Water Operations Summary: Gaming Exercise
April 14, 1999 Draft

Scenario: April			Target Year: End of Stage 1
Possible Water Supply Measures	Details	EWA/ Users Division	How to Model How to Game
South Delta Program - 10.3 kcfs	10.3 kcfs	Users below E/I EWA above E/I	Model in baseline. EWA may use in game when available or above E/I.
JPOD. No individual State/ Federal sublimits	No state or federal sublimits apply	Projects below E/I. EWA above E/I	Model in baseline.
Allow E/I variances			EWA may allow pumping above E/I for credit..
Allow in-Delta AFRP variences			EWA may allow pumping above AFRP in-Delta for credit..
Kern Water Bank	300 kaf storage. 20 kaf/ month in. 20 kaf /month out.	200 kaf Projects 100 kaf EWA	Model Project storage in model using full in/out capacity. EWA storage by hand. For game, EWA assured of 10 kaf/month in/out, but may use full capacity when unused by Projects. (A slight inconsistency. Check during game). Capacity is high priority -- no preemption by Kern.
Semitropic high priority storage	200 kaf storage 20 kaf/ month in. 10 kaf/ month out.	EWA	Operate by hand in game.
Gravelly Ford Groundwater	300 kaf storage. 20 kaf/ month in. 20 kaf /month out.	200 kaf Projects 100 kaf EWA	Operate Project share in model. Operate EWA share by hand. For game, EWA assured of 10 kaf/month in/out, but may use full capacity when unused by Projects. (A slight inconsistency. Check during game).
Shasta Dam Expansion	50 kaf storage	Water Quality Account	Operate by hand.
Expand Usable San Luis Storage	100 kaf storage	Projects	Operate in Model
Webb Tract	120 kaf. 2 kcfs in/out	Projects	Operate by hand Operate under Delta Wetlands rules.

Possible Water Supply Measures	Details	EWA/ Users Division	How to Model How to Game
Bacon, Woodward, Victoria	240 kaf. 4 kcfs in from Delta. 4 kcfs 2-way connector with Clifton Court	EWA	Operate by hand. Can divert water using Project rights up to total south Delta pumping of 15 kcfs, or by diverting water when Delta out-of-balance, even if total diversions rises above 15 kcfs. Delta Wetlands rules do not apply.
ET reductions on Delta storage islands	60 kaf/year average	Project 15 kaf/yr EWA 45 kaf/yr	Operate by hand in game.
Urban efficiency purchase	150 kaf/yr	EWA	Operate by hand in game
SOD water purchase options	No limit, but see price schedule	EWA	Operate by hand in game
NOD water purchase options	No limit, but see price schedule.	EWA	Operate by hand in game
Spot Purchases	No limit, but see price schedule	EWA	Operate by hand in game
Demand shifting	100 kaf. Short term storage lease in San Luis.	EWA	Operate by hand in game
Access Surplus Capacity		EWA	Operate by hand in game

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Notes

1. Additional Information needed for:

- Groundwater input/output capacities
- Can new screens be in place at Clifton Court/ Tracy by end of Stage 1/

2. Remaining decisions/confirmations before game:

- Use of Victoria, Woodward Islands
- If use new Delta storage , then what are the operational constraints (currently written very liberally for the game)?
- Baseline assumptions (e.g., in-Delta AFRP?)
- Amount of grounwater assumed available. Is it credible? (800 kaf of new storage. 400 to Projects, 400 to EWA)
- Distribution of new infrastructure between users and the EWA.
- New cost schedules (below) for purchases, pumping, etc.
- The efficiency water for EWA is significantly higher this game (150 kaf/yr), based upon estimates from Greg Young for CALFED funded conservation/ reclamation. However, the costs are higher than purchased water (75 kaf/yr of conserved water at $300-500/af and 75 kaf/yr of recycled water at $800 - 1,500/af). We must assume that these costs are paid for outside of the EWA budget, because the total cost of this water far exceeds the annual EWA budget. One option to consider would be to use some or all of this water, not for the EWA, but to increase state and federal water supplies. 150 kaf of annual supplies, combined with the increased infrastructure in this game would should meet or exceed water user objectives.
- Is increase in San Luis usable storage by end of Stage 1 feasible?

3. Giving 10.3 kcfs to Projects with no new controls is risky for EWA -- could greatly increase cost of export reductions. Need to watch this during game.

Initial Conditions

Assume that:

- All EWA storage is 50% full at the beginning of the game.
- EWA starts w/ $30 million.

EWA Budget

$30 million/year, paid on October 1 of each year. Funds may accrue. The EWA may borrow up to $30 million of future income. EWA funds accrue interest at 5% per year. Borrowing costs 5% per year. Capital costs for assumed facilities are outside the game. EWA may build up its fiscal reserves by selling or leasing its rights to water or facilities.

Price Schedules

Discretionary and operating costs must be paid for using the EWA budget. These costs include:

o Cost of options
o Cost of purchases
o Cost of groundwater pumping
o Cost of Project transportation (but with credits for avoided costs from the Projects)

Assumed prices:

1. Options

   $10/af for water to be delivered next year. Options must be purchased before October 1.
   $60/af to call options upstream of the Delta.
   $100/af to call options in export areas
   All options must be called before April 1 or the water reverts to the seller.

2. Spot purchases

   $200/af for the first 200 kaf/yr
   $300/af for the next 200 kaf/yr
   etc.

   Add $100/af during years projected to be dry and critical with > 50% probability.

3. Water sales by EWA

   Price to be negotiated during game.

4. Groundwater pumping costs

   Kern/ Gravelly Ford at $100/af
   Semitropic at $200/af

5. Demand Shifting

   $100/af to rent up to $100 kaf of storage in San Luis from MWD
   Intention to shift storage must be declared by April 1
   Water must be paid back by January 1 of next year or $1000/af payment

6. Project Transportation Costs

   Still needs work. Should vary by time of year and by the total amount of export pumping. As pumping increases, the marginal cost of electricity will increase. EWA should pay for

extra transporation cost, and get credits for reduced transportation costs.

Water Quality Account

50 kaf of high priority storage in Shasta, operated by hand. Fills when Shasta spills.

Up to $3 million/yr. Account does not accrue

Modeling Basis

Based upon the matrix above, the modeling upon which the game would be founded would be run with the following assumptions:

- 1995 Level of Development?
- Accord + VAMP
- All AFRP
- Trinity
- South Delta Improvements (10.3 kcfs)
- Unlimited JPOD
- Gravelly Ford storage (200 kaf)
- Kern Water Bank Storage (200 kaf)
- Increased usable storage in San Luis

Water Supply Evaluation

The results from the modeling basis plus water developed at Webb Tract, plus ET gains, plus any efficiency water allocated to the Projects, will roughly represent estimated Project deliveries.

Game Rules

- EWA has the right to carry debt and to use Project facilities, provided it can assure no harm, unless arrangements for compensation are agreed to in advance. Thus, the EWA may borrow against future water supplies, may shift Project storage from upstream storage to downstream storage, etc., provided that it can make the Project's whole before the water is needed.
- Unless otherwise specified, EWA has low priority access to Project facilities.