

AGENDA

DECEMBER 4, 2008

10:00 - 12:00

316(a) & (b) VARIANCE MEETING

MERRIMACK STATION

PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE

Boston Offices of the US Environmental Protection Agency, Region 1

**Science and Technology Overview of Merrimack Station NPDES Information
Relative to the Cooling Water Intakes and Discharges**

10:00 - 10:10	Opening Remarks	Bill Smagula, PSNH
10:10 - 11:00	Aquatic Biology Data	Mark Mattson, NAI
11:00 - 11:10	Overview	Allan Palmer, PSNH
11:10 - 11:45	Technology Discussion	Sam Beaver, Enercon
11:45 - 12:00	Closure	Bill Smagula, PSNH

December 4, 2008

**EPA – PSNH
Merrimack Station Meeting**

EPA

David Webster

Eric Nelson

John Paul King

617.918.1295

king.john@epa.gov

NHDES

Paul Heirtzler

Stergios Spanos

Jeffrey Andrews

PSNH

William Smagula

Allan Palmer

603.634.2439

palmeag@nu.com

Mark Mattson (Normandeau) - 40 306(a)/316(4) annex

Richard Simmons (Normandeau) - Fisheries Biologist

Drew Trested (Normandeau) - Fisheries Biologist

Sam Beaver (Enercon) - Atlantic

Memorandum Station

12/4/2008

Bill Smagala

- Lots of information

- Good to discuss; see if there are questions

Objective - 316(a) Variations

- compliance w/ 316(b)

~~We~~ We have information to support the conclusion

Data on value/economics

* → Still coming

Lowest price base

- 75% of state served by PSNH

60% of total ^{supply} by Bow

- Lowest price in New England

- Big contribution

- Leads to employment/economy in NH

* ~~Can~~ Can we get Power Point.

Mark Mattson - overview

4 studies

* - Still to come 2008 reports ("Supplemental")

316(a) 1984-2004

April 2007 Report on Hydrothermal

Dec 2006 - migration

April 2007 - 1967-2005 1 1/2"

316(b) - Oct 2007

3/b(a)

- Fish Abundance determined by electrofishing
- 1967-71 - data poor - inconsistent methodology
 - change in sampling design
- Two Zones 1) upstream - ambient
2) downstream - downstream

Changes - Ecosystem Adjusts to utilize max biomass (Odum)

• Merrimack River less productive (nutrients); DO improvement

• Changes in fish

- Restock Shad (2002/2003) ?
- Herring (2002/2003) ?
- Bluegill (1970's - 99's))
- Rock bass (1995)) Centocididae ?
- Black crappie (2004)

N-10 - upstream, N-5 in the

S-0 ~~at~~ in River, outlet of canal

S-4 - mixing, still stratified

A-0 below ^{Hwy 102} dam (Amherst Pool) ~~Hot Spot~~

Flow - max in April

- for Discharge Point

- level - July → Oct.

Temperatures 1984-2004

- Max at about 75°F in July/Aug - Max about 80°F

- Most decrease is between S-0 and S-4 → about 10°F

- S-0 - full Canal.

- S-4 - float in the River

Temperature at A-0 never gets back down to the temperature at N-10 (except in April)

They've had problems with S-4.

Better prediction of temp is ~~the~~ at A-0 than
from S-0, S-4. → This is the main point Mark
is trying to get across.

"My

Merrimah site - $\frac{\text{BTU/hr}}{\text{sec}}$ ^{of} -
 BTU/ft^2

Migrating Fish

Smolt released upstream in June 2003 (only 1% of smolt left)

Retrospective Analysis of RIS

- defined thermal requirement

- quantified exclusion volume

• UILT - upper incident lethal temp - Lab

• Upper Avoidance

- Lab + Field in Cage

Yellow Perch

~~Point~~ 83° Avoid

Lethal 90° Lethal

Avg F

84°F

90°F

Calculate the % of volume of Holmset Point

that is above the (Lethal or Avoidance) temp.

VT judge rules < 5% is minimum

316(6) - Sam Beaver - Emercon

- Entergy's only contractor
- #2 service to Nuclear - 90% of work in Nuclear
- ~~SB~~ SBX (was Mowley) - partner

Indian Point - conversion

Nuclear - estimates cost (need to be accurate)

- ^{Emercon} proposed changes for utilities - and have to make

Sam - we are confident of values.

- we go to the Vendors - pumps, Muddy to get quotes, construction

- use certified cost estimates

- Plant operations - PBRN models to follow heat balance

Inlet temperature changes.

- Cost-effectiveness

- Researched operational constraints

Unit 1 could not use VFDs

Fine Mesh

Not

Intake Mods would be \$20M per Intake

- ~~no~~ down time of plant

Frazil Ice - addressed now with recirculating water and $\frac{3}{8}$ " mesh size

COE article said ~~not no~~ ~~fracts~~ they could not install wedge wire screens or any fine mesh screens due to Frazil Ice

Wedge wire - size
- water depth issues

Frazil Ice - to avoid ~~greater~~

Allan - we could explore more

Gunderboom

- How many square feet? →

Grand Gulf - Make up fl water gets make-up for cooling towers

- uses "Aquifers"

- Mississippi River

→ Radial Wells

5 wells x 40

Most entrainment in the winter

Cooling Towers

6.7 MW parasitic losses - Pumps + Fans

3.0 MW Condenser efficiency losses

→ peaks at 14.3 in July/Aug

as high as 41 MW on hottest

could be 50 MW or loss on the hottest day

within 7° of wet bulb (≤ 7° approach)

Summer 68°F → ∴ 73° is as cold as you can get.

Mainly uses 8° approach

Added coal to burn 50,000 lbs/hr → cannot

Price estimate includes plume abatement and noise abatement

Nearby AES Plant has cooling towers and needed plume abatement

because it's close to Concord Airport

Seven cycles of concentration for fresh water

Noise - there are existing issues w/ noise

- High of Plant + Bill doren Backup; Plant PA limits especially

- Across The River neighborhood

- on a ridge on the other side of the River
there are

- ~~Evaporative~~ Loss

.5-10% of 7010 of Merrimack

- Concern in the Merrimack?

- Can't say

Both units - O/M ~~\$~~ 6.5 M

Wind from NW to SW

little from W to E

Scrubber design came after the CCC

" is not on island, concerning road and
trying to ~~find~~ leave a path open for ~~water~~ ^{collected, recirculated} water

→ may be along the river edge (or bottom)

"It's a challenge"

Now - There are four pointed at hot points for cooling.

- "Not out of control, but close"

- pushing several critical aspects at the part

Proposed BTA

1. upgraded fish return system

2. Continuous operation of Unit 1 + 2 during screens April-Dec

3. One pump reduced

4. Efficiency rebid 19% for Unit 1

51% for Unit 2

Next studies

- Age structure of yellow perch, age, growth, fecundity (Munk)
- Compared to Garvin Pool + An: Pool
- 316(b) - Entrainment had the high adult equivalent
 - and White Lake had the ~~E~~ highest E of the species
 - Building a model of the flux of larvae into and out of plant.

Compare to ~~that~~ ~~in this~~ plant in River

There is a similar plant on the Washburn River

~~8~~ - sampled larvae at intake + outfall to compare entrainment mortality.

- How many ~~to~~ live?

Alan: we never get feedback from EPA

Bill ~~By~~ - would rather develop a consensus.

316(b) Entrainment Abundance
Highest in June

April ~~to~~ Sept /
Sept - March

No sample Oct - March

Larvae, not eggs

Larvae

Impaired Fish Survival Study. → 50% survival on current nets

In Garvin's Report ~~which is~~ it

Is Impairment \geq reduction - ~~Adult~~ Fish or ~~Adult~~ Adult Equivalents.

6-5,517

Annual Adult Equivalents

$$\begin{array}{r} 5,507 \quad I \\ 8,800 \quad E \\ \hline 14,307 \end{array} \rightarrow \text{Annual Loss.}$$

Lots of Fishermen.