# NIPOMO COMMUNITY SERVICES DISTRICT

## NOVEMBER 1, 2012

## 1:30 P.M.

# SPECIAL MEETING MINUTES

## SUPPLEMENTAL WATER ALTERNATIVES EVALUATION COMMITTEE

**APPOINTED COMMITTEE MEMBERS**
MICHAEL K. NUNLEY, CHAIRMAN (NON-VOTING)
PETER V. SEVCIK, VICE CHAIRMAN (NON-VOTING)
CRAIG ARMSTRONG (VOTING)
DAN GARSON (VOTING)
DENNIS GRAUE (VOTING)
KATHIE MATSUYAMA (VOTING)
ROBERT MILLER (VOTING)
DAVE WATSON (VOTING)
DAN WOODSON (VOTING)

**PRINCIPAL STAFF**
MICHAEL S. LEBRUN, **GENERAL MANAGER**
LISA BOGNUDA, **ASST GM/FINANCE DIRECTOR**

MEETING LOCATION - District Board Room
148 S. Wilson Street, Nipomo, California

**1. CALL TO ORDER, FLAG SALUTE AND ROLL CALL**
Chairman Nunley called the Special meeting of November 1, 2012, to order at 1:00 PM. and led the flag salute. At roll call, all Committee members were present.

**2. WATER RESOURCES POLICY COMMITTEE CHAIRMAN'S REPORT**
The Board's Water Resources Policy Committee Chairman, Ed Eby, read the attached statement to the Committee.

Member Woodson asked if the findings of the Committee would change the timeline for serving new customers, or if the District Board would wait until a water project was constructed. Director Eby responded that any Board discussion about serving new customers may occur when a clear recommendation and timeline for a supplemental water project is developed. Then, he would expect that the Board will discuss whether to lift the prohibition against issuing "intent to serve" letters. He noted that the Committee's work was a key milestone for that decision-making process.

There was no public comment.

**3. REVIEW DRAFT MINUTES FROM OCTOBER 2, 2012, COMMITTEE MEETING**
Chairman Nunley introduced the item. Member Watson stated that he did not remember specifying that the bulk of the Committee's work could be performed in 2-3 weeks as noted in the last paragraph on p. 6 of the meeting minutes. Chairman Nunley and Member Matsuyama asked if he would like to propose edits to the minutes. Member Watson noted that he had not intended to say what was attributed to him in the minutes, but that he did not need the Committee to change that statement in the final meeting minutes.

There was no public comment.

The Committee voted to accept the draft meeting Minutes as final Minutes with no revisions.

**4. DISCUSS SUBCOMMITTEE PROGRESS**

Each subcommittee presented the status of their alternative evaluations using the attached powerpoint slides.

State Water – Member Armstrong presented this alternative and noted that the Subcommittee had learned from Bill Brennan (Central Coast Water Agency) that State Water contracted by one contractor could not be used outside its service area. He also noted that a representative of the City of Santa Barbara had stated that they did not want to sell their desalinated water since the water treatment facility is their drought buffer. Member Miller thanked the subcommittee for talking directly with agency representatives about State Water. He also noted that the City of Santa Maria had suggested the buy-in cost for Nipomo to become a new State Water contractor could be in the neighborhood of $100M. Member Armstrong said CCWA had budgeted for approximately $5M for year from Santa Maria so it would be difficult to reach that estimate based on this budget. Chairman Nunley asked if this included debt service and other costs and said that he was unsure whether that budget captured all the cost categories. He noted that Mr. Brennan had stated San Luis Obispo County and/or Nipomo would need to acquire capacity to deliver any additional State Water between Polonio Pass and Devil's Den, not including other costs. CCWA had estimated that it would cost approximately $20M to increase capacity for SLO County's full Table A delivery just within this reach.

Members Miller and Armstrong stated it would be difficult to arrive at the "real cost" for State Water buy-in. Member Miller asked if the published Constraints Analysis (Boyle, 2007) should be reviewed and a "middle number" selected based on that analysis. Member Watson asked if SLO County was currently looking at delivering more State Water and Member Miller noted that Courtney Howard and Paavo Ogren with San Luis Obispo County would be the right people to answer that question. Chairman Nunley said he was setting up a meeting with the subcommittee and SLO County to discuss this.

Member Watson asked for a definition of the term "excess capacity" used in the first slide. Member Armstrong replied that this referred to unused capacity in the pipeline and treatment facility, meaning it was not subscribed to any current users. Chairman Nunley noted there had been discussion over ownership of that "unused capacity" within CCWA. Member Watson expressed support for defining the different types of capacity (both resource and delivery) so the Committee could develop a range of costs.

Member Garson asked if there were compatibility issues with State Water. Member Miller responded that disinfectant compatibility was a concern and Chairman Nunley added that the Santa Maria Waterline Intertie Project had included chloramination facilities to address this. He also noted that State Water participation would need to go back to ballot since it had been voted down twice. Member Armstrong asked if this only included District customers and Chairman Nunley noted that he did not know. Member Miller suggested the meeting with SLO County could be a good opportunity to get buy-in cost information.

Member Garson asked how the District would connect to and use water from the CCWA pipeline. Vice Chair Sevcik noted there was a rumor that a tee had been placed in the CCWA pipeline within the Nipomo CSD service area. This rumor is not correct.

Members Armstrong, Miller, and Garson discussed cost categories for State Water including both capacity and State Water purchase costs. Member Armstrong noted that Santa Maria pays CCWA approximately $1300 / AF according to the budget. Member Miller noted that

State Water transfers were based on negotiated costs and that State Water was not priced as a commodity.

Member Nunley noted the number offered by Santa Maria for "buy-in" to CCWA facilities and State Water was considered a number that would make the existing participants "whole" with respect to their investment in State Water.

Member Graue asked if there was a "fair market value" for State Water. Chairman Nunley noted that costs were documented for proposed water sales or transfers in the 2007 Constraints Analysis and used as a basis for estimating Nipomo's buy-in costs for State Water. Members Miller and Matsuyama likened this to a "comp" in determining real estate values. Chairman Nunley noted there were various legal and institutional constraints to Nipomo connecting to State Water that did not affect these other proposed transfers. Member Armstrong noted there was a range up to $63M published in that report. Member Miller offered to provide more input from Santa Maria when they presented their subcommittee's work.

Member Armstrong provided some updates to the questions at the end of the State Water presentation. He noted there was available excess capacity at Polonio Pass WTP. Also, Mr. Brennan had stated that State Water customers in the SLO Northern Cities area may be looking at acquiring more State Water. Member Armstrong said that the City of Santa Barbara was not interested in selling their desalinated water.

Seawater– Member Graue presented desalination technologies. Member Miller noted that the brine stream is a challenge for any desalination project and stated the Committee should consider whether the District's desalination study could be a reliable source for cost estimates during the Committee's evaluation. Member Watson asked how much water per acre could be treated with thermal or solar distillation and Member Graue noted it would depend on time of year and other factors, but he would provide an estimate later. Member Graue would like to engage with a desalination expert to discuss other treatment and delivery needs related to seawater or brackish water supplies. Chairman Nunley noted that other system components include pretreatment, finishing facilities, intake, and brine disposal.

Agricultural and Industrial Reuse – Member Matsuyama said the subcommittee had met with Jim Anderson at Phillips 66, and the owner of the refinery was now independent from production and transmission facilities. She noted that MCA members and the Chairman had also attended this meeting and that MCA had provided an analysis of using Phillips 66 wastewater. Approximately 220 AFY would be available for treatment and approximately 325 AFY currently flows to the ocean via a diffuser assembly. He noted Phillips 66 would always need to maintain flow in that pipe to prevent sand from clogging the diffusers. Capturing the steam or waste heat for use by the District would not be feasible based on the meeting. Phillips 66 may be willing to provide land for a future District facility. There appears to be a willingness for Phillips 66 to work with NCSD and Member Matsuyama speculated that it might enhance their relationship with regulatory agencies. She noted the subcommittee would write notes from their meeting. Member Armstrong opined that this water could also be used in different ways to relieve the pumping depression in the Mesa. Various members discussed whether this water could be intercepted and used as "supplemental water" if it is currently being released to the ocean.

Member Matsuyama described a $65-70M, 1.0 MGD water desalination project being developed by PXP to handle wastewater from their production. She provided an article from an online publication regarding the project (see attachment). The facility will initially

discharge water to Arroyo Grande creek but could eventually be applied for beneficial uses. It is planned to operate for 10-12 years. Members Garson, Matsuyama, and Watson discussed the use of groundwater to generate steam for extraction processes like those being applied by PXP. Member Graue suggested the cost of the facility must include other production efforts in addition to water treatment. Member Garson asked who would "own" this water. Member Miller discussed the challenges with relying on a temporary water supply, and Member Matsuyama suggested 10-12 years may provide an adequate amount of time for developing a desalination project. Member Watson noted that he worked with an adjacent landowner and that there were questions about the long-term reliability of this water supply and there was also a need to meet other water resource goals within its watershed.

Member Miller asked if the Phillips 66 outfall could have more capacity for future brine management given the size of the discharge pipeline. Member Matsuyama said Chairman Nunley would be requesting the wastewater discharge permit from Regional Water Quality Control Board (RWQCB) and that it may have some of this information.

Member Matsuyama noted that water that has been used once and is recycled would not be included as "supplemental water" based on discussions with various experts as described at this meeting. She expressed concern that the District's conservation efforts may not be adequate for future grant funding related to water supply or wastewater projects.

Santa Maria Waterline Intertie Project – Member Miller presented this update and noted some subsequent work would be done to look at phased delivery from Santa Maria to Nipomo. Member Watson encouraged the Committee to review the 2011 Santa Maria Urban Water Management Plan (UWMP) which notes that the City needs to acquire 5,000 to 10,000 AFY of State Water to serve Nipomo and meet their own needs. He noted that Santa Maria could acquire this additional water to supply the full 2500 AFY within 18 months, and Member Garson noted that this would not be a problem given the District's plan to ramp up deliveries over a period of years. Vice Chair Sevcik stated that the City had always said they would need to acquire more State Water to meet future District deliveries. He also discussed the City's ability to deliver water for 12 months out of the year as opposed to the State Water project which currently delivers water approximately 11 months out of the year.

Member Garson noted that Santa Maria would be delivering the same quality of water to their customers and Nipomo with no ability to deliver higher or lower quality water to either entity. He also noted that Nipomo would be receiving approximately 50% State Water via this delivery approach. Member Miller said many years it will be a higher proportion of State Water to groundwater. Since the City pays a relatively high fixed cost for State Water, they tend to take and use a higher percentage of State Water than 50%. Chairman Nunley also described the turnback pool and Central Valley groundwater banking project which can be used by the City as drought buffers. Member Matsuyama asked if City water supplies would be adequate for buildout. Member Watson said his impression based on the meeting with Santa Maria was that they could meet these demands but he encouraged the Committee members to review the City's UWMP for details.

Member Graue asked if City residents felt they had overpaid for State Water Project involvement. Member Miller said he had not heard this was an issue but did not know. Member Woodson noted the City had expressed the need for constant deliveries to Nipomo to maintain their own storage. Chairman Nunley and Member Miller said the subcommittee was working on providing varying delivery rates to Santa Maria for hydraulic analysis to see if they could increase their total delivery of water.

Chairman Nunley noted that both he and the Vice Chair would need to leave the meeting at 4:00 PM.

Recycled Wastewater from Municipal Facilities – Member Watson presented this alternative. He noted that distribution of recycled water must be considered in any cost opinions and asked for an estimate of pipeline costs per mile. Director Eby replied that the number can vary from $1M to $3M per mile.

Member Matsuyama asked why the Mesa Road location had been identified as a location for percolation of treated effluent. Member Miller noted the soil would accept approximately 1 ft per day of water but the location was controversial. Member Garson asked if there was confusion that the site was being proposed as a treatment plant. Both members Miller and Garson said they had heard that the neighbors were under this impression. Vice Chair Sevcik noted that some preliminary studies on possible percolation sites in the Mesa Road area took place but the District proceeded no further due to the neighbors' concerns and the misunderstanding regarding a "treatment plant".

Member Miller noted that salt content would be a concern among golf courses and other potential users.

Conservation and Gray Water – Member Matsuyama said the Committee could move past this item in the interest of time. Chairman Nunley noted he had seen progress on this investigation via emails and Member Matsuyama stated she wanted to include the District's 2008 Conservation Program in the list of approved documents.

Local Groundwater – Members Garson and Graue presented this item. Member Garson noted the focus had moved to 1) local, shallow groundwater ; 2)local groundwater (Dana Wells) and 3) drilling wells along the Santa Maria River which was ruled out quickly since the water rights were owned by other entities. He noted the subcommittee had met with Brad Newton and was impressed with his knowledge and presentation of the issues. Dr. Newton had told the subcommittee that the shallow groundwater is included in the NMMA's groundwater "budget" and is not considered supplemental water. Member Graue said the basin had not been studied as thoroughly as one would expect, but he was encouraged such a study would take place soon and some efforts had taken place already to define and understand the basin.

Vice Chair Sevcik explained the Dana Wells are already owned by the District and are not considered supplemental water. They were obtained via an annexation agreement that was developed prior to the 2005 stipulation (around 2002-2003) and were never defined as a source of "new water" or "supplemental water" since they deliver water from within the NMMA. The wells were not completed by the developer. They are rated at 100-200 gallons per minute (gpm) each. Member Watson asked if they would address any short-term water needs for new or pending development. Vice Chair Sevcik said the wells would address the conditions of the will-serve letter already issued for the project, and completing the wells would be required prior to issuing any additional water services within the development. Member Graue said the wells could help mitigate the depression at Black Lake by allowing the District to spread the extraction of water across a larger area of the NMMA.

Member Matsuyama asked the Committee to identify action items.

Member Graue estimated that approximately 1.6 square miles would be required for solar distillation of 2500 acre-feet per year (AFY) of seawater.

Member Matsuyama said she would like the Committee to receive a presentation from Jacqueline Fredericks regarding the Santa Maria Valley groundwater litigation and a presentation from Brad Newton. She had met with Jacqueline Fredericks and was impressed with her knowledge of the history and outstanding issues of the groundwater litigation. Ms. Fredericks had offered to present to the Committee. Member Matsuyama noted the subcommittee had questions for Jim Markman, the District's legal support for water issues related to the litigation, and recommended the members submit their written questions to the Chairman for submittal to Mr. Markman.

Member Miller asked the Chairman to contact Phillips 66 to see if they would be interested in receiving and using recycled water. Chairman Nunley asked the subcommittee to submit questions he can forward to Jim Anderson to avoid convening a quorum of Committee members. Member Garson stated he understands the Committee is avoiding convening a quorum outside of public meetings, but had been very impressed during his meeting with Brad Newton and felt he should present to the public to help explain the issues. He supported the request to have Dr. Newton meet with the Committee.

Member Woodson asked the Committee to include power costs in their evaluation. Member Miller supported this request and noted it was a key component of ongoing costs.

Member Matsuyama said she will be meeting with Margaret Lange, Nipomo resident and attendee at several Committee meetings, to discuss supplemental water.

Chairman Nunley asked if a powerpoint format would be appropriate for the "final deliverable" by the Committee. It could be completed and updated as the subcommittees work through their alternative evaluations. Member Miller expressed support. Member Matsuyama also noted that it would be useful for presenting to the community but she would like the final presentation deliverable include pictures and graphics – for example, pictures of facilities being considered.

Member Armstrong asked to set up a meeting with San Luis Obispo County to discuss State Water.

Member Nunley requested public comment and reminded the public that this presentation was not a completed report, but a progress report from the subcommittees.

Public Comment:

Tim Kraumer, Nipomo resident, thanked the Committee for their efforts. He had not liked the behavior and conduct of people opposing the proposed Santa Maria Waterline Intertie Project, but felt the project proponents had not made their case for the project. He stated the need for supplemental water was evident to him, but the proponents of finding supplemental water needed to get their message out.

Bill Kengel, Nipomo resident, said it was a great idea to get Jackie Fredericks and Brad Newton to present to the Committee. He asked if he could attend this meeting. Chairman Nunley noted that a public meeting could be scheduled, either through the Committee or in a separate workshop or Board meeting since the groundwater basin issues and the litigation are outside the Committee's charge. Member Matsuyama suggested this could be a separate workshop or community meeting and would prefer it not be a formal Board meeting.

Mr. Kengel was concerned that a community meeting would not be technically-focused and he would like to attend a technical meeting without the rest of the public.

Member Garson said he understands the Committee's focus but he feels the Board needs to refocus their public outreach efforts and he wants the public to understand the issues. He supports scheduling a community meeting or workshop and feels public outreach was a major factor in the assessment vote failing.

Director Ed Eby stated that the District would not be able to get State Water if the City of Santa Maria did not approve the purchase. He provided information to the Board on the Chula Vista water treatment facility owned by Sweetwater Authority. He noted that Santa Maria has access to approximately 50,000 AFY of water, is currently using 10,000-13,000 AFY, and has a buildout demand estimated at 30,000 AFY.

Sam Saltoun, Nipomo resident, said he was pleased with the committee's discussion and asked that they consider permitting when evaluating alternatives. He noted that reusing industrial wastewater and some other alternatives would require concentrating contaminants for discharge and this could be a permitting issue.

Member Watson noted the Committee still needed to hear more about the alternatives that had not been discussed today, but based on the discussion today, wanted to see if the Committee was ready to decide whether to further evaluation groundwater as an alternative. Members Matsuyama and Garson noted some questions still needed to be answered before making that decision. Member Nunley noted the Committee could decide to eliminate this alternative as part of a screening process.

Mr. Nunley asked if Jacqueline Fredericks would present an unbiased overview of the litigation if she represents one of the parties. Member Matsuyama said she expected Ms. Fredericks could provide an unbiased overview.

The Committee voted to receive the reports and for subcommittees to direct their needs to the Chairman. The Committee also voted to invite Brad Newton and Jacqueline Fredericks to present to the Committee, schedule depending on their availability.

**5. DISCUSS NEED FOR SPOKESPERSON TO PROVIDE UPDATE TO THE BOARD**
Chairman Nunley presented this item.

There was no public comment.

The Committee voted to continue this item at the next meeting.

**6. PRESENT REFERENCE DOCUMENTS FOR REVIEW AND ACCEPTANCE**
Chairman Nunley presented this item.

Member Watson requested to include the Arroyo Grande recycled water memoranda authored by Wallace Group in 2010 and the South SLO County Sanitation District recycled water study. Member Matsuyama asked if the documents were posted on the District's website and Chairman Nunley said he would make sure that they are there.

Member Matsuyama asked to include the District's Water Conservation Program (2008).

There was no public comment.

The Committee voted to include the following documents:

- Nipomo CSD Water Conservation Program (February, 2008)
- City of Arroyo Grande Recycled Water Distribution System Conceptual Plan – City of Pismo Beach WWTP (Wallace Group - June, 2010)
- City of Arroyo Grande Recycled Water Distribution System Conceptual Plan – South SLO County Sanitation District WWTP (Wallace Group - June, 2010)
- South SLO County Sanitation District Water Recycling Update Report (Wallace Group - January, 2009)
- Sweetwater Authority Groundwater Desalination Facility Brochures (provided by Director Eby at the Committee Meeting)

**7. DEVELOP RANKING CRITERIA**

Chairman Nunley presented this item.

There was no public comment.

The Committee voted to continue this item at the next meeting.

**8. SET NEXT COMMITTEE MEETING DATE AND TIME**

Chairman Nunley presented this item.

There was no public comment.

The Committee voted to hold the next meeting on November 15, 2012, at 1:00 PM

**9. ADJOURN**

Chairman Nunley adjourned the meeting at 4:08 PM.

Attachments:
Written statement from Director Ed Eby for Item 2
Item 4 Progress Report
Calcoastnews.com article – May 25, 2011 – Arroyo Grande Water Recycling Plant Under Construction

Item 2 Attachment- Statement from Director Ed Eby

Over the past 10 years technical experts have consistently reported that the Nipomo Mesa has and continues to use more groundwater than is being replaced by rainfall, a condition that could be reversed by importing supplemental water.

Given the uncertain timeline for supplemental water delivery, and the preponderance of evidence pointing to diminishing basin health, The NCSD is unable to make findings that it has sufficient excess water to serve new projects.

Consequently, on June 27, 2012, the NCSD passed an ordinance to stop processing intent-to-serve applications for new development. This action is to be revisited in October and May. On October 24, 2012 the NCSD Board again considered the ordinance and found no change in the diminishing water supply or clear timeline for supplemental water delivery. They postponed further action until next May, or after a viable supplemental water plan can present a timeline. This committee's final report could accelerate that action date.

Item 4 Attachment - Progress Report by Subcommittees

# Progress Report by Subcommittees

Supplemental Water Alternatives Evaluation Committee

November 1, 2012

## State Water Project

Craig Armstrong

Dennis Graue

Kathie Matsuyama

# State Water Project- 1

Quantity of water available

SLO County has 17,530 AF in excess Table A amounts (table A amounts are the number of acre feet each entity has agreed to purchase and is the basis for allocating actual water deliveries).
The drought buffers for CCWA and Goleta Water District total 6,400 AF (questionable if available).

Delivery of Water

Capacity of Polonio Pass WTP is 43,900 AF plus a possible 5,000 AF in excess capacity.

The SWP pipeline has 3,900 AF in unused capacity and 5,600 AF in excess capacity (total of 9,500 AF).

Available capacity would be higher in those years when SWP is delivering less than 100% of Table A amounts.

Reliability

Long term delivery reliability through 2029 is 61% of Table A amounts. You would need 5,000 AF in Table A amounts to get 3,000 AF and 10,300 AF in Table A amounts to get 6,200 AF.

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# State Water Project - 2

Legal constraints

Any option involving state water (except the Santa Maria pipeline) would be subject to approval by various local and state agencies.

State Water Project (SWP) Options

- Acquire unused or excess Table A amounts
- Purchase Table A amounts from CCWA participants (i.e., Santa Maria)
- Directly participate in SWP/CCWA.
- Acquire "other" water through participants in SWP (Santa Maria pipeline)
- Reactivate 3,000 AF desal plant in Santa Barbara and exchange for SWP water

Acquire unused or excess Table A amounts

Possible option—SLO County has sufficient Table A amounts and WTP and pipeline capacity would be sufficient except in years when 95% of Table A amounts (excluding drought buffers and turn back sales AF) is delivered. 95% based on Polonio Pass WFT capacity.

Purchase Table A amounts from CCWA participants

Possible option

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# State Water Project - 3

Directly participate in SWP.

Possible option

Acquire "other" water through participants in SWP (Santa Maria pipeline)

Possible option

Reactivate 3,000 AF desal plant in Santa Barbara and exchange for SWP water

Fails criteria--does not provide dependable 3,000 AF per year since it is unlikely that Santa Barbara would receive full Table A amount every year. Possibly could be combined with other options.

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# State Water Project - 4

Questions

Is excess capacity still available at Polonio WTF?

Have there been any updated studies regarding unused or excess capacity on the pipelines?

Do any of the CCWA members have efforts in progress to acquire a larger share of SWP water delivered by CCWA?

Do any of the SLO agencies using SWP water have efforts in progress to acquire a larger share of SWP water delivered by SLOCFC& WCD?

Are CCWA and SLOCFC& WCD open to NCSD (1) acquiring unused or excess Table A amounts, (2) purchasing Table A amounts from SWP participants, or (3) directly participating in SWP?

Would the City of Santa Barbara be interested in reactivating its desalination plant and entering into a water exchange agreement?

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# Seawater

Craig Armstrong
Dennis Graue
Kathie Matsuyama

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# Major Considerations

- Nipomo's proximity to seawater and brackish water
- Insolation of south SLO County
- Size of Santa Maria Basin aquifer
- Rainfall volumes in the future
- Price of purchased energy in the future
- Availability of land for processes requiring a lot of it, like solar distillation

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## Seawater - Other Considerations

- Future rainfall volumes influence the availability of water from the aquifer and from the California Water Project
- Operating costs of membrane separation methods and most distillation methods are very sensitive to energy costs
- Amount of crude oil produced nearby as an energy source

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## From Wikipedia
### Water Desalination Methods: DESWARE.net
### Encyclopedia of Desalination and Water Resources

- Distillation
  - Multi-stage flash distillation (MSF)
  - **Multiple-effect distillation** (MED|ME)
  - Vapor-compression (VC)
- Ion exchange
- Membrane processes
  - Electrodialysis reversal (EDR)
  - Reverse osmosis (RO)
  - Nanofiltration (NF)
  - Membrane distillation (MD)
- Freezing desalination
- Geothermal desalination
- Solar desalination
  - Solar humidification-Dehumidification (HDH)
  - Multiple-effect humidification (MEH)
- Methane hydrate crystallization
- High grade water recycling
- Seawater greenhouse

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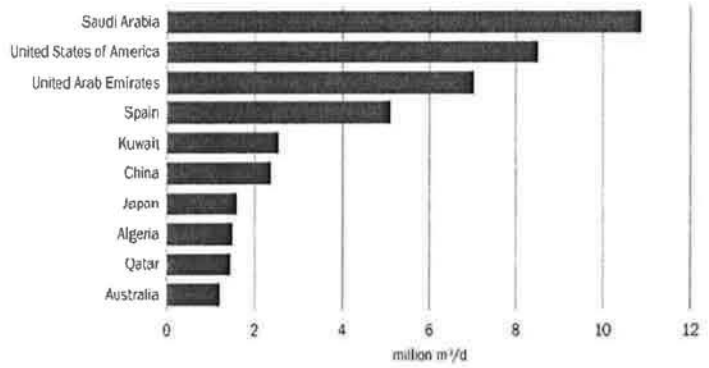
## Top 10 countries by total installed capacity since 1945 - DesalData.com

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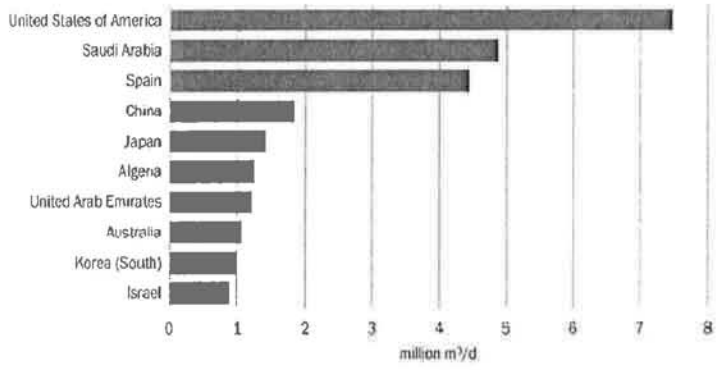
## The US has led the membrane market, while Saudia Arabia and the United Arab Emirates have led the thermal market

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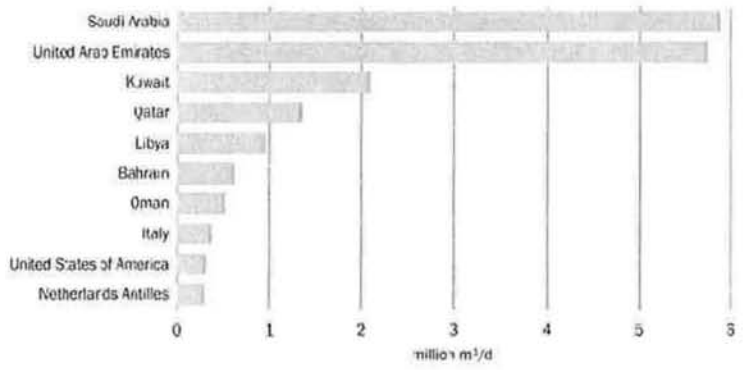
## Top 10 countries by total installed thermal capacity since 1945 - DesalData.com

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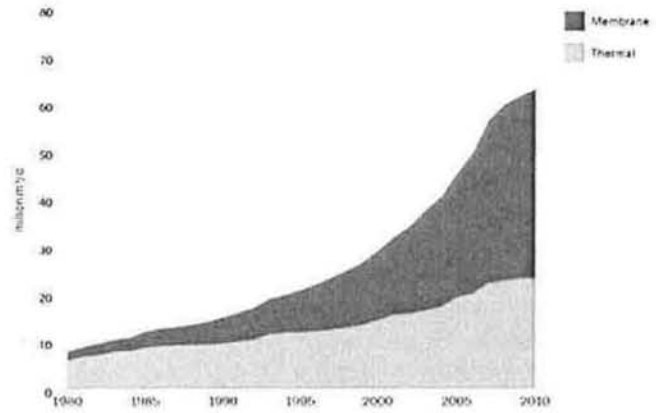
## Installed membrane and thermal capacity, 1980-2010 (cumulative) - DesalData.com

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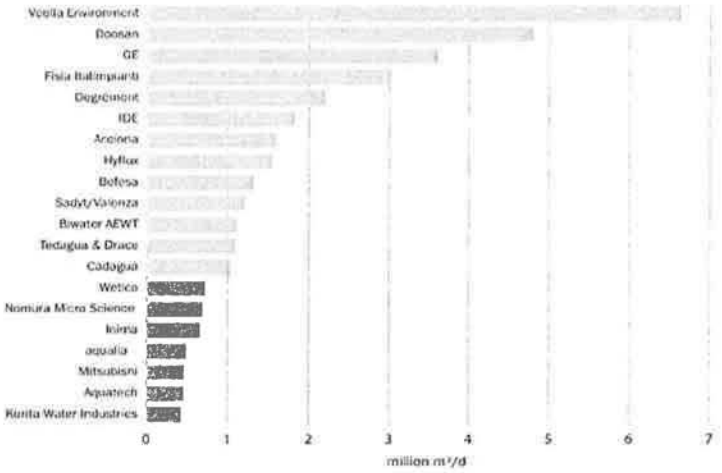
## Desalination plants as created by engineering, procurement and construction (EPC) contractors.

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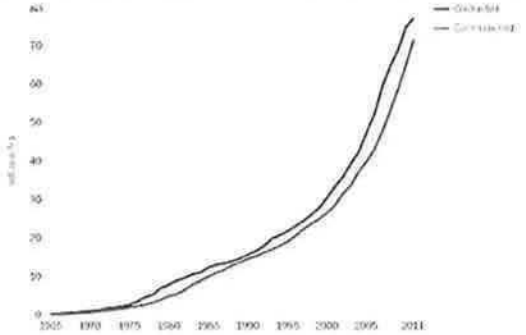
## Background on Reverse Osmosis

- To date over 16,000 reverse osmosis plants have been built in the world, capable of producing more than 17 million AFY of fresh water – DesalData.com



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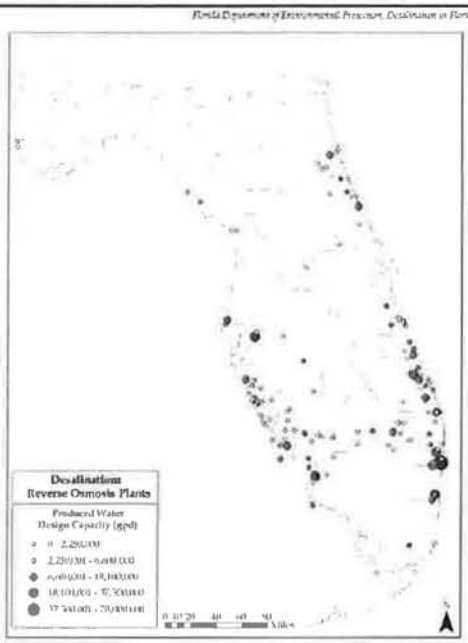


Figure 1-4. Desalination Facilities in Florida (FDEP, 2009)

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## Possible Ways to Implement Desalination in Nipomo

1. Thermal using waste heat from Conoco-Phillips refinery – a possible 900 AFY
2. Other thermal applications using 1- solar distillation or 2- purchased energy (gas) to generate the heat
3. Conventional Reverse Osmosis, like Santa Barbara
4. Enhanced Reverse Osmosis using VSEP technology – a possible 170 AFY from 6 idle units in Orcutt Oil Field

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# Needed for Evaluation

1. Discussion with Conoco-Phillips regarding joint projects using their waste heat
2. Discussion with experts to narrow the evaluation of thermal and membrane methods
3. Discussion with Santa Barbara and Poseidon representatives and with experts to narrow the evaluation of membrane methods, especially RO and Membrane Distillation
4. DJG discussion with a Pacific Coast Energy representative suggests the possibility of purchasing 6 VSEP units for a possible gain of 170 AFY

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# Capital & Operating Costs

| Plant | Year Built | Capacity | Capacity | Cap Cost | Cap Cost/AFY | Op Cost | Op Cost |
|---|---|---|---|---|---|---|---|
| Reverse Osmosis | | AFY | kgpd | $M | $/AFY | $/AF | US$/M3 |
| Carlsbad - Poseidon | 2012 | 56,048 | 50,000 | 900 | 16,058 | 2,290 | 1.86 |
| London - Thames | 2012 | 44,719 | 39,894 | 432 | 9,660 | | |
| Marina - Monterey | | 673 | 600 | 14 | 20,815 | | |
| Israel | | | | | | 654 | 0.53 |
| Singapore | | | | | | 604 | 0.49 |
| San Leandro, CA | | | | | | 567 | 0.46 |
| Perth | | | | | | | |
| Santa Barbara | 1991 | 7,500 | | 34 | 4,533 | 1,918 | 1.55 |
| Sand City, CA | 2010 | 300 | 268 | 12 | 39,667 | | |
| World | 2012 | 17,887,703 | 15,957,447 | | | | |
| PCEC VSEPs | | 168 | 150 | | | | |
| Thermal | | | | | | | |
| Lakshadweep, India | 2012 | 29,818 | 26600 | 1.1986 | 40 | 7,376 | 5.98 |

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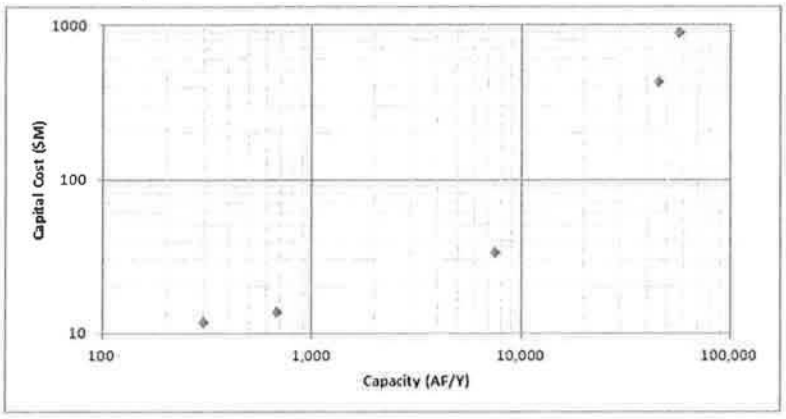
# Capital Costs in US RO Plants




Various sources: So far the data make little sense. We need more information and expert help to sort through it.

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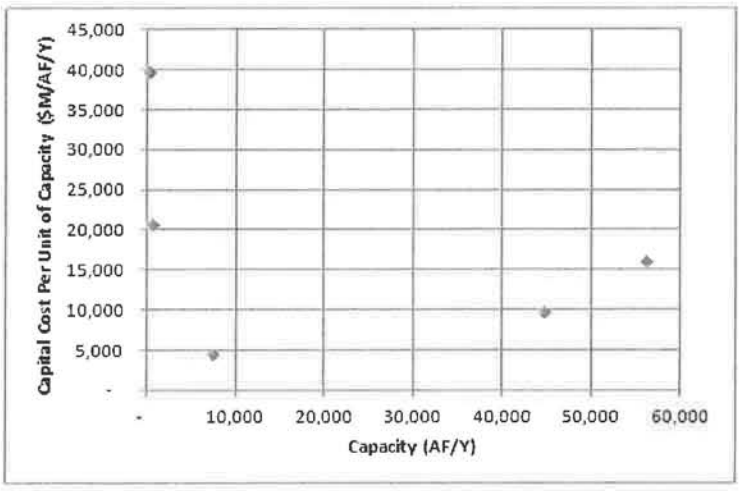
# Economy of Scale?

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## Persons Interviewed

- Mr. Dick Hart, Pacific Coast Energy Company
- Mr. Pete Corboy, New Logic
- Mr. Clay Bradfield, Cannon Engineering
- VSEP RO devices they have as surplus
- Capacity and operating characteristics of VSEPs
- Learned that Cannon has no experience with solar distillation

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## Agricultural and Industrial Reuse

Craig Armstrong

Dennis Graue

Kathie Matsuyama

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# Santa Maria Waterline Intertie Project

Rob Miller

Dave Watson

Dan Woodson

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# Santa Maria Waterline Intertie Project

- Feedback from meeting with the City of Santa Maria, including a discussion of reliability, water quality, constraints associated with direct State Water connections, future State Water purchases, and next steps.
- The City must maintain a blend of at least 50% State Water to meet water quality requirements at their wastewater treatment facility.
  - In order for the City to supply NCSD with 2,500-3,000 AFY, additional State Water Allocation must be acquired. It is estimated that this will take about 18 months for the City to complete.
  - The City can "bank" or carry over in one year up to 8,500 AF of unused water supplies, to improve reliability of City supplies and by extension, the Intertie water deliveries.

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## Surface Water

Rob Miller

Dave Watson

Dan Woodson

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## Recycled Wastewater from Municipal Facilities

Rob Miller

Dave Watson

Dan Woodson

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# Recycled Wastewater from Municipal Facilities - 1

Recycled water from SSLOCSD and/or Pismo Beach:

- Recommend adoption of posted reports as reliable sources of information.

SSLOCSD has the potential for up to 2,250 AFY available

- Water quality is a constraint, due to high chloride and sodium levels, and therefore reverse osmosis treatment is likely.
- The capital cost at the treatment plant, including demineralization, is on the order of $15 to $20M, not including any distribution piping. Costs per ac-ft are in the range of $4,000 to $6,000, depending on the final use. The costs are reported in 2008 dollars.

Pismo has the potential for up to 1,450 AFY available.

- Water quality issues are similar to SSLOCSD.
- Pismo has plans to reuse as much recycled water as possible, with the balance conveyed to the joint outfall with SSLOCSD for discharge to the ocean. Recycled water from Pismo can be made available at Oceano.
- The capital cost at the treatment plant for irrigation-ready applications is on the order of $4M, not including any distribution piping. Costs per ac-ft are in the range of $2,750 plus piping costs. The costs are reported in 2012 dollars.

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# Recycled Wastewater from Municipal Facilities - 2

- Groundwater recharge via percolation may be viable in the area of Mesa and Eucalyptus Roads, but the community opposition to this 24 acre site is expected to be substantial. Groundwater recharge for purposes other than disposal may require advanced treatment including demineralization and advanced oxidation.
- Additional input from the industrial group is needed on the Phillips 66 option, which was estimated to cost $4,000 per acre-ft in 2008.
- Agricultural use is allowable, but based on local experience, may take years to develop willing users.
- Golf course use is viable with demineralization, but the overall demand is limited (three courses)
- Additional applications to parks, landscaping and Caltrans Hwy 1 and 101 parkways is possible.
- Groundwater recharge from Pismo or SSLOCSD along the coast would be beneficial in managing saltwater intrusion impacts.
- Can Nipomo receive credit for groundwater recharge applications of recycled water in the Santa Maria or Northern Cities areas?

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## Conservation/Graywater

Dan Garson
Dennis Graue
Kathie Matsuyama

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## Local Groundwater

Dan Garson
Dennis Graue
Kathie Matsuyama

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# Local Groundwater

1. The term local groundwater may be misleading - per TM1, Local Groundwater includes water that may be available from proposed wells near the Santa Maria river (the Bonita and Hutton wells). We may need to clarify this (discussion)

2. We seem to be focusing on two areas of interest: local shallow ground water aquifer and the Dana wells per Ben-Ing Corp. We are focusing less on the opportunity to drill wells at the Santa Maria river bed as this appears to be water claimed by Santa Maria.

3. We have some concerns that these sources may not be considered legitimate sources although there is clearly water at these locations (legal concerns).

4. We are seeking to determine the quantity and quality of these two sources (quantity and quality issues).

5. Based on the information the Woodlands has received from Cleath on this water source, one would need numerous low volume wells rather than one or two large wells to avoid creating depressions (this may be fine for small producers and a valuable resource, but probably not worthy of NCSD - discussion).

6. We are looking forward to speaking in depth with the District hydrologist.

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# Note

- This topic should allow us to conserve water and lessen tendencies for seawater encroachment, but it does not meet the criterion of adding to water supplies.

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## Subtopic: Local Shallow Aquifer

- Have surveyed the available reports and studies
- Past studies have been piece-meal, although helpful
- The geology is the key to defining "local" and "shallow" – therefore we await the discussion with hydrogeologist Brad Newton
- Answers to the submitted list of questions should give enough information to allow us to proceed to make rankings on this topic

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## Subtopic: Riverside Wells

- Riverside wells have been proposed before, e.g. Boyle TM1, Padre Figure 1
- Need to discuss with lawyer Jim Martin the questions submitted to determine legal restrictions on such well drilling
- That discussion should allow rankings to be made

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## Subtopic: Dana Wells

- Dispersing the withdrawal points in the aquifer is desirable to help avoid severe local drawdowns of the air-water interface, such as that experienced currently near Blacklake Golf Course
- We need data from BenIng Company LLC regarding the physical conditions of the wells, their depths, well logs and productivities to determine whether they could be of use.
- The discussion with the lawyer Jim Martin should reveal the legal restrictions of putting those wells to use.

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## Action Items

- Summarize Committee information requests
- Identify other meetings or areas for assistance by Committee Chairman or District staff

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calcoastnews.com http://calcoastnews.com/2011/05/arroyo-grande-water-recycling-plant-under-construction/

# Arroyo Grande water recycling plant under construction

$65-70M ~ 1MGD (1206 AFY)

## May 25, 2011

By LISA RIZZO

After years seeking approval, construction is now underway on a cutting edge water recycling plant—unique in the world—at the Plains Exploration and Production Company (PXP) oil field in Arroyo Grande which will increase its oil production.

PXP recently broke ground for the Produced Water Reclamation Facility at its oil field off Price Canyon Road in partnership with Veolia Water Solutions & Technologies, which has been contracted to design, build and operate the plant under a 12-year agreement.

Veolia Water says the water treatment facility will be the first of its kind utilizing technology that has never been installed before with the exception of a four-month pilot scale study that was conducted at the site.

PXP was required to obtain more than half a dozen permits to be granted permission to build the water reclamation facility including a discharge permit from the Regional Water Quality Control Board which allows the company to release recycled water back into Pismo Creek.

The facility, in operation and using "a highly technical and sophisticated version of reverse osmosis technology," is expected to produce 45,000 barrels per day of treated water that, according to Veolia Water, meets or exceeds state and federal permit requirements for cleanliness.

The completed plant, anticipated in 2013, will be used to process the water produced from increased oil extraction efforts and will allow PXP to boost daily production of marketable crude oil by thousands of barrels a day.

Over the last five years the field has produced on average about 1,300 barrels of oil equivalent per day.

"Anything that increases hydrocarbon production is helpful to the country, state and overall

economy," said Norm Witt, senior vice president of Cook Hill Properties which manages real estate assets for a number of PXP projects.

Advances in technology have enabled oil companies to produce large quantities of oil from some previously abandoned or under-performing oil fields.

In 2009, to improve oil extraction efforts at its San Luis Obispo County property, PXP spent $4 million on a capital improvement project that included drilling seven oil wells with depths averaging 1,700 feet. Because of the heaviness of the oil, the wells require continuous steam injection to operate.

When the oil is extracted from the ground, so is water which is then re-injected back into the earth. Once the water treatment facility is operational, it will allow PXP to skip the re-injection process and instead treat and discharge the water, speeding the oil recovery process.

Neither the designer nor PXP would divulge or discuss the cost to build and operate the facility, but a source close to the project who asked not to be named, says it is in the range of $65 million to $70 million.

Veolia Water General Manager Kirk Schwab says they are proud of the "societal and environmental benefits" this project will create including the "responsible development of resources."

The technology may have future applications for PXP or the neighboring community. That reclaimed water plant sits next to the Pismo Beach sewage plant

"We are looking for opportunities for beneficial reuse, but we plan to use it on our property in the meantime," Witt said.