An Example of an Integrated Remedy: Halby Chemical Superfund Site, Wilmington, Delaware

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INTRODUCTION

The Halby Chemical Site is located in Wilmington, New Castle County, Delaware, in a highly industrialized area near the Port of Wilmington. The Halby and Witco (now known as the Crompton Corporation) Chemical Companies produced thiocyanates, sulfides, hydrosulfides, and thioglycolates at the former process plant from 1948-1977. The Pyrites Company stored pyrite ore (iron sulfide) on a portion of the Site from 1969 and on adjacent properties until 1974. From 1948 to 1964, the Halby Chemical Company discharged all liquid wastes, including cooling water and acid wastewater, into the 2.0-acre unlined on-Site lagoon via the process plant drainage ditch. Historically, the lagoon discharged into the adjacent tidal marsh, which is connected to the Christina River by the Lobdell Canal. The acid wastewater was discharged into the municipal sewer system from 1964 to 1972, when a pilot treatment plant was constructed. The pilot plant discharged treated effluent into the lagoon until the production facility closed in 1977. The lagoon received run-off from the Site and adjacent areas. Since 1977, the Brandywine Chemical Company has stored bulk chemicals in the former process plant area. The USEPA placed the Site on the National Priorities list (NPL) in 1986 after several preliminary studies found high levels of a wide variety of organic and inorganic compounds in soil, surface water, and ground water on the Site. Operable Unit 1 (OU1) consisted exclusively of soils in the former chemical process plant area and was covered under a 1991 USEPA Record of Decision (ROD). The 1991 ROD required that the former process plant area be remediated by excavating and stabilizing the top 6 inches of surface soil and covering the entire area with an asphalt cap. Operable Unit 2 (OU2) addressed Site-wide contamination, including ground water and areas that are beyond the boundaries of the former process plant. The USEPA's selected remedy for Operable Unit 2 for the Halby Chemical Site as set forth in the March 1998 ROD consisted of: capping Site soils with a paved surface, instituting surface water run-off controls, backfilling and capping the on-Site lagoon and backfilling the tidal marsh, mitigating wetland losses off-site, instituting ground water use controls, and long term monitoring. Industrial activities were expected to continue on the Site following remediation. Major contaminants of concern (COCs) to the natural resources trustees at the Halby Chemical Site are arsenic, copper, zinc, cyanide, ammonia, thiocyanate, and carbon disulfide. The Responsible Parties are the Crompton Corporation and Pyrites.

Halby Chemical Site - Remediation

Photo credit: Matt Mellon, EPA

Trust Resources Directly or In-Directly Impacted:

- Wetlands
- Riverine
- Uplands
- 57 avian species (Barnhill et al., 1991)
- Variety of mammal species
- Species of Concern found in the area:
  - federally endangered shortnose sturgeon
  - federally threatened pair of bald eagles

The Responsible Party's (RP) Restoration Offer:

- Purchase 248 acres of tidal wetlands located 14 miles south of the Site
- Transfer the title to the State of Delaware (DNREC)
- Enhance the property by:
  - Building and installing two osprey nesting structures
  - Providing funds for the control and long-term maintenance of *Phragmites*, an invasive plant species.

Habitat Equivalency Analysis: Number of enhanced wetland acres needed to compensate for the services lost (comparing different rates of injury and services gained)

	50% of baseline (353.47 acre-years)	62.5% of baseline (380.05 acre-years)	75%of baseline (406.64 acre-years)
40% increase (9 acre-years/acre)	39.4 acres	42.4 acres	45.3 acres
27.5% increase (6.2 acre-years/acre)	57.3 acres	61.6 acres	65.9 acres
15% increase (3.4 acre-year/acre	105 acres	113 acres	121 acres

Maximum Required Acreage:

21.6 acres (EPA Wetlands Mitigation)
+121 acres (Trustee Compensatory Restoration)

Total = 142.6 Enhanced Wetland Acres

Conclusion:

- The RP's offer exceeded the acreage needed to satisfy both the EPA's mitigation and the Trustees' restoration requirements.
- The EPA and the Trustees accepted the RP's offer.
- The property has been purchased and the title is held by the State of Delaware (DNREC).
- A Covenant Not to Sue is being granted and the Consent Decree is being signed.
- Enhancement of the property has begun – *Phragmites* has been sprayed and burned by DNREC.

Cleaver Marsh (before burn)

Photo credit: Rob Hossler, DNREC

***Phragmites* Control – aerial spray**

Photo credit: Rob Hossler, DNREC

***Phragmites* Control – burn**

Photo credit: Rob Hossler, DNREC

Area after 1 year of treatment

Photo credit: Rob Hossler, DNREC

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