

11. COURTHOUSE SECURITY IMPROVEMENTS

As the project architect finalizes the bid documents for the Courthouse Security Improvements, a question has arisen regarding the sizing of the emergency generator. The electrical engineer has developed 3 options for your consideration:

1. **Provide an emergency generator to back-up the entire building** - In this option an 800 amp service entrance rated transfer switch with main breaker would be added outside the building above the floodplain. This switch would be sized to back-up the entire building and would remedy an existing conflict with the 2008 National Electrical Code (NEC) Article 230.6. The generator would be 150 kw and would back-up the entire building. The cost for this option is estimated to be \$192,000.00.
2. **Provide an emergency generator system to back-up the entire building with the exception of the air conditioning chiller and condensing units** – This option would include an 800 amp service entrance rated transfer switch added outside the building above the floodplain. This switch would be sized to back-up the entire building and would remedy the existing conflict with 2008 NEC Article 230.6. The generator would be 125 kw and would back-up the entire building less the air conditioning chiller and condensing units. The air conditioning chiller and condensing units would be shut down through controls during loss of normal power. The cost for this option is estimated to be \$185,000.00.
3. **Provide an emergency generator system to back-up the entire building with the exception of the air conditioning chiller, condensing units and elevators** - the original design on the building included a generator and transfer switch to back-up the entire building less the air conditioning chiller, condensing units and elevators. This option would include a 400 amp transfer switch added outside the building above the floodplain. This switch would be sized to back-up the entire building. An 800A enclosed circuit breaker would need to be added on the normal electrical service on the outside of the building to remedy the existing conflict with 2008 NEC Article 230.6. The generator would be 100 kw and would back-up the entire building less the air conditioning chiller, condensing units and elevators. The cost for this option is estimated to be \$176,000.00.

Sheriff Stutts has questioned the practicality and safety of not powering the elevators by pointing out that if power goes out, wheel chair occupants that may be on the second floor may not be able to leave the building unassisted in the event of a power failure.

Mr. Stodghill will be seeking your input on which option you prefer. It's my understanding that he intends to bring the electrical engineer in case there are technical questions.

MOTION REQUIRED: A motion is required to provide the Architect direction on which option the Board prefers.



MEMORANDUM

Date: October 24, 2013

Project # 1225

To: Mr. Michael Johnson, County Administrator

From: Jeff Stodghill

Re: Courthouse Security Improvements

We have looked at the generators at the Sheriff's Office and it has been determined (see attached Meeting and Field Notes) that neither of these generators will provide the correct voltage needed at the Courthouse to satisfy the needs. Second, the engineers have discovered that the main electrical feed to the Courthouse is run in a manner that does not meet the electrical code which needs to be remedied by installing a disconnect switch. This problem can be solved concurrently with the installation of a transfer switch and generator being discussed. As the engineers at PACE discuss in their memo (see attached) the issue is whether or not to power the air-conditioning system and elevator system. Their estimate is that the cost to provide emergency power to the courthouse without the a/c and elevator will be approximately \$176,000. Adding the elevator adds about \$10K to the cost. Adding the A/C and adds about \$7K to the cost.

It is my recommendation that the Board include the elevator on the new emergency power system due to the fact that wheel chair users that may be on the upper floor may not be able to leave the building safely in a power outage or emergency.

I will need direction from the Board concerning whether or not they want to design the generator back up system to power the elevator. If they elect to do that, then the cost difference to provide emergency power for the whole building will add about \$7K.



1277 Perimeter Parkway
Virginia Beach VA 23454
Phone: 757 499 7223
FAX: 757 301 6060

Emergency Generator System Options and Recommendation

BY: Jaye Stutzman / Eddie Abrams

DATE: 10/16/13

PROJECT: Southampton County Courthouse Generator

PACE PROJECT NO.: 12001.46

Objective

The design objective for the emergency generator power system at the Southampton County Courthouse is to provide an emergency generator to automatically provide back-up power to the building during a power outage. To accomplish this objective at a minimum an emergency generator and automatic transfer switch will need to be provided as well as circuit modifications to accommodate this equipment.

Existing Condition

During the investigation of the existing electrical system at the building it was observed that the existing electrical service conductors are run in the crawl space from the utility company equipment on the exterior of the building to the main panel in the basement. This is in conflict with the requirements of 2008 NEC Article 230.6 identifying when service conductors are considered to be located outside the building. The proposed design solutions take this into account and will remedy this condition.

Proposed Design Options

There are three design options that are the most practical and cost effective:

Option #1: Provide an emergency generator to back-up the entire building.

In this option an 800 amp service entrance rated transfer switch with main breaker would be added outside the building above the floodplain. This switch would be sized to back-up the entire building and would remedy the existing conflict with 2008 NEC Article 230.6. The generator would be 150 kw and would back-up the entire building.

The cost for Option #1 is estimated to be \$192,000.00.

Option #2: Provide an emergency generator system to back-up the entire building with the exception of the air conditioning chiller and condensing units. The elevator would remain on the emergency generator system.

This option would include an 800 amp service entrance rated transfer switch added outside the building above the floodplain. This switch would be sized to back-up the entire building and would remedy the existing conflict with 2008 NEC Article 230.6. The generator would be 125 kw and would back-up the entire building less the air conditioning chiller and condensing units. The air conditioning chiller and condensing units would be shut down through controls during loss of normal power.

The cost for Option #2 is estimated to be \$185,000.00.

Option #3: Provide an emergency generator system to back-up the entire building with the exception of the air conditioning chiller, condensing units and elevators.

The original design on the building included a generator and transfer switch to back-up the entire building less the air conditioning chiller, condensing units and elevators. This option would include a 400 amp transfer switch added outside the building above the floodplain. This switch would be sized to back-up the entire building. An 800A enclosed circuit breaker would need to be added on the normal electrical service on the outside of the building to remedy the

existing conflict with 2008 NEC Article 230.6. The generator would be 100 kw and would back-up the entire building less the air conditioning chiller, condensing units and elevators.

The cost for Option #3 is estimated to be \$176,000.00.

Summary

Looking the system and overall benefit to the end user Option #1 would provide the most benefit for the cost while resolving the existing system deficiencies. The potential cost savings from Options #2 and #3 do not appear to be substantial when looking at the overall cost and benefit to the end user. Option #1 also provides for the least amount of disruption to the building operation and affords an overall better result.

Based on this information it is recommended to provide Option #1 and back-up the entire building.



1277 Perimeter Parkway
Virginia Beach VA 23454
Phone: 757 499 7223
FAX: 757 301 6060

MEETING and FIELD NOTES

DATE: 10/04/13

BY: Greg Marable

MEETING DATE: 10/03/13

PROJECT: Southampton County Courthouse Generator

PACE PROJECT NO.: 12001.46

Sheriff's Office / 911 Center

I met Jeff Stodghill and Ryan with PM Architects, and Jackie Vick with Southampton County Maintenance at the project site. Jeff indicated that the Board of Supervisors had asked if we could provide emergency power to the Courts Building from the generators at the Sheriff's office. They are under budget constraints.

We then met with the Sheriff and the Director of the 911 Center. We found that there are two emergency generators behind the Sheriff's office and 911 Center.

The first generator is an Onan/Cummins 75 kW at 0.8 PF, 93.7 kVA, 120/240V, propane in a weatherproof enclosure. This generator feeds a 225A-2P 3W Onan ATS, which serves the 911 Center. This generator also serves a UPS, which serves the computers in the 911 Center. The UPS is a Powerware #FE4, 3kVA with 208V input and 120V output. We were advised that the UPS was rated 32A, and the present load is 28A.

The second generator is a Kohler #80R0ZJ, 80 kW at 1.0 PF, 80 kVA, 120/240V, single-phase, 3W with 400A 2P output breaker. This generator is a diesel generator, in a weatherproof enclosure and with a base mounted fuel tank.

This generator feeds a Kohler #KGATS, ATS, 400A, 2P, 3W. The second generator feeds the Emergency Operations Center in the Sheriff's office.

Neither of the generators have the capacity to serve the emergency load of the Courthouse, nor are they configured to supply the required voltage for the Courthouse.



1277 Perimeter Parkway
Virginia Beach VA 23454
Phone: 757 499 7223
FAX: 757 301 6060

FIELD NOTES

DATE: 10/04/13

BY: Greg Marable

MEETING DATE: 10/03/13

PROJECT: Southampton County Courthouse Generator

PACE PROJECT NO.:

Courthouse

When I met with Jeff, he advised that the Board of Supervisors may be interested in reducing the generator size by taking some of the load off the emergency generator. The loads removed may include:

- A. The elevators (2@20 HP)
- B. Air cooled chiller, CH-1
- C. Air cooled condensing units

Following is a summary of each of these loads:

- A. Elevator 1 or 2: 20 HP each, 62A, 208V, 3 Φ , 22.3 kVA
- B. Air cooled chiller, CH-1: 179, 4A, 208V, 3 Φ , 64.6 kVA
- C. Condensing unit #1, CU-1: 29A, 208V, 3 Φ , 10.00 kVA
- D. Condensing Unit #2, CU-2: 35.4A, 208V, 3 Φ , 12.7 kVA

The total connected load that may be deleted is approximately 131.9 kVA. This does not represent the actual load that may be deleted from the building demand load.

The electrical service is fed from a DVPC pad mounted transformer at 208/120V, 3 Φ , 4W, and it consist for a DVPC instrument cabinet, a wireway and a feeder, 3 sets each 4-350 KCMIL, 3" C (900A capacity) routed through the crawlspace to panel MDP-1, 1200A, 208/120V, 3 Φ , 4W. Panel MDP-1 is service entrance rated with 6 main breakers. These include:

- A. Ckt #1: 225A/3P serving CH-1
- B. Ckt #2: 175A serving Elevator 1, 60A/3P
- C. Ckt #7: serving CU-1
- D. Ckt #8: 100A/3P, serving Elevator 2
- E. Ckt #13: 60A/3P serving CU-2
- F. Ckt #19: 400A/3P serving panel MDP-2

Panel MDP-2 is a 400A MLO, 208/120V, 3 Φ , 4W and serve the following loads:

- A. Ckt #1: 200A/3P unidentified load
- B. Ckt #2: 125/3P unidentified load
- C. Ckt #7: 100A/3P serving panel 300
- D. Ckt#13: 100A/3P, serving panel 600
- E. Ckt #14: 100A/3P serving panel P200
- F. Ckt #19: 150A/3P circuit serving panel P100
- G. Ckt #20: 125A/3P serving panel 400, 500

GJM/yis