Celebrating 50 Years of the Clean Water Act and IPP's Critical Contributions to the Cleaning of the Merrimack River

24th Annual EPA/NERPCA
Industrial Pretreatment
Coordinators Workshop
Lowell, MA

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Agenda

- History of the Merrimack River
- Economic Engine for the Textile Industry
- Collateral Damage
- Clean Water Act
- EPA Rules and Regulations
- Industrial Pretreatment is Born
- Contributions that Industrial Pretreatment Program Provides
- Observations/Conclusions
- Questions

The Merrimack River and Its Watershed

Merrimack River
A Picture is Worth a Thousand Words

The Merrimack River - Stats

- Length - 117 miles
- Watershed – 5,010 square miles
  - 4th largest in New England
  - 6 defined sub basins
  - 12 rivers enter the Merrimack
- Flows – 7,562 ft^3/s (4.8 billion gallons per day)
- Starts – Franklin, NH Confluence of the
  - Pemigewasset River
  - Winnipesaukee River
- Ends – Newburyport, MA
  - Atlantic Ocean
  - Gulf of Maine

The Merrimack River – A Rich History

- The center of Native American living:
  - Agawam
  - Pawtucket
  - Namoskeag
  - Pennacook
- Merrimack – "*Swift Water Place*"
- Amoskeag – "*Good Fishing Place*"

The Merrimack River – The Early Days

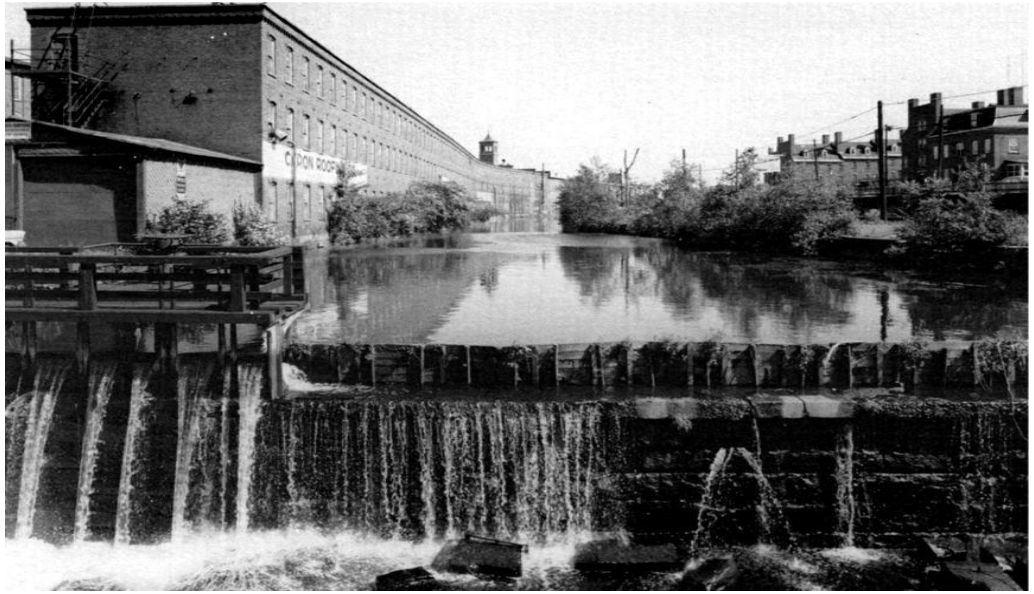
- 1605 - "Discovered" Samuel de Champlain
- 1700s - Settled by immigrants from Europe
- 1800s - Evolved from Agrarian to Industrial Society
- 1807 - First Lock and canal system constructed to navigate around waterfalls
- 1820 - Quickly advanced to hydro power which would fuel the Industrial Revolution
- Immediately became a means of commerce - Beginning of the problem

The Merrimack River – The Economic Engine for the Industrial revolution

- Dam Construction
  - 1820 – Pawtucket Falls in Lowell 32’
  - 1836 - Amoskeag Falls in Manchester 50’
  - 1848 – Great Stone dam in Lawrence 35’
- A few wealthy industrialists controlled the river that allowed them to control the mills.
- 1840 - Bought rights to the waters of Lake Winnipesaukee, Newfound Lake, and Squam Lake in NH

The Merrimack River – The Economic Engine for the Industrial revolution

- Textile Mills soon dominated the New England economy
- Largest employer in the Merrimack Valley and dominated the economy in five cities
  - Lowell
  - Lawrence
  - Haverhill
  - Nashua
  - Manchester



Lowell Mills

- Founded by Francis Cabot Lowell in 1814
- One of the largest cotton textile mill in the world
- Leader in Industrialization of manufacturing cotton
- 1848 the city of Lowell had a population of about 20,000
- 32 textile mills
- 6,000 workers

The Death of the Textile Industry and the Merrimack River

- Started downhill after the Civil War
- Cost to ship cotton north
- Cost to heat buildings
- Higher labor cost in northeast
- Most mills closed during the Great Depression
- 1935 - After 135 years of neglect, we are left with a dead river……..

Collateral Damage No. 1 – Energy

- Dams built in the river with no regard to environmental consequences
  - Diadromous fish (salt to freshwater) no longer able to migrate upstream to spawn
  - Impoundment changed water biology
- Lowell created 18 mile long "mill pond" upstream of dam
  - Common practice
  - Stagnant water
  - Changed ecosystem
- Concord, NH power plant had "coal tar" lagoons adjacent to the river

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Collateral Damage No. 2 - Pollution

- Mills all dumped their waste into the River
  - Dyes, bleaches, wash-water
  - Solid waste that would make the river un-navigable
- Increased population to work in the mills
  - Promoted dense urban living
  - Increased wastewater discharge
  - Increased pollutants in stormwater
- All other industries also discharged to the Merrimack
  - Foundries, tanneries, pulp/paper

Collateral Damage No. 3 – Unable to Use It

- Merrimack River is so polluted unable to use it as a drinking water source
  - Diseases traveled downstream from one river city to another
  - 1832 – 674 cholera deaths in Manchester
  - 1849 – 147 cholera deaths in Lowell
- River so odorous a hardship living adjacent to it
- No longer a food source
  - No fish mitigation
  - Can not support aquatic life

Collateral Damage No. 4 – Aftermath

- Unable to Use It, a sad period of inaction and degradation from 1935 to 1970
- Merrimack River ultimately makes the list of one of the Ten Most Polluted Rivers in the Country
- With mills closed, these cities became depressed. Populations moved to the suburbs
- No funding, no leadership, no Champion
- Merrimack River water quality further degrades with 170 years of unabated industrial and domestic pollution

Laying the Foundation - Locally

- 1878 - Massachusetts General Court - Prohibiting discharge of refuse or any "polluting substances" into streams or public ponds
  - Bowed to corporate pressure and exempted the Connecticut and Merrimack Rivers as well as the Concord within the city limits of Lowell.
- 1893 - Lawrence Experiment station. Groundbreaking water engineering work
- 1917 Lowell engineering report recommends "the construction of proper sewerage facilities"
- 1929 – NEWEA
- 1947 - NEIWPCC

Laying the Foundation – Nationally

- 1899 - Rivers and Harbors Appropriation Act. The country's oldest federal environmental law
  - Addressed navigation of harbors, not water quality
- 1912 - Public Health Service Act
  - Study of sanitation, sewage and pollution
- 1915 to1945 – World War I, Great Depression, World War II
- 1945 – The Surgeon General
  - Drinking water supplies of "*doubtful purity*"
- 1948 - Federal Water Pollution Control Act. **Weak law with no funding and no leadership**
  - Amended in 1956, 1961, 1965, and 1966

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The Clean Water Act of 1972 – Hits a Home Run!

- 1970 – First earth day, social activism proven during the Vietnam War tackles the environment
- 1970 – EPA created, Leadership void filled!
- 1972 – Federal Water Pollution Control Act (1948) amended and now known as the Clean Water Act (CWA).
  - Established water quality standards
    - Provided funding for construction of WWTPs - 90% federal, 5% state, and 5% local
  - Established NPDES permit
- 1978 - Established initial IPP

Construction of WWTPs
Biggest Bang for your Buck $$

- Newburyport, MA
- Haverhill, MA
- Lawrence , MA
- Lowell, MA
- Nashua, NH
- Hooksett, NH
- Manchester, NH
- Concord, NH
- Franklin, NH

Code of Federal Regulations (CFR) Dictates the IPP

- Under 40 CFR 403.8(f) requires that every POTW subject to the national pretreatment program have the necessary legal authority to apply and enforce section 307(b) and (c) and section 402(b)(8) of the Clean Water Act.
- Depending on the stature of the City, they are required to establish their own Sewer Use Ordinance and at least **six minimum elements** must be included in the pretreatment program submission for review and approval by EPA, the State or both.

Code of Federal Regulations (CFR) Implementing the Six Elements

1. **Legal Authority** – A POTW must have the legal authority which authorizes the POTW to apply and enforce any pretreatment requirement. This authority is derived from state law.

Code of Federal Regulations (CFR) Implementing the Six Elements

2. **Procedures** – A POTW must develop and implement procedures to ensure compliance with pretreatment requirements which include:
   - Identifying all Industrial Users (IUs) subject to the pretreatment program
   - Identify the characteristic of pollutants contributed by IUs
   - Notify users of applicable pretreatment standards and requirements Receive and analyze reports from IUs
   - Sample and analyze IU discharges
   - Evaluate the need for an IU slug control plan
   - Investigate instances of IU non-compliance
   - Comply with public participation requirements

Code of Federal Regulations (CFR) Implementing IPP on the Local POTW

3. **Funding** – A POTW must have sufficient resources and qualified personnel to carry out the procedures included in the approved pretreatment program.

4. **Local Limits** – A POTW must develop local limits developed for pollutants that could cause interference, pass through or sludge contamination or worker health and safety problems.

Code of Federal Regulations (CFR) Implementing IPP on the Local POTW

5. **Enforcement Response Plan (ERP)** – A POTW must develop and implement an ERP containing detailed procedures indicating how the POTW will investigate and respond to IU non-compliance instances.

6. **List of CIUs & SIUs** – A POTW must prepare, update and submit to the approval authority a list of all Categorical Industrial Users (CIU) and Significant Industrial Users (SIU).
   - Sample and analyze IU discharges
   - Evaluate the need for an IU slug control plan
   - Investigate instances of IU non-compliance
   - Comply with public participation requirements

Why Permit?

- The Federal Pretreatment Regulations 40 CFR 403.8(f)(2)(v) require that a POTW
  - Develop a permit, implement an inspection and monitoring program, that is independent of information supplied by nondomestic dischargers,
  - Confirm compliance or noncompliance with applicable pretreatment standards and requirements.
  - 40 CFR 403.8(f)(2)(vii) requires POTWs to investigate instances of noncompliance and enforce the regulations as necessary.
- Each City has to issue discharge permits to all CIU's and SIU's to protect the incoming influent to the POTW.

Why Permit ?

- Discharge Permits ensure compliance:
  - First line of defense to protect the POTW's
  - IPP conducts annual inspections on ALL CIUs and SIUs
  - IPP require permitted industries to self monitor their discharge
  - IPP conducts self monitoring sampling to permitted industries

Contributions that Industrial Pretreatment Program Provides

- The introduction of pollutants into a POTW that will interfere with the operation of the POTW.
- Prevents the introduction of pollutants into a POTW that will pass through the treatment works otherwise be incompatible with such works.
- Improves opportunities to recycle municipal and industrial wastewater and sludges.

City of Manchester Industrial Pretreatment Program (IPP)

1. The City has 87 permitted industries
   - CUI / SIU Industries 14
   - Industries of concerns 15
   - Miscellaneous Industries 58
2. Two time EPA award winning program
3. Dental Inspection program
4. Intermunicipal agreements with Towns of Bedford, Goffstown and Londonderry.
   - Conducted the first annual IPP responsibilities for the Towns.
   - Reviewed investigation of potential industries
   - Inspection / Sampling / Reporting requirements

City of Manchester Industrial Pretreatment Program (IPP)

5. Extensive Sampling program
   - PFAS sampling throughout the plant
   - POTW load summary / percent removal
   - Town Metals
   - Quarterly TOX sampling
6. Future Goals:
   - FOG program
   - Permit Brewers
   - Streamlining inspections / electronic forms and reporting

Personnel Observations

- In my lifetime the Merrimack River has gone from un-swimmable, unsightly, and underutilized to……
- The Merrimack River is the cleanest and healthiest it has been in 200 years
- Fully recreational above Amoskeag Falls in NH
  - Swimming
  - Boating
  - Water skiing
  - Fishing
  - Hiking

Conclusions

- The CWA was one of the most significant and successful engineering achievements over the past 100 years.
- The CWA has cleaned nation's waterways in 50 years.
- The CWA with IPP has established environmental stewardship as one of our nation's priorities which included the IPP programs.
- The CWA with IPP has established environmental stewardship as one of our nation's priorities to keep the waterways clean for future generations.

Questions

City of Manchester POTW
Merrimack River