

## Draft Individual Review Form

**Proposal number: 2001-F217-1**

**Short Proposal Title: Irrigation Drainage Water Treatment for Selenium Removal: Panoche**

**1a) Are the objectives and hypotheses clearly stated?**

Yes, the objective is stated clearly. The objective is to scale up an existing selenium removal demonstration project, the Algal-Bacterial Selenium Removal (ABSR) Facility, to full-scale implementation.

**1b1) Does the conceptual model clearly explain the underlying basis for the proposed work?**

The underlying basis for the proposed work is clearly stated. The ABSR process is adequately described and the technical and policy setting for the project is given. Results and status of the pilot ABSR is provided as an appendix. Results from this pilot project were used by the project participants to provide operating parameters and design specifications for the full-scale ABSR Facility described in this proposal.

**1b2) Is the approach well designed and appropriate for meeting the objectives of the project?**

The approach appears to be well designed. The facility will be modeled after an existing wastewater treatment facility so construction techniques and costs are well known.

**1c1) Has the applicant justified the selection of research, pilot or demonstration project, or a full-scale implementation project?**

The full-scale implementation project is based upon a pilot scale project successfully demonstrated by the project proponents.

**1c2) Is the project likely to generate information that can be used to inform future decision making?**

Just as the pilot scale project provided useful information for the design of this full-scale implementation project, information obtained during the three-year study period of this project will provide useful information for expanded selenium treatment facilities.

**2a) Are the monitoring and information assessment plans adequate to assess the outcome of the project?**

A large component of this project is monitoring and assessment of the treatment facility operations. There is water quality monitoring of inflow and outflow from the facility as well as in the treatment ponds themselves. This information can be used to estimate the mass balances of selenium and nutrients in these waters. There is also monitoring to assess selenium bioaccumulation in effluent, and microbial communities in the treatment ponds. There should be sufficient monitoring information to assess the outcome of the project as well as the intermediate successes and/or problems. There is, however, no explicit mention of flow measurement in the performance monitoring tasks. This task should include daily measurement of flow for the influent, effluent, and any possible losses, such as evaporation, from the treatment facility.

**2b) Are data collection, data management, data analysis, and reporting plans well-described, scientifically sound and adequate to meet the proposed objectives?**

The proposal adequately describes the types of data to be collected, the sample frequency, and how the data will be used. Data will be managed in spreadsheet databases which should be adequate for this project.

**3) Is the proposed work likely to be technically feasible?**

The treatment facility described in this proposal is more than two orders of magnitude larger (inflow of 3.3 million acre-feet per day versus 20,000 gallons per day) than the pilot scale project after which it was modeled. Both the pilot and full-scale ABSR of this proposal are modeled after existing full-scale wastewater treatment facilities. Barring unforeseen problems in scale, this project should be technically feasible.

**4) Is the proposed project team qualified to efficiently and effectively implement the proposed project?**

The same team that developed and managed the pilot scale ABSR will be developing and managing the proposed project. This team has the qualifications needed to implement the proposed project.

**Miscellaneous comments**

Reviewers of this project may wish to consider the applicability of the project to selenium loads from the entire GBP drainage area. The 400 to 500 pounds of selenium removal per year addressed in this proposal represents less than ten percent of the 5,661 pound load that may be discharged from the GBP under WDRs currently in place for water year 2001. Treatment methods described in this proposal will be applied to some of the most concentrated sources of selenium in the GBP drainage area. A daily treatment capacity of 340 gpm for these concentrated sources, translates into selenium removal of 400 to 500 pounds per year. Application of this technology to tile drainage with a concentration of only half this concentrated source will result in removal of only 200 to 250 pounds of selenium per year. Total drainage volume, and not just total selenium load must be considered when evaluating the feasibility of this treatment method for the entire volume of tile drainage generated by the GBP drainage area. Total drainage volume from the GBP in water years 1996 through 1998 ranged from 38,000 to 53,000 acre-feet per year. A continuous rate of 340 gpm will treat only 550 acre-feet per year, accounting for one to two percent of the total drainage volume. Broader application of the treatment methods described in this proposal may therefore come at a higher cost in terms of dollars per pound of selenium for some of the less concentrated sources.

The CALFED Salinity and Selenium (SSW) Workgroup is currently funding, through directed action, a Drainage Treatment and Salt Removal project that will use electrical pretreatment, membrane removal, and solidification to treat tile drainage in the Panoche Drainage District. This directed action project proposes to treat 250 gpm and remove 350 pounds of selenium (as well as 4,000 tons of salt and 13,000 pounds of boron) per year. This compares to approximately 340 gpm and 400 to 500 pounds of selenium removal per year for the reviewed proposal. Coordination, if any, between the two projects is not indicated in the proposal.

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**Overall Evaluation  
Summary Rating**

- Excellent
- Very Good
- Good
- Fair
- Poor

**Provide a brief explanation of your summary rating**

There is a great need for selenium removal technology for the continued success of the Grassland Bypass Project and to achieve selenium load reductions in the San Joaquin River and the Sacramento-San Joaquin River Bay and Delta. Success of the pilot project indicates that this full-scale project should have an excellent chance of success. Broader application of the treatment method may be limited, however, when applied to agricultural drainage sources with lower selenium concentrations than will be treated in the proposed project.

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