

# FINAL PLAN OF REMEDIAL ACTION



## KALMAR NYCKEL/CHALLENGE PROGRAM SITE (Operable Unit-1)

*1112 & 1124 East 7<sup>th</sup> Street  
Wilmington, Delaware*

*July 2, 2009  
DNREC Project No. DE-0339*

This Final Plan of Remedial Action (Final Plan) presents the Department of Natural Resources and Environmental Control's (DNREC's) intention to address environmental contamination at the Kalmar Nyckel/Challenge Program Site (Operable Unit-1).

DNREC issued public notice of the Proposed Plan of Remedial Action (Proposed Plan) for the Site on June 2, 2009 and opened a 20-day public comment period. The Proposed Plan is attached. There were no comments from the public; therefore, the Proposed Plan is adopted as the Final Plan.

Remediation will consist of the following activities:

1. Removal of soil from area containing the most elevated levels of lead during an interim action (Completed in June 2009).
2. Installation of clean utility corridors
3. Capping the Site with hardscaping, such as asphalt or concrete, and/or a minimum of two feet of DNREC-approved fill over a marker fabric, in conjunction with redevelopment of the Site.
4. Recording of an environmental covenant consistent with Delaware's Uniform Environmental Covenants Act restricting digging into site soils beneath the cap without prior written DNREC approval and prohibiting the installation of any water supply wells and the use of groundwater in accordance with the existing City of Wilmington Groundwater Management Zone (July 2007).
5. Revision and implementation of the site-specific Contaminated Materials and Water Management Work Plan (CMWMP) (BrightFields, 2008) and Health and Safety Plan (HASP) (BrightFields, 2008)
6. Establishment and implementation of a DNREC-approved Operation and Maintenance (O&M) Plan within 90 days of the issuance of the Certification of Completion of Remedy

### **Approval:**

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

Kathleen Stiller, Program Manager II  
Site Investigation and Restoration Branch



## PROPOSED PLAN OF REMEDIAL ACTION

Kalmar Nyckel/ Challenge Program Site  
Operable Unit 1 (OU-1)  
Wilmington, Delaware  
DNREC Project No. DE-0399



June 2009

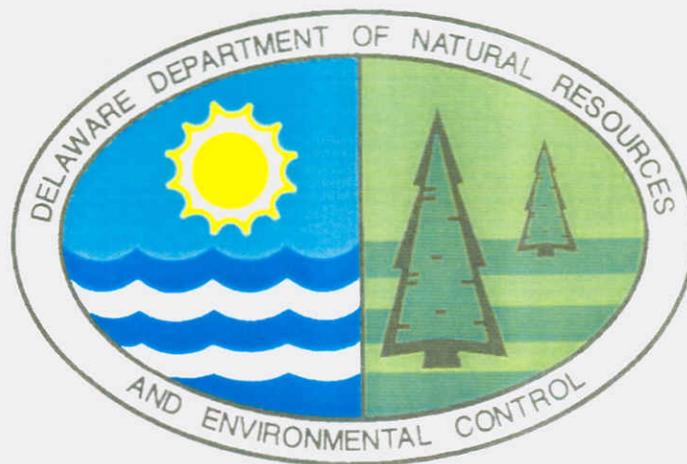
Delaware Department of Natural Resources and Environmental Control  
Division of Air and Waste Management  
Site Investigation & Restoration Branch  
391 Lukens Drive  
New Castle, Delaware 19720

### CONTENTS

- Proposed Plan: Questions and Answers
- Figures 1, 2 and 3
- Appendix: Site Photographs
- Glossary of Terms
- Attachment: *What is a Proposed Plan?*

# PROPOSED PLAN OF REMEDIAL ACTION

Kalmar Nyckel/Challenge Program Site (OU-1)  
Wilmington, Delaware  
DNREC Project No. DE-0399



**Approval:**

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

	Approved by:
James D. Werner, Director Division of Air & Waste Management	
2 JUN 5 2009	Date

## Kalmar Nyckel/Challenge Program Site (OU-1)



### What is the Kalmar Nyckel/Challenge Program Site?

The Kalmar Nyckel and Challenge Program Properties (the Site) are located on the 7<sup>th</sup> Street Peninsula at 1112 & 1124 East 7<sup>th</sup> Street, within the city limits of Wilmington, Delaware. The properties are owned by the City of Wilmington and leased to the Kalmar Nyckel Foundation and the Challenge Program, both non-profit organizations. The Site currently houses the Challenge Program workshop/offices and the Kalmar Nyckel's gift shops, museum, and offices. The Site also includes a storage area for the materials from the Challenge Program's deconstruction of historic buildings. The Kalmar Nyckel Ship is docked here, on the Christina River, throughout the year, with spring and summer time events/tours. The property is depicted on Figures 1 and 2.

The Kalmar Nyckel and Challenge Program Site has been divided into two operable units, OU-1 and OU-2, for purposes of remediation. OU-1 is located along the property limits of the sublease that the Challenge Program has with the Kalmar Nyckel Foundation. Conversely, OU-2 is the remaining portion of the Site, or the property limits of the lease that the Kalmar Nyckel Foundation has with the City of Wilmington. This includes the Kalmar Nyckel Shipyard, museum, and office building (Figure 3). This Proposed Plan of Remedial Action pertains only to OU-1.

**Tax Parcel Numbers:** 26-044.00-012 and 26-044.00-010

**Address:** 1112 & 1124 East 7<sup>th</sup> Street, Wilmington

**Nearest major intersection:** East 7<sup>th</sup> Street and North Claymont Street

**Area:** 3.36 acres

**Surrounding Property:** Surrounding land use is mostly commercial, a vacant wooded lot, and Fort Christina Park, which is currently closed to the public.

**Zoning:** W-2 Waterfront MFG/Commercial

**Site Utilities:** Water and sewer service provided by the City of Wilmington. Electric service provided by Delmarva Power.

**Surface water:** The Christina River borders the Site to the south

**Topography:** The Site surface is relatively flat with a slight slope toward 7<sup>th</sup> Street.

**Groundwater:** Groundwater ranges from 2 to 8 feet below ground surface. It appears that groundwater beneath the site is influenced by the tide and flows northwest during high tide and flows northeast during low tide.

### What happened at the Kalmar Nyckel/Challenge Program Site?

According to historical records, much of this portion of the East 7<sup>th</sup> Street Peninsula was used by the Jackson and Sharp American Car Foundry. Jackson and Sharp built and shipped railroad cars from the early to mid 1800s through the mid 1900s. At its peak, Jackson and Sharp owned over

half of the East 7<sup>th</sup> Street Peninsula. Given the nature of industrial and commercial disposal practices before environmental regulation, the possibility exists for contamination to have migrated into the subsurface media from historic site uses or to have been deposited as part of the contaminated historic fill used to fill in the marsh areas on the 7<sup>th</sup> Street Peninsula.

### **What is the environmental problem at the Kalmar Nyckel/Challenge Program Site?**

According to environmental investigations, the Kalmar Nyckel Challenge Program Site has concentrations of metals and polycyclic aromatic hydrocarbons (PAHs) in the soil that exceed both DNREC's unrestricted use (residential/recreational) and restricted use (commercial/industrial) criteria. Groundwater at the Site contains elevated concentrations of iron and manganese. The contaminant load calculations, which are used to evaluate whether or not the groundwater discharge is impacting the quality of an adjacent water body, indicate that the contaminants are not adversely impacting the Christina River. Sediment samples collected from the Christina River alongside the Site contain elevated concentrations of various metals and PAHs above the sediment criteria. The surface water samples, that were also collected upstream and downstream of the Site, contain elevated concentrations of several metals. The comparable sediment and surface water quality of both upstream and downstream samples suggest that the Site is not the source of the metals and PAHs contamination in the Christina River.

In July 2008, a Site-Specific Assessment (SSA) was conducted at the Kalmar Nyckel Challenge Program Site to further evaluate the soil, groundwater, sediment and surface water at the Site. Twenty-three (23) soil borings were advanced and 46 soil samples, encompassing both surface and subsurface, were collected during this sampling event. All samples were first screened and ten soil samples were selected for analysis at TestAmerica Laboratory in Edison, New Jersey. Groundwater samples were collected from 4 monitoring wells installed during the sampling event. In addition, 4 sediment samples were collected and 2 surface water samples were collected from the adjacent Christina River. All groundwater, surface water, and sediment samples were also analyzed at Test America Laboratory in Edison, New Jersey.

The contaminants of concern (COCs) in soil are arsenic, lead and various PAHs. DNREC determined that their presence in soil at the Site poses a potential unacceptable increased carcinogenic risk to human health; however, that there is not a potential unacceptable increased non-carcinogenic risk posed by Site soil under either unrestricted or restricted use scenarios. Surface and subsurface soil analytical data was used to evaluate the risk to future construction workers performing intrusive activities at the Site. Only the elevated concentrations of lead in Site soil present a potential increased risk for construction workers. Sediment samples contained several metals and PAHs exceeding the corresponding sediment URS values.

There are no contaminants of concern in the groundwater at the Kalmar Nyckel-Challenge Program site based on either an industrial or residential/recreational setting. The Site is, however, located within the City of Wilmington Groundwater Management Zone (GMZ), where the use of groundwater is restricted by DNREC. The groundwater

River surface water does not pose a potential increased risk to human health or the environment.

Also, no contaminants that were detected in either soil or in groundwater were identified as being both sufficiently volatile and toxic as to constitute a vapor intrusion hazard.

### **What does the owner want to do at the Kalmar Nyckel/Challenge Program Site?**

On OU-1, the proposed redevelopment of the property will include a new LEED-certified green workshop and office building for the Challenge Program and will highlight an original railcar manufactured by the Jackson Sharp Company. The projected completion of the Challenge Program's new building is anticipated to be in the winter of 2009. Demolition of the original Challenge Program building was completed in July 2008.

### **What clean-up actions have been taken at the Kalmar Nyckel/Challenge Program Site?**

An Interim Action for OU-1 is anticipated to remove soil from the area with the most elevated concentrations of lead in the surface soil within the Challenge Program's leased property boundaries. As is, this area presents a potential exposure risk scenario to the Challenge Program workers, the Kalmar Nyckel volunteers, and the visiting tour groups. DNREC believes that the Interim Action should eliminate the risk so that the Site is safe for the anticipated future use. The Interim Action for OU-1 is anticipated to be completed in June 2009. The logistics of the final remedial actions for OU-1 will be addressed in a Remedial Action Work Plan to be approved by DNREC prior to implementation. The remediation of OU-2 will be addressed at a later date in a separate Proposed Plan of Remedial Action.

### **What additional clean-up actions are needed at the Kalmar Nyckel/Challenge Program Site (OU-1)?**

In addition to the Interim Action to remove the elevated lead areas on OU-1, DNREC's Proposed Plan for OU-1 includes capping the site; implementation of an environmental oversight program during redevelopment; prohibition of any land disturbance on the property without DNREC's approval, prohibition of groundwater usage at the site; and compliance with a DNREC-approved Operation and Maintenance Plan (O&M Plan).

DNREC requires the following remedial actions be performed on OU-1 of the Kalmar Nyckel/Challenge Program Site:

1. Removal of soil from areas containing the most elevated levels of lead, as performed in the June 2009 Interim Action.
2. Installation of clean utility corridors to eliminate exposure to Site soil to future utility workers.
3. Capping the Site with hardscaping, such as asphalt or concrete, and/or a minimum of two feet of DNREC-approved fill over a marker fabric, in conjunction with redevelopment of the Site.
4. Recording of an environmental covenant consistent with Delaware's Uniform Environmental Covenants Act (Title 7, Del. Code Chapter 79, Subtitle II). The covenant will require written DNREC approval prior to any soil disturbance below the cap and prohibit the installation of any water supply wells and the use of groundwater through the existing City of Wilmington Groundwater Management Zone (July, 2007).
5. Revision and implementation of the site-specific Contaminated Materials and Water Management Work Plan (CMWMP) (BrightFields, 2008) and Health and Safety Plan (HASP) (BrightFields, 2008) to outline how potential environmental issues encountered during redevelopment and construction will be handled.
6. Establishment and implementation of a DNREC-approved Operation and Maintenance (O&M) Plan within 90 days of the issuance of the Certification of Completion of Remedy. The O&M Plan will detail the procedures and practices, including regular inspection, to ensure long-term integrity of the cap.

### **What are the long term plans for the Site after the cleanup?**

The Challenge Program has begun construction activities associated with the foundation for their new LEED-certified green workshop and office building. The neighboring Kalmar Nyckel buildings are also planned to be renovated/redeveloped into modern structures and will continue to host numerous tour groups; however, these plans are still in the conceptual phase. Therefore, the future Site use will include a mix of recreational and commercial uses. Implementation of an O&M Plan will ensure that the remedial measures to be taken at the Site remain protective of the human health and the environment.

DNREC will issue a Certification of Completion of Remedy for the Kalmar Nyckel Challenge Program Site (OU-1) following the completion of the interim action soil removal, installation of clean utility corridors, capping of the surface soil, recording of an environmental covenant restricting digging beneath the cap, as well as, restricting the usage of Site groundwater, both without prior written DNREC approval, and establishment of a site-specific O&M Plan.

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

The complete file on the site, including the Site-Specific Assessment and the Supplemental Risk Report, is available at the DNREC office, 391 Lukens Drive in New Castle. Most documents are also found on:

<http://www.dnrec.state.de.us/dnrec2000/Divisions/AWM/sirb>

The 20-day public comment period begins on June 7, 2009 and ends at close of business (4:30 pm) on June 29, 2009. Please send written comments to the DNREC office or call Lindsay Hall, Project Manager, at: 302-395-2600.

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## 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>Certified Brownfield</b>	A brownfield that DNREC has determined is eligible for partial funding through the Delaware Brownfields Program.
<b>Contaminant of Concern (COC)</b>	These are potentially harmful substances at concentrations above acceptable levels (e.g. metals and PAH).
<b>Certificate of Completion of Remedy (COCR)</b>	A formal determination by the Secretary of DNREC that remedial activities, as required by the site-specific Final Plan of Remedial Action, have been completed.
<b>Exposure</b>	Contact with a substance through inhalation, ingestion, or direct contact with the skin. Exposure may be short term (acute) or long term (chronic).
<b>Final Plan of Remedial Action</b>	DNREC's adopted plan for cleaning up a hazardous site.
<b>Green</b>	A term used to describe either a product whose manufacture and/or use or a process whose implementation have minimal adverse impact to the environment.
<b>Hazardous Substance Cleanup Act (HSCA)</b>	Delaware Code Title 7, Chapter 91. The law that enables DNREC to identify parties responsible for hazardous substances releases and requires cleanup with oversight of the Department.
<b>Human Health Risk Assessment (HHRA)</b>	An assessment done to characterize the potential human health risk associated with exposure to site-related chemicals.
<b>Leadership in Energy and Environmental Design (LEED)</b>	A set of standards created by a U.S. Council by which to evaluate the environmental sustainability of construction projects.
<b>Proposed Plan of Remedial Action</b>	DNREC's initial plan for cleaning up a hazardous site, which is subject to public comment before being adopted as final.
<b>Risk</b>	Likelihood or probability of injury, disease, or death.
<b>Site-Specific Assessment (SSA)</b>	Environmental studies of a site including sampling of soils, groundwater, surface water, sediment and/or wastes on the property.
<b>Uniform Risk-Based Standards (URS)</b>	A set of concentration criteria for various contaminants potentially present in site media that are developed for protection of human health and the environment



FIGURE 1  
Site Location Map

1112 & 1124 East 7th Street  
Kalmar Nyckel Challenge Program

Wilmington, Delaware





Peninsula Ventures  
Property  
Parcel ID:  
2604400029  
2.69 Acres

Pack  
and Process  
Property  
Parcel ID:  
2604400015  
0.84 Acres

Pack  
and Process  
Property  
Parcel ID:  
2604400015  
0.84 Acres

7th Street

CLAYMONT ST

Marine Lubricants Property  
Parcel ID:  
2604400045  
2.16 Acres

Kalmár Nyckel  
1124 E. 7th Street  
Parcel ID:  
2604400012  
2.73 Acres

Kalmár Nyckel  
1112 E. 7th Street  
Parcel ID:  
2604400010  
0.63 Acres

John Kaiser  
Trustee Property  
Parcel ID:  
2604400031  
0.59 Acres

Parcel ID:  
2604400011  
0.45 Acres

Fort Christina  
Park  
Parcel ID:  
2604400009  
2.18 Acres

Figure 2  
Site Layout  
Kalmár Nyckel Challenge Program  
Wilmington, Delaware



**CHRISTINA RIVER**

**Legend**

- Parcel
- Kalmár Nyckel Challenge Program Property Boundary

Source: Delaware  
DataMill, 2007 Aerial

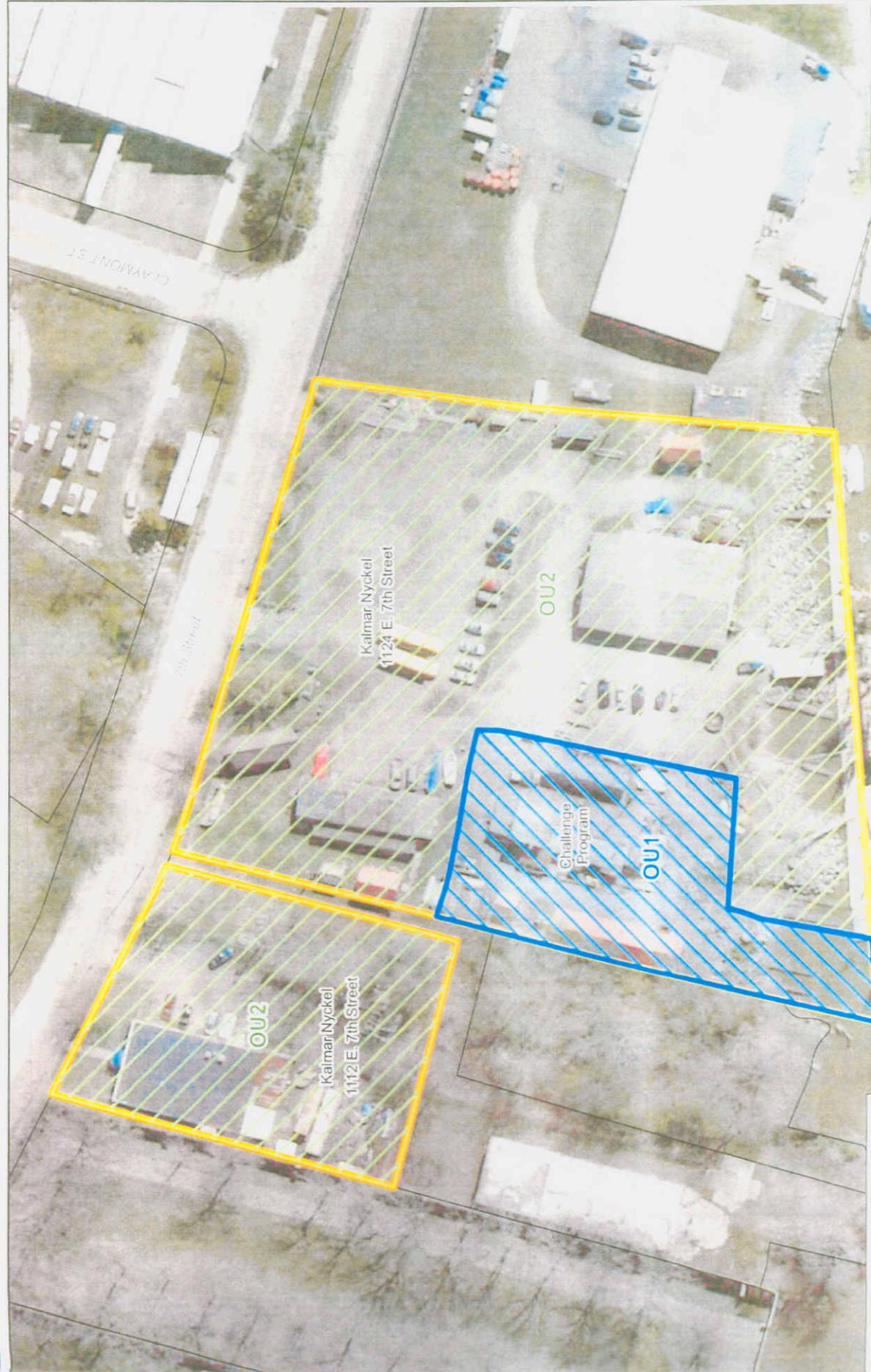


Figure 3  
 OU Location  
 Kalmar Nyckel - Challenge Program  
 Wilmington, Delaware



Legend

- OU 1
- OU 2
- Tax Parcel
- Kalmar Nyckel/Challenge Program Property Boundary

Source: Delaware DataMIL, 2007 Aerial

**CHRISTINA RIVER**

CLAYMONT ST

7th Street

Kalmar Nyckel  
 1124 E. 7th Street

OU2

Challenge Program

OU1

OU2

Kalmar Nyckel  
 1112 E. 7th Street

Appendix Site Photos  
Proposed Plan of Remedial Action  
The Kalmar Nyckel and Challenge Program (DI-0399)  
Wilmington, Delaware



July 2008  
The Challenge Program's Former Workshop



November 2008  
The Challenge Program Workshop Demolished

Appendix Site Photos  
Proposed Plan of Remedial Action  
The Kalmar Nyckel and Challenge Program (DE-0399)  
Wilmington, Delaware



December 2008  
Challenge Program's Temporary Office



May 2009  
Old Train Jackson & Sharp Train

Appendix Site Photos  
Proposed Plan of Remedial Action  
The Kalmar Nyckel and Challenge Program (DE-0399)  
Wilmington, Delaware



05/12/2009

May 2009  
Kalmar Nyckel Gift Shop/Challenge Program's Temporary Office



May 2009  
Kalmar Nyckel Boat Dock

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## What is a *Proposed Plan*?

A Proposed Plan of Remedial Action (Proposed Plan) is a summary of how DNREC plans to clean up a contaminated site. A Final Plan of Remedial Action (Final Plan) is the adoption of the Proposed Plan, after all comments made by the public within the comment period of twenty days have been considered and addressed by DNREC.

The Delaware State Legislature passed the Hazardous Substance Cleanup Act (HSCA) in 1990. The Legislature made sure that members of the public would be informed about environmental problems in their own neighborhoods and have a chance to express their opinion concerning the clean up of those environmental problems before DNREC takes action.

After DNREC studies 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. More detailed information can be found in the reports and documents approved by DNREC. All of the documents and reports created by DNREC or consultants during the course of the investigation of the site are available to the public at the offices of DNREC-SIRB or at DNREC's website:

[http://www.dnrec.state.de.us/dnrec2000/Divisions\\_AWM/sirb\\_sitefiles.asp](http://www.dnrec.state.de.us/dnrec2000/Divisions_AWM/sirb_sitefiles.asp)

DNREC issues the Proposed Plan by advertising it in at least one newspaper in the county where the site is located. The legal notices for the Proposed Plans and the Final Plans usually run on Wednesdays or Sundays in the legal classified section of the News Journal and or the Delaware State News. The public comment period begins on the day (Wednesday), or the day after (Sunday) the newspaper publishes the legal notice for the Proposed Plan.

DNREC frequently holds public meetings during the comment period. Those meetings are usually held near the site in the evening. Citizens can request a public meeting if DNREC did not already schedule one.

Comments are collected at the public meetings, by phone or in writing. DNREC considers all comments and questions from the public before the Proposed Plan is finalized and adopted as a Final Plan.

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