

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
CENTRAL VALLEY REGION

TENTATIVE MONITORING AND REPORTING PROGRAM NO. R5-2007- XXXX  
CALIFORNIA WATER CODE SECTION 13267

FOR  
SPX CORPORATION  
MARLEY COOLING TOWER COMPANY STOCKTON FACILITY  
GROUNDWATER REMEDIATION  
SAN JOAQUIN COUNTY

This monitoring and reporting program (MRP) is issued by the Executive Officer of the California Regional Water Quality Control Board, Central Valley Region (Regional Board) pursuant to California Water Code Section 13267. The Marley Cooling Tower Company (MCTC), a wholly owned subsidiary of SPX Corporation (hereafter collectively referred to as Discharger) is required to comply with this MRP, which contains the minimum monitoring and reporting requirements necessary to determine compliance with Waste Discharge Requirements Order No. R5-2007-XXXX.

The following MRP is designed to delineate and monitor the extent of groundwater contaminant plumes to determine whether remediation efforts are effective. The MCTC facility has a groundwater extraction and treatment system that has been operating for several years. This system provides hydraulic control of the contamination plumes. A more aggressive remediation effort involving in-situ chemical treatment is planned in the near future. This MRP has groundwater monitoring elements for both remediation efforts. The Discharger shall not implement any changes to this MRP unless and until a revised MRP is approved in writing by Executive Officer of the Regional Board.

Prior to construction of any new groundwater monitoring or extraction wells, the Discharger shall submit plans and specifications to the Regional Board for review and approval. Once installed, all new wells shall be added to the monitoring program and shall be sampled and analyzed according to the schedule provided herein.

All monitoring wells shall be purged using micropurging methodology with the use of dedicated bladder pumps in all monitoring wells, as necessary. This approach will increase consistency in sample collection, and produce analytical results that are more representative of actual groundwater conditions. Selected parameters including pH, conductivity, turbidity, and temperature of the pump discharge water shall be monitored during micropurging until they have stabilized. Solid and liquid wastes, principally water resulting from equipment decontamination, well development, formation water generated during drilling, and purge or sampling water, shall be collected and disposed of pursuant to applicable requirements.

T  
E  
N  
T  
A  
T  
I  
V  
E

All samples shall be representative of the volume and the nature of the discharge and matrix of the sampled medium. The time, date, and location of each grab sample shall be recorded on the sample chain of custody form.

## **I. GROUNDWATER MONITORING**

The Discharger has constructed and operates 73 monitoring wells both within its property and on adjoining properties as shown in Attachment B of the WDRs for this MRP. These wells monitor groundwater in shallow, intermediate, and deep zones, as well as a 100-foot sand zone. Based on the current groundwater flow direction being southerly to westerly, wells MW-209, -210, and -401 monitor the up-gradient side of the total chromium plume in shallow groundwater; Wells MW-201, -303, -304 monitor the down-gradient extent of the shallow plume. The highest recent<sup>1</sup> chromium detection in shallow groundwater was 7,100 micrograms per liter (ug/l), which occurred in the onsite Well S-2. The chromium plume extends about 3,000 horizontal feet (roughly from MW-210 to MW-304), with about 1,200 feet of the plume extending offsite on the down-gradient side. Well data from the edge of the plume indicate that average background concentrations for total chromium are less than 5 ug/l.

The chromium plume in the intermediate groundwater zone has a horizontal area similar to the shallow plume. The highest recent chromium detection in the intermediate groundwater was 4,300 ug/l in the onsite Well I-7. Chromium contamination in the 100-foot sand zone and the deep groundwater zone appears to be less significant, with maximum recent detections of 11 ug/l and 137 ug/l, respectively.

The Discharger operates 24 on- and off-site extraction wells (these also serve as monitoring wells) and may install and operate additional extraction wells as necessary to capture the 50 ug/l chromium plumes. Additional extraction and monitoring wells shall be installed based on the results of the annual monitoring reports provided during ongoing remediation.

### **A. Monitoring Wells and Sampling Schedule**

Groundwater elevations shall be measured quarterly except for the domestic, irrigation, and municipal water supply wells (i.e., Wells 5116D, Columbini [Col.] No. 1, Col. No. 2, Cuneo, Col. No. 3, CWS-20, CWS-35, CWS-52, and CWS-62). Groundwater elevations shall be reported in feet above mean sea level, with depths to groundwater measured to the nearest 0.01 foot. The quarterly monitoring events shall occur during January, April, July and October of each year.

Groundwater samples shall be collected from select wells on a semiannual, annual, or biannual basis. Groundwater samples collected semiannually shall be collected during the April and October monitoring events. Groundwater samples collected annually shall be collected during the April monitoring event. Groundwater samples collected biannually shall be collected every

---

<sup>1</sup> From the April/July 2006 semiannual Groundwater Monitoring Report, Dudek Engineering & Environmental, October 2006

other April. The following wells shall be monitored semiannually: MW-301, MW-303, S-2, S-7, S-8, S-9, EW-1, S-6, I-11, I-10, I-2, I-3, I-5, I-7, I-8, I-9, D-1, D-2, 5116D, Col. No. 1, Col. No. 2, Cuneo, Col. No. 3, CWS-20, CWS-35, CWS-52, and CWS-62. In addition, any new monitoring wells installed shall be monitored semiannually.

The following wells shall be monitored annually: EW-2, EW-3, EW-4, EW-5, MW-101, MW-102, MW-103, MW-105, MW-106, MW-107, MW-201, MW-206, MW-207, MW-208, MW-209, MW-300, MW-304, MW-5, MW-6, MW-8, MW-9, MW-310, MW-411, MW-212, MW-320, MW-322, MW-325, MW-4, MW-445, MW-446, I-4, I-6, and MW-465.

The following wells shall be monitored biannually: MT-1, MT-2, MT-3, MT-4, MT-5, MT-6, MT-7, MT-8, MT-9, MW-202, MW-203, MW-400, MW-401, MW-7, MW-410, S-3, S-4, MW-2, MW-211, MW-323, MW-326, MW-327, MW-328, MW-421, MW-422, MW-423, MW-425, MW-426, MW-428, MW-431, MW-432, MW-433, MW-434, MW-435, MW-437, MW-438, MW-440, MW-442, MW-443, MW-464, and MW-468.

## B. Laboratory and Field Analysis

All samples shall be grab samples. Samples from the above wells shall be analyzed pursuant to the following table:

Parameter	Method <sup>1</sup>	Unit	Maximum Detection Limit <sup>2</sup>
Chromium	EPA 6010B	ug/l	5 ug/l
Total Dissolved Solids	EPA 160.1	mg/l	--
Electrical Conductivity	Field Meter	umhos/cm	--
PH	Field Meter	pH units	--
Temperature	Field Meter	°Celsius	--
Extraction Rate <sup>3</sup>	Field Meter	GPM	--
Purge Rate <sup>4</sup>	Field Meter	GPM	--
Turbidity	Field Meter	NTU	--
Total Gallons Purged <sup>4</sup>	Field Meter	Gallons	--
Water Level	Field Meter	ft MSL	--

1. If necessary, equivalent analytical methods may be used. The Discharger shall provide written justification.

2. For non-detectable results

3. This applies only to extraction wells

4. This applies only to monitoring wells

## **II. GROUNDWATER MONITORING UPON INITIATION OF REDUCTANT SOLUTION INJECTION (FULL-SCALE IN-SITU TREATMENT)**

The Remedial Action Plan<sup>2</sup> (RAP) for the MCTC site proposed measures to achieve site-specific groundwater cleanup goals in a shorter time frame than the current extraction and treatment program. These measures include injecting reductant solution (a.k.a., groundwater amendment) along a grid configuration within the northern property using both shallow and deep injection intervals. This section requires more frequent groundwater monitoring to occur during amendment injection. The groundwater monitoring described in this section supercedes that described in Section I for those wells being used to monitor the in-situ groundwater treatment process.

### **A. Groundwater Monitoring for Full-Scale In-situ Treatment - Wells and Sampling Schedule**

Pursuant to the RAP, the currently existing monitoring network will primarily be used for monitoring the progress of the full-scale in-situ treatment. However, six new wells will be installed at the site to augment the existing well network. Two wells will be installed at the north property, three wells on the south property, and one well midway between MW-301 and MW-303.

Because of the limited areas of impact caused by amendment injection, there is no need to monitor the entire MCTC site when injections are occurring only in part of the site. For this reason, the MCTC site will be divided into two amendment injection areas. When amendment injection is occurring north of the Stockton terminal and eastern rail spur, the following wells shall be monitored quarterly: MW-1, MW-2, MW-7, MW-8, MW-101, MW-102, MW-104, MW-105, MW-106, MW-207, MW-208, MW-213, MW-300, MW-323, MW-361, and any new monitoring wells installed north of the Stockton terminal and eastern rail spur.

When amendment injection is occurring south of the Stockton terminal and eastern rail spur, the following wells shall be monitored quarterly: MW-9, MW-201, MW-204, MW-205, MW-301, MW-303, MW-304, MW-310, MW-321, MW-322, MW-324, MW-325, and any new monitoring wells installed south of the Stockton terminal and eastern rail spur.

### **B. Groundwater Monitoring for Full-Scale In-situ Treatment - Laboratory and Field Analysis**

All groundwater samples shall be grab samples. Samples from the wells used for groundwater monitoring during full-scale in-situ treatment shall be analyzed pursuant to the following table:

---

<sup>2</sup> Final Remedial Action Plan Amendment, Former Marley Cooling Tower Company, Stockton, California, MWH, June 2007

<b>Parameter</b>	<b>Method<sup>1</sup></b>	<b>Unit</b>	<b>Maximum Detection Limit<sup>2</sup></b>
Hexavalent Chromium	EPA 7196A	ug/l	5 ug/l
Chromium	EPA 6010B	ug/l	5 ug/l
Arsenic	EPA 200.8	ug/l	5 ug/l
Iron	EPA 200.8	ug/l	20 ug/l
Manganese	EPA 200.8	ug/l	2 ug/l
Nitrate	EPA 300.0	ug/l	0.5 mg/l
Sulfate	EPA 300.0	ug/l	0.5 mg/l
Total Dissolved Solids	EPA 160.1	Mg/l	10 mg/l
Total Organic Carbon	EPA 415.1	Mg/l	2 mg/l
Dissolved Oxygen <sup>1</sup>	Field Meter	Mg/l	--
Electrical Conductivity	Field Meter	Umhos/cm	--
Oxidation/Reduction Potential	Field Meter	Millivolts	--
PH	Field Meter	pH units	--
Water Level	Field Meter	ft MSL	

1. If necessary, equivalent analytical methods may be used. The Discharger shall provide written justification.

2. For non-detectable results

### **III. AMENDMENT DISCHARGE MONITORING**

The Discharger shall monitor daily the discharge of water and amendments that are injected into the groundwater. This monitoring shall include, at a minimum, recording of injected water and amendment volumes in gallons per day, and monitoring of amendment(s) added and biocides added (if any) in kilograms per day. Each amendment addition shall be recorded individually, along with information regarding the time over which the amendment was injected into the aquifer.

### **IV. AMENDMENT ANALYSIS**

Prior to use, amendments shall be analyzed for the following parameters:

<b>Parameter</b>	<b>Method<sup>1</sup></b>	<b>Maximum Detection Limit (ug/l)</b>
Volatile Organic Compounds	EPA 8020 or 8260B	0.5
Semi-volatile Organic Compounds	EPA 8270	5.0
General Minerals <sup>2</sup>	Various	Various
Metals, Total & Dissolved <sup>3</sup>	EPA 200.7, 200.8	Various
Total Dissolved Solids	EPA 160.1	10,000
PH	Field Meter	NA
Electrical Conductivity	Field Meter	NA

<sup>1</sup> Or an equivalent EPA method that achieves the maximum detection limit;  
<sup>2</sup> Alkalinity, bicarbonate, potassium, chloride, sulfate, total hardness, nitrate, nitrite, and ammonia;  
<sup>3</sup> Metals include arsenic, barium, cadmium, calcium, total chromium, copper, iron, lead, manganese, magnesium, mercury, molybdenum, nickel, selenium and silica.

The analysis shall be done on the pure amendment and on the mixture of the amendment and municipal supply or treated effluent water at the estimated concentration that would be injected during the full-scale in-situ treatment.

**V. QUALITY ASSURANCE/QUALITY CONTROL**

Quality assurance/quality control (QA/QC) shall be performed to ensure precision and accuracy for groundwater sampling activities. Minimum QA/QC requirements are as follows:

**A. Duplicate Samples**

One duplicate groundwater sample shall be collected for every ten primary groundwater samples collected during each groundwater monitoring event. At least one duplicate groundwater sample shall be collected from one of the domestic, irrigation, or CWS wells and analyzed for hexavalent chromium.

**B. Chain-of-Custody Forms**

Completed chain-of-custody forms shall be provided with the final laboratory reports.

**C. Field Meters**

Field testing instruments shall be used by an operator trained in proper use and maintenance of the instruments. All field instruments shall be calibrated prior to each monitoring event. In addition, field parameter instruments shall be serviced or calibrated by the manufacturer at the recommended frequency. Field calibration reports shall be included in the semi-annual groundwater monitoring reports.

## VI. ESTABLISHMENT OF BACKGROUND CONCENTRATION VALUES

Pursuant to Finding 9 of the Waste Discharge Requirements for this MRP, the Discharger shall develop background values for concentrations of dissolved arsenic, chromium, copper, iron, manganese, total dissolved solids, electrical conductivity, nitrate, and sulfate in groundwater following the procedures found in the California Code of Regulations Section 20415(e)(10). The Discharger shall submit a proposal to develop the background concentrations by **16 November 2007**.

## VII. REPORTING

In reporting monitoring data, the Discharger shall arrange the data in tabular form so that the date, sample type (e.g., influent, effluent, groundwater, etc.), and reported analytical result for each sample are readily discernible. The data shall be summarized in such a manner to clearly illustrate compliance with waste discharge requirements and spatial or temporal trends, as applicable. The results of any monitoring done more frequently than required at the locations specified in the Monitoring and Reporting Program shall also be reported to the Regional Board.

As required by the California Business and Professions Code Sections 6735, 7835, and 7835.1, all Reports shall be prepared under the direct supervision of a Registered Engineer or Geologist and signed by the registered professional.

### A. Semiannual Reports

Semiannual reports shall be submitted to the Board by the Discharger to monitor long-term groundwater trends and to assess long-term effects of injected substances on aquifer geochemistry until such time as the Executive Officer determines that the reports are no longer necessary. The first semiannual groundwater monitoring report for each year, which will include data collected in January and April, will be submitted to the Regional Board by **1 August**. This report shall include analytical results for groundwater samples collected on a quarterly, semiannual, annual, and biannual basis.

The second semiannual groundwater monitoring report for each year, which will include data collected in July and October, will be submitted to the Regional Board by **1 February** of the following year. This report shall include analytical results for groundwater samples collected on a quarterly and semiannual basis.

Each semiannual report shall include the following minimum information:

1. Depths-to-water measurements and corresponding groundwater elevations for all monitoring wells and extraction wells, extraction rates and total volume extracted from each active extraction well, and groundwater analytical results for all wells sampled. This data shall be presented in tabular format;

2. Copies of all final laboratory analytical reports, including QA/QC (electronic copies are encouraged and preferred);
3. Field logs containing, at a minimum, water quality parameters measured before, during, and after well purging, method of purging, depth of water, volume of water purged, etc.;
4. A calibration log verifying calibration of any field monitoring instrument (e.g., pH, temperature, electrical conductivity, and turbidity meters) used to measure parameters during well purging;
5. Groundwater elevation contour maps for all groundwater zones, including estimated direction flow;
6. Calculated hydraulic gradients and estimated average linear velocities for all groundwater zones;
7. Isoconcentration maps for total dissolved chromium for the shallow and intermediate zones in the January thru June semiannual groundwater monitoring report;
8. Isoconcentration maps for total dissolved chromium for the intermediate zone in the July thru December semiannual groundwater monitoring report;
9. Water level and water quality hydrographs showing historical data for each well; and
10. Any proposed changes in the extraction well network with justification for the change.
11. If applicable, the reasons for and duration of all interruptions in the operation of any remediation system, and actions planned or taken to correct and prevent interruptions.

## **B. Annual Groundwater Evaluation Report**

The July thru December semiannual groundwater monitoring report shall also serve as an annual groundwater evaluation report. This report shall include a summary of the groundwater quality beneath the site; a hydraulic capture analysis; an evaluation of cleanup progress; a discussion of any data gaps and potential deficiencies in the monitoring system; a review of the treatment system performance; and any recommendations to potentially accelerate site cleanup progress or any modifications to enhance cleanup. The annual evaluation report shall additionally contain the following minimum information:

1. A summary of treatment system operation and maintenance performed, including inspections, repairs, and equipment replacement (if applicable);
2. The reasons for and duration of all interruptions in the operation of the remedial well field and treatment system, and actions planned or taken to correct and prevent interruptions, if applicable;

3. A discussion of the long-term trends in the concentrations of chromium detected in the groundwater;
4. An evaluation of the performance of the groundwater treatment system, including a description of all remedial activities conducted during the year, an analysis of their effectiveness in removing the contaminants and whether the contaminant plume is being captured by the extraction system.
5. A discussion of compliance with the monthly waste discharge requirements;
6. A discussion of any data gaps, potential deficiencies/redundancies in the monitoring system or reporting program, and;
7. An analysis of whether the injected plume, and any breakdown or byproducts is being captured by an extraction system or is continuing to spread;
8. If applicable, a proposal and rationale for any revisions to monitoring frequency or the list of analytes.
9. Any recommendations to enhance cleanup.

A letter transmitting the self-monitoring reports shall accompany each report. Such a letter shall include a discussion of requirement violations found during the reporting period (if applicable), and actions taken or planned for correcting noted violations, such as operation or facility modifications. If the Discharger has previously submitted a report describing corrective actions and/or a time schedule for implementing the corrective actions, reference to the previous correspondence will be satisfactory. The transmittal letter shall contain the penalty of perjury statement by the Discharger, or the Discharger's authorized agent, as described in the Standard Provisions General Reporting Requirements Section B.3.

The results of any monitoring done more frequently than required at the locations specified in the MRP also shall be reported to the Board. The Discharger shall implement the above monitoring program as of the date of the Order.

Ordered by:

---

PAMELA C. CREEDON, Executive Officer

---

Date