CASE FILE

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SITE CIVIL IMPROVEMENT ↷ EROSION CONTROL ↷ SURFACE WATER QUALITY

Geopro® Learning Tool

November 4, 2004

Big Rock Point Restoration - Charlevoix, MI; Spring 2004

Decommissioning of the Nation's third oldest nuclear power plant includes complete site restoration … beginning with the removal of all structures and impacted soils. Although project start-up began in 1997, significant soil, pavement and other earth changes did not initiate until late spring of 2004. At that time, special concern for site water discharge quality was needed as all storm and pumped excavation water had to pass stringent *Michigan Department of Environmental Quality* [MDEQ] requirements prior to its release to an adjacent wetland and Lake Michigan.

Big Rock Point Power Plant

Difficulty in achieving sufficient discharge clarity was expected due to small clay and silt inclusions within the predominantly granular subsoils. Even if a large basin could be constructed, the colloidal fraction would not settle by gravity and other clay and fine silt particles would re-suspend during basin pump-out operations.

To meet State requirements, *Consumers Energy* developed an on-site water clarification system using *Applied Polymer Systems, Inc.* **Floc Logs®**.

A field trial was conducted in 2003 to ensure that the environmentally safe, polymer blends were able to adequately remove soil suspensions originating from what would be multiple site locations during several years of work. The successful field trial indicated that a **703d-706b Floc Log** duplex generated adequate water clarity and a floc/chelate that settled easily.

Water Quality Entering Clarification System

Once these polymer blends were identified, *Consumers Energy* designed and constructed [2004] site water capturing and transporting systems, a method to introduce the blends into the combined source waters and a method to achieve proper floc/chelate formation via mixing of the blends with the waters. To achieve the latter two system needs, the combined water was introduced into a flume [which captured heavy particulates at a weir and allowed water heating for winter operations], followed by an enclosed pipe circuit [which provided polymer blend introduction via ports as well as mixing]. The pipe discharged into a PVC lined basin where settlement of the floc/chelate could occur.

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Mixing System

Consumers Energy designed the polymer blend introduction and mixing systems to handle a continuous 200 gpm flow rate. However, in-use needs often generated much higher flows, compromising both the polymer quantity requirements and the mixing thoroughness. To maintain water quality

Floc Log Entry Port with 706 Floc Log Visible

when excess flows occurred, water was drawn from the basin and re-circulated through the flume and pipe, allowing polymer blend addition [without a greater quantity of **Floc Logs**] and adequate mixing. This ability to re-circulate worked well in combination with the *Consumers Energy* need to test for proper water clarity prior to a discharge [an automatic discharge method was not allowed for this site … a pump switch had to be manually thrown to start a basin discharge].

Floc Log is a trademark of Applied Polymer Systems, Inc.

Consumers Energy provided a pair of data points as a representative review of system effectiveness. On September 15, 2004, a sample of water taken at a collection point prior to flume entry indicated a TSS value of 2050 mg/l. At the same time, a sample of the system discharge water indicated a TSS value of 15.2 mg/l … a 99+% decrease in suspended solids. Due to this system's effectiveness, low cost and operational simplicity, it is scheduled to remain in operation until some time in 2006.

System Exit Point - Note 'black' [clarified] water

For more information pertaining to **Floc Logs** and the systems that enable water clarification using environmentally safe processes, please contact your *Price and Company, Inc.* **Regional Representative.**

Clarified Water Flowing Through Wetlands

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