ATTACHMENT C

REQUIREMENTS FOR MONITORING WELL INSTALLATION WORKPLANS AND MONITORING WELL INSTALLATION REPORTS

Prior to installation of any additional groundwater monitoring wells, the Discharger shall submit an updated workplan containing, at a minimum, the information listed in Section 1, below. Wells may only be installed after Central Valley Water Board staff approves the workplan. Upon installation of the monitoring wells, the Discharger shall submit a well installation report which includes the information contained in Section 2, below. All workplans and reports must be prepared under the direction of, and signed by, a registered geologist or civil engineer licensed by the State of California.

SECTION 1 - Monitoring Well Installation Workplan and Groundwater Sampling and Analysis Plan

The monitoring well installation workplan shall contain the following minimum information:

A. General Information:
   A discussion of the purpose of the well installation project;
   A brief description of local geologic and hydrogeologic conditions;
   The proposed monitoring well locations and rationale for well locations;
   A topographic map showing facility location, roads, and surface water bodies; and
   A large scaled site map showing all existing on-site wells, proposed wells, surface drainage courses, surface water bodies, buildings, waste handling facilities, utilities, and major physical and man-made features.

B. Drilling Details:
   The person responsible for on-site supervision of drilling and well installation activities;
   A description of the drilling method/equipment and techniques to be used;
   A description of the equipment decontamination procedures to be used; and
   A description of the soil sampling methods to be used, the intervals sampled, and soil logging methods.

C. Monitoring Well Design (in narrative and/or graphic form) including:
   A diagram of the proposed well construction details;
   - Borehole diameter;
   - Casing and screen material, diameter, and centralizer spacing (if needed);
   - Type of well caps (bottom cap either screw on or secured with stainless steel screws);
   - Anticipated depth of well, length of well casing, and length and position of perforated interval;
   - Thickness, position and composition of surface seal, sanitary seal, and sand pack; and
   - Anticipated screen slot size and filter pack.

D. Well Development (not to be performed until at least 48 hours after sanitary seal placement):

Method of development to be used (i.e., surge, bail, pump, etc.);
Parameters to be monitored during development and record keeping technique;
Method of determining when development is complete; and
The method used to dispose development water.

E. Well Survey (precision of vertical survey data shall be at least 0.01 foot):

Identify the Licensed Land Surveyor or Civil Engineer that will perform the survey;
The datum used for survey measurements; and
A discussion/list of well features to be surveyed (i.e. top of casing, horizontal and vertical coordinates, etc.).

F. Schedule for Completion of Work

G. Appendix: Groundwater Sampling and Analysis Plan (SAP)

The Groundwater SAP shall be included as an appendix to the workplan, and shall be utilized as a guidance document that is referred to by individuals responsible for conducting groundwater monitoring and sampling activities.

The SAP shall provide a detailed written description of standard operating procedures for the following:

Equipment to be used during sampling;
Equipment decontamination procedures;
Water level measurement procedures;
Well purging (include a discussion of procedures to follow if three casing volumes cannot be purged);
Monitoring and record keeping during water level measurement and well purging (include copies of record keeping logs to be used);
Purge water disposal;
Analytical methods and required reporting limits;
Sample containers and preservatives;
Sampling;

- General sampling techniques
- Record keeping during sampling (include copies of record keeping logs to be used)
- QA/QC samples

Chain of Custody; and
Sample handling and transport.

SECTION 2 - Monitoring Well Installation Completion Report

The monitoring well installation report must provide the information listed below. In addition, the report must also clearly identify, describe, and justify any deviations from the approved workplan.

A. General Information:
The purpose of the well installation project;
A Brief description of local geologic and hydrogeologic conditions encountered during installation of the wells;
The number of monitoring wells installed and copies of County Well Construction Permits;
A topographic map showing facility location, roads, and surface water bodies; and
A scaled site map showing all previously existing wells, newly installed wells, surface water bodies, buildings, waste handling facilities, utilities, and other major physical and man-made features.

B. Drilling Details (in narrative and/or graphic form) including:
The individual responsible for on-site supervision of drilling and well installation activities;
The drilling contractor and driller's name;
A description of drilling equipment and techniques used;
The equipment decontamination procedures used;
The soil sampling intervals and logging methods; and
Well boring logs depicting/describing:
- Well boring number and date drilled;
- Borehole diameter and total depth;
- Total depth of open hole (same as total depth drilled if no caving or back-grouting occurs);
- Depth to first encountered groundwater and stabilized groundwater depth;
- Detailed description of soils encountered, using the Unified Soil Classification System.

C. A description of the Well Construction Details (in narrative and/or graphic form):
A well construction diagram, including:
- Monitoring well number and date constructed;
- Casing and screen material, diameter, and centralizer spacing (if needed);
- Length of well casing, and length and position of perforated interval;
- Thickness, position and composition of surface seal, sanitary seal, and sand pack;
- Type of well caps (bottom cap slotted or not).

D. A description of the Well Development performed:
The date(s) of development and method(s) of development used;
How well development completion was determined;

The volume of water purged from well and method of development water disposal; and

A copy of the field notes from well development.

E. Well Survey (survey the north side of the top rim of the well casing with the cap removed):
Identify the type and location of permanent marking used to indicate the surveyed point;
Identify the coordinate system and datum for survey measurements;
Describe the measuring points (i.e. ground surface, top of casing, etc.);
Present the well survey report data in a table; and
Include the Registered Engineer or Licensed Surveyor's report and field notes in an appendix.