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NOV 15 1982

Docket No. 50-142

Dr. Walter F. Wegst, Director
Office of Environmental Health
and Safety
Center for Health Sciences
University of California, Los Angeles
Los Angeles, California 90024

Dear Dr. Wegst:

The staff has reviewed and evaluated the amended application for operating license renewal submitted by UCLA dated June 23, 1982, as amended October 8, 1982, and the UCLA Emergency Response Plan dated March 28, 1982, as amended July 29, 1982 and August 18, 1982, and has issued the enclosed supplemental Safety Evaluation Report (SSER) dated October 1982.

As a result of its review and evaluation, the staff has determined that the UCLA amended application supports the conclusions delineated in the June 1981 SER. In addition, the staff has determined that the UCLA Emergency Response Plan, as amended, adequately responds to the standards of the guidance documents against which it was evaluated, and meets the applicable requirements of the Commission's regulations. Accordingly, the staff concludes that the UCLA Emergency Response Plan is acceptable.

A copy of the Notice of Availability of the SSER, which is to be published in the Federal Register Notice, is enclosed.

If you have any questions, please contact the Project Manager, Harold Bernard at (301) 492-9799.

Sincerely,

/s/

Cecil O. Thomas, Acting Chief
Standardization & Special
Projects Branch
Division of Licensing

Enclosure:
As Stated

cc w/enclosures:
See next page

DESIGNATED ORIGINAL

Certified By C. Thomas 11/15/82

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SURNAME	HBernard:cc	PAnderson	CThomas		FMiraglia		
DATE	11/8/82	11/9/82	11/9/82	11/ /82	11/ /82		

SUPPLEMENTAL

SAFETY EVALUATION REPORT

RELATED TO

RENEWAL OF THE

OPERATING LICENSE

FOR THE

RESEARCH REACTOR

AT THE

UNIVERSITY OF CALIFORNIA AT LOS ANGELES

DOCKET NO. 50-142

LICENSE R-71

DATE: OCTOBER 1982

PROJECT MANAGER: H. BERNARD

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SECTION A - INTRODUCTION AND GENERAL DESCRIPTION

The Nuclear Regulatory Commission (NRC) staff issued its Safety Evaluation Report (SER) in June 1981 with corrections in July 1981, regarding the application by the University of California at Los Angeles (referred to hereinafter as UCLA, applicant or licensee) for renewal of their Operating License R-71.

In the SER, the staff explained that the UCLA was resubmitting their Emergency Response Plan, and that a review of the "Plan" would be conducted following its submittal and the results of that review would be reported in a Supplemental Safety Evaluation Report. The revised UCLA Emergency Response Plan was submitted by letter dated March 28, 1982. Amendment to the Plans were dated July 29, 1982 and August 18, 1982.

In addition, on June 23, 1982, and October 8, 1982, UCLA submitted amendments to their February 1980 application for license renewal. A summary of the UCLA amendments is as follows:

Appendix I: Financial Qualifications - June 23, 1982 amendment replaces February 1980 submittal.

Appendix II: Environmental Impact Appraisal - Supplemental information provided.

Appendix III: Argonaut Safety Analysis Report - Chapter 8 of June 1982 amendment submittal replaces UCLA Safety Analysis Report (SAR) in February 1980 application. Other chapters of UCLA SAR 1980 application are updated, clarified or corrected.

Appendix IV: Emergency Response Plan - Original was withdrawn and replaced with a revised Emergency Plan submitted separately as explained above.

Appendix V: Technical Specifications - The UCLA Technical Specifications included in the February 1980 application are entirely replaced with the Technical Specifications written by the staff as part of the SER plus a correction of the Table of Contents and some modifications to the body of Technical Specifications.

The October 1982 amendments reduces the permissible inventory of reactor fuel to less than 5000 gms of U-235 (93% enclosed). The amendments relocate and adjust the function of the Safety High Level Radiation Monitor, and clarify or correct sentences.

An assessment of the amendments is presented in Section II.

Mr. Eugene Bates of the Division of Emergency Preparedness, Office of Inspection and Enforcement reviewed and evaluated the UCLA Emergency Plan and amendments. Mr. H. Bernard, the Project Manager for UCLA, reviewed and analyzed the contents of the UCLA June 1982 amendments.

Each of the following sections or appendices is numbered identically with the corresponding parts of the June/July 1981 SER.

Copies of this Supplemental SER are available for inspection at the NRC Public Document Room at 1717 H Street, Washington, D. C. 20555, and for the duration of the current hearings on the UCLA license renewal application, at the Local Public Document Room in the Santa Monica Library, Santa Monica, California.

The NRC Project Manager assigned to the operating license renewal application is H. Bernard. He may be contacted by phone at (301) 492-9799 or by writing:

Harold Bernard
Division of Licensing
Mail Stop 340
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

SECTION B - ASSESSMENT OF AMENDED APPENDICES

1 - Introduction

Chapter 1, Appendix III of the amended UCLA June 1982 submittal pertains to Section 1 of the SER. The pages of the amendment replace respective pages in the 1980 license renewal application.

Whereas the SER reflect's data through 1979 in the UCLA license renewal application, the amended pages provide details on purposes of operation of users of the reactor and the approximate total hours of operation through 1981 for each category identified.

Though the amended information does not change the import of the original 1980 submittal, Section 1-7, "Operations Summary" of the SER is changed to reflect the expanded information as follows:

Section 1-7 - Operations Summary

As shown in Table 1-7-1 (replaces Table 1-6-1 in SER),total annual useage of the UCLA reactor from 1973-1981 varied from a low of 119 equivalent full power hours in 1975 to a high of 290 equivalent full power hours in 1979. Tables 1-7-1, 1-7-2 and 1-7-3 provide details on reactor utilization and reactor users.

Table 1-7-1 (from Amended Application June 82)

REACTOR ANNUAL USE			
Year	Number of Runs	Megawatt-Hours	Actual Operating Hours
1973	76	13.8	
1974	76	14.8	
1975	91	11.9	
1976	82	13.1	184
1977	106	15.9	238
1978	132	20.3	2,1
1979	149	29.0	372
1980	131	28.9	381
1981	134	23.9	364

Table 1-7-2

UCLA NUCLEAR ENERGY LABORATORY (from Amended Application June 82)

Table of Class Use of UCLA Reactor **1981 - 1982 Academic Year**

USE → / CLASS ↓	UNITS PER QUARTER	STUDENTS PER PER QUARTER	REACTOR ACADEMIC HRS/QTR [2]	LABORATORY ANALYSIS HRS/QTR [3]	LECTURE & PREPARATION HRS/QTR [4]	TOTAL HRS/QTR	STUDENT HRS/QTR	OFFERINGS PER YEAR	STUDENT HOURS/YEAR
ENGR 135 AL	2	8	9	2	29	40	320	1	320
ENGR 135 BL	2	8	9	4	27	40	320	1	320
ENGR 135 F	2	5	28 (100)[5]	0	12	40	200	1	200
ENGR 139 A	4	25	1	12	7	20	500	3	1500
CHEM 184 A	4	16	1	7	2	10	160	1[6]	160
E&SS 298	4	6	1	32	15	48	288	1	288
PHYS 180 A	4	10	1	12	11	24	240	1[6]	240
ENGR-EXT. 497.17	4	10	3	0	27	30	300	1	300
TOTAL:	ANNUAL STUDENT HOURS OF REACTOR DEPENDENT INSTRUCTION								3328

[1] CLASSES LISTED ARE THOSE WHICH USE THE REACTOR FOR THE INSTRUCTION OF UCLA STUDENTS IN THE SCHOOL OF ENGINEERING, AND THE DEPARTMENTS OF CHEMISTRY, EARTH AND SPACE SCIENCE, AND PHYSICS IN REACTOR CHARACTERISTICS, BOTH FUNDAMENTAL AND OPERATIONAL, ACTIVATION ANALYSIS, AND REACTOR OPERATIONS. THE TABLE DOES NOT INCLUDE CLASSES FROM OTHER COLLEGES AND UNIVERSITIES WHICH USE THE REACTOR. STUDENT ENROLLMENT IN THESE COURSES AND THE SPECIFIC COURSE CONTENT VARIES FROM ACADEMIC QUARTER TO ACADEMIC QUARTER. THE TABULATED ENTRIES REPRESENT THE CURRENT TYPICAL USAGE AS ESTIMATED BY THE COURSE INSTRUCTORS.

[2] REACTOR ACADEMIC HOURS - INCLUDES OPERATING HOURS "AT-POWER" AS REPORTED ANNUALLY TO THE NRC AS WELL AS "NON-POWER" HOURS SUCH AS THE "APPROACH-TO-CRITICAL" EXPERIMENT IN ENGR 135 AL AND THE PRE-START CHECK-OFF IN THE OPERATOR TRAINING COURSE ENGR 135 F.

[3] LABORATORY ANALYSIS HOURS - RECOGNIZES THE USE OF THE RLACTOR IN THE PRODUCTION OF VARIOUS RADIOACTIVE MATERIALS OR SUBSTANCES WHICH SUBSEQUENTLY ARE SUBJECTED TO LABORATORY ANALYSIS BY STUDENTS, FOR EXAMPLE, TO PRODUCE MATERIALS USED IN GAMMA RAY SPECTRO. OPY.

[4] LABORATORY LECTURE AND PREPARATION HOURS - RECOGNIZES THE STUDENT INSTRUCTION THAT OCCURS IN CONNECTION WITH THE OPERATION OF THE REACTOR IN REACTOR PHYSICS AND OPERATIONS, REACTOR INSTRUMENTATION, EXPERIMENTAL PROCEDURES AND TECHNIQUES, MEASUREMENT TECHNIQUES, AND METHODS OF DATA REDUCTION.

[5] INCLUDES APPROXIMATELY 100 ADDITIONAL TRAINING HOURS REQUIRED FOR OPERATOR LICENSING, THE TRAINING TAKING PLACE CONCURRENTLY WITH OTHER REACTOR OPERATIONS.

[6] GENERALLY TWO COURSES WITH DIFFERENT COURSE CONTENT BUT WITH THE SAME COURSE NUMBER ARE OFFERED ANNUALLY, ONLY ONE OF WHICH REQUIRES THE USE OF THE REACTOR.

1-7-3

Table 1-7-3

Research Usage of the Reactor
(from Amended Application)

User Category	Port Hours										Total Port Hours
	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	
NEL Staff Users	41	1	31	11	4	31	9	1	27	113	269
Other UCLA Users	81	122	105	139	109	106	105	91	101	67	1026
College & Univ. Users	25	31	45	27	45	47	37	53	20	38	368
Non-academic Users	2	1	--	1	1	5	95	264	360	211	940
Total Port Hours	149	155	181	178	159	189	246	409	508	429	2603

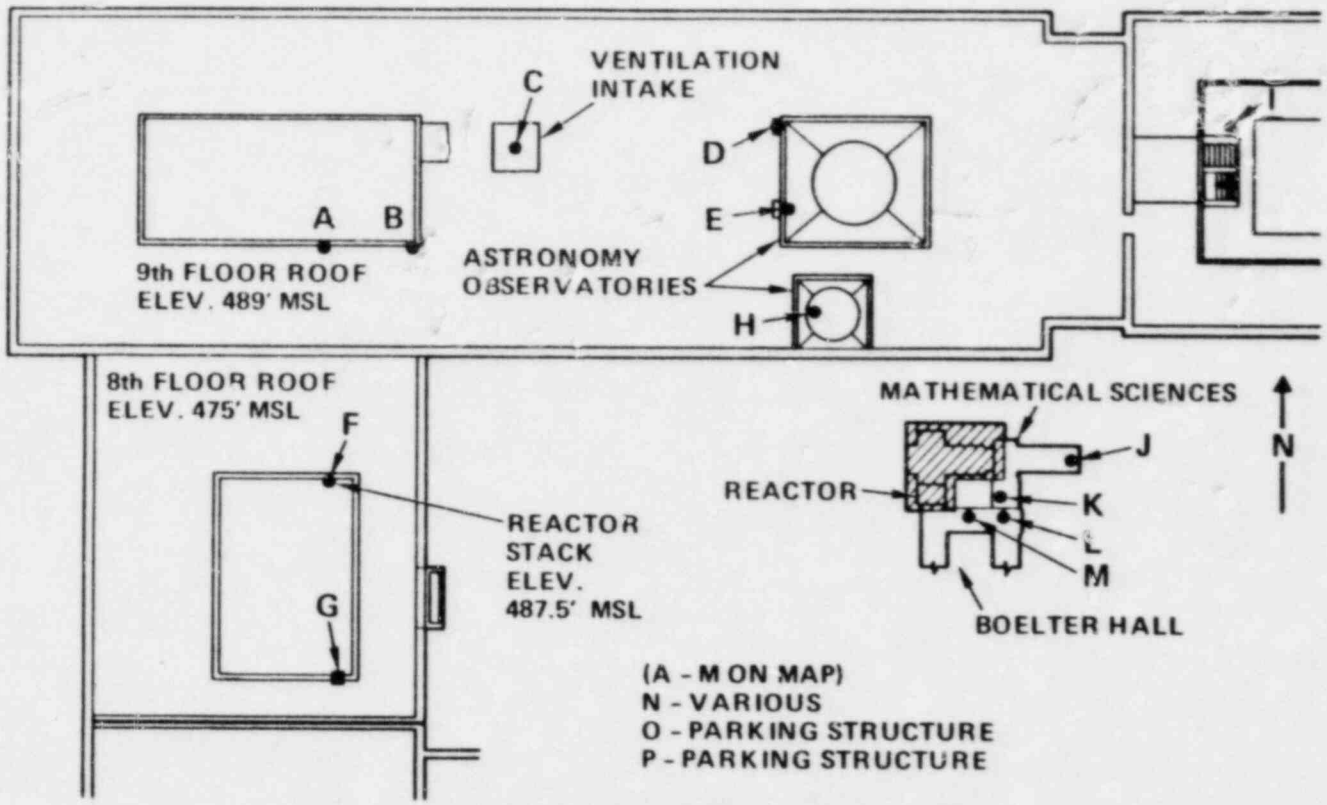
SECTION 11.3 - Dose Assessments

The SER discusses the effects of the environmental radiation survey performed by UCLA in 1976-1978. As that survey was recognized by UCLA and the staff to have inconsistent data in many of the thermoluminescent dosimeter (TLD) locations, due principally to radiation effects of contiguous concrete, UCLA initiated another environmental radiation survey which was completed in 1982. The results of this survey are contained in amended Appendix II of the UCLA June 1982 submittal.

The new environmental survey utilized 16 TLD's, the locations of which were consistent with the Nuclear Energy Laboratory (NEL) discharge stack, local meteorology, and the Math/Science Building ventillation intake. Locations are shown in Fig. 11-4-1. Some of the TLD's were fitted with lead bricks for shielding against natural radiation emissions from the adjacent concrete structure; others were placed on the structure itself if natural radiation were of no concern.

The TLD readings are shown in Table 11-4-2. TLD "F", which was located in the exhaust fan inlet plenum chamber, can be considered analogous to TLD No. 3 of the 1976-78 series which had been placed on a screen across the mouth of the Nuclear Engineering Laboratory discharge stack.

TLD "F" read 48-52 mrem for about 348 days of exposure and 24 MW hrs. of operation. In the 1976-1978 survey, TLD No. 3 read 44 mrem for 20 MW hrs. of operation and 1 year of exposure. If these values are normalized for 44.2 MW-hrs, the maximum annual MW-hours of operation permitted in the Technical Specifications, the respective TLD values would be approximately 88.4-95.7 for TLD "F" and 95 for TLD No. 3. The values of the two different surveys when normalized are similar. Each of these values are less than 2% of the values given in 10 CFR §20.101 for restricted areas.



ROOF SAMPLING LOCATIONS ON MATH SCIENCE COMPLEX
(from Amended Application June 82)

TLD Locations

FIGURE 11-4-1

Table 11-4-2

TLD Readings (mRem)

(for Amended Application June 82)

# - LOCATION	8-26-80 12-01-80	12-01-80 3-05-81	3-05-81 5-26-81	5-26-81 8-28-81	8-28-81 11-24 81	11-24-81 2-26-82
A ROOF TOP, 47'N OF STACK	6	0¤	0¤	0¤	0¤	0¤
B ROOF TOP, 50' @ 20°N	5	0¤	0¤	0¤	0¤	0¤
C MSA VENTILATION INTAKE, 74' @ 20°N	4	4	4	5	5	5
D ROOF TOP, 111' @ 51°N	5	0¤	0¤	0¤	0¤	0¤
E ROOF TOP, 102' @ 58°N	6	NR*	0¤	0¤	0¤	0¤
F EXHAUST FAN INTAKE PLENUM	12	12	10	14	12	16
G WINDSCREEN, 38'S OF STACK	3	4	3	2	0	3
H ROOF TOP, 98' @ 70°N	3	4	4	1	1	0
I ROOF TOP, 183' @ 68°N	2	5	5	0	3	5
J ROOF TOP, 353' @ 86°N	0	3	2	0	0	4
K ROOF TOP, 166' @ 92°N	5	5	4	5	6	3
L COOLING TOWER, 165' @ 110°N	4	4	3	4	2	3
M ROOF TOP, 84' @ 148°N	6	6	4	6	6	5
N VARIOUS	0	LOST	7▪	16▪	5	5
O PARKING STRUCTURES	20	16	15	21	17	18
P PARKING STRUCTURES	21	18	16	15	9	13

¤ON LEAD BRICKS

*NOT REPORTED

▪DISPLACED FROM ASSIGNED LOCATION

In the 1976-78 environmental survey, the TLD at the Math Science Building intake was not used because of the inconsistent data due to background radiation. In the current environmental survey, TLD "C" which is located on the top of the Math/Science Building intake, indicated an annual dose of 15-17 mrem per year. 10 CFR §20.105 specifies a maximum annual average dose in unrestricted areas of 500 mrem. Accordingly, the exposure to an individual standing at the intake for 100% of the time that the UCLA reactor is operated will be approximately 1/30th of the above mentioned 500 mrem.

Conclusion

The supplemental information provided in amended Appendix II corroborates the analyses in the SER derived from values in the 1980 submittal. Accordingly, the conclusions in the SER, which indicate that Ar-41 discharges from NEL are a fraction of 10 CFR §20, still pertain.

13-3 Emergency Plan

13-3.1 Introduction

The University of California at Los Angeles (UCLA) filed with the Nuclear Regulatory Commission an Emergency Response Plan for the UCLA Training Reactor dated February, 1980, as amended July 29 and August 18, 1982 (hereinafter referred to as the Plan). The Plan is an amendment to the license renewal application submitted in February 1980 and replaces Appendix IV of the application.

The Plan was reviewed against the requirements of 10 CFR Part 50, Appendix E. In addition the staff review extended to ascertaining the degree of conformance with the guidance criteria set forth in proposed Revision 1 to Regulatory Guide 2.6, "Emergency Planning for Research and Test Reactors," March 1982. Revision 1 to Regulatory Guide 2.6., dated March 1982 endorses Draft II of ANSI/ANS-15.16, "Emergency Planning for Research Reactors," dated November 29, 1981, which provides guidance criteria for formulating an emergency plan. The ANSI/ANS-15.16 Standard was developed as a parallel effort by the American Nuclear Society Subcommittee ANS-15 and the NRC staff to provide guidance for Research and Test Reactor licensees and applicants in developing radiological emergency plans and upgrading emergency preparedness at their f[illegible]ilities.

This evaluation report follows the format of section 3 of Draft II of ANSI/ANS-15.16 in that each of the planning standards is listed followed by a summary of the applicable portions of the Plan and the findings that relate to that specific standard. The final section of this report provides our conclusions.

13-3.1.1 Planning Standard

This section of the licensee's Emergency Response Plan (ERP) briefly describes the type of reactor, its major functions and utilizations, and its location. The scope and purpose of the emergency plan are stated in section 1.0. The Plan is designed to cope with emergencies which arise as a result of, or in connection with, reactor operations.

As stated in section 1 of the SER and SSER, the UCLA reactor is of the Argonaut class, water cooled and moderated, and graphite reflected. The reactor core is surrounded by a massive concrete biological shield. The reactor is licensed to operate at a maximum power of 100 kw (thermal). The functions and utilization of the reactor are to satisfy the needs of classroom instruction, prepare class materials, and provide irradiation services to researchers. The actual operating schedule seldom exceeds eight hours per week.

The reactor is located on the campus of UCLA in a two story reinforced concrete building (the Reactor Building), within the Nuclear Energy Laboratory and it is contiguous to Boelter Hall to the south where administrative offices are located.

13-3.1.2 Findings

The intent of the planning standard has been addressed and we conclude that this portion of the Plan is adequate.

13-3.2 Definitions

13-3.2.1 Planning Standard

Terms unique to the reactor facility or that have a special meaning when used in the plan shall be defined in the plan.

13-3.2.2 Evaluation

The Plan contains definitions of terms that are unique to the Licensee's organization and facility or have a special meaning when used in the plan. The Plan also contains drawings which provide additional definitive information on facility layout and bounded areas controlled by the licensee.

13-3.2.3 Findings

The intent of the planning standard has been addressed and we conclude that this portion of the Plan is adequate.

13-3.3 Organization and Responsibilities

13-3.3.1 Planning Standard

The plan shall describe the emergency organization that would be activated to cope with radiological emergencies. This includes the onsite emergency organization and any augmentation from offsite groups. Persons or groups that will fill positions in the emergency organization should be identified by their normal everyday title.

13-3.3.2 EVALUATION

The Plan discusses authority and responsibility of governmental agencies, the licensee's emergency organization, and the identification of offsite support groups and the key members of the emergency organization are identified. Emergencies that have radiological release implications will arise from reactor operations, failure of an experiment-in-progress, or fuel handling. Under these circumstances, a designated Reactor Supervisor and one or more Reactor Operators will always be present. To provide reason able assurance that emergency management exists to meet such operational emergencies, a chain of the following succession is specified:

Emergency Director

Emergency Coordinator*

Reactor Supervisor

Laboratory Manager

On-site Senior Reactor Operator

The most technically experienced on-site NEL staff member

The Radiation Safety Officer or Appointee

* The Emergency Director and the Emergency Coordinator may be the same individual.

A block diagram (Fig. 13-3-1) shows the relationships and interfaces among the components of the overall (reactor, campus, offsite) emergency response organization. A copy of the Letter of Agreement with the off-site support agency is included in the Plan.

13.3.3.3 Findings

The intent of the planning standard has been addressed and we conclude that this portion of the Plan is adequate.

13-3.4 Emergency Classification System

13-3.4.1 Planning Standard

The emergency plan shall describe several classes of emergency situations covering the spectrum of emergency conditions that involve the alerting or activation of progressively larger segments of the emergency organization. To provide for improved communications between the licensee, federal, state and local agencies and organizations, the most severe accidents are standardized in four classes of emergency conditions

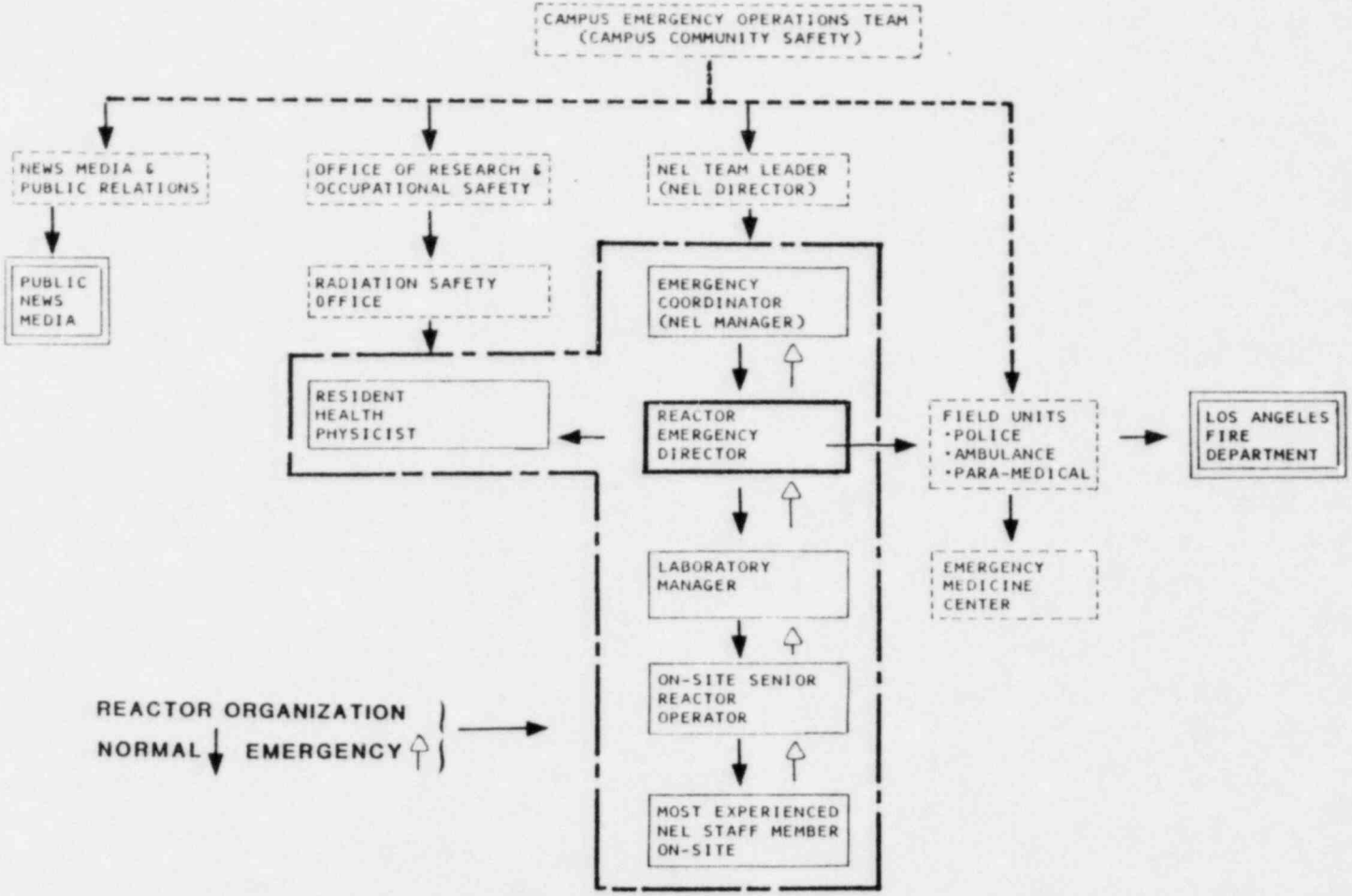


Fig. 13-3-1 **Reactor Organization: Normal, Emergency, and Extensions**

(extensions removed for this report)

which group the accidents according to the severity of offsite radiological consequences. Each emergency plan shall include only those standard classes appropriate for dealing with accident consequences determined to be credible for the specific facility. Most research reactors have potential emergency situations which may occur (e.g., personnel injury with contamination, fire, etc.) that have less severe offsite consequences than the least severe standard class, notification of unusual events. For some research reactors no credible accidents are postulated which result in consequences matching the least severe class. However, planning for onsite emergencies is important. Preparedness for these onsite emergencies should be accomplished by identifying them and including in the plan those elements commensurate with the postulated emergency situations.

Each class of emergency shall be associated with particular emergency action levels and with particular immediate actions to provide appropriate graded response. In order of increasing severity, the four standard emergency classes are: Notification of Unusual Events, Alert, Site Area Emergency, and General Emergency.

13-3.4.2 Evaluation

The Plan includes both the Alert and Notification of Unusual Event Classes as well as a class less severe than a NUE. The example conditions and emergency action levels (EALs) cover a range of emergency conditions that correlate severity with each emergency class. The emergency classes are described as:

13-3.4.2a Events Less Severe Than The Lowest Category (Class 0)

ants of this category are peripheral to the reactor operations and do not necessarily indicate changing the reactor status. The reactor might be shut down to reassign personnel or because of injury to a key individual. The condition may require local services such as ambulance and medical. Advisories to campus police may be warranted.

13-3.4.2b Notification of Unusual Event (Class 1)

This condition may arise as a result of either man-made events or natural phenomena that can be recognized as creating significant hazard potential that was previously non-existent or unrecognized. There is usually sufficient time to take precautionary and corrective measures to prevent the escalation of the event and/or to mitigate the possible consequences. This event can warrant termination or alteration of normal routines.

13-3.4.2c Alert (Class 2)

An alert condition may exist when events have occurred or are in progress which require emergency response to control or limit a serious radiological hazard. Suspension of the normal routine is indicated and evacuation of the reactor room may be necessary.

Site Area Emergency and General Emergency classes are not included as there are no credible events attributable to the reactor or its operation that could lead to emergency conditions beyond the reactor operations boundary (reactor room).

13-3.4.3 Findings

The intent of the planning standard has been addressed and we conclude that the emergency classes described are appropriate for a reactor of this type and size. This portion of the Plan is adequate.

13-3.5 Emergency Action Levels

13-3.5.1 Planning Standard

Because of the wide diversity in research reactors (power level, engineered safety features, site environment, etc.), those conditions which might initiate or signal a radiological incident having particular offsite consequences will vary widely among facilities. Action levels may be specified for effluent monitors or other plant parameters for which the dose rates and radiological effluent releases at the site boundary can be projected. Each emergency plan shall establish emergency action levels appropriate for the specific facility and consistent with Table I of Draft II ANSI/ANS-15.16. The emergency plan shall include emergency action levels to initiate protective

actions for members of the general public onsite. The protective guide shall be 1 rem whole-body or 5 rem thyroid.

13-3.5.2 Evaluation

The Plan states that planning for radiation doses that exceed the protective action guides (PAGs) of 1 rem whole-body and 5 rem thyroid for the general public onsite or other personnel beyond the operations boundary is inappropriate. However, the Plan does include specific instrument readings for classifying the emergency classes. The Plan states that the action levels included in the Plan (Table 13-3-2) are considered as EALs for activating the emergency organization and initiating protective actions appropriate for the emergency event.

13-3.5.3 Findings

The intent of the planning standard has been addressed and we conclude that the specific EALs for activating the emergency organization and the initiation of protective actions are appropriate for a reactor of this type and size. This portion of the Plan is adequate.

Table 13-3-2 Emergency Classification Guide

Emergency Class	Action Level	Purpose
Class 0. Less severe than the lowest class	Vague threats of bombs or civil disturbances Minor seismic event Personnel injury	(1) Alert staff to a possible escalation; (2) Initiate assessment, (3) To provide treatment
Class 1. Unusual Event	Receipt of bomb threat with possible radiological release implications. Fire or minor explosion which might adversely affect the reactor or control systems. Significant seismic event having perceptible affect upon reactor operation. Area monitors above 50 mr/hr. Ar-41 monitor above 1 volt (equivalent to 2.9×10^{-5} µCi/mℓ of Ar-41). Radiation at process pit above 100 mr/hr.	(1) Assure that emergency personnel are readily available to respond if situation becomes more serious or to perform confirmatory radiation monitoring if required, and (2) Provide off-site authorities current status information.
Class 2. Alert	Visible damage to fuel bundle, other visible failure. Area monitors above 500 mr/hr Ar-41 monitor above 6 volts (equivalent to 1.8×10^{-4} µCi/mℓ of Ar-41).	(1) Assure that response centers are manned, (2) Assure that monitoring teams are dispatched, (3) Assure that personnel required for evacuation of on-site areas are at duty stations, (4) Provide consultation with off-site authorities, and (5) Provide information for the public through the UCLA Public Information Office.

NOTE: The argon-41 monitor will alarm audibly at the console at 0.6 volt (1.8×10^{-5}µCi/mℓ) on the 0 to 1.0 volt range. If the reading exceeds 1.0 volt, the scale must be changed. On the 0-10 volt range the alarm will be sounded if the voltage exceeds 6 volts, ten times the initial alarm concentration.

13-3.6 Emergency Planning Zones

13-3.6.1 Planning Standard

As part of emergency planning, the reactor owner/operator of a facility that identifies radiological emergencies which result in offsite plume exposure exceeding 1 rem whole-body or 5 rem thyroid shall identify an emergency planning zone (EPZ). The postulated radioactive releases from credible accidents provide the basis for determining the need for an EPZ. The size of the EPZ should be established such that the dose to individuals beyond the EPZ is not projected to exceed the PAG. As an alternative to performing such calculations, the EPZ sizes in Table II of Draft II ANSI.ANS-15.16 may be adopted according to the power level.

13-3.6.2 Evaluation

The Plan states that an emergency planning zone (EPZ) is unnecessary since there are no credible accidents that could cause dose equivalents greater than 1 rem whole-body or 5 rem thyroid within or beyond the operations boundary; however, the licensee does establish the area within the operations boundary (reactor room) as an emergency planning zone (EPZ). Predetermined protective actions for the EPZ are described in section 7.0 of the Plan.

13-3.6.3 Findings

The intent of the planning standard has been addressed and the licensee demonstrates a conservative emergency planning policy in support of the defense-in-depth philosophy. We conclude that the planning basis for establishing the area within the operations boundary as an EPZ and the predetermined protective actions for the EPZ are appropriate for credible accidents associated with a reactor of this type and size. This portion of the Plan is adequate.

13-3.7 Emergency Response

13-3.7.1 Planning Standard

Emergency response measures shall be identified for each emergency. These response measures should be related to the emergency class and action levels that specify what measures are to be implemented.

13-3.7.2 Evaluation

The Plan includes emergency response measures for each emergency class. These response measures cover 1) activation of the emergency organization, 2) assessment actions, 3) corrective actions and 4) protective actions. The evaluation and findings for each response measure are presented in the following subsections of this report.

13-3.7.2a Activation of Emergency Organization

Planning Standard

The method for activating the emergency organization shall be described. The plan should specify the location(s) of current notification lists, specific actions to notify and mobilize the emergency organization and the applicable offsite support organizations for each emergency class.

Evaluation

Methods and actions for activating all components of the emergency response organization for each emergency class are described and commensurate with the licensee's organization. Notification lists and emergency procedures are located near telephones in the Nuclear Emergency Laboratory. Actions for activating the emergency organization for each emergency class are as follows:

Events Less Severe Than The Lowest Category (Class 0)

These events are limited to normal working hours and normally encompass occassional vague threats. Staff and campus police are alerted and no further action is taken. For personnel injury, the Emergency Director and/or Emergency Coordinator will be notified. The Radiation Safety Office will be notified if appropriate.

Notification of Unusual Event (Class 1)

In the event that a situation exists that presents a potentially serious hazard to the reactor, the Emergency Director will activate the emergency organization and where appropriate, will request external support via the campus emergency system.

Alert (Class 2)

The events of this class are only credible when reactor operations or fuel handling are in progress. The Emergency Director is responsible for assembling all available NEL staff, making a preliminary assessment of the situation and requesting additional assistance from the Radiation Safety Office if needed.

For personnel injury, the Emergency Director with the consent of the Radiation Safety Officer or his delegate may authorize a voluntary dose rate equivalent in excess of occupational exposure limits to facilitate rescue or emergency control. The guideline exposure limit is 100 rem for emergency life saving and 25 rem for actions that moderate or reduce the severity of the emergency. In either case, the exposure is authorized on a once-in-a-lifetime basis, with preference given to the eldest able-bodied volunteers. Personnel injuries shall be otherwise treated as in Class 0 emergencies.

Findings

The intent of the planning standard has been addressed and we conclude that this portion of the Plan is adequate.

13-3.7.2b Assessment Actions

Planning Standard

The methods, systems and equipment for gathering and processing information and data on which to base decisions to escalate or de-escalate emergency response actions shall be described.

Evaluation

Fixed and portable instruments are available to measure radiation dose rates and contamination levels. Self-reading dosimeters and area film badges will be used to determine radiation doses to personnel. Escalation/deescalation decisionmaking is referenced to specific instrument readings; e.g., area radiation monitors and continuous flow ion chambers. Gamma-ray spectrometers are available at the facility for radioisotope identification.

Findings

The assessment actions are described for each emergency class. We find

the actions to be appropriate for assessing credible accidents associated with a reactor of this type and size. This portion of the Plan is adequate.

13-3.7.2c Corrective Actions

Planning Standard

The corrective actions for taking control of the emergency situation, to protect or provide aid to affected personnel, and mitigate the consequences of the emergency shall be described.

Evaluation

Corrective actions to mitigate the consquences of an emergency and protect and provide aid to affected personnel include conditions for shutdown of the reactor and ventilation system, sealing of access doors to the affected area and providing assistance for bomb search or other actions as the security considerations may indicate. These actions are identified for each emergency class and cover a broad spectrum of events ranging from fires to unusual radiation or airborne radioactivity levels.

Findings

Based on our review, we conclude that the described corrective actions are appropriate for the emergency classes identified in the Plan. This portion of the Plan is adequate.

13-3.7.2d Protective Actions

Planning Standard

The emergency plan shall describe protective actions appropriate for the emergency class. The emergency plan should include the following:

(1) Conditions for either partial or complete onsite evacuation, evacuation routes, and primary and alternate assembly areas.

(2) Methods to assure personnel accountability and the segregation of potentially contaminated personnel.

(3) Protective measures and exposure guidelines for emergency personnel.

(4) Provisions for isolation and access control of facility areas to minimize exposures to radiation and the spread of radioactive contamination.

(5) The methods of monitoring radiation doserates and contamination levels, both on and offsite, including provisions for transmitting collected information and data to that element of the emergency organization responsible for accident assessment.

Evaluation

The conditions and methods for evacuation of the reactor room (defined as operations boundary and EPZ) are described and related to the readings from the radiation and effluent monitors described in Table II of the plan. Personnel accountability is by observation and all persons are surveyed for contamination. Contamination control measures to prevent the spread of contamination are described. Access and reentry to evacuated areas is under the control of the Emergency Director and is limited to rescue and emergency response operations.

Film badges and self-reading pocket dosimeters are used to determine personnel exposures to radiation. Protable survey meters are used for confirmatory measurements and determining radiation dose rates for consideration in the decisionmaking process. Low-level counting instruments and gamma-ray spectrometers are used for determining radiatioactivity concentrations and isotopic analyses. Emergency exposure limits are established for lifesaving (100 rem) and corrective actions (25 rems).

Findings

The intent of the planning standard has been addressed and we conclude that this portion of the Plan is adequate.

13-3.7.3 Conclusions

Based upon our findings in the four aformentioned categories of the Emergency Response Measures, the staff concludes that this portion of the plan is adequate for the emergency classes identified.

13-3.8 Emergency Facilities and Equipment

13-3.8.1 Planning Standard

The emergency plan shall briefly describe the emergency facilities, types of equipment and their location.

13-3.8.2 Evaluation

The plan describes the emergency support center (ESC), assessment equipment, first aid and medical facilities and communications equipment. The evaluation and findings for these facilities and equipment are presented in the following subsections of this report.

13-3.8.2a Emergency Support Center

Planning Standard

A facility or defined area within a facility should be designated as an emergency support center from which emergency control directions will be given. The support center should be located to effectively oversee operations, but should be separated from actual activities to function efficiently.

Evaluation

The reactor control room and the adjacent classroom are identified as the primary and backup ESC's. In addition, criteria governing the habitability of the primary ESC is described.

Findings

The intent of the planning standard has been addressed and given the consequences from credible accidents associated with reactors of this type and size, we conclude this portion of the Plan is adequate.

13-3.8.2b Assessment Facilities

Planning Standard

The emergency plan shall identify monitoring systems and laboratory facilities that are to be used to determine the need to initiate emergency measures, as well as those to be used for continuing assessment. These monitoring systems may consist of equipment such as radiological monitors, sampling equipment, geophysical phenomena monitors, fire and combustion products detectors, and process monitors that provide pertinent facility system or status information.

Evaluation

Area radiation monitors, a hand and foot counter and portable survey meters are in or near the reactor room. Low level counting equipment, including gamma-ray spectrometers, and a high-volume air sampler are in or near the reactor room.

Findings

The intent of the planning standard has been addressed and we conclude this portion of the Plan is adequate.

13-3.8.2c First Aid and Medical Facilities

Planning Standard

Identify those measures that will be used to provide necessary assistance to persons injured or exposed to radiation. The capabilities for decontamination, administering first aid, transporting personnel, and arrangements for medical treatment shall be described. The following items should be included:

(1) Capabilities for decontaminating personnel for their own protection and to prevent or minimize further spread of contamination.

(2) First aid training and capabilities of the emergency organization.

(3) Arrangements for transporting injured personnel who may also be contaminated to medical treatment facilities.

(4) Arrangements for local hospital and medical services.

(5) Assurance that hospital and medical services can provide the required services and that persons providing them are available, prepared, and qualified to handle radiological emergencies. Written agreements with respect to arrangements made for hospital and medical services shall be included.

Evaluation

Protective clothing and decontamination supplies and equipment are available in the control room which is designated as the primary ESC. First aid training and the capabilities of the emergency organization and arrangements for ambulance and medical services are described. Campus police are qualified in first aid and can provide paramedical assistance. First aid kits are available in the control room. UCLA owns and operates its own ambulance. For a contaminated victim, a designated health physicist will accompany the victim in the ambulance to advise on proper handling, to minimize personnel dose rates and the spread of contamination during transport, and to convey dose estimate information. The UCLA Emergency Medical Center handles all emergency cases and is also a designated radiation accident emergency facility with the capability of handling radiation exposed and contaminated victims.

In addition, decontamination facilities and methods for handling contaminated injured personnel are described. If the reactor high-bay is declared habitable by the radiation survey team, the decontamination shower or sink located in the reactor high-bay may be utilized for decontamination purposes since it drains into the process pit sump. If the reactor high-bay is unavailable and the victim is only slightly contaminated, as determined by the Resident Health Physicist or his designate, either the shower located in the bathroom of the reactor control room or the chemistry sink located in the laboratory next to

the class room may be utilized. If the extent of the victim's injuries are such that he cannot be decontaminated on site, he will be transported to the designated decontamination site at the UCLA Emergency Medicine Center by the campus ambulance.

Findings

The intent of the planning standard has been addressed and we conclude that this portion of the Plan is adequate.

13-3.8.2d Communications Equipment

Planning Standard

Identify the systems of emergency communications that will be available to communicate instructions and information both on and offsite throughout the course of the emergency. Facilities planning for a site area emergency shall establish reliable primary and backup means of communication, e.g., public telephone and radio, that is compatible with local offsite support groups.

Evaluation

The Plan describes the communication and equipment that is in place and would be used during an emergency event. The Nuclear Energy Laboratory intercom system links both the reactor control room and the front

office with the various areas of the Nuclear Energy Laboratory including the reactor room which is served by three stations. Telephones also connect various areas of the Nuclear Energy Laboratory to the control room, front office and the outside. Back-up communication assistance is available through the campus police via hand-held radio equipment.

Findings

The intent of the planning standard has been addressed and we conclude that this portion of the Plan is adequate.

13-3.8.3 Conclusion

Based upon our findings in the four aforementioned categories of this section, the staff concludes that the UCLA emergency facilities and equipment are adequate for the emergency classes identified.

13-3.9 Recovery

13-3.9.1 Planning Standard

This element of the emergency plan shall describe the criteria for restoring the reactor facility to a safe status including reentry into the reactor building or portions of the facility that may have been evacuated because of the accident. The operations to recover from the

most severe accidents will be complex and depend on the actual conditions at the facility. It is not not practicable to plan detailed recovery actions for all conceivable situations.

13-3.9.2 Evaluation

The assessment and corrective actions in Section 7.0 are described as being applicable criteria for downward classification of the emergency and for recovery operations. Reentry to evacuated areas of the Facility is under the control of the Emergency Director. In addition, the Plan states that decontamination will conform to the limits specified in 10 CFR Part 20 and Title 17 of the California Administrative Code.

13-3.9.3 Findings

The intent of the planning standard has been addressed and we conclude that portion of the Plan is adequate.

13-3.10 Maintaining Emergency Preparedness

13-3.10.1 Planning Standard

The emergency plan shall describe the elements necessary for maintaining an acceptable state of emergency preparedness. A description shall be provided of how the effectiveness of the emergency plan will be main-

tained, including training, review and update of the emergency plan and associated implementing procedures, and maintenance and inventory of equipment and supplies that would be used in emergencies.

13-3.10.2 Evaluation

The Plan describes the provisions for maintaining emergency preparedness. The programs and frequency for training, retraining, drills, drill critiques, plan reviews and updates, equipment inventory and calibration are described. Reviews and updates of procedures, including modifications resulting from drills, are described in section 11.2. The evaluation and findings for training and drills, plan review and update, and equipment maintenance are presented in the following subsections of this report.

13-3.10.2a Training and Drills

Planning Standard

The following shall be identified or described, as applicable, to demonstrate emergency preparedness:

(1) Programs to train and periodically retrain onsite personnel for participation in the emergency organization and to give specified training to onsite and offsite personnel who have specific emergency assignments.

(2) Annual onsite emergency drills, are to be conducted as action drills with each required emergency measure being executed as realistically as is reasonably possible, including the use of appropriate emergency equipment. At least every two years, these drills shall contain provisions for coordination with offsite emergency personnel and should test, as a minimum, the communication links and notification procedures with those offsite agencies and support organizations. To provide operational flexibility, the maximum allowable intervals between drills shall be consistent with the surveillance requirements of ANS 15.1, "Standard for the Development of Technical Specifications for Research Reactors."

(3) Provision for critiques of all drills, including timely evaluation of observer comments and correction of identified deficiencies.

Evaluation

The Plan describes the elements for training and re-training for members of the emergency organization and includes criteria for scenario development for conducting onsite emergency drills to test the adequacy of the

Plan. All licensed reactor operators and senior reactor operators attend an annual cycle of monthly requalification lectures. The NEL management along with other unlicensed laboratory personnel are invited to attend the emergency preparedness session in order to keep them updated. University Police attend an orientation and familiarization tour of the NEL on an annual basis. An annual onsite emergency drill is conducted in which the reactor room may be evacuated and an emergency scenario simulated to test the emergency preparedness of the Nuclear Energy Laboratory staff, and to the extent appropriate, the response of the Campus Emergency Staff. The scenario is planned in consultation with the Office of Research and Occupational Safety, and that office will provide one or more observers for the drill. The Los Angeles Fire Department will be included as necessary in the drill with a minimum requirement of testing the communication links and notification procedures at least every two years. At the conclusion of the drill, a critique will be held by the participating NEL staff, observers from the Office of Research and Occupational Safety, and may include members of other support and emergency groups.

Findings

The intent of the planning standard has been addressed and we conclude that this portion of the Plan is adequate.

13-3.10.2b Plan Review and Update

Planning Standard

The emergency plan shall provide for revising and updating of the emergency plan. This includes specifying the methods to ensure that changes and revisions are reviewed, approved, and distributed to appropriate elements of the emergency organization.

EVALUATION

The Plan in section 10.2 discusses the methods and frequency for plan review and update. The Plan will be revised as required and updated on an annual basis and approved for use by the Reactor Use Committee. Updated plans are distributed to all agencies and personnel having emergency responsibilities. The emergency notification and call list are updated at 3 month intervals.

Findings

The intent of the planning standard has been addressed and we conclude that this portion of the Plan is adequate.

13-3.10.2c Equipment Maintenance

Planning Standard

The emergency plan shall describe the provisions to ensure operational readiness of emergency equipment and supplies including required maintenance and calibrations, testing, and periodic inventory.

Evaluation

The maintenance testing and calibration schedules for equipment to be used during emergency operations are adequately outlined in Table III of section 10.3 of the plan. Emergency supplies at the NEL including the emergency kit located in the reactor control room are verified to be operational and complete on an annual basis by the Resident Health Physicist. All other back-up agencies maintain their emergency supplies in accordance with their own procedures. Fire extinguishers located throughout the NEL are checked annually by the Campus Physical Plant personnel.

Findings

The intent of the planning standard has been addressed and we conclude that this portion of the plan is adequate.

13-3.10.3 Conclusion

Based on our findings,in the three above mentioned categories of this section, the staff concludes that UCLA's plan for maintaining the emergency plan is adequate

13.3.11 Conclusion

As the staff has found that all the sections of the Radiological Emergency Response Plan for the UCLA Training Reactor meet the requirements of the Commission's Emergency Planning Regulations, we conclude that the plan is acceptable.

SECTION 14-2.2.5 - Fuel Handling Accident

Chapter 8, Appendix III of the UCLA June 1982 submittal pertains to this section of the SER. In the amended submittal, UCLA provided site-specific information on seismic activity and hydrology in the region, data on air flow through a closed core, core physics analyses, fuel fabrication information and core maintenance operations procedures.

All the new information provided by UCLA, especially the core maintenance procedure information, provides effects and doses that are less than those indicated in the staff's SER, making the staff's assumptions, calculations, results, and conclusions more conservative than indicated in the SER analysis of a fuel handling accident [SER Section 14].

Whereas UCLA indicated that maintenance inside the core will not proceed until at least three weeks after the reactor has been shut down, the staff's accident analysis used 100 KW steady state operation for many days and "instantaneous" fuel removal followed by the fuel handling accident. Accordingly, the staff's analysis resulted in doses one or two orders of magnitude greater than if a three week period elapsed between reactor shutdown and core contents handling. As the staff's conservative analysis indicated that the doses were only a small fraction of 10 CFR 20, the actual values need not be refined to the lower values suggested by the core opening restriction noted above. UCLA has also amended the Technical Specifications in several places to include the three week waiting period before proceeding with core maintenance. The staff concurs with the use of a three week waiting period.

Conclusion

The values of radioactivity emission and dose specified in Section 14 of the staff's SER should be decreased by a factor of 40-100, since the irradiated fuel will not be removed from the core for three weeks after shutdown. However, inasmuch as the calculated doses specified therein are already a small fraction of 10 CFR 20, the staff finds that a more exact calculation to determine the actual dose is not warranted.

SECTION 16 - Financial Qualifications

Appendix I of the amended application provided additional information and details on the funding, appropriations, sources of revenue for the UCLA Nuclear Engineering Laboratory, and costs for operating that facility.

Conclusion

The amended section does not change the staff's previous review and conclusions in the SER that UCLA possesses or is able to obtain the necessary funds to meet the requirements of 10 CFR §50.33(f).

The amended information also supports UCLA's application for a Class 104 license.