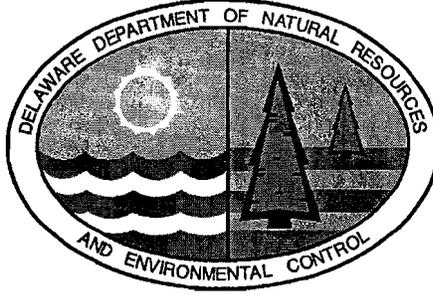


# FINAL PLAN OF REMEDIAL ACTION



Del Chapel Place Site  
Operable Unit (OU)-4  
(UNIVERSITY COURTYARD)

*Delaware Avenue & Chapel Street  
Newark, Delaware*

*DNREC Project No. DE-0163/1221*

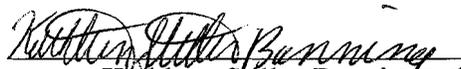
This Final Plan of Remedial Action (Final Plan) presents the Department of Natural Resources and Environmental Control's (DNREC's) determination that: 1) the concentration of zinc in the groundwater which discharges to a small unnamed tributary of White Clay Creek exceeds the Delaware Surface Water Quality Standard; 2) the impacts to ecological receptors in the stream require remediation; and 3) the zinc concentrations in the stream present no risk to human health.

DNREC issued public notice of the Proposed Plan for the Site on July 11, 2007 and opened a 20-day public comment period. The Proposed Plan requires: 1) the injection of slurry of non-hazardous magnesium hydroxide compound into the ground in areas near the stream, creating an underground barrier to take zinc out of the dissolved aqueous phase for conversion to solid zinc minerals, which should reduce zinc migration to the stream; 2) the establishment of a Groundwater Management Zone (GMZ) and an environmental covenant restricting groundwater use; and 3) an operation & maintenance (O&M) Plan to continue monitoring of groundwater, surface water and sediment to ensure the effectiveness of the barrier. The Proposed Plan also includes the location of additional information found on the DNREC web page and at the DNREC office on Lukens Drive in New Castle.

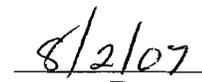
There were no comments or questions from the public regarding the proposed plan. Therefore, the Proposed Plan was adopted as the Final Plan (see attached).

## **Approval:**

**This Final Plan meets the requirements of the Hazardous Substance Cleanup Act.**

  
Kathleen Stiller-Banning

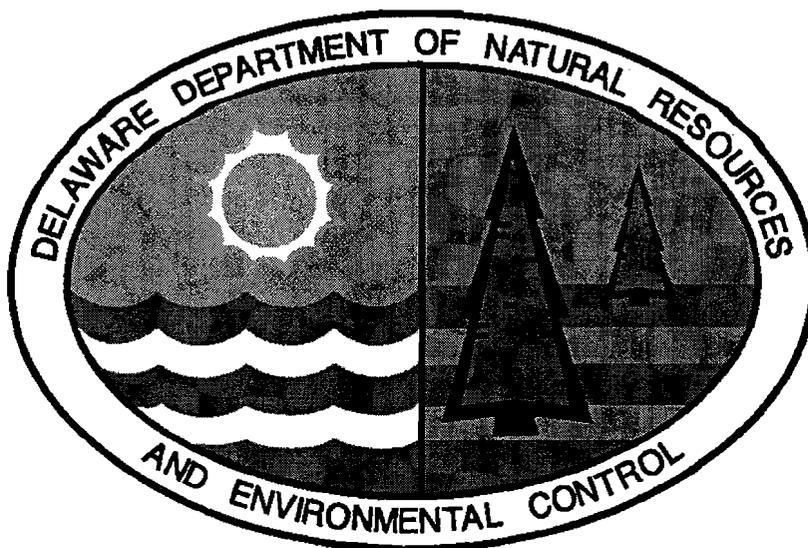
Division of Air and Waste Management

  
Date

# PROPOSED PLAN OF REMEDIAL ACTION

Del Chapel Place Site  
Operable Unit (OU)-4  
Delaware Avenue and Chapel Streets  
Newark, DE

DNREC Project No. DE-0163/1221



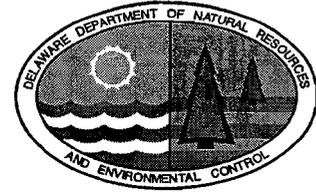
July 2007

Delaware Department of Natural Resources and Environmental Control  
Division of Air and Waste Management  
Site Investigation & Restoration Branch  
391 Lukens Drive  
New Castle, Delaware 19720

## CONTENTS

- Proposed Plan Information
- Figure: Site Location
- Glossary of Terms
- Attachment: *What is a Proposed Plan?*

**DEL CHAPEL PLACE SITE  
Operable Unit (OU) 4  
(UNIVERSITY COURTYARD)**



**What is the Del Chapel Place Site?** The site is a certified Brownfield site which is currently an apartment complex (University Courtyard) for University of Delaware students. The address is 1 Scholar Drive, Newark, DE 19711.

Tax Parcel Number: 18-021.00-031

Nearest major intersection: Delaware Avenue and Chapel Streets

Area: 21.74 acres

Zoning: Residential RA (high-rise apartments)

Nearest surface water body: A small stream originating from storm water outfall is found in the south-central part of the property.

Shallow groundwater on the site flows south towards the small stream.

The site is not within the 100-year flood plain. The site is flat.

Surrounding Land Uses: Apartments and residences are present to the west. Downtown Newark commercial properties are nearby to the north and northwest. Newark High School is adjacent to the east. Christina School District bus yard is to the south.

The City of Newark supplies the site with drinking water and sewer service. There are no known private or public wells in the vicinity of the site.

**What is Del Chapel Place Operable Unit (OU)-4?** OU-4, consists of the groundwater and surface water on the Del Chapel Place site.

**What happened at the Del Chapel Place Site?** Previous owners, including the Continental Diamond Fibre Company and the Budd Company, operated a manufacturing plant on the site between 1907 and 1982. Historically, on site industrial activities included the treatment of materials and products with zinc solutions, which were released on the site.

The site has a long history of industrial use. Manufacturing operations on the site began at the early 1900's and ceased in the mid 1980's. Prior to redevelopment, the site stood vacant and derelict for several years. The property was purchased in 1998 and developed into a student apartment complex between 1999 and 2001.

**What is the problem at Del Chapel Place OU-4?** Extensive investigations conducted by Environmental Alliance, the consultant for the property owner, have documented that groundwater contamination exists beneath a portion of the site as a result of the release of zinc chloride from the historical operations at the site. The impacted groundwater discharges onsite

to a small unnamed tributary of White Clay Creek, and the concentrations of zinc discharging to surface water exceed the Delaware Surface Water Quality Standard of 110 milligrams per liter ( $\mu\text{g/L}$ ) for zinc and may therefore be detrimental to wildlife living in the stream. Zinc concentrations in the stream have consistently been reported below DNREC screening levels for human exposure.

The Contaminant of Concern (COC) for Operable Unit-4 is zinc.

During the Facility Evaluation that was conducted by Environmental Alliance, Inc. in 2000, a preliminary risk assessment determined that the site development did not present an unacceptable risk for residential use. Contaminated soil at the site was addressed previously in OU-2 and OU-3. Groundwater and surface water (OU-4) have been impacted by zinc contamination. Although no human health risk is present, the impacts to ecological receptors in the stream require remediation.

**What does the owner want to do at Del Chapel Place OU-4?** The University Courtyard Apartments are fully constructed and in use. The property owner has no plans to modify the existing development. The proposed work will reduce the movement of zinc in groundwater beneath the property so that less zinc enters the stream.

The apartments are three-story buildings with slab-on-grade construction. The buildings and paved surfaces cover most of the property area. The subject stream is adjacent to a small preserved wetland area covered with trees.

**How does DNREC plan to clean up Del Chapel Place OU-4?** DNREC proposes to authorize the property owner, through its consultant, Environmental Alliance, Inc., to inject: (pending issuance of injection permit) a slurry of non-hazardous magnesium hydroxide compound into the ground in areas near the stream, creating an underground barrier to take zinc out of the dissolved aqueous phase for conversion to solid zinc minerals, which should reduce zinc migration to the stream.

Magnesium hydroxide is presently used routinely in waste water treatment applications. Groundwater treatment using magnesium hydroxide for zinc is a relatively new technique. The compound was tested at Del Chapel in a limited field Pilot Test in 2006 which resulted in a greater than 75% reduction in dissolved zinc in the groundwater. The compound will be injected below grass and paved areas using a small, truck-mounted drilling rig. The injected compound will spread below the water table and will release magnesium hydroxide to the groundwater over time. The treated groundwater will contain reduced quantities of dissolved zinc. The reduction of zinc in the groundwater is expected to result in a reduced discharge of zinc to the stream over time. An Operations and Monitoring (O&M) Plan will be established to monitor the stream's zinc concentrations in the future.

**What are the long term plans for Del Chapel Place OU-4 after the cleanup?** Monitoring of the zinc concentrations in groundwater, surface water and sediment will be continued in

accordance with a DNREC approved Operations and Monitoring (O&M) Plan. An Environmental Covenant and a Groundwater Management Zone (GMZ) will be established for the site that specifies that no drinking water wells be installed on the property. Current and future owners of the property will be responsible for implementation of all aspects and costs of the approved remedy, including all requirements of the final plan, and the approved O & M Plan for a period of no less than two (2) years, at which time DNREC may deem that groundwater monitoring is no longer necessary, or can be reduced to a lesser schedule agreed upon by DNREC. Upon conclusion of the 2 year monitoring period, Courtyard LLC, per the Agreement will be released from any further O & M responsibilities. If further O & M is required, or additional remediation is required, DNREC will undertake these activities and pursue cost recovery against the PRPs for the Site. The current and future owners will be required to adhere to the requirements and conditions established in the Uniform Environmental Covenant for the site.

The site owner has recorded a notice on the deed consistent with the Uniform Environmental Covenants Act. The covenant will restrict the installation and use of groundwater wells for drinking water supply. The covenant will note the site's location within a Groundwater Management Zone.

### **How can I find additional information or comment on the Proposed Plan?**

The complete file on the site including a Facility Evaluation, monitoring reports, and a Focused Feasibility Study/Remedial Design Report is available at the DNREC office, 391 Lukens Drive in New Castle. Most documents are also found on <http://apps.dnrec.state.de.us/intraviewer/session/frmmain.cfm>

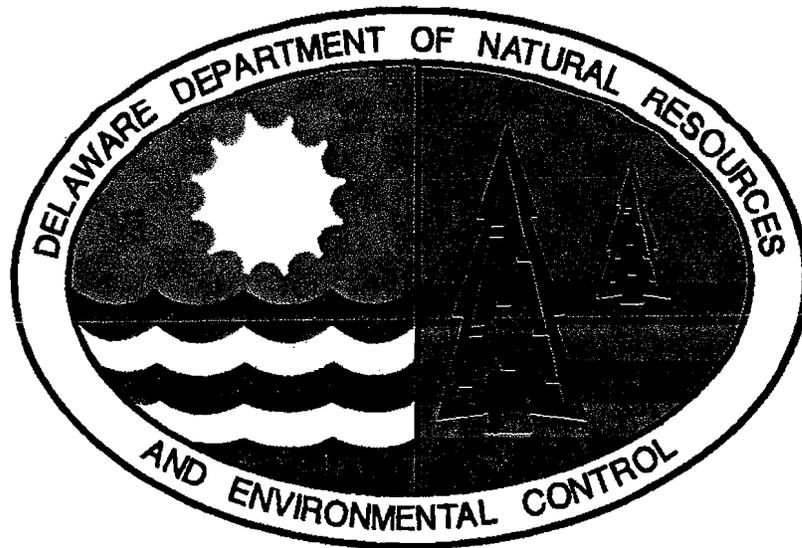
The 20-day public comment period ends at 4:30 PM on 07/31/07. Please send written comments to the DNREC office or call Robert Asreen, project manager, at: 302-395-2600.

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# PROPOSED PLAN OF REMEDIAL ACTION

Del Chapel Place Site  
Operable Unit (OU)-4  
Delaware Avenue and Chapel Streets  
Newark, DE

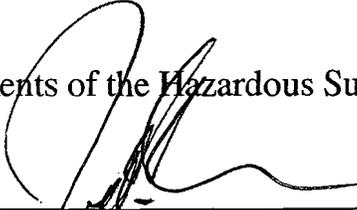
DNREC Project No. DE-0163/1221



July 2007

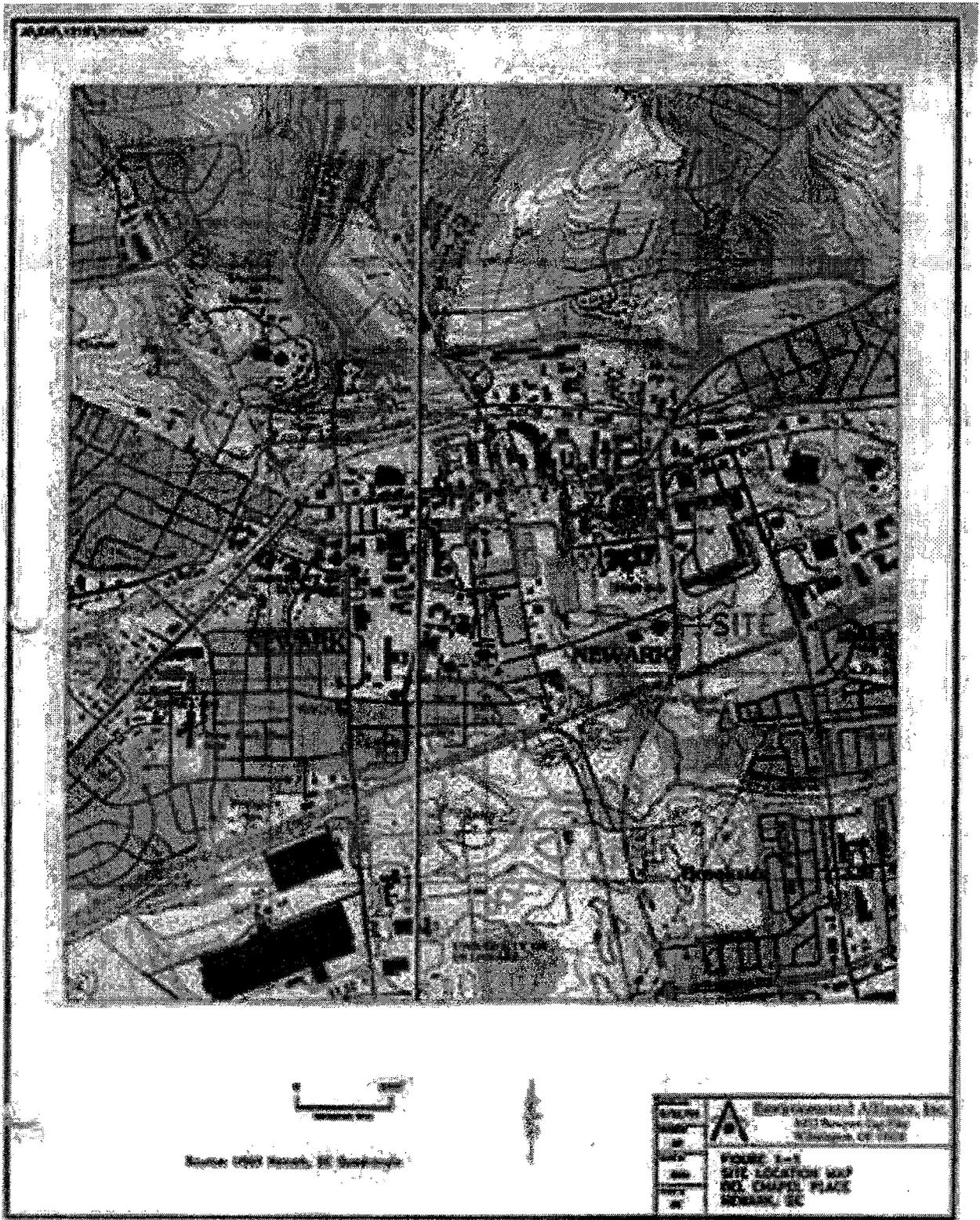
**Approval:**

This Proposed Plan meets the requirements of the Hazardous Substance Cleanup Act.



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**James D. Werner, Director**  
DNREC Division of Air and Waste Management



**Figure 1: Del Chapel Place Site Location Map**

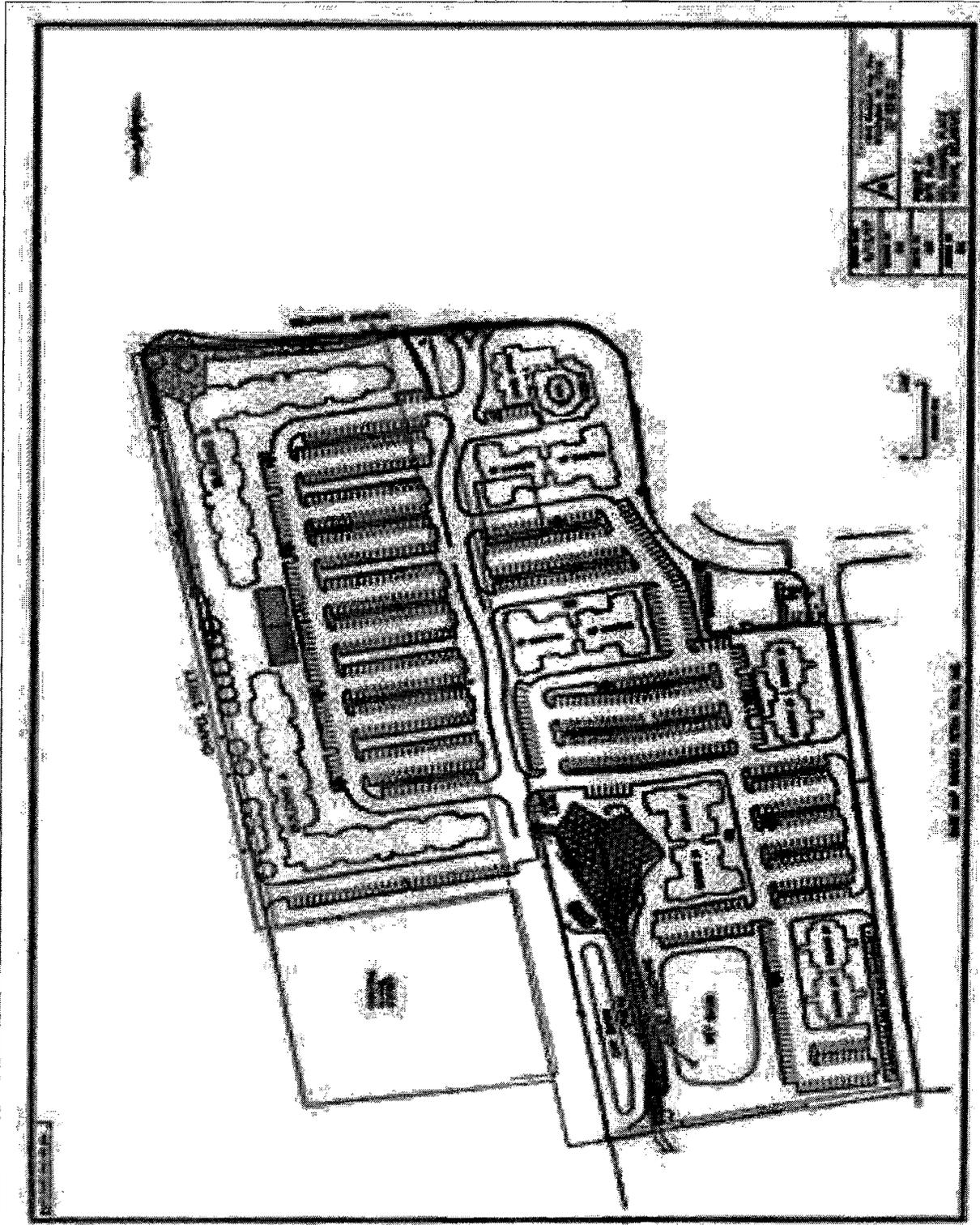


Figure 2: Del Chapel Place Site Plan

## Glossary of Terms Used in this Proposed Plan

<b>Brownfield</b>	Property that is vacant or underutilized because of the perception or presence of an environmental problem
<b>COCR</b>	<p><b>Certificate of Completion of Remedy.</b> Upon completion of all tasks (except operations and maintenance) specified in the Final Plan, 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.</p> <p>A checklist of the requirements for a COCR is at  <a href="http://www.dnrec.state.de.us/dnrec2000/Divisions/AWM/sirb/misc%5CJGC07004.pdf">http://www.dnrec.state.de.us/dnrec2000/Divisions/AWM/sirb/misc%5CJGC07004.pdf</a></p>
<b>Contamination</b>	The introduction of harmful or hazardous matter into the environment
<b>Ecologically based Benchmarks:</b>	Reference data by which the level of contamination of sensitive environments is evaluated to determine the relative risk to the environment.
<b>Environment</b>	The navigable waters, the waters of the contiguous zone, ocean waters, and any other surface water, groundwater, drinking water supply, land surface or subsurface strata or ambient air within the State.
<b>Facility Evaluation (FE)</b>	If the initial investigation indicates a release or imminent threat of release, DNREC conducts an FE to assess the related risk. This may consist of a review of general facility and existing information and/or a field investigation, including sampling of soil, air, groundwater, surface water, sediments, and animals or plants as appropriate. The scope is flexible and depends on the specific conditions of the facility.
<b>Feasibility Study (FS)</b>	A study undertaken to develop, screen and evaluate options for remedial action, performed after or in combination with a Remedial Investigation (RI).
<b>Final Plan of Remedial Action (“Final Plan” or FPRA)</b>	DNREC’s plan for cleaning up a hazardous site after it has been reviewed by the public; the written determination by the Secretary, of appropriate action for remediation of a release at or from a facility to protect public health, welfare, or the environment.
<b>Groundwater</b>	Water below the land surface in the zone of saturation.
<b>Groundwater Management Zone (GMZ)</b>	A geographical area where DNREC restricts drilling for ground water because it is or may be contaminated.

<b>Hazardous Substance Cleanup Act (HSCA)</b>	<p>7 Delaware Code, Chapter 91. Found at <a href="http://www.delcode.state.de.us/title7/c091/index.htm#P-1_0">http://www.delcode.state.de.us/title7/c091/index.htm#P-1_0</a></p> <p>In 1990, Delaware enacted HSCA to deal with potentially harmful sites in the state that will not receive the attention of the federal government. In July of 1995, HSCA was amended to encourage voluntary cleanup of sites and restoration of "brownfields."</p>
<b>Interim Action or Interim Response Activity</b>	<p>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.</p> <p>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.</p>
<b>No Further Action (NFA)</b>	<p>A No Further Action decision can be issued at the end of an investigation or the completion of the remedy. NFA means that no known danger exists at the site.</p>
<b>Operations &amp; Maintenance (O&amp;M)</b>	<p>The activities necessary to provide for continued effectiveness and integrity of a remedial action after it is completed.</p> <p>O&amp;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&amp;M.</p>
<b>Owner or Operator</b>	<p>(a) Any person owning or operating a facility.</p> <p>(b) Any person who previously owned, operated, or otherwise controlled activities at a facility.</p> <p>(c) The term "owner or operator" does not include an agency of the State or unit of local government that acquired title or control of the facility involuntarily through bankruptcy, tax delinquency, abandonment or other circumstances.</p> <p>(d) The term "control" does not include regulation of the activity by a federal, state or local government agency.</p> <p>(e) The term "owner or operator" does not include a person, who, without participating in the management of a facility, holds indicia of ownership primarily to protect his security interest in the facility.</p>

<b>Proposed Plan of Remedial Action (“Proposed Plan” or PPRA)</b>	A plan for cleaning up a hazardous site submitted by DNREC for public review and comments; a detailed plan describing cleanup actions and related information for the containment or permanent removal and disposal of hazardous substances from a facility, or other measures to protect public health, welfare, and the environment.
<b>Regulations</b>	As used under HSCA, the Delaware <i>Regulations Governing Hazardous Substance Cleanup</i> , found at <a href="http://www.dnrec.state.de.us/dnrec2000/Divisions/AWM/sirb/DOCS/PDFS/Misc/fdb99085.pdf">http://www.dnrec.state.de.us/dnrec2000/Divisions/AWM/sirb/DOCS/PDFS/Misc/fdb99085.pdf</a>
<b>Remedial Action (RA)</b>	The containment, contaminant mass or toxicity reduction, isolation, treatment, removal, cleanup, or monitoring of hazardous substances released into the environment, or the taking of such other actions as may be necessary to prevent, minimize, or mitigate harm or risk of harm to the public health, welfare, or the environment which may result from a release or an imminent threat of a release of hazardous substances.  After the remedy selected in the Final Plan has been designed and specified, its implementation becomes the RA. The RA should follow the approved design and achieve all performance measures.
<b>Site Investigation and Restoration Branch (SIRB)</b>	The branch within DNREC’s Division of Air and Waste Management (DAWM) which carries out HSCA and the Regulations, overseeing cleanup and restoration of hazardous substance sites..
<b>Surface Water</b>	The waters of the State of Delaware, occurring on the surface of the earth.
<b>Uniform Environmental Covenants Act (UECA)</b>	A standardized form of a land use restriction that is recorded on the deed and runs with the land.
<b>Voluntary Cleanup Program (VCP)</b>	The remedial process established by DNREC under HSCA, that a party willingly enters into (provided its application is approved by DNREC) for the purpose of conducting a remedy at a facility.  When a property is contaminated with hazardous substances there are liabilities under Federal and State laws, regardless of who caused the contamination and when it was caused. Because of these liabilities, old industrial sites (with contamination) may not readily attract developers or buyers. Under the VCP, developers and buyers performing the cleanup of contaminated properties are provided protection from potential liabilities for past contamination, provided certain requirements are met.

### **What is a *Proposed Plan*?**

**A proposed plan tells the public how DNREC plans to clean up a contaminated site.**

**When the Hazardous Substance Cleanup Act was passed in 1995, the Delaware State Legislature wanted to make sure that members of the public would be informed about environmental problems in their**

neighborhoods. It was also important to the Legislature that citizens have a chance to express their opinion concerning the clean up of those environmental problems BEFORE DNREC takes action.

After DNREC studies the a site, it summarizes the problems there and proposes one or more possible solutions in a Proposed Plan. The Proposed Plan contains enough information to allow lay persons to understand the site. It also points to places to easily find more detailed information if needed.

DNREC issues the Proposed Plan by advertising it in at least one newspaper of statewide circulation. The ads for proposed plans usually run on Wednesdays or Sundays in the legal section. Publication in the newspaper is followed by a public comment period of at least 20 days. DNREC frequently holds public meetings during the comment period. Those meetings are usually held near the site.

Comments are collected at the public meetings, by phone or in writing.

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