Delaware Department of Natural Resources & Environmental Control
Site Investigation and Restoration Branch

Subject: Policy and Guidance concerning the Delaware Hazard Ranking Model

Issued: January 30, 2008

This Policy addresses the requirement stipulated in Subsection 7.1 of the Delaware Regulations Governing Hazardous Substance Cleanup (the Regulations), amended February 2002, which requires the Site Investigation and Restoration Branch (the Branch) to "establish a priority list of facilities from the inventory of hazardous substance release sites, where further response has been determined to be necessary, based on the relative hazard ranking of the facility using the Delaware Hazard Ranking Model." The purpose of the ranking is to assist in estimating the relative potential risk posed by a site to public health, welfare or the environmental based on the information provided.

The Delaware Hazard Ranking Model (the Model) will be used to determine the priority for performing response actions, including remedial investigations or any other required remedial or investigative activities at the hazardous substance release sites. Information gathered from investigations, or any other additional data specified by the Branch, will be used in the ranking evaluation. The ranking will be performed on all sites being addressed by the Branch.

The Model and guidance were revised in January 2008, based on input from the Branch's Hazard Ranking Subcommittee and technical staff. The guidance has been written in order to have consistent implementation of the Model and to avoid misinterpretation of the Model or its use. It is the responsibility of the Project Managers to rank the sites that they are responsible for. Ranking must be based on the current status and conditions of the Site. As new information is gathered, through investigation or remediation processes, the Project Manager will re-rank the site. At a minimum, the Project Manager will evaluate their sites on an annual basis to determine if they need to be re-ranked. The completed Hazard Ranking Model Worksheets for the site will be maintained within the Branch's site file. The ranking may be published in a report annually.

A site can be removed from the ranking when the Branch determines that no further action is required. The site will be removed because there is no longer a threat to public

health, welfare or the environment and the site no longer requires long term Operations and Maintenance (O&M). The public notice requirements stated within the Regulations and the Guidance shall be adhered to.

Model Categories:
In order to ensure the protection of public health, welfare or the environment, the Model ranks the sites into three categories: high, intermediate and low. For more specifics please refer to the Hazard Ranking Model and the guidance (Attachment).

High Hazard Rank: A high hazard ranking applies to any site that shows an imminent danger to public health, welfare or the environmental that is associated with an actual or on-going release at the Site. This includes, but is not limited to: a known ongoing release; free product onsite; contamination of a drinking water supply well; location of a supply well relative to the site; risk of fire, explosion, or toxic effects; contamination levels exceed applicable Uniform Risk-based Standards (URS) values by a factor of 10; location of a surface water body which is being impacted by a mass loading exceedence of groundwater from the site to the surface water body; a possible threat to critical habitats for threatened or endangered species; and location of the site in relation to a sensitive population (as defined in the attached guidance document).

Intermediate Hazard Rank: An intermediate hazard ranking applies to any site where release is known to have occurred but does not present an imminent danger to public health, welfare or the environmental. Ranking criteria includes, but is not limited to: site impacting an existing water supply well for non drinking purposes; site location is within an area designated as "excellent" for groundwater recharge by DNREC's Division of Water Resources; vapor intrusion concerns; interim action performed; potentially contaminated sediments; location of site in relation to a surface water body; impacting an aquifer; and location of site in relation to a sensitive population.

Low Hazard Rank: A low hazard ranking applies to a site that has completed an applicable remedy/corrective action resulting from a completed investigation. This includes but is not limited to: issuance of a Certification of Completion of Remedy (COCR), full compliance with the requirements of the COCR and the O&M Plan, or a No Further Action (NFA) has been issued based on current restricted land use.

Model Limitations:
It should be noted that this Model, as with any model, has limitations and has been designed as an aid only but does meet the requirements of the Regulations. This ranking is not intended to replace or hinder any further investigation of a property that is deemed necessary by the Branch. The Branch will address sites, to the best it practically can, based on their priority ranking. The Branch will evaluate any diversions from the priority ranking on a case-by-case basis with best professional judgment. The Branch reserves the right to take action at any site, regardless of its priority ranking.

The Branch would like to acknowledge the members of the Hazard Ranking Subcommittee whose efforts helped to draft and finalize this Policy, the Delaware Hazard Ranking Model and the Guidance:

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Date Modified: _____
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HAZARD RANKING MODEL FOR DNREC-SIRB SITES

Site Name: _____ **Program:** _____

DE Number: _____

Project Officer: _____

Report(s) Utilized for Ranking, Including Date _____

Is the site located within a GMZ ? _____

Hazard Ranking of the Site : _____

Screening Criteria Questions:

If you can answer YES to any of the questions below, the site will be assigned a High Hazard Rank:

a) Is there imminent danger to public health, the environment or public welfare associated with a release at the site? ☐

b) Is there a known ongoing release (i.e. spilling, leaking, pouring or discharging) at the site? ☐

c) Does free product associated with a past release at the site exist in any media? ☐

d) Has an existing water supply well used for drinking water been contaminated at any concentration by a release at the site? ☐

e) Is there a water supply well used for drinking water within 1,000 feet of the release? ☐

f) Is there a risk of explosion, fire or toxic effects due to accumulation of vapors in confined spaces or indoor air resulting from a release at the site? ☐

g) Does the level of contaminants in any media exceed the appropriate Delaware URS ☐

standards by a factor greater than 10?

h) Does a surface water body (including wetlands) exist within 500 feet of a confirmed release at the site? ☐

i) Does the release pose a threat to critical habitats for known endangered, threatened or protected species at the site or surrounding area? ☐

j) Is there a daycare, school, nursing home, hospital or other sensitive human population located within 500 feet of the release at a site ☐

If you can answer YES to any of the questions below, the site will be classified with an Intermediate Hazard Rank:

a) Has an existing water supply well used for non-drinking purposes (i.e. agricultural well) been contaminated by a release from the site? ☐

b) Is the release at the site located within an "Excellent" groundwater recharge area/wellhead protection area as shown on current Water Resource Protection Area maps issued by the Division of Water Resources? ☐

c) Is there potential for health risk associated with vapor intrusion into occupied spaces as a result of a release at the site? ☐

d) Has any interim action (related to hazardous/potentially hazardous substances) or emergency response been performed at the site? ☐

e) Are sediments at or adjacent to the site (including upstream and/or downstream) impacted with contaminants that have been detected in other media on the site? ☐

f) Does a surface water body (including wetlands) exist between 500 feet and 1,000 feet of a confirmed release at the site? ☐

g) Does a confirmed release in soil have the potential to impact an aquifer? ☐

h) Is the site with confirmed contamination located in a Green Infrastructure Area or State Resource Area as defined in Executive Order 61 and/or the current State Resource Area maps, or in a Targeted Growth Area as defined in the Glossary? ☐

i) Is there a daycare, school, nursing home, hospital or other sensitive human population located between 500 and 1,000 feet of the release at a site? ☐

If you can answer YES to any of the questions below, or you answered NO to all of the screening criteria questions above, then the site will be classified with a Low Hazard Rank:

a) Has a Certification of Completion of Remedy been established for the site, and is the site in full compliance with all requirements of the COCR and O&M Plan? ☐

b) Has a No Further Action been issued for the release based on current restricted land usage (commercial/industrial)? ☐

Notes:

This ranking system does not discriminate between sites based on the fact that they are located within an established GMZ.

Any site can and will be re-ranked as new information becomes available.

Comments *(use this section to make any notes that might help in understanding the site priority rank (i.e. where information came from, why something at the site changed, etc.)*:

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JGC:vdc

Hazard Ranking Model Guidance

January, 2008

The Hazard Ranking Model (HRM) consists of a general information section and a total of 21 screening questions in three distinct hazard rankings (high, intermediate, low). The HRM can be used for any site within the Site Investigation and Restoration Branch (SIRB) database. Ranking of sites that are State-lead HSCA sites is the first goal of the HRM in order to better allocate assets to sites that pose the greatest hazard to human health, welfare and the environment.

Following this guidance section is a Glossary that provides definitions of terms used in the HRM as they apply to Delaware – Department of Natural Resources and Environmental Control-Division of Air Waste Management-Site Investigation and Restoration Branch. Several web links are provided in the glossary to expand on the definition provided as well as provide the appropriate maps.

In order to utilize the HRM properly, all questions in all three hazard sections need to be answered first. Should any question in the High Hazard screening list be answered in the affirmative, that site (in its current state) is ranked as a High Hazard. By answering all of the questions in the High Hazard section, and tabulating the total number of affirmative responses, a numerical "value" is achieved as well. For instance, if two questions in the High Hazard section are answered in the affirmative, then the site is labeled with a High-2 rank.

Should there be no affirmative responses in the High Hazard screening list, the Intermediate Hazard screening list should be used to evaluate the site hazard. The same method is used to determine the rank and numerical value in the Intermediate rank. Should 5 questions from the Intermediate list be answered in the affirmative then the site is an Intermediate -5.

In the case where there are no affirmative responses in the High or Intermediate screening list, then the Low Hazard list is utilized to determine the hazard rank of the site. Should neither of these two questions be answered in the affirmative, the site should be evaluated to determine if the site should be closed.

There is a section at the end of the model that is provided for comments if the Project Officer deems this appropriate.

The Hazard Ranking Model should be updated on a periodic basis in order to accurately track the Site's progress towards remediation of contamination.

Hazard Ranking Model Glossary

Aquifer- A geologic formation, group of formations, or a part of a formation capable of yielding groundwater to wells or springs.

COCR- Certificate of Completion of Remedy. Upon completion of all tasks (except operations and maintenance) specified in the Final Plan of Remedial Action, the person cleaning up a site, or the owner of a site, may apply for a COCR. When issued, a COCR is recorded on the county tax records for a property, identifying the property as having been cleaned up as specified in the Final Plan. A COCR may include conditions or restrictions.

A checklist of the requirements for a COCR is at:
http://www.dnrec.state.de.us/dnrec2000/Divisions/AWM/sirb/misc%5CJGC07004.pdf

Confined Space – An area that has limited or restricted means of entry or exit, is large enough for a person to enter and perform assigned work, **and** is not designed for continuous occupancy.

Critical Habitats- A specific geographic area(s) that is essential for the conservation of a threatened or endangered species and that may require special management and protection.

Delaware URS- Uniform Risk-Based Standard- This standard approach is useful for sites where it is not possible or cost-effective to achieve background standards because of the volume of the contamination or a site-specific risk assessment was not performed. Attainment of the uniform risk-based standard will provide a limited level of liability release.

Emergency Response- A response activity undertaken to eliminate or control an immediate threat to human health, welfare, or the environment from such situations as: (1) human, animal, or food chain exposure to contaminating substances; (2) contamination of drinking water supply; (3) contamination of air; (4) fire and/or explosion; or (5) similarly acute situations.

Excellent Groundwater Recharge Area- Those areas with high percentages of sand and gravel that have "excellent" potential for recharge as determined through a Stack Unit Mapping Analysis performed originally by the Delaware Geological Survey and presented in the Report of Investigations No. 66, Ground-water Recharge Potential Mapping in Kent and Sussex Counties, Delaware, Geological Survey, 2004. See link below:

Kent County - http://www.dgs.udel.edu/publications/pubs/HydroMaps/hydromap11.pdf
Sussex County- http://www.dgs.udel.edu/publications/pubs/HydroMaps/hydromap12.pdf

New Castle County uses the term Water Resource Protection Area. See term in this glossary.

Free Product- A hazardous substance which occurs as an immiscible (non aqueous phase [*i.e.*, not dissolved in water]) liquid in surface water, groundwater, the vadose zone, or the ground surface or soils.

Green Infrastructure Area- Delaware's natural life support system of parks and preserves, woodlands and wildlife areas, wetlands and waterways, productive agricultural and forest land, greenways, cultural, historical, and recreational sites and other natural areas, all with conservation value.

http://stateplanning.delaware.gov/strategies/maps_04/green_infrastructure_strategy.pdf

Imminent Danger- Imminent Threat of Release- Potential for a release which requires action to prevent or mitigate any adverse impact to the environment or endangerment to public health or welfare which may result from such a release.

Interim Action *or* **Interim Response Activity-** The containment, cleanup, or removal of a release or imminent threat of release of hazardous substances from a facility, or the taking of other actions, prior to the selection of a remedial action, as may be necessary to prevent, minimize, or mitigate threat to public health, welfare, or the environment. If DNREC determines that an interim measure is necessary, it may require interim response activities to be conducted. These activities may occur any time during the cleanup process.

No Further Action (NFA) - A No Further Action decision can be issued at the end of an investigation or after the completion of the remedy. NFA means that no known risk above acceptable risk exists at the site as determined by DNREC.

Operations & Maintenance (O&M) - The activities necessary to provide for continued effectiveness and integrity of a remedial action after it is completed. O&M includes all activities needed to ensure effective operation of the remedy under both normal conditions and emergencies. Post-cleanup compliance monitoring (regular testing to determine if the prescribed cleanup levels have been met and if the treated effluent or emission meets discharge requirements) is often included under O&M.

Release- Any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping or disposing of a hazardous substance, pollutant or contaminant into the environment (including the abandonment or discarding of barrels, containers, and other closed receptacles containing any hazardous substance or pollutant or contaminant), but exclude[ing]:

(a) any release which results in exposure to a person solely within his or her workplace, with respect to a claim which such person may assert against his or her employer;

provided, however, that this exclusion does not apply to any such release which also results in exposure to the environment;

(b) emissions from the engine exhaust of a motor vehicle, railroad cars, aircraft, vessel or pipeline pumping station engine;

(c) the appropriate and legal application of fertilizers and pesticides; and

(d) any discharges in compliance with State permits issued in conformance with Title 7 of the *Delaware Code* and federally permitted releases under CERCLA.

Sediment- Solid material that has settled down from a state of suspension in a liquid; More generally, solid fragmental material transported and deposited by wind, water or ice, chemically precipitated from a solution, or secreted by organisms, and that forms in layers in a loose unconsolidated form e.g. sand, mud, till. Sediments which become contaminated are often difficult and expensive to clean up, and provide a pathway for exposure of aquatic animals to hazardous substances.

Sensitive Human Population- A group of people that, due to age or health issues, may be more at risk to environmental contamination than a typical population.

State of Delaware Resource Area- Typically large, contiguous areas of forested or wetland habitats as larger parcels and where the opportunity exists for the greatest diversity of plant and animal species. See link below:

http://www.dnrec.delaware.gov/gi/gisramaps.htm

Surface Water- The waters of the State of Delaware, occurring on the surface of the earth.

Targeted Growth Area- Areas in the State of Delaware have been determined to be most desirable for growth based upon environmental and financial reasons. See link below:

http://stateplanning.delaware.gov/strategies/document_04/03_directing.pdf

Toxic Effects- Physiologic, physical or laboratory manifestations or derangement that can be attributed to the presence of a substance within the body.

Vapor Intrusion Pathway- The pathway by which vapors from subsurface contaminants may move through the vadose zone or through void spaces below the ground surface and enter buildings or other structures.

Water Resource Protection Area (WRPA): In New Castle County water resource protection areas are the Cockeysville Formation, Cockeysville Formation drainage area, wellheads, and

recharge areas. All such areas are as depicted on the three-map series "Water Resource Protections Areas for the City of Newark, City of Wilmington, New Castle County, Delaware," prepared by the Water Resources Agency for the County that is dated 1993, or as amended. These maps are available in paper form at SIRB.

Wellhead Protection Area (WHPA): the surface or subsurface area surrounding a groundwater-well or well-field supplying a public water system, through which contaminants are reasonably likely to move toward and reach such well or well-field. These WHPA areas are delineated through the Division of Water Resources- Groundwater Protection Branch- Source Water Assessment and Protection Program. See link below:

http://www.wr.udel.edu/swaphome/index.html

Wetlands- Lands where saturation with water is the dominant factor determining the nature of soil development and the types of plant and animal communities living in the soil and on its surface.