

Aquatic Nuisance Species Dispersal Barrier Chicago Sanitary & Ship Canal – MM 296.5

Issue:

The combined Cal-Sag Channel and Chicago Sanitary and Ship Canal (CSSC) below mile marker 303 represents the singular hydraulic connection between the Great Lakes and the western rivers basin. The Army Corps of Engineers (ACOE) constructed an electric dispersal barrier as an environmentally sound method for preventing the movement of aquatic nuisance species through the CSSC. The ultimate goal for the dispersal barrier is to prevent aquatic invasive species from moving between the basins, facilitate commerce throughout the region with minimal impact, and to protect the commercial/recreational waterway users. Two species of non-indigenous Asian Carp (Silver and Bighead) are presently migrating toward the Great Lakes through the Mississippi/Illinois River basin and are estimated to be within 15 miles of the Dispersal Barrier. If these aquatic nuisance species reach the Great Lakes, scientists are concerned they will devastate the \$4 billion Great Lakes commercial and sport fishing industries.

Background:

Dispersal Barrier Construction

The Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, as amended by the National Invasive Species Act (NISA) of 1996, authorized ACOE to conduct a demonstration project to identify an environmentally sound method for preventing and reducing the dispersal of non-indigenous aquatic nuisance species through the CSSC. The ACOE selected an electric barrier because it is a non-lethal deterrent with a proven history, which does not overtly interfere with navigation in the canal.

A demonstration dispersal barrier (Barrier I) was constructed and has been in operation since April 2002. It is located approximately 30 miles from Lake Michigan and creates an electric field in the water by pulsing low voltage DC current through steel cables secured to the bottom of the canal.

A second (permanent) barrier (Barrier IIA) was constructed 800 to 1300 feet downstream of the demonstration barrier. The potential field strength for the permanent barrier will be up to four times that of the demonstration barrier. Barrier IIA operated successfully for five weeks in early September 2008 and was energized for continuous operation on April 21, 2009. Construction is planned for a third barrier that will augment the capabilities of Barrier IIA without affecting the barriers general capabilities.

Safety and Navigation Concerns

In spring 2004, a commercial towboat operator reported an electrical arc between a wire rope and timberhead while making up a tow in the vicinity of the Demonstration Barrier.

During subsequent ACOE safety testing in January 2005, sparking was observed upon metal-to-metal contact between two independent barges in the barrier field. As a result of the electrical discharge a Coast Guard Regulated Navigation Area (RNA) was put into place. The RNA stretches 0.8 miles and requires increased use of PFDs, prohibits vessel mooring, meeting, passing, or overtaking, and requires tows to be made up with wire rope to maintain electrical connectivity. A Temporary Interim Rule stating the requirements for the RNA is currently in effect and expires September 30, 2009 with the goal to have the Final Rule in place by October 1, 2009.

The Navy Experimental Diving Unit (NEDU) was tasked with researching how the electric current would affect a human body if immersed in the water. The NEDU final report was released in June 2008 and concluded that the possible effects to a human body if immersed in the water include paralysis of body muscles, inability to breathe, and ventricular fibrillation.

Discussion:

Based on the commercial significance and successful transit history of the Demonstration Barrier by thousands of barges since its inception in April 2002, the Coast Guard has not chosen to close the waterway; despite the proven electrical discharge hazard and additional safety concerns. Tows spanning Barrier IIA and the coal fired power plant barge loading area just south of the RNA remain a concern. The Coast Guard also has specific concerns regarding person in the water testing and is motivated to implement the necessary safety measures to prevent a person from entering the water.

Upon review of the Final Report by the NEDU, it became imperative to act sooner rather than later in implementing increased safety measures for the operation of the dispersal barrier. The result was the formation of a Safety Work Group. This Safety Work Group initially met in February of 2008 and focused on three goals: education and public outreach, keeping people out of the water and egress/rescue efforts. The leadership role of the safety workgroup officially passed from USCG/USACE to the new Dispersal Barrier Safety Workgroup Chair (Captain Bill Russell) and Co-Chair (Dr. Phil Moy) in April 2009.

The Safety Work Group has regularly been attended by a broad cross-section of stakeholders. Key partners include the American Waterways Operators (AWO), Illinois River Carriers Association (IRCA), ACOE Chicago District, MSU Chicago, Sector Lake Michigan, and the Ninth Coast Guard District. During the past 12 months the Coast Guard hosted five Safety Work Group meetings with full participation of stakeholders.

Public Outreach:

The Safety Work Group began a robust public outreach campaign to educate the boating community of the risks associated with the Fish Barrier. This includes a joint ACOE/CG press release, creation of an educational/warning flyer and radio broadcasts, newspapers, and attendance at boating events.

Another public outreach initiative was to improve the signage at the Fish Barrier to better inform mariners of what to do when entering the area. At the present time signage is located at both ends of the Fish Barrier. The Safety Work Group determined that additional signage was necessary one-half mile up river and down river to provide sufficient notice to mariners **before** entering the Fish Barrier. The ACOE and Metropolitan Water Reclamation District of Greater Chicago (MWRD) are currently discussing real estate right issues to be able to move forward with this signage initiative. Additional temporary signage was installed and will remain active until permanent signage is in place.

Keeping People Out of Water:

One of the obvious measures to keep people out of the water from a landside perspective was to install chain link fencing the length of the Fish Barrier on each side of the river. Temporary fencing is installed with permanent fencing installed once real estate rights are completed with MWRD.

Egress and Rescue:

The ability to remove a person from the water in the vicinity of the Fish Barrier presented itself as a serious concern. The Coast Guard has contacted area first responders to educate them on the dangers of attempting a rescue from the Fish Barrier. The ACOE is currently looking into developing a fast-acting remote emergency shut down procedure to remove the electric current from the water. The ACOE has the ability to shut the Fish Barrier off remotely from a computer at the ACOE building but it could take up to an hour for this to occur, which is not practical in a person in the water situation.

To better prepare everyone involved in a person in the water situation the Safety Work Group plans to conduct a rescue/egress drill with first responders. This drill will ensure all first responders have the basic knowledge of what to do if an emergency rescue is needed in the Fish Barrier location. The risks associated with the electric current in the water plays a key role in how to physically remove a victim without serious risks for the rescuer. This remains one of the Safety Work Groups primary obstacles to overcome and provide clear direction to first responders.

The Way Forward:

The ACOE currently has Barrier I and Barrier IIA activated. For commercial tow vessels, sparking tests at 1V/inch were conducted in spring 2008. The tests determined sparking was minimal/non-existent as long as vessels were made up of wire rope and didn't come in contact with any other vessels or shore side conductors. A bow boat is escorting all "red flag" vessels (vessels carrying flammable products) through the dispersal barrier to ensure a safe transit and minimize the chance of a collision which may produce a spark.

The remaining issues that exist and are being discussed are:

- How can the dispersal barrier be shut down quickly in the event of an emergency?
- Completion of training/education for first responders that may need to operate within the dispersal barrier?
- Completing the installation of updated signage and fencing to provide the instruction, awareness, and a physical barrier.
- Publication of the Final Rule making the RNA permanent.
- Development/implementation of an enhanced biological monitoring plan.
- Complete safety testing at higher voltages to include mapping the field strength and sparking potential for voltage levels from 1-4 Volts/inch.
- Complete initial research on the optimal operating voltage required to deter all sizes of fish.

The Safety Work Group is currently discussing all the issues discussed in this document and continues to make progress through meetings and on-site assessments to determine the best course of action. The Coast Guard and ACOE remain the leading agencies to ensure the dispersal barrier presents minimal risk to the public.