DRAFT

BUILDING A DISASTER-RESISTANT UNIVERSITY

Draft –5/10/2000

The Federal Emergency Management Agency

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Executive Summary

> *During my time at FEMA, the President has declared disasters in every state--two or three times in some states. The costs are staggering. It takes years for governments, businesses and universities to recover financially from these disasters. Many of these institutions could have been protected through mitigation actions. FEMA is committed to promoting disaster resistance and assisting the nation's universities and colleges in their efforts to reduce future losses.*
>
> ***James Lee Witt. Director, FEMA***

In the last decade, disasters have visited university campuses with disturbing frequency, sometimes causing death and injury, but always imposing large monetary costs and disruption. The costs involve more than repairs to buildings and infrastructure; interruptions to teaching and research result in significant business losses measured by faculty and student departures, drops in research funding, and increases in insurance premiums.

Disaster-related costs show no clear sign of decreasing--in any sector--in the immediate future. Loss studies indicate that, at universities such as UC Berkeley, Miami, and Washington, the worst may be yet to come. University administrators concerned with capital asset management and improvement, and liability control, have recognized that strategic risk reduction is the way to get the largest return on investment while protecting the lives and work of all members of the university community. Positive steps will ensure that your institution remains viable well into the future.

This Could Happen to You

A quick review of major disasters in the past ten years reveals the many hazards to which universities are vulnerable:

- The 1989 Loma Prieta earthquake damaged a number of buildings at Stanford University, closing 11 of them. After spending about $300 million over ten years on repairs and retrofits, Stanford has finally reopened most buildings.

- In 1992, Hurricane Andrew caused $17 million in damage to the University of Miami. The school was compelled to close for almost one

month because there was no water or electricity, and to purchase round trip tickets to send students home in the hiatus. Insurance premiums went up dramatically after the disaster.

- The January, 1994, Northridge earthquake damaged three universities in the Los Angeles area. California State University, Northridge suffered the most: nearly all of its buildings were damaged and the university was forced to close for one month. It was able to reopen to its 30,000 students with 450 temporary trailers serving as the only classrooms. Damages are currently set at $380 million. Six years later CSUN still does not have one usable science laboratory.

- In April, 1997, the Red River of the North inundated the University of North Dakota. It was forced to relocate critical functions such as the computer center, send students home and close. After one month of inspection, clean-up efforts, and repairs, UND reopened. The damages have so far totaled $46 million.

- Just three months later, in July, 1997, the Colorado State University campus was flooded by a local creek; water poured into both the library and the bookstore, damaging hundreds of thousands of books and other valuable documents. Most of the campus was closed for a week or two while clean-up was underway. Damages exceeded $100 million.

- At Tulane University in New Orleans, Hurricane Georges prompted the closure and evacuation of the campus in 1998. Ultimately, the hurricane did not hit New Orleans, but Tulane's risk management practices dictate early evacuations to protect the university community's safety.

- On Labor Day, 1998, a severe windstorm in central New York State damaged many buildings, trees and utilities on the Syracuse University campus, forcing closure of some residence halls and relocation of 600 students. The costs of repairs to roofs, windows and masonry, as well as a big debris clearance bill, drove the damage figure to over $4 million.

- A July, 1999, heat wave resulted in a sustained power outage in New York City. The electricity went out at Columbia University and was not completely restored for two or three days. In the intervening time, researchers at Columbia's College of Physicians and Surgeons lost irreplaceable research materials--human tissue, enzymes and cells--because there were not sufficient back-up generators to keep freezers or incubators running. Damages to the $200 million research program were calculated at many millions of dollars.

- In September, 1999, Hurricane Floyd pounded ashore in North Carolina. causing serious flooding at East Carolina University in Greenville. The

Both the UCLA Medical Center and the Los Angeles County-University of Southern California Medical Center sustained major damage in the 1994 quake. Engineers estimated the cost of repairs for the UCLA complex at $1.8 billion.

campus was surrounded by water for weeks and could conduct only part of its classes and other activities. Some students had to lodge with residents in the town.

- On January 19, 2000, a fire raced through an old residence hall at Seton Hall University in the middle of the night. Students leapt from windows, crawled out stairways, and a number were rescued by firefighters. The fire killed three students, seriously injured 12 more, and traumatized everyone there. The residence hall did not have a sprinkler system.

Columbia Presbyterian Medical Center struggled with limited power due to malfunctioning generators. Lacking the use of electricity-dependent equipment, the conditions under which personnel worked were described as similar to those in developing countries.

Prospectus

Over the past ten years, FEMA has awarded billions in disaster assistance to public and private universities in the United States. Private insurance carriers have paid out substantial sums to the universities as well. Business interruption costs to the universities are much harder to calculate, but certainly equal hundreds of millions.

Federal research investment at many of these institutions was significant. What was lost to the researchers and the U.S. taxpayers when research projects were interrupted or ruined? Every year, federal research grants to U.S. universities total around $15 billion. Where will the next disaster close down a university and its laboratories?

FEMA's Disaster-Resistant University Initiative is intended to support efforts by universities to reduce and manage their vulnerability to hazards. This guide demonstrates loss reduction measures to avoid damages that may kill or injure students, faculty and staff; cost millions to repair; interrupt teaching; and harm research activities. Risk management policies, plans, and practices can be integrated into the day-to-day decisions of the campus. Management also involves ongoing education for the campus community on the impacts of natural hazards, the implications of hazard events, and appropriate measures to reduce the risks.

This guide demonstrates that every university can decide how best to achieve its unique mitigation objectives--unique because risks differ from campus to campus. The approach is based on experience with FEMA's Project Impact ("*Building Disaster-Resistant Communities"*), other university planning and management efforts, and a prototype project at the University of California, Berkeley (UCB).

Approaches already used with Project Impact cities and counties are here applied to universities to demonstrate the value of: 1) loss estimates and risk assessments; 2) strategic loss reduction plans; 3) using local experts and their expertise; 4) identifying and implementing mitigation priorities;

5) partnerships with public and private sector stakeholders; and 6) using the media to educate about risk and acknowledge risk reduction efforts.

Chapter 1

A Disaster Resistant University

"Our top priority is the protection of the life and safety of students, faculty and staff. We also want to ensure the sustained operation of the campus. As one of the region's largest job centers, and an important research and educational center for the nation, it is very important for the campus to continue business if a major quake strikes." ***Robert Berdahl, Chancellor, UC Berkeley***

Characteristics

A Disaster Resistant University understands the threat posed by natural hazards to its campus and its mission. It actively implements policies, programs, and practices to address its risk. It integrates loss reduction into its teaching, research and public service activities. It has the leadership and plans necessary to reduce risk to the level the campus community believes appropriate.

A 1997 engineering survey of all its buildings revealed to University of California, Berkeley administrators that 27% of their buildings would perform poorly in an earthquake on the Hayward fault. The Chancellor then created a seismic safety program, SAFER, and pledged to commit the resources and time over the next 20-30 years to upgrade buildings and improve business planning to survive a major quake.

The committed leadership understands the need to sustain the university's research and teaching standards in the face of the damages, repair delays and financial diversions a disaster can bring. Ultimately, the organization will be able to withstand the impacts of foreseeable hazard events without unacceptable losses or interruptions to its instruction, research and community service missions.

A Disaster Resistant University is committed to becoming resilient in a selected period of time. Resilience is characterized by structures that meet life safety standards, an emergency response that will rescue those in danger and minimize additional damage, and limited interruption to teaching and research. Each campus will vary in its definition of acceptable losses and interruption because these decisions depend on the community, the nature of the hazard and available resources.

Resilience does not imply there will be no damage in large events. Hurricanes, tornadoes, floods, fires, earthquakes are similar in that the damage varies by the force of the event and the location where the energy is

focused. However, a Disaster Resistant University will have in place the following components needed to reduce losses:

- A strategic loss reduction and risk management plan endorsed by the chief executive officer on the campus to guide its efforts.
- An ongoing to retrofit or rehabilitate existing buildings, utilities, and equipment or contents to improve their performance when subject to the hazards.
- Projects from this list are included on the campus capital outlay plan or operating budget, and new projects are undertaken yearly.
- A current building code that addresses the hazards germane to the campus. Enforcement of a code for all new construction and renovation work through independent checking of construction plans and inspection of construction.
- A campus master plan, or land use plan, that identifies hazard areas and conditions and has policies that assure hazards are considered in land use or development decisions regarding new buildings and utilities.
- An up-to-date business resumption plan and ability to re-establish teaching and research with minimal reliance on external assistance.
- An emergency response capability that can manage the disaster, supplemented by resources from neighboring communities and the state.
- Arrangements to use university resources to assist neighboring communities.
- Agreements with the surrounding community or city regarding the disaster resistance of the community's critical facilities and the private commercial and residential services used by university faculty, staff and students.
- A recovery scheme to guide decisions about prioritizing, financing, and performing repairs and rebuilding projects in the aftermath of disaster losses.
- Ongoing educational/informational programs on disaster resistance for the campus community, the public, the board of trustees, and legislative representatives.
- Stakeholders interested in the disaster resistance of the campus, and partnerships with them to provide financial and political support for project implementation.

The University of Washington is working closely with Seattle's Project Impact to improve the mutual disaster resistance of both the city and the university. Utilities are one of the cooperative projects

Commitments

A Disaster Resistant University will commit to changing policies and practices to reduce its potential losses and manage its ongoing risk. It will

also promise to involve government, private utilities, and businesses in its loss reduction and risk management.

1. Policy commitment

- The campus will evaluate its risk and adopt a policy statement describing the acceptable level of risk (public safety, performance of buildings, transportation and utility systems, and emergency response standards, interruption of business).
- The campus will enforce codes and standards with provisions for the relevant hazards.
- The campus will engage in master planning that locates hazard zones and vulnerable elements, and that contains enforceable policies to reduce the risk.
- The campus will stop subsidizing risk. For example, decisions to put the university's research park in the 100-year flood plain or build new student family housing there are counterproductive to disaster resistance.

2. Process commitment

- The campus will prepare a detailed risk assessment to establish a baseline that identifies relevant hazards and vulnerable structures and systems. It will use it to set performance objectives for the community, its building, transportation and utility systems. Each campus will define what constitutes a disaster "resilient" campus in its own context.
- The campus will designate a person with significant leadership responsibilities to actively manage the disaster resistance project.
- The campus will form a high-level leadership council consisting of a high-level administrator; officers representing facilities and maintenance, capital projects, budget, and physical and environmental planning; representatives of the community such as a building official and planner; officers from utility companies, and local business leaders. The council will meet frequently to evaluate and guide the progress of the DRU project.
- The campus will follow through over a period of many years.
- The campus will document its effort to encourage and assist other jurisdictions in carrying out similar programs.

At the University of Miami, a risk assessment was prepared by a consulting firm with extensive experience in GIS-based loss estimation.

Appendices Supporting Chapter One

Please refer to the Appendices in Chapter 6 for the following materials:

Appendix A-1: UC Berkeley and the SAFER Program

Chapter 2

Risk Assessment

"If anybody had told me before the '94 quake that all the buildings on campus would be damaged and closed, I would have said they were crazy. But that's what happened--every last one of them. A few we were able to open up in a week or so, but others have taken years to repair or replace."

--Blenda Wilson, former President, California State University Northridge

Once the commitment to disaster resistance is made, begin to assess the local hazards and the university's vulnerability to them.

After the Northridge earthquake, the universities in the Los Angeles area realized that the San Andreas fault isn't the only earthquake source to worry about. In fact, awareness of the known faults isn't enough: Cal State Northridge was sitting virtually on top of a fault no one knew was there.

Initial Steps

1. Define the Hazards

Identify the natural hazards that threaten the campus. Technological hazards, such as hazardous materials incidents, may be triggered by natural hazards. If there is any doubt regarding hazards on the campus, contact on-campus authorities in such departments as engineering and earth science. Additional information can be gotten from the local or county office of emergency services, state office of emergency services or geological survey, or FEMA regional office. Typical natural and technological hazards are listed below.

Natural Hazards of Concern

- ☞ Coastal Erosion
- ☞ Fire (urban-wildland interface, conflagration, and facility fires)
- ☞ Hazardous materials incidents
- ☞ Hurricane (wind and storm surge)
- ☞ Landslides & Mudflows
- ☞ Tsunami and Seiche
- ☞ Earthquake
- ☞ Flood
- ☞ Severe Weather (ice storms, hail, high winds, drought)
- ☞ Tornado
- ☞ Volcano (ash fall, blast, debris flows)

After identifying the hazards that affect the area, administrators may use the **General Vulnerability Checklist (Appendix A-2)** to begin to get a complete picture of campus vulnerabilities. This requires no specialized knowledge; a broad understanding of the campus will do.

2. Who is Responsible?

The campus chancellor or president should appoint the person responsible for the assessment effort. This person should be a high-level administrator who commands respect, particularly among faculty, and can inspire the cooperation of others with experience or data relevant to the issue. In addition to faculty, this may include graduate and upper division students under the guidance of faculty. Additionally, campus administrative staff responsible for planning, facilities management, risk management or emergency response will have much to contribute to the initial work.

3. Prepare a Map

Display on a map of campus buildings and utilities the areas affected by hazards. In the beginning, this will involve simple tasks like delineating the fault zone, flood plain, or storm surge run-up zone. Identify areas historically affected by discrete hazards. The map should extend beyond the campus boundaries to include campus-related facilities such as residential areas, city fire stations, transportation facilities, and fraternity and sorority buildings. Placing this map on a geographic information system (GIS) will make it more useful as the project progresses and the data get more complex.

At UC Berkeley, the SAFER Program published a map of poor and very poor buildings in 1997. Bad buildings are easy to see. The map is now updated as buildings are improved.

As the study progresses, add to the map classroom buildings, communications and computer facilities, laboratories, animal facilities, offices, libraries, food service, historic and architecturally important structures and parking areas. Then locate "essential services" needed during and immediately after a hazard event. This would include fire, police, emergency communications, emergency operations centers, medical facilities, and shelters. Also place on the map hazardous materials and biological agent storage and use areas, as well as animal facilities.

4. Gather Data

To obtain the information in the list below, first learn what data is already available, in various university offices. In some cases, this may require persuasion and/or pleading. After assembling the extant information, it will be necessary to integrate it into one data base. That will serve both the DRU project and all the other facilities and planning efforts on the campus.

" Obtain an accurate listing of all buildings on the main campus, as well as those that the university may own on outlying properties, with as much detailed information about the buildings as possible. Typically, this data is held by a facilities management department.

" Determine the amount of space in classrooms, laboratories, offices, libraries, and other facilities such as convocation spaces. Most campuses have an office that manages the assignment of space to various departments or units. Note that residential and parking structures should be accounted for as well.

" Get a map or maps of the main campus infrastructure--power, water, sewer lines, voice and data communications systems. This is usually in the domain of the managers of the physical plant or facilities management.

" Find out if any assessments of facilities have been done, perhaps for hazardous materials management, deferred maintenance, or for insurance purposes. Collect the documentation.

" Create a simple database from the above information as a basis for analyzing the amount of space in different uses, as well as the total space occupied, and begin to highlight known vulnerabilities.

At this point, a "snapshot of vulnerability" will be helpful in summarizing the findings so that they can be used for the following steps outlined below. **(See Appendices A-3 and A-4 for sample Snapshots of Vulnerability.)**

5. How is the University's Mission Threatened?

The universityís mission can be affected in various ways by each hazard event. Although damages to buildings and costs of repairs are important, also include initial estimates of potential failed experiments, lost administrative and research data, damaged libraries and collections, damaged computer and communications systems, loss of historically or architecturally important structures, and of injuries to students, faculty and staff,. Take into account the disruption to teaching and research while repairs are underway, faculty flight, inability to attract new students, and income losses.

If a large medical facility is connected to, or associated with, your university, determine which of operations are most at risk to local hazards. Teaching activities? Research dollars? Community service and patient care? Then consider how the mission of the facility is threatened, and how that affects the university as a whole.

Furthermore, a disaster will set back a university's capital expansion and modernization efforts, making it difficult to keep current with needs imposed

by cutting-edge technology and research innovations. Repair and retrofit will become a priority for capital funds, at least for some period of time.

Since the university may be dependent on matters beyond its immediate control, these items must also be taken into account. Damage to city- or utility-owned facilities, to transportation lifelines, or to the residential building stock in the community can affect the ability of the campus to function properly.

6. Do the Risks Merit Action?

The initial review will help the campus leadership determine whether natural hazards pose a significant threat to the mission of the university. If so, the chancellor or president can decide to perform a detailed loss estimation study, and to engage in a formal strategic planning process.

Summarize the initial observations resulting from the steps 1 through 5, and write a summary that clarifies the issues. The summary could be in the form of a proposal for funds. It should establish a time line and a budget. **(See Appendix B for a sample schedule and budget.)** The chancellor or president can use this summary to formally endorse the effort and to engage the participation of stakeholders from the campus and external communities.

Detailed Risk Analysis

1. Improve on the Initial Hazard Assessment

Engage experts from the campus or the community to describe the hazards more precisely and in terms of their likelihood. Move to more complex mapping that might include a detailed earthquake shaking map or a hydrological analysis of peak flood elevations. This information is needed to understand the risk due to hazards that will vary in frequency and effect. Digitizing information for use with a Geographic Information System will make the information more useful. Emphasize areas where essential activities are located.

2. Perform an Assessment for Selected Areas of Concern

Identify buildings, utility systems and communications networks that are important because of their heavy use, numbers of occupants, presence of hazardous substances or other factors. The initial assessment should have indicated where to concentrate your efforts. Collect information on the vulnerability of these critical facilities. For flood, this may be elevation and the susceptibility to water damage of contents below a given elevation. For earthquake, the FEMA vulnerability screening methodology could be used. For hurricane, consider structure vulnerability to wind, and content

vulnerability to water from roof and window damage as well as from flooding.

People, animals, buildings (structures and contents), communication systems and utilities are vulnerable in unique ways to hazard events. What effects will the hazards have on them? Where are key facilities relative to the areas most at risk? Will campus employees have access to the campus, especially those who provide essential services or maintain critical facilities? Estimate the time needed to get critical activities back in working order. Consult with the campus community and with campus experts on these matters.

People--Reducing the potential for death and injury to students, faculty, staff, and visitors should be paramount. In addition to work spaces, consider whose living quarters are threatened (private residences and university-supplied housing). Who will be in shelters--students, faculty, staff? Beyond that, consider how repairs and general community disruption will impede everyone's getting back to work. Will faculty and staff have access to the campus, to offices and to laboratories in the aftermath of a disaster?

Buildings--Describe various building characteristics: structural, nonstructural, age, deferred maintenance, and content values. In each building, calculate the value of sponsored research projects located there, as well as the associated investments in equipment. If flooding is a risk, note the research investment in basements and ground floors of buildings. Identify "safe areas" for shelter when short-term warning is received, as for example in tornadoes or tsunamis.

Uses--Describe buildings according to use: classrooms, research laboratories, libraries and collections, housing and dining, special uses such as gyms and concert halls, parking, and police, fire and emergency services. Also include occupancy, which can be described in one of two ways: 1) estimated continuous occupancy (ECO), an annualized average; or 2) typical peak hour occupancy (an hour between 8 a.m. and 5 p.m.). Include consider vulnerable facilities located off campus that affect the university (student and faculty housing, transportation access, utilities, fire, medical and police services).

Contents--Many of the losses in any disaster are to contents, furnishings, and the electrical and mechanical systems in buildings. These include laboratory animals, library and other collections, laboratory equipment and systems, computer and communications equipment, irreplaceable specimens. Begin to assess the potential losses and how they might be reduced. Inform all members of the campus community what they can do to protect themselves from damage to their research data and valuable belongings.

- **Infrastructure**--As with buildings, describe conditions and vulnerabilities of utilities and communications systems. Electric, water and gas systems are essential for campus activities and may be critical to maintaining many types of experiments. Internet and e-mail dependencies grow with every passing day. Will they be interrupted and, if so, for how long? Are there back-up systems and are they reliable? Administrative systems (payroll, accounts payable, student records) are critical to continued operations.

3. Estimate Losses

With the above data, it is possible to calculate repair and replacement costs, and downtimes--the amount of time necessary to get each building or system operational. The downtime estimates are critical to setting strategic goals and very useful in business continuity planning.

A method is available for estimating the effects of damages on campus business. **(See Appendix C for a sample loss study)**. This involves looking at vulnerable labs, the income of such labs, and the potentially lost or disrupted research. Further, it examines issues of human capital--students, faculty retention and ability to teach.

With these data, it estimates the effects of campus business interruption not just on the university, but also on the economy of the surrounding region. Capital replacement (repair cost), campus expenditures, salaries and benefits, and other measures of local spending are included in the calculation. The approach can be used to demonstrate the degree to which a surrounding community is dependent on the ongoing business of its university, and may persuade community members to support the campus in its efforts to become disaster resistant.

4. Quantify and Display the Losses

Once the vulnerabilities begin to become clear, it is vital to get the information to decision makers and the entire campus community. Before publication of written reports, and potential loss figures, make certain that the president or chancellor is briefed, as well as deans and department chairs particularly affected by any findings. Determine whether there are particular issues that should not be publicized in order to guard against possible terrorism or sabotage.

Depict the data graphically as often as possible. Maps--both simple ones and computer-based--will be valuable tools. **(See Appendix D for sample maps.)** Involve campus and community media in discussing both the vulnerabilities and what the university is doing about them. Have

information sessions around campus. Invite the specialists who contributed to the loss estimation to speak on their findings. Create a webpage with all the information. Update it frequently.

Geographic Information Systems (GIS) can be used to store and access the mapping information. The maps can picture the areas, systems, and functions that are at risk. Further, a GIS database can depict graphically the damaged areas and buildings, costs of repair, and concomitant threats to mission that will assist in priority setting. There may be value in displaying summary results by college or department. Regional and city loss estimation models, for example FEMA's HAZUS program, can help you picture the risks to the community at large.

5. Review Options for Loss Reduction

Survey the recommended mitigation techniques for the kinds of losses you anticipate. Review the costs and benefits associated with each. Develop and implement the associated capital projects, policies, spending approaches, and business operations practices that would support your campus mission and objectives.

Resources for Performing the Analysis

To complete the detailed risk analysis, it will be necessary to engage the services of various professionals on particular elements. A number of such professionals are likely to be right there on your campus, but others may be located in the larger community and can be engaged to assist you. By sharing human resources with the community surrounding the campus, gaps in experience can be filled to the benefit of both.

1. On-Campus Faculty and Professionals

Faculty members may already have answered some of your risk questions as part of their own teaching or research activities. They may also participate in committees or study groups that focus on issues related to campus hazards and vulnerability. For example, at UCB there has long been a Seismic Review Committee, made up of structural engineers from engineering departments and the PEER Center, that identifies and advises the Planning Design and Construction Division on all issues related to seismic specifications for new or retrofit buildings.

Beyond academicians, there are other specialists on your campus--in units such as Facilities, Planning, Environmental Health & Safety, or Risk Management--who have data or expertise to help in the risk analysis. Ascertain first who on campus has the information you need, and where, and

then you can decide what additional assistance you must search for off-campus.

2. Off-Campus Consultants

When the expertise you need is not available on campus, you must look to the community for help. There, you may find specialists in the city or county government who will help you as part of their jobs, or scientists working for the state department of water or geology. Already established community working groups or committees may have some of the information you need; or they may agree to help you get it. Perhaps your search for assistance will lead you to a planner in the university's Office of the President or a financial analyst in the legislature.

Failing that, hire consultants to investigate particular issues and/or give you their professional judgment. Geotechnical and structural engineers, hydrologists, economists, survey research firms, building code specialists, fire prevention specialists or historical preservation advisors can provide critical data and recommendations.

Appendices Supporting Chapter Two

Please refer to the Appendices in Chapter 6 for the following materials:

Appendix A-2: General Vulnerability Checklist

Appendix A-3: Snapshot of Vulnerability, University of Washington

Appendix A-4: Vulnerability Survey from a hurricane or flood university--WE NEED

Appendix B: Project Schedule and Budget

Appendix C: Sample Loss Study

Appendix D: Sample Maps

Chapter 3

Developing Interest and Support

To engender support--moral and financial--for the risk management plan, seek out partnerships with members and groups in the community. That's community in the LARGEST sense of the word. The stakeholders are everywhere: on campus and off. They are in government (city, county, state, federal), business, and community groups. Identify your shared and individual responsibilities for a safer, disaster resistant community and begin to consider how each can contribute to that goal.

The DRU process should be structured to create long-term support through the education of decision makers--intramural and extramural--not just once, but year after year. Universities have multiple and independent decision-making bodies, academic and administrative leaders change frequently, and regents and trustees are often motivated by political agendas. A highly placed administrator must support and "sponsor" the DRU project, and assist in educating his or her colleagues. Institutional commitment can be secured only by regular efforts to help decision makers understand there is a problem, that there are practicable ways to solve it, that there are benefits to doing so, and that it would be remiss of them not to work on it.

In this regard, be prepared to capitalize on big and small disasters in the region and nation, or, for that matter, the world. Disasters caused by hazards to which your university is vulnerable can be used as object lessons to the campus and the community. Impacts on universities elsewhere illustrate probable future problems on your campus after a disaster. Never miss an opportunity to call attention to other disasters because they create a "window of opportunity" for raising awareness and making progress on related initiatives and programs. The window may remain open only a few days or a

couple of weeks, but that will be long enough for your purposes if you are ready.

Steps Toward Partnership

1. Advisory Group

Appoint a Campus/Community Steering Committee. Decisions on how to deal with the effects of hazards on the university are best based in policy and program, that is, institutionalized. They are issues that should be considered by the chief executive of the campus—the president or chancellor—in consultation with trustees and academic leadership. It involves matters affecting academic, research and administrative units, the acceptability of risk, funding priorities, the surrounding community, the fiduciary responsibility of a board of trustees or regents, and the need for fundraising. Constitute a DRU steering committee of policy makers and others knowledgeable in pertinent areas to guide your efforts in both loss estimation and strategic planning. Work with, and appoint, professionals on the campus already involved in emergency preparedness, crisis response, or risk management, but make certain that the Steering Committee is made up of people whose purviews extend far beyond what is typically thought of as emergency services or environmental health and safety.

The committee should be small enough so members will actively participate and have a sense of ownership, and large enough to include important points of view and key decision makers. The committee can build relationships needed to facilitate compromise and engender commitments to carry out the plan.

Although not applicable to all campuses, the UC Berkeley experience will help to illustrate the general approach. At UCB, a member of the Chancellor's cabinet chairs the committee. Serving from the campus are the Vice Chancellor for Capital Projects, Vice Chancellor for Resource Planning and Budget, Assistant Vice Chancellor for Research, a dean of Letters and Science, Chair of the Academic Senate, and Directors of Business Services, Emergency Preparedness and Community Relations. From the Office of the President, the Assistant Vice President for Facilities serves. From the community, there are representatives of the City Manager and two businesses: a small property management company, and the Bayer Corporation. UCB is also fortunate to have the participation of its Bay Area neighbor, Stanford University; a Stanford Vice Provost brings to the committee Stanford's experience recovering from the 1989 Loma Prieta earthquake, and their ongoing risk management concerns.

Appointing a few campus experts can be helpful. At UCB, two engineering professors and an architecture professor, well-respected in the earthquake

field, are on the steering committee. Not only do they have an interest in the issue, but also they provide educated judgment and can speak persuasively to their faculty colleagues.

It is important to work with a high-ranking representative of the Development Office. This could be accomplished by appointing them to the steering committee, but it's also possible to form special working arrangements with them. The Development Office on many campuses, and in larger departments, is the chief steward of the university's "friends." The people in the office know how to establish "public-private partnerships;" they do it all the time. The donations from those partnerships are annually directed at the projects the university President or Chancellor has deemed most important. Though contributions to specific loss reduction projects are unlikely, large capital contributions can have a part devoted to improving the disaster resistance of the project under consideration. Disaster resistance should be on the Development Office's list of worthy goals worth promoting.

The Alumni Association also cares for a significant pool of donors and should be working with the DRU Project in raising interest in, and support for appropriate projects. The alumni of any university are perhaps most useful in efforts indirectly related to money raising, specifically, government relations and connections to private funding organizations.

The advisory committee could also include representatives from the FEMA national or regional office. They can help in a number of ways: give guidance and support; recommend specialists to help you; integrate you into ongoing and complementary activities in your community or region; connect you with other campuses who have experiences that they will share with you; and perhaps recommend some funding sources.

2. Outreach

Communicating about the university's risk and plans to manage them is critical to the success of the DRU plan. Outreach to community stakeholders will encourage them to be supportive. Often, one-to-one contact is most persuasive. To help create campus-community partnerships, publicize the information through local media and through other more direct contacts. Cultivate helpful reporters in local and campus newspapers so that coverage is regular and accurate. Contact key decision makers in local government and the private sector to inform them and ask for their support. Invite them to a roundtable on risk management in the community. Create a joint town and gown group to deal with disaster planning and risk reduction. Community service is part of the university's mission, and it can contribute know-how and resources to community's that frequently lack them.

Information dissemination on the campus is equally as important. All members of the campus community will want to be informed of the risk, the

plans and approaches to reducing them, and the implications for people who work on the campus. Campus newspapers, departmental newsletters, and web pages can disseminate information. Special briefings and question/answer periods with high-ranking administrators will work to apprise people of the latest developments and reasons for them. Such sessions are also helpful in allowing people to express their unhappiness and improve morale.

3. Opportunities for Promoting the Plan

In addition to conventional outreach techniques, it is beneficial to insert risk reduction into other related initiatives on campus, or to marry the campus efforts to other ongoing projects in the community. This accomplishes two desirable ends: 1) it keeps risk reduction issues in the forefront of attention and under discussion, and 2) allows for simultaneous work on two or three projects--an efficiency that anyone in the institution can appreciate.

- **Master Plan (campus or community)--**Either develop a new master plan, or insert your risk reduction goals into the existing one, so every project is planned with an eye to disaster resistance. The UC Berkeley Master Plan had not been updated for about 20 years before the seismic risk reduction program called for a new one. Not only does this produce a badly needed new Master Plan for a dynamic university in a complex community, but it allows decision makers to capitalize on opportunities to modernize facilities. Significant efficiencies and cost savings can be realized when various programmatic needs are met, and funding sources tapped, at the same time a building is being retrofit for earthquake safety.

- **Community Alliance for Safety--**Following both the 1989 earthquake and the 1991 urban-wildland fire, organizations formed in Oakland and Berkeley to promote ongoing hazard mitigation and risk management. An alliance of concerned citizens, local government departments, the school district, and the university calls itself the Hills Emergency Forum, and routinely addresses all manner of disaster planning issues. Inserting the disaster-resistant university concerns and approaches into such an ongoing group was easy, and has resulted in added support from the community for the campus's efforts. If such an organization doesn't exist, it is a good idea to create one. Not only will it actually work to solve some problems, but it will keep the pressing issues in the public eye and mind.

- **Project Impact--**FEMA's Project Impact, a risk reduction program for cities and counties, is actually the prototype for the Disaster-Resistant University initiative, and has many of the same goals and approaches. Should there be a Project Impact grant in place in the community, the landscape is perfect for cooperative and collaborative projects. The

symbiosis will benefit each program with additional resources and staff time, and will also engender greater community interest and support.

- **Governmental Relations**--Each university generally has offices devoted to communication and lobbying with city, state, and federal governments. The issues under consideration are myriad, but disaster resistance should be one of them. Efforts can be made to articulate the university's loss reduction concerns in all initiatives to which they are germaine. Specify not only what the city or state can expect from the university in terms of emergency preparedness or disaster recovery, but also what the university needs from the other governmental entities.

4. Craft Scenario-Based Exercises

To keep the disaster vulnerability issue before the decision makers and campus community, annual (at a minimum) disaster drills and exercises can be useful. Base exercises on scenarios that embody the very vulnerabilities that figure largely in the university's risk profile. Ask campus and community experts--scientific and technical--to help create each scenario so it's credible. To begin, design the exercise to focus on one area of concern--search and rescue or post-disaster communications, for example. Over time, expand the goals of the exercise to include all important players on campus--and in the community as well--and to address other concerns such as business resumption.

Such exercises serve as opportunities for training the faculty and staff directly involved in them, but they are invaluable as educational tools for administrators. Invite important decision makers to play a particular role in an exercise, or at the very least to observe. In just one or two hours, an administrator who has never given hazard vulnerability much thought will see the implications played out in technicolor right before his or her eyes. Follow up the experience by getting the exercise covered in the campus and local newspapers, and reported on in high-level cabinet meetings.

For example, a campus-wide Y2K exercise at Stanford University in November, 1999 involved decision makers in problem-solving for potential lost electricity and computing capacity at the new year. The executive order compelling every unit to participate was motivated by a desire to avoid problems at the rollover, but functioned equally to educate some previously unmotivated administrators to the full implications of losing those two systems in any disaster.

Stakeholders on Campus

1. Chancellor or President

The DRU project won't be successful without the commitment of the university's highest officer, so get it early and advertise it widely. Disaster resistance may not be high on his or her list of priorities, but the loss estimate can be used to make clear the implications of not reducing potential losses.

2. Champion

Also critical to the success of the DRU project is the interest and support of a high-ranking administrative officer. It's impossible to specify who that might be, but search for someone who--because of their discipline, research bent, or experience--understands the seriousness of the issue and is willing to take on some responsibility to advance the project in the organization. Even with a chancellor or president's support, you rarely get his or her attention on a routine basis. The champion should be someone who can keep the issue on the table or the agenda of high-level campus committees, and see to it that related tasks get done and reported on.

3. Project Manager

It is critical that the project have a manager who focuses only on DRU-related activities. The project manager should report to the highest decision makers, and be seen by the campus community as having access to, and support from the chancellor or president. The project manager may come from the campus or may be hired from outside. It may be expedient to redirect the tasks of someone familiar with campus operations, personalities, and the vagaries of its culture. On the other hand, an off-campus specialist in loss reduction may be more effective in a shorter period of time. The ideal situation will differ from campus to campus.

In either event, however, encourage the project manager to insinuate her or himself into the activities of any groups on campus working on related issues. The projects of those charged with emergency preparedness, risk management, or crisis response are obvious cooperative opportunities, but look beyond them to other initiatives in resource planning, space management, instruction improvements, research facilities, and business operations. Collaborating with faculty, administrative staff and students on various tasks will allow the manager to introduce the DRU concept to others, and help to establish a mutually supportive spirit. **(See Appendix E for a duty statement and description of manager qualifications.)**

4. Other Campus Players

University campuses are full of people who are highly focused on issues other than the potential for disaster and the need to reduce it. The pressing needs of

their work or research--always immediate and greater than the available time--don't permit much time for reflection on what MIGHT happen. In order to reach particular segments of the campus community--and it's vital to reach them all!--it will be necessary to tailor individual information materials and approaches. Common to all, however, will be a "hook" that personalizes the risk for each one: each person must be helped to see 1) what he or she could lose in a disaster, and 2) how they can act now to reduce those losses. With that perspective, they will all be supportive of the efforts of the DRU Project.

- **Administrators--**We have spoken earlier of the importance of having the visible support of one or two highly placed administrators, but it necessary to see to it that all of them have some level of understanding for the issues. Furthermore, it is possible that someone will oppose the goals or procedures of the DRU Project, so it is very important to neutralize that. Generally, the opposition or indifference arises from a conviction that there is not enough money or time to deal with a low-probability event, when routine problems are not well enough attended to. In either case, information and persuasion are the keys, and peer contacts may be the most effective vehicles.

- **Faculty--**Unless the discipline of a faculty member makes him or her conscious of disaster impacts or environmental risks, professors are unlikely to be interested in those topics. Highly indifferent, in fact. And yet, each of them stands to lose a great deal if a disaster hits their university and destroys buildings, laboratories, computer systems and databases, books and papers, course notes, and specimen collections. Develop credible loss scenarios that will illustrate the losses and help the faculty imagine them. Use the faculty members who are experts to work on their colleagues who are not. Secure the support of the Faculty Senate and various other faculty committees that deal with research, planning and resource allocation, and graduate division matters.

- **Staff--**Devoted members of the staff spend much of their time assuring the continued turning of the many cogs that comprise institutional function, and they are intimate with the many and various forces that can interrupt their smooth progress. In many cases, they will be among the most receptive to a message about risk management. They are, furthermore, typically involved with managing their individual building's safety program and emergency preparedness efforts. Their work should be applauded and their interest maintained through informational meetings, training sessions, exercises, and recognition in campus media and annual service reviews and awards.

- **Students--**This segment of the campus population is hardest to reach, but largest by far. It is not that they will necessarily affect critical campus decisions on risk reduction, but they are the objects of so much of it. If they are not aware of how to protect themselves in an emergency, they

will only increase losses to life and property. Interest in studies, exceeded in some cases by interest in parties, conspires with the optimism of youth and the supremacy of hormones to make them nearly unconscious of risks. Not so their parents! Educating students about risk reduction--their own and the institution's--and reassuring their parents, must be part of the curriculum for any Disaster-Resistant University. Get information to them through all the vehicles used for routine information flow: newspaper, letters, leaflets, class handouts, residence hall fact sheets, club and organizational channels, web sites, radio and TV, cable, and peer counseling.

- **Alumni**--Alumni may support the goals and programs of the DRU Project financially, politically, or directly through technical assistance and good advice. Keep the alumni well-informed about risk management through the alumni newsletter, the campus website, and other alumni functions, and expect that the university will reap various benefits. Money--in large and small amounts--will come in for retrofit and modernization projects. Additionally, many alumni work in government and private sector organizations that have influence over resource allocation. Well-placed alumni can affect legislative decisions and votes--on the state and federal levels.

Community Partners

Each of the partners below can contribute to the DRU Project in a number of ways. It is important to involve as many of them as possible in appropriate ways.

1. Government

Because one of the major roles of government is to protect the public health, safety and well-being, governments at all levels manage hazards and contribute to the efforts of other organizations to do so. Their commitment to goals of the DRU Project will yield significant help in many areas: financial, legislative, planning, technical and scientific information.

- **City**--Cities and universities are mutually dependent on each other to prepare for disasters and reduce potential losses. There should be a close working relationship between the city government and the university, for each reduction in risk accomplished by one necessarily affects the other. The DRU Project will focus on the particular ways the university is dependent on the city for pre and post-disaster services, and should guarantee that projects are undertaken on both sides to improve them. Likewise, it will identify the ways in which the university can improve the disaster resistance of the community by improving its own.

Engineering and architectural experts from the UC Berkeley faculty serve the City of Berkeley as consultants on the vulnerability of municipal buildings, and recommended retrofit tech-

Often faculty at universities consult with communities on technical issues relating to mitigation and preparedness; this should be broadened to involve administrators working with community committees in order to guarantee that risk management policy and practice are consistent and complementary in both organizations. Work with the city on everything from public information campaigns and emergency preparedness to cooperative response drills and agreements with utility providers on repair priorities following a disaster. Make sure the university facilities management has a good working relationship with the city building department and can coordinate rapid building inspection following a damaging disaster.

- **State--**Especially if the university is a public one, the state legislature and budget committees play a large role in making resources available for increasing disaster resistance. In addition, the university system-wide office controls some budget allocations. The DRU Project should have extensive outreach to both of these bodies. Appoint a representative from the system-wide office to the advisory committee. Send high-ranking campus officials to brief legislators on the risks to the university, and the many initiatives to reduce them. Develop regular informational pieces to keep all the representatives current on progress and challenges. Consider involving them as observers in scenario exercises to help them appreciate the importance of natural hazard threats to the university and the university's commitment to reducing its risk.

  For both public and private universities, much planning and technical support for risk reduction can come from state agencies such as the office of emergency services, and the departments of geological services, water conservation, and forestry. Perhaps there is also a seismic safety commission, or a flood control commission, in the state that will assist with DRU Project goals. One or two key state agency representatives involved in the DRU Project can also assist in efforts to lobby the legislature.

  For post-earthquake response and recovery planning, turn to the departments of emergency services, housing, transportation and building and construction.

- **Federal--**The U.S. Congress is a source of funds and technical support for many loss reduction projects. See to it that local senators and representatives are aware of your university's risk management efforts, and can be persuaded to sponsor or support bills that advance the cause in one way or another. Bills may be specific to one university's need or support initiatives of interest to all institutions of higher learning. Budgets can be increased or earmarked. Work closely with the campus Governmental Relations representative.

A number of federal agencies are directly involved in concerns related to the DRU Project. Beyond FEMA, which sponsors the DRU initiative and provides seed money for planning and some funds for mitigation projects, there are many others. The National Flood Insurance Program, part of FEMA, has the most up-to date data on flood plain mapping. Other obvious agencies for risk data are the U.S. Geological Survey, the National Weather Service, and the Department of Energy. For response and recovery planning assistance, turn to FEMA as well as the Department of Housing and Urban Development, the Small Business Administration, the Department of Education, and the Department of Transportation.

- **Special Districts--**Universities should work with schools, park districts, regional government associations, flood control districts, and fire suppression and vegetation management districts on various aspects of disaster resistance. The survivability of the local K-12 schools is critical to the university on two levels: 1) schools are the main shelters in many communities, and may need to accommodate university employees, and 2) the children of university employees attend local schools, and any extended closure of schools will affect the ability of parents to get back to work. Work cooperatively with local schools on planning for risk reduction and post-disaster response.

  Park districts may occupy lands near the university, or at the very least be prominent in the community, and their efforts at risk reduction will complement the university's. Vegetation management, erosion control, landslide mapping, and firefighting are obvious ways in which the university and park district can cooperate. Plan, train and exercise together. There may also be scientific and technical staff in the district that can assist in providing hazard information, technical support, and post-disaster impacts data.

  Some larger urban areas have regional government organizations that work on land use, transportation, and housing issues, to name a few. When there are obvious environmental risks present, these organizations gather data and sponsor many planning initiatives to cope with the risks. Such regional organizations can be of considerable assistance in providing hazard data to local governments and universities, and in conducting sophisticated public information campaigns on the risks and how to reduce them. Work closely with such organizations.

  Flood and fire control districts are obvious sources of information, and cooperation with them will help reduce the university's risk. Plan, educate, mitigate and train with them.

2. Infrastructure Organizations

- **Utilities--**Utility loss following disaster will create serious problems for the community, and every home and business in it. Without electricity, gas, water and wastewater, and telephones, the ability to respond to the emergency will be hampered. There will be substantial threat to research projects & specimen collections that depend on temperature control, fluid flows, gas or light. Business resumption will be impossible without basic utilities. Furthermore, the campus may need outside help repairing university-owned and operated utilities. Involve representatives of these critical lifelines in your planning efforts, and make special arrangements with them to secure your campus' utility connections and service.

- **Transportation--**The functionality of roads, bridges, and transit systems is critical to emergency response and business resumption. Extensive damages to them will leave the campus and the community paralyzed. Transportation specialists should be on the DRU advisory committee to convey information and aid in planning for post-disaster alternatives.

- **Housing--**Employees and many students at the university live in homes and apartments that may also be damaged by the disaster. Losing even a small percentage of the available housing units will put large burdens on the university: 1) it may need to shelter displaced employees and students, and 2) it will be difficult for many people to work steadily or attend class when they have no place to live reasonably close to campus.

  Reducing risks in community housing--owned or rented--should be a high priority for any disaster-resistant community or university. Student-run cooperatives and hellenic houses are also important providers of student housing. However, dealing with private-sector housing is very challenging. In many cases, market forces determine the economic feasibility of retrofit--for single family owners, apartment house owners, and fraternity and sorority house owners--and mere information is rarely sufficient to prompt retrofit. The university and the city government should explore various financial incentives to motivate retrofit.

3. Community Organizations

- **Hospitals and Health Care--**It is critical for the university and the community that health care facilities are strengthened to withstand disaster impacts, and that their staffs are well-prepared. Not only are hospitals critical in emergency response, but their routine services are important for community recovery. It should be the business of the university to assure that emergency medical services will be sufficient to the needs of the campus community. If one of the major hospitals in the area belongs to the university, it should take steps to see that the hospital will be functional. If the university doesn't own a hospital, it should have

cooperative working arrangements with more than one to ensure that care is available for university employees and students.

- **Emergency Volunteers**--The mission of some organizations is specific to disasters. For example, the Red Cross, Salvation Army, and Mennonite Disaster Services work in the immediate disaster aftermath to furnish shelter, food, clothing, and home repair. They will be critical in the community response and recovery, and a working knowledge of their services is important for the university. It may be especially desirable for the university to have a formal arrangement with the local Red Cross chapter for cooperative shelter provision.

- **Religious and Secular NGOs**--While many community-based organizations don't have a disaster-specific mission, they can assist the local population in coping with disaster impacts. They may not provide assistance to the university directly, but those that provide food and clothing, shelter, housing, and medical care can help the community deal with its affected populations. University students and employees may receive help from these NGOs and that, in turn, will aid the university's recovery. The university should have familiarity with local NGOs and their services, and enter into mutually supportive agreements where appropriate.

4. Business and Industry

The private sector can contribute to the goals of the DRU Project in a number of ways. In a large sense, the practices of businesses and industry help to determine the overall disaster resistance of the community, which in turn affects the disaster resistance of the university. Likewise, the ability of the university to remain functional following a large disaster will have a large impact on the businesses in the community.

More specifically, businesses that supply the university, and businesses that serve the needs of its students depend on its being open and operating. Many businesses contribute financially to programs that support community well-being, and they can be encouraged to contribute funds or technical assistance to the DRU project. A number of businesses have a ready employee pool in the graduates of the local university, and they can be encouraged to contribute to helping the university reduce its risk and, thus, its downtime, following a disaster.

The university may also hire specialists in the business community to advise on hazards, risk, and loss reduction techniques. It may be desirable in some instances to pay full price for the advice received, while in other circumstances in-kind contributions of the specialists' time may be quite appropriate. Each case will be unique.

A first step is to appoint representatives of important businesses on the DRU advisory committee; that will begin a relationship. It will yield valuable technical and informational support immediately, and may result in financial and technical support later on.

5. Insurance Industry

Private universities that carry commercial disaster insurance can obtain extensive information on hazards and risks from the companies themselves, or from insurance industry information groups. Work with insurance carriers and risk management specialists to assess potential losses and to reduce them.

Faculty specialists on business in general, and the insurance industry in particular, can also assist in establishing a dialogue with industry representatives on the needs of home and building owners for hazard insurance, the most feasible approaches, the appropriate premiums, and the possibility of companies offering incentives to owners to reduce their risks. Every employee of the university lives in a home or an apartment, and their personal insurance coverage (or lack thereof) will affect their ability to contribute to the university after a disaster.

Appendices Supporting Chapter Three

Please refer to the Appendices Section for the following materials:

Appendix E: **DRU Project Manager Duty Statement**

Chapter 4

Loss Reduction Plan

Who cares about the plan, a famous planner once said; it's the process of making it that really matters. That process involves people that will carry out the plan, and allows them to think about it, contribute to it, and have a stake in its implementation. The bound document is important, but is less valuable than what resides in people's heads and hearts.

Set Priorities and Goals

1. Health and Safety

This issue is generally of unanimous concern. The questions arise over how best to spend limited resources on reducing safety risks. The plan should propose priorities for reducing the possibilities of deaths or injuries at your facilities, and for handling injuries in them.

It's not difficult to imagine loss of function: on most campuses there are frequent utility interruptions unconnected to major disasters. Power outages, broken water and steam pipes, and computer server and hub interruptions illustrate just how vulnerable campus operations are.

2. Loss of Function

Think about the obstacles to the university's ability to continue teaching and research after a disaster. Some disasters may force closure for a day or two, perhaps a week, or destroy a database, collection, ongoing experiment, or unique and expensive equipment. In extreme cases, when extensive damages will close many buildings for months, the viability of the institution may be in question. Make plans to open for business in various constrained circumstances.

Every unit and division of the institution--teaching, research, business operations, facilities, and utilities support--should engage in business resumption planning. Such planning involves a thorough analysis of what jobs are done routinely, how they are done (what resources they rely on), and

alternate ways to do them in an emergency. There should also be an executive plan that incorporates elements of each particular plan. This is no different from standard procedure for all large businesses, which consider contingency planning and prudent asset management routine parts of what they do.

3. Mission of the University

There may be some debate about the relative priorities of elements in an institution's mission. For example, are teaching and research considered of equal value and weight? This becomes important as you set priorities for loss prevention projects. To consider both health and safety and loss of function appropriately in your plan, you must distill from the debate enough of a consensus to assign priorities. Review the fragility of each element and assess the relative impacts of losing each one. Which losses would have the greatest consequences for the overall mission.

4. The University in the Community

Universities frequently have vexed relationships with their communities, but the goal of better communication and improved cooperation between the university and the community must always be part of a DRU plan. Just as hazards are shared and potential losses are interactive and reciprocal, so also must mitigation be collaborative.

Decide on Objectives

Once you understand the probable consequences of natural hazard events, you can craft objectives that, when met, will result in reduced losses and disruption. Determine what length of time various campus activities may be disrupted by frequent or rare hazard events. Determine the amount of disruption that the campus can tolerate.

1. Evaluate Existing Capacity, Policies, Plans and Practices

How capable are campus departments to deal with the anticipated disruptions? Review the following plans that have some bearing on risk reduction and emergency response: 1) the campus emergency response plan, 2) the USDA-required plan for laboratory animals, 3) housing and dining services business continuity plan, 4) the transportation and parking office business continuity plan, 5) the campus master plan, and 6) the facilities capital outlay plan.

Understand Your Plans

Emergency Response Plans *govern immediate response to an emergency or disaster: life saving, rescue, damage control, evacuation, shelter.*

Business Resumption Plans *govern actions to take when the emergency period is over, to resume operations and support teaching and research.*

Recovery Plans *govern repair and rebuilding of facilities after a disaster, and set priorities for doing so.*

Loss Reduction Plans *focus on mitigation and education before the disaster. They indicate policies, practices and activities that will, over time, reduce losses to the campus. They will be complementary to the above plans, and will recommend that such plans be made and updated.*

Review policies regarding location and standards for new buildings, utilities and facilities. Determine whether the campus has the skills to implement policies regarding buildings and utilities.

2. Invite Stakeholder Contributions

Various techniques for obtaining stakeholder input include executive committee meetings, focus groups, briefings, departmental or deans' meetings, workshops, and town hall meetings. Reach out to parents of students through all the channels available. Get on the agendas of on-campus and opff-campus groups and organizations, both to explain your project and be exposed to their questions and opinions. Illustrate for them their potential losses and invite them to imagine the consequences. Seek partners in these situations. Use all the possibilities presented by electronic information technology: web pages, e-mail dispatches, and chat rooms.

Review Mitigation Alternatives

Explore your options. In light of the agreed-upon mitigation priorities, evaluate the practicability of the available ways to reduce the extent and duration of likely disaster effects. Typical mitigation approaches for particular hazards are listed below:

- **Flood:** Drainage improvements, structural works, elevating or relocating facilities, moving critical uses (communications, library and other collections, offices) to higher locations, ongoing education on reducing potential losses.

- **Wind:** Improved roof-wall-foundation connections, improved roofing materials, installation of shutters, vegetation management, ongoing education on reducing potential losses.

- **Earthquake:** Strengthened buildings, braced contents and equipment, upgraded utilities, ongoing education on personal safety and loss reduction.

- **Hurricane, tornado, flood and tsunami:** Installation of warning systems, improved communications, ongoing education an appropriate steps to take before, during and after an event. Efficient evacuation procedures. Safe houses or structures.

- **Wildfire:** Vegetation management, fire-resistant building materials, improved water supply, training permanent and/or volunteer staff in fire-fighting techniques.

- **All-hazard:** Install, or improve upon, back-up systems (electric generators, computer databases) and contingency procedures.

- **All-hazard:** Maintain USDA-required emergency plan for federally funded research facilities using laboratory animals.

- **All-hazard:** Inform campus personnel of risks and mitigation strategies. Assist them in reducing the most pressing ones. Train and exercise them in up-to-date emergency response procedures.

- **All hazard:** Keep current detailed and current information regarding hazardous chemicals, biological and radiological agents, laboratory animals, critical works of art or cultural treasures.

- **All-hazard:** Prepare a business resumption plan that will allow rapid restoration of all critical activities.

- **All-hazard:** Develop priorities to guide and expedite long-term recovery (financing strategy, repair/rebuilding)

Write the Plan

Develop a loss reduction and risk management plan that links measures to the university mission and potential damages in a disaster. Specify mitigation priorities that arise from the mission and campus objectives. Draft a short policy document, and adopt policies that support the plan and the university's mission. Choose measurable objectives. Indicate how loss reduction and risk management can be integrated into day-to-day campus activities. An action plan--with short- and long-term tasks--and a schedule will form one part of the larger plan.

The Project Manager can write the plan, with direction and contributions from the executive sponsor and the steering committee. Drafts of the plan should be circulated to additional important stakeholders like faculty senate groups or campus planning committees so their comments can be incorporated.

The plan should have the following sections:

Mission and objectives
Policies
Major recommendations
Risks
Resources for reducing the risk
    financial
    technical and informational

Buildings and their uses
    research
    teaching
    business operations
Utilities infrastructure
Contents--their vulnerabilities and value
Emergency response
Business continuity plans
Campus recovery plan
Education and training
Funding
Plan maintenance--monitoring and updating
University and community

Support the Plan

1. Policies and Procedures

The better the plan is institutionalized in regular policies and procedures, the more successful will its implementation be, and the better it will withstand the ravages of time.

2. Specify Tasks

Detail exactly what needs to be done, with whom, when. Arrange for the responsible position to report annually on progress on each task.

3. Accountability

Assign responsibility for oversight of plan implementation to one high-level decision maker and to a steering committee. Execution depends on accountability, and that follows from specifics in a job description.

4. Oversight by Chancellor or President

Keep the highest decision maker apprised of progress and involved in reviewing and evaluating priorities.

5. Schedule for Implementation

Set out the probable duration and desired date of completion for each task specified. When the schedule can't be met, the responsible decision maker must justify the departure from the timetable.

6. Keeping top-level interest over time

The person responsible for plan implementation is also responsible for keeping the issues and their solutions before campus decision makers, educating them to new issues, and orienting new administrators to the ongoing risk.

Appendices Supporting Chapter Four

Please refer to the Appendices Section for the following materials:

Appendix F: **UC Berkeley Strategic Loss Reduction and Risk Management Plan**