The Metropolitan

Water Reclamation District

of Greater Chicago

WELCOME
TO THE JANUARY EDITION
OF THE 2015
M&R SEMINAR SERIES

BEFORE WE BEGIN

- PLEASE SILENCE CELL PHONES & SMART PHONES
- QUESTION AND ANSWER SESSION WILL FOLLOW PRESENTATION
- PLEASE FILL EVALUATION FORM
- SEMINAR SLIDES WILL BE POSTED ON MWRD WEBSITE (www. MWRD.org: Home Page ⇒ Reports ⇒ M&R Data and Reports ⇒ M&R Seminar Series ⇒ 2015 Seminar Series)
- STREAM VIDEO WILL BE AVAILABLE ON MWRD WEBSITE (www.MWRD.org: Home Page ⇒ MWRDGC RSS Feeds)

KULDIP KUMAR, *Ph.D.*

Current: **Senior Environmental Soil Scientist, Biosolids Utilization and Soil Science Section, M&R, MWRDGC**

Experience: Associate Environmental Soil Scientist, Biosolids Utilization and Soil Science Section, M&R, MWRDGC

- GI studies: CDOT streetscape & permeable pavement
- Phosphorus source identification and tracking
- MWRD research study on using algae for nutrient removal and recovery

Education: **Ph.D.** (Soil Science), (*1998*) Lincoln University, Canterbury, New Zealand

M.Sc.(Soil Sci.-Soil Physics), (*1989*) Punjab Agricultural University, Ludhiana, India

Bachelor of Agricultural Science (Hons. in Soil Sci.) *(1986)*
Punjab Agricultural University, Ludhiana, India

Professional: Associate Editor – Journal of Environmental Quality (2007 – Present)
Senior Associate Editor – Agronomy Journal (2008 – Present)

Award: "*Fund for Excellence Award*" by Lincoln University
"*Best Quality Research Award*" by Lincoln University

Technical Re-evaluation of Local Limits for Industrial Discharges in the Metropolitan Water Reclamation District of Greater Chicago Service Area

Dr. Kuldip Kumar

Senior Environmental Soil Scientist

Taskforce (Initiated in 2012) By Catherine O'Connor - Heng Zhang

Members

Ted Denning, Retired - Senior Environmental Specialist

Gregory Yarnik – Supervising Environmental Specialist

Diane Moe – Senior Environmental Chemist

Dale MacDonald – Assoc. Environmental Research Scientist

Kuldip Kumar – Senior Environmental Soil Scientist

Acknowledgements

Mr. Justin Vick

Ms. Jennifer Wasik

Presentation Outline

- Need for Pretreatment Program and Developing Local Limits – Little History - CWA
- What Are We Protecting ?
- USEPA Categorical Limits vs. Local Limits
- Types of Industry in Cook County
- National POCs + Other Pollutants
- Requirements for Developing Local Limits
- Development of Local Limits
- Implementation and Compliance History
- Summary of Local Limits

Why ?

- Industrialization brought with it a level of pollution never before seen in the country.
- By the 1960s scenes of dying fish and burning rivers were repeated regularly on the evening news.
- December 1970 the President created the U.S. Environmental Protection Agency (EPA) by an executive order in response to such critical environmental problems.
- The EPA subsequently passed its first piece of legislation, the Clean Water Act, in 1972.

Kentucky Sewer Explosion, 1981

NEED FOR THE PRETREATMENT PROGRAM

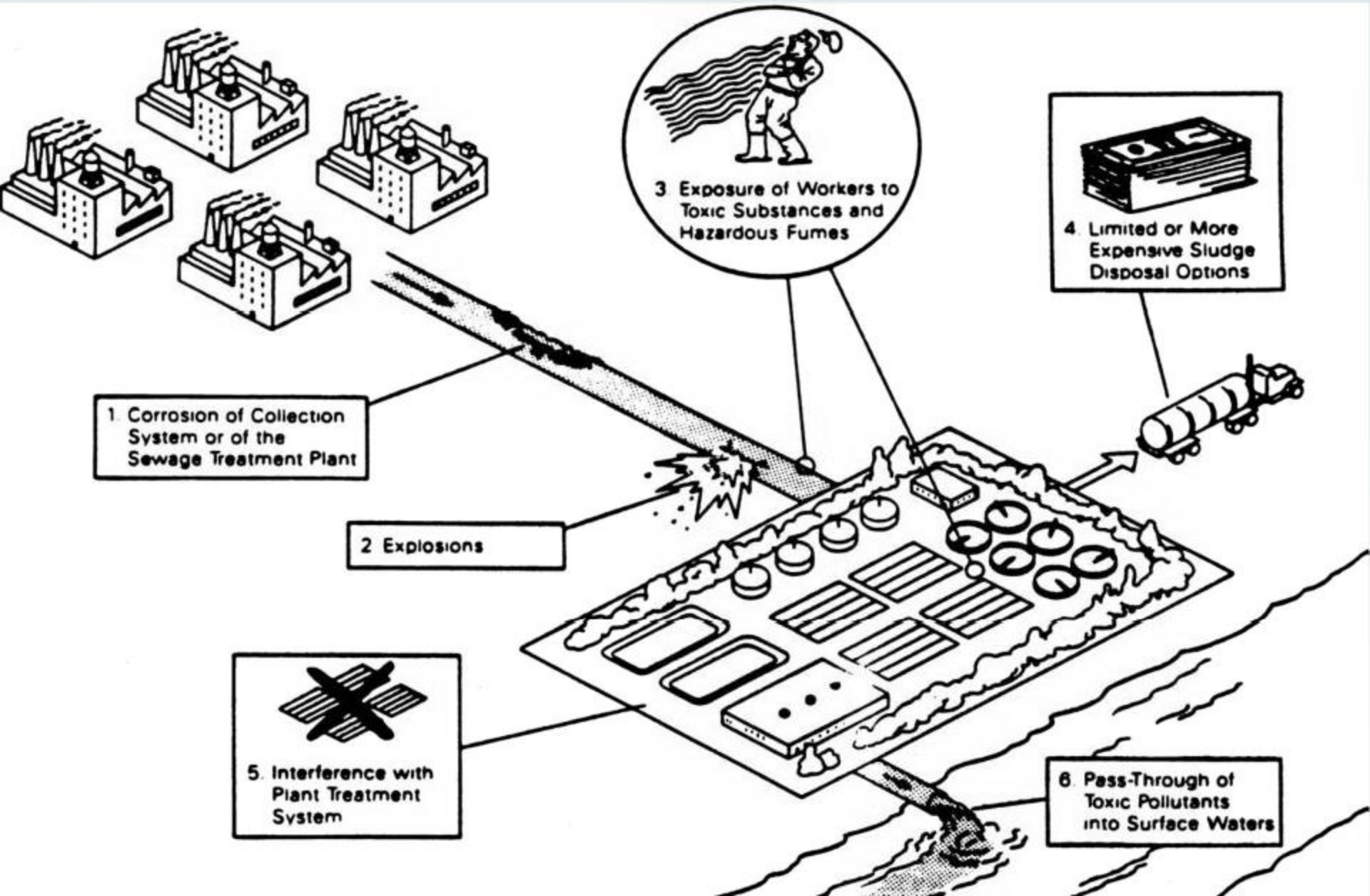
- POTWs are designed to treat typical household waste, biodegradable commercial or industrial waste.
- POTWs are NOT designed to treat most toxic or non-conventional pollutants that are present in industrial waste.
- Discharges from both industrial and commercial sources can cause problems at POTWs and can have detrimental effects on the water quality of the receiving water body.
- The undesirable effects of those discharges can be prevented by using treatment techniques or management practices to reduce or eliminate the discharge of the contaminants at sources.

National Pre-Treatment Program (NPP)

40 CFR Part 403 provides the regulatory basis to require non-domestic dischargers to comply with pretreatment standards to ensure that the goals of the Clean Water Act (CWA) are attained.

Objectives of the NPP are stated in 40 CFR 403.2, as follows:

- Prevent the introduction of pollutants into a POTW that will interfere with the operation of the POTW, including interference with its use or disposal of biosolids
- Prevent the introduction of pollutants into a POTW that will pass through the treatment works or otherwise be incompatible with such works
- Improve opportunities to recycle and reclaim municipal and industrial wastewaters and biosolids


3 Exposure of Workers to Toxic Substances and Hazardous Fumes
4. Limited or More Expensive Sludge Disposal Options
1. Corrosion of Collection System or of the Sewage Treatment Plant
2 Explosions
5. Interference with Plant Treatment System
6. Pass-Through of Toxic Pollutants into Surface Waters

Specific Prohibitions [40 CFR § 403.5(b)]

(1) Pollutants which create a fire or explosion hazard;

(2) Pollutants which will cause corrosive structural damage to the POTW;

(3) Solid or viscous pollutants causing obstruction and resulting in interference;

(4) Pollutants released at a flow rate and/or concentration causing interference

(5) Heat in amounts which will inhibit biological activity in the POTW resulting in interference;

(6) Oils in amounts that will cause interference or pass through;

(7) Pollutants which result in the presence of toxic gases, vapors, or fumes; and

(8) Trucked or hauled pollutants, except at discharge points designated by the POTW.

40CFR403.8(f)(4) Local Limits

- The POTW shall develop local limits as required in 403.5(c)(1), or……

- … demonstrate they are not necessary.

Pre-Treatment Program

	Categorical Standards	Local Limits
Developed	By USEPA	By POTW
Objective	Uniform National Control of Certain IUs	POTW/Receiving Waters Protection
Pollutants	Priority Pollutants (toxic and non-conventional only)	Any Pollutant
Basis	Technology Based	Technically Based on Site Specific Factors
Apply	At the End of Regulated Process(es)	Depends on Development Method

Significant Industrial Users By Category (Total = 375 as of May 2014)

Category		SIUs	Category		SIUs
410	Textile Mills	1	439	Pharmaceutical Mfrg.	3
413	Electroplating	58	442	Transport Equip. Clean	9
414	Org. Chems, Plastics and Synthetic Fibers	8	455	Pesticide Chemicals	2
415	Inorg. Chems	1	463	Plastics Molding & Forming	1
417	Soaps Detergents Mfrg.	1	464	Metal Molding & Casting	3
419	Petroleum Refining	1	465	Coil Coating	3
420	Iron and Steel Mfrg.	8	466	Porcelain Enameling	1
421	Nonferrous Metal Mfrg.	2	467	Aluminum Forming	1
425	Leather Tanning & Finishing	1	468	Copper Forming	2
430	Pulp, Paper & Paperboard Mills	1	469	Electrical and Electronic Components	1
433	Metal Finishing	125	471	Nonferrous Metals Forming & Metal Powders	1
437	Centralized Waste Treat.	5	SIU	Non-categorical SIUs	136

Abbreviations Used in This Presentation

- POC – Pollutant of Concern
- AHL – Allowable Headworks Loading
  - WQ-AHL – Water Quality Based AHL
  - BQ-AHL – Biosolids Quality Based AHL
  - ASI-AHL – Activated Sludge Inhibition Based AHL
  - ADI-AHL – Anaerobic Digestion Inhibition Based AHL
- MAHL – Maximum Allowable Headworks Loading: The most protective (lowest) of the AHLs.
- MAIL – Maximum Allowable Industrial Loading
- SF – Safety Factor: The MAIL is usually calculated by applying a safety factor to the MAHL and discounting for uncontrolled sources, hauled waste and growth allowance.

National POCs

USEPA Guidance 2004

- EPA Identified 15 pollutants often found in POTW effluent and sludge
  - Assume all 15 to be POCs unless Approval Authority agrees otherwise.

- EPA recommends POTW screening for these 15 using data from:

  POTW influent, effluent, and biosolids

  Industrial user discharges

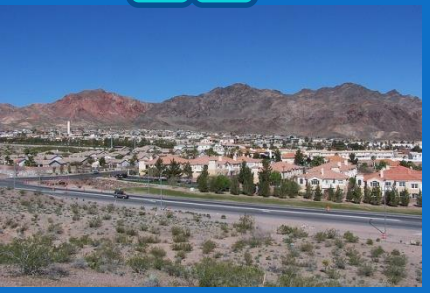
15 POCs + 5 Additional Pollutants

1. 5 Day-BOD
2. Ammonia
3. Arsenic
4. Cadmium
5. Chromium
6. Copper
7. Cyanide
8. Lead
9. Mercury
10. Molybdenum
11. Nickel
12. Selenium
13. Silver
14. Suspended Solids
15. Zinc
16. Fluoride
17. Phenol
18. Fat, Oil, and Grease (FOG)
19. Total Phosphorus
20. Iron

Collect Data & Characterize Existing Loadings

MAIL= MAHL (1-SF) – Domestic & Commercial Loading
Local Limit = MAIL/Industry Flow

Domestic & Commercial



Local Limits
Industry

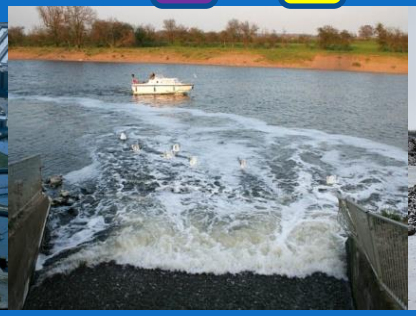
Old New

MAHL

ASI-AHL

WQ-AHL

BQ-AHL



(SF) Safety Factor - 10 to 30%

POTW Sampling Locations

- POTW Influent
- POTW Effluent
- Feed to Anaerobic Digesters
- Biosolids Produced
    - 40 CFR Part 503 Annual Report Data

Characterize Existing Loadings

- Industrial Users/Commercial Sources
- Hauled Waste
- Domestic Loading
- Treatment Plant Data (Flows & POCs)
- Receiving Stream Flow (1Q10 & 7Q10)
- Upstream Background Concentrations of POCs
- Drinking Water POC Concentrations

Average Flow Data For Years 2010 and 2011 for All Seven District WRPs

	Cal.	Egan	HP	Kirie	Lem.	O'Brien	Stick.
	----------MGD----------						
WRP Influent	250.5	27.4	9.3	38.4	2.5	235.0	721.0
Industrial	8.3	0.5	0.2	0.9	0.0	1.9	22.6
Domestic	242.2	26.8	9.1	37.5	2.5	233.1	698.4
Receiving Stream 7Q10	12.9	0	0	0	848.6	0	201.0
Receiving Stream 1Q10	0	0	0	0	526.0	0	54.0
P & S To Digesters	0.61	0.20	0.03	n/a	n/a	n/a	2.53
Digester Draw-off	0.61	0.21	0.03	n/a	n/a	n/a	2.07

Estimation of WRP Removal Efficiencies for all POCs

- Average Daily Removal Efficiency

  Paired Influent & Effluent data to calculate daily removal efficiency and average the data for a period

- Mean Removal Efficiency

  Average influent and effluent values separately, to calculate removal efficiency

  Deciles Method

  - Statistical Method

- Literature Values

Estimated Removal Efficiencies for POCs

(Using 2010 & 2011 data)

7 WRP Removal Efficiencies

TABLE 9: REMOVAL EFFICIENCIES FOR POLLUTANTS THROUGH WASTEWATER TREATMENT PROCESSES AT METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO WATER RECLAMATION PLANTS

	District Water Reclamation Plant						
	Calumet	Egan	Hanover Park	Kirie	Lemont	O'Brien	Stickney
Ammonia	0.98	0.99	0.99	0.98	0.97	0.97	0.96
Arsenic	0.05*	0.06**	0.36	0.24	0.05*	0.04**	0.05
BOD_5	0.94	0.99	0.98	0.98	0.95	0.94	0.97
Cadmium	0.59*	0.59*	0.40	0.14	0.59*	0.14	0.98
Chromium, Total	0.68	0.57	0.77	0.57	0.40	0.40	0.83
Chromium, Hexavalent	0.33	0.76*	0.95	0.76*	0.50	0.76*	0.76*
Copper	0.90	0.90	0.86	0.91	0.85	0.85	0.89
Cyanide	0.30	0.29	0.38	0.39	0.23	0.37	0.48
Fats, oils and grease (FOG)	0.90	0.93	0.94	0.91	0.86	0.92	0.79
Fluoride	0.06	0.12	0.07	0.23	0.02	0.07	0.09
Iron, total	0.95	0.97	0.96	0.95	0.91	0.94	0.97
Iron, soluble	0.60	0.39	0.42	0.29	0.42	0.29	0.46
Lead	0.40	0.40	0.65	0.20	0.40	0.57	0.42
Mercury	0.92	0.84	0.82	0.84	0.86	0.83	0.40
Nickel	0.35	0.50	0.36	0.48	0.21	0.24	0.61
Phenol	0.98	0.88	0.90	0.88	0.85	0.83	0.63
Selenium	0.50*	0.21	0.43	0.14	0.50	0.14	0.15
Silver	0.30**	0.63	0.78	0.48	0.29**	0.40	0.36
Suspended Solids	0.95	0.99	0.97	0.99	0.96	0.95	0.99
Total Phosphorus	0.42	0.51	0.43	0.68	0.48	0.54	0.86
Zinc	0.88	0.72	0.76	0.70	0.67	0.63	0.86

[1]The value is the average removal efficiency over two years (2010 and 2011) for the WRPs which had at least 30 percent of the samples with pollutant concentrations above the detection limit.
*All values were below detection limits, removal efficiency from previous report (MWRDGC, 2003).
** Removal efficiency estimated using deciles approach using 2010 and 2011 data.

*All values below detection limits, removal efficiency from previous report (MWRDGC, 2003)

**Estimated using Deciles Approach
Note: These are best possible estimates with uncertainty

Calumet WRP Example for Few POCs

POC	Removal Efficiency
Ammonia	0.98
Arsenic	0.05*
BOD_5	0.94
Cadmium	0.59*
Chromium, Total	0.68
Chromium, Hexavalent	0.33
Copper	0.90
Silver	0.30**
Fats, Oil and Grease (FOG)	0.90

Procedure for Local Limit Development

- Screening
  - Calculating AHLs to determine MAHL
  - Calculating Actual loading, average and daily max
  - Comparing Actual loading vs MAHL
  - Criteria for further evaluation:

    Avg > 60% MAHL or Max > 80% MAHL
- Further Evaluation

  From MAHL to MAIL to Limit Value Calculation
- Establishing

  Common sense assessment

Considerations for Developing Maximum Allowable Industrial Loading

Allocate Allowable Industrial Loading

Develop MAHLs

Develop Maximum Allowable Headworks Loading (MAHL)

Select Most Stringent AHL as MAHL:

- Effluent Quality (NPDES Permit)
- Water Quality Standards
- Interference (Inhibition)
- Biosolids Quality (40CFR 503)
- Air Quality Standards
- Other (e.g. worker safety)

Determine Maximum Allowable Industrial Loading (MAIL)

Water Quality Based AHL

NPDES Permits

$$AHL = \frac{C_{NPDES}\, Q_{WRP}\, 8.34}{1 - R_{WRP}}$$

C_{NPDES} = Effluent NPDES Permit Concentration Limit, mg/L

Q_{WRP} = WRP Flow, MGD

R_{WRP} = Removal Efficiency Across WRP, as a Decimal

8.34 = Unit Conversion Factor

State Water Quality Standards

$$AHL = \frac{[C_{WQ}\,(Q_{WRP}+Q_{STREAM}) - C_{STREAM}Q_{STREAM})\,]8.34}{1 - R_{WRP}}$$

C_{WQ} = Water Quality Std Conc. mg/L

Q_{WRP} = WRP Flow, MGD

Q_{STREAM} = Receiving Stream Flow, MGD

C_{STREAM} = Receiving Stream Conc. mg/L

8.34 = Unit Conversion Factor

Criteria Used for Screening Based on Water Quality

Example of Copper			HP WRP
Conc. Limit, mg/L	NPDES	Daily	0.035
		Monthly	0.022
	State Water	Chronic Toxicity	0.0270
		Acute Toxicity	0.0443
		Ind. Aquatic Life Use	n/a
AHL, lbs/day	NPDES	Daily	19.30
		Monthly	12.13
	State Water	Chronic Toxicity	17.53
		Acute Toxicity	28.72
		Ind. Aquatic Life Use	n/a
Water Quality Based AHL (WQAHL), lbs/day			12.13
Actual Average Influent Loading (Lavg), lbs/day			5.02
Actual Maximum Influent Loading (Lmax), lbs/day			10.28
Actual Loading vs. WQAHL			
% Lavg/WQAHL			41
%Lmax/WQAHL			85
% Lmax/AHL Acute Toxicity			36
Further Evaluation Recommended			yes

Biosolids Quality Based

AHL Calculations

$$BQAHL = \frac{C_{BIOSOLIDS}\, Q_{BIOSOLIDS}\, (PS/100)\, G_{BIOSOLIDS}\, 8.34}{R_{WRP}}$$

$C_{BIOSOLIDS}$ = Biosolids Quality Standard Conc., mg/kg

$Q_{BIOSOLIDS}$ = Biosolids Digester Draw –Off, MGD

PS = Percent Solids of Digester Draw

$G_{BIOSOLIDS}$ = Specific Gravity of Biosolids ~ 1 kg/L

R_{WRP} = Removal Efficiency Across WRP, as a Decimal

8.34 = Unit Conversion Factor

40 CFR 503 Limits

POC	Standard, mg/kg
Arsenic	41
Cadmium	39
Copper	1,500
Lead	300
Mercury	17
Molybdenum	75
Nickel	420
Selenium	100
Zinc	2,800

Criteria Used for Screening based on Biosolids Quality

Example of Copper	Egan Digesters	Stickney Digesters
40 CFR 503 Limit (C_{503})	1,500	1,500
Actual Average Concentration (C_{avg}), mg/dry Kg	774	367
Actual Maximum Concentration (C_{max}), mg/dry Kg	895	416
Biosolids Quality Based AHL (BQAHL), lbs/day*	64.22	864.2
Actual Average Influent Loading (L_{avg}) , lbs/day	40.99 (15.52E+ 25.47K)	933.0 (848.3S+83.34O+1. 35L)
Actual Concentration vs. 40 CFR 503 Limit		
C_{avg}/C_{503}, %	**52**	**24**
C_{max}/C_{503}, %	**60**	**28**
Biosolids meet 40 CFR 503 Limits:	**Biosolids are Even Better Than EQ!**	
Actual Loading vs. BQAHL (L_{avg}/BQAHL), %	64	108
Further Evaluation Recommended	yes	yes
Criteria (L_{avg}/BQAHL)	> 60%	> 60%

* Calculated using estimated removal efficiency

Activated Sludge Inhibition Based

AHL Calculation

$$ASIAHL = \frac{CAS/INHIBIT \; QWRP \; 8.34}{1 - RWRP}$$

CAS/INHIBIT = Activated Sludge Inhibition Conc., mg/L

QWRP = WRP Flow, MGD

RWRP = Removal Efficiency Across WRP, as a Decimal

8.34 = Unit Conversion Factor

Literature Inhibition Values

POC	Carbonaceous MO's, mg/L	Nitrogenous MO's, mg/L
Arsenic	0.1	1.5
Cadmium	1	5.2
Chromium	1	0.25
Chromium-Hexavalent	1	1
Copper	1	0.05-0.48
Lead	1	0.5
Mercury	0.1	n/a
Nickel	1	0.25
Zinc	0.3	0.08
Ammonia	480	n/a
Cyanide	0.1	0.34
Phenol	50	4

Criteria for Further Evaluation Based on Activated Sludge Inhibition

Example of Copper	Egan WRP	Stickney WRP
Threshold Concentration Limit (mg/L)		
Carbonaceous Microorganisms Inhibition	1.00	1.00
Nitrogenous Microorganisms Inhibition	0.05	0.05
Allowable Headworks Loading		
Carbonaceous Microorganisms Inhibition (lbs/day)	292.4	7,809
Nitrogenous Microorganisms Inhibition (lbs/day)	14.62	390.5
Activated Sludge Toxicity (ASIAHL) (lbs/day)*	14.62	390.5
Actual Average Influent Loading (L_{avg}), lbs/day	15.52	848.3
Actual Maximum Influent Loading (L_{max}), lbs/day	36.80	2,972
Actual Loading vs. ASIAHL		
L_{avg}/ASTAHL, %	106	217
L_{max}/ASTAHL, %	252	761
Further Evaluation Recommended	yes	yes
Criteria Used L_{avg}/ASIAHL L_{max}/ASIAHL	> 60 % > 80 %	> 60 % > 80 %

* Calculated using estimated removal efficiency

Anaerobic Digestion Inhibition Based

AHL Calculation

$$AHL = \frac{C_{DIG/INHIBIT} \, Q_{DIGESTER} \, 8.34}{R_{WRP}}$$

$C_{DIG/INHIBIT}$ = Anaerobic Digestion Inhibition Conc., mg/L

$Q_{DIGESTER}$ = Sludge Flow to Digester, MGD

R_{WRP} = Removal Efficiency Across WRP, as a Decimal

8.34 = Unit Conversion Factor

Literature Inhibition Values

POC	AD Inhibition Limit mg/L
Arsenic	1.6
Cadmium	20
Chromium	130
Chromium-Hexavalent	110
Copper	40
Lead	340
Nickel	10
Silver	13
Zinc	400
Ammonia	1500
Cyanide	4

Criteria for Further Evaluation Based on Anaerobic Digestion Inhibition

Example of Copper	Stickney Digesters
Anaerobic Digestion Inhibition Level (mg/L)	40.00
Anaerobic Digestion Toxicity Based Allowable Headworks Loading (ADIAHL), lbs/day *	948.3
Actual Average Influent Loading (L_{avg}), lbs/day	933.0 (848.3S+83.34 O+1.35L)
Actual Loading vs. ADIAHL	
L_{avg}/ADIAHL, %	98
Further Evaluation Recommended	yes
Criteria Used L_{avg}/ADIAHL	> 60 %

* Calculated using estimated removal efficiency

Further Evaluation Recommended

POC	Water Qual.	Biosolids Qual.	AS Inhib.	AD Inhib.
5 Day-BOD				
Arsenic		C, E, HP, S	C, L, S	HP
Ammonia				
Cadmium		S		
Chromium				
Copper	HP	E, S	C, E, HP, K, L, O, S	S
Cyanide				
Lead	S	S		
Mercury	E, HP, K, S			
Molybdenum				
Nickel	E, K			
Selenium		S		
Silver				
Suspended Solids				
Zinc		C, S	C, E, HP, K,L,O,S	
Fluoride				
Phenol				
FOG				
Total P	C, O, S			

Determination of Allowable Industrial Loading

Allocate Allowable Industrial Loading

Develop MAHLs

Determine MAIL =MAHL (1- SF) – LDOM

- SF - Safety Factor (10 to 30%)
  - Uncontrolled Sources
  - Hauled Waste
  - Growth Factor
- LDOM – Domestic & Commercial Loading

Determine Maximum Allowable Industrial Loading (MAIL)

Determination of Local Limits

Allocate Allowable Industrial Loading

Develop MAHLs

Allocate MAIL to IUs

1. Uniform Concentration

Option 1: One limit for all POTWs

Option 2: Separate limits for each POTW

2. Industrial User Contributory Flow Based
3. Mass Proportional Limits
4. Selected Industrial Reduction

Determine Maximum Allowable Industrial Loading (MAIL)

Local Limit Calculations (Example of Cu)

Water Quality – Hanover Park WRP

$L_{MAIL} = MAHL (1\text{-}SF) - L_{DOM}$

Where, MAHL = 12.13 lbs/d

SF = 0.20

L_{DOM} = 0.12 lbs/d

Q_{IND} = 0.20 MGD

L_{MAIL} = 12.13 lbs/d(1-0.20)-0.12 lbs/d = 9.58 lbs/d

$C_{LOCAL\text{-}LIMIT} = L_{MAIL} / (Q_{IND}*8.34)$

$C_{LOCAL\text{-}LIMIT}$ = 9.58 / (0.20*8.34) = 5.83 mg/L

Activated Sludge Inhibition – Calumet WRP

$L_{MAIL} = MAHL (1\text{-}SF) - L_{DOM}$

Where, MAHL = 139.28 lbs/d

SF = 0.10

L_{DOM} = 3.23 lbs/d

Q_{IND} = 8.34 MGD

L_{MAIL} = 139.28 lbs/d(1-0.10)-3.23 lbs/d = 122.12 lbs/d

$C_{LOCAL\text{-}LIMIT} = L_{MAIL}/ (Q_{IND}*8.34)$

$C_{LOCAL\text{-}LIMIT}$ = 122.12/(8.34*8.34) = 1.75 mg/L

Local Limit Calculations (Example of Copper)

Biosolids Quality – Stickney WRP

$L_{MAIL} = MAHL (1\text{-}SF) - L_{DOM}$

Where, MAHL = 864.2 lbs/d

SF = 0.20

L_{DOM} = 9.31 lbs/d

Q_{IND} = 22.6 Stickney + 1.9 O'Brien = 24.5 MGD

L_{MAIL} = 864.2 lbs/d(1-0.20)-9.31 lbs/d = 681.8 lbs/d

$C_{LOCAL\text{-}LIMIT} = L_{MAIL} / (Q_{IND}*8.34)$

$C_{LOCAL\text{-}LIMIT}$ = 681.8 / (24.5*8.34) = 3.34 mg/L

Summary for Copper

Hanover Park WRP (Water Quality) = Higher Than Previous

Calumet WRP(Activated Sludge Inhib.) = Lower Than Previous

Stickney WRP (Biosolids Quality) = Higher Than Previous

Copper Previous Local Limit = 3.0 mg/L

Common Sense Assessment

- **Are the limits technologically achievable?**
- **Can compliance with the limits be determined?**
- **Do the limits make sense based on actual POTW conditions and compliance experience?**

Local Limit Calculations (Example of Copper)

Biosolids Quality – Stickney WRP

$L_{MAIL} = MAHL (1\text{-}SF) - L_{DOM}$

Where, MAHL = 864.2 lbs/d
SF = 0.20

L_{DOM} = 9.31 lbs/d

Q_{IND} = 22.6 Stickney + 1.9 O'Brien = 24.5 MGD

L_{MAIL} =
864.2 lbs/d(1-0.20)-9.31 lbs/d = 681.8 lbs/d

$C_{LOCAL\text{-}LIMIT} = L_{MAIL} / (Q_{IND}*8.34)$

$C_{LOCAL\text{-}LIMIT}$ = 681.8 / (24.5*8.34) = 3.34 mg/L

Summary for Copper

Hanover Park WRP (Water Quality) =
Higher Than Previous

Calumet WRP(Activated Sludge Inhib.) =
Lower Than Previous

Stickney WRP (Biosolids Quality) =
Higher Than Previous

Copper Previous Local Limit = 3.0 mg/L
Recommended New Local Limit = 3.0 mg/L

Annual Enforcement Actions

Year	Cease & Desist Orders/NONs/Amendments	Board Orders	Legal Actions
2007	368	0	0
2008	359	1	0
2009	299	1	0
2010	321	3	0
2011	281	0	0
2012	364	0	0

NON = Notice of Noncompliance

Compliance Status

Compliance Status	Users Published in 2011	Users Published in 2012
Exemplary	248	235
Significant Noncompliance	27	41

Summary of Recommendations

POC	Current Limit, mg/L	Recommended Limit, mg/L
Cadmium	2.0	2.0
Chromium, Trivalent	25.0	25.0
Chromium, Hexavalent	10.0	10.0
Copper	3.0	3.0
Lead	0.5	0.5
Iron	250.0	250.0
Mercury	0.0005	0.0005
Nickel	10.0	10.0
Zinc	15.0	15.0
Cyanide, Total	5.0	5.0
FOG	250.0	250.0
Arsenic	None	None
Fluoride	None	None
Molybdenum	None	None
Selenium	None	None
Silver	None	None
Ammonia	None	None
cBOD	None	None
Cyanide, WAD	None	None
Phenol	None	None
Phosphorus, Total	None	None
Suspended Solids, Total	None	None

Local Limits Evaluation is NDPES Permit Required as well as Need Based

- M&R Report # 14-58 - per NPDES permit requirement
- Reflecting - future
  - New Regulations
  - Changes in WRP Operations

Questions ?

Kuldip.Kumar@mwrd.org

708-588-3579