



Third
Five-Year Review Report
For The
Burnt Fly Bog Superfund Site
Marlboro Township
Monmouth County, New Jersey



June 2011

PREPARED BY:
U.S. Environmental Protection Agency
Region 2
New York, New York

Executive Summary

This is the third five-year review for Operable Units One, Two, and Three (OU1, OU2, and OU3) of the Burnt Fly Bog Superfund site. The Burnt Fly Bog site (Site) is located in Marlboro Township, Monmouth County, New Jersey. All remedial activities have been completed at the Site. The cleanup of contaminated soils, and the installation of a fence around the Site, together with its isolated location, will protect public health and the environment. Institutional controls in the form of deed notices will further contribute to the protection of public health.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name (from WasteLAN): Burnt Fly Bog		
EPA ID (from WasteLAN): NJD 980504997		
Region: 2	State: NJ	City/County: Marlboro Township/Monmouth County
SITE STATUS		
NPL status: ☒ Final ☐ Deleted ☐ Other (specify)		
Remediation status (choose all that apply): ☐ Under Construction ☐ Operating ☒ Complete		
Multiple OUs?* ☒ YES ☐ NO		Construction completion date: 09/21/2004
Are site related properties currently in use? ☐ YES ALL ☐ YES SOME ☒ NO NONE ☐ N/A GW		
REVIEW STATUS		
Lead agency: ☐ EPA ☒ State ☐ Tribe ☐ Other Federal Agency		
Author name: Jeff Josephson		
Author title: Team Leader	Author affiliation: EPA	
Review period:** 06/09/2006 to 05/01/2011		
Date(s) of site inspection: 10 / 28 / 2010		
Type of review: ☒ Post-SARA Statutory ☐ Pre-SARA or post-SARA Policy ☐ NPL-Removal only ☐ Non-NPL Remedial Action Site ☐ Regional Discretion		
Review number: ☐ 1 (first) ☐ 2 (second) ☒ 3 (third) ☐ Other (specify) _____		
Triggering action: ☒ Previous Five-Year Review Report ☐ Other (specify) ☐ Actual RA Onsite Construction or RA Start at OU # _____ ☐ Construction Completion		
Triggering action date (from WasteLAN): 06/09/2006		
Does the report include recommendation(s) and follow-up action(s)? ☐ yes ☒ no		
Does the remedy protect the environment? ☒ yes ☐ no		

* ["OU" refers to operable unit.]

** [Review period should correspond to the actual start and end dates of the Five-Year Review as reported in WasteLAN.]

Five-Year Review Summary Form, cont'd.

Issues, Recommendations and Follow-up Actions:

A fence has been installed around the entire Site to restrict access and protect human health. However, an inspection revealed that the fence has been breached in several locations. These breaches must be repaired by New Jersey Department of Environmental Protection (NJDEP) to restore Site access control.

Protectiveness Statement(s):

OU1 – short-term protective

The remedy at OU1 currently protects human health and the environment because the contaminated soils have been excavated and replaced with clean backfill. In addition, the Site is currently surrounded by a fence. However, in order to be protective in the long term, institutional controls restricting residential use of the Site need to be implemented.

OU2 – no statement needed since the downstream area was cleaned up to residential levels and the Westerly Wetlands interim action was finalized in the OU3 ROD.

OU3 – short-term protective

The remedy at OU3 currently protects human health and the environment because contaminated soils in the Northerly Wetlands and Tar Patch area have been excavated, replaced by clean fill and a fence restricts access to the area. In addition, humification is occurring in the Westerly Wetlands and the sedimentation basin is preventing the migration of contaminants into the Burnt Fly Creek. However, in order for the remedy to be protective in the long term, institutional controls need to be implemented.

Sitewide statement – short-term protective

The remedies at the Burnt Fly Bog Superfund Site protect human health and the environment because contaminated soils and sediments have been excavated; the sedimentation basin prevents migration of the contaminants into surface water and Site access is restricted by fencing. In order for the Site to be protective in the long term, institutional controls need to be implemented.

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Five Year Review Report

I. Introduction

This third five-year review for the Burnt Fly Bog Superfund site (Site), located in Marlboro Township, Monmouth County, New Jersey, was conducted by United States Environmental Protection Agency (EPA) Remedial Project Manager, Diane Salkie. The five-year review was conducted pursuant to Section 121 (c) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, 42 U.S.C. §9601 *et seq.* and 40 CFR 300.430(f)(4)(ii), and in accordance with the Comprehensive Five-Year Review Guidance, OSWER Directive 9355.7-03B-P (June 2001). The purpose of a five-year review is to assure that implemented remedies protect public health and the environment and function as intended by the decision documents. This report will become part of the administrative record for this Site.

This is the third statutory five-year review for this Site. This review covers the period from May 2006 through April 2011. The triggering action for this review is the date of the last five-year review. The lead agency for this Site is the New Jersey Department of Environmental Protection (NJDEP). NJDEP assisted EPA in the development and completion of this third review by having State personnel participate in the Site visit, and provide data, technical information and documents.

II. Site Chronology

Table 1 on page 19 summarizes the site-related events from discovery to the present.

III. Background

Site Location and Physical Description

The Site is located near the intersection of Texas and Spring Valley Roads in Marlboro Township, Monmouth County, New Jersey. It is in a semi-rural area in Marlboro Township, Monmouth County, a portion of which extends into Old Bridge Township, Middlesex County. The Site area includes the approximately 60 acres affected by lead and polychlorinated biphenyl (PCB) contamination.

The approximately 60-acre tract of land occupied by the Site is part of a larger area, composed mostly of wetlands, known as Burnt Fly Bog. Burnt Fly Bog occupies about 1,700 acres in the east-central section of the State of New Jersey, and is located in a fringe area of the New Jersey Pine Barrens. NJDEP considers the New Jersey Pine Barrens to be an environmentally sensitive area.

Site Geology and Hydrology

The entire Site is located in an outcrop area of the Englishtown Formation. In the Westerly Wetlands, a relatively impermeable clay layer is at or near the ground surface. The Westerly Wetlands receives drainage from the Uplands Area, Northerly Wetlands, Tar Patch Area, and parts of the surrounding 1,700 acres of Burnt Fly Bog, as well as the Pine Barrens. Groundwater flows from the Uplands Area through the overlying upper sand layer and discharges to the surface of the Westerly Wetlands, which is inundated most of the year. The surface water flows in a south-westerly direction through the Westerly Wetlands, into the Downstream Area, through the recently constructed sedimentation basin and eventually into Burnt Fly Brook. The combined flow in Burnt Fly Brook flows into Deep Run at a distance of about one mile from the Site. Deep Run is a source of potable water for the City of Perth Amboy. NJDEP indicated the few residences, rehabilitation facility, and horse farm located adjacent to the Site use private groundwater wells for potable water supplies. According to NJDEP, in the past, several homes were sampled over a number of years and no contamination was found. NJDEP also indicated that the Tyler (rehabilitation) Home has its own private well that was sampled several years ago without any evidence of Site contamination.

Land and Resource Use

The predominant land use within the Township of Marlboro includes residential development, agricultural land, open spaces and wooded lands. Two auto salvage yards, a few scattered residences, a rehabilitation facility, and a horse farm are located near the Site. For purposes of identification, for delineating study areas and for defining practical boundaries for cleanup, the Site is divided into the following areas: the Uplands Area, Tar Patch Area, Northerly Wetlands, Westerly Wetlands, and Downstream Area. Of these areas comprising the Site, the Westerly Wetlands provides habitat to a greater diversity of wildlife than the other habitats on the Site. No federally listed threatened or endangered plant species are present on the Site.

History of Contamination

The Uplands Area of the Site was an abandoned oil recovery and storage facility originally owned and operated by the Imperial Oil Company and Champion Chemical, whose base of operations was at a nearby facility located in Morgantown, New Jersey. Before 1950, the Site was still an undeveloped area. Contamination of the Site began during the 1950s and continued through the mid-1960s, with the direct dumping and spreading of hazardous materials resulting from recycled waste oil operations. The areas contaminated by the results of these operations, including the storage lagoons, the areas used for waste oil operations, and the adjacent areas affected by downgradient movement of contaminants, became known as the Site.

The majority of the waste was originally deposited in a roughly ten-acre parcel located in the southeastern portion of the Site designated the Uplands Area. Recycled waste oil operations were also carried out in this same portion of the Site. Treatment and disposal

facilities for reprocessed waste oil were poorly built and improperly operated, becoming a source of contamination of the Site. Under several different owners, these facilities were allowed to degenerate. The Uplands Area included several unlined waste oil lagoons containing residual oil sludges and aqueous wastes, contaminated waste piles, drummed wastes, and areas of contaminated soil resulting from associated waste oil reprocessing activities. Uncontrolled discharges from the Uplands Area resulted in surface water and soil contamination moving downgradient into adjoining undisturbed lands including the Westerly Wetlands, Northerly Wetlands, Tar Patch Area, and the Downstream Area.

Initial Response

An Environmental Information Document (EID) pertaining to the Site was prepared by Dames and Moore for NJDEP in 1982. Contamination of soil, groundwater and surface water was found to exist from the improper disposal of hazardous substances at the Site. As a result of the findings of the EID document and data from several earlier investigations, the Site was included on the National Priorities List on September 1, 1983.

In an attempt to identify Potentially Responsible Parties (PRPs) and induce them, under the authority of the Superfund law, to enter negotiations with EPA to clean up the Site, General Notice Letters, as well as Special Notice Letters, were sent out in 1982 and 1983. Unsuccessful attempts at getting the PRPs to participate in the cleanup of the Site, as well as the inability of other PRPs to pay cleanup costs, ultimately led the Department of Justice (DOJ) to later file suit, in 1996, against three PRPs to successfully recover some of the cleanup costs.

Basis for Taking Action

On-site sampling during investigation of the Uplands Area and Westerly Wetlands revealed the presence of heavy metals, PCBs, and volatile organics. The Uplands Area is considered to be the source of contamination for the entire Site. As a result of the waste oil storage activities conducted in the Uplands Area, the sludge lagoon liquid, surface soil, and shallow subsurface soil in the Uplands Area were found to be contaminated primarily with PCBs and lead. Site risks are almost entirely attributable to the presence of lead and PCBs in the soil and surface water. Other contaminants in the environment were so limited in concentration and location that their contributions to carcinogenic and noncarcinogenic risks were insignificant in comparison to lead and PCBs. Therefore, lead and PCBs were the two parameters driving the selection of the remedies in all three operable units. Construction at all three operable units was completed by September 21, 2004.

IV. Remedial Actions

OUI Remedy Selection

Based upon the results of the Environmental Information Document prepared by Dames and Moore for NJDEP in 1982, EPA signed a Record of Decision (ROD) on November 16, 1983 for the selection of a remedy to clean up the sources of contamination in the Uplands Area.

The major components of the remedy selected in the OUI ROD include the following:

- 1) excavation of hazardous substances in lagoon 1, the Asphalt Pile Area (diatomaceous earth), the Tar Patch Area, and the drummed waste area, and disposing of them at EPA-approved off-site facilities;
- 2) excavation and removal of hazardous materials in lagoons 2, 3, and 4;
- 3) excavation and removal of contaminated soil in other areas for off-site disposal;
- 4) excavation and removal of sludge contaminated with high levels of PCBs for off-site incineration;
- 5) restoration of the original Site contours and replanting the area; and
- 6) Continued monitoring of Site groundwater for five years.

OUI Remedial Action Implementation

On December 7, 1983, EPA awarded a Cooperative Agreement to NJDEP for the development of the remedial design and construction of the remedial action. Based on this Cooperative Agreement, the NJDEP was designated the lead agency for the Site and the EPA was designated as the support agency. All Site studies and actions, as well as the oversight of all Site activities, would be performed by NJDEP.

The remedial actions outlined in the OUI ROD were restricted to the Uplands Area, which contained the original sources of contamination that spread throughout the Site. Between 1985 and 1990, remedial actions were completed including the removal of the asphalt pile area, drummed waste area, lagoon liquids, 10,000 tons of lagoon sludge, and the excavation and off-site disposal of approximately 85,000 tons of soil contaminated with lead and PCBs. After backfilling the excavated area, a ten-acre clay cap was installed over the backfilled area, covered by six inches of additional soil. The cap provides additional protection from lead and/or PCBs. In addition, about 600 cubic yards of stabilized sludge contaminated with PCBs in excess of 500 parts per million (ppm) were removed from the lagoons for off-site incineration in accordance with the requirements of the Toxic Substances and Control Act (TSCA). Finally, NJDEP removed surficial patches of tar located in the Tar Patch Area. The Uplands Area is now covered by a field of tall grass as a result of seeding the soil above the cap.

The extent of the areas excavated was determined by the action levels based on residential exposures. Lead was excavated to a level of 200 ppm; PCBs were excavated to 5 ppm. Compliance with these limits was accomplished through post-excavation sampling followed by backfilling with clean soil. The clay cap beneath the surface soil

prevents rainwater and runoff from penetrating into the groundwater, which later emerges downstream in the Westerly Wetlands. The soil and underlying cap are still in place because the Site is surrounded by a fence which prevents entrance to the Uplands Area. Inspections of the surface soil area for evidence of damage are also conducted during periodic Site inspections and maintenance of surface vegetation.

The OU1 ROD selected cleanup levels based on residential usage because the Uplands Area is located near several residences situated a short distance away. In addition, a rehabilitation facility is located immediately adjacent to the Uplands Area.

OU2 Remedy Selection

Ebasco, Inc. (Ebasco) performed a Remedial Investigation and Feasibility Study (RI/FS) for the Westerly Wetlands and the Downstream Area between 1984 and 1987. As part of the RI/FS investigations, sampling and analysis of soil, surface water, and groundwater were performed. Following the RI/FS, lead mobility studies and a water budget analysis were also performed by Ebasco. Based on the findings of these investigations and studies, EPA signed a second ROD (OU2 ROD) on September 29, 1988 for the selection of an interim remedy for the Westerly Wetlands and Downstream Area. The excavation of the Downstream Area and the disposal of these materials are considered part of the final remedy.

The major components of the remedy selected in the OU2 ROD include the following:

- 1) the excavation and off-site disposal of approximately 6,000 tons of contaminated soil/sediment that migrated downstream through the Westerly Wetlands to the area known as the Downstream Area;
- 2) disposal of these materials in the same manner in which the Uplands Area contaminated materials were handled;
- 3) preventing the contaminated soil and sediment in the Westerly Wetlands from leaving the Site through the installation of a sedimentation basin in the excavated Downstream Area and the use of appropriate diversion controls;
- 4) installation of security fencing at the Downstream Area end of the Site and construction of an access road into the Downstream Area of the Westerly Wetlands from Spring Valley Road; and
- 5) future treatability studies on the most promising treatment technologies for the contaminated materials (lead and PCBs) in the Westerly Wetlands, Northerly Wetlands, and Tar Patch Area.

OU2 Remedial Action Implementation

The purpose for constructing the sedimentation basin was to reduce the amount of contaminated sediment migrating downstream from the Westerly Wetlands and other upstream areas of the Site, such as the Tar Patch Area and Northerly Wetlands, which could potentially be transported during storm events into Burnt Fly Brook. Burnt Fly Brook is a tributary of the watershed that is a source of potable water for Perth Amboy.

The second reason for the basin's construction was the removal of the accumulated sediment contaminated with PCBs and lead.

On-site construction work began on November 7, 1995. More than 6,000 tons of contaminated soil and sediment were removed from the Downstream Area, creating a depression immediately downstream of the Westerly Wetlands that would be used to construct the sedimentation basin. This Interim Remedy (OU2) prevents sediment contaminated with lead and PCBs from traveling downstream into Burnt Fly Brook and Deep Run, thereby protecting the watershed area used by the City of Perth Amboy for its water supply. This work was completed by the end of 1996.

OU3 Remedy Selection

In June 1993, BCM Engineers was contracted by NJDEP to perform a Supplemental Feasibility Study (SFS) for the OU3 areas. Treatability studies were also performed in an effort to develop a process remedy for OU3. Soil washing and chemical dechlorination were evaluated as alternatives in the SFS. However, these studies showed these processes to be ineffective.

EPA also completed an Ecological Assessment of the Westerly Wetlands based on the results of a field study conducted in 1991 and summarized in the June 1992 Ecological Assessment document. Soil sampling in the Northerly Wetlands was performed by NJDEP in 1995 in order to fully delineate the contamination in this portion of the Site. Surface soil sampling was also performed in the Westerly Wetlands in 1996 to confirm the established levels of contamination in this area.

Based on the findings of these investigations and studies, EPA signed a third ROD (OU3 ROD) on September 28, 1998 for the selection of a final remedy for the Westerly Wetlands, Northerly Wetlands Area, and the Tar Patch Area.

The major components of the remedy selected in the OU3 ROD include the following:

- 1) The excavation and off-site disposal of contaminated soil from the Tar Patch Area;
- 2) the excavation and off-site disposal of contaminated soil from the Northerly Wetlands Area;
- 3) backfilling the excavated areas in the Northerly Wetlands and restoring the wetlands;
- 4) backfilling the excavated areas in the Tar Patch Area and creating a wetlands area where none existed before due to contamination;
- 5) provision of additional security fencing around the Westerly Wetlands, and the recording of Deed Restrictions (Notice) for the Westerly Wetlands, Northerly Wetlands, and the Tar Patch Area;
- 6) monitoring of surface water, sediment, and groundwater in various locations throughout the Site, and at the exit from the Site, as outlined in the Long-Term Monitoring Plan; and

- 7) ecological monitoring of the Westerly Wetlands Area to confirm protectiveness of the environment.

OU3 Remedial Action Implementation

On-site work began in May 2003 and was completed in May 2004. During OU3, NJDEP contractors removed about 46,000 tons of contaminated soil from the Tar Patch Area and transported it off-site for disposal. In addition, about 600 tons of "hot spot" material exceeding 1000 ppm PCBs were excavated and transported off-site for incineration. Finally, approximately 9,400 tons of contaminated soil in the Northerly Wetlands were excavated and disposed of off-site. The additional fencing of the Westerly Wetlands was completed in January 2004.

The excavation of contaminated soil in the Northerly Wetlands down to 0.49 ppm for PCBs and 400 ppm for lead provides protection to human health and the environment. For the Tar Patch Area, the cleanup goal is based on visual contamination instead of actual cleanup level. However, the excavation in this area should also meet the residential soil cleanup goal as described for the Northerly Wetlands. The visual goal was chosen because the contaminated area is clearly defined due to its lack of vegetation. If an exact number had been specified for the Tar Patch Area, it would have included vegetated wooded areas of the Westerly Wetlands Area.

The Westerly Wetlands provides habitat to a greater diversity of wildlife than any of the other habitats on the Site. Therefore, remediation via excavation of the Westerly Wetlands would cause significant ecological impacts to this area and it is uncertain if these wetlands could be restored. The selected remedy, however, is expected to result in a long-term sediment buildup from vegetative humification, forming an increasingly protective barrier over the contaminated soil in the Westerly Wetlands. The selected remedy will preserve the existing wetland system and require monitoring of the natural protective barrier as it continues to develop and increase protectiveness. In addition, surface water and sediment in Burnt Fly Brook have been sampled, and continue to be sampled.

The Site achieved construction completion status when the Preliminary Close-Out Report was signed in September 2004

Institutional Controls Implementation

Five properties in Marlboro Township and nine properties in Old Bridge require deed notices under the ROD. Two deed restriction notices are scheduled to be filed in accordance with the United States/State of New Jersey versus Dominick Manzo Consent Decree entered in 2011. The remaining deed restrictions will be filed with the appropriate authorities to control future use of the Westerly Wetlands area and prevent intrusive activities in the Uplands Area. The fencing of the Site, coupled with the use/deed restrictions which NJDEP anticipates placing on the properties comprising the Site, will prevent the Site from being subject to intrusive purposes that could create

exposure pathways.

Operation, Maintenance and Monitoring:

As part of its ongoing Operation and Maintenance (O&M) program, the State periodically inspects the Site to determine its maintenance needs. As a result, the State usually cuts the grass at least twice a year and performs any necessary repairs to the fence or entrance gate in the vicinity of the Uplands Area. Damage to wetlands vegetation is also inspected and replaced as needed. NJDEP is responsible for maintaining the integrity of the fence from damage, wear, and from trespassers, since the fence is a factor in assuring protectiveness at the Site by preventing human access. Preventing human trespassers from gaining access to the Site is an important element in assuring the protectiveness of human health. Finally, NJDEP is responsible for maintaining the wetlands, which includes replacing the restored wetlands area plants that were killed or destroyed by the weather, animals, trespassers, etc. NJDEP must also monitor the condition of the upper surface soil in the Uplands Area and the subsurface clay cap that lies below the upper soil layer because of the possibility of damage caused by trespassers using All Terrain Vehicles (ATVs). The average annual O&M and monitoring costs are presented in Table 3 on page 21.

Annual monitoring of the surface water, sediments, and groundwater in accordance with the Long-Term Monitoring plan is required. The sampling outlined in this plan will gauge the effect on the Westerly Wetlands of the removal of upgradient contaminants from the Tar Patch Area and Northerly Wetlands, as well as the earlier remedial work completed on the Uplands Area. This information will be used to confirm that all three remedies are successful in protecting human health and the environment.

In accordance with the OU3 ROD, ecological monitoring in the Westerly Wetlands was begun by EPA in the Summer of 2006 and resulted in the 2008 Burnt Fly Bog Site Baseline Ecological Risk Assessment Report (BERA). The ecological monitoring was conducted by an EPA contractor under the supervision of EPA's Environmental Response Team (ERT) with input from the Biological-Technical Assistance Group (B-TAG). The results of the BERA were compared with the June 1992 Ecological Assessment (1992 EA).

V. Progress Since the Last Review

The second five-year review for this Site was completed on June 19, 2006. All construction activities at the Site have been completed. Since June 19, 2006, with the exception of 2010, NJDEP continues to monitor surface water, sediment and groundwater quality. In addition, NJDEP has installed barriers that prevent recreational vehicles from entering the Site. Finally, NJDEP has continued to negotiate with the various property owners where deed notices are required. The recording of deed notices restrict future use of contaminated areas of the Site. There are a total of 14 deed notices required. Finally, the Baseline Ecological Risk Assessment was completed in 2008.

VI. Five-Year Review Process

Five-Year Review Team

EPA personnel on the five-year review team include Jeff Josephson (Team Leader), Diane Salkie (Remedial Project Manager), Julie McPherson (human health risk assessor), Urszula Filipowicz (human health risk assessor), Diana Cutt (hydrogeologist), Mike Clemetsen (ecological risk assessor), Pat Seppi (community involvement coordinator), and Amelia Wagner (attorney). NJDEP personnel on the five-year review team include Tom O'Neill (Section Chief), Jane TenEyck (operations manager).

Community Notification and Involvement

The EPA Community Involvement Coordinator (CIC) for the Site, Pat Seppi, arranged for a notice to be published in a local newspaper, the News Transcript, on March 30, 2011. This notice indicated that a five-year review would be conducted at the Burnt Fly Bog site to ensure that the Site is protective of human health and the environment. EPA would review the Site operation, maintenance and monitoring information as well as the status of any land use controls. EPA indicated that comments or questions on the remedy or the Site were welcome. The notice also identified the local information repositories. Although this notification was published nearly three months ago, EPA has not received any comments, inquiries and/or questions from citizens on the Site, the cleanup remedies, or the five-year review.

Document Review

The documents, data, reports, and other information which were examined in the process of completing this five-year review are summarized in Table 2 on page 20.

Data Review

An exposure route of concern is the migration of lead and PCBs flowing via surface water from the Site through Burnt Fly Brook to Deep Run. Burnt Fly Brook empties into Deep Run about a mile further downstream. Deep Run is a source of potable water for Perth Amboy.

Quarterly monitoring of Burnt Fly Brook began in 1992. Surface water and sediment samples are collected from three locations (SW/SED1, SW/SED2, SW/SED3) within Burnt Fly Brook and one location (SW/SED4) at the outflow from the sedimentation basin. See Figure 1-2 on page 31.

PCBs have not been detected in surface water samples collected by NJDEP during quarterly monitoring in Burnt Fly Brook. Sediment sample data in Burnt Fly Brook indicated PCB levels did not exceed the 0.49 ppm criteria. NJDEP ended PCB monitoring in 2006.

Lead contaminant levels in Burnt Fly Brook fluctuate. Concentrations of lead in the Burnt Fly Brook surface water downstream of the inflow from the Site have, at times, been detected above the 5 ppb surface water criteria. However, lead has also been detected in the upstream sampling location (SW/SED1).

Except for several marginal exceedances, over the last several years, lead levels in Burnt Fly Brook sediment were found to be below the Lowest Effect Level sediment screening criteria described in the Ontario Ministry of the Environment and Energy publication entitled, "Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario, August 1993". The Ontario Guidelines have been used for a number of years as a screening guide to compare sediment contaminant levels to concentrations that produce Ecological Lowest Effect Levels and Severe Effect Levels.

Continued monitoring of the surface water and sediment (see Table 5 on page 23) in the sedimentation basin and Burnt Fly Brook was conducted since the second five-year review to determine whether contaminants migrating from the Westerly Wetlands will be mitigated by the increasing depth of vegetation, the sedimentation basin, and the restoration/creation of the Tar Patch and Northerly Wetlands Areas in OU3.

Continued monitoring of groundwater (see Table 6 on page 24) for lead was conducted since the second five-year review (with the exception of 2010) to determine whether contaminant migration from the Site is occurring. Lead concentrations exceeding the New Jersey Ground Water Quality Standards (NJGWQS) of 5 micrograms per liter ($\mu\text{g/L}$) were observed in the Upland Area groundwater samples. These lead concentrations range from 1.5 $\mu\text{g/L}$ to 75.3 $\mu\text{g/L}$ with concentrations fluctuating over time in each of the four upland wells. Lead concentrations showed a general downward trend in UP-4, the easternmost well in this area. Lead was only detected once in a Downstream Area well, SP2, in 2007 at a concentration of 22.3 $\mu\text{g/L}$. Lead concentrations in all other Downstream Area wells have not exceeded the NJQWGS in the past four years of sample collection. With the exception of the 2007 lead detection in SP2, groundwater results indicate lead is not spreading laterally in the east direction past the Downstream Area.

2008 Baseline Ecological Risk Assessment (BERA) - Risk is characterized in the BERA based on soil, vegetation, small mammals, an earthworm bioaccumulation study, and dietary exposure models. The study focused on three primary contaminants of concern – total petroleum hydrocarbons (TPHs), lead (Pb), and polychlorinated biphenyls (PCBs).

The report concludes that attenuation of TPHs, Pb and PCBs in the bog soils appears to have been occurring when comparing results of this study with the 1992 EA. Lead did not accumulate in the vegetation samples collected from the bog for the BERA or the 1992 EA. High concentrations of Pb were present in earthworms for both the EA and the BERA. For small mammals, Pb bioconcentrations are an order of magnitude higher in the BERA compared with the EA. The bioaccumulation of PCBs in small mammals was at a lower level in the BERA than in the 1992 ecological assessment. Similar to the 1992 EA, the BERA found that the highest level of PCBs in mammals was found in shrews.

The BERA characterizes risks to herbivorous, carnivorous, and omnivorous birds and mammals using dietary exposure models. The models evaluated exposure and total exposure using both conservative and representative parameters and concludes that potential risk to herbivorous birds and mammals from Pb, PCBs, and TPH exists only in conservative model results, while Pb posed a risk to herbivorous birds, and TPH posed a risk to herbivorous mammals based on more representative models.

Site Inspection

On October 28, 2010, a five-year review-related Site inspection was conducted by EPA and NJDEP. The following EPA members of the review team were present: Jeff Josephson (team leader), Julie McPherson (human health risk assessor), Urszula Filipowicz (human health risk assessor) and Diana Cutt (hydrogeologist). NJDEP personnel on the five-year review team included Tom O'Neill (section chief), and Jane TenEyck (case manager). In addition, on January 11, 2011, and again on February 10, 2011, EPA's Division of Environmental Science and Assessment (DESA) attempted to conduct surface water sampling at nine Site locations but was unable due to ice and snow conditions. On March 17, 2011, DESA collected surface water samples from the nine Site locations as well as the two sediment Site locations for lead and PCB analysis. The results were consistent with previous sampling conducted by NJDEP.

Interviews

During October and November 2010, discussions were held with, Tom O'Neill, and Jane TenEyck to obtain information on the status of the Deed Restrictions, O&M costs, and sampling and monitoring data.

VII. Technical Assessment

Question A: Is the remedy functioning as intended by the decision document?

Several areas compromise the entirety of the Burnt Fly Bog Site; these areas were separated into three Operable Units (OU). The selected remedies for each of the areas within the OU have been identified in their corresponding Record of Decision (ROD) and are discussed in more detail below.

The ROD for OU 1, signed in 1983, was specifically for the Upland Areas of Burnt Fly Bog. The selected remedy included the following: excavation and removal of hazardous substances in Lagoons 1-4, the Asphalt Pile Area, Tar Patch Area, Drummed Waste Area, Northerly Wetlands and the Contaminated Soils Area; the design of a site restoration plan (i.e., restoration of original site contours and re-vegetation of the area); the design of an extensive five-year groundwater program including testing of eight area residential wells; and lastly, a further study of the Westerly Wetlands. After backfilling, a ten-acre clay cap was installed over the backfilled area and covered by an additional six inches of soil. This capped Upland Area is covered by a field of tall grass as a result of re-vegetation of

the surface soil. The clay cap prevents rainwater and runoff from penetrating into the groundwater, which may potentially impact the Westerly Wetlands and residential wells nearby. A fence is in place to prevent entrance to the Upland Area. The remedy selected has interrupted direct exposure to contamination disposed in these areas, as well as reduced the spread of contamination through infiltration and runoff.

The remedy selected for OU 1 identified monitoring of residential wells in the vicinity of the site. Post-ROD, NJDEP and EPA agreed that the monitoring of these homes was not necessary. A review of the current groundwater data suggests that continued sampling and water level gauging is necessary.

The 1988 ROD for OU 2 addresses the Westerly Wetlands and the Downstream Area. The selected interim remedy was containment without capping of the Westerly Wetlands including the installation of an appropriate drainage system and sedimentation basin. In the sedimentation basin, the particulate matter is allowed to settle, thus preventing off-site migration of lead. A security fence was included in this remedy which eliminated the direct contact pathway of exposure. Lastly, the remedy also included the excavation and off-site disposal of sediment contaminated with PCBs and lead that migrated into the Downstream Area.

The Westerly Wetlands receives drainage from the Upland Areas; ultimately the combined flow enters Deep Run, a creek located approximately 3,000 feet from the western end of the Westerly Wetlands which is a source of potable water for the city of Perth Amboy. The excavation of the contaminated sediments in the Downstream Area decreased the risk of contamination to Deep Run. The excavation of the Downstream Area was done in accordance with Soil Cleanup Criteria agreed to by EPA and NJDEP, 5 milligrams per kilogram (mg/kg) for PCBs and 250 mg/kg lead. The cleanup level established in the ROD for lead is currently protective since it is below the current cleanup level of 400 mg/kg. The cleanup level established in the ROD for PCBs exceeds the current NJDEP cleanup level of 0.22 mg/kg and EPA's residential soil cleanup criteria of 1 ppm; however, it is within the EPA acceptable cancer risk range and therefore remains protective of human health and the environment.

The final ROD for OU 3 was signed in 1998, and addressed the remaining contamination in the Westerly Wetlands, Northerly Wetlands and the Tar Patch Area of Burnt Fly Bog. The major components of the selected remedy included the following: excavation and off-site disposal of contaminated soil from the Northerly Wetlands and the Tar Patch Area; backfilling the excavated area in the Northerly Wetlands and re-establishing wetlands; backfilling the excavated areas in the Tar Patch Area and creating wetlands; provisions of additional security fencing around the Westerly Wetlands, and the recording of a Deed Notice for the Westerly Wetlands, Northerly Wetlands, and Tar Patch Area; monitoring of surface water and sediment in the Westerly Wetlands, surface water and sediment in the existing sedimentation basin located in the Downstream Area, and surface water, sediment and, if necessary, biota in Burnt Fly Brook; and finally, biological sampling in the Westerly Wetlands. The cleanup criteria established in the ROD for the Northerly Wetlands were 0.49 mg/kg for PCBs and 400 mg/kg for lead. The

cleanup levels established in the ROD for PCBs exceeds the current NJDEP cleanup level of 0.22 mg/kg; however, it remains protective of human health. For the Tar Patch Area, the cleanup goal was based on visual contamination instead of an actual cleanup level. Currently, fencing aides in controlling exposure to contamination left on site. Although not yet implemented, the use of deed restrictions will further aide in reducing exposure to onsite contaminants.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAO) used at the time of the remedy selection still valid?

There have been no physical changes to the Site that would adversely affect the protectiveness of the remedy. The exposure assumptions and the toxicity values that were used to estimate the potential risks and hazards to human health followed the general risk assessment practice at the time the risk assessment was performed. Although the risk assessment process has been updated and specific parameters and toxicity values may have changed, the risk assessment process that was used is still fairly consistent with current practice and the need to implement a remedial action remains valid. As stated earlier, although the numeric cleanup criteria established in the RODs for Westerly Wetlands and the Northerly Wetlands exceed the current cleanup levels for PCBs, they remain protective of human health and the environment.

Remedial action objectives (RAOs) were not identified in the ROD for OU1 or OU 2 therefore they cannot be evaluated in this review. The following RAOs were established for OU 3: minimize exposures to PCBs and lead in the soil at levels exceeding State and Federal soil cleanup criteria, while minimizing the extent of wetlands to be excavated; minimize/control releases of contaminants in sediment into surface waters during storm events; minimize/control exposures to PCBs and lead in soil to ecological receptors; and restore the wetlands to a productive ecosystem. The established RAOs for OU 3 remain valid.

Lead and polychlorinated biphenyls were previously identified as the contaminants of concern (COCs) at the site. Surface water and groundwater samples collected on an annual basis from 2006 to 2009 have been analyzed for lead only, whereas sediment samples have been analyzed for both lead and PCBs. An additional round of surface water samples were collected in 2011 for lead and PCB analysis. In the future, all three media (groundwater, surface water and sediment) should be sampled and analyzed for both contaminants of concern to ensure the RAOs are met and the remedy remains protective.

The current cleanup goals established for PCBs and lead are 1.0 ppm and 400 ppm, respectively (EPA Residential Soil Cleanup Criteria). The cleanup goal for lead is currently protective since the cleanup level established in the ROD is lower than the current cleanup goal. The cleanup goal for PCBs of 5 ppm in the OU1 ROD exceeds the current cleanup goal. Although the cleanup goal has decreased since the remedy selected in the ROD has been implemented, it was determined that the 5 ppm cleanup goal is

within the cancer risk range and is considered to be health protective. In addition, the Uplands Area is not residential; therefore, a cleanup goal of 5 ppm is sufficient.

In the OU2 ROD, the Action Levels for PCBs and lead were 5 ppm and 250 ppm, respectively. As in OU1, human exposure to 5 ppm of PCBs in soil or sediment would result in an excess lifetime cancer risk within EPA's acceptable risk range of 10^{-4} to 10^{-6} . The 250 ppm action level used for the OU2 cleanup of the accumulated sediment is less than the presently used lead screening level of 400 ppm.

Lead concentrations exceeding the NJGWQS of $5\mu\text{g/L}$ were observed in the Upland Area groundwater samples. These lead concentrations ranged from $1.5\mu\text{g/L}$ to $75.3\mu\text{g/L}$. Lead was only detected once in a Downstream Area well, SP2, in 2007 at a concentration of $22.3\mu\text{g/L}$. Lead concentrations in all other Downstream Area wells have not exceeded the NJGWQS in the past four years of sample collection. With the exception of the 2007 lead detection in SP2, groundwater results indicate lead is not spreading laterally in the east direction past the Downstream Area. If in future sampling events, the groundwater samples are analyzed filtered and unfiltered (like the surface water samples), the comparison of these results may be helpful in better determining representative lead concentrations in groundwater samples.

Similar results were reported for total lead in surface water; there were no exceedances above the NJDEP Surface Water Quality Standards (SWQS) in samples collected below the sedimentation basin in Burnt Fly Brook (SW-1 – SW-3) during 2006 to 2009 sampling events. These results indicate that lead in surface water is not migrating from the sedimentation basin. In the past five years of sampling lead concentrations in SW4, the downgradient perimeter location of the sediment basin, are above the NJDEP SWQS. The observed lead in SW4 ranged from $5.4\mu\text{g/L}$ (June 2007) to $68.4\mu\text{g/L}$ in September of 2009. In 2009 higher concentrations of lead have been reported in the upgradient sampling locations (SW-7 through SW-9), however more recent results from 2011 showed levels are consistent with earlier years. In 2011, surface water samples SW-1 through SW-11 were collected and analyzed for total lead, dissolved lead and PCBs. PCBs were not detected in any of the surface water samples. Concentrations of total lead were similar to the concentrations in the dissolved lead samples indicating that in most cases, lead is present in its dissolved phase. In 2011 total lead was observed above the NJDEP SWQS in surface water SW-3 through SW-11 samples. The 2011 data indicates lead is slightly above the NJDEP SWQS in the downgradient surface water sample location SW-3. This sample location is below the sedimentation basin. To ensure that lead is not migrating off-site, continual monitoring is necessary.

Eleven sediment locations within the Westerly Wetlands and the Downstream Area were sampled and analyzed for lead and PCBs. Results indicate both lead and PCB exceedances within the Westerly Wetlands are collocated within the same region (area within the SED 7, 8, 9, 10 and 11 sampling locations). Furthermore, increasing trends of lead are evident in the SED 8, 10 and 11 locations. PCB concentrations in these same locations, along with the SED 9 location, also indicate increasing trends. Lead and PCB exceedances have not been detected in the sediment samples downgradient of the

sedimentation basin, indicating no containment migration past the Downstream Area is occurring. Since contamination in the Westerly Wetlands Area has been left in place as part of the remedy, continual monitoring is imperative to ensure the migration of on-site contaminants is not occurring past the sedimentation basin. Monitoring will ensure the selected remedy remains protective and functions as intended by the decision document.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

The inspection of the Site also revealed a breach in the fence surrounding the Upland Capped Area; additionally, a fallen tree has compromised the fence in another area close to breach. The breach along with the tree damage need to be repaired to ensure that access to the Site remains restricted and the remedy continues to be protective.

The selected remedy has not been fully implemented. Specifically, the institutional controls have not yet been put into effect by NJDEP. The implementation of Deed Restrictions is necessary to assure that the Site remains protective and is not subjected to any future intrusive activities and/or uses that could release contaminants and/or create exposure pathways.

Surface water sample location SW-3 located downstream of the sedimentation basin, showed a lead result above the NJDEP SWQS in 2011. This suggests that the site related contamination is potentially migrating past the sedimentation basin. However, in 2011 the surface water samples were collected following a season of unusually high precipitation. Continued monitoring for lead in surface water is required.

Technical Assessment Summary

This third five-year review concludes that:

- The cap and vegetative cover in the Uplands Area are intact and in good condition.
- Monitoring wells around the Site are functional and securely locked.
- No one is drinking groundwater at the Site.
- Institutional controls (Deed Restriction/Notice), when implemented, will prevent improper use of the property located within the Burnt Fly Bog Site, thus protecting human health by preventing activities that might cause exposure to contaminants.
- In accordance with institutional (not yet implemented) and access controls, the Site is not being used by the public.
- The fence around the Site is not completely intact. Vandalism and storm damage has breached the fence in a number of locations allowing access to the Site. Engineering controls put in place to prevent all-terrain vehicles appear to be successful.

VIII. Issues, Recommendations, and Follow-up Actions

A fence was installed around the Site to restrict access and protect human health. However, an inspection revealed that the fence has been breached in several locations. These breaches must be repaired by NJDEP to restore Site access control.

IX. Protectiveness Statement

OU1 – short-term protective

The remedy at OU1 currently protects human health and the environment because the contaminated soils have been excavated and replaced with clean backfill and the Site is currently surrounded by a fence. However, in order to be protective in the long term, institutional controls restricting Site residential use need to be implemented.

OU2 – no statement needed since the downstream area was cleaned up to residential levels and the Westerly Wetlands interim action was finalized in the OU3 ROD.

OU3 – short-term protective

The remedy at OU3 currently protects human health and the environment because contaminated soils in the Northerly Wetlands and Tar Patch area have been excavated, replaced by clean fill and a fence restricts access to the area. In addition, humification is occurring in the Westerly Wetlands and the sedimentation basin is preventing migration of contaminants into the Burnt Fly Creek. However, in order for the remedy to be protective in the long term, institutional controls need to be implemented.

Sitewide statement – short-term protective

The remedies at the Burnt Fly Bog Superfund Site protect human health and the environment because contaminated soils and sediments have been excavated, the sedimentation basin prevents migration of the contaminants into surface water and Site access is restricted by fencing. In order for the Site to be protective in the long term, institutional controls need to be implemented.

X. Next Review

Since hazardous substances, pollutants or contaminants remain at the Site which do not allow for unlimited use or unrestricted exposure, in accordance with 40 CFR 300.430 (f) (4) (ii), the remedial action for the Site shall be reviewed no less often than every five years. EPA will conduct another five-year review prior to June 2016.

Approved:

for John E. LaPadula
Walter E. Mugdan, Director
Emergency and Remedial Response Division

June 16, 2011
Date

LIST OF ACRONYMS

BFB	=	Burnt Fly Bog
CERCLA	=	Comprehensive Environmental Response, Compensation, and Liability Act
EID	=	Environmental Information Document
EPA	=	U.S. Environmental Protection Agency
DOJ	=	Department of Justice
NJDEP	=	New Jersey Department of Environmental Protection
OSWER	=	Office of Solid Waste and Environmental Response
OU	=	Operable Unit
OU1	=	Operable Unit One
OU2	=	Operable Unit Two
OU3	=	Operable Unit Three
O&M	=	Operation and Maintenance
PCBs	=	Polychlorinated Biphenyls
PRP	=	Potentially Responsible Party
RI/FS	=	Remedial Investigation/Feasibility Study
ROD	=	Record of Decision
SFS	=	Supplemental Feasibility Study
TSCA	=	Toxic Substances Control Act

Table 1: Chronology of Site Events

EVENT	DATE
Site is an Undeveloped Area	Before 1950
Site is Used for Recycled Waste Storage	1950s through mid-1960s
Preliminary Site Investigations First Conducted	1979-1981
Dames and Moore Study (OU1 RI/FS equivalent)	1981-1982
General and Special Notice Letters Sent Out	1982-1983
NPL Listing	1983
OU1 ROD Signed	1983
EPA Awards Cooperative Agreement to NJDEP	1983
OU1 Remedial Design	1983-1986
OU1 Remedial Action	1983-1994
OU2 RI/FS	1985-1988
OU2 ROD Signed	1988
OU2 Remedial Design	1989-1994
OU2 Remedial Action	1994-1997
Referral to DOJ	1993
OU3 RI/FS	1988-1998
OU3 Remedial Design	1999-2002
OU3 Remedial Action	2002-2004
Construction Completion Attained	2004
Litigation	1997-2010

Table 2: Documents, Data, Information Reviewed for Five-Year Review

DOCUMENT, TITLE, AUTHOR	SUBMITTAL DATE
OU1 Record of Decision	1983
OU2 Record of Decision	1988
Ecological Assessment Report	1992
OU3 Record of Decision	1998
Long-Term Monitoring Plan	2004
Baseline Ecological Risk Assessment Report	2008
2001 Five-Year Review, 2006 Five Year Review	2001, 2006
Sampling Results of Sediment, Surface Water, and Groundwater Monitoring Program	2004-2009

Table 3: Annual Operations, Maintenance, and Monitoring Costs*

TYPE OF ANNUAL COSTS	ESTIMATED COSTS
Annual Contractor Costs	\$30,000 to \$50,000
Annual Sampling and Analysis Costs	\$30,000 to \$40,000
TOTAL ANNUAL O&M/MONITORING COSTS	\$70,000 to \$80,000

* - costs estimated from 2006 data

Table 4: Comparison of Maximum Detected Concentration (ppb) in Burnt Fly Brook Surface Water Sampling Locations (SW1, SW2, SW3) since Last Five-Year Review to the following criteria: NJDEP Surface Water Quality Standards (SWQS)*

Contaminants of Potential Concern	Maximum Concentration (ppb)	SWQS*	
		Chronic	Acute
Lead (dissolved)	6.69 ppb	2.5 ppb	65 ppb

SWQS* = NJDEP, N. J. A. C. 7:9B, Surface Water Quality Standards for dissolved lead

Table 5: Burnt Fly Bog Quarterly Monitoring Program - Surface Water Results

Date	Parameter	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	SW9	SED10*	SED11*
06/13/06	Dissolved Lead (µg/L)	1	2.35	2.41	20.8	52.8	33.3	NA	NA	NA		
	Total Lead (µg/L)	1.23	2.69	2.72	25.2	52	32.2	NA	201	472		
06/19/07	Dissolved Lead (µg/L)	2.04	2.46	2.14	1.38	3.38	41.5					
	Total Lead (µg/L)	2.87	2.81	3.01	5.4	40.2	8.9	NS	60.1	393		
	Hardness (mg/L)	18.94	18.64	18.1	19.01	19.77	15.96	NS	69.8	67.99		
	pH analysis	3.96	3.76	3.77	5.09	4.35	4.03	NS	4.82	5.08		
08/20/08	Dissolved Lead (µg/L)	1.8	2	1.9	11.6				68.5	24.1		
	Total Lead (µg/L)	2.3	2	2	16.1	27.8	11.5	NS	197	125		
	Hardness (mg/L)	21.1	23.2	23.2	16.9				92.8	54.9		
	pH analysis	3.11	3.18	5.68	3.43				3.6	3.53		
09/29/09	Total Lead (µg/L)	1.3	1.8	1.9	68.4	15.7	45	1020	3060	214		
03/17/11	Total Lead (µg/L)	3.98	2.25	6.39	44.3	73.9	51	67.8	75.6	22.4	83.5	19.41
	Dissolved Lead (µg/L)	3.04	2.56	6.69	45.4	76.1	51.2	79.3	90.8	12.6	107	7.4
	PCBS (µg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
* Surface water samples were collected at the sediment locations, SED10 and SED11												
NS = Not Sampled due to insufficient water.												
ND = Not detected.												
NA = Not Analyzed												
SW4 sample location was moved from the Brook to the outlet of the Sedimentation Basin beginning 3/21/01.												

Table 6: Burnt Fly Bog Quarterly Monitoring Program – Sediment Results

Date	Parameter	SED 1	SED 2	SED 3	SED 4	SED 5	SED 6	SED 7	SED 8	SED 9	SED 10	SED 11
06/13/06	PCBs (mg/kg)	ND	0.15	ND	ND	ND	ND	12.6	1.62	3.07	8.42	13.92
	Lead (mg/kg)	22.3	21	17.9	659	33.7	54.3	2570	20,200	26,200	18,600	2600
	% Solids	48.4	57.6	56.4	10.8	71.8	64.3	19.8	68.2	67.8	47.9	43.6
	TOC (mg/kg)	90,900	32,700	38,300	239,000	12,800	149,000	1,350,000	675,000	433,000	679,000	113,000
	pH	4.28	4.88	6.01	6.75	5.96	5.81	5.47	4.24	4.54	4.22	5.79
06/19/07	PCBs (mg/kg)	ND	0.137	ND	ND	ND	ND	9.76	37.5	39.3	17.49	13.92
	Lead (mg/kg)	20.8	17.8	9.42	828	36.7	25.7	3720	7080	14,900	2180	10,000
	TOC (mg/kg)	44,100	38,900	15,300	236,000	21,800	9300	294,000	589,000	360,000	190,000	791,000
	pH	4.03	4.45	5.11	6.79	6.3	4.42	4.58	4.53	4.96	3.87	5.99
08/20/08	PCBs (mg/kg)	ND	ND	ND	0.034	ND	ND	27.8	121	93	85	102
	Lead (mg/kg)	8.2	23.5	16.8	71.8	29.7	20.5	974	96,700	5210	4890	23,500
	TOC (mg/kg)	22,100	36,400	22,900	53,600							
	pH		4.51		6.6				3.6	3.53		
	% Solids	68.7	60.3	68.4	58.5	68.8	78.2	45.1	24.8	53.8	70.6	52
	Total PHC	NA	NA	NA	NA	NA	NA	7430	113,000	95,800	136,000	99,600
09/29/09	PCBs (mg/kg)	ND	0.132	ND	0.16	ND	0.053	10.2	55	60	89	77
	Lead (mg/kg)	30.9	21	20.6	672	32.5	155	2190	20,600	5420	57,600	15,900
	% Solids	43.1	61.8	58.7	12.3	67.2	36.6	20.1	45.3	32.2	56.3	71.3
ND = Not Detected; NA = Not Analyzed; MDL for PCBs varies, but is less than NJ Soil Cleanup Criteria of 0.49 ppm.												
SED 4 location was moved from the Brook to the outlet of sedimentation basin beginning on 3/21/01.												
SED 5 and SED 6 samples were collected within the sedimentation basin and SED 7-11 samples were collected at locations within the Westerly Wetlands												

Table 7: Burnt Fly Bog Quarterly Monitoring Program - Ground Water Results

Date	Parameter	SP1	SP2	SP3	UP1	UP2	UP3	UP4
06/13/06	Total Lead (µg/L)	0.21 J	0.21 J	0.21 J	13.1	15.4	4.48	9.62
	Hardness (mg/L)	27.71	11.34	25.45	112	147.5	55.1	31.1
	pH analysis	6.31	3.7	4.82	5.94	3.07	3.69	3.92
06/19/07	Total Lead (µg/L)	0.178	22.3	0.22	12.8	70	6.35	7.11
	Hardness (mg/L)	27.76	13.74	25.34	67.77	199.5	47.95	21.82
	pH analysis	NA	4.04	5.82	6.08	4.15	4.05	4.25
08/20/08	Total Lead (µg/L)	0.24	2.1	0.4	30.8	75.3	9.4	8.4
	Hardness (mg/L)	23.2	23.2	16.9	84.4	88.6	42.2	25.3
	pH analysis	5.33	3.4	5.37	5.72	3.94	3.8	3.72
09/29/09	Total Lead (µg/L)	0.67	0.45	0.25	16.3	6.9	1.5	4.4
NA = Not Analyzed								
J = The letter J after a value indicates an estimated value. The reported value is quantitatively qualified because it is below the method detection limit (MDL) however above the instrument detection limit.								

Burnt Fly Bog Sample Location Map

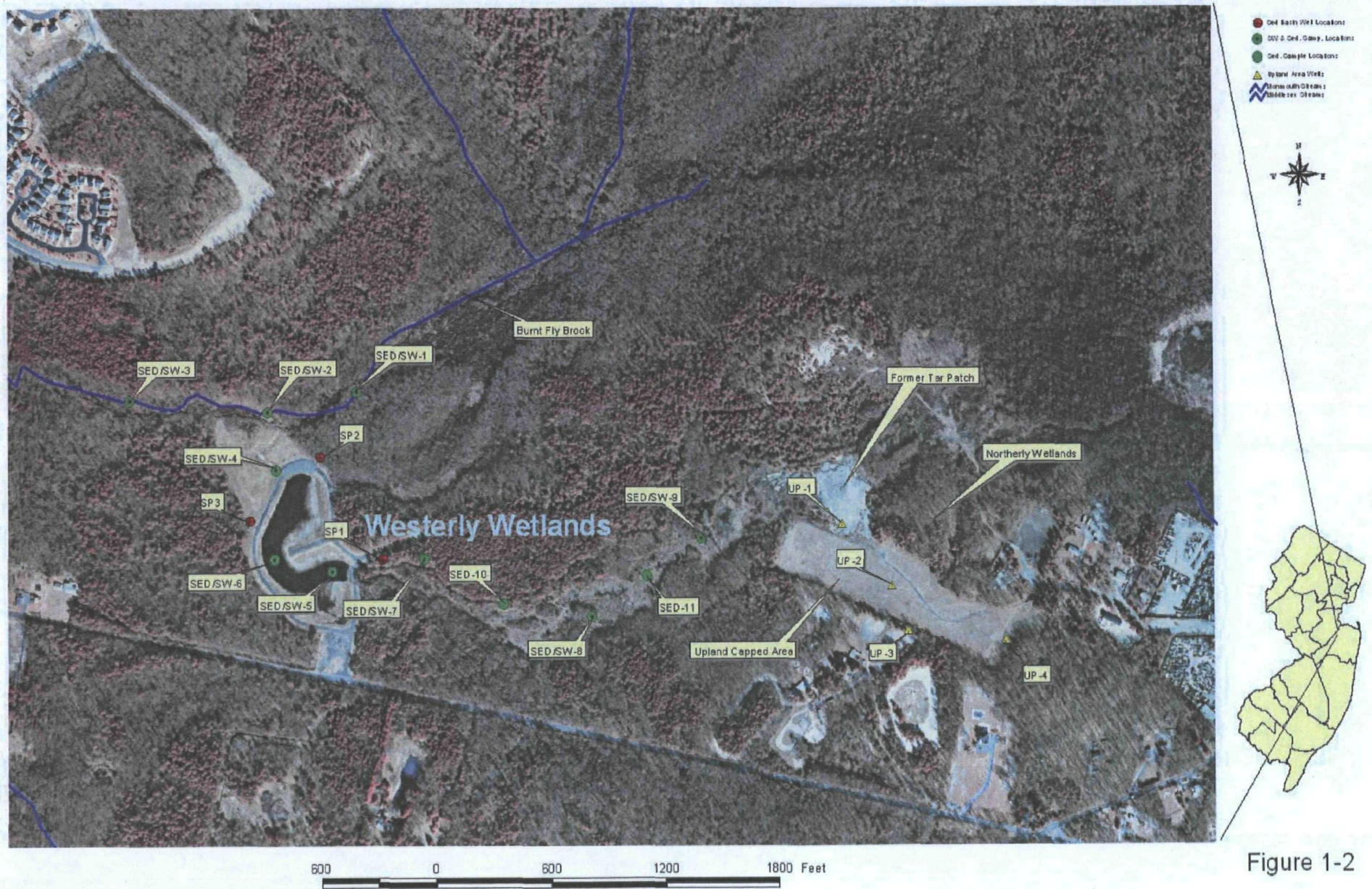


Figure 1-2