Complying with National Pollutant Discharge Elimination System Permit (NPDES) Requirements

December 14, 2012

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NPDES History

- Federal Clean Water Act (CWA), 1972
  - *Established NPDES program that requires permits for discharge of treated municipal & industrial effluents and stormwater*
  - *Administered by the United States Environmental Protection Agency (USEPA); Delegated authority to states (Illinois Environmental Protection Agency)*
- NPDES Permits Establish
  - *Conditions that allow discharge*
  - *Monitoring / reporting requirements*

MWRDGC Permit Overview

- Illinois Environmental Protection Agency (IEPA) Permit Types (31 Permits – Bureau of Water and Air)
  - National Pollutant Discharge Elimination System (NPDES) Permits (14 Permits)
    - *Effluent Discharge (8 Permits)*
    - *Storm Water for Industrial Activities (5 WRP General Permits)*
    - *Pesticide Application Permit (1 General Permit for MWRD)*
  - Water Pollution Control Permits (aka "Construction/Operating Permits") (11 Permits)
- Permit Components and Process

NPDES Permits for All Seven WRPs and Lockport Powerhouse

Facility	*NPDES No.*	*Expiration Date*
Stickney	IL0028053	2/28/2007
Calumet	IL0028061	2/28/2007
O'Brien	IL0028088	2/28/2007
Kirie	IL0047741	7/31/2009
Egan	IL0036340	8/31/2012
Hanover Park	IL0036137	3/31/2010
Lemont	IL0028070	1/31/2013
Lockport Powerhouse	IL0077305	2/28/2013

NPDES
Monitoring and Reporting

- Limit Types
  - *Loading (lbs/day)*
  - *Concentration (mg/L)*
  - *Limit Frequency (i.e., daily, weekly, monthly)*
- Sample Frequency
  - *Continuous*
  - *One to five days/week*
- Sample Type
  - *Grab*
  - *Composite*

NPDES
Influent Monitoring and Reporting

- Permitted Parameters
  - *Flow (MGD)*
  - *BOD_5 (mg/L)*
  - *Suspended Solids (mg/L)*

NPDES
Effluent Monitoring and Reporting

- Permitted Parameters
  - Flow (MGD)
  - $CBOD_5$ (mg/L and lbs/day)
  - Suspended Solids (mg/L and lbs/day)
  - pH
  - Ammonia Nitrogen as N (mg/L and lbs/day)
    - *All WRPs except Lemont*
  - Copper (mg/L and lbs/day)
    - *Hanover Park and Kirie WRPs*
  - Cyanide – Weak Acid Dissociable and Total (mg/L and lbs/day)
    - *Kirie WRP and Calumet WRP*
  - Fats, Oil, and Grease (FOG) and Temperature (deg F)
    - *Only Lockport Powerhouse; turbine oil/water separator*

NPDES
Effluent Monitoring and Reporting (cont.)

- Permitted Parameters
  - Dissolved Oxygen (DO)
    - *Current limit - daily minimum of 6.0 mg/l*
      - Hanover Park
      - Egan
      - Kirie
      - Stickney
    - *Daily minimum of 4.0 mg/L is in draft permit*
      - O'Brien (5.0 mg/L – 16 hours)
      - Calumet
    - *Chicago Area Waterways DO (Stickney, Calumet, O'Brien, Lemont WRPs)*
      - Use Attainability Analysis (UAA) dependent

NPDES
Effluent Monitoring and Reporting (cont.)

- Nickel (mg/L and lbs per day)
  - *.013 mg/L Total Nickel proposed for Egan WRP*
- Disinfection (Fecal Coliform and Chlorine Residual)
  - *Hanover Park, Egan, and Kirie WRPs*
  - *UAA – Future O'Brien and Calumet WRPs*
- Nutrients (Total Phosphorus and Total Nitrogen)
  - *No current limits (1.0 mg/L TP is proposed in draft permits for O'Brien, Stickney, Calumet, and Kirie WRPs); Monitor TN Only*

Plant	Stickney	O'Brien	Calumet	Lemont	Hanover Park	Kirie	Egan
Permit No.	IL0028053	IL0028088	IL0028061	IL0028070	IL0036137	IL0047741	IL0036340
Issue Date:	1/22/2002	1/22/2002	1/22/2002	1/25/2008	12/14/2004	7/19/2004	12/26/2007
Effective Date:	3/1/2002	3/1/2002	3/1/2002	2/1/2008	4/1/2005	8/1/2004	9/1/2007
Modification Date:	None	None	None	3/21/2008 3/31/2008	None	8/20/2004 3/28/2005	None
Correction Date:	None	None	None	None	None	None	None
Expiration Date:	2/28/2007	2/28/2007	2/28/2007	1/31/2013	3/31/2010	7/31/2009	8/31/2012
DAF(MGD)	1200 {732}	333 {240}	354 {274}	2.3 {2.5}	12 {9.0}	52 {39.8}	30 {27.2}
DMF (MGD)	1440	450	430	4.0	22	110	50
Parameters							
CBOD5	(10)[15]	(10)[12]	(10)[20]	(20)[40]	(10)20	(4)20	(10) 20
SS	(12)[20]	(12)[18]	(15)[25]	(25)[45]	(12)24	(5)24	(12) 24
DO	6.0	-	-	-	6.0	6.0	6.0
NH_3-N	(2.5/4.0) 5.0/8.0s	(2.5/4.0) 5.0/8.0s	(2.5/4.0) 5.0/8.0s	-	(1.5/1.5/3.9/2.9) 6.5/6.5/13.0/13.3 [---/3.8/12.5/7.4]s*	(2.1/1.6/4.0) 7.8/11.1/8.4 [5.3/4.0/---]s**	(1.5/3.6) 3.0/8.0s
Fecal	-	-	-	-	Geo (200)s	Geo (200)s	(400)s
Res. Cl2	0.05*	0.05*	0.05*	0.05*	0.05*s	0.05*s	0.05*s
pH	6/9	6/9	6/9	6/9	6/9	6/9	6/9
Cu	-	-	-	-	(0.022) 0.035	(0.029) 0.048	-
CN	-	-	(0.15) 0.30	-		-	-
CN-WAD**	-	-	-	-		(0.01) 0.02	-

All values are maximum daily values (mg/l) except as follows:

1. DO has a minimum daily value.
2. pH has a minimum/maximum range.
3. Fecal coliform in counts/100ml. - geometric mean
4. pH in standard units.
5. [] = maximum weekly average.
6. () = maximum monthly average.
7. {} = average treated flow (2006-2010).
8. s = seasonal (April - Oct; Nov - Feb; March).
9. s = seasonal (April - Oct/Nov - March for NH_3-N; *May - Oct for disinfection*).
10. s* = seasonal (April - May/Sept - Oct; June - August; Nov - Feb; March).
11. s** = seasonal (March - May/Sept - Oct; June - August; Nov - Feb).

*Effective upon chlorination

**CN-WAD: Cyanide Weak Acid Dissociable
DAF - Design Average Flow
DMF - Design Maximum Flow
MGD - Million Gallons per Day

NPDES
Discharge Monitoring Reports (DMRs)

- Monthly submittals (due to the IEPA on the 20th of each month)
  - *All seven WRPs and Lockport Powerhouse*
  - *DO monitoring results (weekly grab samples)*
  - *Major pump station discharges (i.e., North Branch, Racine Avenue, 95th Street), bypass streams (i.e., Egan's 004), and emergency high level overflow (EHLO) points (i.e., Stickney's 003)*

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)

NAME Metropolitan Water Reclamation District of Greater Chicago

ADDRESS 100 E. Erie Street Chicago, IL. 60611-2803
(312) 751-5600

FACILITY LOCATION Hanover Park WRP
1200 E. Sycamore, Hanover Park, IL. 60103
Attn: Manju P. Sharma, Maintenance & Operations

National Pollutant Discharge Elimination System (NPDES)
Discharge Monitoring Report (DMR)

Form Approved.
OMB No. 2040-0004

IL0036137	007 0
Permit Number	Discharge Number

MAJOR
(SUBR 02)
F - FINAL
WRP OUTFALL
EFFLUENT
***No Discharge

Monitoring Period	Year	Mo	Day		Year	Mo	Day
From	11	01	01	To	11	01	31

Note: Read instructions before completing this form.

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX (62-63)	Frequency of Analysis (64-68)	SAMPLE TYPE (69-70)
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
OXYGEN, DISSOLVED (DO) 00300 1 0 0 EFFLUENT GROSS VALUE	Sample Measurement	********	********	(26) LBS/DAY	10.7	********	********	(19) MG/L	0	04/07	GR
	Permit Requirement	********	********		6.0 MINIMUM	********	********			4 DAYS /WEEK	GRAB
pH 00400 1 0 0 EFFLUENT GROSS VALUE	Sample Measurement	********	********	********	7.0	********	7.2	(12) SU	0	04/07	GR
	Permit Requirement	********	********		6.0 MINIMUM	********	9.0 MAXIMUM			4 DAYS /WEEK	GRAB
SOLIDS, TOTAL SUSPENDED 00530 1 0 0 EFFLUENT GROSS VALUE	Sample Measurement	439	652	(26) LBS/DAY	********	7	11	(19) MG/L	0	04/07	CP
	Permit Requirement	1,201 MO AVG	2,402 DAILY MAX		********	12 MO AVG	24 DAILY MAX			4 DAYS /WEEK	COMP
NITROGEN, AMMONIA TOTAL (AS N) NOV-FEB 00610 1 0 0 EFFLUENT GROSS VALUE	Sample Measurement	<11	58	(26) LBS/DAY	********	<0.18	0.88	(19) MG/L	0	05/DW	CP
	Permit Requirement	390 MO AVG	1,301 DAILY MAX		********	3.9 MO AVG	13.0 DAILY MAX			5 DAYS /WEEK	COMP
NITROGEN, AMMONIA TOTAL (AS N) NOV-FEB 00610 8 0 0 OTHER TRT, PRCS CMPLT	Sample Measurement	********	20	(26) LBS/DAY	********	********	0.31	(19) MG/L	0	05/DW	CP
	Permit Requirement	********	1,251 WKLY AVG		********	********	12.5 WKLY AVG			5 DAYS /WEEK	COMP
COPPER, TOTAL (AS CU) 01042 1 0 0 EFFLUENT GROSS VALUE	Sample Measurement	0.6	1.0	(26) LBS/DAY	********	0.009	0.015	(19) MG/L	0	03/DW	CP
	Permit Requirement	2.2 MO AVG	3.5 DAILY MAX		********	0.022 MO AVG	0.035 DAILY MAX			3 DAYS /WEEK	COMP
FLOW, IN CONDUIT OR THRU TREATMENT PLANT 50050 1 0 0 EFFLUENT GROSS VALUE	Sample Measurement	7.67	12.09	(03) MGD	********	********	********	********	0	99/99	CN
	Permit Requirement	REPORT MO AVG	REPORT DAILY MAX		********	********	********			CONTIN UOUS	

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER		TELEPHONE	DATE
MANJU PRAKASH SHARMA DIRECTOR OF MAINTENANCE & OPERATIONS	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.	312.751.5600	2011/02/18
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE . NUMBER	YEAR / MO / DAY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)
DAF LOAD LIMITS DISPLAYED.

NACWA Awards (Compliance with NPDES Effluent Standards)

YEAR	Hanover Park	Egan	Kirie	O'Brien	Stickney	Calumet	Lemont
2006	Gold	Gold	Gold	Gold	Platinum (10)	Platinum (15)	Platinum (10)
2007	Silver	Gold	Gold	Gold	Platinum (11)	Platinum (16)	Platinum (11)
2008	Gold	Gold (4)	Gold (4)	Gold	Platinum (12)	Platinum (17)	Platinum (12)
2009	Gold	Platinum (5)	Platinum (5)	Gold (4)	Platinum (13)	Platinum (18)	Platinum (13)
2010	Gold	Platinum (6)	Platinum (6)	Platinum (5)	Platinum (14)	Platinum (19)	Platinum (14)
2011	Gold (4)	Silver	Platinum (7)	Platinum (6)	Platinum (15)	Platinum (20)	Platinum (15)

NPDES
Special Conditions

- Pretreatment Program
- Financial and Fiscal Reports
- Biomonitoring - Whole Effluent Toxicity Testing
- Dry Weather Flow Quantification
- UAA (Operation of Aeration Stations)
- Sludge Management Reports
- Long Term Control Plans
- Authorization of Combined Sewer and Treatment Plant Discharges
  - Treatment Requirements for combined sewer overflows (CSOs) and plant bypasses (Primary and disinfection for 10X average dry weather flow; TARP equivalency)
  - Sensitive Area Considerations
  - Operation and Maintenance Plans
  - Sewer Use Ordinances (Control of Inflow and Infiltration; new Sewer Summit; Capacity Maintenance Operation and Management (CMOM) Requirements)
  - Nine Minimum Controls
  - Compliance with Water Quality Standards

Combined Sewer Overflows

Receiving Water Type	Number of Outfalls		
	City of Chicago	Suburbs	District
General Use	37	143	16
Secondary Contact	152	30	19
Total	189	173	35
Grand Total		**397**	

NPDES
CSO Requirements

- Public notification program
- Quarterly reports (monitor and report on behalf of CSO communities)
  - Monitor 221 of 397 (56%) Active CSOs
- TARP equivalency to primary treatment for 10x average dry weather flow

CSO Community Reporting

- Arlington Heights
- Blue Island
- Broadview
- Brookfield
- Burnham
- Calumet City
- Calumet Park
- Chicago
- Des Plaines
- Dixmoor
- Dolton
- Evanston
- Forest Park
- Forest View
- Golf
- Harvey
- La Grange
- La Grange Park
- Lansing
- Lincolnwood
- Lyons
- Markham
- Melrose Park
- Morton Grove
- Mount Prospect
- Niles
- North Riverside
- Park Ridge
- Phoenix
- Posen
- River Forest
- River Grove
- Riverdale
- Riverside
- Schiller Park
- Skokie
- South Holland
- Stickney
- Summit
- Western Springs
- Wilmette

General NPDES Permit (ILR00)
Stormwater Discharges from Industrial Activities

- Stickney, Calumet, Kirie, Egan, and Hanover Park WRPs
  - O'Brien and Lemont WRPs are exempt – all on-site stormwater is routed to the head of the plant
- Regulates on-site overland flows of stormwater
- Annual Reports
- Development of Stormwater Pollution Prevention Plans (SWPPPs)
  - Quarterly inspections
  - Management of spills
  - Sampling
  - Overall good housekeeping

Water Pollution Control Permits (State Construction/Operating Permits)



- Illinois Environmental Protection Act and Pollution Control Board Regulations
- Required for the Construction/Remodeling of:
  - New sewers, sewer connections, and sewage pumping stations
  - WRPs, pretreatment equipment, and Industrial WTPs
- Required for the Operation of:
  - Land application of biosolids
  - Non-discharge wastewater treatment systems
  - Illinois Administrative Code Title 35 Part 391 “Design Criteria for Sludge Application on Land” and Part 830 “Standards for Compost Facilities”
- USEPA 40 Code of Federal Regulation Part 503 promulgated in 1993

MWRDGC Operating Permits

Facility	*Permit No.*	*Expiration Date*
Controlled Solids Distribution	2010-SC-0200(1,2)	4/30/2015
Hanover Park Fischer Farm	2012-SC-2255	12/31/2016
Land Application of Sewage Sludge	2009-SC-2056(1)	3/31/2014
Egan Solids Drying	2010-AO-0266	5/31/2015
Stickney WRP Solids Drying Areas	2010-AO-0267	5/31/2015
Cal WRP East & West Drying Areas	2010-AO-0265	5/31/2015
Harlem Avenue Solids Drying Areas	2009-AO-2715(1)	8/31/2014
Fulton County Land Application	2009-SC-2921	12/31/2013
Stickney Septage Disposal	2010-HO-0464	6/30/2015
Gloria Alitto Majewski Reservoir	2010-AO-0991	11/30/2015
Egan Backup Solids Drying	2011-AO-2197	11/30/2016

Operating Permit Requirements

- IEPA notifications (verbal and written)
  - *User Information Forms*
- Sampling of metals and other parameters in biosolids
  - *Notice and Necessary Information*
- Monthly and semi-annual reports
- Groundwater sampling
- Odor management

NOTICE AND NECESSARY INFORMATION (NANI)

This form is to assist compliance with the bulk sewage sludge (biosolids) notification requirements [503.12(f)]. Please note, however, that if the biosolids meet the exceptional quality criteria, then the notification requirements do not apply. This form can be used by preparers of biosolids to transmit information to land appliers and also by land appliers to transmit information to land owners or lease holders.

Facility and Biosolids Type: Egan WRP, Centrifuge Cake Sample
Monitoring Period: From 6/ 1 / 11 **To** 6/ 30 / 11

To be Completed by PREPARERS of Biosolids

A. Please provide pollutant concentrations

Name	Concentration (mg/kg) Dry Weight	Pollutant Concentrations (Table 3, 40 CFR 503.13) (monthly average)	Ceiling Concentrations* (Table 1, 40 CFR 503.13) (daily maximum)
Arsenic	10	41 mg/kg	75 mg/kg
Cadmium	4	39 mg/kg	85 mg/kg
Copper	646	1500 mg/kg	4300 mg/kg
Lead	45	300 mg/kg	840 mg/kg
Mercury	1.366	17 mg/kg	57 mg/kg
Molybdenum	9	N/A**	75 mg/kg
Nickel	41	420 mg/kg	420 mg/kg
Selenium	<5	100 mg/kg	100 mg/kg
Zinc	725	2800 mg/kg	7500 mg/kg
Nitrogen Concentration	33,473	N/A	N/A

*Biosolids may not be land applied if any pollutant exceeds these values.
**EPA has temporarily removed molybdenum limits from Tables 2, 3 and 4 and has deleted chromium from all the Tables.

B. Pathogen Reduction (40 CFR 503.32) – Please indicate the level achieved and the alternative number or name

☐ Class A ☒ Class B

Alternative: #2 (40 CFR 503.32.B. 3)

C. Vector Attraction Reduction (40 CFR 503.33) – Please indicate the option performed

☒ Option 1 ☐ Option 2 ☐ Option 3 ☐ Option 4
☐ Option 5 ☐ Option 6 ☐ Option 7 ☐ Option 8
☐ No vector attraction reduction options were performed.

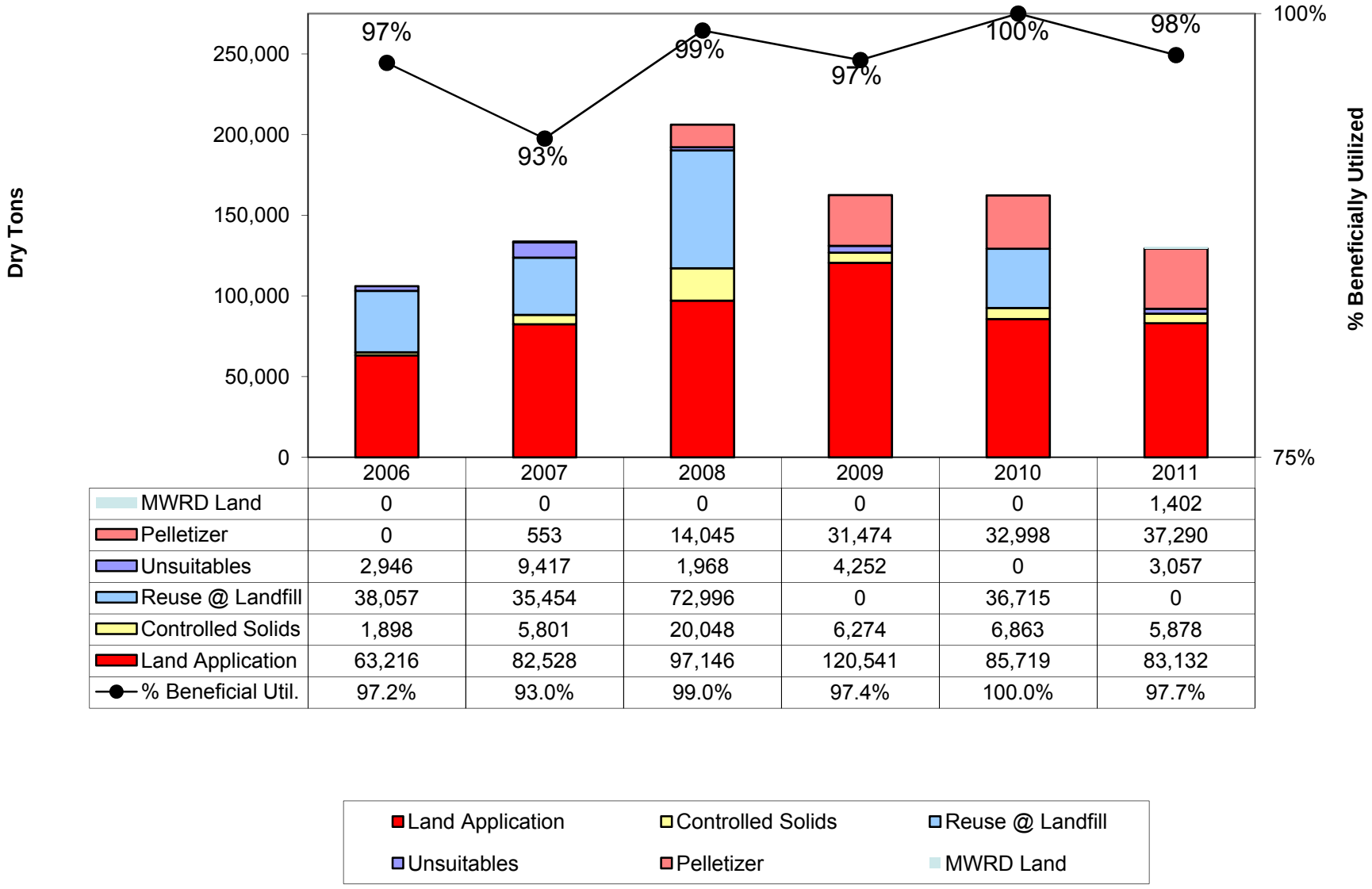
D. CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name and Official Title (*type or print*) Sergio E. Serafino, Assistant Director of M&O	B. Area Code and Telephone Number 312.751.5102
C. Signature	D. Date Signed

Updated 8/12/02

Biosolids Utilization 2006-2011



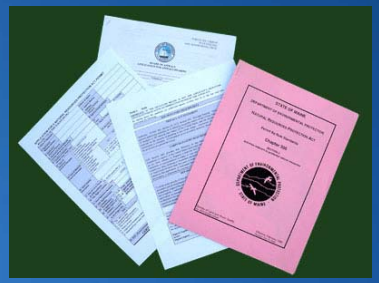
	2006	2007	2008	2009	2010	2011
MWRD Land	0	0	0	0	0	1,402
Pelletizer	0	553	14,045	31,474	32,998	37,290
Unsuitables	2,946	9,417	1,968	4,252	0	3,057
Reuse @ Landfill	38,057	35,454	72,996	0	36,715	0
Controlled Solids	1,898	5,801	20,048	6,274	6,863	5,878
Land Application	63,216	82,528	97,146	120,541	85,719	83,132
% Beneficial Util.	97.2%	93.0%	99.0%	97.4%	100.0%	97.7%

Permit Process (5-Year Cycle)

- Application for renewal (3 to 6 months prior to expiration)
  - *Seek input from Engineering, Law, M&R, and M&O Field Staff*
- Draft permit issued
  - *Public notice and/or public meeting*
  - *30-day comment period*
- Final Permit Issued
  - *30-day appeal period*
- "Permit as a Shield" clause
  - *Permit not issued prior to expiration*
  - *Operate under existing permit conditions*

Factors that May Impact Permits

- USEPA rule-making
- Citizen groups (Lawsuits)
- Political trends
- UAA
- Anti-degradation
- Impaired waterway lists (303d)
  - *Total Maximum Daily Loads (TMDLs)*
- Consent Decrees
- Long Term Control Plans
- Compliance Schedules
- Permit Violations
- Variances



Permit Video

Whole Effluent Toxicity (WET) Testing

Nick Kollias
Assistant Aquatic Biologist
Aquatic Ecology & Water Quality

Acknowledgment

Dr. Geeta Rijal
Auralene Glymph
Hemangini Shukla
Section 124

Regulatory Background

- Clean Water Act
  - CWA section 101(a)(3)
- National Pollutant Discharge Elimination System (NPDES)
  - 3 Approaches
    - *Chemical-Specific control*
    - *Biological criteria/Bioassessment*
    - ***Whole Effluent Toxicity***

What is WET Testing?

- Whole Effluent Toxicity (WET) Testing
  - "The aggregate toxic effect of an aqueous sample as measured by an organism's response upon exposure to the sample (e.g., Lethality, impaired growth or reproduction)"

What is WET Testing?

- Expose aquatic organisms to a range of effluent concentrations
  - 100%, 50%, 25%, 12.5%, 6.25%, 0% (control)
- Exposure ranges from 24hrs – 7 days
- Biological endpoints:
  - Survival
  - Growth
  - Reproduction

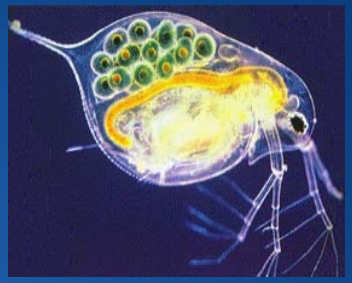
Why do we do WET Testing?

- Clean Water Act
- NPDES Permits
  - WQ criteria for only a few of the thousands of chemicals.
  - Toxicity of chemicals combined in effluent.
  - “The District is the #1 environmental organization in Chicagoland”

What organisms do we use?

- Fathead Minnows
  - (*Pimephales promelas)*
    - *7-14 days old*

- Waterfleas
  - (*Ceriodaphnia dubia)*
    - *<24 hours old*



- *Green Algae*
  - *(Selenastrum capricornutum)*

Types of WET Tests

- **Acute**
  - **Short-term**
- **Chronic**
  - **Long-term**
- **Static**
  - Static Non-Renewal
  - Static Renewal
- **Flow Through**

Acute

- **Endpoint**
  - Estimate the effluent concentration that is lethal to 50% of the test organisms. (LC_{50})
  - Estimate the “safe” or “no effect” concentration (NOEC)
- **Duration**
  - 24-96hrs
- **Test Acceptability Criteria (TAC)**
  - 90% survival in control

Chronic

- **Objective**
  - Estimate the toxicant concentration that would cause a 25% reduction in reproduction or growth (IC_{25})
  - Estimate the “safe” or “no effect” concentration (NOEC)

- **Duration**
  - 4 – 7 days

- **Test Acceptability Criteria (TAC)**
  - 80% survival in control
  - Average dry weight of fish ≥ 0.25mg (fish)
  - 60% produced 3rd brood in 7 ± 1 days (waterfleas)
    - *number of young must be ≥ 15*
  - Average cell density must ≥ 1 x 10^6 cells/mL (algae)
    - *Must not vary more than 20% among replicates*

Static Non-Renewal

- **Advantages**
  - Simple and inexpensive
  - Limited resources required
  - Smaller effluent sample required
- **Disadvantages**
  - Low dissolved oxygen may result
  - Possible loss of toxicants
  - Less sensitive

Static Renewal

- **Advantages**
  - Reduced possibility of dissolved oxygen depletion
  - Reduced possibility of loss of toxicants
  - Organisms fed (healthier)
- **Disadvantages**
  - Larger effluent sample volume required
  - Less sensitive than Flow-Through

Flow-Through

- **Advantages**
  - More representative evaluation
  - Dissolved oxygen is more easily maintained
  - Further reduced possibility of loss of toxicants
- **Disadvantages**
  - Greatest effluent sample volume required
  - More resources required
  - Difficult to perform multiple/overlapping tests

How do we do WET Testing?

- Coordinate collection of WRP final effluent
  - 5 grab samples 6hrs apart (24hr composite sample)
    - *0hr, 6hr, 12hr, 18hr, 24hr*
- Dilute effluent
  - Using HSW or MHSW
    - *100%, 50%, 25%, 12.5%, 6.25%, 0% (straight HSW)*
- Pour off 4 replicates of each concentration

How do we do WET Testing?

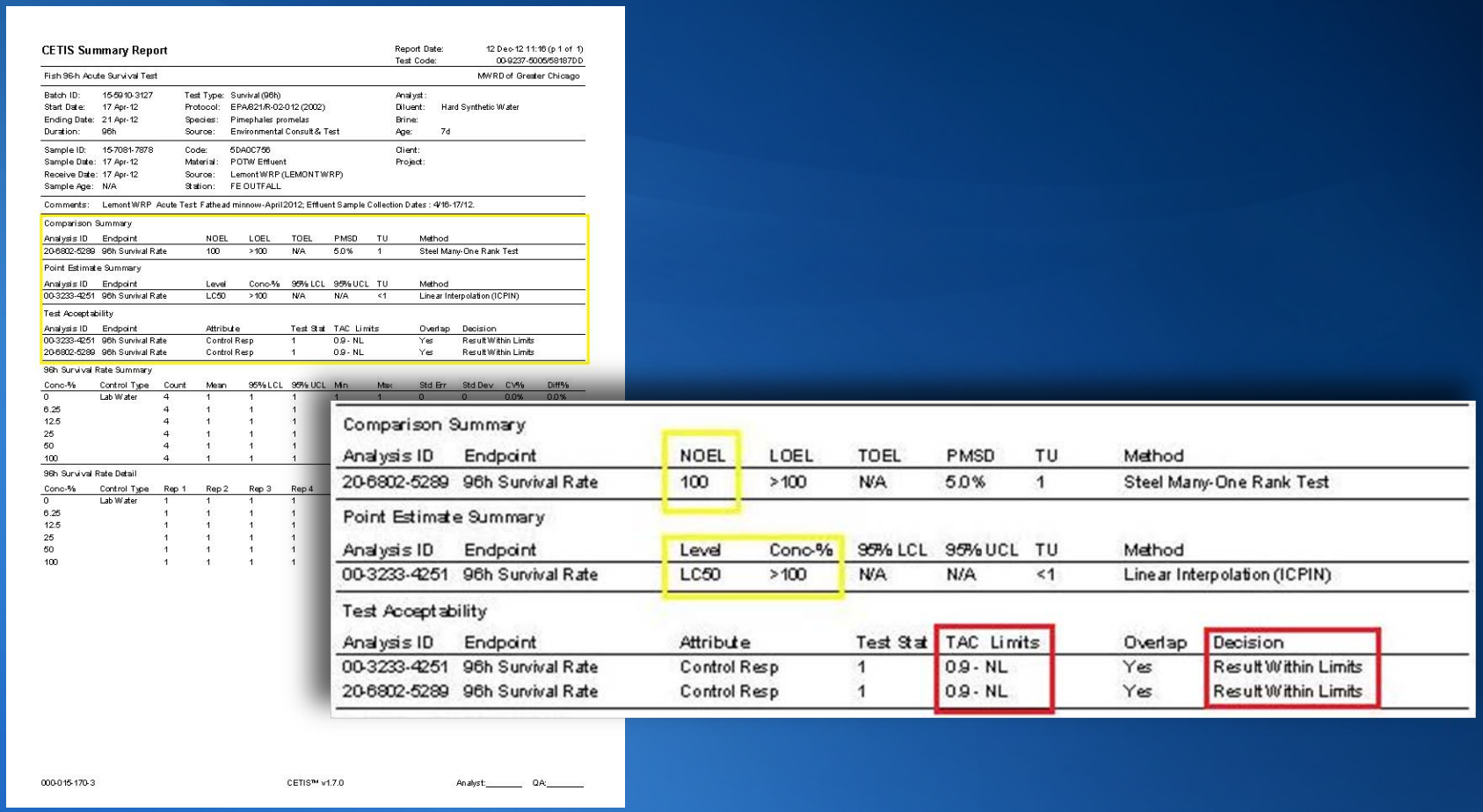
- Measure parameters
  - pH, dissolved oxygen, specific conductivity, Hardness, Alkalinity, Temperature, Total Ammonia, Residual Chlorine
- Randomize the cups
- Introduce organisms to samples
  - 5 organisms per replicate

- Introduce organisms to samples
  - 5 organisms per replicate
  - 4 replicates per concentration
  - 6 concentrations per test
  - 120 total organisms per test

How do we do WET Testing?

- Maintain/Renew/Count
  - Feed organisms 1hr before renewal
  - Replace 80% of the test solution
- Interpret data using statistical program
  - CETIS (Comprehensive Environmental Toxicity Information System)

Example CETIS Summary Report



CETIS Summary Report

Report Date: 12 Dec-12 11:16 (p 1 of 1)
Test Code: 00-9237-5005/58187DD

Fish 96h Acute Survival Test — MWRD of Greater Chicago

Batch ID:	15-5910-3127	Test Type:	Survival (96h)	Analyst:	
Start Date:	17 Apr-12	Protocol:	EPA/821/R-02-012 (2002)	Diluent:	Hard Synthetic Water
Ending Date:	21 Apr-12	Species:	Pimephales promelas	Brine:	
Duration:	96h	Source:	Environmental Consult & Test	Age:	7d
Sample ID:	15-7081-7878	Code:	5DA0C756	Client:	
Sample Date:	17 Apr-12	Material:	POTW Effluent	Project:	
Receive Date:	17 Apr-12	Source:	Lemont WRP (LEMONT WRP)		
Sample Age:	N/A	Station:	FE OUTFALL		

Comments: Lemont WRP Acute Test: Fathead minnow-April 2012; Effluent Sample Collection Dates : 4/16-17/12.

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
20-6802-5289	96h Survival Rate	100	>100	N/A	5.0%	1	Steel Many-One Rank Test

Point Estimate Summary

Analysis ID	Endpoint	Level	Conc-%	95% LCL	95% UCL	TU	Method
00-3233-4251	96h Survival Rate	LC50	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
00-3233-4251	96h Survival Rate	Control Resp	1	0.9 - NL	Yes	Result Within Limits
20-6802-5289	96h Survival Rate	Control Resp	1	0.9 - NL	Yes	Result Within Limits

96h Survival Rate Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water	4	1	1	1	1	1	0	0	0.0%	0.0%
6.25		4	1	1	1						
12.5		4	1	1	1						
25		4	1	1	1						
50		4	1	1	1						
100		4	1	1	1						

96h Survival Rate Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Lab Water	1	1	1	1
6.25		1	1	1	1
12.5		1	1	1	1
25		1	1	1	1
50		1	1	1	1
100		1	1	1	1

000-015-170-3 CETIS™ v1.7.0 Analyst:_____ QA:_____

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
20-6802-5289	96h Survival Rate	100	>100	N/A	5.0%	1	Steel Many-One Rank Test

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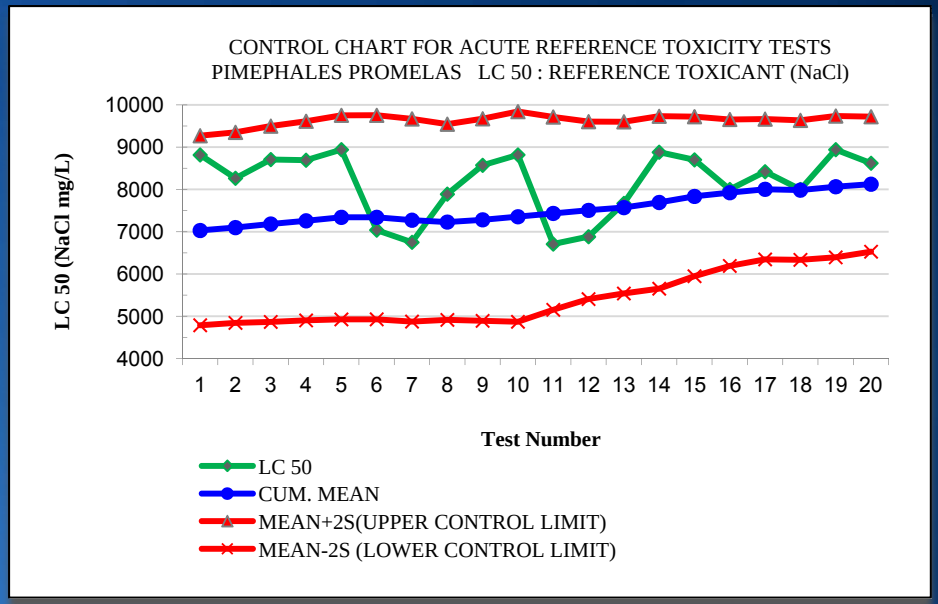
What if Toxicity is found?

- Toxicity Reduction Evaluation (TRE)
  - “a site specific study conducted in a stepwise process designed to identify the causative agents of effluent toxicity, isolate the sources of toxicity, evaluate the effectiveness of toxicity control options, and then confirm the reduction in effluent toxicity”
- Toxicity Identification Evaluation (TIE)
  - 3 phase approach
    - *Characterization*
    - *Identification*
    - *Confirmation*

How do we QC WET tests?

- Reference Toxicant Testing
  - NaCl
- Control Charts
  - (2S) of LC_{50} cumulative mean
- Used to determine
  - Quality of the test organisms
  - Ongoing laboratory performance



When do we Test?

- Determined by NPDES Permits
- Currently no tests are being run
  - Permits are expired/expiring
- Previous tests were conducted:
  - 18, 15, 12, and 9 months prior to expiration of permit

Resources

- US Environmental Protection Agency
  - http://water.epa.gov/scitech/methods/cwa/wet/
- “Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms”
  - Fifth Edition. EPA 821/R-02/012, U.S. EPA, October 2002
- “Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms”
  - Fourth Edition. EPA 821/R-02/013 U.S. EPA, October 2002
- “Technical Support Document for Water Quality Based Toxics Control”
  - Second Printing, EPA 505/2-90-001, U.S. EPA, March, 1991.
- “Understanding and Accounting for Method Variability in Whole Effluent Toxicity Applications Under the NPDES Program”
  - (EPA 833-R-00-003), (6/1/2000)


QUESTIONS?
Thank You...