



City of Napa Water Division

Available water supply:

- Local storage:
 - Lake Hennessey: 31,000 Acre-Ft
 - Milliken Reservoir: 1,400 Acre-Ft
- State Water Project entitlements: 18,800 Acre-Ft/year

Existing treatment facilities:

- Hennessey Treatment Plant: 18 MGD
- Milliken Treatment Plant: 3 MGD (summer only)
- Jamieson Canyon Water Treatment Plant: 12 MGD

Treated water demand:

- Peak Summer: 22 MGD
- Off-season: 8-15 MGD



Project scheduled for completion in 2010

Improving water quality for the residents of Napa Valley

The City of Napa Water Division can treat water from three possible supplies at three different water treatment facilities. The highest source water quality is available from Milliken Reservoir. The State Water Project increases the reliability of the City of Napa's water supply.

The City of Napa Water Division's contracted State Water Project entitlements are scheduled to increase to 21,600 Acre-Ft by the year 2020. In order to take beneficial use of existing and scheduled State Water Project entitlements, the City chose to optimize its overall water system by operating a single treatment facility, the Jamieson Canyon Water Treatment Plant (JCWTP), to meet most water demands year round. This allows the City to save water supplies in local reservoirs for use during dry years.

Upgrading a 40-year-old facility

The JCWTP is over 40 years old and treats challenging surface water from the State Water Project through the North Bay Aqueduct. While the City has maintained the JCWTP well over the years, improvements are required to meet more stringent water quality requirements, update the Operations and Maintenance (O&M) Building, and increase the capacity of the WTP to take full beneficial use of the City's contract water entitlements.

Project components include:

- New inlet meter and pre-ozone contactor
- New pretreatment basins with rapid mix, flocculation, and sedimentation with tube settlers

- Two new filters to supplement the existing four filters
- New chemical storage and washwater recovery facilities
- Retrofit of the existing pretreatment basin into a new Ozone Generation and Sludge Dewatering Facility
- Extensive remodeling and expansion of the existing O&M Building
- New site utilities, roadways, electrical systems, and instrumentation and controls
- Two new raw water storage tanks (by California Department of Water Resources)
- Provisions for future intermediate ozonation, ultraviolet disinfection, and mechanical sludge dewatering facilities.

JCWTP improvements project will help the City of Napa increase system efficiency and permit full beneficial use of their contract water entitlements.

Acknowledgements

City of Napa
Owner

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Kennedy/Jenks Consultants
Design Engineer

- Doug Henderson, Deb Hart

C. Overaa & Co.
Construction Contractor

- Jeff Naff, Wayne Ricci, Mark Hunter

Jamieson Canyon Water Treatment Plant Details

General

Capacity:

- Current: 12 MGD
- New: 20 MGD
- Ultimate: 24 MGD

Improvements Project Bid Price: \$35 M

Ozonation

Equipment:

- Ozone generator capacity (each of 2): 425 lb/day @ 12wt-%
- LOX storage capacity: 6,000 gallons

Pre-ozone Oxidation:

- Dose: 1.5/3.0 mg/l (avg/max)
- Detention Time: 5 minutes (at 24 MGD)
- System Goal: TOC conditioning for removal
- Potential Additional Benefits: DBP control, T&O improvement

Intermediate Ozone:

Provisions for future use include a 72-inch settled water pipeline that can double as a contactor

Pre-treatment

Chemical Coagulation:

- Alum Dose: 40/75/140 mg/L (min/avg/max)
- Ferric Chloride Dose (Alternative): 15/25/34 mg/L (min/avg/max)
- Coagulant Aid (cationic) Polymer Dose: 0.5/1.5/2.5 mg/L (min/avg/max)

Rapid mix:

- High-rate chemical induction mixer
- Detention time: 33 seconds (at 24 MGD)
- Mixing intensity: 800 – 1,000 sec⁻¹

Flocculation:

- Three-stage tapered process
- Total detention time: 28 minutes (at 24 MGD)
- Mixing intensity per stage: 80, 40, 20 sec⁻¹

Sedimentation:

- PVC tube settlers
- Detention time: 1.4 hours (at 24 MGD)
- Tube settler loading rate: 2.6 gpm/sf

Filtration

Basins: 4 existing, 2 new

Media design:

- 10 inches of silica sand
- 30 inches of anthracite (new filters)
- 20 inches of anthracite (existing filters)

Filtration rate: 3.3 gpm/sf (all filters in service)

Maximum backwash rate: 22 gpm/sf

Chlorine (Sodium Hypochlorite) Disinfection

Dose to filter inlet: 0.4/0.7/1.5 mg/L (min/avg/max)

Dose to filtered water: 1.2/2.0/4.0 mg/L (min/avg/max)

Pathogen inactivation goal:

1-log *Giardia*, 2-log virus

Target residual for CT compliance: 1.5 mg/L

Free chlorine CT required for 1-log *Giardia* inactivation: 57 mg/L-min

Contact time (T10) required for 1-log *Giardia* inactivation: 38 min

Contact time (T10) available (at 20 MGD):

- Filtered water pipeline: 2 min
- Treated water reservoir: 36 min

Washwater Recovery

Process units:

- 2 circular tanks
- Sludge loading rate: 18,200 lb/day (at 24 MGD)
- Active clarification volume per unit: 475,000 gallons
- Sludge thickening/storage volume per unit: 150,000 gallons

Supernatant pumps (to equalization basin):

- Units: 2
- Maximum capacity (each): 1,000 gpm

Equalization basin: 320,000 gallons

Washwater return pumps (to pre-ozonation):

- Units: 2
- Capacity range (each): 275 - 1,000 gpm

