

NEW JERSEY STATE LIBRARY

CHAPTER 26F

REMEDIAL PRIORITY SYSTEM

Authority

N.J.S.A. 58:10-23.16 and 58:10-23.20 through 58:10-23.24.

Source and Effective Date

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See: 27 N.J.R. 4516(a), 28 N.J.R. 5419(a).

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Chapter 26F, Remedial Priority System, expires on December 16, 2001.

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SUBCHAPTER 1. REMEDIAL PRIORITY SCORING OF CONTAMINATED SITES

7:26F-1.1 Scope

This subchapter provides the procedures and criteria the Department shall use to score sites to rank for remediation with public funds.

7:26F-1.2 Objective

The objective of these rules is to develop and apply a system which will allow the Department to evaluate the relative risks associated with sites that are contaminated with hazardous substances, hazardous wastes and pollutants that pose a risk to public health, safety and the environment. The system will characterize those risks as numerical scores which can be organized in ranked order. By defining the relative risk posed by these sites, the Department shall be better able to determine its priorities for remediation using public funds.

7:26F-1.3 Basis of remedial priority scoring

- (a) To score contaminated sites, the Department shall:
1. Identify the sites it intends to score from the list of known contaminated sites;
  2. Solicit information from the public to assist in scoring of sites pursuant to (d)1 below;
  3. Generate a draft remedial priority score pursuant to (b) below;
  4. Rescore sites pursuant to N.J.A.C. 7:26F-1.4; and
  5. Finalize each score, once the Department plans to spend public money to remediate a site, by issuing a Spill Act Directive as appropriate.

(b) To generate a draft remedial priority score for a contaminated site, the Department:

1. Shall use the Remedial Priority Scoring Manual in Appendix A, the Remedial Priority Score Sheet in Appendix B, and the Remedial Priority System Requirements in Appendix C of this subchapter, incorporated herein by reference; the Department, however, may deviate from a strict application of the Manual, as necessary, to achieve the regulatory objectives set forth in N.J.A.C. 7:26F-1.2;
2. May elect to evaluate the cumulative risks of two or more sites by assigning a single score to the sites as a group; and
3. May conduct site inspections to assist in the scoring of contaminated sites.

(c) To generate a final remedial priority score for a contaminated site, the Department shall:

1. Conduct a remedial priority system site inspection;
2. Correct any typographical, minor administrative or mathematical errors in the score sheets for the draft score; and
3. Provide notice of the final score to the persons the Department believes to be responsible for the contamination through the issuance of a Spill Act Directive or other appropriate means.

(d) The Department shall determine what information in its possession is available and relevant for providing the factual basis for the scoring of contaminated sites.

1 By March 16, 1997, any person may submit to the Department, at the address provided in N.J.A.C. 7:26F-1.4, information for the Department's use in the scoring of any contaminated site.

2. The Department may, in its sole discretion, elect not to use available information for scoring of a contaminated

site which was not collected and submitted in compliance with the requirements of N.J.A.C. 7:26E.

#### 7:26F-1.4 Rescoring of sites

(a) On its own initiative, the Department may elect to rescore a site prior to finalizing the remedial priority score based upon:

1. The Department's identification of typographical, minor administrative, or mathematical errors in scoring;
2. The availability of additional information which the Department recognizes as relevant to the scoring of a site; or
3. A change in an applicable cleanup standard or criteria or other reference material applicable to a particular site.

(b) The Department may also rescore a site, prior to finalizing the remedial priority score, based upon a proposed revised scoring sheet which reflects new site information which:

1. A requester has submitted in accordance with the data collection and reporting requirements of N.J.A.C. 7:26E; and
2. The Department has previously reviewed and approved, or the requester has entered into a memorandum of agreement with the Department pursuant to N.J.A.C. 7:26C for the Department to review and approve both:
  - i. New site information; and
  - ii. Proposed revised score sheets.

#### 7:26F-1.5 Submissions to the Department

Any person making a submission pursuant to this chapter shall send it to the Department at the following address:

New Jersey Department of Environmental Protection  
 Division of Responsible Party Site Remediation  
 Bureau of Field Operations  
 CN 434  
 Trenton, New Jersey 08625-0434  
 Attention: Case Assignment Section

#### 7:26F-1.6 Liberal construction

These rules, being necessary to promote the public health and welfare, shall be liberally construed in order to permit the Commissioner and the Department to effectuate the purposes of N.J.S.A. 13:1D-1 et seq.

#### 7:26F-1.7 Severability

If any section, subsection, provision, clause or portion of these regulations is adjudged to be invalid or unconstitutional by a court of competent jurisdiction, the remainder of these rules shall not be affected thereby.

### APPENDIX A

#### REMEDIAL PRIORITY SYSTEM MANUAL INTRODUCTION

The Department of Environmental Protection uses this Remedial Priority System Manual to index the relative risks that sites pose to public health and safety, and the environment. The Department's use of this Manual allows it to express those risks as numerical scores and use those scores to rank contaminated sites in the order of their relative risks.

#### DESCRIPTION OF THE REMEDIAL PRIORITY SCORING SYSTEM

This Manual contains four sections: Soil Contamination, Ground Water Contamination, Surface Water Contamination and Subsurface Gas Contamination. Each of the four sections focuses on three factors relevant to risk: Contaminant Characteristics, Receptors, and Likelihood of Impact, which are further described below.

The Contaminant Characteristics factor provides the starting point for scoring a site in order to evaluate its relative risks as compared to other known sites. The first step is to identify the contaminants at the site which form the basis of the risks to public health and safety, and the environment. These contaminants are referred to as the contaminants of concern. Each section in the Remedial Priority System Manual (with the exception of the Subsurface Gas section) allows for the selection of a Contaminant of Concern from each analytical category. Contaminants of concern are separated in the manual into six analytical categories: volatile organic, semi-volatile organic, inorganic, pesticide/herbicide/PCB, dioxin and radionuclide. The concentration of each contaminant detected at a site is compared with the applicable cleanup standard or criterion for that particular contaminant. The contaminant in each analytical category which exceeds the applicable cleanup or health-based criterion by the greatest extent is selected as a contaminant of concern for that analytical category. It is likely that different contaminants will be selected for scoring different sections of the Remedial Priority System Manual based on the environmental data that are available for the site. The score for the concentration of the contaminant of concern is limited to a maximum score of 20, so that the presence of multiple contaminants will not disproportionately affect the total score for a site. The contaminants of concern are further evaluated by assigning numerical scores for contaminant characteristics such as toxicity, mobility, bioaccumulation, and whether or not all sources of contamination have been properly remediated; the individual numerical values achieved will yield a score for contaminant characteristics.

Once the Department has identified and evaluated the contaminants of concern, the Manual then focuses on human and ecological receptors in the area of a site. For humans as receptors, the Manual identifies numerical values for factors which generally affect human exposure to the contamination from a site, such as land use in the area of the site, as reflected by local zoning and documented resource use. For ecological receptors, numerical values are assigned to natural resources based upon regulatory classification schemes and other relevant factors.

The third and final factor within each of the four sections of the manual is the likelihood of impact where the Department assigns numerical scores to a site and its environs based upon the potential for contamination to impact receptors. For example, when the Department evaluates the threat of subsurface gas contamination, relevant considerations are depth to ground water, soil permeability and the distance from the contamination to the point of exposure. For examining the likelihood of impact from documented ground water contamination, considerations are distance from contamination to the point of use, and the hydraulic conductivity of the aquifer involved. These same two factors are evaluated together with the depth to the aquifer of concern, where the potential for ground water contamination is the issue.

There are different numbers of variables throughout the four sections evaluated. To ensure that each category is given equal weight relative to the other sections, it is necessary to equalize the maximum numerical scores assigned to the individual section. The Department provides this equalization by incorporating a multiplier into the calculation of the relative numeric scores.

If, when scoring a site, the Department deviates from the manual pursuant to N.J.A.C. 7:26F-1.3(b)1, a description of the deviation and the Department's rationale will be documented on and attached to the site score sheet.

The Department will use the score sheet in Appendix B to record the details on the Department's calculation of a score and the source of the data and information used to score a site.

#### COMPLETING A REMEDIAL PRIORITY SCORE

To complete a remedial priority score for a site, the Department will use the following items:

- (1) a copy of this Manual (Appendix A),
- (2) a blank score sheet (Appendix B),
- (3) Remedial Priority System Requirements (Appendix C),
- (4) available site information, and

(5) other relevant, available information, such as zoning information and the regulatory classification of surface and ground waters.

A specific sequence for completing a score for a site by using each of the four sections of the Manual is not critical. The introduction to each section identifies criteria for the Department's determination as to whether it is appropriate to evaluate a site under that section of the Manual.

The Department will use the score sheet (Appendix B) to record the necessary information to calculate the numerical subscores for each category and section, and a score for each site as a whole.

#### DEFINITIONS

The following terms used in the Manual shall have the following meanings unless the context clearly indicates otherwise.

"Aquifer" means any aquifer defined as such pursuant to the Ground Water Quality Standards, N.J.A.C. 7:9-6.

"Category one waters" or "C1" means those waters designated as such pursuant to the Surface Water Quality Standards, N.J.A.C. 7:9B.

"Category two waters" or "C2" means those waters designated as such pursuant to the Surface Water Quality Standards, N.J.A.C. 7:9B.

"Contaminant" or "contamination" means any contaminant defined as such pursuant to the Technical Requirements for Site Remediation, N.J.A.C. 7:26E.

"Department" means the New Jersey Department of Environmental Protection.

"Discharge" means any discharge defined as such pursuant to the Technical Requirements for Site Remediation, N.J.A.C. 7:26E.

"Distribution coefficient" means the ratio of an absorbed chemical per unit of weight of soil to the aqueous solute concentration.

"Effects range-low" or "ER-L" means the concentration of a contaminant in sediment above which adverse effects may begin or are predicted among sensitive life stages and/or species.

"Effects range-medium" or "ER-M" means the concentration of a contaminant in sediment above which effects are frequently or always observed or predicted among most species.

"Environmentally sensitive areas" means all areas defined as such at N.J.A.C. 7:1E-1.8.

“Free product” means any free product defined as such pursuant to the Technical Requirements for Site Remediation, N.J.A.C. 7:26E.

“Ground water quality criteria” means the health-based criteria in the New Jersey Ground Water Quality Standards, N.J.A.C. 7:9-6.

“Hazardous substance” means any substance defined as such pursuant to the Discharge of Petroleum and Other Hazardous Substances Regulations, N.J.A.C. 7:1E.

“Hazardous waste” means any solid waste as defined in the Solid Waste Regulations, N.J.A.C. 7:26-1.6, which is further defined as a hazardous waste pursuant to the Solid Waste Regulations, N.J.A.C. 7:26-1.4.

“Hydraulic conductivity” means the capacity of a porous medium to transmit water.

“Lower explosive limit” or “LEL” means the minimum concentration of a combustible gas measured as a percentage of the total constituents present in the atmosphere that will combust when ignited.

“Nondegradation waters” means those waters designated as such in the Surface Water Quality Standards, N.J.A.C. 7:9B.

“Pinelands waters” means those waters designated as such in the Surface Water Quality Standards, N.J.A.C. 7:9B.

“Pollutant” means any substance defined as such pursuant to the New Jersey Pollutant Discharge Elimination System Regulations, N.J.A.C. 7:14A.

“Receptor” means any receptor defined as such pursuant to the Technical Requirements for Site Remediation, N.J.A.C. 7:26E.

“Site” means a specific physical location within the State of New Jersey. The boundaries of a site are based on the geographical extent of the contamination.

“Solubility” means the concentration of a specific compound in water at a given temperature and pressure.

“Source” means any contaminant or contaminated medium which provides a continuing or intermittent reservoir of a contaminant into an environmental medium or from one environmental medium to another environmental medium.

“Vapor pressure” means the pressure of a confined liquid such that the vapor collects above it.

“Volatile organic compound” means any compound having a vapor pressure greater or equal to 1 mm of mercury at standard temperature and pressure.

“Waste oil” means any material defined as such pursuant to the Solid Waste Regulations, N.J.A.C. 7:26-1.4.

“Wetlands” means an area designated as such in the Surface Water Quality Standards, N.J.A.C. 7:9B, the Coastal Zone Management Regulations, N.J.A.C. 7:7E-3.27, the Subsurface Sewage Disposal Regulations, N.J.A.C. 7:9A-2.1, New Jersey Pollutant Discharge Elimination System Regulations, N.J.A.C. 7:14A-1.9, Grants for Wastewater Facilities Regulations, N.J.A.C. 7:22-10.2, Pinelands Management Plan Regulations, N.J.A.C. 7:50-6.3 and 6.4. Wetlands also include freshwater wetlands as defined in the Freshwater Wetlands Regulations, N.J.A.C. 7:7A-1.4.

## SECTION 1: SOIL CONTAMINATION

Complete the Soil Contamination section when soil contamination which exceeds the Residential Direct Contact Soil Cleanup Criteria or other applicable criteria included in Table 1 of Appendix C, has been documented, either through analytical data or visual observation of free product in the soil.

If such soil contamination has not been documented at the site, do not complete this section, and complete additional sections of the manual which apply to the site being scored.

### I. CONTAMINANT CHARACTERISTICS

A. CONTAMINANTS OF CONCERN—OTHER THAN TOTAL PETROLEUM HYDROCARBONS (If only data for petroleum hydrocarbon data are available for the site, do not complete subsection A, but rather complete subsection B below.)

#### 1. CONTAMINANTS OF CONCERN SELECTION

Identify all soil contaminants which exceed the most recent version of the Residential Direct Contact Soil Ranking Criteria, (see Table 1 of Appendix C). Refer to the Requirements for Contaminant of Concern Selection in Table 2 of Appendix C for analytical considerations in the selection of contaminants of concern. If the only analytical results for the site are total petroleum hydrocarbons proceed to IB1 below. For contaminants which do not have a soil ranking criteria, the Department will develop criteria on a case-by-case basis. Separate the contaminants into the six following analytical categories:

- Volatile Organic
- Semi-Volatile Organic
- Inorganic
- Pesticide/Herbicide/PCB
- Dioxin
- Radionuclide

List the contaminants in Chart 1.1 of the score sheet according to the appropriate analytical category, and the highest concentration for each contaminant detected at the site. Enter on the score sheet the most recent version of the corresponding health-based soil ranking criteria (see Table 1 of Appendix C). Determine the exceedance of the health-based soil ranking criteria by dividing the concentration of each contaminant in Chart 1.1 by the health-based soil ranking criteria. Enter the criteria exceedance (quotient) in Chart 1.1 of the score sheet.

2. CONTAMINANT CONCENTRATION

Select the contaminant of concern from each analytical category which exceeds the health-based soil ranking criteria by the highest amount based upon a comparison of the quotients. Enter the selected contaminants of concern, and the concentration, in Chart 1.2 on the score sheet. Enter the applicable Residential Direct Contact Soil Ranking Criteria in Chart 1.2. Identify the appropriate score for each of the contaminants listed in Chart 1.2 from the scores provided below. Enter the score for each of the selected contaminants of concern. Add the scores from all applicable analytical categories to determine the total contaminant concentration score. (The maximum score for contaminant concentration is 20. All calculations which are higher than 20 will receive the maximum score.) Enter the total contaminant concentration score in Chart 1.2 on the score sheet.

<u>Contaminant Concentration</u>	<u>Score</u>
Free product	10
>100x criteria without free product	8
>10x criteria to 100x criteria	5
>criteria to 10x criteria	1

B. CONTAMINANTS OF CONCERN—PETROLEUM HYDROCARBONS

1. CONTAMINANTS OF CONCERN SELECTION

Complete this subsection B if total petroleum hydrocarbons are the only analytical data that are available for the site. If other data are available, do not complete subsection B, but rather complete subsection A above.

Identify all types of petroleum hydrocarbon contamination which exceed the applicable action level included in Table 1 of Appendix C. Refer to the Requirements for Contaminant of Concern Selection in Table 2 of Appendix C for analytical considerations in the selection of contaminants of concern. Separate the types of petroleum hydrocarbon contamination based on the probable source. If the source is not known, assume the source is waste oil.

- Fuel Oil N. 2, Diesel Fuel
- Fuel Oil Nos. 4 & 6, Hydraulic oils, Crude oil and Lubricating oil
- Waste Oil

List the highest concentration of the total petroleum hydrocarbons in Chart 1.1A of the score sheet according to the appropriate probable source. Enter on the score sheet the corresponding action level listed in Table 2 of Appendix C. Determine the exceedance of the action level by dividing the concentration of each petroleum contaminant in Chart 1.1A by the action level. Enter the action level exceedance (quotient) in Chart 1.1A of the score sheet.

2. CONTAMINANT CONCENTRATION

Select the petroleum contaminant which exceeds the action level by the highest amount based upon a comparison of the quotients. Enter the selected petroleum contaminant of concern and the concentration in Chart 1.2A of the score sheet. Identify the appropriate total concentration score from the scores provided below and enter it in space 1 of the score sheet.

<u>Contaminant Concentration</u>	<u>Score</u>
Free product	10
>100x criteria without free product	8
>10x criteria to 100x criteria	5
>criteria to 10x criteria	1

C. CONTAMINANT SOURCE STATUS

Select the score that reflects the status of all sources of soil contamination, even if the sources are off the site which is being scored. Enter the score in space 2 of the score sheet.

<u>Source Status</u>	<u>Score</u>
All sources of soil contamination have <u>not</u> been remediated in accordance with the Technical Requirements for Site Remediation, N.J.A.C. 7:26E, and either documented in a report to the Department or approved in writing by the Department	10
All sources of soil contamination have been remediated in accordance with the Technical Requirements for Site Remediation, N.J.A.C. 7:26E, and either documented in a report to the Department or approved in writing by the Department	0

D. BIOACCUMULATION

Select the score which reflects the presence or the absence of bioaccumulation chemicals of concern which are present in site soil above soil ranking criteria. Refer to USEPA, 40 C.F.R. Parts 9, 122, 123, 131 Final Water Quality Guidance for the Great Lakes System; final rule, March 23, 1995 (see Table 3 of Appendix C, Bioaccumulative Chemicals of Concern). Enter the contaminant and score in space 3 of the score sheet.

	<u>Score</u>
Bioaccumulation chemical(s) present in site soil	10
No bioaccumulation chemical(s) present in site soil	0

**CALCULATION**

Calculate the score for Soil Contamination Category I: Contaminant Characteristics and enter it on space 4 of the score sheet.

**II. RECEPTORS**

**A. ZONING**

Select the score for the land use zoning at and adjacent to the site. Zoning information can be obtained from local zoning officials. If the zoning in the area of the site includes more than one zoning classification, assign a score based on the zoning classification which yields the highest score. For example, a site which is zoned industrial with adjacent property which is zoned residential would be assigned a score of "10" based on the residential zoning. Enter the score in space 5 of the score sheet.

<u>Zoning</u>	<u>Score</u>
Residential/recreational	10
Commercial	8
Agricultural/rural	3
Industrial	1

**B. NATURAL RESOURCES**

Select the score which reflects the presence or absence of an environmentally sensitive area within 1/2 mile of any point of documented soil contamination. Enter the score in space 6 of the score sheet.

<u>Natural Resources</u>	<u>Score</u>
Environmentally sensitive area present	10
Areas not described above	0

**CALCULATION**

Calculate the score for Soil Contamination Category II: Receptors and enter it on space 7 of the score sheet.

**III. LIKELIHOOD OF IMPACT**

**A. DISTANCE**

Select the score which reflects the shortest distance between any point of detected soil contamination and the nearest area selected in IIA or IIB above. Enter the score in space 8 of the score sheet.

<u>Distance</u>	<u>Score</u>
0 to 100 feet	10
>100 to 500 feet	5
>500 to 1,000 feet	3
>1000 feet to 1/2 mile	1
>1/2 mile or no known usage or no environmentally sensitive area	0

**B. LIKELIHOOD OF ACCESS**

Select the score which reflects the likelihood of one or more individuals to gain access to areas of soil contamination. Access information may be obtained from site inspections, file information and from local officials. Enter the score in space 9 of the score sheet.

<u>Likelihood of Access</u>	<u>Score</u>
Access has been documented in areas of soil contamination	10
Access is likely to any area of soil contamination	3
Access is unlikely to any area of soil contamination	1

**C. POTENTIAL FOR AIR MIGRATION**

Select the score which reflects the potential for soil contaminants of concern to become airborne, either as vapor or as particulate. This factor is scored based upon site conditions described below. Enter the score in space 10 of the score sheet.

<u>Potential for Air Migration</u>	<u>Score</u>
Exposed surface soil or soil piles are present which contain contaminant concentrations that exceed the soil ranking criteria	10
Migration of soil contaminants to the air is unlikely due to the presence of vegetation or at least six inches or more of a non-vegetative cover	0

**CALCULATION**

Calculate the score for Soil Contamination Category III: Likelihood of Impact and enter it on space 11 of the score sheet.

Calculate the total score for Section 1: Soil Contamination (I+II+III) and enter it on space 12 of the score sheet.

**ALL REFERENCES USED TO COMPLETE THIS SECTION MUST BE FULLY IDENTIFIED IN THE SPACES PROVIDED ON THE SCORE SHEET.**

**SECTION 2: GROUND WATER CONTAMINATION**

Complete the Ground Water Contamination section when either: (1) ground water contamination which exceeds the Ground Water Quality Standards N.J.A.C. 7:9-6 has been documented, or (2) when the Department determines that the potential exists for documented contamination to migrate to ground water.

The Ground Water Contamination section contains two subsections. Apply Subsection A: Documented Ground Water Quality Standards when analytical data are available which document contaminant concentrations in the ground water in excess of the Ground Water Quality Standards, N.J.A.C. 7:9-6, or when free product has been observed in or on the ground water. Only apply Subsection B: Potential Ground Water Contamination when ground water contamination is likely, but not documented, based on the presence of contaminant sources which can cause ground water contamination.

If there is neither documented ground water contamination nor potential for ground water contamination, do not complete this section. Either complete additional sections of the manual, which apply to the site being scored, or calculate the draft score on the final page of the score sheet.

SUBSECTION A: DOCUMENTED  
GROUND WATER CONTAMINATION

I. CONTAMINANT CHARACTERISTICS

A. CONTAMINANTS OF CONCERN FOR GROUND WATER

1. CONTAMINANTS OF CONCERN SELECTION

Identify all ground water contaminants which exceed the Ground Water Quality Standards, N.J.A.C. 7:9-6. Refer to the discussion on Requirements for Contaminant of Concern Selection in Table 2, Appendix C for analytical considerations in the selection of contaminants of concern. For contaminants which do not have a regulatory standard, the Department will develop a standard pursuant to the Ground Water Quality Standards, N.J.A.C. 7:9-6.7, on a case-by-case basis. Separate the contaminants into the six following analytical categories:

- Volatile Organic
- Semi-Volatile Organic
- Inorganic
- Pesticide/Herbicide/PCB
- Dioxin
- Radionuclide

List the contaminants in Chart 2.A.1 according to the appropriate analytical category, and the highest concentration for each contaminant detected at the site. Enter in Chart 2.A.1 the corresponding health-based Ground Water Quality Criteria pursuant to the Ground Water Quality Standards. Determine the exceedance of the health-based Ground Water Quality Criteria by dividing the concentration of each contaminant in Chart 2.A.1 by the health-based Ground Water Quality Criteria. Enter the criteria exceedance (quotient) in Chart 2.A.1. Select the contaminant of concern from each analytical category which exceeds the health-based Ground Water Quality Criteria by the highest amount based upon a comparison of the quotients.

2. CONTAMINANT CONCENTRATION

Enter the selected contaminants of concern and the concentration, in Chart 2.A.2 of the score sheet. Enter the corresponding Ground Water Quality Standard Criteria in Chart 2.A.2 of the score sheet. Identify the appropriate score for each of the contaminants listed in Chart 2.A.2 from the scores provided below. Enter the score for each of the selected contaminants of concern. Add the scores from all applicable analytical categories to determine the total contaminant concentration score. (The maximum

score for contaminant concentration is 20. All calculations which are higher than 20 will receive the maximum score.) Enter the total contaminant concentration score in Chart 2.A.2 in space 13 of the score sheet.

<u>Contaminant Concentration</u>	<u>Score</u>
Free product	10
>10,000x criteria	10
>1,000x criteria to 10,000x criteria	8
>100x criteria to 1,000x criteria	5
>10x criteria to 100x criteria	3
>criteria to 10x criteria	1

B. CONTAMINANT SOURCE STATUS

Select the score that reflects the status of all sources of ground water contamination, even if those sources are off the site which is being scored. Enter the score in space 14 of the score sheet.

<u>Source Status</u>	<u>Score</u>
All sources of ground water contamination have <u>not</u> been remediated in accordance with Technical Requirements for Site Remediation, N.J.A.C. 7:26E, and either documented in a report to the Department or approved in writing by the Department	10
All sources of ground water contamination have been remediated in accordance with Technical Requirements for Site Remediation, N.J.A.C. 7:26E, and either documented in a report to the Department or approved in writing by the Department	0

C. CONTAMINANT MOBILITY

Select a score for the contaminant mobility based on the solubility of each contaminant listed in the organic analytical categories in Chart 2.A.2, and list each contaminant solubility score in Chart 2.A.3 of the score sheet. Solubility values are listed in "Solubility Value Chart," USEPA, 1990 (see Table 4 of Appendix C). If the contaminant is not found in this reference, apply a default score of 8. Enter the score in space 15 of the score sheet.

<u>Solubility</u>	<u>Score</u>
>10,000 mg/l	10
>100 to 10,000 mg/l	8
>1 to 100 mg/l	5
≤1 mg/l	1

Select a score for contaminant mobility based on the distribution coefficient of the inorganic and the radionuclide contaminants listed in Chart 2.A.2, and list each contaminant of concern and its distribution coefficient score in Chart 2.A.3 on the score sheet. Distribution coefficient values are listed in "Preliminary Soil Action Level for Superfund Sites" Research Triangle Institute, 1992 (see Table 5 of Appendix C). If the contaminant is not in this reference, apply a default score of 8. Enter the score in space 15 of the score sheet.

<u>Distribution Coefficient</u>	<u>Score</u>
≤10 ml/g	10
>10 to 50 ml/g	8
>50 to 100 ml/g	5
>100 ml/g	1

If more than one contaminant is listed on Chart 2.A.3, determine the contaminant mobility score by selecting the highest solubility or distribution coefficient score.

#### CALCULATION

Calculate the score for Documented Ground Water Contamination Category I: Contaminant Characteristics and enter it on space 16 of the score sheet.

### II. RECEPTORS

#### A. GROUND WATER CLASSIFICATION

List in Chart 2.A.4 each aquifer which is impacted by the contamination and any interconnected aquifer within one mile radius of each point where contamination was detected. Identify the associated ground water classification of each aquifer listed and enter it in Chart 2.A.4. Select the score which reflects the ground water classification of each aquifer which is impacted by contamination. If more than one aquifer is impacted, select the ground water classification which yields the highest score. Ground water classification information is contained in the Ground Water Quality Standards. Enter the score in space 17 of the score sheet.

<u>Classification</u>	<u>Score</u>
Class I ground water	10
Class II ground water	8
Class III ground water	1

#### B. TYPE OF USAGE

Select the score which reflects the type of wells within one mile of any point where ground water contamination was detected. If reliable ground water flow direction data are available, then only consider receptors one mile in a down gradient direction. If more than one type of usage exists within any of these radii, select the usage which yields the highest score. This is the point of usage. Both the well where contamination was detected and the point of usage must draw ground water from the same aquifer or draw from interconnected aquifers. Information on the type of usage may be included in well records and other information maintained by the Department. Enter the score in space 18 of the score sheet.

<u>Type of Usage</u>	<u>Score</u>
Potable	10
Irrigation (food crops, livestock watering)	5
Industrial/commercial	1
No known usage	0

#### C. NATURAL RESOURCES

Select the score which reflects the presence or absence of an environmentally sensitive area within one mile of documented ground water contamination which may be affected by the contaminated ground water (selected in IIA above). Enter the score in space 19 of the score sheet.

<u>Natural Resources</u>	<u>Score</u>
Environmentally sensitive area present	10
Areas not described above	0

#### CALCULATION

Calculate the score for Documented Ground Water Contamination Category II: Receptors and enter it on space 20 of the score sheet.

### III. LIKELIHOOD OF IMPACT

#### A. DISTANCE TO POINT OF USAGE

Select the score which reflects the shortest distance between any point of ground water contamination and the selected point of usage or environmentally sensitive area (selected in IIB and IIC above). Enter the score in space 21 of the score sheet.

<u>Distance</u>	<u>Score</u>
0 to 1,000 feet	10
>1,000 feet to 2,000 feet	5
>2,000 feet to 1 mile	3
>1 mile or no known usage or no environmentally sensitive area	0

#### B. HYDRAULIC CONDUCTIVITY

Select the score which reflects the hydraulic conductivity of the aquifer or geologic formation, selected in IIA above. Determine the hydraulic conductivity by referencing site-specific reports, county geologic maps, or state geologic maps. Table 6 in Appendix C lists the hydraulic conductivities for most aquifers and formations in New Jersey. If the hydraulic conductivity cannot be determined from Table 6 apply a default scores listed below. If more than one aquifer is affected, select the aquifer which yields the highest score. Enter the score in space 22 of the score sheet.

<u>Hydraulic Conductivity</u>	<u>Score</u>
>100 ft/day	10
>10 to 100 ft/day	8
>1 to 10 ft/day	5
>0.1 to 1 ft/day	3
≤0.1 ft/day	1

<u>Geologic Formation</u>	<u>Default Score</u>
Limestone/dolomite karst formations	10
Coastal plain aquifers	8
Glacial aquifers	8
Other bedrock formations	5
Coastal plain confining units	1
Glacial confining units	1

#### CALCULATION

Calculate the score for Documented Ground Water Contamination Category III: Likelihood of Impact and enter it on space 23 of the score sheet.

Calculate the total score for Section 2 Subsection A: Documented Ground Water Contamination: (I+II+III) and enter the score on space 24 of the score sheet.

ALL REFERENCES USED TO COMPLETE THIS SECTION MUST BE FULLY IDENTIFIED IN THE SPACES PROVIDED ON THE SCORE SHEET.

SUBSECTION B: POTENTIAL GROUND WATER CONTAMINATION

I. CONTAMINANT CHARACTERISTICS

A. CONTAMINANTS OF CONCERN

1. CONTAMINANTS OF CONCERN SELECTION

Identify all soil contaminants which exceed the most recent version of the Impact to Ground Water Soil Ranking Criteria on Table 1 of Appendix C. Refer to the discussion on Requirements for Contaminant of Concern Selection in Table 2 of Appendix C for analytical considerations in the selection of contaminants of concern. For contaminants which do not have an impact to ground water criteria, the Department will develop a criteria on a case-by-case basis. When no soil or ground water analytical results exist for a site, but other documentation indicates to the Department that a discharge has occurred to the soil or ground water, use the hazardous substances, hazardous wastes or pollutants suspected to have been discharged for completing this section. Separate the contaminants into the six following analytical categories:

- Volatile Organic
- Semi-Volatile Organic
- Inorganic
- Pesticide/Herbicide/PCB
- Dioxin
- Radionuclide

List the contaminants in Chart 2.B.1 according to the appropriate analytical category, and the highest concentration for each contaminant detected at the site. Enter on the score sheet the corresponding Impact to Ground Water Soil Ranking Criteria in Table 1 of Appendix C. Determine the exceedance of the Impact to Ground Water Soil Ranking Criteria by dividing the concentration of each contaminant in Chart 2.B.1 by the impact to ground water criteria. Enter the criteria exceedance (quotient) in Chart 2.B.1. Select the contaminant of concern from each analytical category which exceeds the Impact to Ground Water Soil Ranking Criteria by the highest amount based upon a comparison of the quotients. When no soil analytical results exist for a site, leave Chart 1 blank and continue with 2. Contaminant Concentration below.

2. CONTAMINANT CONCENTRATION

Enter the selected contaminants of concern and the concentrations, in Chart 2.B.2. Enter the corresponding Impact to Ground Water Soil Ranking Criteria in Chart 2.B.2. Identify the appropriate score for each of the contaminants or the type of free product listed in Chart 2.B.2 from the scores provided below. Enter the score for each of the selected contaminants of concern or the type of free product, whichever is higher. Add the scores from all applicable analytical categories to determine the total contaminant concentration score. (The maximum score for contaminant concentration is 20. All calculations which are higher than 20 will receive the maximum score.).

Contaminant Concentration	Score
Free product	10
>100x criteria	8
>10x criteria to 100x criteria	5
>criteria to <10x criteria	1

B. CONTAMINANT MOBILITY

Select a score for contaminant mobility based on the solubility of each contaminant listed in the organic analytical categories in Chart 2.B.2, and list each contaminant of concern and its solubility score in Chart 2.B.3. Solubility values are listed in "Solubility Value Chart," USEPA 1990 (see Table 4 of Appendix C). If the contaminant is not found in this reference, apply a default score of 8. Enter the score on space 26 of the score sheet.

Solubility	Score
>10,000 mg/l	10
>100 to 10,000 mg/l	8
>1 to 100 mg/l	5
≤1mg/l	1

Select a score for contaminant mobility based on the distribution coefficient of the inorganic and radionuclide contaminants listed in Chart 2.B.2, and list each contaminant of concern and its distribution coefficient score in Chart 2.B.3. Distribution coefficient values are listed in "Preliminary Soil Action Level for Superfund Sites" Research Triangle Institute, 1992 (see Table 5 in Appendix C). If the selected contaminant is either unknown or not found not in the above reference, apply a default score of 8. Enter the score in space 26 of the score sheet.

Distribution Coefficient	Score
≤10 ml/g	10
>10 to 50 ml/g	8
>50 to 100 ml/g	5
>100 ml/g	1

If more than one contaminant is listed on Chart 2.B.2, determine the contaminant mobility score by selecting the highest solubility or distribution coefficient score.

CALCULATION

Calculate the score for Potential Ground Water Contamination Category I: Contaminant Characteristics and enter it on space 27 of the score sheet.

## II. RECEPTORS

### A. GROUND WATER CLASSIFICATION

List in Chart 2.B.4 each aquifer which is impacted by the contamination and any interconnected aquifer within one mile radius of each point where contamination was detected. Identify the associated ground water classification of each aquifer listed and enter it in Chart 2.B.4. Select the score which reflects the ground water classification of each aquifer which may be impacted by contamination. If more than one aquifer is impacted, select the ground water classification which yields the highest score. Ground water classification information is contained in the Ground Water Quality Standards. Enter the score in space 28 of the score sheet.

<u>Classification</u>	<u>Score</u>
Class I ground water	10
Class II ground water	8
Class III ground water	1

### B. TYPE OF USAGE

Select the score which reflects the type of wells within one mile of any point where soil contamination was detected. If reliable ground water flow direction data are available, then only consider receptors in a down gradient direction. If there is more than one type of usage, select the usage which yields the highest score. This is the point of usage. The aquifer potentially impacted must be the same or interconnected with the point of usage. Information on the type of well usage may be included in well records and other information maintained by the Department. Enter the score in space 29 of the score sheet.

<u>Type of Usage</u>	<u>Score</u>
Potable	10
Irrigation (food crops, livestock watering)	5
Industrial/commercial	1
No known use	0

### C. NATURAL RESOURCES

Select the score which reflects the presence or absence of an environmentally sensitive area within one mile of any point of documented soil contamination which may be affected by the ground water contamination (selected in IIA above). Enter the score in space 30 of the score sheet.

<u>Natural Resources</u>	<u>Score</u>
Environmentally sensitive area present	10
Areas not described above calculation	0

## CALCULATION

Calculate the score for Potential Ground Water Contamination Category II: Receptors and enter it on space 31 of the score sheet.

## III. LIKELIHOOD OF IMPACT

### A. DISTANCE TO POINT OF USAGE

Select the score which reflects the shortest distance between any point of detected soil contamination and the selected point of usage or an environmentally sensitive area (selected in IIB or IIC above). Enter the score in space 32 of the score sheet.

<u>Distance</u>	<u>Score</u>
0 to 1,000 feet	10
>1,000 feet to 2,000 feet	5
>2,000 feet to 1 mile	3
>1 mile or no known usage or no environmentally sensitive area	0

### B. HYDRAULIC CONDUCTIVITY

Select the score which reflects the hydraulic conductivity of the aquifer or geologic formation (selected in IIA above). Determine hydraulic conductivity by referencing site-specific reports, county geologic maps, or state geologic maps. Table 6 in Appendix C lists the hydraulic conductivities for most aquifers and formations in New Jersey. If hydraulic conductivities cannot be determined from the Table 6, apply a default score listed below. If more than one aquifer is impacted, select the aquifer which yields the highest conductivity score. Enter the score in space 33 of the score sheet.

<u>Hydraulic Conductivity</u>	<u>Score</u>
>100 ft/day	10
>10-100 ft/day	8
>1-10 ft/day	5
>0.1-1 ft/day	3
≤0.1 ft/day	1

<u>Geologic Formations</u>	<u>Default Score</u>
Limestone/dolomite karst formations	10
Coastal plain aquifers	8
Glacial aquifers	8
Other bedrock formations	5
Coastal plain confining units	1
Glacial confining units	1

### C. DEPTH TO AQUIFER OF CONCERN

Select the score for the depth to the aquifer by measuring the shortest vertical distance from the lowest point of documented or suspected soil contamination to the water table. If there is no on-site data indicating the depth to the aquifer, refer to well logs, soil boring logs, or geologic and soil survey reports for the area where the site is located. If the depth of the suspected source is unknown, assign a default score of 10. Enter the score in space 34 of the score sheet.

Depth	Score
≤10 feet	10
>10 to 20 feet	8
>20 to 50 feet	3
>50 feet	1

**CALCULATION**

Calculate the score for Potential Ground Water Contamination Category III: Likelihood of Access and enter it on space 35 of the score sheet.

Calculate the total score for Section 2—Subsection B: Potential Ground Water Contamination: (I+II+III) and enter it on space 36 of the score sheet.

ALL REFERENCES USED TO COMPLETE THIS SECTION MUST BE FULLY IDENTIFIED IN THE SPACES PROVIDED ON THE SCORE SHEET.

**SECTION 3: SURFACE WATER AND SEDIMENT CONTAMINATION**

Complete the Surface Water and Sediment Contamination section when surface water contamination exceeds the Surface Water Quality Standards, N.J.A.C. 7:9B, sediment contamination has been documented, or the Department determines that the potential exists for soil or ground water contamination to migrate to surface water.

The Surface Water and Sediment Contamination section contains two subsections. Apply Subsection A: Documented Surface Water Contamination when analytical data are available which document contaminant concentrations in the surface water in excess of the New Jersey Surface Water Quality Standards, N.J.A.C. 7:9B, or when free product has been observed in or on the surface water or sediment. Only apply Subsection B: Potential Surface Water Contamination when surface water contamination is likely, but not documented, based on the presence of contaminant sources which can cause surface water or sediment contamination. If there is both documented surface water contamination and the potential for contamination of a separate water body, complete both subsections and utilize the section which generates the highest score.

If there is neither documented surface water or sediment contamination nor potential for surface water or sediment contamination, do not complete this section. Either complete additional sections of the manual which apply to the site being scored, or calculate the draft score on the final page of the score sheet.

**SUBSECTION A. DOCUMENTED SURFACE WATER AND SEDIMENT CONTAMINATION**

**I. CONTAMINANT CHARACTERISTICS**

**A. CONTAMINANTS OF CONCERN FOR SURFACE WATER**

**1. CONTAMINANT OF CONCERN SELECTION**

Identify all surface water contaminants which exceed the Surface Water Quality Standards, N.J.A.C. 7:9B. If contaminants are not listed in the Surface Water Quality Standards, refer to the USEPA Water Standards, 40 C.F.R. Part 131, for applicable standards. Refer to the discussion on Requirements for Contaminant of Concern Selection in Table 2, Appendix C for analytical considerations in the selection of contaminants of concern. For contaminants which do not have a regulatory standard, the Department will develop a standard on a case-by-case basis. Separate the contaminants into the six following analytical categories:

- Volatile Organic
- Semi-Volatile Organic
- Inorganic
- Pesticide/Herbicide/PCB
- Dioxin
- Radionuclide

List the contaminants in Chart 3.A.1 of the score sheet according to the appropriate analytical category, and the highest concentration for each contaminant detected at the site. Enter on the score sheet the corresponding Surface Water Quality Standards. Utilize either the health-based or the aquatic-based standard, whichever is more stringent for the type of water that is being impacted. Determine the exceedance of the applicable surface water standard by dividing the concentration of each contaminant in Chart 3.A.1 by the applicable standard. Enter the standard exceedance (quotient) in Chart 3.A.1. Select the contaminant of concern from each analytical category which exceeds the applicable Surface Water Standard by the highest amount based upon a comparison of the quotients.

**2. CONTAMINANT CONCENTRATION**

Enter the selected contaminants of concern and the concentration, as determined above, in Chart 3.A.2. Enter the corresponding Surface Water Quality Standard in Chart 3.A.2. Identify the appropriate score for each of the contaminants listed in Chart 3.A.2 from the scores provided below. Enter the score for each of the selected contaminants of concern. Add the scores from all applicable analytical categories to determine the total contaminant concentration score. (The maximum score for the contaminant concentration is 20. All calculations which are higher than 20 will receive the maximum score.) Enter the total contaminant concentration score in Chart 3.A.2 on space 37 of the score sheet.

<u>Contaminant Concentration</u>	<u>Score</u>
Free Product	10
≥100x standard	8
≥10x standard to <100x standard	5
>standard to <10x standard	1

3. CONTAMINANT SOURCE STATUS

Select the score which reflects the status of all on site sources of surface water contamination. Enter the score in space 38 of the score sheet.

<u>Source Status</u>	<u>Score</u>
All sources of surface water contamination have not been remediated in accordance with the Technical Requirements for Site Remediation N.J.A.C. 7:26E, and either documented in a report to the Department or approved in writing by the Department	10
All sources of surface water contamination have been remediated in accordance with the Technical Requirements for Site Remediation N.J.A.C. 7:26E, and either documented in a report to the Department or approved in writing by the Department	0

4. BIOACCUMULATION

Select the score which reflects the presence or the absence of bioaccumulation chemicals of concern in the surface water which exceeds the Surface Water Quality Standards, N.J.A.C. 7:9B. Refer to USEPA, 40 C.F.R. Parts 9, 122, 123, 131 Final Water Quality Guidance for the Great Lakes System; final rule, March 23, 1995 (see Table 3 of Appendix C Bioaccumulative Chemicals of Concern). Enter the contaminant and score in space 39 of the score sheet.

	<u>Score</u>
Bioaccumulation chemical(s) present in surface water	10
No bioaccumulation chemical(s) present in surface water	0

CALCULATION

Calculate the score for A. Contaminant of Concern for Surface Water and enter it on space 40 of the score sheet.

B. CONTAMINANTS OF CONCERN FOR SEDIMENT

1. CONTAMINANT OF CONCERN SELECTION

Identify all sediment contaminants which exceed the National Oceanic and Atmospheric Administration values as listed in "The Potential for Biological Effects of Sediment Sorbed Contaminants Tested in the National Status and Trends Program," NOAA 1990, or the Incidence of Adverse Biological Effects Within Ranges of Chemical Concentrations in Marine and Estuarine Sediments. Environmental Management Vol. 19, No. 1, pp. 81-97 (see Table 7 of Appendix C). Refer to the discussion on Requirements on Contaminant of Concern Selection in Table 2 of Appendix C. For contaminants which do not have values listed in either of these publications, the Department will develop a value on a case-by-case basis. Separate contaminants into the six following analytical categories:

- Volatile Organic
- Semi-Volatile Organic
- Inorganic
- Pesticide/Herbicide/PCB
- Dioxin
- Radionuclide

List the contaminants in Chart 3.A.3 of the score sheet according to the appropriate analytical category, and the highest concentration for each contaminant detected at the site. Enter on the score sheet the corresponding NOAA value. Determine the exceedance of the NOAA Effects Range-Low (ER-L) value by dividing the concentration of each contaminant in Chart 3.A.3 by the value. Enter the value exceedance (quotient) in Chart 3.A.3 of the score sheet. Select the contaminant of concern from each analytical category which exceeds the applicable NOAA value by the highest amount based upon a comparison of the quotients.

2. CONTAMINANT CONCENTRATION

Enter the selected contaminants of concern and the concentration, as determined above, in Chart 3.A.4. Enter the corresponding NOAA value on Chart 3.A.4. Identify the appropriate score for each of the contaminants listed in Chart 3.A.4 from the scores provided below. Enter the score for each of the selected contaminants of concern. Add the scores from all applicable analytical categories to determine the total contaminant concentration score. (The maximum score for contaminant concentration is 20. All calculations which are higher than 20 will receive the maximum score.) Enter the total contaminant concentration score in Chart 3.A.2 on space 41 of the score sheet.

<u>Contaminant Concentration</u>	<u>Score</u>
≥10x ER-M	10
>ER-M to <10x ER-M	5
>Effects Range-Low (ER-L) to Effects Range-Medium (ER-M)	1

3. CONTAMINANT SOURCE STATUS

Select the score which reflects the status of on site sources of sediment contamination. Enter the score in space 42 of the score sheet.

<u>Source Status</u>	<u>Score</u>
All sources of sediment contamination have not been remediated in accordance with the Technical Requirements for Site Remediation, N.J.A.C. 7:26E, and either documented in a report to the Department or approved in writing by the Department	10
All sources of sediment contamination have been remediated in accordance with the Technical Requirements for Site Remediation, N.J.A.C. 7:26E, and either documented in a report to the Department or approved in writing by the Department	0

4. BIOACCUMULATION

Select the score which reflects the presence or the absence of bioaccumulation chemicals of concern in the sediment which exceeds the NOAA values (see Table 7 of Appendix C). Refer to USEPA, 40 C.F.R. Parts 9, 122, 123, 131 Final Water Quality Guidance for the Great Lakes System; final rule, March 23, 1995 (see Table 3 of Appendix C, Bioaccumulative Chemicals of Concern). Enter the contaminant and score in space 43 of the score sheet.

<u>Bioaccumulation Factor</u>	<u>Score</u>
Bioaccumulation chemical(s) present in sediments	10
No bioaccumulation chemical(s) present in sediments	0

**CALCULATION**

Calculate the score for B. Contaminants of Concern for Sediment and enter it on space 44 of the score sheet.

Calculate the score for Documented Surface Water Contamination Category I: Contaminant Characteristics and enter it on space 45 of the score sheet.

**II. RECEPTORS**

**A. SURFACE WATER CATEGORY**

Select the score which reflects the surface water category of each surface water body which is impacted by site contamination. Enter the affected surface water bodies and its category on Chart 3.A.5. If more than one surface water body is impacted, select the surface water category which yields the highest score. Surface water category information is contained in the Surface Water Quality Standards. Enter the score in space 46 of the score sheet.

<u>Category</u>	<u>Score</u>
Non-degradation areas and Pinelands (FW-1)	10
Category One Waters (C1)	5
Category Two (C2)	3

**B. TYPE OF USAGE**

Select the score which reflects the nearest usage of the impacted surface water resource (selected in IIA above). If there is more than one type of usage, select the usage which yields the highest score. This is the point of usage. Information on surface water usage may be available in Departmental and local health department records. Enter the score in space 47 of the score sheet.

<u>Type of Usage</u>	<u>Score</u>
Potable	10
Primary contact recreation (swimming/surfing permitted)	8
Irrigation/livestock watering/food production	5
Secondary contact recreation (boating/fishing permitted)	3
Non-potable commercial/industrial	1

**C. NATURAL RESOURCES**

Select the score which reflects the presence or absence of an environmentally sensitive area within one mile of any

point of documented surface water contamination which may be affected by the surface water contamination (selected in IIA above). Enter the score in space 48 of the score sheet.

<u>Natural Resources</u>	<u>Score</u>
Environmentally sensitive area present	10
Areas not described above	0

**CALCULATION**

Calculate the score for Documented Surface Water Contamination Category II: Receptors and enter it on space 49 of the score sheet.

**III. LIKELIHOOD OF IMPACT**

**A. DISTANCE TO POINT OF USAGE**

Select the score which reflects the shortest distance between any surface water data collection point and the nearest down-stream point of usage (selected in IIB and IIC above). To determine the distance, utilize USGS topographic maps and measure down-stream to the nearest point of usage or for one stream mile. If the impacted water body is tidally influenced, measure one mile downstream and upstream as far as the tidal run could be expected to carry the contaminants of concern. If this information is unavailable, include usage up to 0.5 miles up-stream and one mile downstream. Enter the score in space 50 of the score sheet.

<u>Distance</u>	<u>Score</u>
≤500 feet	10
>500 feet to 1,000 feet	5
>1,000 feet to 1 mile	3
>1 mile or no known usage or no environmentally sensitive area	0

**B. SURFACE WATER FLOW CHARACTERISTICS**

Select the score which reflects the annual mean flow of the affected surface water body. The most recent edition of "Water Resources Data, New Jersey, Water Year 1992," U.S. Geological Survey, 1993 lists the annual mean flow, in cubic feet per second, for specific surface water bodies (see Table 8 of Appendix C). Apply a default score of 8 if flow information is not available for this factor. Enter the score in space 51 of the score sheet.

<u>Annual Mean Flow</u>	<u>Score</u>
≤10 cubic feet per second	10
>10 to 100 cubic feet per second	8
>100 to 1,000 cubic feet per second	5
>1,000 cubic feet per second	1

**CALCULATION**

Calculate the score for Documented Surface Water Contamination Category III: Likelihood of Impact and enter the score on space 52 of the score sheet.

Calculate the total score for Documented Surface Water and Sediment Contamination: (I+II+III) and enter it on space 53 of the score sheet.

ALL REFERENCES USED TO COMPLETE THIS SECTION MUST BE FULLY IDENTIFIED IN THE SPACES PROVIDED ON THE SCORE SHEET.

SUBSECTION B: POTENTIAL  
SURFACE WATER CONTAMINATION

I. CONTAMINANT CHARACTERISTICS

A. CONTAMINANTS OF CONCERN

1. CONTAMINANT OF CONCERN SELECTION

If the potential for surface water contamination is based on soil contamination, identify all soil contaminants which exceed the most recent version of the Residential Direct Contact Soil Ranking Criteria (see Table 1 of Appendix C). If the potential for surface water contamination is based on the presence of contaminated ground water, identify all contaminants in the ground water which exceed the Surface Water Quality Standards. If contaminants are not listed in the Surface Water Quality Standards, refer the USEPA Water Standards, 40 C.F.R. Part 131, for applicable standards. For contaminants which do not have a regulatory standard, the Department will develop a standard on a case-by-case basis. When no soil and ground water analytical exist for a site, but other documentation indicates to the Department that a discharge has occurred, use the hazardous substance, hazardous waste or pollutants suspected to have been discharged as the contaminants for completing this section. Refer to Table 2, the Requirements on Contaminant of Concern Selection in Appendix C for analytical considerations in the selection of contaminants of concern. Separate the contaminants into the six following analytical categories:

- Volatil Organic
- Semi-Volatile Organic
- Inorganic
- Pesticide/Herbicide/PCB
- Dioxin
- Radionuclide

List the contaminants in Chart 3.B.1 of the score sheet according to appropriate analytical category, and the highest concentrations for each contaminant detected at the site. Enter on the score sheet either the corresponding Health-Based Soil Ranking Criteria or the Health/Aquatic-based Surface Water Quality Standard. Determine the exceedance of the related health-based soil ranking criteria or health/aquatic based standard by dividing the concentration of each contaminant in Chart 1 by the applicable criteria or standard. Enter the criteria or standard exceedance (quotient) in Chart 3.B.1 of the score sheet. Select the contaminant of concern from each analytical category which contaminant exceeds the applicable criteria or standard by the highest amount based upon a comparison of the quotients.

2. CONTAMINANT CONCENTRATION

Enter the selected contaminants of concern and the concentration, as determined above, in Chart 3.B.2. Enter the corresponding Residential Direct Contact Soil Ranking Criteria or the applicable Surface Water Quality Standard on Chart 3.B.2. Identify the appropriate score for each of the contaminants listed in Chart 3.B.2 from the scores provided below. Enter the score for each of the selected contaminants of concern. Add the scores from all applicable analytical categories to determine the total contaminant concentration score. (The maximum score for the contaminant concentration is 20. All calculations which are higher than 20 will receive the maximum score.) Enter the total contaminant concentration score in Chart 3.B.2 in space 53 of the score sheet. If potential surface water contamination is not based on analytical data from contaminated soil or ground water, assign a default score of 1 for the total contaminant concentration score in Chart 3.B.2 on space 54.

Exceedance of Direct Contact Soil Ranking Criteria

<u>Concentration</u>	<u>Score</u>
Free product	10
>100x criteria	8
>10x criteria to 100x criteria	5
>criteria to 10x criteria	1

Ground Water Exceedance of Surface  
Water Quality Standards

<u>Concentration</u>	<u>Score</u>
Free product	10
>100x standard	8
>10x standard to 100x standard	5
>standard to 10x standard	1

B. CONTAMINANT MOBILITY

Select a score for the contaminant mobility based on the solubility of each contaminant listed in the organic analytical categories in Chart 3.B.2, and list each contaminant of concern and its solubility score in Chart 3.B.3. Solubility values are listed in "Solubility Value Chart," USEPA 1990 (see Table 4 of Appendix C). If the contaminant is not found in this reference, apply a default score of 8. Enter the score in space 55 of the score sheet.

<u>Solubility</u>	<u>Score</u>
>10,000 mg/l	10
>100 to 10,000 mg/l	8
>1 to 100 mg/l	5
≤1 mg/l	1

Select a score for contaminant mobility based on the distribution coefficient of the inorganic and the radionuclide contaminants listed in Chart 3.B.2, and list each contaminant of concern and its distribution coefficient score in Chart 3.B.3 on the score sheet. Distribution coefficient values are listed in "Preliminary Soil Action Level for Superfund Sites," Research Triangle Institute, 1992 (see Table 5 of Appendix C). If the contaminant is not in this reference, apply a default score of 8. Enter the score in space 55 of the score sheet.

<u>Distribution Coefficient</u>	<u>Score</u>
≤10 ml/g	10
>10 to 50 ml/g	8
>50 to 100 ml/g	5
>100 ml/g	1

If more than one contaminant is listed on Chart 3.B.3, determine the contaminant mobility score by selecting the highest solubility or distribution coefficient score.

**C. BIOACCUMULATION**

Select the score which reflects the presence or the absence of bioaccumulation chemicals of concern in soil which exceeds the soil ranking criteria. Refer to USEPA, 40 C.F.R. Parts 9, 122, 123, 131 Final Water Quality Guidance for the Great Lakes System; final rule, March 23, 1995 (see Table 3 of Appendix C Bioaccumulative Chemicals of Concern). Enter the contaminant and score in space 56 of the score sheet.

	<u>Score</u>
Bioaccumulation chemical(s) present in soil	10
No bioaccumulation chemical(s) present in soil	0

**CALCULATION**

Calculate the score for Potential Surface Water Category I: Contaminant Characteristics and enter it on space 57 of the score sheet.

**II. RECEPTORS**

**A. SURFACE WATER CATEGORY**

Select the score which reflects the surface water category of each surface water body that may be impacted by site contamination. Enter the affected surface water bodies and their category Chart 3.B.5. If more than one surface water body may be impacted, select the surface water category which yields the highest score. Surface water category information is contained in the Surface Water Quality Standards. Enter the score in space 58 of the score sheet.

<u>Category</u>	<u>Score</u>
Non-degradation areas and Pinelands (FW-1)	10
Category One Waters (C1)	5
Category Two (C2)	3

**B. TYPE OF USAGE**

Select the score which reflects the nearest usage of the impacted surface water resource, (selected in IIA above). If there is more than one type of usage, select the usage which yields the highest score. This is the point of usage. Information on surface water usage may be available in Departmental and local health department records. Enter the score in space 59 of the score sheet.

<u>Type of Usage</u>	<u>Score</u>
Potable	10

<u>Type of Usage</u>	<u>Score</u>
Primary contact recreation (swimming/surfing permitted)	8
Irrigation/livestock watering/food production	5
Secondary contact recreation (boating/fishing permitted)	3
Non-potable commercial/industrial	1

**C. NATURAL RESOURCES**

Select the score which reflects the presence or absence of an environmentally sensitive area within 1/2 mile of any documented soil contamination which may be affected by the potential surface water (consistent with IIA above). Enter the score in space 60 of the score sheet.

<u>Natural Resources</u>	<u>Score</u>
Environmentally sensitive area present	10
Areas not described above	0

**D. OVERLAND DISTANCE**

Select the score which reflects the shortest runoff route from where contaminants have been detected to the probable point of entry to the closest surface water body. This is a down-gradient route and is unlikely to be along a straight line. Elevation contours on USGS topographic maps may be helpful in determining the runoff route. Enter the score in space 61 of the score sheet.

<u>Overland Distance</u>	<u>Score</u>
≤100 feet	10
>100 feet to 500 feet	8
>500 feet to 1,000 feet	5
>1,000 feet to 1/2 mile	1
> 1/2 mile	0

**CALCULATION**

Calculate the score for Potential Surface Water Contamination Category II: Receptors and enter it on space 62 of the score sheet.

**III. LIKELIHOOD OF IMPACT**

**A. DISTANCE TO POINT OF USAGE**

Select the score which reflects the shortest distance between any point of soil or ground water contamination and the nearest downstream point of usage (selected in IIB and IIC above). To determine the distance, utilize USGS topographic maps and measure the downstream to the nearest point of usage or for one stream mile. If the impacted water body is tidally influenced, measure one mile downstream and upstream as far as the tidal run could be expected to carry the contaminants of concern. If this information is unavailable, include up-stream usages of 0.5 mile and downstream one mile. Enter the score in space 63 of the score sheet.

<u>Distance</u>	<u>Score</u>
≤500 feet	10

<u>Distance</u>	<u>Score</u>
>500 feet to 1,000 feet	5
>1,000 feet to 1 mile	3
>1 mile or no known usage or no environmentally sensitive area	0

<u>Hydraulic Conductivity</u>	<u>Default Score</u>
Limestone/dolomite karst formations	10
Coastal plain aquifers	8
Glacial aquifers	8
Other bedrock formations	5
Coastal plain confining units	1
Glacial confining units	1

## B. SURFACE WATER FLOW CHARACTERISTICS

Select the score which reflects the annual mean flow of the affected surface water body. The most recent edition of U.S. Geological Survey 1993 (see Table 8 of Appendix C) lists the annual mean flow, in cubic feet per second, for specific water bodies. Annual mean flow information for additional water bodies is listed in Water Resources Data, New Jersey, New Jersey Geological Survey (published annually). Apply a default score of 8 if flow information is not available. Enter the score in space 64 of the score sheet.

<u>Annual Mean Flow</u>	<u>Score</u>
≤10 cubic feet per second	10
>10 to 100 cubic feet per second	8
>100 to 1,000 cubic feet per second	5
>1,000 cubic feet per second	1

## C. MIGRATION POTENTIAL

Select the score which reflects the potential for contamination to reach a surface water body. Enter the score in space 65 of the score sheet.

<u>Migration Potential</u>	<u>Score</u>
A direct physical connection has been documented between the area of contamination and the surface water body	10
Soil or ground water contamination present and no containment at contaminated areas	5
Conditions not as described above	1

## D. HYDRAULIC CONDUCTIVITY

When the potential surface water contamination is from contaminated ground water, select the score which reflects the hydraulic conductivity of the aquifer or geologic formation on which the area of contamination lies. Determine the hydraulic conductivity by referencing site specific reports, county geologic maps, or state geologic maps. Table 6 in Appendix C lists the hydraulic conductivities for most aquifers and formations in New Jersey. If hydraulic conductivities cannot be determined from Table 6, apply a default score listed below. If more than one aquifer is impacted, select the aquifer which yields the highest conductivity score. If the potential source is not from ground water, enter a 0 for the score for D. Enter the score in space 66 of the score sheet.

<u>Hydraulic Conductivity</u>	<u>Score</u>
>100 ft/day	10
>10 to 100 ft/day	8
>1 to 10 ft/day	5
>0.1 to 1 ft/day	3
≤0.1 ft/day	1

## CALCULATION

Calculate the score for Potential Surface Water Contamination Category III: Likelihood of Impact and enter it on space 67 of the score sheet.

Calculate the score for Section 3, Subsection B: Potential for Surface Water Contamination (I + II + III) and enter in on space 68 of the score sheet.

ALL REFERENCES USED TO COMPLETE THIS SECTION MUST BE FULLY IDENTIFIED IN THE SPACES PROVIDED ON THE SCORE SHEET.

## SECTION 4: SUBSURFACE GAS

Complete the Subsurface Gas section when either (1) volatile organic gases exist in the subsurface, or (2) volatile organic free product is present in soil or ground water.

If neither volatile organic subsurface gas, nor volatile organic free product exist at the site, do not complete this section. Either complete additional sections of the manual, which apply to the site being scored, or calculate the draft score on the final page of the score sheet.

## I. CONTAMINANT CHARACTERISTICS

### A. CONTAMINANT OF CONCERN

#### 1. CONTAMINANT OF CONCERN SELECTION

List in Chart 4.1 the volatile organic gases or free product and the corresponding vapor. Select the contaminant which has the highest vapor pressure at standard temperature and pressure. If more than one contaminant has the same vapor pressure, select the contaminant which has the highest Inhalation Toxicity Level as listed in "Reference Concentrations for Inhalation," NJDEPE 1994 (see Table 9 of Appendix C). Enter the contaminant of concern in space 69 of the score sheet.

#### 2. TOXICITY OF CONTAMINANT OF CONCERN

Select the score which reflects the toxicity based upon the Inhalation Toxicity Level for the selected contaminant of concern. Inhalation Toxicity Levels for specific contaminants are listed in "Unit Risk Factors for Inhalation," NJDEPE 1994 (see Table 9 of Appendix C). For contaminants which do not have inhalation toxicity level, the Department will develop a level on a case-by-case basis. Enter the inhalation toxicity score in space 70 of the score sheet.

Level	Score
Inhalation Toxicity Level 3	10
Inhalation Toxicity Level 2	5
Inhalation Toxicity Level 1	1

3. CONTAMINANT CONCENTRATION

Select the score which reflects the concentration of the contaminant of concern based on field observation of free product, or instrument readings from explosimeter, photoionization detector (PID), and organic vapor analyzer (OVA). Enter the score in space 71 of the score sheet.

Contaminant Concentration	Score
Volatile organic free product present on ground water or in subsurface soil	10
Explosimeter readings of soil gas >10% LEL	10
Explosimeter readings of soil gas 1% to 10% LEL	8
PID readings of soil gas >500 ppm	10
PID readings of soil gas >200 ppm to 500 ppm	8
PID readings of soil gas >50 ppm to 200 ppm	3
PID readings ≤50 ppm	1
OVA readings of soil gas >1000 ppm	10
OVA readings of soil gas >500 ppm to 1000 ppm	8
OVA readings of soil gas >200 ppm to 500 ppm	3
OVA readings of soil gas ≤200 ppm	1

CALCULATION

Calculate the score for Subsurface Gas Category I: Contaminant Source Status and enter it on space 72 of the score sheet.

II. RECEPTORS

A. DISTANCE TO OCCUPIED BUILDING

Select the score which reflects the shortest distance between point of subsurface gas of free product detection and the nearest occupied building which has a basement. If it is unknown whether or not a building has a basement, score the site under this section as if a basement exists. Enter the score in space 73 of the score sheet.

Distance	Score
≤100 feet	10
>100 feet to 200 feet	8
>200 feet to 500 feet	3
>500 feet to 1,000 feet	1
>1,000 feet	0

B. ZONING

Select the score for the land use zoning at and adjacent to the site. Zoning information can be obtained from local zoning officials. If the zoning in the area of the site includes more than one zoning classification, assign a score based on the classification which yields the highest score. For example, a site which is zoned industrial with adjacent

property which is zoned residential would be assigned a score of "10" based on the residential zoning. Enter the score in space 74 of the score sheet.

Zoning	Score
Residential/recreational	10
Commercial	8
Agricultural/rural	3
Industrial	1

CALCULATION

Calculate the score for Subsurface Gas Category II: Receptors and enter the score on space 75 of the score sheet.

III. LIKELIHOOD OF IMPACT

A. DEPTH TO AQUIFER OF CONCERN

Select the score for the depth of the aquifer of concern by measuring the shortest vertical distance from the ground surface to the depth of the saturated zone of the first water table in the area where free product or volatile organic gas was detected. If there are no on-site data indicating the depth to the aquifer of concern, refer to well logs, soil boring logs, or geologic and soil survey reports for the area where the site is located. Enter the score in space 76 of the score sheet.

Depth	Score
≤10 feet	10
>10 to 20 feet	8
>20 to 50 feet	3
>50 feet	1

B. SOIL PERMEABILITY

Select the score which reflects the soil permeability based upon the type of soil for the area where the site is located. If no site specific information is available, determine the type of soil based on soil survey reference information compiled by the U.S. Department of Agriculture, Soil Conservation Service. If there is more than one soil type in the area where the site is located, select the score based on the permeability which yields the highest score. Enter the score in space 77 of the score sheet.

Type of Soil	Score
Highly fractured/cavernous limestone and dolostone (karst topographical regions)	10
Gravel, coarse sand, coarse stratified drift, highly fractured metamorphic and highly vesicular igneous rock (including basalt and diabase), highly fractured shale and sandstone, moderately fractured/cavernous limestone and dolostone	8
Slightly to moderately fractured metamorphic and moderately vesicular igneous rock (including basalt and diabase), slightly to moderately fractured shale and sandstone, slightly fractured limestone and dolostone, man-made conduits	5

<u>Type of Soil</u>	<u>Score</u>
Silty sand, sandy clay, sandy loam, fine sand, loamy sand, coarse till, fine to medium stratified drift, silt, silty clay, silty loam, loess, clay loam, moderately permeable till	3
Clay, compact till	1

**CALCULATION**

Calculate the score for Subsurface Gas Category III: Likelihood of Impact and enter it on space 78 of the score sheet.

Calculate the total score for Section 4: Subsurface Gas: (I+II+III) and enter in on space 79 of the score sheet.

**ALL REFERENCES USED TO COMPLETE THIS SECTION MUST BE FULLY IDENTIFIED IN THE SPACES PROVIDED ON THE SCORE SHEET.**

**REFERENCES**

Allard, B. et al., 1977. Adsorption of Long Lived Radionuclides in Clay and Bedrock. Part 1. Determination of Distribution Coefficients, KBS Technical Report 55.

Long, E.R. et al., 1995. Incidence of Adverse Biological Effects Within Ranges of Chemical Concentrations in Marine and Estuarine Sediments. Environmental Management, Vol. 19, No. 1 pp. 81-97.

NJDEPE. 1994. Unit Risk Factors for Inhalation. Air Quality Regulation Program, Bureau of Air Quality Evaluation, Trenton, New Jersey.

NJDEPE. 1994. Reference Concentrations for Inhalation. Air Quality Regulation Program, Bureau of Air Quality Evaluation, Trenton, New Jersey.

Research Triangle Institute, 1992. Preliminary Soil Action Level for Superfund Sites, Draft Interim Report. EPA Contract 68-W1-0021.

Bioaccumulative Chemicals of Concern, USEPA, 40 C.F.R. Parts 9, 122, 123, 131 Final Water Quality Guidance for the Great Lakes System; final rule, March 23, 1995.

USEPA. 1990. Basics of Pump and Treat Ground Water Remediation Technology. EPA-600/8-90/003.

U.S. Geological Survey. 1993. Water Resources Data, New Jersey, Water Year 1992. U.S.G.S. Water Data Report NJ-92-1.

APPENDIX B

REMEDIAL PRIORITY SYSTEM SCORE SHEET

GENERAL SITE INFORMATION:

SITE NAME: \_\_\_\_\_

AKA: \_\_\_\_\_

ADDRESS \_\_\_\_\_

MUNICIPALITY: \_\_\_\_\_ COUNTY: \_\_\_\_\_

BLOCK: \_\_\_\_\_ LOT: \_\_\_\_\_

CSL ID NO: N J - - - - -

DRAFT SCORE:  DATE: \_\_\_\_\_

EVALUATOR: \_\_\_\_\_

Date of Remedial Priority System Site Inspection \_\_\_\_\_

INSPECTOR: \_\_\_\_\_

FINAL SCORE:  DATE: \_\_\_\_\_

EVALUATOR: \_\_\_\_\_

COMMENTS:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

PLEASE ATTACH ADDITIONAL PAGES AS NECESSARY

**SECTION 1: SOIL CONTAMINATION**

**I. CONTAMINANT CHARACTERISTICS**

**A. CONTAMINANTS OF CONCERN**

**1. CONTAMINANTS OF CONCERN SELECTION**

**CHART 1.1**

ANALYTICAL CATEGORIES/ CONTAMINANTS	REF. #*	DATA (ppm)**	HEALTH-BASED SOIL RANKING CRITERIA (ppm)	CRITERIA EXCEEDANCE**
VOLATILE ORGANIC				
SEMI-VOLATILE ORGANIC				
INORGANIC				
PESTICIDE/HERBICIDE/PCB				
DIOXIN				
RADIONUCLIDE				

\* If more than one reference is used to complete this section footnote each reference in the order that they are used.

\*\* Use "FP" to indicate the presence of free product.

2. CONTAMINANT CONCENTRATION

CHART 1.2

CHEMICAL FRACTION	CONTAMINANT	CONCENTRATION (ppm)	RES. DIRECT CONTACT RANKING CRITERIA	CONCENTRATION SCORE
VOLATILE ORGANIC				
SEMI-VOLATILE ORGANIC				
INORGANIC				
PESTICIDE/HERBICIDE/PCB				
DIOXIN				
RADIONUCLIDE				
<b>TOTAL CONTAMINANT CONCENTRATION SCORE</b>	////////// //////////	////////// //////////	////////// //////////	1. _____

B. CONTAMINANTS OF CONCERN—PETROLEUM HYDROCARBONS

1. CONTAMINANTS OF CONCERN SELECTION

CHART 1.1A

TYPES OF PETROLEUM HYDROCARBON CONTAMINATION	* REF. #	DATA	ACTION LEVEL	ACTION LEVEL EXCEEDANCE
Fuel Oil #2, Diesel Fuel				
Fuel Oils Nos. 4 & 6, Hydraulic/cutting/crude & lubricating oils				
Waste Oil				

2. CONTAMINANT CONCENTRATION

CHART 1.2A

SELECTED PETROLEUM CONTAMINANT	CONCENTRATION	TOTAL CONCENTRATION SCORE
		1. _____

SCORE

C. Contaminant Source Status (reference reports submitted \*[and]\* \*or\* Department approval letter if a score of "0" is recorded) 2 \_\_\_\_\_

D. Bioaccumulation Factor \_\_\_\_\_ (contaminant) 3 \_\_\_\_\_

Calculation for Soil Contamination Category I:  
 Contaminant Characteristics (1 + 2 + 3) x equalization multiplier  
 ( \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_ ) x 8.33 4 \_\_\_\_\_

References: (include name and date of all reports, sampling episodes, permits, inspections, site visits, departmental actions used to score the site. Include specific reference to page numbers, tables figures, appendices, etc)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**II. RECEPTORS**

**SCORE**

A. Zoning at or adjacent to the site \_\_\_\_\_ 5 \_\_\_\_\_  
(zoning)

B. Natural Resources \_\_\_\_\_ 6 \_\_\_\_\_

\_\_\_\_\_ (briefly describe \*[designated natural resource]\* \*environmentally sensitive area\*)

Calculation for Soil Contamination Category II: Receptors  
(5 + 6) × equalization multiplier  
(\_\_\_\_\_ + \_\_\_\_\_) × 16.67

II: 7 \_\_\_\_\_

References: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**III. LIKELIHOOD OF IMPACT**

**SCORE**

A. Distance from \_\_\_\_\_ to \_\_\_\_\_ 8 \_\_\_\_\_  
(sample point) (occupied area/natural resource)  
is \_\_\_\_\_  
(distance)

B. Likelihood of access \_\_\_\_\_ 9 \_\_\_\_\_

\* \_\_\_\_\_  
\_\_\_\_\_  
(supporting rational)\*

C. Potential for air migration \_\_\_\_\_ 10 \_\_\_\_\_

\* \_\_\_\_\_  
\_\_\_\_\_  
(supporting rational)\*

Calculation for Soil Contamination Category III: Likelihood of Impact  
(8 + 9 + 10) × equalization multiplier  
(\_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_) × 11.11

III: 11 \_\_\_\_\_

References: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**SECTION 1:  
CALCULATION FOR TOTAL SOIL CONTAMINATION SCORE:**

4. + 7. + 11.

( \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_ ) [× 0.5\*]

SECTION 1 SCORE: 12 \_\_\_\_\_

**\*If depth of soil contamination is 6 inches or more below the ground surface, \*or if the soil contamination is beneath paved or impervious surface,\* multiply Section 1: Soil Contamination score by 0.5.**

Enter the score for Section 1 Soil Contamination on the final page of the score sheet.

**SECTION 2: GROUND WATER CONTAMINATION**

**SUBSECTION A: DOCUMENTED CONTAMINATION**

**I. CONTAMINANT CHARACTERISTICS**

**A. CONTAMINANTS OF CONCERN**

**1. CONTAMINANTS OF CONCERN SELECTION**

**CHART 2.A.1**

ANALYTICAL CATEGORIES/ CONTAMINANTS	REF. #**	DATA (ppb) **	HEALTH-BASED GROUND WATER QUALITY CRITERIA (ppb)	CRITERIA EXCEEDANCE**
VOLATILE ORGANIC				
SEMI-VOLATILE ORGANIC				
INORGANIC				
PESTICIDE/HERBICIDE/PCB				
DIOXIN				
RADIONUCLIDE				

\* If more than one reference is used to complete this section footnote each reference in the order that they are used.

\*\* Use "FP" to indicate the presence of free product.

2. CONTAMINANT CONCENTRATION

CHART 2.A.2

CHEMICAL FRACTION	CONTAMINANTS	DATA (ppb)**	GROUND WATER QUALITY CRITERIA (ppb)	CONCENTRATION SCORE
VOLATILE ORGANIC				
SEMI-VOLATILE ORGANIC				
INORGANIC				
PESTICIDE/HERBICIDE/PCB				
DIOXIN				
RADIONUCLIDE				
TOTAL CONTAMINANT CONCENTRATION SCORE	//////////////////// ////////////////////	////////// //////////	//////////////////// ////////////////////	13. _____

\*\* Use "FP" to indicate the presence of free product.

SCORE

B. Contaminant Source Status (reference reports submitted \*[and]\* \*or\* Department approval letter if a score of "0" is recorded)

14 \_\_\_\_\_

C. Contaminant mobility

CHART 2.A.3

CHEMICAL FRACTION	CONTAMINANTS	SOLUBILITY SCORE	DISTRIBUTION COEFFICIENT SCORE
VOLATILE ORGANIC			//////////////////// ////////////////////
SEMI-VOLATILE ORGANIC			//////////////////// ////////////////////
PESTICIDE/HERBICIDE/PCB			//////////////////// ////////////////////
DIOXIN			//////////////////// ////////////////////
INORGANIC		//////////////////// ////////////////////	
RADIONUCLIDE		//////////////////// ////////////////////	

15 \_\_\_\_\_

Calculation for Ground Water Contamination Category I:

Contaminant Characteristics = (13 + 14 + 15) × equalization multiplier  
 ( \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_ ) × 8.33

I: 16 \_\_\_\_\_

References: (include name and date of all reports, sampling episodes, permits, inspections, site visits, departmental actions used to score the site).

**II. RECEPTORS**

**SCORE**

Chart 2.A.4.

AQUIFER	CLASSIFICATION

A. Ground water classification \_\_\_\_\_ 17 \_\_\_\_\_

B. Type of usage \_\_\_\_\_ 18 \_\_\_\_\_  
 (specifically identify)

C. Natural resources \_\_\_\_\_ 19 \_\_\_\_\_

\_\_\_\_\_ (briefly describe \*[designated natural resource]\* \*environmentally sensitive area\*)

**Calculation for Ground Water Contamination Category II:**

**Receptors = (17 + 18 + 19) × equalization multiplier**  
 (\_\_\_\_ + \_\_\_\_ + \_\_\_\_ ) × 11.11

**II: 20 \_\_\_\_\_**

References: \_\_\_\_\_

**III. LIKELIHOOD OF IMPACT**

**SCORE**

A. Distance between \_\_\_\_\_ and \_\_\_\_\_  
 (point of gw cont.) (usage/natural resource)  
 is \_\_\_\_\_ 21 \_\_\_\_\_  
 (distance)

B. Hydraulic conductivity \_\_\_\_\_ 22 \_\_\_\_\_  
 (aquifer and hydraulic conductivity)

**Calculate the score for Category III: Likelihood of Impact**

**(21 + 22) × equalization multiplier**  
 (\_\_\_\_ + \_\_\_\_ ) × 16.67

**III: 23 \_\_\_\_\_**

References: \_\_\_\_\_

---

**CALCULATION FOR GROUND WATER—DOCUMENTED CONTAMINATION:**

16 + 20 + 23

\_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_

**Section 2 Score**    24 \_\_\_\_\_

Enter the score for Documented Ground Water Contamination on the final page of the score sheet.

\*[If both the Documented and the Potential Ground Water Contamination sections are scored, utilize the section which yields the highest score.]\*

**SECTION 2: GROUND WATER CONTAMINATION**

**SUBSECTION B—POTENTIAL GROUND WATER CONTAMINATION**

**I. CONTAMINANT CHARACTERISTICS**

**A. CONTAMINANTS OF CONCERN**

**1. CONTAMINANTS OF CONCERN**

**CHART 2.B.1:**

ANALYTICAL CATEGORIES/ CONTAMINANTS	REF. **	DATA (ppm)**	IMPACT TO GROUND WATER SOIL RANKING CRITERIA (ppm)	CRITERIA EXCEEDANCE**
VOLATILE ORGANIC				
SEMI-VOLATILE ORGANIC				
INORGANIC				
PESTICIDE/HERBICIDE/PCB				
DIOXIN				
RADIONUCLIDE				

\*. If more than one reference is used to complete this section footnote each reference in the order that they are used.

\*\* Use "FP" to indicate the presence of free product.

2. CONTAMINANT CONCENTRATION

CHART 2.B.2

CHEMICAL FRACTION	CONTAMINANT	CONCENTRATION (ppm)**	IMPACT TO GROUND WATER SOIL RANKING CRITERIA	CONCENTRATION SCORE
VOLATILE ORGANIC				
SEMI-VOLATILE ORGANIC				
INORGANIC				
PESTICIDE/HERBICIDE/PCB				
DIOXIN				
RADIONUCLIDE				
TOTAL CONTAMINANT CONCENTRATION SCORE	/////////////////	/////////////////	/////////////////	25. _____

\*\* Use "FP" to indicate the presence of free product.

B. Contaminant mobility

CHART 2B3

CHEMICAL FRACTION	CONTAMINANT	SOLUBILITY	DISTRIBUTION COEFFICIENT
VOLATILE ORGANIC			/////////////////
SEMI-VOLATILE ORGANIC			/////////////////
PESTICIDE/HERBICIDE/PCB			/////////////////
DIOXIN			/////////////////
INORGANIC		/////////////////	
RADIONUCLIDE		/////////////////	

26 \_\_\_\_\_

Calculation for Potential Ground Water Contamination Category I:  
 Contaminant Characteristics = (25 + 26) × equalization multiplier  
 (\_\_\_\_ + \_\_\_\_ ) × 5.56

I: 27 \_\_\_\_\_

References: (include name and date of all reports, sampling episodes, permits, inspections, site visits, departmental actions used to score the site).

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**II. RECEPTORS**

**SCORE**

Chart 2.A.4

AQUIFER	CLASSIFICATION

A. Ground water classification \_\_\_\_\_ 28 \_\_\_\_\_  
 (classification)

B. Type of usage \_\_\_\_\_ 29 \_\_\_\_\_  
 (specifically identify)

C. Natural resources \_\_\_\_\_ 30 \_\_\_\_\_

\_\_\_\_\_ (briefly describe \*[designated natural resource]\* \*environmentally sensitive area\*)

**Calculation for Potential Ground Water Contamination Category II:**

Receptors = (28 + 29 + 30) × equalization multiplier  
 (\_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_) × 5.55 **II: 31** \_\_\_\_\_

References: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**III. LIKELIHOOD OF IMPACT**

A. Distance between \_\_\_\_\_ and \_\_\_\_\_  
 (point of GW cont.) (usage/natural resource)  
 is \_\_\_\_\_ 32 \_\_\_\_\_  
 (distance)

B. Hydraulic conductivity \_\_\_\_\_ 33 \_\_\_\_\_  
 (aquifer/geologic formation and hydraulic conductivity)

C. Depth to aquifer of concern \_\_\_\_\_ 34 \_\_\_\_\_  
 (depth)

**Calculate for Potential Ground Water Contamination Category III:**

Likelihood of Impact = (32 + 33 + 34) × equalization multiplier  
 (\_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_) × 5.56 **III: 35** \_\_\_\_\_

References: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**TOTAL CALCULATION FOR GROUND WATER—POTENTIAL CONTAMINATION:**

27 + 31 + 35

\_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_

**SECTION 2 SCORE**      36 \_\_\_\_\_

Enter the score for Potental Ground Water Contamination on Page 22 of the score sheet.

\*[If both the Documented and the Potential Ground Water Contamination sections are scored, utilize the section which yields the highest score.]\*

**SECTION 3: SURFACE WATER AND SEDIMENT CONTAMINATION**

**SUBSECTION A—DOCUMENTED SURFACE WATER CONTAMINATION**

**I. CONTAMINANT CHARACTERISTICS**

**A. CONTAMINANTS OF CONCERN FOR SURFACE WATER**

**1. CONTAMINANTS OF CONCERN SELECTION**

**CHART 3.A.1**

ANALYTICAL CATEGORIES/ CONTAMINANTS	REF. #**	DATA (ppb)**	HEALTH/AQUATIC BASED SWQS (ppb)	CRITERIA EXCEEDANCE**
VOLATILE ORGANIC				
SEMI-VOLATILE ORGANIC				
INORGANIC				
PESTICIDE/HERBICIDE/PCB				
DIOXIN				
RADIONUCLIDE				

\* If more than one reference is used to complete this section footnote each reference in the order that they are used.

\*\* Use "FP" to indicate the presence of free product.

2. CONTAMINANT CONCENTRATION

CHART 3.A.2

CHEMICAL FRACTION	CONTAMINANT	CONCENTRATION	SWQS (ppb)	CONCENTRATION SCORE
VOLATILE ORGANIC				
SEMI-VOLATILE ORGANIC				
INORGANIC				
PESTICIDE/HERBICIDE/PCB				
DIOXIN				
RADIONUCLIDE				
TOTAL CONTAMINANT CONCENTRATION SCORE	//////////////////// ////////////////////	//////////////////// ////////////////////	//////// ////////	37 _____

A3. Contaminant source status \*(reference reports submitted or Department approval letter if a score of "0" is recorded)\* 38 \_\_\_\_\_

A4. Bioaccumulation \_\_\_\_\_ 39 \_\_\_\_\_  
(contaminant)

Calculation for Factor A:  
Contaminant Characteristics Surface Water = (37 + 38 + 39) \_\_\_\_\_ 40 \_\_\_\_\_  
\_\_\_\_\_ + \_\_\_\_\_

\*[If both the Documented and the Potential Ground Water Contamination sections are scored, utilize the section which yields the highest score.]\*

B. CONTAMINANTS OF CONCERN—SEDIMENT

1. CONTAMINANT OF CONCERN SELECTION—SEDIMENT

CHART 3.A.3

ANALYTICAL CATEGORIES/CONTAMINANTS	REF. #*	DATA (ppb)	NOAA ER-L VALUES (ppb)	CRITERIA EXCEEDENCE
VOLATILE ORGANIC				
SEMI-VOLATILE ORGANIC				

ANALYTICAL CATEGORIES/ CONTAMINANTS	REF. #*	DATA (ppb)	NOAA ER-L VALUES (ppb)	CRITERIA EXCEEDENCE
INORGANIC				
PESTICIDE/HERBICIDE/PCB				
DIOXIN				
RADIONUCLIDE				

\* If more than one reference is used to complete this section footnote each reference in the order that they are used.

CHART 3.A.4

CHEMICAL FRACTION	CONTAMINANT	CONCENTRATION	VALUES (ppm)	CONCENTRATION SCORE
VOLATILE ORGANIC				
SEMI-VOLATILE ORGANIC				
INORGANIC				
PESTICIDE/HERBICIDE/PCB				
DIOXIN				
RADIONUCLIDE				
TOTAL CONTAMINANT CONCENTRATION SCORE	//////////////////// ////////////////////	//////////////////// ////////////////////	//////// ////////	41 _____

SCORE

B3. Contaminant source status (reference reports submitted \*[and the]\* \*or\* Department approval\*s letter if a score of "0" is recorded)\* 42 \_\_\_\_\_

B4. Bioaccumulation \_\_\_\_\_ 43 \_\_\_\_\_  
(contaminant)

Calculation for Factor B: Contaminant Concentration Sediment =

$$\frac{41 + 42 + 43}{\quad + \quad + \quad}$$

B: 44 \_\_\_\_\_

References: (include name and date of all reports, sampling episodes, permits, inspections, site visits, departmental actions used to score the site).

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Calculation for Surface Water Contamination Category I:

CONTAMINANT CHARACTERISTICS = (40 + 44) × equalization factor  
 ( \_\_\_\_\_ + \_\_\_\_\_ ) × 4.16

45 \_\_\_\_\_

II. RECEPTORS

SCORE

CHART 3.A.5

SURFACE WATER BODY	*[CLASSIFICATION]* *CATEGORY*

A. Surface water \*[classification]\* \*category\* \_\_\_\_\_  
 (\*[classification]\* \*category\*)

46 \_\_\_\_\_

B. Type of usage \_\_\_\_\_  
 (specifically identify)

47 \_\_\_\_\_

C. Natural resources \_\_\_\_\_  
 (describe \*[natural resource area]\* \*environmentally sensitive area\*)

48 \_\_\_\_\_

Calculation for Surface Water Contamination Category II:

Receptors = (46 + 47 + 48) × equalization multiplier  
 ( \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_ ) × 11.11

II: 49 \_\_\_\_\_

References: \_\_\_\_\_

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III. LIKELIHOOD OF IMPACT

A. Distance from \_\_\_\_\_ and \_\_\_\_\_  
 (sw collection point) (usage/natural resource)

is \_\_\_\_\_  
 (distance)

50 \_\_\_\_\_

B. Surface water flow characteristics \_\_\_\_\_  
 (surface water body/flow rate)

51 \_\_\_\_\_

**Calculation for Documented Surface Water Contamination Category III:**

$$\text{Likelihood of Impact} = (50 + 51) \times \text{equalization multiplier}$$

$$(\text{---} + \text{---}) \times 8.33$$

III: 52 \_\_\_\_\_

References: \_\_\_\_\_

**TOTAL CALCULATION FOR SURFACE WATER DOCUMENTED CONTAMINATION:**

$$45 + 49 + 52$$

\_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_      **SECTION 3 SCORE**      53 \_\_\_\_\_

Enter the score for the Documented Surface Water Contamination Section 3 on the final page of the score sheet. \*[Please note that if both the Documented and the Potential Ground Water Contamination sections are scored, utilize the section which yields the highest score.]\*

**SECTION 3: SURFACE WATER AND SEDIMENT CONTAMINATION**

**SUBSECTION B—POTENTIAL SURFACE WATER CONTAMINATION**

**I. CONTAMINANT CHARACTERISTICS**

**A. CONTAMINANTS OF CONCERN**

**1. SELECTION OF CONTAMINANTS OF CONCERN**

**CHART 3.B.1**

ANALYTICAL CATEGORIES/ CONTAMINANTS	REF. #**	DATA (ppm/ppb)**)	STANDARD/ CRITERIA	CRITERIA EXCEEDENCE**
VOLATILE ORGANIC				
SEMI-VOLATILE ORGANIC				
INORGANIC				
PESTICIDE/HERBICIDE/PCB				
DIOXIN				
RADIONUCLIDE				

\* If more than one reference is used to complete this section footnote each reference in the order that they are used.

\*\* Use "FP" to indicate the presence of free product.

2. CONTAMINANT CONCENTRATION

CHART 3.B.2

CHEMICAL FRACTION	CONTAMINANT	DATA (ppm/ppb)	RES. DIRECT CONTACT SOIL RANKING CRITERIA (ppb)	CONCENTRATION SCORE
VOLATILE ORGANIC				
SEMI-VOLATILE ORGANIC				
INORGANIC				
PESTICIDE/HERBICIDE/PCB				
DIOXIN				
RADIONUCLIDE				
TOTAL CONTAMINANT CONCENTRATION SCORE	////////////////	////////	////////////////////////////////	54 _____

B. Contaminant mobility

CHART 3B3:

CHEMICAL FRACTION	CONTAMINANT	SOLUBILITY SCORE	DISTRIBUTION COEFFICIENT SCORE
VOLATILE ORGANIC			////////////////
SEMI-VOLATILE ORGANIC			////////////////
PESTICIDE/HERBICIDE/PCB			////////////////
DIOXIN			////////////////
INORGANIC		////////////////	
RADIONUCLIDE		////////////////	

55 \_\_\_\_\_

C. Bioaccumulation factor \_\_\_\_\_  
(contaminant)

56 \_\_\_\_\_

Calculation for Potential Surface Water Contamination Category I:

Contaminant Characteristics = (54 + 55 + 56) × equalization multiplier  
(\_\_\_\_\_ + \_\_\_\_\_) × 4.16

I: 57 \_\_\_\_\_

References: (include name and date of all reports, sampling episodes, permits, inspections, site visits, departmental actions used to score the site).

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**II. RECEPTORS**

**CHART 3.B.5**

SURFACE WATER BODY	*[CLASSIFICATION]* *CATEGORY*

- A. Surface Water \*[Classification]\* \*Category\* \_\_\_\_\_ 58 \_\_\_\_\_  
 (\*[classification]\* \*category\*)
- B. Type of usage \_\_\_\_\_ 59 \_\_\_\_\_  
 (type of usage)
- C. Natural resources \_\_\_\_\_ 60 \_\_\_\_\_  
 (describe \*[natural resource area]\* \*environmentally sensitive area\*)
- D. Overland distance from \_\_\_\_\_ to \_\_\_\_\_  
 (point of detection) (point of entry)  
 is \_\_\_\_\_ 61 \_\_\_\_\_  
 (distance)

**Calculation for Potential Surface Water Contamination Category II:**  
**Receptors = (58 + 59 + 60 + 61) × equalization multiplier**

( \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_ ) × 4.17 II: 62 \_\_\_\_\_

References: \_\_\_\_\_

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**III. LIKELIHOOD FOR IMPACT**

- A. Distance from \_\_\_\_\_ to \_\_\_\_\_  
 (point of detection) (usage/natural resource)  
 is \_\_\_\_\_ 63 \_\_\_\_\_  
 (distance)
- B. Surface water flow characteristics \_\_\_\_\_ 64 \_\_\_\_\_  
 (surface water body/flow rate)
- C. Migration potential \_\_\_\_\_ 65 \_\_\_\_\_

D. Hydraulic conductivity \_\_\_\_\_ 66 \_\_\_\_\_  
 (aquifer/hydraulic conductivity/geologic formation)

**Calculate for Potential Surface Water Contamination Category III:**

**Likelihood of Impact = (63 + 64 + 65 + 66) × equalization multiplier**

( \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_ ) × 4.17                      **III: 67** \_\_\_\_\_

References: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**CALCULATION FOR SURFACE WATER—POTENTIAL CONTAMINATION:**

**57 + 62 + 67**

\_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_ = Section 3 Score                      68 \_\_\_\_\_

Enter the score for \*[Documented]\* **\*Potential\*** Surface Water Contamination Section 3 on the final page of the score sheet.

\*[Please note that if both the Documented and the Potential Ground Water Contamination sections are scored, utilize the section which yields the highest score.]\*

**SECTION 4: SUBSURFACE GAS**

**I. CONTAMINANT CHARACTERISTICS**

**A. CONTAMINANTS OF CONCERN**

**1. SELECTION OF CONTAMINANTS OF CONCERN**

**CHART 1**

ANALYTICAL CATEGORIES/ CONTAMINANTS	VAPOR PRESSURE
VOLATILE ORGANIC	
Contaminant of concern	69. _____

\* If more than one reference is used to complete this section footnote each reference in the order that they are used.

B. Toxicity \_\_\_\_\_ (toxicity) 70 \_\_\_\_\_

C. Contaminant concentration \_\_\_\_\_ (instrument & reading) 71 \_\_\_\_\_

**Calculation for Subsurface Gas Category I: Contaminant Characteristics = (70 + 71) × equalization multiplier**  
 (\_\_\_\_ + \_\_\_\_ ) × 16.67 **I: 72 \_\_\_\_\_**

References: (include the name and date of all reports, sampling episodes, inspections, site visits, permits utilized to score the site).

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**II. RECEPTORS** **SCORE**

A. Distance from \_\_\_\_\_ to \_\_\_\_\_  
 (point of detection) (occupied building)  
 is \_\_\_\_\_ 73 \_\_\_\_\_  
 (distance)

B. Zoning \_\_\_\_\_ 74 \_\_\_\_\_



FINAL CALCULATION SHEET FOR THE REMEDIAL PRIORITY SYSTEM SCORE

SECTION	SECTION SCORE
SECTION 1: SOIL CONTAMINATION	
SECTION 2: GROUND WATER	
SECTION 3: SURFACE WATER AND SEDIMENT	
SECTION 4: SUBSURFACE GAS	

Place the section score from Chart 1 above in the equation below and calculate the total score for the site.

\*[EQUATION FOR CALCULATING TOTAL SCORE:

$$\sqrt{\frac{\text{_____}^2 + \text{_____}^2 + \text{_____}^2 + \text{_____}^2}{n}} = \text{_____}$$

n = number of sections utilized]\*

\*EQUATION FOR CALCULATING TOTAL SCORE:

$$\frac{\text{Section 1} + \text{Section 2} + \text{Section 3} + \text{Section 4}}{4} = \underline{\underline{\text{TOTAL SCORE*}}}$$

SCORE: \_\_\_\_\_

DATE \_\_\_\_\_

## APPENDIX C

## REMEDIAL PRIORITY SYSTEM REQUIREMENTS

The Remedial Priority System Requirements are to be used in conjunction with the Remedial Priority System Manual. This reference is a compilation of information which is required to complete a Remedial Priority System score.

TABLE 1  
SOIL RANKING CRITERIA (mg/kg)

<u>Chemical Name</u>	<u>CAS No.</u>	<u>Residential Direct Contact Soil Ranking Criteria</u>	<u>Health-Based Soil Ranking Criteria</u>	<u>Impact to Ground water Soil Ranking Criteria</u>
Acenaphthene	83-32-9	3400	3400	100
Acetone	67-64-1	1000	1000	100
Acrylonitrile	107-13-1	1	1	1
Aldrin	309-00-2	0.04	0.04	50
Anthracene	120-12-7	10000. <sup>1</sup>	-	100
Antimony	7440-36-0	14	14	-
Arsenic	7440-38-2	20	0.4	-
Barium	7440-39-3	700	700	-
Benzene	71-43-2	3	3	1
Benzo(a)anthracene	56-55-3	0.9	0.9	500
Benzo(a)pyrene	50-32-8	0.66	0.09	100
Benzo(b)fluoranthene	205-99-2	0.9	0.9	50
Benzo(k)fluoranthene	207-08-9	0.9	0.9	500
Benzyl Alcohol	100-51-6	10000. <sup>1</sup>	-	50
Beryllium	7440-41-7	1	0.2	-
BHC (gamma) (Lindane)	58-89-9	0.52	0.52	50
Bis(2-chloroethyl) ether	111-44-4	0.66	0.62	10
Bis(2-chloroisopropyl) ether	39638-32-9	2300	2300	10
Bis(2-ethylhexyl) phthalate	117-81-7	49	49	100
Bromodichloromethane	75-27-4	11	11	1
Bromoform	75-25-2	86	86	1
Bromomethane	74-83-9	79	79	1
2-Butanone (MEK)	78-93-3	1000	1000	50
Butylbenzyl phthalate	85-68-7	1100	1100	100
Cadmium	7440-43-9	1	1	-
Carbon tetrachloride	56-23-5	2	2	1
4-Chloroaniline	106-47-8	230	230	-
Chlorobenzene	108-90-7	37	37	1
Chloroform	67-66-3	19	19	1
p-Chloro-m-cresol	59-50-7	10000. <sup>1</sup>	-	100
Chloromethane	74-87-3	520	520	10
2-Chlorophenol	95-57-8	280	280	10
Chrysene	218-01-9	9	9	500
Copper	7440-50-8	600	600	-
Cyanide	57-12-5	1100	1100	-
4,4'-DDD	72-54-8	3	3	50
4,4'-DDE	72-55-9	2	2	50
4,4'-DDT	50-29-3	2	2	500
Dibenz(a,h)anthracene	53-70-3	0.66	0.09	100
Dibromochloromethane	124-48-1	110	110	1
1,2-Dichlorobenzene	95-50-1	5100	5100	50
1,3-Dichlorobenzene	541-73-1	5100	5100	100
1,4-Dichlorobenzene	106-46-7	570	570	100
3,3'-Dichlorobenzidine	91-94-1	2	2	100
1,1-Dichloroethane	75-34-3	570	570	10
1,2-Dichloroethane	107-06-2	6	6	1
1,1-Dichloroethene	75-35-4	8	8	10
1,2-Dichloroethene (cis)	540-59-5	79	79	1

Chemical Name	CAS No.	Residential Direct Contact Soil Ranking Criteria	Health-Based Soil Ranking Criteria	Impact to Ground water Soil Ranking Criteria
1,2-Dichloroethene (trans)	540-60-2	1000	1000	50
2,4-Dichlorophenol	120-83-2	170	170	10
1,2-Dichloropropane	78-87-5	10	10	-
1,3-Dichloropropene (cis and trans)	542-75-6	4	4	1
Dieldrin	60-57-1	0.042	0.042	50
Diethyl phthalate	84-66-2	10000. <sup>1</sup>	-	50
2,4-Dimethyl phenol	105-67-9	1100	1100	10
Dimethyl phthalate	131-11-3	10000. <sup>1</sup>	-	50
Di-n-butyl phthalate	84-74-2	5700	5700	100
Di-n-octyl phthalate	117-84-0	1100	1100	100
2,4-Dinitrophenol	51-28-5	110	110	10
Dinitrotoluene (2,4-/2,6- mixture)	25321-14-6	1	1	10
Endosulfan	115-29-7	340	340	50
Endrin	72-20-8	17	17	50
Ethylbenzene	100-41-4	1000	1000	100
Fluoranthene	206-44-0	2300	2300	100
Fluorene	86-73-7	2300	2300	100
Heptachlor	76-44-8	0.15	0.15	50
Hexachlorobenzene	118-74-1	0.66	0.42	100
Hexachlorobutadiene	87-68-3	1	1	100
Hexachlorocyclopentadiene	77-47-4	400	400	100
Hexachloroethane	67-72-1	6	6	100
Indeno(1,2,3-cd)pyrene	193-39-5	0.9	0.9	500
Isophorone	78-59-1	1100	1100	50
Lead	7439-92-1	400	400	-
Mercury	7439-97-6	14	14	-
2-Methylphenol	95-48-7	2800	2800	-
4-Methylphenol	106-44-5	2800	2800	-
Methoxychlor	72-43-5	280	280	50
4-Methyl-2-pentanone(MIBK)	108-10-1	1000	1000	50
Methylene chloride	75-09-2	49	49	1
Naphthalene	91-20-3	230	230	100
Nickel	7440-02-0	250	250	-
Nitrobenzene	98-95-3	28	28	10
N-Nitrosodiphenylamine	86-30-6	140	140	100
N-Nitrosodi-n-propylamine	621-64-7	0.66	0.10	10
PCB (Polychlorinated biphenyl)	1336-36-3	0.49	0.49	50
Pentachlorophenol	87-86-5	6	6	100
Phenol	108-95-2	10000. <sup>1</sup>	-	-
Pyrene	129-00-0	1700	1700	100
Selenium	7782-49-2	63	63	-
Silver	7440-22-4	110	110	-
Styrene	100-42-5	23	23	100
1,1,1,2-Tetrachloroethane	630-20-6	170	170	1
1,1,2,2-Tetrachloroethane	79-34-5	34	34	1
Tetrachloroethene	127-18-4	4	4	1
Thallium	7440-28-0	2	0	-
Toluene	108-88-3	1000	1000	500
Toxaphene	8001-35-2	0.10	0.10	50
1,2,4-Trichlorobenzene	120-82-1	68	68	100
1,1,1-Trichloroethane	71-53-6	210	210	50
1,1,2-Trichloroethane	79-00-5	22	22	1
Trichloroethene	79-01-6	23	23	1
2,4,5-Trichlorophenol	95-95-4	5600	5600	50
2,4,6-Trichlorophenol	88-06-2	62	62	10
Vanadium	7440-62-2	370	370	-
Vinyl chloride	75-01-4	2	2	10
Xylenes (Mixed)	1330-29-7	410	410	10
Zinc	7440-66-6	1500	1500	-

Health based criterion exceeds the 10,000 mg/kg maximum for total organic contaminants <sup>1</sup>  
 Reference: NJDEP, 1996. Guidance Document for the Remediation of Contaminated Soils.

<u>Petroleum Hydrocarbons</u>	<u>Action Level</u>
Crude Oil	100
Cutting Oil	100
Diesel Fuel, Fuel Oil #2	1000
Fuel Oil #4, #6	100
Hydraulic Oil	100
Lubricating Oil	100
Waste Oil	1

<sup>1</sup> Criteria is maximum allowable organic contamination.

Reference: NJDEP Technical Requirements for Site Remediation, N.J.A.C. 7:26E-2.

TABLE 2

### ADDITIONAL REQUIREMENTS FOR CONTAMINANT OF CONCERN SELECTION

The requirements outlined below are applicable to the evaluation of all analytical data used to score contaminated sites pursuant to N.J.A.C. 7:26F.

#### I. Combining Data Sets

The scorer gathers all available analytical data prior to scoring a site. Data for a site may represent several sampling events or different analytical methods. Varied analytical data may be considered together for the purpose of scoring a site if the methods used to analyze samples are comparable in terms of the types of analyses conducted and the quality assurance and quality control (QA/QC) procedures followed, or if contaminant concentrations are similar between sampling periods. If concentrations of contaminants change significantly between sampling periods, apply only the most recent available data in the scoring process. Older data is typically retained in the case file for informational purposes.

#### II. Contaminant Concentration Selection

To determine the appropriate sample concentration to apply in scoring from more than one sample, select the maximum concentration from the detected analytes within all analyzed analytical categories. The arithmetic mean, geometric mean or upper confidence limit is not appropriate for scoring purposes.

#### III. Evaluation of Contaminant Concentrations in Blank Samples

Evaluate analytical samples from the site relative to contaminant concentrations in laboratory method blank, field and trip blank samples (if available). Criteria for comparison differ based upon whether or not the analytes present are common laboratory contaminants. The evaluation of blank samples is conducted as follows:

##### A. Common Laboratory Contaminants

1. An analyte that is a common laboratory contaminant (e.g., acetone, methylene chloride, 2-butanone, phthalates) is negated if:

(a) The concentration of the laboratory contaminant in the blank sample exceeds 3 times the Contract Required Quantitation Limits (CRQL) as determined by the U.S.EPA-CLP program or the Method Detection Limit (MDL) for an analyte; or

(b) The concentration in the blank sample is acceptable, but the sample concentration is less than 3 times the blank value.

2. An analyte that is a common laboratory contaminant is accepted for scoring purposes if:

The concentration in the site sample exceeds the concentration in the blank sample by at least 3 times and the concentration in the blank is acceptable.

##### B. Uncommon Laboratory Contaminants

1. An analyte that is an uncommon laboratory contaminant (i.e., any contaminant not noted in 1 above) is negated if:

(a) Concentrations of contaminants in the blank sample exceeds the CRQL or MDL; or

(b) The concentration in the blank sample is acceptable, but the concentration in the site sample is less than 3 times the concentration in the blank sample.

2. An analyte that is an uncommon laboratory contaminant accepted for scoring purposes if:

The concentration in the blank sample is less than the CRQL/MDL, AND the concentration in the sample 3 times the blank concentration.

#### IV. Exclusion of Artifacts

Chemicals that are detected infrequently at a site may be artifacts in the data due to sampling, analytical or other problems and may not relate to site conditions. An analyte is considered an artifact and is generally not used for scoring purposes if:

1. The analyte is detected infrequently in one environmental media (e.g., 5 percent or less, 1 detect in 20 samples) and not detected at atypically elevated concentrations;

2. The analyte is not detected in other media; or

3. There is no reason to believe the chemical is present, based upon available site history.

##### V. Evaluation of Validated Data

Analytical data may be accompanied by various data qualifiers from the laboratory conducting the analyses or persons performing the data validation. These qualifiers pertain to QA/QC problems and generally indicate uncertainty regarding chemical identity, chemical concentration or both. If available, all qualifiers must be addressed before data can be used for scoring. Data with qualifiers that indicate uncertainties in concentration but not in identification may be used for scoring. Data accompanied by the "R" qualifier, which indicates uncertainties in contaminant identification, can not be used for scoring purposes.

References:

- USEPA, 1989. Risk Assessment Guidance for Superfund, Volume II, Human Health Evaluation Manual (EPA/540/1-89/001).
- NJDEP, 1990. NJDEP/DPFSR SOP for the Quality Assurance Data Validation of Analytical Deliverables—TCL Organics (based on U.S.EPA May 1990 SOW OLM01.0 with revisions).

TABLE 3

BIOACCUMULATIVE CHEMICALS OF CONCERN

Chemical Name	CAS No.
BHC (gamma)(Lindane)	58-89-9
Chlordane	57-74-9
4,4'-DDD (p,p'-DDD)	72-54-8
4,4'-DDE (p,p'-DDE)	72-55-9
4,4'-DDT (p,p'-DDT)	50-29-3
Dieldrin	60-57-1
Hexachlorobenzene	118-74-1
Hexachlorobutadiene	87-68-3
Hexachlorocyclohexane (BHC)	608-73-1
alpha-Hexachlorocyclohexane (alpha-BHC)	319-84-6
beta-Hexachlorocyclohexane (beta-BHC)	319-85-7
delta-Hexachlorocyclohexane (delta-BHC)	319-86-8
Mercury	7439-97-6
Mirex (Dechlorane)	2385-85-5
Octachlorostyrene	29082-74-4
PCB (Polychlorinated biphenyls)	1336-36-3
Pentachlorobenzene	608-93-5
Photomirex	39801-14-4
4,4'-TDE (p,p'-TDE)	—
1,2,3,4-Tetrachlorobenzene	634-66-2
1,2,4,5-Tetrachlorobenzene	95-94-3
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746-01-6
Toxaphene	8001-35-2

Reference: USEPA, March 23, 1995. Bioaccumulative Chemicals of Concern as listed by EPA in Table 6A, 40 CFR Parts 9, 122, 123, 131 and 132 Final Water Quality Guidance for the Great Lakes System; Final Rule.

TABLE 4

WATER SOLUBILITY VALUES (mg/l)

Chemical Name	CAS No.	Solubility
Acenaphthene	83-32-9	3.42E+00
Acenaphthylene	208-96-8	3.93E+00
Acetone	67-64-1	infinite

Chemical Name	CAS No.	Solubility
Acrolein	107-02-8	2.08E+05
Acrylonitrile	107-13-1	7.94E+04
Aldrin	309-00-2	1.08E-01
Anthracene	120-12-7	4.50E-02
Benzene	71-43-2	1.75E+03
Ben-zidine	92-87-5	4.00E+02
Benzo(a)anthracene	56-55-3	5.70E-03
Benzo(a)pyrene	50-32-8	1.20E-03
Benzo(b)fluoranthene	205-99-2	1.40E-02
Benzo(ghi)perylene	191-24-2	7.00E-04
Benzo(k)fluoranthene	207-08-9	4.30E-03
Benzoic acid	65-85-0	2.70E+03
Benzyl alcohol	100-51-6	8.00E+02
BHC (alpha)	319-84-6	1.63E+00
BHC (beta)	319-85-7	2.40E-01
BHC (delta)	319-86-8	3.14E+01
BHC (gamma) (Lindane)	58-89-9	7.80E+00
Bis(2-chloroethoxy)methane	111-91-1	8.10E+04
Bis(2-chloroethyl)ether	111-44-4	1.02E+04
Bis(2-chloroisopropyl)ether	108-60-1	1.70E+03
Bis(2-ethylhexyl)phthalate	117-81-7	2.85E-01
Bromodichloromethane	75-27-4	4.40E+03
Bromomethane	74-83-9	1.30E+04
2-Butanone (Methyl ethyl ketone)	78-93-3	2.68E+05
Butylbenzyl phthalate	85-68-7	4.22E+01
Carbon Disulfide	75-15-0	2.94E+03
Carbon Tetrachloride	56-23-5	7.57E+02
Chlordane	57-74-9	5.60E-01
4-Chloroaniline	106-47-8	5.30E+03
Chlorobenzene	108-90-7	4.66E+02
Chloroethane	75-00-3	5.74E+03
2-Chloroethyl vinyl ether	110-75-8	1.50E+04
Chloromethane	74-87-3	6.50E+03
2-Chloronaphthalene	91-58-7	6.74E+00
2-Chlorophenol	95-57-8	2.90E+04
4-Chlorophenylphenyl ether	7005-72-3	3.30E+00
Chrysene	218-01-9	1.80E-03
4,4'-DDD	72-54-8	1.00E-01
4,4'-DDE	72-55-9	4.00E-02
4,4'-DDT	50-29-3	5.00E-03
Dibenz(a,h)anthracene	53-70-3	5.00E-04
1,2-Dichlorobenzene	95-50-1	1.00E+02
1,3-Dichlorobenzene	541-73-1	1.23E+02
1,4-Dichlorobenzene	106-46-7	7.90E+01
3,3'-Dichlorobenzidine	91-94-1	4.00E+00
1,1-Dichloroethane	75-34-3	5.50E+03
1,2-Dichloroethane	107-06-2	8.52E+03
1,1-Dichloroethene	75-35-4	2.25E+03
1,2-Dichloroethene (cis)	540-59-0	3.50E+03
1,2-Dichloroethene (trans)	540-60-0	6.30E+03
2,4-Dichlorophenol	120-83-2	4.60E+03
1,2-Dichloropropane	78-87-5	2.70E+03
1,3-Dichloropropene (cis and trans)	542-75-6	2.80E+03
Dieldrin	60-57-1	1.95E-01
Diethyl Phthalate	84-66-2	8.96E+02
2,4-Dimethylphenol	1300-71-6	4.20E+03
Dimethylphthalate	131-11-3	4.32E+03
Di-n-butyl phthalate	84-74-2	1.30E+01
Di-n-octyl phthalate	117-84-0	3.00E+00
2,4-Dinitrophenol	51-28-5	5.60E+03
2,4-Dinitrotoluene	121-14-2	2.40E+02
2,6-Dinitrotoluene	606-20-2	1.32E+03
1,2-Diphenylhydrazine	122-66-7	1.84E+03
alpha-Endosulfan	115-29-7	1.60E-01
beta-Endosulfan	115-29-7	7.00E-02
Endosulfan sulfate	1031-07-0	1.60E-01

Chemical Name	CAS No.	Solubility
Endrin	72-20-8	2.40E-02
Ethylbenzene	100-41-4	1.52E+02
Fluoranthene	206-44-0	2.06E-01
Fluorene	86-73-7	1.69E+00
Heptachlor	76-44-8	1.80E-01
Heptachlor epoxide	1024-57-3	3.50E-01
Hexachlorobenzene	118-74-1	6.00E-03
Hexachlorobutadiene	87-68-3	1.50E-01
Hexachlorocyclopentadiene	77-47-4	2.10E+00
Hexachloroethane	67-72-1	5.00E+01
2-Hexanone (Methyl butyl ketone)	591-78-6	1.40E+04
Indeno(1,2,3-cd)pyrene	193-99-5	5.30E-04
Methoxychlor	72-43-5	3.00E-03
Methylene Chloride	75-09-2	2.00E+04
4-Methyl-2-pentanone	108-10-1	1.70E+04
2-Methylnapthalene	91-57-6	2.54E+01
Napthalene	91-20-3	3.17E+01
2-Nitroaniline	88-74-4	1.47E+04
3-Nitroaniline	99-09-2	8.90E+02
4-Nitroaniline	100-01-6	7.30E+02
Nitrobenzene	98-95-3	1.90E+03
2-Nitrophenol	88-75-5	2.10E+03
4-Nitrophenol	100-07-7	1.60E+04
Polychlorinated Biphenyl (Total)	1336-36-3	3.10E-02
Aroclor 1016	12674-11-2	4.20E-01
Aroclor 1232	11141-16-5	1.45E+00
Aroclor 1221	11104-28-2	1.50E+01
Aroclor 1242	53469-21-9	2.40E-01
Aroclor 1260	11096-82-5	2.70E-03
Aroclor 1248	12672-29-6	5.40E-02
Aroclor 1254	11097-69-1	1.20E-02
Pentachlorophenol	87-86-5	1.40E+01
Phenanthrene	85-01-8	1.00E+00
Phenol	108-95-2	9.30E+04
Pyrene	129-00-0	1.32E-01
Styrene	100-42-5	3.00E+02
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746-01-6	2.00E-04
1,1,2,2-Tetrachloroethane	79-34-5	2.90E+03
Tetrachloroethene	127-18-4	1.50E+02
Toluene	108-88-3	5.35E+02
o-Toluidine	119-93-7	7.35E+01
Toxaphene	8001-35-2	5.00E-01
1,1,1-Trichloroethane	71-55-6	1.50E+03
1,1,2-Trichloroethane	79-00-5	4.50E+03
1,2,4-Trichlorobenzene	120-82-1	3.00E+01
Trichloroethene	79-01-6	1.10E+03
2,4,5-Trichlorophenol	95-95-4	1.19E+03
2,4,6-Trichlorophenol	88-06-2	8.00E+02
Vinyl Acetate	108-05-4	2.00E+04
Vinyl Chloride	75-01-4	2.67E+03
Xylene (Mixed)	1330-20-7	1.98E+02
m-Xylene	108-38-3	1.30E+02
o-Xylene	95-47-6	1.75E+02
p-Xylene	106-42-3	1.98E+02

Reference: USEPA, 1990. Basics of Pump and Treat Ground Water Remediation Technology. EPA-600/8-90/003, Ada, Oklahoma.

TABLE 5

SOIL WATER DISTRIBUTION COEFFICIENT (ml/g)

Metal	CAS No.	Distribution Coefficient
Antimony	7440-36-0	45

Metal	CAS No.	Distribution Coefficient
Arsenic	7440-38-2	29
Beryllium	7440-41-7	250
Cadmium	7440-43-9	162
Chromium (VI)	—	8
Copper	7440-50-8	22
Lead	7439-92-1	270
Mercury	7439-97-6	152
Nickel	7440-02-0	82
Selenium	7782-49-2	43
Silver	7440-22-4	35
Thallium	7440-28-0	3200
Zinc	7440-66-6	40

  

Radionuclide	CAS No.	Distribution Coefficient
Radium	7440-14-4	40
Thorium	7440-29-1	40
Uranium	7440-61-1	2.5

References:

Allard, B., H. Kipatsi and J. Rydberg. 1977. Adsorption of long lived radionuclides in clay and bedrock. Part 1. Determination of distribution coefficients. KBS Technical Report 55.

Research Triangle Institute. 1992. Preliminary soil action level for Superfund Sites, draft interim report. Prepared for USEPA Hazardous Site Control Division, Arlington, VA. EPA Contract 68-W1-0021.

Sheppard, Marsha I. and Thibault, D.H. 1990. Default soil solid/liquid partition coefficients,  $K_d$ s, for four major soil types: a compendium. Health Physics Volume 50 No. 4.

TABLE 6  
HYDRAULIC CONDUCTIVITY VALUES FOR NEW JERSEY AQUIFERS AND GEOLOGICAL FORMATIONS (ft/day)

Geologic Age Aquifer/Geologic Formation	Hydraulic Conductivity
<u>Quaternary</u>	
Quaternary Undifferentiated	39.71
<u>Tertiary</u>	
Cohansey Formation	118.68
Kirkwood Formation	73.48
Kirkwood-Cohansey Aquifer System	102.23
Atlantic City 800-Foot Sand Aquifer	99.68
Rio Grande Water Bearing Zone	114.50
Piney Point Aquifer	65.68
Shark River Formation	54.90
Manasquan Formation*	0.008155
Vincentown Aquifer	15.10
Hornerstown Formation*	0.005882
<u>Cretaceous</u>	
Navesink Formation	0.060000
Mt. Laurel & Wenonah Formations	12.74
Mt. Laurel-Wenonah Aquifer	14.34
Wenonah Formation*	0.000050
Marshalltown Formation*	0.001744
Marshalltown-Wenonah Confining Unit*	0.001711
Englishtown Aquifer	19.06
Woodbury Formation*	0.000123
Merchantville Formation*	0.000024

Geologic Age	Hydraulic Conductivity	Geologic Age	Hydraulic Conductivity
<u>Aquifer/Geologic Formation</u>		<u>Aquifer/Geologic Formation</u>	
Merchantville-Woodbury Confining Unit*	0.000084	Stockton Formation	3.50
Magothy Formation	79.23	<u>Cambrian-Ordovician</u>	
Raritan Formation	144.32	Martinsburg Formation	0.82
Potomac Formation	163.1	Allentown Dolomite	4.16
Potomac-Raritan-Magothy Aquifer System	39.56	Kittatinny Supergroup	2.06
Lower Potomac-Raritan-Magothy Aquifer	110.93	<u>Proterozoic</u>	
Middle Potomac-Raritan-Magothy Aquifer	144.32	Pyroxene Granite	0.77
Upper Potomac-Raritan-Magothy Aquifer	79.98	Proterozoic Era Undifferentiated	3.22
<u>Jurassic</u>			
Passaic Formation	5.01		
Brunswick Aquifer	4.24		
<u>Triassic</u>			

Reference: NJDEP, 1994. New Jersey Geologic Survey.  
 \* Vertical hydraulic conductivity data used for these formations because no horizontal conductivity data was available.

TABLE 7  
 BIOLOGICAL EFFECTS VALUES IN SEDIMENT (mg/kg)

Chemical Name	CAS No.	Fresh Water		Estuarine/Marine	
		ER-L Concentration	ER-M Concentration	ER-L Concentration	ER-M Concentration
Acenaphthylene	208-96-8	-	-	0.044	0.64
Acenaphthene	83-32-9	0.15	0.65	0.016	0.5
Anthracene	120-12-7	0.085	0.96	0.085	0.1
Antimony	7440-36-0	2	25	-	-
Arsenic	7740-38-2	33	85	8.2	70
Benzo(a)anthracene	56-55-3	0.23	1.6	0.261	1.6
Benzo(a)pyrene	50-32-8	0.4	2.5	0.43	1.6
Cadmium	7440-47-9	5	9	1.2	9.6
Chlordane	57-74-9	0.0005	0.006	-	-
Chromium	7440-47-3	80	145	81	370
Chrysene	218-01-9	0.4	2.8	0.384	2.8
Copper	7440-50-8	70	390	34	270
DDT (Total)	50-29-3	-	-	0.00158	0.0461
Dibenz(a,h)anthracene	53-70-3	0.06	0.26	0.0634	0.26
Fluoranthene	206-44-0	0.6	3.6	0.6	5.1
Fluorene	86-73-7	-	-	0.019	0.54
Lead	7439-92-1	35	110	46.7	218
Mercury	7439-97-6	0.15	1.3	.15	.71
2-Methylnaphthalene	91-57-6	0.065	0.67	0.07	0.67
Napthalene	91-20-3	0.34	2.1	0.16	2.1
Nickel	7440-02-0	30	50	20.9	51.6
P'P' DDE	72-55-9	-	-	0.0022	0.027
PAH (Total)	-	4	35	4.022	44.792
PCB (Total)	1336-36-3	-	-	0.022	0.18
Phenanthrene	85-01-8	0.225	1.38	0.24	1.5
Pyrene	129-00-0	0.35	2.2	0.665	2.6
Silver	7440-22-4	1	2.2	1	3.7
Zinc	7440-66-6	120	270	150	410

References:  
 Fresh water: NOAA, 1990. The Potential for Biological Effects of Sediment Sorbed Contaminants Tested in the National Status and Trends Program.  
 Estuarine/Marine: Long, E.R. et al., 1995. Incidence of Adverse Biological Effects Within Ranges of Chemical Concentrations in Marine and Estuarine Sediments. Environmental Management Vol. 19, No. 1 pp. 81-87.

TABLE 8  
 SURFACE WATER FLOW  
 (cubic feet per second)

Water Body—Location	Annual Mean Flow, Calendar Days	Water Body—Location	Annual Mean Flow, Calendar Days
Assunpink Creek—Trenton	129	Batsto River—Batsto	134
Bass River, East Branch—New Gretna	16.5	Cooper River—Haddonfield	20.1
		Crosswicks Creek—Extonville	104
		Delaware & Raritan Canal—Port Mercer	133
		Delaware River—Belvidere	5,735
		Delaware River—Montague	4,064
		Delaware River—Port Jervis	3,599
		Delaware River—Trenton	8,574

Water Body—Location	Annual Mean Flow, Calendar Days	Water Body—Location	Annual Mean Flow, Calendar Days
Elizabeth River—Elizabeth	24	Pennsauken Creek, South Branch—Cherry Hill	13.6
Flat Brook—Flatbrookville	88.1	Pompton River—Pompton Plains	369
Great Egg Harbor River—Folsom	78.7	Raccoon Creek—Swedesboro	35.1
Green Brook—Seeley Mills	9.09	Rahway River—Rahway	51.3
Green Pond Brook—Picutinny Arsenal	8.98	Rahway River—Springfield	31.4
Green Pond Brook—Wharton	17.2	Ramapo River—Mahwah	176
Hackensack River—Riverdale	80.2	Ramapo River—Pompton Lakes	219
Hackensack River—West Nyach	40.8	Ramapo River—Suffern	127
Hackensack River—Westwood	46.1	Rancocas Creek, North Branch—Pemberton	158
Hohokus Brook—Hohokus	35.5	Raritan River—Bound Brook	933
Holland Brook—Readington	11.2	Raritan River—Raritan	276
Jumping Brook—Neptune City	8.04	Raritan River, North Branch—Far Hills	39.5
Lamington (Black) River—Pottersville	46.9	Raritan River, South Branch—Highbridge	103
Lawrence Brook—Westons Mill	42.4	Raritan River, South Branch—Manville	673
Little Ease Run—Clayton	9.7	Ringwood Creek—Wanaque	24.3
Mahwah River—N Suffern	16.8	Robinsons Branch—Rahway	27.3
Manalapan Brook—Spotswood	54.1	Rockaway River—Berkshire Valley	40.8
Manasquan River—Allenwood	73.5	Rockaway River—above Boonton Reservoir	168
Manasquan River—Squankum	59.1	Rockaway River—below Boonton Reservoir	106
Maurice River—Norma	146	Saddle River—Lodi	99.9
McDonalds Branch—Lebanon St. Forest	1.95	Saddle River—Ridgewood	27.2
Metedeconk, North Branch—Lakewood	50.6	Shark River—Neptune City	12.6
Middlebrook, West Branch—Martinsville	3.73	Shrewsbury River—Red Bank	73.9
Millstone River—Blackwell Mills	331	Stony Brook—Princeton	51.1
Mullica River—near Batsto	101	Stony Brook—Watchung	8.23
Musconetcong River—Bloomsbury	196	Swimming River—Red Bank	32.1
Neshanic River—Reaville	30.7	Third River—Passaic	18.6
Neversink River—Godeffroy	317	Toms River—Toms River	178
Oswego River—Harrisville	83.8	Wading River, West Branch—Jenkins	146
Pascack Brook—West Wood	46.1	Wanaque River—Awosting	39.6
Passaic River—Chatham	150	Whippany River—Morristown	53.4
Passaic River—Little Falls	771		
Passaic River—Millington	80.9		
Passaic River—Pine Brook	530		
Paulins Kill—Blairstown	146		
Peters Brook—Raritan	4.43		

Reference: U.S. Geological Survey, 1993. Water Resources Data, New Jersey, Water Year 1992, U.S. Geological Survey Water Data Report. NJ-92-1

TABLE 9  
INHALATION TOXICITY AND VAPOR PRESSURE (mm/mercury)

Chemical Name	CAS No.	Toxicity Level Category	Vapor Pressure
Acetaldehyde	75-07-0	2	748.0
Acetone cyanohydrin	75-86-5	1	0.8
Acetonitrile	75-05-8	1	74.0
Acetophenone	98-86-2	2	1.0
Acrolein	107-02-8	2	210.0
Acrylamide	79-06-1	3	2.0
Acrylic acid	79-10-7	2	3.2
Acrylonitrile	107-13-1	2	137.0
Aldrin	309-00-2	3	0.00023
Allyl chloride	107-05-1	1	340.0
Aniline	62-53-3	1	1.0
Aramite	140-57-8	2	—
Arsenic (inorganic)	7440-38-2	3	1.0
Asbestos	1332-21-4	3	—
Azobenzene	103-33-3	2	1.0
Barium	7440-39-3	2	10.0
Benzene	71-43-2	2	95.0
Benzidine	92-87-5	3	—
Benzo(a)pyrene	50-32-8	3	0.00000005
Benzyl chloride	100-44-7	2	1.0
Beryllium	7440-41-7	3	—
BHC (gamma) (Lindane)	58-89-9	3	0.000094
Bis(2-chloroethyl)ether	111-44-4	3	0.71
Bis(2-chloroisopropyl)ether	108-60-1	2	0.10

Chemical Name	CAS No.	Toxicity Level Category	Vapor Pressure
Bis(chloromethyl)ether	542-88-1	3	30.0
Boron	7440-42-8	1	—
Boron trifluoride	7637-07-2	2	—
Bromoethene	593-60-2	2	—
Bromoform	75-25-2	2	5.6
Bromomethane	74-83-9	1	1,420.0
1,3-Butadiene	106-99-0	3	1,520.0
Cadmium	7440-43-9	3	1.0
Carbon disulfide	75-15-0	1	298.0
Carbon tetrachloride	56-23-5	2	113.0
Chlordane	57-74-9	3	0.00001
Chlorine dioxide	10049-04-4	2	—
2-Chloroacetophenone	532-27-4	2	—
Chlorobenzene	108-90-7	1	11.8
Chlorobenzilate	510-15-6	2	0.000022
2-Chloro-1,3-butadiene	126-99-8	1	200.0
Chlorodifluoromethane (HCFC-22)	74-45-6	1	—
Chloroform	67-66-3	2	160.0
Chloromethane	74-87-3	2	3,800.0
Chloroprene	126-99-8	1	200.0
2-Chloropropane	75-29-6	1	—
Chromium VI	—	3	—
Chromium (total)	7440-47-3	3	1.0
Chrysene	218-01-9	—	0.0000000063
Copper	7440-50-8	2	1.0
Cumene	98-82-8	1	3.2
4'4'-DDT	50-29-3	2	0.0000015
1,2-Dibromo-3-chloropropane	96-12-8	2	0.8
1,2-Dibromoethane	106-93-4	3	12.0
Dibutylnitrosamine	924-16-3	3	—
1,2-Dichlorobenzene	95-50-1	1	1.5
1,4-Dichlorobenzene	106-46-7	1	1.8
3,3'-Dichlorobenzidine	91-94-1	3	—
1,4-Dichloro-2-butene	764-41-0	3	—
Dichlorodifluoromethane (Freon 12)	75-71-8	1	4,250.0
1,1-Dichloroethane	75-34-3	1	234.0
1,2-Dichloroethane	107-06-2	2	79.0
1,1-Dichloroethene	75-35-4	2	591.0
Dichloroethyl ether	111-44-4	3	0.71
1,2-Dichloropropane	78-87-5	1	42.0
1,3-Dichloropropene	542-75-6	2	43.0
Dicyclopentadiene	77-73-6	2	10.0
Dieldrin	60-57-1	3	0.0000018
Diesel Fuel	—	—	<1.0
Diethanolamine	111-42-2	1	—
Diethylene glycol monobutyl ether	112-34-5	1	0.02
Diethylnitrosamine	55-18-5	3	—
N,N-Dimethylformamide	68-12-2	1	2.7
1,1-Dimethylhydrazine	57-14-7	3	157.0
1,2-Dimethylhydrazine	540-73-8	3	54.0
Dimethylnitrosamine	62-75-9	3	8.0
2,4-Dinitrotoluene	121-14-2	2	0.0013
N-Dioctylphthalate	117-84-0	1	0.2
1,4-Dioxane	123-91-1	2	37.0
Dioxin	—	3	—
1,2-Diphenylhydrazine	122-66-7	3	—
Epichlorohydrin	106-89-8	2	12.0
1,2-Epoxybutane	106-88-7	1	—
2-Ethoxyethanol	110-80-5	1	3.8
Ethyl acrylate	140-88-5	1	29.3
Ethylbenzene	100-41-4	1	10.0
Ethyl chloride	75-00-3	1	2,660.0
Ethylene	74-85-1	2	—
Ethylene bromide	106-93-4	3	12.0

<u>Chemical Name</u>	<u>CAS No.</u>	<u>Toxicity Level Category</u>	<u>Vapor Pressure</u>
Ethylene chloride	107-06-2	2	79.0
Ethylene dibromide	106-93-4	3	12.0
Ethylene dichloride	107-06-2	2	79.0
Ethylene glycol monobutyl ether	111-76-2	1	—
Ethylene oxide	75-21-8	2	1,095.0
Ethylidene dichloride	75-34-3	1	234.0
Formaldehyde	50-00-0	2	—
Fuel Oil #2, #4, #6	—	—	<1.0
Furfural	98-01-1	1	1.0
Gasoline	8006-61-9	1	76.8
Glycidaldehyde	765-34-4	1	—
Heptachlor	76-44-8	3	0.0003
Heptachlor epoxide	1024-57-3	3	—
Hexachlorobenzene	118-74-1	3	1.0
Hexachlorobutadiene	87-68-3	2	0.15
alpha-Hexachlorocyclohexane	319-84-6	3	0.06
beta-Hexachlorocyclohexane	319-85-7	3	0.17
Hexachlorocyclopentadiene	77-47-4	2	0.08
Hexachloroethane	67-72-1	2	0.40
N-Hexane	110-54-3	1	120.0
Hydrazine	302-01-2	3	16.0
Hydrazine sulfate	10034-93-2	3	—
Hydrochloric acid	7647-01-0	1	3,040.0
Hydrogen chloride	7647-01-0	1	3,040.0
Hydrogen sulfide	7783-06-4	2	1,520.0
4,4-Isopropylidenediphenol	80-05-7	2	—
Lead	7439-92-1	2	1.0
Lubricating/hydraulic oils	—	—	<1
Manganese	7439-96-5	2	1.0
Melamine	108-78-1	1	50.0
Mercury (inorganic)	7439-97-6	2	0.012
Methacrylonitrile	126-98-7	2	65.0
Methane	—	—	>1
2-Methoxyethanol	109-86-4	1	—
Methyl bromide	74-83-9	1	1,420.0
Methyl chloride	74-87-3	2	3,800.0
Methyl chloroform	71-55-6	1	100.0
Methylcyclohexane	108-87-2	1	40.0
4,4'-Methylene bis(2-chloroaniline)	101-14-4	2	—
Methylene chloride	75-09-2	1	429.0
4,4-Methylenedianiline	101-77-9	2	—
Methylene dichloride	75-09-2	1	429.0
Methylene diphenyl diisocyanate	101-68-8	2	—
4,4'-Methylenediphenyl isocyanate	101-68-8	2	—
Methyl ethyl ketone	78-93-3	1	100.0
Methyl isobutyl ketone	108-10-1	1	10.0
Methyl styrene (mixed isomers)	25013-15-4	1	—
Methyl tert butyl ether	1634-04-4	1	245.0
Nickel subsulfide	12035-72-2	3	—
Nickel (refinery dust)	7440-02-0	3	1.0
o-Nitroaniline	88-74-4	2	0.1
Nitrobenzene	98-95-3	1	0.15
2-Nitropropane	79-46-9	3	10.0
N-Nitrosodiethylamine	55-18-5	3	—
N-Nitrosodimethylamine	62-75-9	3	8.0
N-Nitrosodi-n-butylamine	924-16-3	3	—
N-Nitrosodiphenylamine	86-30-6	2	0.1
N-Nitrosomorpholine	59-89-2	2	—
N-Nitroso-n-ethylurea	759-73-9	3	—
N-Nitroso-n-methylurea	684-93-5	3	—
N-Nitrosopyrrolidine	930-55-2	3	—
Pentachlorophenol	87-86-5	1	0.0011
Phosphine	7803-51-2	2	—
Phthalic anhydride	85-44-9	1	0.0002

<u>Chemical Name</u>	<u>CAS No.</u>	<u>Toxicity Level Category</u>	<u>Vapor Pressure</u>
Polychlorinated biphenyl (PCB)	1336-36-3	3	0.00077
Polycyclic aromatic hydrocarbons (PAHs)	—	3	—
Propylene chloride	78-87-5	1	42.0
Propylene dichloride	78-87-5	1	42.0
Propylene glycol	57-55-6	1	—
Propylene glycol monomethyl ether	107-98-2	1	—
Propylene oxide	75-56-9	2	—
Styrene	100-42-5	1	5.0
Sulfuric acid	7664-93-9	1	1.0
Terephthalic acid	100-21-0	1	—
2,3,7,8-Tetrachlorodibenzo(p)dioxin	1746-01-6	3	0.000000074
1,1,1,2-Tetrachloroethane	630-20-6	2	10.0
1,1,2,2-Tetrachloroethane	79-34-5	2	4.0
Tetrachloroethylene	127-18-4	2	19.0
Toluene	108-88-3	1	28.0
Toxaphene	8001-35-2	3	0.4
1,2,4-Trichlorobenzene	120-82-1	1	1.0
1,1,1-Trichloroethane	71-55-6	1	100.0
1,1,2-Trichloroethane	79-00-5	2	25.0
Trichloroethylene	79-01-6	2	77.0
Trichlorofluoromethane (Freon 11)	75-69-4	1	687.0
2,4,6-Trichlorophenol	88-06-2	2	1.0
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	1	273.0
Triethylamine	121-44-8	1	50.0
Vinyl acetate	108-05-4	1	100.0
Vinyl bromide	593-60-2	2	—
Vinyl chloride	75-01-4	2	2,580.0
Vinylidene chloride	75-35-4	2	591.0
m-Xylene	108-38-3	1	6.0
o-Xylene	95-47-6	1	5.0
p-Xylene	106-42-3	1	6.5
Xylenes (mixed)	1330-20-7	1	6.0
Zinc/zinc oxide	7446-66-6	2	1.0

Key:

- 1 = slight toxicity
- 2 = moderate toxicity
- 3 = severe toxicity

Reference:

NJDEP. 1994. Air Quality Regulation Program, Bureau of Air Quality Evaluation, Unit Risk Factors for Inhalation.  
 NJDEP. 1994. Air Quality Regulation Program, Bureau of Air Quality Evaluation, Reference Concentrations for Inhalation.