

# Lawrence Berkeley National Laboratory

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### **Author**

Lawrence Berkeley National Laboratory

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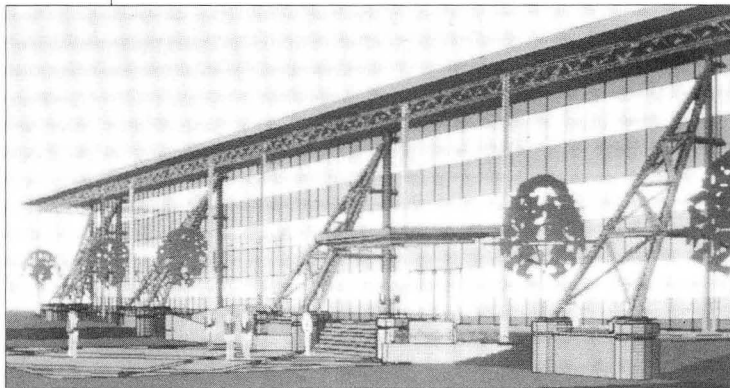
# Facilities Quarterly

LAWRENCE BERKELEY LABORATORY FACILITIES DEPARTMENT NEWSLETTER

APRIL  
1993

## BLDG 90 OFFICES TO BE MOVED DURING REHAB

Relocation of personnel to leased space will begin soon in preparation for the structural modification phase of the Bldg 90 Seismic Rehabilitation project. Work will be completed in April on nonstructural modifications in the exit corridors and stairwells. Design work for the structural upgrades is proceeding.



This project corrects problems with Bldg 90's seismic capacity. One concern is the long-term settlement of Bldg 90's foundation, the result of the foundation caissons having, over the decades, "punched" through the weak underlying bedrock. Besides causing pencils to roll off desks, this settlement has created extra stress on some of the building's structural members.

A contributing factor to the settlement problem is the fact that Bldg 90 is sited on top of a spur, with its long axis perpendicular to the direction of the spur. Ancient landslides situated on either side of the spur provide potentially unstable support for the building's north and south ends. Intense ground shaking could trigger these landslides, weakening the foundation.

Another negative in Bldg 90's probable performance during a major earthquake is its structural design. In the late '50s, when Bldg 90 was designed, structural design tools we now take for granted, such as computer modeling, didn't exist,

*continued on page 2*

## PHASING OUT OZONE-DEPLETING CFCs

Reducing chlorofluorocarbons (CFCs) makes environmental and economic sense. But it's also the law. The U.S. Clean Air Act of 1990 mandates reducing ozone-depleting CFC emissions to the lowest achievable levels, sets requirements for refrigerant recovery and recycling, and as of July 1, 1992, bans intentional venting of CFCs and hydrochlorofluorocarbons (HCFCs). Violators may be penalized up to \$25,000 per day. Moreover, in February 1992 President Bush announced an accelerated phase-out date of December 31, 1995, for production of the most significant ozone-depleting substances—CFCs, halons, methyl chloroform, and carbon tetrachloride. HCFCs are to be phased out by 2030. Other new regulations require all technicians and personnel who handle refrigerants to be certified for recovery and recycling equipment by July 1993. The Lab will have to maintain careful records to document compliance.

In anticipation of these changes, Associate Facilities Manager Bruce Bagnoli initiated a program over

three years ago to eliminate venting of ozone-depleting substances from the Lab's approximately 700 refrigeration units, phase out CFCs, and ensure that non-CFC producing units are cost effective and efficient. As part of this initiative, the HVAC (Heating, Ventilation and Air Conditioning) Refrigeration shop was authorized to develop and implement a refrigerant recovery and recycling program before required to do so by law.

Over a year ago, the HVAC shop's success in recovering and recycling CFCs earned it an E safety award. The shop regularly checks refrigeration systems for leaks of ozone-depleting substances (ODSs). Outside contractors have visited the lab to learn about the shop's program and

*continued on*

## INSIDE

From the Facility Manager  
At Your Service  
Construction and You  
Projects  
Bldg 70A Fan Replacements

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## BLDG 90 REHAB

*continued from page 1*

and the magnitude of the earthquake hazard in the East Bay wasn't well understood.

Facilities Dept studies indicate that a major earthquake would result in an inelastic horizontal displacement of the building's structural steel frame, irreparably twisting the building out of shape and rendering it uninhabitable. Although the structure would not collapse, the intense shaking and deflec-

tions would cause ceilings, light fixtures, ductwork, and piping to fall, blocking exit ways and exposing occupants to falling hazards.

The Facilities Dept has carried out an exhaustive series of geotechnical investigations to establish design criteria for strengthening the building and stabilizing the landslides. Two subsurface walls will be constructed north and south of Bldg 90. Extending downward 68 feet, these retaining walls will consist of drilled piers. They are designed to prevent earthquake-

induced movement of the ancient landslide material beneath the building and to mitigate the long-term settlement problem.

Eight buttresses, two at either end of the building and four along the front, will provide seismic bracing for Bldg 90's structural frame. The buttresses will be connected to the building at each of the above-grade floors and founded on clusters of 3-foot-diameter reinforced concrete caissons. The caissons will be drilled into bedrock to a depth of about 60 feet. In addition, three of the building's columns will require jacking to relieve excessive stress on some structural members caused by the long-term settlement.

Most of the work done so far has been accomplished during nonbusiness hours to minimize the impact on occupants. This work consists of improvements in exit corridors to mitigate falling hazards, including bracing of suspended ceilings, light fixtures, ductwork, and piping. In the stairwells, plaster walls are being replaced with drywall. During an earthquake, plaster can pulverize, filling the air with dense, suffocating clouds of particles, a hazard for persons using the stairwells for evacuation.

As punchlist items for the nonstructural work are being completed, preparations for the structural phase are well under way. Design work for the slide repairs and buttresses should be completed by the end of May. Construction will begin this September and continue into September of 1994.

Before structural modifications begin, about 90 persons will be temporarily relocated, including members of the Personnel Dept, Information Systems and Services (ISS) Dept, and Center for Science and Engineering Education (CSEE). This will create available office space within Bldg 90 for personnel displaced as construction proceeds. The relocated departments are being moved to the Promenade Bldg in downtown Berkeley between Milvia and Martin Luther King Blvd, where office construction is under way. Relocation is scheduled to be completed in May.



### FROM THE FACILITY MANAGER...

**I**n the past three months the Work Request Center has received a steadily increasing number of calls. For those of you who have not used the Work Request Center for requesting services from the Facilities Department, I encourage you to give it a try. There have been some growing pains in the guise of lost requests and responses a little slower than we had planned; however, the general feedback indicates we

are moving in the right direction. The telephone numbers and electronic mail addresses are listed on the next page.

A new feature is being introduced in this issue. Since the list of contact telephone numbers has been dramatically reduced by centralizing calls through the Work Request Center, that space will be used to tell you about a specific service that the Facilities Department provides. This issue features the M&O Regulator Shop lead by Steve Slusher.

The recent rains have caused a few problems with sliding slopes, but the Civil Engineering Section and M&O have been able to keep ahead of them and prevent any disruption to the laboratory operations. The worst area is the fire trail behind Building 51. A consultant has been hired and we are working on a fix to stabilize the area.

In the near future a representative from Facilities Planning, probably Rich McClure, will be contacting some of you for the annual project call. This call gives divisions an opportunity to update items presently on the institutional non-capital and general plant project lists, and to submit new items for the FY94 lists. The information received is also used to develop line item projects for submission to DOE.

The primary function of the Facilities Department is to serve the laboratory community; let me know how we are doing.

*Bob Camper*

## FACILITIES DEPARTMENT

The Facilities Department provides LBL with a full range of plant engineering, construction, and maintenance services for development of new facilities and modification and support of existing facilities. Engineering services include planning, programming, design, engineering, project management, and construction management for new facilities and modifications to existing facilities.

Ongoing Facilities activities include renewal and upgrade of site utility systems and building equipment; preparation of environmental planning studies; in-house energy management, space

planning; and assurance of Laboratory compliance with appropriate facilities-related regulations and with University and DOE policies and procedures.

Maintenance and construction functions include custodial, gardening, and lighting services; operation, service, and minor repairs and replacements to equipment and utility systems; and construction of modifications, alterations, and additions to buildings, equipment, facilities, and utilities.

The Work Request Center can expedite any facility-related work request, answer questions, and provide other support for your facilities-related needs.

## FOCUS ON SERVICE: REGULATOR SHOP

Pressure regulators are used at the Lab for systems ranging from vacuum pumps to very high pressure cryogenic systems. When properly installed and serviced, they are precise and durable instruments.

When improperly installed, modified, or maintained, they can cause explosions, fires, releases of toxic or cryogenic substances, and other accidents.

To decrease the risk of such hazards as well as to support Lab research, the Maintenance and Operations (M&O) Regulator Shop offers a variety of services. Technicians will inspect and pressure-test regulators, modify regulators to run compatible gases, and help with selection of pressure regulators and gas manifold systems free of charge. On a recharge basis, the shop tests pressure relief devices, installs, repairs and provides custom alteration of pressure regulation components, and designs and builds custom gas manifold systems. Pressure vessel testing and certification services are in the planning stage.

LBL stocks several models of cylinder-to-line gas regulators,

available from Central Stores with advance approval of the Regulator Shop. In the future, all models in the stock catalog will be kept in stock. To have the proper equipment set up, call the Regulator Shop (x7669).

A major safety concern at the Lab is unauthorized user modifications that circumvent built-in safety features and may result in serious injury to persons and damage to equipment. Thus only the Regulator Shop is authorized to alter or repair regulators. Regulator adapters must be approved for use by the Shop. Each regulator should be inspected before installation to ensure that it is correct for the particular application and is in safe working condition. Supervisors also need to make periodic surveys of equipment in their areas. Damaged, unreliable, or defective regulators must be replaced immediately. Surplus regulators must be sent to the Regulator Shop for inspection and service.

Anyone who uses gases or pressure related equipment at the Lab should read Chapters 13 and 20 of PUB 3000. DOE is developing a Pressure Safety

Guideline that will require all pressure systems to be designed, tested, inspected, and used in accordance with sound engineering principles by qualified and trained personnel only. The Regulator Shop has contributed to the guideline, which will be issued next year.

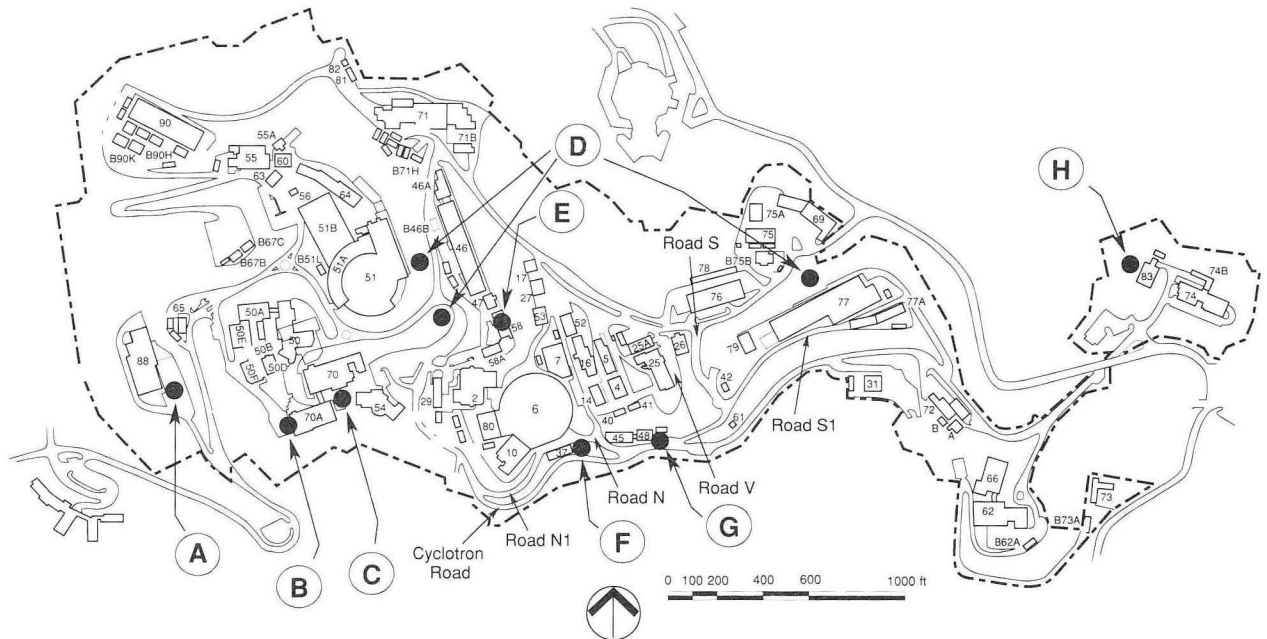
The Regulator Shop (x7669) is open seven days a week from 7:30 am to 3 pm. The technicians are Jaime Abenojar and Andy Cutt. For emergency service, Steve Slusher is available Saturday through Wednesday between 3 pm and 11 pm. The Facility Dept's pressure safety engineer, William Thur, is available to assist with system design.

### WORK REQUEST CENTER

Telephone	6274
Fax	6272
Quickmail	FACILITY
E-Mail	FACILITY
VAX-Mail	FACILITY
Mailstop	76-222

# CONSTRUCTION AND YOU

current construction projects affecting parking or vehicular or pedestrian circulation



### Bldg 88 Second Level Addition

A	APRIL	MAY	JUNE
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Construction is scheduled to begin in April. About 15 parking spaces will be affected, so we ask that employees other than Bldg 88 occupants or their visitors refrain from parking in that area.

### Bldg 70/70A Site Ventilation Improvements

B	APRIL	MAY	JUNE
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Twelve parking spaces adjacent to Bldg 70 continue to be reserved for a laydown area, trailer and parking spaces for the contractor. This area will be needed until about July.

### Instrumentation Support Lab Rehabilitation

C	APRIL	MAY	JUNE
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Modification of chemistry labs on the third floor of Bldg 70A will continue into April 1993. Contractor parking and laydown areas in the loading dock area behind Bldgs 70 and 70A will affect parking periodically.

### Slope and Seismic Stabilization

D	APRIL	MAY	JUNE
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Construction is scheduled to begin in April. About half of the parking spaces in the "Y" lot will be affected during installation of support systems on the slopes above Bldgs 51 and 77.

### Bldg 58 12 kV Substation Replacement

E	APRIL	MAY	JUNE
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Construction of the 12 kV substation for Bldg 58 and surrounding facilities is to start mid-April. Parking in area will be affected.

### Original Labsite Substation

F	APRIL	MAY	JUNE
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This project will begin construction in April and continue through October. Slowdowns or delayed traffic will occur periodically along Road N.

### Bldg 48 Firehouse Addition

G	APRIL	MAY	JUNE
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Construction of a new 1,968 sq ft addition to the firehouse began in March and is expected to last nine months. Parking in the area immediately adjacent to the firehouse will be reserved for subcontractor use.

### Hazardous Waste Handling Facility Site Work

H	APRIL	MAY	JUNE
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Construction begins in April and will last 6 months. Included will be an access road, site utilities, the grading of two yard areas. During construction the Bldg 83 parking lot will be reserved for subcontractors.

## ON THE DRAWING BOARD

*projects in study or conceptual design*

### **ALS Structural Biology Support Facilities**

The Structural Biology Support Facilities will occupy a total of 11,100 sq ft; 5,100 on the second floor of ALS Bldg 6, and 6,000 on the second floor in Bldg 80, which adjoins the ALS. The ALS Structural Biology Support Facilities will support x-ray microimaging and microholography, x-ray spectroscopy, and x-ray crystallography. If funded by Congress this fall, design work will begin early in 1994.

### **Human Genome Laboratory**

The Human Genome Laboratory will be a 41,000 sq ft, three-story building. Located near the Biomedical Laboratory Bldg 74 and the Cell Culture Laboratory Bldg 83, this will be a state-of-the-art molecular genetics research facility. If Congress approves funding this fall, design work on the Human Genome Laboratory will begin in early 1994.

### **Medical Services Bldg Rehabilitation**

Improvements to Bldg 26 include renovation of the HVAC system; replacement of wall panels, pipe insulation, and flooring that contain asbestos; installation of new lighting; roof replacement; and installation of wheelchair access ramps and an elevator. A Conceptual Design Report is in preparation. If funding is approved, work will begin in 1995.

### **Roadway Safety and Stabilization, Phase I**

Now in the conceptual design phase, this project will modify and upgrade sections of LBL's roadway system, improving pedestrian and vehicular traffic safety and stabilizing adjacent landslides that threaten to displace roadways and integral underground utilities. The improved roads will have wider lanes, longer turning radii, greater vertical and horizontal sight lines, and better separation of pedestrian and vehicular traffic. Subgrade and pavement sections will be strengthened to handle modern highway loadings and reduce maintenance.

## IN PROGRESS

*funded projects*

### **Bldg 90, Seismic Rehabilitation**

Stairwell upgrades are in progress. Structural work is scheduled to begin in September 1993. See pg 1.

### **Bldg 56, Biomedical Isotope Facility**

Design work continues on this laboratory for incorporating short-lived and stable isotopes into compounds for high-resolution positron emission tomography (PET) and high-field NMR studies. Bldg 56 will be completely remodeled and a new 900 sq ft concrete vault for a small radiopharmaceutical cyclotron will be added. Also included in the project are a radiopharmaceutical laboratory and a storage area. The new lab will greatly reduce the need to transport short-lived isotopes from offsite.

### **Hazardous Materials Safeguards, Phase 1**

Funding has been received to carry out work on safety, health, and environmental protection safeguards for Bldg 70. Improvements will include fire protection separations for different occupancy types, exterior walkways for chemical deliveries, and upgrades to the ventilation and electrical systems. Bldg 70 will then meet all requirements and industry standards for the storage, dispensing, and use of hazardous materials used in materials research.

### **Bldg 74 Laboratory Conversion**

This project will convert the 900 nsf of existing animal facility rooms 268, 272, 272A and 280 to wet laboratory space with the flexibility to accommodate

one or two independent research groups. This will provide laboratory space for the Chemical and Molecular Biology Division for the on-going differentiation/carcinogenesis and hematopoiesis research.

### **Fire and Safety Upgrades, Phase 1**

An architect is now being selected for design work to bring a number of buildings into compliance with current building, fire, and life safety codes. Improvements include installation or repair of fire-rated assemblies and exiting hardware, additional exits, exit signs and emergency lighting, upgraded fire sprinkler and alarm systems, and removal of combustibles in exit corridors. This project will be completed in 1996.

### **Hearst Sanitary Sewer Monitoring Station**

A subsurface flume vault will be constructed to house monitoring equipment and sample pumps and to provide access for maintenance. Discharge will be monitored for flow rate and for various constituents to meet EBMUD requirements. Construction will begin in early March and take four months.

### **East Canyon Electrical Safety Project**

Now in the detail design stage, this project is the third of several rehabilitation elements that will improve the reliability of the LBL electrical distribution system. The project involves installation of new 12kV switching station near the Centennial Drive overpass, new 12kV circuits to facilities in the East Site area, and installation of a new 500 kVA substation with standby generator at Bldg 72.

## VENTILATION UPGRADES AID RESEARCHERS, SAVE ENERGY

The Bldg 70/70A Ventilation Improvements Project is one of several EH&S-sponsored projects to upgrade lab and shop exhaust systems to meet modern industrial hygiene standards. The new design will also conserve energy and benefit researchers by giving them more flexibility under safer conditions.

The project's first phase was completed last November, when Facilities removed the 40-yr-old main supply fan from Bldg 70A and replaced it with a 100HP, 130,000 cu ft/min centrifugal fan. The new fan uses a variable frequency drive controller to automatically vary the fan speed as the demands of the building vary. During the upgrade, Bldg 70A was served by temporary air supply ducts, visible to passersby as large yellow "snakes" emerging from the 70A entrances.

The project's major tasks include replacement of ductwork, hood con-

trols, and more than 60 roof fans that provide exhaust for the lab hoods. Dampers at the lab hoods will be replaced with automatic exhaust dampers (controlled by face velocity sensors) that maintain air flow into the hoods at the proper velocity for capturing fumes. New automatic supply dampers (variable air volume or VAV boxes), regulate flow through the supply ducts, working with the face velocity controllers to maintain a negative pressure in the labs preventing lab air from entering corridors.

An upgraded control system will tie the face velocity controllers and VAV boxes to the main supply fan. When a researcher opens his hood the exhaust damper will open, allowing more air into the hood. The resulting decreased air pressure in the lab will cause the VAV box to open, decreasing the pressure in the main supply duct. The main fan then automatically speeds up to supply more air.

In Bldg 70A, duct work, fan replacement, and hood control upgrades started in February and will be finished this November. The contractor, Lawson Mechanical Contractors, will then start work in Bldg 70, with completion in October or November 1994. To minimize the impact on researchers, the motor control center (MCC) housing the electrical starters for the Bldg 70A roof fans was replaced over Christmas. Facilities will replace the MCC for the Bldg 70 roof fans in August, just before the fan replacements start.

Facilities Architecture & Engineering (A&E) and EH&S are designing a series of additional hood and canopy upgrades and replacements in 19 buildings throughout LBL to meet current industrial hygiene standards. The project is being run on a fast track, with Maintenance & Operations (M&O) installing upgrades in one building while A&E is designing for the next.

## PHASING OUT CFCs

*continued from page 1*

view the equipment that has been developed and acquired.

Currently Facilities and EH&S are developing a program for changing to alternative refrigerants and have identified three categories of ozone-depleting refrigeration equipment used at the Lab: four large centrifugal chillers, commercial refrigeration units, and small and/or portable units.

**Large chillers.** Present plans call for retrofitting two relatively new chillers at Bldg 2 to use a new refrigerant, HCFC-123. To address toxicity concern Architecture and Engineering is redesigning the machine room in Bldg 2 to the latest industry standards, allowing mechanical changes to be made to the chillers.

The Lab's two other centrifugal chillers are housed in Bldg 50B. Because they are over 30 years old and have exceeded their life expectancy, they must be replaced. Plans are to purchase high-pressure vessels that use R-22, an HCFC believed to have a very low ozone-depleting potential compared to CFCs. These new units can also use HFC-134a, believed to have no ozone-depleting potential.

Refrigerant HFC-134a now costs five to seven times more per pound than R-22. Because these systems can hold up to 600 pounds of refrigerant, that cost is substantial. By buying units that can use either R-22 or HFC-134a, these units can be switched over to HFC-134a if the year 2030 phase-out date for HCFCs is moved up. This will save the high cost of replacement.

### Commercial refrigeration units.

Facilities and EH&S are looking at converting walk-ins, reach-ins, ice machines, freezers, and refrigerator/freezers to use R-22, HFC-134a or other non-ozone-depleting on the market.

**Portable and small units.** It will not be cost effective to convert units such as domestic refrigerators, ultra-low units, small chilled water baths, and drinking fountains. Facilities will work with EH&S and Purchasing to buy non-ozone-depleting units when new units are required and to slowly phase out all old units.

After the conversions, Facilities and EH&S will monitor the systems and examine the results. Based on the success of this effort, the conversion process will be continued.

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