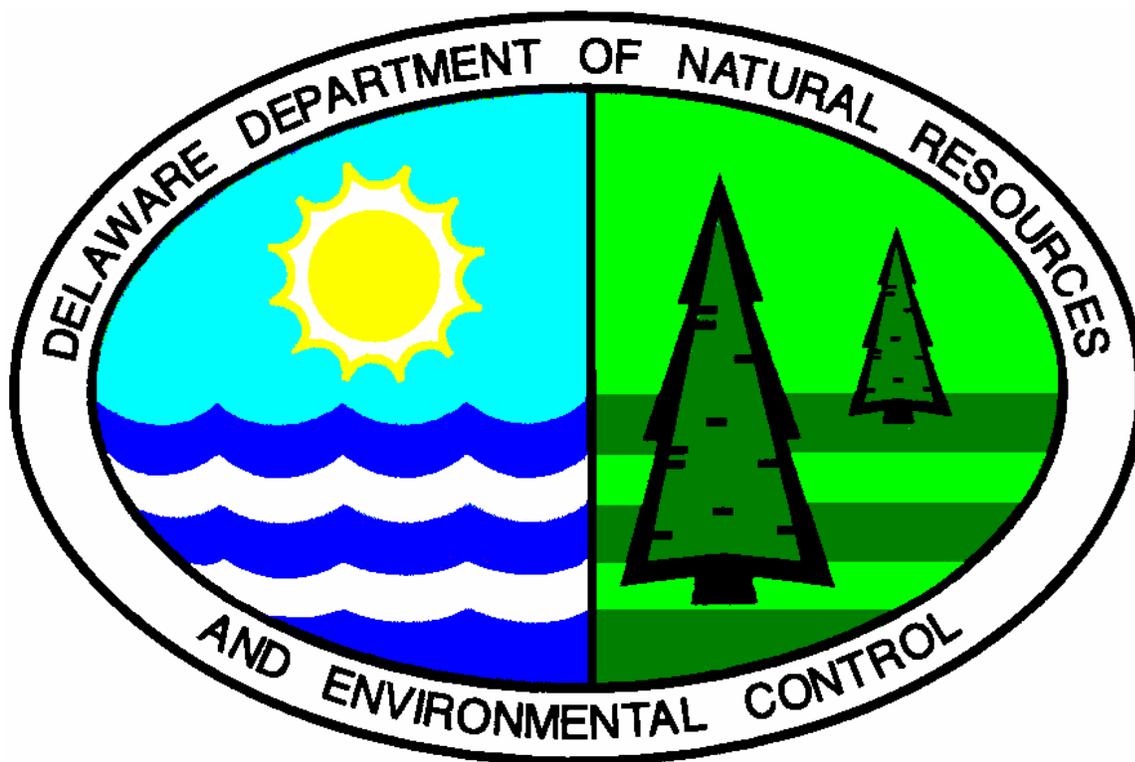


PROPOSED PLAN OF REMEDIAL ACTION

Former Draper King Cole Vegetable Cannery

Milton, Delaware

DE-1252



February 2003

**Department of Natural Resources and Environmental Control
Division of Air and Waste Management
Site Investigation and Restoration Branch**

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1.0 INTRODUCTION

The Former Draper King Cole Vegetable Cannery (Cannery or site) is located on Chestnut Street, in Milton, Delaware (Figure 1). In order to determine the potential for environmental liability prior to the development of the site, Cannery Village, L.L.C. (Cannery Village) entered into the Department of Natural Resources and Environmental Control's (DNREC's or Department's) Voluntary Cleanup Program (VCP) under the provisions of the Delaware Hazardous Substance Cleanup Act (HSCA), 7 Del. C. Chapter 91. Through a VCP Agreement, Cannery Village agreed to investigate the potential risks posed to public health, welfare and the environment at the site. Cannery Village contracted Ten Bears Environmental, L.L.C. (Ten Bears) to perform a remedial investigation/feasibility study (RI/FS) of the site.

The site was divided into two operable units (OUs) to assess future development options (Figure 2). OU-1 consists of the areas proposed for development as residential use (apartments, single and multi-family dwellings), with open greenways and recreational areas, and is located on the northeastern and southern portions of the site. OU-2 consists of the area proposed for nonresidential use (biotechnology/agribusiness, commercial/retail/warehousing) and is located on the northwestern and center areas of the site.

The purpose of the RI was to: 1) understand the nature and extent of any soil, sediment and/or groundwater contamination at the site, and 2) evaluate risks to public health, welfare and the environment associated with any identified contamination. Finally, Cannery Village agreed to perform, if necessary, a FS that would identify and recommend a remedial action, if required by the Department. Cannery Village desires to obtain a Certification of Completion of Remedy from DNREC upon completion of all required tasks.

This document is the Department's proposed plan of remedial action (proposed plan) for both OU-1 and OU-2 at the site. It is based on the results of the previous investigations performed at the site. The proposed plan is issued under the provisions of the HSCA and the Regulations Governing Hazardous Substance Cleanup (Regulations). It presents the Department's assessment of the potential health and environmental risks posed by the site.

As described in Section 12 of the Regulations, DNREC will provide notice to the public and an opportunity for the public to comment on the proposed plan. At the comment period's conclusion, DNREC will review and consider all of the comments received and then will issue a final plan of remedial action (final plan). The final plan shall designate the selected remedy for the site. All investigations of the site, the proposed plan, the comments received from the public, DNREC responses to those comments, and the final plan will constitute the Remedial Decision Record for the site.

Section 2.0 presents a summary of the site description, site history and previous investigations of the site. Section 3.0 provides a description of the investigation results. Section 4.0 presents a discussion of the remedial action objectives (RAOs). Section 5.0 presents the proposed plan of remedial action for the site. Section 6.0 discusses public participation requirements.

2.0 SITE DESCRIPTION AND HISTORY

The site is located on Chestnut Street in Milton, Sussex County, Delaware. The area addressed by the RI/FS consists of portions of three tax parcels (Tax Parcel Nos. 2-35-20.11-52, 2-35-20.11-53, and 2-35-20-53) totaling approximately 35 acres (Figure 3). To simplify future record keeping, Cannery Village intends to subdivide the portions of the three tax parcels so that the VCP determination area will consist of separate tax parcels.

The site is located in a mixed-use area of Milton, Delaware. Residential properties are located north, south, and west of the site. Agricultural properties are located east and south of the property. Commercial properties are present north of the site. A grain-distribution/processing facility and a lumberyard are present immediately west of the property, across Chestnut Street. A vehicle maintenance facility owned and operated by Cannery Village is present approximately 500 feet southwest of the site. A small creek, Round Pole Branch, is located at the site.

The site historically was used to process, can, and freeze vegetables. During its operation, the majority of the canning facility (the western portion of the site) was primarily covered with buildings. Concrete and earthen structures formerly used to treat process wastewater from the vegetable-canning operations remain on the eastern portion of the site. These structures include a holding tank, chlorine contact tank, flocculation tank, and three lagoons (one of which was lined and used for detention/settling), along with appurtenances, such as pump houses and piping. Some of the former structures have been removed from the property.

The wastewater treatment facilities have been decommissioned in accordance with the DNREC-Division of Water Resources requirements. The RI/FS work plan included a copy of a letter from the Division of Water Resources indicating completion of the treatment plant closure activities. The disposition of the remaining sludge in a concrete holding tank and the lined lagoon remains to be addressed as part of the proposed remedial action at the site.

The site is currently being redeveloped for industrial, commercial, and residential uses. Figure 4 shows a historic site plan of the former facility provided by Cannery Village. According to Cannery Village personnel, this plan depicts the facility layout and building configuration similar to that present on site at the start of building demolition activities. Buildings 25, 26, and 33, as noted on the plan, remain intact and are being renovated as part of site redevelopment. The remaining site buildings shown have been demolished, including a majority of the concrete floor slabs. As indicated on the plan, the former buildings were interconnected and covered a significant area (approximately 16 acres) of the western portion of the property.

Round Pole Branch traverses north-south through the property and separates the former wastewater treatment area (eastern portion) from the canning facility (western portion). The remainder of the canning facility area is primarily covered by the buildings, pavement or gravel. A limited area of the canning facility area is vegetated. Railroad tracks extend east-west through the northern end of the western portion of the property. Other than the remaining treatment plant structures, much of the wastewater treatment area is covered with vegetation.

A chain-link fence encircles most of the site along the perimeter, and along portions of the former cannery facility. Vehicle access to the site is limited to gated-entry points from Chestnut Street through the adjacent property and an access road from Atlantic Street to the former wastewater treatment area.

2.1 *Site and Project History*

The Draper King Cole Vegetable Cannery employed over 1,000 people during its operation. The business experienced a rapid decline in the 1990s. Hanover Foods of Pennsylvania, Inc. purchased the business in April 1999 and continued warehousing and distribution activities at the site through mid-October 1999. After Hanover Foods discontinued operations at the site, remaining activity generally consisted of machinery and equipment dismantling by Hanover Foods contract personnel. Cannery Village purchased the site in October 2000 and has since completed the site preparation work described above. A fire reportedly caused minimal damage to the property in July 2001.

Historically, the vegetables were cooked and canned in fresh water. Process wastewater was discharged to the wastewater treatment plant located on the eastern portion of the property. Treatment processes included sedimentation, flocculation, and chlorination. Two spray-irrigation basins received the accumulated sludge. Treated wastewater was discharged to Round Pole Branch and non-contact cooling water was also discharged to Round Pole Branch on the southern portion of the site. National Pollutant Discharge Elimination System (NPDES) permits were obtained for both discharges.

Historic Sanborn Fire Insurance (Sanborn) maps were reviewed to identify former operations/areas of potential environmental concern. Canning operations apparently began on the western portion of the site some time prior to 1911. The Sanborn map dated 1911 indicates that the facility consisted of a main building referred to as “H. R. Draper Tomato & Pea Canning,” “H. R. Draper Cannery,” and “Draper Canning Co.,” a warehouse, and at least one outbuilding. The location of the main building on the Sanborn map roughly corresponds with the location of Building 2 on the facility historic site plan (Figure 4).

The main building reportedly housed the vegetable-canning operations, a pea “viner,” a “gas machine” which was used for generating gas for capping cans, and a warehouse for canned goods. The 1911 map also indicated the presence of a buried “gasol” tank at the property, just south of the main building, as well as the presence of railroad tracks at the site.

Historically, the Draper vegetable-canning facility utilized both fuel oil and coal to provide the majority of heat for buildings and steam for vegetable processing. Based on information provided by Cannery Village personnel, coal ash and slag were deposited on selected areas of the site (i.e., near the wastewater treatment structures and along the border of the former building complex). In addition, two fuel oil underground storage tanks (USTs) and one used oil UST were removed from the site as part of the interim actions performed by Cannery Village.

Prior to 1944, the northeastern portion of the wastewater treatment area contained several small buildings, most of which were demolished sometime prior to 1955. An access road was constructed in this area some time prior to 1944. The wastewater treatment area of the property was also used as a quarry or an open pit mine from the 1950s to the 1980s. A building and possible rows of stockpiled materials were depicted on historical mapping from this time period.

Several industrial sites were present in the surrounding area; primarily west, north and south of the site along Chestnut and Federal Streets prior to 1911. The former industrial and commercial facilities identified on the Sanborn maps include: a saw and planing mill and supplier of building materials, lime, coal, and cement; a lumber yard; a warehouse for shirt materials; a clothing manufacturer; a “Venetian blind laundry;” and an automobile-repair facility.

Two gasoline USTs were noted in the Chestnut Street right-of-way, on the 1923 and 1937 Sanborn maps. The tank locations roughly correspond with the location of the Company Store operated off site by the former canning company. DNREC records indicate that the two USTs were removed from the “King Cole Company Store.”

Mapped ground surface elevations at the property ranged from approximately 10 to 30 feet above mean sea level (msl). Review of the topographic relief at the property indicated that storm water runoff at the site would likely flow toward Round Pole Branch, which drains to the Broadkill River, approximately 2,000 feet north of the site.

The groundwater table in the vicinity of the site is mapped at an elevation of approximately 10 feet above msl and ranges from just below the ground surface level to approximately 20 feet below ground surface level. Groundwater flow direction in the vicinity of the site is expected to follow general surface topographic trends toward Round Pole Branch.

3.0 INVESTIGATION RESULTS

Several environmental investigations were conducted at the site, which comprise the RI/FS. These consist of a preliminary environmental evaluation prior to entry of the site into the VCP, and additional exploration, sampling and laboratory analysis to complete the RI/FS, and DNREC-approved interim actions including the removal of the three USTs.

3.1 *Preliminary Environmental Evaluation*

The preliminary environmental evaluation consisted of 56 Geoprobe[®] soil borings, 24 hand-augered soil borings, and three manual excavations (Figure 5). On September 4 and 5, 2001, Ten Bears Environmental L.L.C. (Ten Bears) completed the initial evaluation consisting of 26 of the Geoprobe[®] soil borings and 12 hand-augered soil borings to collect soil samples for field screening and laboratory analysis. In an attempt to delineate a surface layer of coal ash and slag fill observed during the initial evaluation, an additional 30 Geoprobe[®] soil borings, 12 hand-augered soil borings, and three manual excavations were performed on October 15, 2001.

During the preliminary environmental evaluation, a total of 64 grab soil samples were collected for field screening for metals using an X-Ray Fluorescence (XRF) analyzer. In addition, 17 soil samples were collected for screening for polynuclear aromatic hydrocarbons (PAHs) and polychlorinated biphenyls (PCBs) using immunoassay test kits. A total of four composite samples of sludge from the former wastewater treatment structures were sent for laboratory analysis for waste characterization. Two samples (SS-1 and SS-2) were collected from a concrete holding tank and two samples (SS-3 and SS-4) were collected from the lined lagoon. The four sludge samples and 16 soil samples were submitted for laboratory analysis for Target Compound List (TCL) volatile and semivolatile organic compounds (VOCs and SVOCs), pesticides, PCBs and Target Analyte List (TAL) metals in accordance with HSCA requirements.

3.2 Remedial Investigation

In accordance with the DNREC approved RI/FS work plan, further investigation was performed at the site, including 16 Geoprobe[®] soil borings, the collection of five sediment samples, and the installation and sampling of three groundwater monitoring wells. Free-phase petroleum product was encountered in monitoring well, MW-1, installed near the location of the former 15,000-gallon No. 6 fuel oil UST. On July 31, 2002, additional investigation of groundwater in this area was performed using a Geoprobe[®]. This consisted of the installation and sampling of five temporary Geoprobe[®] well points. Also, a sample of groundwater was collected from the brewery production well. Figure 5 shows the groundwater sample locations.

During the RI field activities, additional soil samples were collected for metals screening using XRF analysis and for PAHs and PCBs screening using immunoassay test kits. Shallow and deep soil samples, as well as samples of soils exhibiting possible impact, were collected from each Geoprobe[®] and hollow-stem auger boring. Also, XRF and immunoassay screening was conducted for five sediment samples collected from Round Pole Branch. The RI sampling activities included laboratory analysis of 11 soil samples and two sediment samples for TCL VOCs and SVOCs, pesticides, PCBs and TAL metals in accordance with HSCA requirements.

3.3 Interim Actions

Cannery Village removed three USTs and the contiguous concrete slabs that covered much of the southern and western portions of the site, as DNREC-approved interim actions in 2002/2003. Cannery Village recycled the concrete building slabs that remained after removal of the on-site buildings. Approximately 4,000 to 6,000 cubic yards of concrete were removed and stockpiled on the southeastern portion of the site. The concrete was crushed for on-site reuse as structural fill. Soil exposed beneath the concrete slabs appeared to be consistent with the results of the preliminary environmental evaluation, as no evidence of contamination was observed in the exposed soil. A few small areas of fine-grained coal ash were identified near the HA-GP-7 and HA-GP-7A soil boring locations shown on Figure 5.

The UST removals included a 10,000-gallon tank and a 15,000-gallon tank reportedly used to store No. 6 fuel oil, and a 2,000-gallon used oil tank. Ten Bears provided oversight including

field screening with a photo-ionization detector (PID), soil logging, and collecting soil samples for laboratory analysis.

During the UST removals, 11 soil samples were collected for laboratory analysis for DNREC parameters for “Tier 0” evaluation, by SW-846 methods. Soil sampling during the grading interim action included the collection of five post-excavation soil samples and five composite samples of stockpiled soils for laboratory analysis for TCL VOCs and SVOCs, pesticides, PCBs and TAL metals in accordance with HSCA requirements.

3.4 *Surface Soils Evaluation*

Surface soils across the site consisted of silt and sand containing concrete, gravel, and miscellaneous debris/fill. During the evaluation, several isolated areas of concern were identified based on field observations, including petroleum-impacted soils in the vicinity of the former UST areas, semi-solid wastewater sludge in two on-site wastewater treatment structures, stained soils surrounding former equipment pads and a thin layer of coal ash and slag observed at or near surface grade in several areas of the site.

Coal ash and slag were noted at surface grade in several areas at the site. These areas primarily included the roadways in the wastewater treatment area and unpaved areas to the south and east of the former concrete slab-covered area. Figure 5 includes the approximate horizontal limits of the observed coal ash/slag fill materials. Appendix 1-Table 1 summarizes the observed thickness of the coal ash. Several small areas of coal ash were also observed beneath the former concrete slab-covered areas.

Two different types of coal ash/slag were observed. The majority of the observed coal ash appeared to consist primarily of relatively fine-grained black material with a few gravel-sized particles of partially-combusted coal. Approximately 600 to 800 cubic yards of a copper-colored coarse-grained coal ash/slag were also observed to the west of Building 26 upon removal of the concrete slab in preparation for construction of the brewery entrance.

3.5 *UST Investigation*

Petroleum-impacted soils were encountered in several soil borings completed at the site. These soil borings were located on the western portion of the site near the west end of Building 26. Heavily stained soils were observed in soil borings completed in the vicinity of the former 15,000-gallon No. 6 fuel oil tank located adjacent to the southern wall of Building 26. Heavily stained soils were also observed immediately beneath the former 10,000-gallon No. 6 fuel oil tank upon its removal. Small areas of moderately stained soils were observed near the 2,000-gallon used oil tank and several nearby equipment pads. The USTs were removed and post-excavation samples were collected in accordance with DNREC regulations and guidance documents. The following summarizes the observations in each tank area:

15,000-Gallon No. 6 Fuel Oil UST

Coastal Pump & Tank, Inc. (Coastal) removed the 15,000-gallon No. 6 fuel oil tank from just outside the southern wall of Building 26 near the western side during the period from April 18 through April 25, 2002. Based on field observations, the tank appeared to have been drained, but not cleaned, prior to abandonment, leaving a layer of product and sludge in the bottom of the tank. A few hundred gallons of sludge were also observed above the sand near each end of the tank. Approximately 87 tons of soil associated with this tank removal were transported to Clean Earth for treatment. As previously noted, free product was encountered in MW-1, which was installed in the vicinity of this tank.

2,000-Gallon Used Oil UST

Cannery Village contracted International Petroleum Corp. (IPC) to remove the contents of the 2,000-gallon used oil tank located near the southwestern corner of Building 26. IPC pumped approximately 2,000 gallons of oil with some water from the tank. On April 19, 2002, Coastal removed this tank.

10,000-Gallon No. 6 Fuel Oil UST

The 10,000-gallon tank was discovered on June 19, 2002 in the area now known as the brewery entrance. Based on site observations of the piping and tank configuration, the tank was likely used to store No. 6 fuel oil. The tank was removed on July 31, 2002.

3.6 *Contaminants of Concern and Analytical Results*

Based on the results of the investigations completed at the site, the extent of contaminant impact is limited to a few isolated areas. The primary contaminants of concern (COCs) are associated with the coarse-grained slag, petroleum-impacted soils, wastewater treatment sludge in the unlined lagoon, and stockpiled soils for waste disposal located near the southeast corner of the former concrete slab. The stockpile of coarse-grained slag is estimated to be approximately 600 to 800 cubic yards. Petroleum-impacted soils are estimated to be approximately 7,000 to 10,000 cubic yards in the vicinity of the 15,000-gallon UST and approximately 2,000 to 4,000 cubic yards near the 10,000-gallon UST. The lined lagoon is estimated to contain up to 1,000 cubic yards of wastewater sludge. The volume of soils stockpiled for waste disposal near the southeast corner of the slab is estimated to be approximately 1,500 to 2,000 cubic yards.

3.6.1 FIELD SCREENING AND LABORATORY ANALYTICAL RESULTS

An initial screening of the analytical results was performed to eliminate contaminants that presented minimal risk from further consideration. The initial screening for data reduction purposes consisted of a comparison of the maximum concentration detected for each contaminant with the higher of the applicable Uniform Risk-Based Remediation Standards (URS) values or the Default Background Standard (DBS) to identify potential COCs. As a conservative measure, the unrestricted use URS values were utilized for soils in both OU-1 (residential) and OU-2 (nonresidential) areas. The groundwater data was compared with the

URS values for Protection of Human Health for Groundwater and the URS values for Protection of the Environment for Surface Water.

3.6.1.1 Field Screening Results

Field screening was performed during the preliminary environmental evaluation and the RI using XRF and immunoassay field-testing kits to help delineate areas of potential environmental concern. The XRF results for the preliminary environmental evaluation and the RI indicated elevated concentrations of several metals throughout the site including chromium, cobalt, iron, mercury and nickel (Appendix 1-Table 2). With the exception of the former UST areas, the results of the immunoassay testing, completed as part of the preliminary evaluation, did not reveal any concentrations of PAHs or PCBs. However, the immunoassay testing completed during the RI indicated several positive results for PCBs and PAHs in sediment and soil samples collected (Appendix 1-Table 3).

The XRF results for the sediment samples indicated elevated concentrations of iron, lead, and zinc. Iron concentrations increased slightly from the upstream to the downstream samples. Lead and zinc concentrations decreased from upstream to downstream. Immunoassay test results indicated PAHs in two upstream samples (SED-1 and SED-3), but not in the downstream samples. The PCB test kit results indicated concentrations above the lower detection limit in SED-3 and SED-4, collected in the central portion of the site. PCBs were not detected above the lower detection limit for the method in the remaining sediment samples.

3.6.1.2 UST Laboratory Analytical Results

During the UST removals at the site, several soil samples collected from the tank-removal excavations contained elevated concentrations of petroleum hydrocarbons in OU-2 (Appendix 1-Table 4). The majority of the petroleum hydrocarbons were identified as No. 6 fuel oil, with concentrations ranging from 3,400 to 68,000 milligrams per kilogram (mg/kg).

Five of the soil samples were analyzed for arsenic; only one sample contained arsenic at a concentration greater than the URS value. This sample, "Slab Removal Slag," was collected from the confined, coarse-grained slag materials encountered during the slab removal to the west of Building 26.

Waste disposal characterization results for the two composite samples collected from the staged petroleum-impacted soils indicated the materials were suitable for treatment or disposal as non-hazardous waste (Appendix 1-Table 5). Results for Toxicity Characteristic Leaching Procedure (TCLP) analysis indicated concentrations for both composite samples were below the applicable limits for classification of a waste as hazardous under the Resource Conservation and Recovery Act (RCRA) and 7 Del. C. Chapter 63 (the state equivalent of RCRA). The analytical results for all three samples of coal ash analyzed for TCLP metals indicated that the concentrations were below the RCRA limits (see Appendix 1-Table 5).

3.6.1.3 Preliminary Environmental Evaluation Laboratory Analytical Results

As part of the preliminary evaluation, four composite sludge samples and 16 soil samples were collected from OU-1 and OU-2 and submitted for laboratory analysis for TCL VOCs and SVOCs, pesticides, PCBs and TAL metals in accordance with HSCA requirements. The laboratory analytical results indicated that very few contaminants were detected above the respective URS values for unrestricted use. Elevated concentrations of aluminum, antimony, iron, vanadium, PCBs and dieldrin were detected in the composite sludge samples (Appendix 1-Tables 6 and 7). Slightly elevated concentrations of antimony, iron dieldrin, and PCBs, as well as PAH compounds were detected above the respective unrestricted URS in SB-8, SB-9, and SB-10. These soil samples were collected from the former UST areas located in OU-2. Iron, antimony, and slightly elevated concentrations of PAH compounds were also detected in several soil samples collected from OU-1 and OU-2.

3.6.1.4 Remedial Investigation Laboratory Analytical Results

As part of the RI, 11 soils samples, two sediment samples and 11 groundwater samples (both filtered and unfiltered samples) were submitted for laboratory analysis for TCL VOCs and SVOCs, pesticides, PCBs and TAL metals in accordance with HSCA requirements. The results are detailed below:

SOILS

The laboratory analytical results for the soil samples collected as part of the RI identified several COCs for soils including several metals (aluminum, antimony, arsenic, copper, iron, lead, and vanadium), the pesticide dieldrin, PCB aroclors 1254 and 1260, several PAH compounds (benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, and dibenz(a,h)anthracene), and the VOC, benzene. Appendix 1-Tables 8 and 9 summarize the soil COCs and associated laboratory analytical results.

Only a few elevated metal concentrations were detected on OU-1 (the residential area). However, several elevated levels of contaminants were detected on OU-2 (the nonresidential area). One or more of the PAH compounds were detected at concentrations above their respective URS values for restricted use in the soil samples collected from petroleum-impacted soils in the vicinity of the southwest corner of Building 26.

One sample (HS2-2) contained arsenic at a concentration greater than the URS value for restricted use. Two samples (HS2-2 and HS2-3) contained lead at concentrations greater than the URS value for restricted use. However, HS2-2 was collected from a relatively small quantity of coarse-grained coal ash observed outside of the brewery entrance. HS2-3 was collected from miscellaneous fill material observed near the southeastern corner of the former concrete slab area. No other COCs were detected in the soil samples at concentrations exceeding the URS values for restricted use on OU-2.

A number of COCs were detected in the soil and sludge samples collected from OU-2 at concentrations exceeding applicable unrestricted use URS values, but below their respective restricted use URS values. These contaminants were the pesticide dieldrin, the PCB compounds aroclor 1248, 1254, and 1260; benzene; several SVOCs; and several metals. The concentrations of dieldrin and aroclor 1254 that exceeded the respective unrestricted use URS values were detected in the sludge samples collected from the former lined, storage/settling lagoon located on OU-2. The benzene and SVOCs were primarily detected in the soil samples collected from locations impacted by petroleum hydrocarbons near the southwest corner of Building 26 on OU-2.

SEDIMENT

For sediments, the COCs included several metals, pesticides, and SVOCs which were detected at concentrations greater than their respective URS values for sediment and DBSs in both the upstream (SED-1) and downstream (SED-2) samples from the site (Figure 5 and Appendix 1-Table 10).

GROUNDWATER

For groundwater, the COCs included dieldrin, naphthalene, benzene, and tetrachloroethene or perchloroethene (PCE). Appendix 1-Tables 11 and 12 summarize the identified groundwater COCs and associated analytical results.

With the exception of iron and manganese, no contaminants were detected at concentrations greater than the applicable URS values for groundwater in the groundwater samples collected from MW-2 and MW-3 (Appendix 1-Table 11). The groundwater URS values for iron and manganese are based on the EPA's Secondary Maximum Contaminant Levels (SMCLs), which are drinking water standards for odor and taste, and are not based on human health effects. A groundwater to surface water discharge evaluation was not completed for these metals, as the levels do not present an ecological risk.

Neither a groundwater or product sample could be collected from MW-1 in the former UST area due to the viscosity of free product in the well. However, the extent of the free product was delineated by temporary Geoprobe® wells completed on OU-2 (nonresidential area).

The groundwater samples collected from the temporary Geoprobe® wells located on OU-2 contained several COCs at concentrations exceeding the groundwater URS values (Appendix 1-Table 12). These compounds included a trace of thallium, dieldrin, naphthalene, benzene, and tetrachloroethene or perchloroethene (PCE). There is no EPA Maximum Contaminant Level (MCL) for thallium in drinking water. Dieldrin was detected in GW-2, the one sample analyzed for pesticides, at a concentration of 20 parts per trillion (ppt), which is four times the groundwater URS value of five ppt.

Four of the five temporary Geoprobe® wells contained PCE at concentrations greater than the MCL for drinking water. Three of the groundwater samples also contained traces of 1,1,1-

trichloroethane (TCA), which is a possible degradation product of PCE. The PCE detected in the Geoprobe® groundwater samples may have been used as a solvent in label-printing operations, formerly housed in Building 3, located just south of the railroad tracks from Building 26.

The PCE concentrations detected in these samples ranged from 0.007 to 0.027 mg/l, compared with the MCL of 0.005 mg/l. The PCE concentrations were highest in GW-3, diminishing with distance from the GW-3 area. The lowest detectable PCE concentration was reported in GW-4, located furthest downgradient from GW-3 towards Round Pole Branch. Fate and transport modeling and an evaluation of the distribution of PCE (i.e., absence of PCE concentrations in GW-5, located less than 30 feet upgradient of GW-3), suggests that GW-3 is in close proximity to the source of the PCE, and the contaminant plume is limited to this area (Appendix 1-Table 13).

The ground water sample collected from the brewery area well on OU-2 (nonresidential area) contained manganese at a concentration of 0.097 mg/l, slightly exceeding the SMCL threshold value for odor and taste effects. No other contaminant was detected above the URS values for groundwater in the brewery well.

4.0 RISK ASSESSMENT

A limited human health risk assessment was completed for the site, in accordance with the DNREC-SIRB Remediation Standards Guidance, the HSCA Guidance Manual, and the EPA's Risk Assessment Guidance for Superfund: Volume I - Human Health Evaluation Manual (Part A), dated 1989. The site is divided into two parcels, OU-1 (residential) and OU-2 (nonresidential). The risk assessment included a pathway analysis to identify current and reasonably anticipated future scenarios involving exposure to site contaminants, selection of COCs contributing the majority of risk to potential receptors, and estimation of the associated risk levels for carcinogenic and non-carcinogenic substances. While the risk estimates were performed in accordance with the Remediation Standards Guidance, the estimates represented relative worse-case conditions. Risk associated with overall site conditions may be more appropriately estimated using a weighted-average to adjust for the sampling bias. The risk estimates presented below are based on the laboratory analytical data only; field-screening data was not used in the assessment.

The ecological risk assessment for the site was limited to direct comparison of laboratory analytical results to the URS, used as screening values. Based on the review of site characteristics, the primary ecological receptor at the site would be Round Pole Branch. Laboratory analytical results for the sediment samples collected from Round Pole Branch indicated elevated background concentrations of metals, several PAH compounds, and pesticides (see Appendix 1-Table 10). Both upstream and downstream sediment samples contained elevated concentrations of metals, several PAH compounds, and pesticides with respect to the URS values. Therefore, the contaminants detected in the sediment samples cannot be attributed solely to the site, and no further assessment of ecological impacts was performed.

A human health risk assessment was conducted on site surface soils. Appendix 2-Tables 14A, 14B, and 15 provide a summary of the exposure point concentrations for OU-1 and OU-2. A total cumulative cancer risk of 1.0×10^{-5} was used to calculate site-specific standards for carcinogenic compounds. Chemicals of potential concern from the site include benzo(a)pyrene and dibenz(a,h)anthracene. A cumulative risk assessment results are presented in Appendix 2-Table 16, which show that the calculated cumulative cancer risk is equal to 1.0×10^{-5} .

In accordance with DNREC guidance, estimates of human health risk consider complete exposure pathways for both current and likely future development scenarios. The primary current and future exposure pathway is direct contact with surface soils. Assuming redevelopment of the site performed in an uncontrolled manner, there is some potential that site construction would result in the creation of a future direct-contact exposure pathway for deeper soils. Ingestion of groundwater from the well on site is also a complete pathway; however, sample analysis results for the brewery well were below the EPA's MCLs.

Based on the partial future usage of the site for residential development, the baseline risk assessment for future conditions includes exposure to residential occupants. The potential COCs identified in the nonresidential areas are well removed from the residential areas. The calculated human health risk assessment based on the current conditions does not pose an unacceptable risk in the residential area. The assessment of future risk associated with residential direct-contact exposure is based on the character of those soils currently located in areas proposed for residential development. These include the wastewater treatment plant area and the southern portion of the site (residential areas). Should the development plans for the site change, the Department must be notified and the risk assessment revisited.

Risk estimates were calculated with the same equations used to calculate the URS values for residential and non-residential soil ingestion. Appendix 2-Tables 17A and 17B summarize cumulative cancer risk estimates for residential and non-residential areas, respectively. Appendix 2-Table 18A summarizes the hazard index calculations for the residential area, and Appendix 2-Table 18B summarizes the calculations for the non-residential area. These estimates are intended to represent potential future risks associated with the site assuming uncontrolled development without consideration of DNREC requirements, for OU-1 (residential) and OU-2 (nonresidential) areas. Current exposure would be limited primarily to construction workers and trespassers ingesting surface soils or excavating deeper soils. Such exposures were estimated to be short-term.

The majority of the risk estimates indicated acceptable levels. However, the cumulative carcinogenic risk estimate for OU-2 (nonresidential area) was 1.65×10^{-5} , which exceeds the limit of 1.0×10^{-5} required by the Remediation Standards Guidance. The cumulative carcinogenic risk estimate for residential areas was acceptable, at 9.57×10^{-6} . Hazard index estimates were 0.45 for residential areas and 0.05 for OU-2 (nonresidential area), well below the Remediation Standards Guidance limit of 1.0. Based on these estimates, some remedial action is warranted to address soil conditions and future use in OU-2 and (the nonresidential area).

5.0 REMEDIAL ACTION OBJECTIVES

According to Section 8.4 (1) of the Regulations, site-specific RAOs must be established for all plans of remedial action. The Regulations provide that DNREC set objectives for land use, resource use, and cleanup levels that are protective of human health and the environment. Qualitative objectives describe, in general terms, what the ultimate result of the remedial action, if necessary, should be. The following qualitative objectives are determined to be appropriate for the site:

- Control potential human exposure (i.e., future occupants of the residential and commercial areas, future visitors, and construction workers) to impacted soils and groundwater (i.e., dermal, inhalation and ingestion);
- Ensure that any remaining contaminant concentrations in soil are such that the associated risk levels will allow unrestricted use of OU-1 (residential area); and
- Control potential future migration of impacted soils to Round Pole Branch through stormwater runoff management.

These objectives are consistent with the current and proposed use of the site as a mixed-use residential and non-residential community, State regulations governing water supply, and worker health and safety.

Quantitative objectives define specific levels of remedial action to achieve protection of human health and the environment. Based on the qualitative objectives, the quantitative objectives will be to ensure that future site users, such as site workers, construction workers, visitors, and trespassers, do not come in contact with soils that contain elevated levels of contaminants including metals and PAHs above the established restricted use URS values.

Based on the qualitative objectives, the quantitative objectives are:

1. For OU-1 (residential use), prevent potential human exposure to soils that contain regulated substances/contaminants at concentrations greater than the URS values for unrestricted use.
2. For OU-2 (nonresidential use), prevent human exposure to soils and groundwater contaminated by VOCs, PAHs, metals, pesticides and PCBs that would result in a carcinogenic risk exceeding 1×10^{-5} , a hazard index of 1.0, or to lead with concentrations exceeding 1,000 mg/kg.
3. For OU-2 (nonresidential use), prevent human exposure to soils and groundwater contaminated by regulated substances/contaminants that would result in a cumulative risk exceeding 1×10^{-5} , or a hazard index of 1.0.
4. Prevent erosion of surface soils contaminated above DNREC URS values for protection of the environment into the Round Pole Branch.

Based on the risk assessment, the proposed project-specific quantitative RAOs (cleanup goals) for the nonresidential area are as follows:

RESIDENTIAL SOILS

Due to Cannery Village's desire for unrestricted use of the residential areas, soil RAOs for OU-1 (residential) will consist of the URS values for unrestricted use.

NONRESIDENTIAL SOILS

The RAOs for OU-2 soils (nonresidential) will consist of the following:

• dieldrin	0.07 mg/kg
• aroclor 1254	0.91 mg/kg
• aroclor 1260	0.71 mg/kg
• benzo(a)anthracene	7.89 mg/kg
• benzo(b)fluoranthene	3.05 mg/kg
• benzo(a)pyrene	3.75 mg/kg
• indeno(1,2,3-cd)pyrene	5.29 mg/kg
• dibenz(a,h)anthracene	1.9 mg/kg
• benzene	0.86 mg/kg

GROUNDWATER

The contaminants detected in the shallow groundwater samples were dieldrin, naphthalene, benzene and PCE. The RAOs for the shallow groundwater will consist of the EPA's MCLs for these compounds. The source of the contaminants in the shallow groundwater appears to be related to the former UST operations conducted at the site. No contamination was detected in the brewery supply well.

6.0 PROPOSED PLAN OF REMEDIAL ACTION

As detailed in Section 3.0 of this proposed plan, soils located on portions of the site contain elevated levels of contaminants including PAHs and metals. OU-1 consists of the areas proposed for development as residential use (apartments, single and multi-family dwellings), with open greenways and recreational areas, and OU-2 is the proposed non-residential use area (biotechnology/agribusiness, commercial/retail/warehousing).

To accomplish the above described remedial action objectives, five (5) potential remedial alternatives were reviewed for the site. The five alternatives were compared based on the ten criteria listed in Section 5.2.3 of the HSCA Guidance Manual. The alternatives were also compared on the basis of other factors affecting the overall project, including operations and maintenance (O&M), requirements for institutional controls, and construction and O&M costs for the remedy. The five alternatives are presented in the RI/FS. Appendix 3-Tables 19 and 20

summarize the comparative analysis of these alternatives. DNREC evaluated these alternatives as required by the Regulations and is in agreement that the following proposed remedial actions for the site, consisting of soil capping and management including excavation and placement of selected soils under a parking lot, a ground water monitoring program, and institutional controls, are protective of human health, welfare and the environment:

1. Development of a DNREC-approved Soil Management Plan (SMP) prior to redevelopment of both OU-1 and OU-2 which will outline the procedures for soil excavation, post-excavation confirmatory soil sampling, stockpiling and reuse of soil on site, or proper off site disposal, as applicable. Areas to be excavated include the wastewater treatment sludge in the former lined lagoon, the coarse-grained coal ash and petroleum-impacted soils identified near Building 26, and the stockpiled soils for waste disposal located near the southwestern corner of the former concrete slab. Provisions will be included in the SMP for reuse of the wastewater treatment sludge, which may be mixed with the coarse-grained coal ash during placement to improve the structural stability of the materials, or for proper disposal off-site.

The SMP will also include contingency provisions for OU-1 in the event that contaminants are encountered during the construction activities. This will ensure that any identified contaminants in soils are such that the associated risk levels will allow unrestricted use of OU-1, or will be below the applicable URS values for residential use. The SMP shall also include confirmatory soil sampling to be conducted on the OU-1 portion of the site following excavation.

The SMP will also incorporate remedial activities on OU-2 to achieve the RAOs for soil and ensure that any remaining contaminant concentrations in soils are such that the associated risk levels will allow restricted use of OU-2, or will be below the applicable URS values for nonresidential use. In addition, the SMP will also detail the containment or capping system for the contaminant-impacted areas in OU-2. The cap will be protective of human health, welfare and the environment and should consist of a combination of the bituminous concrete paving, concrete sidewalks, and, where warranted, placement of “clean” soil in unpaved areas to limit potential human contact with regulated substances. Proposed pavement areas will be covered with a 9-inch gravel sub-base and approximately 3 to 5-inch pavement section. The proposed landscaped areas will be covered with a “demarcation” geotextile and a minimum of 1.5 feet of clean soil.

2. Placement of a deed restriction on the OU-2 portion of the site limiting OU-2 to restricted land use (nonresidential uses) and prohibiting any land disturbing activities (i.e., digging, trenching or excavation activities) on OU-2 without prior approval of DNREC.
3. Placement of a Groundwater Management Zone (GMZ) and associated deed restriction for OU-1 and OU-2 to prevent future use of the groundwater beneath the site without prior approval of DNREC.

4. Development of a DNREC-approved Groundwater Quality Monitoring Program (GQMP) and schedule within three months of the signed final plan of remedial action to include the installation of sentinel monitoring wells downgradient of the area of identified groundwater contamination in the former UST area, to monitor any possible contaminant plume migration toward the brewery well and Round Pole Branch. The GQMP will also include provisions to address the free product identified in MW-1, and develop a semi-annual groundwater quality monitoring program for the OU-2 portion of the site for a minimum of three (3) years.
5. Development of an O&M Plan for the OU-2 portion of the site to insure future maintenance of the cap and cover.

7.0 PUBLIC PARTICIPATION

The Department actively solicits public comments or suggestions on the proposed plan and welcomes opportunities to answer questions. Please direct written comments to:

DNREC
Site Investigation and Restoration Branch
391 Lukens Drive
New Castle, Delaware 19720-2774
Attn: Larry Jones

The public comment period for this proposed plan begins on February 12, 2003, and ends at the close of business (4:30 p.m.) on March 3, 2003. If a request is received, a public hearing will be held on the proposed plan of remedial action. The meeting time and place will be announced if said hearing is requested.

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Figure 1: SITE LOCATION MAP

Figure 2: PROPOSED DEVELOPMENT (OU-1 and OU-2)

Figure 3: VCP DETERMINATION AREA

Figure 4: HISTORIC SITE PLAN

Figure 5: SAMPLE LOCATION MAP

Appendix 1: SUMMARY OF SITE DATA (TABLES 1-13)

Appendix 2: SUMMARY OF RISK ASSESSMENT DATA (Tables 14 A-18B)

**Appendix 3: SUMMARY OF REMEDIAL ALTERNATIVE ANALYSIS
(TABLES 19 and 20)**