



## **Monitoring Surface Runoff of manure or process wastewater from the Production Area or Land Application Areas**

*Compiled by Deanne Meyer, Livestock Waste Management Specialist, Department of Animal Science, University of California, Davis. September 2007*

In May 2007 the Central Valley Regional Water Quality Control Board (RB 5) adopted Waste Discharge Requirements General Order R5-2007-0035 for Existing Milk Cow Dairies (the General Order). The General Order requires that unauthorized discharges of manure or process wastewater from the production area or land application areas be monitored effective October 1, 2007. Unauthorized discharges include both over application of manure that isn't associated with an off-site discharge as well as off-property discharges from either the production or land application areas. If you are covered under the General Order, you will need to comply with monitoring and reporting all unauthorized discharges (both on-site and off-site).

### **Identification of sampling location**

All sampling locations need to be identified. The location of unauthorized on-site discharge of manure or process wastewater is defined by the specific discharge. A description of the location needs to be written down. All off-site discharges to surface water require sampling surface water upstream of the discharge far enough upstream so as to not be influenced by the discharge. The downstream sampling should be taken just far enough downstream where the discharge is blended with the receiving water but that it is not influenced by dilution flows or other discharges.

### **Part I –Laboratory Selection and Identification of Sampling and Analytical Requirements**

1. Select a laboratory that is accredited by the California Department of Public Health (formerly California Department of Health Services) under the Environmental Laboratory Accreditation Program (ELAP) for Fields of Testing 107 (Microbiology of Wastewater) and 108 (Inorganic Chemistry of Wastewater) and that can analyze your samples in accordance with the Title 40 Code of Federal Regulations Part 136 (*Guidelines Establishing Test Procedures for the Analysis of Pollutants*) or other test methods for which you have approval by the Executive Officer. A list of accredited labs is maintained at [http://www.dhs.ca.gov/ps/ls/ELAP/lab\\_lists/ELAPLablist.xls](http://www.dhs.ca.gov/ps/ls/ELAP/lab_lists/ELAPLablist.xls) .
2. Contact your analytical laboratory to obtain sample bottles and labels and appropriate instructions for sample collection, preservation, sample holding times, required record keeping, and chain of custody forms (see Table 1 for a summary of bottle requirements). Your lab may have you combine some of the samples listed in Table 1 below.

Table 1. Sample container types, preservation requirements, analytes, and allowable holding times.

Sample container size and type <sup>1</sup>	Preservative	Analytes	Maximum holding time <sup>2</sup>
1 liter (ℓ) P, TP, G <sup>3</sup>	ice chest ≤6 C	BOD5	Less than 48 hrs
250 ml to 1 ℓ P, FP, G Calculated based on results from other analyses	H <sub>2</sub> SO <sub>4</sub> to ≤2 pH; ice chest ≤6 C	TKN and total ammonia  Unionized ammonia-nitrogen	28 days
250 ml to 1 ℓ P, FP, G	ice chest ≤6 C	Nitrate	48 hours
1 ℓ P, FP, G	ice chest ≤6 C	total dissolved solids and total suspended solids	7 days
250 ml P, FP, G	ice chest ≤6 C; H <sub>2</sub> SO <sub>4</sub> to <pH 2	total phosphorus	28 days
250 ml P, FP, G	HNO <sub>3</sub> to <pH 2; cool ≤6 C	potassium	6 months
100 ml sterile bottle P, G	ice chest <10 C	total and fecal coliform	<6 hrs
250 ml P, FP, G	None; analyze immediately	on farm analyses of EC, temp (no hold time--analyze), pH, DO (glass, analyze within 15 min)	Analyze immediately on-farm

## Part II - Sampling Preparation & Location Determination

1. Identify your samples (e.g., sample identification, location of sampling, individual taking samples, date and time sampled, analyses needed).
2. Gather sampling equipment needed (e.g., disposable gloves, safety goggles if handling sample bottles with preservatives, sample bottles, preservatives, ice and ice chest, labels for sample identification, chain of custody forms, notebook for record-keeping, on-farm field testing equipment).
3. Calibrate on-farm field testing equipment (electrical conductivity, dissolved oxygen, and pH) prior to going into the field.

<sup>1</sup> Container type, preservation techniques and holding times are from Table II of Part 136 of Title 40 of the Code of Federal Regulations. Federal Register Vol 72. NO 47. March 12, 2007. Page 11236 for all analyses except Potassium. The preservation techniques and holding times for Potassium are from Regional Water Quality Control Board 5 staff.

<sup>2</sup> Maximum holding time is the maximum amount of time between when the sample is collected and it begins analyses in the laboratory. Remember time is needed in the laboratory to process the sample into the lab and begin the analysis. Some laboratories have restricted times during the day to conduct some tests.

<sup>3</sup> "Sample container types: P=polyethylene; FP = fluoropolymer; G= glass

**For on-site unauthorized discharge (manure solids or liquids applied beyond rates in the nutrient management plan or in an inappropriate location either intentionally or accidentally) or to surface water:**

1. Record date, time, approximate volume (gallons) or weight (tons), duration, location, source and ultimate destination of the discharge.
2. Conduct field testing for electrical conductivity, temperature, and pH.
3. Laboratory analyses of the discharge for nitrate-nitrogen, total ammonia-nitrogen, unionized ammonia-nitrogen, total Kjeldahl nitrogen, total phosphorus, potassium, total dissolved solids, five-day biochemical oxygen demand, total suspended solids, and total and fecal coliform.

**For off-site unauthorized discharge (either to land or surface water):**

1. Record date, time, approximate volume (gallons) or weight (tons), duration, location, source and ultimate destination of the discharge.
2. Conduct field testing for electrical conductivity, dissolved oxygen, temperature, and pH.
3. Laboratory analyses of the discharge for nitrate-nitrogen, total ammonia-nitrogen, unionized ammonia-nitrogen, total Kjeldahl nitrogen, total phosphorus, potassium, total dissolved solids, five-day biochemical oxygen demand, total suspended solids, and total and fecal coliform.

**For any discharge to surface water**

Unauthorized discharges to surface water require additional sampling of the water upstream and water downstream of the discharge point. The upstream sample should be taken just far enough upstream so as not to be influenced by the discharge. The downstream samples shall be taken just far enough downstream where the discharge is blended with the receiving water but not influenced by dilution flows or other discharges. Dissolved oxygen analysis is an additional field test to be conducted on these upstream and downstream samples. The other field tests and laboratory analyses conducted on the actual manure discharge must also be carried out.

**Part III – Sample Collection**

1. Label sample bottles with a description of the sample (discharge, upstream, downstream), sampler's name, the date and time of sampling.
2. Put on sampling gloves and safety goggles (if handling sample containers with preservatives).
3. Remove lid from sample bottle. Be sure to keep the lid clean.
4. If sample bottles have been used previously, then rinse each bottle 3 times with the water you will be collecting. Do not rinse new bottles or bottles with preservatives. **DO NOT RINSE OUT PRESERVATIVE.**
5. Collect sample into the bottle, leaving the proper head-space (open space at the top) as required by the laboratory.
6. Preserve appropriate samples as required by your laboratory. The laboratory may provide

sample bottles that include preservative.

7. Tightly cap bottles.
8. Immediately put all bottles except those designated for field analysis into an ice-cooled chest. DO NOT FREEZE THE SAMPLES.
9. Conduct field analysis of temperature, pH, electrical conductivity should be conducted as soon as possible after collection. Dissolved oxygen should be analyzed within in 15 minutes after collection.
10. Record results from field analysis.
11. Complete a chain of custody form for each of the samples to be delivered to the laboratory.
12. Deliver to laboratory in time to maintain a viable sample. Laboratories need time to process samples into their system before the required holding time. Take samples to the laboratory as soon as possible. Note: samples used for total and fecal coliform need to begin laboratory analysis within 6 hours of sampling.
13. Keep a copy of the chain of custody forms and records on sample collection & sample identification (information needed is found in Table 2).

Table 2. Chain of custody information to accompany samples to analytical laboratory.	
Sample identification	
Material being sampled	
Location of sampling	
Sample preservation method	
Desired analytes	
Date of sampling	
Time of sampling	
Personnel for sampling	
Identification of area where sample was taken	
Field measurement of electrical conductivity, temperature, and pH (include dissolved oxygen for upstream and downstream samples).	
Date and time sample was delivered to laboratory	

## Sample analyses

Required analytes for unauthorized discharge are listed in the table 3.

<b>Table 3. Analytes for analysis in unauthorized discharges of manure or process wastewater (liquid manure).</b>		
Material to be Sampled	Sampling unauthorized discharge of solid or liquid manure (on or off property)	Samples of upstream and downstream waters relative to off-site discharges of manure or process wastewater
<b>Field analyses—calibrate equipment prior to use</b>		
EC	✓	✓
Temperature	✓	✓
pH	✓	✓
Dissolved oxygen		✓
<b>Laboratory analyses</b>		
Nitrate-N	✓	✓
Total ammonia-N	✓	✓
Unionized ammonia N	✓	✓
Total Kjeldahl nitrogen	✓	✓
Total phosphorus	✓	✓
Potassium	✓	✓
Total dissolved solids	✓	✓
5 day Biological Oxygen Demand	✓	✓
Total suspended solids	✓	✓
Total coliform.	✓	✓
Fecal coliform.	✓	✓

## Reporting requirements

Unauthorized discharges fall into a special category for reporting. Incidents need to be reported to the Central Valley Regional Water Quality Control Board Office, local environmental health department, and the California Office of Emergency Services (OES). **Voice mail** is available at the Water Board’s number during non-business hours. Information to report **within 24 hours** of the incident includes: the time, date, place, and nature of noncompliance, as well as the name and contact number of the reporting person. A quick reference list of contact numbers is provided in the CDQAP document titled “Significant Noncompliance Event Agency Contact Information Sheet.”

**A written report** shall be submitted to the Water Board **within two weeks** of the Discharger becoming aware of the incident. The written report requires the following information:

1. The approximate date, time, and location of the noncompliance including a description of the ultimate destination of any unauthorized discharge and the flow path of such discharge to a receiving water body;

2. A description of the noncompliance and its cause;
3. The flow rate, volume, and duration of any discharge involved in the noncompliance;
4. The amount of precipitation (in inches) the day of any discharge and for each of the seven days preceding the discharge;
5. A description (location; date and time collected; field measurements of pH, temperature, dissolved oxygen and electrical conductivity; sample identification; date submitted to laboratory; analyses requested) of noncompliance discharge samples and/or surface water samples taken to comply with the Monitoring Requirements above for *Unauthorized Discharges (Including Off-Property Discharges) of Manure or Process Wastewater From the Production Area or Land Application Area and Storm Water Discharges to Surface Water from the Production Area*;
6. The period of noncompliance, including dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue;
7. A time schedule and a plan to implement corrective actions necessary to prevent the recurrence of such noncompliance; and
8. The laboratory analyses of the noncompliance discharge sample and/or upstream and downstream surface water samples shall be submitted to the Central Valley Water Board office within 45 days of the discharge.

If conditions are not safe for sampling, the Discharger must provide documentation of why samples could not be collected and analyzed.

#### **Additional information**

Contact the Central Valley Regional Water Quality Control Board for any other information requests.

*Information in this document was compiled by CDQAP to assist dairy producers in understanding and complying with the General Order Waste Discharge Requirements for Existing Milk Cow Dairies (Central Valley Regional Water Quality Control Board Order R5-2007-0035). Effort has been made to ensure accuracy, but these summaries are not official regulatory guidance and are not legal advice. Producers are advised that these summaries are not intended to be a substitute for producers reading the complete order and consulting their own legal counsel to ensure compliance with the waste discharge requirements. Should any information here conflict with the General Order and/or official information provided by the Regional Board, Board-provided information takes precedence.*

#### **References:**

Order No. R5-2007-0035. Waste Discharge Requirements for General Order for Existing Milk Cow Dairies. May 3, 2007. Available at [http://www.waterboards.ca.gov/centralvalley/adopted\\_orders/GeneralOrders/R5-2007-0035.pdf](http://www.waterboards.ca.gov/centralvalley/adopted_orders/GeneralOrders/R5-2007-0035.pdf) See Monitoring and Reporting Program Pages 7 & 8 and Reporting requirements C. on pages 10 and 11.