QuEST

QUANTUM ENERGY SERVICES & TECHNOLOGIES, INC.

California Wastewater Process Optimization Program

Program Introduction

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QuEST

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Program Overview: What is CalPOP?

- CalPOP – California Wastewater Process Optimization Program
- QuEST – Quantum Energy Services & Technologies, Inc.
  a 3rd Party Implementer to PG&E (under a 'performance' contract)
- QUEST is currently managing CalPOP & other programs that are publicly-funded program through the CPUC to deliver energy savings in California wastewater facilities.
- Program funds cover all admin and engineering costs along with providing significant incentives for installed energy saving measures.

CalPOP History

- First program iteration in 2000 in Response to California energy crisis – WWTF's are major energy consumers
- Initial focus on surface aeration optimization -- delivered DO sensors, controls, and training.
- Broadened program focus to include all treatment types and equipment optimization/retrofit. Total savings to date:
  - 50+ Installations
  - Annual savings – 40+ GWh.

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Who, What and When?

- Who can participate ? – Municipal or private wastewater facilities in PG&E service territory (excluding ag & food processing pre-treatment).
- What kind of projects ? – Any process measure that leads to electric or natural gas savings (excludes HVAC & Lighting)
- When can participation start ?
  - The CalPOP program has begun a new three-year Program Cycle in 2010. Recruitment of customers is underway.
  - Timeline – Projects participating in current program cycle must be complete by end of 3-Year program cycle (Dec. 2012)
- What are participation costs ?
  - No-cost audit and recommendation reports
  - Incentives provide up to 50% of project costs based on actual savings.

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Program Steps:

- Marketing Meeting with Customer
- Site Access Agreement – signed by Customer
- Conduct Customer Facility Audit
- Facility Audit Report Package - delivered and approved
- Program Participation Agreement (incentive application) – signed by Customer
- Project Implementation
- Inspection and Savings Verification Measurement
- Rebate Incentive - Approval & Payment

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Example Installations & $avings

- Cameron Park (2005) – Optimize Blower DO Control
  - Annual Savings = $90,000 Cost to Facility = $0 (pre-2010)
- Discovery Bay (2006) – Solar Mixers and Other Measures
  - Annual Savings = $80,600, Payback = 7 Months (pre-2010)
- Los Banos (2008)
  - Solar-driven mixers eliminate need for a major facility expansion
  - Incentive Payment: $105,548
- Lemoore (2008) – Solar Mixers replace Surface Aeration
  - Annual Savings = $90,600, Payback = 8.4 Months
- Livermore (2008) - High Efficiency Replacement Blower with VFD
  - Annual Savings = $73,000 Incentive: $80,105

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Example Installations & $avings (cont'd)

- San Jose (2008) – multiple process optimization measures
  - Annual Energy Cost Savings > $2.0 Million,
  - Project Cost = $279,700 Cost to Facility = $0 (pre-2010)
- Lamont (2009) – Solar-Powered Mixers
  - Annual Savings = $183,153 Incentive: $159,000 Payback : 0.5 yrs.
- SKF (2010) – High Efficiency Turbo Blowers
  - Annual Savings: $499,882 Incentive : $460,902
- Santa Rosa (2010) – Irrigation Pump Optimization
  - Annual Savings = $107,300, Incentive: $97,200

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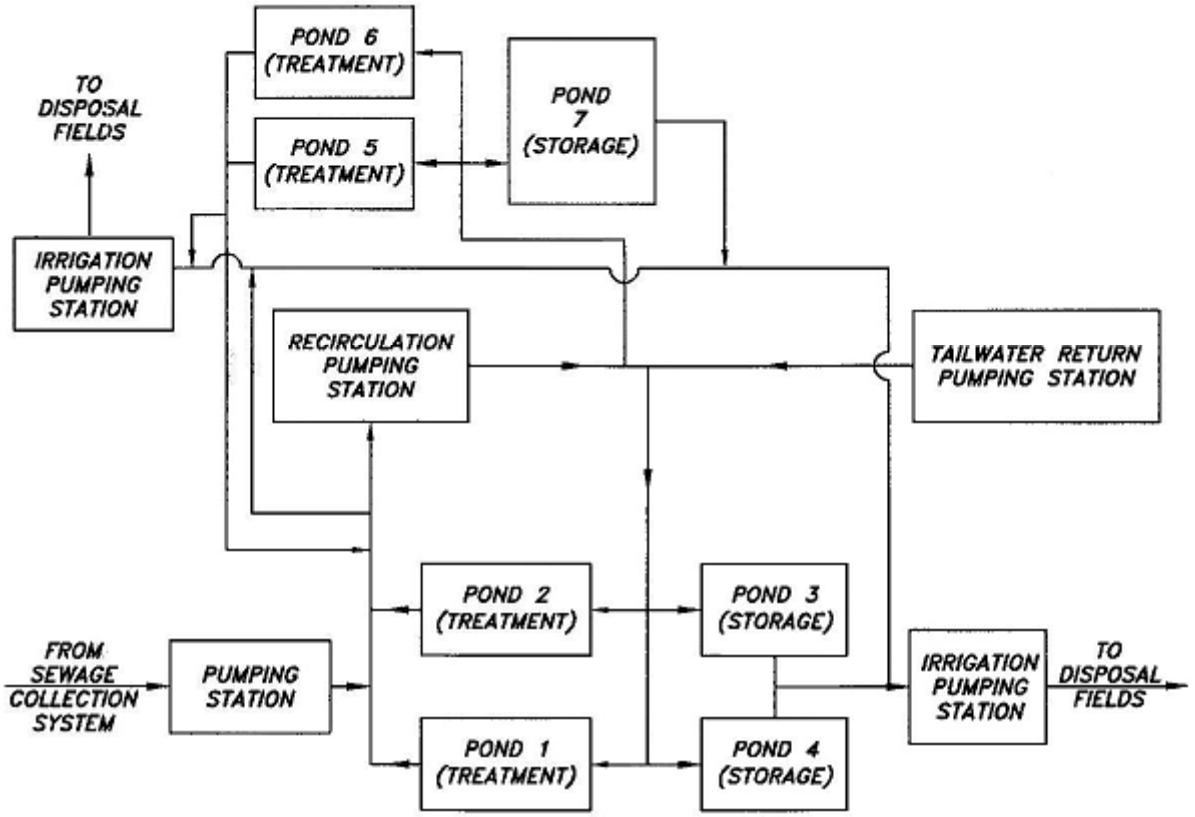
Common Measures Incentivized by CalPOP

- High Efficiency Turbo Blowers / Integrated VFD's
  - Replace multi-stage centrifugal or turblex with high-efficiency turbo blowers
  - Variation: retrofit VFD's on existing blowers
- DO Control
  - "Dialing it down" through refined DO sensing & appropriate control systems
- Solar-Powered Mixers in Treatment Lagoons
  - Either replacing surface aeration, or introduced to facultative lagoons
- Pump Controls & Reconfiguration of Pump Systems
  - Introduce VFDs / sequencing controls / systems isolation / adjust pressures
  - In-Plant systems / Irrigation & effluent systems / Collection systems
- UV System Optimization or Replacement
- Fine Bubble Diffusers
- Process Optimization – Anaerobic Digesters / Methane Recovery / Cogen

Los Banos


POND 6 (TREATMENT)
POND 5 (TREATMENT)
POND 7 (STORAGE)
TO DISPOSAL FIELDS
IRRIGATION PUMPING STATION
RECIRCULATION PUMPING STATION
TAILWATER RETURN PUMPING STATION
POND 2 (TREATMENT)
POND 3 (STORAGE)
FROM SEWAGE COLLECTION SYSTEM
PUMPING STATION
IRRIGATION PUMPING STATION
TO DISPOSAL FIELDS
POND 1 (TREATMENT)
POND 4 (STORAGE)

Los Banos – Solar-powered Mixers

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Lemoore - Solar-powered Mixers (Replace Aerators)

Livermore - High Efficiency Replacement Blower with VFD

San Jose - Pulsed Aeration in Secondary Tanks

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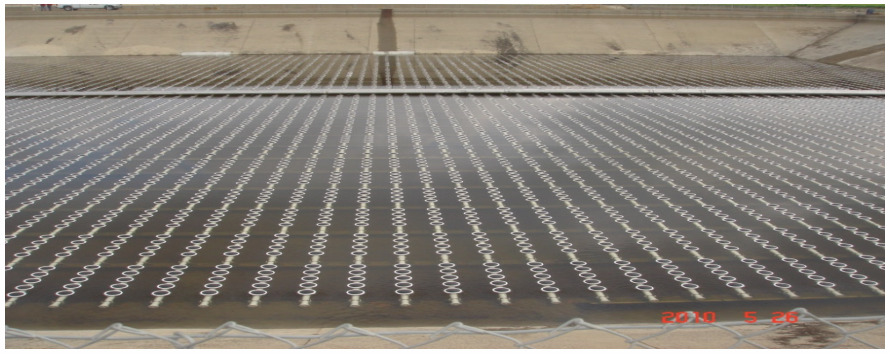
SKF- High-Efficiency Turbo Blowers & FBDs



Barriers and Solutions

- Project potential is enormous with good payback, but barriers still exist:
  - Budgetary issues
  - Available personnel and technical resources
  - Time constraints – long project cycles
- QuEST understands what needs to be done to move projects forward
  - Customer technical support
  - Municipal approval process
  - Implementation project management
- Program Incentive funding reduces strain on budget; additional project financing options identified and pursued.
- QuEST can fill gaps in engineering and project management resources and help to “push” projects along, especially in the post-audit phase
- Facilities are helped by incorporating EE measures into other required upgrade or problem-solving projects.

Wrap Up

- QuEST has the track record to bring energy efficiency to wastewater treatment facilities in California
  - 50+ completed installs
  - 40+ GWh annual savings installed
- We understand what needs to be done to move projects forward
  - Customer technical support
  - Municipal approval process
  - Implementation project management
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