

**STATE OF DELAWARE  
DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL  
CONTROL SITE INVESTIGATION AND RESTORATION BRANCH**

**FINAL PLAN OF REMEDIAL ACTION**



**APRIL 2007**

SCANNED

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**Naga Foods Site  
Wilmington, Delaware**

**DNREC Project No. DE-1369**

This Final Plan of Remedial Action (Final Plan) presents the Department of Natural Resources and Environmental Control's (DNREC's) proposed cleanup alternative for the remediation for the contamination at the Naga Foods Site (Site) in Wilmington, Delaware. For Site-related reports and more information, please see the public participation section of this document.

The purpose of the Final Plan is to provide: 1) specific information about the contamination present at the Site, 2) the cleanup alternatives DNREC has considered for the contamination, and 3) the final remedial action for the Site. In addition, as described in Section 12 of the Delaware Regulations Governing Hazardous Substance Cleanup (the Regulations), DNREC provided notice to the public and an opportunity for the public to comment on the Proposed Plan. At the comment period's conclusion, DNREC reviewed and considered all of the comments received and issued the Final Plan of Remedial Action (Final Plan). The Final Plan designates the selected remedy for the Site. All investigations of the Site, the Proposed Plan, comments received from the public, DNREC's responses to the comments, and the Final Plan will constitute the Remedial Decision Record.

The Final Plan summarizes the Brownfields Remedial Investigation Report revised December 2006, and the administrative record file upon which this final remedy is based. Copies of these documents can be obtained or viewed at locations listed at the end of this document.

## **INTRODUCTION**

The Site is located at 1331 North Heald Street in Wilmington, Delaware and is currently owned by the City of Wilmington. The Site is comprised of one parcel of land (26-036.20-067) and encompasses approximately 0.5 acres of land (Figure 1).

Naga Food Products, Inc. entered into a Brownfield Development Agreement (BDA) with DNREC in December 2006 to conduct a Brownfields Remedial Investigation (BRI) of the Site in preparation for the potential transfer of the property. Naga Food Products, Inc. contracted Ten Bears Environmental, LLC. (Ten Bears), a HSCA-approved environmental consulting company, to perform the BRI. Naga Foods Products, Inc. intends to redevelop the Site into a food packaging and processing facility.

## **SITE DESCRIPTION AND HISTORY**

The Site is located in a residential/commercial area and was formerly used as a forklift repair facility. The Site has been vacant for a number of years. The property is currently covered by an approximately 8,000 square-foot, concrete block building that is vacant and in poor condition; an approximately 2,500 square-foot chain-link fence enclosed area on the northeastern corner of the Site; and an approximately 4,500 square-foot area adjacent to Thatcher Street that is partially enclosed with a concrete block wall. The building is constructed over a concrete slab-on-grade, and the areas outside the building are completely covered with asphalt paving and concrete (Figure 2).

According to historical information, the Site was vacant land until 1951. Domestic dwellings occupied the Site between 1951 and 1984. The forklift repair facility operated on the Site from 1984 to 1986, and the City of Wilmington has owned the property since 1986. The City of Wilmington has operated the Site as a vehicle storage facility since that time.

The Site is located adjacent to another Brownfields site, the Habitat for Humanity site (DE-1372), which DNREC investigated in the summer of 2006. The Habitat for Humanity site is slated for residential redevelopment. Residences and an equipment parking facility comprise the remainder of the 1300 block of North Heald Street. Residences and commercial buildings are located north and east of the Site across 14<sup>th</sup> and North Heald Streets (Figure 1).

## **Site Investigation History**

The City of Wilmington hired consultants to perform a Phase I and a Phase II evaluation of the property in 1993 and 1994 respectively. The results of the Phase II investigation led to the identification and removal of a 1,000 gallon heating oil tank. DNREC's Tanks Management Branch oversaw the removal of this tank.

### ***Limited Hydrogeologic Investigation, 1996***

Following the removal of a 1,000 gallon heating oil tank on the Site, the TMB required the City of Wilmington to perform a Limited Hydrogeologic Investigation. Based on this investigation, the City of Wilmington removed approximately 110 tons of petroleum-contaminated soil from around the tank. The TMB issued a No Further Action letter in December 1996 based on the investigation, over excavation, and confirmatory soil samples.

***Site Specific Assessment, June 2006***

DNREC completed a Site Specific Assessment (SSA) of the Site. For this investigation, DNREC collected surface and subsurface soil samples and groundwater samples from the Site. Figure 2 shows the locations of the sampling points and groundwater monitoring wells on the Site. Several contaminants were detected in surface soil, subsurface soil, and groundwater above Delaware's Uniform Risk-Based (URS) values. A detailed discussion of the sampling results is included in the SSA report. The following section is a summary of the investigation results.

***Brownfield Remedial Investigation Report, August 2006 (revised December 2006)***

Ten Bears completed a Brownfield Remedial Investigation (BRI) for the Site. This report included an assessment of the risk posed by the contaminants found onsite to the current and future users of the Site. More information is included in the following section.

## **INVESTIGATION RESULTS**

### **SOIL**

In Site soils, the following compounds were detected at concentrations above DNREC's Uniform Risk-Based Remediation Standards (URS) for restricted use (commercial) in a non-critical water resource area: arsenic, lead, iron, and poly-aromatic hydrocarbons (PAHs), including benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, and dibenz(a,h)anthracene. These compounds are shown in bold in Table 1.

The following compounds were detected at concentrations above DNREC's URS for unrestricted use (residential) in a non-critical water resource area antimony, barium, cadmium, copper, chromium, manganese, mercury, nickel, selenium, thallium, vanadium, zinc, indeno(1,2,3-cd)pyrene; the following PCBs: Aroclor 1260 and 1262; and the following pesticides: Alpha-BHC, Heptachlor, and Dieldrin. While the Site is slated for restricted (commercial) use and is zoned commercial, the compounds that exceed the unrestricted use URSs were also assessed to provide a more conservative evaluation of the Site.

Contaminants in the Site soil that exceeded the URS values are shown in Table 1.

TABLE 1

Contaminant of Concern (COC)	Mean Concentration <sup>1</sup> (mg/kg)	DNREC Unrestricted <sup>2</sup> URS (mg/kg)	DNREC Restrictive URS <sup>3</sup> (mg/kg)
<b>METALS</b>			
Antimony	20.2	3	82
Arsenic	<b>60.4</b>	11 <sup>^</sup>	11 <sup>^</sup>
Barium	1,079	550	14,000
Cadmium	30.5	4	100
Copper	1,267	310	8,200
Lead	<b>2,392</b>	400	1,000
Iron	<b>85,598</b>	2,300	61,000
Manganese	783	160	4,100
Mercury	25.8	10	610
Nickel	57.8	160	4,100
Selenium	11.2	39	1,000
Thallium	51.9	18	220
Vanadium	164	55	1,400
Chromium (total)	110.41	12,000/270*	310,000/610**
Zinc	8,001	2,300	61,000
<b>POLY-AROMATIC HYDROCARBONS (PAHs)</b>			
Benzo(a)anthracene	<b>10.9</b>	0.9	8
Benzo(b)fluoranthene	<b>10.4</b>	0.9	8
Benzo(a)pyrene	<b>10.6</b>	0.09	0.8
Dibenz(a,h)anthracene	<b>1.36</b>	0.09	0.8
Indeno(1,2,3-cd)pyrene	3.76	0.9	8
<b>PCBs</b>			
Aroclor 1260	0.99	0.3	3
Aroclor 1262	0.42	Not Listed	Not Listed
<b>PESTICIDES</b>			
Alpha-BHC	0.16	0.1	0.9
Heptachlor	0.25	0.1	1
Dieldrin	0.15	0.04	0.4

Notes:

- <sup>1</sup> Mean concentration calculated using the 95% Upper Confidence Limit (UCL) method
- <sup>2</sup> DNREC Unrestricted Use, Non-Critical Water Resource Area Uniform Risk-Based Standards
- <sup>3</sup> DNREC Restricted Use, Non-Critical Water Resource Area Uniform Risk-Based Standards
- <sup>^</sup> The Default Background Standard value for Arsenic (DNREC policy, 2007)
- \* Chromium III/Chromium VI Unrestricted Use URS values
- \*\*Chromium III/Chromium VI Restricted Use URS values

The **bold** contaminants are the Restricted Use Contaminants of Concern for the Site.

## GROUNDWATER

Groundwater occurred at a depth from 5 to 7 feet below ground surface (bgs) at the Site. Based on information from the adjacent HSCA sites, groundwater flow in the area is primarily to the south. DNREC installed and sampled two monitoring wells during the Site investigation. Only iron and manganese were detected in the groundwater above their applicable DNREC standard

(URS value). Iron and manganese URSs are based on the Federal Secondary Maximum Contaminant Levels (SMCLs). The SMCLs represent advisory values for odor and taste of drinking water and are not enforceable. Iron and manganese are not considered to be Contaminants of Concern.

Contaminants that exceeded URS in groundwater at the site are shown in Table 3:

**Table 3: Groundwater Results**

<u>Contaminant</u>	<u>Maximum Concentration*</u> (ug/L)	<u>Groundwater URS</u> (ug/L)
Iron	36,300	300
Manganese	1,270	50

\* Maximum Concentration detected in groundwater.

## SITE RISK EVALUATION

For the purpose of the soil risk assessment, both shallow (0-2 feet) and deep (>2 feet) soil sample results were grouped together instead of being evaluated separately. This approach was used because both the surface and subsurface soil are all fill material, and it is anticipated that future site work will result in the mixing of these soils. A risk assessment was performed based on all of the soil data collected from the Site.

### Soil

The cumulative carcinogenic risk posed by the Site soil to human health in a restricted use (commercial) setting is calculated to be 3.53 in 100,000 ( $3.53 \times 10^{-5}$ ). The risk evaluation indicated that the cumulative cancer risk is slightly greater than the DNREC cleanup level of 1 in 100,000 ( $1 \times 10^{-5}$ ).

The non-carcinogenic risk expressed as the hazard index (HI) for the Site soil in a restricted use (commercial) setting is 0.82. The results are less than the DNREC cleanup level of hazard index of 1.0.

The cumulative carcinogenic risk posed by the Site soil to a construction worker performing intrusive work on the Site was also evaluated. The risk to a construction worker on the Site is calculated to be 6.86 in 1,000,000 ( $6.86 \times 10^{-6}$ ), which is less than the DNREC cleanup level of 1 in 100,000 ( $1 \times 10^{-5}$ ).

### Groundwater

Groundwater, as described above, does not contain any contaminants of concern for the Site. The Site is also included in the City of Wilmington's Groundwater Management Zone, which prohibits the installation of drinking water wells on the Site. Currently, groundwater is not being used for drinking water at the Site.

## **REMEDIAL ACTION OBJECTIVES**

According to Section 8.4 (1) of the HSCA Regulations, Site-specific remedial action objectives (RAOs) must be established for all plans of remedial action. The Regulations provide that DNREC will set objectives for land use, resource use, and cleanup levels that are protective of human health and the environment. The following qualitative RAOs are appropriate for the Site:

### ***Qualitative Objectives***

- Restrict the future use of the Site to restricted use (commercial).
- Control potential human exposure (dermal, inhalation, and ingestion) to the Site soils.

### ***Quantitative Objectives***

- Prevent human exposure to Site soils contaminated with the metals arsenic, lead, and iron, as well as PAHs, specifically benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, and dibenz (a,h) anthracene, that would result in a carcinogenic risk exceeding 1 in 100,000 or a non-carcinogenic exceeding a hazard index of 1.0.

## **EVALUATION OF REMEDIAL ALTERNATIVES**

A presumptive remedy is the preferred and established remedial alternative for common categories of releases or facilities. The presumptive remedy considered for the Site is an environmental covenant restricting use of the Site for restricted use (commercial) purposes, including the construction of new a new building foundation, maintenance of the existing building foundation, and paved areas, which serve as a cap. DNREC will also require a Site-Specific Contaminated Materials Management Plan and Health and Safety Plan for all construction activities. According to Subsection 8.5 (3) of the HSCA Regulations, “The Department may consider and approve any presumptive remedy that is determined to satisfy the requirements contained in Subsection 8.6”. The proposed remedy was determined to be protective of human health, welfare, and the environment and meet the remaining requirements of Subsection 8.6.

DNREC proposes environmental covenants as the preferred remedial action for the Site since the remedy meets the criteria presented above. The Site owners must also execute an Operations and Maintenance Plan (O&M Plan) for the inspection and any necessary repairs of the building foundation and paved areas, which serve as a cap to prevent future Site workers from coming into contact with surface soils.

## **FINAL PLAN OF REMEDIAL ACTION**

Based on DNREC’s evaluation of the Site information, which includes current and past environmental investigations, historical information, the above-mentioned remedial action objectives, and the evaluation of the presumptive remedy, the following are the remedial actions:

1. An environmental covenant, consistent with Delaware's Uniform Environmental Covenants Act, UECA (Title 7, Del. Code Chapter 79, Subtitle II), will be required at the Site, within 90-days following DNREC's adoption of the Final Plan of Remedial Action. The environmental covenant will describe the following:
  - a) The Site will be restricted to commercial use. Any future development will be limited to commercial use.
  - b) Any land disturbing activities will be prohibited including, but not limited to digging, drilling, construction, earth moving or any other land disturbing activity on the Site will not be allowed without DNREC's prior written approval. DNREC's approval will require a Site-specific Contaminated Material Management Plan and Health and Safety Plan.
2. The building foundation and paved areas will serve as an impervious cap for the Site. The Site owner must maintain the integrity of this cap in order to be protective of future Site users.
3. The Site owners must implement a DNREC-approved Operations and Maintenance (O&M) Plan within 90 days following construction completion. The O&M Plan will provide procedures for evaluating the integrity of the Site cap following construction completion.

## **PUBLIC PARTICIPATION**

The Department actively solicited written public comments and suggestions on the Proposed Plan of Remedial Action. The comment period began on March 14, 2007 and ended on April 4, 2007. No comments were received. If you have any questions or concerns regarding the Naga Foods site, or if you would like to view reports or other information regarding this Site, please contact the project manager, Morgan Price, at 391 Lukens Drive, New Castle, Delaware 19720 or at 302.395.2600

## **DECLARATION**

The Final Plan of Remedial Action for the Naga Foods site is protective of human health, welfare and the environment, and is consistent with the requirements of the Delaware Hazardous Substance Cleanup Act.

  
James Werner, Director,  
Division of Air and Waste Management

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Date

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**SITE FIGURES**



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0 25 50 75 100 Feet

**DNREC  
SITE INVESTIGATION &  
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391 LUKENS DR  
NEW CASTLE, DE 19720-2774  
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**FIGURE 1  
Naga Foods Site  
in relation to the  
Habitat for Humanity Site**

