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PROJECT WORKPLAN

Recirculation Feasibility Study

BACKGROUND

Previous recirculation studies consisted of discharging DMC water to the San Joaquin River, via the wasteways that connect the DMC to the river, to meet the April 15 - May 15 pulse flow mandated by the Bay Delta 1994 accords. This discharge would reduce demands on the New Melones reservoir during the spring pulse flow period. New Melones would then be able to provide more water to meet water quality standards at Vernalis during the summer months. In the proposed study, recirculation will be analyzed throughout the year to help meet water quality objectives at Vernalis and in south Delta channels.

This study will include all necessary scientific and engineering studies required to ensure that recirculation can be implemented in a manner that meets applicable laws and regulations, and is acceptable to Reclamation, the California Department of Water Resources (DWR), local, state, and federal agencies and stakeholders participating in the CalFed Bay-Delta Program, and the state and federal water contractors. The implementation of a recirculation program will be covered in a later phase of and is not discussed in detail this study. This second phase of work would include all activities necessary to move DMC water into the San Joaquin River, including the negotiation and execution of agreements, and a petition to the State Board for any necessary enabling decisions.

The tasks covered in this workplan are expected to take 18 to 24 months to complete. The total cost of this proposal is $283,000. Costs are broken down as follows:

DWRSIM modeling:	$35,000 (Task 1)
DWRSIM2 Modeling:	$75,000 (Task 1)
Model development for DWRDSM2:	$40,000 (Task 2)
Upstream conveyance evaluation:	$83,000 (Tasks 3-8)
Feasibility Study Report preparation:	$50,000 (Task 9)

The DMC Recirculation Appraisal study, conducted by Reclamation in late 1995, examined the probable outcome of discharging DMC water into the San Joaquin River upstream of Vernalis to meet the April 15 - May 15 pulse flow requirement. The Appraisal study determined it was physically possible to meet the pulse flows using recirculation water. However, there were many issues associated with required legal and institutional changes that would have to be resolved in order for recirculation to be implemented. In addition, the Appraisal study did not completely address critical water quality and fisheries issues.

Comments on the Appraisal study by several agencies were compiled for purposes of

conducting a more detailed study that could lead to implementation of the recirculation proposal. One suggestion was that the study should be included as an alternative in the CVPIA PEIS. However, the changes that would be required in terms of legal and institutional matters in order to implement recirculation were incompatible with the PEIS screening criteria; therefore, it was decided to conduct the DMC Recirculation Special Study outside of the PEIS.

Earlier this year, the CalFed Bay-Delta Program, an interagency effort of 15 state and federal agencies with management and regulatory responsibilities in the estuary proposed the initiation of a Recirculation Feasibility Study. This workplan, proposed as a Stage 1 action, provides a framework to advance the feasibility study.

TASK DESCRIPTIONS

This project will consist of nine tasks leading to (1) a decision on whether recirculation is acceptable and desirable in terms of the environmental, economic, and institutional framework, (2) identification of the terms and conditions for implementing recirculation, and (3) a workplan for the implementation of recirculation.

Task I - Alternatives Formulation ($110,000)

This task consists of defining the characteristics and assumptions of the No-Action Base Case and the various alternatives. The purpose of the alternatives is to explore the impacts of recirculation under a variety of conditions at the 1995 level of development. The alternatives formulation was be driven by: (1) the comments that Reclamation has received on the Appraisal study, (2) possible outcomes of the process to provide additional environmental and fisheries water under CVP1A, (3) possible outcomes of implementation decisions for Bay Delta Water Quality Control Plan 95-1WR, and (4) testimony from the 1998 Bay-Delta water rights hearings.

Table 1 outlines the various DWRSIM and DWRDSM2 alternatives being proposed for analysis in this Feasibility Study. In all, six DWRSIM and seven DWRDSM2 studies are being proposed for this study. However, it may be necessary to run two or three iterations of the DWRDSM2 studies to account for changes in water quality due to variations in the blending of water reaching Vernalis. For the DWRDSM2 studies, 16 years of hydrology will be studied (1976-1991). The alternatives explore using various "tools" to provide protection for both aquatic species and water quality. The tools include:

- Delta operations criteria
- Upstream operation criteria/objectives

- Conveyance criteria
- Storage components (operations objectives), and
- South Delta Modifications

Delta Operations Criteria

The key variation this tool provides to vary E/I ratios in the south Delta. Varying E/I restrictions could maximize the benefits of recirculation, while simulating adaptive management of critical Delta resources. In some analyses, prescriptive Delta actions (EWA for example) will be modeled.

Upstream Operations Criteria/Objectives

Two criteria are modeled together and then separately. The first is the WQCP flow objectives at Vernalis, and the second is the salinity objectives for the San Joaquin and the Stanislaus Rivers.

Conveyance Criteria

Conveyance tools include the use of the full Joint Point of Diversion, recirculation to the San Joaquin River via the Newman wasteway, and recirculation to the San Joaquin River via Mud and Salt Sloughs.

Storage Components (Operation Objectives)

This group studies the use of various reservoirs to help accomplish the recirculation goals. Don Pedro and Exchecquer are modeled to operate and provide additional flows at Vernalis while New Melones Reservoir is optimized to meet salinity flow objectives. San Luis reservoir is operated to utilize available storage for recirculation.

South Delta Flow Control Structures and Project Intake Facilities

South Delta improvements are studied to compare the benefits of the proposed SDIP flow control structures (Middle River, Old River at Tracy only) against the SDIP flow control structures with a Grant Line Canal flow control structure. This comparison will evaluate the potential water quality benefits of a Grant Line Canal flow control structure. All DWRDSM2 modeling studies will be run with flow control structures in place in accordance with times and operations modeled by DWR for the South Delta Improvements Program and in the SDIP flow

control structures with a June 1 through September 30 Grant Line Canal flow control structure operation. In addition, both duel intakes for SWP /CVP diversions and a combined SWP/CVP single point of diversion intake structure are studied.

Modeling Assumptions

One assumption common to all alternatives is that there will be no new construction of storage or conveyance facilities as a result of recirculation. However, repairs to existing structures, and removal of sediment, vegetation, and debris blocking the wasteways, can be assumed. Analysis of which wasteways should be used for recirculation will be incorporated into other tasks. Another assumption is that a water rights limitation will be imposed along the San Joaquin River, so that the DMC recirculated water is allowed to return to the Delta, rather than becoming an additional source of water for the San Joaquin River diverters.

The alternatives should include assumptions and methodologies associated with the CVPIA PEIS, except where these conflict with operational and legal changes required for DMC recirculation. Specifically, the alternatives should include dedicated water, instream fish flows, refuge water supplies, and the priority of uses.

Retention of agricultural drainage through improved drainage storage will also be studied.

Task 2 - Alternatives Modeling including Water Quality and Power Generation Analysis ($40,000)

DWRSIM is to be used in conjunction with DWRDSM2 to conduct the mathematical model runs to assess the impact of different alternatives for this study. DSM2 will need to be extended to include the study area along SJR. A full sequence of model runs for each alternative would include a DWRSIM run, DWRDSM2 run, statistical water quality analysis, and a power generation analysis. It is likely that some alternatives will not require the full sequence of model runs.

DWRSIM will provide flow quantity, reservoir storage, contractor delivery quantities, and part of the power analysis. DWRDSM2 will provide water quality predictions at the Delta pumping plants (Tracy and Banks), at various locations within the Delta, and along SJR upstream from Vernalis, and at Vernalis.

All model runs will attempt to meet applicable laws and standards in terms of flow quantity and water quality, unless otherwise noted. For example, the models may be run without Export/Inflow ration restrictions (and only limited by the physical capacity of the pumping

plants) to determine if adaptive management, at times, might provide additional benefits. Impacts will be recorded in terms of contractor delivery deficiencies, reservoir storage, power generation changes, aquatic impacts, and any failure to meet applicable water quality standards.

To perform the TDS water quality analysis in the San Joaquin River at Vernalis for each alternative, historic San Joaquin River water quality data (upstream of the confluence of the Stanislaus River if possible), water quality estimated for Grasslands Bypass releases into the San Joaquin River, the water volumes and flows obtained from the hydrology modeling (DWRSIM) runs for each alternative, the tide and other hydrology (e.g. rim flows, export pumping, channel depletions, Ag. Returns, and etc.) and water quality data used in DWRDSM2, and flow and water quality data from the maximum expected Grasslands Bypass release into the river will be used. Water quality from each source will have a range of values, allowing a statistical analysis of the probability of exceedance of the Vernalis standards.

The TDS water quality analysis should be done separately for the different water year types. A methodology for achieving this will be chosen as part of this task.

An additional TDS water quality analysis that may be desirable, for any alternatives that do not include south delta channel barriers, is the use of historic DMC water quality rather than DSM2 modeled water quality to determine the probability of exceedance of the TDS standards at Vernalis.

Task 3 - Fish & Wildlife Evaluation on Fisheries, Wetlands, and Contaminants ($20,000)

The U.S. Fish and Wildlife Service (FWS), the National Marine Fishery Service (NMFS), and the California Department of Fish and Game (DFG) will be asked to evaluate the impacts of recirculation on, but not limited to: (1) DMC water impact on salmon smolt imprinting, delta smelt in the central and southern Delta, and other fisheries issues, (2) impacts of recirculation on wetlands, and (3) potential bio-toxicity of the wasteway contaminants. The extent of these analyses will play a key role in determining measures to avoid and mitigate for program impacts, and determining if the program alternatives would cause jeopardy to threatened or endangered species.

Task 4 - Water and Sediment Sampling and Laboratory Analysis ($33,000)

A water quality and sediment sampling program will be included in the study to determine the type and quantity of contaminants such as pesticides and metals in the wasteways. This analysis will sample at only the Newman wasteway.

A field examination will be made of the Newman wasteway in order to estimate the location and quantity of sediment, vegetation, and debris that must be removed in order to restore the original capacity of the wasteways. This material will be analyzed so that it can be disposed of properly if it is removed. Additional sediment sampling will be done in the unlined portions of the wasteways, and laboratory and leach tests will be conducted on these samples for leached pesticides and metals.

This proposal includes five sediment samples (field and laboratory cost estimate is $25,000), two water quality samples (total of $5,000) and one leachate test ($3,000). The total cost for this work is estimated at $33,000.

Task 5 - Analysis of Pumping Capacity, Channel Conveyance Capacity, and Loss to Groundwater ($5,000)

An evaluation will be made to determine the potential loss of DMC recirculation water through infiltration to groundwater in both lined and unlined sections of the wasteways. This analysis is not expected to require a groundwater model.

A major goal of this task will be to identify operational capabilities that would result in no loss of delivery to the CVP contractors (and to the SWP contractors) as a result of recirculation. Therefore, this task will evaluate the potential for using the state facility at Banks for repumping recirculated water in a quantity sufficient to make up for deficiencies to CVP contractors caused by recirculation. The available pumping and conveyance capacity from Banks to the O'Neill Forebay will be determined, and the capability for delivery of mitigation water to CVP contractors south of the Delta will be computed separately for the April 15-30 and May 1-15 time periods.

Task 6 - Review of Water Rights, Agreements, Permits, and Other Legal Issues ($10,000)

A review will be undertaken by the Solicitor's office to determine the full extent of the legal constraints/considerations associated with DMC recirculation. Numerous legal issues must be addressed in order to implement DMC recirculation; some of the issues will require action by the State Board.

A critical issue with recirculation is that water rights commitments will not be shorted. Note that the exchange contractor's DMC water is the equivalent of a water right.

Water rights issues include:

(1) Possible modification of the COA so that Reclamation can pump water at tile state facility at Banks for delivery to Reclamation customers in an amount sufficient to make up for the deficiency caused by DMC recirculation;

(2) Possible relief from the restrictions on Delta pumping (i.e., percent of inflow/outflow,); and

(3) Limitations imposed on diverters along the San Joaquin River so that the DMC recirculated water is allowed to return to the Delta, rattler than becoming an additional source of water for these diverters.

Other legal issues include meeting the water quality and flow conditions imposed by the Bay Delta Water Quality Control Plan 95-1WR, and other applicable federal and state laws. The CVPIA has opened up the possibility of additional water being made available for fisheries or water quality via water purchases (B3 water), or from the 800,000 AF dedicated yield (B2 water). If some component of recirculated water were to be deemed to fall into one of these categories, an evaluation would have to be made as to whether the recirculated water could be repumped when it was returned to the Delta.

Permits for wasteway channel use must be obtained from the state Department of Fish and Game. Additional permits must be obtained to remove sediment, vegetation, and debris blocking the wasteways. Environmental documentation will be required for the removal of this material. Flood easements may be required for the entire length of the wasteways channels.

Task 7 - Economic Analysis ($5,000)

This task will be performed for the preferred alternative. The purpose of this task is to determine the cost of DMC recirculation, both in terms of implementation costs, and the cost of replacing water to mitigate for deficiencies induced by recirculation. Implementation costs include removal, transport, and disposal of wasteway sediment, vegetation, and debris that is blocking the wasteways; repair or modification of wasteway structures, if necessary; addition of wasteway water quality monitoring to the existing monitoring program; pumping energy costs for water acquired at Banks; and other costs associated with acquisition of water rights, agreements, permits, and approvals. Replacement water is expected to be acquired via pumping at Banks. Additional costs may be associated with changes in power generation capability, flood easements, and any necessary real estate purchases.

There would be costs associated with groundwater pumping that could occur as a means of replacing water to make up for deficiencies induced by recirculation. However, it is not anticipated that the preferred alternative will include additional groundwater pumping, owing to

the potential for water quality degradation and land subsidence.

Task 8 - Public Involvement ($10,000)

This task will involve tile general public and all key interested parties in the study process, to ensure the success of the study. The guiding principles will be team coordination, information materials, public notices, and public meetings.

The Reclamation Public Affairs office will prepare a Public Involvement Plan for the study, coordinate the public involvement process, prepare appropriate public notices, and coordinate public meetings.

Task 9 - Preparation of Study Report and Workplan for Implementation ($50,000)

The purpose of this task is to prepare a feasibility report summarizing the study findings leading to (1) a decision on whether recirculation is acceptable and desirable in terms of the environmental, economic, and institutional framework, (2) identification of the terms and conditions for implementing recirculation, and (3) a workplan for the implementation of recirculation.

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