

Y-12's Biomonitoring and Water Quality

The following details of the emerging environmental situation and public concerns that produced increased regulations for Y-12 is provided by Mick Wiest, of the Y-12 Environment, Safety and Health organization's Water Compliance Department. It will give additional insights into this highly specialized area of environmental management.

Introducing the subject of the environment at Y-12, Mick said, "Beginning in the early 1970's Congress passed a number of rules and regulations aimed at improving the quality of our rivers and streams. One of the most significant and challenging efforts to be initiated was the National Pollutant Discharge Elimination System program, authorized by the Clean Water Act. The NPDES program focused on controlling point sources, or 'end of pipe' pollution, by placing limits on what can be discharged and requiring sampling/reporting of the data."

These new rules and regulations would change the way Y-12 addressed issues of environmental concern. Before these forced changes, Y-12 personnel had not had the money designated to expend the needed effort to prevent adverse environmental impact, and the early years of Y-12 saw new and untested processes constantly coming into use. Many of these first-time efforts were literally designed to be learn-as-you-go.

Mick continues, "The Y-12 Plant was issued its first NPDES permit in 1975, and this sparked the first comprehensive improvement in the way the site managed the various wastewaters generated by the Oak Ridge nuclear weapons plant. This new permit and the related regulations carried hefty fines that could not be ignored. Y-12 began a major initiative to identify its waste streams or point sources, and with the 1985 NPDES permit several wastewater treatment facilities were built to collect these wastes and discharge them within regulatory limits.

Focusing on the stream that has its beginnings in Y-12, Mick said, "The primary receiving stream for Y-12 is East Fork Poplar Creek. This stream flows through the city and turns west eventually joining Poplar Creek near the East Tennessee Technology Park's Heritage Center (former K-25 Plant). Just like East Fork Poplar Creek, Bear Creek also originates within the borders of Y-12, but East Fork Poplar Creek receives most of the plant effluents and has the largest number of outfalls along the creek."

"Overall, the NPDES permitting program was a success on a national level and for the federal facilities on the Department of Energy's Oak Ridge Reservation. Although many industries were slow to come into compliance, most permitted sites today devote full-time resources to ensure that they meet all water quality requirements.

"Y-12's 1985 NPDES permit was significant in that biomonitoring, or fish and aquatic life sampling was required. This shifted the focus from just point sources to one that included area sources of pollution and required monitoring the total ecosystem as the true measure of the stream's health. This spawned the creation of Y-12's Biological Monitoring and Abatement Program.

"In early 1985, Y-12 enlisted the help of Dr. Jim Loar, an aquatic biologist at the Oak Ridge National Laboratory, to develop a biomonitoring program that would assess the health of East Fork Poplar Creek and seek ways to improve it. In those days there was very little aquatic life found in the upper reaches of the creek, so a comprehensive system was needed to address the problems.

"Loar and fellow scientists from ORNL's Environmental Sciences Division developed a Biological Monitoring and Abatement Program that would assess ecological conditions in the stream relative to regulatory limits, and measure how well the stream was recovering from industrial impacts suffered over the years.

"There are three primary tasks that make up the Biological Monitoring and Abatement Program:

- (1) Bioaccumulation monitoring – measuring the uptake of pollutants,

- (2) Benthic macroinvertebrate community monitoring – an assessment of the creek bottom and the quality and type of food that sustains the aquatic life, and
- (3) Fish community monitoring – a measure of the fish and aquatic life species, noting those that are pollution tolerant and intolerant, and a comparison to reference streams off the reservation.

“With the help of this biomonitoring program a major turnaround has taken place with East Fork Poplar Creek over the last 25 years. Today the stream is supporting a diverse population of fish and other aquatic life.

“Although there is still room for improvement, the Biological Monitoring and Abatement Program points the way to where resources should be focused to maximize those improvements. The Y-12 Complex Biological Monitoring and Abatement Program is still conducted by ORNL, now directed by Mark Peterson.

“A public presentation (state of the creek) to provide an assessment of stream health for East Fork Poplar Creek is planned in the near future. This is a good way for the public to learn more about Y-12 and nearby waterways.”

Mick is B&W Y-12's person who works with Mark on the Y-12 Complex Biological Monitoring and Abatement Program. Please watch for announcements of that “state of the creek” public presentation.