Water Technology Applications in San Diego

NR&C Committee

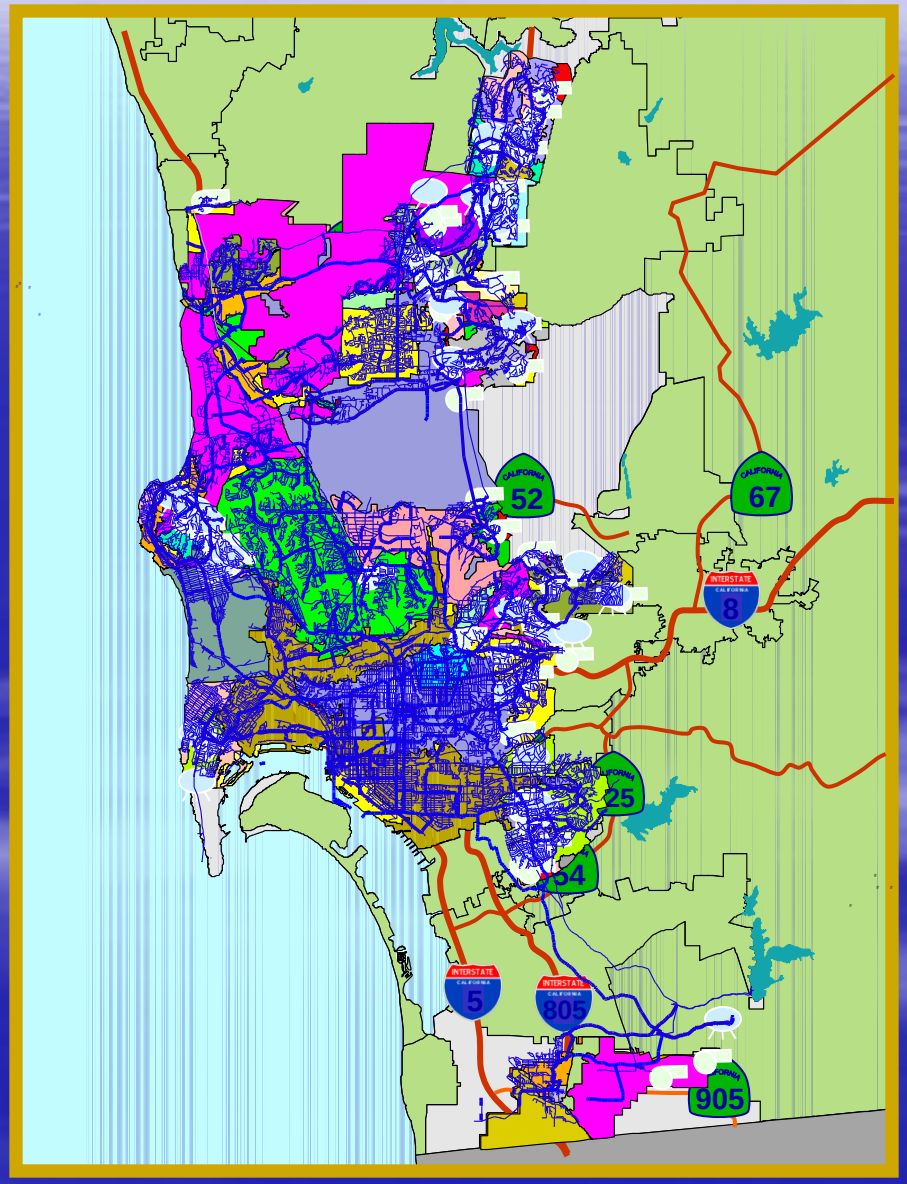
November 9, 2011

Presented by Public Utilities

San Diego's Water Treatment Plants

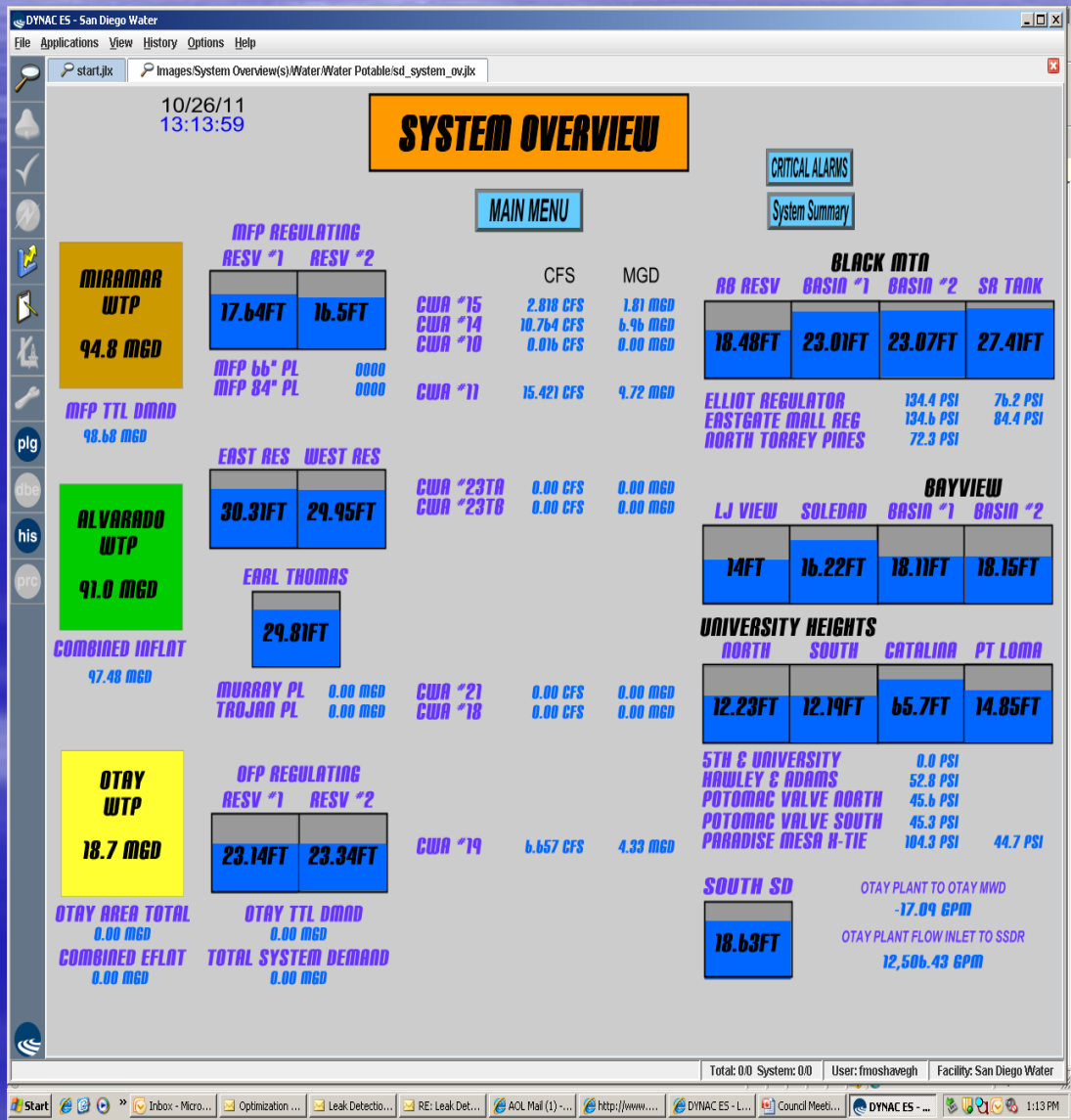
The Water System Includes:

- 9 Surface Water Reservoirs
- 3 Water Treatment Plants
- 129 Pressure Zones
- 48 Potable Water Pump Stations
- 32 Potable Water Reservoirs
- 561 Miles of Transmission Pipelines
- 2,726 Miles of Distribution Pipelines



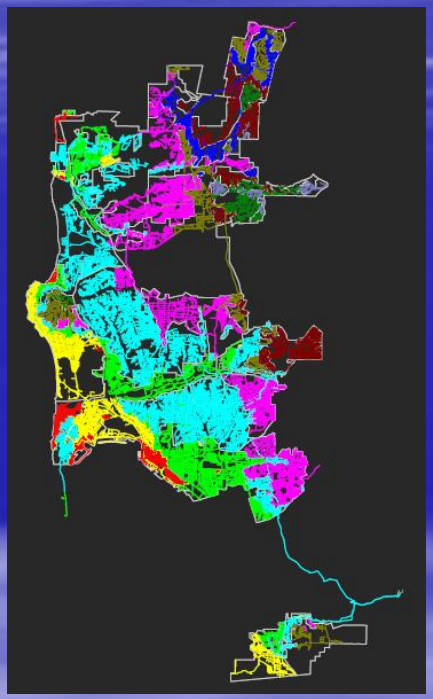
Supervisory Control & Data Acquisition - SCADA

- Total 11,200 points
- 41 alarms
- 74 tank levels
- 429 pressure points
- Operation data is updated every 40 seconds
- Pump and major valve control
- Trend historical data
- Link to hydraulic water model

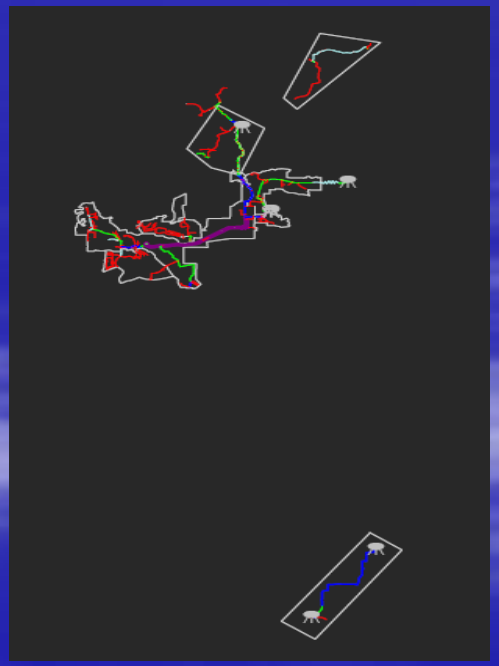


Water Models

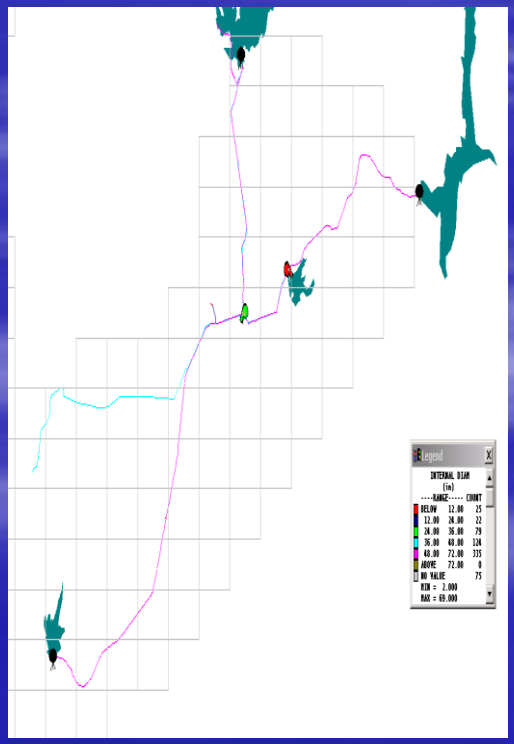
Potable Water



Recycled Water



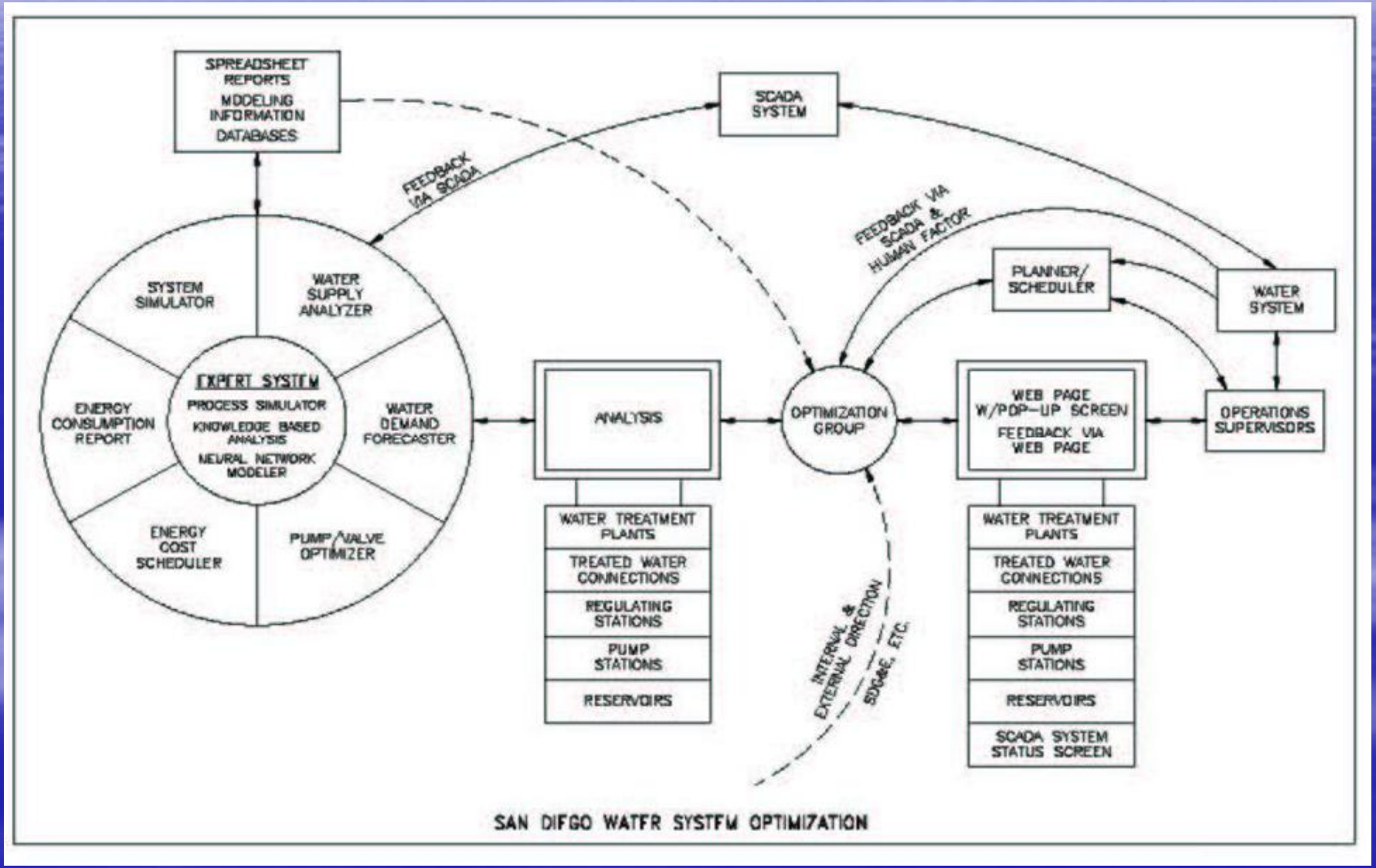
Raw Water



How the models are used?

- New Development
- Master Planning/CIP Support
- Facilities Shutdown Planning
- Operation Support/System Optimization
- Water Purchase Planning
- Quality Control on GIS, CCS and SCADA Data
- Emergency/Security Planning
- Water Quality/Source Tracing

Optimization Flow Chart



Optimization Strategy

- Forecast Water Demand
- Optimize Water Supply
- Develop Water Treatment Plant Production Schedules
- Operate Pumps and Valves to Minimize Energy Consumption
- Coordinate Construction and Maintenance which Affects System Operations
- Develop Optimal System Operating Plan
- Develop Schedules and Accounts for Energy Cost
- Measure System Performance, Respond to Events, and Upgrade the Plan

Partnership For Safe Drinking Water

- City is an active participant for the Water Treatment Plants and Distribution System.
- The goal of the Partnership is to optimize water treatment and water system operations.
- The result is the production and delivery of superior quality water to all users.
- Program participants work with the Partnership collecting, analyzing, evaluating and implementing optimization plans.
- City's Miramar WTP began its participation in the Partnership Program in 2010.
- City's Water Distribution System began its participation in the Program in April 2011.

Reservoir Management Study

- Comprehensive study and investigation of the City's water storage and delivery system, and of the system's current and future needs
- Modeling and study results were used to optimize water supply operations
  - improve reservoir storage efficiencies by optimizing storage allocations between reservoirs
  - Reducing losses, such as to evaporation and spill
- Results also provided a guide to prioritize water supply capital projects for further optimization and efficiency improvements

Regional Surface Reservoir Optimization

- Current initiative with the San Diego County Water Authority (SDCWA) and other Local Agencies
- Purpose is to evaluate local surface storage opportunities for the region to improve water supply reliability and local storage efficiencies
- City has actively participated in similar previous efforts (since 1990's) which have resulted in cost savings (typically $2M-$3M per year when available) and improved local water supply reliability

Leak Detection Experience

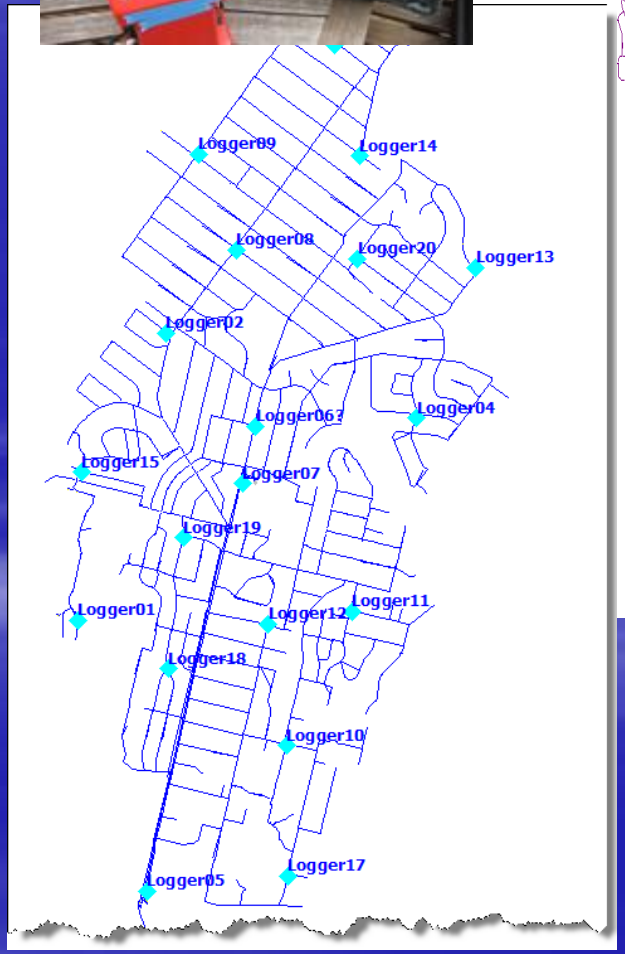
- Permalog leak noise loggers

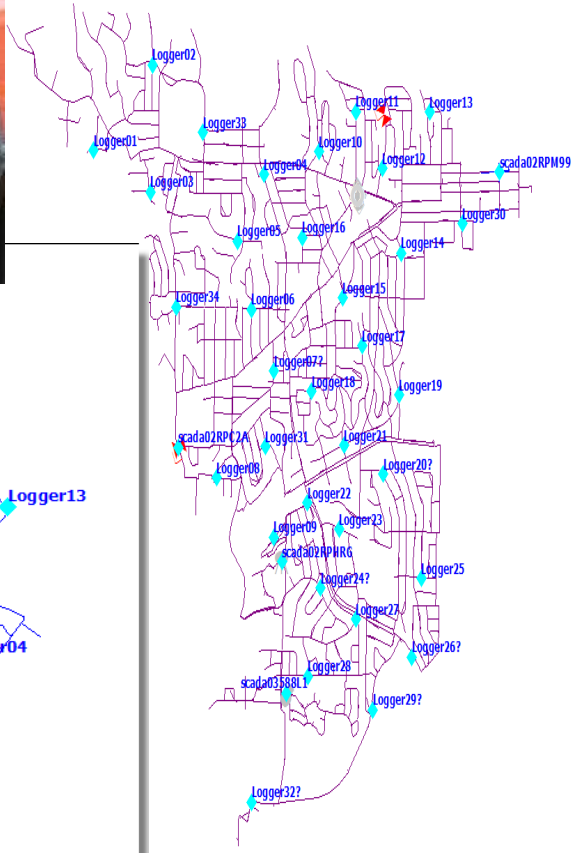
- Sahara

- Echologics

2009 Burstfinder Pilot Project

- Genetic algorithm
- Identifies “hot spots”
- Provides better focus for water loss investigation
- Data Requirements
  - Hydraulic model of the area
  - Pressure logger
  - In/out flow to the area
- Findings/outcome were non conclusive and were not able to identify “hot spots”





Next Steps

- Pilot Study by BRADY/IBM – the Proof of Concept
- Paradise Mesa 610 zone (2200 homes)
- Otay 2nd and 3rd Pipelines (optional)
- Approximate 6 month effort
  - 3 months continuous data evaluation
- Cooperative effort by City/BRADY/IBM
- No cost to the City ($75,000)

Questions?