

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. R5-2003-0130

NPDES NO. CA0079731

WASTE DISCHARGE REQUIREMENTS
FOR
CITY OF REDDING
CLEAR CREEK WASTEWATER TREATMENT PLANT
SHASTA COUNTY

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

1. The City of Redding (hereafter Discharger) submitted a Report of Waste Discharge, dated 3 December 2002, and applied for a permit renewal to discharge waste under the National Pollutant Discharge Elimination System (NPDES) for the Clear Creek Wastewater Treatment Plant (No. CA0079731).
2. The Discharger discharges an average dry weather flow of 6.5 million gallons per day (mgd) of treated domestic and industrial wastewater (advanced secondary treatment) from the wastewater treatment facility into the Sacramento River, a water of the United States, at a point in Section 31, T31N, R4W, MDB&M (latitude 40° 29' 56" and longitude 122° 21' 37"), as shown on Attachment A, which is incorporated herein and made part of this Order. The facility (Assessor's Parcel No. 050-030-12) is owned by the Discharger.
3. The treatment system consists of screening for removal of large solids, grit removal, primary clarification, activated sludge treatment with secondary clarification, filtration, chlorination/dechlorination, flow equalization, and emergency storage. Primary sludge is treated by anaerobic digestion followed by dewatering using a plate and frame filter press and then disposed at a sanitary landfill. Waste activated sludge is stabilized in facultative sludge lagoons and air dried to generate Class B biosolids. Biosolids from the secondary treatment process are land applied on property owned by the Discharger. The Report of Waste Discharge and information from the Discharger's monitoring reports describes the discharge as follows:

Design Average Dry Weather Flow:	8.8 mgd
Average Dry Weather Flow:	6.5 mgd
Maximum Daily Wet Weather Flow:	12.5 mgd
Average Temperature:	73°F Summer; 63°F Winter

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<u>Constituent</u>	<u>mg/L</u>	<u>lbs/day^b</u>
BOD ^a	3.0	220
Total Suspended Solids	2.0	147

^a 5-day, 20°C biochemical oxygen demand.

^b Based on a flow of 8.8 mgd.

4. The U.S. Environmental Protection Agency (USEPA) and the Board have classified this discharge as a major discharge.
5. The Board adopted a Water Quality Control Plan, Fourth Edition, for the Sacramento and San Joaquin River Basins (hereafter Basin Plan). The Basin Plan designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve water quality objectives for all waters of the Basin. These requirements implement the Basin Plan.
6. The USEPA adopted the *National Toxics Rule* (NTR) on 5 February 1993 and the *California Toxics Rule* (CTR) on 18 May 2000. These Rules contain water quality standards applicable to this discharge. The State Water Resources Control Board adopted the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (known as the State Implementation Policy), which contains guidance on implementation of the *National Toxics Rule* and the *California Toxics Rule*.
7. The Discharger was issued a letter under the authority of California Water Code Section 13267 on 28 February 2001, requesting effluent and receiving water monitoring meeting the requirements of the State Implementation Policy (SIP). The Discharger has submitted the required monitoring except for the remaining effluent monitoring for the 17 Dioxin congeners. The deadline for this monitoring is 28 February 2004.
8. The Discharger has collected Sacramento River data for low level metals in samples collected at the Caldwell Park boat launch ramp in Redding from January 1998 through August 2002 to more thoroughly investigate background concentrations of constituents where historical data show levels are at or near the Water Quality Criteria (WQC). Receiving water data indicate that the EPA standard conversion factors (translators) may not be representative of the dissolved fraction of copper and zinc in this reach of the Sacramento River during high flow, high turbidity events. Through this sampling, the Discharger has been able to ascertain copper and zinc translators specific to the stretch of the Sacramento River near Redding. The Discharger proposes to continue the use of the Caldwell Park boat launch ramp site to refine these translators concurrent with remediation at Iron Mountain Mine. The Discharger proposes the following translators:

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	<u>Chronic</u>	<u>Acute</u>
Copper	0.666	0.711
Zinc	0.723	0.780

9. The ratio of Sacramento River flow to effluent flow is approximately 160:1 at extreme critical low river flow and high treatment facility flow; and 550:1 at average flows, however it is unlikely that the discharge meets the definition of “completely-mixed discharge” contained in the SIP. The Discharger proposes the use of an interim dilution credit of 40:1 for all criteria, based on a minimum Sacramento River flow of 3,165 cfs and a maximum WWTP effluent flow of 19.34 cfs (12.5 mgd). This is based on the preliminary estimate that the discharge mixes with 25 percent of the river’s total flow using measurements from aerial photographs of the river at 4,600 cfs and the outfall diffuser length of 120 feet. The Discharger plans to perform a mixing zone study to determine the actual dilution credit provided by the discharge diffuser.
10. Federal regulations require effluent limitations for all pollutants that are or may be discharged at a level that will cause or have a reasonable potential to cause, or contribute to an in-stream excursion above a narrative or numerical water quality standard. Based on information submitted as part of the application, in studies, and as directed by monitoring and reporting programs, the Regional Board finds that the discharge has a reasonable potential to cause or contribute to an in-stream excursion above a water quality standard for the following constituents:

a. Copper:

As reported by the Discharger, copper was detected in the effluent at a maximum concentration of 6.9 µg/L. The USEPA CTR aquatic life chronic criterion for copper is 6.67 µg/L (for a minimum receiving water hardness of 44 mg/L and applying the site specific translator of 0.666).

The detected concentration of copper exceeds the CTR criterion. Therefore, the discharge has a reasonable potential to cause or contribute to an exceedance of the CTR criterion. An effluent limitation for copper is included in this Order based on the CTR chronic toxicity criterion and is established as 12 µg/L as a monthly average and the daily maximum of 17 µg/L.

b. Zinc:

As reported by the Discharger, zinc was detected in the effluent at a maximum concentration of 41.7 µg/L. Basin Plan objective for zinc is 22.2 µg/L (for a minimum receiving water hardness of 44 mg/L and applying the site specific translator of 0.780).

The detected concentration of zinc exceeds the Basin Plan criterion. Therefore, the discharge has a reasonable potential to cause or contribute to an exceedance of the Basin Plan objective. An effluent limitation for zinc is included in this Order based on the Basin Plan objective and is established as 81 µg/L as a monthly average and the daily maximum of 120 µg/L.

c. Bromodichloromethane:

As reported by the Discharger, bromodichloromethane was detected in the effluent at a maximum concentration of 9.9 µg/L. The USEPA CTR human health criterion for bromodichloromethane is 0.56 µg/L (for waters that are sources of drinking water and which aquatic organisms may be consumed).

The detected concentration of bromodichloromethane exceeds the CTR criterion. Therefore, the discharge has a reasonable potential to cause or contribute to an exceedance of the CTR criterion. Bromodichloromethane is a trihalomethane, which poses a serious cancer risk. An effluent limitation for bromodichloromethane is included in this Order based on the CTR human health criterion and is established as 21 µg/L as a monthly average and the daily maximum of 42 µg/L.

d. Dibromochloromethane:

As reported by the Discharger, dibromochloromethane was detected in the effluent at a maximum concentration of 2.5 µg/L. The USEPA CTR human health criterion for dibromochloromethane is 0.41 µg/L (for waters that are sources of drinking water and which aquatic organisms may be consumed).

The detected concentration of dibromochloromethane exceeds the CTR criterion. Therefore, the discharge has a reasonable potential to cause or contribute to an exceedance of the CTR criterion. Dibromochloromethane is a trihalomethane, which poses a serious cancer risk. An effluent limitation for dibromochloromethane is included in this Order based on the CTR human health criterion and is established as 14 µg/L as a monthly average and the daily maximum of 29 µg/L.

e. Tetrachloroethene:

As reported by the Discharger, tetrachloroethene was detected in the effluent at a maximum concentration of 2.0 µg/L. The USEPA CTR human health criterion for tetrachloroethene is 0.8 µg/L (for waters that are sources of drinking water and which aquatic organisms may be consumed).

The detected concentration of tetrachloroethene exceeds the CTR criterion. Therefore, the discharge has a reasonable potential to cause or contribute to an exceedance of the CTR criterion. An effluent limitation for tetrachloroethene is included in this Order

based on the CTR human health criterion and is established as 30 $\mu\text{g/L}$ as a monthly average and the daily maximum of 59 $\mu\text{g/L}$.

f. Total Chlorine Residual:

Chlorine is commonly used as a disinfection agent in the treatment of wastewater. Proper disinfection ensures destruction of pathogens prior to discharge to the surface waters. The Discharger uses chlorine for disinfection of the wastewater at the treatment plant. Because chlorine poses a threat to human health and is especially harmful to organisms living in water, a dechlorination process is necessary for the removal of chlorine. For dechlorination, the Discharger uses sulfur dioxide, which combines with chlorine, to render it relatively unreactive and thus removes it from the waste stream. Inadequate dechlorination may result in the discharge of chlorine to the receiving stream and cause toxicity to aquatic life. The Basin Plan prohibits the discharge of toxic substances in toxic concentrations.

The USEPA has developed Ambient Water Quality Criteria for the protection of freshwater aquatic life. The recommended maximum one-hour average and four-day average concentrations for chlorine are 0.02 mg/L and 0.01 mg/L, respectively. Effluent Limitations for chlorine are included in this Order and are based on the Basin Plan narrative toxicity objective.

g. Total Suspended Solids (TSS) and Biochemical Oxygen Demand (BOD):

Federal regulations, 40 CFR, part 133, provide technology based effluent limitation for BOD and TSS. Pursuant to the regulations at 40 CFR Sections 133.102(a), and (b), the BOD and TSS 30 day average discharge limit for secondary treatment systems shall not exceed 30 mg/L, the 7 day average shall not exceed 45 mg/L, and the 30 day BOD percent removal shall not be less than 85 percent. Historically, special consideration has been given for critical salmon and steelhead trout spawning areas in the Sacramento River from Redding to Hamilton City. Treatment facilities discharging to this portion of the Sacramento River have been designed to include effluent filtration. These facilities can easily meet technology based standards of 10 mg/L for BOD and TSS on a 30 day average basis and 15 mg/L on a 7 day average basis.

The previous permit called for monthly average effluent limits for BOD and TSS of 10 mg/L, weekly average limits of 15 mg/L, and a monthly average removal rate of 85 percent. These limits remain the same in this permit.

h. Settleable Solids:

The previous permit contained monthly average and daily maximum settleable solids limits of 0.1 ml/L and 0.2 ml/L, respectively. Suspended solids limits are in place and measure a similar parameter that is of greater concern in relation to water quality. This

Order eliminates the settleable solids limits. With TSS limits in place, the settleable solids limits can be eliminated and still protect water quality objectives in the receiving water.

i. Total Coliform Organisms:

This Order requires a monthly median total coliform limit of 23 MPN/100 ml and a daily maximum limit of 500 MPN/100 ml for effluent discharged to the Sacramento River. This level is thought to be adequately protective of beneficial uses and is consistent with the previous permit.

j. pH:

The Basin Plan provides that the pH of surface waters shall not be depressed below 6.5 nor raised above 8.5 nor shall the discharge alter pH of the receiving water more than 0.5 units. Federal regulations at 40 CFR 133.102(c) describes the minimum level of effluent quality to be attained by secondary treatment facilities for pH to be within 6.0 and 9.0 units. This Order requires the pH of the effluent to be maintained within the limits of 6.0 and 9.0 pH units.

11. The Sacramento River from Shasta Dam to Red Bluff has been listed as an impaired waterbody pursuant to Section 303(d) of the Clean Water Act for cadmium, copper, unknown toxicity, and zinc. The listing for metals was mainly a result of long term affects of mining operations at Iron Mountain Mine (located along this reach of river) in addition to other mines up stream of Shasta Dam. The Board adopted an interim Total Maximum Daily Loads (TMDL) for these metals. There has been a great deal of physical corrective work done at Iron Mountain Mine in the last two years with more work planned in the next two years. The interim TMDL focuses on additional copper, cadmium, and zinc removal from Iron Mountain Mine. In five years a final TMDL, if necessary, will be developed for these metals. The newly adopted 303(d) listing does not include this reach of the river as being impaired for these metals.
12. Section 13263.6(a), California Water Code, requires that “the regional board shall prescribe effluent limitations as part of the waste discharge requirements of a POTW for all substances that the most recent toxic chemical release data reported to the state emergency response commission pursuant to Section 313 of the Emergency Planning and Community Right to Know Act of 1986 (42 U.S.C. Sec. 11023) (EPCRA) indicate as discharged into the POTW, for which the state board or the regional board has established numeric water quality objectives, and has determined that the discharge is or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to, an excursion above any numeric water quality objective”. The Board has adopted numeric water quality objectives in the Basin Plan for the following constituents: arsenic, cadmium, copper, silver, zinc, and cyanide. Data for arsenic, cadmium, silver and cyanide indicate that there is not a reasonable potential to

- cause or contribute to an excursion above any numeric water quality objectives referred to in Water Code Section 13263.6(a). This Order contains effluent limitations for copper and zinc.
13. California Water Code Section 13267 states, in part, "(a) A Regional Board, in establishing...waste discharge requirements... may investigate the quality of any waters of the state within its region" and "(b) (1) In conducting an investigation... the Regional Board may require that any person who... discharges... waste...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." California Water Code Section 13383 states in part, "a regional board may establish monitoring, inspection, entry, reporting, and record keeping requirements . . . for any person who discharges pollutants . . . to navigable waters." The attached Monitoring and Reporting Program No. R5-2003-0130 required by this Order is necessary to assure compliance with waste discharge requirements and is incorporated by reference herein. The attached Monitoring and Reporting Program is pursuant to California Water Code Sections 13267 and 13383.
 14. The beneficial uses of the Sacramento River downstream of the discharge are municipal and domestic, industrial, and agricultural supply; water contact and noncontact recreation; esthetic enjoyment; navigation; ground water recharge, fresh water replenishment; hydroelectric power generation; and preservation and enhancement of fish, wildlife and other aquatic resources.
 15. The beneficial uses of the underlying ground water are municipal, domestic, industrial and agricultural supply.
 16. The permitted discharge is consistent with the antidegradation provisions of 40 CFR 131.12 and State Water Resources Control Board (SWRCB) Resolution 68-16. Compliance with these requirements will result in the use of best practicable treatment or control of the discharge. The impact on water quality will be insignificant.
 17. Effluent limitations, and toxic and pretreatment effluent standards established pursuant to Sections 301 (Effluent Limitations), 302 (Water Quality Related Effluent Limitations), 304 (Information and Guidelines), and 307 (Toxic and Pretreatment Effluent Standards) of the Clean Water Act (CWA) and amendments thereto are applicable to the discharge.
 18. Federal regulations for storm water discharges were promulgated by USEPA on 16 November 1990 (40 CFR Parts 122, 123, and 124) which require specific categories of industrial facilities, which discharge storm water, to obtain NPDES permits and to implement Best Available Technology Economically Achievable (BAT) and Best Conventional Pollutant Control Technology (BCT) to reduce or eliminate industrial storm water pollution.
 19. The SWRCB adopted Order No. 97-03-DWQ (General Permit No. CAS000001), on 17 April 1997, specifying waste discharge requirements for discharge of storm water associated with industrial activities, excluding construction activities, and requiring submittal

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of a Notice of Intent (NOI) by industries to be covered under the permit. The SWRCB is currently in the process of renewing this general permit.

20. The Discharger's facility was covered by storm water provisions in the previous individual Order No. 98-125. To help ensure that the requirements for storm water monitoring and control are consistent with the SWRCB general permit, the Discharger is being required to obtain coverage under the general storm water permit and this Order does not include storm water provisions.
21. The Discharger developed a pretreatment program in conformance with 40 CFR Part 403, which was approved on 9 February 1983.
22. Subsequent to approval of the pretreatment program on 9 February 1983 the Regional Board on 26 April 2002 approved a substantial modification of the Pretreatment Program to accept wastewater from the Redding Rancheria and portions of the County of Shasta as described in agreements between the City and each of these entities.
23. The Discharger, jointly with the City of Anderson, land applies Biosolids at the Redding Municipal Airport. This land application program is regulated under Waste Discharge Requirements Order No. 5-01-226 adopted on 7 September 2001.
24. The action to adopt an NPDES permit is exempt from the provisions of Chapter 3 of the California Environmental Quality Act (CEQA) (Public Resources Code Section 21100, et seq.), requiring preparation of an environmental impact report or negative declaration in accordance with Section 13389 of the California Water Code.
25. The Board has considered the information in the attached Information Sheet in developing the Findings of this Order. The attached Information Sheet is part of this Order.
26. The Board has notified the Discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for this discharge and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.
27. The Board, in a public meeting, heard and considered all comments pertaining to the discharge.
28. This Order shall serve as an NPDES permit pursuant to Section 402 of the CWA, and amendments thereto, and shall take effect upon the date of hearing, provided USEPA has no objections.

IT IS HEREBY ORDERED that Order No. 98-125 is rescinded and the City of Redding, its agents, successors and assigns, in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder, and the provisions of the Clean Water Act and regulations and guidelines adopted thereunder, shall comply with the following:

A. Discharge Prohibitions

1. Discharge of treated wastewater at a location or in a manner different from that described in Finding Nos. 2 and 3 is prohibited.
2. Discharge of storm water at a location or in a manner different from that allowed in coverage under the general Permit for Discharges of Storm Water Associated with Industrial Activities is prohibited.
3. The by-pass or overflow of wastes to surface waters is prohibited, except as allowed by Standard Provision A.13. See attached "Standard Provisions and Reporting Requirements for Waste Discharge Requirements (NPDES)."
4. Neither the discharge nor its treatment shall create a nuisance as defined in Section 13050 of the California Water Code.

B. Effluent Limitations

1. Effluent shall not exceed the following limits:

<u>Constituents</u>	<u>Units</u>	<u>Monthly Average</u>	<u>Weekly Average</u>	<u>Monthly Median</u>	<u>4-day Average</u>	<u>Daily Maximum</u>
BOD ^a	mg/L	10	15	--	--	30
	lbs/day ^b	734	1,101	--	--	2,202
Total Suspended Solids	mg/L	10	15	--	--	30
	lbs/day ^b	734	1,101	--	--	2,202
Chlorine Residual	mg/L	--	--	--	0.01	0.02 ^c
Total Recoverable Copper	μg/L	12	--	--	--	17
Total Recoverable Zinc	lbs/day ^b	0.88	--	--	--	1.2
	μg/L	81	--	--	--	120
Bromodichloromethane	lbs/day ^b	5.9	--	--	--	8.8
	μg/L	21	--	--	--	42
Dibromochloromethane	lbs/day ^b	1.5	--	--	--	3.1
	μg/L	14	--	--	--	29
Tetrachloroethene	lbs/day ^b	1.0	--	--	--	2.1
	μg/L	30	--	--	--	59
Total Coliform Organisms	lbs/day ^b	2.2	--	--	--	4.3
	MPN/100 ml	--	--	23	--	500

^a 5-day, 20°C Biochemical Oxygen Demand (BOD).

^b Based upon a design treatment capacity of 8.8 mgd.

^c 1-hour average

2. The arithmetic mean of 20°C BOD (5-day) and total suspended solids in effluent samples collected over a monthly period shall not exceed 15 percent of the arithmetic mean of the values for influent samples collected at approximately the same times during the same period (85 percent removal).
3. The discharge shall not have a pH less than 6.0 nor greater than 9.0.
4. The average dry weather (July through September) discharge flow shall not exceed 8.8 mgd.
5. Survival of aquatic organisms in 96-hour bioassays of undiluted waste shall be no less than:

Minimum for any one bioassay -----70%

Median for any three or more consecutive bioassays -----90%

C. Sludge Disposal

1. Collected screenings, sludges, and other solids removed from liquid wastes shall be disposed of in a manner approved by the Executive Officer, and consistent with *Consolidated Regulations for Treatment, Storage, Processing, or Disposal of Solid Waste*, as set forth in Title 27, CCR, Division 2, Subdivision 1, Section 20005, et seq.
2. Any proposed change in sludge use or disposal practice from a previously approved practice shall be reported to the Executive Officer and USEPA Regional Administrator at least **90 days** in advance of the change.
3. Use and disposal of sewage sludge shall comply with existing Federal and State laws and regulations, including permitting requirements and technical standards included in 40 CFR 503. If the State Water Resources Control Board and the Regional Water Quality Control Boards are given the authority to implement regulations contained in 40 CFR 503, this Order may be reopened to incorporate appropriate time schedules and technical standards. The Discharger must comply with the standards and time schedules contained in 40 CFR 503 whether or not they have been incorporated into this Order.
4. The Discharger is encouraged to comply with the “Manual of Good Practice for Agricultural Land Application of Biosolids” developed by the California Water Environment Association.
5. The Discharger shall submit a sludge disposal plan describing the annual volume of sludge generated by the plant and specifying the disposal practices in accordance with the attached Monitoring and Reporting Program.

D. Discharge Specifications (Ponds and Sludge Lagoons)

1. Ponds and lagoons shall be managed to maintain the integrity of the pond embankments and to prevent breeding of mosquitoes. Weeds shall be minimized.
2. The dissolved oxygen content of the ponds shall not be less than 1.0 mg/L for 16 hours in any 24 hour period.
3. The Discharger shall maintain a minimum 2 feet of freeboard in the final pond and lagoon at all times. The ponds shall have sufficient capacity to accommodate allowable wastewater flow and design seasonal precipitation. Design seasonal precipitation shall be based on total annual precipitation using a return period of 25 years, distributed monthly in accordance with historical rainfall patterns.
4. The discharge to ponds or lagoons shall not cause degradation of any water supply.

E. Receiving Water Limitations

Receiving water limitations are based upon water quality objectives contained in the Basin Plan. As such, they are a required part of this permit.

The discharge shall not cause the following in the Sacramento River:

1. Concentrations of dissolved oxygen to fall below 9.0 mg/L. When natural conditions lower dissolved Oxygen below this level, the concentrations shall be maintained at or above 95 percent of saturation.
2. Oils, greases, waxes, or other materials to form a visible film or coating on the water surface or on the stream bottom.
3. Oils, greases, waxes, floating material (liquids, solids, foams, and scums) or suspended material to create a nuisance or adversely affect beneficial uses.
4. Chlorine to be detected in the receiving water in concentrations equal to or greater than 0.01 mg/L.
5. Aesthetically undesirable discoloration.
6. Fungi, slimes, or other objectionable growths.
7. The turbidity to increase as follows:
 - a. More than 1 Nephelometric Turbidity Units (NTUs) where natural turbidity is between 0 and 5 NTUs.

- b. More than 20 percent where natural turbidity is between 5 and 50 NTUs.
- c. More than 10 NTUs where natural turbidity is between 50 and 100 NTUs.
- d. More than 10 percent where natural turbidity is greater than 100 NTUs.
8. The normal ambient pH to fall below 6.5, exceed 8.5, or change by more than 0.5 units.
9. Deposition of material that causes nuisance or adversely affects beneficial uses.
10. The normal ambient temperature to be increased more than 5°F, or to higher than 56°F when such an increase will be detrimental to the fishery, whichever is more restrictive.
11. Radionuclides to be present in concentrations that exceed maximum contaminant levels specified in the California Code of Regulations, Title 22; that harm human, plant, animal or aquatic life; or that result in the accumulation of radionuclides in the food web to an extent that presents a hazard to human, plant, animal, or aquatic life.
12. Aquatic communities and populations, including vertebrate, invertebrate, and plant species, to be degraded.
13. Toxic pollutants to be present in the water column, sediments, or biota in concentrations that adversely affect beneficial uses; that produce detrimental response in human, plant, animal, or aquatic life; or that bioaccumulate in aquatic resources at levels which are harmful to human health.
14. Violations of any applicable water quality standard for receiving waters adopted by the Board or the State Water Resources Control Board pursuant to the CWA and regulations adopted thereunder.
15. Taste or odor-producing substances to impart undesirable tastes or odors to fish flesh or other edible products of aquatic origin or to cause nuisance or adversely affect beneficial uses.
16. The fecal coliform concentration in any 30-day period to exceed a geometric mean of 200 MPN/100 ml or cause more than 10 percent of total samples to exceed 400 MPN/100 ml.

F. Groundwater Limitations

1. The discharge, in combination with other sources, shall not cause groundwater underlying the wastewater disposal areas to contain waste constituents statistically greater than background water quality, except for coliform bacteria. For coliform bacteria, increases

shall not cause the most probable number of total coliform organisms to exceed 2.2 MPN/100 ml over any seven-day period.

G. Pretreatment Program Requirements

The Discharger shall:

1. Comply with all pretreatment requirements contained in 40 CFR Part 403 and shall be subject to enforcement actions, penalties, fines, and other remedies by USEPA or other appropriate parties, as provided in the CWA, as amended. The Discharger shall implement and enforce its approved Pretreatment Program. The USEPA may initiate enforcement action against an industrial user for noncompliance with applicable standards and requirements as provided in the CWA.
2. Enforce the requirements promulgated under Section 307(b), (c), and (d), and Section 402(b) of the CWA. The Discharger shall cause industrial users subject to federal categorical standards to achieve compliance no later than the date specified in those requirements, or in the case of a new industrial user, upon commencement of the discharge.
3. Perform the pretreatment functions required in 40 CFR Part 403, including, but not limited to:
 - a. Implementing the necessary legal authorities as provided in 40 CFR 403.8(f)(1);
 - b. Enforcing the pretreatment requirements under 40 CFR 403.5 and 403.6;
 - c. Implementing the programmatic functions as provided in 40 CFR 403.8(f)(2);
 - d. Providing the requisite funding and personnel to implement the pretreatment program as provided in 40 CFR 403.8(f)(3); and
 - e. Publishing a list of significant violators as required by 40 CFR 403.8(f)(2)(vii), where "significant violations" and "significant noncompliance" are as defined by USEPA in Pretreatment Compliance Monitoring and Enforcement Guidance, pp. 3-48 through 3-52.
4. The Discharger shall implement the provisions of the agreement between the Discharger and the County of Shasta dated 7 March 2000 to accept wastewater from unincorporated portions of the County of Shasta. The Discharger shall implement the provisions of the agreement between the Discharger and the Redding Rancheria dated 15 January 2002 to accept wastewater from the Redding Rancheria.

H. Provisions

1. The Discharger shall not allow pollutant-free wastewater to be discharged into the collection, treatment, and disposal system in amounts that significantly diminish the system's capability to comply with this Order. Pollutant-free wastewater means rainfall, ground water, cooling waters, and condensates that are essentially free of pollutants.
2. The treatment facilities shall be designed, constructed, operated, and maintained to prevent inundation or washout due to floods with a 100-year return frequency.
3. The Discharger shall obtain coverage by **1 November 2003** under the SWRCB Order No. 97 03 DWQ (General Permit No. CAS000001), adopted on 17 April 1997 (or latest renewal, scheduled to be adopted in 2003), specifying waste discharge requirements for discharge of storm water associated with industrial activities, excluding construction activities, and requiring submittal of a Notice of Intent (NOI) by industries to be covered under the permit.
4. A letter was issued on 28 February 2001 by the Executive Officer under the authority of California Water Code Section 13267 requesting a technical report containing analysis of effluent and receiving water samples for NTR and CTR constituents, and additional constituents that could exceed Basin Plan numeric or narrative water quality objectives. The Discharger shall comply with the following time schedule in conducting the remainder of the required technical report analysis:

<u>Task</u>	<u>Compliance Date</u>
Submit remaining effluent data for 17 Dioxin congeners	28 February 2004

The Discharger shall submit to the Regional Board on or before each compliance due date, the specified document or a written report detailing compliance or noncompliance with the specific date and task. If noncompliance is reported, the Discharger shall state the reasons for noncompliance and include an estimate of the date when the Discharger will be in compliance. The Discharger shall notify the Regional Board by letter when it returns to compliance with the time schedule.

5. By **1 August 2004** the Discharger shall complete and submit a workplan and schedule for completion of a mixing zone study for copper, zinc, bromodichloromethane, dibromochloromethane, and tetrachloroethene. The mixing zone study shall be completed by **1 February 2006**.
6. If the mixing zone study performed by the Discharger results in a dilution credit of less than 40:1, the Board will reopen the permit to establish more stringent limits for copper, zinc, bromodichloromethane, dibromochloromethane, or tetrachloroethene as appropriate.

7. The Discharger shall report to the Regional Board any toxic chemical release data it reports to the State Emergency Response Commission within 15 days of reporting the data to the Commission pursuant to section 313 of the "Emergency Planning and Community Right to Know Act of 1986.
8. The Discharger shall conduct the chronic toxicity testing specified in the Monitoring and Reporting Program. If the testing indicates that the discharge causes, has the reasonable potential to cause, or contributes to an in-stream excursion above the water quality objective for toxicity, the Discharger shall initiate a Toxicity Identification Evaluation (TIE) to identify the causes of toxicity. Upon completion of the TIE, the Discharger shall submit a workplan to conduct a Toxicity Reduction Evaluation (TRE) and, after Board evaluation, conduct the TRE. This Order will be reopened and a chronic toxicity limitation included and/or a limitation for the specific toxicant identified in the TRE included. Additionally, if a chronic toxicity water quality objective is adopted by the State Water Resources Control Board, this Order may be reopened and a limitation based on that objective included.
9. The Discharger shall use the best practicable cost-effective control technique currently available to limit mineralization to no more than a reasonable increment.
10. The Discharger shall comply with all the items of the "Standard Provisions and Reporting Requirements for Waste Discharge Requirements (NPDES)," dated 1 March 1991, which are part of this Order. This attachment and its individual paragraphs are referred to as "Standard Provisions."
11. The Discharger shall comply with Monitoring and Reporting Program No. R5-2003-0130, which is a part of this Order, and any revisions thereto as ordered by the Executive Officer.

When requested, the Discharger shall complete and submit Discharge Monitoring Reports to USEPA. The submittal date shall be no later than the submittal date specified in the Monitoring and Reporting Program for Discharger Self Monitoring Reports.

12. This Order expires on **1 September 2008** and the Discharger must file a Report of Waste Discharge in accordance with Title 23, CCR, not later than **180 days** in advance of such date in application for renewal of waste discharge requirements if it wishes to continue the discharge.
13. Prior to making any change in the discharge point, place of use, or purpose of use of the wastewater, the Discharger shall obtain approval of, or clearance from, the State Water Resources Control Board (Division of Water Rights).
14. In the event of any change in control or ownership of land or waste discharge facilities presently owned or controlled by the Discharger, the Discharger shall notify the

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succeeding owner or operator of the existence of this Order by letter, a copy of which shall be immediately forwarded to this office.

To assume operation under this Order, the succeeding owner or operator must apply in writing to the Executive Officer requesting transfer of the Order. The request must contain the requesting entity's full legal name, the state of incorporation if a corporation, the address and telephone number of the persons responsible for contact with the Board and a statement. The statement shall comply with the signatory paragraph of Standard Provision D.6 and state that the new owner or operator assumes full responsibility for compliance with this Order. Failure to submit the request shall be considered a discharge without requirements, a violation of the California Water Code. Transfer shall be approved or disapproved in writing by the Executive Officer.

I, THOMAS R. PINKOS, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on 5 September 2003.

original signed by

THOMAS R. PINKOS, Executive Officer

Attachments

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. R5-2003-0130

NPDES NO. CA0079731

FOR
CITY OF REDDING
CLEAR CREEK WASTEWATER TREATMENT PLANT
SHASTA COUNTY

This Monitoring and Reporting Program is issued pursuant to California Water Code Sections 13383 and 13267. The Discharger shall not implement any changes to this Monitoring and Reporting Program unless and until the Regional Board or Executive Officer issues a revised Monitoring and Reporting Program.

INFLUENT MONITORING

Samples shall be collected at approximately the same time as effluent samples and should be representative of the influent. Influent monitoring shall include at least the following:

<u>Constituent</u>	<u>Unit</u>	<u>Type of Sample</u>	<u>Sampling Frequency</u>
Daily Flow	mgd	Continuous	Daily
20°C BOD ₅	mg/L, lbs/day	24-hour Composite	2 per month
Suspended Solids	mg/L, lbs/day	24-hour Composite	2 per month
Temperature	°F	Grab	2 per month

A 24-hour composite influent sample shall be collected annually and analyzed for total cadmium, chromium, copper, lead, nickel, silver, and zinc. The influent sample shall be collected at the same time an effluent sample is obtained for analysis of priority pollutants.

EFFLUENT MONITORING

Effluent samples shall be collected downstream from the last connection through which wastes can be admitted into the outfall. Effluent samples should be representative of the volume and quality of the discharge. Samples collected from the outlet structure of ponds will be considered adequately composited. Time of collection of samples shall be recorded. Effluent monitoring shall include at least the following:

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<u>Constituent</u>	<u>Unit</u>	<u>Type of Sample</u>	<u>Sampling Frequency</u>
Daily Flow	mgd	Continuous	Daily
Chlorine Residual	mg/L	Continuous	Continuous ^a
pH ^b	PH units	Grab	Daily
20°C BOD ₅	mg/L, lbs/day	24-hour Composite	Weekly
Suspended Solids	mg/L, lbs/day	24-hour Composite	Weekly
Total Coliform Organisms	MPN/100 ml	Grab	Weekly
Temperature ^b	°F	Grab	Weekly
Ammonia ^{b,c}	mg/L	Grab	Monthly
Total Recoverable Copper	µg/L	Grab	Monthly
Total Recoverable Zinc	µg/L	Grab	Monthly
Bromodichloromethane	µg/L	Grab	Monthly
Dibromochloromethane	µg/L	Grab	Monthly
Tetrachloroethene	µg/L	Grab	Monthly
Electrical Conductivity @ 25°C	µmhos/cm	Grab	Monthly
Total Dissolved Solids	mg/L	Grab	Quarterly
Priority Pollutants	µg/L	Grab	Annually ^d
Acute Toxicity ^e	% Survival	Grab	Quarterly

^a Report peak 1-hour average for each day and peak 4-day average for the month.

^b Concurrent with biotoxicity monitoring.

^c Report as both total and un-ionized ammonia.

^d Receiving water hardness and pH shall be determined at R-1a at the same time as effluent samples are taken.

^e Rainbow trout shall be used as the test species.

If the discharge is intermittent rather than continuous, then on the first day of each such intermittent discharge, the Discharger shall monitor and record data for all of the constituents listed above, after which the frequencies of analysis given in the schedule shall apply for the duration of each such intermittent discharge. In no event shall the Discharger be required to monitor and record data more often than twice the frequencies listed in the schedule.

RECEIVING WATER MONITORING

All receiving water samples shall be grab samples taken from the Sacramento River. Receiving water monitoring shall include at least the following:

<u>Station</u>	<u>Description</u>
R-1	100 feet upstream from the point of discharge
R-1a	Caldwell Park at boat launch ramp
R-2	300 feet downstream from the point of discharge

<u>Constituent</u>	<u>Unit</u>	<u>Station</u>	<u>Sampling Frequency</u>
PH	pH units	R-1, R-2	Monthly
Turbidity	NTU	R-1, R-2	Monthly
Dissolved Oxygen	mg/L	R-1, R-2	Monthly
Total Recoverable Copper ^a	µg/L	R-1a	Monthly
Total Recoverable Zinc ^a	µg/L	R-1a	Monthly
Temperature	°F (or °C)	R-1, R-2	Monthly
Priority Pollutants ^a	µg/L	R-1a	Annually
Dissolved Copper ^a	µg/L	R-1a	Annually ^b
Dissolved Zinc ^a	µg/L	R-1a	Annually ^b

^a Receiving water hardness and pH shall be determined at R-1a at the same time. These samples shall be taken the same day as effluent samples for the same constituents are taken.

^b During the period of January through May

In conducting the receiving water sampling, a log shall be kept of the receiving water conditions throughout the reach bounded by Stations R-1 and R-2. Attention shall be given to the presence or absence of:

- a. Floating or suspended matter
- b. Discoloration
- c. Bottom deposits
- d. Aquatic life
- e. Visible films, sheens or coatings
- f. Fungi, slimes, or objectionable growths
- g. Potential nuisance conditions

Notes on receiving water conditions shall be summarized in the monitoring report.

THREE SPECIES CHRONIC TOXICITY MONITORING

Chronic toxicity screening shall be conducted annually to determine whether the effluent is contributing toxicity to the Sacramento River. The screening shall be conducted as specified in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Water to Freshwater Organisms*, EPA 600/4-91-002, or latest edition. Chronic toxicity samples shall be collected at the discharge of the plant prior to its entering the Sacramento River. Twenty-four-hour composite samples shall be representative of the volume and quality of the discharge. Time of collection samples shall be recorded. The screening test shall be performed on the undiluted effluent samples. Chronic toxicity screening shall include the following:

Species: Pimephales promelas, Ceriodaphnia dubia, and Selenastrum capricornutum

Frequency: Once per year.

If the results of the chronic toxicity screening indicate the waste stream may cause in-stream toxicity, the Discharger will be required to implement an effluent toxicity monitoring program in accordance with the procedures outlined in the document referenced in the above paragraph and *Technical Support Document for Water Quality-Based Toxics Control*, EPA 505/2-90-001. Appropriate deadlines for this program will be established if and when it is determined that a toxicity monitoring program is required.

CALIFORNIA TOXICS RULE/SIP MONITORING

Discharger shall submit monitoring data for effluent as follows:

Dioxin Toxic Equivalents shall be determined by analyzing for the 17 congeners as described in the SIP using High Resolution Mass Spectrometry (Method 1613). Discharger is required to monitor effluent for the presence of the 17 congeners once during dry weather and once during wet weather each year for three years. Three samples remain to be completed. Results for the Analyses for the 17 dioxin congeners shall be submitted no later than **28 February 2004**.

SLUDGE MONITORING

A composite sample of sludge shall be collected annually in accordance with USEPA's Publicly Owned Treatment Works (POTW) Sludge Sampling and Analysis Guidance Document, August 1989 (or most recent edition), and tested for priority pollutants.

Sampling records shall be retained for a minimum of five years. A log shall be kept of sludge quantities generated and of handling and disposal activities. The frequency of entries is discretionary; however, the log should be complete enough to serve as a basis for part of the annual report.

1. Annually by **30 January**, the Discharger shall submit:
 - a. Annual sludge production in dry tons and percent solids.
 - b. A schematic diagram showing sludge handling facilities and a solids flow diagram.
 - c. Depth of application and drying time for sludge drying beds.
 - d. A description of disposal methods, including the following information related to the disposal methods used at the facility. If more than one method is used, include the percentage of annual sludge production disposed by each method.
 - (1) For **landfill disposal**, include (1) the Regional Board's WDR order numbers that regulate the landfill(s) used, (2) the present classifications of the landfill(s) used, and (3) the names and locations of the facilities receiving sludge.
 - (2) For **land application**, include, if applicable, (1) the location of the site(s), (2) the Regional Board's WDR order numbers that regulate the site(s), (3) the application rate in lbs/acre/year (specify wet or dry), and (4) subsequent uses of the land.
 - (3) For **incineration**, include (1) the names and locations of the site(s) where sludge incineration occurs, (2) the Regional Board's WDR order numbers that regulate the site(s), (3) the ash disposal method, and (4) the names and locations of facilities receiving ash (if applicable).

Annually, the Discharger shall submit characterization of sludge quality, including sludge percent solids and quantitative results of chemical analysis for the priority pollutants listed in 40 CFR 122 Appendix D, Tables II and III (excluding total phenols). All sludge samples shall be a composite of a minimum of twelve (12) discrete samples taken at equal time intervals over 24 hours. Suggested methods for analysis of sludge are provided in EPA publications titled *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods* and *Test Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater*. Recommended analytical holding times for sludge samples should reflect those specified in 40 CFR 136.6.3(e). Other guidance is available in EPA's *POTW Sludge Sampling and Analysis Guidance Document, August 1989*.

PRETREATMENT PROGRAM MONITORING

The Discharger shall submit an annual report to the Board, with copies to the USEPA Regional Administrator and the State Board, describing the Discharger's pretreatment activities over the previous 12 months. In the event that the Discharger is not in compliance with any conditions or requirements of this Order, the Discharger shall include the reasons for the noncompliance and state how and when the Discharger shall comply with such conditions and requirements. This annual report shall be submitted by **28 February** and shall contain, but not be limited to, items G.1 through 10 of Standard Provisions and Reporting Requirements for Waste Discharge Requirements (NPDES) dated 1 March 1991.

In addition to the information required in the annual report, the Discharger shall report quarterly the information contained in G.4. (a through g) of Standard Provisions and Reporting Requirements for Waste Discharge Requirements (NPDES) dated 1 March 1991. The reports shall also describe progress towards compliance with audit or pretreatment compliance inspection requirements. Reports shall be submitted within **30 days of the end of each quarter**; however, information required in the fourth quarterly report may be included as part of the annual report. If none of the aforementioned conditions exist, at a minimum, a letter certifying that all industries are in compliance and no violations or changes to the pretreatment program have occurred during the quarter must be submitted.

In addition to the Regional Board, signed copies of the reports shall be submitted to the Regional Administrator and the State Board at the following addresses:

Mr. Keith Silva
U.S. Environmental Protection Agency
Region IX, Attn: W-5-2
75 Hawthorne Street
San Francisco, CA 94105

Pretreatment Program Manager
Regulatory Section
Division of Water Quality
State Water Resources Control Board
P.O. Box 944213
Sacramento, CA 94244-2130

REPORTING

Monitoring results shall be submitted to the Regional Board by the **first day of the second month** following sample collection. Quarterly and annual monitoring results shall be submitted by the **first day of the second month** following each calendar quarter and year, respectively. California Toxics Rule/SIP monitoring shall be submitted as soon as individual results are available, with all results submitted by the date stated above.

In reporting the monitoring data, the Discharger shall arrange the data in tabular form so that the date, the constituents, and the concentrations are readily discernible. The data shall be summarized in such a manner to illustrate clearly whether the discharge complies with waste discharge requirements. The highest daily maximum for the month, monthly and weekly

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averages, and medians, and removal efficiencies (%) for BOD and Suspended Solids, should be determined and recorded.

If the Discharger monitors any pollutant at the locations designated herein more frequently than is required by this Order, the results of such monitoring shall be included in the calculation and reporting of the values required in the discharge monitoring report form. Such increased frequency shall be indicated on the discharge monitoring report form.

By **30 January of each year**, the Discharger shall submit a written report to the Executive Officer containing the following:

- a. The names, certificate grades, and general responsibilities of all persons employed at the WWTF (Standard Provision A.5).
- b. The names and telephone numbers of persons to contact regarding the plant for emergency and routine situations.
- c. A statement certifying when the flow meter and other monitoring instruments and devices used for demonstration of compliance with this order were last calibrated, including identification of who performed the calibration (Standard Provision C.6).
- d. A statement certifying whether the current operation and maintenance manual, and contingency plan, reflect the wastewater treatment plant as currently constructed and operated, and the dates when these documents were last revised and last reviewed for adequacy.

The Discharger may also be requested to submit an annual report to the Board with both tabular and graphical summaries of the monitoring data obtained during the previous year. Any such request shall be made in writing. The report shall discuss the compliance record. If violations have occurred, the report shall also discuss the corrective actions taken and planned to bring the discharge into full compliance with the waste discharge requirements.

All reports submitted in response to this Order shall comply with the signatory requirements of Standard Provision D.6.

The Discharger shall implement the above monitoring program on the first day of the month following effective date of this Order.

original signed by

Ordered by: _____
THOMAS R. PINKOS, Executive Officer

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5 September 2003

(Date)

INFORMATION SHEET

ORDER NO. R5-2003-0130
NPDES NO. CA0079731
CITY OF REDDING
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SHASTA COUNTY

GENERAL INFORMATION

The City of Redding operates a wastewater treatment plant in Section 31, T31N, R4W, MDB&M. The treatment plant presently treats an average dry weather flow of 6.5 mgd. Treated effluent is discharged to the Sacramento River.

Liquid treatment processes at the plant include raw sewage screening for removal of large solids, grit removal, activated sludge treatment with secondary clarification, filtration, and chlorination/dechlorination. Primary sludge is treated by aerobic digestion followed by plate-and-frame-filter-press dewatering and landfill disposal. Waste activated sludge is stabilized in sludge lagoons and air dried for use as a soil amendment on land at and around the Redding Municipal Airport.

TYPE AND QUANTITY OF WASTE DISCHARGED

The discharger treats an average dry weather flow of approximately 6.5 mgd of municipal wastewater. The waste is treated by biological treatment and filtration. The report of waste discharge describes the discharge as follows:

Design Average Dry Weather Flow: 8.8 mgd
Design Peak Day Wet Weather Flow: 29.4 mgd through primary treatment
16.2 mgd through secondary treatment
13.2 mgd diversion to flow equalization
Average Temperature: 73°F Summer; 63°F Winter

<u>Constituent</u>	<u>mg/L</u>	<u>lbs/day^b</u>
BOD ₅ ^a	3.0	163
Total Suspended Solids	2.0	108

^a5-day, 20°C biochemical oxygen demand

^bBased on a current average dry weather flow of 6.5 mgd

REASONABLE POTENTIAL ANALYSIS

Federal regulations contained at 40 CFR 122.4 (d) require effluent limitations for all pollutants that are or may be discharged at a level that will cause or have the reasonable potential to cause, or contribute to an in-stream excursion above a narrative or numerical water quality standard. USEPA adopted the National Toxics Rule (NTR) on 5 February 1993 and the California Toxics Rule (CTR) on 18 May 2000. The NTR and CTR contain water quality standards applicable to

this discharge. The State Water Resources Control Board adopted the *Policy for Implementation of Toxics Standards for Inland Surface waters, Enclosed Bays, and Estuaries of California* (known as the State Implementation Policy or SIP), which contains guidance on implementation for the NTR and CTR.

The Sacramento River from Shasta Dam to Red Bluff was previously listed as an impaired waterbody pursuant to Section 303(d) of the Clean Water Act for cadmium, copper, unknown toxicity, and zinc. The listing for metals was mainly a result of long term effects of mining operations at Iron Mountain Mine (located along this reach of river) in addition to other mines upstream of Shasta Dam. Regional Board staff developed a Total Maximum Daily Loads (TMDL) water management strategy for cadmium, copper and zinc loading into the upper Sacramento River. The Board has adopted the technical report, *Upper Sacramento River TMDL for Cadmium, Copper and Zinc*, dated April 2002. There has been a great deal of physical corrective work done at Iron Mountain Mine in the recent years with more work planned in the next few years. An interim TMDL has been developed that focuses on additional copper, cadmium, and zinc removal from Iron Mountain Mine. Five years from development of the interim TMDL a final TMDL, if necessary, will be developed for these metals. The newly adopted 303(d) listing does not include this reach of the river as impaired for these metals.

The Discharger completed sampling required by the SIP and has submitted the results of this sampling. A determination was made that there is reasonable potential to cause or contribute to an in-stream excursion above the water quality standards for copper, zinc, bromodichloromethane, dibromochloromethane, and tetrachloroethene. Development of effluent limits for these constituents are presented below. There were a small number of sample results that were discarded as not being representative of the effluent or receiving water. These were as follows: Effluent cyanide of 16 µg/L; effluent heptachlor detected, but not quantified at 0.01 µg/L; effluent bis-(2-Ethylhexyl)phthalate of 9 µg/L; river total zinc of 19.9 µg/L; river cyanide of 9 µg/L.

BASIS FOR PERMIT CONDITIONS

Metals Translators

Water quality criteria and objectives for metals in the CTR and Basin Plan are presented as dissolved concentrations. Lacking site-specific data, the USEPA recommends conversion factors (translators) to translate dissolved concentrations to total concentrations. The conversion factor for copper in freshwater is 0.960 for both the acute and the chronic criteria. The conversion factors for zinc in freshwater are 0.978 for the acute and 0.986 for the chronic criteria.

Receiving water data collected by the Discharger indicate that the EPA standard conversion factors may not be representative of the dissolved fraction of copper and zinc in this reach of the Sacramento River during high flow, high turbidity events, which also correspond to high metals

concentrations. The Discharger has analyzed the data for copper and zinc and proposes the following translators:

	<u>Chronic</u>	<u>Acute</u>
Copper	0.666	0.711
Zinc	0.723	0.780

Conditions in the Sacramento River change as AMD loading is reduced, therefore recent data from calendar years 2000 through 2002 were used to generate translators for copper and zinc. The data indicate a greater risk of in stream excursions of the applicable water quality criteria during the winter and spring months, therefore data from January through May were used to develop site specific translators. Clean sampling techniques using EPA Method 1669 procedures and analysis by EPA 1638 ICP/MS were used in this study.

The SIP contains guidance on the development of translators. The median and 90th percentile values are used for the chronic and acute translators in accordance with Section 1.4.1 of the SIP.

Dilution Credit and Mixing Zone Study

The ratio of Sacramento River flow to effluent flow is approximately 160:1 at extreme critical low river flow and high treatment facility flow; and 550:1 at average flows, however it is unlikely that the discharge meets the definition of “completely-mixed discharge” contained in the SIP. The Discharger proposes the use of an interim dilution credit of 40:1 for all criteria, based on a minimum Sacramento River flow of 3,165 cfs and a maximum WWTP effluent flow of 19.34 cfs (12.5 mgd). This is based on the preliminary estimate that the discharge mixes with 25 percent of the river’s total flow using measurements from aerial photographs of the river at 4,600 cfs and the outfall diffuser length of 120 feet. The Discharger plans to perform a mixing zone study to determine the actual dilution credit provided by the discharge diffuser.

Effluent Limitations

Total Suspended Solids (TSS) and Biochemical Oxygen Demand (BOD) Limits:

Federal regulations, 40 CFR, part 133, provide technology based effluent limitation for BOD and TSS. Pursuant to the regulations at 40 CFR Sections 133.102(a), and (b), the BOD and TSS 30-day average discharge limit for secondary treatment systems shall not exceed 30 mg/L, the 7-day average shall not exceed 45 mg/L, and the 30-day BOD percent removal shall not be less than 85 percent. Historically, special consideration has been given for critical salmon and steelhead trout spawning areas in the Sacramento River from Redding to Hamilton City. Treatment facilities discharging to this portion of the Sacramento River have been designed to include effluent filtration. These facilities can easily meet technology based standards of 10 mg/L for BOD and TSS on a 30-day average basis and 15 mg/L on a 7-day average basis.

The previous permit called for monthly average effluent limits for BOD and TSS of 10 mg/L, weekly average limits of 15 mg/L, and a monthly average removal rate of 85 percent. These limits remain the same in this permit.

Settleable Solids:

The previous permit contained monthly average and daily maximum settleable solids limits of 0.1 ml/L and 0.2 ml/L, respectively. Suspended solids limits are in place and measure a similar parameter that is of greater concern in relation to water quality. This Order eliminates the settleable solids limits. With TSS limits in place, the settleable solids limits can be eliminated and still protect water quality objectives in the receiving water.

Chlorine Residual:

The Basin Plan prohibits the discharge of toxic materials in toxic concentrations. Chlorine is used for disinfection of the effluent waste stream. Chlorine can cause toxicity to aquatic organisms when discharged to surface waters. USEPA recommends, in their *Ambient Water Quality Criteria for the Protection of Fresh Water Aquatic Life*, that chlorine concentrations not exceed 0.02 mg/L as a 1-hour average and 0.01 mg/L as a 4-day average. The use of chlorine as a disinfectant in the wastewater treatment process presents a reasonable potential that it could be discharged in toxic concentrations. An effluent limitation for chlorine has been included in the Order to protect the receiving stream aquatic life beneficial uses. The effluent limitation has been established at the USEPA recommended ambient water quality criteria for chlorine. The one-hour average limitation, rather than an instantaneous or daily maximum, will be applied for compliance determinations. A one-hour average limitation allows for continuous monitoring anomalies while protecting aquatic organisms against toxicity.

Total Coliform Organisms:

This Order requires a monthly median total coliform limit of 23 MPN/100 ml and a daily maximum limit of 500 MPN/100 ml for effluent discharged to the Sacramento River. This level is thought to be adequately protective of beneficial uses and is consistent with the previous permit.

pH:

The Basin Plan provides that the pH of surface waters shall not be depressed below 6.5 nor raised above 8.5 nor shall the discharge alter pH of the receiving water more than 0.5 units. Federal regulations at 40 CFR 133.102(c) describes the minimum level of effluent quality to be attained by secondary treatment facilities for pH to be within 6.0 and 9.0 units. This Order requires the pH of the effluent to be maintained within the limits of 6.0 and 9.0 pH units.

Flow Limits:

The monthly average daily dry weather flow limit of 8.8 mgd is based on the design capacity of the treatment facility.

Copper:

Based on analytical results of effluent samples collected by the Discharger and the procedures presented in the SIP, the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR standards for copper; therefore, effluent limitations for copper are included in the Order. Effluent results submitted by the Discharger are summarized in Table FS-1.

Table FS-1 – Copper Concentrations (µg/L)

	Clear Creek WWTP Effluent		Sacramento River at Caldwell Park	
	Total		Total	
	Recoverable	Dissolved	Recoverable	Dissolved
Minimum	2.68	2.71	0.03	0.01
Maximum	6.90	5.91	9.01	4.93
Average	5.19	4.55	3.15	2.07
No. of Samples	18	12	42	42
Standard Deviation	1.15	1.09	--	--
Coefficient of Variation	0.22	0.24	--	--

Copper toxicity is hardness dependent. Table FS-2 presents the hardness values monitored in the Sacramento River at Caldwell Park, upstream of the Clear Creek WWTP. Table FS-2 also presents the CTR chronic criteria and Basin Plan objectives associated with the given hardness. Figure FS-1 is a plot of the Sacramento River and effluent copper concentrations and the CTR chronic criteria calculated using the hardness data for each sampling day. As can be seen in this figure, the dissolved concentration of copper in the river did not exceed the CTR chronic criteria in 2000 through 2002. When the river dissolved copper concentration was higher, the hardness was also higher, resulting in a higher criterion. For calculation of effluent limits the difference between the river dissolved concentrations and calculated criterion for the measured hardness will be evaluated and the minimum value will be used for “C-B” in the ECA equation in step No. 2 of SIP section 1.4.B. This “C-B” value represents the critical condition assimilative capacity in this reach of the river. A safety factor of five (5) will be applied to the “C-B” value such that 20 percent of the assimilative capacity of the river is used to calculate an effluent limit. This allows for the four dischargers in this reach of the river to share the assimilative capacity (20 percent each) and gives a 20 percent allowance for municipal stormwater discharges and other unknown discharges.

Table FS-2 – Receiving Water Criteria/Objectives for Copper

	Hardness (mg/L)	CTR Chronic Criteria (µg/L)		Basin Plan Objective (µg/L)	
		Total Recoverable ^a	Dissolved	Total Recoverable ^a	Dissolved
Minimum	32	5.05	3.38	5.99	4.59
Maximum	87	11.9	7.95	14.8	11.4
Average	45	6.76	4.53	8.16	6.25
No. of Samples	40	--	--	--	--

^aUsing site specific translator

The CTR chronic criteria for dissolved copper was exceeded in two of the 42 Sacramento River samples analyzed over the period from January 1998 to August 2002. The latest of these two samples was taken in April of 1999. As stated previously, the concentration of metals in the Sacramento River is primarily a result of mining activity in the area. It is expected that the concentration in the river will be reduced by measures being taken at Iron Mountain Mine. Following are the steps, as presented in section 1.4.B of the SIP, to calculate the effluent limits for copper:

Step 1: Applicable water quality criteria (C)

CTR criteria are a function of receiving water hardness and are given by the following equation for criterion continuous concentration (CCC):

$$CCC \text{ (chronic)} = e^{(0.8545 \cdot \ln(\text{hardness}) - 1.702)} * (0.960) \text{ as dissolved fraction}$$

The CTR criterion maximum concentration (CMC) does not apply in this reach of the Sacramento River. Using the river hardness data for the past three years and discarding the high and low readings, the minimum hardness of 44 mg/L gives the following criterion:

$$CCC = 4.44 \text{ } \mu\text{g/L}$$

The basin Plan objective for copper is hardness dependant also and is given by:

$$\text{Basin Plan} = e^{(0.905 \cdot \ln(\text{hardness}) - 1.612)} \text{ as dissolved fraction}$$

$$\text{Basin Plan} = 6.13 \text{ } \mu\text{g/L}$$

Applying the translators developed by the Discharger of 0.666 for chronic and 0.711 for acute:

$$CCC = 6.67 \text{ } \mu\text{g/L}$$

$$\text{Basin Plan} = 8.62 \mu\text{g/L}$$

Step 2: Calculate the ECA

$$\text{ECA} = \text{Effluent Concentration Allowance} = C + D*(C-B)$$

Where D = dilution credit and B = background

Until mixing zone study is complete, interim D = 40

$$\begin{aligned} \text{Minimum C-B} &= 0.548 \text{ dissolved for CCC; } 0.820 \mu\text{g/L total} / 5 \text{ SF} = 0.16 \mu\text{g/L} \\ &= 2.10 \text{ dissolved for Basin Plan; } 2.95 \mu\text{g/L total} / 5 \text{ SF} = 0.59 \mu\text{g/L} \end{aligned}$$

$$\text{ECA}_{\text{CCC}} = 6.67 + 40 * (0.16) = 13.2 \mu\text{g/L}$$

$$\text{ECA}_{\text{BP}} = 8.62 + 40 * (0.59) = 32.2$$

Step 3: Determine long-term average (LTA)

$$C_V = 0.22; \text{ECA multiplier}_{\text{chronic99}} = 0.778$$

$$\text{ECA multiplier}_{\text{acute99}} = 0.616$$

$$\text{LTA}_{\text{CCC}} = 10.3 \mu\text{g/L}$$

$$\text{Using acute multiplier for Basin Plan objective; } \text{LTA}_{\text{BP}} = 19.8 \mu\text{g/L}$$

Step 4: Select lowest LTA

$$\text{LTA}_{\text{CCC}} = 10.3 \mu\text{g/L}$$

Step 5: Calculate water quality based effluent limits

$$C_V = 0.22; \text{AMEL multiplier}_{95} = 1.19 \text{ (n=4 for less than 4 samples per month)}$$

$$\text{MDEL multiplier}_{99} = 1.62$$

$$\text{Average Monthly Effluent Limit} = 12 \mu\text{g/L}$$

$$\text{Maximum Daily Effluent Limit} = 17 \mu\text{g/L}$$

Zinc:

Based on analytical results of effluent samples collected by the Discharger and the procedures presented in the SIP, the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the Basin Plan objective for zinc; therefore, effluent limitations for zinc are included in the Order. Effluent results submitted by the Discharger are summarized in Table FS-3.

Table FS-3 – Zinc Concentrations (µg/L)

	Clear Creek WWTP		Sacramento River at	
	Effluent		Caldwell Park	
	Total Recoverable	Dissolved	Total Recoverable	Dissolved
Minimum	11.1	10.6	0.56	0.2
Maximum	41.7	34.8	14.2	9.19
Average	26.0	22.7	5.3	3.6
No. of Samples	18	12	42	42
Standard Deviation	7.45	6.02	--	--
Coefficient of Variation	0.29	0.27	--	--

Zinc toxicity is hardness dependent. Table FS-4 presents the hardness values monitored in the Sacramento River at Caldwell Park, upstream of the Clear Creek WWTP. Table FS-4 also presents the CTR chronic criteria and Basin Plan objectives associated with the given hardness. Figure FS-2 is a plot of the Sacramento River and effluent zinc concentrations and the Basin Plan objective calculated using the hardness data for each sampling day. As can be seen in this figure, the dissolved concentration of zinc in the river did not exceed the Basin Plan objective in 1998 through 2002. As was done for copper, for calculation of zinc effluent limits the difference between the river dissolved concentrations and calculated criterion for the measured hardness will be evaluated and the minimum value will be used for “C-B” in the ECA equation in step No. 2 of SIP section 1.4.B. And as was done for copper, a safety factor of 5 will be applied to the “C-B” value such that only 20 percent of the assimilative capacity of the river is used to calculate an effluent limit.

Table FS-4 – Receiving Water Criteria/Objectives for Zinc

	Hardness (mg/L)	CTR Chronic Criteria (µg/L)		Basin Plan Objective (µg/L)	
		Total		Total	
		Recoverable	Dissolved	Recoverable	Dissolved
Minimum	32	62.2	45.0	17.1	13.3
Maximum	87	145	105	39.1	30.5
Average	45	83.1	60.1	22.6	17.7
No. of Samples	40	--	--	--	--

The Basin Plan objective for dissolved zinc was not exceeded in the Sacramento River samples analyzed over the period from January 1998 to August 2002. Following are the steps, as presented in section 1.4.B of the SIP, to calculate the effluent limits for zinc:

Step 1: Applicable water quality criteria (C)

CTR criteria are a function of receiving water hardness and are given by the following equation:

$$CCC \text{ (chronic)} = e^{(0.8473 \cdot \ln(\text{hardness}) + 0.884)} * (0.986) \text{ as dissolved fraction}$$

The CTR CMC criterion does not apply in this reach of the River. Using the river hardness data for the past three years and discarding the high and low readings, the minimum hardness of 44 mg/L gives the following criteria:

$$CCC = 58.9 \mu\text{g/L}$$

The basin Plan objective for zinc is hardness dependant also and is given by:

$$\text{Basin Plan} = e^{(0.830 \cdot \ln(\text{hardness}) - 0.289)} \text{ as dissolved fraction}$$

$$\text{Basin Plan} = 17.3 \mu\text{g/L}$$

Applying the site specific translators of 0.723 for chronic, and 0.780 for acute:

$$CCC = 81.5 \mu\text{g/L}$$

$$\text{Basin Plan} = 22.2 \mu\text{g/L}$$

Step 2: Calculate the ECA

$$ECA = \text{Effluent Concentration Allowance} = C + D \cdot (C - B)$$

Where D = dilution credit and B = background

Until mixing zone study is complete, interim D = 40

Minimum C-B = 41.24 dissolved for CCC; $57.0 \mu\text{g/L total} / 5 \text{ SF} = 11.4 \mu\text{g/L}$
 $= 9.54 \text{ dissolved for Basin Plan; } 12.2 \mu\text{g/L total} / 5 \text{ SF} = 2.4 \mu\text{g/L}$

$ECA_{\text{CCC}} = 81.5 + 40 * (11.4) = 538 \mu\text{g/L}$

$ECA_{\text{BP}} = 22.2 + 40 * (2.4) = 120 \mu\text{g/L}$

Step 3: Determine long-term average (LTA)

$C_V = 0.29$; ECA multiplier_{chronic99} = 0.725

ECA multiplier_{acute99} = 0.541

$LTA_{\text{CCC}} = 390 \mu\text{g/L}$

Using acute multiplier for Basin Plan objective; $LTA_{\text{BP}} = 65 \mu\text{g/L}$

Step 4: Select lowest LTA

$LTA_{\text{BP}} = 65 \mu\text{g/L}$

Step 5: Calculate water quality based effluent limits

$C_V = 0.29$; AMEL multiplier₉₅ = 1.25 (n=4 for less than 4 samples per month)

MDEL multiplier₉₉ = 1.85

Average Monthly Effluent Limit = $81 \mu\text{g/L}$

Maximum Daily Effluent Limit = $120 \mu\text{g/L}$

Bromodichloromethane:

Based on analytical results of effluent samples collected by the Discharger and the procedures presented in the SIP, the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR human health criterion for bromodichloromethane; therefore, effluent limitations for bromodichloromethane are included in the Order. Effluent results submitted by the Discharger are summarized in Table FS-5. The CTR human health criterion for bromodichloromethane is $0.56 \mu\text{g/L}$.

Table FS-5 – Bromodichloromethane Concentrations (µg/L)

	Clear Creek WWTP Effluent	Sacramento River at Caldwell Park ^a
Minimum	0.5	<0.05
Maximum	9.9	<0.5
Average	4.0 ^b	<0.43
No. of Samples	6	6
Standard Deviation	3.88	--
Coefficient of Variation	0.6 ^c	--

^a All sample results were “Not detected” (ND). Value shown is the method detection limit (MDL)

^b Two sample results were 0.8 µg/L “Detected, but Not Quantified” (DNQ)

^c Default C_v in SIP for number of samples less than 10 is 0.6

The CTR criterion for bromodichloromethane was not exceeded in the Sacramento River samples analyzed over the period from July 2001 to August 2002. Dilution credits will be allowed as presented in the SIP. Following are the steps, as presented in section 1.4.B of the SIP, to calculate the effluent limits for bromodichloromethane:

Step 1: Applicable water quality criteria (C)

CTR human health criteria for consumption of water and organisms:

$$C = 0.56 \text{ } \mu\text{g/L}$$

Step 2: Calculate the ECA

$$\text{ECA} = \text{Effluent Concentration Allowance} = C + D(C-B)$$

Where D = dilution credit and B = background

Until mixing zone study is complete, interim D = 40

$$\text{ECA} = 0.56 + 40 * (0.56 - 0.05) = 20.96 \text{ } \mu\text{g/L}$$

Step 3: N/A

Step 4: N/A

Step 5: Calculate water quality based effluent limits

$$\text{AMEL} = \text{ECA}$$

Average Monthly Effluent Limit = 21 µg/L

$C_v = 0.6$; MDEL₉₉/AMEL₉₅ multiplier = 2.01 (n=4 for less than 4 samples per month)

Maximum Daily Effluent Limit = 42 µg/L

Dibromochloromethane:

Based on analytical results of effluent samples collected by the Discharger and the procedures presented in the SIP, the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR human health criterion for dibromochloromethane; therefore, effluent limitations for dibromochloromethane are included in the Order. Effluent results submitted by the Discharger are summarized in Table FS-6. The CTR human health criterion for dibromochloromethane is 0.41 µg/L.

Table FS-6 – Dibromochloromethane Concentrations (µg/L)

	Clear Creek WWTP Effluent	Sacramento River at Caldwell Park ^a
Minimum	<0.5	<0.06
Maximum	2.5	<0.5
Average	<0.92 ^b	<0.43
No. of Samples	6	6
Standard Deviation	0.8	--
Coefficient of Variation	0.6 ^c	--

^aAll sample results were “Not detected” (ND). Value shown is the method detection limit (MDL)

^bFour sample results were ND at MDL of 0.5 µg/L

^cDefault C_v in SIP for number of samples less than 10 is 0.6

The CTR criterion for dibromochloromethane was not exceeded in the Sacramento River samples analyzed over the period from July 2001 to August 2002. Dilution credits will be allowed as presented in the SIP. Following are the steps, as presented in section 1.4.B of the SIP, to calculate the effluent limits for dibromochloromethane:

Step 1: Applicable water quality criteria (C)

CTR human health criteria for consumption of water and organisms:

$C = 0.41 \mu\text{g/L}$

Step 2: Calculate the ECA

$$\text{ECA} = \text{Effluent Concentration Allowance} = C + D(C-B)$$

Where D = dilution credit and B = background

Until mixing zone study is complete, interim D = 40

$$\text{ECA} = 0.41 + 40 * (0.41 - 0.06) = 14.4 \mu\text{g/L}$$

Step 3: N/A

Step 4: N/A

Step 5: Calculate water quality based effluent limits

$$\text{AMEL} = \text{ECA}$$

Average Monthly Effluent Limit = 14 $\mu\text{g/L}$

$C_v = 0.6$; $\text{MDEL}_{99}/\text{AMEL}_{95}$ multiplier = 2.01 (n=4 for less than 4 samples per month)

Maximum Daily Effluent Limit = 29 $\mu\text{g/L}$

Tetrachloroethene:

Based on analytical results of effluent samples collected by the Discharger and the procedures presented in the SIP, the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR human health criterion for tetrachloroethene; therefore, effluent limitations for tetrachloroethene are included in the Order. Effluent results submitted by the Discharger are summarized in Table FS-7. The CTR human health criterion for tetrachloroethene is 0.8 $\mu\text{g/L}$.

Table FS-7 – Tetrachloroethene Concentrations (µg/L)

	Clear Creek WWTP Effluent	Sacramento River at Caldwell Park ^a
Minimum	0.08	<0.08
Maximum	2	<0.5
Average	0.76 ^b	<0.43
No. of Samples	6	6
Standard Deviation	0.67	--
Coefficient of Variation	0.6 ^c	--

^a All sample results were “Not Detected” (ND). Value shown is the method detection limit (MDL)

^b Three sample results were ND at an MDL of 0.5 µg/L, and one at 0.08 µg/L

^c Default C_v in SIP for number of samples less than 10 is 0.6

The CTR criterion for tetrachloroethene was not exceeded in the Sacramento River samples analyzed over the period from July 2001 to August 2002. Dilution credits will be allowed as presented in the SIP. Following are the steps, as presented in section 1.4.B of the SIP, to calculate the effluent limits for tetrachloroethene:

Step 1: Applicable water quality criteria (C)

CTR human health criteria for consumption of water and organisms:

$$C = 0.8 \text{ } \mu\text{g/L}$$

Step 2: Calculate the ECA

$$\text{ECA} = \text{Effluent Concentration Allowance} = C + D(C-B)$$

Where D = dilution credit and B = background

Until mixing zone study is complete, interim D = 40

$$\text{ECA} = 0.8 + 40 * (0.8 - 0.08) = 29.6 \text{ } \mu\text{g/L}$$

Step 3: N/A

Step 4: N/A

Step 5: Calculate water quality based effluent limits

$$\text{AMEL} = \text{ECA}$$

Average Monthly Effluent Limit = 30 µg/L

$C_v = 0.6$; MDEL₉₉/AMEL₉₅ multiplier = 2.01 (n=4 for less than 4 samples per month)

Maximum Daily Effluent Limit = 59 µg/L

Toxicity Limits:

The Basin Plan requires that all waters be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life. This Order contains an acute toxicity effluent limit which states, "Survival of aquatic organisms in 96-hour bioassays of undiluted waste shall be no less than:

Minimum for any one bioassay -----70%
Median for any three or more consecutive bioassays -----90%"

The monitoring and reporting program requires analysis for pH and temperature to be performed concurrent to each monthly acute toxicity bioassay. This Order also contains annual monitoring for chronic toxicity.

SLUDGE DISPOSAL

This Order contains provisions requiring the Discharger to comply with current federal and state laws and regulations for disposal of sewage sludge. The Discharger is required to report any proposed change in sludge use or disposal practice **90 days** in advance of change.

RECEIVING WATER LIMITATIONS

The receiving water limitations contained in this Order are based on water quality objectives contained in the Basin Plan for the Sacramento River.

PROCEDURES ON REACHING FINAL DECISION ON DRAFT PERMIT

The tentative waste discharge requirements have been sent to the Discharger and interested parties for review (at least 30 days) prior to formal presentation to the Regional Board. Any contested items on the permit will be heard and considered for change prior to formal adoption at the Board Meeting.

FOR FURTHER INFORMATION

For further information or questions regarding the NPDES permit, contact Nolan Randall at the Regional Water Quality Control Board in Redding at (530) 224-4801.

5 September 2003