

LOCAL LIMITS: A PIECE OF THE PIE

October 6, 2016

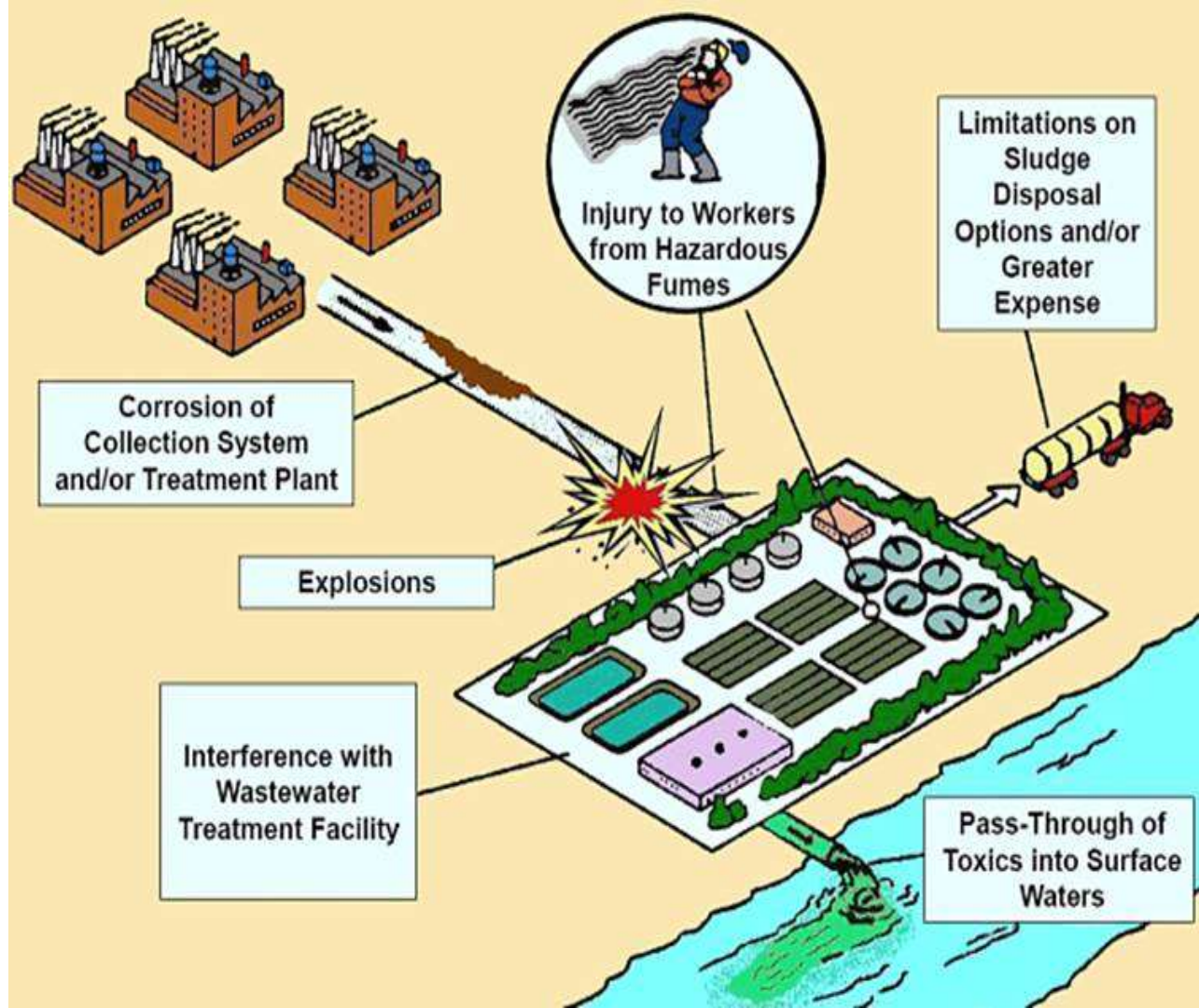
Agenda

- Background
- Local Limits Defined & Purpose
- Calculating Local Limits
- Examples
- Implementation
- Final Thoughts
- Q&A



Background

Clean Water Act of 1972, amended 1977



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)



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

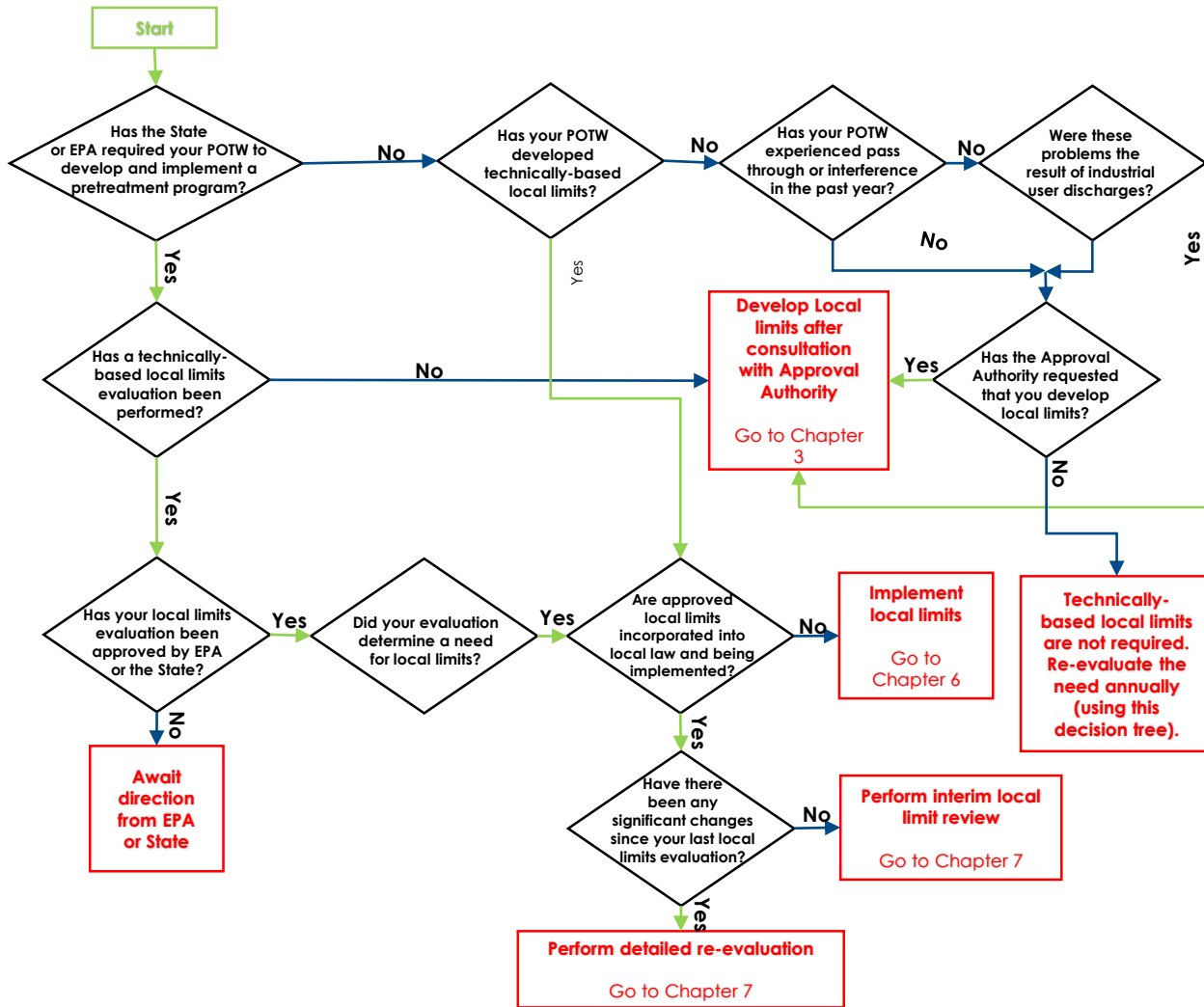




Local Limits

- 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



- 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

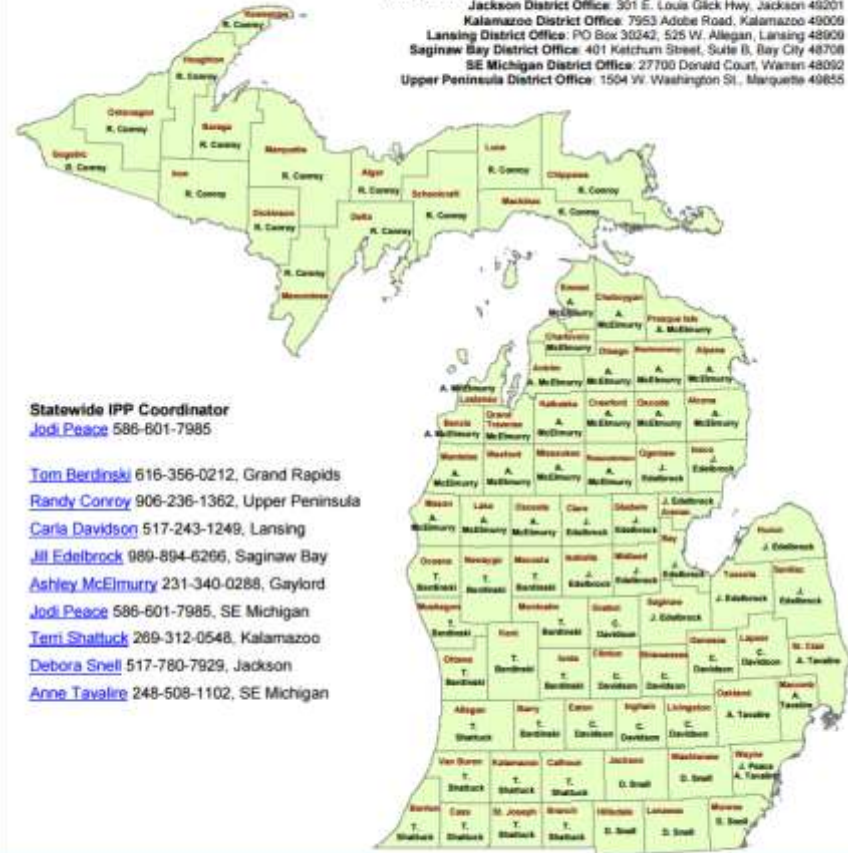
Local Limits Development

- 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

Industrial Pretreatment Program (IPP) Staff

www.mi.gov/ipp

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Step 1: Determine Pollutants of Concern

- EPA's 15 National POCs

Arsenic	Cyanide	Nickel	BOD ₅
Cadmium	Lead	Selenium	TSS
Chromium	Mercury	Silver	Ammonia
Copper	Molybdenum	Zinc	

- 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

Metals (Total Recoverable), Cyanide and Total Phenols (Quantification levels in parentheses)

antimony (1 µg/l)	arsenic (1 µg/l)	available cyanide (2 µg/l) using Method OIA – 1677	
barium (5 µg/l)	beryllium (1 µg/l)	boron (20 µg/l)	cadmium (0.2 µg/l)
chromium (10 µg/l)	copper (1 µg/l)	lead (1 µg/l)	nickel (5 µg/l)
selenium (1 µg/l)	silver (0.5 µg/l)	thallium (1 µg/l)	zinc (10 µg/l)
total phenolic compounds			

Volatile Organic Compounds

acrolein	acrylonitrile	benzene	bromoform
carbon tetrachloride	chlorobenzene	chlorodibromomethane	chloroethane
2-chloroethylvinyl ether	chloroform	dichlorobromomethane	1,1-dichloroethane
1,2-dichloroethane	trans-1,2-dichloroethylene	1,1-dichloroethylene	1,2-dichloropropane
1,3-dichloropropylene	ethylbenzene	methyl bromide	methyl chloride
methylene chloride	1,1,2,2,-tetrachloroethane	tetrachloroethylene	toluene
1,1,1-trichloroethane	1,1,2-trichloroethane	trichloroethylene	vinyl chloride

Acid-Extractable Compounds

p-chloro-m-cresol	2-chlorophenol	2,4-dichlorophenol	2,4-dimethylphenol
4,6-dinitro-o-cresol	2,4-dinitrophenol	2-nitrophenol	4-nitrophenol
Pentachlorophenol	phenol	2,4,6-trichlorophenol	

Base/Neutral Compounds

acenaphthene	acenaphthylene	anthracene	benzidine
benzo(a)anthracene	benzo(a)pyrene	3,4-benzofluoranthene	benzo(ghi)perylene
benzo(k)fluoranthene	bis(2-chloroethoxy)methane	bis(2-chloroethyl)ether	bis(2-chloroisopropyl)ether
bis(2-ethylhexyl)phthalate	4-bromophenyl phenyl ether	butyl benzyl phthalate	2-chloronaphthalene
4-chlorophenyl phenyl ether	chrysene	di-n-butyl phthalate	di-n-octyl phthalate
dibenzo(a,h)anthracene	1,2-dichlorobenzene	1,3-dichlorobenzene	1,4-dichlorobenzene
3,3'-dichlorobenzidine	diethyl phthalate	dimethyl phthalate	2,4-dinitrotoluene
2,6-dinitrotoluene	1,2-diphenylhydrazine	fluoranthene	fluorene
Hexachlorobenzene	hexachlorobutadiene	hexachlorocyclo-pentadiene	hexachloroethane
indeno(1,2,3-cd)pyrene	isophorone	naphthalene	nitrobenzene
n-nitrosodi-n-propylamine	n-nitrosodimethylamine	n-nitrosodiphenylamine	phenanthrene
pyrene	1,2,4-trichlorobenzene		

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

$$L_{NPDES} = \frac{8.34 * C_{NPDES} * Q_{POTW}}{(1 - R_{Avg})}$$

$$L_{Chronic} = Q_{POTW} * 8.34 * \frac{WQBEL_C / 1000}{(1 - R_{Avg})}$$

- Water Quality based limits

$$WQBEL_C = C_{WQS} * \frac{(Q_{MAX} + (25\% * Q_{STREAM}))}{Q_{MAX}}$$

C_{WQS} for various pollutants are tabulated in Part 57 Rules

MAHL Determination – Non-Compatibles

- Treatment Inhibition

$$L_{INHIB,Sec} = \frac{Q_{POTW} * 8.34 * C_{INHIB,Sec}}{1 - R_{PRIM}}$$

$$L_{INHIB,Dig} = \frac{Q_{Dig} * 8.34 * C_{INHIB,Dig}}{R_{Avg} * F_{sorp}}$$

- Digester Inhibition

- Biosolids Contamination

$$L_{Sludge} = Q_{Sludge} * \frac{TSS_{Sludge}}{100} * 8.34 * \frac{C_{Sludge}}{R_{avg} * F_{Sorp}}$$

MAHL Determination – Non-Compatibles

- AHL formulas explained:

$$L_{INHIB,Sec} = Loading_{CRITERIA}$$

$$Q_{POTW} = Flow_{LOCATION}$$

$$C_{NPDES} = Concentration_{CRITERIA}$$

$$R_{Avg} = \% removal_{CRITERIA}$$



MAHL Determination – Non-Compatibles

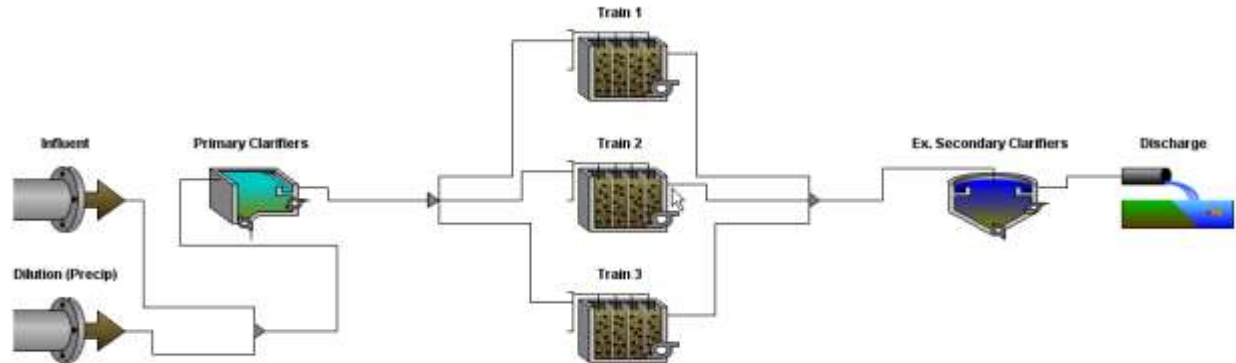
- Example of non-compatible MAHL spreadsheet

Allowable Headworks Load

			Arsenic	Cadmium	Chromium	Copper	Cyanide	Lead	Mercury	Molybdeum	Nickel	Selenium	Silver	Zinc
Secondary Treatment Inhibition SI	(lbs/day)	(Lhw)	0.701	5.689	6.624	9.961	0.662	11.245	0.537	-	21.7	-	1.511	64.8
Nitrification Inhibition NI	(lbs/day)	(Lhw)	12.89	76.20	20.95	25.909	-	6.199	-	-	74.2	-	-	8.516
Chronic Water Quality Standards C	(lbs/day)	(Lhw)	14.82	0.570	24.90	7.862	0.933	4.097	0.107	220	125	0.415	0.013	32.6
Acute Water Quality Standards A	(lbs/day)	(Lhw)	5.84	0.105	33.3	1.063	0.686	6.830	0.034	346	196	0.866	0.021	5.63
USEPA 503 Sludge Regulations BS	(lbs/day)	(Lhw)	0.212	0.157	-	5.838	-	1.702	0.117	0.488	0.537	0.375	-	12.95
MAHL	(lbs/day)		0.212	0.105	6.624	1.063	0.662	1.702	0.034	0.488	0.537	0.375	0.013	5.63
Basis			BS	A	SI	A	SI	BS	A	BS	BS	BS	C	A

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
- $MAIL = MAHL - \text{background domestic loading}$
- 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 $\frac{1.4 \text{ lb/day}}{(0.1 \text{ mgd} * 8.34)} = 1.67 \text{ mg/L}$

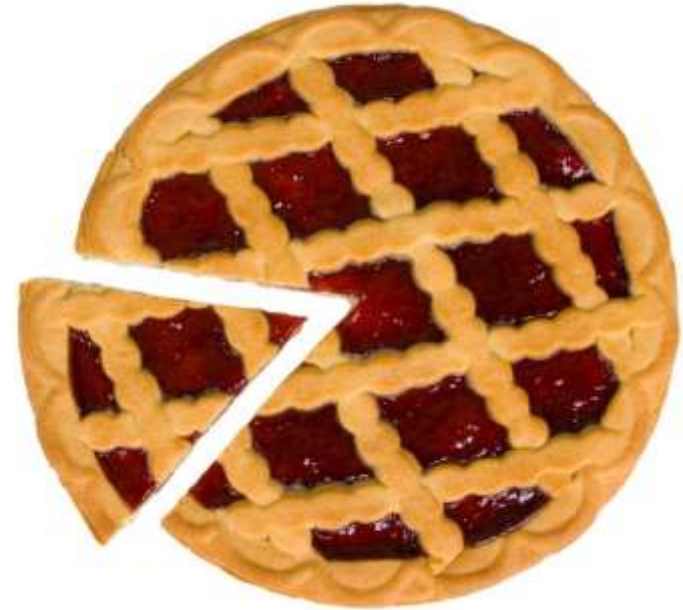
Non-Uniform Allocation Approach

- 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

BOD MAHL ALLOCATION



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

Review & Approval

- MAHL evaluation/report
- Proposed Local Limits
- Proposed SIU allocations/permits
- Proposed SUO updates/changes





Legal Review

- Local Limits are specified in the Sewer Use Ordinance
- Any proposed changes to the Ordinance should be reviewed by an experienced attorney

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!

Surcharges – Part of IPP?

- Surcharge threshold concentrations are **different** from Local Limits
- IUs 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 are extra fees to cover increased O&M expenses for higher strength wastewater (compatibles)

Final Thoughts

- IPP is specialized, highly technical, and site-specific
- Networking with fellow IPP staff-DEQ, other communities with IPP
- Join the MWEA IPP Committee, we have great discussions on lessons learned every 6 weeks at our meetings



QUESTIONS