

INFORMATION SHEET

ORDER NO.

CONTRA COSTA WATER AUTHORITY AND CONTRA COSTA WATER DISTRICT
RANDALL BOLD WATER TREATMENT PLANT AND
BRENTWOOD WATER TREATMENT PLANT
CONTRA COSTA COUNTY

Background

The Contra Costa Water Authority, a Joint Powers Authority, owns the Randall Bold Water Treatment Plant (WTP) in Oakley. Contra Costa Water District operates the WTP, which is designed to treat up to 40 million gallons of water per day. The Dischargers plan to modify the Randall Bold facility and construct a new WTP at the same site to serve the City of Brentwood. The new Brentwood WTP will be owned by the Contra Costa Water District.

The Randall Bold WTP provides treatment by pre-ozonation, coagulation with aluminum sulfate and cationic polymer, flocculation, filtration through granular activated carbon and sand, post-ozonation, chloramination, fluoridation, and pH adjustment. Periodic filter backwashing generates dilute alum sludge (filter wash water). The filter wash water is discharged to lagoons for settling/decanting and evapoconcentration to a solids content of 30 to 40 percent. The three existing Randall Bold WTP filter backwash lagoons are lined with soil cement on the side slopes. Dried solids removed from the filter wash water lagoons are disposed of off-site at the Ironhouse Sanitary District's (ISD) recycling area near the plant and on Jersey Island. The waste in the lagoons has been characterized for ISD and was presented in Finding 20 of WDRs Order No. 5-01-237. The concentrations in the dried solids may exceed applicable water quality limits for dissolved arsenic, cadmium, lead, and manganese before application, however the application of these dried solids is consistent with standard practice 40 CFR Part 503.

The Dischargers plan to modify the Randall Bold WTP. Contra Costa Water District will oversee construction of upgrades at the site in phases over the next three years. The project includes adding two new flocculation and sedimentation basins and two new lined solids lagoons that will allow Randall Bold WTP to produce up to 40 mgd of treated water. Three additional solids lagoons are planned, but will be constructed later.

A new Brentwood WTP is under design, and will be operated by Contra Costa Water District. It will employ the same treatment technologies as the Randall Bold WTP. Initially, it will treat up to 12 mgd, then an additional foot of GAC will be added and the plant will be re-rated for 15 mgd, and it may ultimately be expanded to up to 30 mgd, depending on demand. The Brentwood WTP will include up to six new filter backwash lagoons. The solids stream will be discharged to the new lagoons constructed for the Randall Bold WTP.

Soils at the site consist primarily of sands and silty sands to a depth of approximately 90 feet below ground surface (bgs), and shallow groundwater is encountered at a depth of approximately 44 feet bgs. Based on limited groundwater characterization data, shallow groundwater upgradient of the facility is significantly more saline than the wastes discharged to the lagoons. Specifically, concentrations of hardness, alkalinity, TDS, chloride, nitrate, sulfate,

CONTRA COSTA WATER AUTHORITY AND CONTRA COSTA WATER DISTRICT
RANDALL BOLD WATER TREATMENT PLANT AND
BRENTWOOD WATER TREATMENT PLANT
CONTRA COSTA COUNTY

boron, calcium, magnesium, manganese, potassium and sodium in upgradient groundwater appear to be much higher than the corresponding concentrations in the waste discharged to the lagoons. Based on staff's professional experience with facilities in the area, the high groundwater salinity is likely a naturally occurring phenomenon.

However, concentrations of dissolved arsenic, cadmium, chromium, copper, iron, lead, mercury, silver, and zinc in the waste appear to exceed upgradient groundwater quality, indicating that the discharge poses some threat to groundwater quality from these constituents. The data also indicate that downgradient groundwater quality is generally much less saline than upgradient groundwater quality. The existing lagoons have sides lined with soil cement and native soil bottoms that are allowed to percolate, so it is not clear whether the decrease in downgradient salinity constituents is due to dilution from lagoon leakage. Downgradient groundwater concentrations of arsenic and chromium exceed upgradient concentrations, indicating potential degradation from the existing lagoons.

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 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 Dischargers 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

CONTRA COSTA WATER AUTHORITY AND CONTRA COSTA WATER DISTRICT
RANDALL BOLD WATER TREATMENT PLANT AND
BRENTWOOD WATER TREATMENT PLANT
CONTRA COSTA COUNTY

- 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.

The current and proposed treatment and control practices may not represent sufficient best practicable treatment and control (BPTC) to comply with Resolution No. 68-16. Reasonable time is necessary to gather specific information about the WTP site to make informed, appropriate, long-term decisions. This proposed Order, therefore, establishes interim groundwater limitations to assure protection of the beneficial uses of groundwater of the State pending the completion of certain tasks and provides time schedules to complete specified tasks. During this period, degradation may occur from certain constituents, but can never exceed water quality objectives (or natural background water quality should it exceed objectives) or cause nuisance.

Groundwater Limitations

As described in Finding 28, the limited groundwater quality information provided in the RWD indicates that shallow groundwater upgradient of the facility is significantly more saline than the waste discharged to the lagoons. However, concentrations of certain dissolved metals in the waste appear to exceed upgradient groundwater quality, indicating that the discharge poses some threat to groundwater quality. Downgradient groundwater concentrations of arsenic and chromium exceed upgradient concentrations, indicating potential degradation from the existing lagoons. The data are not sufficient to determine whether degradation has occurred, but they indicate that there is a potential for groundwater degradation. Therefore, although it is not possible to establish final groundwater limitations at this time, it is appropriate for this Order to establish interim groundwater limitations and require groundwater monitoring and determination of background groundwater quality to support determination of final groundwater limitations.

CONTRA COSTA WATER AUTHORITY AND CONTRA COSTA WATER DISTRICT
RANDALL BOLD WATER TREATMENT PLANT AND
BRENTWOOD WATER TREATMENT PLANT
CONTRA COSTA COUNTY

The interim groundwater limitations of the proposed Order are generally limited to those constituents known to be present in the waste, and which appear to be present in concentrations similar to, or higher than, the apparent background groundwater quality. 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	0.3	MUN ¹	Secondary MCL ⁵
Lead	ug/L	2	MUN ¹	California Public Health Goal ¹⁰
Manganese	ug/L	0.05	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

CONTRA COSTA WATER AUTHORITY AND CONTRA COSTA WATER DISTRICT
RANDALL BOLD WATER TREATMENT PLANT AND
BRENTWOOD WATER TREATMENT PLANT
CONTRA COSTA COUNTY

<u>Constituent</u>	<u>Units</u>	<u>Value</u>	<u>Beneficial Use</u>	<u>Criteria or Justification</u>
		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 6.5 to 8.4	MUN ¹ AGR ²	USEPA Secondary MCL ⁸ 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 groundwater upgradient of the WTPs exceeds the most stringent water quality limits for total dissolved solids, chloride, sulfate, arsenic, boron, manganese, and sodium. If groundwater monitoring and determination of background concentrations support this empirical observation, then 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). Despite the apparent poor quality of upgradient groundwater, the waste discharged to the lagoons contains some constituents at concentrations that exceed apparent background groundwater quality: dissolved arsenic, cadmium, chromium, copper, iron, lead, mercury, silver, and zinc. If groundwater monitoring 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.

CONTRA COSTA WATER AUTHORITY AND CONTRA COSTA WATER DISTRICT
RANDALL BOLD WATER TREATMENT PLANT AND
BRENTWOOD WATER TREATMENT PLANT
CONTRA COSTA COUNTY

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 will have low-permeability liners and the site is underlain by approximately 40 feet of fine-grained soil. 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

The Dischargers shall conduct groundwater monitoring beneath the facility. Provision E.1. requires that the Dischargers submit a *Monitoring Well Installation Workplan*, install groundwater monitoring wells, and complete a statistical evaluation of background groundwater quality. This work is necessary to support determination of appropriate final groundwater limitations and to allow verification of compliance with those limitations.

Groundwater Monitoring Requirements

Beginning with the 3rd Quarter 2009, the Monitoring and Reporting Program requires that the Dischargers monitor shallow groundwater quarterly to determine the site-specific gradient and concentrations of all constituents for which interim groundwater limitations have been established. This requirement is standard for all discharges that pose a threat to groundwater quality.

The Dischargers are required to evaluate potential groundwater degradation each year based on statistical analysis and comparison of concentrations in upgradient and downgradient monitoring wells. If it is determined that groundwater has been degraded, the Dischargers will be required to evaluate and implement BPTC measures for each treatment, storage, and disposal component of the system. Completion of these tasks will ensure that BPTC and the highest water quality consistent with the maximum benefit to the people of the State will be achieved.

Discharge Specifications B.1 and B.2

It is not practical to prescribe a flow limit for the wastewater discharged from the WTPs, because the amount of water treated (and therefore the amount of wastewater generated) will vary significantly throughout the year. The RWD identified specific final water treatment capacities for the two WTPs and the specific waste containment lagoons needed to manage the waste based on those capacities. Therefore, Discharge Specification B.1 requires that the Dischargers construct new filter backwash and sedimentation lagoons commensurate with treatment capacity expansion and as needed to ensure adequate capacity to prevent spills outside of the lagoons. The water balance provided in the RWD indicates that this should be sufficient to ensure adequate waste storage and disposal capacity. Additional protection from

CONTRA COSTA WATER AUTHORITY AND CONTRA COSTA WATER DISTRICT
RANDALL BOLD WATER TREATMENT PLANT AND
BRENTWOOD WATER TREATMENT PLANT
CONTRA COSTA COUNTY

spills is provided by the lagoon decant pumps, which allow the Dischargers to lower lagoon freeboard by pumping any excess water back into the water treatment process.

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. Therefore, Discharge Specification B.2 requires that the Dischargers limit the volume of water treated at each facility to the ultimate capacity envisioned in the environmental review documents.

Other Discharge Specifications

The waste lagoons will be excavated completely below the surrounding grade, so there is no potential for berm failure to cause a spill. The lagoons are designed to provide three feet of freeboard, but Discharge Specification B.9 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.

Other Monitoring Requirements

The proposed Order requires wastewater monitoring and pond monitoring. In order to adequately characterize the waste, the Dischargers are required to monitor for constituents previously detected in the waste as well as other metals not previously monitored. 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 Dischargers as required by schedules set forth in 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.