

CAN THE EMERGENCY OPERATIONS CENTER AT LOMA RIDGE SURVIVE A DISASTER?

SUMMARY

The Sheriff-Coroner Department's Emergency Operations Center (EOC) on Loma Ridge in Silverado plays an essential role in day-to-day public safety communications. When disaster strikes, such as in the recent wildfires, the EOC's role in the countywide coordination of emergency response becomes critical. It must not fail.

And yet, the 2007-2008 Orange County Grand Jury found, this critical facility may not survive a disaster. When the October 2007 Santiago Canyon wildfire swept up to the facility's perimeter, smoke was carried inside by a ventilation system that lacks a smoke filtration system. Emergency personnel performing critical services were forced to wear breathing masks for hours. During an emergency, staffing in the center swells substantially and could exceed the sewage system's designed capacity. The two pair of Uninterruptible Power Supplies (UPS) are inadequate to meet the center's critical electrical demands should one pair fail. And a fire inside the vital equipment rooms could trigger sprinklers that would shower water on critical computers and communication electronics, knocking them out.

The Sheriff-Coroner Department has known about some of these deficiencies for over a year and yet corrections have not been forthcoming. The 2007-2008 Orange County Grand Jury recommends that the Sheriff-Coroner Department urgently request Board of Supervisors' approval of emergency funding to upgrade the EOC's ventilation and sewage system and continue to provide adequate funding for the fire suppression and vital electrical systems to ensure that this critical facility does not fail in a disaster.

REASON FOR INVESTIGATION

Previous Grand Jury reports of 1998-1999 and 1999-2000¹ on the Loma Ridge EOC raised questions about its viability after an earthquake.

A Board of Supervisors' document, the "2005 Strategic Financial Plan," revealed serious questions about the EOC being "...able to support current daily operations, emergency activation events, and future growth." Discussions between the 2007-2008 Grand Jury members and Sheriff-Coroner Department's management staff caused serious questions about the viability of vital infrastructure systems at the EOC during a prolonged emergency activation.

¹ Source: www.ocgrandjury.org

METHOD OF INVESTIGATION

In the Grand Jury investigation of the Loma Ridge Emergency Operation Center (EOC), it reviewed:

- The 1998-1999 Orange County Grand Jury report, “Safety Concerns at the OC EOC”
- The 1999-2000 Orange County Grand Jury report, “Access Concerns at the OC EOC”
- The Board of Supervisors’ “2005 Strategic Financial Plan” which lists specific improvements at the Loma Ridge as a top priority
- The 2006 “Facility Assessment Report” of the EOC prepared for the Sheriff-Coroner by a private firm which identified numerous deficiencies

The Grand Jury:

- Toured the EOC several times, once during the October wildfire emergency
- Interviewed staff and management at both the EOC and Sheriff-Coroner Department’s Research and Development Division which handles facility maintenance and projects

BACKGROUND AND FACTS

The Loma Ridge Emergency Operations Center was designed and built under provisions of the Unified Building Code (1988 edition) and met all the requirements of an essential facility at that time. The EOC was issued a certificate of occupancy in 1992 and opened in 1993.

The Emergency Operations Center is a 30,000 square foot, single story facility that has a fresh water supply tank of 30,000 gallons, a fire suppression water tank of 30,000 gallons, a sewage system consisting of a pump and sewage-holding tank of 30,000 gallon capacity, two emergency generators of 920 kilowatts each, and an 18,000 gallon diesel fuel tank for the generators. Additionally, there is a stock of emergency food supplies, a kitchen/cafeteria and sleeping quarters. It is operated by the Orange County Sheriff-Coroner Department.

This facility was originally designed in the early 1990’s to house a small day-to-day staff of employees on location. However, in 1995, the Sheriff-Coroner Department began adding several bureaus, departments and support personnel which required full and part-time positions, some staffed 24 hours, 7 days per week and others staffed on a Monday through Friday schedule. As of September 3, 2007, EOC had 128 full-time and 17 part-time employees.² During an emergency activation of the EOC, the occupancy could increase by as many as 100, or more, emergency personnel.

As a result of these additions, the building has evolved from a site that was to be used only in countywide emergencies into a building that houses numerous public safety functions in the county including:

² Source: www.ocsd.org/operations

- Emergency Communications Bureau – operating the Sheriff’s radio dispatch center, including the 9-1-1 center and the Control One component of the countywide Coordinated Communications System. The primary function of Control One is to provide communication services to all law enforcement and public service agencies within the County. The Emergency Communications Bureau operates on a 24-hour, 7-day weekly schedule
- Emergency Management Bureau – responsible for training, planning and staffing the EOC in the event of an emergency activation
- Communications Division – responsible for radio operations and maintenance of all County public safety radio and microwave systems
- Terrorism and Early Warning Group Support Division – monitoring trends and potential terrorist threats or attacks in Orange County
- Radio and Microwave Unit/Radio Operations and Maintenance
- 24-hour contact for oil and hazardous material spill
- 24-hour Monitoring Station for San Onofre Nuclear Generation station
- 24-hour contact for the Federal Emergency Management Agency (FEMA)
- 24-hour contact for the State of California Office of Emergency Services (OES)
- 800 MHz Countywide Coordinated Communications System for all local public safety agencies (law enforcement, fire, paramedic, lifeguard)

The 2007-2008 Grand Jury reviewed two previous Grand Jury reports on the Loma Ridge Emergency Operations Center. The report from 1999-2000, “Access Concerns at the OC EOC,” dealt with access to the facility if the only access road was cut off by earthquake, fire or other calamity.

The Grand Jury report from 1998-1999, “Safety Concerns at the OC EOC,” dealt with hazards posed by items such as computers, printers, copiers, large, heavy cabinets (including heavy soft drink machines in the cafeteria) that were not tied down or restrained. The concern was that during an earthquake these items would move or fall, creating safety hazards for the staff. Further, there was concern about computer systems remaining operational if damaged.

The 2007-2008 Grand Jury toured the Loma Ridge Emergency Operations Center several times, once during the emergency activation of the EOC due to the Santiago Canyon fire on October 22, 2007. During a visit on November 13, 2007, members of the Grand Jury had extensive discussions with staff and management of both the EOC and the Sheriff-Coroner Department Research and Development Division which handles the facility maintenance.

The Board of Supervisors’ “2005 Strategic Financial Plan,” which includes Strategic Priority 10a – The Loma Ridge Facility Expansion, noted deficiencies at the location by stating:

“...the continued growth of programs, services and staffing has placed a tremendous strain on the facility resulting in space shortage and building systems (electrical, heating, HVAC, plumbing, water, sewage, etc.) that have

reached their maximum capacities. Access to the facility could be cut off if the one narrow access road is damaged. In addition, the threat of terrorist attack now makes it necessary to improve security at the facility. The facility needs to be assessed to ensure that the facility will be able to support current daily operations, emergency activation events, and future growth.”

The Board of Supervisors then approved \$250,000 in FY 2004-2005 for a feasibility study. Upon completion of the study, the Board requested that the Sheriff-Coroner submit funding requests for Board consideration for future updates of the Strategic Financial Plan.

The Grand Jury obtained a copy of the Facility Assessment Report in December 2007, which had been completed and received by the Sheriff-Coroner Department in December 2006. The report, prepared by the architectural firm, “gkkworks Construction Services,” in conjunction with other engineering consultants, dealt with both building systems (i.e. electrical, HVAC, plumbing, water, sewage, etc.) (Phase 1) and renovation and expansion requirements (Phase 2). This Grand Jury report focuses **only** on the building systems and associated infrastructure of the EOC.

While there were numerous deficiencies pointed out in the 2006 Facility Assessment Report, the Grand Jury will highlight only the ones that it considers to be the most grievous in potentially rendering the EOC unusable, partially or completely, in a time of county emergency.

Heating, Ventilation and Air Conditioning (HVAC) systems

The Facility Assessment Report stated there were no known issues with the HVAC system as of November 2005. However, the Grand Jury learned that, when the EOC was activated for the Santiago Canyon fire, staff had to wear breathing masks for 4-6 hours because of smoke entering the building through the HVAC system. Facilities personnel indicated that the ventilation system had no provision for filtering (scrubbing) the air. A certain amount of fresh air intake is needed at all times in order to limit the build-up of carbon dioxide (CO²).

In an interview with the Sheriff-Coroner Department’s Research and Development personnel, the Grand Jury learned that an interim solution to the ventilation problem, labeled an “HVAC damper,” is currently in progress with an expected completion date of April 2008. During a smoke-related emergency, all of the fresh air intakes will be closed and the air in the EOC will be re-circulated. Doing this, however, will create a new problem. Dangerous levels of CO² buildup may occur which will be monitored by the installation of sensors in the facility to warn personnel of unacceptable CO² levels.

The Grand Jury also ascertained that a long-term solution, labeled “Install Air Filtration System,” is part of the Five-Year Maintenance Plan that will be submitted in fiscal year 2008-2009 by the Facility Operations Division of the Sheriff-Coroner Department. This plan will include the installation of efficient filters (scrubbers).

Sewage holding tank

Under everyday staffing the sewage system is barely adequate. But when the EOC is activated during an emergency, staffing could swell to as many as 245 people. This increase could cause the system to fail. Additionally, the Facility Assessment Report stated that: “The condition of the existing tank *and how full it is remains unknown*” [italics added for emphasis]. Daily trips during an emergency activation are required by a sewer pump truck, which can only remove an average of 3,000 gallons per trip. Also, if the only access road were cutoff by either fire or an earthquake, the ability of the EOC to function could be crippled.

Sheriff-Coroner Department’s Research and Development management disagrees with the aforementioned report finding that states the level of the sewage holding tank is unknown. They state that they determine the level by the use of a manual “stick method” reading performed on a weekly basis, as well as by checking the volume of sewage pumped to trucks, both of which serve to confirm the existing tank level gauge.

Fire suppression in critical areas

The 2006 Facility Assessment Report states that, “Several critical equipment rooms housing computers, telephone and telecommunication systems are not properly safeguarded with a suitable fire extinguishing system. The current fire protection system is a sprinkler system with a water pre-action feature. The pre-action permits intervention prior to release of water from the sprinkler heads.” Pre-action fire sprinkler systems do not have water within their pipes. Water is held from piping by an electronically operated valve, know as a pre-action valve. Two separate events must occur to initiate sprinkler discharge. First, the fire detection system must identify a fire, which opens the pre-action valve and allows water to flow into the pipes. Second, individual sprinkler heads must activate to allow water to be sprayed onto the fire.

The report adds that, “This system is inadequate because, it only responds when a fire has substantially developed, and the release of water will damage all the electronic equipment in the vicinity of the fire. Fire and smoke from such an incident will adversely affect the operation of the facility...” Instead of using water for fire suppression in critical electronic equipment spaces, the solution is to use a clean agent fire extinguishing system. A clean agent is stored as a liquid, which turns to gas when released into the air. This system should be in compliance with National Fire Protection Association 2001 standard on Clean Agent Fire Extinguishing Systems, 2004 Edition³.

A clean agent system is capable of extinguishing a fire at its very early stages without release of water into the space. A fire smaller than a single candle will activate the release of the clean agent. This action will extinguish the fire without damage to the operation of electronic systems in the vicinity of the fire. Furthermore, the clean agent dissipates without any residue.

³ 2006 Facilities Assessment Report, Page 3.3

The recommended clean agent is Pentafluoroethane (HFC-R5) designed to extinguish class C fires (electrical). This clean agent fire extinguishing system will cover the following areas at the EOC⁴:

- System Management Room 1,480 Sq Feet
- Transmitter Room 2,655 Sq Feet
- UPS Battery Room 410 Sq Feet
- UPS Equipment Room 215 Sq Feet
- Electrical Equipment Room 261 Sq Feet

In the interview with Sheriff-Coroner Department's Research and Development personnel, the Grand Jury learned that a cursory timeline for the completion of a large project such as replacing the Loma Ridge fire suppression system, would take approximately 18 months from the date of its approval.⁵

Critical electrical service

Critical facility electrical service is provided by four Liebert Uninterruptible Power Supply (UPS) units of 25 Kva (thousand volt-amps) capacity each, configured in pairs, which feed two critical service electrical panels. These electrical panels provide power to critical equipment services, including dispatch consoles, Control One, 800 MHz radio equipment, data computer equipment, and others.

As originally designed, each Liebert UPS pair should be able to handle 100 % of the critical electrical service; therefore, each pair **must** have a load of much less than 50% to properly accomplish that task. Presently, each Liebert UPS pair is running at greater than 50% load. If one pair fails, the other one will not be able to handle the full load of critical electrical service. Information from the Facility Assessment Report, and Grand Jury interviews with facilities personnel, indicate that the actual demand on the UPS units has exceeded the desired "less than 50% of available capacity." Additionally, these units are nearing the end of their rated design life of 20 years, according to the manufacturer's specifications.

Sheriff-Coroner Department's Research and Development personnel also indicated that funds have been allocated for the replacement of the four Liebert UPS units. The project is in the design and plan check phase, where all the parameters and specifications for the electrical and construction will be specified. The plan is to replace the four 25 Kva UPS with units of 60 to 80 Kva capacity.

⁴ Source 2006 Facility Assessment Report, page 3.3

⁵ OC Sheriff's Department cursory timeline of events of a project with a design cost less than \$100,000.

CONCLUSION

The Loma Ridge Emergency Operations Center physical facility has exceeded its designed capacity. The 2006 Facility Assessment Report concluded that "...the facility is deficient in its infrastructure; including the access road, sanitary sewer system, and fire protection system." The Grand Jury believes that the Heating, Ventilation and Air Conditioning (HVAC) systems, as well as the Uninterruptible Power Supply (UPS) system are also deficient.

FINDINGS

In accordance with California Penal Code sections 933 and 933.05, each finding will be responded to by the government entity to which it is addressed. The responses are to be submitted to the Presiding Judge of the Superior Court. The 2007-2008 Orange County Grand Jury has arrived at the following findings:

- F-1. The HVAC systems are inadequate for the Emergency Operations Center facility because they lack a smoke filtration system.**
- F-2. The sewage system is barely adequate for the present staffing level. Any increase in staffing will overload the system and require daily, or more frequent, trips of the sewage pump truck.**
 - F-2.1. In case of a blocked access road due to fire or earthquake the sewage would not be able to be pumped out, potentially rendering the Emergency Operations Center inoperable.**
- F-3. The Emergency Operations Center uses water for its fire suppression system in vital equipment areas that house computer servers, critical telecommunications systems, and backup batteries. The release of water will damage all electronic equipment in the vicinity and the system responds only when a fire has substantially developed.**
- F-4. The four Liebert Uninterruptible Power Supply (UPS) systems used in the critical electrical service are nearing the end of their rated design life of 20 years, according to the manufacturer specifications. The demand on these units has exceeded the desired "less than 50% of available capacity."**

Responses to Findings F1 through F4 are required from the Orange County Sheriff-Coroner.

Responses to Findings F1 through F4 are required from the Orange County Board of Supervisors.

RECOMMENDATIONS

In accordance with California Penal Code sections 933 and 933.05, each recommendation will be responded to by the government entity to which it is addressed. The responses are to be submitted to the Presiding Judge of the Superior Court. Based on the findings of this report, the 2007-2008 Orange County Grand Jury makes the following recommendations:

R-1a. The Orange County Sheriff-Coroner Department complete the installation of the “HVAC Damper” project before the start of the 2008 summer fire season.

R-1b. The Board of Supervisors approve the request for the retrofit of the HVAC units for FY 2008-2009, labeled “Install Air Filtration System” at the Loma Ridge Facility to be submitted by the Sheriff-Coroner, and prioritize the budgetary process to support installation before the 2009 fire season.

R-2a. The Orange County Sheriff-Coroner Department submit a funding request to the Board of Supervisors for one of the following items:

- **A larger sewage holding tank to replace the existing tank, or an additional holding tank to supplement the existing tank**

or

- **Connect the Emergency Operation Center to the nearest public sewer system, near the intersection of Jamboree Road and Santiago Canyon Road, a distance of about 2.7 miles**

R-2b. The Orange County Board of Supervisors approve the aforementioned funding request upon submission.

R-3a. The Orange County Sheriff-Coroner Department submit to the Orange County Board of Supervisors a request to adequately fund a clean agent fire extinguishing system in compliance with National Fire Protection Association (NFPA) 2001 Standard on Clean Agent Fire Extinguishing systems, (2004 edition). This clean agent fire extinguishing system will cover the areas as detailed in the report.

R-3b. The Orange County Board of Supervisors approve the aforementioned funding request upon submission.

R-4. The Orange County Sheriff-Coroner’s Department replace the existing four Liebert UPS units with four other units of 60 to 80 Kva each.

Responses to Recommendations R-1a, R-2a, R-3a, and R-4 are required from the Orange County Sheriff-Coroner.

Responses to Recommendations R-1b, R-2b and R-3b are required from the Orange County Board of Supervisors.

REQUIRED RESPONSES:

The California Penal Code specifies the required permissible responses to the findings and recommendations contained in this report. The specific sections are quoted below:

§933.05

(a) For purposes of subdivision (b) of Section 933, as to each grand jury finding, the responding person or entity shall indicate one of the following:

- (1) The respondent agrees with the finding.
- (2) The respondent disagrees wholly or partially with the finding, in which case the response shall specify the portion of the finding that is disputed and shall include an explanation of the reasons therefore.

(b) For purposes of subdivision (b) of Section 933, as to each grand jury recommendation, the responding person or entity shall report one of the following actions:

- (1) The recommendation has been implemented, with a summary regarding the implemented action.
- (2) The recommendation has not yet been implemented, but will be implemented in the future, with a timeframe for implementation.
- (3) The recommendation requires further analysis, with an explanation and the scope and parameters of an analysis or study, and a timeframe for the matter to be prepared for discussion by the officer or head of the agency or department being investigated or reviewed, including the governing body of the public agency when applicable. This timeframe shall not exceed six months from the date of publication of the grand jury report.
- (4) The recommendation will not be implemented because it is not warranted or is not reasonable, with an explanation therefore.