

INFORMATION SHEET

ORDER NO.
CITY OF SACRAMENTO UTILITIES DEPARTMENT
E.A. FAIRBAIRN WATER TREATMENT PLANT
SACRAMENTO COUNTY

Background

The City of Sacramento owns and operates the E.A. Fairbairn Water Treatment Plant (WTP) in east Sacramento. The WTP is designed to treat up to 200 million gallons of water per day. The WTP provides treatment by settling, coagulation with aluminum sulfate, chlorine disinfection, fluoridation, and pH adjustment. Alum sludge from the sedimentation basins and spent lime from the CT Basin and the reservoirs are pumped to the sludge drying lagoons. Filter backwashing generates dilute alum sludge (filter wash water), which is discharged to the filter wash water lagoons for settling/decanting and evapoconcentration. Supernatant water has historically been discharged to the headworks or the sanitary sewer.

The WTP has three sludge drying lagoons and two filter wash water lagoons, all of which are concrete-lined. Sludge is removed from the lagoons when it is no longer free draining and further dried to a solids content of 20 to 50 percent before final disposal. Dried sludge is disposed of at an off-site solid waste landfill. The Discharger wishes to use a less costly means of disposal. The Discharger submitted a conceptual Sludge Management Plan that describes management protocols and includes specific restrictions to prevent or minimize sludge exposure to storm water runoff and waterways, and a plan to provide sludge only to public agencies or businesses with appropriate licenses and permits. The RWD did not provide groundwater characterization for the site, so it is not possible to determine background groundwater quality.

The derivation of selected terms and conditions of the proposed Order is discussed below.

Proposed Order Terms and Conditions

The antidegradation directives of Section 13000 of the California Water Code require that waters of the State that are better in quality than established water quality objectives be maintained "consistent with the maximum benefit to the people of the State." Waters can be of high quality for some constituents or beneficial uses and not others. Policies and procedures for complying with this directive are set forth in the Basin Plan (including by reference State Water Board Resolution No. 68-16, "Statement of Policy With Respect to Maintaining High Quality Waters in California," or "Antidegradation" Policy).

Resolution No. 68-16 is applied on a case-by-case, constituent-by-constituent basis in determining whether a certain degree of degradation can be justified. It is incumbent upon the Discharger to provide technical information for the Regional Water Board to evaluate that fully characterizes:

- All waste constituents to be discharged;
- The background quality of the uppermost layer of the uppermost aquifer;

- The background quality of other waters that may be affected;
- The underlying hydrogeologic conditions;
- Waste treatment and control measures;
- How treatment and control measures are justified as best practicable treatment and control;
- The extent the discharge will impact the quality of each aquifer; and
- The expected degree of degradation.

In allowing a discharge, the Regional Water Board must comply with CWC section 13263 in setting appropriate conditions. The Regional Water Board is required to implement the Basin Plan and consider the beneficial uses to be protected along with the water quality objectives essential for that purpose. The Regional Water Board need not authorize the full utilization of the waste assimilation capacity of the groundwater (CWC 13263(b)) and must consider other waste discharges and factors that affect that capacity.

Some degradation of the groundwater for certain constituents is consistent with maximum benefit to the people of California because the technology, energy, and waste management advantages of municipal water treatment plants far outweigh the environmental impact of a community that would otherwise be reliant on numerous domestic wells. Economic prosperity of local communities is of maximum benefit to the people of California, and therefore sufficient reason to accommodate this wastewater discharge provided terms of reasonable degradation are defined and met. The proposed Order authorizes some degradation consistent with the maximum benefit to the people of the State.

Based on the superior chemical character of the raw water treated at the WTP, the nature of the treatment processes, and the fact that all treatment and waste management structures at the WTP are constructed of reinforced concrete (which has inherently low permeability), the discharge poses little threat to groundwater quality. At this time, there is no reason to believe that additional BPTC measures are needed to protect groundwater quality. This proposed Order establishes interim groundwater limitations to assure protection of the beneficial uses of groundwater.

Groundwater Limitations

The lack of groundwater quality information in the RWD precludes establishment of final groundwater limitations. The interim groundwater limitations of the proposed Order are generally limited to those constituents known to be present in the waste. This does not apply to trihalomethanes, which are expected to be present in the waste based on the treatment technologies employed at the WTPs, and sodium and chloride, which are good basic salinity indicators. An interim groundwater limitation for each was selected in accordance with the most stringent limits set forth in the Basin Plan. The values tabulated below reflect water quality objectives that must be met to maintain specific beneficial uses of groundwater. The

most stringent value applies unless it has been demonstrated that background groundwater quality exceeds that value or the beneficial use that is it designed to protect could not exist. For instance, the most stringent limit for TDS (450 mg/L) is based on protection of irrigation supply for the most salt-sensitive crops. If it can be shown that salt-sensitive crops will not be grown due to local climate and/or soil conditions, then the next highest limit applies. In general, the burden of making such a demonstration falls on the discharger.

<u>Constituent</u>	<u>Units</u>	<u>Value</u>	<u>Beneficial Use</u>	<u>Criteria or Justification</u>
Arsenic	ug/L	0.004	MUN ¹	California Public Health Goal ¹⁰
Cadmium	ug/L	0.07	MUN ¹	California Public Health Goal ¹⁰
Chloride	mg/L	106	AGR ²	Chloride sensitivity on certain crops irrigated via sprinklers ³
		142	AGR ²	Chloride sensitivity on certain crops ³
		250	MUN ¹	Recommended Secondary MCL ⁴
		500	MUN ¹	Upper Secondary MCL ⁴
Chromium, total	ug/L	50	MUN ¹	Primary MCL ⁵
Copper	ug/L	170	MUN ¹	California Public Health Goal ¹⁰
Iron	ug/L	300	MUN ¹	Secondary MCL ⁵
Lead	ug/L	2	MUN ¹	California Public Health Goal ¹⁰
Manganese	ug/L	50	MUN ¹	Secondary MCL ⁵
Mercury	ug/L	1.2	MUN ¹	California Public Health Goal ¹⁰
Nickel	ug/L	12	MUN ¹	California Public Health Goal ¹⁰
Sodium	mg/L	69	AGR ²	Sodium sensitivity on certain crops ³
Zinc	ug/L	2,000	AGR ²	Irrigation of crops ³
		2,100	MUN ¹	USEPA Cancer Risk Estimate ⁶
Total Dissolved Solids	mg/L	450 ⁸	AGR ²	Salt sensitivity for certain crops ³
		500	MUN ¹	Recommended Secondary MCL ⁴
		1,000	MUN ¹	Upper Secondary MCL ⁴
Total Coliform Organisms	MPN/100 ml	Less than 2.2	MUN ¹	Basin Plan
Trihalomethanes	ug/L	80	MUN ¹	Federal MCL ⁹
Bromoform	ug/L	4	MUN ¹	USEPA Cancer Risk Estimate ⁶
Bromodichloromethane	ug/L	0.27	MUN ¹	Cal/EPA Cancer Potency Factor ⁷
Chloroform	ug/L	1.1	MUN ¹	Cal/EPA Cancer Potency Factor ⁷
Dibromochloromethane	ug/L	0.37	MUN ¹	Cal/EPA Cancer Potency Factor ⁷
pH	pH Units	6.5 to 8.5	MUN ¹	USEPA Secondary MCL ⁸

<u>Constituent</u>	<u>Units</u>	<u>Value</u>	<u>Beneficial Use</u>	<u>Criteria or Justification</u>
		6.5 to 8.4	AGR ²	Irrigation of crops ³

- 1 Municipal and domestic supply.
- 2 Agricultural supply.
- 3 Ayers, R. S. and D. W. Westcot, Water Quality for Agriculture, Food and Agriculture Organization of the United Nations – Irrigation and Drainage Paper No. 29, Rev. 1, Rome (1985).
- 4 Title 22, California Code of Regulations (CCR), Section 64449, Table 64449-B.
- 5 Title 22, CCR, Section 64449, Table 64449-A.
- 6 USEPA Integrated Risk Information System.
- 7 Cal/EPA Toxicity Criteria Database (OEHHA).
- 8 40 Code of Federal Regulations, 143.3.
- 9 40 Code of Federal Regulations, 141.64.
- 10 Negligible cancer risk level for drinking water (OEHHA).

It appears that shallow groundwater at the WTP is of high quality. If waste monitoring indicates that the discharge of wastes at the WTP poses a threat to groundwater quality, groundwater monitoring may be required. If so, and determination of background concentrations support this empirical observation, then the most stringent limits cited in the table above will be the final groundwater limitation for those constituents. Otherwise, the statistically determined background groundwater concentration will be the final groundwater limitation for those constituents (and any others whose background groundwater concentrations exceed applicable water quality limits).

Coliform organisms may be present in the waste due to their presence in the source water and the fact that disinfection is performed before filtration. However, the coliform counts should generally be low and the potential for regrowth is limited because the waste contains very little organic matter (most having been oxidized during disinfection). Additionally, the lagoons have low-permeability concrete liners. These conditions should provide adequate filtration to prevent migration of coliform organisms to groundwater. However, because the Basin Plan specifies a numeric limit for coliform organisms in groundwater, that limit is included as a groundwater limitation.

Provision E.1.a

Storm water from the WTP site is discharged to the American River via a City-owned storm drain. Provision E.1.a requires that the Discharger submit either a Notice of Non-Applicability, an application for a No Exposure Certification, or a Notice of Intent to comply with State Board Water Quality Order No. 97-03-DWQ for discharges of storm water from the facility.

Provision E.1.b

The WTP is designed to treat up to 200 mgd. However, the RWD indicated that additional sludge handling facilities and/or dewatering facilities will likely be needed to manage the waste before the WTP reaches its design capacity. Therefore, Provision E.1.b requires that the

Discharger submit a report that describes the management strategies or improvements planned to handle sludge by 30 December 2008.

Any lagoons other than those described in the RWD and the proposed Order would be beyond the scope of the projects described in the respective CEQA environmental review documents and would trigger the need for revised WDRs.

Other Discharge Specifications

The waste lagoons are excavated completely below the surrounding grade, so there is no potential for berm failure to cause a spill. Discharge Specification B.7 allows a minimum operating freeboard of two feet, which is consistent with WDRs for other facilities that rely on lagoons for waste treatment, storage, and disposal.

Because the waste contains negligible organic mater, the standard specification requiring that the dissolved oxygen concentration in the lagoons be maintained above 1.0 mg/L oxygen is not necessary to prevent nuisance odors.

Solids Disposal Requirements

Currently, dried sludge from the water treatment process is disposed of at an off-site solid waste landfill. The Discharger wishes to use a less costly means of disposal and submitted a conceptual Sludge Management Plan that describes management protocols and includes specific restrictions to prevent or minimize sludge exposure to storm water runoff and waterways, and a plan to provide sludge only to public agencies or businesses with appropriate licenses and permits. Analytical data indicate that the sludge is non-hazardous. However, it is not inert as defined in Section 20230 of Title 27 and may, under some circumstances, pose a threat to water quality if used or disposed of in an uncontrolled manner. Such use or disposal is beyond the scope of this Order and the Discharger does not wish to oversee or monitor such use or disposal. Therefore, this Order requires that all sludge be disposed of at appropriately permitted facilities only. This does not preclude its use as an ingredient in soil amendments that may be distributed commercially, as long as the facility that accepts the sludge as feedstock has appropriate permits and the permitting agency understands the nature of the sludge.

Monitoring Requirements

The proposed Order requires regular monitoring of raw water, pond supernatant, and water treatment sludge. In order to adequately characterize the waste, the Discharger is required to monitor for constituents previously detected in the waste as well as other metals not previously monitored, and compare these results to the Groundwater Limitations. If those metals not previously monitored are detected at concentrations that pose a threat to groundwater quality, the Monitoring and Reporting Program may be revised at the Executive Officer's discretion to require groundwater monitoring for those constituents.

Reopener

The conditions of discharge in the proposed Order were developed based on currently available technical information and applicable water quality laws, regulations, policies, and plans, and are intended to assure conformance with them. However, information is presently insufficient to develop final groundwater limitations, so the proposed Order contains interim limitations. Additional information must be developed and documented by the Discharger as required by the Monitoring and Reporting Program of the proposed Order. As this additional information is obtained, decisions will be made concerning the best means of assuring the highest water quality possible and that could involve substantial cost. It may be appropriate to reopen the Order if applicable laws and regulations change, but the mere possibility that such laws and regulations may change is not sufficient basis for reopening the Order. The CWC requires that waste discharge requirements implement all applicable requirements.

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