

**Regional Water Quality Control Board  
Central Valley Region  
Board Meeting – 11-12 April 2013**

**Response to Written Comments for the City of Ione  
Wastewater Treatment Facility,  
Tentative Waste Discharge Requirements  
And  
Cease and Desist Order**

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At a public hearing scheduled for 11 and 12 April 2013, the Regional Water Quality Control Board, Central Valley Region ("Central Valley Water Board") will consider adoption of Waste Discharge Requirements ("WDRs") and a Cease and Desist Order for discharges from the City of Ione (the "City") Wastewater Treatment Facility ("WWTF"). This document contains responses to written comments received from interested parties regarding the tentative WDRs and CDO. Written comments from interested parties were required by public notice to be received by the Central Valley Water Board by 7 March 2013 to receive full consideration. Comments were received from the City and from the Central Valley Clean Water Association ("CVCWA").

Written comments from the above interested parties are summarized below, followed by the responses of Central Valley Water Board staff. Based on the comments, Central Valley Water Board staff made some changes to the tentative WDRs and CDO. Central Valley Water Board staff also made some changes to correct typographical errors and to improve clarity.

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**CITY OF IONE'S (CITY) COMMENTS**

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The City and the Central Valley Water Board staff exchanged multiple written correspondences and held several teleconferences prior to the release of the final draft of the tentative WDRs and CDO. On 6 March 2013, the City provided a final set of comments regarding the tentative WDRs and CDO. These comments requested five changes to the tentative CDO. These five requests are discussed below, along with the Board's responses.

**City Comment No. 1:** The City asks that various deadline dates be changed from May to October, and that interim compliance dates that would accelerate the Board's 2011 CDO compliance deadline of 30 October 2013 not be included in the tentative CDO.

**RESPONSE:** Staff has made these requested changes.

**City Comment No. 2:** The City asks that the date of construction of new monitoring well MW2A be changed from April to July 2013 and that the Board allow the installation of new aerators in conjunction with the rest of the construction work, rather than in advance of the overall project certification deadline.

**RESPONSE:** Staff has made these requested changes.

**City Comment No. 3:** The City requests that the CDO require the use of only the two closest monitoring wells (MW2 and MW2A) as compliance wells.

**RESPONSE:** This change has not been made, because the Board does not need to see reductions in these wells over the short term. During the development of the CDO, Board Staff asked the City to provide the expected iron and manganese concentration decreases in each of the four wells, not just monitoring wells MW2 and MW2A. On 12 March 2013, the Discharger submitted a report titled *Projected Statistically Significant Manganese and Iron Concentration Changes in Monitoring Wells, City of Ione, Wastewater Treatment Plant* (the

“Expected Concentration Change Report”). The Expected Concentration Change Report provides an estimated range of travel times for groundwater moving from the western edge of Pond 5, and predicts the manganese and iron concentration changes that would be seen in monitoring wells MW-2, MW-2A, MW-3, and MW-3A after the Discharger removes sludge and aerates/mixes the wastewater in Pond 5. The Expected Concentration Change Report provides a range of projected concentrations expected to be found in these monitoring wells in October 2014, October 2015, October 2016, and October 2017. The Board has modified the CDO to use only the most conservative values (i.e., the longest travel times and therefore the longest time before improvements will be detected) from the Expected Concentration Change Report as compliance determination metrics. For MW-3, and MW-3A, the most conservative expected concentration changes are zero for these wells in 2014 and 2015, which means that the Board will not initially be requiring these wells to show any evidence that the City’s proposed upgrades have been effective. This essentially means that the Board is not using these wells as compliance wells in the near future, and will only be using MW2 and MW2A as compliance wells for the next few years.

**City Comment No. 4:** The City requests that the Board use “best available science” to establish concentration reduction levels for iron and manganese.

**RESPONSE:** The City’s comment is directed at the way the Board will measure the “success” of the City’s improvements. As mentioned in both the tentative WDRs and CDO, as well as in numerous enforcement orders issued by the Board over the past decade, the City’s discharge is currently causing groundwater to exceed secondary MCLs for iron and manganese, and a solution to this problem is urgently needed. Board staff has absolute confidence that one effective solution would be for the City to install a geosynthetic liner or equivalent containment structure. However, the City has verbally stated that the cost of this solution is approximately \$14 million. This cost estimate prompted the City to search for a cheaper means of complying with applicable regulatory requirements. The City is now proposing a \$2.4 million solution that relies upon wastewater reclamation on cropland, additional aeration in the treatment ponds, sludge removal in two ponds, and the mixing of wastewater in one pond, rather than installing a geosynthetic liner or equivalent containment structure. The intent of the CDO is to provide the City with a chance to construct its proposed lower-cost upgrade, but the big challenge lies in determining whether this upgrade is effective.

The Board initially proposed that the effectiveness of the City’s proposal be evaluated on the basis of whether or not downgradient monitoring wells show a 25% improvement in iron and manganese concentrations within one year, a 50% improvement within two years, a 75% improvement within three years, and full compliance with the Groundwater Limitations by May 2016. This does not mean that the Board would be requiring the City to focus on cleaning up the groundwater; rather, this requirement was put in a draft of the tentative CDO because the Board would expect groundwater to show improvements if the City’s proposal is successful. The City countered the percentage improvement proposal by providing the Board with the Expected Concentration Change Report mentioned above, which contains a predicted range of expected concentrations that would be seen in the monitoring wells if the City’s lower-cost proposal is effective. Board staff responded by integrating the most conservative values (i.e., the longest travel times and the longest times before improvements would be detected) from the Expected Concentration Change Report into the tentative CDO.

The use of the numeric values provided in the Expected Concentration Change Report reflects the Board’s effort to utilize the best available science to determine whether the City’s upgrades ultimately will ensure compliance with applicable regulatory requirements.

However, there may be weaknesses in the Expected Concentration Change Report, because it appears that the City did not determine site-specific hydraulic conductivity or porosity values when it prepared the report (which is expected, given the short amount of time that it took the City to prepare this report). This results in a wide range of travel time calculations for each well; for example, the travel time from the edge of Pond 5 to well MW-3 is estimated to range from 155 days to 2,322 days. This large travel time results in a large range of expected concentrations in well MW-3; for example, the starting concentration for manganese is 4,100 ug/l, and, using the most conservative values submitted by the City, no improvement would be seen until October 2016, when the concentration would drop by only 150 ug/l to 3,950 ug/l. Given that the groundwater limitation (secondary MCL) is 50 ug/l, and using the most conservative numbers provided by the City, it could take 14 years for groundwater concentrations at well MW-3 to reach the WDR Groundwater Limitation for manganese.

Board staff is also proposing that the Board require the City to conduct site-specific studies to refine the travel time estimates in the Expected Concentration Change Report. The study is to be conducted during 2013, and the City shall submit a report that (a) documents the results of the travel time refinement study, (b) proposes site specific hydraulic conductivity and porosity values, and (c) update the tables found in the March 2013 version of the report using the most recently obtained data for the site as well as iron and manganese concentrations from 2012 and 2013 only. When site-specific values are used, the travel time estimates may decrease, which could result in accelerated compliance timelines. The CDO may be re-opened and the compliance dates modified based on the new, site-specific information. Although the proposed schedule for groundwater improvements or amendments thereto, may be considered aggressive, Board staff contends that the proposed schedule *is* based on the best available science.

**City Comment No. 5:** The City requests that if groundwater concentration triggers require filling the bottom two feet of pond 5, that the City be allowed to use clean soil, rather than clay, which would allow for the continued percolation of oxygenated water, thereby helping to attenuate iron and manganese levels.

**RESPONSE:** The City has verbally estimated that it could cost up to \$1 million to add 2-4 feet of clean soil to the bottom of Pond 5. (While the City has not provided an exact figure, Board staff has used the RACER cost-estimating program and has estimated that the cost would be around \$660,000 for delivery, spreading, and compacting of this clean soil.) However, the addition of this 2-4 feet of clean soil was not a factor that was analyzed in the Expected Concentration Change Report. This means that the Board need not extend the CDO compliance timeline in order for the City to add 2-4 feet of clean soil to the bottom of Pond 5, because the Expected Concentration Change Report predicts that groundwater concentrations will start to decline *even if* this soil isn't added. However, the tentative CDO does not restrict the City from adding 2-4 feet of clean soil to the bottom of Pond 5 at any time, should the City conclude that this measure will provide further assurance that the WWTF will come into compliance with applicable regulatory requirements by the timeline specified in the CDO.

The City is already proposing to add soil to the bottom of Pond 5 in October 2013 (after the sludge is removed). Board staff suggests that the City evaluate the cost savings of installing 2-4 feet of clean soil at this time, as one equipment mobilization could provide a cost savings over two equipment mobilizations. If the City chose to include the addition of 2-4 feet of clean soil to its lower-cost compliance proposal (sludge removal and aeration/mixing vs. geosynthetic liner), the City would first submit a workplan, and would be required to

determine whether or not the addition of this material would result in less disposal capacity than the amount required by the tentative WDRs. If additional disposal capacity is required, then the City would need to submit a new RWD.

**RESPONSE SUMMARY:** The City is now proposing a set of improvements that would not result in rate hikes for the City residents. Board staff are recommending that the Board grant the City the time to implement the sludge removal and aeration/mixing proposal, but also recommend that the Board include specific triggers that would require the City to implement a compliance option that Board staff know would work (i.e., lining the ponds with a geosynthetic or equivalent liner) if the sludge removal and aeration/mixing proposal does not result in decreasing concentrations of iron and manganese in the groundwater. It is also reasonable for the Board to require the City to refine the travel time estimates that were hastily put together, so that the Board has more accurate compliance numbers that can be used to evaluate whether the City's proposal is successful or not.

Board staff is not recommending that the Board immediately require that the City come into compliance with applicable regulatory requirements, as the City's proposed lower-cost compliance solution would, if successful, bring the City into compliance within a specified time period. If the iron and manganese concentrations show yearly improvements and the City complies with the yearly interim concentrations in the proposed CDO, then the City would not need to install geosynthetic liners and would simply be required to continue to aerate and mix the wastewater.

Because the City's travel time estimates in the Expected Concentration Change Report did not necessarily use site-specific data, Board staff does not feel comfortable recommending that the Board require a final groundwater limit compliance date in the WDRs. Instead, this CDO would need to be updated within the next 5-6 years, or sooner depending on the results of the 2013 study, after reliable data make it reasonable to calculate a final groundwater limit compliance date. The last item required by the CDO is a *Groundwater Compliance Evaluation and Capacity Study Report*. The CDO states that if the Discharger was *not* required to install a geosynthetic liner or equivalent in Ponds 5-7, then the Discharger shall submit a report by 30 October 2018 that would include:

- An evaluation of the concentration trends in monitoring wells MW-2, MW-2A, MW-3, and MW-3A between 2012 and 2018, and a discussion of whether the concentrations are decreasing, stable, or increasing.
- Projected dates by which the dissolved iron and manganese concentrations in all four wells will comply with the Groundwater Limitations (i.e., Secondary MCLs) listed in the WDRs.
- An evaluation of other options to accelerate compliance with the Groundwater Limitations, which shall include, but not be limited to, an evaluation of the use of the Castle Oaks tertiary treatment plant and/or moving Ponds 1-7 away from Sutter Creek.
- A water balance evaluating the treatment, storage, and disposal capacity for influent flows generated in 2018 and a second water balance evaluating the projected influent flows for 2030. The water balance shall include the information listed in Item 17 of Attachment A. If the 2018 water balance shows a lack of capacity, then the City shall submit a Report of Waste Discharge containing a proposal for facility improvements that would create adequate capacity. If the 2030 water balance shows a lack of capacity, then the Report shall include a proposed time schedule for the submittal of a Report of Waste Discharge.

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**CENTRAL VALLEY CLEAN WATER ASSOCIATION (CVCWA) COMMENTS**

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**CVCWA Comment No. 1:** CVCWA stated that the Tentative WDRs include an effluent limitation of 10 mg/L for total nitrogen, which is inappropriate because:

- a) Although there is a primary maximum contaminant level (MCL) for nitrate of 10 mg/L, there is no water quality objective for total nitrogen. Total nitrogen is different and distinguishable from nitrate and the proposed limit is not consistent with any adopted water quality objective. At most, an effluent limitation for nitrate at 10 mg/L is appropriate based on the MCL.
- b) The findings provide no support for the proposed total nitrogen effluent. Finding 50(d) discusses why a groundwater limitation of 10 mg/L for nitrate is appropriate, but does not state why it is necessary to adopt an effluent limitation for total nitrogen. Findings are necessary to bridge the analytical gap between the evidence and the regulatory requirement. Here, there is no identification of any evidence to support an effluent limitation for total nitrogen of 10 mg/L. Accordingly, the requirement is not supported by the evidence in the record, and must therefore be removed.

**RESPONSE:** Domestic wastewater contains nitrogen in the form of both organic nitrogen and ammonia before treatment. Biological treatment transforms some of the organic nitrogen to ammonia and some of the ammonia to nitrate. Additionally, some ammonia can be lost to the air by volatilization during treatment and storage. The degree of transformation (or mineralization) and ammonia volatilization within the treatment system varies depending on the type of treatment system, the climate, and operational factors. Secondary effluent often contains little nitrate, but can contain significant concentrations of total Kjeldahl nitrogen (TKN), which is a measure of the sum of ammonia and organic nitrogen.

Advanced secondary treatment processes (nitrification and denitrification) enhance nitrogen removal by converting most of the nitrogen to nitrate and forcing further oxidation of the nitrate to nitrogen gas, which is then released to the atmosphere. However, the City of Lone does not use these technologies. As a result, the City's effluent contains 17 to 28 mg/L total nitrogen, and about 10% of that is in nitrate form (the other 90% is typically in the form of TKN).

However, the fact the effluent contains little nitrate does not mean there is no threat to the beneficial uses of groundwater. The same mineralization, nitrification, and denitrification processes can occur in the vadose (unsaturated zone) as the effluent interacts with air in the soil, and virtually all of the nitrogen present in the wastewater as it percolates through soil will ultimately convert to nitrate. Unfortunately, there is often not enough oxygen to force denitrification of the nitrate, especially once the effluent percolates to the water table. In cases where wastewater treatment or storage takes place in unlined ponds, there may be little or no vadose zone to support denitrification. In such cases, it is then appropriate to impose an effluent limit for total nitrogen to protect groundwater beneath the ponds. Finding 50(d) has been revised to clarify these processes and reiterate that groundwater is very shallow at the site and total Kjeldahl nitrogen has been found in the shallow groundwater. There is, therefore adequate evidence and justification for a nitrogen effluent limit expressed as total nitrogen.

However, upon review the effluent monitoring data provided in the Report of Waste Discharge and Lone's monitoring reports, it appears that the City could not reliably comply with the 10 mg/L total nitrogen effluent limit that was included in the tentative WDRs. Therefore, the effluent limit for total nitrogen was revised to 25 mg/L as an annual average to prevent exceedance of the water quality objective for nitrate in groundwater. Based on the available data, the City will be able to comply with this limit.