Revisions of the Draft Water Quality Monitoring Program for the Union Mine Landfill

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Presented below are revisions of the Central Valley Regional Water Quality Control Board's (CVRWQCB) May 18, 1998 Tentative Order revising the Monitoring and Reporting Program (MPR) No. 94-149 for the Union Mine Disposal Site.

The Union Mine Landfill is located at an unsuitable site for a municipal landfill due to the geology, surface and groundwater hydrology, and close proximity to high quality aquatic resources (fish and aquatic life habitat) in Martinez Creek. The characteristics of the Union Mine Landfill require that a considerably expanded water quality monitoring program be implemented to more adequately protect the aquatic life resources of Martinez Creek than is possible by the existing and CVRWQCB May 18, 1998 proposed revised Monitoring and Reporting Program. This revised water quality monitoring plan utilizes the CVRWQCB Tentative Order Monitoring and Reporting Program as the basic framework for the monitoring and expands it where necessary. It includes the addition of two additional upgradient monitoring wells, five additional downgradient monitoring wells, a near Seep monitoring well, two sampling locations for storm water runoff from the Spray fields, and upgradient monitoring point on the Unnamed Tributary, sample of the South Basin discharge, an additional upgradient and a downgradient sampling points on Martinez Creek. Further the sampling frequency and additional monitoring parameters have been added to the sampling program. Biological assessment and toxicity testing of Martinez Creek have been added to the monitoring program. This revised monitoring program will provide increased protection of Martinez Creek from pollution by the El Dorado County Union Mine Landfill.

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CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

REVISED MONITORING AND REPORTING PROGRAM NO. 94-149
FOR
COUNTY OF EL DORADO
UNION MINE DISPOSAL SITE
CLASS II LANDFILL, CLASS III LANDFILL
CLASS II SURFACE IMPOUNDMENT
SEPTAGE/LEACHATE TREATMENT FACILITY
EL DORADO COUNTY

State Water Resources Control Board Order No.97-03-DWQ NPDES General Permit No. CAS000001 (General Permit)
and
Waste Discharge Requirements (WDRS) for
Discharges of Storm Water Associated with (Industrial Activities Excluding Construction Activities

The Discharger shall maintain water quality monitoring systems that are appropriate for detection monitoring and evaluation monitoring that comply with the provisions of Title 27, California Code of Regulations (CCR), Division 2, Subdivision 1, Chapter 3, Subchapter 3.

It also includes provisions for storm water runoff water quality monitoring to satisfy the requirements of State Water Resources Control Board Order No.97-03-DWQ NPDES General Permit No. CAS000001 (General Permit) and Waste Discharge Requirements (WDRs) for Discharges of Storm Water Associated with (Industrial Activities Excluding Construction Activities.)

Waste Discharge Requirements Order No. 94-149 and Standard Provisions and Reporting Requirements require compliance with this Monitoring and Reporting Program. Failure to comply with this Program, or with the Standard Provisions and Reporting Requirements, constitutes non-compliance with the WDRs and with the Water Code, which can result in the imposition of civil monetary liability.

A. REPORTING

The Discharger shall report monitoring data and information as required in this Monitoring and Reporting Program and as required in the Standard Provisions and Reporting Requirements. Reports which do not comply with the required format will be **REJECTED** and the Discharger shall be deemed to be in non-compliance with the WDRs. In reporting the monitoring data required by this program, the Discharger shall arrange the data in tabular form so that the date, the constituents, the concentrations, and the units are readily discernible. The Discharger shall summarize the data to clearly illustrate compliance with waste discharge requirements or the lack thereof. An appropriate discussion of the monitoring results, including notations of any water quality violations, shall precede the tabular summaries.

The Discharger shall report field and laboratory test results in semi-annual monitoring reports. The Discharger shall submit the semi-annual monitoring reports to the Board by **28 February** (Fall report) and **31 August** (Spring report) of each year. The Spring report shall constitute the semi-annual report for data collected between the previous 1 January and 30 June. The Fall report shall constitute the semi-annual report for data collected between 1 July and 31 December of the previous calendar year. The Fall report shall also constitute the annual report for the previous calendar year summarizing data collected over the entire calendar year. The annual report shall contain both tabular and graphical summaries of the monitoring data obtained during the previous twelve months, so as to show historical trends at each well. The Discharger shall report to the Board the results of any monitoring done more frequently than specified herein.

The Discharger shall report method detection limits and practical quantitation limits. The report shall include all method peaks, including those which the Discharger cannot quantify and/or specifically identify.

B. REQUIRED MONITORING REPORTS

1. Water Quality Protection Standard Report

The Discharger submitted a water quality protection standard in February 1998. The Discharger shall describe any changes to the water quality protection standard in the annual monitoring report.

2. Detection Monitoring Report

The Discharger shall submit reports of the results of detection monitoring in accordance with the schedules specified in this Monitoring and Reporting Program.

3. Annual Monitoring Summary Report

The Discharger shall submit the Annual Monitoring Summary Report as specified in the Standard Provisions and Reporting Requirements and in this Monitoring and Reporting Program.

The Discharger shall report the results of the Storm Water runoff monitoring in accord with the requirements of the General Permit including filing of an annual and the reporting of any exceedance of applicable water quality standards (objectives) or the applicable CVRWQCB Basin Plan requirements within 30 days of receipt of monitoring data that shows that an exceedance has occurred.

4. Constituents-of-Concern Annual Monitoring Program

The Discharger shall sample all Monitoring Points and Background Monitoring Points for each monitored medium for all Constituents of Concern (COCs) every year, beginning with the Fall of 1998, with subsequent COC monitoring efforts being carried out every year thereafter alternately in the Spring and Fall.

Standard Observations

Each monitoring report shall include a summary and certification of completion of all Standard Observations for the waste management unit (WMU), for the perimeter of the WMU, and for the receiving waters. The Discharger shall conduct standard observations weekly and shall include those elements as defined in the Standard Provisions and Reporting Requirements.

C. MONITORING

If the Discharger, through a detection monitoring program, or the Board finds that there is a measurably significant increase in indicator parameters or waste constituents over the water quality protection standards (established pursuant to Monitoring and Reporting Program No. 94-149) at or beyond the Points of Compliance, the Discharger shall notify the Board or acknowledge the Board's finding in writing within seven days, and shall immediately resample for the constituent(s) or parameter(s) at the point where the standard was exceeded. Within 90 days, the Discharger shall submit to the Board the results of the resampling and either:

a. a report demonstrating that the water quality protection standard was not, in fact, exceeded; or

b. an amended Report of Waste Discharge for the establishment of an evaluation monitoring program, per Section 20415 and 20425 of Title 27, which is designed to evaluate changes in water quality due to the release from the landfills.

If the Discharger, through an evaluation monitoring program, or the Board verifies that water quality protection standards have been exceeded at or beyond the Points of Compliance, the Discharger shall notify the Board or acknowledge the Board's finding in writing within seven days. Within 180 days, the Discharger shall submit to the Board an amended Report of Waste Discharge for the establishment of a corrective action program, per Section 20430 of Title 27, which is designed to remediate releases from the facility and to achieve compliance with the water quality protection standards.

D. REQUIRED MONITORING PROGRAMS

1. Solid Waste, Leachate, and LCRS Monitoring Program

<u>Designated and Non-hazardous Solid Waste Monitoring</u>

The Discharger shall monitor all wastes discharged to Class III WMUs and Class II WMUs on a monthly basis and submit the results with the corresponding semi-annual report:

Parameter	Report in Units of	Monitoring Frequency
Quantity Discharged to:		
Class II landfill	Yds^3 or tons	Monthly
Class III landfill	Yds^3 or tons	Monthly
Capacity of Landfill Unit Remaining	Percent	Yearly

Liquid and Semi-Liquid Waste Monitoring

The Discharger shall monitor all wastes discharged to the Class II surface impoundment and to the wastewater treatment plant and report to the Board on a semi-annual basis:

Parameter	Report in Units of
Quantity discharged	Gallons/day
Type of Material Discharged	- -
Minimum Freeboard	Feet and Tenths

In addition, the Discharger shall collect grab samples of the Class II surface impoundment contents and analyze the samples for the parameters and constituents listed below under "Leachate Monitoring" at the frequencies indicated thereunder.

Leachate Monitoring

The Class III landfill unit does not have a Leachate Collection and Removal System (LCRS). However there is a leachate collection toe drain along the junction of the Class III and Class II landfills and around the northern perimeter of the Class III unit. In addition, the Class II landfill has an LCRS. The Class II surface impoundment has a geonet LCRS and collection sump.

The Discharger shall inspect all landfill unit and surface impoundment LCRS sumps and conveyance systems weekly for leachate generation. If leachate is present in the sumps and conveyance systems in the northern perimeter toe drain and the toe drain along the junction of the Class III and Class II landfills, Class II or Class III LCRSs, the Discharger shall immediately sample the leachate and continue to sample at the frequencies listed in Table 1. The Discharger shall measure the quantity of leachate pumped from the Class II surface impoundment LCRS and report the quality as Leachate Volume (in gallons/day). The Discharger shall report the data in the semi-annual monitoring reports.

LCRS Monitoring

The Discharger shall test all LCRSs annually to demonstrate operation in conformance with waste discharge requirements. The Discharger shall report the results of these tests to the Board and shall include comparisons with earlier tests made under comparable conditions. The Discharger shall report the data in the annual monitoring report.

2. Detection Monitoring Program

Quarterly the Discharger shall monitor all Monitoring Points assigned to detection monitoring and all Background Monitoring Points (for each monitored medium) for the Monitoring Parameters listed in this Program.

For any given monitored medium, the Discharger shall collect a sufficient number of samples from all Monitoring Points and Background Monitoring Points to satisfy the data analysis

requirements for a given Reporting Period. The Discharger shall collect the samples in a manner that ensures sample independence to the greatest extent feasible.

TABLE 1 - LEACHATE MONITORING PROGRAM

Parameter	Units	Monitoring Frequency
Field Parameters		
Flow Rate	gallons/day	Monthly
pH		Monthly
Specific Conductance	µmhos/cm at 20 C	Monthly
Monitoring		
Bicarbonate Alkalinity	mg/l as $CaCO_3$	Quarterly
Carbonate	mg/l as $CaCO_3$	Quarterly
Chloride	mg/l	Quarterly
Nitrate Nitrogen	mg/l N	Quarterly
Ammonia Nitrogen	mg/l N	Quarterly
Total Organic Nitrogen	mg/l N	Quarterly
Sulfate	mg/l	Quarterly
Total Dissolved Solids (TDS)	mg/l	Quarterly
Volatile Organic Compounds (EPA Method 8260, Attachment E)	µg/l	Quarterly
Constituents of Concern		
Inorganics[1]	mg/l	Semi-annually
Total Organic Carbon	mg/l	Semi-annually
Volatile Organic Compounds (EPA Method 8260, Attachment F)	µg/l	Semi-annually
Semi-volatile Organic Compounds (EPA Method 8270, Attachment F)	µg/l	Semi-annually
Chlorinated Herbicides (EPA Method 8150, Attachment F)	µg/l	Semi-annually
Organophosphorus Compounds (EPA Method 8141, Attachment F)	µg/l	Semi-annually
Carbamate Pesticides (EPA Method 8321, Attachment F)	µg/l	Semi-annually

[1] Inorganics (total and dissolved): Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Cyanide, Iron, Lead, Manganese, Mercury, Nickel, Selenium, Silver, Sulfide, Thallium, Tin, Vanadium, and Zinc.

The temperature at which specific conductance values are measured is to be reported.

Groundwater sampling shall include an accurate determination of the groundwater surface elevation and field parameters (pH, temperature, electrical conductivity, turbidity) for all monitoring points. The Discharger shall measure groundwater elevations prior to purging and sampling the wells to fulfill the groundwater gradient and direction requirements. For each monitored groundwater body, the Discharger shall measure the water level in each well (in feet and hundredths, MSL) and determine groundwater gradient and direction at least semi-annually,

including the times of expected highest and lowest water level elevations for the respective groundwater body. The Discharger shall display this information on a water table contour map and/or groundwater flow net for the site and submit the map with the semi-annual monitoring reports.

The Discharger shall measure groundwater elevations for all background and downgradient wells for a given groundwater body within a period of time short enough to avoid temporal groundwater flow variations which could preclude accurate determination of groundwater gradient and direction.

The Discharger shall perform statistical or non-statistical analysis when the monitoring data are available.

3. Groundwater Monitoring

The monitoring network shall consist of background monitoring wells MW-5, MW-6, MW-10, MW-B, and two additional background monitoring wells MW-N1 and MW-N2, to be constructed on the west side of the Class III landfill at appropriate locations to sample the groundwater that will pass under the Class III landfill unit. The screening of the wells should be such that the samples will be taken just below the expected low groundwater table for the wells. The Discharger shall install and maintain a sufficient number of background monitoring wells to adequately characterize the upgradient groundwater chemical characteristics and the existing downgradient monitoring wells MW-7, MW-9, UM-3, MW-A, MW-11 and new downgradient monitoring wells MW-12, MW-13, MW-14, MW-15, MW-16 and MW-17 shown on Attachment C. The Discharger shall install and maintain a sufficient number of appropriately located new downgradient groundwater monitoring wells to adequately determine the groundwater characteristics that are a threat to Martinez Creek water quality – beneficial uses. Prior to abandonment of monitoring wells due to construction or expansion activities at the site, the Discharger shall install replacement monitoring wells. The Discharger shall collect samples from the wells at the frequency and for the parameters specified in Table 2. The Discharger shall report the data in the semi-annual monitoring reports.

The Discharger shall sample all new monitoring wells on a bi-monthly basis for the parameters in Table 2 until there is sufficient data for statistical analysis. Thereafter, the Discharger shall sample the new monitoring wells quarterly. If after five years of data collected at this frequency that shows that no groundwater quality problems are found, then the quarterly ground water sampling can be reduced semi-annually.

In addition, the Discharger shall sample one seep (designated MS-1) from along the western side of Church Mine Road, downslope of the Class II surface impoundment. The Discharger shall analyze the seep bi-monthly for the parameters listed in Table 2 One of the seep samples shall be taken of the seep water that is likely to enter the culvert that transports the seep water to the drainage to Martinez Creek. Also a shallow monitoring well, MW-17, shall be constructed to sample the shallow groundwater that is discharged in the seep. The Discharger shall report the data in the semi-annual monitoring reports.

4. Surface Water Monitoring

The Discharger shall sample Martinez Creek upstream of the waste management facility at upstream monitoring point S-6a and S-6b and downstream at monitoring points S-7, and S-8, at surface water discharge points S-1, S-2 and S-9 and at the sampling points, S-3 and S-4, where the wastewater Spray Fields storm water runoff leaves the area that received the sprayed wastewater. Also an upgradient surface water monitoring point, S-5 is to be sampled during storm water runoff events. The locations of the existing and additional monitoring points are shown on Attachment C.

TABLE 2 – GROUNDWATER MONITORING and SEEP PROGRAM

Parameter	Units	Monitoring Frequency
Field Parameters		
Groundwater Elevation	Ft. & 100ths, MSL	Quarterly
pH		Quarterly
Specific Conductance	µmhos/cm	Quarterly
Temperature	F	Quarterly
Turbidity	Turbidity units	Quarterly
Dissolved Oxygen	mg/l	Quarterly
Monitoring Parameters		
Anions/Cations[1]	mg/l	Quarterly
Chloride	mg/l	Quarterly
Total Organic Nitrogen	mg/l N	Quarterly
Ammonia	mg/l N	Quarterly
Total Dissolved Solids (TDS)	mg/l	Quarterly
Volatile Organic Compounds (EPA Method 8260, Attachment E)	µg/l	Semi-annually
Constituents of Concern		
Inorganics[2]	mg/l	Annually
Total Organic Carbon	mg/l	Annually
Volatile Organic Compounds (EPA Method 8260, Attachment F)	µg/l	Annually
Semi-volatile Organic Compounds (EPA Method 8270, Attachment F)	µg/l	Annually
Chlorinated Herbicides (EPA Method 8150, Attachment F)	µg/l	Annually
Organophosphorus Compounds (EPA Method 8141, Attachment F)	µg/l	Annually
Carbamate Pesticides (EPA Method 8321, Attachment F)	µg/l	Annually

[1] Anions/Cations: Bicarbonate, Carbonate, Nitrate, Sulfate, Calcium, Magnesium, Potassium, and Sodium.

[2] Inorganics (total and dissolved): Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Cyanide, Iron, Lead, Manganese, Mercury, Nickel, Selenium, Silver, Sulfide, Thallium, Tin, Vanadium, and Zinc.

The temperature at which specific conductance values are measured is to be reported.

The Discharger shall collect surface water samples during the first storm of the rainy season which produces significant flow and quarterly thereafter when water is present. At least one storm each season (fall, winter and spring) the Discharger shall collect samples from all stations and analyze

at the frequency and for the monitoring parameters specified in Table 3. In addition to sampling the Spray Fields storm water runoff for the parameters listed in this table, the Discharger shall sample the Spray Fields storm water runoff for total and fecal coliforms once each quarter. Further the Discharger shall sample the discharges to Martinez Creek from the North Basin and South Basin for total and fecal coliforms monthly.

The Discharger shall submit the surface water monitoring reports with the corresponding semi-annual groundwater monitoring reports. The Discharger shall include an evaluation of surface water quality impacts and compliance with the Water Quality Protection Standard and water quality objectives and CVRWQB Basin Plan requirements.

The Discharger shall continue to monitor storm water discharges in accordance with Water Quality Order No. 97-03-DWQ (Discharges of Storm Water Associated with Industrial Activities).

TABLE 3 - SURFACE WATER MONITORING PROGRAM

Parameter	Units	Monitoring Frequency
Field Parameters		
pH		Monthly
Specific Conductance	µmhos/cm	Monthly
Temperature	F	Monthly
Turbidity	Turbidity units	Monthly
Dissolved Oxygen	mg/l	Monthly
Monitoring Parameters		
Anions/Cations[1]	mg/l	Monthly
Total Dissolved Solids (TDS)	mg/l	Monthly
Total Suspended Solids	mg/l	Monthly
Constituents of Concern		
Total Organic Carbon	mg/l	Monthly
Inorganics[2]	mg/l	Monthly
Volatile Organic Compounds (EPA Method 8260, Attachment F)	µg/l	Annually
Semi-volatile Organic Compounds (EPA Method 8270, Attachment F)	µg/l	Annually
Chlorinated Herbicides (EPA Method 8150, Attachment F)	µg/l	Annually
Organophosphorus Compounds (EPA Method 8141, Attachment F)	µg/l	Annually
Carbamate Pesticides (EPA Method 8321, Attachment F)	µg/l	Annually
Spray Field storm water runoff only		
Total Coliforms	MPN/100ml	Quarterly
Fecal Coliforms	MPN/100ml	Quarterly
North Basin and South Basin Discharges		
Total Coliforms	MPN/100ml	Monthly
Fecal Coliforms	MPN/100ml	Monthly

[1] Anions/Cations: Bicarbonate, Carbonate, Chloride, Nitrate, Sulfate, Calcium, Magnesium, Potassium, and Sodium.

[2] Inorganics (total and dissolved): Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Cyanide, Iron, Lead, Manganese, Mercury, Nickel, Silver, Thallium, Tin, Selenium, Sulfide, Vanadium, and Zinc.

The temperature at which specific conductance values are measured is to be reported.

5. Unsaturated Zone Monitoring

The unsaturated zone monitoring network shall consist of two vacuum lysimeters beneath the Class II surface impoundment (L2N and L2S). The Discharger shall install additional vacuum

lysimeters beneath new landfill expansion areas. The Discharger shall analyze soil-pore liquid samples at the frequency and for the monitoring parameters specified in Table 4.

The Discharger shall submit unsaturated zone monitoring reports with the corresponding semi-annual monitoring report and shall include evaluation of potential impacts of the facility on the unsaturated zone and compliance with the Water Quality Protection Standard.

TABLE 4 - UNSATURATED ZONE MONITORING PROGRAM

Parameter	Units	Monitoring Frequency
Field Parameters		
pH		Quarterly
Specific Conductance	µmhos/cm	Quarterly
Monitoring Parameters		
Bicarbonate Alkalinity	mg/l as $CaCO_3$	Quarterly
Carbonate	mg/l as $CaCO_3$	Quarterly
Chloride	mg/l	Quarterly
Nitrate Nitrogen	mg/l N	Quarterly
Ammonia	mg/l N	Quarterly
Sulfate	mg/l	Quarterly
Total Dissolved Solids (TDS)	mg/l	Quarterly
Volatile Organic Compounds (EPA Method 8260, Attachment E)	µg/l	Quarterly
Constituents of Concern		
Inorganics[1]	mg/l	Annually
Total Organic Carbon	mg/l	Annually
Volatile Organic Compounds (EPA Method 8260, Attachment F)	µg/l	Annually
Semi-volatile Organic Compounds (EPA Method 8270, Attachment F)	µg/l	Annually
Chlorinated Herbicides (EPA Method 8150, Attachment F)	µg/l	Annually
Organophosphorus Compounds (EPA Method 8141, Attachment F)	µg/l	Annually
Carbamate Pesticides (EPA Method 8321, Attachment F)	µg/l	Annually

[1] Inorganics (total and dissolved): Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Cyanide, Iron, Lead, Mercury, Manganese, Nickel, Selenium, Silver, Sulfide, Thallium, Tin, Vanadium, and Zinc.

The temperature at which specific conductance values are measured is to be reported.

6. Wastewater Treatment Plant Effluent/Spray Irrigation Monitoring

The Wastewater Treatment Plant Effluent/Spray Irrigation Monitoring program shall consist of monitoring the effluent quality from the treatment plant and two pan lysimeters installed in the spray fields (L3N and L3S). The Discharger shall submit Wastewater Treatment Plant Effluent/ Spray Irrigation and lysimeter monitoring reports with the corresponding semi-annual monitoring reports and shall include evaluation of potential impacts of the facility on the unsaturated zone.

During periods of wastewater application to the spray fields, the Discharger shall monitor the wastewater effluent at the frequency and for the monitoring parameters specified in Table 5.

During periods of wastewater application to the spray fields, the Discharger shall monitor the spray field lysimeters weekly for liquids. Upon initial detection of liquids in the lysimeters, the Discharger shall analyze the samples for the monitoring parameters in Table 5. Thereafter, the Discharger shall monitor and analyze samples from the lysimeters at the frequency and for the monitoring parameters specified in Table 5.

TABLE 5 – WASTEWATER EFFLUENT AND SPRAY FIELD MONITORING PROGRAM

Parameter	Units	Monitoring Frequency
Field Parameters		
Quantity Applied	gallons/day	Weekly
pH		Bi-weekly
Specific Conductance	µmhos/cm	Bi-weekly
Monitoring Parameters		
BOD (5-day, 20°C)	mg/l	Bi-monthly
Chloride	mg/l	Bi-monthly
Settleable Matter	mg/l	Bi-monthly
Total Coliform	MPN/100ml	Bi-monthly
Total Dissolved Solids (TDS)	mg/l	Bi-monthly
Anions/Cations[1]	mg/l	Bi-monthly
Constituents of Concern		
Bicarbonate Alkalinity	mg/l as $CaCO_3$	Monthly
Carbonate	mg/l as $CaCO_3$	Monthly
Nitrate	mg/l N	Monthly
Total Organic Nitrogen	mg/l N	Monthly
Ammonia	mg/l N	Monthly
Sulfate	mg/l	Monthly
Sulfide (including H_2S)	mg/l	Monthly
Inorganics[2]	mg/l	Monthly

[1] Anions/Cations: Bicarbonate, Carbonate, Chloride, Nitrate, Sulfate, Calcium, Magnesium, Potassium, and Sodium.

[2] Inorganics (total and dissolved): Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Cyanide, Iron, Lead, Manganese, Mercury, Nickel, Silver, Thallium, Tin, Selenium, Vanadium, and Zinc.

The temperature at which specific conductance values are measured is to be reported.

Toxicity testing shall be conducted on the North Basin and South Basin discharges to Martinez Creek at sampling points S-2 and S-9, MS-1 seep and storm water runoff from the Spray Fields S-3 and S-4. These samples shall be tested using the US EPA standard three species short term chronic toxicity tests (US EPA Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Water to Freshwater Organisms, EPA-600-4-91-002, July, 1994) using both the acute and chronic endpoints. The test organisms shall include fathead minnow larvae (*Pimephales promelas*), rainbow trout larvae (*Salmo gairdneri*), zooplankton (*Ceriodaphnia dubia*,) and algae (*Selanastrum capricornutum*.) The wastewater effluent discharges from the storm water North Basin and South Basin ponds and the seep discharge shall be sampled monthly. The storm water runoff from sampling points S-1, S-3 and S-4 shall be tested for aquatic organism toxicity once each fall, winter and spring.

Quarterly samples of Martinez Creek water and sediments shall be taken for aquatic life toxicity testing at about 1,000 ft upstream and near S-2 and about 500 ft and 1,000 ft downstream of S-2. The sediment samples should be taken on the Union Mine Landfill side of the Creek. Sediment testing shall be conducted using *Hyalella asteca.* (US EPA Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Invertebrates, EPA/600/R-94-024, June, 1994).

If toxicity is found then Toxicity Investigation Evaluations (TIEs) shall be conducted to determine the cause of the toxicity. The discharger shall develop a program to eliminate the toxicity in the discharges to Martinez Creek.

All surface water sample analyses for the organophosphate and carbamate pesticides analytical procedures should, if possible, use 1,500 ml samples evapoconcentrated two to five ml in order to achieve adequate sensitivity for these compounds.

E. WATER QUALITY PROTECTION STANDARDS

The Water Quality Protection Standard (Standard) shall consist of the following elements:

1. Constituents of Concern;
2. Concentration Limits;
3. Monitoring Points;
4. Points of Compliance;
5. Compliance Period.

Each of these is described as follows:

1. Constituents of Concern

The 'COC list' (list of Constituents of Concern required under 27 CCR 20395) shall include all constituents listed in Tables 1, 2, 3, 4, and 5 and in Waste Discharge Requirements Order No. 94-149.

2. Concentration Limits

The Discharger shall determine the Concentration Limit for any given Constituent of Concern or Monitoring Parameter in a given monitored medium (i.e., groundwater, surface water, and the unsaturated zone) at WMUs. The Discharger shall use background wells to establish concentration limits for each constituent of concern. The Discharger shall use the limits as the basis of comparison with data from the Monitoring Points in that monitored medium.

Tables 6 and 7 list the concentration limits for groundwater and surface water. The Discharger shall determine the unsaturated zone concentration limits when sufficient data is available.

3. Monitoring Points

Attachment C shows the approximate locations of the following monitoring points:

Groundwater Monitoring Points

The upgradient groundwater monitoring points shall be MW-5, MW-6, MW-10, and MW-B. and two additional monitoring wells established in accord with this monitoring program The downgradient groundwater monitoring points for detection monitoring shall be MW-7, MW-9, MW-A, UM-3, and MW-11 as well as the additional wells MW-12, MW-13, MW-14, MW-15, MW-16 and MW-17 established as part of this program.

Unsaturated Zone Monitoring Points

The unsaturated zone monitoring points shall be the lysimeters located within the Class II WMU, and the spray fields: L2N, L2S, L3N, and L3S.

Seep Monitoring Point

The seep monitoring point shall be MS-1 (along the western side of Church Mine Road, downslope of the Class II surface impoundment).

Surface Water Monitoring Points

The surface water monitoring points for detection monitoring shall be:

S-1 In the tributary (formerly the unnamed creek) channel downgradient of the Springfield Shaft and Springfield West Adit to sample for any potential seeps developing from the mine seals.

S-2 Outfall from north sedimentation pond and S-9 outfall from the south sedimentation pond before discharge enters Martinez Creek.

S-5 Located where runoff from adjacent properties enters the landfill property on the Unnamed Tributary.

S-6a and 6b Martinez Creek, 600 feet upstream from north sedimentation pond discharge; 6b should be taken about 100 ft upstream of 6a.

S-7 Martinez Creek, approximately 450 feet downstream from north sedimentation pond discharge. S-7 is the surface water point of compliance.

S-8 Martinez Creek approximately 1000 ft downstream from north sedimentation pond discharge

TABLE 6 - GROUNDWATER CONCENTRATION LIMITS

Parameter	Units	Class II/III WMUs[1]	Class II Surface Impoundment[1]
Specific Conductance	µmhos/cm	1300	930
PH			-
Turbidity	Turbidity	15	3.7
Total Dissolved Solids	mg/l	640	520
Chloride	mg/l	16	5.0
Arsenic	mg/l	0.028	0.006
Iron	mg/l	0.99	0.20
Calcium	mg/l	-	2.5
Magnesium	mg/l	-	0.5
Potassium	mg/l	-	0.005
Sodium	mg/l	-	0.5
Nitrate	mg/l N	0.69	0.41
Ammonia	mg/l N	-	-
Sulfate	mg/l	160	220
Carbonate	mg/l	10	10
Bicarbonate	mg/l	330	64
Aluminum	mg/l	-	0.20
Antimony	mg/l	0.10	0.10
Barium	mg/l	0.05	0.02
Beryllium	mg/l	0.02	0.02
Cadmium	mg/l	0.02	0.02
Chromium	mg/l	0.02	0.02
Cobalt	mg/l	0.05	0.05
Copper	mg/l	0.067	0.02
Manganese	mg/l	1.8	0.61
Silver	mg/l	0.02	0.02
Tin	mg/l	0.10	0.10
Vanadium	mg/l	0.05	0.05
Zinc	mg/l	0.051	0.05
Lead	mg/l	0.002	0.002
Mercury	mg/l	0.0005	0.0002
Nickel	mg/l	0.017	0.005
Selenium	mg/l	0.013	0.005
Thallium	mg/l	0.005	0.005
Cyanide	mg/l	0.004	0.004
Sulfide	mg/l	2.0	1.0
Total Organic Carbon	mg/l	5.8	1.9
Volatile Organic Compounds	µg/l	ND	ND
Semi-volatile Organic Compounds	µg/l	ND	ND
Chlorinated Herbicides	µg/l	ND	ND
Organophosphorus Compounds	µg/l	ND	ND
Carbamate Pesticides	µg/l	ND	ND

[1] These limits apply to both dissolved and total concentrations.

- The Discharger shall develop concentration limits for these parameters.

ND Non-detect at the appropriate method detection limit.

TABLE 7 - SURFACE WATER CONCENTRATION LIMITS

Parameter	Units	S-7&S-8
Specific Conductance	µmhos/cm At 20 C	410
pH		-
Turbidity	NTU	22
Total Dissolved Solids	mg/l	190
Total Suspended Solids	mg/l	-
Chloride	mg/l	13
Arsenic	mg/l	0.005
Iron	mg/l	0.20
Calcium	mg/l	27
Magnesium	mg/l	14
Potassium	mg/l	-
Sodium	mg/l	11
Nitrate	mg/l N	0.79
Ammonia	mg/l N	-
Sulfate	mg/l	40
Carbonate	mg/l as $CaCO_3$	10
Bicarbonate	mg/l as $CaCO_3$	110
Aluminum	mg/l	0.20
Antimony	mg/l	0.10
Barium	mg/l	0.02
Beryllium	mg/l	0.02
Cadmium	mg/l	0.001
Chromium	mg/l	0.0005
Cobalt	mg/l	0.05
Copper	mg/l	0.005
Manganese	mg/l	0.03
Silver	mg/l	0.02
Tin	mg/l	0.10
Vanadium	mg/l	0.05
Zinc	mg/l	0.05
Lead	mg/l	0.002
Mercury	mg/l	0.00001
Nickel	mg/l	0.005
Selenium	mg/l	0.005
Thallium	mg/l	0.005
Cyanide	mg/l	0.004
Sulfide	mg/l	1.0
Total Organic Carbon	mg/l	6.0
Volatile Organic Compounds	µg/l	ND
Semi-volatile Organic Compounds	µg/l	ND
Chlorinated Herbicides	µg/l	ND
Organophosphorus Compounds	µg/l	ND
Carbamate Pesticides	µg/l	ND

The Limits apply to dissolved and total concentrations.
-The Discharger shall develop concentration limits for these parameters
ND Non-detect at the appropriate method detection limit

4. Biological Monitoring

Excessive Bioaccumulation of Hazardous Chemicals

Each early fall, samples consisting of six fish each of uniform size of two dominant types of fish shall be taken from Martinez Creek about 2,000 ft upstream and 1,000 feet downstream of the S-2. Edible size fish should be obtained if possible. The fish samples should be composited and analyzed for chlorinated hydrocarbon pesticides, PCBs, dioxins and mercury. The results of these fish tissue analysis shall be compared to DHS fish advisory levels and US EPA Region 9 guidelines values for excessive bioaccumulation of hazardous chemicals.

Organism Assemblage Information

Each fall biological surveys to determine the numbers and dominant types of benthic macroinvertebrates and fish shall be conducted about 1,000 ft upstream and at 100 ft, 500 ft and 1,000 ft downstream of S-2. Standard California Department of Fish and Game (California Stream Bioassessment Procedure [CSBP]) sampling and data analysis techniques shall be used, (Harrington, J.M. 1996. California Stream Bioassessment Procedures – Third Edition. California Department of Fish and Game, Water Pollution Control Laboratory. Rancho Cordova, CA.)

5. Point of Compliance

The Point of Compliance for groundwater shall be the vertical surface located at the hydraulically downgradient limit of the waste management units that extends through the uppermost aquifer underlying the units.

6. Compliance Period

The Compliance Period is the number of years equal to the active life of the waste management unit plus the closure period. Each time the Discharger exceeds the Water Quality Protection Standard (i.e., a release is discovered), the facility begins a Compliance Period on the date the Board directs the Discharger to begin an Evaluation Monitoring Program. If the Discharger's Corrective Action Program (CAP) has not achieved compliance with the Standard by the scheduled end of the Compliance Period, the Compliance Period is automatically extended until the facility has been in continuous compliance for at least three consecutive years.

ATTACHMENT E

Constituents included in VOC_{water} (by USEPA Method 8260):

Acetone
Acrylonitrile
Benzene
Bromochloromethane
Bromodichloromethane
Bromoform (Tribromomethane)
Carbon disulfide
Carbon tetrachloride
Chlorobenzene
Chloroethane (Ethyl chloride)
Chloroform (Trichloromethane)
Dibromochloromethane (Chlorodibromomethane)
1,2-Dibromo-3-chloropropane (DBCP)
1,2-Dibromoethane (Ethylene dibromide; EDB)
o-Dichlorobenzene (1,2-Dichlorobenzene)
p-Dichlorobenzene (1,4-Dichlorobenzene)
trans-1,4-Dichloro-2-butene
1,1-Dichloroethane (Ethylidene chloride)
1,2-Dichloroethane (Ethylene dichloride)
1,1-Dichloroethylene (1,1-Dichloroethene; Vinylidene chloride)
cis-1,2-Dichloroethylene (cis-1,2-Dichloroethene)
trans-1,2-Dichloroethylene (trans-l,2-Dichloroethene)
1,2-Dichloropropane (Propylene dichloride)
cis-1,3-Dichloropropene
trans-1,3-Dichloropropene
Ethylbenzene
2-Hexanone (Methyl butyl ketone)
Methyl bromide (Bromomethene)
Methyl chloride (Chloromethane)
Methylene bromide (Dibromomethane)
Methylene chloride (Dichloromethane)
Methyl ethyl ketone (MEK; 2-Butanone)
Methyl iodide (Iodomethane)
4-Methyl-2-pentanone (Methyl isobutylketone)
Styrene
1,1,1,2-Tetrachloroethane
1,1,2,2-Tetrachloroethane
Tetrachloroethylene (Tetrachloroethene; Perchloroethylene)
Toluene
1,1,1-Trichloethane (Methylchloroform)
1,1,2-Trichloroethane
Trichloroethylene (Trichloroethene)
Trichlorofluoromethane (CFC-11)
1,2,3-Trichloropropane
Vinyl acetate
Vinyl chloride
Xylenes

ATTACHMENT F

Inorganics (USEPA Method):

Aluminum	6010	Copper	6010	Silver	6010		
Antimony	6010	Cyanide		9010	Sulfide	9030	
Arsenic	7061	Iron	6010	Thallium		7841	
Barium	6010	Lead	7421	Tin	6010		
Beryllium	6010	Manganese		6010	Vanadium		6010
Cadmium	6010	Mercury		7470	Zinc	6010	
Chromium	6010	Nickel	7520				
Cobalt	6010	Selenium		7741			

Volatile Organics (USEPA Method 8260):

Acetone
Acetonitrile (Methyl cyanide)
Acrolein
Acrylonitrile
Allyl chloride (3-Chloropropene)
Benzene
Bis(2-ethylhexyl) phthalate
Bromochloromethane (Chlorobromomethane)
Bromodichloromethane (Dibromochloromethane)
Bromoform (Tribromomethane)
Carbon disulfide
Carbon tetrachloride
Chlorobenzene
Chloroethane (Ethyl chloride)
Chloroform (Trichloromethane)
Chloroprene
Dibromochloromethane (Chlorodibromomethane)
1,2-Dibromo-3-chloropropane (DBCP)
1,2-Dibromoethane (Ethylene dribromide; EDB)
o-Dichlorobenzene (1,2-Dichlorobenzene)
m-Dichlorobenzene (1,3-Dichlorobenzene)
p-Dichlorobenzene (1,4-Dichlorobenzene)
trans-1,4-Dichloro-2-butene
Dichlorodifluoromethane (CFC 12)
1,1-Dichloroethane (Ethylidene chloride)
1,2-Dichloroethane (Ethylene dichloride)
1,1-Dichloroethylene (1,1-Dichloroethene; Vinylidene chloride)
cis-1,2-Dichloroethylene (cis-1,2-Dichloroethene)
trans-1,2-Dichloroethylene (trans-1,2-Dichloroethene)
1,2-Dichloropropane (Propylene dichloride)
1,3-Dichloropropane (Trimethylene dichloride)
2,2-Dichloropropane (Isopropylidene chloride)
1,1-Dichloropropene
cis-1,3-Dichloropropene
trans-1,3-Dichloropropene
Ethylbenzene

ATTACHMENT F

Volatile Organics (continued):

Hexachlorobutadiene
2-Hexanone (Methyl butyl ketone)
Isobutyl alcohol
Isodrin
Methacrylonitrile
Methyl bromide (Bromomethane)
Methyl chloride (Chloromethane)
Methyl ethyl ketone (MEK; 2-Butanone)
Methyl iodide (Iodomethane)
Methyl methacrylate
4-Methyl-2-pentanone (Methyl isobutyl ketone)
Methylene bromide (Dibromomethane)
Methylene chloride (Dichloromethane)
Naphthalene
Propionitrile (Ethyl cyanide)
Styrene
1,1,1,2-Tetrachloroethane
1,1,2,2-Tetrachloroethane
Tetrachloroethylene (Tetrachloroethene; Perchloroethylene; PCE)
Toluene
1,2,4-Trichlorobenzene
1,1,1-Trichloroethane, Methylchloroform
1,1,2-Trichloroethane
Trichloroethylene (Trichloroethene; TCE)
Trichlorofluoromethane (CFC-11)
1,2,3-Trichloropropane
Vinyl acetate
Vinyl chloride (Chloroethene)
Xylene (total)

Semivolatile Organics (USEPA Method 8270 - base, neutral, & acid extractables):

Acenaphthene
Acenaphthylene
Acetophenone
2-Acetylaminofluorene (2-AAF)
Aldrin
4-Aminobiphenyl
Anthracene
Benzo[a]anthracene (Benzanthracene)
Benzo[b]fluoranthene
Benzo[k]fluoranthene
Benzo[g,h,i]perylene
Benzo[a]pyrene
Benzyl alcohol
alpha-BHC
beta-BHC
delta-BHC

ATTACHMENT F

Semivolatile Organics (continued):

gamma-BHC (Lindane)
Bis(2-chloroethoxy)methane
Bis(2-chloroethyl) ether (Dichloroethyl ether)
Bis(2-chloro-1-methyethyl) ether (Bis(2-chloroisopropyl) ether; DCIP)
4-Bromophenyl phenyl ether
Butyl benzyl phthalate (Benzyl butyl phthalate)
Chlordane
p-Chloroaniline
Chlorobenzilate
p-Chloro-m-cresol (4-Chloro-3-methylphenol)
2-Chloronaphthalene
2-Chlorophenol
4-Chlorophenyl phenyl ether
Chrysene
o-Cresol (2-methylphenol)
m-Cresol (3-methylphenol)
p-Cresol (4-methylphenol)
4,4'-DDD
4,4'-DDE
4,4'-DDT
Diallate
Dibenz[a,h]anthracene
Dibenzofuran
Di-n-butyl phthalate
o-Dichlorobenzene (1,2-Dichlorobenzene)
m-Dichlorobenzene (1,3-Dichlorobenzene)
p-Dichlorobenzene (1,4-Dichlorobenzene)
3,3'-Dichlorobenzidine
2,4-Dichlorophenol
2,6-Dichlorophenol
Dieldrin
Diethyl phthalate
p-(Dimethylamino)azobenzene
7,12-Dimethylbenz[a]anthracene
3,3'-Dimethylbenzidine
2,4-Dimehtylphenol (m-Xylenol)
Dimethyl phthalate
m-Dinitrobenzene
4,6-Dinitro-o-cresol (4,6-Dinitro-2-methylphenol)
2,4-Dinitrophenol
2,4-Dinitrotoluene
2,6-Dinitrotoluene
Di-n-octyl phthalate
Diphenylamine
Endosulfan I
Endosulfan II
Endosulfan sulfate

ATTACHMENT F

Semivolatile Organics (continued):

Endrin
Endrin aldehyde
Ethyl methacrylate
Ethyl methanesulfonate
Famphur
Fluoranthene
Fluorene
Heptachlor
Heptachlor epoxide
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane
Hexachloropropene
Indeno(1,2,3-c,d)pyrene
Isophorone
Isosafrole
Kepone
Methapyrilene
Methoxychlor
3-Methylcholanthrene
Methyl methanesulfonate
2-Methylnaphthalene
Naphthalene
1,4-Naphthoquinone
1-Naphthylamine
2-Naphthylamine
o-Nitroaniline (2-Nitroaniline)
m-Nitroaniline (3-Nitroaniline)
p-Nitroaniline (4-Nitroaniline)
Nitrobenzene
o-Nitrophenol (2-Nitrophenol)
p-Nitrophenol (4-Nitrophenol)
N-Nitrosodi-n-butylamine (Di-n-butylnitrosamine)
N-Nitrosodiethylamine (Diethylnitrosamine)
N-Nitrosodimethylamine (Dimethylnitrosamine)
N-Nitrosodiphenylamine (Diphenylnitrosamine)
N-Nitrosodipropylamine (N-Nitroso-N-dipropylamine; Di-n-propylnitrosamine)
N-Nitrosomethylethylamine (Methylethylnitrosamine)
N-Nitrosopiperidine
N-Nitrosospyrrolidine
5-Nitro-o-toluidine
Pentachlorobenzene
Pentachloronitrobenzene (PCNB)
Pentachlorophenol
Phenacetin
Phenanthrene

ATTACHMENT F

Semivolatile Organics (continued):

Phenol
p-Phenylenediamine
Polychlorinated biphenyls (PCBs; Aroclors)
Pronamide
Pyrene
Safrole
1,2,4,5-Tetrachlorobenzene
2,3,4,6-Tetrachlorophenol
o-Toluidine
Toxaphene
1,2,4-Trichlorobenzene
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol
0,0,0-Triethyl phosphorothioate
sym-Trinitrobenzene

Organophosphorus Compounds (USEPA Method 8141):

Azinphosmethyl
Bolstar
Chlorpyrifos
Coumaphos
Def
Demeton-s
Diazinon
Dichlorvos
Dimethoate
Diphenamid
Disulfoton
Ethion
Ethoprop
Fensulfothion
Fenthion
Malathion
Merphos
Methidathion
Methyl Trithion
Mevinphos
Naled
"Parathion, ethyl"
"Parathion, methyl"
Phorate
Phosalone
Phosmet
Prometon
Prowl

ATTACHMENT F

Organophosphorus Compounds (USEPA Method 8141):

Ronnel
Simazine
Trichloronate
Trifluralin

Chlorinated Herbicides (USEPA Method 8150):
2,4-D (2,4-Dichlorophenoxyacetic acid)
Dinoseb (DNBP; 2-sec-Butyl-4,6-dinitrophenol)
Silvex (2,4,5-Trichlorophenoxypropionic acid; 2,4,5-TP)
2,4,5-T (2,4,5-Trichlorophenoxyacetic acid)

Carbamate Pesticides (USEPA Method 8321):
Aldicarb
Aminocarb
Barban
Benomyl (Carbendazim)
Bromacil
Carbaryl
Carbofuran
Chloropropham
Chloroxuron
Diuron
Fenuron
Fluometuron
Linuron
Methiocarb
Methomyl
Mexacarbate
Monuron
Neburon
Oxamyl
Propachlor
Propham
Propoxur
Siduron
Tebuthiuron