Mountainview Generating Station (MVGS)
A Southern California Edison Company (SCE)

2492 West San Bernardino Avenue
Redlands, CA 92374
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Wastewater

- Adjudicated water rights (1969)
  - California Energy Commission permit allows for 7,500 ac-ft/year from mid-aquifer
  - California Energy Commission permit allows for 750 ac-ft/year from deep aquifer
- MVGS uses 50-50 blend of cooling water make-up
  - Tertiary-treated municipal effluent (City of Redlands)
  - Non-potable groundwater
- Near-zero wastewater discharge
  - 85% of wastewater is recovered and reused
  - Brine discharge is sent via the Inland Empire Brine Line
- 2012 Water usage and discharge
  - Reclaimed water = 2,300 AF/Yr
  - Mid-Aquifer = 2,220 AF/Yr
  - Deep Wells = 414 AF/Yr
  - Wastewater = 144,806 MG/Yr
    = 444 AF/Yr
  - Clarifier solid waste = 2,074 tons/Yr

Water Treatment and Recovery

Power plant uses gas turbines and steam turbines for a more efficient plant.
- Turbines generate 1,054 mega watts
- Southern California Edison owns property and operated power generation on the site since 1956
Mountainview Generating Station (MVGS)
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This presentation.....

- Water Supplies
- Water Treatment
- Wastewater Discharge
Mountainview Site

- San Bernardino Substation
- Redlands
- San Bernardino
- Loma Linda
- Mountainview Generating Station
MVGS is a 4 x 2 combined cycle power plant using GE 7FA.03 Gas Turbines and D-11 Steam Turbines.

**Nominal generation:**

<table>
<thead>
<tr>
<th></th>
<th>Gas Turbine A</th>
<th>Gas Turbine B</th>
<th>Steam Turbine</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit 3</td>
<td>165 MW</td>
<td>165 MW</td>
<td>197 MW</td>
<td>527 MW</td>
</tr>
<tr>
<td>Unit 4</td>
<td>165 MW</td>
<td>165 MW</td>
<td>197 MW</td>
<td>527 MW</td>
</tr>
</tbody>
</table>

**Total Plant**

1,054 MW

Commercial Operation December 2005 and January 2006
MVGS Units 3 & 4
MVGS is a Unique Water-Cooled Power Plant

**Adjudicated Water Rights (1969)**
- CEC permit for 7,500 acft/year mid-aquifer
- CEC permit for 750 acft/year deep aquifer

**50-50 Blend of Cooling Water Make-up**
- Tertiary-treated municipal effluent (City of Redlands)
- Non-potable groundwater

**Near-zero Wastewater Discharge**
- 85% of wastewater is recovered and reused
- Brine discharge is sent via the Inland Empire Brine Line (IEBL) to Pacific Ocean.
Water Usage and Discharge
(2012)

Reclaimed = 2,300 AF/Y
Mid-Aquifer = 2,220 AF/Y
Deep Wells = 414 AF/Y

Wastewater = 144,806 Mgal/yr
= 444 AF/Y

Clarifier solid waste = 2,074 TPY

(Plant Capacity Factor = 71%)
Deep Well #1
900 gpm

Mid-Aquifer Well A
2500 gpm

Mid-Aquifer Well B
4000 gpm

Deep Well #2
900 gpm

Water & Wastewater Treatment

Power Block

5MM Gallon
Make-up Water
& Waste Water
Storage Tanks

Cooling Towers

WATER SYSTEMS PLOT PLAN
FOR
MOUNTAINVIEW
GENERATING STATION
SARI Chemistry (MVGS)

TDS Average = 9,785  (Min 6,820; Max 13,410)
pH Average = 9.9     (Min 7.5; Max 10.9)
BOD Average = 4      (Min <0.6; Max 20)
O&G Average = 2.2    (Min <1.4; Max 5)
TSS Average = 26     (Min 4; Max 70)
VSS Average = 7      (Min 2; Max 42)
Water Treatment & Recovery
MVGS Design Basis (Full Load, 82°F DB, 63°F WB)

- Reclaimed Water: 2,297 gpm
- Groundwater: 2,297 gpm
- Total Make-up: 4,594 gpm
- Total Treated for Plant Reuse: 1,625 gpm
- Wastewater to IEBL: 169 gpm (0.432 MGD Max)

Evaporation Loss: 4,416 gpm

112,277 gpm to/from Unit 3 or 4 Condensers

Cooling Tower Blow Down: 1,798 gpm

27 TPD Dewatered Solids to Landfill
The waste water treatment plant at MVGS recovers up to 85% of the water for reuse that would otherwise require disposal.
Water Plant Overview
Infilco-Degremont System

Premix Feed
FeCl₃ @ 30-45 ppm

Premix Tank (left)
Accelator Clarifier/Softener (center)
Thickener (Right)
Clarifier Feeds
Polymer @ 2 ppm
Na₂CO₃ @ 354 ppm (CaCO₃)
NaOH @ 500 ppm (CaCO₃) to pH 11

Clarifier Sludge
1.4 % Solids

Reactor Clarifier (foreground)
Thickener (background)
Reactor Clarifier
Effluent Launder
(Waste Water Day Tank
Upper Right)

Outlet Flow Splitter –
1,380 gpm to Clarified Water Tanks
580 gpm to HERO system

pH Adjusted to 8.5 with H2SO4
Andritz-Netzsch Plate and Frames
20 Cubic Yard Roll-off Bins

Sludge Filter Presses
Thickener Outlet
6% Solids

Filter Press
33% Solids

Solids Trucked
To Double-Lined Landfill

Solids
Calcium Carbonate
70%
Magnesium Hydroxide/Silicates
25%
Multimedia Sand/Gravel/Anthracite
<5 micron, 1 NTU max
NaOCl for bio-growth followed by NaHSO3
Weak Acid Cation Exchangers

Lead-Lag Configuration
Purolite C-104+ resin
<0.5 ppm Total Hardness
Regenerated with 0.8% H2SO4 & 4% NaOH
Self neutralized WAC waste 8-10 pH Range
WAC effluent Adjusted to 4.1-4.5 pH with H2SO4
Aquatech
High Efficiency Reverse Osmosis Unit

Influent pH Adjusted to 10.5 with NaOH
Biocide Addition

Brine discharge to SARI Day Tank
MVGS SARI DISCHARGE

- 30,000 gallon SARI Day Tank
- SARI pH Meter
- MVGS pH Meter
- SARI Sample Point
- SARI Pipeline to IEBL
- Automatic Control and Shutoff
The End

Brine Discharged Here