

Rhode Island Department of Environmental Management

***2011
Rhode Island Pollutant Discharge Elimination System (RIPDES)
Discharge Monitoring Report (DMR)
Instructions***

***Rhode Island Department of Environmental Management
RIPDES Program
235 Promenade Street
Providence, RI 02908***

CHAPTER I: INTRODUCTION TO DMR FORM

DMRs should be reviewed carefully so that permittees ensure that the pre-printed DMRs are consistent with the sampling and reporting requirements listed in the formal permit document and so that the permittees familiarize themselves with the reporting requirements. It is important to check the pre-printed information (i.e. discharge number, monitoring period, parameter, permit limits, sampling frequency, etc) and, if there are any discrepancies between the DMRs and the RIPDES permit, contact the RIPDES Program at 222-4700. After reviewing the DMRs for completeness, be sure to read these instructions to be certain you understand your reporting obligations.

If the DMRs include two (2) sets of monitoring requirements to cover different production schemes or climatic considerations for the same discharge point (outfall/pipe), the permittee is required to submit all DMRs for that discharge point (outfall/number). The permittee must report quantitative data on the applicable DMR form and merely indicate "NO DISCHARGE" on the DMR forms that do not apply for the given reporting period by checking the box at the top right of the form.

Description of the preprinted DMR form:

1. Permittee Name/Address/Facility/Location

Verify that the correct corporate/municipal name and mailing address and correct facility name and location appears in the top left corner of the DMR.

2. Permit Number

Verify that the correct RIPDES permit number appears in the Permit Number block. All correspondence regarding the facility, including DMRs and report submissions, must prominently display the permit number.

3. Discharge Number (Outfall/Pipe)

A separate DMR form has been printed for each monitoring period and for each Discharge Number (Outfall/Pipe). The Monitoring Period is printed in the boxes below the permit and discharge number boxes. This refers to the beginning and ending dates for the monitoring period. Verify that you are reporting data on the DMR for the correct Discharge Number (outfall/pipe) and the correct Monitoring Period.

4. Parameter Column

The boxes in the column at the far left of the DMR contain the name, description, and computer identification numbers of each pollutant parameter that must be reported. Seasonal parameters are only included on the DMRs for the monitoring period stipulated in the permit. Parameters that must be reported less frequently than monthly (i.e., quarterly, semi-annually, etc.) will be included in the DMRs for the last month of the reporting period. However, sampling for these parameters may be performed any time during the reporting period, unless otherwise specified in your permit. Verify that these parameters reflect your RIPDES permit requirements.

5. Permit Requirement Row

The permit requirement row lists the permit effluent limit for each parameter and the statistical basis on which the information must be reported (i.e., average monthly, maximum daily, etc). If the parameter is not limited, but monitoring is required, the DMR lists the words "Req. Mon. " followed by a narrative description of the statistical basis on which the information must be reported. The permit requirement row also lists the units (i.e., mg/l, ug/l, etc.) in which the sample measurement values must be reported, the frequency of analysis, and sample type specified for each parameter. Verify that the information contained in the permit requirement row for each parameter reflects your RIPDES permit requirements.

6. Sample Measurement Row

The results of sample analyses conducted during the monitoring period must be reported in the sample measurement rows. If a box contains asterisks, "*****", sample measurements are not required to be reported. The monitoring frequencies specified in the RIPDES permit are minimum monitoring frequencies. Any additional monitoring, even if it is beyond the minimum frequency, must be reported in the sample measurement rows and such increased frequencies of sampling shall be reported in the Frequency of Analysis block. The detection limit of the analytical method used to monitor the parameter must be equal to, or less than, the minimum detection limit (MDL) specified in the facility's RIPDES permit.

Do not leave a box that requires measurement data empty. If a measurement is required and a box is left empty it will result in a reporting violation. If measurement results are not available, one of the following "No Data Indicator" codes, also known as "NODI" codes, should be entered in place of the monitoring data on the DMR and a detailed explanation of why the data is not available should be included in the DMR cover letter:

NODI Code – Description

2	- Operation Shutdown
9	- Conditional Monitoring Not Required this Period
C	- No Discharge
D	- Lost Sample/Data Not Available
E	- Analysis Not Conducted/No Sample
G	- Sampling Equipment Failure
J	- Recycled Water Closed System

As noted above, the detection limit of the analytical method used to analyze the sample must be equal to, or less than, the MDL specified in the facility's permit. If a MDL is not specified in the permit, the detection limit of the analytical method used must be equal to, or less than, the permit limit. When calculating sample averages for reporting on DMRs, results that are less than the applicable MDL shall be replaced with zeroes and the average calculated. The calculated value shall be reported on the DMR and a detailed explanation of how the average was calculated, including all individual sample results, shall be included in the DMR cover letter. In no cases shall non-numeric results be reported on DMRs (i.e., "below detection" or "BDL", "trace" or "TR", "non detect" or "ND", etc.). If all sample results are below the applicable MDL or the daily maximum concentration was below the applicable MDL, the data shall be reported as zero and a detailed explanation of the sample results, including all individual sample results, shall be included in the DMR cover letter.

7. No. Ex. (Number of Exceedances) Column

Enter the number of actual sample measurements that exceeded the permit requirements (maximum and/or minimum, 7-day average, etc.) for each parameter. The number should be the total of all exceedances measured during the reporting period, both of loading and concentration limits. If the laboratory reports values of less than the minimum detection level (< MDL) and that value exceeds the permit limit, this is considered an exceedance and should be included in the total number of exceedances. If all samples are measured at, or below, the permit limit, enter "0" (zero) on the DMR.

8. Frequency of Analysis Column

Enter the actual frequency in which samples were taken during the reporting period. The minimum frequency is specified in the permit requirement row. In instances where samples are taken at an increased frequency for a temporary, short-term basis the "typical" sample frequency should be entered in this row and the temporary increased frequency should be reported on the DMR cover letter (i.e., A facility normally samples 3/week and sampled 3/week for the first 3 weeks of the month. On the last week of the month the permittee sampled 5 times. The permittee should enter 3/week in the Frequency of Analysis box and in the cover letter indicate that samples were taken at an increased frequency of 5/week for the last week of the reporting period). Similarly, if the permittee had an isolated failure to sample, the "typical" sample frequency should be reported in the Frequency of Analysis box and a detailed explanation of the failure to sample should be reported on the DMR cover letter (i.e., A facility normally samples 3/week and sampled 3/week for the first 3 weeks of the month. On the last week of the month the permittee missed a sample and only sample twice. The permittee should enter 3/week in the Frequency of Analysis box and in the cover letter indicate why the third sample was not taken during the last week of the month and what measure have been implemented to prevent missing samples in the future).

9. Sample Type Column

Enter the actual sample type used during the reporting period. The required type is specified in the permit requirement row.

10. Signature Row

The DMR shall be signed by the principal executive officer or his/her authorized agent designated on the DMR form. **AN ORIGINAL DMR FORM AND SIGNATURE IS REQUIRED** (do not send in copies of the signed DMRs). The DMRs shall be signed by the principal executive officer in accordance with Rule 12 of the RIPDES Regulations. If an authorized agent is signing the DMR, and not a principal executive officer, a written authorization must be submitted to the DEM in accordance with Rule 12(b)(1) of the RIPDES Regulations. The written authorization only needs to be submitted once and does not need to be submitted with each DMR. If a different person is to be authorized to sign DMRs, a new written authorization must be submitted for the new agent.

11. Comments Section

Please note any printed comments or instructions that appear on the bottom of the DMR.

CHAPTER II: WHERE TO SUBMIT THE DMR AND RECORD KEEPING

DMRs must be completed in ink and the originals mailed to the following address:

Rhode Island Department of Environmental Management
RIPDES Program
235 Promenade Street
Providence, RI 02908

A copy of the DMRs must be maintained on site for a period of at least 5 years. In addition, the permittee shall retain records of all monitoring, including all calibration and maintenance records, all original strip chart recordings from continuous monitoring instrumentation, and copies of all laboratory Certificates of Analysis, for a period of at least 5 years.

NOTE: If there are any violations of permit requirements, a DMR cover letter must be submitted that references each violation by date and explains the cause and corrective actions taken.

CHAPTER III: DMR CALCULATIONS

1. Mass Reporting (i.e., Quantity or Loading Columns)

a. Monthly Average

When calculating the pollutant load, use the following formula:

Loading (lbs/day) = Concentration (mg/l) x Flow (MGD) x 8.34 (a conversion factor).

Use each sample concentration and multiply it by the flow on the day that the sample was taken and by the conversion factor. The monthly average is calculated using each individual day's loading.

EXAMPLE: The TSS sample results and the flows on the sampling dates are: 56 mg/l (.91 MGD), 75 mg/l (1.01 MGD), 73 mg/l (.98 MGD), and 63 mg/l (1.21 MGD).

The individual loadings are:

$$56 \text{ mg/l} \times 0.91 \text{ MGD} \times 8.34 = 425.0 \text{ lbs/day}$$

$$75 \text{ mg/l} \times 1.01 \text{ MGD} \times 8.34 = 631.8 \text{ lbs/day}$$

$$73 \text{ mg/l} \times 0.98 \text{ MGD} \times 8.34 = 596.6 \text{ lbs/day}$$

$$63 \text{ mg/l} \times 1.21 \text{ MGD} \times 8.34 = 635.8 \text{ lbs/day}$$

The monthly average loading is therefore:

$$\frac{425.0 + 631.8 + 596.6 + 635.8}{4} = 572.3 \text{ lbs/day}$$

b. Weekly Average

The rules and format that are used to calculate and report the weekly average concentration also apply to the weekly average loading.

c. Daily Maximum

The Daily Maximum Loading is the highest pollutant load calculated during the reporting period using the following equation:

$$\text{Loading (lbs/day)} = \text{Sample Concentration (mg/l)} \times \text{Flow on the Sample Day (MGD)} \times 8.34$$

EXAMPLE: A dye house has BOD and flow results for the month as follows:

<u>BOD (mg/l)</u>	<u>Flow (MGD)</u>	<u>Loading (lb/day)</u>
14	2.00	233.5
31	1.64	424.0
22	1.82	333.9
45	1.52	570.5
13	1.90	206.0
16	1.85	246.9
37	1.87	577.0
31	1.90	491.2

From the above information the daily maximum loading from the dye house is 577.0 lb/day. Please note that the daily maximum loading does not necessarily occur on the same day as the daily maximum concentration.

2. Concentration Reporting (i.e., Quality or Concentration Columns)

a. Monthly Average

The monthly average is the sum of all the sample results divided by the number of samples.

EXAMPLE: A sewage treatment plant is required to take two BOD samples a week.

The sample results are:

- Week 1: 30 mg/l and 25 mg/l
- Week 2: 27 mg/l and 18 mg/l
- Week 3: 14 mg/l and 41 mg/l
- Week 4: 38 mg/l and 23 mg/l

The monthly average BOD concentration is therefore:

$$\frac{30 + 25 + 27 + 18 + 14 + 41 + 38 + 23}{8} = 27.0 \text{ mg / l}$$

b. Weekly Average

The weekly average concentration is the average of the sample results from Sunday through Saturday, inclusive, of each week. The highest calculated weekly average should be recorded on the DMR.

EXAMPLE: Using the same sewage treatment plant data the weekly averages for the month would be:

$$\begin{aligned} \text{Week One: } & \frac{30 + 25}{2} = 27.5 \text{ mg/l} & \text{Week Two: } & \frac{27 + 18}{2} = 22.5 \text{ mg/l} \\ \text{Week Three: } & \frac{14 + 41}{2} = 27.5 \text{ mg/l} & \text{Week Four: } & \frac{38 + 23}{2} = 30.5 \text{ mg/l} \end{aligned}$$

Since Week Four had the highest average, 30.5 mg/l, that value is recorded on the DMR for Weekly Average.

NOTE: For those weeks that are split between two (2) months, calculate the weekly average using the daily values from the two (2) months. Include this weekly average value with the month that contains the greatest number of days for that week.

October						
S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

November						
S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

The results from October 29 (Sunday), 30, and 31 would be used with November 1, 2, 3, and 4 (Saturday) to calculate the weekly average. Since four (4) days of that week are in November and only three (3) days are in October, the weekly average value is considered part of November's results.

NOTE: If a permittee is required to report a weekly average but only samples once a week or less, the weekly average is the same as the daily maximum. Therefore, the same value should be entered in both the "Weekly Average" column and the "Daily Maximum" column of the DMR.

c. Daily Maximum

The daily maximum is the highest observed daily sample result for the reporting period.

3. Percent Removal Reporting

Unless the permit specifies otherwise, the percent removal **must** be calculated using the monthly average concentrations for influent and effluent. The formula for calculating percent removal is:

$$\frac{\text{mo. avg. influent conc. (mg/l)} - \text{mo. avg. effluent conc. (mg/l)}}{\text{mo. avg. influent conc. (mg/l)}} \times 100 \%$$

EXAMPLE: A sewage treatment plant's monthly average influent TSS concentration is 270 mg/l and its monthly average effluent TSS concentration is 23 mg/l. The facility's TSS percent removal is:

$$\left(\frac{270 - 23}{270} \right) \times 100\% = 91.5\%$$

4. Bacteria Reporting

Bacteria (i.e., fecal coliform, total coliform, enterococci, etc.) monthly average and weekly average results shall be calculated using the geometric mean. If any of the sample measurements are reported as "too numerous to count", or "TNTC", the permittee shall report a value of 24,000,000 as the daily maximum value and shall use a value of 24,000,000 for this sample in the geometric mean calculations. It is the permittee's responsibility to ensure that a sufficient number of dilutions are used to allow the measurement of the actual bacteria concentration. If any of the bacteria concentrations are reported as TNTC, a detailed explanation of the TNTC result, including the dilutions used in the testing, must be submitted with the DMR cover letter. If the "Most Probable Number", or "MPN" method is used, the actual values from the MPN table must be used and they should not be rounded.

a. Monthly and Weekly Geometric Means

The monthly and weekly geometric means shall be calculated using the following formula:

$$\text{Geometric mean} = (\text{all the individual results multiplied together})^{1/\text{total no. of samples}}$$

EXAMPLE: A WWTF is required to sample fecal coliform twice a week for eight (8) samples a month.

The sample results for a month are:

Week One: 210 MPN and 50 MPN

Week Two: 653 MPN and 332 MPN

Week Three: 170 MPN and 400 MPN

Week Four: 7 MPN and 200 MPN

The monthly geometric mean is:

$$(210 \times 50 \times 653 \times 332 \times 170 \times 400 \times 7 \times 200)^{1/8} = 146.9 \text{ MPN}$$

The weekly geometric means are:

$$\text{Week One : } (210 \times 50)^{1/2} = 102.5 \text{ MPN}$$

$$\text{Week Two : } (653 \times 332)^{1/2} = 465.6 \text{ MPN}$$

$$\text{Week Three : } (170 \times 400)^{1/2} = 260.8 \text{ MPN}$$

$$\text{Week Four : } (7 \times 200)^{1/2} = 37.4 \text{ MPN}$$

Since 465.6 MPN is the highest weekly geometric mean that figure should be recorded on the DMR.

NOTE: For the sole purpose of calculating geometric means, all samples that are reported as zero (0) shall be treated as being equal to one (1).

EXAMPLE: The daily fecal coliform results for a week long sampling period are:

100 MPN, 0 MPN, 60 MPN, 375 MPN, 120 MPN, 0 MPN, 0 MPN

The weekly geometric mean is:

$$(100 \times 1 \times 60 \times 375 \times 120 \times 1 \times 1)^{1/7} = 16.0 \text{ MPN}$$

NOTE: For the sole purpose of calculating geometric means, all samples that are reported as less than (<) a number shall be treated as being equal to that number.

EXAMPLE: The Fecal Coliform results for the month are:
310 MPN, <3 MPN, 150 MPN, 275 MPN
The monthly geometric mean is:
 $(310 \times 3 \times 150 \times 275)^{1/4} = 78.7 \text{ MPN}$

b. Daily Geometric Means

If a permittee takes multiple bacteria samples over the course of a calendar day, the geometric mean of all of the samples taken for that day shall be calculated and the calculated value shall be the daily value used for determining compliance with the daily maximum limit. Note: This only applies to the daily maximum limits. For the purposes of calculating monthly and weekly geometric means, all individual sample results for the given month or week shall be used.

EXAMPLE: A WWTF samples fecal coliform twice a day four times a month.

The sample results for a month are:
Day One: 110 MPN and 60 MPN
Day Two: 200 MPN and 150 MPN
Day Three: 270 MPN and 140 MPN
Day Four: 60 MPN and 100 MPN

The daily bacteria concentrations used for daily maximum reporting are:

$$\text{Day One: } (110 \times 60)^{1/2} = 81.2 \text{ MPN}$$

$$\text{Day Two: } (200 \times 150)^{1/2} = 173.2 \text{ MPN}$$

$$\text{Day Three: } (270 \times 140)^{1/2} = 194.4 \text{ MPN}$$

$$\text{Day Four: } (60 \times 100)^{1/2} = 77.5 \text{ MPN}$$

Since 194.4 MPN is the highest daily geometric mean that figure should be recorded on the DMR as the daily maximum value.

5. Maximum and Minimum Value Reporting

If a permit includes maximum, average, and/or minimum reporting requirements (i.e., pH, Dissolved Oxygen, etc.) the permittee must report the highest individual sample result for the reporting period as the “maximum” value and the lowest individual sample result for the reporting period as the “minimum” value. The average is the mathematical average of all sample results. Any individual sample results greater than the maximum value or less than the minimum value shall be considered separate violations and must be reported in the number of exceedances blank on the DMR.

6. Grab Sample Reporting

If a permittee takes multiple grab samples over the course of a calendar day (i.e., Total Residual Chlorine) and the permit requires “monthly average”, “weekly average”, and “daily maximum” reporting, the average of all of the samples taken for a given day shall be calculated and the calculated value shall be the daily value used for determining compliance with the daily maximum limit.

EXAMPLE: A WWTF samples Total Residual Chlorine twice a day four times a month.

The sample results for a month are:

Day One: 75 ug/l and 62 ug/l
Day Two: 103 ug/l and 50 ug/l
Day Three: 71 ug/l and 64 ug/l
Day Four: 63 ug/l and 102 ug/l

The daily concentrations used for daily maximum reporting are:

Day One: $\frac{75 + 62}{2} = 68.5$ ug/l Day Two: $\frac{103 + 50}{2} = 76.5$ ug/l
Day Three: $\frac{71 + 64}{2} = 67.5$ ug/l Day Four: $\frac{63 + 102}{2} = 82.5$ ug/l

Since 82.5 ug/l is the highest daily average of the grab samples that figure should be recorded on the DMR as the daily maximum value. The "monthly average" and "weekly average" results shall be calculated as described above using the average of all grab samples taken during a given month or week.

NOTE: This method only applies if the permit requires "daily maximum" reporting. If the permit required "maximum" reporting, the highest individual grab sample result would be reported.

7. Flow Reporting

Unless specified otherwise in the permit, the monthly average flow is to be calculated by dividing the total flow discharged for a given month by the number of days in which there was a discharge during the month. If a given month had 30 days, but the facility only discharged wastewater on 25 days, the monthly average flow would be determined by dividing the total volume discharge during the month by 25 days. If the reporting period consists of more than one month (i.e., quarterly or annual reporting), the monthly average flow to be reported on the DMR is the highest monthly average flow for all months in the reporting period. The daily maximum flow is the highest daily flow observed during the reporting period.

8. Rounding Reporting Data

When reporting sample results on DMRs, the data shall be rounded to either the tenths decimal place (i.e., for a % removal limit of 85% report the data in the example from Part III.3 above as 91.5%) or, if the permit limit has more decimal places, to the number of decimal places included in the permit (i.e., for a monthly average copper limit of 5.78 ug/l analytical results of 6.0 ug/l and 5.5 ug/l would be reported as 5.75 ug/l).

CHAPTER IV: ANALYTICAL METHODS

Unless alternative methods are specifically identified in the permit, all sampling and testing procedures must be conducted in accordance with the sampling, preservation, and analysis procedures approved under 40 CFR Part 136. Any samples that do not meet the 40 CFR Part 136 procedures, including sample hold time, must not be reported on the DMR. Failure to meet the requirements of 40 CFR Part 136 is not a valid reason to fail to report effluent data.

CHAPTER V: ADDITIONAL INFORMATION

Any questions regarding RIPDES permits and/or DMRs should be directed to the RIPDES Program Staff at 401-222-4700.

Written inquiries should be sent to the following address:

Rhode Island Department of Environmental Management
RIPDES Program
235 Promenade Street
Providence, RI 02908