Date

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CENTRAL VALLEY SALINITY ALTERNATIVES FOR LONG-TERM SUSTAINABILITY (CV-SALTS) TECHNICAL ADVISORY COMMITTEE RECOMMENDATIONS REGARDING THE CITY OF LIVE OAK'S SITE-SPECIFIC SALINITY STUDY WORKPLAN (ORDER No. R5-2011-0034)

On May 17, 2013, the CV-SALTS Technical Advisory Committee (TAC) reviewed and discussed the Site-Specific Salinity Study Work Plan and Time Schedule submitted under Order No. R5-2011-0034, as it related to ongoing CV-SALTS evaluations to determine appropriate salinity water quality objectives to protect agricultural supply water. A summary of key discussion points and recommendations are provided below with more detail noted in Attachment 1.

- Selection of Study Area: Use of the Vicinity Basis method appears appropriate provided cropping patterns are compared with the Local Basis study area as proposed.
- Selection of Most Sensitive Crop: More detailed information on the cropping pattern for the 900-acre Vicinity Area should be provided
- Effective precipitation: Clarify basis for estimating "normal" effective precipitation
- Leaching Requirement: The factor used is extremely conservative and provides a significant margin of safety

Additional discussion revolved around the focus of the Workplan on the use of an annual average of the water quality data to evaluate compliance with a water quality objective or POTW effluent limitation to protect irrigated agriculture. Given the seasonal nature of crop irrigation, shorter averaging periods may be appropriate in order to provide protection during certain periods, e.g., crop germination. The TAC will prepare a technical recommendation for a default averaging period that may be applied to a POTW effluent discharge to protect the AGR beneficial use in the receiving water. This recommendation will be provided in a subsequent letter. TAC development of a default averaging period would not preclude a POTW discharger from proposing an alternative averaging period supported by site-specific information.

In summary, the Committee recommends that the City of Live Oak provide additional information regarding selection of the study area, selection of the most sensitive crop, and the basis for estimating effective precipitation before a determination that an EC of 1,100 umhos/cm is fully protective of the AGR beneficial use in the area potentially impacted by the City's effluent. In addition, the Committee will provide a technical recommendation regarding averaging periods in the near future.

Sincerely,

Parry Klassen
Chair, CV-SALTS Executive Committee

Nigel T. Quinn
Co-Chair, CV-SALTS TAC

Cc: Ronald Walker, Public Works Facility Manager, City of Live Oak
Pamela Creedon, Central Valley Water Board
Lucio Orellana, Central Valley Water Board
Jeanne Chilcott, Central Valley Regional Water Quality Control Board

Attachment 1
CV-SALTS Technical Committee Comments and Recommendations
Site-Specific Salinity Study Workplan and Time Schedule
City of Live Oak: Order No. R5-2011-0034
Reviewed May 17, 2013

Background: The City of Live Oak (City) is a small economically disadvantaged community with a population of 8,500. The annual average EC of effluent discharged from the City's new tertiary treatment plant (826 umhos/cm) exceeds the 700 umhos/cm trigger specified in their Order. Per the Order's requirements, the City submitted a workplan to evaluate salinity concentrations needed to protect agriculture irrigation supply (AGR) in areas that may be impacted by the effluent. The effluent currently flows into Reclamation District 777 Lateral Drain No. 2 prior to Lateral Drain No. 1 which in turn flows into the East Interceptor Canal and then to the Wadsworth Canal before ultimate discharge to the Sutter Bypass. Based on the initial workplan findings, the City concludes that the annual average effluent EC of 1,100 umhos/cm is protective of the AGR beneficial use and has requested that any additional work be reduced or eliminated.

Central Valley Water Board staff received the workplan on 13 March 2013 and requested input from the CV-SALTS Technical Committee on adequacy of the plan and findings.

Workplan Summary: As part of the workplan, the City proposed a recommended study area to represent the area that may be impacted by the effluent and evaluated permitted and actual diversions from the two laterals for agricultural irrigation, the areas's 2004 Crop Survey and the Western Fertilizing Handbook to determine cropping patterns and most salinity sensitive crop. The workplan also conducted a very preliminary "example determination of site-specific agricultural water quality objectives" using both the 40-30-20-10 (arithmetic) model and exponential model with the following inputs: a 244-day growing season, annual crop ET of 34.88 in., monthly average ET from bare soil at 0.7 in. per month; effective precipitation of 14.68 in. (assumed for normal irrigation season); leaching fractions of 0.07 and 0.10; and supply water at both 826-umhos/cm (2012 average effluent concentration) and 1,100-umhos/cm (final permit effluent limitation). The following notes the CV-SALTS Technical Committee comments/recommendation on some of the assumptions and estimates used in the workplan.

Selection of Study Area: The workplan notes three potential basis for study area selection: Vicinity; Use; and Local. The proposed area is Vicinity based (900-acres directly adjacent to the lateral drains for 1.25 miles downstream of the effluent discharge) with a cursory review of the Local area (approximately 7,780-acres of which 6,420 were surveyed as agriculture in DWR's 2004 crop survey). If the effluent was evenly distributed over the 900-acres for 6-months, it would provide approximately 10-inches.

TAC Comment: A map of study area represented by the Vicinity Basis method is needed; however, selection of this method for delineating the study area appears to provide an adequate "worst-case" area for reviewing potential effluent impacts. The TAC concurs with the inclusion of a process that compares the cropping pattern represented by the Vicinity Basis method with the Local Based study area.

Selection of Most Sensitive Crop: The City used the DWR's 2004 crop survey and 1995 Western Fertilizer Handbook to determine that plums (prunes) were the most salt sensitive crop grown in the area. The workplan provided a very generalized table of percentages of crop types (fruits/nuts; rice; field crops; etc.) in Table 1. Current evaluations conducted as part of the CV-SALTS AGR Zone Study are evaluating cropping patterns over a five to 10-year period and specifically identifying crops that make up 95% of the agricultural production.

TAC Recommendation: Since selection of the most sensitive crop is the most critical element of any evaluation, more detailed information on the cropping pattern for the 900-acre Vicinity area should be provided—by specific crop percentage over at least the last five years rather than relying only on data from 2004. Current information

does not clarify whether the Vicinity Basis study area is primarily orchard or whether it currently rotates cropping patterns. Some of this information may have been collected for CV-SALTS as background for the Central Valley AGR Mapping Zone study.

Effective Precipitation: The City used mean monthly precipitation from the Marysville COOP station and estimated 25% of the rainfall as runoff, with adjustments for the non-growing season and annual crop ET and 0.7 in/mo. bare soil ET. While the methodology was clear, it was not clear whether the numbers cited are from one year, average of multiple years, or some other calculation of a "normal" rainfall year.

TAC Recommendation: Clarify basis for estimating "normal" effective precipitation.

Leaching Fraction: The City uses the published leaching requirement of the crop (7%) and a slight adjustment to 10% as inputs for both the arithmetic and exponential models.

TAC Comment: Use of the leaching requirement of the crop is an extremely conservative input and likely does not represent actual water management capabilities of the local growers (unless they are using a highly managed drip or micro-sprinkler system). The City should have the option to consider identifying typical irrigation methods in the Vicinity Basis study area and determining whether the 15% leaching fraction currently being considered as a default by CV-SALTS more accurately represents anticipated practices.

Annual Averaging: The document focuses on annual average EC concentrations.

TAC Comment: The focus on use of an annual average of the water quality data for evaluating compliance with a water quality objective or effluent limitation likely is an artifact of the wording of the overall effluent limitation as an annual average. Protection of the AGR use has also been evaluated using monthly water quality data or 30-day rolling average concentration data (e.g., Vernalis objective in the Lower San Joaquin River). These shorter averaging periods take into account the seasonal nature of crop irrigation and potential varying crop sensitivity during certain times, e.g., germination period. Given the importance of this issue, the TAC will conduct a technical discussion of averaging periods as they may be applied to a POTW discharge to ensure protection of the AGR beneficial use in the receiving water. It is recommended that the project proponent participate in this discussion. The final recommendation will be provided to the Central Valley Water Board in a subsequent letter.

Date

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CENTRAL VALLEY SALINITY ALTERNATIVES FOR LONG-TERM SUSTAINABILITY (CV-SALTS) TECHNICAL ADVISORY COMMITTEE RECOMMENDATIONS REGARDING THE CITY OF DIXON'S SITE-SPECIFIC BORON OBJECTIVE STUDY WORK PLAN (ORDER No. R5-2008-0136)

On September 12, 2013, the CV-SALTS Technical Advisory Committee (TAC) reviewed and discussed the Site-Specific Boron Objective Study Work Plan submitted under Order No. R5-2008-0136. The discussion focused on how the proposed work related to ongoing CV-SALTS evaluations to determine appropriate water quality objectives to protect agricultural supply water.

The TAC agreed that the Work Plan as proposed will achieve the stated objectives of the project. However, there was discussion regarding the Work Plan statement, "*As with most soil salinity concerns, the time frames needed to cause deleterious effects are generally long (e.g. measured in years or decades); therefore, the boron objective will be presented as an annual average*". As you may be aware, the TAC is currently developing a technical recommendation regarding an appropriate default averaging period to be applied to a POTW effluent discharge to protect the AGR beneficial use in the receiving water. This recommendation will be provided to the Central Valley Water Board in the near future. While the TAC agreed that an annual average may be appropriate for a constituent such as boron for the reasons stated in the Work Plan, the TAC recommended that the project proponent provide the technical justification for the proposed annual average in the Study Report. In addition, the TAC recommends that the project proponent participate in future TAC discussions regarding averaging periods.

Sincerely,

Parry Klassen
Chair, CV-SALTS Executive Committee

Nigel T. Quinn
Co-Chair, CV-SALTS TAC

Cc: Joe Leach, City Engineer/Public Works Director, City of Dixon
Robert Busby, Supervising Engineer, CVWB
Andrew Altevogt, Assistant Executive Officer,CVWB
Jeanne Chilcott, Central Valley Regional Water Quality Control Board