

Power Systems for DC Pulse Generation

**Presented for:
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Site Layout



Barrier IIA

Barrier IIB

**Barrier IIB
Generators**

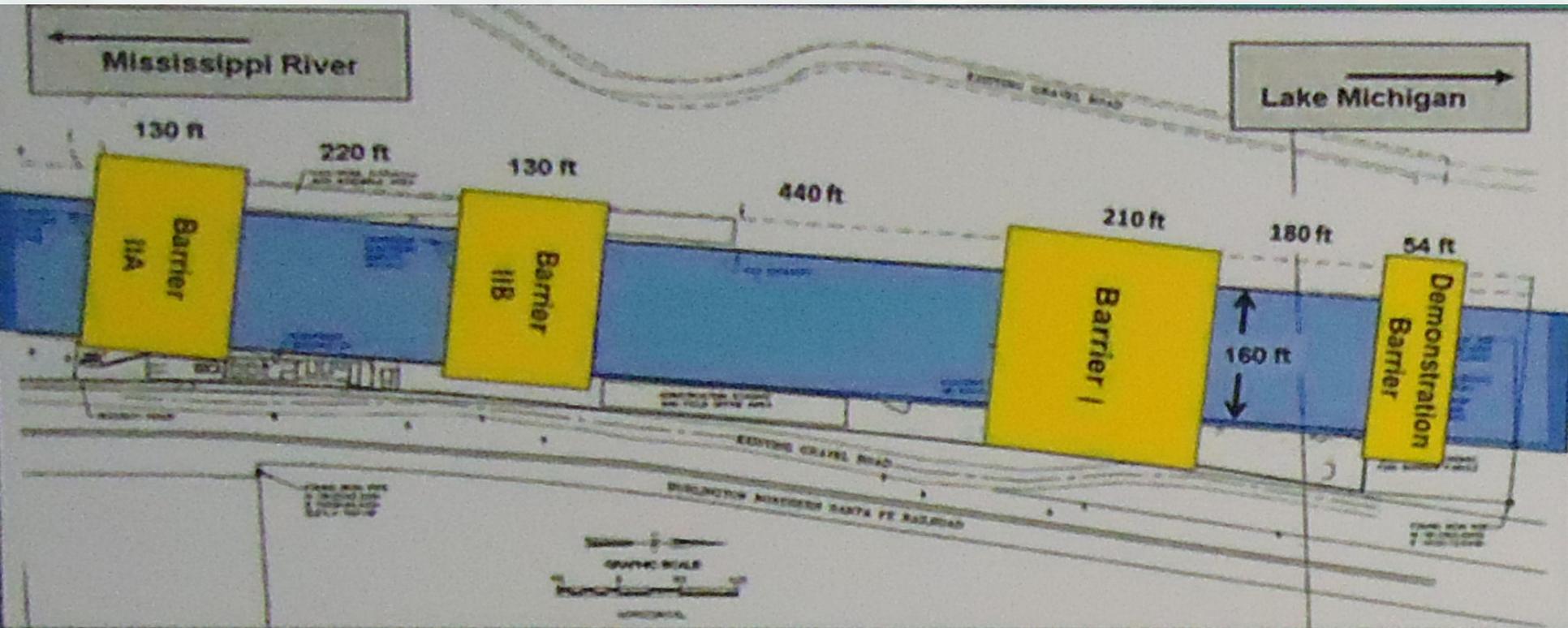
**Barrier I
Under Construction**

Demo Barrier



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General Site Rendering



Overall One Line Diagram

Emphasize Incoming Service/Backup Power and 480V Distribution.



One Line
Overall.pdf



480V Main Distribution Equipment



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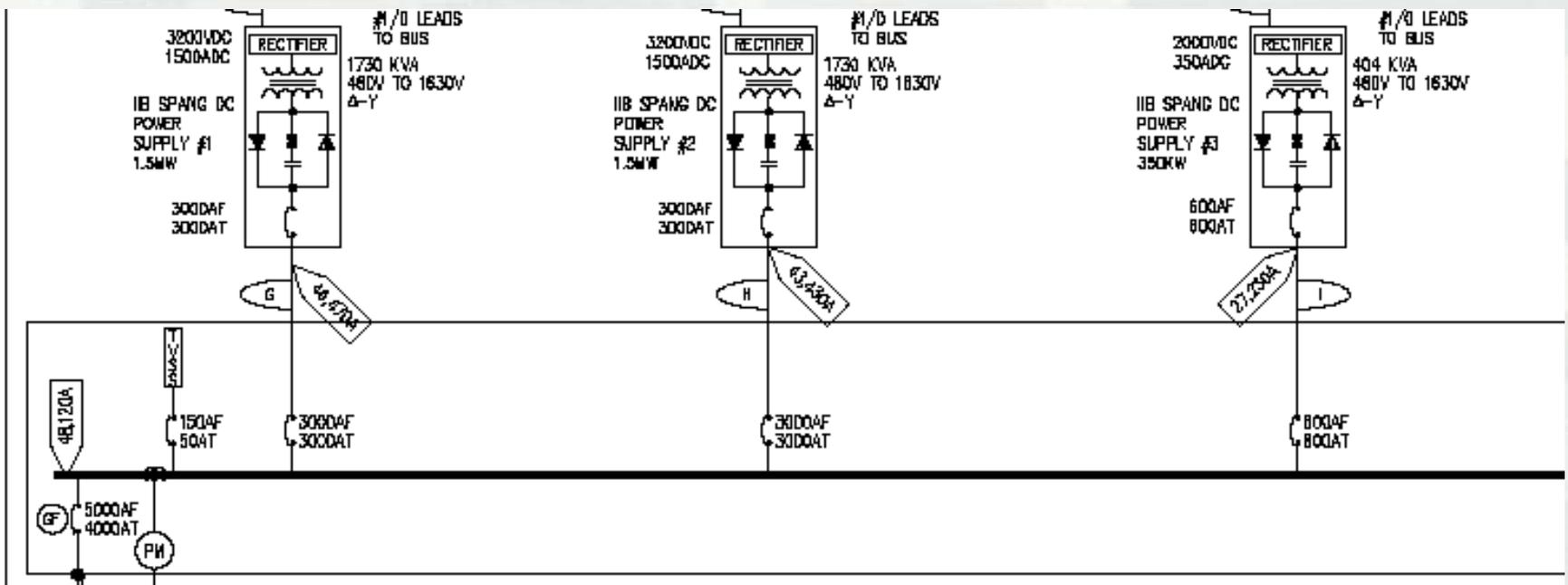
480V Motor Control Center



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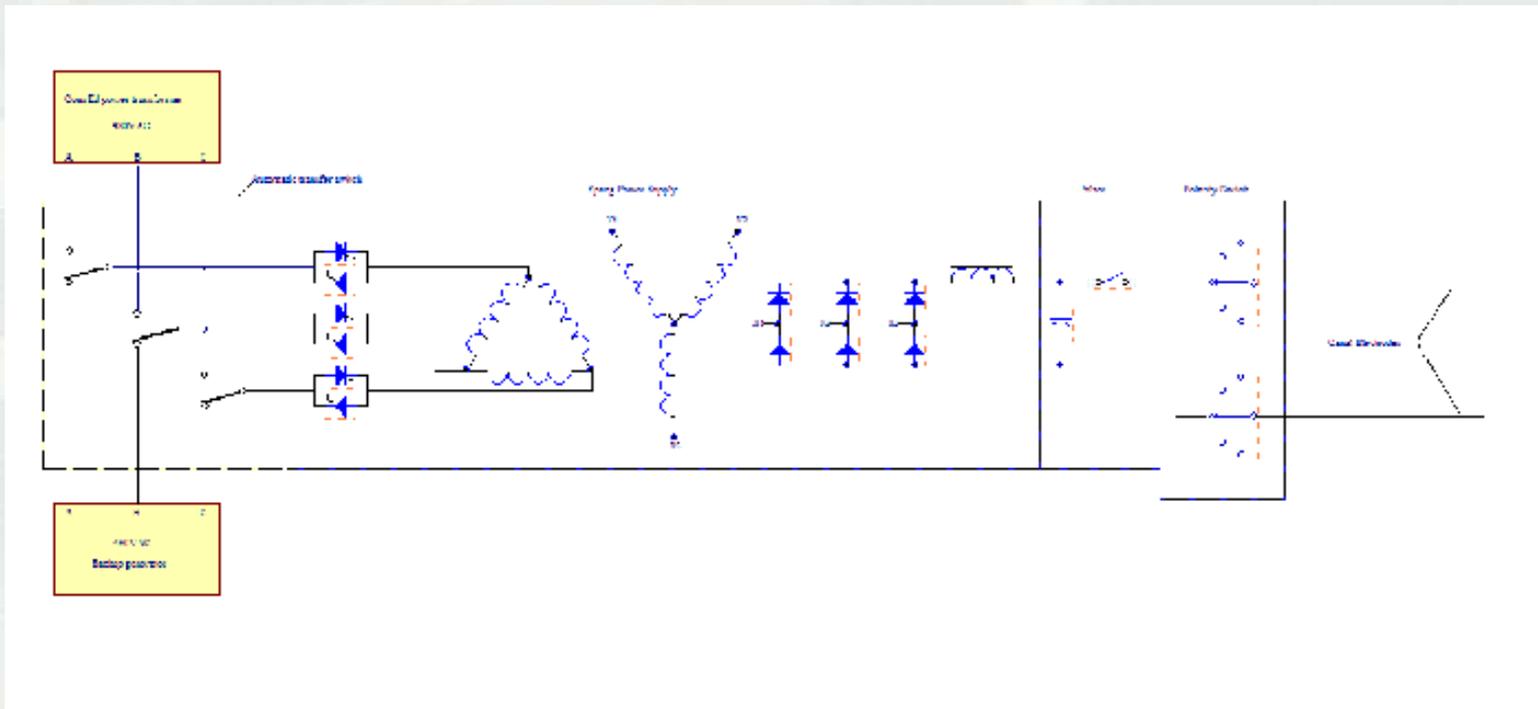
Rectifiers

(Two) 1.5MW units
(One) 350KW unit



Rectifiers

A computer controlled SCR (Silicon Controlled Rectifier) full bridge provides a variable amplitude AC voltage to the primary of a step up transformer. Power from the secondary of the step up transformer is full wave rectified to a DC voltage and then connects to a Pulser.



Rectifiers

1.5 MW

-The rectifier is supplied by a 480V, 3000A feeder breaker which feeds an internal 3 phase 1730 kVA rectifier step up transformer and draws 2083A.

-The rectifier supplies a maximum of 3.2 kV DC output voltage at a maximum 1500A DC continuous output current.

350 kW

-The rectifier is supplied by a 480V, 600A feeder breaker which feeds an internal 3 phase 404 kVA rectifier step up transformer and draws 486A.

-The rectifier supplies a maximum of 2.0 kV DC output voltage at a maximum 350A DC continuous output current.



Rectifiers



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Pulsers

The Pulser is comprised of equipment that pulses the DC supply. The pulsing unit is directed to pulse at an appropriate rate (frequency) and duration (pulse width). This is accomplished from a command from the HMI (Human Machine Interface).

There are three Pulsers for redundancy. Two Pulsers are rated 3.4KV and one Pulser is rated 2.0KV.



Pulser One
Line.pdf



Polarity Switch

-There are two double-pole 5 position switches, one for each array which selects the Pulser and polarity for that array.

-Polarity switch 1 is located in Pulser Room 1 and Polarity Switch 2 is located in Pulser Room 3.



Pulser One
Line.pdf



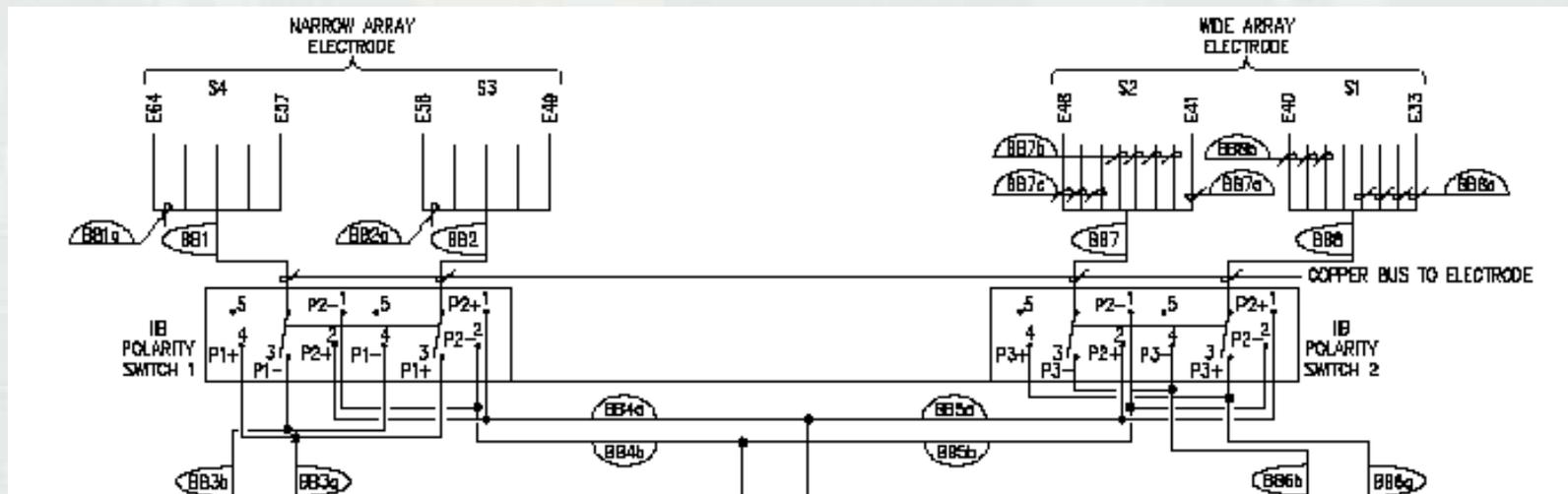
Polarity Switch



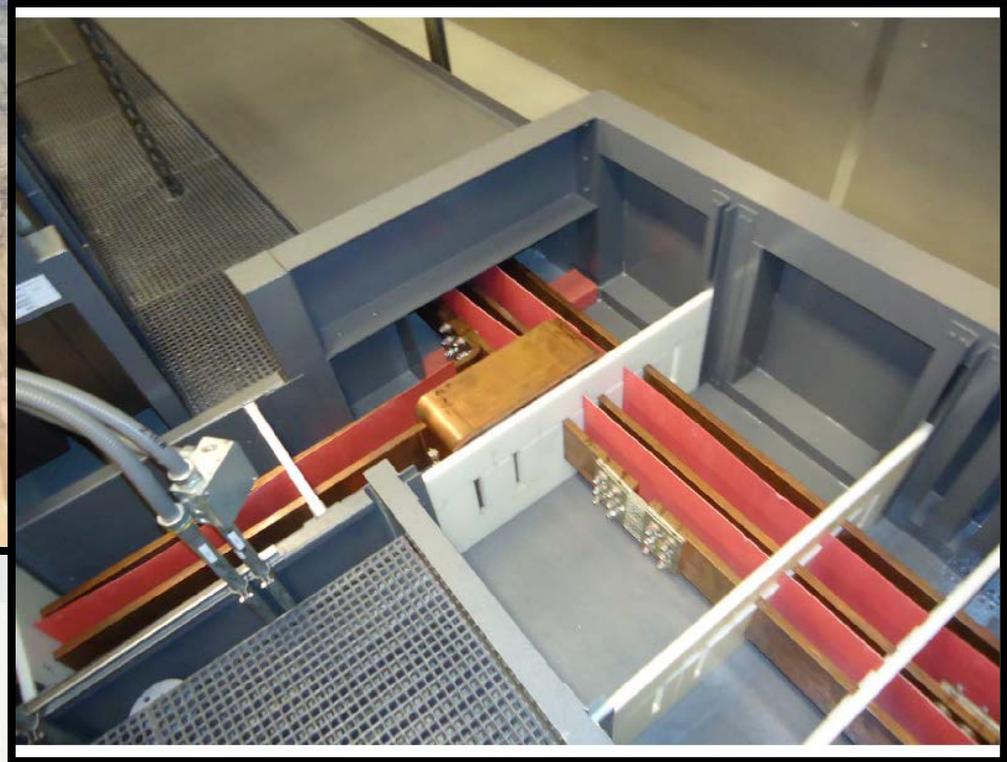
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Electrode Arrays

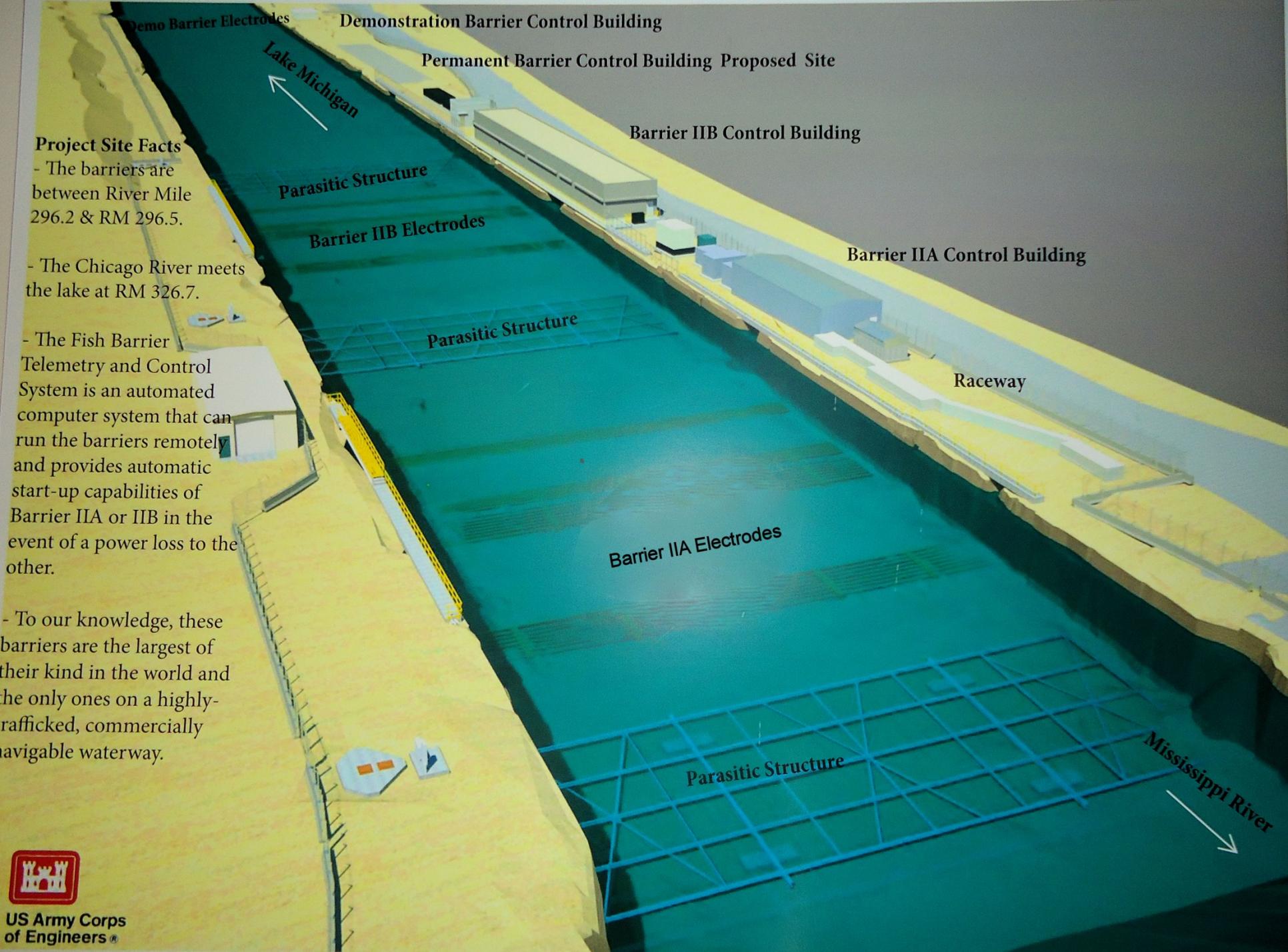
- The arrays consist of 4"x6" steel bars "electrodes" that rest on the bottom and run the width of the canal.
- Jacketed copper cables are fastened to the ends of the submerged "electrodes" and travel up to buss bars fed from the Pulsers.



Electrode Arrays



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Project Site Facts

- The barriers are between River Mile 296.2 & RM 296.5.

- The Chicago River meets the lake at RM 326.7.

- The Fish Barrier Telemetry and Control System is an automated computer system that can run the barriers remotely and provides automatic start-up capabilities of Barrier IIA or IIB in the event of a power loss to the other.

- To our knowledge, these barriers are the largest of their kind in the world and the only ones on a highly-trafficked, commercially navigable waterway.

General Canal Elevation Rendering

