

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

REVISED MONITORING AND REPORTING PROGRAM ORDER NO. R5-2007-0035

GENERAL ORDER
FOR
EXISTING MILK COW DAIRIES

This Monitoring and Reporting Program (MRP) is issued pursuant to California Water Code (CWC) Section 13267. The Discharger shall not implement any changes to this MRP unless a revised MRP is issued by the California Regional Water Quality Control Board, Central Valley Region (Central Valley Water Board) or the Executive Officer.

This MRP includes Monitoring, Record-Keeping, and Reporting requirements. Monitoring requirements include monitoring of discharges of manure and/or process wastewater, storm water, and tailwater from the production area and land application areas, and groundwater.

Monitoring requirements also include monitoring of nutrients applied to, and removed from, land application areas in order for the Discharger to develop and implement a Nutrient Management Plan that will minimize leaching of nutrients and salts to groundwater and transport of these constituents to surface water.

In addition, monitoring requirements include periodic visual inspections of the dairy to ensure the dairy is being operated and maintained to ensure continued compliance with the Order.

This MRP requires the Discharger to keep and maintain records for five years of the monitoring activities for the production and land application areas and to prepare and submit reports containing the results of specified monitoring as indicated below.

All monitoring must begin immediately. Note that some types of events require that a report be submitted to the Central Valley Water Board within 24 hours (see section C).

Dischargers must follow sampling and analytical procedures approved by the Executive Officer. Approved procedures will be posted on the Central Valley Water Board's web site and copies may be obtained by contacting staff. A Discharger may submit alternative procedures for consideration, but must receive written approval from the Executive Officer before using them. If monitoring consistently shows no significant variation of a constituent concentration or parameter, the Discharger may request the MRP be revised to reduce monitoring frequency. The proposal must include adequate technical justification for reduction in monitoring frequency.

The Discharger shall conduct monitoring, record-keeping, and reporting as specified below.

A. MONITORING REQUIREMENTS

Visual Inspections

The Discharger shall conduct and record the inspections specified in Table 1 below and maintain records of the results on-site for a period of five years.

Table 1. INSPECTIONS
<p><i>Production Area</i> <u>Weekly during the wet season (1 October to 30 April) and monthly between 1 May and 30 September:</u> Inspect all waste storage areas and note any conditions or changes that could result in discharges to surface water and/or from property under control of the Discharger.</p> <p>Note whether freeboard within each liquid storage structure is less than, equal to, or greater than the minimum required (two feet for above ground ponds and one foot for below ground ponds).</p> <p><u>During and after each significant storm event¹:</u> Visual inspections of storm water containment structures for discharge, freeboard, berm integrity, cracking, slumping, erosion, excess vegetation, animal burrows, and seepage.</p> <p><u>Monthly on the 1st day of each month:</u> Photograph each pond showing the height of wastewater relative to the depth marker and the current freeboard on that date. All photos shall be dated and maintained as part of the discharger's record.</p>
<p><i>Land Application Areas</i> <u>Prior to each wastewater application:</u> Inspect the land application area and note the condition of land application berms including rodent holes, piping, and bank erosion. Verify that any field valves are correctly set to preclude off-property or accidental discharges of wastewater.</p> <p><u>Daily when process wastewater is being applied:</u> Inspect the land application area and note the condition of land application berms including rodent holes, piping, and bank erosion; the presence (or lack) of field saturation, ponding, erosion, runoff (including tailwater discharges from the end of fields, pipes, or other conveyances), and nuisance conditions; and the conditions of any vegetated buffers or alternative conservation practices.</p>

¹ A significant storm event is defined as a storm event that results in continuous runoff of storm water for a minimum of one hour, or intermittent runoff for a minimum of three hours in a 12-hour period.

Nutrient Monitoring

The Discharger shall monitor process wastewater, manure, and plant tissue produced at the facility, soil in each land application area, and irrigation water used on each land application area for the constituents and at the frequency as specified in Table 2 below. This information is for use in conducting nutrient management on the individual land application areas and at the facility on the whole. It must be used to develop and implement the Nutrient Management Plan. The Discharger is encouraged to collect and use additional data, as necessary, to refine nutrient management.

Table 2. NUTRIENT MONITORING

Process Wastewater

Each application:

Record the volume (gallons or acre-inches) and date of process wastewater application to each land application area.

Quarterly during one application event:

Field measurement of electrical conductivity.

Laboratory analyses for nitrate-nitrogen (only when retention pond is aerated), un-ionized ammonia-nitrogen, total Kjeldahl nitrogen, total phosphorus, total potassium, and total dissolved solids.

Once every two years (biennially):

Laboratory analyses for general minerals (calcium, magnesium, sodium, bicarbonate, carbonate, sulfate, and chloride).

Annually

Laboratory analyses of liquid process wastewater, prior to blending with irrigation water, for pH, total dissolved solids, electrical conductivity, nitrate-nitrogen, ammonium-nitrogen, total Kjeldahl nitrogen, total phosphorus, and total potassium.

Manure

Once every two years (biennially):

Laboratory analyses for general minerals (calcium, magnesium, sodium, sulfur, chloride) and fixed solids (ash).

Twice per year:

Laboratory analyses for total nitrogen, total phosphorus, total potassium, and percent moisture.

Each application to each land application area:

Record the percent moisture and total weight (tons) applied.

Each offsite export of manure:

Record the percent moisture and total weight (tons) exported.

Laboratory analyses for percent moisture.

Annually:

Record the total dry weight (tons) of manure applied annually to each land application area and the total dry weight (tons) of manure exported offsite.

Plant Tissue

At harvest:

Record the percent moisture and total weight (tons) of harvested material removed from each land application area.

Laboratory analyses for total nitrogen, total phosphorus, total potassium (expressed on a dry weight basis), fixed solids (ash), and percent moisture.

The following test is only required if the Discharger wants to add fertilizer in excess of 1.4 times the nitrogen expected to be removed by the harvested portion of the crop (see Attachment C of Order No. R5-2007-0035 for details): Mid-season, if necessary to assess the need for additional nitrogen fertilizer during the growing season.

Laboratory analyses for total nitrogen, expressed on a dry weight basis.

Table 2. NUTRIENT MONITORING
<p>Soil <u>Once every 5 years from each land application area (may be distributed over a 5-year period by sampling 20% of the land application areas annually):</u> Laboratory analyses for soluble phosphorus</p> <p><i>The following soil tests are recommended but not required:</i></p> <p><u>Spring pre-plant for each crop:</u> Laboratory analyses for: 0 to 1 foot depth: Nitrate-nitrogen and organic matter. 1 to 2 feet depth: Nitrate-nitrogen.</p> <p><u>Fall pre-plant for each crop:</u> Laboratory analyses at depths below ground surface of: 0 to 1 foot: Electrical conductivity, nitrate-nitrogen, soluble phosphorus, potassium and organic matter. 1 to 2 feet: Nitrate-nitrogen.</p>
<p><i>Irrigation Water</i>¹ <u>Each irrigation event for each land application area:</u> Record volume (gallons or acre-inches)² and source (well or canal) of irrigation water applied and dates applied.</p> <p><u>One irrigation event during each irrigation season during actual irrigation events:</u> For each irrigation water source (well and canal): Electrical conductivity, total dissolved solids, and total nitrogen.³ Data collected to satisfy the groundwater monitoring requirements (below) can be used to satisfy this requirement.</p>

¹ The Discharger shall monitor irrigation water (from each water well source and canal) that is used on all land application areas.

² Initial volume measurements may be the total volume for all land application areas.

³ In lieu of sampling the irrigation water, the Discharger may provide equivalent data from the local irrigation district.

Monitoring of Surface Runoff

The Discharger shall monitor any discharges of manure and/or process wastewater, storm water, and tailwater from the production area and land application area for the constituents and at the frequencies specified in Table 3 below.

Table 3. DISCHARGE MONITORING
<p><i>Discharges (Including Off-Property Discharges) of Manure or Process Wastewater, from the Production Area or Land Application Area</i></p> <p><u>Daily during each discharge:</u> Record date, time, approximate volume (gallons) or weight (tons), duration, location, source, and ultimate destination of the discharge.</p> <p>Field measurements of the discharge for electrical conductivity, temperature, and pH.</p>

Table 3. DISCHARGE MONITORING
<p>Laboratory analyses of the discharge for nitrate-nitrogen, total ammonia-nitrogen, un-ionized ammonia-nitrogen, total Kjeldahl nitrogen, total phosphorus, potassium, total dissolved solids, BOD₅¹, total suspended solids, and total and fecal coliform.</p> <p><u>Daily during each discharge to surface water:</u> For surface water upstream² and downstream³ of the discharge: Field measurements for electrical conductivity, temperature, dissolved oxygen, and pH.</p> <p>Laboratory analyses for nitrate-nitrogen, total ammonia-nitrogen, un-ionized ammonia-nitrogen, total Kjeldahl nitrogen, total phosphorus, potassium, total dissolved solids, total suspended solids, and total and fecal coliform.</p>
<p><i>Storm Water Discharges to Surface Water from the Production Area⁴</i> <u>Daily during each discharge to surface water:</u> Record date, time, approximate volume, duration, location, source, and ultimate destination of the discharge.</p> <p>For (1) the discharge and surface water (2) upstream and (3) downstream of the discharge: Field measurements of electrical conductivity, dissolved oxygen, temperature, pH, total ammonia-nitrogen, and unionized ammonia-nitrogen.</p> <p>Laboratory analyses for nitrate-nitrogen, turbidity, total phosphorus, and total and fecal coliform.</p>
<p><i>Storm Water Discharges to Surface Water from Each Land Application Area⁴</i> <u>First storm event of the wet season⁵ and during the peak storm season (typically February)⁶ each year from one third of the land application areas⁷ with the land application areas sampled rotated each year⁸:</u> Record date, time, approximate volume, duration, location, and ultimate destination of the discharge.</p> <p>Field measurements of the discharge for electrical conductivity, temperature, pH, total ammonia-nitrogen, and un-ionized ammonia-nitrogen.</p> <p>Laboratory analyses of the discharge for nitrate-nitrogen, total phosphorus, turbidity, and total and fecal coliform.</p>
<p><i>Tailwater Discharges to Surface Water from Land Application Areas⁹</i> <u>Each discharge from each land application area where irrigation has occurred less than 60 days after application of manure and/or process wastewater:</u> Record date, time, approximate volume (gallons), duration, location, and ultimate destination of the discharge.</p> <p>Field measurements of discharge for electrical conductivity, temperature, pH, total ammonia-nitrogen, and un-ionized ammonia-nitrogen.</p> <p><u>First discharge of the year from any land application area where irrigation has occurred less than 60 days after application of manure and/or process wastewater:</u> Laboratory analyses for nitrate-nitrogen, total phosphorus, and total and fecal coliform.</p>

¹ Five-day biochemical oxygen demand.

² Upstream samples shall be taken just far enough upstream so as not to be influenced by the discharge.

³ 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.

⁴ Sample locations must be chosen such that the samples are representative of the quality and quantity of storm water discharged.

- ⁵ This sample shall be taken from the first storm event of the season that produces significant storm water discharge such as would occur during continuous storm water runoff for a minimum of one hour, or intermittent storm water runoff for a minimum of three hours in a 12-hour period.
- ⁶ This sample shall be taken during a storm event that produces significant storm water discharge and that is preceded by at least three days of dry weather. The sample shall be taken during the first hour of the discharge.
- ⁷ One land application area shall be sampled for Dischargers that have one to three land application areas, two land application areas shall be sampled for Dischargers that have four to six land application areas, etc.
- ⁸ The Discharger may propose in the annual storm water report to reduce the constituents and/or sampling frequency of storm water discharges to surface water from any land application area based on the previous year's data (see Storm Water Reporting section below).
- ⁹ Tailwater samples shall be collected at the point of discharge to surface water.
1. If conditions are not safe for sampling, the Discharger must provide documentation of why samples could not be collected and analyzed. For example, the Discharger may be unable to collect samples during dangerous weather conditions (such as local flooding, high winds, tornados, electrical storms, etc.). However, once the dangerous conditions have passed, the Discharger shall collect a sample of the discharge or, if the discharge has ceased, from the waste management unit from which the discharge occurred.
 2. Discharge and surface water sample analyses shall be conducted by a laboratory certified for such analyses by the California Department of Health Services. These laboratory analyses shall be conducted 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 approved by the Executive Officer.
 3. All discharges shall be reported as specified in the Reporting Requirements (Priority Reporting of Significant Events and Annual Reporting) below, as appropriate.
 4. The rationale for all discharge sampling locations shall be included in the Annual Report (in the Storm Water Report for storm water discharges from land application areas).
 5. Parties interested in coordinating or combining surface water monitoring conducted by an individual dairy or group of dairies with monitoring conducted pursuant to the Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands (Order No. R5-2006-0053 for Coalition Group or Order No. R5-2006-0054 for Individual Discharger, or updates thereto) may propose an alternative monitoring program for the Executive Officer's consideration. The alternative program shall not begin until the Discharger receives written approval from the Executive Officer.

Groundwater Monitoring

The Discharger shall sample each domestic and agricultural supply well and subsurface (tile) drainage systems present in the production and/or land application areas to characterize existing groundwater quality. This monitoring shall be conducted at the frequency and for the parameters specified in Table 4 below. The frequency of monitoring the domestic and agricultural supply wells for

ammonium nitrogen and total dissolved solids may be reduced to every five years after two years of data are provided to the Executive Officer.

Table 4. GROUNDWATER MONITORING
<p><i>Domestic and Agricultural Supply Wells</i> <u>Annually:</u> Field measurements of electrical conductivity and ammonium nitrogen¹. Laboratory analyses of nitrate-nitrogen.</p> <p><u>Every five years (may be distributed over a 5-year period by sampling 20% of the wells annually):</u> Laboratory analyses for general minerals (calcium, magnesium, sodium, bicarbonate, carbonate, sulfate, chloride, and total dissolved solids).</p> <p><i>Subsurface (Tile) Drainage System</i> <u>Annually:</u> Field measurements of electrical conductivity and ammonium nitrogen¹. Laboratory analyses of nitrate-nitrogen, total phosphorus, and total dissolved solids.</p>

¹ If field measurement indicates the presence of ammonium nitrogen, the discharger shall collect a sample for laboratory analysis of ammonium nitrogen.

1. Groundwater samples from domestic wells shall be collected from the tap nearest to the pressure tank (and before the pressure tank if possible) after water has been pumped from this tap for 10 to 20 minutes. If the sample cannot be collected prior to a pressure tank, the well must be purged at least twice the volume of the pressure tank. Groundwater samples from agricultural supply wells shall be collected after the pump has run for a minimum of 30 minutes or after at least three well volumes have been purged from the well. Samples from subsurface (tile) drains shall be collected at the discharge point into a canal or drain.
2. Additional groundwater monitoring requirements are specified in Attachment A to this Order.

General Monitoring Requirements

1. The Discharger shall comply with the additional groundwater monitoring requirements specified in Attachment A to this Order either through individual groundwater monitoring or by participation in a Representative Monitoring Program as laid out in Attachment.
2. The Discharger shall comply with all the "Requirements Specifically for Monitoring Programs and Monitoring Reports" as specified in the Standard Provisions and Reporting Requirements.
3. Approved sampling procedures are listed on the Central Valley Water Board's web site at http://www.waterboards.ca.gov/centralvalley/available_documents/index.html#confined. When special procedures appear to be necessary at an individual

dairy, the Discharger may request approval of alternative sampling procedures for nutrient management. The Executive Officer will review such requests and if adequate justification is provided, may approve the requested alternative sampling procedures.

4. The Discharger shall use clean sample containers and sample handling, storage, and preservation methods that are accepted or recommended by the selected analytical laboratory or, as appropriate, in accordance with approved United States Environmental Protection Agency analytical methods.
5. All samples collected shall be representative of the volume and nature of the material being sampled.
6. All sample containers shall be labeled and records maintained to show the time and date of collection as well as the person collecting the sample and the sample location.
7. All samples collected for laboratory analyses shall be preserved and submitted to the laboratory within the required holding time appropriate for the analytical method used and the constituents analyzed.
8. All samples submitted to a laboratory for analyses shall be identified in a properly completed and signed Chain of Custody form.
9. Field test instruments used for temperature, pH, electrical conductivity, ammonia nitrogen, un-ionized ammonia nitrogen, and dissolved oxygen may be used provided:
 - a. The operator is trained in the proper use and maintenance of the instruments;
 - b. The instruments are field calibrated prior to each monitoring event; and
 - c. Instruments are serviced and/or calibrated by the manufacturer at the recommended frequency.

B. RECORD-KEEPING REQUIREMENTS

Dischargers shall maintain on-site for a period of five years from the date they are created all information as follows (Owners must maintain their own copies of this information):

1. All information necessary to document implementation and management of the Nutrient Management Plan, including the information described in Items 2 through 6 below;
2. All records for the production area including:

- a. Records documenting the inspections required under the Monitoring Requirements above;
 - b. Records documenting any corrective actions taken to correct deficiencies noted as a result of the inspections required in the Monitoring Requirements above. Deficiencies not corrected in 30 days must be accompanied by an explanation of the factors preventing immediate correction;
 - c. Records of the date, time, and estimated volume of any overflow or bypass of the wastewater storage or conveyance structures;
 - d. Records of mortality management and practices;
 - e. Steps and dates when action is taken to correct unauthorized releases as reported in accordance with Priority Reporting of Significant Events below; and
 - f. Records of monitoring activities and laboratory analyses conducted as required in Standard Provisions and Reporting Requirements D.5.
3. All records for the land application area including:
- a. Expected and actual crop yields;
 - b. Identification of crop, acreage, and dates of planting and harvest for each field;
 - c. Dates, locations, and approximate weight and moisture content of manure applied to each field;
 - d. Dates, locations, and volume of process wastewater applied to each field;
 - e. Whether precipitation occurred, or standing water was present, at the time of manure and process wastewater applications and for 24 hours prior to and following applications;
 - f. Dates, locations, and test methods for soil, manure, process wastewater, irrigation water, and plant tissue sampling;
 - g. Results from manure, process wastewater, irrigation water, soil, plant tissue, discharge (including tailwater), and storm water sampling;
 - h. Explanation for the basis for determining manure or process wastewater application rates, as provided in the Technical Standards for Nutrient Management established by the Order (Attachment C of Order No. R5-2007-0035);

- i. Calculations showing the total nitrogen, total phosphorus, and potassium to be applied to each field, including sources other than manure or process wastewater (Nutrient Budget);
 - j. Total amount of nitrogen, phosphorus, and potassium actually applied to each field, including documentation of calculations for the total amount applied (Nutrient Application Calculations);
 - k. The method(s) used to apply manure and/or process wastewater;
 - l. Records documenting any corrective actions taken to correct deficiencies noted as a result of the inspections required in the Monitoring Requirements above. Deficiencies not corrected in 30 days must be accompanied by an explanation of the factors preventing immediate correction; and
 - m. Records of monitoring activities and laboratory analyses conducted as required in Standard Provisions and Reporting Requirements D.5.
4. A copy of the Discharger's site-specific Nutrient Management Plan;
 5. Tracking Manifest forms (Attachment D of Order No. R5-2007-0035) for off-site exports of manure or process wastewater which includes information on the manure hauler, destination of the manure, dates hauled, amount hauled, and certification; and
 6. All analyses of manure, process wastewater, irrigation water, soil, plant tissue, discharges (including tailwater discharges), surface water, storm water, subsurface (tile) drainage, and groundwater.

C. REPORTING REQUIREMENTS

Priority Reporting of Significant Events (Prompt Action Required)

The Discharger shall report any noncompliance that endangers human health or the environment or any noncompliance with Prohibitions A.1 through A.5 and A.8 through A.12 in the Order, **within 24 hours** of becoming aware of its occurrence. The incident shall be reported to the Central Valley Water Board office, local environmental health department, and to the California Emergency Management Agency (CalEMA). During non-business hours, the Discharger shall leave a message on the Central Valley Water Board's voice mail. The message shall include the time, date, place, and nature of the noncompliance, the name and number of the reporting person, and shall be recorded in writing by the Discharger. CalEMA is operational 24 hours a day. A written report shall be submitted to the Central Valley Water Board office **within two weeks** of the Discharger becoming aware of the incident. The report shall contain a description of the noncompliance, its causes, duration, and the actual or anticipated time for achieving compliance.

The report shall include complete details of the steps that the Discharger has taken or intends to take, in order to prevent recurrence. All intentional or accidental spills shall be reported as required by this provision. The written submission shall contain:

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 *Discharges (Including Off-Property Discharges) of Manure or Process Wastewater or Other Dairy Waste 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.

Annual Reporting

An annual monitoring report is due by **1 July of each year**. It will consist of a General Section, Groundwater Reporting Section, and a Storm Water Reporting Section, as described below.

General Section

The General section of the annual report shall be completed on an annual report form provided by the Executive Officer (available on the Central Valley Water Board website at

http://www.waterboards.ca.gov/centralvalley/available_documents/index.html#confined) and shall include all the information as specified below. This section of the annual report shall cover information on crops harvested during the previous calendar year, whether or not the crop was planted prior to this period.

1. Identification of the beginning and end dates of the annual reporting period;
2. Maximum and average number and type of animals, whether in open confinement or housed under roof during the reporting period;
3. Estimated amount of total manure (tons) and process wastewater (gallons or acre-inches) generated by the facility during the annual reporting period; a calculation of the total nitrogen, total phosphorus, total potassium, and total salt content measured as fixed solids of the solid waste; and total dissolved solids of the liquid waste;
4. Estimated amount of total manure (tons) and process wastewater (gallons or acre-inches) applied to each land application area during the annual reporting period and a calculation of the total nitrogen, total phosphorus, total potassium, and total salt content measured as fixed solids (ash) of the solid waste and total dissolved solids of the liquid waste;
5. Quantify the ratio of total nitrogen applied to land application areas and total nitrogen removed by crop harvest (nitrogen uptake).
6. Estimated amount of total manure (tons) and process wastewater (gallons or acre-inches) transferred to other persons by the facility during the annual reporting period; a calculation of the total nitrogen, total phosphorus, total potassium, and total salt content measured as fixed solids of the solid waste; and total dissolved solids of the liquid waste;
7. Total number of acres and the Assessor Parcel Numbers for all land application areas that were not used for application of manure or process wastewater during the reporting period;
8. Total number of acres and the Assessor Parcel Numbers of properties that were used for land application of manure and process wastewater during the annual reporting period;
9. Summary of all manure and process wastewater discharges from the production area to surface water or to land areas (land application areas or otherwise) when not in accordance with the facility's Nutrient Management Plan that occurred during the annual reporting period, including date, time, location, and approximate volume; a map showing discharge and sample locations; rationale for sample locations; and method of measuring discharge flows;

10. Summary of all storm water discharges from the production area to surface water during the annual reporting period, including the date, time, approximate volume, duration, and location; a map showing the discharge and sample locations; rationale for sample locations; and method of measuring discharge flows;
11. Summary of all discharges from the land application area to surface water that have occurred during the annual reporting period, including the date, time, approximate volume, location, and source of discharge (i.e., tailwater, process wastewater, or blended process wastewater); a map showing the discharge and sample locations; rationale for sample locations; and method of measuring discharge flows;
12. A statement indicating if the Nutrient Management Plan has been updated and whether the current version of the facility's Nutrient Management Plan was developed or approved by a certified nutrient management specialist as specified in Attachment C of Order No. R5-2007-0035;
13. Copies of all manure/process wastewater tracking manifests for the reporting period;
14. A statement indicating if there were any changes to third party agreements to receive manure or process wastewater. If there were any changes, submit copies of all new or revised written agreements with each third party that receives solid manure or process wastewater from the Discharger for its own use;
15. Copies of laboratory analyses of all discharges (manure, process wastewater, or tailwater), surface water (upstream and downstream of a discharge), and storm water, including Chain of Custody forms and laboratory quality assurance/quality control (QA/QC) results;
16. Tabulated analytical data for samples of manure, process wastewater, irrigation water, soil, and plant tissue. The data shall be tabulated to clearly show sample dates, constituents analyzed, constituent concentrations, and detection limits;
17. Results of the Record-Keeping Requirements for the production and land application areas specified in Record-Keeping Requirements B.2.b, B.2.c, B.3.a, B.3.b, B.3.c, B.3.d, B.3.e, B.3.j, and B.3.l above.

Groundwater Reporting Section

Groundwater monitoring results shall be included with the annual reports.

1. Dischargers that monitor supply wells and subsurface (tile) drainage systems only shall submit information on the location of sample collection and all field

and laboratory data, including all laboratory analyses (including Chain of Custody forms and laboratory QA/QC results).

2. Dischargers that have monitoring well systems shall include all laboratory analyses (including Chain of Custody forms and laboratory QA/QC results) and tabular and graphical summaries of the monitoring data. Data shall be tabulated to clearly show the sample dates, constituents analyzed, constituent concentrations, detection limits, depth to groundwater, and groundwater elevations. Graphical summaries of groundwater gradients and flow directions shall also be included. Each groundwater monitoring report shall include a summary data table of all historical and current groundwater elevations and analytical results. The groundwater monitoring reports shall be certified by a California registered professional as specified in General Reporting Requirements C.9 of the Standard Provisions and Reporting Requirements of Order No. R5-2007-0035.

Storm Water Reporting Section

Storm water monitoring results will be included in the annual report. The report shall include a map showing all sample locations for all land application areas, rationale for all sampling locations, a discussion of how storm water flow measurements were made, the results (including the laboratory analyses, Chain of Custody forms, and laboratory QA/QC results) of all samples of storm water, and any modifications made to the facility or sampling plan in response to pollutants detected in storm water. The annual report must also include documentation if no significant discharge of storm water occurred from the land application area(s) or if it was not possible to collect any of the required samples or perform visual observations due to adverse climatic conditions.

If the storm water monitoring for any land application area indicates pollutants have not been detected in storm water samples, the Discharger may propose to the Executive Officer to reduce the constituents and/or sampling frequency for that area.

General Reporting Requirements

1. The results of any monitoring conducted more frequently than required at the locations specified herein shall be reported to the Central Valley Water Board.
2. Laboratory analyses for manure, process wastewater, and soil shall be submitted to the Central Valley Water Board upon request by the Executive Officer.
3. Each report shall be signed by the Discharger or a duly authorized representative as specified in the General Reporting Requirements C.7 of the Standard Provisions and Reporting Requirements of Order No. R5-2007-0035, and shall contain the following statement:

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

4. For facilities in Fresno, Kern, Kings, Madera, Mariposa, and Tulare counties, submit reports to:

California Regional Water Quality Control Board
Central Valley Region
1685 E Street
Fresno, CA 93706
Attention: Confined Animal Regulatory Unit

For facilities in Butte, Lassen, Modoc, Plumas, Tehama, and Shasta counties, submit reports to:

California Regional Water Quality Control Board
Central Valley Region
415 Knollcrest Drive, Suite 100
Redding, CA 96002
Attention: Confined Animal Regulatory Unit

For facilities in all other counties, submit reports to:

California Regional Water Quality Control Board
Central Valley Region
11020 Sun Center Drive #200
Rancho Cordova, CA 95670
Attention: Confined Animal Regulatory Unit

ORDERED BY:

Original signed by
PAMELA C. CREEDON, Executive Officer

February 23, 2011
Date

9 May 2007
Revised: 23 February 2011

**REVISED MONITORING AND REPORTING PROGRAM NO. R5-2007-0035
ATTACHMENT A**

**Groundwater Monitoring,
Monitoring Well Installation And Sampling Plan
And
Monitoring Well Installation Completion Report
For
Existing Milk Cow Dairies**

I. Groundwater Monitoring

The provisions of Attachment A are set out pursuant to the Executive Officer's authority under California Water Code (CWC) Section 13267 to order Dischargers to implement monitoring and reporting programs. The purpose of groundwater monitoring required by these provisions is to confirm that management practices being employed for the wastewater retention system, land application areas, and animal confinement areas, are protective of groundwater quality and comply with Groundwater Limitation D.1 of the Waste Discharge Requirements General Order for Existing Milk Cow Dairy Facilities (Order).

As an alternative to installing monitoring wells on an individual basis as set out in Section II, Dischargers subject to Order No. R5-2007-0035 (Order) may participate in a Representative Monitoring Program that meets the requirements set forth in Section III below. Dischargers choosing to participate in a Representative Monitoring Program must notify the California Regional Water Quality Control Board, Central Valley Region (Central Valley Water Board). Notification to the Central Valley Water Board¹ must include identification of the Representative Monitoring Program that the Discharger intends to join. Dischargers choosing not to participate in a Representative Monitoring Program or those failing to notify the Central Valley Water Board of their decision to participate in a Representative Monitoring Program, will continue to be subject to the groundwater monitoring requirements of the Order and Monitoring and Reporting Program No. R5-2007-0035 (MRP). If necessary, the Executive Officer will prioritize these groundwater monitoring requirements based on the factors in Table 5 below.

A Representative Monitoring Program is not a Discharger. New or expanded dairy owners and operators are Dischargers and are responsible and liable for individual compliance and for determining if they are in compliance with the terms the Order. As set forth in Section III below, an eligible Representative Monitoring Program will convey information related to a Discharger's participation in the Representative Monitoring Program, conduct representative monitoring pursuant to an approved monitoring plan, and prepare and submit any required plans and monitoring reports. However, member Dischargers will be responsible for failure on the part of the Representative Monitoring Program to comply with the MRP.

¹ In lieu of individual discharger notifications to the Central Valley Water Board, a Representative Monitoring Program may provide to the Central Valley Water Board a list of participants that have signed up and met the initial requirements for participation in that Representative Monitoring Program.

If a Discharger participating in a Representative Monitoring Program wishes to terminate participation in the Program, the Discharger shall submit a Notice of Termination to the Executive Officer and the administrator of the Representative Monitoring Program. Administrators of a Representative Monitoring Program shall also notify the Executive Officer of a participant's failure to participate in their Representative Monitoring Program. A Representative Monitoring Program shall inform the Executive Officer of the participant's failure to participate within 45 days, which may result in the Executive Officer issuing a Notice of Termination to the Discharger stating that the Discharger is no longer able to participate in a Representative Monitoring Program as an alternative to individual groundwater monitoring. Termination from participation in a Representative Monitoring Program will occur on the date specified in the Notice of Termination, unless otherwise specified. Dischargers who voluntarily terminate their participation in a Representative Monitoring Program, receive a Notice of Termination from a Representative Monitoring Program, or receive a Notice of Termination from the Executive Officer, shall be individually subject to the groundwater monitoring requirements of the Order and MRP.

Pursuant to the CWC Section 13267, the Executive Officer may, at any time, order implementation of individual groundwater monitoring at an expanded or new dairy facility, even if the Discharger participates in a Representative Monitoring Program. Such order may occur, for instance, if violations of the Order are documented and/or the facility is found to be in an area where site conditions and characteristics pose a high risk to groundwater quality. In the event the Executive Officer orders implementation of individual groundwater monitoring to a participant of a Representative Monitoring Program, such an order shall constitute a Notice of Termination to the participant and the Discharger shall no longer be eligible to participate in a Representative Monitoring Program to comply with the groundwater monitoring requirements of the MRP.

II. Individual Monitoring Program Requirements

1. The Discharger shall install sufficient monitoring wells to:
 - a. Characterize groundwater flow direction and gradient beneath the site;
 - b. Characterize natural background (unaffected by the Discharger or others) groundwater quality upgradient of the facility; and
 - c. Characterize groundwater quality downgradient of the corrals, downgradient of the retention ponds, and downgradient of the land application areas.
2. It may be necessary to install more than one upgradient monitoring well (i.e., for the production area and the land application area). The Executive Officer may order more extensive monitoring based on site-specific conditions.

TABLE 5. GROUNDWATER MONITORING FACTORS FOR RANKING PRIORITY			
FACTOR	SITE CONDITION	POINTS	SCORE
Highest nitrate concentration (nitrate-nitrogen in mg/L) in any existing domestic well, agricultural supply well, or subsurface (tile) drainage system at the dairy or associated land application area.	< 10	0	
	10 to 20	10	
	> 20	20	
Location of production area or land application area relative to a Department of Pesticide Groundwater Protection Area (GWPA).	Outside GWPA	0	
	In GWPA	20	
Distance (feet) of production area or land application area from an artificial recharge area as identified in the California Department of Water Resources Bulletin 118 or by the Executive Officer.	> 1,500	0	
	601 to 1,500	10	
	0 to 600	20	
Nitrate concentration (nitrate-nitrogen in mg/L) in domestic well on property adjacent to the dairy production area or land application area (detected two or more times).	< 10 or unknown	0	
	10 or greater	20	
Distance (feet) from dairy production area or land application area and the nearest off-property domestic well.	> 600	0	
	301 to 600	10	
	0 to 300	20	
Distance (feet) from dairy production area or land application area and the nearest off-property municipal well.	> 1,500	0	
	601 to 1,500	10	
	0 to 600	20	
Number of crops grown per year per field.	1	5	
	2	10	
	3	15	
Whole Farm Nitrogen Balance.	< 1.65	0	
	1.65 to 3	10	
	> 3	20	

Total Score: _____

3. Prior to installation of monitoring wells, the Discharger shall submit to the Executive Officer a Monitoring Well Installation and Sampling Plan (MWISP) (see below) and schedule prepared by, or under the direct supervision of, and certified by, a California registered civil engineer or a California registered geologist with experience in hydrogeology. Installation of monitoring wells shall not begin until the Executive Officer notifies the Discharger in writing that the MWISP is acceptable.
4. All monitoring wells shall be constructed in a manner that maintains the integrity of the monitoring well borehole and prevents the well (including the annular space outside of the well casing) from acting as a conduit for pollutant/contaminant transport. Each monitoring well shall be appropriately designed and constructed to enable collection of representative samples of the first encountered groundwater.
5. The construction and destruction of monitoring wells and supply wells shall be in accordance with the standards under *Water Wells* and *Monitoring Wells* in the *California Well Standards Bulletin 74-90 (June 1991)* and *Bulletin 74-81 (December 1981)*, adopted by the Department of Water Resources (DWR). Should any county or local agency adopt more stringent standards than that adopted by the DWR, then these local standards shall supercede the Well Standard of DWR, and the Discharger shall comply with the more stringent standards. More stringent practices shall be implemented if needed to prevent the well from acting as a conduit for the vertical migration of waste constituents.
6. The horizontal and vertical position of each monitoring well shall be determined by a registered land surveyor or other qualified professional. The horizontal position of each monitoring well shall be measured with one-foot lateral accuracy using the North American Datum 1983 (NAD83 datum). The vertical elevations of each monitoring well shall be referenced to the North American Vertical Datum 1988 (NAVD88 datum) to an absolute accuracy of at least 0.5 feet and a relative accuracy between monitoring wells of 0.01 feet.
7. Within 45 days after completion of any monitoring well, the Discharger shall submit to the Executive Officer a Monitoring Well Installation Completion Report (MWICR) (see below) prepared by, or under the direct supervision of, and certified by, a California registered civil engineer or a California registered geologist with experience in hydrogeology.
8. The Discharger shall sample monitoring wells for the constituents and at the frequency as specified in Table 6 below. Groundwater monitoring shall include monitoring during periods of the expected highest and lowest water table levels.

Table 6. ADDITIONAL GROUNDWATER MONITORING

<p><i>Monitoring Wells</i></p> <p><u>Quarterly</u>¹: Measurement of the depth to groundwater from a surveyed reference point to the nearest 0.01 foot in each monitoring well.</p> <p><u>Semi-annually</u>: Field measurements of electrical conductivity, temperature, and pH. Laboratory analyses for nitrate and ammonia.</p> <p><u>Within six months of well construction and every two years thereafter</u>: Laboratory analyses for general minerals (calcium, magnesium, sodium, potassium, bicarbonate, carbonate, sulfate, and chloride).</p>

¹ After two years of quarterly depth to groundwater measurements, the discharger may request reduction of frequency of depth to groundwater measurements to semi-annually upon demonstration there are no seasonal impacts to groundwater levels.

9. Groundwater samples from monitoring wells shall be collected as specified in the approved Monitoring Well Installation and Sampling Plan (MWISP).
10. The Discharger shall submit to the Executive officer an annual assessment of the groundwater monitoring data due 1 July of each year. The annual assessment may be attached to the annual report required in Section C of the MRP. The annual assessment shall include a tabulated summary of all analytical data collected to date including analytical lab reports for data collected during the past year. The assessment shall include an evaluation of the groundwater monitoring program's adequacy to assess compliance with the Order, including whether the data provided is representative of conditions upgradient and downgradient wastewater management area, production area and land application area of the dairy facility. The assessment shall also include an evaluation of the groundwater monitoring data collected to date with a description of the statistical or non-statistical methods used. The assessment must use methods approved by the Executive Officer. If the Discharger determines that the analytical methods required by this MRP are insufficient to identify whether site activities are impacting groundwater quality, the annual assessment must address Item II.11 below and employ the needed analyses during future monitoring events.
11. If the monitoring parameters required by this MRP are insufficient to identify whether site activities are impacting groundwater quality, the Discharger must employ all reasonable chemical analyses to differentiate the source of the particular constituent. This includes, but is not limited to, analyses for a wider array of constituents and chemical isotopes.
12. Within six years of initiating sampling activities, the Discharger shall submit to the Executive Officer a summary report presenting a detailed assessment of the monitoring data to evaluate whether site activities associated with operation of the wastewater retention system, corrals, or land application areas have impacted groundwater quality. This summary report can be required at an earlier date if evaluation by the Discharger or Central Valley Water Board staff indicates that the

assessment can be completed at an earlier date. This summary report shall also include detailed descriptions of management practices employed at the wastewater retention system, animal confinement areas, and land application areas along with the design standards of the wastewater retention system. The summary report must include an adequate technical justification for the conclusions incorporating available data and reasonable interpretations of geologic and engineering principles to identify management practices protective of groundwater quality. The summary report is subject to approval by the Executive Officer. If monitoring data indicate that Groundwater Limitation D.1 of the Order has been violated, this assessment shall include a description of changes in management practices and/or activities that will be undertaken to bring the facility into compliance. Annual reports required in Section C of the MRP submitted after this summary report must include a discussion on implementation of changes in management practices and/or activities that are being taken and an evaluation of progress in complying with Groundwater Limitation D.1 of the Order.

13. At any time during the term of this permit, the Central Valley Water Board may notify the Discharger to submit assessments of groundwater monitoring data (including the annual reports and the summary report) electronically. Data shall be submitted in a digital format acceptable to the Executive Officer.

III. Representative Monitoring Program Requirements

To establish a Representative Monitoring Program in lieu of individual groundwater monitoring, the Representative Monitoring Program must have Executive Officer approval of a submitted Monitoring and Reporting Workplan. The Monitoring and Reporting Workplan shall include sufficient information for the Executive Officer to evaluate the adequacy of the proposed groundwater monitoring program to serve as an alternative to the installation of individual groundwater monitoring wells at dairies. The Monitoring and Reporting Workplan must explain how data collected at facilities that are monitored will be used to assess impacts to groundwater at facilities that are not part of the Representative Monitoring Program's network of monitoring wells. This information is needed to demonstrate whether collected facility monitoring data will allow identification of practices that are protective of water quality at all facilities represented by the Representative Monitoring Program, including those for which on-site data are not collected. The Monitoring and Reporting Workplan must additionally propose constituents the Representative Monitoring Program will monitor and the frequency of monitoring for each constituent identified. The Monitoring and Reporting Workplan must propose a list of constituents that is sufficient to identify whether activities at facilities being monitored are impacting groundwater quality. The list of constituents may necessarily be greater than the constituents required to be monitored at sites under individual orders (as listed in Table 6), as failure to determine whether groundwater has been impacted at a monitored facility will impair the ability to extrapolate findings to facilities where monitoring does not occur. At a minimum the baseline constituents shall include those required of individual groundwater monitoring systems.

1. Once the Monitoring and Reporting Workplan is approved, the Representative Monitoring Program shall begin the process of installing monitoring wells as prescribed in paragraphs 3-7 below.
2. Prior to installation of monitoring wells, the Representative Monitoring Program shall submit to the Executive Officer a MWISP (see below) and schedule prepared by, or under the direct supervision of, and certified by, a California registered civil engineer or a California registered geologist with experience in hydrogeology. Installation of monitoring wells shall not begin until the Executive Officer notifies the Representative Monitoring Program in writing that the MWISP is acceptable. The MWISP must be submitted within 60 days of Executive Officer approval of the Monitoring and Reporting Workplan.
3. All monitoring wells shall be constructed in a manner that maintains the integrity of the monitoring well borehole and prevents the well (including the annular space outside of the well casing) from acting as a conduit for pollutant/contaminant transport. Each monitoring well shall be appropriately designed and constructed to enable collection of representative samples of the first encountered groundwater.
4. The construction and destruction of monitoring wells and supply wells shall be in accordance with the standards under *Water Wells* and *Monitoring Wells* in the *California Well Standards Bulletin 74-90 (June 1991)* and *Bulletin 74-81 (December 1981)*, adopted by the Department of Water Resources (DWR). Should any county or local agency adopt more stringent standards than that adopted by the DWR, then these local standards shall supersede the Well Standard of DWR, and the Representative Monitoring Program shall comply with the more stringent standards. More stringent practices shall be implemented if needed to prevent the well from acting as a conduit for the vertical migration of waste constituents.
5. The horizontal and vertical position of each monitoring well shall be determined by a registered land surveyor or other qualified professional. The horizontal position of each monitoring well shall be measured with one-foot lateral accuracy using the North American Datum 1983 (NAD83 datum). The vertical elevations of each monitoring well shall be referenced to the North American Vertical Datum 1988 (NAVD88 datum) to an absolute accuracy of at least 0.5 feet and a relative accuracy between monitoring wells of 0.01 feet.
6. Within 45 days after completion of any monitoring well network, the Representative Monitoring Program shall submit to the Executive Officer a MWICR (see below) prepared by, or under the direct supervision of, and certified by, a California registered civil engineer or a California registered geologist with experience in hydrogeology. In cases where monitoring wells are completed in phases or completion of the network is delayed for any reason, monitoring well construction data are to be submitted within 180 days of well completion, even if this requires submittal of multiple reports.

7. Once the groundwater monitoring network is installed pursuant to an approved Monitoring and Reporting Workplan and paragraphs 3-6 above, the Representative Monitoring Program shall sample monitoring wells for the constituents and at the frequencies as specified in the approved Monitoring and Reporting Workplan. Groundwater monitoring shall include monitoring during periods of the expected highest and lowest water table levels. In cases where the monitoring wells are completed in phases or completion of the monitoring well network is delayed for any reason, collection and analysis of groundwater samples from each well is to commence within 180 days of completion of that well.
8. Groundwater samples from monitoring wells shall be collected as specified in an approved MWISP.
9. The Representative Monitoring Program shall submit to the Executive Officer an Annual Representative Monitoring Report (ARMR). The ARMР shall be due by 1 April of each year and shall include all data (including analytical reports) collected during the previous calendar year. The ARMР shall also contain a tabulated summary of data collected to date by the Representative Monitoring Program. The ARMР shall describe the monitoring activities conducted by the Representative Monitoring Program, and identify the number and location of installed monitoring wells and other types of monitoring devices. Within each ARMР, the Representative Monitoring Program shall evaluate the groundwater monitoring data to determine whether groundwater is being impacted by activities at facilities being monitored by the Representative Monitoring Program. The submittal shall include a description of the methods used in evaluating the groundwater monitoring data. Each ARMР shall include an evaluation of whether the representative monitoring program is on track to provide the data needed to complete the summary report (detailed in Item III.10 below). If the evaluation concludes that information needed to complete the summary report may not be available by the required deadline, the ARMР shall include measures that will be taken to bring the program back on track.

The ARMР shall include an evaluation of data collected to date and an assessment of whether monitored dairies are implementing management practices that are protective of groundwater quality. If the management practices being implemented at a dairy being monitored are found to not be protective of groundwater quality, the Executive Officer may issue an order to the owner/operator of the monitored dairy to identify and implement management practices that are protective of groundwater quality prior to submittal of the report described in Item III.10 below.

10. No later than six (6) years following submittal of the first ARMР, the Representative Monitoring Program shall submit a Summary Representative Monitoring Report (SRMR) identifying management practices that are protective of groundwater quality for the range of conditions found at facilities covered by

- the Representative Monitoring Program. The identification of management practices for the range of conditions must be of sufficient specificity to allow participants covered by the Representative Monitoring Program and the Central Valley Water Board to identify which practices at monitored facilities are appropriate for facilities with a corresponding range of site conditions, and generally where such facilities may be located within the Central Valley (e.g., the summary report may need to include maps of the Central Valley that identify the types of management practices that should be implemented in certain areas based on specified site conditions). The summary report must include an adequate technical justification for the conclusions incorporating available data and reasonable interpretations of geologic and engineering principles to identify management practices protective of groundwater quality. The summary report is subject to approval by the Executive Officer.
11. Assessments of groundwater monitoring data (including the annual reports and the summary report) are to be submitted electronically. Data shall be submitted in an electronic format acceptable to the Executive Officer.
 12. On July 1 following Executive Officer approval of the SRMR, each Discharger that is a participant covered by a Representative Monitoring Program shall include in their annual report required in Section C of the MRP a description of management practices currently being implemented at their wastewater retention system(s), land application area(s), and animal confinement area(s). If these management practices are not confirmed to be protective of groundwater quality based on information contained in the SRMR, and therefore are not confirmed to be sufficient to ensure compliance of the facility with Groundwater Limitation D.1 of the Order the Discharger's annual report shall identify which alternative management practices the participant intends to implement at its dairy facility (based on the findings of the SRMR). Management practices deemed to be protective of groundwater quality are subject to approval by the Executive Officer. With each annual report submitted after the first report following Executive Officer approval of the SRMR, each participant shall include within his or her annual report an update with respect to implementation of the additional or alternative management practices being employed by the Discharger to protect groundwater quality.
 13. Within three months of joining a Representative Monitoring Program, each Discharger that is a participant covered by a Representative Monitoring Program shall submit to the Central Valley Water Board a letter stating that they are voluntarily joining the Representative Monitoring Program, they are aware of the conditions and requirements to be a member of the Program, they intend to fully comply with the monitoring and reporting program and intent of the Program, and they are fully aware failure to comply with the Program may result in their removal from the Program and that they may be subject to enforcement by the Central Valley Water Board.

IV. Monitoring Well Installation and Sampling Plan (MWISP) (Applicable to both Individual and Representative Monitoring Program Requirements)

At a minimum, the MWISP must contain all of the information listed below.

1. General Information:
 - a. Topographic map showing any existing nearby (about 2,000 feet) domestic, irrigation, and municipal supply wells and monitoring wells known to the Discharger, utilities, surface water bodies, drainage courses and their tributaries/destinations, and other major physical and man-made features, as appropriate.
 - b. Site plan showing proposed well locations, other existing wells, unused and/or abandoned wells, major physical site structures (such as corrals, freestall barns, milking barns, feed storage areas, etc.), waste handling facilities (including solid separation basins, retention ponds, manure storage areas), irrigated cropland and pasture, and on-site surface water features.
 - c. Rationale for the number of proposed monitoring wells, their locations and depths, and identification of anticipated depth to groundwater. In the case of a Representative Monitoring Program, this information must include an explanation of how the location, number, and depths of wells proposed will result in the collection of data that can be used to assess groundwater at sites with a variety of conditions that have joined the Representative Monitoring Program but are not being monitored as part of the monitoring network.
 - d. Local permitting information (as required for drilling, well seals, boring/well abandonment).
 - e. Drilling details, including methods and types of equipment for drilling and logging activities. Equipment decontamination procedures (as appropriate) should be described.
 - f. Health and Safety Plan.
2. Proposed Drilling Details:
 - a. Drilling techniques.
 - b. Well logging method.

3. Proposed Monitoring Well Design - all proposed well construction information must be displayed on a construction diagram or schematic to accurately identify the following:
 - a. Well depth.
 - b. Borehole depth and diameter.
 - c. Well construction materials.
 - d. Casing material and diameter - include conductor casing, if appropriate.
 - e. Location and length of perforation interval, size of perforations, and rationale.
 - f. Location and thickness of filter pack, type and size of filter pack material, and rationale.
 - g. Location and thickness of bentonite seal.
 - h. Location, thickness, and type of annular seal.
 - i. Surface seal depth and material.
 - j. Type of well cap(s).
 - k. Type of well surface completion.
 - l. Well protection devices (such as below-grade water-tight vaults, locking steel monument, bollards, etc.).
4. Proposed Monitoring Well Development:
 - a. Schedule for development (not less than 48 hours or more than 10 days after well completion).
 - b. Method of development.
 - c. Method of determining when development is complete.
 - d. Parameters to be monitored during development.
 - e. Method for storage and disposal of development water.
5. Proposed Surveying:
 - a. How horizontal and vertical position of each monitoring well will be determined.

- b. The accuracy of horizontal and vertical measurements to be obtained.
 - c. The California licensed professional (licensed land surveyor or civil engineer) to perform the survey.
6. Proposed Groundwater Monitoring:
- a. Schedule (at least 48 hours after well development).
 - b. Depth to groundwater measuring equipment (e.g., electric sounder or chalked tape capable of ± 0.01 -foot measurements).
 - c. Well purging method, equipment, and amount of purge water.
 - d. Sample collection (e.g., bottles and preservation methods), handling procedures, and holding times.
 - e. Quality assurance/quality control (QA/QC) procedures (as appropriate).
 - f. Analytical procedures.
 - g. Equipment decontamination procedures (as appropriate).
7. Proposed Schedule:
- a. Fieldwork.
 - b. Laboratory analyses.
 - c. Report submittal.

V. Monitoring Well Installation Completion Report (MWICR)

At a minimum, the MWICR shall summarize the field activities as described below.

1. General Information:
- a. Brief overview of field activities including well installation summary (such as number, depths), and description and resolution of difficulties encountered during field program.
 - b. Topographic map showing any existing nearby domestic, irrigation, and municipal supply wells and monitoring wells, utilities, surface water bodies, drainage courses and their tributaries/destinations, and other major physical and man-made features.

- c. Site plan showing monitoring well locations, other existing wells, unused and/or abandoned wells, major physical site structures (such as corrals, freestall barns, milking barns, feed storage areas, etc.), waste handling facilities (including solid separation basins, retention ponds, manure storage areas), land application area(s), and on-site surface water features.
 - d. Period of field activities and milestone events (e.g., distinguish between dates of well installation, development, and sampling).
2. Monitoring Well Construction:
- a. Number and depths of monitoring wells installed.
 - b. Monitoring well identification (i.e., numbers).
 - c. Date(s) of drilling and well installation.
 - d. Description of monitoring well locations including field-implemented changes (from proposed locations) due to physical obstacles or safety hazards.
 - e. Description of drilling and construction, including equipment, methods, and difficulties encountered (such as hole collapse, lost circulation, need for fishing).
 - f. Name of drilling company, driller, and logger (site geologist to be identified).
 - g. As-builts for each monitoring well with the following details:
 - i. Well identification.
 - ii. Total borehole and well depth.
 - iii. Date of installation.
 - iv. Boring diameter.
 - v. Casing material and diameter (include conductor casing, if appropriate).
 - vi. Location and thickness of slotted casing, perforation size.
 - vii. Location, thickness, type, and size of filter pack.
 - viii. Location and thickness of bentonite seal.

- ix. Location, thickness, and type of annular seal.
 - x. Depth of surface seal.
 - xi. Type of well cap.
 - xii. Type of surface completion.
 - xiii. Depth to water (note any rises in water level from initial measurement) and date of measurement.
 - xiv. Well protection device (such as below-grade water-tight vaults, stovepipe, bollards, etc).
- h. All depth to groundwater measurements during field program.
 - i. Field notes from drilling and installation activities (e.g., all subcontractor dailies, as appropriate).
 - j. Construction summary table of pertinent information such as date of installation, well depth, casing diameter, screen interval, bentonite seal interval, and well elevation.
3. Monitoring Well Development:
- a. Date(s) and time of development.
 - b. Name of developer.
 - c. Method of development.
 - d. Methods used to identify completion of development.
 - e. Development log: volume of water purged and measurements of temperature, pH, and electrical conductivity during and after development.
 - f. Disposition of development water.
 - g. Field notes (such a bailing to dryness, recovery time, number of development cycles).
4. Monitoring Well Survey:
- a. Identify coordinate system or reference points used.
 - b. Description of measuring points (e.g., ground surface, top of casing, etc.).

- c. Horizontal and vertical coordinates of well casing with cap removed (measuring point to nearest ± 0.01 foot).
- d. Name, license number, and signature of California licensed professional who conducted survey.
- e. Surveyor's field notes.
- f. Tabulated survey data.