

FACILITY ASSESSMENT for THE EAU CLAIRE COUNTY GOVERNMENT COMPLEX

REVIEW OF ELECTRICAL SYSTEMS

PURPOSE

Arnold & O'Sheridan, Inc. visited the facility on August 21, 2006 to evaluate the existing Electrical systems for the government complex consisting of the following buildings:

- 1953 (Annex)
- 1973 (Courts)
- 1977/88 (Sheriff's Dept. and Jail)
- 1995/1998 (HSS and Huber)

The purpose was to determine the condition of existing equipment and systems as it relates to potential renovation and/or expansion. Included in this report are recommendations on the replacement and/or renovation of equipment and systems based upon our observations of the building, past project drawings, available statistical data and using sound engineering judgment based upon our experiences of similar projects.

The information contained in this report is the result of the field review and interviewing of Eau Claire County maintenance staff and Sheriff's Department staff. All data has not been field verified for underground utility locations.

ELECTRICAL SERVICE

The electrical service is 2,000 ampere, 480Y/277 volt, 3 phase, 4 wire. The service is fed underground from a utility pad mount transformer located on the west side of the building. The utility is Excel Energy Corp.

Information provided by Excel Energy indicates that the highest demand recorded occurred on May 24, 2006. The demand was 1,105kW which translates to 1,330 amperes on the 2,000 ampere service, 66% of total available capacity. Sound engineering judgment recommends not loading electrical services to more than 80% of their capacity which would be 1,600 amperes. Based upon this recommendation, the service is 83% of recommended capacity.

Recommendations:

A new larger service may be required based upon the new mechanical system loads of future remodeling for the building. The indoor air quality requirements will add additional load to the mechanical system. There will be some efficiency realized due to lighting systems as a result of remodeling but it is not anticipated that it will relieve enough capacity to feed the entire building.

ELECTRICAL DISTRIBUTION

The electrical service terminates on a main circuit breaker switchboard on the ground level of the 1953 building. The main switch board is Square D Power style and has only two 200 ampere circuit breaker spaces available. Several circuit breakers and disconnects have been

tapped off the switchboard to serve other building additions. A 500 ampere, 100 ampere and a 225 ampere have been added for this purpose. It was not identified what these devices are feeding.

There is a 225kVA transformer installed in the service room to feed 120/208 volt loads. The secondary side feeds a Square D I-line panel and includes circuit breakers to feed panels located throughout the building.

There is no transient voltage surge suppression device on the main switchboard.

Major feeders from the main service are extended to the 1995/98 addition (600 ampere) and the 1988 (jail) addition (400 ampere).

There are motor control centers in all the major mechanical rooms to feed those loads.

Distribution panels are typically Square D, Cutler-Hammer or Siemens.

Recommendation:

An in-depth review of the entire electrical power distribution should be performed for any National Electrical Code violations as a result of code revisions since the installation of this equipment. There were numerous load taps off of switchboards, transformers and panels that could not be reviewed in detail without all the electrical building plans available.

Transient voltage surge protection should be provided to protect the main electric equipment from lightning or utility power surges.

EMERGENCY DISTRIBUTION

Emergency power is derived from two generators as follows:

A 150kW diesel generator in the 1953 building located on the ground level in the same room as the mechanical HVAC equipment. This is a Kurz and Root generator with 975 running hours, 10-gal day tank and unit mounted radiator. The exhaust piping is uninsulated and extends to the boiler stack. This generator feeds the majority of the complex except for the jail addition.

Distribution from this generator is to a single 400 ampere, 3 pole automatic transfer switch and main distribution panel for feeds to panels and transformers for 120/208 volt loads.

A 100kW natural gas generator in the 1988 building is located on the penthouse level in a dedicated room. This is a Kohler generator with 720 running hours and a unit mounted radiator. The exhaust piping extends to the building roof. This generator feeds the jail addition.

Distribution from this generator is to a single 150 ampere, 3 pole automatic transfer switch and main distribution panel for feeds to panels and transformers for 120/208 volt loads.

There is also a 200 ampere and a 100 ampere manual transfer switches feed for this generator for mechanical motor control centers in the jail.

Recommendations:

Maintenance staff were requested to measure the load of these generators at their next generator load test. It could not be determined what the available spare capacity of these generators is. The generators should be tested under actual load and record the amperes for future reference. The diesel generator will be required to be enclosed to be in its own 2-hour rated room under current code.

Any major remodeling will require the emergency distribution system to be segregated between life safety loads (emergency egress and exit lighting) from other loads. An additional transfer switch will be required and all non-life safety loads refeed from these transfer switches including conduit and wiring.

It is difficult to determine whether these generators would support a major remodeling project. If the generators were reused strictly for code required emergency loads they may be adequate. It is the experience of this engineer however, that a major renovation of this complex will add considerable load as the demand to maintain normal government operations while under a power outage becomes a greater concern.

LIGHT FIXTURES

The existing fluorescent light fixtures were installed as part of the 1995 renovation and addition. The fixtures are primarily 2' X 2' or 2' X 4' recessed acrylic lensed fixtures and some parabolic louvered fixtures in the 95/98 addition and some spot remodeled areas throughout the complex.

The exit lights are fluorescent PL type in the 95/98 addition. Most of the other areas of the complex were replaced with LED type exit lights.

There are mostly T8 energy-efficient lamps and some T12 rapid start and "U," lamps existing.

Maintenance staff indicated that lamps and ballasts were replaced in the 90's when utilities were offering rebates.

Recommendations:

Remodeling of spaces should consider the replacement of light fixtures using the latest energy-efficient lamps and ballasts. Most of the light fixtures are near end of life (20-years +) and it is less expensive to replace fixtures than to upgrade.

LIGHTING CONTROLS

There are no energy-saving lighting controls.

Recommendation:

Any new building or renovation will be required to have energy-saving automatic controls installed to meet the State of Wisconsin Chapter 63 – Energy Code. Devices such as

occupancy sensors, dual level switching, added switches at exterior windows and automatic off controls will be required. Occupancy sensors should be considered for private offices, conference rooms and small storage rooms to meet the automatic shut off code requirement. A low voltage relay lighting control system will have to be installed for larger areas.

FIRE ALARM

The building is only partially sprinklered. The fire alarm system consists of a Simplex 4020 system installed in the 95/98 building and a 4100U installed in the 53 building in the early 90's to replace the previous system in the remainder of the building except the jail. The 4100U was installed with fire-rated cable above accessible ceilings. The jail has a Pyrotronics System 3 fire alarm system.

Smoke detection exists but only sporadically. ADA strobes have been added.

Recommendations:

Any major renovation should consider a smoke detection system for the protection of personnel and an early warning for the protection of assets. Dead storage spaces and equipment rooms should include smoke and/or heat (rate of rise) detectors. The Pyrotronics system should be replaced with a Simplex system and combined into a single system. All remodeled areas require review for the latest ADA requirements which have become much more restrictive since the install of the replacement fire alarm system.

CLOCK SYSTEM

The complex includes a clock correction system for the automatic updating of synchronized clocks, American Time Signal model YMP.

Recommendations:

This system can remain and be reused and expanded as required.

PAGING SYSTEM

There is an amplifier for paging within the complex to ceiling mounted speakers. The system is interface to the telephone system for two-digit dial-up. The amplifier is a Rauland 1406 and the telephone interface is a Universal 1110. This system can remain and be reused and expanded as required.

Recommendations:

This system can remain and be reused and expanded as required. The amplifier may need to be replaced and upsized based upon the quantity of speakers added.

JAIL SECURITY SYSTEM

The existing jail security systems are relay-based in the 1988 section consisting of industrial switches, Rauland intercom amplifiers and switching boards. The 1998 Huber addition includes control system by MTI. This system is proprietary and spare parts can not be obtained from any other source other than MTI. Some of the older jail control panels were also replaced with MTI.

There are a multitude of cameras and monitors throughout the jail with digital video recording devices. These systems are decentralized.

Recommendations:

If the jail were to remain at its present location consideration should be given to total replacement of the jail control system to non-proprietary touch screen and a centralized camera control and digital video camera recording system. The existing controls are near there end of life especially the 1988 portion.