where comments and questions can be received.

7.2. Department of Environmental Protection Notice to the Public.

7.2.a. Upon receipt of a Notice of Intent to Remediate, the Department of Environmental Protection shall publish a summary of the notice in a Department of Environmental Protection publication of general circulation. Information contained in the summary shall meet the requirements set forth in subsection 7.1 of this rule.

7.2.b. The summary also shall include information on the public's right under the Voluntary Remediation and Redevelopment Act to become involved in the development of the remediation and reuse plans for the site.

7.2.c. The Department of Environmental Protection shall issue a news release summarizing the Notice. The news release shall be sent to media outlets serving the general area where the remediation is proposed.

7.2.d. The Department of Environmental Protection also may post the Notice and information required under this section on the Department of Environmental Protection's Internet Website.

### 7.3. Notice to Governmental Agencies.

7.3.a. Upon receipt of a Notice of Intent to Remediate, the secretary shall notify the municipality and the county commission where the site is located.

7.3.b. Notice shall be issued to the county and/or municipal land use agency, or the area's Regional Planning and Development Council created under W. Va. Code §8-25-1.

7.3.c. Notice may be issued to the U.S. Environmental Protection Agency, U.S. Army Corps of Engineers, state Bureau for Public Health and other state or federal agencies that may have an interest in the remediation project.

7.3.d. The secretary shall notify the government agencies identified in this section of the Department of Environmental Protection's final decision on a Certificate of Completion.

### 7.4. Notice of Intent to Remediate Comment Period and Information Meeting.

7.4.a. The secretary shall require a 30-day comment period and information meeting on all Brownfield Notices of Intent to Remediate filed with the Department of Environmental Protection. Costs incurred under this section shall be paid by the brownfield applicant.

7.4.b. To notify the public of the start of the 30-day comment period, the brownfield applicant shall:

7.4.b.1. Erect a sign on the proposed brownfield site informing the community the site is being considered for participation in the state's brownfield program, under the Voluntary Remediation and Redevelopment Act;

7.4.b.2. The sign must be placed on the property so it is clearly visible and legible, and shall be, at a minimum, three feet by four feet;

7.4.b.3. The sign shall state: "This site is under consideration for environmental cleanup and participation in the state's brownfield program under the Voluntary Remediation and Redevelopment Act;"

7.4.b.4. The sign shall include the telephone number and address of the Department of Environmental Protection's brownfield office;

7.4.b.5. Publish a commercial box advertisement in a local newspaper of general circulation in the county where the brownfield remediation is proposed once a week for four consecutive weeks;

7.4.b.6. The advertisement shall be, at a minimum, four inches by four inches;

7.4.b.7. The advertisement shall contain information as set forth in subsection 7.1 of this rule, plus the time, date and location of the information meeting;

7.4.b.8. The brownfield applicant shall send a copy of the advertisement to the municipality and the county commission, the county and/or municipal land use agency, or the area's Regional Planning and Development Council created under W. Va. Code §8-25-1.

7.4.b.9. The Department of Environmental Protection shall draft the

advertisement and send it to the brownfield applicant for publication; and

7.4.b.10. The brownfield applicant shall submit certified and notarized proof of publication to the Department of Environmental Protection no later than four weeks after the last publication date. The certification of publication shall be made part of the final brownfield remediation agreement file.

7.4.c. The information meeting is to occur by day 21 of the 30-day comment period, provided that a minimum of 15 days notice is given for such meeting. The information meeting shall address how remediation issues are applied to the site, site risk issues including key risk assessment assumptions, uncertainties, populations considered, the context of site risk to other risks, and how the remedy will address site risks.

7.4.d. The information meeting for the purpose of informing the public shall occur in the community where the proposed brownfield remediation is to occur.

#### 7.5. Public Inspection of Brownfield Notice of Intent to Remediate.

7.5.a. A Brownfield Notice of Intent to Remediate filed with the Department of Environmental Protection shall be available for public inspection and copying.

7.5.b. The Notice shall be available upon request at the Department of Environmental Protection's Division of Waste Management Land Restoration in Charleston, and in the municipal and/or county commission offices where the remediation is proposed. Copies of the Notice also may be placed in the county library.

#### 7.6. Request to Participate in Remediation and Reuse Planning.

7.6.a. Any person may ask to be involved in the development of a brownfield remediation and reuse plan.

7.6.b. Requests to participate in a brownfield remediation and reuse plan shall be made in writing to the secretary during the 30-day comment period.

7.6.c. Each person who files a request may participate in the development of the remediation and reuse plan, in person or by representative.

#### 7.7. Brownfield Public Involvement Plan.

7.7.a. The brownfield applicant shall establish a Public Involvement Plan if requested by the public, county, municipality, or the secretary.

7.7.b. The brownfield applicant, in consultation with the persons requesting to be involved in the remediation and reuse of a brownfield site, shall develop a Public Involvement Plan within 30 days of receiving notice from the secretary that a request to participate, as provided in subsection 7.6 of this rule, has been received.

7.7.c. The brownfield applicant shall submit the Public Involvement Plan to the secretary for his/her review and approval prior to its implementation.

7.7.d. The Public Involvement Plan shall include, but is not limited to:

7.7.d.1. Provisions for further meetings in the community; and

7.7.d.2. Opportunities for participants to review and comment on each work plan as well as review and comment on the voluntary agreement before it is finalized and accepted by the secretary.

7.7.e. The secretary shall consider comments from participants and the brownfield applicant's responses to comments regarding the voluntary agreement, work plans, and reports before deciding whether to approve the submission.

7.7.f. Means of communicating with a community, may include, but ~~is~~are not limited to:

7.7.f.1. Brownfield applicant point-of-contact with public;

7.7.f.2. Establish and maintain mailing and telephone list of interested individuals;

7.7.f.3. Newsletter;

7.7.f.4. Doorstep notice to residents and businesses;

7.7.f.5. Newspaper, radio, and television advertisements;

7.7.f.6. News releases to local media;

7.7.f.7. Presentations to local civic organizations; and

7.7.f.8. Citizen advisory panel for development of remediation and reuse plan.

7.7.g. The Public Involvement Plan shall remain in effect until the Certificate of Completion is issued, or until the brownfield applicant withdraws from the brownfields program.

7.8. Technical Assistance. -- At any time during the life of the Public Involvement Plan, the participants other than brownfield applicants may petition the secretary for technical assistance related to:

7.8.a. Review of site-related documents;

7.8.b. Explaining technical information to panel members;

7.8.c. Translating technical information into language understandable to non-technical persons;

7.8.d. Providing assistance in communicating the concerns of the non-brownfield applicant members of the panel to the appropriate persons; or

7.8.e. Such other areas deemed appropriate by the secretary.

~~7.8.e.~~ 7.8.f. Upon receipt of such petition, the secretary and the brownfield applicant, by mutual agreement, will develop a technical assistance component to the Public Involvement Plan. Comments from other participants shall be considered in the development of such component. The applicant shall be responsible for expenses incurred in this process.

7.9. Public Notice of Applications for Voluntary Remediation Projects. -- Except for applications from brownfield applicants, upon receipt of an application to conduct a voluntary cleanup under the Act, the Department of Environmental Protection shall publish a summary of the application in a Department of Environmental Protection publication of general circulation. Information contained in the summary shall include:

7.9.a. The name and business address of the applicant, including a street address or route number;

7.9.b. Geographic location of site and/or, if one exists, the locally used name of the area;

7.9.c. Current use of site;

7.9.d. Suspected contaminants on site;

7.9.e. Proposed methods to clean up site;

7.9.f. Proposed methods to control possible health exposure;

7.9.g. Location address of where interested persons may review application;

7.9.h. Name, address and telephone number of applicant contact for questions from interested individuals; and

7.9.i. Name, address and telephone number of Department of Environmental Protection contact where comments and questions can be received.

7.9.i.1. The Department of Environmental Protection shall issue a news release summarizing the application. The news release shall be sent to media outlets serving the general area where the remediation is proposed.

#### 7.10. Public Inspection of Voluntary Application.

7.10.a. A voluntary cleanup application filed with the Department of Environmental Protection shall be available for inspection and copying by the public.

7.10.b. The application shall be available upon request at the Department of Environmental Protection's ~~Office of Waste Management~~ Division of Land Restoration in Charleston and in the municipal and/or county commission offices where the remediation is proposed. Copies of the application also may be placed in the county library.

#### 7.11. Public Involvement for Site Remediation Loans.

7.11.a. In the event an applicant to participate in the voluntary remediation program becomes a brownfield applicant, ~~he/she~~ the applicant shall be required to comply with subsections 7.4, 7.6, 7.7, and 7.8 of this rule.

#### 7.12. Public Involvement/Public Notification in Development of Remediation Goal.

7.12.a. In the development of remediation goals pursuant to subdivisions 9.3.d and 9.4.a of this rule, the secretary shall require a 30-day comment period and information meeting.

7.12.b. To notify the public of the start of the 30-day comment period, the applicant shall comply with paragraphs 7.4.b.5; 7.4.b.6; 7.4.b.7; 7.4.b.8; 7.4.b.9; 7.4.b.10; and subdivisions 7.4.c and 7.4.d of this rule.

7.12.c. The applicant shall respond to comments received during the comment period and submit the responses to the secretary and any commenters.

7.12.d. The secretary shall review the comments and applicant's responses when making a decision. The secretary shall notify the parties who provided comments during the comment period of his/her decision.

### §60-3-8. Risk Protocol.

This section establishes a risk protocol for conduct of human health and ecological risk assessments. It describes general requirements for risk assessments and specific requirements for baseline human health and ecological risk assessments, residual risk assessments, and application of probabilistic risk assessment methods.

8.1. General Requirements for Risk Assessments. Risk assessments shall consider existing and reasonably anticipated future human exposures and significant adverse effects to ecological receptors of concern in accordance with this rule.

8.1.a. Risk assessments may be conducted using either deterministic (single point value) or probabilistic risk assessment methodologies as agreed to in the Voluntary Remediation Agreement.

8.1.b. Risk assessments, to the extent practicable, shall consider the range of probabilities of risks potentially occurring, the range of size of populations likely to be exposed, current and reasonably anticipated future land and water uses, and quantitative and/or qualitative descriptions of uncertainties in accordance with subsections 8.1 and 8.2 of this rule.

8.1.c. Appropriate sources of toxicity information include the following:

8.1.c.1. For human health risk assessments, in order of preference:

8.1.c.1.A. U.S. EPA Integrated Risk Information System (IRIS);

8.1.c.1.B. U.S. EPA Superfund Health Risk Technical Support Center (SHRTSC) provisional peer reviewed toxicity criteria;

8.1.c.1.C. Other scientifically valid documents or information developed from governmental or non-governmental sources and approved by the secretary.;

8.1.c.2. For ecological risk assessments:

8.1.c.2.A. U.S. EPA—~~AQUIRE~~ Data-Base ECOTOX Database;

8.1.c.2.B. U.S. EPA IRIS Data ~~Base~~;

8.1.c.2.C. U.S. EPA HEAST ~~Data-Base~~;

8.1.c.2.D. U.S. EPA—~~ASTER~~ Data-Base Region 3 BTAG Screening Benchmarks;

8.1.c.2.E. ~~U.S. EPA~~ PHYTOTOX Data Base;

~~8.1.c.2.F. U.S. EPA Terrestrial Toxicity Data Base (TERRATOX);~~

8.1.c.2.GE. U.S. Fish and Wildlife Service Technical Reports;

8.1.c.2.HF. Oak Ridge National Laboratory Toxicological Benchmark Technical Reports;

~~8.1.c.2.I. Other U.S. EPA documents acceptable to the secretary;~~

8.1.c.2.JG. Toxicological Profiles;

8.1.c.2.KH. Other peer-reviewed technical publications; and

~~8.1.c.2.LI. Data developed in accordance with a peer-reviewed scientific testing protocol and approved by the secretary~~ Other scientifically valid documents or information developed from governmental or non-governmental sources and approved by the secretary.

8.1.d. Risk assessments may include the use of fate and transport models subject to secretary approval of the model and the data to be used for the parameters specified in the model.

8.1.d.1. The secretary shall insure that any fate and transport model approved for use is capable of simulating those site conditions and contaminant properties that might have a significant impact on site-specific contaminant fate or transport.

8.1.d.2. Sensitivity analyses of models and data used ~~in~~ as model parameters shall be included in risk assessments. Sensitivity analyses shall be based on the range of conditions which have historically occurred or may be likely to occur at the site.

8.1.d.3. For models not included in division guidance documents, a description, including published references, if available, shall be included in the risk assessments.

8.1.d.4. Where available, the department shall give preference to the use of peer-reviewed models and data for which on-site validation is demonstrated.

8.1.e. The use of population risk estimates in addition to individual risk assessments is provided for as follows:

8.1.e.1. For human health risk assessments, risk estimates shall initially be made at the level of the individual. A

population-based risk assessment may be conducted where the applicant determines it would be practicable and of assistance in evaluating the appropriateness of the remedial action; and

8.1.e.2. For ecological risk assessments, risk estimates shall be made: (i) at the individual level where any endangered and threatened species is significantly impacted by the proposed activities at the site; and (ii) at the level of the population for all ecological receptors of concern exposed to contaminants at the site.

8.2. Sampling protocol, data requirements and sampling methods. -- The applicant shall use appropriate sampling approaches, and data quality requirements and statistical methods as approved by the secretary to support the risk assessment and remedy selection process.

8.2.a. Characterization of site contamination. A sufficient number of environmental media samples shall be collected and analyzed as to provide a reasonable characterization of the nature and distribution of site contaminants. The number and location of the samples to be collected shall be of sufficient quantity and quality to calculate the appropriate exposure point concentration as defined in subparagraph 8.4.b.3.B and subdivision 8.5.c of this rule.

8.2.b. Media to be sampled. Samples shall be collected and analyzed from those media that are reasonably anticipated to have been impacted from contaminants at the site, considering the nature of the site operations and the nature of the contaminants of potential concern at the site.

8.2.c. Contaminants for analyses. Not all samples will need to be analyzed for the same contaminants. Samples collected shall be analyzed for those contaminants that are reasonably anticipated to be encountered, considering the nature of the site operations and the nature of the substances used or disposed of at the site.

8.2.d. Data validation. The quality of the analytical data to be used shall be validated by review of at least ten percent of the data or some other percentage agreed to by the secretary in accordance with standard EPA protocols. Standard EPA protocols for validation may need to be modified require modification, with the secretary's approval, depending on the type of analyses performed (e.g., Contract Laboratory Protocol or SW-846).

8.2.e. The 95th percentile upper confidence limit on the mean concentration, or the maximum value of the site contaminant concentration data shall be a reasonable estimate of a plausible exposure point concentration for this contaminant. If a contaminant can be shown to have dissimilar distributions of concentrations in different areas, then the areas should be subdivided. For example "hot spots" may be considered separately.

8.3. Quantification of cumulative risks posed by multiple exposure pathways. (Reserved)

8.4. Baseline Human Health Risk Assessments (BHHRA). A BHHRA may be used to provide a characterization of the risks to human health posed by contaminants at the site, given a full evaluation of site-specific conditions.

8.4.a. The BHHRA may be used either to:

8.4.a.1. Assess the need for remedial action considering site-specific conditions; or

8.4.a.2. Demonstrate the acceptability of current site conditions with respect to the remediation standards specified in this rule.

8.4.b. BHHRAs shall include, but are not limited to, the following information:

8.4.b.1. A conceptual site model showing contaminant sources, release mechanisms, transport routes and media,

potential human receptor populations, and reasonably potential exposure scenarios based on current and reasonably anticipated land and water uses;

8.4.b.2. Data quality objectives for the human health risk assessment based on the conceptual site model;

8.4.b.3. An exposure assessment that evaluates the potential for and magnitude of human exposure, considering both the current and reasonably anticipated future land and water uses at, and in close proximity to the site. An exposure assessment shall include:

8.4.b.3.A. An exposure pathway analysis which identifies complete exposure pathways from contaminants to receptor populations shall be performed. The nature and extent of site contamination, the presence or absence of media that could transport such site contamination, the presence or absence of receptor populations that could be exposed to the contamination, and the likely exposure routes shall be identified; and

8.4.b.3.B. If, following the performance of the exposure pathway analysis, the potential exists for exposure of receptor populations to site contaminants, the magnitude of the exposure shall be quantified in accordance with division guidance documents. At a minimum, exposure levels that approximate an estimate of central tendency and reasonable upper bound of the exposure distribution shall be developed.

8.4.b.4. A toxicity analysis shall be performed if the potential for human exposure to site contaminants is identified and quantified in accordance with subparagraph 8.4.b.3.B of this rule. The toxicity analysis shall include a summary of current information regarding the carcinogenic and non-carcinogenic effects of the identified contaminants of concern as well as current slope factors and reference doses from the sources described in subdivision 8.1.c of this rule.

8.4.b.5. Risk Characterization. If the potential exists for human exposure to site contaminants, the exposure quantification information shall be integrated with the dose-response assessment (toxicity analysis) to provide a characterization of the potential risks present at the site. The risk characterization shall include a quantification of risks from individual contaminants. The applicant shall include a quantification of cumulative risks posed by multiple contaminants using the most sensitive exposure pathway for each constituent. The risk characterization shall analyze the following:

8.4.b.5.A. Non-Carcinogenic Risk: In quantifying risks from individual systemic toxicants at the site, a hazard quotient shall be developed for each contaminant. In quantifying the risks from cumulative exposure to multiple contaminants at the site, a hazard index for exposures to multiple contaminants shall be developed. In developing the hazard index for multiple contaminants, additivity shall be assumed only for those contaminants that affect the same target organ or act by the same method of toxicity;

8.4.b.5.B. Carcinogenic Risk: In quantifying risks from carcinogens at the site, the excess lifetime cancer risk shall be estimated above and beyond the risk associated with background exposures. Such risk estimates are presumed to be additive unless an alternative mechanism is appropriate; and

8.4.b.5.C. A discussion of any available facility-specific human health studies, and consideration of any other non-quantified (qualitative) risks shall be included as appropriate.

8.4.b.6. Uncertainty Analysis: As part of performing the site-specific risk assessment under this section, the qualitative, and to the extent practicable, the quantitative uncertainty embodied in the analysis shall be identified. The likelihood of overestimating or underestimating risk shall be identified for each element of the analysis. At a minimum, this shall include consideration of:

8.4.b.6.A. The analytical characterization of the site;

8.4.b.6.B. The exposure assessment, including the size of the potentially exposed population; and

8.4.b.6.C. The dose-response assessment, including the toxicological criteria used in the analysis.

**8.5. Baseline Ecological Risk Assessment.** A site-specific De Minimis screening ecological evaluation as specified in subsection 9.5 of this rule may be performed by the applicant as part of the site investigation to determine if a complete exposure pathway exists and there are ecological receptors of concern. If, after this evaluation, a potentially significant complete exposure pathway is identified, then the applicant shall complete the uniform ecological evaluation as specified in subsection 9.6 of this rule to determine if site concentrations exceed benchmark levels. If the applicant proposes remediation goals that exceed benchmark levels, then, at the secretary's discretion, a baseline ecological assessment may be required to evaluate potential risks to ecological receptors and to develop appropriate remediation standards based on these risks. If a baseline ecological risk assessment is determined to be necessary, it shall address, but not be limited to, the following information:

8.5.a. **Problem Formulation.** The purpose (goals) of the assessment shall be identified and the problem defined. This step includes identification of potential contaminants of concern, potential ecological effects, potential ecological receptors of concern, potential exposure pathways, and initial assessment and measurement endpoints; all with respect to current and reasonably anticipated future land and water uses. A conceptual site model shall be developed to depict how the site conditions might affect ecological components of the natural environment;

8.5.b. **Data Quality.** Data quality objectives for the site based on the conceptual site model shall be developed;

8.5.c. **Exposure Analysis.** An exposure assessment that evaluates the potential for and magnitude of ecological effects to receptors of concern considering current and reasonably anticipated future conditions at the site shall be performed. Exposure is analyzed by describing the source and releases, the distribution of the stressor in the environment, and the extent and pattern of contact or co-occurrence. The end product of this analysis is an exposure profile which summarizes the magnitude and spatial and temporal patterns of exposure for the scenarios described in the conceptual site model;

8.5.d. **Ecological Response Analysis.** An ecological response analysis shall be developed which includes a summary of current information regarding the toxicological and ecological effects of the identified contaminants of ecological concern, as well as ecological benchmark values. Appropriate sources of toxicity information are identified in paragraph 8.1.c.2 of this rule;

8.5.e. **Ecological Risk Characterization.** If the potential exists for significant ecological risks due to exposure to site contaminants, the exposure quantification information in subdivision 8.5.c of this rule shall be integrated with the ecological response analysis to provide a characterization of the risks presented at the site, considering current and reasonably anticipated future land and water uses. The risk characterization shall include a quantitative evaluation of ecological risks potentially associated with the site, a weight-of-evidence analysis of risk, a discussion of available site-specific ecological studies, and consideration of the non-quantified (qualitative) risks as appropriate; and

8.5.f. **Uncertainty Analysis.** Qualitative and/or quantitative uncertainty analyses shall be used as appropriate for each element of the risk assessment.

8.6. Residual Risk Assessments (RRA). Conditions that will be present at the site following implementation of the proposed remedy, should one be needed, shall be considered in residual human health and ecological risk assessments.

8.6.a. In a situation where a baseline risk assessment has been conducted and where no further action is the proposed remedy, the base line risk assessment may serve as the residual risk assessment.

8.6.b. A RRA shall include an assessment of the risks under current and reasonably anticipated future land and water use scenarios, given:

8.6.b.1. The exposure conditions that will be present following remediation and the concentrations of untreated constituents or treatment residuals remaining at the conclusion of any excavation, treatment, or off-site disposal; and/or

8.6.b.2. The exposure conditions that will result following implementation of any institutional or engineering controls necessary to manage risks from treatment residuals or untreated hazardous constituents.

8.6.c. The RRA shall be conducted following the same basic steps outlined in subsections 8.4 and 8.5 of this rule, except that the conditions used to define the site shall reflect post-remediation conditions, including site-specific numeric remediation standards and site-specific exposure conditions that incorporate any engineering and institutional controls proposed as part of the remedial action.

8.7. Probabilistic Assessment: Probabilistic techniques may be applied to human health and ecological risk assessments. At a minimum, before the commencement of a probabilistic risk assessment, the applicant shall discuss with the secretary the sources and characteristics of the distributions proposed for use in the assessment. The probabilistic risk assessment shall include, but not be limited to, information regarding:

8.7.a. All formulae used to estimate exposure point values, toxicity (cancer slope factor, reference dose) values, ecological benchmark values, hazard indices, and incremental lifetime cancer risks;

8.7.b. A combination of input parameters expressed as either point estimates or distributions. For each input parameter expressed as a distribution, the following information shall be provided:

8.7.b.1. The shape of the full distribution;

8.7.b.2. To the extent practicable, the mean, standard deviation, minimum, 5th percentile, 10th percentile, median, 90th percentile, 95th percentile, and maximum of the specified distribution;

8.7.b.3. Justification for the use of each distribution clearly explaining the rationale for its use and the rejection of other relevant distributions; and

8.7.b.4. The extent to which input distributions and their parameters capture and separately represent both stochastic variability and knowledge uncertainty. This information shall comprise a portion of, but not be a replacement for a comprehensive discussion in the body of the baseline risk assessment of the qualitative and quantitative sources of uncertainty.

8.7.c. A description of any correlations between or among input variables that are known or expected to have the practical effect of significantly affecting the risk assessment;

8.7.d. For each output distribution resulting from the probabilistic risk assessment, the following information:

8.7.d.1. The shape of the full distribution and location of the acceptable risk level; and

8.7.d.2. To the extent practicable, the mean, standard deviation, minimum, 5th

percentile, 10th percentile, median, 90th percentile, 95th percentile, and maximum of the specified distribution.

8.7.e. A probabilistic sensitivity analysis for all key input distributions conducted so as to distinguish, to the extent possible, the effects of variability from the effects of uncertainty in the input variables;

8.7.f. Justification for the selection of any point estimate value incorporated into the probabilistic assessment and the rationale for its selection and for the rejection of other relevant point estimate values;

8.7.g. Probabilistic methods may be applied to:

8.7.g.1. Environmental media contaminant concentration data;

8.7.g.2. Transport and fate modeling;

8.7.g.3. Exposure estimation;

8.7.g.4. Ecological response estimation; or

8.7.g.5 Risk characterization.

8.7.h. The plausible upper-bound exposure condition is equal to approximately the 90th percentile of the exposure distribution. The central-tendency exposure case is the 50th percentile of the exposure distribution. Risk assessments utilizing only deterministic (single point value) methods shall provide both central tendency and plausible upper-bound estimates of exposures and risk.

### **§60-3-9. Remediation Standards.**

This section shall be used for developing risk-based soil and groundwater remedial objectives for site remediation. The purpose of these procedures is to provide for the adequate protection of human health and the environment relative to the current and the reasonably anticipated future uses of the site while

incorporating site-related information, to the extent practicable, which may allow for more cost-effective site remediation based on identified site risks.

9.1. Types of remediation standards. Each applicant who responds to the release of a regulated substance at a site shall select and attain compliance with one or a combination of the following remediation standards in subdivision in each of subdivisions 9.1.a and one or a combination of the remediation standards in subdivision 9.1.b:

#### **9.1.a. Human Health:**

9.1.a.1. A De Minimis Risk-Based Standard is one in which contaminant levels pose no ~~significant~~ substantial risks to human health based on any current or reasonably anticipated future land and water use as provided in subsection 9.2 of this rule. If these levels are below natural background, background levels will be considered the De Minimis levels;

9.1.a.2. A Uniform Risk-Based Standard is one which uses pre-approved analytical methodologies established by the secretary to input exposure factors and other site-specific variables to calculate compound-specific remediation levels that will be protective of human health based on any current or reasonably anticipated future land and water use, as provided in subsection 9.3 of this rule. If these levels are below anthropogenic background levels, such background levels will be considered the uniform risk-based levels;

9.1.a.3. A Site-Specific Risk-Based Standard is one which uses a site-specific analysis of present contamination, and develops a remedial approach that considers the remedy selection criteria in subdivision 9.8.a of this rule and is protective of human health based upon any current, or reasonably anticipated future land and water use; or

9.1.a.4. The applicant may use a combination of the remediation standards to implement a site remediation plan and may choose to use the Site-Specific Risk-Based

Standard whether or not efforts have been made to attain the De Minimis or Uniform Risk-Based standards.

9.1.a.5. In all cases the presence of free product at a site shall require remediation.

#### 9.1.b. Ecological:

9.1.b.1. A De Minimis Ecological Screening Evaluation is an evaluation of the nature and extent of contaminants to determine if potential exposure pathways are completed. If contaminants and ecological receptors of concern do not form complete exposure pathways, no significant risk to ecological receptors is assumed.

9.1.b.2. A Uniform Ecological Evaluation -- where contaminant concentrations are compared to benchmark values which reflect no significant risks to ecological receptors of concern. If these benchmark values are below anthropogenic background levels, such background levels will be considered the Uniform Ecological Standard. Where an applicant proposes a remediation standard based on other existing standards which exceed the benchmark levels and the secretary feels those other existing standards are not protective of ecological receptors of concern, he or she may require a site specific ecological risk assessment in order to establish remediation standards.

9.1.b.3. A Site-Specific Ecological Risk-Based Standard which, based on a site-specific analysis of present contamination, develops a remedial approach that considers the remedy criteria in subdivision 9.8.a of this rule and is protective of ecological receptors of concern for the current, or reasonably anticipated future land and water use.

9.1.b.4. The applicant may use a combination of the remediation standards to implement a site remediation plan and may propose to use the Site-Specific Risk-Based Standard whether or not efforts have been made to attain the De Minimis Risk-Based Standards.

9.2. Human Health -- De Minimis Standard. The De Minimis Standard establishes contaminant levels that do not present a significant-substantial risk to human health. If on the basis of the site assessment, these standards are ~~found to be met~~, no remedial action or further characterization is required and the site is eligible for issuance of a Certificate of Completion by the secretary or by a Licensed Remediation Specialist as provided by in this rule. If at any time during characterization or remedial action the site is shown to meet the De Minimis standard, no further action is required and the site is eligible for issuance of the Certificate of Completion.

9.2.a. De Minimis Standards for Soils. The De Minimis Standards for both surface (<2ft depth) and subsurface (>2ft depth) soils shall be the higher numerical value of the following: 9.2.a.1 or 9.2.a.2, and must not exceed 9.2.a.3 unless it is shown to the satisfaction of the secretary that migration of soil contaminants to groundwater will not result in an exceedance of De Minimis Groundwater Standards.

9.2.a.1. Risk-Based Concentrations (RBCs) for human health for residential or industrial site uses that consider direct contact exposures (ingestion, dermal, and inhalation). When such risk-based concentrations exceed soil saturation concentrations (CSAT), soil saturation concentrations shall be considered as alternatives to RBCs. All RBCs are presented in Table 60-3B;

9.2.a.2. Natural background levels for each constituent as determined by sampling and statistical analyses completed using secretary approved methods and/or data sources.

9.2.a.3. De Minimis Soil Standards for the migration of each constituent from soil to groundwater presented in Table 60-3B.

9.2.b. De Minimis Standards for Groundwater. The De Minimis standards for groundwater shall be determined as follows:

9.2.b.1. Groundwater contaminant concentration limits established in Title 476-Series 12 of the Code of State Rules (~~46CSR1247CSR12~~);

9.2.b.2. For those contaminants where a concentration limit has not been established in ~~46CSR1247CSR12~~, the higher numerical value of the following:

9.2.b.2.A. The Risk-Based Concentrations (RBCs) for human health for residential site uses will be used as presented in Table 60-3B; or

9.2.b.2.B Natural background levels for each constituent as determined by sampling and statistical analyses completed using secretary approved methods and/or data sources.

9.2.c. Carcinogens. For individual known or suspected carcinogens, remediation standards derived under subdivisions 9.2.a and 9.2.b of this rule shall be established at levels which represent an excess upper-bound lifetime cancer risk of one in one million ( $1 \times 10^{-6}$ ) for residential land uses and one in one hundred thousand ( $1 \times 10^{-5}$ ) for industrial land uses.

9.2.d. Systemic toxicants. For individual systemic toxicants, remediation standards shall represent levels to which the human population could be exposed without appreciable risk of deleterious effect, where the hazard quotient shall not exceed 1.

9.2.e. If a contaminant exhibits both carcinogenic and noncarcinogenic effects, then the more protective risk-based standard (i.e., the lower of the two values) shall be used as the remediation standard.

9.2.f. Should soil or groundwater concentrations meet De Minimis levels, and no exposure pathways exist in addition to those considered in the De Minimis Table 60-3B, then no further action shall be required and the Certificate of Completion can be issued.

9.3. Human Health-Uniform Risk-Based Standard. This Standard sets forth uniform, approved methodologies, exposure factors, and other input variables needed to calculate site risks for residential or nonresidential land uses. The secretary recognizes that there may be instances where the pre-established input variables may not be applicable to a site, and thus will allow for site-specific variables to replace the default variables with adequate technical justification. Typical parameters that may require site-specific input include soil attenuation factors, site-specific hydrogeologic properties, and institutional controls used to manage potential exposure to site contamination.

9.3.a. Uniform Risk-Based Standards for Surface Soils/Sediments. Surface soil remediation standards for residential or industrial land uses shall be derived by applying site-specific information to the equations and constants from the secretary's Uniform Risk-Based Guidance or other equations and constants approved by the secretary considering reasonably anticipated future land and water use.

9.3.b. Uniform Risk-Based Standards for Subsurface Soils. Subsurface soil remediation values shall be derived based on:

9.3.b.1. Migration potentials;

9.3.b.2. Leaching potentials; and

9.3.b.3. Soil saturation concentrations. The equations and constants described in the secretary's Uniform Risk-Based Guidance or other equations and constants approved by the secretary shall be applied.

9.3.c. Uniform Risk-Based Standard for Groundwater. Groundwater remediation values shall be derived based on:

9.3.c.1. Current or reasonably anticipated future land and water use;

9.3.c.2. The potential for the groundwater to serve as a source of drinking water. Groundwater that has a background total dissolved solids content greater than 2500

milligrams per liter (mg/l), or where the applicant can demonstrate to the secretary's satisfaction that the aquifer is not being used, cannot be used for future drinking water sources, and is not hydrologically connected to an aquifer being used for drinking water shall not be considered a current or potential source of drinking water; and

9.3.c.3. Migration potentials. The equations and constants described in the secretary's uniform Risk Based Guidance shall be applied.

9.3.d. Carcinogens. For individual known or suspected carcinogens, remedial standards derived under subdivisions 9.3.a, 9.3.b, and 9.3.c of this rule shall be established at levels which represent an excess upper-bound lifetime risk of between one in ten thousand to one in one million ( $1 \times 10^{-4}$  to  $1 \times 10^{-6}$ ). If carcinogenic risk greater than  $1 \times 10^{-6}$  is considered for development of residential remediation goals or greater than  $1 \times 10^{-5}$ , for development of industrial remediation goals, public notification shall be required as specified in subsection 7.12 of this rule.

9.3.e. Systemic Toxicants. For individual systemic toxicants, remedial standards derived under subdivisions 9.3.a, 9.3.b, and 9.3.c of this rule shall represent levels to which the human population could be exposed without appreciable risk of deleterious effect, where the hazard quotient shall not exceed one.

9.3.f. If a contaminant exhibits both carcinogenic and noncarcinogenic effects, then the more conservative risk-based standard (i.e., the lower of the two values) shall be used as the remediation standard.

9.3.g. Cumulative Site Risk. Cumulative upper-bound estimate of site risk per receptor from exposure to known or suspected carcinogens shall not exceed one in ten thousand ( $1 \times 10^{-4}$ ); and where multiple systemic toxicants affect the same target organ or act by the same method of toxicity, the upper-bound estimate of hazard index shall not exceed 1, or 10 where it is

not determined whether multiple systemic toxicants affect the same organ.

9.3.h. Should Uniform Risk-Based soil or groundwater concentrations be met, no further action shall be required with regard to those media.

9.4. Human Health-Site-Specific Risk-Based Standard. Site-Specific Risk-Based Standards will be determined using one or a combination of a BHHRA as described in subsection 8.4 of this rule or a RRA as described in subsection 8.6 of this rule. In establishing the remediation standard under this section, the potential for exposure to site contaminants under current and reasonably anticipated future land and water use and the application of institutional and engineering controls shall be considered.

9.4.a. Carcinogens. For individual known or suspected carcinogens, remedial standards derived under subsection 9.4 shall be established at levels which represent an excess upper-bound lifetime risk of between one in ten thousand to one million ( $1 \times 10^{-4}$  to  $1 \times 10^{-6}$ ). If carcinogenic risk greater than  $1 \times 10^{-6}$  for individual carcinogens is considered for development of residential remediation goals, or greater than  $1 \times 10^{-5}$  for development of industrial remediation goals, public notification shall be required as specified in subsection 7.12 of this rule.

9.4.b. Systemic toxicants. For individual systemic toxicants, remedial standards shall represent levels to which the human population could be exposed without appreciable risk of deleterious effect, where the hazard quotient shall not exceed one. Where multiple systemic toxicants affect the same target organ or act by the same method of toxicity, the hazard index shall not exceed 1, or 10 where it is not determined whether multiple systemic toxicants affect the same organ.

9.4.c. If a contaminant exhibits both carcinogenic and noncarcinogenic effects, then the more protective risk-based standard (i.e., the lower of the two values) shall be used as the remediation standard.

9.4.d. If probabilistic risk assessment methods are used in establishing the remedial standards or demonstrating the acceptability of the proposed remedial alternative, exposure levels shall approximate the 90th percentile of the exposure distribution.

9.4.e. Groundwater. Remedial standards for groundwater shall be established using the following considerations:

9.4.e.1. Potential receptors based on the current and reasonably anticipated future use of groundwater;

9.4.e.2. The potential for groundwater to serve as a drinking water source, as defined in paragraph 9.3.c.2 of this rule;

9.4.e.3. Site-specific sources of contaminants;

9.4.e.4. Natural environmental conditions affecting the fate and transport of contaminants, such as natural attenuation processes, as determined by appropriate scientific methods; and

9.4.e.5. Institutional and engineering controls.

9.4.f. Soil. Remedial standards for soil/sediments shall be established using the following considerations:

9.4.f.1. Potential receptors based on the current and reasonably anticipated use of the site;

9.4.f.2. Site-specific sources of contaminants;

9.4.f.3. Natural environmental conditions affecting the fate and transport of contaminants, such as natural attenuation processes, as determined by approved scientific methods; and

9.4.f.4. Institutional and engineering controls.

9.4.g. The secretary shall incorporate the equations and constants for risk-based standards into a guidance document, along with other relevant information for establishing and applying such standards to specific sites. The guidance document shall be revised from time to time as needed to incorporate scientific advancements and new or alternative risk assessment and methods. The guidance document, any subsequent revisions, and any alternative risk assessment methods proposed by an applicant will be reviewed by independent scientists recognized as experts in relevant risk assessment disciplines. The secretary shall incorporate as appropriate the comments of scientific reviewers into the guidance document or decisions regarding risk-based standards or methods.

9.5. Ecological -- De Minimis Screening Evaluation. This standard sets forth uniform, pre-approved methodologies, exposure assumptions, and other input variables needed to evaluate whether complete exposure pathways exist for aquatic and terrestrial ecological receptors of concern. The secretary recognizes that there may be instances where the pre-established input variables may not be applicable to a site, and thus will allow for site-specific variables to indicate whether an ecological risk assessment is needed.

9.5.a. Typical parameters that shall be considered when evaluating whether or not to perform an ecological risk assessment include but are not limited to the following:

9.5.a.1. Evaluate whether a complete exposure pathway exists. If no complete exposure pathway exists because either the contamination is restricted in movement or there are no ecological receptors of concern, then no ecological risk exists (e.g., if the majority of the site is paved with roads and buildings, no pathway exists);

9.5.a.2. Some sites may be screened out and not require evaluation given their size, estimated risk to ecological receptors, or lack of

valued ecological receptors, including threatened or endangered species;

9.5.a.3. Local conditions should be considered for assessing whether a site is degrading an aquatic environment. In cases where the site does not present an ecological risk over and above "local conditions" and further release of contaminants into the aquatic environment has been stopped, there will not be a need for further evaluation;

9.5.a.4. Define what level of ecological resource is considered valued; and

9.5.a.5. If for each contaminated media, harm is readily apparent and a condition of no-significant risk of harm to the site biota and habitats clearly does not exist, further ecological risk characterization would be redundant and is not required. The applicant can then proceed directly to the remedy evaluation.

9.5.b. The following are conditions which may be considered indicators of the need for an ecological risk assessment:

9.5.b.1. Stressors have migrated off-site and become widely distributed in the environment;

9.5.b.2. Wildlife or ecological resources of concern are exposed or have potential for significant exposure to stressors from a site, either on or off-site;

9.5.b.3. Remediation of stressors at a site has the potential to expose ecological resources of concern to further impacts;

9.5.b.4. A potential exists for indirect or cumulative impacts to ecosystems of concern;

9.5.b.5. Rare or sensitive species of concern are potentially impacted;

9.5.b.6. Adverse ecological effects have been observed in an otherwise high quality habitat; and

9.5.b.7. Projected land use involves sensitive ecosystems.

9.5.c. Should the ecological screening evaluation indicate no complete exposure pathways ~~exist~~ or other conditions specified in subdivision 9.5.a. of this rule exist, or the Screening Ecological Evaluation Guidance ~~are~~ is met, no further action shall be required and the Certificate of Completion can be issued.

9.6. Ecological-Uniform Ecological Evaluation. The Uniform Ecological Evaluation establishes benchmark levels that do not present a significant risk to potential ecological receptors. If during initial screening, these standards are found to be met, no remedial action or further characterization is required and the site is eligible for issuance of a Certificate of Completion by the secretary or by a Licensed Remediation Specialist. If at any time during characterization or remedial action the site is shown to meet the Uniform Ecological Evaluation, no further action is required and the Certificate of Completion can be issued. If site contaminants exceed benchmark criteria, the applicant can propose remediation goals protective of ecological receptors of concern. If the applicant chooses to remediate to benchmark levels, the following shall be used:

9.6.a. Uniform Standards for Soils. Uniform Standards for soils (0-4 ft) shall be the highest of the following numerical values:

9.6.a.1. Benchmarks for relevant ecological receptors that consider direct contact exposures, as presented in division guidance documents; or

9.6.a.2. Natural or anthropogenic background levels for each constituent as determined by sampling and statistical analyses completed using secretary approved methods and/or data sources.

9.6.b. Uniform Standards for Sediments. Uniform Standards for sediments (0-6 inches) shall be the highest of the following numerical values:

9.6.b.1. Benchmarks for relevant ecological receptors that consider direct contact exposures, as presented in division guidance documents; or

9.6.b.2. Natural or anthropogenic background levels for each constituent as determined by sampling and statistical analyses completed using secretary approved methods and/or data sources.

9.6.c. Uniform Standards for Surface Water. The Uniform standards for surface water shall be the highest of the following numerical value:

9.6.c.1. Federal Ambient or State Water Quality Criteria;

9.6.c.2. For those contaminants where a Federal or State Water Quality Criteria has not been established, applicable NOAEL (No Observable Adverse Effect Level) or LOAEL (Lowest Observable Adverse Effect Level) values will be used, as presented in division guidance documents; or

9.6.c.3. Natural or anthropogenic background levels for each constituent as determined by sampling and statistical analyses completed using secretary-approved methods and/or data sources.

9.6.d. Uniform Standards for Groundwater. Where groundwater is expected to impact surface water bodies of concern, the Uniform standards for groundwater shall be the highest of the following numerical value:

9.6.d.1. Federal Ambient or State Water Quality Criteria;

9.6.d.2. For those contaminants where a Federal or State Water Quality Criteria has not been established, applicable NOAEL (No Observable Adverse Effect Level) or LOAEL (Lowest Observable Adverse Effect Level) values will be used, as presented in division guidance documents; or

9.6.d.3. Anthropogenic background levels for each constituent as determined by sampling and statistical analyses completed using secretary-approved methods and/or data sources.

9.7. Ecological-Site-Specific Risk-Based Standard. Site-Specific Risk-Based Standards shall be developed using the procedures and factors established by this section.

9.7.a. In establishing the remediation standard under this section, the potential for exposure of ecological receptors of concern to site contaminants under current and reasonably anticipated future land and water use and the application of institutional and engineering controls shall be considered.

9.7.b. For individual toxicants, remedial standards shall represent levels to which sensitive (i.e., threatened or endangered) ecological population(s) could be exposed without appreciable risk of deleterious effect, where the hazard index shall not exceed one. For non-sensitive ecological receptors, a weight-of-evidence approach shall be used to establish acceptable remedial standards.

9.7.c. If probabilistic risk assessment methods are used in establishing the remedial standards or demonstrating the acceptability of the proposed remedial alternative, exposure levels shall approximate the 90th percentile of the exposure distribution.

9.7.d. Remedial standards for soil, sediment, surface water, or groundwater shall be established using the following considerations:

9.7.d.1. Potential receptors of concern based on the current and reasonably anticipated use of the site;

9.7.d.2. Site-specific sources of contaminants;

9.7.d.3. Natural environmental conditions affecting the fate and transport of contaminants, such as natural attenuation

processes, as determined by approved scientific methods; and

9.7.d.4. Institutional and engineering controls.

9.7.e. The secretary shall incorporate the equations and constants into a guidance document, along with other relevant information for establishing and applying such standards to specific sites. The guidance document shall be revised from time to time as needed to incorporate scientific advancements and new or alternative risk assessment methods. The guidance document, any subsequent revisions, and any alternative risk assessment methods proposed by an applicant will be reviewed by independent scientists recognized as experts in relevant risk assessment disciplines. The department shall incorporate as appropriate the comments of scientific reviewers into the guidance document. These services will be contracted through arrangements made by the secretary with a nonprofit organization governed by a board of secretaries representing diverse interests of West Virginia.

9.8. Remediation measures. Any of the remediation standards may be attained through one or more remediation activities that can include treatment, removal, engineering or institutional controls, and natural attenuation and including, but not limited to, innovative or other demonstrated measures.

9.8.a. Remedy evaluation. In selecting a remedial action from among alternatives that achieve the goal of cost effective protection of human health and the environment, the following factors shall be balanced ensuring that no single factor predominates over the others. The remedy that protects human health and the environment shall be selected using the following criteria:

9.8.a.1. The effectiveness of the remedy in protecting human health and the environment;

9.8.a.2. The reliability of the remedial action in achieving the standards over the long term;

9.8.a.3. Short-term risks to the affected community, those engaged in the remedial action effort, and to the environment posed by the implementation of the remedial action;

9.8.a.4. The acceptability of the remedial action to the affected community;

9.8.a.5. The implementability and technical practicability of the remedial action from an engineering perspective;

9.8.a.6. Meets protectiveness goal at lowest cost; and

9.8.a.7. Considers net environmental benefits of the remedial action.

9.9. Natural Attenuation. Any person may request that the secretary approve a remediation plan based upon natural processes of degradation and attenuation of contaminants. A request submitted to the secretary under this paragraph shall include a description of site-specific conditions, including written documentation of projected groundwater use in the contaminated area based on current state or local government planning efforts; the technical basis for the request; and any other information requested by the secretary to thoroughly evaluate the request. In addition, the person making the request must demonstrate to the satisfaction of the secretary:

9.9.a. That the contaminant has the capacity to degrade or attenuate under the site-specific conditions;

9.9.b. That the contaminant area, such as a groundwater plume or soil volume, is not increasing in size; or, because of natural attenuation processes, that the rate of contaminant degradation is demonstrably more rapid than the rate of contaminant migration; and that all sources of contamination and free

product have been controlled or removed where practicable;

9.9.c. That the time and direction of contaminant travel can be predicted with reasonable certainty;

9.9.d. That contaminant migration will not result in any violation of applicable groundwater standards at any existing or reasonably foreseeable receptor;

9.9.e. If the contaminants have migrated onto adjacent properties, the owner must demonstrate that:

9.9.e.1. Such properties are served by an existing public water supply system dependent on surface waters or hydraulically isolated groundwater, or

9.9.e.2. The owners of such properties have consented in writing to allow contaminant migration onto their property.

9.9.f. That, if the contaminant plume is expected to intercept surface waters, the groundwater discharge beyond the sediment/water interface will not possess contaminant concentrations that would result in violations of standards for surface waters contained in 46CSR1-47CSR2;

9.9.g. That the person making the request will ~~put in place~~ implement a groundwater monitoring program sufficient to ~~track document~~ the degradation and attenuation of contaminants and contaminant by-products within and down-gradient of the plume and to detect contaminants and contaminant by-products prior to their reaching any existing or foreseeable receptor. Such monitoring program shall provide for placing one or more monitoring wells at least one year's time of travel upgradient of the receptor, and at least one monitoring well shall be placed at a location no farther away from the leading edge of the contaminated groundwater at the site than such contamination is likely to travel in five years;

9.9.h. That all necessary access agreements needed to monitor groundwater quality pursuant to subdivision 9.9.g. of this section have been or can be obtained; and

9.9.i. That the proposed corrective action plan would be consistent with all other environmental laws.

#### **§60-3-10. Work Plan.**

10.1. Submittal of Work Plans. The applicant, or the applicant's licensed remediation specialist or contractor, shall submit to the secretary both hardcopy and electronic versions of the appropriate work plans and reports as required by the parties' voluntary remediation agreement.

#### **10.2. Action on Work Plans.**

10.2.a. The secretary may, based upon accuracy, quality, and completeness, either approve or disapprove a work plan or report submitted ~~from~~ by the applicant or the applicant's licensed remediation specialist or contractor.

10.2.b. If the secretary disapproves a work plan or report, the secretary must, within 5 days of its disapproval, notify the applicant in writing that ~~its~~ the work plan or report has been disapproved. Such written notice shall include a list specifying the reasons that the work plan or report was disapproved, and shall specify all additional information needed for the work plan or report to obtain approval.

10.2.c. If the secretary disapproves a work plan or report as submitted, the applicant must resubmit the work plan or report or terminate the agreement pursuant to W. Va. Code §22-22-9.

#### **10.3. Timing of Submittal and Review.**

10.3.a. The secretary shall either approve or disapprove all work plans and reports within 30 days of receipt or within a shorter period if specified in the parties' voluntary remediation agreement. Any such action taken

on a work plan or report must be confirmed in writing and received by the applicant within the 30-day period or within such shorter period specified in the parties' voluntary remediation agreement. An extension of time for approval or disapproval of work plans or report may be mutually agreed to between the applicant and the secretary. If an extension of time is mutually agreed to by the secretary and applicant, it must be confirmed in writing.

10.3.b. If work plans or reports are resubmitted, the secretary shall approve or disapprove the resubmitted work plans or reports within 30 days of receipt or within such shorter period specified in the parties' voluntary remediation agreement. Any action taken on resubmitted work plans or reports must be confirmed in writing and received by the applicant within the 30-day period for acting on a resubmitted application, or within such shorter time specified in the parties' voluntary remediation agreement. An extension of time or action on resubmitted work plans or reports may be mutually agreed to between the applicant and the secretary. If an extension of time is mutually agreed to by the secretary and applicant, it must be confirmed in writing. If resubmitted work plans or reports are not approved by the secretary, then the secretary and the applicant may mutually agree, in writing, to a schedule for additional review of the resubmitted work plans or reports.

10.3.c. If work plans or reports are not approved or disapproved within 30 days of receipt by the secretary or within such shorter time specified in the parties' voluntary remediation agreement, or if resubmitted work plans or reports are not approved or disapproved within 30 days of receipt by the secretary or within such shorter time specified in the parties' voluntary remediation agreement, then the work plans or reports will be deemed approved unless such work plans or reports are determined to be materially inaccurate.

10.4. Notice. Any notice required to be given under the provisions of this section must be in writing and sent via United States certified mail, or as specified in the parties' voluntary

remediation agreement. Notice is complete upon receipt.

10.5. Completeness and Quality of Work Plans. In reviewing work plans for quality and completeness, the secretary may require such work plans to include each of the following:

10.5.a. Documentation of the investigation conducted by the applicant in preparing the work plan;

10.5.b. A description of assessments and other work, if any, to be performed by the applicant to further determine the nature and extent of the actual or threatened release;

10.5.c. A description of risk assessments, if any, to be conducted to show the appropriateness of the proposed remedy for the site;

10.5.d. A statement of work to be conducted to accomplish the proposed remediation in accordance with the risk protocol and remediation standards established under sections 8 and 9 of this rule, and a schedule for the implementation of all tasks set forth in the proposed statement of work;

10.5.e. The applicant's verification sampling plan to determine the adequacy of the remediation; and

10.5.f. Other necessary supporting plans or information as deemed appropriate by the party conducting the remediation.

#### **§60-3-11. Final Report.**

11.1. This rule sets forth the requirements for the submittal and contents of the Final Report for a voluntary remediation program. The Final Report may be prepared and submitted when all applicable standards developed for the site have been met.

11.2. Sites may be subdivided for the purpose of preparing Final Reports.

11.3. The Final Report shall include all data and information needed to document and verify that all applicable standards have been met and that all activities specified in the Voluntary Remediation Agreement have been completed. Supporting documentation, such as sample collection records, field monitoring data, laboratory reports, relevant correspondence, and permits, should be placed in one or more appendices to the Final Report. The use of maps, drawings, photographs, tables, and other aids to visualization and data presentation is encouraged. Hardcopies and electronic versions of the Final Report are to be submitted.

11.4. Earlier reports, plans, and/or other relevant documents may be incorporated into the Final Report by reference if these items previously have been submitted to the Division. In such cases a complete bibliographic reference shall be provided for each document being incorporated by reference.

11.5. The names, addresses, telephone numbers, and facsimile transmission numbers, and email addresses (if available) shall be provided for the current owners and operators of the site, the owners and/or operators conducting the remediation (if different), and the licensed remediation specialist. Individual names and titles for management contacts for each listed firm or organization also shall be provided.

11.6. The site location shall be clearly identified by providing the street address, legal description (including lot and block numbers), and a site location map.

11.7. Ongoing work, such as site cover or treatment system operation and maintenance or groundwater or surface water monitoring, shall be described. This shall include descriptions of planned activities and schedules.

11.8. If institutional controls, such as deed restrictions or land use covenants, are part of the remediation program, copies of appropriate documents recorded or to be recorded shall be appended to the Final Report. A site map showing the area(s) subject to institutional

controls shall be provided in hard copy and electronic format.

11.9. The completeness and accuracy of the Final Report shall be certified, in writing, by an authorized agent of the applicant and by the licensed remediation specialist. The form of this certification shall be as follows:

I hereby certify that the information presented in this report is, to the best of my knowledge and belief, true, accurate, and complete having been prepared under a system and organization designed to produce true, accurate, and complete information.

Form

If the authorized agent and the licensed remediation specialist are the same, a single signature will be sufficient.

#### **§60-3-12. Certificate of Completion.**

##### **12.1. Completion of Remediation.**

12.1.a. A voluntary remediation is complete when a site meets applicable standards and all work has been completed as contemplated in the voluntary remediation agreement.

Form

12.1.b. When a site meets applicable standards and all work required by the voluntary remediation agreement to meet applicable standards has been completed, the licensed remediation specialist shall issue a final report to the applicant. Such report shall explain how the compliance with the requirements of the voluntary remediation agreement has been demonstrated.

12.1.c. The applicant to whom a final report has been issued may do either of the following:

12.1.c.1. Request a certificate of completion from the secretary, as provided in subsection 12.2 of this rule; or

12.1.c.2. Request a certificate of completion from the licensed remediation

specialist, when applicable, as provided in subsection 12.4 of this rule.

12.2. Issuance of Certificate of Completion by the secretary.

12.2.a. Upon receiving the request provided in paragraph 12.1.c.1 of this rule, the secretary must evaluate the final report provided by the applicant, and determine, within sixty days, whether the final report was properly issued by the licensed remediation specialist. When reviewing a final report, the secretary shall only consider whether:

12.2.a.1. The site meets applicable standards for those areas of the site and for those contaminants identified in the voluntary remediation agreement; and

12.2.a.2. The applicant has complied with the voluntary remediation agreement and any approved work plans for the site.

12.2.b. If the secretary agrees that the final report was properly issued, a certificate of completion shall be issued by the secretary within 60 days of receipt of a request for a certificate of completion from the applicant.

12.2.c. If the secretary does not agree that the final report was properly issued, he must promptly provide written notification to the applicant stating in detail the reasons why the report was not deemed properly issued and indicating the further action that must be taken to allow the certificate to be issued. Upon receipt of such notification, the applicant may:

12.2.c.1. Instruct the licensed remediation specialist to take the further action identified by the secretary;

12.2.c.2. Appeal the secretary's decision to the Environmental Quality Board in accordance with the provisions of W. Va. Code §22B-1-7; or

12.2.c.3. Terminate the voluntary remediation agreement.

12.3. Contents of the Certificate of Completion.

12.3.a. The certificate of completion shall attach or incorporate the following:

12.3.a.1. A description of the site to which the certificate of completion pertains;

12.3.a.2. A ~~description~~ list of the contaminants of concern for which applicable standards are met at the site;

Form

12.3.a.3. The voluntary remediation agreement under which the site was remediated and/or evaluated;

12.3.a.4. The final report of the licensed remediation specialist; and

12.3.a.5. Any land use covenant or deed restriction imposed for purposes of meeting applicable standards including, where applicable, a description of any institutional or engineering controls employed at the site for purposes of meeting applicable standards.

12.3.b. The certificate of completion shall provide that:

12.3.b.1. The site that is described in the certificate of completion meets the applicable standards as provided in section 6 of this rule;

12.3.b.2. The applicant and the persons identified in section 18 of the Act (1) are relieved of liability to the state for the release that caused the contamination that was the subject of the voluntary remediation, and the state shall not institute any civil, criminal or administrative action arising from the release and resulting contamination, as long as the site continues to meet applicable standards in effect at the time the certificate was issued; and (2) shall not be subject to citizen suits or contribution actions with regard to the contamination that was the subject of the voluntary remediation agreement;

12.3.b.3. Where the agreement imposes an obligation that continues beyond the effective date of the certificate and such obligations are no longer satisfied with the result that the applicable standards approved for the site are no longer being met, or continued compliance with the applicable standard is threatened, the secretary shall initiate action to insure the site is brought into compliance in accordance with section 14 of this rule, ~~to~~ or rescind the covenant contained in this certificate as it would apply to the then current owner or operators of the site and their successors and assigns;

12.3.b.4. Except as provided in paragraph 12.3.b.3 of this rule, a certificate of completion may be revoked or, in lieu thereof, further remediation may be required of any site described in the certificate of completion only where the secretary has determined that a reopener has been triggered in accordance with section 16. Where a certificate is revoked under this provision, it shall be revoked only as to the then current owner or operator of the site, their successors and assigns except in the case where fraud was committed in demonstrating attainment at the site as provided in subdivision 16.1.a of this rule. In this latter case, the certificate is revoked as it would apply to any person; and

12.3.b.5. The duties and benefits of the certificate of completion are transferable to successors and assigns of the applicant, subject to the obligations of any land use covenant referred to in the certificate of completion.

12.3.c. The certificate of completion contained in Appendix 60-3C meets the requirements of this section. Additional provisions and modifications which differ from the form in Appendix 60-3C but which are consistent with this rule may be agreed to by the applicant and the secretary.

#### 12.4. Certificates of Completion Issued by Licensed Remediation Specialists.

12.4.a. A licensed remediation specialist may issue a certificate of completion

for any site that complies with the de minimus standards set forth in subsections 9.2 and 9.5 of this rule, provided that a final report is issued and the secretary is given notice of the licensed remediation specialist's intention to issue a certificate of completion for the site.

12.4.b. A certificate of completion issued by a licensed remediation specialist shall comply with subsection 12.3 of this rule.

12.4.c. The secretary may object to the issuance of a certificate of completion by a licensed remediation specialist within 30 days of receipt of notice of the certificate's issuance, as provided in subdivision 12.4.a. of this rule. If the secretary objects to issuance of the certificate, the applicant may take any of the actions allowed under subdivision 12.2.c. of this rule. If the secretary fails to object within the 30 day period, the licensed remediation specialist may issue the certificate of completion.

#### 12.5. Effective Date.

12.5.a. A certificate of completion issued by the secretary shall become effective when signed by the secretary or, where applicable, upon the filing of any land use covenant required by the certificate, whichever shall last occur.

12.5.b. A certificate of completion issued by a licensed remediation specialist shall become effective when signed by the licensed remediation specialist after notice to the secretary in accordance with subsection 12.4 of this rule, or, where applicable, upon the filing of any land use covenant required by the certificate, whichever shall last occur.

#### §60-3-13. Land Use Covenants.

13.1. Any limitation on the use of a property that is required in order to meet applicable environmental standards shall be contained in a land use covenant. Such use restrictions may include prohibiting residential development of some or all of the site, or requiring maintenance of engineering or institutional controls.

## 13.2. Contents of a land use covenant

### 13.2.a. A land use covenant shall:

13.2.a.1. State that the instrument is an environmental covenant executed pursuant to the Uniform Environmental Covenants Act, W. Va. Code § 22-22B-1 et seq.;

13.2.a.2. Contain a legally sufficient description of the real property subject to the covenant;

13.2.a.3. Describe the activity and use limitations on the real property;

13.2.a.4. Identify every owner of record of a fee interest in the property;

13.2.a.5. Identify every holder of the land use covenant within the meaning of W. Va. Code § 22-22B-2;

13.2.a.6. Contain the notarized signature(s) of the agency, every holder and, unless waived by the agency, every owner of the fee simple of the real property subject to the covenant;

13.2.a.7. Identify the name and location of any administrative record for the work performed under the Act at the real property subject to the covenant;

13.2.a.8. State whether residential or non-residential exposure assumptions were used to comply with a site-specific remediation standard;

13.2.a.9. Provide requirements for notice within 10 days following transfer of a specified interest in, or concerning proposed changes in use of, applications for building permits for, or proposals for any site work affecting the contamination on, the property subject to the covenant;

13.2.a.10. Contain a provision that the applicant, and his assigns and successors, are relieved of all civil liability to the state for the

release of contaminants and remediation activities, as long as the property meets applicable standards in effect at the time the covenant was issued;

### 13.2.b. A land use covenant may:

13.2.b.1. Provide a brief narrative description of the contamination and remedy; including the contaminants of concern, the pathways of exposure, limits on exposure and the location and extent of the contamination;

13.2.b.2. Grant rights of access to the property for purposes of implementation or enforcement of the covenant;

13.2.b.3. Provide requirements for periodic reporting describing compliance with the covenant;

13.2.b.4. Provide limitations on amendments or termination of the covenant in addition to those specified in W. Va. Code § 22-22B-9 and § 22-22B-10;

13.2.b.5. Provide rights of the holder in addition to its right to enforce the covenant pursuant to W. Va. Code § 22-22B-11

13.2.c. In addition to other conditions for its approval of an environmental covenant, the agency may require those persons specified by the agency who have interests in the real property to sign the covenant.

13.3. The applicant for participation in the remediation program shall cause the land use covenant to be recorded in the deed book of each county in which any portion of the site is located and shall provide a certified copy of the recorded covenant to the Secretary and to each of the parties named in section 3-5 of this rule.

13.4. The land use covenant form contained in Appendix 60-3D meets the requirements of this section. Additional provisions or modifications that are not inconsistent with this rule, the Voluntary Remediation and Redevelopment Act or the Uniform

Environmental Covenants Act may be agreed to by the holders and the secretary.

13.5. A copy of a land use covenant shall be provided by the persons required, and in the manner required, by the agency to:

13.5.a. Each person that signed the covenant;

13.5.b. Each person holding a recorded interest in the real property subject to the covenant;

13.5.c. Each person in possession of the real property subject to the covenant;

13.5.d. Each municipality or other unit of local government in which real property subject to the covenant is located; and

13.5.e. Any other person the agency requires.

13.6. The validity of a covenant is not affected by failure to provide a copy of the covenant as required under section 13.5 ~~if of~~ this rule.

13.7. The duration, amendment and termination of a land use covenant shall be governed by the provisions regarding environmental covenants set forth in the Uniform Environmental Covenants Act, W. Va. Code § 22-22B-1 et seq.

#### **§60-3-14. Procedure where Certificate of Completion or Land Use Covenant is Violated.**

14.1. If at any time the secretary determines that an obligation imposed by the certificate of completion or by any land use covenant issued pursuant to the Act is not being satisfied with the result that the remediation standard approved for the site is no longer being met, or continued compliance with the remediation standard is threatened, the secretary shall issue notice of such determination by providing written notice through certified/registered mail to the current owner or operator of the site. Such notice shall

identify the obligations that are not being satisfied and the appropriate corrective action that must be taken.

14.2. Any person aggrieved by the secretary's determination under subsection 14.1 of this rule may appeal such ruling to the Environmental Quality Board in accordance with the provisions of W. Va. Code §22B-1-7.

14.3. The covenant set forth in the certificate of completion and the provisions regarding relief from liability in any land use covenant shall no longer apply to the current owner or operator of the site and their successors and assigns upon the expiration of 60 days from the date of issuance of notice as provided in subsection 14.1 of this rule, or 60 days from issuance of a final order of the Environmental Quality Board affirming the action of the secretary where an appeal is taken as provided in subsection 14.2 of this rule, unless prior to such time the current owner or operator takes action to assure that all obligations imposed by the Certificate are satisfied.

#### **§60-3-15. Loans from Brownfields Revolving Fund.**

##### **15.1. Loan Applications.**

15.1.a. Any person who satisfies the criteria set forth in subsection 3.2 of this rule may apply, after conferring with the secretary as provided in W. Va. Code §22-22-5(a), to the secretary for a loan to perform a site assessment at a brownfield site. The application shall be on a form prescribed by the secretary which, at a minimum, shall require the following information:

15.1.a.1. Name of applicant and business;

15.1.a.2. Name of current owner(s) of record of the property;

15.1.a.3. Size and location of property;

15.1.a.4. Description of past and current uses of property;

15.1.a.5. Nature of contamination; and

15.1.a.6. Financial capability of applicant.

15.1.b. The secretary shall act upon a completed application within 60 days of receiving it. The secretary may approve the application, reject the application, or accept the application subject to correction. The applicant shall be given a reasonable amount of time to make corrections specified by the secretary.

15.1.c. Each loan shall be memorialized in a written document that identifies the amount of the loan, the interest rate, and the repayment schedule.

## 15.2. Qualifying Activities:

15.2.a. Money may be loaned to an applicant from the Revolving Fund for the site assessment of a brownfield property; or

15.2.b. Money may be loaned to an applicant from the Revolving Fund for activities at brownfield sites other than site assessments to the extent monies are appropriated to, or received by, the Revolving Fund for purposes other than site assessments.

## 15.3. Loan Conditions.

15.3.a. The secretary shall require periodic reports from each applicant of all expenditures of funds loaned to the applicant from the Brownfield Revolving Fund;

15.3.b. Where the applicant is the owner of the property upon which the site assessment is to be performed, the secretary shall require a deed of trust to be executed or any other collateral of equal or greater value to secure the loan; and

15.3.c. Where the applicant is not the owner of the property upon which the site

assessment is to be performed, the secretary shall require appropriate collateral to secure the loan, except where the applicant is a development authority or other public entity.

## 15.4. Repayment.

15.4.a. Loans shall be repaid at a rate of interest determined by the secretary at the time the application is approved. The loans shall be low interest. For a public entity, the interest rate shall be from 0% to 3%. For a private entity the interest rate shall be the prime rate less three percent; and

15.4.b. Loans shall be repaid in equal installments over a period of no longer than 10 years, as allowed by the secretary.

## §60-3-16. Reopener Provisions.

16.1. A voluntary remediation agreement shall be reopened in accordance with the procedures set forth in this section upon a determination by the secretary that one or more of the following conditions has occurred:

16.1.a. Fraud was committed in demonstrating attainment at the site with regard to a standard set forth in the voluntary remediation agreement or in these rules that resulted in avoiding the need for further remediation at the site;

16.1.b. New information confirms the existence of an area of previously unknown contamination which contains contaminants that have been shown to exceed the standards applied to the previous remediation at the site;

16.1.c. The level of risk is increased significantly beyond the established level of protection at the site due to substantial changes in exposure conditions, such as, a change in land use, or new information is obtained about a contaminant associated with the site which revises exposure assumptions beyond the acceptable range:

16.1.c.1. This condition applies only where the level of risk is increased by a

factor of at least five or the hazard index exceeds 1, or 10 where it is not determined whether multiple systemic toxicants affect the same organ.

16.1.d. The release that is addressed by the voluntary remediation agreement occurred after July 1, 1996, on a site not used for industrial activity prior to that date and (1) the remedy relied, in whole or in part, upon institutional or engineering controls instead of treatment or removal of contamination; and (2) treatment, removal or destruction has become technically and economically practicable; or

16.1.e. The remediation method failed to meet the remediation standard or combination of standards identified in the voluntary remediation agreement or these rules.

16.2. If at any time the secretary determines that one of the reopener conditions in subsection 16.1 has been triggered, the secretary shall issue notice of such determination by providing written notice through certified/registered mail to the initial remediator and the current occupant, and any other person who has asked to be notified of any actions regarding the site.

16.3. Any person aggrieved by the secretary's determination under subsection 16.2, may appeal such ruling to the Environmental Quality Board in accordance with the provisions of W. Va. Code §22B-1-7.

16.4. The Certificate of Completion previously issued for the site shall become null and void upon the expiration of 60 days from the date of issuance of notice as provided in subsection 16.1 or 60 days from issuance of a final order of the Environmental Quality Board where an appeal is taken as provided in subsection 16.2, unless prior to such time at least one of the following occurs:

16.4.a. Where the initial remediator seeks to maintain the certificate of completion then in effect, the initial remediator shall:

16.4.a.1. ~~Enter into an agreement with the secretary to reopen~~ Reopen and revise

the voluntary agreement to the extent necessary to return the site to its previously agreed to state of remediation; or

16.4.a.2. ~~Agree to reopen~~ Reopen and revise the voluntary agreement to the extent necessary to achieve an alternative appropriate standard as determined by the secretary;

16.4.b. Where some person other than the initial remediator seeks to maintain the certificate of completion then in effect, such person shall:

16.4.b.1. Enter into a voluntary agreement with the secretary in accordance with the requirements of these rules which contains such provisions as are necessary to assure that the property meets the state of remediation previously agreed to or another appropriate standard as determined by the secretary.

#### **§60-3-17. Appeals of Rulings of the Secretary.**

17.1. If at any time the secretary determines that an obligation imposed by the certificate of completion or by any land use covenant issued pursuant to the Act is not being satisfied, with the result that the remediation standard approved for the site is no longer being met, or continued compliance with the remediation standard is threatened, the secretary shall issue notice of such determination by providing written notice through certified/registered mail to the current owner or operator of the site. Such notice shall identify the obligations that are not being satisfied and the appropriate corrective action that must be taken.

17.2. Any person aggrieved by the secretary's determination under subsection 17.1 of this rule may appeal such ruling to the Environmental Quality Board in accordance with the provisions of W. Va. Code §22B-1-7.

17.3. The covenant set forth in the certificate of completion and the provisions regarding relief from liability in any land use covenant shall no longer apply to the current owner or operator of the site and their successors

and assigns upon the expiration of 60 days from the date of issuance of notice as provided in subsection 17.1 of this rule, or 60 days from issuance of a final order of the Environmental Quality Board affirming the action of the

secretary where an appeal is taken as provided in subsection 17.2 of this rule, unless prior to such time the current owner or operator takes action to assure that all obligations imposed by the Certificate are satisfied.

## APPENDIX 60-3A

WEST VIRGINIA VOLUNTARY REMEDIATION AGREEMENT FOR  
NO FURTHER ACTION INVESTIGATION ACTIVITIES

[For Brownfields and Non-Brownfields Sites]

## I. INTRODUCTION

1. The West Virginia Department of Environmental Protection (WVDEP), by its Secretary, and \_\_\_\_\_ ("~~applicant~~Applicant") hereby enter into this Voluntary Remediation Agreement ("Agreement"), pursuant to the Voluntary Remediation and Redevelopment Act, W. Va. Code §22-22-1 et seq. (the "Act"), for the purpose of investigating and, if warranted, remediating the property that is the subject of this Agreement ("~~the site~~Site").

## II. JURISDICTION

2. This Agreement is entered into by and between the WVDEP, by its Secretary, and, \_\_\_\_\_ ~~applicant~~Applicant, pursuant to W. Va. Code §22-22-7.

3. The Parties agree to the following terms and conditions as satisfying the requirements of the Act for the investigation and remediation of the ~~site~~Site. ~~The applicant~~Applicant reserves all rights it may have under common law, the West Virginia Code and federal statutes to seek contribution or indemnity. The WVDEP reserves all rights it may have under common law, the West Virginia Code and federal statutes to seek contribution or indemnity from persons other than ~~the applicant~~Applicant and those persons identified in W. Va. Code §22-22-18.

4. By entering into this Agreement, ~~the applicant~~Applicant neither admits nor denies liability.

## III. STATEMENT OF ELIGIBILITY

5. The Secretary has determined that the application submitted by ~~applicant~~Applicant is complete and that ~~applicant~~Applicant is eligible to participate in the voluntary remediation program [Add for brownfields locations: and that the ~~site~~Site qualifies as a brownfields site]. However, neither the Secretary's determination of eligibility nor the entry into this Agreement precludes any finding by the Secretary at a later date that the ~~site~~Site poses an imminent and substantial threat to human health or the environment within the meaning of W. Va. Code §22-22-7(d). In addition, if it is determined that ~~applicant~~Applicant withheld or misrepresented information that would be relevant to the ~~applicant~~Applicant's eligibility, the Secretary may withdraw from this Agreement.

## IV. PARTIES BOUND

6. This Agreement shall apply to and be binding upon ~~the applicant~~Applicant, its officers, secretaries, principals, employees, agents, successors, subsidiaries and assigns and upon WVDEP, its employees, agents and successors. The signatories to this Agreement certify that they are fully authorized to execute and legally bind the parties they represent.

7. ~~The applicant~~Applicant shall provide a copy of this Agreement to any subsequent owners or successors before ownership rights are transferred.

## V. DEFINITIONS

8. "Day" or ~~"calendar day"~~ means the 24-hour period between 12:00 A.M. - 12:00 A.M.
9. "No further action" means a site is eligible to receive a Certificate of Completion on the basis of site assessment sampling or sampling data developed under a Voluntary Remediation Agreement which demonstrates that the site meets applicable standards.
10. "Rules" means those rules adopted by the Secretary of the Department of Environmental Protection pursuant to the Voluntary Remediation and Redevelopment Act, W. Va. Code §22-22-1 through 22-22-21.
11. "Site" shall be used in the manner as defined by W. Va. Code §22-22-2 and for purposes of this Agreement means the property located in \_\_\_\_\_, West Virginia, and is more particularly described in the Application for Participating in the Voluntary Remediation Program submitted to WVDEP and accepted by letter dated, 20\_. A map depicting the site boundaries and including \_\_\_\_\_ acres, is attached and incorporated herein as Exhibit "A". ~~[OPTIONAL LANGUAGE - Submitted to WVDEP and accepted by letter dated, 200\_.]~~
12. All other terms contained in this Agreement shall be used in the manner as defined by W. Va. Code §22-22-2 or the rules.

## VI. STATEMENT OF PURPOSE

13. This Agreement sets forth necessary terms and conditions to satisfy the requirements of the Act for the investigation and, if warranted, the remediation of the site Site.
14. The activities conducted by ~~the applicant~~ Applicant under this Agreement are subject to approval by WVDEP as provided herein. Applicant shall provide all necessary information for the site Site. The activities conducted by ~~the applicant~~ Applicant shall be consistent with this Agreement, all applicable laws and regulations and any appropriate guidance documents.

## VII. EVALUATION OF SITE ASSESSMENT

15. ~~Applicant~~ Applicant has submitted a site assessment as a part of the application. The site assessment was accompanied by a final report prepared by \_\_\_\_\_, a licensed remediation specialist, which states that the site Site meets the applicable standard described in paragraph 16 of this Agreement.
16. The parties agree that the applicable standard for this site Site, consistent with [insert cite to rule relating to remediation standards] is as follows:
- [Insert appropriate standard and, where applicable, a description of any engineering or institutional controls for this site Site, as agreed upon by the Parties.]
17. The statutes and regulations for which compliance is mandated in connection with the investigation or remediation of this site Site are as follows:

[Insert appropriate list of statutes and rules.]

[OPTIONAL LANGUAGE - If applicable]

- (a) Air Pollution Control Act, W.Va. Code §§ 22-5-1 et seq.;
- (b) Water Pollution Control Act, W. Va. Code §§ 22-11-1 et seq.;
- (c) Groundwater Protection Act, W. Va. Code §§ 22-12-1 et seq.;
- (d) Hazardous Waste Management Act, W. Va. Code §§ 22-18-1 et seq.;
- (e) Section 103(a) of Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C.A. §§ 9603(a)
- (f) Section 304 of Emergency Planning and Community Right-To-Know Act of 1986, 42 U.S.C.A. §§ 11001 to 11050;
- (g) Occupational Safety & Health Act, 29 U.S.C.A. §§ 651 to 678;
- (h) Resource Conservation and Recovery Act, as amended, et. seq., 42 U.S.C.A. §§ 6901, et seq.; and
- (i) Toxic Substances Control Act, 15 U.S.C.A. §§ 2601, et seq.; and any applicable regulation promulgated thereunder.

18. The WVDEP has reviewed the final report and the site assessment submitted as a part of the application to participate in the Voluntary Remediation Program and has concluded that the ~~site~~Site meets the applicable standard described in paragraph 16 of this Agreement. [If applicable - include a description of the technical standards applied in evaluating the site assessment with reference to proposed future land uses.]

19. Nothing herein shall be construed as restricting the inspection or access authority of DEP under any law or regulation.

#### VIII. RECORD PRESERVATION

20. ~~The applicant~~Applicant agrees to preserve, for a minimum of three years from the effective date of this Agreement, all documents required by this Agreement and any other documents generated or used to prepare the documents required by this Agreement. Upon request by WVDEP, ~~the applicant~~Applicant shall make available to WVDEP such records, or copies of any such records.

#### IX. RESERVATION OF RIGHTS

21. WVDEP and ~~applicant~~Applicant reserve all rights and defenses they may have pursuant to any available legal authority unless expressly waived herein.

22. Nothing herein is intended to release, discharge, or in any way affect any claims, causes of action or demands in law or equity which the parties may have against any person, firm, partnership or corporation, not a party to this Agreement, for any liability it may have arising out of or relating in any way to, the generation, storage, treatment, handling, transportation, release or disposal of any materials, hazardous substances, hazardous waste, contaminants, or pollutants at, to, or from the ~~site~~Site. The parties to this Agreement expressly reserve all rights, claims, demands, and causes of action they have against any and all other persons and entities who are not parties to this Agreement, and as to each other for matters not covered hereby.

23. ~~The applicant~~Applicant reserves the right to seek contribution, indemnity, or any other available remedy against any person found to be responsible or liable for contributions, indemnity, or otherwise for any amounts which have been or will be expended by ~~the applicant~~Applicant in connection with the ~~site~~Site.

24. WVDEP acknowledges that, pursuant to W. Va. Code §22-22-18, ~~applicant~~Applicant, upon receipt of the Certificate of Completion, is not liable for claims for contribution concerning matters addressed in the Voluntary Remediation Work Plan.

#### **X. PUBLIC NOTIFICATION/INVOLVEMENT**

25. [For brownfield applicants, insert provision requiring compliance with approved-public involvement plan, where appropriate]

#### **XI. ADMINISTRATIVE COSTS**

26. Applicant agrees to reimburse WVDEP for all of its reasonable administrative costs associated with this Agreement in the amount of \$ \_\_\_\_\_ within 30 days of the effective date of this Agreement with a check made payable to the Voluntary Remediation Fund and be mailed along with a transmittal letter stating the ~~site~~Site name and address to the West Virginia Department of Environmental Protection; Attention: \_\_\_\_\_, \_\_\_\_\_, West Virginia. Reimbursable costs under this provision shall be those costs for which reimbursement is required under the rules.

#### **XII. [IF APPLICABLE] LAND USE COVENANTS**

27. [Insert provisions describing restrictions on future use of property and attach copy of land use covenant that is to be recorded for the site.]

#### **XIII. EFFECTIVE DATE AND SUBSEQUENT MODIFICATION**

28. The effective date of this Agreement shall be the date on which the ~~applicant~~Applicant receives notice that this Agreement has been signed by the Secretary of WVDEP.

29. This Agreement may be amended by mutual agreement of WVDEP and ~~the applicant~~Applicant. Amendments shall be in writing and shall be effective when ~~the applicant~~Applicant receives notice that the amendment has been signed by the Secretary of WVDEP.

30. If the Secretary determines that there is an imminent threat to the public, he or she may unilaterally modify or amend this Agreement.

#### **XIV. TERMINATION AND SATISFACTION**

31. Upon completion of the final report prepared by the licensed remediation specialist, ~~the applicant~~Applicant may seek a Certificate of Completion from the Secretary. Upon receipt of a request for a Certificate of Completion, the Secretary shall determine that the ~~site~~Site meets applicable standards for those areas of the ~~site~~Site and for those contaminants identified in the voluntary remediation agreement and that ~~the applicant~~Applicant has complied with the voluntary remediation agreement and any approved work plans for the ~~site~~Site. Upon making this determination, the Secretary shall issue a Certificate of Completion which conforms substantially to Appendix 60-3C of the rule. Where a land use covenant is required by this Agreement, such Certificate of Completion shall not become effective until it is properly filed with the Clerk of the County Commission of the county in which the property is located.

If the Secretary determines that the certificate should not be issued because the work required by this Agreement and any approved work plans has not been completed or because the ~~site~~Site does not meet

applicable standards the Secretary shall initiate the procedures relating to denial of a certificate as provided in the rules.

32. The provisions of this Agreement shall be satisfied and this Agreement shall end when the Secretary issues the Certificate of Completion.

#### XV. REOPENER

33. This Agreement may be reopened upon agreement of the parties or upon occurrence of one or more of the conditions of W. Va. Code §22-22-15 and the rules implementing that section.

#### XVI. GOVERNING LAW

34. This Agreement will be governed by the laws of the State of West Virginia.

\_\_\_\_\_  
APPLICANT

Printed Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

WEST VIRGINIA DEPARTMENT OF  
ENVIRONMENTAL PROTECTION

By: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

[Include if applicant is not owner of the site and agreement calls for land use covenant:

| \_\_\_\_\_, as owner of the ~~site~~Site referenced in the above Agreement hereby acknowledges that said Agreement requires the imposition of a land use covenant and, in consideration of the benefits accruing to the ~~site~~Site from said Agreement, I hereby agree to the imposition of such land use covenant and agree to cooperate in the execution and filing of such land use covenant.

\_\_\_\_\_  
Owner

\_\_\_\_\_  
Date

## APPENDIX 60-3B

WEST VIRGINIA VOLUNTARY REMEDIATION AGREEMENT FOR INVESTIGATION AND  
REMEDIAL ACTIVITIES

[For Brownfields and Non-Brownfields Sites]

## I. INTRODUCTION

1. The West Virginia Department of Environmental Protection (WVDEP), by its Secretary, and \_\_\_\_\_ ("~~applicant~~Applicant") hereby enter into this Voluntary Remediation Agreement ("Agreement"), pursuant to the Voluntary Remediation and Redevelopment Act, W. Va. Code §22-22-1 et seq. ("the Act"), for the purpose of investigating and remediating the property that is the subject of this Agreement ("the Site").

## II. JURISDICTION

2. This Agreement is entered into by and between the WVDEP, by its Secretary, and \_\_\_\_\_, ~~applicant~~Applicant, pursuant to W. Va. Code §22-22-7.

3. The Parties agree to the following terms and conditions as satisfying the requirements of the Act for the investigation and remediation of the ~~site~~Site. ~~The applicant~~Applicant reserves all rights under common law, the West Virginia Code and federal statutes to seek contribution or indemnity. The WVDEP reserves all rights it may have under common law, the West Virginia Code and federal statutes to seek contribution or indemnity from persons other than ~~the applicant~~Applicant and those persons identified in W. Va. Code §22-22-18.

4. By entering into this Agreement, ~~the applicant~~Applicant neither admits nor denies liability.

## III. STATEMENT OF ELIGIBILITY

5. The Secretary has determined that the application submitted by the ~~applicant~~Applicant is complete and that ~~applicant~~Applicant is eligible to participate in the voluntary remediation program. However, neither the Secretary's determination of eligibility nor the entry into this Agreement precludes any finding by the Secretary at a later date that the ~~site~~Site poses an imminent and substantial threat to human health or the environment within the meaning of W. Va. Code §22-22-7(d). In addition, if it is determined that ~~applicant~~Applicant withheld or misrepresented information that would be relevant to the ~~applicant~~Applicant's eligibility, the Secretary may withdraw from this Agreement.

## IV. PARTIES BOUND

6. This Agreement shall apply to and be binding upon ~~the applicant~~Applicant, its officers, secretaries, principals, employees, agents, successors, subsidiaries, and assigns and upon WVDEP, its employees, agents and successors. The signatories to this Agreement certify that they are fully authorized to execute and legally bind the parties they represent. No change in ownership, corporate, or partnership status of ~~the applicant~~Applicant shall in any way alter its status or responsibilities under this Agreement unless the ~~applicant~~Applicant or WVDEP withdraws from this Program as provide herein.

7. ~~The applicant~~Applicant shall provide a copy of this Agreement to any subsequent owners or successors before ownership rights are transferred. ~~The applicant~~Applicant shall provide a copy of this Agreement to all contractors, subcontractors, laboratories, and consultants which are retained to conduct

any work performed under this Agreement, within fourteen (14) days after the effective date of this Agreement or within fourteen (14) days of the date of retaining their services.

## V. DEFINITIONS

8. "Day" or "~~calendar day~~" means the 24-hour period between 12:00 A.M. - 12:00 A.M.

9. "No further action" means a site is eligible to receive a Certificate of Completion on the basis of site assessment sampling or sampling data developed under a Voluntary Remediation Agreement which demonstrates that the site meets applicable standards.

10. "Rules" mean those rules adopted by the Secretary of the Department of Environmental Protection pursuant to the Voluntary Remediation and Redevelopment Act, and promulgated at 60 CSR 3 as the Voluntary Remediation and Redevelopment Rule.

11. "Site" shall be used in the manner as defined by W. Va. Code §22-22-2(dd) and for purposes of this Agreement means the property located in \_\_\_\_\_, West Virginia, and is more particularly described in the Application for Participating in the Voluntary Remediation Program submitted to WVDEP and accepted by letter dated, 201\_\_. A map depicting the site boundaries and including \_\_\_\_\_ acres, is attached and incorporated herein as Exhibit "A". ~~[OPTIONAL LANGUAGE—Submitted to WVDEP and accepted by letter dated \_\_\_\_\_, 200\_\_.]~~

12. All other terms contained in this Agreement shall be used in the manner as defined by W. Va. Code §22-22-2 or the Rules.

## VI. STATEMENT OF PURPOSE

13. This Agreement sets forth necessary terms and conditions to satisfy the requirements of the Act for the investigation and remediation of the Site.

14. The activities conducted by ~~the applicant~~ Applicant under this Agreement are subject to approval by WVDEP as provided herein. Applicant shall provide all necessary information for the Site. The activities conducted by ~~the applicant~~ Applicant shall be consistent with this Agreement, all applicable laws and regulations and any appropriate guidance documents.

## VII. WORK TO BE PERFORMED

15. All work to be performed by ~~the applicant~~ Applicant pursuant to this Agreement shall be under the direction and supervision of a licensed remediation specialist. The licensed remediation specialist may be designated by ~~applicant~~ Applicant as ~~applicant~~ Applicant's project manager pursuant to Paragraph 33. Prior to the initiation of Site work, ~~the applicant~~ Applicant shall notify WVDEP, in writing, regarding the name and title of the licensed remediation specialist, if different from the licensed remediation specialist designated in the application, and of any contractors and/or subcontractors to be used in carrying out the terms of this Agreement.

16. Applicant shall submit a hardcopy and electronic version of a Voluntary Remediation Work Plan which when implemented provides for the attainment of the applicable standard specified in Paragraph 18 of this Agreement.

(OPTIONAL LANGUAGE - If applicable):

Prior to the filing of the application and prior to the execution of this Agreement, ~~applicant~~ Applicant has undertaken work at the ~~site~~ Site. The following documents have been accepted and approved by the licensed remediation specialist in support of the requirements of the Act for the investigation and remediation of the ~~site~~ Site:

[List of documents and reports submitted]

(OPTIONAL LANGUAGE-If applicable):

For the purposes of remediation and preparing Final Reports the Site may be divided into separate areas, and different human health and ecological remediation standards; e.g., De Minimis, Uniform Risk-Based, Site-Specific Risk-Based, may be utilized for these individual areas. Applicant currently contemplates that the Site will be subdivided into the following areas:

[Description of the subdivided areas]

17. The Voluntary Remediation Work Plans submitted with this Agreement includes the following:

[List by Site or Subdivided Areas, if applicable]

[OPTIONAL LANGUAGE-If applicable]:

No Voluntary Remediation Work Plans are submitted with this Agreement.

18. The parties agree that the applicable standard for this Site, consistent with Section 9 of the rule, is as follows:

[Insert applicable standard and, where applicable, engineering or institutional controls for this site, as agreed upon by the Parties.]

[List by Site or Subdivided Areas, if applicable]

[OPTIONAL LANGUAGE-If applicable]:

The parties agree that the applicable standard(s) for this Site will be determined upon approval of the work plan(s) and report(s) described in Paragraph 20 of this Agreement. The parties agree that the future determination of standard(s) will be described in a modification to the Agreement.

19. The statutes and regulations for which compliance is mandated in connection with the investigation or remediation of this Site are as follows:

[Insert appropriate list of statutes and rules.]

[OPTIONAL LANGUAGE-If applicable]:

- (a) Air Pollution Control Act, W. Va. Code §§ 22-5-1 et seq.;
- (b) Water Pollution Control Act, W. Va. Code §§ 22-11-1 et seq.;
- (c) Groundwater Protection Act, W. Va. Code §§ 22-12-1 et seq.;
- (d) Hazardous Waste Management Act, W. Va. Code §§ 22-18-1 et seq.;
- (e) Section 103(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C.A. §§ 9603(a)
- (f) Section 304 of the Emergency Planning and Community Right-To-Know Act of 1986, 42 U.S.C.A. §§ 11001 to 11050;
- (g) Occupational Safety & Health Act, 29 U.S.C.A. §§ 651 to 678;

- (h) Resource Conservation and Recovery Act, as amended, et. seq., 42 U.S.C.A. §§ 6901, et seq.; and
- (i) Toxic Substances Control Act, 15 U.S.C.A. §§ 2601, et seq.; and
- (j) any applicable regulation promulgated thereunder.

### VIII. SUBMITTAL AND APPROVAL OF WORK PLANS OR REPORTS

20. ~~The applicant~~Applicant shall submit hardcopies and electronic versions of the following work plans or reports in accordance with the schedule provided in this Agreement:

[List of work plans and/or reports to be submitted]

~~[OPTIONAL LANGUAGE - If Applicable]~~

When additional work plans or reports are planned as a follow-up to initial or subsequent activities, ~~the applicant~~Applicant shall submit hardcopies and electronic versions of the subsequent-future work plans, reports (including final reports), and schedules in accordance with a modification to this Agreement.

21. The Secretary may, based upon accuracy, quality, and completeness, either approve or disapprove a work plan or report submitted by ~~applicant~~Applicant.

22. If the Secretary disapproves a work plan or report, the Secretary must, within 5 days of its disapproval, notify ~~the applicant~~Applicant in writing that its work plan or report has been disapproved. Such written notice shall include a list specifying the reasons that the work plan or report was disapproved, and shall specify all additional information needed for the work plan or report to obtain approval.

23. If the Secretary disapproves a work plan or report as submitted, ~~the applicant~~Applicant must resubmit the work plan or report or terminate this Agreement as provided in Paragraph 7475.

24. Except for the final report as described in §60-3-11, and paragraph 29 of this agreement, The the Secretary shall either approve or disapprove all work plans and reports within 30 days of receipt [shorter period may be specified]. Any such action taken on a work plan or report must be confirmed in writing and received by ~~the applicant~~Applicant within the 30-day period [may be shorter period specified]. An extension of time for approval or disapproval of work plans or reports may be mutually agreed to by and between ~~the applicant~~Applicant and the Secretary. If an extension of time is mutually agreed to by the Secretary and ~~applicant~~Applicant, it must be confirmed in writing.

25. After work plans or reports are resubmitted, the Secretary shall approve or disapprove the resubmitted work plans or reports within thirty (30) days of receipt, or within such shorter period specified in the party's voluntary remediation agreement. Any action taken on resubmitted work plans or reports must be confirmed in writing and received by ~~the applicant~~Applicant within the thirty (30)-day period for acting on a resubmitted application, or within such shorter time specified in the party's voluntary remediation agreement. An extension of time or action on resubmitted work plans or reports may be mutually agreed to between ~~the applicant~~Applicant and the Secretary. If an extension of time is mutually agreed to by the Secretary and ~~the applicant~~Applicant, it must be confirmed in writing. If resubmitted work plans or reports are not approved by the Secretary, then the Secretary and ~~the applicant~~Applicant may mutually agree, in writing, to a schedule for additional review of the resubmitted work plans or reports.

26. If work plans or reports are not approved or disapproved within 30 days of receipt by the Secretary [shorter time may be specified], or if resubmitted work plans or reports are not approved or disapproved within 30 days of receipt by the Secretary [shorter time may be specified], then the work plans or reports will be deemed approved unless such work plans or reports are determined to be materially inaccurate.

27. Notice. Any notice required to be given under the provisions of this section must be in writing and sent via United States certified mail [alternate method may be specified]. Notice is complete upon receipt.

28. If ~~the applicant~~ Applicant desires to proceed with the implementation of the approved work plan, ~~the applicant~~ Applicant must notify the Secretary in writing not more than 90 days after the work plan is approved. After providing such notice, ~~the applicant~~ Applicant shall initiate the work detailed in the Voluntary Remediation Work Plan according to the schedule as set forth in the Secretary's Notice of Approval. Upon the Secretary's receipt of notice that ~~the applicant~~ Applicant intends to proceed, the fully approved Voluntary Remediation Work Plan shall be deemed incorporated into and made an enforceable part of this Agreement.

29. Upon completion of the work contemplated by all work plans, ~~the applicant~~ Applicant shall submit to the Secretary hardcopies and electronic versions of the final report prepared by the licensed remediation specialist, along with a request for a Certificate of Completion as required in §60-3-12.1.c.1. The final report shall include all information necessary to verify that all work contemplated by the work plan has been completed and all information required by the rules. Upon receiving the request for a Certificate of Completion, the Secretary shall evaluate the final report provided by Applicant, and determine, within 60 days, whether the final report was properly issued by the licensed remediation specialist.

#### [OPTIONAL SECTION - IX. PUBLIC NOTIFICATION/INVOLVEMENT ]

30. [For brownfield applicants, insert provision requiring compliance with approved Public Involvement Plan, where appropriate].

#### IX. ADDRESSES FOR ALL CORRESPONDENCE

31. Documents, including reports, approvals, notifications, disapprovals, and other correspondence, to be submitted under this Agreement, may be sent by certified U. S. mail, return receipt requested, hand delivery, overnight mail or by courier service to the following addresses or to such addresses as the ~~applicant~~ Applicant or WVDEP may designate in writing.

Documents to be submitted to WVDEP should be sent to:  
[Insert name of Project Manager]

West Virginia Department of Environmental Protection  
Division of Land Restoration  
601 57<sup>th</sup> Street  
Charleston, WV 25304

Phone No. (304) 926-0455

and a copy to:

\_\_\_\_\_ [Insert name and address of Project Manager]

Documents to be submitted to the ~~applicant~~Applicant should be sent to:

Attn:

Phone No.

## XI. COMPLIANCE WITH APPLICABLE LAWS

32. All work undertaken by the ~~applicant~~Applicant pursuant to this Agreement shall be performed in compliance with all applicable federal, state and local laws, ordinances and regulations, including, but not limited to, all Occupational Safety and Health Administration, Department of Transportation and Resource Conservation and Recovery Act regulations. The ~~applicant~~Applicant shall be responsible for obtaining all permits which are necessary for the performance of any work hereunder.

33. Completion of the work performed in accordance with this Agreement shall satisfy all applicable remediation requirements of Chapter 22 of the West Virginia Code, including the following: the Surface Coal Mining and Reclamation Act, W. Va. Code §22-3-1 et seq.; the Air Pollution Control Act, W. Va. Code §22-5-1 et seq.; the Water Pollution Control Act, W. Va. Code §22-11-1 et seq.; the Groundwater Protection Act, W. Va. Code §22-12-1 et seq.; the Solid Waste Management Act, W. Va. Code §22-15-1 et seq.; the Underground Storage Tank Act, W. Va. Code §22-17-1 et seq.; and the Hazardous Waste Management Act, W. Va. Code §22-18-1 et seq.

## XII. PROJECT MANAGER/LICENSED REMEDIATION SPECIALIST

34. The WVDEP Project Manager for the Site is identified in Paragraph 30 of this Agreement. The ~~applicant~~Applicant has designated (insert name of ~~LRS~~licensed remediation specialist) as the ~~applicant~~Applicant's ~~Licensed—licensed Remediation—remediation Specialist—specialist (LRS)~~ and [OPTIONAL – Insert name as] Project Manager for the Site. The licensed remediation specialist shall be responsible for the supervision of all activities under this Agreement. The WVDEP project manager will be the WVDEP designated representative at the Site. To the maximum extent possible, communications between the ~~applicant~~Applicant and WVDEP and all documents (including reports, approvals, and other correspondence) concerning the activities performed pursuant to the terms and conditions of this Agreement shall be directed through the project managers. During the implementation of this Agreement, the project managers shall, whenever possible, operate by consensus and shall attempt in good faith to resolve disputes informally through discussion of the issues. Each party has the right to change its respective project manager or licensed remediation specialist and shall notify the other party of such change within seventy-two (72) hours.

35. The absence of the ~~applicant~~Applicant's or WVDEP's project manager or licensed remediation specialist from the Site shall not be cause for the stoppage of work. The ~~applicant~~Applicant's project manager or licensed remediation specialist or his supervisor or licensed remediation specialists shall reasonably be available by telephone while work is being performed. The ~~applicant~~Applicant shall designate a person to be in charge who will be available on-site when field work is being performed.

### XIII. QUALITY ASSURANCE

36. ~~The applicant~~Applicant shall use quality assurance, quality control, and chain of custody procedures in accordance with the Quality Assurance Project Plan approved for use by WVDEP throughout any work plan sample collection and analysis activities under this Agreement, unless WVDEP agrees otherwise.

37. Applicant shall provide the WVDEP project manager with reasonable advance notice of all sampling and analysis as detailed in the work plan. To provide quality assurance and maintain quality control, ~~the applicant~~Applicant shall:

- (a) Use laboratories certified by WVDEP;
- (b) Ensure that all sampling and analyses are performed according to US EPA methods, the approved Quality Assurance Project Plan, or other methods deemed satisfactory by WVDEP; and
- (c) Ensure that any laboratories used by ~~the applicant~~Applicant for analyses participate in a documented Quality Assurance/Quality Control program that complies with US EPA guidance documents. As part of such a program, and upon request by WVDEP, such laboratories shall perform analyses of samples provided by WVDEP to demonstrate the quality of analytical data for each such laboratory.

[OPTIONAL LANGUAGE - If applicable]:

~~The applicant~~Applicant may use a mobile laboratory (if it is certified by WVDEP) with the advance written approval of the WVDEP Project Manager.

38. In the event any laboratory fails to perform the activities required above, WVDEP reserves the right to reject any data not gathered pursuant to the requirements listed above, and to require that ~~the applicant~~Applicant utilize a different laboratory.

### XIV. SAMPLING AND DATA/DOCUMENT AVAILABILITY

39. ~~The applicant~~Applicant shall, upon request, make the results of all sampling, including raw data and/or tests or other data generated by ~~the applicant~~Applicant, or on ~~the applicant~~Applicant's behalf, available to WVDEP. WVDEP shall make available to ~~the applicant~~Applicant the quality-assured results of sampling and/or tests or other data similarly generated by WVDEP.

40. At the request of WVDEP, ~~the applicant~~Applicant shall permit an authorized representative of WVDEP to take samples of wastes, soils, air surface water and groundwater at the Site. For each sample taken, the authorized representative shall provide ~~the applicant~~Applicant a receipt describing the sample obtained and, if requested, a portion of each sample equal in weight or volume to the portion retained.

### XV. ACCESS

41. To the extent that the Site or other areas where work is performed hereunder is presently owned or controlled by parties other than those bound by this Agreement, ~~the applicant~~Applicant shall obtain, or use its best efforts to obtain, access agreements from the present owners. Best efforts shall include, at a minimum, a certified letter from ~~the applicant~~Applicant to the present owner of such property requesting access agreements to permit ~~the applicant~~Applicant or any authorized representative of the WVDEP

access to such property. Such agreement shall provide access for authorized representatives of the WVDEP as specified below. In the event such access agreements are not obtained, the ~~applicant~~Applicant shall so notify the WVDEP, which may then, at its discretion, assist the ~~applicant~~Applicant in gaining access.

42. Upon presentation of proper credentials, authorized representatives of the WVDEP shall be provided access by the ~~applicant~~Applicant to the Site and other areas where work is to be performed under this Agreement at all reasonable times. Such access shall be related solely to the work being performed on the Site and shall include, but not be limited to: inspecting records, operating logs and contracts related to the Site; reviewing the progress of the ~~applicant~~Applicant in carrying out the terms of this Agreement; conducting such tests, inspections and sampling as WVDEP may deem necessary consistent with this Agreement. The ~~applicant~~Applicant shall permit WVDEP's authorized representatives to inspect and copy all records, files, photographs, documents and other writings, including all sampling and monitoring data, which pertain to this Agreement over which the ~~applicant~~Applicant exercises control. All persons with access to the Site pursuant to this Agreement shall comply with any applicable the-health and safety plans.

43. Nothing herein shall be construed as restricting the inspection or access authority of WVDEP under any law or regulation.

## XVI. RECORD PRESERVATION

44. The ~~applicant~~Applicant agrees to preserve, during the pendency of this Agreement, and for a minimum of three years after its termination, all documents required by this Agreement and any other documents generated or used to prepare the documents required by this Agreement. Upon request by WVDEP, the ~~applicant~~Applicant shall make available to WVDEP such records, or copies of any such records.

45. The ~~applicant~~Applicant may assert a confidentiality claim for any information submitted pursuant to this Agreement on the grounds that such information, or parts thereof, if made public would divulge methods, processes, or activities entitled to protection as trade secrets. If no such confidentiality claim accompanies the information when it is submitted to the WVDEP, it may be made available to the public by WVDEP without further notice to the ~~applicant~~Applicant. The ~~applicant~~Applicant agrees not to assert any confidentiality claim with regard to any physical or analytical data regarding environmental conditions at the Site.

## XVII. DISPUTE RESOLUTION

46. The parties shall use their best efforts to, in good faith, resolve all disputes or differences of opinion informally. The period of informal resolution shall not exceed thirty (30) days from the time that either party commences informal resolution by verbally citing the dispute with reference to this paragraph to the other party, unless the parties agree otherwise in writing. If, however, the parties are unable to resolve the dispute informally, the ~~applicant~~Applicant may present written notices of such dispute to WVDEP and set forth specific points of dispute and the position of the ~~applicant~~Applicant. This written notice shall be submitted no later than 10 calendar days after the expiration of the informal dispute resolution period. The ~~applicant~~Applicant's project manager will notify the WVDEP project manager immediately by phone or other appropriate methods of communication, prior to written notice, when she/he believes that the parties are unable to resolve a dispute. If either party requests, within 14 days receipt of written notice of the dispute by WVDEP, disputes will be submitted to a mutually-approved impartial third party for non-binding mediation.

47. After the parties have attempted in good faith to resolve disputes pursuant to the terms of Paragraph 46, any unresolved disputes arising out of or relating to this agreement, or the breach thereof, shall be settled by binding arbitration and judgment on the arbitrator's decision may be entered in any court having jurisdiction. ~~The applicant~~Applicant shall notify WVDEP in writing of any unresolved disputes which they believe require arbitration. Within 5 days, the parties shall agree to an arbitrator. If the parties fail to agree to an arbitrator, the arbitration shall be administered by the American Arbitration Association. In selecting a mediator or arbitrator, the parties shall attempt to select persons with experience in environmental matters, including but not limited to a licensed remediation specialist.

48. ~~The applicant~~Applicant shall make a written submission in support of its position to the agreed arbitrator within 10 days of the arbitrator's selection, and the other party may make a written response in support of its position within 7 days thereafter. Upon notice to the parties, the arbitrator may request additional information or make specific inquiry of either party. Within 30 days of the written response under this paragraph, the arbitrator shall render a decision on the dispute and notify each of the parties of the decision. ~~The applicant~~Applicant agrees to pay for the services of any mediator and arbitrator used by the parties in attempting to resolve disputes arising out of or relating to this agreement. Each party shall pay its own legal fees in conducting mediation or arbitration.

49. Until the dispute is resolved, any actions concerning that element of work in dispute shall be halted. The resolution of the dispute shall be incorporated into the work plan and made an enforceable part thereof. The time schedule for the work in dispute shall be extended by the amount of time needed for resolution. Elements of work and/or obligations not affected by the dispute shall be completed in accordance with the schedule contained in the work plan.

50. Elements of work and any actions required as a result of such dispute resolution shall immediately be incorporated, if necessary, into the appropriate plan or procedure, and into this Agreement. ~~The applicant~~Applicant shall proceed with all remaining work according to the modified plan or procedure.

### **XVIII. FORCE MAJEURE**

51. ~~The applicant~~Applicant shall cause all work or required reporting to be performed within the time limits set forth herein, unless performance is delayed by events which constitute a force majeure. "Force Majeure" shall mean conditions or circumstances beyond the reasonable control of ~~applicant~~Applicant which could not have been overcome by due diligence and shall include, without limitation, acts of God, action or inaction of other governmental agencies, or administrative or judicial tribunals or other third parties, or strikes or labor disputes (provided, however, ~~applicant~~Applicant shall not be required to concede to any labor demands), which prevent or delay ~~applicant~~Applicant from complying with the work plan.

52. ~~The applicant~~Applicant shall notify WVDEP by telephone within three (3) working days and by writing no later than seven (7) working days after any event, which ~~the applicant~~Applicant contends is a Force Majeure. Such notification shall describe the anticipated length of the delay, the cause or causes of the delay, the measures taken or to be taken by ~~the applicant~~Applicant to minimize the delay, and the timetable by which these measures will be implemented. ~~The applicant~~Applicant shall have the burden of demonstrating that the event is a Force Majeure. The decision of whether an event is a Force Majeure shall be made by the Secretary, or the Secretary's designate. The decision shall be immediately communicated to ~~the applicant~~Applicant.

53. If a delay is attributable to a Force Majeure, the time period for performance under this Agreement shall be extended, in writing, by the amount of time that is attributable to the event constituting the Force Majeure.

### **XIX. RESERVATION OF RIGHTS**

54. WVDEP and ~~applicant~~Applicant reserve all rights and defenses they may have pursuant to any available authority unless expressly waived herein.

55. Nothing herein is intended to release, discharge, or in any way affect any claims, causes of actions or demands in law or equity which the parties may have against any person, firm, partnership or corporation, not a party to this Agreement for any liability it may have arising out of or relating in any way to, the generation, storage, treatment, handling, transportation, release or disposal of any materials, hazardous substances, hazardous waste, contaminants, or pollutants at, to, or from the Site. The parties to this Agreement expressly reserve all rights, claims, demands, and causes of action they have against any and all other persons and entities who are not parties to this Agreement, and as to each other for matters not covered hereby.

56. ~~The applicant~~Applicant reserves the right to seek contribution, indemnity, or any other available remedy against any persons found to be responsible or liable for contributions, indemnity, or otherwise for any amounts which have been or will be expended by ~~the applicant~~Applicant in connection with the Site.

57. The WVDEP reserves the right to bring an action, including an administrative action, against the ~~applicant~~Applicant for any violation of statutes or regulations except for the specific violations or releases that are being remediated in the work plan.

58. The WVDEP reserves the right to withdraw its approval of the work plan at any time during the implementation of the work plan if:

- (a) WVDEP determines that ~~the applicant~~Applicant has failed to substantially comply with the terms and conditions of this Agreement or the work plan;
- (b) ~~The applicant~~Applicant declines to implement the work plan after being notified of its approval by the WVDEP; or
- (c) WVDEP determines that a hazardous substance or petroleum has become an imminent or substantial threat to human health or the environment.

Upon WVDEP's withdrawal of its approval, this Agreement shall be terminated and WVDEP reserves the right to bring any action to enforce any statute or regulation under Chapter 22 of the West Virginia Code, including an action regarding the violations or releases that were the subject of this Agreement.

59. The WVDEP acknowledges that, pursuant to W. Va. Code §22-22-18, ~~applicant~~Applicant, upon receipt of the Certificate of Completion, is not liable for claims for contribution concerning matters addressed in the Voluntary Remediation Agreement or any related work plan.

### **XX. ADMINISTRATIVE COSTS**

60. Applicant agrees to reimburse WVDEP for all of its reasonable administrative costs associated with implementation of this Agreement at the rate of 2.5 times the hourly rate of the primary employee

assigned to the ~~site~~Site plus the actual and direct expenses of such employee. Within 60 calendar days of the approval of the work plan, WVDEP shall send the ~~applicant~~Applicant an itemized list of estimated in-house costs that WVDEP expects to incur under this Agreement. The ~~applicant~~Applicant agrees that a reasonable estimate of WVDEP contractor costs will be provided as described in the following paragraph. Itemization will be in standard WVDEP format. The estimated costs may include the preparation of the itemized list of administrative costs. Upon request, the ~~applicant~~Applicant shall have the right to examine any documentation in WVDEP's possession used to develop the itemized list of costs. Requests for such documentation shall be made in writing and must be received by WVDEP within two (2) weeks from the date the ~~applicant~~Applicant receives the estimate of costs.

61. WVDEP agrees to allow the ~~applicant~~Applicant to review and comment on the scope of work and associated cost estimates for outside contractors prior to WVDEP's authorization of the said contractor to proceed with the associated work. WVDEP will strive where possible to use cost effective and qualified outside contractor(s). "Outside contractors" are defined as individuals, partnerships or corporations paid by WVDEP to assist in the oversight of the activities under this agreement (e.g., risk assessment), but shall not include WVDEP employees. Cost estimates and invoices from outside contractors shall be submitted to the ~~applicant~~Applicant within two (2) weeks from the date the WVDEP receives the cost estimate or invoice. The ~~applicant~~Applicant shall raise any and all objections regarding cost estimates or invoiced work to the WVDEP within two (2) weeks from the date the ~~applicant~~Applicant receives the forwarded estimates/invoice(s) from the WVDEP or within two (2) weeks of the receipt by the ~~applicant~~Applicant of any back-up documentation of the said cost estimates/invoices which is contained in WVDEP files and requested by the ~~applicant~~Applicant, whichever shall last occur. Notwithstanding any other provision of this Agreement, the process for the review of and objection to any cost estimates pursuant to this paragraph may extend the period otherwise provided in this Agreement for the WVDEP review of the submitted work plan or report by no more than an additional 30 days.

62. Applicant shall pay these costs in accordance with the following provisions. The \$ \_\_\_\_\_ application fee shall be credited against the first accounting. WVDEP shall periodically send an accounting of contractor, subcontractor and laboratory costs to ~~applicant~~Applicant. Said accounting shall itemize all costs incurred by WVDEP for the previous calendar quarter. Applicant shall pay said amount within \_\_\_\_\_ days of receipt of the accounting. WVDEP shall also periodically send an accounting of WVDEP's primary employee time charged to this ~~site~~Site to ~~applicant~~Applicant. Applicant shall pay said amount within \_\_\_\_\_ days of receipt of the accounting.

63. Checks should be made payable to the Voluntary Remediation Fund and mailed along with a transmittal letter stating the ~~site~~Site name and address to the West Virginia Department of Environmental Protection: Attention: Director, Division of Land Restoration, Charleston, West Virginia. In addition, a copy of the check and transmittal letter should be mailed to the WVDEP project manager.

## XXI. NOTICE OF BANKRUPTCY

64. As soon as ~~applicant~~Applicant has knowledge of its intention to file bankruptcy or no later than 7 days prior to the actual filing of a voluntary or involuntary bankruptcy petition, ~~applicant~~Applicant shall notify WVDEP of its intention to file a bankruptcy petition.

## XII. INDEMNIFICATION

65. The ~~applicant~~Applicant agrees to indemnify and save and hold the State of West Virginia, its agencies, departments, agents, and employees, harmless from and all claims or causes of action arising from, or on account of, acts or omissions of the ~~applicant~~Applicant, its officers, employees, receivers, trustees, agents, or assigns, in carrying out the activities pursuant to this Agreement.

### XXIII. EFFECTIVE DATE AND SUBSEQUENT MODIFICATION

66. The effective date of this Agreement shall be the date on which ~~the applicant~~Applicant receives the notice that this Agreement has been signed by the Secretary of WVDEP.

67. This Agreement may be amended by mutual agreement of WVDEP and ~~the applicant~~Applicant. Amendments shall be in writing and shall be effective when ~~the applicant~~Applicant receives notice that the amendment has been signed by the Secretary of WVDEP.

68. If the Secretary determines that there is an imminent threat to the public, he or she may unilaterally modify or amend this Agreement.

### XXIV. EXTENSIONS OF TIME PERIODS

69. Any written response shall be deemed timely performed if hand delivered or postmarked by the last day of any time period prescribed herein. Whenever a party has the right or is required to do some act or make some response within a prescribed period after the service of a notice or other paper on him and the notice or paper is served upon him by United States mail, three (3) days shall be added to the prescribed period.

70. Whenever any party is called upon to respond or otherwise act in a certain number of days, and if the final day occurs on a Saturday, Sunday or legal holiday (whether state or national), such time limitation shall automatically extend to the next business day after such Saturday, Sunday, or holiday.

71. Any time periods specified in this Agreement may be extended only by agreement of the parties in writing.

### XXV. TERMINATION AND SATISFACTION

72. Upon completion of the final report prepared by the LRS, ~~the applicant~~Applicant may seek a Certificate of Completion from the Secretary. Upon receipt of a request for a Certificate of Completion, the Secretary shall determine that the ~~site~~Site meets applicable standards for those areas of the ~~site~~Site and for those contaminants identified in the voluntary remediation agreement and that ~~the applicant~~Applicant has complied with the voluntary remediation agreement and any approved work plans for the ~~site~~Site. Upon making this determination, the Secretary shall issue a Certificate of Completion which conforms substantially to Appendix 60-3C of the rules. Where a land use covenant is required by this Agreement, such Certificate of Completion shall not become effective until it is properly filed with the Clerk of the County Commission of the county in which the property is located.

If the Secretary determines that the certificate should not be issued because work required by this Agreement and any approved work plans has not been completed or because the ~~site~~Site does not meet applicable standards, the Secretary shall initiate the procedures relating to denial of a certificate as provided in the rules.

73. The provisions of this Agreement shall be satisfied and this Agreement shall terminate when the Secretary issues the Certificate of Completion.

74. Nothing in this Agreement shall restrict the State of West Virginia from seeking other appropriate relief to protect human health or the environment from pollution or contamination at or from this Site not remediated in accordance with this Agreement.

75. Applicant may, in its sole discretion, terminate this Agreement by providing to the Secretary fifteen (15) days advance written notice of termination. Only those costs incurred or obligated by the Secretary before the notice of termination is received are recoverable if the Agreement is terminated. If ~~the applicant~~Applicant terminates this Agreement, then ~~the applicant~~Applicant shall pay WVDEP's costs associated with the voluntary remediation within 31 days after receiving notice that the costs are due and owing.

#### XXVI. [IF APPLICABLE] LAND USE COVENANTS

76. [Insert provisions describing restrictions on future use of property and attach copy of land use covenant that is to be recorded for the site].

#### XXVII. REOPENER

77. Upon agreement of the parties or upon occurrence of one or more conditions of W. Va. Code §22-22-15, this Agreement may be reopened in accordance with W. Va. Code §22-22-15 and the rules implementing that section.

#### XXVIII. PRECEDENCE OF AGREEMENT

78. In the event that conflict arises among the terms and conditions of this Agreement, the Statement of Work, or the approved work plan, this Agreement shall govern and the terms and conditions hereunder shall determine the parties' rights and responsibilities.

#### XXIX. GOVERNING LAW

79. This Agreement will be governed by the laws of the State of West Virginia.

(Applicant)

Printed Name:

Title:

Date:

WEST VIRGINIA DEPARTMENT OF  
ENVIRONMENTAL PROTECTION

By:

Title:

Date:

[Include if applicant is not owner of the site and Agreement calls for a land use covenant:

, as owner of the siteSite referenced in the above Agreement hereby acknowledges that said Agreement requires the imposition of a land use covenant and, in consideration of the benefits accruing to the siteSite from said Agreement, I hereby agree to the

imposition of such land use covenant and agree to cooperate in the execution and filing of such land use covenant.

Owner

Date

## APPENDIX 60-3C

**STATE OF WEST VIRGINIA  
VOLUNTARY REMEDIATION PROGRAM  
CERTIFICATE OF COMPLETION AND COVENANT**

[Applicant] entered into a Voluntary Remediation Agreement with the Secretary of the Department of Environmental Protection, dated \_\_\_\_\_ ("Agreement"). The Agreement was entered into to address the release of any contaminants at \_\_\_\_\_ ("Site") located at \_\_\_\_\_, in \_\_\_\_\_ District, \_\_\_\_\_ County, West Virginia. The following documents are incorporated as a part of this Certificate and Covenant:

- \$ The application dated \_\_\_\_\_ and the site assessment submitted with the application
- \$ The Agreement dated \_\_\_\_\_ and modifications 1-[,], dated as follows: |
- \$ A map depicting the ~~site~~Site (-See Exhibit A) |
- \$ A list of the contaminants of concern for which the remediation standards specified in the Agreement have been met (See Exhibit B) |
- \$ The final report submitted for the ~~site~~Site dated \_\_\_\_\_, issued by a licensed remediation specialist. |
- \$ [If applicable] A description of any institutional or engineering controls that were used to achieve a remediation standard (See Exhibit C)
- \$ [If applicable] The land use covenant that is to be recorded for this ~~site~~Site (See Exhibit D). |

This Certificate of Completion is issued pursuant to W.Va. Code §22-22-13 to [Applicant] in recognition of the completion of the work required under the Agreement.

Pursuant to W. Va. Code §22-22-7(f), 22-22-13, 22-22-14, and 22-22-18, the Secretary of the West Virginia Department of Environmental Protection (hereinafter, "WVDEP"), in the name of and on behalf of the State of West Virginia, now covenants not to bring any civil, criminal or administrative action or claim, resulting from or based upon the release or threatened release of contaminants that were the subject of the Voluntary Remediation Agreement. This covenant shall bar actions against [applicant], [applicant]'s successors and assigns, and those persons identified in W. Va. Code §22-22-18, from all public and private claims arising under Chapter 22 of the West Virginia Code or rules adopted thereunder in connection with the release or threatened release that was the subject of the Voluntary Remediation Agreement. This covenant shall not apply to [applicant]'s predecessors in title.

**CONDITIONS**

This Certificate and the covenant it contains are subject to the terms and conditions set forth below:

1. The following conditions, contained in W.Va. Code §22-22-15, which may cause the Voluntary Remediation Agreement to be reopened:

- (a) fraud was committed in demonstrating attainment of a standard at the site that resulted in avoiding the need for further remediation of the site;
- (b) new information confirms the existence of an area of previously unknown contamination which contains contaminants that have been shown to exceed the standards applied to the previous remediation at the site;
- (c) the level of risk is increased significantly beyond the established level of protection at the site due to substantial changes in exposure conditions, such as, a change in land use, or new information is obtained about a contaminant associated with the site which revises exposure assumptions beyond the acceptable range. This condition applies only where the level of risk is increased by a factor of at least five or the hazard index exceeds 1, or 10 where multiple systemic toxicants do not affect the same organ;
- (d) the release occurred after the effective date of this Article on a site not used for industrial activity prior to the effective date of this Article; the remedy relied, in whole or in part, upon institutional or engineering controls instead of treatment or removal of contamination; and treatment, removal or destruction has become technically and economically practicable; or
- (e) the remediation method failed to meet the remediation standard or combination of standards.

For purposes of this paragraph, "new information" means any information obtained directly or indirectly by the department from any person after issuance of a Certificate of Completion, but does not include information the department has received in the application for participation in the voluntary remediation program, including any site assessment, [optional: during the execution of the voluntary remediation agreement or any work plan developed under such an agreement] or other information available to the department under the voluntary remediation program prior to the execution of the Certificate of Completion. Information that does not qualify as new information may be considered by the Secretary along with new information if necessary, to determine whether any of the conditions for reopening set out in section 16 of this rule, have occurred.

Where one of the foregoing conditions is found to exist for a portion but not all of the ~~site~~Site, this certificate and covenant shall continue to apply to all portions of the ~~site~~Site that were unaffected by the occurrence of that condition.

2. To the extent that the Agreement or any of the documents referenced in this certificate impose obligations that continue after the execution of this certificate, there shall be continued compliance with such obligations.

3. This certificate and covenant do not preclude the State of West Virginia from taking any unilateral action at the ~~site~~Site, under any existing or future statutory authority, to protect human health and the environment; provided however, in no event shall the State have a right of recovery against [applicant] or any other person to whom the covenant herein applies to the extent that such right of recovery arises under Chapter 22 of the West Virginia Code, and relates to matters covered by the Agreement.

4. This certificate and covenant do not preclude the State from seeking recovery of such sums as the [applicant] has agreed to pay the WVDEP under the Agreement.

**WHEREFORE**, the Secretary of the Department of Environmental Protection, on behalf of the State of West Virginia, issues this certificate and covenant, with all aforementioned privileges, responsibilities, conditions and reservations, this date of \_\_\_\_\_, to [applicant].

Secretary, Department of Environmental Protection

APPENDIX 60-3D

LAND USE COVENANT

This is an environmental covenant executed pursuant to the Voluntary Remediation and Redevelopment Act, West Virginia Code Chapter 22, Article 22, and the Uniform Environmental Covenants Act, West Virginia Code Chapter 22, Article 22B, to restrict the activities on, and uses of, the following described property:

[Insert legally sufficient description of the real property subject to the covenant. If the description is longer than one page, it may be included as an attachment.]

Activities on and uses of the above describe property that may result in excessive human exposure or in the release of a contaminant that was contained as part of the remedial action related to this covenant are prohibited. Those activities and uses include, but are not limited to:

*[Insert list of prohibited activities]*

The current owners of record of the property, and their contact information, are:

*[Insert identity and address of all owners of record]*

Any person, including a person that owns an interest in the real property, the state or federal agency determining or approving the environmental response project pursuant to which an environmental covenant is created, or a municipality or other unit of local government may be a holder of an environmental covenant. The following are all of the holders of this covenant:

*[Insert identity and address of all holders]*

The facts regarding the remediation response project at this property are: *[Provide a brief narrative description of the contamination and remedy, including the contaminants of concern, the pathways of exposure, limits on exposure and the location and extent of the contamination and state whether residential or non-residential exposure assumptions were used to comply with a site-specific remediation standard.]*

The owner(s) of the property shall provide written notice to the Secretary of the Department of Environmental Protection within 10 days following transfer of a specified interest in the property subject to this covenant, changes in use of the property, application for building permits regarding the property, or proposals for any site work affecting the contamination on the property.

The *[owner(s) or applicant(s)]* shall conduct inspections of the property to monitor compliance with this Land Use Covenant at least \_\_\_ *[insert number]* time[s] per year, and shall submit two (2) signed copies of the inspection monitoring report to the WVDEP, DLR headquarters in Charleston, within thirty (30) days of the inspection.

This covenant relieves the applicant and subsequent successors and assigns from all civil liability to the state as provided under West Virginia Code Article 22 of Chapter 22 and shall remain in effect so long as the property complies with the applicable standards in effect at the time this covenant was issued.

This covenant shall not be amended, modified or terminated except by written instrument executed by

and between the Owner at the time of the proposed amendment, modification or termination, and the Secretary of the West Virginia Department of Environmental Protection, or his successor in accordance with regulations promulgated by the Secretary or his successor. Within 5 days of executing an amendment, modification or termination of this Land Use Covenant, the Owner shall record such amendment, modification or termination with the Clerk of the [County] Commission, and within 5 days thereafter, the Owner shall provide a true copy of the recorded amendment, modification or termination to the Secretary of the Department of Environmental Protection.

The administrative record for the environmental response project reflected in this covenant is maintained in the *[insert the name and address of the appropriate agency office]* and is entitled *[insert title of administrative record]*.

The West Virginia Department of Environmental Protection is granted full right of access to the property for the purpose of implementation or enforcement of this covenant.

All restrictions and other requirements described in this covenant shall run with the land and shall be binding upon all holders and their grantees, lessees, authorized agents, employees or persons acting under their direction or control.

IN WITNESS WHEREOF, the following holders have executed this covenant on the dates indicated.

SIGNED:

Date:

I, \_\_\_\_\_, a Notary Public in and for the County of \_\_\_\_\_, State of \_\_\_\_\_, do hereby certify that the holder(s) whose (name is) (names are) signed above, this day executed this document in my presence or this day acknowledged same to be the true act and deed of said holder(s).

Given under my hand this the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_

Notary Public

[The document must contain the notarized signature(s) of the agency, every holder and, unless waived by the agency, every owner of the fee simple of the real property subject to the covenant.]  
[Repeat the Signature and Notary materials as many times as needed. If several holders sign before the same Notary, their signatures may be listed together and only one Notarization, referring to all such holders, will be needed for those signatures.]

[This covenant, and any amendment or termination of this covenant, must be recorded in every county in which any portion of the real property subject to the covenant is located. For purposes of indexing, a holder shall be treated as a grantee. ]

TABLE 60-3A

LICENSED REMEDIATION SPECIALIST FEES

|                            |          |
|----------------------------|----------|
| APPLICATION FEE .....      | \$300.00 |
| BIENNIAL RENEWAL FEE ..... | \$200.00 |
| EXAMINATION FEE .....      | \$250.00 |

Table 60-3B

| CONTAMINANT            | CAS No.    | Residential<br>Soil <sup>1,4</sup><br>(mg/kg) | Value <sup>5</sup><br>Basis | Industrial<br>Soil <sup>1,4</sup><br>(mg/kg) | Value <sup>5</sup><br>Basis | Ground<br>Water <sup>2,4</sup><br>(ug/L) | Value <sup>5</sup><br>Basis | Migration<br>to<br>Groundwater <sup>3,4</sup><br>(mg/kg) |
|------------------------|------------|-----------------------------------------------|-----------------------------|----------------------------------------------|-----------------------------|------------------------------------------|-----------------------------|----------------------------------------------------------|
| Acetaldehyde           | 75-07-0    | 1.1E+01                                       | c                           | 1.6E+02<br>3.8E+02                           | nc                          | 1.7E+00<br>2.2E+00                       | c                           | 8.3E-03<br>8.9E-03                                       |
| Acetochlor             | 34256-82-1 | 1.2E+03                                       | nc                          | 1.8E+04                                      | nc                          | 7.3E+02                                  | nc                          | 8.1E+00<br>1.2E+01                                       |
| Acetone                | 67-64-1    | 1.4E+04<br>6.1E+04                            | nc                          | 5.6E+04<br>2.0E+05                           | nc<br>Csat                  | 5.5E+03<br>2.2E+04                       | nc                          | 2.2E+01<br>8.9E+01                                       |
| Acetonitrile           | 75-05-8    | 6.2E+02<br>8.9E+02                            | nc                          | 2.0E+03<br>3.7E+03                           | nc                          | 1.2E+02                                  | nc                          | 5.7E-01<br>5.2E-01                                       |
| Acetophenone           | 98-86-2    | 4.1E+03<br>7.8E+03                            | nc                          | 2.5E+04<br>2.0E+05                           | nc                          | 6.1E+02<br>3.7E+03                       | nc                          | 3.2E+00<br>2.2E+01                                       |
| Acrolein               | 107-02-8   | 1.0E-01<br>1.6E-01                            | nc                          | 3.4E-01<br>6.7E-01                           | nc                          | 4.2E-02                                  | nc                          | 2.0E-04<br>1.7E-04                                       |
| Acrylamide             | 79-06-1    | 1.1E-01<br>2.3E-01                            | c                           | 5.5E+00<br>4.9E+01                           | c                           | 1.5E-02<br>4.3E-02                       | c                           | 7.5E-05<br>1.8E-04                                       |
| Acrylonitrile          | 107-13-1   | 2.1E-01<br>2.4E-01                            | c                           | 5.2E+00<br>1.3E+01                           | c                           | 3.9E-02<br>4.5E-02                       | c                           | 1.6E-04<br>2.0E-04                                       |
| Alachlor               | 15972-60-8 | 6.0E+00<br>8.7E+00                            | c                           | 3.1E+02<br>4.4E+02                           | c                           | 2.0E+00                                  | gws                         | 1.7E-02<br>3.3E-02                                       |
| Alar                   | 1596-84-5  | 9.2E+03<br>2.7E+01                            | nc<br>c                     | 1.3E+05<br>1.4E+03                           | nc<br>c                     | 5.5E+03<br>3.7E+00                       | nc<br>c                     | 2.4E+01<br>1.6E-02                                       |
| Aldicarb               | 116-06-3   | 6.1E+01                                       | nc                          | 8.8E+02                                      | nc                          | 3.7E+01                                  | nc                          | 2.1E-01<br>1.8E-01                                       |
| Aldicarb sulfone       | 1646-88-4  | 6.1E+01                                       | nc                          | 8.8E+02                                      | nc                          | 3.7E+01                                  | nc                          | 1.5E-01<br>1.6E-01                                       |
| Aldrin                 | 309-00-2   | 2.9E-02                                       | c                           | 1.5E+00                                      | c                           | 4.0E-03                                  | c                           | 3.9E-04<br>1.3E-02                                       |
| Aluminum               | 7429-90-5  | 7.5E+04<br>7.7E+04                            | nc                          | 1.0E+06                                      | max                         | 3.7E+04                                  | nc                          | 1.1E+06                                                  |
| 4-Aminopyridine        | 504-24-5   | 1.2E+00                                       | nc                          | 1.8E+01                                      | nc                          | 7.3E-01                                  | nc                          | 4.2E-03<br>3.9E-03                                       |
| Aniline                | 62-53-3    | 8.5E+01                                       | c                           | 4.3E+03                                      | c                           | 1.2E+01                                  | c                           | 1.4E-01<br>8.0E-02                                       |
| Antimony and compounds | 7440-36-0  | 3.1E+01                                       | nc                          | 8.2E+02                                      | nc                          | 6.0E+00<br>1.5E+01                       | gws<br>nc                   | 5.4E+00<br>1.3E+01                                       |
| Antimony trioxide      | 1309-64-4  | 3.1E+01                                       | nc                          | 8.2E+02                                      | nc                          | 1.5E+01                                  | nc                          |                                                          |
| Arsenic                | 7440-38-2  | 3.9E-01                                       | c                           | 2.7E+01                                      | c                           | 1.0E+01                                  | gws                         | 5.8E+00                                                  |
| Assure                 | 76578-14-8 | 5.5E+02                                       | nc                          | 7.9E+03                                      | nc                          | 3.3E+02                                  | nc                          | 7.3E+01<br>1.0E+02                                       |
| Atrazine               | 1912-24-9  | 2.2E+00<br>2.1E+00                            | c                           | 1.1E+02                                      | c                           | 3.0E+00                                  | gws                         | 8.6E-02<br>3.9E-02                                       |
| Azobenzene             | 103-33-3   | 3.7E+00<br>5.2E+00                            | c                           | 1.5E+02<br>4.3E+02                           | c                           | 1.0E-01<br>1.2E-01                       | c                           | 5.9E-03<br>1.9E-02                                       |
| Barium and compounds   | 7440-39-3  | 1.5E+04                                       | nc                          | 2.9E+05<br>3.6E+05                           | nc                          | 2.0E+03                                  | gws                         | 1.6E+03                                                  |
| Baygon                 | 114-26-1   | 2.4E+02                                       | nc                          | 3.5E+03                                      | nc                          | 1.5E+02                                  | nc                          | 8.4E-01<br>9.3E-01                                       |
| Baythroid              | 68359-37-5 | 1.5E+03                                       | nc                          | 2.2E+04                                      | nc                          | 9.1E+02                                  | nc                          | 6.5E+03<br>4.8E+03                                       |
| Bentazon               | 25057-89-0 | 1.8E+03                                       | nc                          | 2.6E+04                                      | nc                          | 1.1E+03                                  | nc                          | 6.0E+00<br>4.8E+00                                       |
| Benzaldehyde           | 100-52-7   | 1.7E+03<br>1.5E+03                            | Csat                        | 1.7E+03<br>1.5E+03                           | Csat                        | 6.1E+02                                  | nc                          | 3.2E+00<br>2.7E+00                                       |
| Benzene                | 71-43-2    | 6.6E-01<br>1.1E+00                            | c                           | 1.5E+01<br>5.8E+01                           | c                           | 5.0E+00                                  | gws                         | 3.4E-02<br>5.1E-02                                       |
| Benzidine              | 92-87-5    | 2.1E-03<br>5.0E-04                            | c                           | 1.1E-01                                      | c                           | 2.9E-04<br>9.4E-05                       | c                           | 3.3E-05<br>4.8E-06                                       |
| Benzoic acid           | 65-85-0    | 2.4E+05                                       | nc                          | 1.0E+06                                      | max                         | 1.5E+05                                  | nc                          | 5.9E+02<br>6.8E+02                                       |

| CONTAMINANT                       | CAS No.    | Residential<br>Soil <sup>1,4</sup><br>(mg/kg) | Value<br>Basis <sup>5</sup> | Industrial<br>Soil <sup>1,4</sup><br>(mg/kg) | Value<br>Basis <sup>5</sup> | Ground<br>Water <sup>2,4</sup><br>(ug/L) | Value<br>Basis <sup>5</sup> | Migration<br>to<br>Groundwater <sup>3,4</sup><br>(mg/kg) |
|-----------------------------------|------------|-----------------------------------------------|-----------------------------|----------------------------------------------|-----------------------------|------------------------------------------|-----------------------------|----------------------------------------------------------|
| Benzyl alcohol                    | 100-51-6   | 3.1E+04<br>6.1E+03                            | nc                          | 4.4E+05<br>8.8E+04                           | nc                          | 1.8E+04<br>3.7E+03                       | nc                          | 1.5E+02<br>1.8E+01                                       |
| Benzyl chloride                   | 100-44-7   | 8.9E-01<br>1.0E+00                            | c                           | 2.3E+01<br>5.8E+01                           | c                           | 6.6E-02<br>7.9E-02                       | c                           | 4.0E-04<br>1.7E-03                                       |
| Beryllium and compounds           | 7440-41-7  | 1.5E+02<br>1.6E+02                            | nc                          | 3.7E+03<br>3.9E+03                           | nc                          | 4.0E+00                                  | gws                         | 6.3E+01                                                  |
| 1,1-Biphenyl                      | 92-52-4    | 3.0E+03<br>3.3E+03                            | nc                          | 3.0E+04<br>5.0E+04                           | nc                          | 3.0E+02                                  | nc                          | 9.6E+01<br>6.4E+01                                       |
| Bis(2-chloroethyl)ether           | 111-44-4   | 2.1E-01<br>2.2E-01                            | c                           | 6.0E+00<br>1.3E+01                           | c                           | 8.0E+01<br>1.2E-02                       | gws<br>c                    | 5.6E-01<br>6.3E-05                                       |
| Bis(2-chloroisopropyl)ether       | 108-60-1   | 2.9E+00<br>4.6E+00                            | c                           | 8.1E+01<br>3.0E+02                           | c                           | 2.7E-01<br>3.2E-01                       | c                           | 1.8E-03<br>2.4E-03                                       |
| Bis(chloromethyl)ether            | 542-88-1   | 1.9E-04<br>7.9E-05                            | c                           | 4.4E-03<br>4.0E-03                           | c                           | 5.2E-05<br>6.2E-05                       | c                           | 2.1E-07<br>2.9E-07                                       |
| Bis(2-ethylhexyl)phthalate (DEHP) | 117-81-7   | 3.5E+01                                       | c                           | 1.8E+03                                      | c                           | 6.0E+00                                  | gws                         | 3.6E+03<br>2.9E+01                                       |
| Bromodichloromethane              | 75-27-4    | 1.0E+00<br>2.8E-01                            | c                           | 2.4E+01<br>1.4E+01                           | c                           | 1.8E-01<br>1.2E-01                       | c                           | 1.5E-03<br>6.4E-04                                       |
| Bromoform (tribromomethane)       | 75-25-2    | 6.1E+01                                       | c                           | 3.1E+03                                      | c                           | 8.5E+00                                  | c                           | 6.4E-02<br>4.5E-02                                       |
| Bromomethane                      | 74-83-9    | 3.9E+00<br>7.5E+00                            | nc                          | 1.3E+01<br>3.3E+01                           | nc                          | 8.7E+00                                  | nc                          | 4.2E-02<br>4.4E-02                                       |
| Bromophos                         | 2104-96-3  | 3.1E+02                                       | nc                          | 4.4E+03                                      | nc                          | 1.8E+02                                  | nc                          | 1.5E+01                                                  |
| 1,3-Butadiene                     | 106-99-0   | 5.9E-02<br>5.5E-02                            | c                           | 1.3E+00<br>3.2E+00                           | c                           | 1.2E-01<br>1.8E-02                       | c                           | 2.6E-03<br>1.9E-04                                       |
| 1-Butanol                         | 71-36-3    | 6.1E+03                                       | nc                          | 8.8E+04                                      | nc                          | 3.7E+03                                  | nc                          | 1.6E+01<br>1.5E+01                                       |
| Butylate                          | 2008-41-5  | 3.1E+03                                       | nc                          | 4.4E+04                                      | nc                          | 1.8E+03                                  | nc                          | 5.2E+01<br>3.5E+01                                       |
| n-Butylbenzene                    | 104-51-8   | 8.2E+01<br>3.8E+01                            | Csat                        | 8.2E+01<br>3.8E+01                           | Csat                        | 6.1E+01<br>1.8E+03                       | nc                          | 7.2E+00<br>1.2E+02                                       |
| sec-Butylbenzene                  | 135-9-88   | 7.8E+01<br>5.1E+01                            | Csat                        | 7.8E+01<br>5.1E+01                           | Csat                        | 6.1E+01                                  | nc                          | 5.6E+00<br>3.6E+00                                       |
| tert-Butylbenzene                 | 98-06-6    | 1.3E+02<br>6.6E+01                            | ne<br>Csat                  | 1.4E+02<br>6.6E+01                           | Csat                        | 6.1E+01                                  | nc                          | 5.5E+00<br>2.7E+00                                       |
| Butyl benzyl phthalate            | 85-68-7    | 1.2E+04<br>2.6E+02                            | ne<br>c                     | 1.8E+05<br>1.3E+04                           | ne<br>c                     | 7.3E+03<br>3.5E+01                       | ne<br>c                     | 1.7E+04<br>1.0E+01                                       |
| Cadmium and compounds             | 7440-43-9  | 3.9E+01<br>3.7E+01                            | nc                          | 1.0E+03<br>8.0E+02                           | nc                          | 5.0E+00                                  | gws                         | 7.5E+00                                                  |
| Caprolactam                       | 105-60-2   | 3.1E+04                                       | nc                          | 4.4E+05                                      | nc                          | 1.8E+04                                  | nc                          | 1.1E+02<br>9.1E+01                                       |
| Carbaryl                          | 63-25-2    | 6.1E+03                                       | nc                          | 8.8E+04                                      | nc                          | 3.7E+03                                  | nc                          | 3.0E+01<br>6.6E+01                                       |
| Carbazole                         | 86-74-8    | 2.4E+01                                       | c                           | 1.2E+03                                      | c                           | 3.4E+00                                  | c                           | 4.7E-01<br>1.2E+00                                       |
| Carbon disulfide                  | 75-15-0    | 3.6E+02<br>6.4E+02                            | ne<br>Csat                  | 4.7E+02<br>6.4E+02                           | Csat                        | 1.0E+03                                  | nc                          | 8.3E+00<br>6.1E+00                                       |
| Carbon tetrachloride              | 56-23-5    | 2.4E-01<br>6.2E-01                            | c                           | 5.3E+00<br>3.2E+01                           | c                           | 5.0E+00                                  | gws                         | 6.1E-02<br>3.9E-02                                       |
| Carbosulfan                       | 55285-14-8 | 6.1E+02                                       | nc                          | 8.8E+03                                      | nc                          | 3.7E+02                                  | nc                          | 2.2E+02<br>1.8E+02                                       |
| Chloranil                         | 118-75-2   | 1.2E+00                                       | c                           | 6.1E+01                                      | c                           | 1.7E-01                                  | c                           | 7.4E-04<br>2.7E-03                                       |
| Chlordane (Technical)             | 12789-03-6 | 1.6E+00                                       | c                           | 1.1E+02                                      | c                           | 2.0E+00                                  | gws                         | 9.6E+00<br>2.7E+00                                       |
| Chloroacetic acid                 | 79-11-8    | 1.2E+02                                       | nc                          | 1.8E+03                                      | nc                          | 7.3E+01                                  | nc                          | 3.0E-01                                                  |

| CONTAMINANT              | CAS No.    | Residential<br>Soil <sup>1,4</sup><br>(mg/kg) | Value<br>Basis <sup>5</sup> | Industrial<br>Soil <sup>1,4</sup><br>(mg/kg) | Value<br>Basis <sup>5</sup> | Ground<br>Water <sup>2,4</sup><br>(ug/L) | Value<br>Basis <sup>5</sup> | Migration<br>to<br>Groundwater <sup>3,4</sup><br>(mg/kg) |
|--------------------------|------------|-----------------------------------------------|-----------------------------|----------------------------------------------|-----------------------------|------------------------------------------|-----------------------------|----------------------------------------------------------|
| 4-Chloroaniline          | 106-47-8   | 2.4E+02                                       | nc                          | 3.5E+03<br>1.2E+02                           | nc<br>c                     | 1.5E+02<br>3.4E-01                       | nc<br>c                     | 9.7E-01<br>2.9E-03                                       |
| Chlorobenzene            | 108-90-7   | 1.3E+02<br>3.0E+02                            | nc                          | 3.1E+02<br>3.4E+02                           | Csat                        | 1.0E+02                                  | gws                         | 1.3E+00<br>1.4E+00                                       |
| Chlorobenzilate          | 510-15-6   | 1.8E+00<br>4.4E+00                            | c                           | 9.1E+01<br>2.2E+02                           | c                           | 2.5E-01<br>6.1E-01                       | c                           | 2.7E-02<br>4.0E-02                                       |
| p-Chlorobenzoic acid     | 74-11-3    | 1.2E+04<br>1.8E+03                            | nc                          | 1.8E+05<br>2.6E+04                           | nc                          | 7.3E+03<br>1.1E+03                       | nc                          | 3.6E+01<br>5.5E+00                                       |
| 2-Chloro-1,3-butadiene   | 126-99-8   | 3.6E+00<br>9.6E-03                            | nc<br>c                     | 1.2E+01<br>4.8E-01                           | nc<br>c                     | 1.4E+01<br>1.6E-02                       | nc<br>c                     | 1.2E-01<br>1.7E-04                                       |
| 1-Chlorobutane           | 109-69-3   | 7.1E+01<br>2.6E+02                            | nc                          | 2.4E+02<br>4.4E+02                           | nc<br>Csat                  | 2.4E+02                                  | nc                          | 2.0E+00                                                  |
| Chloroethane             | 75-00-3    | 3.0E+00<br>1.9E+03                            | c<br>Csat                   | 6.5E+01<br>1.9E+03                           | c<br>Csat                   | 3.9E+00<br>2.1E+04                       | c<br>nc                     | 2.1E-02<br>1.2E+02                                       |
| Chloroform               | 67-66-3    | 2.5E-01<br>3.0E-01                            | c                           | 5.2E+00<br>1.5E+01                           | c                           | 1.7E-01<br>1.9E-01                       | c                           | 1.1E-03<br>1.1E-03                                       |
| Chloromethane            | 74-87-3    | 4.8E+01<br>1.2E+02                            | nc                          | 1.6E+02<br>5.1E+02                           | nc                          | 1.9E+02                                  | nc                          | 1.3E+00<br>9.8E-01                                       |
| 4-Chloro-2-methylaniline | 95-69-2    | 8.4E-01<br>4.9E+00                            | c                           | 4.3E+01<br>2.5E+02                           | c                           | 1.2E-01<br>6.7E-01                       | c                           | 1.0E-03<br>7.7E-03                                       |
| beta-Chloronaphthalene   | 91-58-7    | 3.9E+03<br>5.0E+03                            | nc                          | 2.7E+04<br>6.5E+04                           | nc                          | 4.9E+02                                  | nc                          | 3.2E+01<br>5.0E+01                                       |
| o-Chloronitrobenzene     | 88-73-3    | 1.4E+00<br>2.1E+00                            | nc<br>c                     | 4.5E+00<br>1.9E+02                           | nc<br>c                     | 1.5E-01<br>2.2E-01                       | nc<br>c                     | 9.6E-04<br>4.2E-03                                       |
| p-Chloronitrobenzene     | 100-00-5   | 1.0E+01<br>7.8E+01                            | nc                          | 3.8E+01<br>2.0E+03                           | nc                          | 1.2E+00<br>1.1E+01                       | nc<br>c                     | 7.9E-03<br>2.0E-01                                       |
| 2-Chlorophenol           | 95-57-8    | 6.4E+01<br>3.4E+02                            | nc                          | 2.4E+02<br>5.2E+03                           | nc                          | 3.0E+01                                  | nc                          | 6.1E-01<br>5.0E-01                                       |
| 2-Chloropropane          | 75-29-6    | 1.8E+02<br>1.5E+02                            | nc                          | 6.0E+02<br>6.2E+02                           | nc                          | 2.1E+02                                  | nc                          | 1.3E+00<br>1.4E+00                                       |
| o-Chlorotoluene          | 95-49-8    | 1.6E+02<br>3.7E+02                            | nc<br>Csat                  | 2.5E+02<br>3.7E+02                           | Csat                        | 1.2E+02                                  | nc                          | 1.3E+00<br>2.4E+00                                       |
| Chlorpyrifos             | 2921-88-2  | 1.8E+02                                       | nc                          | 2.6E+03                                      | nc                          | 1.1E+02                                  | nc                          | 6.3E+01<br>3.2E+01                                       |
| Chlorpyrifos-methyl      | 5598-13-0  | 6.1E+02                                       | nc                          | 8.8E+03                                      | nc                          | 3.7E+02                                  | nc                          | 3.1E+01<br>3.3E+01                                       |
| Chromium III             | 16065-83-1 | 1.2E+05                                       | nc                          | 1.0E+06                                      | max                         | 5.5E+04                                  | nc                          | 2.0E+09                                                  |
| Chromium VI              | 18540-29-9 | 2.1E+02<br>3.0E-01                            | c                           | 4.5E+03<br>1.1E+02                           | c                           | 1.1E+02<br>4.3E-02                       | nc<br>c                     | 4.2E+01<br>1.7E-02                                       |
| Cobalt                   | 7440-48-4  | 9.0E+02<br>3.6E-03                            | c                           | 1.9E+04<br>1.8E-01                           | c                           | 7.3E+02<br>1.1E+01                       | nc                          | 6.6E+02<br>9.9E+00                                       |
| Copper and compounds     | 7440-50-8  | 3.1E+03                                       | nc                          | 8.2E+04                                      | nc                          | 1.5E+03                                  | nc                          | 1.0E+03                                                  |
| Crotonaldehyde           | 123-73-9   | 5.3E-03<br>7.3E-02                            | c                           | 1.1E-01<br>4.1E+00                           | c                           | 5.9E-03<br>7.1E-03                       | c                           | 3.2E-04<br>2.9E-05                                       |
| Cyanazine                | 21725-46-2 | 5.8E-01                                       | c                           | 2.9E+01                                      | c                           | 8.0E-02                                  | c                           | 5.3E-04<br>7.5E-04                                       |
| Cyanide and compounds    | 74-90-8    | 1.1E+01<br>4.7E+00                            | nc                          | 3.5E+01<br>2.2E+01                           | nc                          | 2.0E+02                                  | gws                         | 7.9E+00<br>4.0E+01                                       |
| Cyanogen                 | 460-19-5   | 2.3E+03<br>2.1E+03                            | Csat                        | 2.3E+03<br>2.1E+03                           | Csat                        | 1.5E+03                                  | nc                          | 6.5E+00                                                  |
| Cyanogen bromide         | 506-68-3   | 7.0E+03                                       | nc                          | 1.8E+05<br>9.6E+04                           | nc<br>Csat                  | 3.3E+03                                  | nc                          | 1.8E+01<br>1.9E+01                                       |
| Cyclohexane              | 110-82-7   | 6.8E+01<br>5.6E+01                            | Csat                        | 6.8E+01<br>5.6E+01                           | Csat                        | 1.2E+04                                  | nc                          | 3.1E+02<br>2.5E+02                                       |

| CONTAMINANT                                     | CAS No.    | Residential<br>Soil <sup>1,4</sup><br>(mg/kg) | Value<br>Basis <sup>5</sup> | Industrial<br>Soil <sup>1,4</sup><br>(mg/kg) | Value<br>Basis <sup>5</sup> | Ground<br>Water <sup>2,4</sup><br>(ug/L) | Value<br>Basis <sup>5</sup> | Migration<br>to<br>Groundwater <sup>3,4</sup><br>(mg/kg) |
|-------------------------------------------------|------------|-----------------------------------------------|-----------------------------|----------------------------------------------|-----------------------------|------------------------------------------|-----------------------------|----------------------------------------------------------|
| Cyclohexanone                                   | 108-94-1   | 3.1E+05                                       | nc                          | 1.0E+06                                      | max                         | 1.8E+05                                  | nc                          | 1.2E+03<br>8.6E+02                                       |
| Cyhalothrin/Karate                              | 68085-85-8 | 3.1E+02                                       | nc                          | 4.4E+03                                      | nc                          | 1.8E+02                                  | nc                          | 3.5E+03<br>2.5E+03                                       |
| Cypermethrin                                    | 52315-07-8 | 6.1E+02                                       | nc                          | 8.8E+03                                      | nc                          | 3.7E+02                                  | nc                          | 1.6E+03<br>1.2E+03                                       |
| Dacthal                                         | 1861-32-1  | 6.1E+02                                       | nc                          | 8.8E+03                                      | nc                          | 3.7E+02                                  | nc                          | 5.6E+00<br>8.9E+00                                       |
| Dalapon                                         | 75-99-0    | 1.8E+03                                       | nc                          | 2.6E+04                                      | nc                          | 2.0E+02                                  | gws                         | 1.3E+00<br>8.3E-01                                       |
| DDD                                             | 72-54-8    | 2.4E+00<br>2.0E+00                            | c                           | 1.7E+02<br>1.0E+02                           | c                           | 2.8E-01                                  | c                           | 1.1E+01<br>1.3E+00                                       |
| DDE                                             | 72-55-9    | 1.7E+00<br>1.4E+00                            | c                           | 1.2E+02<br>7.3E+01                           | c                           | 2.0E-01                                  | c                           | 3.5E+01<br>9.3E-01                                       |
| DDT                                             | 50-29-3    | 1.7E+00                                       | c                           | 1.2E+02                                      | c                           | 2.0E-01                                  | c                           | 2.1E+01<br>1.3E+00                                       |
| Diazinon                                        | 333-41-5   | 5.6E+01<br>4.3E+01                            | nc                          | 7.0E+02<br>6.2E+02                           | nc                          | 3.3E+01<br>2.6E+01                       | nc                          | 4.3E-01<br>3.2E+00                                       |
| Dibenzofuran                                    | 132-64-9   | 7.8E+01                                       | nc                          | 2.0E+03                                      | nc                          | 3.7E+01                                  | nc                          | 1.1E+01<br>1.4E+01                                       |
| 1,4-Dibromobenzene                              | 106-37-6   | 6.1E+02                                       | nc                          | 8.8E+03                                      | nc                          | 3.7E+02                                  | nc                          | 7.8E+00<br>7.0E+00                                       |
| Dibromochloromethane                            | 124-48-1   | 7.6E+00<br>5.8E+00                            | c                           | 6.8E+02<br>2.9E+02                           | c                           | 8.0E-01                                  | c                           | 1.8E-02<br>4.3E-03                                       |
| 1,2-Dibromo-3-chloropropane                     | 96-12-8    | 8.0E-01<br>1.9E-01                            | c                           | 7.1E+01                                      | c                           | 2.0E-01                                  | gws                         | 1.0E-03<br>1.7E-03                                       |
| 1,2-Dibromoethane                               | 106-93-4   | 2.7E-02<br>3.4E-02                            | c                           | 6.2E-01<br>1.8E+00                           | c                           | 5.0E-02                                  | gws                         | 2.6E-04<br>2.8E-04                                       |
| Dibutyl phthalate                               | 84-74-2    | 6.1E+03                                       | nc                          | 8.8E+04                                      | nc                          | 3.7E+03                                  | nc                          | 6.0E+03<br>1.8E+02                                       |
| Dicamba                                         | 1918-00-9  | 1.8E+03                                       | nc                          | 2.6E+04                                      | nc                          | 1.1E+03                                  | nc                          | 4.6E+00<br>5.7E+00                                       |
| 1,2-Dichlorobenzene                             | 95-50-1    | 1.5E+02                                       | Csat                        | 1.5E+02                                      | Csat                        | 6.0E+02                                  | gws                         | 1.2E+01                                                  |
| 1,3-Dichlorobenzene                             | 541-73-1   | 3.5E+01<br>6.6E+01                            | nc                          | 1.3E+02<br>1.2E+02                           | nc<br>Csat                  | 6.0E+02                                  | gws                         | 1.2E+01                                                  |
| 1,4-Dichlorobenzene                             | 106-46-7   | 2.0E+00<br>2.7E+00                            | c                           | 4.5E+01<br>1.4E+02                           | c                           | 7.5E+01                                  | gws                         | 2.2E+00<br>1.4E+00                                       |
| 3,3-Dichlorobenzidine                           | 91-94-1    | 1.1E+00                                       | c                           | 5.5E+01                                      | c                           | 1.5E-01                                  | c                           | 4.0E-03<br>2.0E-02                                       |
| 1,4-Dichloro-2-butene                           | 764-41-0   | 7.9E-03<br>6.7E-03                            | c                           | 1.8E-01<br>3.4E-01                           | c                           | 1.2E-03                                  | c                           | 7.2E-06<br>1.1E-05                                       |
| Dichlorodifluoromethane                         | 75-71-8    | 9.4E+01<br>1.9E+02                            | nc                          | 1.0E+02<br>4.2E+02                           | nc<br>Csat                  | 3.9E+02                                  | nc                          | 6.3E+00<br>1.2E+01                                       |
| 1,1-Dichloroethane                              | 75-34-3    | 6.1E+02<br>3.4E+00                            | nc<br>c                     | 1.0E+03<br>1.7E+02                           | Csat<br>C                   | 9.1E+02<br>2.4E+00                       | nc<br>c                     | 5.0E+00<br>1.4E-02                                       |
| 1,2-Dichloroethane                              | 107-06-2   | 3.5E-01<br>4.4E-01                            | c                           | 7.7E+00<br>2.3E+01                           | c                           | 5.0E+00                                  | gws                         | 2.8E-02                                                  |
| 1,1-Dichloroethylene                            | 75-35-4    | 1.3E+02<br>2.5E+02                            | nc                          | 4.3E+02<br>8.6E+02                           | nc<br>Csat                  | 7.0E+00                                  | gws                         | 5.0E-02<br>5.0E-02                                       |
| 1,2-Dichloroethylene (cis)                      | 156-59-2   | 4.3E+01<br>1.8E+01                            | nc                          | 1.5E+02<br>8.3E+01                           | nc                          | 7.0E+01                                  | gws                         | 4.0E-01<br>4.1E-01                                       |
| 1,2-Dichloroethylene (trans)                    | 156-60-5   | 5.4E+01<br>1.6E+02                            | nc                          | 1.8E+02<br>7.1E+02                           | nc                          | 1.0E+02                                  | gws                         | 6.2E-01<br>5.9E-01                                       |
| 2,4-Dichlorophenol                              | 120-83-2   | 1.8E+02                                       | nc                          | 2.6E+03                                      | nc                          | 1.1E+02                                  | nc                          | 1.1E+00<br>2.6E+00                                       |
| 4-(2,4-Dichlorophenoxy)butyric Acid<br>(2,4-DB) | 94-82-6    | 4.9E+02                                       | nc                          | 7.0E+03                                      | nc                          | 2.9E+02                                  | nc                          | 2.3E+00                                                  |
| 2,4-Dichlorophenoxyacetic Acid (2,4-<br>D)      | 94-75-7    | 6.9E+02                                       | nc                          | 1.2E+04                                      | nc                          | 7.0E+01                                  | gws                         | 1.7E+00<br>3.6E-01                                       |
| 1,2-Dichloropropane                             | 78-87-5    | 6.4E-01<br>9.2E-01                            | c                           | 1.4E+01<br>4.7E+01                           | c                           | 5.0E+00                                  | gws                         | 3.0E-02<br>3.3E-02                                       |
| 1,3-Dichloropropene                             | 542-75-6   | 7.0E-01<br>1.7E+00                            | c                           | 1.6E+01<br>9.6E+01                           | c                           | 4.0E-01<br>4.3E-01                       | c                           | 2.5E-03<br>3.1E-03                                       |

| CONTAMINANT                        | CAS No.    | Residential<br>Soil <sup>1,4</sup><br>(mg/kg) | Value<br>Basis <sup>5</sup> | Industrial<br>Soil <sup>1,4</sup><br>(mg/kg) | Value<br>Basis <sup>5</sup> | Ground<br>Water <sup>2,4</sup><br>(ug/L) | Value<br>Basis <sup>5</sup> | Migration<br>to<br>Groundwater <sup>3,4</sup><br>(mg/kg) |
|------------------------------------|------------|-----------------------------------------------|-----------------------------|----------------------------------------------|-----------------------------|------------------------------------------|-----------------------------|----------------------------------------------------------|
| 2,3-Dichloropropanol               | 616-23-9   | 1.8E+02                                       | nc                          | 2.6E+03                                      | nc                          | 1.1E+02                                  | nc                          | 4.6E-01                                                  |
| Dichlorvos                         | 62-73-7    | 1.7E+00                                       | c                           | 8.5E+01                                      | c                           | 2.3E-01                                  | C                           | 4.1E-03<br>1.4E-03                                       |
| Dicofol                            | 115-32-2   | 1.1E+00                                       | c                           | 5.8E+01                                      | c                           | 1.5E-01                                  | c                           | 1.9E-02<br>7.8E-02                                       |
| Dicyclopentadiene                  | 77-73-6    | 4.9E+01<br>2.8E+01                            | nc                          | 6.2E+01<br>1.2E+02                           | nc                          | 1.4E+01                                  | nc                          | 3.8E-01<br>9.6E-01                                       |
| Dieldrin                           | 60-57-1    | 3.0E-02                                       | c                           | 1.5E+00                                      | c                           | 4.2E-03                                  | c                           | 3.6E-03<br>3.4E-03                                       |
| Diethylene glycol, monobutyl ether | 112-34-5   | 6.1E+02<br>1.8E+03                            | nc                          | 8.8E+03<br>2.5E+04                           | nc                          | 3.7E+02<br>1.1E+03                       | nc                          | 4.6E+00<br>4.8E+00                                       |
| Diethylene glycol, monoethyl ether | 111-90-0   | 3.7E+03<br>3.6E+03                            | nc                          | 6.2E+04<br>5.1E+04                           | nc                          | 2.2E+03                                  | nc                          | 8.8E+00                                                  |
| Di(2-ethylhexyl)adipate            | 103-23-1   | 4.0E+02                                       | c                           | 2.1E+04                                      | c                           | 4.0E+02                                  | gws                         | 7.8E+02<br>5.8E+02                                       |
| Diethyl phthalate                  | 84-66-2    | 4.9E+04                                       | nc                          | 7.0E+05                                      | nc                          | 2.9E+04                                  | nc                          | 4.5E+02<br>2.4E+02                                       |
| Diethylstilbestrol                 | 56-53-1    | 1.0E-04                                       | c                           | 6.2E-03<br>7.0E-02                           | c                           | 1.4E-05<br>1.9E-04                       | c                           | 3.3E-04<br>2.1E-03                                       |
| Difenzoquat (Avenge)               | 43222-48-6 | 4.9E+03                                       | nc                          | 7.0E+04                                      | nc                          | 2.9E+03                                  | nc                          | 1.4E+04<br>9.2E+03                                       |
| 1,1-Difluoroethane                 | 75-37-6    | 1.1E+03                                       | Csat                        | 1.1E+03                                      | Csat                        | 8.3E+04                                  | nc                          | 5.7E+02<br>5.6E+02                                       |
| Diisopropyl methylphosphonate      | 1445-75-6  | 3.9E+02<br>4.3E+02                            | Csat                        | 3.9E+02<br>4.3E+02                           | Csat                        | 2.9E+03                                  | nc                          | 1.5E+01<br>1.7E+01                                       |
| 3,3'-Dimethoxybenzidine            | 119-90-4   | 3.5E+01                                       | c                           | 1.8E+03                                      | c                           | 4.8E+00                                  | c                           | 3.0E-01<br>1.2E-01                                       |
| Dimethylamine                      | 124-40-3   | 7.9E-02<br>4.7E-01                            | nc                          | 2.6E-04<br>2.0E+00                           | nc                          | 4.2E-02                                  | nc                          | 1.7E-04<br>1.8E-04                                       |
| N-N-Dimethylaniline                | 121-69-7   | 4.4E+01<br>9.6E+01                            | nc                          | 2.0E+02<br>5.2E+02                           | nc<br>Csat                  | 1.2E+01                                  | nc                          | 8.6E-02<br>8.7E-02                                       |
| 2,4-Dimethylaniline                | 95-68-1    | 6.5E-01                                       | c                           | 3.3E+01                                      | c                           | 9.0E-02                                  | c                           | 7.9E-04<br>1.0E-03                                       |
| 2,4-Dimethylaniline hydrochloride  | 21436-96-4 | 8.4E-01                                       | c                           | 4.3E+01                                      | c                           | 1.2E-01                                  | c                           | 1.0E-03<br>1.3E-03                                       |
| 3,3'-Dimethylbenzidine             | 119-93-7   | 2.1E-01<br>4.4E-02                            | c                           | 1.1E+01<br>2.2E+00                           | c                           | 2.9E-02<br>6.1E-03                       | c                           | 8.9E-03<br>8.0E-04                                       |
| 2,4-Dimethylphenol                 | 105-67-9   | 1.2E+03                                       | nc                          | 1.8E+04                                      | nc                          | 7.3E+02                                  | nc                          | 9.0E+00<br>1.7E+01                                       |
| 2,6-Dimethylphenol                 | 576-26-1   | 3.7E+01                                       | nc                          | 5.3E+02                                      | nc                          | 2.2E+01                                  | nc                          | 7.3E-01<br>5.3E-01                                       |
| 3,4-Dimethylphenol                 | 95-65-8    | 6.1E+01                                       | nc                          | 8.8E+02                                      | nc                          | 3.7E+01                                  | nc                          | 4.2E+00<br>8.6E-01                                       |
| Dimethyl phthalate                 | 131-11-3   | 6.1E+05                                       | nc                          | 1.0E+06                                      | max                         | 3.7E+05                                  | nc                          | 2.0E+03<br>1.9E+03                                       |
| 4,6-Dinitro-o-cyclohexyl phenol    | 131-89-5   | 1.2E+02                                       | nc                          | 1.8E+03                                      | nc                          | 7.3E+01                                  | nc                          | 4.1E+01<br>4.8E+01                                       |
| 1,2-Dinitrobenzene                 | 528-29-0   | 6.1E+00                                       | nc                          | 8.8E+01                                      | nc                          | 3.7E+00                                  | nc                          | 4.7E-02<br>6.7E-02                                       |
| 1,3-Dinitrobenzene                 | 99-65-0    | 6.1E+00                                       | nc                          | 8.8E+01                                      | nc                          | 3.7E+00                                  | nc                          | 3.7E-02<br>6.6E-02                                       |
| 1,4-Dinitrobenzene                 | 100-25-4   | 6.1E+00                                       | nc                          | 8.8E+01                                      | nc                          | 3.7E+00                                  | nc                          | 4.7E-02<br>6.6E-02                                       |
| 2,4-Dinitrophenol                  | 51-28-5    | 1.2E+02                                       | nc                          | 1.8E+03                                      | nc                          | 7.3E+01                                  | nc                          | 2.9E-01<br>1.6E+00                                       |
| Dinitrotoluene mixture             | 25321-14-6 | 7.1E-01                                       | c                           | 3.6E+01                                      | c                           | 9.9E-02                                  | c                           | 1.9E-03<br>2.7E-03                                       |
| 2,4-Dinitrotoluene                 | 121-14-2   | 4.2E+02<br>1.6E+00                            | nc<br>c                     | 4.8E+03<br>8.0E+01                           | nc<br>c                     | 7.3E+01<br>2.2E-01                       | nc<br>c                     | 5.7E-01<br>5.9E-03                                       |
| 2,6-Dinitrotoluene                 | 606-20-2   | 6.1E+01                                       | nc                          | 8.9E+02                                      | nc                          | 3.7E+01                                  | nc                          | 2.5E-01<br>1.0E+00                                       |
| Dinoseb                            | 88-85-7    | 6.1E+01                                       | nc                          | 8.8E+02                                      | nc                          | 7.0E+00                                  | gws                         | 3.3E-02<br>1.2E+00                                       |
| 1,4-Dioxane                        | 123-91-1   | 4.4E+01<br>4.9E+00                            | c                           | 2.2E+03<br>2.5E+02                           | c                           | 6.1E+00<br>6.7E-01                       | c                           | 2.6E-02<br>2.8E-03                                       |

| CONTAMINANT                      | CAS No.    | Residential<br>Soil <sup>1,4</sup><br>(mg/kg) | Value<br>Basis <sup>5</sup> | Industrial<br>Soil <sup>1,4</sup><br>(mg/kg) | Value<br>Basis <sup>5</sup> | Ground<br>Water <sup>2,4</sup><br>(ug/L) | Value<br>Basis <sup>5</sup> | Migration<br>to<br>Groundwater <sup>3,4</sup><br>(mg/kg) |
|----------------------------------|------------|-----------------------------------------------|-----------------------------|----------------------------------------------|-----------------------------|------------------------------------------|-----------------------------|----------------------------------------------------------|
| Diphenylamine                    | 122-39-4   | 1.5E+03                                       | nc                          | 2.2E+04                                      | nc                          | 9.1E+02                                  | nc                          | 2.5E+01<br>3.4E+01                                       |
| 1,2-Diphenylhydrazine            | 122-66-7   | 6.1E-01                                       | c                           | 3.1E+01                                      | c                           | 8.4E-02                                  | c                           | 2.6E-03<br>5.4E-03                                       |
| Diquat                           | 85-00-7    | 1.3E+02                                       | nc                          | 1.9E+03                                      | nc                          | 2.0E+01                                  | gws                         | 8.2E-02<br>7.5E+00                                       |
| Disulfoton                       | 298-04-4   | 2.4E+00                                       | nc                          | 3.5E+01                                      | nc                          | 1.5E+00                                  | nc                          | 6.4E-02<br>5.5E-02                                       |
| 1,4-Dithiane                     | 505-29-3   | 6.1E+02<br>5.4E+02                            | nc                          | 8.8E+03<br>5.3E+03                           | nc                          | 3.7E+02<br>6.1E+01                       | nc                          | 3.9E+00<br>6.0E-01                                       |
| Diuron                           | 330-54-1   | 1.2E+02                                       | nc                          | 1.8E+03                                      | nc                          | 7.3E+01                                  | nc                          | 1.2E+00<br>6.1E-01                                       |
| Endosulfan                       | 115-29-7   | 3.7E+02                                       | nc                          | 5.3E+03                                      | nc                          | 2.2E+02                                  | nc                          | 2.0E+01<br>6.0E-01                                       |
| Endothall                        | 145-73-3   | 1.2E+03                                       | nc                          | 1.8E+04                                      | nc                          | 1.0E+02                                  | gws                         | 4.4E-01<br>4.8E-01                                       |
| Endrin                           | 72-20-8    | 1.8E+01                                       | nc                          | 2.6E+02                                      | nc                          | 2.0E+00                                  | gws                         | 9.9E-01<br>1.6E+00                                       |
| Epichlorohydrin                  | 106-89-8   | 7.8E+00<br>2.1E+01                            | nc                          | 2.6E+01<br>9.1E+01                           | nc                          | 2.1E+00                                  | nc                          | 8.6E-03<br>9.1E-03                                       |
| Ethion                           | 563-12-2   | 3.1E+01                                       | nc                          | 4.4E+02                                      | nc                          | 1.8E+01                                  | nc                          | 6.4E+00<br>7.2E-01                                       |
| 2-Ethoxyethanol                  | 110-80-5   | 2.4E+04                                       | nc                          | 3.5E+05                                      | nc                          | 1.5E+04                                  | nc                          | 6.5E+01<br>5.9E+01                                       |
| Ethyl acetate                    | 141-78-6   | 1.9E+04<br>1.7E+04                            | nc<br>Csat                  | 2.6E+04<br>1.7E+04                           | Csat                        | 5.5E+03                                  | nc                          | 3.5E+01<br>2.3E+01                                       |
| Ethylbenzene                     | 100-41-4   | 1.1E+02<br>5.5E+00                            | Csat<br>c                   | 1.1E+02<br>1.9E+02                           | Csat                        | 7.0E+02                                  | gws                         | 8.9E+00<br>1.6E+01                                       |
| Ethylene diamine                 | 107-15-3   | 5.5E+03                                       | nc                          | 7.9E+04                                      | nc                          | 3.3E+03                                  | nc                          | 1.6E+01<br>1.5E+01                                       |
| Ethylene glycol                  | 107-21-1   | 1.2E+05                                       | nc                          | 1.0E+06                                      | max                         | 7.3E+04                                  | nc                          | 3.0E+02<br>2.9E+02                                       |
| Ethylene glycol, monobutyl ether | 111-76-2   | 3.1E+04<br>6.1E+03                            | nc                          | 4.4E+05<br>8.8E+04                           | nc                          | 1.8E+04<br>3.7E+03                       | nc                          | 7.4E+01<br>1.5E+01                                       |
| Ethylene thiourea (ETU)          | 96-45-7    | 4.4E+00<br>4.9E+00                            | c<br>nc                     | 7.0E+01                                      | nc                          | 6.1E-01<br>1.5E+00                       | c                           | 2.6E-03<br>6.8E-03                                       |
| Ethyl ether                      | 60-29-7    | 2.3E+03<br>2.2E+03                            | Csat<br>nc                  | 2.3E+03<br>1.0E+04                           | Csat<br>nc                  | 1.2E+03                                  | nc                          | 5.5E+00<br>5.4E+00                                       |
| Ethyl methacrylate               | 97-63-2    | 5.5E+01<br>1.3E+03                            | Csat                        | 5.5E+01<br>1.3E+03                           | Csat                        | 5.5E+02<br>5.3E+02                       | nc                          | 3.0E+01<br>2.5E+00                                       |
| Fenamiphos                       | 22224-92-6 | 1.5E+01                                       | nc                          | 2.2E+02                                      | nc                          | 9.1E+00                                  | nc                          | 1.6E-01<br>1.8E-01                                       |
| Fluometuron                      | 2164-17-2  | 7.9E+02                                       | nc                          | 1.1E+04                                      | nc                          | 4.7E+02                                  | nc                          | 8.8E+00<br>7.3E+00                                       |
| Fluoride                         | 7782-41-4  | 3.7E+03<br>4.7E+03                            | nc                          | 5.3E+04<br>1.2E+05                           | nc                          | 4.0E+03                                  | gws                         | 1.2E+04                                                  |
| Fomesafen                        | 72178-02-0 | 2.6E+00                                       | c                           | 1.3E+02                                      | c                           | 3.5E-01                                  | c                           | 1.6E-01<br>2.3E-02                                       |
| Fonofos                          | 944-22-9   | 1.2E+02                                       | nc                          | 1.8E+03                                      | nc                          | 7.3E+01                                  | nc                          | 3.5E+00<br>2.8E+00                                       |
| Formaldehyde                     | 50-00-0    | 1.2E+04                                       | nc                          | 1.8E+05                                      | nc                          | 7.3E+03                                  | nc                          | 3.0E+01<br>2.9E+01                                       |
| Formic Acid                      | 64-18-6    | 4.1E+05<br>4.9E+04                            | nc                          | 1.0E+06<br>5.4E+05                           | max<br>nc                   | 7.3E+04<br>3.3E+04                       | nc                          | 2.0E+02<br>1.3E+02                                       |
| Furan                            | 110-00-9   | 2.5E+00<br>9.3E+00                            | nc                          | 8.6E+00<br>4.3E+01                           | nc                          | 6.1E+00                                  | nc                          | 3.0E-02<br>4.6E-02                                       |
| Furazolidone                     | 67-45-8    | 1.3E-01                                       | c                           | 6.5E+00                                      | c                           | 1.8E-02                                  | c                           | 6.6E-04<br>6.8E-04                                       |
| Furfural                         | 98-01-1    | 1.8E+02                                       | nc                          | 2.6E+03                                      | nc                          | 1.1E+02                                  | nc                          | 4.6E-01                                                  |
| Glycidaldehyde                   | 765-34-4   | 2.4E+01                                       | nc                          | 3.5E+02                                      | nc                          | 1.5E+01                                  | nc                          | 5.9E-02                                                  |
| Glyphosate                       | 1071-83-6  | 6.1E+03                                       | nc                          | 8.8E+04                                      | nc                          | 7.0E+02                                  | gws                         | 1.0E+02<br>2.8E+00                                       |
| Heptachlor                       | 76-44-8    | 1.1E-01                                       | c                           | 5.5E+00                                      | c                           | 4.0E-01                                  | gws                         | 2.3E+01<br>6.6E-01                                       |
| Heptachlor epoxide               | 1024-57-3  | 5.3E-02                                       | c                           | 2.7E+00                                      | c                           | 2.0E-01                                  | gws                         | 6.7E-01<br>8.2E-02                                       |

| CONTAMINANT                                   | CAS No.    | Residential<br>Soil <sup>1,4</sup><br>(mg/kg) | Value<br>Basis <sup>5</sup> | Industrial<br>Soil <sup>1,4</sup><br>(mg/kg) | Value<br>Basis <sup>5</sup> | Ground<br>Water <sup>2,4</sup><br>(ug/L) | Value<br>Basis <sup>5</sup> | Migration<br>to<br>Groundwater <sup>3,4</sup><br>(mg/kg) |
|-----------------------------------------------|------------|-----------------------------------------------|-----------------------------|----------------------------------------------|-----------------------------|------------------------------------------|-----------------------------|----------------------------------------------------------|
| Hexabromobenzene                              | 87-82-1    | 1.2E+02                                       | nc                          | 1.8E+03                                      | nc                          | 7.3E+01                                  | nc                          | 1.0E+01<br>8.5E+00                                       |
| Hexachlorobenzene                             | 118-74-1   | 3.0E-01                                       | c                           | 1.5E+01                                      | c                           | 1.0E+00                                  | gws                         | 2.2E+00<br>2.5E-01                                       |
| Hexachlorobutadiene                           | 87-68-3    | 6.2E+00                                       | c                           | 3.2E+02                                      | c                           | 8.6E-01                                  | c                           | 1.9E+00<br>3.3E-02                                       |
| HCH (alpha)                                   | 319-84-6   | 9.0E-02<br>7.7E-02                            | c                           | 5.9E+00<br>3.9E+00                           | c                           | 1.1E-02                                  | c                           | 5.7E-04<br>1.2E-03                                       |
| HCH (beta)                                    | 319-85-7   | 3.2E-01<br>2.7E-01                            | c                           | 2.1E+01<br>1.4E+01                           | c                           | 3.7E-02                                  | c                           | 2.0E-03<br>4.3E-03                                       |
| HCH (gamma) Lindane                           | 58-89-9    | 4.4E-01<br>5.2E-01                            | c                           | 2.9E+01<br>3.4E+01                           | c                           | 2.0E-01                                  | gws                         | 9.4E-03<br>2.3E-02                                       |
| HCH-technical                                 | 608-73-1   | 3.2E-01<br>2.7E-01                            | c                           | 2.1E+01<br>1.4E+01                           | c                           | 3.7E-02                                  | c                           | 5.2E-03<br>4.3E-03                                       |
| Hexachlorocyclopentadiene                     | 77-47-4    | 3.7E+02                                       | nc                          | 5.2E+03<br>5.3E+03                           | nc                          | 5.0E+01                                  | gws                         | 4.0E+02<br>3.1E+00                                       |
| Hexachlorodibenzo-p-dioxin mixture<br>(HxCDD) | 19408-74-3 | 7.8E-05<br>9.4E-05                            | c                           | 4.0E-03<br>6.6E-03                           | c                           | 1.1E-05                                  | c                           | 1.8E-04<br>3.0E-04                                       |
| Hexachloroethane                              | 67-72-1    | 3.5E+01                                       | c                           | 8.8E+02                                      | nc                          | 4.8E+00                                  | c                           | 3.8E-01<br>5.8E-02                                       |
| Hexachlorophene                               | 70-30-4    | 1.8E+01                                       | nc                          | 2.6E+02                                      | nc                          | 1.1E+01                                  | nc                          | 2.0E+03<br>2.9E+02                                       |
| 1,6-Hexamethylene diisocyanate                | 822-08-0   | 1.7E+00<br>3.5E+00                            | nc                          | 5.6E+00<br>1.5E+01                           | nc                          | 2.1E-02                                  | nc                          | 5.0E-03<br>4.1E-03                                       |
| n-Hexane                                      | 110-54-3   | 4.3E+01<br>6.5E+01                            | Csat                        | 4.3E+01<br>6.5E+01                           | Csat                        | 4.5E+03<br>8.8E+02                       | nc                          | 7.0E+01<br>1.2E+02                                       |
| Hexazinone                                    | 51235-04-2 | 2.0E+03                                       | nc                          | 2.9E+04                                      | nc                          | 1.2E+03                                  | nc                          | 3.4E+01<br>1.1E+01                                       |
| HMX                                           | 2691-41-0  | 3.8E+03                                       | nc                          | 9.5E+04                                      | nc                          | 1.8E+03                                  | nc                          | 1.4E+02<br>4.6E+01                                       |
| Hydrazine                                     | 302-01-2   | 1.8E-01<br>2.1E-01                            | c                           | 8.2E+00<br>1.9E+01                           | c                           | 2.2E-02                                  | c                           | 9.1E-05                                                  |
| Hydrogen sulfide                              | 7783-06-4  | 2.3E+02<br>1.8E+00                            | nc                          | 6.1E+03<br>7.6E+00                           | nc                          | 4.2E+00                                  | nc                          |                                                          |
| p-Hydroquinone                                | 123-31-9   | 8.7E+00<br>8.1E+00                            | C                           | 4.4E+02<br>4.1E+02                           | c                           | 1.2E+00<br>1.1E+00                       | c                           | 2.6E-02<br>1.5E-02                                       |
| Iron                                          | 7439-89-6  | 5.5E+04                                       | nc                          | 1.0E+06                                      | max                         | 2.6E+04                                  | nc                          | 1.3E+04                                                  |
| Isobutanol                                    | 78-83-1    | 1.3E+04<br>2.3E+04                            | nc                          | 2.7E+04<br>6.1E+05                           | Csat<br>nc                  | 1.8E+03<br>1.1E+04                       | nc                          | 1.2E+01<br>4.5E+01                                       |
| Isophorone                                    | 78-59-1    | 5.1E+02                                       | c                           | 2.6E+04                                      | c                           | 7.1E+01                                  | c                           | 4.2E-01<br>4.7E-01                                       |
| Isopropalin                                   | 33820-53-0 | 9.2E+02                                       | nc                          | 1.3E+04                                      | nc                          | 5.5E+02                                  | nc                          | 1.5E+02<br>2.5E+02                                       |
| Isopropyl methyl phosphonic acid              | 1832-54-8  | 6.1E+03                                       | nc                          | 8.8E+04                                      | nc                          | 3.7E+03                                  | nc                          | 4.5E+01<br>1.6E+01                                       |
| Lead*                                         | 7439-92-1  | 4.0E+02                                       | nc                          | 1.0E+03                                      | nc                          | 1.5E+01                                  | gws                         | 2.7E+02                                                  |
| Lead (tetraethyl)                             | 78-00-2    | 6.1E-03                                       | nc                          | 8.8E-02                                      | nc                          | 3.7E-03                                  | nc                          | 9.2E-04<br>2.6E-04                                       |
| Lithium                                       | 7439-93-2  | 1.6E+03                                       | nc                          | 4.1E+04                                      | nc                          | 7.3E+02<br>7.3E+01                       | nc                          | 4.4E+03<br>4.4E+02                                       |
| Malathion                                     | 121-75-5   | 1.2E+03                                       | nc                          | 1.8E+04                                      | nc                          | 7.3E+02                                  | nc                          | 8.1E+00<br>3.8E+00                                       |
| Maleic anhydride                              | 108-31-6   | 6.1E+03                                       | nc                          | 8.8E+04<br>8.6E+04                           | nc                          | 3.7E+03                                  | nc                          | 1.5E+01                                                  |
| Manganese (non-food)                          | 7439-96-5  | 3.3E+03                                       | nc                          | 4.8E+04<br>7.2E+04                           | nc                          | 1.7E+03                                  | nc                          | 2.2E+03                                                  |
| Mephosfolan                                   | 950-10-7   | 5.5E+00                                       | nc                          | 7.9E+01                                      | nc                          | 3.3E+00                                  | nc                          | 7.9E-02<br>9.7E-02                                       |
| Mepiquat                                      | 24307-26-4 | 1.8E+03                                       | nc                          | 2.6E+04                                      | nc                          | 1.1E+03                                  | nc                          | 1.2E+01<br>7.3E+00                                       |
| Mercury, (elemental and inorganic)            | 7439-97-6  | 2.3E+01                                       | nc                          | 6.1E+02                                      | nc                          | 2.0E+00                                  | gws                         | 2.1E+00                                                  |
| Mercury (methyl)                              | 22967-92-6 | 6.1E+00<br>7.8E+00                            | nc                          | 8.8E+01<br>2.0E+02                           | nc                          | 3.7E+00                                  | nc                          |                                                          |
| Methacrylonitrile                             | 126-98-7   | 2.1E+00<br>3.2E+00                            | nc                          | 8.8E+00<br>2.1E+01                           | nc                          | 1.0E+00                                  | nc                          | 4.2E-03<br>4.7E-03                                       |
| Methanol                                      | 67-56-1    | 3.1E+04                                       | nc                          | 4.4E+05                                      | nc                          | 1.8E+04                                  | nc                          | 7.5E+04<br>7.4E+01                                       |

| CONTAMINANT                                 | CAS No.    | Residential<br>Soil <sup>1,4</sup><br>(mg/kg) | Value <sup>5</sup><br>Basis | Industrial<br>Soil <sup>1,4</sup><br>(mg/kg) | Value <sup>5</sup><br>Basis | Ground<br>Water <sup>2,4</sup><br>(ug/L) | Value <sup>5</sup><br>Basis | Migration<br>to<br>Groundwater <sup>3,4</sup><br>(mg/kg) |
|---------------------------------------------|------------|-----------------------------------------------|-----------------------------|----------------------------------------------|-----------------------------|------------------------------------------|-----------------------------|----------------------------------------------------------|
| Methidathion                                | 950-37-8   | 6.1E+01                                       | nc                          | 8.8E+02                                      | nc                          | 3.7E+01                                  | nc                          | 1.6E-01<br>1.8E-01                                       |
| Methoxychlor                                | 72-43-5    | 3.1E+02                                       | nc                          | 4.4E+03                                      | nc                          | 4.0E+01                                  | gws                         | 1.6E+02<br>4.3E+01                                       |
| Methyl acetate                              | 79-20-9    | 2.2E+04<br>2.3E+04                            | nc                          | 9.6E+04<br>5.0E+04                           | nc<br>Csat                  | 6.1E+03                                  | nc                          | 2.5E+01                                                  |
| Methyl acrylate                             | 96-33-3    | 7.0E+01<br>8.4E+02                            | nc                          | 1.6E+02<br>3.5E+03                           | Csat<br>nc                  | 1.8E+02<br>2.2E+02                       | nc                          | 1.0E+01<br>9.3E-01                                       |
| Methyl Tertiary Butyl Ether (MTBE)          | 1634-04-4  | 1.5E+02<br>4.4E+01                            | c                           | 1.1E+04<br>2.4E+03                           | Csat<br>C                   | 1.7E+01<br>1.2E+01                       | c                           | 7.1E-02<br>5.6E-02                                       |
| 2-Methylaniline (o-toluidine)               | 95-53-4    | 2.0E+00                                       | c                           | 1.0E+02                                      | c                           | 2.8E-01                                  | c                           | 5.7E-03<br>2.4E-03                                       |
| 2-Methyl-4-chlorophenoxyacetic acid         | 94-74-6    | 3.1E+01                                       | nc                          | 4.4E+02                                      | nc                          | 1.8E+01                                  | nc                          | 8.4E-02<br>9.5E-02                                       |
| 4-(2-Methyl-4-chlorophenoxy) butyric acid   | 94-81-5    | 6.1E+02                                       | nc                          | 8.8E+03                                      | nc                          | 3.7E+02                                  | nc                          | 2.9E+00                                                  |
| 2-(2-Methyl-4-chlorophenoxy) propionic acid | 93-65-2    | 6.1E+01                                       | nc                          | 8.8E+02                                      | nc                          | 3.7E+01                                  | nc                          | 2.2E-01                                                  |
| Methylcyclohexane                           | 108-87-2   | 8.5E+01<br>3.1E+01                            | Csat                        | 8.5E+01<br>3.1E+01                           | Csat                        | 6.3E+03                                  | nc                          | 7.6E+02<br>2.7E+02                                       |
| 4,4'-Methylenebisbenzeneamine               | 101-77-9   | 1.9E+00<br>3.0E-01                            | c                           | 9.9E+01<br>1.5E+01                           | c                           | 2.7E-01<br>4.2E-02                       | c                           | 5.4E-02<br>3.7E-03                                       |
| 4,4'-Methylene bis(2-chloroaniline)         | 101-14-4   | 4.9E+00<br>1.2E+00                            | c                           | 2.5E+02                                      | c                           | 6.7E-01<br>2.2E-01                       | c                           | 3.7E-01<br>5.0E-02                                       |
| 4,4'-Methylene bis(N,N'-dimethyl)aniline    | 101-61-1   | 1.1E+01                                       | c                           | 5.4E+02                                      | c                           | 1.5E+00                                  | c                           | 8.7E-01<br>1.6E-01                                       |
| Methylene bromide                           | 74-95-3    | 6.7E+01<br>2.3E+02                            | nc                          | 2.4E+02<br>9.5E+02                           | nc                          | 6.1E+01<br>7.3E+01                       | nc                          | 3.1E-01<br>3.6E-01                                       |
| Methylene chloride                          | 75-09-2    | 8.9E+00<br>1.1E+01                            | c                           | 2.1E+02<br>5.8E+02                           | c                           | 5.0E+00                                  | gws                         | 2.3E-02<br>2.5E-02                                       |
| 4,4'-Methylenediphenyl isocyanate           | 101-68-8   | 3.5E+05<br>8.2E+05                            | nc                          | 1.0E+06                                      | max                         |                                          |                             |                                                          |
| Methyl ethyl ketone                         | 78-93-3    | 2.2E+04<br>2.8E+04                            | nc                          | 5.6E+04<br>4.7E+04                           | Csat                        | 7.0E+03<br>7.1E+03                       | nc                          | 2.9E+01<br>3.0E+01                                       |
| Methyl isobutyl ketone                      | 108-10-1   | 8.9E+03<br>4.3E+03                            | Csat                        | 8.9E+03<br>4.3E+03                           | Csat                        | 6.3E+03<br>2.0E+03                       | nc                          | 5.9E+01<br>9.5E+00                                       |
| Methyl methacrylate                         | 80-62-6    | 2.2E+03<br>3.3E+03                            | nc<br>Csat                  | 3.4E+03<br>3.3E+03                           | Csat                        | 1.4E+03                                  | nc                          | 6.5E+00<br>6.2E+00                                       |
| 2-Methyl-5-nitroaniline                     | 99-55-8    | 1.5E+01                                       | c                           | 7.5E+02                                      | c                           | 2.0E+00                                  | c                           | 1.5E-02<br>2.3E-02                                       |
| Methyl parathion                            | 298-00-0   | 1.5E+01                                       | nc                          | 2.2E+02                                      | nc                          | 9.1E+00                                  | nc                          | 8.5E-02<br>3.0E-01                                       |
| 2-Methylphenol                              | 95-48-7    | 3.1E+03                                       | nc                          | 4.4E+04                                      | nc                          | 1.8E+03                                  | nc                          | 1.4E+01<br>3.0E+01                                       |
| 3-Methylphenol                              | 108-39-4   | 3.1E+03                                       | nc                          | 4.4E+04                                      | nc                          | 1.8E+03                                  | nc                          | 3.9E+01<br>2.9E+01                                       |
| 4-Methylphenol                              | 106-44-5   | 3.1E+02                                       | nc                          | 4.4E+03                                      | nc                          | 1.8E+02                                  | nc                          | 3.9E+00<br>2.9E+00                                       |
| Methyl styrene (mixture)                    | 25013-15-4 | 1.3E+02<br>1.4E+02                            | nc<br>Csat                  | 2.8E+02<br>1.4E+02                           | Csat                        | 6.0E+01<br>8.3E+01                       | nc                          | 1.1E+00<br>2.7E+00                                       |
| Methyl styrene (alpha)                      | 98-83-9    | 2.8E+02<br>1.9E+02                            | Csat                        | 2.8E+02<br>1.9E+02                           | Csat                        | 4.3E+02<br>5.1E+02                       | nc                          | 7.9E+00<br>1.6E+01                                       |
| Metolaclor (Dual)                           | 51218-45-2 | 9.2E+03                                       | nc                          | 1.3E+05                                      | nc                          | 5.5E+03                                  | nc                          | 8.6E+01<br>1.3E+01                                       |
| Metribuzin                                  | 21087-64-9 | 1.5E+03                                       | nc                          | 2.2E+04                                      | nc                          | 9.1E+02                                  | nc                          | 4.7E+01<br>5.6E+00                                       |
| Mirex                                       | 2385-85-5  | 2.7E-01<br>2.7E-02                            | c                           | 1.4E+01<br>1.4E+00                           | c                           | 3.7E-02<br>3.7E-03                       | c                           | 7.1E-01<br>5.3E-02                                       |
| Molybdenum                                  | 7439-98-7  | 3.9E+02                                       | nc                          | 1.0E+04                                      | nc                          | 1.8E+02                                  | nc                          | 7.4E+01                                                  |
| Monochloramine                              | 10599-90-3 | 6.1E+03<br>7.8E+03                            | nc                          | 8.8E+04<br>2.0E+05                           | nc                          | 3.7E+03                                  | nc                          |                                                          |
| Naled                                       | 300-76-5   | 1.2E+02                                       | nc                          | 1.8E+03                                      | nc                          | 7.3E+01                                  | nc                          | 5.7E-01<br>6.6E-01                                       |
| Nickel and compounds                        | 7440-02-0  | 1.6E+03<br>1.5E+03                            | nc                          | 4.1E+04<br>3.8E+04                           | nc                          | 1.0E+02<br>7.3E+02                       | gws<br>nc                   | 1.3E+02<br>9.5E+02                                       |
| Nitrate                                     | 14797-55-8 | 1.3E+05                                       | nc                          | 1.0E+06                                      | max                         | 1.0E+04                                  | gws                         |                                                          |
| Nitrite                                     | 14797-65-0 | 7.8E+03                                       | nc                          | 2.0E+05                                      | nc                          | 1.0E+03                                  | gws                         |                                                          |

| CONTAMINANT                  | CAS No.    | Residential<br>Soil <sup>1,4</sup><br>(mg/kg) | Value<br>Basis <sup>5</sup> | Industrial<br>Soil <sup>1,4</sup><br>(mg/kg) | Value<br>Basis <sup>5</sup> | Ground<br>Water <sup>2,4</sup><br>(ug/L) | Value<br>Basis <sup>5</sup> | Migration<br>to<br>Groundwater <sup>3,4</sup><br>(mg/kg) |
|------------------------------|------------|-----------------------------------------------|-----------------------------|----------------------------------------------|-----------------------------|------------------------------------------|-----------------------------|----------------------------------------------------------|
| 2-Nitroaniline               | 88-74-4    | 4.8E+02<br>6.1E+02                            | nc                          | 2.6E+03<br>8.5E+03                           | nc                          | 1.1E+02<br>3.7E+02                       | nc                          | 5.6E-01<br>3.1E+00                                       |
| Nitrobenzene                 | 98-95-3    | 2.0E+01<br>4.9E+00                            | nc<br>c                     | 1.1E+02<br>2.5E+02                           | nc<br>c                     | 3.4E+00<br>1.2E-01                       | nc<br>c                     | 2.2E-02<br>1.6E-03                                       |
| Nitrofurantoin               | 67-20-9    | 4.3E+03                                       | nc                          | 6.2E+04                                      | nc                          | 2.6E+03                                  | nc                          | 3.7E+01<br>2.2E+01                                       |
| Nitrofurazone                | 59-87-0    | 3.2E-01<br>3.7E-01                            | c                           | 1.8E+01<br>1.9E+01                           | c                           | 4.5E-02<br>5.2E-02                       | c                           | 8.5E-04<br>9.3E-04                                       |
| Nitroglycerin                | 55-63-0    | 6.1E+00                                       | nc                          | 8.8E+01                                      | nc                          | 3.7E+00                                  | nc                          | 3.4E-02<br>3.2E-02                                       |
| 4-Nitrophenol                | 100-02-7   | 4.9E+02                                       | nc                          | 7.0E+03                                      | nc                          | 2.9E+02                                  | nc                          | 1.7E+00<br>4.6E+00                                       |
| 2-Nitropropane               | 79-46-9    | 7.6E-03<br>1.3E-02                            | c                           | 1.8E-01<br>6.6E-01                           | c                           | 1.2E-03<br>1.8E-03                       | c                           | 5.7E-06<br>9.5E-06                                       |
| N-Nitrosodi-n-butylamine     | 924-16-3   | 2.4E-02<br>8.7E-02                            | c                           | 6.2E-04<br>6.5E+00                           | c                           | 2.0E-03<br>2.4E-03                       | c                           | 2.0E-05<br>9.9E-05                                       |
| N-Nitrosodiethanolamine      | 1116-54-7  | 1.7E-01                                       | c                           | 8.8E+00                                      | c                           | 2.4E-02                                  | c                           | 9.7E-05                                                  |
| N-Nitrosodiethylamine        | 55-18-5    | 3.2E-03<br>7.7E-04                            | c                           | 1.6E-01                                      | c                           | 4.5E-04<br>1.4E-04                       | c                           | 2.3E-06<br>1.1E-06                                       |
| N-Nitrosodimethylamine       | 62-75-9    | 9.5E-03<br>2.3E-03                            | c                           | 4.8E-01                                      | c                           | 1.3E-03<br>4.2E-04                       | c                           | 5.7E-06<br>2.1E-06                                       |
| N-Nitrosodiphenylamine       | 86-30-6    | 9.9E+01                                       | c                           | 5.0E+03                                      | c                           | 1.4E+01                                  | c                           | 7.6E-01<br>1.5E+00                                       |
| N-Nitroso di-n-propylamine   | 621-64-7   | 6.9E-02                                       | c                           | 3.5E+00                                      | c                           | 9.6E-03                                  | c                           | 4.8E-05<br>1.4E-04                                       |
| N-Nitroso-N-methylethylamine | 10595-95-6 | 2.2E-02                                       | c                           | 1.1E+00                                      | c                           | 3.1E-03                                  | c                           | 2.1E-05<br>1.8E-05                                       |
| N-Nitrosopyrrolidine         | 930-55-2   | 2.3E-01                                       | c                           | 1.2E+01                                      | c                           | 3.2E-02                                  | c                           | 3.3E-04<br>2.5E-04                                       |
| m-Nitrotoluene               | 99-08-1    | 6.9E+02<br>6.1E+00                            | Csat<br>nc                  | 6.9E+02<br>8.8E+01                           | Csat<br>nc                  | 1.2E+02<br>3.7E+00                       | nc                          | 8.0E-01<br>6.8E-02                                       |
| o-Nitrotoluene               | 88-72-2    | 2.8E+00<br>2.9E+00                            | c                           | 2.5E+02<br>2.6E+02                           | c                           | 2.9E-01<br>3.1E-01                       | c                           | 1.9E-03<br>5.8E-03                                       |
| p-Nitrotoluene               | 99-99-0    | 4.0E+01<br>3.0E+01                            | c                           | 1.8E+03<br>1.5E+03                           | nc                          | 4.2E+00                                  | c                           | 2.8E-02<br>7.8E-02                                       |
| NuStar                       | 85509-19-9 | 4.3E+01                                       | nc                          | 6.2E+02                                      | nc                          | 2.6E+01                                  | nc                          | 1.8E+03<br>8.3E+01                                       |
| Oryzalin                     | 19044-88-3 | 3.1E+03                                       | nc                          | 4.4E+04                                      | nc                          | 1.8E+03                                  | nc                          | 9.8E+01<br>6.8E+01                                       |
| Oxadiazon                    | 19666-30-9 | 3.1E+02                                       | nc                          | 4.4E+03                                      | nc                          | 1.8E+02                                  | nc                          | 2.6E+01<br>3.7E+01                                       |
| Oxamyl                       | 23135-22-0 | 1.5E+03                                       | nc                          | 2.2E+04                                      | nc                          | 2.0E+02                                  | gws                         | 8.4E-01<br>8.8E-01                                       |
| Oxyfluorfen                  | 42874-03-3 | 1.8E+02                                       | nc                          | 2.6E+03                                      | nc                          | 1.1E+02                                  | nc                          | 2.1E+02<br>1.8E+02                                       |
| Paraquat dichloride          | 1910-42-5  | 2.7E+02                                       | nc                          | 4.0E+03                                      | nc                          | 1.6E+02                                  | nc                          | 9.0E+00<br>4.5E+01                                       |
| Parathion                    | 56-38-2    | 3.7E+02                                       | nc                          | 5.3E+03                                      | nc                          | 2.2E+02                                  | nc                          | 1.0E+01<br>2.2E+01                                       |
| Pentachlorobenzene           | 608-93-5   | 4.9E+01                                       | nc                          | 7.0E+02                                      | nc                          | 2.9E+01                                  | nc                          | 2.0E+01<br>4.5E+00                                       |
| Pentachloronitrobenzene      | 82-68-8    | 1.9E+00                                       | c                           | 9.5E+01                                      | c                           | 2.6E-01                                  | c                           | 8.3E-02<br>6.3E-02                                       |
| Pentachlorophenol            | 87-86-5    | 3.0E+00<br>8.9E-01                            | c                           | 1.7E+02<br>3.3E+01                           | c                           | 1.0E+00                                  | gws                         | 2.8E-02<br>2.0E-01                                       |
| Perchlorate                  | 7790-98-9  | 5.5E+01                                       | nc                          | 1.4E+03                                      | nc                          | 2.6E+01                                  | nc                          |                                                          |
| Permethrin                   | 52645-53-1 | 3.1E+03                                       | nc                          | 4.4E+04                                      | nc                          | 1.8E+03                                  | nc                          | 2.4E+03<br>8.7E+03                                       |
| Phenol                       | 108-95-2   | 1.8E+04                                       | nc                          | 2.6E+05                                      | nc                          | 1.1E+04                                  | nc                          | 5.6E+01<br>1.3E+02                                       |
| m-Phenylenediamine           | 108-45-2   | 3.7E+02                                       | nc                          | 5.3E+03                                      | nc                          | 2.2E+02                                  | nc                          | 1.5E+00<br>1.2E+00                                       |
| p-Phenylenediamine           | 106-50-3   | 1.2E+04                                       | nc                          | 1.7E+05                                      | nc                          | 6.9E+03                                  | nc                          | 4.8E+04<br>3.7E+01                                       |
| 2-Phenylphenol               | 90-43-7    | 2.5E+02                                       | c                           | 1.3E+04                                      | c                           | 3.5E+01                                  | c                           | 1.4E+01<br>9.5E+00                                       |
| Phosphine                    | 7803-51-2  | 1.8E+04<br>2.3E+01                            | nc                          | 2.6E+02<br>6.1E+02                           | nc                          | 1.1E+01                                  | nc                          |                                                          |

| CONTAMINANT                                    | CAS No.    | Residential<br>Soil <sup>1,4</sup><br>(mg/kg) | Value<br>Basis <sup>5</sup> | Industrial<br>Soil <sup>1,4</sup><br>(mg/kg) | Value<br>Basis <sup>5</sup> | Ground<br>Water <sup>2,4</sup><br>(ug/L) | Value<br>Basis <sup>5</sup> | Migration<br>to<br>Groundwater <sup>3,4</sup><br>(mg/kg) |
|------------------------------------------------|------------|-----------------------------------------------|-----------------------------|----------------------------------------------|-----------------------------|------------------------------------------|-----------------------------|----------------------------------------------------------|
| Phosphorus (white)                             | 7723-14-0  | 1.6E+00                                       | nc                          | 4.1E+01                                      | nc                          | 7.3E-01                                  | nc                          | 5.4E-02                                                  |
| p-Phthalic acid                                | 100-21-0   | 6.1E+04                                       | nc                          | 8.8E+05                                      | nc                          | 3.7E+04                                  | nc                          | 2.5E+02<br>2.6E+02                                       |
| Phthalic anhydride                             | 85-44-9    | 1.2E+05                                       | nc                          | 1.0E+06                                      | max                         | 7.3E+04                                  | nc                          | 5.2E+02<br>3.2E+02                                       |
| Polybrominated biphenyls                       | 59536-65-1 | 5.5E-02<br>1.6E-02                            | c                           | 2.8E+00<br>8.2E-01                           | c                           | 7.6E-03<br>2.2E-03                       | c                           |                                                          |
| Polychlorinated biphenyls (PCBs)               | 1336-36-3  | 2.2E-01                                       | c                           | 1.0E+01                                      | c                           | 5.0E-01                                  | gws                         | 9.0E-01                                                  |
| Aroclor 1016                                   | 12674-11-2 | 3.9E+00                                       | nc                          | 5.0E+01                                      | nc                          | 9.6E-01                                  | c                           | 1.3E+00<br>1.8E+00                                       |
| Aroclor 1221                                   | 11104-28-2 | 2.2E-01<br>1.8E-01                            | c                           | 1.0E+01<br>1.2E+01                           | c                           | 5.6E-03<br>6.8E-03                       | c                           | 2.3E-03                                                  |
| Aroclor 1232                                   | 11141-16-5 | 2.2E-01<br>1.8E-01                            | c                           | 1.0E+01<br>1.2E+01                           | c                           | 5.6E-03<br>6.8E-03                       | c                           | 2.3E-03                                                  |
| Aroclor 1242                                   | 53469-21-9 | 2.2E-01                                       | c                           | 1.0E+01                                      | c                           | 3.4E-02                                  | c                           | 4.5E-02<br>1.1E-01                                       |
| Aroclor 1248                                   | 12672-29-6 | 2.2E-01                                       | c                           | 1.0E+01                                      | c                           | 3.4E-02                                  | c                           | 5.9E-02<br>1.0E-01                                       |
| Aroclor 1254                                   | 11097-69-1 | 2.2E-01                                       | c                           | 1.0E+01                                      | c                           | 3.4E-02                                  | c                           | 2.7E-01<br>1.8E-01                                       |
| Aroclor 1260                                   | 11096-82-5 | 2.2E-01                                       | c                           | 1.0E+01                                      | c                           | 3.4E-02                                  | c                           | 3.9E-01<br>4.7E-01                                       |
| <b>Polycyclic Aromatic Hydrocarbons (PAHs)</b> |            |                                               |                             |                                              |                             |                                          |                             |                                                          |
| Acenaphthene                                   | 83-32-9    | 3.7E+03<br>4.1E+03                            | nc                          | 3.8E+04<br>6.6E+04                           | nc                          | 3.7E+02                                  | nc                          | 7.3E+01<br>7.5E+01                                       |
| Acenaphthylene                                 | 208-96-8   | 3.8E+03<br>4.3E+03                            | nc                          | 4.4E+04<br>7.5E+04                           | nc                          | 3.7E+02                                  | nc                          | 9.1E+01<br>7.5E+01                                       |
| Anthracene                                     | 120-12-7   | 2.2E+04<br>2.3E+04                            | nc                          | 3.9E+05<br>6.1E+05                           | nc                          | 1.8E+03<br>1.1E+04                       | nc                          | 1.7E+03<br>7.2E+03                                       |
| Benz[a]anthracene                              | 56-55-3    | 6.2E-01<br>1.5E-01                            | c                           | 2.9E+01                                      | c                           | 9.2E-02<br>2.9E-02                       | c                           | 1.5E+00<br>2.1E-01                                       |
| Benzo[b]fluoranthene                           | 205-99-2   | 6.2E-01<br>1.5E-01                            | c                           | 2.9E+01                                      | c                           | 9.2E-02<br>2.9E-02                       | c                           | 4.5E+00<br>7.1E-01                                       |
| Benzo[k]fluoranthene                           | 207-08-9   | 6.2E+00<br>1.5E+00                            | c                           | 2.9E+02                                      | c                           | 9.2E-01<br>2.9E-01                       | c                           | 4.5E+01<br>6.9E+00                                       |
| Benzo[g,h,i]perylene                           | 191-24-2   | 1.7E+03                                       | nc                          | 2.3E+04                                      | nc                          | 1.1E+03                                  | nc                          | 1.2E+05<br>8.5E+04                                       |
| Benzo[a]pyrene                                 | 50-32-8    | 6.2E-02<br>1.5E-02                            | c                           | 2.9E+00                                      | c                           | 2.0E-01                                  | gws                         | 8.2E+00<br>4.7E+00                                       |
| Chrysene                                       | 218-01-9   | 6.2E+01<br>1.5E+01                            | c                           | 2.9E+03                                      | c                           | 9.2E+00<br>2.9E+00                       | c                           | 1.5E+02<br>2.1E+01                                       |
| Dibenz[ah]anthracene                           | 53-70-3    | 6.2E-02<br>1.5E-02                            | c                           | 2.9E+00                                      | c                           | 9.2E-03<br>2.9E-03                       | c                           | 1.4E+00<br>2.3E-01                                       |
| Fluoranthene                                   | 206-44-0   | 2.3E+03                                       | nc                          | 3.0E+04                                      | nc                          | 1.5E+03                                  | nc                          | 6.3E+03<br>3.2E+03                                       |
| Fluorene                                       | 86-73-7    | 2.6E+03<br>2.9E+03                            | nc                          | 3.3E+04<br>5.7E+04                           | nc                          | 2.4E+02                                  | nc                          | 7.8E+01<br>9.0E+01                                       |
| Indeno[1,2,3-cd]pyrene                         | 193-39-5   | 6.2E-01<br>1.5E-01                            | c                           | 2.9E+01                                      | c                           | 9.2E-02<br>2.9E-01                       | c                           | 1.3E+01<br>2.3E+00                                       |
| Naphthalene                                    | 91-20-3    | 5.6E+01<br>3.6E+00                            | nc<br>c                     | 1.9E+02<br>1.8E+02                           | nc<br>c                     | 6.2E+00<br>1.4E-01                       | nc<br>c                     | 3.2E+01<br>9.4E-03                                       |
| Phenanthrene                                   | 85-01-8    | 2.2E+04<br>2.3E+04                            | nc                          | 4.1E+05<br>6.1E+05                           | nc                          | 1.8E+03<br>1.1E+04                       | nc                          | 1.5E+03<br>7.4E+03                                       |
| Pyrene                                         | 129-00-0   | 2.3E+03                                       | nc                          | 5.4E+04<br>5.8E+04                           | nc                          | 1.8E+02                                  | nc                          | 5.0E+02<br>4.0E+02                                       |
| Prometon                                       | 1610-18-0  | 9.2E+02                                       | nc                          | 1.3E+04                                      | nc                          | 5.5E+02                                  | nc                          | 5.6E+00<br>5.2E+00                                       |
| Prometryn                                      | 7287-19-6  | 2.4E+02                                       | nc                          | 3.5E+03                                      | nc                          | 1.5E+02                                  | nc                          | 4.6E+00<br>4.4E+00                                       |
| Propachlor                                     | 1918-16-7  | 7.9E+02                                       | nc                          | 1.1E+04                                      | nc                          | 4.7E+02                                  | nc                          | 7.3E+00<br>5.8E+00                                       |
| Propanil                                       | 709-98-8   | 3.1E+02                                       | nc                          | 4.4E+03                                      | nc                          | 1.8E+02                                  | nc                          | 2.2E+00<br>2.0E+00                                       |
| Propargite                                     | 2312-35-8  | 1.2E+03                                       | nc                          | 1.8E+04                                      | nc                          | 7.3E+02                                  | nc                          | 4.0E+03<br>1.1E+03                                       |

| CONTAMINANT                                       | CAS No.               | Residential<br>Soil <sup>1,4</sup><br>(mg/kg) | Value<br>Basis <sup>5</sup> | Industrial<br>Soil <sup>1,4</sup><br>(mg/kg) | Value<br>Basis <sup>5</sup> | Ground<br>Water <sup>2,4</sup><br>(ug/L) | Value<br>Basis <sup>5</sup> | Migration<br>to<br>Groundwater <sup>3,4</sup><br>(mg/kg) |
|---------------------------------------------------|-----------------------|-----------------------------------------------|-----------------------------|----------------------------------------------|-----------------------------|------------------------------------------|-----------------------------|----------------------------------------------------------|
| Iso-Propylbenzene (Cumene)                        | 98-82-8               | 1.6E+02<br>1.0E+02                            | nc<br>Csat                  | 2.9E+02<br>1.0E+02                           | Csat<br>nc                  | 6.6E+02<br>6.8E+02                       | nc                          | 6.3E+01<br>2.2E+01                                       |
| n-Propylbenzene                                   | 103-65-1              | 7.8E+02<br>9.7E+01                            | nc<br>Csat                  | 2.0E+04<br>9.7E+01                           | nc<br>Csat                  | 3.7E+02<br>1.3E+03                       | nc                          | 4.3E+01<br>4.9E+01                                       |
| Propylene glycol                                  | 57-55-6               | 3.0E+04<br>1.0E+06                            | nc<br>max                   | 4.1E+05<br>1.0E+06                           | nc<br>max                   | 1.8E+04<br>7.3E+05                       | nc                          | 7.4E+01<br>2.9E+03                                       |
| Propylene glycol, monoethyl ether                 | 111-35-3<br>1569-02-4 | 4.3E+04                                       | nc                          | 6.2E+05                                      | nc                          | 2.6E+04                                  | nc                          | 1.0E+02                                                  |
| Propylene glycol, monomethyl ether                | 107-98-2              | 4.3E+04                                       | nc                          | 6.2E+05                                      | nc                          | 2.6E+04                                  | nc                          | 1.0E+02                                                  |
| Pursuit                                           | 81335-77-5            | 1.5E+04                                       | nc                          | 2.2E+05                                      | nc                          | 9.1E+03                                  | nc                          | 6.4E+02<br>1.6E+02                                       |
| Pyridine                                          | 110-86-1              | 6.1E+01<br>5.8E+01                            | nc                          | 8.8E+02<br>6.4E+02                           | nc                          | 3.7E+01<br>6.1E+00                       | nc                          | 1.9E+01<br>4.2E+02                                       |
| Quinoline                                         | 91-22-5               | 1.6E-01                                       | c                           | 8.2E+00                                      | c                           | 2.2E-02                                  | c                           | 1.7E-03<br>1.5E-03                                       |
| RDX (Cyclonite)                                   | 121-82-4              | 4.4E+00<br>5.5E+00                            | c                           | 2.2E+02<br>4.3E+02                           | c                           | 6.1E-01                                  | c                           | 7.2E-03<br>4.6E-03                                       |
| Resmethrin                                        | 10453-86-8            | 1.8E+03                                       | nc                          | 2.6E+04                                      | nc                          | 1.1E+03                                  | nc                          | 1.9E+04<br>1.4E+04                                       |
| Ronnel                                            | 299-84-3              | 3.1E+03                                       | nc                          | 4.4E+04                                      | nc                          | 1.8E+03                                  | nc                          | 1.5E+02<br>3.3E+02                                       |
| Rotenone                                          | 83-79-4               | 2.4E+02                                       | nc                          | 3.5E+03                                      | nc                          | 1.5E+02                                  | nc                          | 2.0E+03<br>1.5E+03                                       |
| Selenious Acid                                    | 7783-00-8             | 3.1E+02<br>3.9E+02                            | nc                          | 4.4E+03<br>1.0E+04                           | nc                          | 1.8E+02                                  | nc                          |                                                          |
| Selenium                                          | 7782-49-2             | 3.9E+02                                       | nc                          | 1.0E+04                                      | nc                          | 5.0E+01                                  | gws                         | 5.2E+00                                                  |
| Silver and compounds                              | 7440-22-4             | 3.9E+02                                       | nc                          | 1.0E+04                                      | nc                          | 1.8E+02                                  | nc                          | 3.1E+01                                                  |
| Simazine                                          | 122-34-9              | 4.0E+00                                       | c                           | 2.1E+02                                      | c                           | 4.0E+00                                  | gws                         | 2.4E-02<br>4.0E-02                                       |
| Sodium azide                                      | 26628-22-8            | 3.1E+02                                       | nc                          | 8.2E+03                                      | nc                          | 1.5E+02                                  | nc                          |                                                          |
| Sodium diethyldithiocarbamate                     | 148-18-5              | 1.8E+00                                       | c                           | 9.1E+01                                      | c                           | 2.5E-01                                  | c                           | 1.2E-03<br>3.0E-03                                       |
| Strontium, stable                                 | 7440-24-6             | 4.7E+04                                       | nc                          | 1.0E+06                                      | max                         | 2.2E+04                                  | nc                          | 1.5E+04                                                  |
| Strychnine                                        | 57-24-9               | 1.8E+01                                       | nc                          | 2.6E+02                                      | nc                          | 1.1E+01                                  | nc                          | 1.7E-01<br>2.4E+00                                       |
| Styrene                                           | 100-42-5              | 6.3E+02<br>3.4E+02                            | Csat                        | 6.3E+02<br>3.4E+02                           | Csat                        | 1.0E+02                                  | gws                         | 4.1E+00<br>2.2E+00                                       |
| 2,3,7,8-Tetrachlorodibenzodioxin<br>(TCDD/dioxin) | 1746-01-6             | 3.9E-06<br>4.5E-06                            | c                           | 2.7E-04<br>3.2E-04                           | c                           | 5.0E-06<br>3.0E-05                       | gws                         | 8.6E-05<br>3.0E-04                                       |
| 1,2,4,5-Tetrachlorobenzene                        | 95-94-3               | 1.8E+01                                       | nc                          | 2.6E+02                                      | nc                          | 1.1E+01                                  | nc                          | 6.6E-01<br>1.0E+00                                       |
| 1,1,1,2-Tetrachloroethane                         | 630-20-6              | 3.0E+00<br>1.9E+00                            | c                           | 7.1E+01<br>9.9E+01                           | c                           | 4.3E-01<br>5.2E-01                       | c                           | 3.1E-03<br>4.0E-03                                       |
| 1,1,2,2-Tetrachloroethane                         | 79-34-5               | 3.8E-01<br>5.7E-01                            | c                           | 9.0E+00<br>3.1E+01                           | c                           | 5.5E-02<br>6.7E-02                       | c                           | 4.0E-04<br>5.3E-04                                       |
| Tetrachloroethylene (PCE)                         | 127-18-4              | 5.6E-01                                       | c                           | 1.0E+01<br>3.6E+01                           | c                           | 5.0E+00                                  | gws                         | 8.0E-02<br>4.5E-02                                       |
| 2,3,4,6-Tetrachlorophenol                         | 58-90-2               | 1.8E+03                                       | nc                          | 2.6E+04                                      | nc                          | 1.1E+03                                  | nc                          | 9.2E+01<br>1.3E+02                                       |
| p,a,a,a-Tetrachlorotoluene                        | 5216-25-1             | 2.4E-02                                       | c                           | 1.2E+00                                      | c                           | 3.4E-03                                  | c                           | 2.7E-04<br>2.3E-04                                       |
| Tetrahydrofuran                                   | 109-99-9              | 8.3E+00<br>1.4E+01                            | c                           | 7.2E+02<br>7.6E+02                           | c                           | 1.8E+00<br>2.0E+00                       | c                           | 6.7E-03<br>8.7E-03                                       |
| Thallium and compounds                            | 7440-28-0             | 6.3E+00<br>7.8E-01                            | nc                          | 4.6E+02<br>2.0E+01                           | nc                          | 2.0E+00                                  | gws                         | 2.8E+00                                                  |
| Thiobencarb                                       | 28249-77-6            | 6.1E+02                                       | nc                          | 8.8E+03                                      | nc                          | 3.7E+02                                  | nc                          | 4.1E+01<br>2.5E+01                                       |
| Thiocyanate                                       | 463-56-9              | 1.2E+01<br>1.6E+01                            | nc                          | 1.8E+02<br>4.1E+02                           | nc                          | 7.3E+00                                  | nc                          | 3.1E-02                                                  |
| Tin and compounds                                 | 7440-31-5             | 4.7E+04                                       | nc                          | 1.0E+06                                      | max                         | 2.2E+04                                  | nc                          | 1.1E+05                                                  |
| Toluene                                           | 108-88-3              | 2.6E+02<br>3.6E+02                            | Csat                        | 2.6E+02<br>3.6E+02                           | Csat                        | 1.0E+03                                  | gws                         | 1.0E+01<br>1.4E+01                                       |
| Toluene-2,4-diamine                               | 95-80-7               | 1.5E-01                                       | c                           | 7.7E+00                                      | c                           | 2.1E-02                                  | c                           | 1.8E-04<br>1.3E-04                                       |
| Toluene-2,5-diamine                               | 95-70-5               | 3.7E+04                                       | nc                          | 5.3E+05                                      | nc                          | 2.2E+04                                  | nc                          | 1.0E+02<br>1.4E+02                                       |

| CONTAMINANT                                       | CAS No.    | Residential<br>Soil <sup>1,4</sup><br>(mg/kg) | Value <sup>5</sup><br>Basis | Industrial<br>Soil <sup>1,4</sup><br>(mg/kg) | Value <sup>5</sup><br>Basis | Ground<br>Water <sup>2,4</sup><br>(ug/L) | Value <sup>5</sup><br>Basis | Migration<br>to<br>Groundwater <sup>3,4</sup><br>(mg/kg) |
|---------------------------------------------------|------------|-----------------------------------------------|-----------------------------|----------------------------------------------|-----------------------------|------------------------------------------|-----------------------------|----------------------------------------------------------|
| Toluene-2,6-diamine                               | 823-40-5   | 1.8E+03                                       | nc                          | 2.6E+04                                      | nc                          | 1.1E+03                                  | nc                          | 9.7E+00<br>6.9E+00                                       |
| p-Toluidine                                       | 106-49-0   | 2.6E+00                                       | c                           | 1.3E+02                                      | c                           | 3.5E-01                                  | c                           | 5.9E-03<br>3.0E-03                                       |
| Toxaphene                                         | 8001-35-2  | 4.4E-01                                       | c                           | 2.2E+01                                      | c                           | 3.0E+00                                  | gws                         | 3.1E+01<br>9.3E+00                                       |
| 1,2,4-Tribromobenzene                             | 615-54-3   | 3.1E+02                                       | nc                          | 4.4E+03                                      | nc                          | 1.8E+02                                  | nc                          | 6.0E+00<br>5.2E+00                                       |
| Tributyltin oxide (TBTO)                          | 56-35-9    | 1.8E+01                                       | nc                          | 2.6E+02                                      | nc                          | 1.1E+01                                  | nc                          | 1.6E+04<br>1.1E+04                                       |
| 2,4,6-Trichloroaniline                            | 634-93-5   | 1.4E+01                                       | c                           | 7.3E+02                                      | c                           | 2.0E+00                                  | c                           | 2.4E-02<br>3.6E-01                                       |
| 1,2,4-Trichlorobenzene                            | 120-82-1   | 7.8E+02<br>2.2E+01                            | nc<br>c                     | 2.0E+04<br>2.9E+02                           | nc                          | 7.0E+01                                  | gws                         | 4.9E+00<br>4.1E+00                                       |
| 1,1,1-Trichloroethane                             | 71-55-6    | 7.1E+02<br>4.5E+02                            | Csat                        | 7.1E+02<br>4.5E+02                           | Csat                        | 2.0E+02                                  | gws                         | 2.1E+00<br>1.4E+00                                       |
| 1,1,2-Trichloroethane                             | 79-00-5    | 8.4E-01<br>1.1E+00                            | c                           | 1.9E+01<br>5.7E+01                           | c                           | 5.0E+00                                  | gws                         | 3.5E-02<br>3.2E-02                                       |
| Trichloroethylene (TCE)                           | 79-01-6    | 4.3E-02<br>2.9E+00                            | c                           | 9.2E-01<br>1.5E+02                           | c                           | 5.0E+00                                  | gws                         | 4.3E-02<br>3.6E-02                                       |
| Trichlorofluoromethane                            | 75-69-4    | 3.9E+02<br>7.0E+02                            | nc<br>Csat                  | 9.5E+02<br>7.0E+02                           | Csat                        | 1.3E+03                                  | nc                          | 2.2E+01<br>1.6E+01                                       |
| 2,4,5-Trichlorophenol                             | 95-95-4    | 6.1E+03                                       | nc                          | 8.8E+04                                      | nc                          | 3.7E+03                                  | nc                          | 2.5E+02<br>2.7E+02                                       |
| 2,4,6-Trichlorophenol                             | 88-06-2    | 4.4E+01                                       | c                           | 2.2E+03                                      | nc                          | 6.1E+00                                  | c                           | 1.2E-01<br>4.6E-01                                       |
| 2,4,5-Trichlorophenoxyacetic Acid                 | 93-76-5    | 6.1E+02                                       | nc                          | 8.8E+03                                      | nc                          | 3.7E+02                                  | nc                          | 2.0E+00<br>3.0E+00                                       |
| 2-(2,4,5-Trichlorophenoxy) propionic acid         | 93-72-1    | 4.9E+02                                       | nc                          | 7.0E+03                                      | nc                          | 5.0E+01                                  | gws                         | 3.6E+00<br>5.5E-01                                       |
| 1,1,2-Trichloropropane                            | 598-77-6   | 1.5E+01<br>1.7E+02                            | nc                          | 5.1E+01<br>7.4E+02                           | nc                          | 3.0E+01                                  | nc                          | 2.5E-01<br>2.4E-01                                       |
| 1,2,3-Trichloropropane                            | 96-18-4    | 3.2E-01<br>5.0E-03                            | c                           | 1.1E+01<br>1.9E+00                           | nc<br>c                     | 3.4E-02<br>7.2E-04                       | c                           | 2.7E-04<br>6.2E-06                                       |
| 1,2,3-Trichloropropene                            | 96-19-5    | 7.1E-04<br>8.0E-01                            | nc                          | 2.3E+00<br>3.4E+00                           | nc                          | 2.2E+00<br>6.2E-01                       | nc                          | 1.7E-02<br>6.2E-03                                       |
| 1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113) | 76-13-1    | 2.8E+03<br>4.2E+02                            | Csat                        | 2.8E+03<br>4.2E+02                           | Csat                        | 5.9E+04                                  | nc                          | 2.8E+03<br>2.9E+03                                       |
| 1,2,4-Trimethylbenzene                            | 95-63-6    | 5.2E+01<br>6.4E+01                            | nc                          | 1.7E+02<br>8.3E+01                           | nc<br>Csat                  | 1.2E+01<br>1.5E+01                       | nc                          | 1.9E+00<br>4.2E-01                                       |
| 1,3,5-Trimethylbenzene                            | 108-67-8   | 2.1E+01<br>6.9E+01                            | nc<br>Csat                  | 7.0E+01<br>6.9E+01                           | nc<br>Csat                  | 1.2E+01<br>6.1E+01                       | nc                          | 4.6E-01<br>1.7E+00                                       |
| Trimethyl phosphate                               | 512-56-1   | 1.3E+01<br>2.4E+01                            | c                           | 6.7E+02<br>1.2E+03                           | c                           | 1.8E+00<br>3.4E+00                       | c                           | 7.8E-03<br>1.5E-02                                       |
| 1,3,5-Trinitrobenzene                             | 99-35-4    | 1.8E+03<br>2.2E+03                            | nc                          | 2.6E+04<br>4.9E+04                           | nc                          | 1.1E+03                                  | nc                          | 5.2E+01<br>7.8E+01                                       |
| Trinitrophenylmethylnitramine (Tetryl)            | 479-45-8   | 2.4E+02                                       | nc                          | 3.5E+03                                      | nc                          | 1.5E+02                                  | nc                          | 1.3E+04<br>2.8E+01                                       |
| 2,4,6-Trinitrotoluene                             | 118-96-7   | 1.6E+01<br>1.9E+01                            | c                           | 4.4E+02<br>7.2E+02                           | nc                          | 2.2E+00                                  | c                           | 1.7E-01<br>2.6E-01                                       |
| Uranium (chemical toxicity only)                  | 7440-61-1  | 1.6E+01                                       | nc                          | 4.1E+02                                      | nc                          | 7.3E+00                                  | nc                          |                                                          |
| Vanadium and compounds                            | 7440-62-2  | 7.8E+01<br>5.5E+00                            | nc                          | 2.0E+03<br>1.4E+02                           | nc                          | 3.7E+01<br>2.6E+00                       | nc                          | 7.3E+02<br>5.1E+01                                       |
| Vinclozolin                                       | 50471-44-8 | 1.5E+03                                       | nc                          | 2.2E+04                                      | nc                          | 9.1E+02                                  | nc                          | 1.4E+01                                                  |
| Vinyl acetate                                     | 108-05-4   | 4.3E+02<br>1.0E+03                            | nc                          | 1.4E+03<br>4.2E+03                           | nc                          | 4.1E+02                                  | nc                          | 1.8E+00                                                  |
| Vinyl bromide                                     | 593-60-2   | 1.9E-01<br>1.1E-01                            | c                           | 4.2E+00<br>5.8E+00                           | c                           | 1.0E-01<br>1.5E-01                       | c                           | 9.7E-04<br>8.7E-04                                       |
| Vinyl chloride (lifetime)                         | 75-01-4    | 1.5E-01<br>5.5E-02                            | c                           |                                              |                             | 2.0E+00                                  | gws                         | 1.3E-02<br>1.4E-02                                       |
| Vinyl chloride (adult)                            | 75-01-4    |                                               |                             | 8.8E+00<br>2.1E+01                           | c                           | 2.0E+00                                  | gws                         | 1.3E-02<br>1.4E-02                                       |
| Warfarin                                          | 81-81-2    | 1.8E+01                                       | nc                          | 2.6E+02                                      | nc                          | 1.1E+01                                  | nc                          | 4.4E-01<br>2.3E-01                                       |

| CONTAMINANT    | CAS No.    | Residential<br>Soil <sup>1,4</sup><br>(mg/kg) | Value<br>Basis <sup>5</sup> | Industrial<br>Soil <sup>1,4</sup><br>(mg/kg) | Value<br>Basis <sup>5</sup> | Ground<br>Water <sup>2,4</sup><br>(ug/L) | Value<br>Basis <sup>5</sup> | Migration<br>to<br>Groundwater <sup>3,4</sup><br>(mg/kg) |
|----------------|------------|-----------------------------------------------|-----------------------------|----------------------------------------------|-----------------------------|------------------------------------------|-----------------------------|----------------------------------------------------------|
| Xylenes        | 1330-20-7  | 1.0E+02                                       | Csat                        | 1.0E+02                                      | Csat                        | 1.0E+04                                  | gws                         | 1.2E+02<br>2.0E+02                                       |
| Zinc           | 7440-66-6  | 2.3E+04                                       | nc                          | 6.1E+05                                      | nc                          | 1.1E+04                                  | nc                          | 1.4E+04                                                  |
| Zinc phosphide | 1314-84-7  | 2.3E+01                                       | nc                          | 6.1E+02                                      | nc                          | 1.1E+01                                  | nc                          |                                                          |
| Zineb          | 12122-67-7 | 3.1E+03                                       | nc                          | 4.4E+04                                      | nc                          | 1.8E+03                                  | nc                          | 8.0E+00<br>1.1E+02                                       |

**Notes:**

<sup>1</sup>The residential and industrial soil values consider ingestion and dermal exposure to soil and inhalation exposure to contaminants moving from soil to ambient air.

<sup>2</sup>Groundwater standards promulgated under 46CSR12-47CSR12 are provided, where available. Standards that are unavailable under 46CSR12-47CSR12 are based on a risk-based methodology that considers ingestion and inhalation exposure arising from the domestic use of groundwater.

<sup>3</sup>The migration from soil to groundwater values shall be applied unless it is shown to the satisfaction of the Secretary that migration of soil contaminants to groundwater will not result in an exceedance of the DeMinimi Groundwater Standards.

<sup>4</sup>The concentrations in this table shall be applied where the exposure pathways described in footnotes 1,2, and 3 are the major contributors to risks identified in the site assessment. If other exposure pathways are identified, the acceptable concentrations shall be determined only in consultation with the Secretary, considering all exposure pathways, and all other requirements of the regulations.

<sup>5</sup>Basis of standard: c – cancer effect; nc – noncancer effect; max – calculated risk-based concentration exceeds maximum possible contaminant level of  $1 \times 10^6$  mg/kg; Csat - calculated risk-based concentration exceeds residual saturation level; gws – West Virginia Groundwater Quality Standard from 46CSR12.

\*Lead - Residential soil based on Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities (July 1994), USEPA OSWER Directive 9355.4-12. Industrial soil based on the USEPA documents Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soils (December 1996) and Frequently Asked Questions (FAQs) on the Adult Lead Model (April 1999).

In Re:

**PUBLIC HEARING ON PROPOSED RULES  
33CSR1, 33CSR20 and 60CSR3**

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**July 15, 2011  
6:00 P.M.**

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**WEST VIRGINIA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
601 57<sup>TH</sup> STREET, SE  
CHARLESTON, WEST VIRGINIA**

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*Lauren Belisle Morrison  
Certified Court Reporter*

**ORIGINAL**

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**CAPITOL CITY REPORTING**  
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A P P E A R A N C E S

TOM ALUISE  
PUBLIC INFORMATION SPECIALIST  
PUBLIC INFORMATION OFFICE  
601 57<sup>TH</sup> STREET, SE  
CHARLESTON, WEST VIRGINIA 25304

T A B L E O F C O N T E N T S

REPORTER'S CERTIFICATE - 7, 8

## P R O C E E D I N G S

1  
2 MR. ALUISE: Good evening. My name  
3 is Tom Aluise and I am with the Public Information  
4 Office. Welcome to the Department of Environmental  
5 Protection and the public hearing on three of the  
6 agency's proposed rules.

7 The purpose of this meeting is for the  
8 agency to accept comments from the public regarding  
9 these rules. Comments, whether submitted in written  
10 form or spoken, will become part of the public  
11 record. Staff members are in attendance to hear your  
12 comments and may provide clarification if you have  
13 questions.

14 This evening we will be taking comments  
15 on changes to 33CSR1, Solid Waste Management Rule.  
16 Revisions to this rule are to add the definition of  
17 "covered electronic devices" to the list of defined  
18 terms and to add covered electronic devices as an  
19 unacceptable waste banned from disposal in the  
20 state's landfills. This revision is necessary due to  
21 the passage of Senate Bill 298 on March 12, 2010.

22 We will also be taking comments on  
23 changes to 33CSR20, Hazardous Waste Management Rule.  
24 Revisions to this rule include annual incorporation

1 by reference updates from the federal counterpart.  
2 Further, Division of Water and Waste Management  
3 proposes to amend the rule to reflect that the  
4 authority it previously transferred to the Division  
5 of Highways to regulate hazardous waste on the  
6 highways has been transferred by statute to the  
7 Public Service Commission when the Weights and  
8 Measures Section was transferred from the DOH to the  
9 PSC.

10 Finally, we will be taking comments on  
11 changes to 60CSR3, Voluntary Remediation and  
12 Redevelopment Rule. This rule is being revised to  
13 update the de minimus cleanup standards. This change  
14 is necessary because the toxicological profiles for  
15 many chemicals in the federal IRIS database have been  
16 revised, which necessitates changes to the de minimus  
17 table.

18 We'll open the hearing with comments on  
19 the first rule, which is 33CSR1, Solid Waste  
20 Management Rule. And no one has signed up to speak,  
21 therefore, that concludes the public hearing on  
22 33CSR1, Solid Waste Management Rule. The public  
23 comment period ends tonight. The agency will review  
24 all comments and take them into consideration for the

1 rule.

2 We will now accept comments on 33CSR20,  
3 Hazardous Waste Management Rule. No one has signed  
4 up to comment, so that concludes the public hearing  
5 on 33CSR20, Hazardous Waste Management Rule. Public  
6 comment period ends tonight. The agency will review  
7 all comments and take them into consideration for the  
8 rule.

9 Finally, we will hear public comments  
10 on 60CSR3, Voluntary Remediation and Redevelopment  
11 Rule. No one has signed up to comment on this rule.  
12 So that concludes the public hearing on Rule 60CSR3.  
13 The public comment period ends tonight. The agency  
14 will review all comments and take them into  
15 consideration for the rule.

16 That concludes tonight's hearing.

17 \* \* \* \* \*

18 Concluded at 6:05 p.m.

19 \* \* \* \* \*

20

## REPORTER'S CERTIFICATE

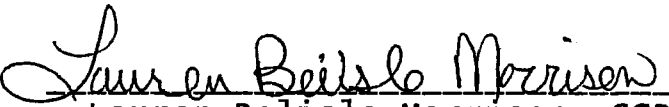
STATE OF WEST VIRGINIA,  
COUNTY OF BOONE, to wit:

I, Lauren Belisle Morrison, Notary Public in and for the State of West Virginia, duly commissioned and qualified, do hereby certify that the foregoing hearing was duly taken by and before me, under the West Virginia Rules of Civil Procedure, at the time and place and for the purpose specified in the caption thereof; the said witness having been duly sworn by me to testify the whole truth and nothing but the truth concerning the matter in controversy.

I do certify that the said deposition was correctly taken by me by means of the Stenomask; that the same was transcribed by me, and that the said transcript is a true record of the testimony given by said witness.

I further certify that I am not connected by blood or marriage with any of the parties to this action, am not a relative or employee or attorney or counsel of any of the parties, nor am I a relative or employee of such attorney or counsel, or financially interested in the action, or interested, directly or indirectly, in the matter in controversy.

Given under my hand this 12<sup>th</sup> day of  
July, 2011.

  
Lauren Belisle Morrison, CCR  
Notary Public

My commission expires July 8, 2013.

# Public Hearing Sign In Sheet

**Division of Land Restoration – Voluntary Remediation and Redevelopment Rule 60CSR3**  
**July 12, 2011, 6 p.m. Charleston, WV.**

**The Department of Environmental Protection asks for the information below so that agency staff may provide responses and information about decisions to you. The information you voluntarily provide on this sheet becomes part of the public record related to this topic and may be released if requested under the Freedom of Information Act.**

[illegible]



## WEST VIRGINIA CHAMBER

July 12, 2011

**Via E-mail @ Kathy.Cosco@wv.gov (Confirmation copy via U.S. Mail)**

Ms. Kathy Cosco  
Public Information Officer  
West Virginia Department of  
Environmental Protection  
601 57<sup>th</sup> Street  
Charleston, West Virginia 25304

**Re: 2012 Proposed Voluntary Remediation and Redevelopment Rule, 60 CSR 3**

Dear Ms. Cosco:

The West Virginia Chamber of Commerce (the "Chamber") is pleased to have an opportunity to comment on the West Virginia Department of Environmental Protection's 2012 Proposed West Virginia Voluntary Remediation and Redevelopment Rule, 60 CSR 3 (the "Rule"). The Chamber is West Virginia's largest, most influential general business organization, representing all business sectors in every region of the State. Members range from small business enterprises to mid-sized manufacturers to tourism destinations to energy companies to Fortune 500 corporations; however, small businesses are the core of the WV Chamber's membership - making up 85 percent of the WV Chamber's companies and firms.

Earlier this year, the Chamber responded by letter dated March 31, 2011, to a survey by the West Virginia Department of Environmental Protection (WVDEP) concerning the West Virginia Voluntary Remediation Program. The Chamber is pleased that the WVDEP is proposing to incorporate many of the Chamber's suggested changes to the Rule. The Chamber is supportive of the WVDEP's proposed revisions to the text of the Rule, including incorporation of the agency's enforcement shield policy in Section 60-3-6.8, and urges the WVDEP to finalize its proposed revisions to the text of the Rule.

The Chamber also suggested certain changes to the text of the Rule that the WVDEP is not proposing to make at this time. The Chamber requests that the WVDEP explain its rationale for declining to make the suggested changes. The changes that the Chamber suggested but the WVDEP declined to make are to Sections 60-3-5.1.b; 60-3-6.1.h and .i; 60-3-9.4; and 60-3-12.3.b. and are as follows:

**Chamber's Suggested Change to Section 60-3-5.1.b:**

5.1.b. It is the licensed remediation specialist's duty to protect the safety, health and welfare of the public in the performance of his or her professional duties. If he or she is unable to meet this duty, the licensed remediation specialist may either sever the relationship with the client or employer or refuse professional responsibility for the work plan, report or design. If the relationship is severed because the licensed remediation specialist believes that he or she is unable to meet this duty, the applicant shall notify the division within 72 hours of the severing of the relationship. This 72-hour notice requirement does not apply if the applicant changes licensed remediation specialist on the project for any other reason.

**Chamber's Suggested Change to Section 60-3-6.1.h and .i:**

6.1.h. A listing of the applicable standards to be achieved at the site, if those standards have been determined at the time the agreement is executed;

6.1.i. Where applicable, a description of any engineering or institutional controls and any land use covenant to be imposed for the property, if those engineering or institutional controls and land use covenants have been determined at the time the agreement is executed;

**Chamber's Suggested Change to Section 60-3-9.4:**

9.4. Human Health-Site-Specific Risk-Based Standard. Site-Specific Risk-Based Standards will be determined using one or a combination of a BHHRA as described in subsection 8.4 of this rule or a RRA as described in subsection 8.6 of this rule. In establishing the remediation standard under this section, the potential for exposure to site contaminants under current and reasonably anticipated future land and water use and the application of institutional and engineering controls shall be considered. When evaluating the potential for exposure where the anticipated future land use is as a "recreational area," reasonable assumptions with respect to frequency and duration of exposure as well as other relevant factors for exposure may be made in accordance with division guidance.

**Chamber's Suggested Change to Section 60-3-12.3.b:**

12.3.b.6. The certificate of completion may be amended only where new information or changed conditions at a site demonstrate that one or more of the restrictions placed upon the site are no longer necessary to meet the applicable standards. A request to amend a certificate of completion may be considered only where it is submitted by or with the written consent of the owner(s) of the site at the time the request is submitted.

The Chamber notes that the WVDEP is proposing to change the word "significant" to "substantial" when describing the risk to human health established under the de minimis standard in Section 9.2 but is not proposing a similar change when defining the de minimis risk-based standard for human health in Section 9.1.a.1. This inconsistency is confusing, and the Chamber urges the WVDEP to use the same word in describing the risk to human health in these two sections, or in the alternative, to clarify the significance of the use of the word "substantial" in Section 9.2 and "significant" in Section 9.1.a.1 when describing the risk to human health.

The Chamber agrees with the WVDEP's proposed revisions to the model documents, Appendices 60-3A through 60-3C, subject to one formatting change. At the end of the list of statutes found in paragraph 19 of Appendix 60-3B, "West Virginia Voluntary Remediation Agreement for Investigation and Remediation Activities," the Chamber believes that the language "any applicable regulation promulgated thereunder" is intended to apply to all of the enumerated statutes and not just the last enumerated statute. To clarify that the language "any applicable regulation promulgated thereunder" applies to all of the enumerated statutes, the Chamber urges the WVDEP to revise the list so that the language "any applicable regulation promulgated thereunder" begins a new line as follows:

- (i) Toxic Substances Control Act, 15 U.S.C.A. §§ 2601, et seq.; and
- (j) Any applicable regulation promulgated thereunder.

As the Chamber stated in its response to the WVDEP's survey, the Chamber believes that changes to those provisions pertaining to the approach for sampling surface water and sediment may be needed but that such changes require more discussion and a more thorough vetting than the time allowed for comments on the proposed Rule. The Chamber urges the WVDEP to establish a stakeholder group similar to the Technical Standards Subcommittee that drafted the original Guidance Manual to consider these and other technical revisions to the Rule and to update the current version of the Guidance Manual and address major technical issues such as updating the list of guidance documents and references, evaluating the approach provided in Appendix J for sampling surface water and sediment, and for providing guidance regarding investigating soil vapor intrusion and the discharge of groundwater to surface water.

Section 2.53a should be revised to reflect that any reduction of the hazard quotient to a value less than 1 under this Rule (which would reduce the De Minimis values) will only be considered under situations where site-specific cumulative risks warrant such reduction based on scientific principles consistent with the principles of USEPA risk assessment methodologies (i.e., if multiple constituents exists at elevated concentrations that all target the same organs per the USEPA IRIS database).

In addition to the above technical issues, the Chamber notes that the Guidance Manual in Section 2.6.6 refers to "USEPA Region III Risk-Based Concentration Tables," which USEPA Region III is no longer using. Instead, USEPA Region III is using Regional Screening Levels (RSLs). The Chamber requests that the WVDEP clarify whether it is using RSLs instead of

Risk-Based Concentrations (RBCs) and if so, consider proposing appropriate revisions to the text of the Rule. See Sections 2.53, 9.2.a.1, and 9.2.b.2.A.

If the WVDEP updates the Guidance Manual by establishing a stakeholder group or approaches the task through other means, the Chamber considers the flexibility of the current Guidance Manual and the West Virginia Voluntary Remediation Program in general to be absolutely necessary to the success of those environmental programs and urges the WVDEP to retain those aspects. The Chamber believes it would not be beneficial for the Guidance Manual or the West Virginia Voluntary Remediation Program to become more prescriptive.

With respect to the WVDEP's proposed revisions to the De Minimis Table, the Chamber offers the following comments:

**1. The Stated Rationale for the Proposed Revisions to the De Minimis Table:**

WVDEP's "Briefing Document" and the Environmental Protection Advisory Council's Meeting Minutes of June 2, 2011, that accompanied the WVDEP's proposed West Virginia Voluntary Remediation and Redevelopment Rule, 60 CSR 3, on file with the West Virginia Secretary of State, state that the proposed revisions to the risk-based cleanup standards in the De Minimis Table, Table 60-3B, are necessary "because the toxicological profiles for many chemicals in the federal IRIS database have been revised". The limited public comment period has not allowed the Chamber adequate time to review all of the many proposed changes to the De Minimis Table; however, it is unclear from a review of the proposed soil values for benzene that the proposed revisions to the current value are being driven by revisions to the federal IRIS database.

This comment is illustrated by a review of two previous versions of the De Minimis tables: the table from Version 2.1 of the Guidance Manual (2003) and the table most recently published in June 2008. The 2003 version of the table lists a residential soil value of 22 mg/kg, while the June 2008 table lists a residential soil value of 0.66 mg/kg. The currently proposed value for benzene is 0.82 mg/kg.

The reason for the discrepancy between the 2003 values and the more recent values are the toxicity values listed for benzene. For example, the table from Appendix C-1 of the 2003 guidance manual provided an oral cancer slope factor (CSFo) for benzene of 0.029 mg/kg-day-1, while the current CSFo is 0.055 mg/kg-day-1. In addition, the table from the 2003 guidance does not include an oral reference dose (RfDo) for benzene. The current RfDo is 0.004 mg/kg-day. These changes result in a significant difference in the overall soil De Minimis values.

To the extent that proposed values in the De Minimis Table are not based solely upon updates to the federal IRIS database, the Chamber requests that the WVDEP identify those proposed values and explain the drivers for each of those proposed values.

**2. The Process for Revising the De Minimis Table:**

The Chamber and other members of the public are not provided an opportunity to comment on proposed revisions to values in the De Minimis Table as those values are generated. The Chamber urges the WVDEP to provide an opportunity for public comment on proposed revisions to values in the De Minimis Table as those values are generated. In addition, the process that the WVDEP uses for quality control (QC) of proposed revisions to values in the De Minimis Table should be transparent. The Chamber requests that the WVDEP explain the QC process it follows in revising values in the De Minimis Table.

**3. De Minimis Standards for Hydrogen Sulfide (H<sub>2</sub>S):**

The existing promulgated values for H<sub>2</sub>S are 230 mg/kg for residential soil; 6100 mg/kg for industrial soil; and a risk-based groundwater value of 110 µg/L. The values are based on a withdrawn RfD oral and an IRIS RfC. The inhalation pathway was not incorporated into this original standard since there was no Henry's Law Constant in the database. Due to the volatile nature of this constituent, the existing standard should have but did not address the inhalation pathway.

The proposed values that are currently under review of 1E6 mg/kg for both residential and industrial soils, and no value for groundwater, appear to be in error. In the revised WVDEP toxicity database, the withdrawn RfD oral was removed and the IRIS RfC was retained, as would be expected. Since the potentially complete pathway is inhalation, the lack of a Henry's Law Constant may have resulted in the calculation of a standard without any adverse endpoint as a basis.

The de minimis standards have been recalculated with the inclusion of the Henry's Law Constant. As there was no Henry's Law Constant available from the DOE/ORNL Risk Assessment Information System (RAIS), a value was obtained from the USEPA Water Database, as recommended by USEPA as a secondary source of these data.

The corrected proposed values are 1.8 mg/kg for residential soil; 7.6 mg/kg for industrial soil; and a risk-based groundwater value of 4.2 µg/L. The Chamber urges the WVDEP to correct the proposed values in the De Minimis Table accordingly.

**4. De Minimis Standards for Polychlorinated Biphenyls (PCBs)-Low:**

The existing promulgated values for PCBs are: 0.22 mg/kg for residential soil; 10 mg/kg for industrial soil; and a federal MCL-based groundwater value of 0.5 µg/L promulgated under 47CSR12. These risk-based values are based on an IRIS oral CSF of 2 per mg/kg-day and an inhalation URF of 5.7E-4 per µg/m<sup>3</sup> for "high risk and persistence" PCBs.

The proposed approach by WVDEP for de minimis values was to promulgate separate direct contact soil values for "high risk and persistence" PCBs and "low risk and persistence" PCBs as follows:

Thomas Boggs to Kathy Cosco  
July 12, 2011  
Page 6 of 6

PCBs-high: 0.22 mg/kg for residential soil and 10 mg/kg for industrial soil based on the same toxicity criteria listed above.

PCBs-low: 1.1 mg/kg for residential soil and 50 mg/kg for industrial soil based on the IRIS CSF oral of 0.4 per mg/kg-day and an inhalation URF of  $1E-4$  per  $\mu\text{g}/\text{m}^3$  for "low risk and persistence" PCBs.

It is important to evaluate all potentially hazardous substances including PCBs according to the most accurate scientific information available. It appears that the approach taken by WVDEP for evaluation of high and low persistence PCBs is not consistent with the USEPA IRIS database information from which PCB values are derived. For this reason, it is recommended that for screening purposes, the de minimis standards retain the previous single residential and industrial standards for PCBs. The alternate oral CSF should be retained for deriving uniform or site-specific values for any instances in which the data are applicable and the applicant wishes to employ these standards.

The Chamber appreciates the opportunity to comment on the WVDEP's proposed revisions to the West Virginia Voluntary Remediation and Redevelopment Rule, 60 CSR 3.

Should you have any questions concerning the Chamber's submission, please call me at (304) 342-1695.

Sincerely,



Thomas M. Boggs  
Vice President

## **RESPONSE TO COMMENTS - - 60CSR3**

The comment period for the Voluntary Remediation and Redevelopment Rule, 60CSR3, closed July 12, 2011. A Public Hearing was held at 6:00 pm on July 12, 2011 at the Department headquarters and written comments were received from the West Virginia Chamber of Commerce (Chamber). No oral comments were received during the hearing.

### **COMMENT 1**

*The Chamber noted that it is supportive of the WVDEP's proposed revisions to the text of the Rule which incorporated many of the Chamber's suggested changes submitted in response to the March 31, 2011 survey letter from the agency, but requested that the WVDEP explain its rationale for declining to make the Chamber's suggested changes to Sections 60-3-5.1.b; 60-3-6.1.h and .i; 60-3-9.4; and 60-3-12.3.b. [The specific sections and responses are outlined in subsequent responses following Response 1.]*

### **RESPONSE 1**

The WVDEP acknowledges the support of the Chamber for the proposed changes to the text of the Rule.

### **COMMENT 2**

#### ***Chamber's Suggested Change to Section 60-3-5.1.b:***

*5.1.b. It is the licensed remediation specialist's duty to protect the safety, health and welfare of the public in the performance of his or her professional duties. If he or she is unable to meet this duty, the licensed remediation specialist may either sever the relationship with the client or employer or refuse professional responsibility for the work plan, report or design. If the relationship is severed because the licensed remediation specialist believes that he or she is unable to meet this duty, the applicant shall notify the division within 72 hours of the severing of the relationship. This 72-hour notice requirement does not apply if the applicant changes licensed remediation specialist on the project for any other reason.*

### **RESPONSE 2**

The WVDEP believes that Section 60-3-5.1.b is sufficiently clear as written and the suggested changes are not necessary in the context of the section.

### **COMMENT 3**

#### ***Chamber's Suggested Change to Section 60-3-6.1.h and .i:***

*6.1 .h. A listing of the applicable standards to be achieved at the site, if those standards have been determined at the time the agreement is executed:*

*6.1.i. Where applicable, a description of any engineering or institutional controls and any land use covenant to be imposed for the property, if those engineering or institutional controls and land use covenants have been determined at the time the agreement is executed:*

### RESPONSE 3

Section 6.1 pertains to the provisions of the Voluntary Remediation Agreement, cites Appendix 60-3A and Appendix 60-3B as meeting the requirements, and notes that additional modifications may be agreed upon by the applicant and the secretary. Appendix 60-3A is the "No Further Action" agreement, in which the standards and/or controls as required by sections 6.1.h and 6.1.i should be known and therefore stated. Appendix 60-3B is the 'standard' agreement used for sites which are often involved in an iterative process as the site progresses through the program in pursuit of a Certificate of Completion. The WVDEP believes that Appendix 60-3B provides the flexibility suggested by the Chamber for modifications subsequent to execution of the initial agreement.

### COMMENT 4

***Chamber's Suggested Change to Section 60-3-9.4:***

*9.4. Human Health-Site-Specific Risk-Based Standard. Site-Specific Risk-Based Standards will be determined using one or a combination of a BHHRA as described in subsection 8.4 of this rule or a RRA as described in subsection 8.6 of this rule. In establishing the remediation standard under this section, the potential for exposure to site contaminants under current and reasonably anticipated future land and water use and the application of institutional and engineering controls shall be considered. When evaluating the potential for exposure where the anticipated future land use is as a "recreational area," reasonable assumptions with respect to frequency and duration of exposure as well as other relevant factors for exposure may be made in accordance with division guidance.*

### RESPONSE 4

WVDEP does not see a need for the added language since it is inherent to establishing a site specific risk-based standard.

### COMMENT 5

***Chamber's Suggested Change to Section 60-3-12.3.b:***

*12.3.b.6. The certificate of completion may be amended only where new information or changed conditions at a site demonstrate that one or more of the restrictions placed upon the site are no longer necessary to meet the applicable standards. A request to amend a certificate of completion may be considered only where it is submitted by or with the written consent of the owner(s) of the site at the time the request is submitted.*

### RESPONSE 5

Inasmuch as no Voluntary Remediation Agreement is in place once the Certificate of Completion is issued, WVDEP has no means to conduct an effective review of "the new information or changed conditions" described in the proposed change. Although not specifically

articulated in the existing rule, the means to amend the Certificate of Completion would best be accomplished by following the "Reopener" provisions as outlined in 60-3-16.4.a or 60-3-16.4.b

#### **COMMENT 6**

*The Chamber noted that the WVDEP is proposing to change the word "significant" to "substantial" when describing the risk to human health established under the de minimis standard in Section 9.2 but is not proposing a similar change when defining the de minimis risk-based standard for human health in Section 9.1.a.1. The Chamber urged the WVDEP to use the same word in describing the risk to human health in these two sections, or in the alternative, to clarify the significance of the use of the word "substantial" in Section 9.2 and "significant" in Section 9.1.a.1 when describing the risk to human health.*

#### **RESPONSE 6**

The WVDEP agrees with the comment and the final rule has incorporated the suggested change to "substantial" in Section 9.1.a.1.

#### **COMMENT 7**

*The Chamber agreed with the WVDEP's proposed revisions to the model documents, Appendices 60-3 A through 60-3C, subject to one formatting change because the Chamber believes that the language "any applicable regulation promulgated thereunder" is intended to apply to all of the enumerated statutes and not just the last enumerated statute. At the end of the list of statutes found in paragraph 19 of Appendix 60-3B, "West Virginia Voluntary Remediation Agreement for Investigation and Remediation Activities," the Chamber urged the WVDEP to revise the list so that the language "any applicable regulation promulgated thereunder" begins a new line as follows:*

- (i) Toxic Substances Control Act, 15 U.S.C.A. §§ 2601, et seq.; and*
- (j) Any applicable regulation promulgated thereunder.*

#### **RESPONSE 7**

The WVDEP agrees with the comment and the final rule has incorporated the suggested formatting change in paragraph 19 of Appendix 60-3B.

#### **COMMENT 8**

*The Chamber reiterated its response to the WVDEP's survey, and urged the WVDEP to establish a stakeholder group similar to the Technical Standards Subcommittee that drafted the original Guidance Manual to consider other technical revisions to the Rule, update the current version of the Guidance Manual, and address major technical issues such as updating the list of guidance documents and references, evaluating the approach provided in Appendix J for sampling surface water and sediment, and providing guidance regarding investigating soil vapor intrusion and the discharge of groundwater to surface water.*

## RESPONSE 8

The WVDEP agrees with the comment and will strive to establish a stakeholder group in the future.

## COMMENT 9

*The Chamber suggested that Section 2.53a should be revised to reflect that any reduction of the hazard quotient to a value less than 1 under this Rule (which would reduce the De Minimis values) will only be considered under situations where site-specific cumulative risks warrant such reduction based on scientific principles consistent with the principles of USEPA risk assessment methodologies (i.e., if multiple constituents exists at elevated concentrations that all target the same organs per the USEPA IRIS database).*

## RESPONSE 9

As neither the present rule, nor any of the currently proposed rule changes contains a Section 2.53a, the comment is apparently proposing additional language to CSR§60-3.2.53. The existing paragraph defines risk-based concentrations specifically in the context of de minimis standards. Because a reduction of target concentrations for individual constituents arising from multiple chemicals acting on the same target organ through related modes of action would be related to the suite of chemicals occurring at a specific site, WVDEP believes that including this discussion under the suggested section would be confusing.

In contrast, cumulative site risks are already discussed under CSR§60-3.9.3.g and CSR§60-3.9.4.a and b for uniform and site-specific risk-based standards, respectively. WVDEP will consider additional clarification through updates in the guidance document.

## COMMENT 10

*The Chamber noted that the Guidance Manual in Section 2.6.6 refers to "USEPA Region III Risk-Based Concentration Tables," which USEPA Region III is no longer using. Instead, USEPA Region III is using Regional Screening Levels (RSLs). The Chamber requested that the WVDEP clarify whether it is using RSLs instead of Risk-Based Concentrations (RBCs) and if so, consider proposing appropriate revisions to the text of the Rule. See Sections 2.53, 9.2.0.1, and 9.2.b.2.A.*

## RESPONSE 10

Although the guidance manual citation refers to a specific set of values produced by USEPA Region III for screening purposes, the rule references the concept of cleanup standards calculated to meet specified levels of risk/hazard. Thus, de minimis, uniform, and site-specific standards continue to be based on meeting target excess lifetime cancer risks or hazard quotients and may be characterized as "risk-based concentrations".

WVDEP acknowledges that USEPA Region III no longer provides a set of screening values published as Risk-Based Screening (RBC) Tables. Rather, a series of tables are produced by the Oak Ridge National Laboratory (ORNL) under contract with USEPA, and published on a

semiannual basis as Regional Screening Levels. The updated name will be included in the revised guidance document.

#### COMMENT 11

*The Chamber considers the flexibility of the current Guidance Manual and the West Virginia Voluntary Remediation Program in general to be absolutely necessary to the success of those environmental programs and urged the WVDEP to retain those aspects. The Chamber believes it would not be beneficial for the Guidance Manual or the West Virginia Voluntary Remediation Program to become more prescriptive.*

#### RESPONSE 11

The WVDEP acknowledges the Chamber's comment.

#### COMMENT 12

*The Stated Rationale for the Proposed Revisions to the De Minimis Table: WVDEP's "Briefing Document" and the Environmental Protection Advisory Council's Meeting Minutes of June 2, 2011, that accompanied the WVDEP's proposed West Virginia Voluntary Remediation and Redevelopment Rule, 60 CSR 3, on file with the West Virginia Secretary of State, state that the proposed revisions to the risk-based cleanup standards in the De Minimis Table, Table 60-3B, are necessary "because the toxicological profiles for many chemicals in the federal IRIS database have been revised". The limited public comment period has not allowed the Chamber adequate time to review all of the many proposed changes to the De Minimis Table; however, it is unclear from a review of the proposed soil values for benzene that the proposed revisions to the current value are being driven by revisions to the federal IRIS database. To the extent that proposed values in the De Minimis Table are not based solely upon updates to the federal IRIS database, the Chamber requested that the WVDEP identify those proposed values and explain the drivers for each of those proposed values.*

#### RESPONSE 12

The comment correctly indicates that the proposed changes in the de minimis values are not due solely to updated toxicity criteria available on the IRIS database. The briefing document was prepared from a document provided with a previous de minimis revision and did not completely explain the basis for the current revisions.

Updates in toxicity criteria, including those included in the IRIS database account for many of the changes; however, additional updates were incorporated from secondary sources (see 60CSR3.8.1), in the absence of IRIS values. A number of these replaced values that were obtained from Health Effects Assessment Summary Tables (HEAST) which was last updated in 1997 and is no longer supported.

In addition to changes in toxicity criteria, the revised de minimis values were derived using an updated algorithm to calculate exposure via the inhalation pathway. Consistent with the dosimetry methodologies used to derive inhalation toxicity criteria, the method is based upon exposure concentration rather than the previous intake-based calculations. As the relevant UESPA guidance<sup>1</sup> was released subsequent to the previous de minimis update, this revision provided the first opportunity to incorporate the newer calculation.

For those standards driven by the inhalation pathway, the update results in higher de minimis concentrations, as illustrated in the comments related to changes in the de minimis values for benzene. Using the same toxicity criteria for all pathways, the existing residential de minimis concentration (0.66 mg/kg) increases to 0.82 mg/kg. Please note that the de minimis soil standards for benzene are driven by its oral slope factor ( $SF_{ORAL}$ ) and air unit risk factor (AURF). Although concentrations based on non-carcinogenic criteria (oral reference dose ( $RfD_O$ ) and reference concentration ( $RfC$ )) are also calculated, the values exceed those based on the carcinogenic criteria. Thus the  $RfD_O$  and  $RfC$  have no impact on the proposed de minimis values for benzene.

The proposed standards also incorporate revisions in the physicochemical parameters used in their calculation. Although physicochemical data are seldom updated, the data used in previous calculations were obtained from multiple sources, often with little or no supporting documentation, and little indication of whether the values were derived experimentally, as preferred, or modeled. Thus the validity of these data could not be completely verified. For these reasons, the physicochemical terms were updated from the Oak Ridge National Laboratory (ORNL) Risk Assessment Information System (RAIS) database<sup>2</sup>. The RAIS database is well documented and contains relevant data for most of the chemicals listed in the de minimis table. Moreover its values are consistent with those used by ORNL to calculate the EPA Regional Screening Values. An additional advantage is that the data can be downloaded in a format that permits data transfer directly to the spreadsheets used to calculate the de minimis standards, reducing the likelihood of transcriptional errors arising from manual data entry. The specific terms include the air and water diffusivity terms ( $\theta_A$  and  $\theta_W$ , respectively), Henry's Law constants (expressed as  $\text{atm}\cdot\text{m}^3/\text{mole}$  and dimensionless),  $K_{OC}$  (soil organic carbon/ water partition coefficient ( $\text{cm}^3/\text{g}$ )),  $K_D$  (soil/water partition coefficient ( $\text{cm}^3/\text{g}$ )), and water solubility ( $\text{mg/L}$ ).

In the case of benzene discussed in the comment letter, the value based on changes in the inhalation calculation (0.82 mg/kg) is further increased to the final proposed residential soil de minimis concentration (1.1 mg/kg.). This additional increase is specifically due to changes in  $\theta_A$  and  $\theta_W$ , described above.

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<sup>1</sup>USEPA OSRTI, *Risk Assessment Guidance for Superfund Vol I: Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment - Final*. January 2009.

<sup>2</sup>US Dept. of Energy, Oak Ridge National Laboratory Risk Assessment Information System.  
<http://rais.ornl.gov/tools/profile.php>

In addition to the changes indicated above, the revised de minimis standards incorporate USEPA guidance on evaluating risk to carcinogens acting via a mutagenic mode of action<sup>3</sup>. The purpose of the guidance is to account for increased susceptibility to this group of carcinogens following early life exposures. The impact of this change is limited to residential de minimis soil and risk-based groundwater values for 16 chemicals. These chemicals are listed in the table below with proposed de minimis concentrations calculated with and without this adjustment:

| Chemical Name                       | Residential Soil Standard (mg/kg) |              | Groundwater Standard (µg/L) |              |
|-------------------------------------|-----------------------------------|--------------|-----------------------------|--------------|
|                                     | As Proposed                       | Not Adjusted | As Proposed                 | Not Adjusted |
| Acrylamide                          | 2.3E-01                           | 9.7E-01      | 4.3E-02                     | 1.3E-01      |
| Benzidine                           | 5.0E-04                           | 2.1E-03      | 9.4E-05                     | 2.9E-04      |
| Chromium VI                         | 3.0E-01                           | 1.3E+00      | 4.3E-02                     | 1.3E-01      |
| 1,2-Dibromo-3-chloropropane         | 1.9E-01                           | 8.0E-01      | 2.0E-01*                    | 2.0E-01      |
| 4,4'-Methylene bis(2-chloroaniline) | 1.2E+00                           | 4.9E+00      | 2.2E-01                     | 6.7E-01      |
| N-Nitrosodiethylamine               | 7.7E-04                           | 3.2E-03      | 1.4E-04                     | 4.5E-04      |
| N-Nitrosodimethylamine              | 2.3E-03                           | 9.5E-03      | 4.2E-04                     | 1.3E-03      |
| Benz[a]anthracene                   | 1.5E-01                           | 6.2E-01      | 2.9E-02                     | 9.2E-02      |
| Benzo[b]fluoranthene                | 1.5E-01                           | 6.2E-01      | 2.9E-02                     | 9.2E-02      |
| Benzo[k]fluoranthene                | 1.5E+00                           | 6.2E+00      | 2.9E-01                     | 9.2E-01      |
| Benzo[a]pyrene                      | 1.5E-02                           | 6.2E-02      | 2.0E-01*                    | 2.0E-01      |
| Chrysene                            | 1.5E+01                           | 6.2E+01      | 2.9E+00                     | 9.2E+00      |
| Dibenz[ah]anthracene                | 1.5E-02                           | 6.2E-02      | 2.9E-03                     | 9.2E-03      |
| Indeno[1,2,3-cd]pyrene              | 1.5E-01                           | 6.2E-01      | 2.9E-02                     | 9.2E-02      |
| 1,2,3-Trichloropropane              | 5.0E-03                           | 2.1E-02      | 7.2E-04                     | 2.2E-03      |
| Vinyl chloride (lifetime)           | 5.5E-02                           | 1.8E-01      | 2.0E+0*                     | 2.0E+0*      |

\*Values are based on Federal Drinking Water Standards (MCLs) and are not risk-based.

In summary, it is clear that the actual changes incorporated in the revised de minimis standards greatly exceed the description provided in the briefing document accompanying the proposed rule. WVDEP regrets any confusion arising from the previous document and hopes that the above explanation provides sufficient clarification of the issues raised in Comment 12. WVDEP has also revised the Briefing Document to reflect the summary of this response.

## COMMENT 13

### *The Process for Revising the De Minimis Table:*

*The Chamber noted that they and other members of the public are not provided an opportunity to comment on proposed revisions to values in the De Minimis Table as those values are generated. The Chamber urged the WVDEP to provide an opportunity for public comment on proposed revisions to values in the De Minimis Table as those values are generated. In addition, the process that the WVDEP uses for quality control (QC) of proposed revisions to values in the De Minimis Table should be transparent. The Chamber requested that the WVDEP explain the QC process it follows in revising values in the De Minimis Table.*

<sup>3</sup>USEPA Risk Assessment Forum, *Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens*. March 2005.

## RESPONSE 13

The WVDEP agrees that the process for revising the de minimis standards should be transparent and will carefully consider the suggestions provided in the comment for future revisions. With regard to the proposed de minimis values, the Voluntary Remediation and Redevelopment Program (VRRP) intends to publish the revised calculation algorithms, as well as all of the input terms including physicochemical, toxicological, and exposure data used in their calculation in a suitable format available through its webpage<sup>4</sup>.

The process used to revise the current de minimis standards began with updating the spreadsheet models to incorporate the EPA guidance on estimating inhalation risk and enhanced susceptibility to early life exposure to mutagens, as discussed above. Once the new algorithms were incorporated into the revised spreadsheets, they were verified by comparing the results of spreadsheet with those produced by manual calculations for a suite of volatile, semi-volatile, and inorganic analytes reflecting carcinogenic, non-carcinogenic or both toxic endpoints and driven by oral, dermal, or inhalation pathways.

Once the spreadsheet calculations were verified, the toxicity criteria were verified on a hybrid spreadsheet containing the toxicity criteria used to calculate the current de minimis standards and those used to calculate the most current USEPA Region III Preliminary Remediation Goals (PRGs)<sup>5</sup>. The advantage to this approach was that the spreadsheet was designed to automatically highlight those constituents where discrepancies existed between the DEP and EPA sources, avoiding potential errors arising from manual chemical-by-chemical verification.

For those constituents selected on the basis of different toxicity criteria, the original sources of the DEP and EPA values were reviewed and the DEP values revised where appropriate. In the case of constituents having no PRG, the IRIS database<sup>6</sup> was consulted for updated toxicity criteria. In the event that no IRIS value was available, secondary (USEPA provisional peer-reviewed toxicity values (PPRTV<sup>7</sup>)) and tertiary sources (ATSDR minimal risk levels (MRLs)<sup>8</sup>, California OEHHA Toxicity Criteria Database<sup>9</sup> (RELs), etc.) were consulted. After the toxicity criteria were reconciled against the Region III PRG tables, a final check was performed against the IRIS and PPRTV databases to insure that the most recent data were included.

A similar spreadsheet comparison between the de minimis and Region III tables was performed for the physicochemical data. In this case, however, the indicated discrepancies were compared directly to values obtained from the RAIS database<sup>2</sup>. Aside from occasional rounding

<sup>4</sup> <http://www.dep.wv.gov/dlr/oer/voluntarymain/Pages/default.aspx>

<sup>5</sup> USEPA Region III, Preliminary Remediation Goals (October, 2010).

[http://www.epa.gov/reg3hwmd/risk/human/rb-concentration\\_table/Generic\\_Tables/index.htm](http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/index.htm)

<sup>6</sup> USEPA NCEA Integrated Risk Information System.

[http://cfpub.epa.gov/ncea/iris/index.cfm?fuseaction=iris.showSubstanceList&list\\_type=alpha&view=A](http://cfpub.epa.gov/ncea/iris/index.cfm?fuseaction=iris.showSubstanceList&list_type=alpha&view=A)

<sup>7</sup> USEPA OSWER, Provisional Peer Reviewed Toxicity Values for Superfund (PPRTV).

<http://hhpprtv.onrl.gov/quickview/pprtv.php>

<sup>8</sup> ATSDR, Minimal Risk Levels (MRLs) for Hazardous Substances. <http://www.atsdr.cdc.gov/mrls/mrlolist.asp>.

<sup>9</sup> State of California, Office of Environmental Health Hazard Assessment, Toxicity Criteria Database.

<http://www.oehha.ca.gov/risk/ChemicalDB/>

differences, the RAIS values were identical to values listed on the EPA tables, while many of the values used in the existing de minimis tables differed, often substantially, from the RAIS and EPA values. Because most of the physicochemical data included in the de minimis spreadsheets were derived from the original de minimis spreadsheets developed in 2001 and included values that could no longer be verified, a decision was made to adopt the RAIS values. The advantages of the RAIS database were that the values were well documented and referenced, were available for large number of chemicals (including most of those on the de minimis table), and were available in a format allowing them to be imported directly into the de minimis spreadsheets, avoiding transcriptional errors that might occur during manual data entry.

In a few instances, data were not available in the RAIS database. For these chemicals, the values were obtained from the EPA program, WATER9 Version 2<sup>10</sup>. This program has both an extensive database of physicochemical parameters and a modeling feature that can estimate missing data based upon available parameters and molecular structure.

The spreadsheets incorporating the updated algorithms, toxicity criteria, and physicochemical data were subjected to a final review using a limited distribution to internal DEP and external reviewers. The purpose of this review was intended primarily to confirm that the spreadsheets were performing as intended, however spot checks of toxicity and physicochemical data were also performed.

#### COMMENT 14

##### **De Minimis Standards for Hydrogen Sulfide (H<sub>2</sub>S):**

*The Chamber noted that the existing promulgated values for H<sub>2</sub>S are 230 mg/kg for residential soil; 6100 mg/kg for industrial soil; and a risk-based groundwater value of 110 ug/L. The values are based on a withdrawn RfD oral and an IRIS RfC. The inhalation pathway was not incorporated into this original standard since there was no Henry's Law Constant in the database. Due to the volatile nature of this constituent, the existing standard should have but did not address the inhalation pathway. The de minimis standards were recalculated with the inclusion of the Henry's Law Constant. As there was no Henry's Law Constant available from the DOE/ORNL Risk Assessment Information System (RAIS), a value was obtained from the USEPA Water Database, as recommended by USEPA as a secondary source of these data. The corrected proposed values are 1.8 mg/kg for residential soil; 7.6 mg/kg for industrial soil; and a risk-based groundwater value of 4.2 ug/L. The Chamber urged the WVDEP to correct the proposed values in the De Minimis Table accordingly.*

#### RESPONSE 14

WVDEP agrees that the proposed values do not correctly reflect the toxicity of this chemical and should be revised. The values indicated in the comment ( 1.8 mg/kg, 7.6 mg/kg, and 4.2 µg/L)

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<sup>10</sup> USEPA Clearinghouse for Inventories & Emissions Factors, Water9 Version 2.  
<http://www.epa.gov/ttn/chief/software/water/index.html#install>

will be included on the updated de minimis table for residential soil, industrial soil, and groundwater de minimis standards, respectively.

#### COMMENT 15

##### **De Minimis Standards for Polychlorinated Biphenyls (PCBs)-Low:**

*The Chamber noted that the existing promulgated values for PCBs are: 0.22 mg/kg for residential soil; 10 mg/kg for industrial soil; and a federal MCL-based groundwater value of 0.5 ug/L promulgated under 47CSR12. These risk-based values are based on an IRIS oral CSF of 2 per mg/kg-day and an inhalation URF of  $5.7E-4$  per (ug/m<sup>3</sup>) for "high risk and persistence" PCBs. The proposed approach by WVDEP for de minimis values was to promulgate separate direct contact soil values for "high risk and persistence" PCBs and "low risk and persistence" PCBs as follows: PCBs-high: 0.22 mg/kg for residential soil and 10 mg/kg for industrial soil based on the same toxicity criteria listed above. PCBs-low: 1.1 mg/kg for residential soil and 50 mg/kg for industrial soil based on the IRIS CSF oral of 0.4 per mg/kg-day and an inhalation URF of  $1E-4$  per ng/m<sup>3</sup> for "low risk and persistence" PCBs. It appears that the approach taken by WVDEP for evaluation of high and low persistence PCBs is not consistent with the USEPA IRIS database information from which PCB values are derived and the Chamber recommended that for screening purposes, the de minimis standards retain the previous single residential and industrial standards for PCBs. The alternate oral CSF should be retained for deriving uniform or site-specific values for any instances in which the data are applicable and the applicant wishes to employ these standards.*

#### RESPONSE 15

WVDEP agrees that derivation of de minimis values for low risk and persistence PCBs was not consistent with the IRIS Summary Document provided by USEPA listing the CSF<sub>ORAL</sub> and AURF for these compounds, as well as a discussion of the relevant literature supporting their derivation. The proposed values will be removed and the existing de minimis standards for PCBs will be retained.