INDUSTRIAL PRETREATMENT PROGRAM 101

MWEA IPP Seminar 2017

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Back to Basics:
What is an Industrial Pretreatment Program?
Background

▪ Clean Water Act (1972, amended 1977)
▪ General Pretreatment Regulations for Existing & New Sources of Pollutions – 40 CFR Part 403
▪ National Pretreatment Standards:
  ▪ Prohibited Discharges
  ▪ Categorical Standards
  ▪ Local Limits
Specific Prohibitions [40 CFR 403.5(b)]

Pollutants that:

- Create fire or explosion hazards 🔥
- Cause structural damage due to corrosion
- Cause obstructions in the flow to the POTW
- Released at excessive rates of flow or concentration
- Excessive heat in amounts that inhibit biological activity
- Certain oils that cause pass through or interference
- Result in the presence of toxic gases, vapors or fumes
- Trucked or hauled pollutants (except at designated discharge points)
Who Needs an IPP?

- POTWs that:
  - Receive discharges from industrial users with the potential for pass through, interference, or biosolids contamination
  - OR
  - Receive discharges from *categorical* industrial users
    - e.g. metal finishers, different types of food processors, soap/detergents manufacturers, plastics manufacturers, leather/tanneries

- See complete list at: [www.ecfr.gov](http://www.ecfr.gov)
Categorical Standards

- Developed by EPA
- Applicable nationwide
- Limits for specific industries
- 40 CFR 405 through 471

Some common categories in Michigan

- metal finishing, centralized waste treatment, pulp, paper & paperboard, electroplating, dairy products processing, sugar processing, meat & poultry products

www.ecfr.gov
Non-Domestic User Survey

- Periodically review the users in your service area
- Required to be kept up-to-date if your POTW has an IPP
- Also good for determining if an IPP is needed for POTWs that don’t currently have an IPP
**User Survey**

- EPA has a model user survey
- This form should be included in your IPP Manual, for MDEQ review and approval
Non-Domestic User Survey – Classifying Users

- Compile/organize survey results

- Types of users:
  - Categorical Industrial Users
  - Significant Industrial Users
  - Non-SIUUs – industrial user that is not categorical, or significant, which has no reasonable potential for adversely affecting the POTW’s operation or for violating any Pretreatment Standard or requirement

- May need to do a follow-up facility inspection and/or baseline monitoring/sampling
Maintaining Non-Domestic User Inventory

- Keep the list of non-domestic users on file
- **New** non-domestic users to fill out survey when:
  - Building permit application
  - Requesting sewer service
  - Applying for business license
- Require industrial users to notify POTW of significant changes in processes, discharge and ownership
- Periodically redo the non-domestic survey (every 5 years, or if changes)
Who Needs an IPP?

- POTWs with categorical users
- What if I have non-categorical industrial users?

Are they significant?
- More than 25,000 gpd process wastewater
- More than 5% of avg dry weather flow
- More than 5% of organic load
- High concentration of metals
- If you answered “yes” to any of these, you probably need an IPP...
"I don’t have an IPP, but I need one; what now?"

- “MDEQ told us we need to develop an IPP”
- Learn from others/experts
- Multi faceted program:
  - Legal requirements
  - Technical requirements
  - MDEQ review & approval
  - Usually iterative process
Program Components – 40 CFR 403.8(f)(1-6)

- Legal Authority
- Implementation Procedures
- Local Limits
- Enforcement Response Plan
- Industrial Waste Inventory
- Funding/Resources
IPP in Michigan

- Michigan Part 23 Rules (R323.2303)
- Good Resources: www.mi.gov/ipp
IPP – Technical Development

- Maximum Allowable Headworks Loading Evaluation (MAHL)
- Develop Local Limits
- Special Allocation Limits (SALs)
- Industrial User Permits
Local Limits

- Developed by POTWs to enforce specific prohibitions and limits
- Protect against site-specific pass through, interference and inhibition
- Work in tandem with categorical limits – local limits can be more or less stringent; however IUs must comply with the most stringent limitation for each pollutant
Local Limits – Non-Compatibles

- Developed for a specific POTW
- Loadings of pollutants a POTW can accept without causing pass through, interference, or permit violations
- Because no one wants the river/creek in their neighborhood to look like this
Local Limits

- Where do I start?
- EPA Decision Tree to determine if new limits are needed
- The process for developing all new limits or re-evaluating after significant changes is similar
Local Limits Development

- Developing local limits is a process, includes:
  - Determine Pollutants of Concern
  - Sampling and lab analysis
  - Calculate AHLs for several environmental criteria
  - Determine MAHL and MAIL for PoCs

United States Environmental Protection Agency
Office of Wastewater Management 4203
EPA 833-R-04-002A
July 2004

Local Limits Development Guidance

134 pages plus 24 appendices
Local Limits Development

- Can seem daunting if haven’t done it before
- Review EPA’s guidance
- Discuss with MDEQ District IPP staff before getting started
- Consider getting outside assistance
Step 1: Determine Pollutants of Concern

- EPA’s 15 National POCs

<table>
<thead>
<tr>
<th>Arsenic</th>
<th>Cyanide</th>
<th>Nickel</th>
<th>BOD$_{5}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cadmium</td>
<td>Lead</td>
<td>Selenium</td>
<td>TSS</td>
</tr>
<tr>
<td>Chromium</td>
<td>Mercury</td>
<td>Silver</td>
<td>Ammonia</td>
</tr>
<tr>
<td>Copper</td>
<td>Molybdenum</td>
<td>Zinc</td>
<td></td>
</tr>
</tbody>
</table>

- Review recent available data and NPDES permit to determine others
- Typically add Phosphorus in Michigan
Step 2: Develop Sampling Plan

- Typically need more analytical data than available from routine sampling
- Develop a sampling plan to review with MDEQ
- Sample requirements – at least 6 for:
  - Each SIU/CIU
  - WWTP influent
  - Primary effluent
  - Final effluent
  - Domestic sample(s)
- Biosolids/sludge
- Need corresponding flows
Step 2: Develop Sampling Plan

- Representative data:
  - Flow proportional composite samples, if possible
  - Grab samples for those parameters where required
  - Vary sample days
  - Account for hydraulic retention times
  - Don’t collect samples during rain events if you have a lot of I/I or combined sewer
  - Account for seasonal variations
    - Food processors might have significant variations
    - Lagoon systems achieve different performance in summer vs. winter
    - Seasonal limitations – e.g. ammonia much lower during summer
Step 2: Develop Sampling Plan

Typically analyze the 1st set of samples for full scan of pollutants

Determine if any of these should be added as a POC after reviewing first round of analytical data
Step 3: Calculate MAHLs for each POC

Maximum Allowable Headworks Loading

- The estimated maximum loading of a pollutant that can be received at a POTW’s headworks without causing pass through, interference (or biosolids contamination)

- Determined as the most protective (lowest) of the AHLs estimated for a pollutant.
MAHL Determination – Non-Compatibles

- Criteria Considered:
  - NPDES discharge or GW permit effluent limits
  - Water Quality based limits (chronic or acute toxicity)
  - Secondary Treatment Inhibition
  - Nitrification Treatment Inhibition
  - Digester Inhibition
  - Biosolids Contamination (Part 503)
MAHL Determination – Non-Compatibles

- **Discharge permit limits**

\[
L_{NPDES} = \frac{8.34 \times C_{NPDES} \times Q_{POTW}}{(1 - R_{Avg})}
\]

\[
L_{Chronic} = Q_{POTW} \times 8.34 \times \frac{WQBEL_{c}}{1000} (1 - R_{Avg})
\]

- **Water Quality based limits**

\[
WQBEL_{c} = C_{WQS} \times \left(\frac{Q_{MAX}}{Q_{MAX}} + (25\% \times Q_{STREAM})\right)
\]

\[
C_{WQS} \text{ for various pollutants are tabulated in Part 57 Rules}
\]
MAHL Determination – Non-Compatibles

- Treatment Inhibition
  \[ L_{\text{INHIB, Soci}} = \frac{Q_{\text{POTW}} \times 8.34 \times C_{\text{INHIB, Soci}}}{1 - R_{\text{PRIM}}} \]

- Digester Inhibition
  \[ L_{\text{INHIB, Dig}} = \frac{Q_{\text{Dig}} \times 8.34 \times C_{\text{INHIB, Dig}}}{R_{\text{Avg}} \times F_{\text{sorp}}} \]

- Biosolids Contamination
  \[ L_{\text{Sludge}} = \frac{Q_{\text{Sludge}} \times TSS_{\text{Sludge}}}{100} \times 8.34 \times \frac{C_{\text{Sludge}}}{R_{\text{avg}} \times F_{\text{sorp}}} \]
MAHL Determination – Non-Compatibles

AHL formulas explained:

\[ L_{INHIB,sec} = \text{Loading}_{\text{CRITERIA}} \]

\[ Q_{POTW} = \text{Flow}_{\text{LOCATION}} \]

\[ C_{NPDES} = \text{Concentration}_{\text{ion}_{\text{CRITERIA}}} \]

\[ R_{Avg} = \% \text{removal}_{\text{CRITERIA}} \]
### MAHL Determination – Non-Compatibles

- Example of non-compatible MAHL spreadsheet

<table>
<thead>
<tr>
<th>Allowable Headworks Load</th>
<th>Arsenic</th>
<th>Cadmium</th>
<th>Chromium</th>
<th>Copper</th>
<th>Cyanide</th>
<th>Lead</th>
<th>Mercury</th>
<th>Molybdenum</th>
<th>Nickel</th>
<th>Selenium</th>
<th>Silver</th>
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<tr>
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<td>(Lhw)</td>
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<td>Acute Water Quality Standards A</td>
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<td>(Lhw)</td>
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<td>USEPA 503 Sludge Regulations BS</td>
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<td>5.838</td>
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<td>MAHL</td>
<td>(lbs/day)</td>
<td>0.212</td>
<td>0.105</td>
<td>6.624</td>
<td>1.063</td>
<td>0.662</td>
<td>1.702</td>
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<td>C</td>
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</tbody>
</table>
MAHL Determination - Compatibles

- Criteria Considered – Compatible Pollutants
  - NPDES discharge permit limits (or GW permit effluent limits)
  - Water Quality based limits
  - WWTP Design Basis
  - Calibrated Biological Wastewater Treatment Plant Models (for max day loading, if DEQ approves this method)
Safety Factors

- Need to include safety factor
- EPA Guidance recommends *minimum* of 10%
- Higher safety factors are needed if there’s a history of non-compliance due to a POC
- For example, community has history of digester inhibition problem with nickel, increase the nickel SF so the local limit is conservative & protective
Step 4: Determine Local Limits

- Once the MAHL is determined, determine the Maximum Allowable Industrial Loading

- MAIL = MAHL – background domestic loading

- Use MAIL to develop local limits

- A couple of different approaches:
  - Uniform Allocation
  - Non-Uniform Allocation
Uniform Allocation Approach

- Typically done for non-compatible POCs
- MAIL is divided equally by all industrial and/or non-domestic flow

**Example:**

Zinc MAHL = 1.8 lb/day

Domestic Loading = 0.25 lb/day

MAIL = 1.4 lb/day after 10% Safety Factor

Non-Domestic Flow = 0.10 mgd

Local Limit calculated as $\frac{1.4\text{lb/day}}{(0.1 \text{ mgd} \times 8.34)} = 1.67 \text{ mg/L}$
Non-Uniform Allocation Approach

▪ Very infrequently used for non-compatibles
▪ Becoming more frequent approach for compatible pollutants
▪ Optimizes the compatible pollutant capacity of the POTW
▪ MAIL is apportioned to each permitted user as needed, then “leftovers” are divided among non-permitted, non-domestic users
Non-Uniform Allocation Approach

- Divvy up the MAHL “pie”
- Account for domestic sources and reserve
- Allocate remaining MAIL
- Special Allocation Limits (SALs) for permit holders
- Other non-domestic user (non-permitted) mass is divided equally by the flow to determine local limit for users without an SAL or IU permit
Reserve Amounts

- Set aside a reserve amount for the compatible POCs to accommodate reasonable amount of growth in the future
- Future SALs or updated SALs can be allocated from that reserve amount
Legal Review

▪ Local Limits are specified in the Sewer Use Ordinance

▪ Any proposed changes to the Ordinance should be reviewed by an experienced attorney
Review & Approval

- MAHL evaluation/report
- Proposed Local Limits
- Proposed SUO updates/changes
  - Proposed SIU allocations/permits
  - IPP Procedures/IPP Manual/Forms
  - Enforcement Response Plan
Implementation

- Municipality implements SUO updates
- Issue SIU/CIU discharge permits
- SIU/CIU self-monitoring & reporting
- Annual SIU/CIU inspection
- Surprise SIU/CIU sampling/inspections
- MDEQ Annual Inspections of POTW IPP
IPP Manual

- Program Description & Procedures
- Other Items to include in manual:
  - Inspection Forms
  - Permit Application/Renewal Form
  - Sample Collection Forms
  - Enforcement Response Plan (ERP)
  - List of IUs/Non-Domestic Users
  - Slug Discharge Control Policy
Compliance and Operations-Sampling

- POTW must sample each SIU at least once per year for all regulated pollutants
- All SIUs must self-sample a minimum of 2 times per year for all regulated pollutants
- Permitted users must sample/report in accordance with discharge permit & federal requirements (if categorical)
Compliance & Operations - Annual Inspections

- Prepare before doing inspection:
  - Review current discharge permit
  - Review recent sampling results/monthly reports
  - Review last two years’ inspection reports

- Follow up on any items flagged for action

- Submit Inspection report to industry within 30 days
Pretreatment In Action: Some Examples
Compliance and Operations - Reporting

- Annual Report to MDEQ
- Updated list of IU's, SIU's & CIU's
- Summary of compliance
- Summary of enforcement & inspections
Compliance and Operations - Enforcement

- Enforcement procedures detailed in ERP
- Escalate if appropriate action isn’t taken in timely manner

Minor/Insignificant Noncompliance
- Level 1 response: Informal Communication
- Telephone call & Follow up Letter

Potentially Significant and/or Infrequent Violation
- Level 2 response: Formal Communication
- Notice of Violation

Significant Violation
- Level 3 response: Administrative Order
- Show Cause Order, Consent Order, or Compliance Order

Major Violation or Emergency
- Level 4 response: Civil Litigation and/or Criminal Prosecution
- Level 5 response: Suspension of Service (Cease & Desist Order, Notice of Termination)
Compliance & Operations-MDEQ Inspection

Some hints to make it go smoothly:

- Need good/organized documentation
- All reporting hard copy (not pdf/emails) with received-on date stamped
- Have IU list up-to-date
- Make sure all violations were followed up on in accordance with the approved ERP (and documented)
Paying for IPP

- IPP should be paid for by those industries that require a municipality to have the program
- IPP charge as part of user rates
  - Usage charge for all non-domestic users
  - Usage charge for all permitted users
- Sampling & inspection expenses charged to specific industry
Surcharges – Part of IPP?

▪ Surcharges combine both increased levels of wastewater and increased O&M expenses and are subject to surcharge levels.

▪ Surcharge threshold concentrations are different from local limits.

▪ IU's with extra strength wastewater are subject to all applicable federal and local limits and their IU discharge permit.

▪ Surcharges are separate from violation fines.

▪ Surcharges cover increased O&M expenses for higher strength wastewater (compatibles).
Surcharges – Part of IPP?

- Surcharges are **different** from IPP fees
- Surcharges are extra charges to cover increased O&M expenses for higher strength wastewater (compatibles)
- Bottom line: Surcharges should **not** be used to pay for the IPP program, IPP should be a sustainable program without surcharge fees
Continuing Improvements to IPP

- Ongoing Federal & State level improvements
- Many aspects of the IPP should be updated routinely:
  - MAHL Evaluation & Local Limits
  - IU/Non-Domestic User Lists
  - Industrial Discharge Permits
  - IPP Manual/Procedures if regs change
- So...
  Whether you’ve been doing IPP for 30 years OR are brand new to the program, stay involved and up-to-date!
Final Thoughts

- IPP is specialized, highly technical, and site-specific
- Join the MWEA IPP Committee, we have great discussions on lessons learned every 6 weeks at our meetings and a seminar every fall
References

- 40 CFR Part 403-471
- MDEQ IPP Webpage
- EPA Pretreatment Compliance & Enforcement Guidance
- EPA Local Limits Development Guidance
- Grace Scott (former Michigan State IPP Coordinator) State and Federal IPP Regulations presentation
- EPA Pretreatment 101 Series: Industrial User Waste Survey Procedures September 2010
QUESTIONS