

Discharge Monitoring Reports

Avoiding Common Mistakes

15 July 2020

Webinar Panel Discussion

with

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US EPA Office of Compliance Technical Assistance Webinar Series

- Introduction: Seth Heminway, US EPA Office of Compliance (heminway.seth@epa.gov)
- Webinar series supports the national EPA and state initiative to reduce noncompliance among CWA-NPDES permitted facilities. Focus is on helping wastewater system operators return their facilities to compliance, and those interested in fine-tuning their systems.
- The webinar will be recorded and circulated to all who registered.
- Certificates of attendance will be sent to those who have registered.

US EPA Office of Compliance Technical Assistance Webinar Series

- You will be in “listen only mode.”
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- Speakers do not necessarily reflect EPA positions or policy.
- Be sure to download the handouts.
- We strive for continuous improvement. Please complete the post webinar survey.

Discharge Monitoring Reports Definition - 40 C.F.R. 122.2

- The EPA uniform national form, including any subsequent additions, revisions, or modifications for the reporting of self-monitoring results by permittees. DMRs must be used by “authorized States” as well as by EPA. EPA will supply DMRs to any authorized State upon request. The EPA national forms may be modified to substitute the State Agency name, address, logo, and other similar information, as appropriate, in place of EPA’s.

Discharge Monitoring Reports Regulatory Requirements

- DMRs must be submitted by any facility that has been issued an NPDES permit that requires sampling and monitoring.
- 40 C.F.R. 122.41(I)(4) Monitoring results shall be reported at the intervals specified in the permit.
(typically monthly, quarterly, semi-annually or annually)
- As of December 21, 2016 all reports and forms submitted in compliance with this section must be submitted electronically by the permittee to the Director or initial recipient.

Permit Definitions and Requirements

- Always check your permit for DMR related definitions and requirements.
- Permit definitions and permit requirements can vary slightly from state to state.
- Sampling frequencies can vary for each parameter.
- Permit requirements can change when a permit is re-issued.
- Very important to read the permit to understand how to report the monitoring data.
- Check with your permitting authority, if you have questions on the permit definitions and requirements.

Monthly Average

- Example permit language:

“The average monthly (or 30-day) limitation, other than for microbiological organisms (e.g., bacteria, viruses, etc.), is the arithmetic mean of all samples collected during a calendar month (or consecutive 30-day period if applicable). Geometric means shall be calculated for microbiological organisms unless specified otherwise in the Permit. The calendar month shall be used for purposes of reporting self-monitoring data on discharge monitoring reports.”

Example

Monthly Average for March = the average of all samples taken between March 1 and March 31

Weekly Average

- Example permit language:

“The average weekly (or 7-day) limitation, other than for microbiological organisms (e.g., bacteria, viruses, etc.), is the arithmetic mean of all samples collected during a calendar week (or consecutive 7- day period if applicable). Geometric means shall be calculated for microbiological organisms unless specified otherwise in the Permit. The calendar week, which begins on Sunday and ends on Saturday, shall be used for purposes of reporting self-monitoring data on discharge monitoring reports. If a calendar week overlaps two months (i.e., the Sunday is in one month and the Saturday in the following month), the weekly average calculated for that calendar week shall be included in the data for the month that contains the Saturday.”

Example:

Weekly Average = average of samples taken Sunday through Saturday

Daily Maximum

- Daily Maximum (Daily Max.) is the maximum measured value for a pollutant discharged during a calendar day or any 24-hour period that reasonably represents a calendar day for purposes of sampling. For pollutants with daily maximum limitations expressed in units of mass (e.g., kilograms, pounds), the daily maximum is calculated as the total mass of pollutant discharged over the calendar day or representative 24-hour period. For pollutants with limitations expressed in other units of measurement (e.g., milligrams/ Liter, parts per billion), the daily maximum is calculated as the average of all measurements of the pollutant over the calendar day or representative 24-hour period. If only one measurement or sample is taken during a calendar day or representative 24-hour period, the single measured value for a pollutant will be considered the daily maximum measurement for that calendar day or representative 24-hour period.

Daily Maximum Examples

- Examples
- 1 sample take per day = Daily Maximum
- 2 samples taken per day. Average of samples = Daily Maximum
- 3 samples taken per day. Average of samples = Daily Maximum

- Three BOD samples taken on the same day:
 - 13 mg/L, 21 mg/L and 6 mg/L
 - Daily Max is the average of all samples taken. In this case the Daily Max for BOD is 13.3 mg/L.
 - Most permits require a max of one sample per day.

Detection Limits

- The detection limit of the analytical method used to generate the reported Sample Measurements must be equal to, or less than, the minimum level specified for the particular parameter in your Permit.
- If a minimum level for the parameter is not specified in your Permit, the detection limit of the analytical method used to generate the Sample Measurement Values must be equal to, or less than, the Permit limit.
- If the laboratory reports a trace amount, then the laboratory detection limit for the analytical procedure used to determine a trace amount preceded by the "<" sign shall be reported on the DMR.

Net-DMR allows you to include less than symbol (<)

00530	Solids, total suspended	Smpl.	=		=		lb/d	
1 - Effluent Gross							List	
Season: 0		Req.	Req Mon	30 Day Average	Req Mon	Daily Maximum	Pounds per Day	
NODI:		NODI						Day Average <=30.0
								30
00556	Oil & Grease	Smpl.						
1 - Effluent Gross								
Season: 0		Req.						
NODI:		NODI						
45613	Floating solids, waste or visible foam-visual	Smpl.			=		N=0;Y=1	
1 - Effluent Gross							List	
Season: 0		Req.			<=0.0	Instantaneous Maximum	No=0; Yes=1	
NODI:		NODI						
50060	Chlorine, total residual	Smpl.						
1 - Effluent Gross								
Season: 0		Req.						



Practical Quantification Limit (PQL)

- Practical Quantitation Limit (PQL) means the minimum concentration of an analyte (substance) that can be measured with a high degree of confidence that the analyte is present at or above that concentration. The method and procedures used to analyze for an effluent characteristic (e.g., cadmium) shall have a PQL no greater than specified in this table (e.g., PQL for cadmium no greater than 1 ug/L).
- **For purposes of this permit, analytical values less than the PQL shall be considered to be zero for purposes of determining averages. If all analytical results are less than the PQL, then "less than x", where x is the PQL, shall be reported on the Discharge Monitoring Report form. Otherwise, report the maximum observed value and the calculated average(s).**

PQL Example

Effluent Characteristic	Frequency	Sample Type <u>a/</u>	Practical Quantitation Limits, ug/L g/
Cadmium, Potentially Dissolved, ug/L <u>e/</u>	Monthly	Composite	1
Chromium, Hexavalent, Dissolved, ug/L	Monthly	Grab	20
Copper, Potentially Dissolved <u>e/</u>	Monthly	Composite	5
Mercury, Total, ug/L (low level) <u>f/</u>	Quarterly	Composite	0.003
Selenium, Potentially Dissolved, ug/L <u>e/</u>	Monthly	Composite	1
Silver, Potentially Dissolved, ug/L <u>e/</u>	Monthly	Composite	0.5
Zinc, Potentially Dissolved. ug/L <u>e/</u>	Monthly	Composite	10
Cyanide, Weak Acid Dissociable, ug/L <u>h/</u>	Monthly	Composite	5

Additional Monitoring

- If the permittee monitors any pollutant more frequently than required by this permit, using test procedures approved under 40 CFR 136, 40 CFR 503, or as specified in this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR. Such increased frequency shall also be indicated.

Effluent Characteristic	Frequency	Sample Type <u>a/</u>	Practical Quantitation Limits, ug/L g/
Total Flow, mgd <u>b/</u>	Continuously	Recorder	
Total BOD ₅ , mg/L <u>c/</u>	2/Week	Composite	
Total Suspended Solids, mg/L <u>c/</u>	2/Week	Composite	

Significant Digits

- Net-DMR allows you to enter 8 characters after the decimal point.
- If you enter more than 8 decimal places you will get a hard error in Net-DMR

Edit Check Errors

<u>Code</u>	<u>Name</u>	Monitoring Location	Season ID	Field	Type	Description
00530	Solids, total suspended	Effluent Gross	0	Quality or Concentration Sample Value 2	Hard	Cannot exceed ten characters, including up to eight digits and optional decimal point and +/- sign.

Rounding Numbers

- Suppose that we had a permit with a copper limit daily max limit of 1.1 mg/L:
 - 1) If the digit 6, 7, 8, or 9 is dropped, increase preceding digit by one unit
 - 1.06 mg/L should be rounded to 1.1 mg/L
 - 2) If the digit 0, 1, 2, 3, or 4 is dropped, do not alter the preceding digit.
 - 1.04 mg/L should be rounded to 1.0 mg/L
 - 3) If the digit 5 is dropped, round off preceding digit to the nearest even number.
 - 1.05 mg/L should be rounded to 1.0 mg/L
 - 1.15 mg/L should be rounded to 1.2 mg/L

Unit Conversions

- ppm = mg/L
- ppb = ug/L
- 1,000 ug/L = 1 mg/L
- Lab report
 - Cadmium 30 ug/L Selenium 3 ug/L
 - 30 ug/L / 1,000 = 0.03 mg/L 3 ug/L / 1,000 = 0.003 mg/L
- Net-DMR allows you to include different units in the drop down menu.

Unit Conversions

- Pollutant Loading = Concentration x FLOW X Conversion Factor
- Load (lbs/Day) = (mg/L) x (MGD) X (8.34 lbs/gal)

Tip: concentration unit always need to be in mg/L and flow needs to be in MGD

Example

- Calculate BOD monthly loading
- Monthly BOD concentration 27 mg/L
- Monthly Flow average 112,000 gallons/day Divide flow rate by 1,000,000 = 0.112 MGD
- Step 1 – Make unit conversions
- Step 2 – Insert Values in equation
- Pollutant Load = 27 mg/L x 0.112 MGD x 8.34 = 25.2 pounds/day

Lab Records to DMR

Validate Quality of Reported Data

- Select a month or two of recent data
- Follow the Data.....from the Bench Sheets to the Monthly Summary, and finally to the DMR
- The DMR must mirror the permit
 - (parameter, frequency, sample type and location, etc.)
- Run the calculations.....for each parameter !
- Evaluating the data management system and DMR reporting integrity
- Expand the review period if necessary

Permit Monitoring Requirements

Effluent Characteristic	Frequency	Sample Type <u>a/</u>	Practical Quantitation Limits, ug/L g/
Total Flow, mgd <u>b/</u>	Continuously	Recorder	
Total BOD ₅ , mg/L <u>c/</u>	2/Week	Composite	
Total Suspended Solids, mg/L <u>c/</u>	2/Week	Composite	
<i>E. coli</i> , no./100 mL	2/Week	Grab	
pH, units	Daily	Grab	
Oil and Grease, visual <u>d/</u>	Daily	Visual <u>d/</u>	
Ammonia Nitrogen, Total, mg/L	2/Week	Composite	

Permit Limits

Effluent Characteristic	Effluent Limitation		
	30-Day Average <u>a/</u>	7-Day Average <u>a/</u>	Daily Maximum <u>a/</u>
Flow, mgd	4.0	N/A	N/A
BOD ₅ , mg/L (Kg/day) <u>b/</u>	30 (454)	45 (681)	N/A
Total Suspended Solids, mg/L (Kg/day) <u>b/</u>	30 (454)	45 (681)	N/A
<i>E. Coli</i> , No./100 mL	126	252	N/A
Dissolved Oxygen, mg/L, Minimum <u>c/</u>	N/A	N/A	5.0 <u>c/</u>
Ammonia, Total (as N), mg/L	See Table 1	See Table 1	See Table 1

MONTHLY AVERAGE BOD CALCULATION

1st Week		
Sun	1-Jan	
Mon	2-Jan	40.6
Tue	3-Jan	
Wed	4-Jan	
Thu	5-Jan	57.1
Fri	6-Jan	
Sat	7-Jan	
Weekly Ave.		48.85
Round		48.8

2nd Week		
Sun	8-Jan	46.2
Mon	9-Jan	46.2
Tue	10-Jan	
Wed	11-Jan	
Thu	12-Jan	50.5
Fri	13-Jan	
Sat	14-Jan	
Weekly Ave.		48.35
Round		48.4

3rd Week		
Sun	15-Jan	
Mon	16-Jan	10.2
Tue	17-Jan	
Wed	18-Jan	
Thu	19-Jan	12
Fri	20-Jan	
Sat	21-Jan	
Weekly Ave.		11.1

4th Week		
Sun	22-Jan	
Mon	23-Jan	7.1
Tue	24-Jan	
Wed	25-Jan	
Thu	26-Jan	10.1
Fri	27-Jan	
Sat	28-Jan	
Weekly Ave.		8.6

5th Week		
Sun	29-Jan	
Mon	30-Jan	45.6
Tue	31-Jan	
Wed	1-Feb	
Thu	2-Feb	2
Fri	3-Feb	
Sat	4-Feb	
Weekly Ave.		23.8

Above monthly Average BOD limit of 30 mg/L

Monthly Average	31.044
Round	31.0

Thursday Feb 2 value not used in January monthly average because it was collected in February

WEEKLY AVERAGE BOD CALCULATION

1st Week		
Sun	1-Jan	
Mon	2-Jan	40.6
Tue	3-Jan	
Wed	4-Jan	
Thu	5-Jan	57.1
Fri	6-Jan	
Sat	7-Jan	
Weekly Ave.		48.85
	Round	48.8

2nd Week		
Sun	8-Jan	46.2
Mon	9-Jan	46.2
Tue	10-Jan	
Wed	11-Jan	
Thu	12-Jan	50.5
Fri	13-Jan	
Sat	14-Jan	
Weekly Ave.		48.35
	Round	48.4

3rd Week		
Sun	15-Jan	
Mon	16-Jan	10.2
Tue	17-Jan	
Wed	18-Jan	
Thu	19-Jan	12
Fri	20-Jan	
Sat	21-Jan	
Weekly Ave.		11.1

4th Week		
Sun	22-Jan	
Mon	23-Jan	7.1
Tue	24-Jan	
Wed	25-Jan	
Thu	26-Jan	10.1
Fri	27-Jan	
Sat	28-Jan	
Weekly Ave.		8.6

5th Week		
Sun	29-Jan	
Mon	30-Jan	45.6
Tue	31-Jan	
Wed	1-Feb	
Thu	2-Feb	2
Fri	3-Feb	
Sat	4-Feb	
Weekly Ave.		23.8

5th weekly average reported in February because last day of weekly average was in February

DAILY MAX BOD

1st Week		
Sun	1-Jan	
Mon	2-Jan	40.6
Tue	3-Jan	
Wed	4-Jan	
Thu	5-Jan	57.1
Fri	6-Jan	
Sat	7-Jan	
Weekly Ave.		48.85
Round		48.8

2nd Week		
Sun	8-Jan	
Mon	9-Jan	46.2
Tue	10-Jan	
Wed	11-Jan	
Thu	12-Jan	50.5
Fri	13-Jan	
Sat	14-Jan	
Weekly Ave.		48.35
Round		48.4

3rd Week		
Sun	15-Jan	
Mon	16-Jan	10.2
Tue	17-Jan	
Wed	18-Jan	
Thu	19-Jan	12
Fri	20-Jan	
Sat	21-Jan	
Weekly Ave.		11.1

4th Week		
Sun	22-Jan	
Mon	23-Jan	7.1
Tue	24-Jan	
Wed	25-Jan	
Thu	26-Jan	10.1
Fri	27-Jan	
Sat	28-Jan	
Weekly Ave.		8.6

5th Week		
Sun	29-Jan	
Mon	30-Jan	45.6
Tue	31-Jan	
Wed	1-Feb	
Thu	2-Feb	2
Fri	3-Feb	
Sat	4-Feb	
Weekly Ave.		23.8

BOD QC

- Blanks ≤ 0.2 mg/l
- Seed Controls ~50% depletion (i.e. 40-70% - SOP)
- GGA of 198 +/- 30.5 mg/l (15.4%)
- DO uptake due to seed in samples 0.6 - 1.0 mg/l
- Deplete at least 2 mg/l, with 1 mg/l remaining
- Watch for bacteriacidal effects

BOD QC

- **Supersaturated samples**
 - how do you figure ??? Cold samples or dilution water?
- **pH adjust to 6.5-7.5 (if not 6.0-8.0) and Cl2 check**
- **Run duplicates on the full range of dilutions**
- **Improper DO meter calibration**
- **Basic errors and not following method SOP or QA/QC**
 - daily GGA, water seal, not warming samples to 20⁰, no QC charts, etc.

Bench Sheets to DMR

BOD Example

- Inadequate duplicate
- Slight decrease in BOD as sample conc. increased
- Did not document Cl_2
- GGAs done per batch (do not average results)
- Good seed controls (though the math is difficult)
- Data moves well onto MORs and DMRs !
- Bench Sheet reflects CBOD for effluent

BK
 SET IT UP
 TOOK IT OFF

SET IT UP
 TOOK IT OFF

BOD WORKSHEET

**** CBOD ON EFFLUENT ****

TAKE OFF
 DAY Monday
 DATE 1/18/16

SAMPLING POINT	SAMPLE TYPE				SAMPLING DATE	SAMPLING TIME	DATE SET UP	TIME SET UP
	GRAB	12 HR COMP	24 HR COMP	SAMPLE I.D. #				
INFLUENT			✓	11	1-10-16 1-11-16	1200-1200	1-13-16	1045
PLANT EFFLUENT		✓		11	1-11-16	000-1200	1-13-16	1045

SAMPLE	BTL NO.	DILT N M/	DILT N %	INITL D.O.	FINL D.O.	D.O. DEP.	SEED CORRCT N	BOD Mg/L	AVG BOD Mg/L
BLANK	52	0	0	8.80	8.75	0.05			
BLANK	80	0	0	8.79	8.78	0.01			
RAW	88	6	.02	8.70	6.21	2.49		124.5	
RAW	85	9	.03	8.64	5.02	3.62		120.7	123
SEED	77	10	.40	8.80	6.72	2.08	.83		
SEED	89	15	.27	8.80	5.93	2.87	.77		
SEED	16	20	.20	8.80	5.45	3.35	.67		
SEED	17	25	.16	8.81	2.87	5.94	.95	.81	
EFF.	76	30	.10	8.84	7.31	1.53			
EFF.	93	150	.50	8.84	6.51	2.33	1.52	3.04	
EFF.	61	285	.95	8.84	5.35	3.49	2.68	2.82	
EFF.	19	285	.95	8.80	5.36	3.44	2.63	2.77	2.88
GGA									
GGA									

STANDARD METHODS 22nd Ed. 5210B (2012) Cl₂ RES. AT TIME OF ANALYSIS _____ mg/L

PLANT EFFLUENT COLLECTED AT OUTFALL NO. 001 pH at time of analysis 7.6 su

Disinfection inhibitor added to all Effluent, Seed control, and Glucose - glutamic acid bottles.

Mostly new Dilution water used. Probe Calibration 100% Pass
103.5% Slope
20.9% 29.18 initially @ 9:20 AM
1-13-16

TAKE OFF

BK SET IT UP
BK TOOK IT OFF

BOD WORKSHEET

DAY Monday
 DATE 1/18/16

**** CBOD ON EFFLUENT ****

SAMPLING POINT	SAMPLE TYPE				SAMPLING DATE	SAMPLING TIME	DATE SET UP	TIME SET UP
	GRAB	12 HR COMP	24 HR COMP	SAMPLE I.D. #				
INFLUENT			✓	12	1-11-16 1-12-16	1200 1200	1-13-16	1045
PLANT EFFLUENT		✓		12	1-12-16	000-1200	1-13-16	1045

SAMPLE	BTL NO.	DILT N M/	DILT N %	INITL D.O.	FINL D.O.	D.O. DEP.	SEED CORRECT N	BOD Mg/L	AVG BOD Mg/L
BLANK									
BLANK									
RAW	22	6	.02	8.69	5.61	3.08		154	
RAW	110	9	.03	8.63	3.73	4.90		163.3	159
RAW									
SEED	77	10	.40						
SEED	89	15	.27						
SEED	16	20	.20				(.81)		
SEED	17	25	.16						
EFF.	81	30	.10	8.82	7.38	1.50			
EFF.	78	150	.50	8.87	6.57	2.30	1.49	2.98	
EFF.	11	285	.95	8.90	5.76	3.14	2.33	2.45	
EFF.	24	285 _{dep}	.95	8.91	5.78	3.13	2.32	2.44	2.62
EFF.									

GGA	86	3	.01	8.84	5.94	2.90	2.09	209	
GGA	96	3	.01	8.83	5.78	3.05	2.24	224	217

STANDARD METHODS 22nd Ed. 5210B (2012) Cl₂ RES. AT TIME OF ANALYSIS _____ mg/L
 PLANT EFFLUENT COLLECTED AT OUTFALL NO. 001
 *Nitrification inhibitor added to all Effluent, Seed control, and Glucose - glutamic acid bottles. pH at time of analysis 7.6 - BK SU

note: GGA RPD is 6.9% RPD is calculated when only 2 results are compared

SAMPLE	BTL NO.	DILT N M/	DILT N %	INITL D.O.	FINL D.O.	D.O. DEP.	SEED CORRECT N
SEED	77	10	.40	8.80	6.72	2.08	.83
SEED	89	15	.27	8.80	5.93	2.87	.77
SEED	16	20	.20	8.80	5.45	3.35	.67
SEED	17	25	.16	8.81	2.87	5.94	.95
SEE							.81

- Easy way to determine seed correction factor
- Sum all the seed addition values (10+15+20+25 = 70 ml seed)
- Sum all the DO depletions (2.08+2.87+3.35+5.94 = 14.24 depletion)
- Divide total depletion by total seed (14.24 / 70 = 0.2034 mg/ml seed)
- Therefore, each ml of added seed depletes 0.2034 DO
- Multiply 0.2034 by amount of seed added to each sample bottle
- (0.2034 X 4 mls = 0.81 depletion attributable to the added seed)

$$\text{BOD}_5, \text{ mg/L} = \frac{(D_1 - D_2) - (S)V_s}{P}$$

where:

D_1 = DO of diluted sample immediately after preparation, mg/L,

D_2 = DO of diluted sample after 5 d incubation at 20°C, mg/L,

S = oxygen uptake of seed, Δ DO/mL seed suspension added per bottle (¶ 6d) ($S = 0$ if samples are not seeded),

V_s = volume of seed in the respective test bottle, mL, and

P = decimal volumetric fraction of sample used; $1/P$ = dilution factor.

- To calculate BOD per each sample bottle:
- $D_1 - D_2 = 8.90 \text{ mg/l} - 5.76 \text{ mg/l} = 3.14 \text{ mg/l}$
- $S = 0.2034 \text{ /ml} \times V_s$ (4 ml of seed per sample bottle) = 0.81 (seed CF)
- $P = 295 \text{ ml} / 300 \text{ ml DO bottle} = 0.95$ (dilution factor)
- Therefore, BOD is
- $3.14 - 0.81 / 0.95 = 2.33 / 0.95 = 2.45$

Plant Effluent

January 2016

Date	Flow	CBOD	#	TSS	#	NH3	#	pH	Fecal	Cl2 Res
1	3.76	2.10	65.85	4.70		4.89		7.20		
2	3.64							7.20		
3	3.51							7.20		
4	3.40	2.00	56.71	4.00		0.92		7.10		
5	3.65	2.00	60.98	4.00		0.75		7.10		
6	3.99	2.20	73.21	5.00		0.75		7.10		
7	4.80	3.00	120.10	5.00		0.75		7.10		
8	4.44	4.00	148.12	5.30		0.75		7.10		
9	4.65							7.10		
10	3.93							7.10		
11	3.34	2.90	80.78	5.30		0.75		7.20		
12	3.49	2.60	75.68	5.00		0.75		7.20		
13	3.55	2.60	76.98	5.00		0.75		7.20		
14	3.54	2.40	70.86	4.70		0.75		7.20		
15	3.19	3.20	85.13	5.00		0.75		7.20		
16	3.45							7.20		
17	3.22							7.20		
18	3.50	3.30	96.33	4.70		0.75		7.20		
19	3.12	3.00	78.06	5.70		0.75		7.20		
20	3.50	2.80	81.73	5.30		0.75		7.20		
21	3.38	3.00	84.57	4.00		0.90		7.10		
22	3.69	2.90	89.25	4.00		0.75		7.10		
23	4.98							7.20		
24	4.00							7.20		
25	3.43	2.60	74.38	5.70		1.09		7.10		
26	3.14	4.00	104.75	5.70		0.75		7.20		
27	3.45	2.40	69.06	4.00		0.75		7.20		
28	3.43	2.40	68.65	4.00		0.75		7.20		
29	3.85	2.70	86.69	4.70		0.75		7.10		
30	4.85							7.20		
31	3.95							7.20		
Total	115.82	58.10	✓	100.80	✓	20.55				
Avg	3.74	2.77	✓	4.80	✓	0.98				
Max	4.98							7.20	✓	0.00
Min								7.10	✓	
G.Mean										#NUM!

✓ $\sum_{i=1}^{21} = 1747.77 / 21 = 83.23$

Plant Effluent**January 2016**

Date	CBOD #	TSS #	NH3 #
1	65.85	147.38	153.34
2	0.00	0.00	0.00
3	0.00	0.00	0.00
4	56.71	113.42	26.09
5	60.88	121.76	22.83
6	73.21	166.38	24.96
7	120.10	200.16	30.02
8	148.12	196.26	27.77
9	0.00	0.00	0.00
10	0.00	0.00	0.00
11	80.78	147.63	20.89
12	75.68	145.53	21.83
13	76.98	148.04	22.21
14	70.86	138.76	22.14
15	85.13	133.02	19.95
16	0.00	0.00	0.00
17	0.00	0.00	0.00
18	96.33	137.19	21.89
19	78.06	148.32	19.52
20	81.73	154.71	21.89
21	84.57	112.76	25.37
22	89.25	123.10	23.08
23	0.00	0.00	0.00
24	0.00	0.00	0.00
25	74.38	163.06	31.18
26	104.75	149.27	19.64
27	69.06	115.09	21.58
28	68.65	114.42	21.45
29	86.69	150.91	24.08
30	0.00	0.00	0.00
31	0.00	0.00	0.00
Total	1747.76	3027.19	621.73
Avg	83.23	144.15	29.61

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

Form Approved
OMB No. 2040-0004

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

NAME: [REDACTED]
ADDRESS: [REDACTED]
FACILITY: [REDACTED]
LOCATION: [REDACTED]

OKC [REDACTED]	001-A
PERMIT NUMBER	DISCHARGE NUMBER
MONITORING PERIOD	
MM/DD/YYYY	MM/DD/YYYY
01/01/2016	01/31/2016

DMR Mailing ZIP CODE: 74602
MAJOR \$
(SUBR MNM)
Treated Wastewater
External Outfall

No Discharge

ATTN: [REDACTED] Env Svcs Dir

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
pH	SAMPLE MEASUREMENT	*****	*****	*****	7.1	*****	7.2	su	0	01/01	GR
00400 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	6.5 MINIMUM	*****	9 MAXIMUM	SU	0	Daily	GRAB
Solids, total suspended	SAMPLE MEASUREMENT	144.15	*****	lb/d	*****	4.80	5.00	mg/L	0	05/WK	12
00530 1 0 Effluent Gross	PERMIT REQUIREMENT	1626.3 MO AVG	*****	lb/d	*****	.30 MO AVG	.45 WKLY AVG	mg/L	0	Five per Week	COMP12
Nitrogen, ammonia total (as N)	SAMPLE MEASUREMENT	29.61	*****	lb/d	*****	0.98	2.35	mg/L	0	05/WK	12
00610 1 0 Effluent Gross	PERMIT REQUIREMENT	433.7 MO AVG	*****	lb/d	*****	8 MO AVG	12 WKLY AVG	mg/L	0	Five per Week	COMP12
Flow, in conduit or thru treatment plant	SAMPLE MEASUREMENT	3.74	*****	MGD	*****	*****	*****	*****	0	99/99	TM
50050 1 0 Effluent Gross	PERMIT REQUIREMENT	Req. Mon. MO AVG	*****	MGD	*****	*****	*****	*****	0	Continuous	TOTALZ
Chlorine, total residual	SAMPLE MEASUREMENT	*****	*****	*****	*****	*****	0	mg/L	0	CL/OC	GR
50060 A 0 Disinfection, Process Complete	PERMIT REQUIREMENT	*****	*****	*****	*****	*****	.069 INST. MAX	mg/L	0	Daily	GRAB
BOD, carbonaceous, 05 day, 20 C	SAMPLE MEASUREMENT	83.23	*****	lb/d	*****	2.77	3.00	mg/L	0	05/WK	GR
80082 1 0 Effluent Gross	PERMIT REQUIREMENT	975.8 MO AVG	*****	lb/d	*****	18 MO AVG	27 WKLY AVG	mg/L	0	Five per Week	COMP12

WATER QUALITY DIVISION

FEB 1 0 2016

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER [REDACTED], Ph.D. Environmental Services Director TYPED OR PRINTED	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 to me, 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.	SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT [REDACTED]	TELEPHONE	DATE
			580 763-8093 ARBA Code NUMBER	02/08/2016 MM/DD/YYYY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)
When discharging, S-21202
No chlorine residual tests performed due to no chlorine use during reporting period.

ENTERED FEB 25 2016

TSS QC

- **Proper sample aliquot volume**
 - Sample volume must yield 2.5 to 200 mg wt. increase
- **Repeat the cycle of dry, desiccate, weigh**
 - (weigh within 0.5 mg)
- **Three successive washes**
 - twice: for prep (unless certified pre-weighed) for sample
- **Filter is the wrong pore size (0.7 to 1.5 um) or type**
- **Dups, 1-liter blanks, and QC charting**
- **Laboratory Fortified Blank (LFB std.) (Celite per SM 2540 A) and daily balance check**

Bench Sheets to DMR

TSS Example (done right)

- **Weighed the prepped filter twice**
- **Sufficient sample volume**
 - Ran 1 liter sample and achieved 2.5 mg/l weight increase
- **Pollutant Conc. and Loading correctly calculated**
- **Repeated cycle of drying and weighing**
- **Ran a liter blank**
- **Ran dups and did not average the QC result**

CENTRAL LABORATORY SUPPORT SERVICES
TOTAL SUSPENDED SOLIDS

Don't use cup!!!

STAGE	PI	PI Dup.	PE1	PE2	FE001	FE001 Dup.	BXUB	BXUA
Dish #	1	2	3	4	5	6	7	8
ml Sx	30	30	40	50	1000	1000	2000	2000
Ash Wt.	1.1080	1.1052			1.1022	1.0972 *	1.2043	1.1090
Dry wt. 2	1.1123	1.1097	1.1137	1.1154	1.1047 ²	1.1005 ²	1.2125	1.1143
Dry wt. 1	1.1123	1.1097	1.1137	1.1154	1.1047 ²	1.1004 ¹	1.2125	1.1143
Dish Wt. 2					1.1022 ²	1.0971		
Dish Wt. 1	1.1042	1.1014	1.1068	1.1101	1.1023 ¹	1.0971 *	1.2014	1.1070
Res Wt.	0.0081	0.0083	0.0069	0.0053	0.0025	0.0034	0.0111	0.0073
mg/L	270	277	172	106	2	3	6	4
Vol Wt.	0.0043	0.0045			0.0025	0.0033	0.0082	0.0053
% Vol	53.1	54.2			100.0	97.1	73.9	72.6
Avg mg/L	273				100.0			
Avg % Vol	54				99			

Rounding

AA#	SE 3	EF 1	SE 1	PPD 3	BKWS OVFL	SOLF	Solf Dup.	BLANK
STAGE	8	10	11	12	13	14	15	16
Dish #	500	1000	500	100	100	50	50	1000
Ash Wt.								1.1393
Dry wt. 2	1.1128	1.1129	1.0979	1.1159	1.1082	1.1165	1.1138	1.1395
Dry wt. 1	1.1127	1.1129	1.0979	1.1159	1.1083	1.1165	1.1138	1.1395
Dish Wt. 2								1.1394
Dish Wt. 1	1.1078	1.1118	1.0925	1.1025	1.1034	1.1030	1.1004	1.1395
Res Wt.	0.0050	0.0011	0.0054	0.0134	0.0048	0.0135	0.0134	-0.0002
mg/L	10	<2	11	134	48	270	268	<2
Vol Wt.		0.020102						0.0002
% Vol								-
Avg mg/L								
Avg % Vol								

AA#	PT01	PT02	PT03	PT04	PPD1	PPD2	BOX C	BOX EE
STAGE	17	18	19	20	21	22	23	24
Dish #	25	25	25	20	8	50	15	20
ml Sx								
Ash Wt.								
Dry wt. 2	1.1033	1.1059	1.1060	1.1032	1.1092	1.1022	1.1101	1.1032
Dry wt. 1	1.1032	1.1059	1.1059	1.1032	1.1092	1.1023	1.1101	1.1032
Dish Wt. 1	1.0990	1.1020	1.1021	1.1001	1.1010	1.0992	1.1037	1.0980
Res Wt.	0.0043	0.0039	0.0039	0.0031	0.0082	0.0030	0.0064	0.0052
mg/L	172	156	156	155	1025	60	427	260
Vol Wt.								
% Vol								

Sample Date 1/31/02
Date Analyzed 2/1/02

Analyst JLL
Time 11:00

Cal Wt. 1.0000 g _____
Wt. 5.0000 g _____
Wt. 10.0000 g _____
Balance ID AT 250

1.0000
5.0000
10.0000

Standard Methods 2540 D

*BXUA has high solids
BXUB has very high solids
sho20102*

STAGE	BLANK
Dish#	26
ml Sx	1000
Ash Wt.	1.1335
Dry Wt. 2	1.1336
Dry Wt. 1	1.1337
Dish Wt. 2	1.1337
Dish Wt. 1	1.1338
Res St.	-0.0001
mg/L	<2
	#DIV/0!

MONTH: JAN 02
1-1-1-02

CITY



WATER DEPARTMENT-WASTEWATER TREATMENT
WASTEWATER TREATMENT PLANT
FINAL EFFLUENT-NPDES PERMIT NO. TX

Complete MOR

DAY	RAW BACKCAL MGD	CBOD mg/L	CBOD POUNDS	pH	CI RES. BEFORE	CI RES. AFTER	SETT. SOLIDS mg/L	FECAL COLI. NO./100	TSS mg/L	TSS POUNDS	AMMONIA mg/L	AMMONIA POUNDS	DISSOLVED OXYGEN mg/L
1	81.3 <	2	1356	7.0	1.1	0.0	^	0.1	2	1356	^	68	7.4
2	85 <	2	1418 ✓	6.9	1.6	0.0	^	0.1	2	1418	^	71	7.6
3	88.4	2	1475	7.2	1.4	0.0	^	0.1	4	1475	^	74	7.7
4	89.7 <	2	1496	7.0	1.5	0.0	^	0.1	5	1496	^	75	7.2
5	89.8			7.1	1.5	0.0			9				7.2
6	87.6			7.0	1.6	0.0							6.9
7	87.5	2	1460	7.0	1.6	0.0	^	0.1	2	1460	^	73	7.2
8	86.8	3	2172	7.0	1.3	0.0	^	0.1	5	1448	^	72	7.1
9	85.9 <	2	1433	7.0	1.2	0.0	^	0.1	1	1433	^	72	7.9
10	85.3	2	1423	7.0	1.5	0.0	^	0.1	9	1423	^	71	7.4
11	86.3	2	1439	7.0	1.1	0.0	^	0.1	2	1439		216	6.8
12	86.7			7.0	1.6	0.0							8.2
13	85.1			7.0	1.4	0.0							7.0
14	87	2	1451	6.9	1.3	0.0	^	0.1	2	1451	0.80	580	7.0
15	86.7	2	1446	7.0	1.4	0.0	^	0.1	4	1446	0.20	145	7.3
16	85.8	2	1431	7.1	1.3	0.0	^	0.1	10	1431	0.15	107	7.1
17	84.4	2	1408	7.0	1.3	0.0	^	0.1	3	1408	0.11	77	7.8
18	83.6	2	1394	7.0	1.4	0.0	^	0.1	3	1394	^	70	7.5
19	85.8			7.0	1.2	0.0							7.9
20	83.7			7.0	1.2	0.0							7.9
21	85.2 <	2	1421	7.0	1.3	0.0	^	0.1	2	1421	^	71	8.8
22	83.6 <	2	1394	7.1	1.8	0.0	^	0.1	6	1394	^	70	7.5
23	84.6 <	2	1411	7.0	1.3	0.0	^	0.1	10	1411	^	71	6.9
24	102	2	1701	7.0	1.4	0.0	^	0.1	4	1701	^	85	7.3
25	94.5 <	2	1576	7.0	1.3	0.0	^	0.1	13	1576	^	79	7.5
26	91.4			7.1	1.5	0.0							7.7
27	87.1			7.0	1.4	0.0							7.6
28	87.7 <	2	1463	7.2	1.1	0.0	^	0.1	68	1463	^	73	7.4
29	87.8	2	1465	7.0	1.3	0.0	^	0.1	40	1465	^	73	7.0
30	88.4	2	1475	7.1	1.2	0.0	^	0.1	51	1475	^	74	7.3
31	249.4	3	6240	6.9	1.4	0.0	^	0.1	350	4160	^	208	8.0
SD	28.9	0	983	0.1	0.2	0.0	0.0	74	0	556	0.15	108	0.4
MIN	81.3	2	1356	6.9	1.1	0.0	0.1	1	2	1356	0.10	68	6.8
MAX	249.4	3	6240	7.2	1.8	0.0	0.1	350	2	4160	0.80	580	8.8
SUM	2864.1	48	38948	217.7	42.5	0.0	2.3	608	46	36144	3.36	2574	231.1
AVG	92.4	2	1693	7.0	1.4	0.0	0.1	29	2	1571	0.15	112	7.5

*Take the Self Review
Use MOR → DMR
call me!!*

*don't use the dup.
" avg " "
Dup is for QC!!!
Learn by Doing!*

NAME
ADDRESS

DISCHARGE MONITORING REPORT (DMR)

PERMIT NUMBER

001 A
DISCHARGE NUMBER

ATTN:

FROM YEAR MO DAY TO YEAR MO DAY
02 1 1 TO 02 1 31

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
OXYGEN, DISSOLVED (DO)	SAMPLE MEASUREMENT				6.8			(19)			
EFFLUENT GROSS VALUE	PERMIT REQUIREMENT				6			MG/L		DAILY	GRAB
PH	SAMPLE MEASUREMENT				6.9		7.2	(12)			
EFFLUENT GROSS VALUE	PERMIT REQUIREMENT				6		9.0			DAILY	GRAB
SOLIDS, TOTAL SUSPENDED	SAMPLE MEASUREMENT	1571		(26)		2	2	(19)			
EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	20767		LBS/DY		15	40	MG/L		5 TIME/WEEK	COMP
NITROGEN AMMONIA	SAMPLE MEASUREMENT	112		(26)		0.15	0.80	(19)			
TOTAL (AS N)	PERMIT REQUIREMENT	2769		LBS/DY		2	7	MG/L		5 TIMES/WEEK	COMP
EFFLUENT GROSS VALUE	SAMPLE MEASUREMENT			(26)		0		(19)			
MALATHION	PERMIT REQUIREMENT	REPORT		LBS/DY		REPORT	REPORT	MG/L		ONCE/MONTH	COMP24
EFFLUENT GROSS VALUE	SAMPLE MEASUREMENT			(26)		0		(19)			
DIAZINON	PERMIT REQUIREMENT	REPORT		LBS/DY		REPORT	REPORT	MG/L		ONCE/MONTH	COMP24
EFFLUENT GROSS VALUE	SAMPLE MEASUREMENT			(26)				(19)			
FLOW, IN CONDUIT THRU TREATMENT PLANT	PERMIT REQUIREMENT	REPORT		LBS/DY		REPORT	REPORT	MG/L		ONCE/MONTH	COMP24
SEE COMMENTS BELOW	SAMPLE MEASUREMENT		217291.7	(78)							
	PERMIT REQUIREMENT		256250	GPM						CONTINUOUS	TOTAL

P = 2-HOUR PEAK FLOW.

DISCHARGE MONITORING REPORT (DMR)

PERMIT NUMBER

001 A
DISCHARGE NUMBER

ATTN:

FROM YEAR MO DAY TO YEAR MO DAY
02 1 1 TO 02 1 31

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
FLOW, IN CONDUIT THRU TREATMENT PLANT	SAMPLE MEASUREMENT	103.8		(03)							
	PERMIT REQUIREMENT	166 ANNL AVG		MGD						CONTIN OUS	TOTAL
FLOW, IN CONDUIT THRU TREATMENT PLANT	SAMPLE MEASUREMENT	92.4	249.4	(03)							
	PERMIT REQUIREMENT	REPORT DAILY AV	REPORT DAILY MX	MGD						CONTIN OUS	TOTAL
CHLORINE, TOTAL RESIDUAL	SAMPLE MEASUREMENT						0	(19)			
	PERMIT REQUIREMENT						0.099 INST MAX	MG/L		DAILY	GRAB
CHLORINE, TOTAL RESIDUAL	SAMPLE MEASUREMENT				1.1			(19)			
	PERMIT REQUIREMENT				1 MONTH MN			MG/L		DAILY	GRAB
BOD, CARBONACEOUS 5 DAY, 20C	SAMPLE MEASUREMENT	1693		(26)		2	3	(19)			
	PERMIT REQUIREMENT	9691 DAILY AV		LBS/DY		7 DAILY AV	17 DAILY MX	MG/L		5 TIME/ WEEK	COMP
EFFLUENT GROSS VALUE	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										

Monthly Summary Table

nicely organized example

Permit requirements:

BOD and TSS

3 times per week

pH, TRC, flow, and DO

5 times per week

Fecal coliform

2 times per week

File Home Insert Page Layout Formulas Data Review View Power Pivot Tell me what you want to do...

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B I U A

General

Normal Bad Good Neutral

Check Cell Explanatory ... Input Linked Cell

	A	B	C	D	E	F	G	H	I	J	K
		FLOW DATA	BOD conc	TSS conc	in MGD Flow	BOD loadings	TSS Loadings	pH Values	DO Minimum	Chlorine Maximum	Fecal Coliform
	Day	Day	conc	conc	Flow	loadings	Loadings	Values	Minimum	Maximum	Coliform
4	Sunday	1									
5	Monday	2	20	37	1.1			7.3	5.6	1.1	25
6	Tuesday	3			1.1			7.2	6	0.09	
7	Wednesday	4	26	40	1.2			6.8	6	0.08	200
8	Thursday	5			1.3			6.8	6	0.07	
9	Friday	6	30	41	1.4			6.7	6	0.05	
10	Saturday	7									
11	Sunday	8									
12	Monday	9	25	28	1.2			7	7	0.03	45
13	Tuesday	10			1.3			7.1	7	0.03	
14	Wednesday	11	28	27	1.2			7	7	0.03	300
15	Thursday	12			1.3			7.1	7	0.03	
16	Friday	13	27	24	1.4				7	0.03	
17	Saturday	14									
18	Sunday	15									
19	Monday	16	17	26	1.4			7	5.4	0.04	62
20	Tuesday	17			1.5			6.8	5.6	0.04	
21	Wednesday	18	15	27	1.6			6.6	5.7	0.04	2
22	Thursday	19			1.4			6.4	5.6	0.04	
23	Friday	20	12	32	1.3			6.3	5.4	0.04	
24	Saturday	21									
25	Sunday	22									
26	Monday	23	15	65	1			6.5	7	0.06	
27	Tuesday	24			1.1			6.7	7.4	0.06	150
28	Wednesday	25	invalid	invalid	1.2			6.9	7.3	0.06	
29	Thursday	26			1.1			7.1	7.5	0.06	1
30	Friday	27	14	45	1.3			7.5	7.4	0.06	
31	Saturday	28									
32	Sunday	29									
33	Monday	30									
34	Tuesday	31									
35											
36											
37											
38											

TSS

Example 2

Out of Control Sample Analysis Results

- Sample was 8.4 mg/l and duplicate was 2.0 mg/l
- Standard Deviation outside control limit - 4.5
 - -RPD was 123%
 - Guess what probably happened between 1st and 2nd weighing
- Other Issues:
 - Must increase sample volume (<2.5 mg wt. increase)
 - Do Not Averaged sample result with the dup
 - Should run a liter blank
 - 2nd weighing not stable at <0.5 mg increase
 - Prepped filter not re-weighed

Sampler JLY/HJT
Analyst JLY/HJT

WWTP

	Blank	Effluent	Effluent	Time	Flow	Sample
Filter #		1	2	10:00	0.661	0.273
volume filtered	100ml	250ml	250ml	11:00	0.591	0.244
weight 1	0.1131	0.1135	0.1143	12:00	0.569	0.235
weight 2	0.1131	0.1105	0.1105	13:00	0.565	0.233
difference	0	0.0030	0.0038	14:00	0.461	0.190
wt. Of filter	0.1131	0.1084	0.1100	15:00	0.265	0.109
wt. Of residue	0	0.0021	0.0005	total	3.112	1.285
Tss mg/l		8.4	0	average	0.518667	3.112

SampleDate: 7/25/01

collection Data factor 1.285347

Averages effluent 5.2

Duplicate % N/A

Concentration composite average flow
3.4 0.588
3 0.525
2.2 0.096

Average monthly loading

Loading
16.673328
13.1355
1.761408
0
7.892559

Type of sample: 6hr comp
Location sampled man 1 & 4
collection period 10:00-15:00
desired mls 4
drying data:
1st in 9:15 7/26/01
1st out 11:58 7/26/01
2nd in 12:55 7/26/01
2nd out 1:53 7/26/01

Reference:
Standard Method
18th edition 2540.D

Note that the weights are shown in grams

TSS Sample results on 7/25/2001
were 8.4 mg/l and 2.0 mg/l

Control Limits for Charting sets upper limit of
3 Standard Deviations

$$\begin{aligned} \text{Std Deviation} &= \sqrt{\frac{\sum (x - \bar{x})^2}{n-1}} \\ &= \sqrt{\frac{(8.4-5.2)^2 + (2-5.2)^2}{1}} \\ &= 4.5 \end{aligned}$$

Relative Percent Difference (RPD) –

a measure of precision: $\text{sample} - \text{dup} / \text{sample} + \text{dup} / 2 \times 100$

$$6.4 / 10.4 / 2 \times 100 = 123\% \text{ (want } < 10\% \text{ per SM 2540A.5.QC)}$$

Questions ?

NetDMR Zendesk Resources (Demo)

Resources available on NetDMR Zendesk

<https://netdmr.zendesk.com/hc/en-us>:

- Regional contact information
- Training materials (videos, ppt, webinar)
- Password/ User ID reset
- User guide/ Templates
- Training Schedule

NetDMR Users Support Contact Information

EPA (NPDES eReporting) Helpdesk (recommended)

- *Email:* NPDESeReporting@epa.gov
- *Phone:* 1-877-227-8965
- *Issues with CDX and NetDMR:* Creating account in CDX, changing email address/Organization only, requesting access to permit (DAR/RO), submitting DMRs

CDX Help Desk

- *Email:* helpdesk@epacdx.net
- *Phone:* 888-890-1995
- ONLY If user's require name change (first and last)