

SEISMIC SAFETY AND DISASTER READINESS

HUMBOLDT STATE UNIVERSITY

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ABBREVIATIONS

BOT	Board of Trustees, The California State University
CCR	California Code of Regulations
CPB&G	Committee on Campus Planning, Buildings and Grounds, CSU Board of Trustees
CSTI	California Specialized Training Institute in San Luis Obispo
CSU	California State University
CTS	Computing and Telecommunication Services - HSU
DRP	Disaster Recovery Plan
EH&S	Environmental Health and Safety
EMEP	Earthquake/Major Emergency Preparedness (a CSU task force formed in spring 1985 and disbanded in 1990)
EO	Executive Orders from the Chancellor
EOC	Emergency Operations Center
FEMA	Federal Emergency Management Agency
HSU	Humboldt State University
ICS	Incident Command System protocols required by SEMS regulations
IS	Information Systems
MHEMP	Multi-Hazard Emergency Management Plan
OES	Office of Emergency Services, State of California - Governor's Office
PP&D	Physical Planning and Development, Chancellor's Office
SAFE	Survival Actions for Emergencies
SEMS	Standardized Emergency Management System regulations issued by OES in September 1994
SRB	Seismic Review Board of The CSU formed in 1992
UPS	Uninterruptible Power Supply

INTRODUCTION

PURPOSE

Our overall audit objective was to furnish an independent appraisal of the seismic safety and disaster readiness functions, to ascertain compliance with established policies and procedures, to determine adequacy of internal controls, and to identify opportunities for operational improvements which would help better achieve goals and objectives.

Within the overall audit objective, specific goals included determining whether:

- ▶ necessary seismic retrofitting has been done so facilities meet the relevant building standards in Title 24 of the California Code of Regulations;
- ▶ new construction complies with Board of Trustee policy for seismic peer review (RCPBG 05-93-13);
- ▶ reasonable facility measures for disaster avoidance and prevention have been implemented, e.g., anchoring unsecured furniture and equipment or providing for fire suppression - automatic sprinklers and portable extinguishers;
- ▶ there has been coordinated campuswide planning and preparation for disaster preparedness and response, development and promulgation of sound plans and strategies, and continued vigilance to maintain and update plans;
- ▶ campuses have effective response capabilities to the most probable incidents which may affect the safety of personnel, damage assets, or cause significant business interruption;
- ▶ buildings can be evacuated during disasters/emergencies;
- ▶ reasonable provisions have been made for the availability of equipment, information systems, records, supplies, and trained personnel when needed; and
- ▶ tests/exercises have been conducted to prove plan viability and identify deficiencies or weaknesses in response instructions.

SCOPE AND METHODOLOGY

The review emphasized but was not limited to compliance with state laws, Board of Trustee policy, and Chancellor's Office and campus policies, letters, and directives.

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Various campus functions and offices were involved including, for example, facilities management, environmental health and safety, public safety, student health center and computer center. Auxiliary organizations were generally excluded from the audit except for the seismic safety of buildings that they occupy which have been prioritized by CSU's Seismic Review Board for retrofitting.

The 1995/96 and 1996/97 fiscal years were the primary periods reviewed for disaster preparedness and planning. However, other earlier years were also included as needed, in part, because the seismic safety action plan for the system dates back to the Board of Trustees resolution in May 1993.

During the course of the audit, we:

- ▶ interviewed responsible personnel;
- ▶ inspected certain facilities such as the emergency operations center, the computer center, and telephone switch rooms;
- ▶ reviewed various plans and documents;
- ▶ examined emergency equipment and supplies; and
- ▶ tested selected devices and features integral to the campus system for disaster mitigation, preparedness, response and recovery.

BACKGROUND

As indicated in the May 1993 Agenda Item 7 of the Board of Trustees' Committee on Campus Planning Buildings and Grounds, the CSU relies upon the requirements of Title 24 of the California Code of Regulations (CCR) for seismic safety building standards. From a structural standpoint, the CSU has been specifically involved in a seismic retrofitting program since 1992. In the 1992/93 Budget Act, funds were provided for seismic reviews of CSU facilities. In implementing this program, the CSU formed a Seismic Review Board (SRB) which has been active with essentially the same membership since its original formation. The focus of this program has been to identify and mitigate the highest life safety risks. Part of the program has been for the SRB to rank order facilities on the degree of seismic risk, subject the highest risks to further engineering investigation and, if warranted capital outlay retrofit projects. The resolution of the committee in May 1993 (RCPBG 05-93-13) also provided for independent technical peer reviews of the seismic aspects of all construction projects from their design initiation, including both new construction and remodeling.

Appendix Ia of the 7/19/95 *Report of the Ad Hoc Committee on Emergency Preparedness* contains a recent history of emergency planning in the CSU. This report indicates that much of what is in place within the CSU at the current time can be traced back to the Task Force on Earthquake/Emergency Preparedness (EMEP) formed in the spring of 1985. The EMEP Task Force was instrumental in

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development of Executive Order (EO) 524 issued 4/5/88. While this EO is now dated, it is still in effect as systemwide policy.

In April 1994 (approximately three months after the Northridge earthquake), the CSU convened the Ad Hoc Emergency Preparedness Committee. The 7/19/95 report of the committee was circulated to the campuses but not implemented on a systemwide basis.

In September 1994, the governor's Office of Emergency Services issued "new Standardized Emergency Management System (SEMS) regulations with which the CSU and all other state agencies as well as local governments and special districts must comply."

Disaster readiness terminology varies. Disaster is associated with emergency management or emergency operations and sometimes with other terms such as business continuity. The "3 R's" of business continuity planning have been described as readiness, recovery, and restoration as follows:

READINESS

- Disaster Prevention and Avoidance
- Emergency Preparedness
- Corporate-wide Planning
- Business Unit Recovery Planning

RECOVERY

- Incident Management and Initial Recovery

RESTORATION

- Long-term Business Recovery

OPINION

We visited the Humboldt State University campus from June 30, 1997 to August 1, 1997 and reviewed the seismic safety and disaster readiness functions in effect at that time.

The campus had several initiatives underway but not yet fully implemented including the SAFE (Survival Actions for Emergencies) program; several seismic safety retrofitting projects; a major campuswide infrastructure/utility project addressing areas such as potential flooding from storm drainage and fire security (funded for working drawings in 1997/98); and development of a formal disaster recovery plan for information systems. These activities will further improve the readiness of the campus.

We found that the structural hazards posing the highest life safety risk have been retrofitted and that buildings have been reevaluated as needed. New construction has been subjected to independent technical peer review for seismic safety. Various actions have been taken to address non-structural, falling hazards, but the disposition of certain items had not been well documented.

We further found that the campus has a central disaster/emergency plan with provisions such as an emergency operations center and integrated team structure as required by the state's Standardized Emergency Management Regulations. However, in our opinion, the plan and the degree of preparedness would be improved by formalizing the disaster recovery plan for computing and telecommunications, pursuing alternatives to more quickly mobilize the emergency operations center, and backing up/storing off-site vital records. Some specific improvements to environmental controls in the computer center and communication equipment rooms are recommended.

EXECUTIVE SUMMARY

The purpose of this section is to provide management with an overview of conditions requiring their attention. Areas of review not mentioned in this section were found to be satisfactory. Numbers in brackets [] refer to page numbers in the report.

ENVIRONMENTAL AND FACILITY CONTROLS

FALLING HAZARDS [7]

The campus had not documented mitigation of possible falling hazards. Documenting mitigation of possible falling hazards reduces the campus's exposure to legal liability for injuries that result from earthquakes.

NON-STRUCTURAL HAZARDS [7]

The campus had not completed the mitigation of non-structural hazards to the extent possible in the computer center. Securing hazards will reduce the possibility of injuries and potential damages.

UNINTERRUPTIBLE POWER SUPPLY [8]

Data communications equipment in the natural resources building was not protected by an uninterruptible power supply (UPS). A UPS will reduce the likelihood of damage and network downtime caused by short-term power outages or fluctuations.

AUTOMATIC FIRE SUPPRESSION SYSTEM [8]

The main computer room lacks a fully automatic fire suppression system. Use of such a system reduces the risk of fire damage and the resulting loss of information system assets and disruption of operations.

REMOTE ALARMS/SMOKE DETECTORS [9]

The main computer room and the two communication equipment rooms, which are unoccupied outside of normal business hours, did not have remote notification for high temperatures or the presence of smoke. Remote notification reduces the risk of disruption of voice and data communications.

DISASTER PLANNING

NEW EMPLOYEE ORIENTATION [10]

New employees did not receive orientation on the emergency action plan for the campus. Such orientations would reduce the exposure of new employees to unnecessary safety risks and mitigate potential legal liabilities for the campus.

PLAN APPROVAL [10]

Neither the campuswide *Multi-Hazard Emergency Management Plan* nor any of the business unit plans indicated whether they have been approved by campus administration. Such approval by the president or his designee increases linkage between the plan and the policies of the campus and execution of EO 504.

CTS DISASTER RECOVERY PLAN [11]

Computing and Telecommunication Services (CTS) lacks a formal written disaster recovery plan (DRP.) A DRP will increase the efficiency and timeliness of recovery operations.

MULTI-HAZARD EMERGENCY OPERATIONS PLAN

EMERGENCY EXERCISES [12]

There has not been a campus-wide emergency exercise in the last two years. Testing, at formal prescribed intervals, provides opportunities for the campus to document and evaluate the weakness or failures of the existing plan and to amend the document as needed.

VITAL RECORDS [12]

The campus was not following the vital record back-up provisions of *the Multi-Hazard Emergency Management Plan*. Backup of these records reduces the likelihood of permanent losses.

EMERGENCY OPERATIONS CENTER [13]

The campus Emergency Operations Center is neither stand-alone nor immediately operational. A dedicated facility that could be made available sooner in the event of a disaster/emergency would improve the campus response capability.

OFF-SITE BACKUPS [14]

Critical records were not being backed up in a secure location. In addition, documentation needed to restore and resume computer and telecommunication operations after a disaster was not being stored with the back-up data. Storing both backups and documentation further away from the originals would reduce the risk of a complete loss in the event of a disaster.

OBSERVATIONS, RECOMMENDATIONS, AND CAMPUS RESPONSES

ENVIRONMENTAL AND FACILITY CONTROLS

FALLING HAZARDS

The campus had not documented mitigation of possible falling hazards.

Section I.8 of the campus *Multi-Hazard Emergency Management Plan* states:

Measures will be taken to reduce the potential impact of known hazards on the campus if feasible.

In April 1993, an engineering investigation of falling hazards was conducted that itemized 109 areas on the campus of concern from a life safety standpoint. In February 1995, the campus was delegated authority by the Chancellor's Office to administer the falling hazard project. The campus subsequently contracted out a portion of the falling hazard work in May 1995. Documentation of work completed both within and outside of this contract is either missing or nonexistent.

Failure to document mitigation of possible falling hazards subjects the campus to increased exposure to legal liability for injuries that result from earthquakes.

Recommendation 1

We recommend that the campus document the disposition of possible falling hazards identified in the original 1993 engineering investigation.

Campus Response

We concur. Please see attached letter dated November 14, 1997, from Theodore E. Anvick of Anvick Engineering, which identifies work removed from falling hazard scope by Structural Review Board. B).

NON-STRUCTURAL HAZARDS

The campus had not completed the mitigation of non-structural hazards to the extent possible in the computer center.

In order to protect information system assets and reduce the risk of disruption of operations, Computing and Telecommunication Services (CTS) has secured seismic bracing for most of its critical computer components and all of its critical telecommunications equipment. However, the VAX computer, some UPS units, some peripherals and tape racks, cabinets, and bookshelves still require bracing. Without proper bracing, equipment, racks, and cabinets could fall on personnel or critical equipment or block access paths and prevent timely evacuation.

The manager of computing services stated that CTS was in the process of reorganizing the room and they intend to brace equipment as it is moved to the respective permanent locations.

Failure to take reasonable mitigating measures to secure non-structural earthquake hazards subjects the campus to increased exposure to legal liability for injuries that result from earthquakes.

Recommendation 2

We recommend that the campus develop a system to assure further mitigation of non-structural hazards in the computer center.

Campus Response

We concur. We are in the process of securing tape library racks to the floor.

UNINTERRUPTIBLE POWER SUPPLY

Data communications equipment in the natural resources building was not protected by an uninterruptible power supply (UPS). The equipment allows users in the administration building and some other areas on campus to access computer applications and information through the campus network.

The manager of telecommunications indicated that data communications usage in this area had increased only recently to a level which would justify the UPS cost.

Power fluctuations or failure in the basement of the natural resources building could disrupt users' access and possibly damage the equipment.

Recommendation 3

We recommend that the campus install a UPS or connect the data communications equipment to the existing telecommunications UPS and generator.

Campus Response

We concur. An uninterruptible power supply (UPS) is on order.

AUTOMATIC FIRE SUPPRESSION SYSTEM

The main computer room lacks a fully automatic fire suppression system.

Computer rooms, in general, present a higher risk of fire than other facilities due to the presence of electrical equipment, forced air conditioning, and computer paper and tapes. Hand-operated extinguishers may not be adequate or safe for putting out a larger fire that could result in the complete loss of the data center.

The manager of computing services stated that the use of an automatic fire suppression system was not considered at the time the computer room was built. It is now a matter of allocating scarce resources to competing priorities.

Without an automatic fire suppression system, the risk of fire damage increases with a resulting loss of information system assets and disruption of operations.

Recommendation 4

We recommend that the campus conduct a cost/benefit analysis to evaluate the feasibility of installing an automatic fire suppression system in the main computer room.

Campus Response

We concur. This project has been assigned to one of our technicians and is in the scoping stage.

REMOTE ALARMS/SMOKE DETECTORS

The main computer room and the two communication equipment rooms did not have remote notification for high temperatures and the presence of water. In addition, the furnace/mechanical rooms and paper document storage rooms adjacent to the two communications rooms did not have smoke detectors and remote notification.

The managers of computing services and telecommunications indicated that, at the time this equipment was installed, the cost of the detectors was cost prohibitive. With the reduction of price over time, they have now indicated that the detectors and remote notification will be installed.

The computer and communication equipment generate a large amount of heat and could fail from overheating if the air conditioning unit were to fail while the room is unoccupied. The furnace/mechanical rooms and the paper document storage room represent a potential source of fire. The walls separating these areas from the communication rooms are not sufficient to prevent or significantly delay the spread of fire into the communication rooms.

Recommendation 5

We recommend that:

- a. high temperature and water detectors be installed in the computer room and the two communication equipment rooms and that they include a provision for remote notification; and
- b. smoke detectors with remote notification be installed in the mechanical and storage rooms adjacent to the two communications rooms.

Campus Response

We concur. This project has been assigned to one of our technicians and is in the ordering stage.

DISASTER PLANNING

NEW EMPLOYEE ORIENTATION

New employees did not receive orientation on the emergency action plan for the campus.

8CCR3220(e)(3) states:

The employer shall review with each employee upon initial assignment those parts of the plan which the employee must know to protect the employee in the event of an emergency.

New employee orientation at the campus is geared towards the benefit. Consideration has been given to incorporating plan information into orientation cycles occurring after our visit.

The absence of orientation temporarily exposes new employees to unnecessary safety risks and creates potential legal liabilities for the campus in the window period between the hiring date and the next scheduled evacuation exercise.

Recommendation 6

We recommend that the campus incorporate information on the emergency action plan into the new employee orientation process.

Campus Response

We concur. Public Safety has started a program of new employee orientation in cooperation with the Personnel Office. Personnel provides Public Safety with a list of new employees (half-time or more) on a monthly basis. Public Safety schedules an appropriate block of time to train new employees on the Standardized Emergency Management System (SEMS) and other significant policies such as workplace violence.

PLAN APPROVAL

Neither the campuswide *Multi-Hazard Emergency Management Plan* nor any of the business unit plans indicated whether they have been approved by campus administration.

Executive Order (EO) 524 delegates to the campus presidents the responsibility for maintenance and regular updating of the institution's plan. This EO further indicates that the emergency preparedness plan should "be regarded as a permanent and important element in the policy structure of the

institution.” Section I.3 of the *Multi-Hazard Emergency Management Plan* also states that “the campus president establishes the basic policies”.

Written approval of the various plans has not occurred because of reliance upon updates done by a consultant and other significant involvement by executives in supporting significant elements of the plan (e.g., SEMS). Although the current plan does not have formal approval, the original plan was approved in 1997 and campus executives have informally supported planning activities.

The campus also has a number of different Standard Operating Procedures (SOPs) in place within various units plus the program manual for the SAFE Program. These documents are not integrated with the *Multi-Hazard Emergency Management Plan*. Absence of the approval by the president or his designee limits linkage between the plan and the policies of the campus and execution of EO 504.

Recommendation 7

We recommend that the president or designee formally approve emergency planning documents for the campus.

Campus Response

We concur. We are revising our Emergency Plan and although the president has acknowledged the Emergency Plan in writing, we will insure that a formal approval letter from the president is incorporated in the revised plan.

CTS DISASTER RECOVERY PLAN

Computing and Telecommunication Services (CTS) lacks a formal written disaster recovery plan (DRP).

The manager of computing services indicated that CTS has acquired a DRP preparation guide and plans to use it to assist in performing a risk analysis, planning for various disaster scenarios, and preparing a formal DRP document.

Without a DRP, the efficiency and timeliness of recovery operations are not ensured. The process of performing a risk analysis and preparing the plan also helps identify mitigating steps that can be taken before a disaster occurs.

Recommendation 8

We recommend that CTS perform a risk analysis, develop a written DRP, and perform periodic testing and training of the plan.

Campus Response

We concur. A software package is installed and the University Computing Services' manager is in the process of building the plan.

MULTI-HAZARD EMERGENCY OPERATIONS PLAN

EMERGENCY EXERCISES

There has not been a campus-wide emergency exercise in the last two years.

The requirements of Executive Order (EO) 524 for exercises are as follows:

1. exercises (drills or simulation) involving appropriate segments of the campus community must be held at least semi-annually; and
2. every segment of the response organization must participate in at least some element of a total exercise at least once per year; and
3. a campus-wide test event must be conducted at least once every two years.

According to the director of public safety, the extent of exercises on the campus was less than contemplated in EO 524 in part because of the SAFE (Survival Actions for Emergencies) implementation process which is being phased in by building throughout 1997/98. The purpose of the SAFE program is “. . .to identify and train faculty, staff and students within each major building on campus to deal with the initial response to emergencies that will protect lives, reduce injuries, and protect property.”

Less than full-scale exercises at prescribed intervals with involvement of the total emergency management staff does not provide enough opportunities for the campus to document and evaluate the weakness or failures of the existing plan and to amend the document as needed.

Recommendation 9

We recommend that the campus hold a campus-wide test event and involve every segment of the response organization.

Campus Response

We concur. Public Safety will conduct a campus-wide test as part of Earthquake Preparedness activities in April 1998.

VITAL RECORDS

The campus was not following the vital record provisions of their *Multi-Hazard Emergency Management Plan* (MHEMP).

Enclosure 6 to the MHEMP addresses vital record protection. It includes provisions to:

- ▶ update the survey of vital records on an annual basis;
- ▶ duplicate at least once in a timely fashion all documents which if not reproduced would appropriately be classified as first-class records; and
- ▶ store all first-class records in secure and protected areas defined as fireproof, securable cabinets (safes or vaults).

According to the director of public safety, the difference in vital record protection is an inconsistency in priorities. Proper backup and storage has not been a high priority.

If a fire or other disaster should destroy the area of the building where the first-class records are stored, they may be permanently lost or may require extensive time and resources to recreate.

Recommendation 10

We recommend that the campus update the vital record provisions in their *Multi-Hazard Emergency Management Plan*, and make appropriate arrangements for protecting vital records.

Campus Response

We concur. The vital records provisions in the Emergency Plan will be updated as part of the current revision, and as we identify these vital records, we will develop a system to protect them.

EMERGENCY OPERATIONS CENTER

The campus Emergency Operations Center (EOC) is neither stand-alone nor immediately operational.

The EOC is in a shared facility in the testing office that necessitates set-up time before it is functional.

The campus director of public safety has developed plans to pursue EOC alternatives, including a portable building that could be dedicated to this purpose.

In the event of a disaster/emergency, the EOC may be needed sooner than the earliest that it could be made available under current arrangements.

Recommendation 11

We recommend that the campus pursue alternative EOC arrangements.

Campus Response

We concur. Alternatives are being reviewed by the Emergency Center executive and president's staff.

OFF-SITE BACKUPS

Critical records were not being backed up in a secure location. In addition, needed documentation was not being stored with the back-up data.

Computing and Telecommunication Services was backing up critical data files and storing them in a data safe in Founders Hall. Founders Hall is the oldest building on campus. It is adjacent to the computer center; not a suitably safe distance away. Documentation stored with backup data outside of the computer room did not include operating procedures, network configuration, and other copies of documentation that would be needed to restore and resume operation of information systems in the event the computer room was destroyed.

The managers of computing services and telecommunications stated that documentation needed to restore computer processing capability and resume operations is in the process of being prepared along with the development of the disaster recovery plan.

If a fire or other disaster should destroy the computer room, the backups are also likely to be affected. Not having copies of this documentation could delay the recovery efforts.

Recommendation 12

We recommend that:

- a. the campus store backup data at an off-site location; and
- b. additional technical documentation needed to restore and resume information system operations be stored off-site as well.

Campus Response

We concur.

- a. Computing and Telecommunications Services is in the process of having the safe, which is located in Founders Hall, moved to the Student and Business Services building.
- b. Copies of operations documentation are being generated and stored in the safe.

APPENDIX A: PERSONNEL CONTACTED

<u>Name</u>	<u>Title</u>
Alistair McCrone	President
William C. Canon	Director, Computing and Telecommunication Services
John Capaccio	Associate Director, Housing
Don A. Christensen	Vice President, Development & Administrative Services
Kenneth I. Combs	Director, Physical Services
R. Kevin Creed	Director, Environmental Health & Occupational Safety
Tammy Curtis	Administrative Assistant, Public Safety
Lori A. Dengler	Professor, Geology
Charlotte M. Ferguson	Systems Administrator, Plant Operations
Robert E. Foster	Director, Public Safety
Richard A. Giacolini	Director, Procurement & Support Services
Alfred J. Guillaume	Vice President/Provost, Academic Affairs
Debra Hopkins	Construction Management Specialist
James E. Hulsebus	Lieutenant, Public Safety
Lynda Moore	Director, Personnel Services
Tim S. Moxon	Director, Plant Operations
Carolyn J. Mueller	Executive Assistant to the President
Phil M. Perez	Physical Planner
Cliff Schall	Manager, Telecommunications
Robert Seltzer	Personnel Analyst
David W. Simpson	Manager, Computing Services
J. Michael Slinker	Director of University Relations
Edward M. Webb	Vice President, Student Affairs