

SEISMIC SAFETY & DISASTER READINESS

SAN FRANCISCO STATE UNIVERSITY

Report Number 97-28

March 24, 1998

Members, Committee on Audit

Ali C. Razi, Chair James H. Gray, Vice Chair
Roland E. Arnall Ronald L. Cedillos
Bernard Goldstein Laurence K. Gould, Jr.
William Hauck Joan Otomo-Corgel
Ralph R. Pesqueira Alice S. Petrossian
Stanley T. Wang

Staff

University Auditor: Larry Mandel
Audit Manager: James J. Usher
Senior Auditor: Mike Redmond

BOARD OF TRUSTEES

THE CALIFORNIA STATE UNIVERSITY

CONTENTS

INTRODUCTION

Purpose.....	1
Scope and Methodology.....	1
Background	2
Opinion.....	3
Executive Summary.....	5

OBSERVATIONS, RECOMMENDATIONS, AND CAMPUS RESPONSES

Environmental And Facility Controls	9
Seismic Retrofit Program.....	9
Seismic Peer Review.....	11
Falling Hazards.....	12
Emergency Operations Center.....	13
Water Intrusion.....	14
Emergency Power Off Circuit.....	15
Disaster Planning.....	16
Segregation Of Duties.....	16
Training	17
Drp Testing And Training	17
Alternate Processing Site	18
Local Area Networks.....	19
Plan Validation And Maintenance.....	20
Exercising.....	20
Reporting Test Results.....	20
Critical Campus Emergency Information.....	21
Electric Power Generation	22
Off-Site Backup – Computer Records.....	23
Plan Updates	23
Incomplete Equipment And Supplies.....	24

Expenditures.....25
Backup Of Vital Records25

APPENDICES

APPENDIX A: Personnel Contacted
APPENDIX B: Campus Response
APPENDIX C: Chancellor’s Acceptance

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
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
ICS	Incident Command System protocols required by SEMS regulations
LAN	Local Area Network
OES	Office of Emergency Services, State of California - Governor’s Office
PP&D	Physical Planning and Development, Chancellor’s Office
SFSU	San Francisco State University
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 campus-wide 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 that 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.

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 I_a of the July 1995 *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 to the Task Force on Earthquake/Major Emergency

INTRODUCTION

Preparedness (EMEP) formed in the spring of 1985. The EMEP Task Force was instrumental in development of Executive Order (EO) 524 issued April 5, 1988. While this EO is 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 July 19, 1995 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 and defined 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 San Francisco State University campus from November 3, 1997 to December 12, 1997 and reviewed the seismic safety and disaster readiness functions in effect at that time.

We found that insufficient progress had been made to correct numerous life/safety risks resulting from the October 17, 1989 Loma Prieta earthquake. The responsibility for delays, however, only partially falls upon the campus. For example, Verducci Hall (a high-rise dormitory) experienced severe damage in the 1989 quake. Since August 1991, Verducci Hall has been unoccupied, as structural engineers have deemed it uninhabitable due to damages and material structural flaws they identified. Delays in the correction of this situation stem from a conflict between the Federal Emergency Management Agency (FEMA) and the campus over how this life/safety hazard should be eliminated and the cost of doing so.

Verducci Hall is only one of over a dozen projects at San Francisco that were identified by the CSU Seismic Review Board (SRB) as needing significant seismic retrofit. Of these, several are ranked among the most hazardous buildings operated in the CSU system. We found that completion of these projects has been impeded by several factors, including:

- ▶ funding delays and disputes (i.e., state - CSU capital outlay prioritizations and non-state - FEMA);
- ▶ conflicts over the intent of the SRB program (i.e., the campus' desire to eliminate all significant life/safety hazards, not just seismic); and
- ▶ the campus desire to also meet functionality concerns as projects are being brought on line (i.e., petitions to CSU to reprioritize seismic projects to coincide with functional renovation projects to reduce impact upon academic programs.)

With regard to implementing other aspects of the SRB program, we found that documentation for seismic peer reviews was not immediately available to the campus for new construction projects. This lapse in recordkeeping does not corroborate completion of the required independent technical peer review for seismic soundness in structural design. Some actions had been taken to address falling hazards, but continued vigilance is warranted. In addition, consideration needs to be given toward the establishment of an alternate emergency operations center. Specific improvements to environmental controls in the computing and telecommunication facilities are also recommended.

While the campus has a thorough and well organized 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, it is our opinion that the plan and the degree of preparedness can be improved in several areas. These areas are addressed in both the executive summary below and in the body of the report.

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

SEISMIC RETROFIT PROGRAM [9]

Various state-funded life safety seismic retrofit projects were incomplete. Implementing seismic corrections reduces risk to life and related potential litigation.

SEISMIC PEER REVIEW [11]

Evidence that seismic peer reviews were performed on all construction projects was not available for review. Documentation of the performance of peer reviews provides assurance that life/safety hazards have been appropriately considered.

FALLING HAZARDS [12]

The campus had not completed mitigation of possible falling hazards and seismic bracing. Mitigation of possible falling hazards decreases the campus's exposure to damages and legal liability for injuries.

EMERGENCY OPERATIONS CENTER [13]

The campus had not established an alternate Emergency Operations Center (EOC). In an emergency situation where the primary EOC becomes non-operational, an alternate EOC would help ensure that the campus response to disaster would be adequate.

WATER INTRUSION [14]

Computing services' water intrusion mitigation was incomplete in its main telecommunication and computer facility. Proper mitigation of water intrusion would prevent damage to electrical equipment and wiring.

EMERGENCY POWER OFF CIRCUIT [15]

The emergency power off (EPO) circuit in the main computer and telecommunications rooms was incomplete. A proper functioning EPO could prevent unnecessary injury and/or equipment damage.

DISASTER PLANNING

SEGREGATION OF DUTIES [16]

The director of public safety is both the emergency operations executive and the emergency operations center (EOC) director for the campus. Segregating these positions would prevent the EOC director from being overburdened by these multiple responsibilities during a disaster event and provide internal checks and balances over the campus's emergency planning.

TRAINING [17]

The *Multi-Hazard Emergency Plan* did not provide any specificity on training. Specificity in the plan would provide assurance that an adequate number of people are trained and in the right areas.

DRP TESTING AND TRAINING [17]

The disaster recovery plan (DRP) for computer services had not been subject to any scheduled tests or training sessions. Periodic training and testing of recovery plan details will improve the efficiency and timeliness of recovery operations.

ALTERNATE PROCESSING SITE [18]

The computer services disaster recovery plan did not include provisions for an alternate processing site in case the main computer and/or data communications facilities are destroyed or otherwise unusable. Establishing a such provisions will reduce the amount of time to migrate to an acceptable alternate processing site.

LOCAL AREA NETWORKS [19]

Campus-wide emergency preparedness standards and procedures had not been established for local area networks. Procedures could protect data from being permanently lost or requiring recreation at a significant cost in time and effort.

PLAN VALIDATION AND MAINTENANCE

EXERCISING [20]

There has not been a combined campus-wide emergency preparedness test event. A campus-wide exercise would ensure that consideration of the full impact of an actual disaster on campus resources will not be underestimated.

REPORTING TEST RESULTS [20]

Reporting of emergency response drills and simulations results is minimal. Specific procedures for reporting exercises and test results will ensure that they are documented in consistent detail in support of improving campus planning.

CRITICAL CAMPUS EMERGENCY INFORMATION [21]

Up-to-date versions of the critical campus emergency information were not maintained within the EOC. If critical campus emergency information is available to emergency situation management, individuals might be protected from foreseeable risks of harm.

ELECTRIC POWER GENERATION [22]

Planning and oversight of emergency electric power generation was incomplete and did not meet the campus *Multi-Hazard Emergency Plan's* objectives. Additional oversight of electric power generation would help ensure that the campus needs during an actual disaster would be met.

OFF-SITE BACKUP – COMPUTER RECORDS [23]

Telecommunication and network data back-ups were not consistently stored off-site. Availability of off-site backups will enhance restoration capabilities and improve recovery time.

PLAN UPDATES [23]

The campus *Multi-Hazard Emergency Plan* requires revision. When written plans are kept in sync with practice, the results of campus planning will be optimized.

INCOMPLETE EQUIPMENT AND SUPPLIES [24]

Significant amounts of disaster preparedness equipment and supplies have been requested for readiness purposes, but not funded. If required equipment and supplies are available, the campus can better achieve its planned emergency readiness objectives.

EXPENDITURES [25]

The campus did not budget, track or coordinate disaster readiness expenditures. Tracking and coordinating disaster readiness expenditures provides a system of control for those funds and related acquisitions.

BACKUP OF VITAL RECORDS [25]

The campus is not backing up and storing off-site “first-class” records in several key areas. Backup of these records is a reasonable precaution against permanent losses.

OBSERVATIONS, RECOMMENDATIONS, AND CAMPUS RESPONSES

ENVIRONMENTAL AND FACILITY CONTROLS

SEISMIC RETROFIT PROGRAM

Various significant state funded life safety seismic retrofit projects were incomplete. Several of these projects are among the highest risk seismically within the CSU system as ranked by the CSU Seismic Review Board (SRB).

The SRB first prioritized seismic projects by risk within the CSU system in late 1992. The list is periodically revised. The current list contains 117 projects (exclusive of campuswide falling hazards). Thirteen of these projects are located at San Francisco as follows:

Table 1
SFSU Seismic Projects – Sorted in SRB Priority Order
(According to 1997 Rankings)

1992 RANK	1997 RANK	BUILDING	CURRENT STATUS PER SRB <i>(With Campus Reported Status in Italics)</i>
10	7	Dining Center - Newer Section	Awaiting retrofit design. <i>Construction completed.</i>
23	14	Student Union	Retrofit design in progress.
7	15	Humanities South	Retrofit design completed - not accepted by University.
8	16	Verducci Hall	Retrofit design complete - FEMA appeal in progress.
29	17	Psychology	Awaiting retrofit design.
6	29	Library	Retrofit design complete. <i>Retrofit design will be modified to meet latest code requirements.</i>
17	42	Hensill Hall	Retrofit design complete. <i>Retrofit design will be modified to meet latest code requirements.</i>
48	43	Administration - New Section	Under construction. <i>Construction completed.</i>
49	44	Parking Structure	Work to be performed as part of parking structure program. <i>Construction completed.</i>
61	60	Arts and Industries	Retrofit design complete. <i>Construction scheduled for Summer 1998.</i>
7	71	Humanities North	Assessment complete - no life safety problems.
47	72	Thornton Hall	Assessment complete - no life safety problems.
46	84	Franciscan Building	Assessment complete - no life safety problems.

The campus indicated that:

- ▶ three projects (Humanities North, Thornton Hall, Franciscan Building) have been eliminated because it was subsequently found that no life safety problems exist;
- ▶ three projects (Dining Center, Administration Building and Parking Structure) have construction completed;
- ▶ two projects (Student Union and Hensill Hall) are in preliminary design;
- ▶ one project (Verducci Hall) is in final appeal with FEMA;
- ▶ one project (Arts and Industry) is pending additional funding from PP&D;
- ▶ one project (Library) is the campus' next major capital outlay project which has approval from PP&D to combine program renovation with seismic retrofit; and
- ▶ two projects (Humanities South and Psychology) remain, design pending.

In sum, significant progress has been made, but significant life safety risk still remains unmitigated on the campus.

The vice president of physical planning and development indicated that the incomplete retrofit projects are unfinished because (1) the SRB program inappropriately focuses only on seismic life safety issues and ignores other health and safety issues as well as project function; (2) limitations on capital outlay funding results in systemwide competition for seismic retrofit funding and allowance, at best, for one major capital project per campus (SFSU is charged with retrofitting 13 of the 117 CSU projects to complete but cannot fast track due to practice of funding only one project per cycle); (3) while intended to address life safety, the SRB does not take into consideration the impact upon the academic programs which must be relocated to complete construction with courses either being dislocated, combined, or cancelled for the duration of construction. He further stated that SFSU has encouraged doing program renovation with seismic retrofit as both cost savings and reducing impact to the academic program.

Failure to implement seismic corrections subjects the campus to increased risk to life and related potential litigation.

Recommendation 1

We recommend that the campus (with the assistance of the SRB and PP&D) delineate and prioritize life safety risks associated with SFSU structures in the Seismic Safety Action Plan and document how those risks are or will be mitigated in a timely manner.

Campus Response

There are only three buildings for which the design of seismic upgrades has not been funded: Humanities South (now called HSS South), Psychology and the J. Paul Leonard Library. The University has commissioned two studies of the cost effectiveness of renovating the HSS Building (in 1998 and 1990) and received two cost estimates (1993 and 1994) of the cost of renovating and retrofitting the HSS Building. Based on this information, the University has concluded that it would be more efficient to demolish this structure than to renovate it. The HSS has been reclassified as a temporary building. The SFSU Draft 1999/00 Capital Improvement Plan requests funds to demolish this building in 2000/01.

The University requested funding for the design of the Seismic Upgrade of the Psychology Building in 1998/99, but the Chancellor's Office moved the request to 1999/00.

The University requested funding to complete working drawings for the seismic upgrade of the J. Paul Leonard Library in 1997/98. After consulting with the Chancellor's Office Physical Planning and Development section and the Department of Finance, the University determined that since the Library desperately needs a major renovation and expansion, it would be more efficient to do the seismic retrofit along with program renovations and the construction of an addition. This will mean that the campus will have to suffer the expense and inconvenience of relocating the Library only once.

Regarding other projects where retrofit design has been completed:

- The University has requested state funding for the construction of the Hensill Hall retrofit/renovation in 2000/01.
- Construction of the Student Union retrofit/renovation is scheduled for September 1998; the Student Center will fund the project through bond sales.
- The University has just been notified that FEMA has made a decision on our final appeal and we will receive funding which can be used toward the demolition and replacement of Verducci Hall.
- Construction will begin this summer on Arts and industry but we are still seeking additional funding from Physical Planning and Development to complete this project.

The University will be happy to work with SRB and the Chancellor's Office to develop a plan to mitigate the remaining risks as soon as possible. The primary issues from the Campus perspective are the availability and timing of the funding of the remaining retrofit projects for general fund buildings, and the identification of funds to relocate programs during the retrofit.

SEISMIC PEER REVIEW

Evidence that seismic peer reviews were performed on all construction projects was not made available for review by the campus. Available documentation indicated that only remodeling projects identified by the SRB had their structural designs seismically peer reviewed.

The policy of the CSU since the May 1993 resolution of the Board of Trustee's (BOT) Committee on Campus Planning Buildings and Grounds (RCPBG 05-93-13) has been that independent

technical peer reviews of the seismic aspects of all construction projects (both new construction and remodeling) will be performed starting at design initiation to assure conformance with good seismic resistant practices and pertinent provisions of Title 24 of the California Code of Regulations.

The vice president of physical planning and development indicated that the campus did have all projects peer reviewed, however, documentation was not immediately available. He further stated that documentation was forthcoming from the SRB engineer assigned to the campus.

Without documentation of peer reviews, assurance that life/safety hazards were appropriately considered cannot be verified.

Recommendation 2

We recommend that the campus obtain and retain evidence of the completion of seismic peer reviews for all projects.

Campus Response

We have received peer reviews from Charles Thiel, Ph.D. These reviews are documented by a series of letters from Dr. Thiel to Thomas Coffin.

FALLING HAZARDS

The campus had not completed mitigation of possible falling hazards and seismic bracing. Further bracing is needed in some newly remodeled areas, including computer services telecommunication and main computing areas.

The *Campus Multi-Hazard Emergency Plan* (page 67), states that:

- Hazard mitigation is an important element of a comprehensive disaster preparedness program.
- Measures have been taken to reduce the potential impact of known hazards on campus.

According to the director of plant operations and the acting manager of capital planning, highest priority bracing and falling hazards projects are being completed as funding allows. SFSU had \$528,000 in construction to complete but systemwide funding was only provided for \$320,000. The campus has requested the remaining \$207,875 as it becomes available. The executive director of computing services indicated that rebracing equipment would not be possible until a final configuration of the area was complete.

Failure to mitigate possible falling hazards subjects the campus to increased exposure to damages and legal liability for injuries.

Recommendation 3

We recommend that the campus develop a system to assure the completion of seismic bracing as identified through campus safety inspections and delineate and prioritize (with the assistance of the SRB and PP&D) falling hazard life safety risks associated with the SFSU campus facilities and indicate how those risks are or will be mitigated in a timely manner.

Campus Response

The University completed the work required to address 11 of the 20 identified hazards. There was not sufficient funding to complete the following:

1. Administration: Replace glazing at exits with safety glass.
2. Business: Replace glazing at exits with safety glass.
3. Business: Replace glazing at bridge between elevator and building with safety glass.
4. Science: Replace glazing at exits safety glass.
5. Burk Hall Replace glazing at exits with safety glass.
6. Business Provide additional anchors to support terrazzo wall panels in lobby.
7. Mary Ward Hall: Replace glazing at exits with safety glass.
8. Mary Park Hall Replace glazing at exits with safety glass.
9. Seven Hills: Replace glazing at west exit with safety glass and frames.

The estimated construction cost for this work is \$165,500. Bids for this remaining work are due on June 16, 1998. The University has consulted with the Chancellor's Office PP&D and is seeking funding from year-end Minor Capital Outlay monies to complete these items. If funding is available, construction can be completed by October 15, 1998. If these items are not completed this year, we will continue to work with PP&D to obtain funding in a timely manner.

Computing Services has submitted a work request to Plant Operations to provide seismic bracing for communications racks in Computer Room OAD 9.

EMERGENCY OPERATIONS CENTER

The campus had not established, at the time of our review, an alternate Emergency Operations Center (EOC).

The July 1995 *Report of the Ad Hoc Committee on Emergency Preparedness* indicates a viable alternative EOC is a component of good disaster planning.

The director of public safety stated that the campus was building a new EOC and had preliminarily decided to retain its old EOC as an alternative site, pending funding for supplies. No interim solution was in place at the time of our review.

If the EOC were unavailable during an emergency situation, the campus' response to disaster may be inadequate.

Recommendation 4

We recommend that the campus establish and supply an alternative EOC site.

Campus Response

We concur and already have an alternative site. A new EOC is now operational in the new University Police building. The alternate EOC is Old Admin. 117, the former location of the campus EOC. It contains all basic requirements such as a back-up police radio, Plant Operations & Housing radio system and all campus EOC telephone (party) lines.

WATER INTRUSION

Computing services' water intrusion mitigation was incomplete in its main telecommunication and computer facility.

Water intrusion risks included possible flooding from a building infrastructure service room that was located adjacent to telecommunication and computing services equipment rooms and water leaking from an inadequately sealed walkway slab located above telecommunications equipment. While water intrusion sensing systems were maintained in all rooms, except the main telecommunications switch room, the nature of the intrusion risks make detection systems in all rooms necessary as well as warranting proactive measures such as water dams around unsealed doors necessary.

Prevention and detection of water damage is a critical component of computer and telecommunication equipment room planning.

The executive director of computer services indicated that water risks were known and that computer services staff was working with campus facility planners to implement prudent mitigating systems, considering risks and available funding.

Water could short out and damage electrical equipment and wiring.

Recommendation 5

We recommend that the campus:

- a. take proactive measures to protect computer equipment from known water risks; and
- b. install water detectors with a remote notification alarm in the main telecommunications room.

Campus Response

We concur. Computing Services worked with Physical Plant in February, 1998 to shut off the overhead steam pipes that had caused water leaks into the main computer room, thereby mitigating future overhead water damage.

In addition, Computing Services has submitted a work order with Physical Plant to build a barrier between an adjacent electrical room with water pipes to prevent water from seeping into the telecommunications and main computer rooms. Computing Services will also work with Physical Plant and outside contractors to install water detectors in the old telecommunications room, C-2, that will be linked to our existing remote notification alarm; the main telecommunications room (BE-2) already has water detectors connected. These recommended actions will be completed by Computing Services and Physical Plant (with help from outside contractors) by October 1998.

A request for funds for the correction of water intrusion problems has been submitted to the Chancellor's Office as part of the University's Five Year Special Repairs/Deferred Maintenance Program.

EMERGENCY POWER OFF CIRCUIT

The emergency power off (EPO) circuit in the main computer and telecommunications rooms was incomplete.

The EPO is designed to protect equipment and staff when electrical and fire hazards exist.

The executive director of computing services indicated that some recently implemented systems were not properly connected to the EPO.

In a disaster, an attempt to shut off power to all computer equipment with the EPO switch would not succeed. Continued power could potentially result in unnecessary injury and/or equipment damage.

Recommendation 6

We recommend that the campus take the appropriate action to assure that all computer equipment with the main computer and telecommunications rooms be connected through an EPO circuit.

Campus Response

We concur with the general recommendation that all computer equipment in the computer and telecommunications rooms should be connected to our existing emergency power-off (EPO) circuit. A work order has been initiated with Physical Plant to connect the remaining equipment to the EPO. However, Computing Services is consulting with NEC on its best practices to determine whether or not the phone switch should be connected to the EPO. There has already been discussion between Computing Services and Physical Plant on this request, and we expect final resolution and completion by August 1998.

DISASTER PLANNING

SEGREGATION OF DUTIES

The director of public safety is both the emergency operations executive and the emergency operations center (EOC) director for the campus.

The emergency operations executive and the EOC director are separate functions within the *Campus Multi-Hazard Emergency Plan* (page 4). These functions are typically segregated at CSU campuses to provide adequate coverage and focus. The most common model is to have the vice president for administration designated as the emergency operations executive and the director of public safety as the EOC director.

According to the director of public safety, the duties at one time were separated; however, campus renovation activity has resulted in more responsibilities being placed upon public safety in the interim.

During a disaster event, the EOC Director is likely to be overburdened by these multiple responsibilities. Further, internal checks and balances over the campus's emergency planning would improve with a separation of duties.

Recommendation 7

We recommend that the campus segregate the duties of emergency operations executive and EOC director.

Campus Response

This issue is under consideration and a decision will be made this summer.

TRAINING

The *Multi-Hazard Emergency Plan* did not provide any specificity on training.

There is a considerable amount of training for emergency operations personnel notably in hazardous materials, building evacuation, and public safety. However, the plan does not indicate any goals in terms of what types of training should be provided, how much training, and to whom.

The campus *Multi-Hazard Emergency Plan* (page 67) states that training and exercising are essential to make emergency operations personnel operationally ready.

The director of public safety indicated that resource limitations, both time and money, had precluded enhancement of the training plan.

Without specificity in the plan, the campus risks having an inadequate number of people trained and in the wrong areas.

Recommendation 8

We recommend that the campus specifically establish appropriate training goals for emergency management personnel.

Campus Response

We concur and will include a section on training emergency response personnel in the next update of the campus Emergency Plan scheduled for September 1. It would be helpful if the Chancellor's Office would provide implementation guidance on the Standardized Emergency Management System (SEMS) regulations.

DRP TESTING AND TRAINING

The disaster recovery plan (DRP) for computer services had not been subject to any formal, comprehensive tests or training sessions.

Executive Order 524 presents the campus with the responsibility for training of emergency personnel. The campus plan states that "all emergency plans should include provision for training."

The executive director of computer services indicated that the Loma Prieta earthquake and recent construction-related accidents have provided some opportunity to operate the DRP, however, tabletop type exercises will be considered in the future.

Without periodic testing and training, the feasibility of recovery plan details and the efficiency and

timeliness of recovery operations are not assured.

Recommendation 9

We recommend that the campus establish a computing services DRP testing and training program starting with a walk-through exercise first, a table-top exercise, and then periodic testing of various disaster scenarios as determined by a risk analysis.

Campus Response

We believe we are already implementing the goal of this recommendation and that redirection of resources to establish DRP testing and training programs is not necessary at this time. Since the Loma Prieta earthquake, Computing Services has had at least quarterly incidents which have included power outages, floods, pipes leaking, etc., putting the DRP through real-life scenarios. We feel these real-life scenarios have much more effectively tested the DRP than what could have been through table-top exercises. Our staff is more knowledgeable and better trained to act in disaster situations because of these real-life incidents. New operations employees will be oriented to DRP procedures in Computing Services so they are familiar with the process, and will be walked-through various disaster scenarios that we have experienced.

ALTERNATE PROCESSING SITE

The computer services disaster recovery plan did not include provisions for an alternate processing site in case the main computer and/or data communications facilities are destroyed or otherwise unusable.

The executive director of computer services indicated that computer services has preliminarily investigated establishing agreements with two other CSU campuses. However, only initial computer equipment configurations have been exchanged between campuses, and no formal agreements are yet in place.

Failure to plan for an alternate processing site will increase the amount of time it will take to migrate to an acceptable alternate site should a disaster destroy or otherwise render the existing facilities unusable.

Recommendation 10

We recommend that the campus perform feasibility and requirements analysis to provide at least a minimal alternative processing site plan to mitigate the operational disruption from a disaster which disables the main computer and/or data communications facilities.

Campus Response

We concur with the recommendation to develop an alternate processing site plan. The San Diego, San Jose and San Francisco campuses initiated the first step of using each other as an alternate processing site by exchanging system configurations for hardware and software on the administrative MVS equipment. Additionally, there is a joint effort with San Diego and San Francisco to procure an administrative UNIX solution which incorporates mutual backup. SFSU and SDSU expect to have a written alternate processing site disaster recovery plan in place by August 1998.

The disaster recovery solution for instructional systems (such as centralized Internet and e-mail servers) involves the acquisition of replacement systems which can be quickly procured from vendors and set up at an alternate on-campus location or remotely at San Diego or San Jose.

LOCAL AREA NETWORKS

Campus-wide emergency preparedness standards and procedures had not been established for local area networks (LANs).

Specifics regarding systems back-ups and recoveries as well as equipment bracing should be established to ensure that critical and costly data and equipment are adequately protected in the event of a disaster.

The executive director of computer services indicated that responsibility for these systems is decentralized, therefore, campus-wide standards had not been established. A survey of LAN administrators indicated that many of these systems are critical and are not backed-up off-site as data controlled by computer services is.

In the event of a disaster, transactions entered into and processed by these systems could be permanently lost or need to be recreated at a significant cost in time and effort.

Recommendation 11

We recommend that the campus establish emergency preparedness standards and procedures for LANs.

Campus Response

We concur and have taken action to set standards for the protection of distributed data in the decentralized colleges, departments and administrative units. A May 8, 1998 memo from Don Scoble, Vice President of Business and Finance, to cabinet officers, deans, and directors addresses the issue of protection of distributed, mission-critical data and provides guidelines for the departments to follow.

PLAN VALIDATION AND MAINTENANCE

EXERCISING

There has not been a combined campus-wide emergency preparedness test event. Evacuation drills were done systematically to minimize disruption of campus operations.

Executive Order (EO) 524 requires each campus to develop an ongoing program for testing its emergency plan including a single, combined campus-wide test event to be conducted at least once every two years.

The director of public safety stated that this approach is less disruptive of campus operations. In our opinion, this approach does not meet requirements of EO 524.

Because a campus-wide test event has not been completed, the full impact of an actual disaster on campus resources may be underestimated.

Recommendation 12

We recommend that the campus conduct a single campus-wide test event at least once every two years.

Campus Response

We concur. We have evacuating each building once a year and holding periodic annual EOC table top exercises. While we continue to feel evacuation of the entire campus at one time will be disruptive to the campus environment, we will schedule a campus-wide test event in compliance with Executive Order 524 within the next six months.

REPORTING TEST RESULTS

Reporting of emergency response drills and simulations results is minimal.

Executive Order 524 requires the campus to maintain summary records of each emergency response test event with particular emphasis on documentation of weaknesses or failures in existing planning and the development of appropriate proposals for amending plan documents.

The director of public safety indicated that individual and campus emergency plans have been appropriately updated when deficiencies were identified during drills and simulations. However, specific requirements as to what is reported to whom did not exist.

Without specific procedures, exercises and test results might not be documented in consistent detail. If these results are not appropriately distributed, necessary corrective actions might not be taken to enhance the campus *Multi-Hazard Emergency Plan*.

Recommendation 13

We recommend that the campus enhance and standardize reporting on exercises.

Campus Response

We concur. After an exercise, we do discuss the results with the Building Coordinators, and update plans accordingly. We will reduce these conversations to writing in the future.

CRITICAL CAMPUS EMERGENCY INFORMATION

Up-to-date versions of the critical campus emergency information were not maintained within the EOC.

At the time of our examination, the following was not maintained within the EOC:

- Current maps of the campus including locations of hazards (chemical, biological, radiological, zoological), as required by the Fire Marshal;
- Updated inventories of hazardous materials maintained on campus as required by the California code of Regulations; and
- An updated inventory listing of plant operations emergency supplies and equipment, including precise location information, which could be critical in the event of an extensive campus-wide disaster.

The safety of campus occupants and disaster workers is significantly impacted by the lack of availability of current critical campus information within the EOC.

The director of environmental health and occupational safety indicated that the campus does maintain current hazardous material information on campus; however, it was not maintained within the EOC.

Individuals might be unnecessarily exposed to foreseeable risks of harm, if the above critical campus emergency information is not available to emergency situation management.

Recommendation 14

We recommend that the campus take appropriate steps to ensure that up-to-date versions of critical campus emergency information be maintained within the EOC.

Campus Response

We concur. The Director of Public Safety reports that current campus maps and emergency supply and equipment listings are being maintained in the EOC.

The Office of Environmental Health and Safety (EHOS) updates the campus-wide hazardous materials inventory annually. This update includes chemical, biological, and radioactive materials, as required by the Hazardous Materials Unified Program Agency. The 1998 inventory, which includes floor plans and specific locations of materials, is now available in both EOCs (primary and alternate) and the EHOS office. The inventory will be updated annually, or whenever there is a significant change in the inventory which may impact the University's ability to respond to emergencies. In addition, each department maintains its own specific inventory.

The Plant Operations emergency supplies and equipment inventory is listed in the 1995 Multi-Hazard Emergency Preparedness Plan, Section XIII Facility Emergency preparedness. Section XIII includes lists of supplies, location of supplies, key numbers to access storage rooms, emergency generator locations, light unit locations, and instructions and other pertinent emergency information.

ELECTRIC POWER GENERATION

Planning and oversight of emergency electric power generation was incomplete to meet the campus *Multi-Hazard Emergency Plan's* objectives.

The following, with respect to emergency electric power generation, requires further consideration by the campus:

- slippage in scheduled generator maintenance;
- small generators not included in preventative maintenance tracking;
- detailed location records for small generators were not maintained; and
- short-term and long-term emergency generator fuel reserve requirements, considering estimated power needs for the EOC and other critical campus emergency functions, had not been established.

Sufficient planning and oversight is needed to meet the campus *Multi-Hazard Emergency Plan's* stated purpose for campus emergency equipment (page 67) to be prepared to stand alone for a significant period of time, i.e., 72 hours.

According to the director of plant operations, planning and oversight of electric power generation is a high priority. He indicated that the slippage in preventative maintenance schedules were the result of conflicting demands on facility maintenance staff. The remaining issues have been considered, and an automated system is under development to meet related control objectives, including monitoring of preventative maintenance.

Campus emergency power needs might not be met during an actual disaster.

Recommendation 15

We recommend that the campus implement planned systems to improve and enhance control over emergency electric power generation capabilities.

Campus Response

We concur. The University has reinstated a monthly program of preventative maintenance, including an annual load test by an outside contractor. The replacement of units will be included in the Campus funding request for the Minor Capital Outlay Program as a project to correct life safety deficiencies.

OFF-SITE BACKUP – COMPUTER RECORDS

Telecommunication and network data back-ups were not consistently stored off-site.

Regular, off-site backups of computer data is a critical component of computer services disaster recovery plan (DRP).

The executive director of computer services indicated that systems were adequately backed up, but procedures to regularly store telecommunication and network data off-site were not applied consistently by staff.

In the event of a disaster, transactions entered into and processed by these systems could be permanently lost or need to be recreated at a significant cost in time and effort.

Recommendation 16

We recommend that the campus store regularly backed-up telecommunication and network data off-site consistent with its DRP requirements.

Campus Response

We wholeheartedly agree with the recommendation to store regularly backed-up enterprise data off-site, which is why we have had an agreement with the vendor, Arcus, to provide off-site storage for the last several years. Vital administrative and student records are consistently rotated and stored off-site. We were pleased that the auditor notified us of the inconsistency regarding the less critical telecommunications and network data; the practice was rectified immediately.

PLAN UPDATES

The *Campus Multi-Hazard Emergency Plan* requires revision.

For example, the computer services section was recently updated and needed to be included within the distributed campus-wide plan. Similarly, facility maps included within the plan did not reflect all changes in the location of utilities, etc. Finally, a ham radio communication system described within the plan was not implemented.

CO Executive Order 524 calls for maintenance and regular updating of the *Campus Multi-Hazard Emergency Plan*.

According to the director of public safety, the procedures and practices for emergency preparedness are under constant revision and the above had not yet been included within the current version of the plan. The director of plant operations indicated that utility maps were accurate except where impacted by new construction on campus. Finally, the director of public safety stated that all updated sections will be included in the next printing/distribution of the full campus plan

When written plans are not kept in line with practice, the results of campus planning may not be optimized.

Recommendation 17

We recommend that the campus revise the *Multi-Hazard Emergency Plan*.

Campus Response

The *Multi-Hazard Emergency Plan* is constantly under revision. As changes are made, the revised section is added to the Multi-Hazard Emergency Plan binders located in the Department of Public Safety, both EOC's, and the affected departments. Publication and distribution of an updated complete MHEP is scheduled for September 1, 1998.

INCOMPLETE EQUIPMENT AND SUPPLIES

Significant amounts of disaster preparedness equipment and supplies have been requested for readiness purposes, but not funded. We were unable to determine whether or not this equipment and supplies was critical to the campus' disaster readiness.

The July 1995 *Report of the Ad Hoc Committee on Emergency Preparedness* indicates that adequate investment in equipment and supplies is a component of good disaster planning.

The director of public safety indicated that various supplies are still needed, however, they have not been obtained because of a system-wide lack of funding.

The campus cannot achieve its planned emergency readiness objectives if required equipment and supplies are not available.

Recommendation 18

We recommend that the campus emergency operations executive compile a list of equipment and supplies needed to meet the minimum requirements of the campus *Multi-Hazard Emergency Plan* and identify those requests that do not meet that objective.

Campus Response

We concur. The Director of Public Safety will prepare such a list by June 1, 1998.

EXPENDITURES

The campus did not budget, track or coordinate disaster readiness expenditures.

SAM §20003 states that the elements of a satisfactory system of internal accounting and administrative control shall include a system of authorization and recordkeeping procedures adequate to provide effective accounting control over assets, liabilities, revenues, and expenditures.

The director of public safety indicated that disaster readiness was not funded separately, thus it was not tracked separately.

The absence of a coordinated spending effort exposes the campus to ineffective control and accountability over disaster related acquisitions.

Recommendation 19

We recommend that the campus track and coordinate disaster readiness spending.

Campus Response

We concur. A new accounting cost center will be established under the Department of Public Safety effective July 1, 1998, for use in tracking disaster readiness expenditures.

BACKUP OF VITAL RECORDS

The campus is not backing up and storing off-site "first-class" records in several key areas.

The July 1995 *Report of the Ad Hoc Committee on Emergency Preparedness* suggests that campuses maintain a backup of critical data and information at an off campus location. Examples included building floor plans, utility maps, and contract documents.

The chief financial officer and human resources director indicated that the campus is setting up an imaging system for backups.

If a disaster should destroy the area of the building where the primary records, backup copies, and source documents are stored, the records may be permanently lost or may not be easily recreated in a timely manner. This could disrupt campus operations.

Recommendation 20

We recommend that the campus backup and store off-site all vital records.

Campus Response

We concur with the desirability of backing up and storing all vital records off-site. The campus, through the off-site storage of computer tapes and student records, partially accomplishes this goal. Currently, however the campus cannot fully meet the intent of this recommendation. Funding and staff time is not available to place all vital records on a medium which is easily stored and retrievable but not cost prohibitive.

Other steps have been and are being taken to comply with the intent of this recommendation:

- Original personnel files and appointment and pay documents are stored in a file room behind a locked fire resistant door. Most such records could be reconstructed from copies kept by originating departments. Much vital employment and payroll information is available (backed up) from the State Controller's Office.
- Optical scanning projects are underway in Enrollment Services, Fiscal Affairs, and the President's Office.
- Over the next few years we plan to implement the Oracle Financial and Human Resources applications which will capture transactions and approvals in digitized formats that can be backed up off-site.
- Campus Physical Planning and Development has back-up copies of all floor plans and utility maps on computer tape and will seek an off-campus storage site (possibly at the Tiburon Research Center) to store this information.

APPENDIX A: PERSONNEL CONTACTED

<u>Name</u>	<u>Title</u>
Robert Corrigan	President
Gretchen Armstrong	Secretary to Associate Dean, College of Education
Christopher Bomar	Executive Assistant to Vice President, Business and Finance
John Bredimus	Director of Operations, College of Behavioral and Social Sciences
Phillip Evans	Assistant Director, Plant Operations
Denise Fox	Director, Human Resources
Kirk Gaston	Lieutenant, University Police
Michael Grodzicki	Manager, Telecommunications
Daniel Ho	Hazardous Materials Coordinator, Environmental Health and Occupational Safety
Robert Hutson	Director, Plant Operations
Phoebe Kwan	Director, Campus Systems, Computing Services
Simon Lam	Project Manager, Capital Planning
Myra Lappin	Director, Student Health Services
Linda Madden	Supervisor, Access and Personnel Services, Library
Dave McCormick	Project Coordinator, Capital Planning
Dan McGough	Manager, Technical Services, College of Creative Arts
Richard Miller	Supervisor, Building Services Engineer, Plant Operation
Janice Norimoto	Director, Residential Dining Services
Melissa Purcell	Director, Housing and Residential Services
Robert Quinn	Vice President, Physical Planning and Development
J.E. Saffold	Vice President, Student Affairs/Dean of Students
Heidi Schmidt	Director, Computing Support Services, Computing Services
Stephanie Schwartz	Administrative Assistant, Provost and Vice President for Academic Affairs
Don Scoble	Vice President, Business and Finance
Robert Shearer	Director, Environmental Health and Occupational Safety
Don Smalley	Coordinator, Purchasing and Contracts, Business and Finance
Richard Stevens	Chief Engineer, Plant Operations
Bernadette Tano	Compliance Specialist, Environmental Health and Occupational Safety
John True	Executive Director, Computing Services
Jim Van Ness	Internal Auditor, Business and Finance
Larry Ware	Controller, Business and Finance
Kim Wible	Director of Public Safety