



MERRIMACK STATION

LOCATION: Bow, New Hampshire

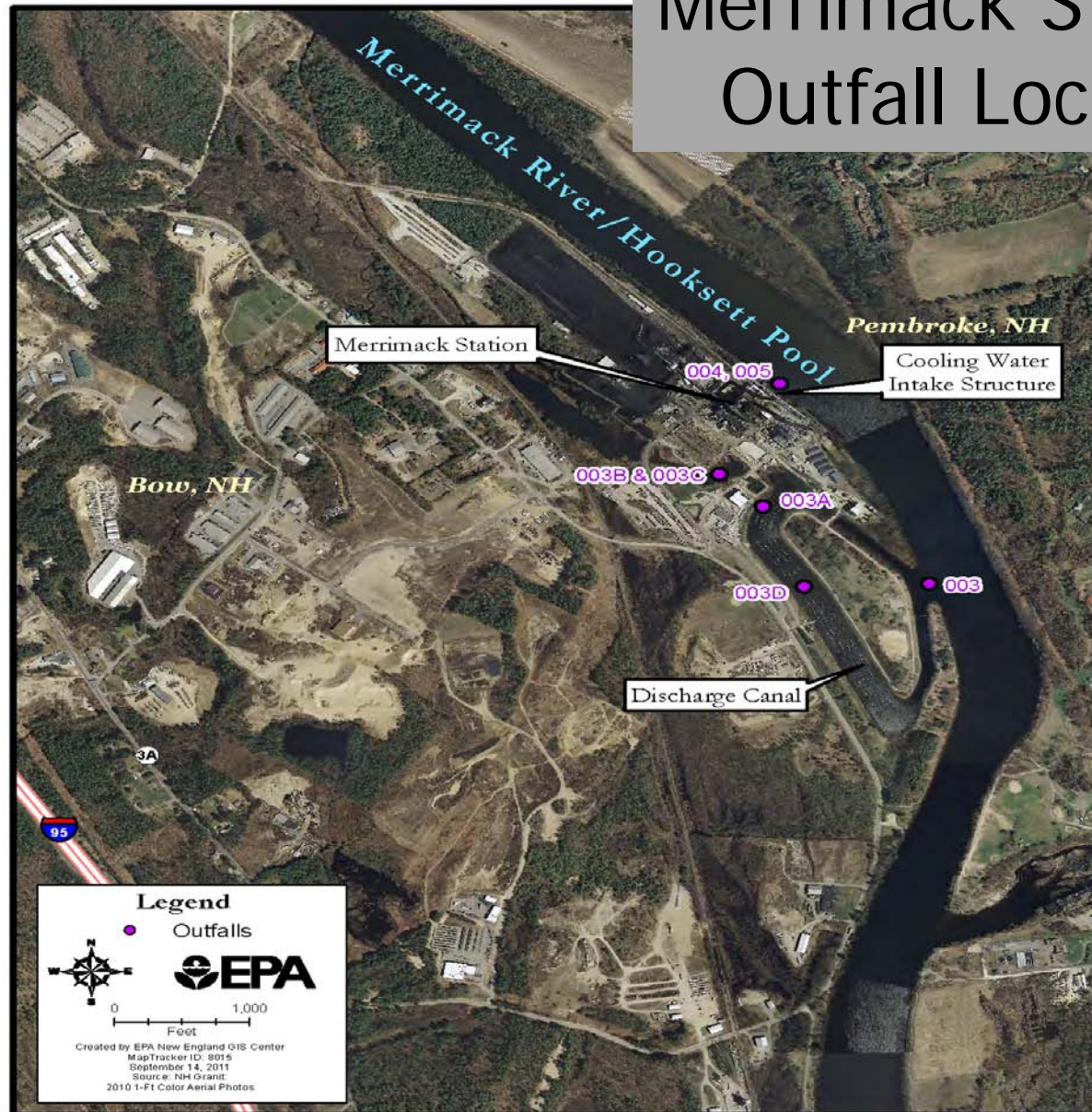
RECEIVING WATER: Merrimack River

CAPACITY: 487 MW – Base-Load Plant

Public Meeting, Concord NH Nov. 3, 2011



Merrimack Station & Outfall Locations



National Pollutant Discharge Elimination System (NPDES)

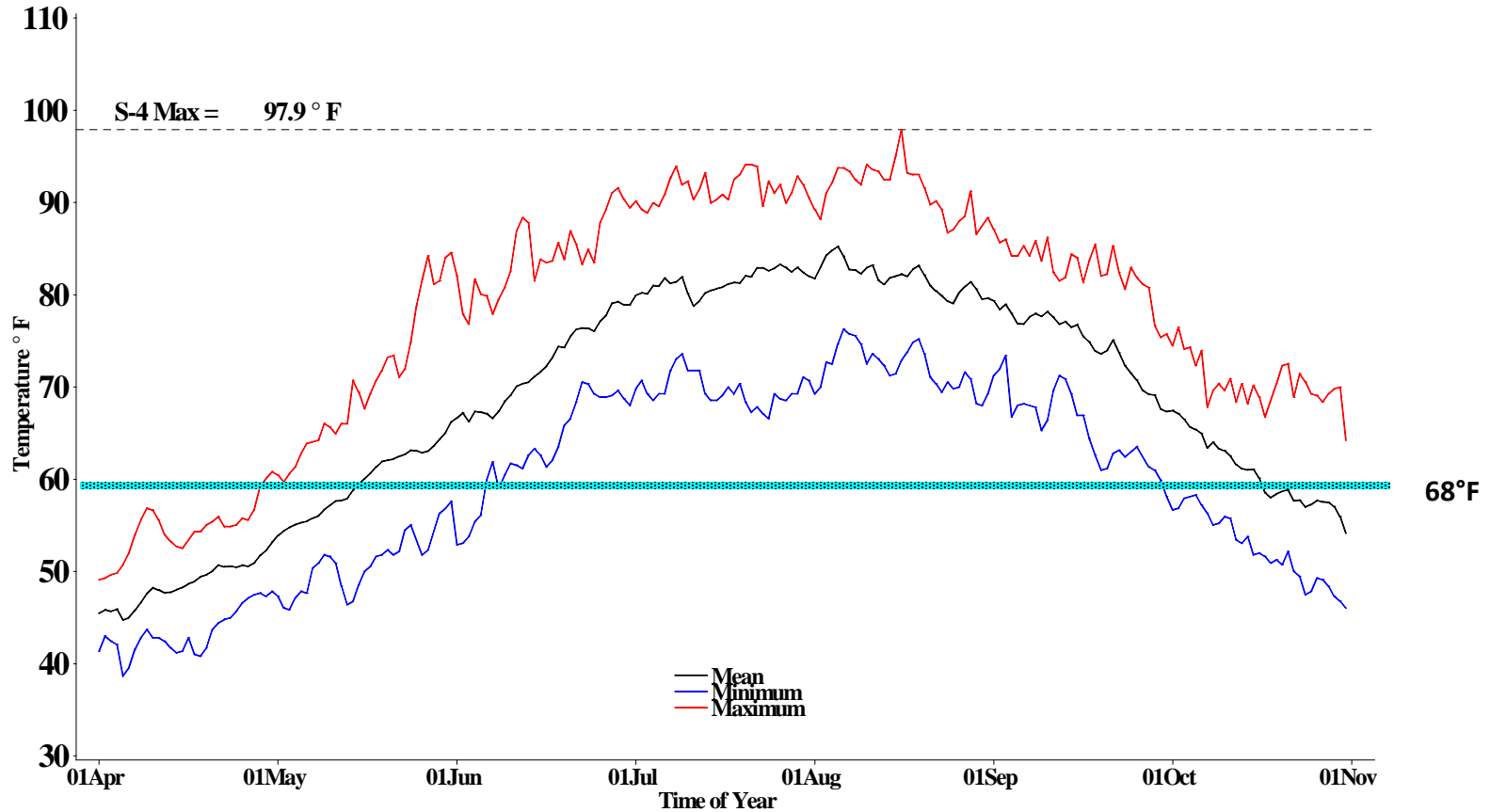
- NPDES is the national permitting system under the Clean Water Act (CWA)
- Generally, all point sources that discharge to a water of the US require a NPDES permit
- Permits issued for 5-years by statute
- EPA issues NPDES permits for NH
- Cooling water intake regulated under CWA 316(b)

Merrimack Station NPDES Draft Permit: 3 Key Environmental Issues

- Thermal discharge effects on aquatic community – CWA §316(a)
- Cooling Water Intake Structure (CWIS) impacts – CWA §316(b)
- Pollutants (mostly metals) removed from stack flue gas by the new FGD system can enter the Flue Gas Desulfurization Wastewater Treatment System (FGD WWTS)

Measured Average Daily Maximum, Minimum and Mean Water Temperature at Station S-4 for 1 April – 31 October of 1984-2004.

WITH OVERLAY OF EXISTING PERMIT TEMPERATURE “TRIGGER”

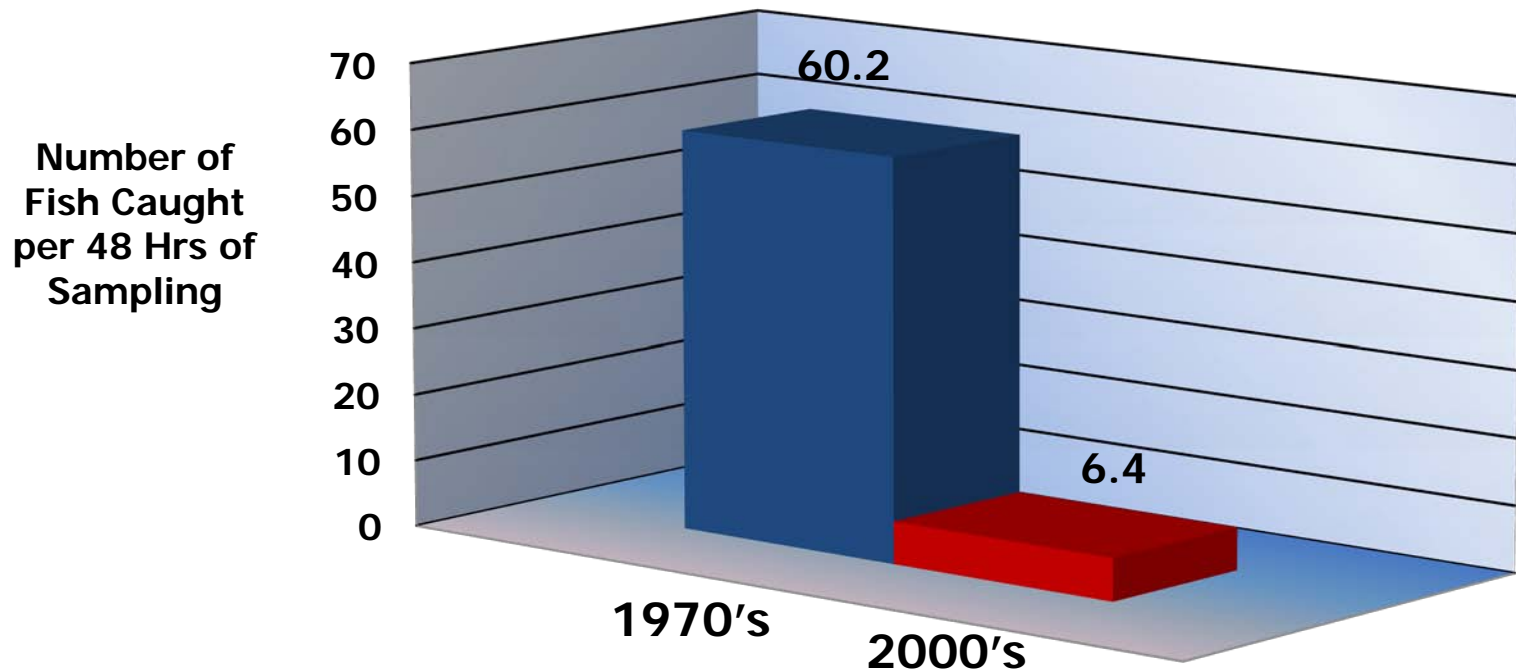


Current Once Through Cooling Water Discharge: Environmental Significance

Merrimack Station's thermal discharge has caused, or contributed to, appreciable harm to Hooksett Pool's balanced indigenous population of fish.

- The Hooksett Pool fish community has shifted from a mix of warm and cool water species to a community now dominated by thermally-tolerant species;
- The abundance for all species combined in the 1970's had declined by 90% in the 2000's; and
- The abundance of some thermally-sensitive resident species, such as yellow perch, has significantly declined.

Two Decade Comparison of All Fish Species in the Hooksett Pool

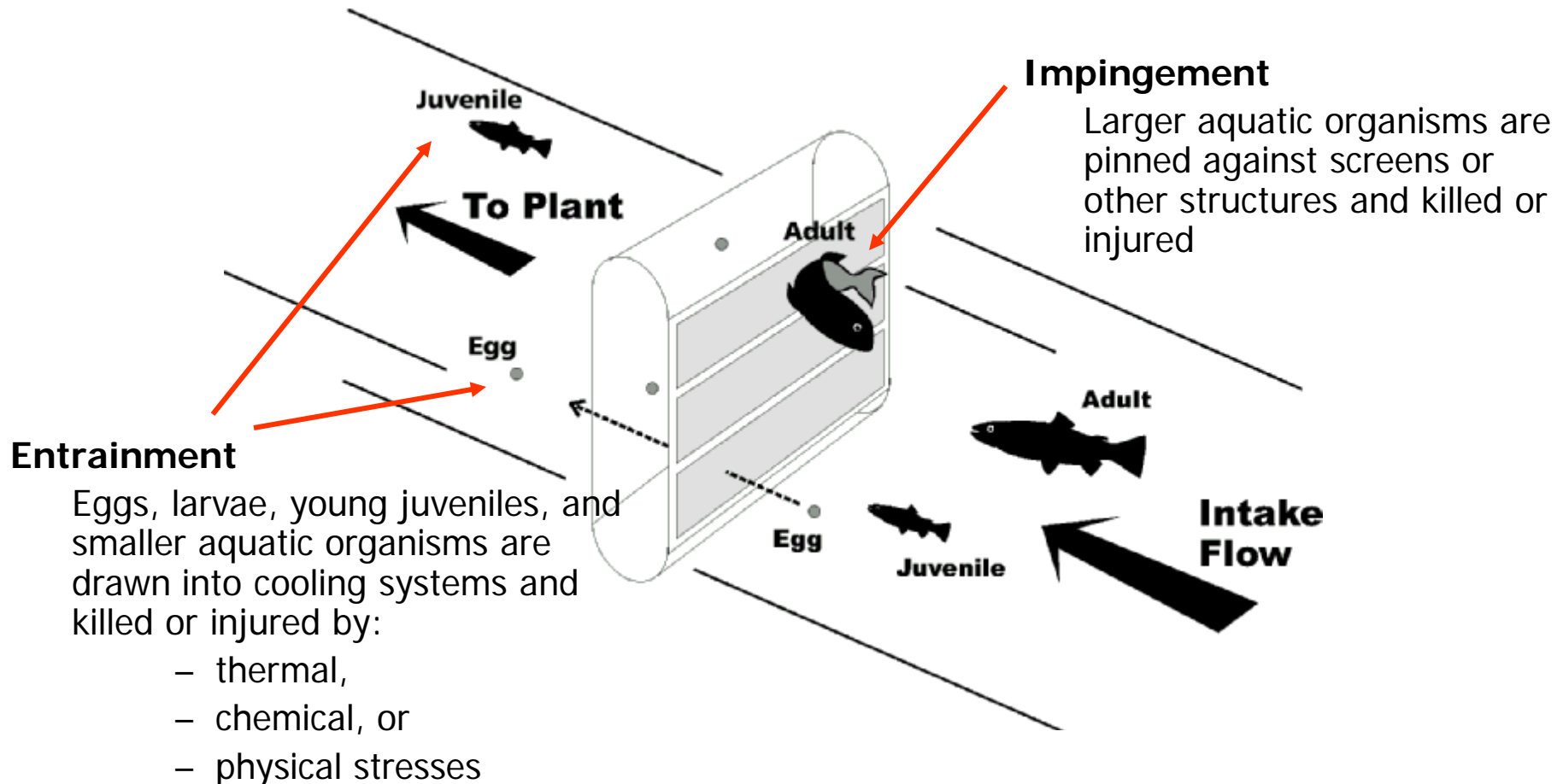


Proposed Thermal Limit Determination

- EPA must select the more stringent of technology-based and water quality-based effluent limits
- A CWA §316(a) variance is available for thermal discharges
- PSNH requested a CWA §316(a) thermal variance, claiming the existing effluent discharge did not harm the balanced indigenous population of fish
- EPA, after reviewing 40 years of data, determined balanced indigenous population was not protected, and did not grant PSNH's variance request.
- EPA based monthly thermal limits at Merrimack Station on the Best Available Technology (BAT) - Closed Cycle Cooling or a comparable technology

CWA §316(b)

Entrainment & Impingement



Proposed Intake Requirement: Conversion from Open Cycle Cooling to Closed Cycle Cooling

STANDARD: Best Technology Available (BTA) to minimize adverse environmental impacts of Cooling Water Intake Structure

ENVIROMENTAL GAIN:

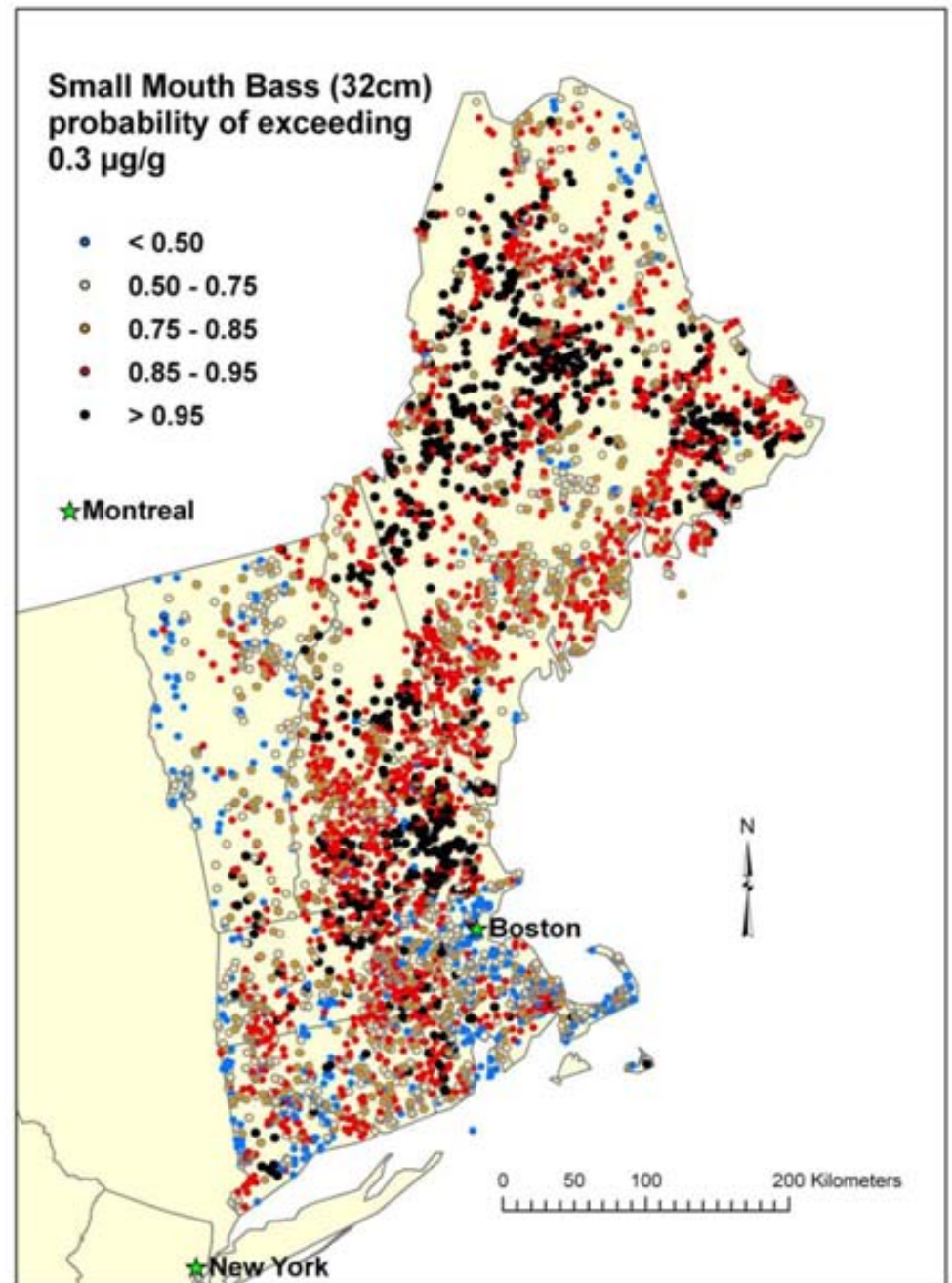
- Flow Reduction (Ave Monthly): **265 MGD to 6.5 MGD (97.5 %)**
- Eggs & Larvae Saved/Year: **3,620,000**
- Impinged Fish Saved/Year: **4,770**

COST:

- Net Present Value Closed Cycle Cooling: **\$112M**
- Annualized Present Value: **\$9M/year**

EPA Region 1 Mercury Model (*MERGANSE*)

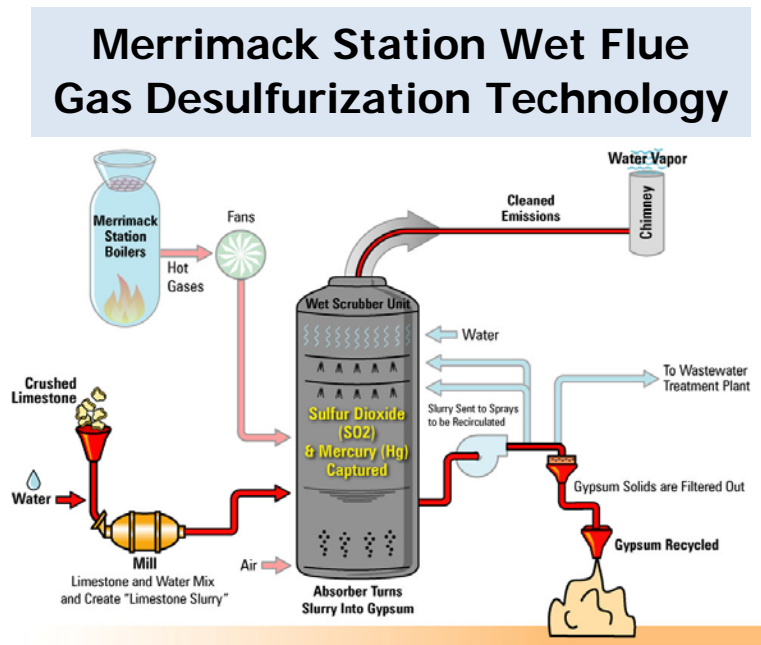
- Modeled Mercury Levels in fish and loon tissues
- Based on measured values, mercury air deposition, and landscape features



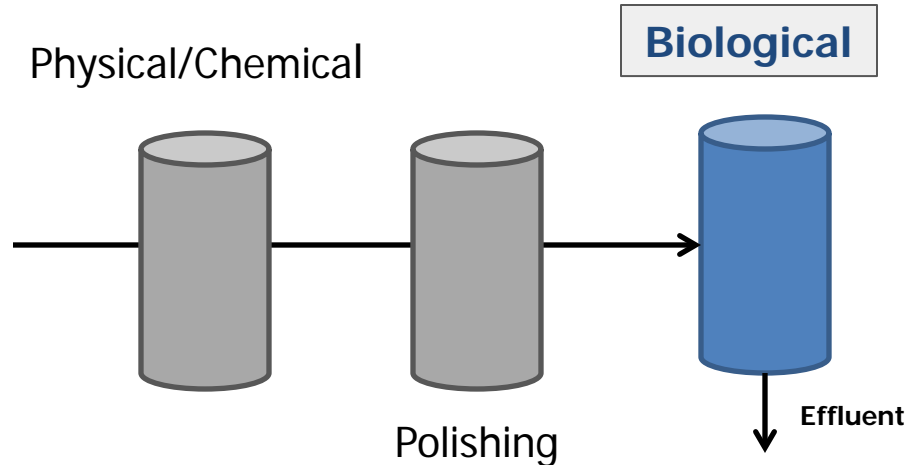
Proposed Permit Limits for Flue Gas Desulfurization (FGD) Waste Water

- PSNH's FGD system required by state law (2006).
- In accordance with the CWA, EPA applied best Professional Judgment (BPJ) to determine Best Available Technology (BAT)
- EPA, for Merrimack Station's FGD WWTS, reviewed a series of treatment processes as BAT based on EPA guidance and the technologies used in similar plants
- EPA then set effluent limits based on these FGD waste water treatment processes

Diagram of Proposed Wet Flue Gas Desulfurization Technology



From March 31, 2010 PSNH presentation to NH Public Utilities Commission
<http://www.puc.nh.gov/Regulatory/CaseFile/2008/08-103/LETTERS,%20MEMOS/08-103%202010-03-31%20PSNH%20Clean%20Air%20Project.pdf>



- EPA determined the best technology available (BAT) is: Physical/Chemical, Polishing, **Biological**
- Effluent limits determine based on these technologies capabilities

Merrimack Station Existing Permit

Significant Effluent Limits

Parameter	Existing Permit Limits	Draft Permit Limits
Thermal Discharge	<u>Attempt</u> to maintain 1°F ΔT	Monthly/Yearly Thermal Limits (Btu)
Impingement/Entrainment	None	Intake flow reduction consistent with CCC. Install up-to-date fish return system.
Flow	265 MGD	6.5 MGD
Iron	1.0 mg/l	1.0 mg/l
Copper	0.077/0.2 mg/l	0.027/0.083 mg/l
Mercury	No	0.0000071 mg/l
Arsenic	No	0.00227 mg/l
Selenium	No	0.0571 mg/l
Aluminum	No	1.08 mg/l
TSS, O&G, Chlorides, pH, etc.	Yes	Yes

Merrimack Station Draft/Final Permit Schedule

- Sept. 30, 2011 – Draft Permit Issued
- Nov. 3, 2011 - Public Hearing; Concord, NH
- Feb. 28, 2012 – Public Comment Period Closes
- EPA reviews, researches and responds to Public Comments and issues Final NPDES Permit.