

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. R5-2006-0900

REQUIRING MERIDIAN BEARTRACK COMPANY
MERIDIAN GOLD COMPANY
AND FELIX MINING COMPANY
ROYAL MOUNTAIN KING MINE FACILITY
CALAVERAS COUNTY

TO COMPLY WITH REQUIREMENTS PRESCRIBED IN ORDER NO. R5-2001-0040

The Executive Officer of the California Regional Water Quality Control Board, Central Valley Region, (hereafter Regional Board) finds that:

1. On 15 March 2001, the Regional Board adopted Closure Waste Discharge Requirements (WDRs) Order No. 5-01-040 prescribing requirements for the Royal Mountain King Mine (RMKM), which is owned and operated by Meridian Beartrack Company, Meridian Gold Company, and Felix Mining Company (hereafter Discharger).
2. WDRs Order No. 5-01-040 provides, in part, the following:

“A. DISCHARGE PROHIBITIONS

2. *The discharge of waste to groundwater, surface water, or surface water drainage courses is prohibited except as specified by this Order.*
4. *The discharge of wastes into Skyrocket pit other than wastewater, which meets allowable transfer standards, is prohibited.*

B. DISCHARGE SPECIFICATIONS

1. *The treatment or disposal of waste shall not cause pollution or a nuisance as defined in the California Water Code, Section 13050.*
2. *The discharge of wastes shall not cause water quality degradation by allowing a statistically significant increase over background or baseline concentrations.*
3. *Waste materials shall be confined to the waste management units designated for that waste as shown on Attachment B except as specified by this Order.*

E. PROVISIONS

8. *The Discharger shall comply with all applicable provisions of Title 27 that are not specifically referred to in this Order.”*

3. There are three spring seepage areas within the Overburden Disposal Sites (ODSs). These springs are known as Gold Knoll, West ODS2, and West ODS5. The spring water contains metals and salts dissolved from the waste rock. In order to prevent discharges of this wastewater to surface waters, the Discharger currently collects the spring water and sprays it back on top of the ODSs. However, the Discharger has stated that it may be unable to prevent discharges to surface waters during severe wet weather conditions.

4. In November 2004, the Discharger proposed revisions to its Storm Water Pollution Prevention Plan (SWPPP) to cover the winter discharges under its NPDES General Storm Water Permit. In March 2005, staff responded that the discharge of ODS spring water to surface waters cannot be covered by the General Permit. By letter dated 29 November 2005, the Discharger states that its existing ODS recirculation systems may pose a threat to water quality when operated in conjunction with severe wet weather conditions.

5. To prevent winter discharges to surface waters, the Discharger has stated in a letter dated 29 November 2005 that it may need to begin transferring wastewater from the three springs into Skyrocket Pit Lake as early as 10 December 2005.

6. However, the Discharger’s recent BMP improvements precluded the need to transfer water in December 2005. Skyrocket Pit Lake is a mine pit now filled with groundwater, precipitation, water from the Flotation Tailings Reservoir, and water from Gold Knoll Spring.

7. The West ODS2 and West ODS5 springs are at the base of the Western ODS (as shown on Figure 1, which is attached hereto and made part of this Order by reference) and contain elevated concentrations of sulfate, selenium, nitrate and total dissolved solids (TDS) relative to the concentrations in Skyrocket Pit Lake, as shown below. The Gold Knoll Spring is at southwest corner of the Gold Knoll ODS, and contains elevated concentrations of sulfate, selenium, nitrate and TDS relative to Skyrocket Pit Lake

Springs and Lake Results

		Gold Knoll	West ODS2	West ODS5	Skyrocket Pit Lake
Constituent	Units	Median 2004-2005	Median 2004-2005	Median 2004-2005	Median 2004-2005
TDS	mg/l	9,130	3,530	5,180	2,510
Sulfate	mg/l	5,520	2,010	3,090	1,150
Nitrate	mg/l	30	17	6.8	4
Selenium	ug/l	70	12	23	8

8. Regional Board staff believe that Skyrocket Pit Lake discharges to the surrounding previous vadose zone and into groundwater. The water elevation in the lake is higher than surrounding groundwater, forming a groundwater mound. Regional Board staff also believe this mounding is causing flows through the previous vadose zone into Littlejohns Creek Diversion and likely into Littlejohns Creek downgradient of the Skyrocket Pit Lake Dam. Increased flows, as well as increased constituent concentrations, are observed in the summer, when there is no upstream dilution of the discharge which surfaces in the creek.
9. The Discharger's October 2005 Report of Waste Discharge (RWD) states that the transfer of spring water to Skyrocket Pit Lake will (a) increase the constituent concentration in the pit lake and (b) increase the elevation of the water in the pit lake. It is reasonable to assume that this will cause an increased discharge to the previous vadose zone and into groundwater. Therefore, it is anticipated that this transfer will likely increase both the flows into the Littlejohns Creek Diversion and the constituent concentration of those flows.
10. While the Discharger's transfer of spring water from the ODSs into Skyrocket Pit may prevent any discharge of wastewater from these springs to surface waters in the rainy season, it will likely increase the groundwater flows into the Littlejohns Creek diversion on a year-round basis. It is, therefore, appropriate to require the Discharger to monitor whether this transfer will significantly impact surface or groundwater quality.
11. The Discharger has submitted two recent NPDES applications. The latest was submitted on 29 September 2005, and requested a transfer of all ODS seepage water to Skyrocket Pit Lake. During the wet season, the waste in the pit would be blended with surface water from Littlejohns Creek and subsequently released downstream, in order to maintain a lower pit lake level. Regional Board staff found the report incomplete and has asked the Discharger to submit more information.
12. On 14 October 2005, the Discharger submitted a RWD to amend WDRs Order No. 5-01-040 for the interim transfer of all ODS seepages to Skyrocket Pit Lake for storage, pending the issuance of an NPDES permit for wet season discharges to Littlejohns Creek. Regional Board staff finds the report incomplete and will be requesting additional information. Because the Regional Board will be unable to consider amended WDRs prior to the 2005-2006 rainy season, the Discharger has requested that it be allowed to make the transfer under a Time Schedule Order.

REGULATORY CONSIDERATIONS

13. The Gold Knoll, West ODS2 and West ODS5 springs contain elevated waste constituents from Gold Knoll and Western ODSs. The leachate and waste rock material at these ODSs are a Group B mining waste as described in the WDRs and State Board Order WQO-2004-0007. Therefore, the transfer of this waste to Skyrocket Pit, a Group C mining waste unit, violates both Chapter 7 of Title 27 and WDRs Order No. 5-01-040. Due to the transfer allowed herein, the Regional Board

may be asked to consider reclassifying Skyrocket Pit Lake when the WDRs are revised.

14. Regional Board staff believe that the transfer of the Gold Knoll, West ODS2, and West ODS5 springs to Skyrocket Pit Lake will cause a statistically significant increase of metals and salts over baseline concentrations, and will further pollute Skyrocket Pit Lake. This discharge also will not confine Group B mining waste to waste management units designated for that waste. Therefore, this discharge will violate Discharge Specifications B.1, B.2, and B.3 of WDRs Order No. 5-01-040. This transfer will also exceed the water transfer standards described in Discharge Specification B.12, causing a violation of Discharge Prohibition A.4 of WDRs Order No. 5-01-040.
15. The transfer of Gold Knoll, West ODS2, and West ODS5 springs to Skyrocket Pit Lake will cause additional mounding of water above surrounding groundwater, and likely will cause additional flow to the Littlejohn Creek Diversion and groundwater. This additional flow would violate Discharge Prohibition A.2 of WDRs Order No. 5-01-040.
16. As a result of the activities described above, the Executive Officer finds that a discharge of waste is taking place, or threatening to take place, in violation of waste discharge requirements prescribed by the Regional Board.
17. Section 13300 of the California Water Code (CWC) states: *“Whenever a regional board finds that a discharge of waste is taking place or threatening to take place that violates or will violate requirements prescribed by the regional board, or the state board, or that the waste collection, treatment, or disposal facilities of a discharger are approaching capacity, the board may require the discharger to submit for approval of the board, with such modifications as it may deem necessary, a detailed time schedule of specific actions the discharger shall take in order to correct or prevent a violation of requirements.”*
18. Section 13267(b) of the CWC provides that: *“In conducting an investigation specified in subdivision (a), the regional board may require that any person who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste within its region, or any citizen or domiciliary, or political agency or entity of this state who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge, waste outside of its region that could affect the quality of waters within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the regional board requires. The burden, including costs, of these reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained from the reports. In requiring those reports, the regional board shall provide the person with a written explanation with regard to the need for the reports, and shall identify the evidence that supports requiring that person to provide the reports.”*
19. The technical reports required by this Order are necessary to ensure compliance with this Time Schedule Order, WDRs Order No. No. 5-01-040, all applicable provisions of the California Water Code and CCR Title 27, and to ensure the protection of the public health and safety. The Discharger owns and operates the facility that discharges waste subject to this Order.

20. This Time Schedule Order (TSO) was requested by the Discharger “*to transfer captured seepage water from the Overburden Disposal System (“ODSs”) to Skyrocket Pit Lake both to protect water quality and to provide a means of gathering specific data in support of Meridian’s submitted NPDES permit application and proposed permanent revisions to the WDRs in connection with that application.*” The Discharger informed the Regional Board that it would begin this transfer on or about 10 December 2005 depending on weather conditions. The requested transfer is reasonable for the short time period authorized herein to (a) prevent uncontrolled discharge from the ODS springs to surface waters during rain events and (b) collect data to evaluate the water quality effects of the transfer on the surface and groundwater in the vicinity of Skyrocket Pit. Such data is necessary to support a future NPDES permit and/or modifications to the WDRs, as well as to evaluate whether it is appropriate to authorize a long-term transfer of the spring water to Skyrocket Pit Lake.
21. The issuance of this Order is an enforcement action taken by a regulatory agency and is exempt from the provisions of the California Environmental Quality Act, pursuant to Section 15321(a)(2), Title 14, California Code of Regulations.
22. Any person affected by this action of the Regional Board may petition the State Water Resources Control Board (State Board) to review the action in accordance with Section 2050 through 2068, Title 23, California Code of Regulations. The petition must be received by the State Board within 30 days of the date of this Order. Copies of the law and regulations applicable to filing petitions are available at http://www.waterboards.ca.gov/water_laws/cawtrcde/wqpetition_instr.html and will also be provided upon request.

IT IS HEREBY ORDERED THAT pursuant to CWC Sections 13300 and 13267, Meridian Beartrack Company, Meridian Gold Company, and Felix Mining Company shall comply with the following time schedule to ensure future compliance with WDRs Order No. 5-01-040 and Title 27 California Code of Regulations (CCR):

Any person signing a document submitted under this Order shall make the following certification:

“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 knowledge and 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.”

1. By **10 February 2006**, the Dischargers shall initiate all monitoring described in Attachment A, with the exception of the surface water and groundwater monitoring activities, which shall be begin as described below.
2. By **15 February 2006**, the Discharger shall submit a *Groundwater Monitoring Well Installation Workplan*. The workplan shall describe the proposed installation of at least two new monitoring wells, as described in Item No. 1 of Attachment A, which is attached hereto and made part of this

Order by reference. Monitoring wells shall be constructed to yield representative samples from the intervals described in Attachment A. The workplan shall be consistent with, and include the items listed in, the first section of Attachment B, which is attached hereto and made part of this Order by reference.

3. Within **60 days** of staff approval of the Groundwater Monitoring Well Installation Workplan, the Discharger shall submit a *Groundwater Monitoring Well Installation Report* that describes the results of the installation of groundwater monitoring wells, and contains the items found in the second section of Attachment B. The groundwater monitoring described in Attachment A shall commence upon submittal of the Well Installation Report.
4. By **15 May 2006**, the Discharger shall submit a report describing the installation of surface water monitoring stations at the locations as described in Attachment A. The surface water monitoring described in Attachment A shall commence as of this date.
5. By **30 September 2006**, the Dischargers shall submit a report describing methods to either (a) reduce the level of Skyrocket Pit Lake to prevent mounding of the groundwater (i.e. treatment and surface water discharge, enhanced evaporation, etc.) or (b) reduce or prevent the transfer of spring water transferred into the pit lake (i.e., summer recirculation, partial or full cover of the ODS, etc.). The report shall include the *Alternatives Analysis* described in the Discharger's 5 December 2005 letter and shall also include an analysis of treating the wastewater with biological processes using *Pseudomonas Stutzeri* bacteria, a proprietary biological process using a fixed-bed anaerobic bioreactor developed by Applied Biosciences, and tailored ion exchange using chelating polymer resins. In addition, the Discharger shall complete a literature search and evaluate treatment technologies other than those described in the 5 December 2005 letter or mentioned above.
6. By **30 April 2007**, the Dischargers shall submit a report containing an evaluation of all data collected at this facility, with specific emphasis on data collected since January 2004 and the impacts of the transfer of the spring water. At a minimum, this evaluation shall include the following:
 - An evaluation of the changes in Skyrocket Pit Lake water level and a comparison to the modeled water level contained in the 17 October 2005 RWD.
 - An evaluation of the changes in Skyrocket Pit Lake water chemistry and a comparison to the modeled chemistry contained in the 17 October 2005 RWD.
 - A comparison of the flows of the Littlejohn Creek Diversion and Littlejohn Creek below the dam from the pre-transfer period to the period when transfers occur.
 - A comparison of the water chemistry of the Littlejohn Creek Diversion and Littlejohn Creek below the dam from the pre-transfer period to the period when transfers occur.

- An evaluation of groundwater gradient in the area around Skyrocket Pit Lake and any changes that occurred due to the transfer of the spring water.
 - A comparison of groundwater chemistry of Skyrocket Pit Lake from the pre-transfer period to the period when transfers occur.
 - A discussion of overall impacts of the transfer on groundwater and surface water, with an evaluation whether the discharge should continue from water quality perspective.
7. The transfer of wastewater collected from the Gold Knoll, West ODS2, and West ODS5 springs to Skyrocket Pit Lake shall cease effective **30 June 2007**, unless further authorized under a revised enforcement order or revised WDRs.
8. The transfer of wastewater collected from the Gold Knoll, West ODS2, and West ODS5 springs to Skyrocket Pit Lake shall discontinue if any of the following occurs:
- The freeboard in Skyrocket Pit Lake, as measured at the lowest point of overflow at the dam spillway, is less than or equal to two feet.
 - Salts and/or metals concentrations increase in the Littlejohn Creek Diversion or Littlejohns Creek to a statistically significant level.

In addition to the above, the Discharger shall comply with existing WDRs Order No. 5-01-040 and all applicable provisions of the California Water Code and CCR Title 27 that are not specifically referred to in this Order. As required by the California Business and Professions Code Sections 6735, 7835, and 7835.1, all reports shall be prepared by, or under the supervision of, a California Registered Engineer or Professional Geologist and signed by the registered professional.

If, in the opinion of the Executive Officer, the Discharger fails to comply with the provisions of this Order, the Executive Officer may refer this matter to the Attorney General for judicial enforcement or may issue a complaint for administrative civil liability.

Failure to comply with this Order may result in the assessment of an Administrative Civil Liability up to \$1,000 per day or up to \$10,000 per day of violation, depending on the violation, pursuant to the California Water Code, including sections 13268, 13271, and 13350. The Regional Board reserves its right to take any enforcement actions authorized by law.

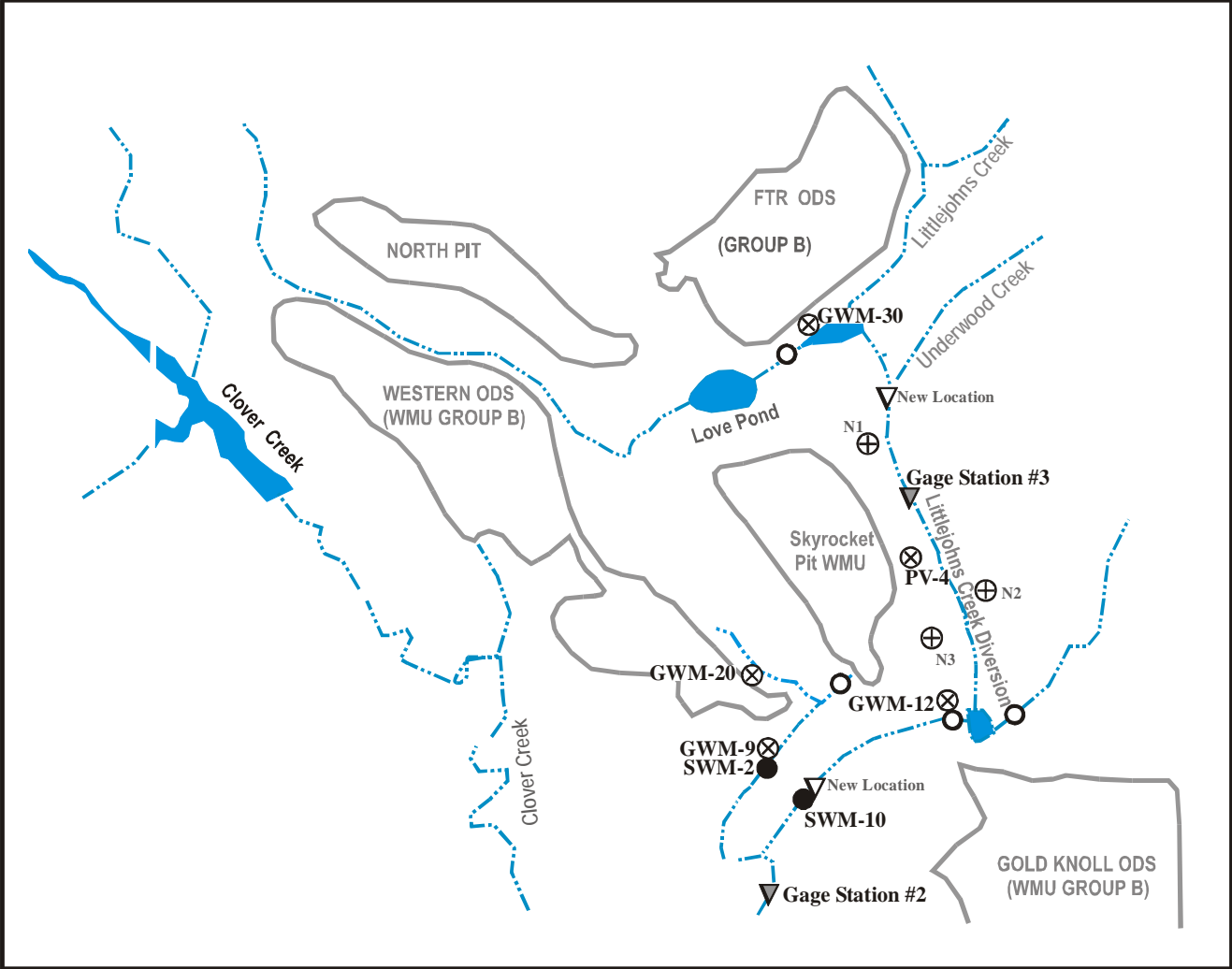
This Order is effective upon the date of signature.

KENNETH D. LANDAU, Acting Executive Officer

(Date)

Attachments:

- Figure 1: Monitoring Locations to Evaluate Impacts of ODS Discharges to Skyrocket Pit Lake
- Attachment A: Additional Monitoring Requirement Pertaining to the Transfer of Overburden Disposal Water to Skyrocket Pit Lake
- Attachment B: Requirements for Monitoring Well Installation Workplans and Monitoring Installation Reports



- ⊗ - Existing Monitoring Well
- ⊕ - Proposed Monitoring Well
- ▽ - Existing Gage Station
- ▽ - New Gage Station
- - Surface Water Monitoring Location
- - Spot Flow Monitoring Location

Figure -1
Monitoring Locations to Evaluate Impacts of ODS Spring Discharges to Skyrocket Pit Lake

Time Schedule Order No. R5-2006-0900
Attachment A

**Additional Monitoring Requirement Pertaining to the Transfer
of Overburden Disposal Water to Skyrocket Pit Lake**

This attachment contains the ground and surface water monitoring required to be completed under Time Schedule Order (TSO) No. R5-2006-0900. The purpose of this monitoring is to collect data to evaluate any water quality impacts that are caused by the transfer of water collected from the Gold Knoll Seep, West ODS2, and West ODS5 springs to Skyrocket Pit Lake. This monitoring will continue as long as the TSO is in effect, and in addition, certain items may be added to the next update of the Monitoring and Reporting Program (MRP) for Royal Mountain King Mine.

All quarterly groundwater, surface water, and pit lake sampling shall be done within a five-day period each quarter.

1. Groundwater Monitoring

- a. Three new monitoring locations will be added to the present groundwater monitoring system. Figure 1 illustrates the approximate location of these monitoring wells. Location N1 and N2 (shown on Figure 1) shall have two screened intervals, one across the interface of the groundwater table and the other at 150 feet. Location N3 shall have a screened interval across the interface of the groundwater table. The well screens shall not exceed 20 feet. At N1 and N2, the two-screened interval requirement may be met by installing two monitoring wells at each location or by installing a dual completion well with two distinct screened intervals.
- b. The following monitoring shall be completed in addition to that required in MRP No. 5-01-040:

Monthly water levels, specific conductance, temperature and pH values will be measured at: GWM-9, GWM-12, GWM-20, GWM-30, PZ-4 and the newly installed monitoring wells described above.

Quarterly samples will be collected at the new monitoring wells described above. The samples shall be analyzed for the constituents in Table 1, below.

Table 1

<u>Constituents</u>	<u>Units</u>	<u>Type of Sample</u>
Static Water Level	Feet MSL	Measured
Temperature	°C	Measured
pH (field)	pH units	Measured
pH (lab)	pH units	Grab
EC	µmhos	Grab
TDS	mg/l	Grab
Chloride	mg/l	Grab
Sulfate	mg/l	Grab

<u>Constituents</u>	<u>Units</u>	<u>Type of Sample</u>
Nitrate	mg/l	Grab
Carbonate	mg/l	Grab
Bicarbonate	mg/l	Grab
Antimony	mg/l	Grab
Arsenic ¹	mg/l	Grab
Chromium (Total)	mg/l	Grab
Copper	mg/l	Grab
Calcium	mg/l	Grab
Sodium	mg/l	Grab
Iron	mg/l	Grab
Lead	mg/l	Grab
Magnesium	mg/l	Grab
Manganese	mg/l	Grab
Nickel ¹	mg/l	Grab
Selenium ¹	mg/l	Grab
Zinc ¹	mg/l	Grab

¹ An appropriate Atomic Absorption (AA) method shall be used for analysis of this constituent.

2. Surface Water Monitoring

- a. Two new weirs shall be installed on the Littlejohns Creek Diversion at the locations illustrated in Figure 1. These weirs are necessary to establish a better understanding of flow increases or decreases along the Littlejohn Creek Diversion and any geochemical changes in the creek as it flows around Skyrocket Pit Lake.
- b. The following monitoring shall be completed in addition to that required in MRP No. 5-01-040:

Continuous flow recordings shall be taken from Gauge Station 2 and 3, as well as the two new gauge stations as described above.

Twice monthly spot flow measurements will be conducted along the Littlejohns Creek Diversion and in Littlejohns Creek channel below the dam. The spot flow measurements will be taken at (a) SWM-2, (b) SWM-10, (c) the toe of the Skyrocket Dam, (d) the culvert where Littlejohns Creek Diversion goes under the old haul road, (e) a small stream entering from east of the culvert, the channel just east of Love Pond and (f-i) at the continuous recording Gauge Stations #2, #3 and two new stations on Littlejohns Creek Diversion (See Figure 1).

The two new gauge stations described above, Gauge Station 2 and SWM-12, will be added to the routine monthly surface water program. These locations will be sampled and analyzed on a monthly basis for temperature, pH, specific conductance, dissolved oxygen, TDS, and TSS. On a quarterly basis, in addition to the monthly sampling, the samples shall be analyzed for constituents in Table 2, below.

3. Skyrocket Pit Lake Monitoring

- a. Lake Surface – Samples will be collected from the pool surface of Skyrocket Pit Lake on a quarterly basis and analyzed for the parameters in Table 2.
- b. Lake Vertical Profile – Samples will be collected from the pool surface of Skyrocket Pit Lake and vertically downward in 100 ft increments on a quarterly basis for the first four quarters and annually thereafter, and analyzed for the parameters in Table 2.

Table 2

<u>Constituents</u>	<u>Units</u>	<u>Type of Sample</u>
Static Water Level	Feet MSL	Measured
pH (field)	pH units	Measured
Dissolved Oxygen	mg/l	Grab
Temperature	°C	Grab
EC	µmhos	Grab
PH (lab)	number	Grab
TDS	mg/l	Grab
Chloride	mg/l	Grab
Sulfate	mg/l	Grab
Nitrate	mg/l	Grab
Carbonate	mg/l	Grab
Bicarbonate	mg/l	Grab
Arsenic ¹	mg/l	Grab
Iron	mg/l	Grab
Calcium	mg/l	Grab
Sodium	mg/l	Grab
Magnesium	mg/l	Grab
Manganese	mg/l	Grab
Copper	mg/l	Grab
Lead	mg/l	Grab
Antimony	mg/l	Grab
Zinc ¹	mg/l	Grab
Nickel ¹	mg/l	Grab
Selenium ¹	mg/l	Grab

¹ An appropriate Atomic Absorption (AA) method shall be used for analysis of this constituent.

- c. A continuous vertical profile shall be done for dissolved oxygen, temperature, conductivity and pH on a quarterly frequency.

4. ODS Spring Flow Monitoring

The volume of water transferred from the Gold Knoll Seep, West ODS2, and West ODS5 springs shall be measured continuously. Total daily and monthly flows shall be reported. On a monthly basis, a sample shall be taken from at each of these ODS springs and analyzed for temperature, pH,

specific conductance, dissolved oxygen, TDS, and TSS.

5. **Weather Monitoring**

The Discharger shall install an on site weather station that records the daily rainfall, high-low temperature and evaporation rate. This information will be used to verify the dischargers Skyrocket Pit Lake model.

6. **Sampling and Analysis Plan**

The Sampling and Analysis plan previously approved for this facility shall be used for the above monitoring. Any updates to this plan shall include specific methods for demonstrating compliance with the water quality protection standard and information on sample collection, handling, chain of custody control, analytical procedures, and field and laboratory quality assurance and quality control.

7. **Reporting**

The data required in this TSO monitoring program shall be reported in the quarterly reports required by Monitoring and Reporting Program No. 5-01-040.

ORDER NO. R5-2006-0900
ATTACHMENT B
REQUIREMENTS FOR
MONITORING WELL INSTALLATION WORKPLANS AND
MONITORING WELL INSTALLATION REPORTS

Prior to installation of groundwater monitoring wells, the Discharger shall submit a workplan containing, at a minimum, the information listed in Section 1, below. Wells may be installed after staff approve 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:

- Purpose of the well installation project
- Brief description of local geologic and hydrogeologic conditions
- Proposed monitoring well locations and rationale for well locations
- Topographic map showing facility location, roads, and surface water bodies
- 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:

- On-site supervision of drilling and well installation activities
- Description of drilling equipment and techniques
- Equipment decontamination procedures
- Soil sampling intervals (if appropriate) and logging methods

C. Monitoring Well Design (in narrative and/or graphic form):

- Diagram of 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
 - 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

California Environmental Protection Agency

Disposal of 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
Datum for survey measurements
List well features to be surveyed (i.e. top of casing, horizontal and vertical coordinates, etc.)
- F. Schedule for Completion of Work

SECTION 2 - Monitoring Well Installation 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:
Purpose of the well installation project
Brief description of local geologic and hydrogeologic conditions encountered during installation of the wells
Number of monitoring wells installed and copies of County Well Construction Permits
Topographic map showing facility location, roads, surface water bodies
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):
On-site supervision of drilling and well installation activities
Drilling contractor and driller's name
Description of drilling equipment and techniques
Equipment decontamination procedures
Soil sampling intervals and logging methods
Well boring log
- 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. Well Construction Details (in narrative and/or graphic form):
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 either screw on or secured with stainless steel screws)
- E. Well Development:

- Date(s) and method of development
- How well development completion was determined
- Volume of water purged from well and method of development water disposal
- Field notes from well development should be included in report

- F. Well Survey (survey the top rim of the well casing with the cap removed):
- 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
 - Include the Registered Engineer or Licensed Surveyor's report and field notes in appendix