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**EXERCISE SUPER-RABBIT, A LIVERMORE POOL TYPE REACTOR
DISASTER EXERCISE**

T. D. Palmer
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May 1, 1974
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LAWRENCE LIVERMORE LABORATORY
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EXERCISE SUPER-RABBIT, A LIVERMORE POOL TYPE REACTOR DISASTER EXERCISE

Abstract

A simulated disaster designed to exercise the LLL Disaster Control Plan, the Livermore Pool Type Reactor (LPTR) Disaster Control Plan, and the various LLL disaster control support organizations and facilities is described. A simulated LPTR experiment, which resulted in damage to the reactor and injuries to reactor personnel, required response to an uncontrollable reactor, rescue and evacuation of contaminated victims in a high radiation field, decontamination of facilities and personnel,

and medical attention for injured operations personnel. The exercise required an alert of the LLL emergency response system and subsequent upgrading from a local accident status to that of a major disaster. The LLL Disaster Control Organization and required support units responded and implemented the LLL and LPTR Disaster Control Plans. Evaluation of the response was provided by umpires and followed by a critique of all personnel involved in the exercise.

Introduction

Practice exercises are regularly held at LLL to evaluate the Laboratory's disaster plans and to ready personnel for possible disasters. Exercise Super-Rabbit, held in December, 1973, was the most comprehensive exercise ever conducted. Both the seriousness of the mock disaster and the resulting large numbers of people required to respond were unique.

Exercise Super-Rabbit was the result of over a month of planning by the Hazards Control Department. It was staged at the Livermore Pool Type Reactor (LPTR) Building, in the street outside the building, and at various LLL support facilities, such as the Medical Department.

A simulated explosion in the LPTR started the 80-minute-long exercise. The results of the explosion were that the reactor was out of control and widespread radiation contamination was possible if it was not brought under control.

The LLL Disaster Control Organization and its support units (Figs. 1 and 2) were required to respond to the accident and to implement the LLL and the LPTR Disaster Control Plans. The major objectives of the exercise were to test the LPTR plan,¹ which had never before been tested, the LLL Disaster Control Plan,² and supportive plans.^{3,4}

Additional objectives of the exercise were:

Fig. 1. LLL Disaster Control Organization.

Fig. 2. LPTB Disaster Control Organization.

- To exercise the three hazards control groups that provide direct support to the disaster operation: the Environmental Evaluation Team, which evaluates off-site radiation levels; the Emergency Assistance Team, which aids in the rescue of victims; and elements of the

Hot Spot Team, which provide immediate mobile decontamination equipment.

- To test the ability of emergency response personnel to effect a difficult rescue.

- To exercise the emergency response and Medical Department personnel in

treatment of contaminated and injured victims.

- To test the response of the LPTR operations staff to a reactor disaster problem and to test the effectiveness of their emergency training in determining what caused the reactor to malfunction and in bringing it under control.

Exercise controls and limitations were adopted as a safety precaution. The use of equipment and the actions of all participants were limited to what could be safely done. Actions which could conceivably result in real accidents or serious equipment damage were to be terminated immediately. Each person participating in the succession of notifications, instructions, alerts, telephone calls, or radio transmissions used in the exercise first advised the contact

that "This is an exercise" and thereafter requested response to exercise activities.

Other precautions included the assignment of safety responsibilities to specific people. The Disaster Director or his deputies were to request all personnel to cancel or delay the exercise in the event of an actual emergency. The Hazards Control Department Exercise Coordinator and designated exercise umpires were responsible for guiding the execution and direction of the exercise. The Reactor Supervisor stayed in the reactor control room of the LPTR building and supervised reactor operations throughout the exercise. He verified that the reactor was maintained in a safe configuration at all times and retained the authority to discontinue the exercise any time he felt the safety of the reactor was being compromised.

Setup and Participants

The exercise is based on an accident that involves the explosion of nuclear material in the LPTR during an experiment. (Figure 3 shows the LPTR Building, Fig. 4 shows its floor plan, and Fig. 5 shows the LPTR control room console.) An accident was planned that might logically occur during the use of the LPTR equipment. Existing LPTR procedures for the use of the reactor in experiments were followed, starting with the requisitioning of machine time by two experimenters. The explosion occurs in the LPTR fast-rabbit irradiation equipment. This is a pressure-operated tube system designed to move a small projectile (the rabbit) from a laboratory staging area into the LPTR for irradiation of

samples placed inside the rabbit. Normally, after a programmed length of time, the projectile is automatically returned through the tube system to the staging area. In this exercise, the rabbit fails to return and two people enter the reactor dome (where the equipment is) to check out the rabbit tube system. During their checkout of the malfunction, the rabbit explodes. The cause given for the simulated explosion is that an oversized fissible sample has generated enough excess heat to vaporize the liquid sample. The two people in the reactor dome are wounded and radioactively contaminated by the explosion. The results of the explosion are the reactor is out of control, radioactive water vapor and radioactive

Fig. 3. General view of the Livermore Pool Type Reactor Building.

Fig. 4. Floor plan of the LPTB Building 281 and associated structures.

Fig. 5. LPTR control console in the reactor control room, 1325.

particles are spewed into the reactor dome atmosphere, spread of radioactive contamination is possible, and there is a chance of off-site radiation release if the reactor is not brought under control.

Exercise Super-Rabbit was carefully designed to closely imitate a disaster. For this reason, most of the personnel required to respond were not aware of the date or nature of the test before it occurred. The two men injured by the explosion were made up to look wounded. Coleman^{*} lantern mantles were attached to their clothes and injuries to simulate radiation contamination. The mantles contain ThO in sufficient quantities to serve as a low-level radiation source. Recalibrated radiation meters picked this up as a high reading. Other instruments were recalibrated and manipulated to give readings expected in this type of disaster. A radiation field was simulated within the reactor dome area (where the explosion occurs) by use of low-level radiation sources and the recalibrated detection instruments. Levels simulated varied from 500 to 1000 R/hr, extremely large amounts of radiation. Other steps taken to simulate a real explosion included scattering debris representing exploded tubing and a damaged rabbit around the reactor floor and landing. The reactor operating status light was adjusted to read "Reactor-On" to simulate failure to shut down. In addition, the reactor dome intercom system and the television display of the dome monitoring camera

were turned off to simulate damaged systems. Sound effects of boiling water and the rattling of rods simulating reactor core and rod damage were played over the reactor speaker to the control room. The power level recording strip chart was changed from the normal 3.0-MW level to read 3.5 MW, representing an uncontrolled power increase. The reactor pool liquid level gage was labeled to indicate a gradual loss of water. The reactor low coolant flow indicator light was on. The conditions simulated indicated a reactor in uncontrollable condition. The power was increasing and the water level decreasing. The reactor could not be shut down and the reason for the water loss was unknown.

Following an initial sizeup of the problem, the nature of the accident required upgrading it from accident to disaster status and required mobilization of the LLL Disaster Control Organization (Figs. 1 and 2), the Hazards Control Department Emergency Response staff and field team, the LPTR Operations staff, the Emergency Assistance Team, the Environmental Evaluation Team, and elements of the Hot Spot Team. Additional support was provided by the Police Department, the Medical Department, Directors' Office, and the Public Information staff.

An informal script was written to direct the exercise, and eight people were assigned parts. They were Experimenters 1 and 2, Hazard Control Technicians 1 and 2, newsman, Emergency Control Coordinator, Hazards Control Reactor Area Representative, and Reactor Supervisor. The script listed the eight people's specific duties and ad lib possibilities.

^{*}Reference to a company or product name does not imply approval or recommendation of the product by the University of California or the U.S. Atomic Energy Commission to the exclusion of others that may be suitable.

Three of the players, the Emergency Control Coordinator, the Hazards Control Reactor Area Representative, and the Reactor Supervisor, are part of the LPTR Disaster Control field group (Fig. 2). In times of actual disaster, they have assigned duties. In this exercise, they performed those duties and were assigned certain others to help control the exercise.

Five members of the Hazards Control Department participated as players with assigned roles and five others were umpires. The umpires were assigned observation stations. They were aware of the overall exercise plan and their job was to guide the flow of the exercise to completion and to prevent potentially hazardous actions by participants. They carefully observed the activity, recorded it, and later held critique sessions with the people in their areas. Checklists were used by the umpires as guides to evaluate

the emergency response. Appendixes A, B, and C give sample checklists. Umpire assignments were as follows. One person each was assigned to observe the effectiveness of: the general exercise, the response to the LPTR Disaster Control Plan, the dispatcher's response, the LPTR Building evacuation, the Environmental Evaluation Team's response, crowd and traffic control, the Medical Department's response, the Emergency Control Coordinator who ran the exercise, and contamination control and radiation procedures. Pairs of umpires critiqued each of the following: the action inside the reactor dome, the action outside the reactor dome, and the overall effectiveness of the response to the exercise.

The umpires' observations and the subsequent critiques were the basis for suggestions resulting from the exercise.

The Exercise

What follows is a detailing of the exercise as it occurred. Table 1 shows the timetable sequence. The entire exercise took place within 80 minutes, numerous people were involved, and many events were occurring simultaneously or in very quick succession. In all aspects of the exercise, attempts were made to simulate a real disaster.

Immediately prior to the official start of the exercise, Experimenters 1 and 2 are conducting a simulated research experiment in reactor building 281 (Fig. 3), using the fast-rabbit equipment discussed above. Hazards Control Technician 1 and Experimenter 1 are in

the reactor radio-chemistry laboratory and sample room (1311 and 1323) doing a sample rabbit shot with water as the simulated liquid fissile sample. See Fig. 4.

In the reactor control room, the Reactor Supervisor is also simulating a real rabbit shot, operating the controls to deliver and return the rabbit. In actuality, the rabbit is returned and the reactor is shut down. This signals the official start of the exercise and the Reactor Supervisor announces the start to the control room personnel. This is time zero on the timetable (Table 1). The Reactor Supervisor initiates the

Table 1. Timetable

Time (minutes)	
0	Reactor shutdown, announcement and start of exercise, klaxon horn sounded, building evacuated.
2	Fire command car, fire equipment, and disaster teams arrive.
4	Wind condition assessed, initial accident evaluation in progress.
6	Hot Lines established, Command Post manned, and disaster teams arrive at scene.
8	Building entry and situation analysis in progress. Hazards Control Technician 2 located and given first aid.
10	Situation upgraded from accident to disaster status and disaster organization activated. Experimenter 2 located and situation assessed.
12	Downwind and off-site surveillance started and monitoring system put in to operation.
14	Hot Lines manned and radiation fields assessed. Experimenter 2 prepared for removal.
16	Disaster organization and support equipment responding, ambulances alerted, Criticality Safety Committee arrives.
18	Newsman arrives at West Gate.
20	Ambulances arrive at scene.
24	Experimenter 2 moved through Hot Lines to ambulance and transported to medical facility.
30	Hazards Control Technician 2 moved through Hot Lines to ambulance.
40	Hazards Control Technician 2 transported to medical facilities.
50	Reactor damage assessment in progress.
60	Reactor damage assessment completed.
70	Reactor control plan developed.
80	Exercise terminated.

exercise activities by informing the building's occupants that a drill is in progress. He makes and repeats the following announcement over the public address system: "Attention all building occupants, this is a drill. Please follow all instructions. An exercise of the LPTR Disaster Plan is in progress. Please respond to all alarm system requests. This is an exercise only. Please respond to all requests."

The acting part of the exercise begins at this point. The Reactor Supervisor informs the reactor control room personnel that the rabbit has failed to return and is apparently still in the reactor core. Experimenter 2 and Hazards Control Technician 2 go to the reactor dome to inspect the equipment. During their checkout of the malfunction, the rabbit explodes. The explosion, simulated by a recording, is heard over the loudspeaker

system in the control room. Simulated radiation levels from 500 R/hr at Experimenter 2 to 1000 R/hr at the airlock entrance to the dome cause the recalibrated dome radiation alarms to go off.

As a result of the explosion in the reactor dome, Hazards Control Technician 2 and Experimenter 2 are wounded and their wounds and clothing radioactively contaminated. Both attempt to escape by running down the stairs toward the emergency escape doors. Experimenter 2 panics, slips, and falls to the reactor balcony where he is conscious but immobilized with a broken back. The Hazards Control Technician proceeds, apparently unaware of the experimenter's accident, and exits through the dome emergency escape doors. He runs to the reactor control room to report the accident. He simulates great pain and panic and forgets that he is possibly contaminated until reminded. Following the technician's report, the Reactor Supervisor gives emergency instructions to the Reactor Operator. At the instructions of the supervisor, the Reactor Operator places an emergency telephone call that is announced on the radio. What remains is for the support teams to respond to the exercise as they are notified and to act according to the disaster plans for a quick and successful conclusion to the problem.

First to respond to the call and to arrive in the street outside the building, about a minute after the official start of the exercise are the Fire Captain and the police. The Fire Captain makes an initial sizeup of "no smoke or flame visible" and the police secure the street.

In the first five minutes after the emergency telephone call is placed, a fire truck arrives as do the Emergency Control Coordinator, the Hazards Control Area Representative for the reactor, and a Health Physicist. According to the LPTR Disaster Plan and the exercise script, the Emergency Control Coordinator is in charge of the exercise. His first action upon arriving at the scene is to set up a Command Post. From it, he will centralize the control of all the activities, decide the general course of action, and direct the activities of the various emergency response groups when they are called out. (Appendix B gives the Disaster Exercise Command Post Checklist.) The Reactor Supervisor radios the Emergency Control Coordinator from the reactor control room and tells him details of the accident. The supervisor stays in the reactor control room and continues to inform and advise the Emergency Control Coordinator throughout the exercise.

About this time, two controlled access barricades (Hot Lines) are set up at the front door of the LPTR building. Two firemen change into protective clothing and Scott-air pak breathing devices to prevent radiation contamination. They enter the reactor building with a meter and note that the radiation level is 1000 R/hr (Fig. 6). They radio this information to the Emergency Control Coordinator at the Command Post. Because of the extremely high radiation level, the coordinator upgrades the accident to disaster status and orders that the LLL Disaster Organization be activated. Two of its support groups, the Emergency Evaluation Team and the Emergency

Fig. 6. Firemen enter the reactor building and check the radiation panel near the entrance.

Assistance Team, are also called out. Smoke bombs are activated throughout the exercise to learn the wind direction, action is taken to avoid being downwind of the reactor building, and air samples are taken to learn of any airborne radioactive contamination. These actions are repeated many times throughout the exercise.

The two firemen in the reactor building proceed to the control room, discover and give first aid to injured Hazards Control Technician 2, and then proceed to the reactor dome area where they discover Experimenter 2 in a 500 R/hr field (Fig. 7). They give him first aid and prepare him for removal.

About this time, the Deputy Disaster Control Director arrives, is briefed by the Emergency Control Coordinator, and discusses the reactor conditions with the Hazards Control Reactor Area Representative. The representative helps the Emergency Control Coordinator throughout the exercise by coordinating all technical assistance necessary from emergency

response personnel and by directing the activities of the Hazards Control technicians and the emergency response teams. At approximately this point in the exercise, a request is made for a Hot Spot Decontamination trailer, the Environmental Evaluation Team is instructed to report to the Hazards Control Area Representative, and one member each of the Criticality Safety Committee and the Industrial Safety Group arrives at the Command Post. Also, the player acting as newsman arrives at the West Gate of LLL. He says that he monitored an LLL radio dispatch indicating that a disaster is occurring and demands a news release. He threatens to release an alarmist news story he has written if he is not given an official one. He continues to harass the gate guards throughout the exercise until the Public Information Office provides him with a release.

Twenty minutes into the disaster, members of the Environmental Evaluation Team and the Emergency Assistance Team arrive. (Appendix C shows the Environmental Evaluation Team's checklist.) The Emergency Assistance Team members put on their protective clothing (Fig. 8). They then perform a radiological survey outside the reactor building, activate a downwind sampler, and set up the Hot Spot Decontamination trailer.

At 24 minutes, two requested vehicles, a respirator truck and ambulance, arrive; the wind sampler shows the wind has shifted and the emergency apparatus is moved upwind; and the firemen in the reactor zone attempt to exit with wounded Experimenter 2. However, they are trapped when an airlock door fails to open because another door has been left

slightly ajar. The umpires step in to ensure the continuance of the exercise and help them open the door. Thirty-five minutes after time zero, the firemen bring the experimenter to the Hot Line (Fig. 9). He is decontaminated and then transferred by ambulance to the Medical Department for further decontamination and treatment of his wounds.

Throughout the exercise, supervisory personnel confer at the Command Post (Fig. 10). At 42 minutes, the Deputy Disaster Control Director contacts the Disaster Control Director and briefs him. He asks the Director to make the necessary notifications, including the San Francisco AEC office and other outside agencies (see notifications, Appendix C). Also at this time, the firemen re-enter the reactor building and proceed to the reactor control room to rescue Hazards Control Technician 2 (Fig. 11). Emergency Assistance Team members have entered the building by this time and they aid in the rescue. The second victim, Hazards Control Technician 2 is taken to the Hot Line, decontaminated, and then sent to the Medical Department (Fig. 12) via ambulance.

The Hazards Control technicians and the Emergency Assistance Team continue their activities to bring the reactor under control. They determine that the reactor rods are damaged and suggest a three-part solution. First, the reactor, which has been losing water as a result of the explosion, should be kept cool by running water. Second, borax should be added to the running water to decrease the radiation coming from the reactor. And third, repair of the damaged rods should begin. However, none of these actions are

Fig. 7. Firemen discover Experimenter 2 in the reactor dome area.

Fig. 8. An Emergency Assistance Team member suits up.

Fig. 9. Experimenter 2 brought to Hot Line.

Fig. 11. Firemen prepare to remove Hazards Control Technician 2 from the reactor control room.

Fig. 10. The Reactor Supervisor, Fire Captain, and Health Physicist confer at the Command Post.

Fig. 12. Hazards Control Technician 2 receives treatment in special Medical Department decontamination facility.

actually taken because all the conditions of the reactor problem are simulated. At this point, the Reactor Supervisor indicates that the evaluation of the reactor damage problem has been completed and the reactor "brought under control," and, therefore, the exercise is concluded.

At completion, other desired actions have been accomplished. They are:

- Both victims have been processed through the Medical Department,
- The Environmental Evaluation Team has completed its survey of off-site radiation release,
- The Emergency Assistance Team has removed the victims, processed them to Medical, secured the reactor area against the spread of radioactive contamination, and been released by the Deputy Disaster Control Director,
- The newsman at the West Gate has been provided with a news story.

Critique

Post-activity critiques and discussions of Exercise Super-Rabbit were just as important as the actual event because the exercise was intended primarily as a learning experience. Its whole purpose was to test and discover the strengths and weaknesses of the disaster control organization and to find ways in which the disaster response capabilities of LLL employees could be improved.

Two different types of critiques were held after Super-Rabbit, and everyone who participated in the exercise was involved in at least one of these. First, each umpire met with his assigned group and critiqued their response. Then he attended the umpires' and coordinators' meeting and summarized his observations of, and recommendations for, his assigned group. A videotape film review was held at this second session. The Emergency Control Coordinator summarized the results of this critique session.

The general post-exercise consensus was that, overall, the exercise was very successful. People responded competently

and the LPTR plan was effective. This was particularly commendable because it was the first time the LPTR plan had actually been tested, because it was such a large scale exercise, and because many of the participating people were new at their jobs or had never before been involved in a disaster exercise.

A number of useful recommendations resulted from the critique process. They were utilized to improve the overall emergency response effectiveness of the entire disaster control organization. These included changes in the LLL and LPTR Disaster Plans, modification of emergency response operational procedures, improvement of response coordination activities, and retraining of emergency response support personnel. The recommendations can be divided into three areas that need improvement: communications, organization, and radiation safety. Specific suggestions follow.

COMMUNICATIONS

Various suggestions were made concerning improving communications. For

example, the Medical Department and the Fire Department need to communicate better in the handling and decontaminating of accident victims. In future exercises, the Fire Department should label the victims as to the nature of injuries; type, degree, and location of contamination; and first aid given; and, they should radio sizeups of the victims' conditions to the Medical Department before transporting them there. All these actions will save time in treating victims and are a normal part of LLL disaster control.

Areas in which communications between the Environmental Analysis Team and the two groups that assist it, the Analytical Laboratory and the Meteorology Group, could be improved were suggested. The Analytical Laboratory should be notified that the Environmental Analysis Team has been activated, it should be given complete instructions with each sample that is being analyzed, and it should be given a priority system for analyzing samples. The Meteorology Group should have a radio to improve their communications with the Command Post and the words "Emergency Services" on their badges to expedite data gathering.

In future exercises, the evacuees should be monitored and briefed on the accident that has occurred, and assembled in a specific area or released. The Health Physicist should ensure that people have been monitored and decontaminated, and the Hazards Control Reactor Area Representative or the Emergency Control Coordinator should see that the Senior Building Supervisor attends to the evacuees. Communication can also be improved if the Senior Fire Officer or the firemen who first enter the building contact the

building reactor personnel to get their assessment of the accident.

A few suggestions were made concerning the overall improvement of communications. An Emergency Control Center should be established, possibly at the Police Department Building. Technical advisors arriving at the accident scene should be directed to a designated assembly point, briefed about the situation by the Disaster Director, and given specific jobs to accomplish. A supplemental radio system should be used to alleviate the considerable radio traffic during the exercise. Suggestions for the supplemental system include the LLL taxi cab frequency, citizen band receivers, and sound-powered phones. The emergency dispatchers should have an automatic log keeping system so that the rapid sequence of events can be recalled for post-accident analysis.

ORGANIZATION

The post-exercise critiques resulted in a number of suggestions for the improvement of organization. For example, the Emergency Assistance Team assignments should be consistent with the overall plan. The team should first conduct an additional radiation survey of the accident scene, and then aid with the rescue of victims. After they have completed these activities, they can proceed with their other tasks. The Medical Department should have enough extra people available to be litter bearers, radiation monitors, and to drive ambulances. In any accident situation, those near a trapped victim should provide him with first aid. In Super-Rabbit, the reactor

operators did not aid injured Hazards Control Technician 2.

RADIATION SAFETY

Improvements were suggested in the area of radiation safety. The need for greater caution with high radiation situations was one of the main lessons learned from Exercise Super-Rabbit. Radiation levels should be constantly monitored by the personnel at the accident scene. The Hazards Control Reactor Area Representative and the Hazards Control Health Physicist should both take an active role in insisting on constant monitoring and ensuring that the radiation levels are known. All members of the disaster organization should be aware that exposure to emergency doses exceeding 25 R must be voluntary.

The use of radiation meters should be improved. Suggestions included: high range radiation meters should be used when entering potentially high radiation fields; monitoring personnel should use at least two meters; meters used in radiation surveys should not be placed on potentially contaminated surfaces; and

radiation monitoring should be performed continuously to establish any change that might occur in the radiation field.

Various suggestions were made for greater care in the area of airborne radiation contamination. They included: the need for breathing apparatus should be constantly reviewed; all people in the radiation area should evaluate their need for respiratory protection; the possibility of contamination during the changing of breathing apparatus bottles should be studied; potentially contaminated clothing should not be removed without respiratory protection; and victims sent to the Medical Department should be stripped and decontaminated.

Improvements were suggested in the control of downwind contamination. Wind direction should be carefully noted and the Command Post should continually announce the correct approach route over the radio. Building air samplers should be set up as early as possible. Other suggestions were: rescue personnel left downwind should be provided with appropriate clothing and an intermediate hot zone should be established at the accident scene.

Comments

The careful planning that went into Exercise Super-Rabbit contributed to its success. Attention was given to realism, constraints and limitations, safety precautions, and post-exercise analysis. Any large scale exercise should be planned with consideration to the above areas if a useful learning experience is to be the result.

Realism can be produced by thoroughly researching the activity to be simulated and rehearsing the exercise script. An individual who experiences realism will always react more reliably in an actual situation.

Constraints and limitations are needed to bring the specific areas to be exercised into focus. Such controls are also needed

to start, stop, and guide the flow of action in an exercise. An exercise which starts prematurely, stops too soon, or runs too long loses its usefulness.

Safety precautions are also imperative in fast-paced and emotionally-charged exercises, such as Super-Rabbit, where there may be danger of personal injuries and of compromising the safety of the facilities being used. Umpires are necessary to supervise the activities; and an exercise safety

officer is required who has overall responsibility for conducting a safe exercise and the authority to stop the exercise at any time.

To judge the effectiveness of the exercise, feedback is required. Video-tapes or other media can be utilized to document and review the results. The umpires should participate in critique sessions. These are needed to elicit and to formalize the remedial actions necessary to improve the response.

References

1. Disaster Control Plan, compiled by Hazards Control Department, Lawrence Livermore Laboratory, Rept. M-014 (1973).
2. "Livermore Pool Type Reactor Disaster Control Plan," in Operational Safety Procedures, compiled by the Hazards Control Department, Lawrence Livermore Laboratory, Procedure 281, Appendix A (1973).
3. Health and Safety Manual, compiled by the Hazards Control Department, Lawrence Livermore Laboratory, Rept. M-010 (1973).
4. Hazards Control Manual, compiled by the Hazards Control Department, Lawrence Livermore Laboratory, Rept. M-017 (1973).

Appendix A

Disaster Exercise General Checklist

PUBLIC RELATIONS

Press release prepared	<u>yes</u>	<u>no</u>	By whom _____
Building occupants briefed	<u>yes</u>	<u>no</u>	By whom _____
Emergency workers briefed	<u>yes</u>	<u>no</u>	By whom _____
Employee notice prepared	<u>yes</u>	<u>no</u>	By whom _____
Press conference called	<u>yes</u>	<u>no</u>	By whom _____

EMERGENCY SUPPLIES

Gasoline	<u>yes</u>	<u>no</u>	Lighting	<u>yes</u>	<u>no</u>	Oxygen	<u>yes</u>	<u>no</u>
Charcoal filter	<u>yes</u>	<u>no</u>	Hard hats	<u>yes</u>	<u>no</u>	TV equipment	<u>yes</u>	<u>no</u>
Transportation	<u>yes</u>	<u>no</u>	Protective clothing	<u>yes</u>	<u>no</u>			

Other: _____

NOTIFICATION

Disaster Director	<u>yes</u>	<u>no</u>	Hazards Control disciplines	<u>yes</u>	<u>no</u>	Public Information Office	<u>yes</u>	<u>no</u>
Deputy Disaster Director	<u>yes</u>	<u>no</u>	AEC San Francisco	<u>yes</u>	<u>no</u>	AEC Washington	<u>yes</u>	<u>no</u>
Radiation Group	<u>yes</u>	<u>no</u>	Site 300	<u>yes</u>	<u>no</u>	Medical Department	<u>yes</u>	<u>no</u>
Next of kin	<u>yes</u>	<u>no</u>	Coroner	<u>yes</u>	<u>no</u>	City of Livermore	<u>yes</u>	<u>no</u>
Hazards Control Area Representative	<u>yes</u>	<u>no</u>	Building Coordinator	<u>yes</u>	<u>no</u>	FBI	<u>yes</u>	<u>no</u>
Newsline	<u>yes</u>	<u>no</u>	Valley Memorial Hospital	<u>yes</u>	<u>no</u>	County Sheriff	<u>yes</u>	<u>no</u>

INCIDENT CLASSIFICATION

Class A yes no Class B yes no Class C yes no

Incident report needed yes no By whom _____

Firemen spot at hydrant yes no

Enter by main entrance yes no

Firemen check panel yes no

Recover nuclear accident dosimeter yes no

Check wind in control room panel yes no

EMERGENCY ACTIONS

Material identified yes no

Radiation levels determined yes no

Stay times set yes no

Stay times observed yes no

Two meters used yes no

Road blocks yes no Where _____

Disconnect Power yes no Area _____

Water yes no Area _____

Gas yes no Area _____

Air yes no Area _____

Ventilation yes no Area _____

Steam yes no Area _____

Klaxons shut off yes no

Smoke bomb yes no

Dispatcher operates
evacuation paging
system

yes no

Dispatcher gives
wind direction
on radio

yes no

Disaster trailer
needed

yes no

Where _____

Emergency morgue
needed

yes no

Where _____

Appendix B Disaster Exercise Command Post Checklist

COMMAND POST OPERATIONS

<u>Command Post</u>			<u>Check-In</u>			<u>Stayed at Command Post</u>	
In safe location	<u>yes</u>	<u>no</u>	Senior Police	<u>yes</u>	<u>no</u>	<u>yes</u>	<u>no</u>
Upwind	<u>yes</u>	<u>no</u>	Area Representative	<u>yes</u>	<u>no</u>	<u>yes</u>	<u>no</u>
Up hill	<u>yes</u>	<u>no</u>	Health Physicists	<u>yes</u>	<u>no</u>	<u>yes</u>	<u>no</u>
Contaminated	<u>yes</u>	<u>no</u>	Emergency Assistance Team	<u>yes</u>	<u>no</u>	<u>yes</u>	<u>no</u>
Away from traffic	<u>yes</u>	<u>no</u>	Environmental Evaluation Team	<u>yes</u>	<u>no</u>	<u>yes</u>	<u>no</u>
Location announced on air	<u>yes</u>	<u>no</u>	Senior Fire Officer	<u>yes</u>	<u>no</u>	<u>yes</u>	<u>no</u>
Sizeup given	<u>yes</u>	<u>no</u>	Disaster Control Director	<u>yes</u>	<u>no</u>	<u>yes</u>	<u>no</u>
Command Post flag used	<u>yes</u>	<u>no</u>	Deputy Disaster Control Director	<u>yes</u>	<u>no</u>	<u>yes</u>	<u>no</u>
			Building Representatives	<u>yes</u>	<u>no</u>	<u>yes</u>	<u>no</u>

RADIATION CONTROL ZONES

<u>Zones</u>	<u>Defined</u>		<u>Adequate</u>		<u>Respected</u>		<u>People Logged In</u>	
Hot zone	<u>yes</u>	<u>no</u>	<u>yes</u>	<u>no</u>	<u>yes</u>	<u>no</u>	<u>yes</u>	<u>no</u>
Intermediate zone	<u>yes</u>	<u>no</u>	<u>yes</u>	<u>no</u>	<u>yes</u>	<u>no</u>	<u>yes</u>	<u>no</u>
How set up	<hr/>							
Respiratory protection	<u>yes</u>	<u>no</u>	Ventilation	<u>on</u>	<u>off</u>	Sewer checked	<u>yes</u>	<u>no</u>
Protective clothing	<u>yes</u>	<u>no</u>	Survey techniques	<hr/>				
Remarks	<hr/>							

Appendix C Environmental Evaluation Team Checklist

ENVIRONMENTAL EVALUATION TEAM

Team captain notified yes no

By whom _____ When _____

Team callout started by _____

When _____ Completed _____

Comments _____

Environmental Evaluation Team (on-site) activated: yes no

Assignment (s) _____

Environmental on-site team vehicles obtained from _____

Adequate two-way radios available from Fire Department yes no

METEROLOGICAL GROUP

Meteorological advisor available yes no

Who _____ Hazards Control Meteorology supplying data

to Meteorological Group yes no Comments _____

Meteorological Group analyzing meteorology data and supplying wind direction, speed, and dilution data. Trajectory map from Meteorology Group yes no

Comments _____

SUPPORT TEAMS

Back-up teams (off-site and on-site) assembled and available at Fire Station yes no

When _____ Comments _____

Perimeter teams deployed (off-site)

Route 1 yes no

Route 2 yes no

Route 3 yes no

Perimeter vehicles obtained from _____

Support activated

Hazards Control Counting Room yes no

Hazards Control Analytical Laboratory yes no

Bio-Medical Tritium Group yes no

Bio-Medical Van yes no

Radiochemistry Group yes no

Home air samplers activated yes no

General Comments _____