

EMERGENCY POWER AND FUEL OIL STORAGE PROJECTS

As a part of ERA's regular consulting activities, the firm has taken on numerous assignments relating to emergency power systems and fuel oil storage. In some cases, the emergency power and fuel oil storage aspects were part of a larger assignment. A sampling of these assignments includes:

- **Santa Cruz County - Replace Generators at Three Facilities.** The County was faced with inadequate emergency power in a number of facilities, including the Emeline Complex, the Sheriff's Rehabilitation Facility and the Medical Clinic in Watsonville.

The first of these projects, at the Emeline Complex, was to upgrade the WW-II-Era General Motors Liberty Ship generator. The design solution was to move the existing generator from the Sheriff's Rehab Facility to this location and equip it with an outdoor-style, sound-attenuating enclosure, and provide a fenced and curbed pad, new vaulted above-ground storage tank, fuel oil piping, and electrical modifications including repairs and modification to existing automatic transfer switches.

The second of the project was to replace the two under-powered generators at the Sheriff's Rehab Facility. This included a load survey, generator selection, installation of the new generator in an essentially-undersized existing room (which required modification to the generator's radiator discharge and replacement of the room exhaust fan). The project also required the installation of a new vaulted, above-ground fuel oil storage tank, double-wall underground piping and modification to an existing automatic transfer switch and installation of new automatic transfer switches.

The final project, at the Watsonville Clinic, included creating a new fenced and curbed and fuel tanker-accessible generator site, including a new 200 kW generator and a vaulted, above-ground fuel oil storage tank. In addition, the existing power distribution at the building had to be modified and a new emergency power distribution panel and automatic transfer switch installed.

- **Santa Cruz County - Install New Emergency Generator at the Blaine Street Women's Minimum Security Facility.** The County was faced with the need for emergency power in this facility, yet had inadequate emergency power to tap the generator in the adjacent Men's Detention facility.

The design solution was to install a stand-alone emergency generator at the facility, including a curbed concrete pad, self-contained generator unit, fencing and landscaping, and power distribution modifications and a new automatic transfer switch.

- **Santa Cruz County - Install New Emergency Generator at Juvenile Hall.** With both a Juvenile Court and a detention facility combined, emergency power became a serious need for the County at this facility.

ERA designed a new emergency generator installation, including a new outdoor generator unit, curbed concrete pad, vaulted fuel oil storage tank, double-wall containment piping, fencing, and power distribution modifications and a new automatic transfer switch.

- **JFK Memorial Hospital - Central Utility Plant Expansion and Modernization.** JFK Memorial Hospital is a 130,000 square foot, community, acute-care hospital. The Hospital was built in three main projects over the last 25+ years, and has an unique blend of utility systems and equipment as a result.

With two new expansions planned (a two-story ICU and a one-story LDRP) which would add another 30,000+ square feet, the central utility plant required concurrent upgrade to support these expansions and provide for efficient plant operations in the future. In a one-day, priority effort in January 1999 to scope the needed plant work, ERA's project team surveyed the facility, developed expansion/upgrade scopes and budgets, and presented the results in a written report to the management team the same day.

Shortly thereafter, ERA was engaged to prepare the construction documents for this work in two packages, for budgeting purposes.

Phase One included:

- one new 500 ton chiller and associated piping, power, auxiliaries and cooling tower
- conversion of the chilled water system to variable flow (and reducing the number of pumps in the plant from 11 to 8)
- addition of air conditioning to the central plant itself (a necessity in the desert)
- structural work to expand the cooling tower yard to accommodate the new cooling tower
- digital controls and automation of the HVAC systems throughout the site
- new electric service to the entire site and an entire new main switchboard
- planning for the new emergency generators (part of Phase Two)
- coordination of consulting teams working on the expansion projects so as to provide for a utility system interface adjacent to the expanded plant (done in a mechanical vault in the cooling tower yard and in traffic boxes in the roadway adjacent to the new Phase-Two generator site)

Phase Two included:

- a second new cooling tower to serve the two remaining existing chillers -- and to serve the new emergency generators (in lieu of radiators)
- two new 750 kW emergency generators (one for the additions, one for the new chiller/tower) in a new air conditioned structure
- transfer switchgear and related electrical work
- upgrading of the space heating distribution system
- upgrading of the medical air and vacuum systems in the plant

Playing a large role during construction, ERA hand selected prospective contractors, coordinated the bidding and award of the work and placed purchase orders for the major equipment including the emergency generators (nearly \$1,000,000 in value) to expedite the construction process (and maintain greater control over equipment selection). The project completed construction in mid-2002.

- **Santa Clara University Facility Condition Assessment.** Similar to Foothill - De Anza, the University was planning to engage a performance contractor, and needed to identify the total HVAC infrastructure renewal needs as well as begin the process of consolidating HVAC and electrical prime-mover (chillers, boilers and emergency generators) in lieu of stand-alone individual building systems which were exceeding the University's ability to keep up with their maintenance and repair. For these purposes, ERA was hired to prepare a Facility Condition Assessment, which included inventorying the HVAC systems and equipment, visually inspecting same, and identifying system restoration needs. This data was assembled into a comprehensive Microsoft ACCESS database (FCAD). In addition, ERA prepared a conceptual design for the first mini-utility plant. ERA ultimately identified a total budget need in excess of \$18,000,000, and managed the University's engagement of a performance contractor to implement a major portion of the needed work.
- **Northern California Presbyterian Homes - Mechanical, Electrical and Plumbing System Assessments.** Among their total inventory of facilities, NCPH owns three large retirement/nursing homes in the San Francisco Bay area. These facilities are all about 30 years old and have each begun to show serious deterioration of their HVAC, power distribution and plumbing systems. While each facility has a director of maintenance, it became apparent to corporate management that long term planning for the renewal of these infrastructure systems was beyond the capacity and mandate of the local maintenance staff. As a result, ERA was engaged to perform an assessment of these systems, including documenting the existing conditions (building plans, equipment inventories, photos, infrared testing, etc.), identification of system deficiencies, development of restoration plans, and programming the needed work over the ensuing decade. The results of this effort were assembled into neatly-crafted 3-ring binders for each facility, which will serve as a long term reference document for local and corporate staff for years to come - as well as provide documentary evidence to upper management of the facility restoration needs.

The need for an emergency generator at the Sequoias Portola Valley site became apparent during the study. In particular, the skilled nursing facility (SNF) needed to be upgraded to OSHPD requirements. While the power distribution system in the facility would have made it very difficult and costly to provide the current-code-required circuit segregation required by OSHPD, ERA met with OSHPD and presented and won approval for a design which did not necessitate the costly circuit segregation modifications desired by OSHPD. This installation included creating a remote generator site including a vaulted above-ground storage tank, double wall containment fuel oil piping and power distribution modifications and automatic transfer switch installation. .

- **John Muir Medical Center - Emergency Power Master Plan.** Having been built in three major phases over a 35 year period, John Muir Medical Center has found itself with aging and un-integrated utility systems in their 400,000 square foot main hospital building. While ERA had already implemented upgrades and integration of the cooling and building automation systems, the Director of Plant Services was still concerned about the overall reliability and longevity of the hospital's emergency power systems. Accordingly ERA was asked to prepare a master plan for the long term management of these systems. This task included documenting the existing

conditions (including a hospital-wide department survey and preparation of CADD single-line power distribution diagrams), identification of system deficiencies and development and budgeting of three alternative plans for system restoration and modernization.

- **John Muir Medical Center - Fuel Oil Storage Tank Abatement.** As part of the ongoing improvements and resoration of infrastructure systems at John Muir (ERA has planned and designed over 30 projects at this facility over a 15 year period), ERA was engaged to plan and manage the demolition and disposal of an existing, aged underground storage tank. This project included testing and disposal of contaminated soil, and extenstion of the fuel oil piping in the newest wing to the existing wing, and modification to the fuel oil puping and control system, so that all generators on the site could be served from the newest tank on the site.
- **Sierra Nevada Memorial Hospital - Utility Infrastructure Master Plan.** Having already implemented numerous infrastructure system projects at this facility, ERA was engaged to perform a master planning effort for the expansion and modernization of the building's utility infrastructure systems. Besides thermal energy distribution (chilled water, heating hot water and steam), the plan includes considerations for a prime power system (1 megawatt gas turbine generator set) as well as alternative consideration of small cogeneration units.