



**DISCUSSION ITEM**  
July 7, 2015

**TO:** Planning & Operations Committee  
(Directors Osborne, Barbre, Hinman)

**FROM:** Robert Hunter  
General Manager

Staff Contact: Karl Seckel

**SUBJECT:** Reliability Benefits in OC from the Poseidon Project

**STAFF RECOMMENDATION**

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Staff recommends the P&O Committee discuss and receive and file the report.

**DETAIL REPORT**

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The Poseidon Project is being discussed in many venues at this time. Staff would like to update the P&O Committee on several issues related to the Poseidon Project. The questions being discussed are:

1. Does the Poseidon Project **qualify** for the MET Local Resources Program (LRP) subsidy?
2. Will the Poseidon Project **receive** the MET LRP subsidy?
3. Is there an improvement in water supply **reliability** in OC and the MET service area from the Poseidon Project? If so, then how much of an improvement?
4. What other issues are related to the water supply reliability discussions?

Staff will attempt to clarify several of the issues imbedded in the questions, although the issues can be complex, difficult to explain and difficult to comprehend. The discussion provided is just a starting point in understanding how the Poseidon Project and other projects fit into the reliability equation in OC and MET. This discussion does not necessarily address all questions raised to date. We will have many such discussions as the work

|   |                  |            |           |
|---|------------------|------------|-----------|
| <b>Budgeted (Y/N):</b>                        | Budgeted amount: | Core __    | Choice __ |
| <b>Action item amount:</b>                    |                  | Line item: |           |
| <b>Fiscal Impact (explain if unbudgeted):</b> |                  |            |           |

continues under the OC Water Reliability Study. The following discussions should be considered as preliminary and incomplete at this time, but will serve as a focus point for receiving input into these complex issues.

## 1. Does the Poseidon Project qualify for the MET Local Resources Program (LRP) subsidy?

**Short Response:** Yes. Qualifying for the LRP subsidy requires that the project results in “supplies that replace an existing demand or prevents a new demand on MET’s imported water deliveries either through direct replacement of potable water or increased regional groundwater production.” Based on the program requirements and past MET actions, MWDOC staff believes the project qualifies for the LRP subsidy.

**Discussion:** Some seem to believe that OCWD will not be able to demonstrate that the OCWD demand on MET will be reduced once the Poseidon Project is in place compared to NOT having the Poseidon Project. MWDOC’s view is that OCWD will qualify for the subsidy. MWDOC notes that offsetting of MET supplies is not only associated with groundwater replenishment deliveries but is also associated with offsetting of full service supplies to the retail agencies within OCWD, which today is on the order of 300,000 acre-feet (AF), far exceeding the 56,000 AF from the Poseidon Project. MWDOC concurs that work with MET staff will be required on how best to measure the imported water demand reduction (or the increase in local production due to the Poseidon Project), but MWDOC does not anticipate a problem. (This remains just staff opinion until the MET Board actually agrees.) MWDOC has discussed with MET Local Resources Program staff how the Poseidon Project LRP Agreement provisions could be developed to demonstrate compliance for qualifying production of the Poseidon water for any of the three distribution options being considered:

- Seawater barrier operations
- Direct delivery to retail agencies
- Injection or percolation in the groundwater basin

While the MET staff cannot make commitments for their Board, it was noted that the current method for determining withdrawal of water from MET’s Conjunctive Use Storage Account could possibly be utilized. There are other options. The final LRP Agreement is always subject to approval by the MET Board and cannot be brought forward until such time as Poseidon has received all permits for the project, including the final Coastal Commission permit. Once the final Coastal Commission permit is received, the LRP Agreement would be agendized for MET Board consideration.

## 2. Will the Poseidon Project receive the MET LRP subsidy?

**Short Response:** Unknown. As noted above, once the final permits have been obtained by Poseidon, the LRP subsidy agreement will be taken to the MET board. It will be up to the MET board to make a final decision. MWDOC's role is to assist in the process.

## 3. Is there an improvement in water supply reliability in OC and the MET service area from the Poseidon Project? If so, then how much of an improvement?

**Short Response:** Yes, there is a water supply reliability improvement to both OC and MET from implementation of the project. The Poseidon Project will produce a new annual water supply of 56,000 AF. During periods of MET water supply allocations, OC would receive a direct benefit equivalent to whatever MET imported supply demand reduction percentage has been requested, say 10% to 50%, times the project yield. The remaining reliability benefit, 50% to 90% of the project yield, accrues to the MET service area. Out of the MET service area, OC purchases about 20% of MET's supplies, so OC gains a 20% benefit of the 50% to 90% benefit that accrues MET-wide. Tables 1 & 2 below track through sample calculations. It should be noted that all percentages in this response are generalized for discussion purposes. The more severe the allocation cut from MET (i.e., mandatory supply reduction) the greater the percent supply benefit to OC.

**Discussion:** To completely answer this question, we need to first define "improvement in water supply reliability." In general terms, reliability relates to the percent of normal water demand that can be provided under water shortages. This can include drought conditions when MET has enacted formal supply reductions through their water supply allocation process. Reliability improvement is a measure of the difference in reliability by having implemented an additional local project, such as the Poseidon Project. The following attempts to characterize the reliability improvements that occur directly and indirectly:

- a. From a narrow perspective, during years in which we are under water supply allocations from MET (such as this current year starting July 1), if OC will have more water available from a combination of local sources plus its allocation of water from MET, OC would be determined to be "more reliable". Thus, the "reliability improvement" is the increased supply of water (an acre-foot or percentage amount) over and above the amount of water that would have been available in OC in the absence of the Poseidon Project.
- b. In a broader sense, the Poseidon Project would reduce the demands OC has for purchases of MET water. Thus, MET would sell less water and would retain or add more water in their various storage accounts (unless they were all full). As a result, all of Southern California (within the MET system) would

be more reliable because of the additional water in MET's storage accounts resulting from the Poseidon Project. Since OC is part of the MET system, OC would be somewhat more reliable with the Poseidon Project. Having these supplies in storage can also help MET (and OC) to stay out of a water supply allocation situation, reduce the allocation reduction or shorten the duration of the shortage situation. As noted above, OC purchases about 20% of MET's supplies, so we could say OC roughly accrues 20% of this benefit.

- c. The narrow and broader perspective will be called "direct" and "indirect" benefits in the discussion below. The direct benefits accrue directly to OC while the indirect benefits accrue to the MET service area and hence help out all of MET, including OC.

The average person might expect OC to be more reliable by 56,000 AF per year with the Poseidon Project. This is not the case under either of these definitions.

The detailed "how much" answer is somewhat complicated and has several parts:

- During a water shortage allocation by MET, the basis MET uses to provide water allocations to their various member agencies is based on the principle of the "need for MET water" to meet retail demands. This is measured based on the actual use of MET water during agreed upon base years plus current local water supply conditions. If a NEW Ocean Desalination supply project producing 56,000 AF of water is brought into operation, the "need" for MET water in OC is lowered by 56,000 AF of water. This results in a lower allocation from MET. The methodology is structured to always result in a higher reliability for whomever has developed a local project compared to not having developed the local project. However, the higher "direct" reliability is not increased by the entire project yield (in our example 56,000 AF) but only by the percentage of the project yield proportional to the MET allocation level (i.e., the percent reduction in supply).
- Why was the MET water supply allocation developed in such a manner? Beginning in the early 1990's, MET's IRP adopted a more regional, cooperative approach to providing reliable supplies over the long run by the combined actions of MET, their member agencies and the subagencies, rather than MET providing the full reliability for all of Southern California. The IRP depends on MET accomplishing certain water supply actions and depends on local agencies accomplishing certain water supply actions. Collectively, these actions and investments are brought together to provide the overall water supply reliability for Southern California. Under this "cooperative" approach, the goal is to provide regional reliability for all while allowing a certain **additional** level of reliability for those who do more by developing local projects. This philosophy of everybody working together has been characterized as "sharing the pain" under water supply allocation events, but the overriding goal is to be fully reliable which would mean the region would not ever have to utilize water supply allocations.

- As an approximation, the reliability from the project yield under MET's current water supply allocation methodology can be estimated by the following calculation:
  - With a MET allocation reduction of 15%, areas that are 100% dependent on MET have to reduce water use by about 15% in round numbers. In the OCWD service area, with the Basin Production Percentage for groundwater production set at 70%, the overall demand reduction for the groundwater producers would be 15% of 30% or 4.5% (in round numbers). For OC as a whole, being roughly 50% dependent on MET, the overall reliability for a 15% reduction is shown in Table 1 at 92.5%. The reliability GAP would then be 7.5% of demands.
  - The "direct" reliability improvement in acre-feet is approximately equal to the MET regional percentage reduction they have requested in the allocation multiplied by the Project yield (Level 3 Allocation = 15% reduction in supply;  $15\% \times 56,000 \text{ AF} = 8,400 \text{ AF}$  reliability improvement).
  - This means that OC would directly have about 8,400 AF more than they otherwise would have had if they had NOT constructed the Poseidon Project.
  - The other portion of the project yield, 47,600 AF, benefits the MET service area, including OC, because MET less MET supplies in this amount are required to be delivered in the MET service area.
  - Assuming OC is 20% of MET, the "indirect" benefit is 9,520 AF.
  - The two benefits combined are 17,920 AF or 32% of the Poseidon project yield. The reliability GAP has been reduced from 7.5% to 4.5%, about a 40% reduction.
- Tables 1&2 below are not exact, but provide sample calculations showing that if the Poseidon Project were operational when the baseline calculations were set for the current MET allocations (baseline years = 2012-13 & 2013-14), OC's reliability would be improved by 17,920 AF today. Table 2 extends the estimates and provides the sample calculations for two additional examples.

#### **4. What other issues are related to the water supply reliability discussions?**

- The definition of reliability used in this discussion regarding MET's water allocation methodology has been completely undermined by the Governor's 25% reduction scheme. The Governor's emergency reductions are focused solely on demand reduction and do not consider local supply conditions or increases in supply. Adding an additional 20 Poseidon Plants would not help under this situation.

- Under the MET allocation formula, the more unreliable MET is (situations with deeper allocation cutbacks), the more reliability improvement OC receives from having implemented a local project such as Poseidon. At a 50% allocation from MET, OC would have an improved reliability of about 28,000 AF (50% of 56,000 AF).
- Can the MET allocation formula be changed? This aspect of the allocation program has remained unchanged since about 1994. The support for “share the pain” is philosophical in nature and central to MET as a regional organization. The issue has been raised in a number of forums at MET but has never gotten enough support from other member agencies to be changed. It is a highly charged issue and it is perceived that a change would adversely affect many MET agencies and subagencies. The MET allocations are a zero sum game. In an allocation you are limiting the available supply of water. If Agency A receives a higher allocation, other agencies receive a lower allocation.
- Simply focusing on what happens during an allocation does not account for the years when MET is not in an allocation.
  - If OC implements the Poseidon Project, we would simply purchase less MET water, MET’s sales will go down and the unsold water will likely be stored in one of MET’s storage accounts for subsequent use in dry years. Overall, this would result in MET having more water in storage, being more reliable and Southern California and OC would be in shortage situations less frequently. This is a good thing, but OC is paying more for their water as a result. OC purchases about 20% of MET’s supplies and so the additional benefit needs to be accounted for.
  - Some would observe that the MET LRP incentive funds actually result from water purchase payments paid by all of the MET member agencies, including OC. In return for this funding, the MET service area receives improved reliability. Under the LRP, MET would be providing about \$400 million over 15 years towards the Poseidon Project; this has been estimated at about 23% of the cost of the Poseidon Project over the 50-year term now being considered (OC has contributed about 20% of the LRP funds to be provided via water rates paid to MET). Some question whether the funding provided by OC ratepayers is commensurate with the return on this investment as an OC investment (OC pays roughly 77% of the costs and receives 32% to 60% of the water supply reliability benefits (Table 2) – this does not account for the SYSTEM reliability benefits discussed below nor for the portion of the LRP payments contributed by OC.)
  - If OC can store the Poseidon water in years when it is not being used to meet demands directly, it becomes a question as to whether the water would result in a significantly higher reliability for OC under those circumstances, without a change in how MET approaches water

allocations. Again, MET looks at the “need” for MET water to meet demands. If local supplies are available, because water was stored in other years, it would likely be counted as “additional local supplies” during a MET allocation in a similar manner to how the Poseidon yield would be counted. OC would likely be better off by only a small percentage.

- One solution to this dilemma is to have MET pursue the project and incorporate the supplies into their water resources mix. The problem with this is that MET has historically evaluated that they have sufficient other supply options, costing less than \$1800 per AF, to help meet their demands and to put into their storage accounts during wet years for use during dry years. MET will soon be releasing their 2015 IRP projections; it is possible that MET could determine that it is time to consider ocean desalination and/or other similar supplies to improve their reliability over time. In addition, the OC Water Reliability Study will be modeling MET supplies over the long range to develop our own estimate of MET’s reliability and how other supply options might improve MET’s or OC’s reliability.
- “Extraordinary supplies”, as defined by MET, are “deliberate actions taken by member agencies to augment the total regional water supply only when MET is allocating supplies through the Water Supply Allocation Plan (WSAP)”. Extraordinary supplies cannot be base-loaded supplies such as the Poseidon Project (i.e., they can’t be used except during allocations). The only projects deemed by MET so far to meet this definition come from either the Strand Ranch Project or from transfers entered into only during years when a WSAP applies. The Strand Ranch Project was developed specifically to store wet year water to be used only when MET implements a WSAP. However again, the value of these extraordinary supplies was undermined by the Governor’s 25% reduction because they are focused only on demand (use) and not supply.
- **SYSTEM RELIABILITY IMPROVEMENTS:** The entire discussion above has focused on SUPPLY reliability benefits. The other benefit that accrues from developing some local projects is SYSTEM reliability benefits – having the capability to continue supplying water during emergency events such as following damaging earthquakes. If an earthquake knocked out the Diemer Filtration Plant in Yorba Linda, there would be a benefit to having an ocean desalination project in Huntington Beach continuing to produce 77 cubic feet per second (cfs) of supplies into the system. None of the discussions above have placed a value on the peak system capacity provided by the Poseidon Project. This represents 77 cfs of peak capacity that could be of value during an emergency event. There are other ways of providing this amount of system reliability, but the value of having this benefit available should be included in the reliability evaluations. MWDOC is in the process of completing a SYSTEM reliability study under the OC Water Reliability Study and should have results within the next several months. This will enable us to place a value on this benefit.

- This discussion has not included the “economic value” of being reliable. Shortages, whether short-term or longer-term, can have a significant impacts on our economy. The prior work by MWDOC and OCBC from 2004 provided estimates of the cost impacts of “not being reliable”, which were quite high.
- IRWD has been heavily involved in the discussions relative to the Poseidon Project, including presentations made to the OCWD Citizens Advisory Committee and in the Groundwater Producer’s meetings. For informational purposes only, MWDOC has attempted to summarize the main points they have made (without taking a stance on the statements).
  - Historically, MET has been very reliable, having gone into shortage allocations only in 1976-77, 1991-92, 2008-09, and now 2015-16 (4 times in 40 years). If OC knows MET will be reliable in the future and has water to sell to replenish the groundwater basin, OC should plan on purchasing the water to do so. This would always be our least cost option for OC and if we kept the groundwater basin at a higher level, we would have more protection during future shortages.
  - If MET is reliable, say 8 or 9 years out of 10, this means OC would only need the Poseidon water 1 or 2 years out of 10. However, ocean desalination projects generally cannot be effectively operated only a few years out of 10 as the financial allocation of capital costs to the smaller volume of water produced yields extremely expensive water. Operating the project to provide yield only in a few years out of 10 or simply operating in a manner that results in building up storage in MET’s storage accounts also results in a high unit cost of the project in OC, based on the limited reliability improvements available at this time.
  - However, if MET is much less reliable, maybe only 1 or 2 years out of 10, the argument in support of the Poseidon Project makes better sense and OC would receive a greater return on investment.



Table 1

Approximate Direct and Indirect Water Reliability Improvement During a MET 15% Water Allocation Reduction With and Without the Poseidon Project Acre-Feet (AF)

| Row | Category  | Current Supplies | With Poseidon | Approximate Reliability Improvement From Poseidon (3) |
|-----|---|------------------|---------------|---|
| 1   | Total OC Demands                                  | 600,000          | 600,000       |   |
| 2   | Existing Local Supplies Today                     | 300,000          | 300,000       |   |
| 3   | Poseidon Project                                  | 0                | 56,000        |   |
| 4   | Demands on MET                                    | 300,000          | 244,000       |   |
| 5   |   |                  |               |   |
| 6   | Call for a 15% Reduction = Reliability GAP (1)    | 45,000           | 36,600        |   |
| 7   | Reduced MET Demands                               | 255,000          | 207,400       |   |
| 8   | Local supplies remain (2)                         | 300,000          | 356,000       |   |
| 9   | Total supplies during allocation                  | 555,000          | 563,400       |   |
| 10  | Reliability = Row 9 % of Row 1                    | 92.5%            | 93.9%         | 1.4%  |
| 11  | Direct Benefit = difference in Row 9              |                  |               | 8,400   |
| 12  | Remaining Poseidon Yield to MET                   |                  |               | 47,600  |
| 13  | Assume OC = 20% of MET                            |                  |               | 9,520   |
| 14  | Total Direct + Indirect Benefit                   |                  |               | 17,920  |
| 15  | Percentage of Poseidon Yield                      |                  |               | 32.0%   |
| 16  | Percentage of Reliability GAP Covered by Poseidon |                  |               | 39.8%   |

(1) Reduction is in demands for MET water

(2) With and without the Poseidon Project

(3) Reliability in acre-feet and % higher supplies under a MET allocation with the Poseidon Project

**Table 2**  
**Approximate Direct & Indirect Reliability Improvement**  
**From the Poseidon Project Under Three Scenarios**

|     |  | MET Supply Allocation Reduction Scenarios |        |         |
|-----|--|---|--------|---------|
| Row |  | 15%                                       | 30%    | 50%     |
| 1   | Reliability % Without Poseidon                         | 92.5%                                     | 85.0%  | 75.0%   |
| 2   | % Reliability GAP Without Poseidon                     | 7.5%                                      | 15.0%  | 25.0%   |
| 3   | Reliability GAP in AF Without Poseidon                 | 45,000                                    | 90,000 | 150,000 |
| 4   |  |   |        |         |
| 5   |  |   |        |         |
| 6   | Direct Poseidon Reliability to OC - AF                 | 8,400                                     | 16,800 | 28,000  |
| 7   | Direct Poseidon Reliability to MET - AF                | 47,600                                    | 39,200 | 28,000  |
| 8   | Portion of MET Poseidon Reliability to OC (20% of MET) | 9,520                                     | 7,840  | 5,600   |
| 9   |  |   |        |         |
| 10  | Direct + Indirect Poseidon Reliability to OC - AF      | 17,920                                    | 24,640 | 33,600  |
| 11  | % of Poseidon Project Yield                            | 32.0%                                     | 44.0%  | 60.0%   |
| 12  | % Reliability Improvement from Poseidon                | 3.0%                                      | 4.1%   | 5.6%    |
| 13  | Remaining Reliability GAP                              | 4.5%                                      | 10.9%  | 19.4%   |
| 14  |  |   |        |         |
| 15  | Portion of Reliability GAP Covered by Poseidon         | 39.8%                                     | 27.4%  | 22.4%   |