



Federal Emergency Management Agency

Region II

26 Federal Plaza

New York, New York 10278

September 8, 1988

MEMORANDUM FOR:

Grant Peterson
Associate Director
State and Local Programs and Support

FROM:

Jack M. Sable
Regional Director

SUBJECTS:

- (1) Regional Assistance Committee (RAC) Review Comments for the LILCO Local Offsite Radiological Emergency Response Plan for Shoreham, Revision 10 dated September 6, 1988.
- (2) Post-Exercise Assessment for the June 7-9, 1988 Exercise of the LILCO Offsite Radiological Emergency Response Plan for the Shoreham Nuclear Power Station dated September 2, 1988.

In response to your earlier requests, Region II herewith transmits three copies of the captioned documents.

As referenced on each page of the plan review, Revision 10 of LILCO's Offsite Radiological Emergency Response Plan has been reviewed in accordance with the interim-use and comment document jointly developed by FEMA and NRC entitled: Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants (Criteria for Utility Offsite Planning and Preparedness); NUREG-0654/FEMA-REP-1, Rev. 1, Supplement 1, November, 1987. This review updates the previous review of Revision 9 of the LILCO plan transmitted to you in May 1988.

On May 23, 1988, the Nuclear Regulatory Commission (NRC) requested that the Federal Emergency Management Agency (FEMA) conduct a review of Revision 10 of the LILCO offsite plan against the criteria of NUREG-0654/FEMA-REP-1, Rev. 1, Supplement 1 and the three assumptions stated below. NRC also requested that Revision 10 changes be incorporated into the exercise play of the upcoming Shoreham exercise. Since a full RAC review could not be conducted in the short time frame remaining before the exercise, FEMA Region II agreed to review the changes, coordinate with the RAC where necessary, and incorporate them into the evaluation of the exercise. The assumptions upon which the plan review and the exercise were based are that in an actual radiological emergency, State and local officials that have declined to participate in

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emergency planning will:

- 1) Exercise their best efforts to protect the health and safety of the public;
- 2) Cooperate with the utility and follow the utility plan, and
- 3) Have the resources sufficient to implement those portions of the utility offsite plan where State and local response is necessary.

After the exercise, Revision 10 was reviewed in detail by FEMA Region II and the RAC. Also included in the review were additional materials which NRC formally requested FEMA to review on August 31, 1988. A RAC meeting, chaired by FEMA Region II was held in our offices on September 1, 1988, on Revision 10 of the plan.

All of the previous outstanding issues have been reviewed including those (1) for which elements were previously rated inadequate, and (2) those for which recommendations for improvements of the plan were made. For clarity, the following nomenclature has been carried over from the previous reviews:

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|----------------|--|
| A (Adequate) | The element is adequately addressed in the plan. Recommendations for improvement shown in <i>italics</i> are not mandatory, but their consideration would further improve the utility's offsite emergency response plan. |
| I (Inadequate) | The element is inadequately addressed in the plan for the reason(s) stated in bold type . The plan and/or procedures must be revised before the element can be considered adequate. |

As a means of summarizing this rather lengthy review and for ease in understanding abbreviations used, an Element Rating Summary and List of Acronyms are provided at the end of the document. In accordance with Richard Krimm's memorandum of July 27, 1988 to Ihor Husar of my staff, elements C.2.b, C.2.c, E.3, and all parts of E.4 have been removed from this review, since they will not appear in the final version of NUREG-0654/FEMA-REP-1, Rev. 1, Supplement 1.

As mentioned above, we also transmit a copy of the Shoreham Post-Exercise Assessment report dated September 2, 1988. There were no exercise issues classified as deficiencies. However, there were some areas requiring corrective action. FEMA evaluated the full-participation June 1988 exercise in response to NRC's request dated February 8, 1988. Objectives for the exercise were developed by LILCO and submitted to FEMA and NRC for review. On May 20, 1988, and May 26, 1988, NRC staff agreed that the proposed objectives submitted by FEMA on May 13, 1988, were sufficient to demonstrate the capabilities of LILCO's Local Emergency Response Organization in a full-participation exercise. They also stated their position that the objectives were sufficient to constitute a "qualifying" exercise under 10 CFR 50, Appendix E, Section IV.F.1 in that it should test as much of the emergency plans as is reasonably achievable without mandatory public participation.

Based upon this determination and changes to the plan which were incorporated in Revision 10 in response to the RAC review of Revision 9, Region II finalized its plans to evaluate the exercise. The exercise was conducted on June 7-9, 1988 with plume-exposure-pathway emergency planning zone (EPZ) activities primarily conducted on June 7th, ingestion-pathway EPZ activities conducted on June 8th, and recovery/reentry activities conducted on June 9th.

A public meeting was held on June 15, 1988 at the Mediterranean Manor in Patchogue, New York. The public meeting was held to acquaint the public with the content of offsite plans and FEMA's preliminary observations on the June exercise. Representatives from offsite organizations participated with FEMA Region II and NRC Region I at the public meeting.

LILCO was provided a copy of the draft report dated August 8, 1988 and their comments were received by the RAC Chairman at a meeting with representatives of the utility in the Region II office on August 17, 1988. Prior to finalizing the Post-Exercise Assessment, the report was reviewed and discussed in detail at the RAC meeting on September 1, 1988.

It should be noted that the plan has been substantially improved by LILCO in response to the RAC's previous reviews. Ninety-four plan elements are currently rated adequate. Seven plan elements are currently rated inadequate. Some of these inadequacies were revealed as shortcomings in the exercise requiring further implementing detail in the plan. However, the exercise demonstrated adequate overall preparedness on the part of LERO personnel, and therefore, based on the evaluation of the plan and the exercise, Region II recommends a finding of reasonable assurance.

If you have any questions, please contact Mr. Ihor W. Husar, Chairman, Regional Assistance Committee, at FTS 649-8200.

Attachments

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A. Assignment of Responsibility
(Organization Control)

A.2.a	Change(s) to the plan could not be located in response to an earlier comment on Rev. 9 that under the LERO plan (see Figure 3.3.7), FEMA is designated as having the primary responsibility for notifying the public of the Federal response. The lead Federal agency for this function is the Cognizant Federal Agency. This should be clarified in Section 2.2, page 2.2-4a, lines 10-15 and acknowledged in Section 3.3 as appropriate.	A
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C. Emergency Response Support and Resources

C.1.c	As recommended in the review of Rev. 9, the outdated designation of USDA responsibility (under FRERP) for the National Radio Fire Cache has been removed from page 2.2-4d of the plan.	A
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C.3	As noted in the review of Rev. 9, the designation of who will transport field samples to the laboratories (i.e., Clean Harbors Analytical Service; located in Massachusetts and Teledyne Isotopes in New Jersey) could not be located in Rev. 10.	A
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C.4	Updated executed leases have been included in Rev. 10 for the following transfer points:	A
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	<u>Expiration Date</u>
• Riverhead (also known as Warehouse Doctors' Path)	3/31/89
• Middle Island	3/31/89
• Shirley Mall	3/31/89
• Coram	3/31/89
• Miller Place	2/28/89

Evidence of valid leases for the Riverhead and Coram transfer points which were unsigned in Rev. 10 were formally provided to FEMA on 8/31/88.

The expiration date for the executed agreement (lease) for the Expressway Plaza Transfer point was incorrectly reported in the Rev. 9 RAC review. The correct

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	expiration date for that agreement was 6/30/88 (see Page App B-66, Rev. 9). On June 27, 1988, this lease agreement between LILCO and Plaza 63 Associates, Inc. was renewed for the period 7/1/88 through 6/30/89. A copy of this updated lease agreement was formally provided to FEMA on 8/31/88.	
	LILCO's purchase order agreement with Gulf Oil Gasoline expired as of 6/30/88. This agreement has been replaced by an agreement with the Rad Oil Company, Inc. of New Rochelle, NY for the period 7/1/88 through 6/30/89. A copy of this lease agreement was formally provided to FEMA on 8/31/88.	
	A letter of agreement dated 3/30/88 has been executed by LILCO with KLD Associates, Inc. to provide qualified volunteer personnel to fill the LERO Traffic Engineer position.	
	With regard to the manner in which LILCO responded to FEMA's comments on letters of agreement with bus companies to obtain "first-call" rights, see comments for element J.10.g.	
	Based on the demonstration of a sample of resources (i.e., ambulances and ambulettes) to implement an evacuation of mobility impaired persons, this objective was met at the 1988 exercise. However, FEMA did not have an opportunity to review a copy of the confidential computerized Homebound Evacuation Listing prior to the exercise. Therefore, a final determination of the overall adequacy of ambulance resources must await comparison of the number of vehicles with the needs of persons listed in the computerized Homebound Evacuation listing.	

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D.	<u>Emergency Classification System</u>	
D.4	Procedure OPIP 3.1.1; Attachment 1, page 7 of 13, has been changed to ensure that the Director of Local Response consults with the Radiation Health Coordinator (if this position is staffed at the EOC) to obtain an assessment of the radiological emergency at the Site Area and General Emergency ECLs before contacting the Suffolk County Executive to obtain approval to initiate notification of the public. Also, telephone numbers for the Governor of New York and the Suffolk and Nassau County Executives are included in procedure OPIP 3.1.1, Attachments 1 and 10.	A
E.	<u>Notification Methods and Procedures</u>	
E.5	<p>EBS messages developed at the 1988 exercise generally followed prescribed messages contained in OPIP 3.8.2 of Rev. 10 of the plan and they were detailed and comprehensive. However, new and important information was usually inserted in the middle or at the end of information contained in previous messages rather than at the beginning of the message where new information should be carried. Due to the excessive length of EBS messages, listeners may potentially miss critical information. Accordingly, the exercise revealed that the format of EBS messages should be revised to make messages more concise and to emphasize important information at the beginning of messages.</p> <p>The plan and procedures have been revised to specify that in accordance with the New York State Emergency Broadcast System Operational Plan (July 1981), WCBS in New York City will be used as the Common Point Control Station (CPCS-1) for disseminating initial and follow-up messages to the public. OPIP 3.8.2, Sections 5.1 and 5.1.4 specify procedures through which the WCBS EBS network would be activated when LERO is authorized to do so by State officials.</p> <p>The plan also (see page 3.8-7, lines 34-38) specifies that WPLR, an FM band radio station in Hamden, Connecticut has agreed to serve as the CPCS for the Shoreham local EBS network until the issuance of a full power operating license, and, if needed, to remain a member EBS station thereafter.</p>	I

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	The Shoreham local emergency broadcast network consisting of ten (10) radio stations on Long Island and Connecticut provide a backup network for use in issuing EBS messages in the event that a problem or delay is encountered in activating the WCBS-based EBS network. The Shoreham Atomic Safety and Licensing Board (ASLB) OL-3 proceeding has this plan element under active consideration (EBS litigation).	
E.7	As recommended in the review of Rev. 9, Section 3 (item 1) has been revised to include a precautionary statement that EBS need not be activated for an Unusual Event.	A
F.	<u>Emergency Communications</u>	
F.1.b	<p>The plan (Section 3.4 and Figures 3.3.5 and 3.4.1) and procedure OPIP 3.1.1 have been revised to specify that NAWAS will provide backup to commercial telephone for communications with New York State and Nassau County. According to Attachment 7, Section B.12 of OPIP 3.1.1, if difficulty is encountered in contacting Nassau County or the State, by commercial telephone, the LERO Lead Communicator is responsible for recommending that communications are relayed by either Suffolk County or the U.S. Department of Energy, Brookhaven Area Office (BHO) Security Station via NAWAS.</p> <p><i>The Shoreham Control Room NAWAS line specified in the plan (see page 3.4-2, line 25) should be added to Figure 3.3.5. Also, availability of the NAWAS link which can be accessed by the EOC via the SNPS Control Room or the DOE Brookhaven Area Office (BHO) should be specified in Attachment 1 of OPIP 3.1.1 for the Director of Local Response in the event that the Lead Communicator is not available to provide this information.</i></p> <p>Telephone numbers for the Governor of New York and the Nassau County Executive are now specified in OPIP 3.1.1, Attachments 1 and 10. However, according to the summary of revisions submitted by LILCO with Rev. 10 of the plan, telephone numbers for New York, Connecticut and Nassau County have been added to the LERO Emergency Telephone Directory, in response to FEMA's comment on this element in Rev. 9 of the plan. This directory</p>	A

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should be submitted to FEMA in order to verify that the points of contact to be used for initial communications include telephone numbers for the New York, Connecticut, Suffolk County and Nassau County warning points.

F.1.d

In response to comments on Rev. 9 of the plan, Attachment 2.2.1, lines 26-27 have been changed to be consistent with Figure 3.3.5 and OPIP 3.3.5, Section 5.11 which specifies that the Brookhaven Area Office (BHO) is notified by the Hicksville Supervising Service Operator.

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Also, page 4.1-4 of the plan has been revised to clarify that the LERO EOC is linked to the DOE-RAP field monitoring teams via BHO radio which is stationed at Brookhaven National Laboratory. If DOE relocates to the LERO EOC, this radio link to the DOE-RAP teams will be direct.

F.1.e

In response to Exercise ASLB PIC findings, procedures OPIPs 3.3.3, 3.6.3, 4.2.3, and 4.5.1 have been revised as follows to facilitate the mobilization/deployment of emergency workers to the field:

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- Traffic Guides are dispatched from Staging Areas immediately after their briefing at the Staging Area is complete (OPIP 3.6.3, page 5 of 77);
- Road Crews are mobilized to the Staging Areas at the Alert ECL rather than the Site Area ECL (OPIP 3.3.3, Attachment 1, page 2 of 3);
- Reception Center management personnel are mobilized to the centers at the Alert ECL (OPIP 3.3.3, Attachment 1, page 3 of 3 and OPIP 4.2.3, Section 3.2).

The Emergency Preparedness Advisor and the Radiation Health Coordinator are now listed in Figures 3.3.3 and 3.3.4 as affiliated with both LILCO and Other Organizations. This change should be made in Fig. 3.3.2,

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which still lists the Emergency Preparedness Advisor only as a LILCO employee.

F.2

In response to earlier comments on Rev. 9, Figure 3.3.5 has been revised to show the radio communication links to hospitals from ambulance dispatch stations and mobile ambulance units. Figure 3.4.1 has also been revised to show the radio links between hospitals and ambulance dispatch stations.

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G.

Public Education and Information

G.1.a-e

In response to comments on Rev. 9, the section of the section of the plan on "Media Awareness" (Page 3.8-3) has been revised and now refers to biennial rather than annual exercises.

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A revised draft of the Shoreham public information brochure was provided to FEMA and its contractor. Based on recommendations and technical assistance provided by FEMA's contractor, the new draft had a much clearer emergency focus and had been reorganized to place emergency instruction sections in the front of the booklet. The information in the brochure was consistent with instructions that may be given to the public via EBS messages and correlated with sample EBS messages contained in the plan. One important change was the addition of a single, summary instructions page to be placed directly inside the front cover that also serves to index additional information. Language simplification and more effective use of graphs and other design elements also greatly enhanced the utility and comprehensibility of the public information brochure.

Subsequent to the above review, on 7/28/88 FEMA informally obtained LILCO's updated, public information brochure. FEMA and the RAC will conduct a detailed review and provide the results at a later date.

See comments for element J.10.g in this review regarding the evaluation of public information for the agricultural community.

See comments for element J.10.g in this review regarding the manner in which the previous discrepancy between the number of nursery schools listed in the plan and the

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	public information brochure has been adequately addressed by LILCO.	
G.2	Provisions for the public information program and provisions for its dissemination as described in Section 3.8 of the plan are adequate. The public information materials should not be sent out until comments from FEMA's contractor have been incorporated into the brochure (See also comments for element G.1.a-e in this review). It is FEMA's understanding that LILCO intends to distribute the public information brochure prior to the formal demonstration of the alert and notification siren system for telephone survey purposes.	A
G.3	In response to earlier comments on Rev. 9, the NUREG-0654 cross reference has been revised to include appropriate citations where this element is addressed in the plan and procedures.	A
G.4.a	<i>The 1988 exercise revealed that the Emergency News Center (ENC) staffing chart does not define a role for radiation health spokespersons, two of which were assigned to the LERO staff to handle briefings related to radiation health issues. The ENC staffing chart should be accordingly revised to reflect that radiation health spokespersons will be assigned to this facility.</i> ¹	A
G.4.b	Copying capabilities for the distribution of hard copies of EBS messages to the media were found to be adequate at the ENC during the 1988 exercise.	A
G.4.c	Procedure OPIP 3.8.1 has been revised (see Section 5.4.3) to specify that the LERO Spokesperson at the ENC will designate a LERO Rumor Control Coordinator from the 13 Public Information Support Staff (see Figure 2.1.1 and OPIP 2.1.1, Attachment 3, page 1 of 5). This LERO Rumor Control Coordinator will be assigned to the LILCO rumor control room in the ENC at the LILCO Training Center, Hauppauge, NY where offsite related rumors will be routed to him/her by the LILCO Rumor Control Administrative Staff.	A

¹Although this exercise issue is not sufficient to rate the element inadequate, this issue should be corrected.

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	In response to Rev. 9 review comments, detailed rumor control procedures are provided in onsite procedure EPIP 4-4 which has been provided for information only behind Attachment 3 of OPIP 3.8.1. When the LERO Rumor Control Coordinator arrives at the CNC, he/she will be responsible for ensuring that offsite rumor control responses are transmitted to the District Offices and Callboards via TSO computer (see EPIP 4-4, Section 2.4) and that responses are forwarded back to the initial caller (see OPIP 3.8.1, Section 5.6.4). LILCO Rumor Control staff at the District Offices and Callboards are accordingly available for use by LERO in the control of offsite rumors. The effectiveness of the system for controlling offsite related rumors was evaluated during the 1988 exercise and found to be adequate as discussed in the Post Exercise Assessment (PEA). <i>Nevertheless, information regarding the number of rumor control staff and the number of telephone lines allocated for this function should be provided to FEMA.</i>	
G.5	Section 3.8 (Page 3.8-4) of the plan has been revised to specify in accordance with NUREG-0654, FEMA-REP-1, Rev. 1, Supp. 1, that the "role of offsite response organizations vs. the State and local organizations during an emergency" will be reinforced during the annual orientation program for members of the news media.	A
H.	<u>Emergency Facilities and Equipment</u>	
H.4	<i>The LERO Emergency Telephone Directory should be submitted to FEMA in order to verify that the point of contact to be used for initial communications with New York State includes the telephone number for the State Warning Point (see also comment for element F.1.b in this review).</i>	A
H.7	In response to earlier comments on Rev. 9, the NUREG-0654 cross reference has been revised to indicate that the field monitoring equipment for the Offsite Radiological Survey (ORS) teams is listed in Attachment 2.2.1 of the plan.	A

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I.	<u>Accident Assessment</u>	
I.7	In response to earlier comments on Rev. 9, reference to OPIP 3.5.1, "Downwind Surveying" which has been deleted from the plan, has been removed as a reference from Section 6 of OPIP 3.5.2.	A
I.9	<i>Provisions for transporting field samples to laboratories located in New Jersey (i.e., Teledyne Laboratories) and Massachusetts (i.e., Clear Harbors) could not be found in the plan.</i>	A
J.	<u>Protective Response</u>	
J.10.a	Figure 3, which is referenced on page II-5 of Appendix A as outlining the 19 Emergency Response Planning Areas (ERPAs) that comprise the plume exposure EPZ needs to be added to Appendix A. A list of the preselected radiological sampling locations is given in Table 3.5.1 of the plan. However, as mentioned in the earlier comments for Rev. 9, a map showing these locations was not contained in the plan submitted for this review of Rev. 10.	A
J.10.e	In response to earlier comments on Rev. 9, the Lead Traffic Guide briefing form (OPIP 3.3.4, Attachment 8, Page 16c of 16) has been revised to clarify that <u>only</u> Route Alert Drivers are to be instructed to ingest KI prior to leaving the Staging Area or when a General Emergency is announced via ERS. Although KI administration procedures are now consistent for Route Alert Drivers, the use of KI by any emergency workers is unacceptable without a dose projection of thyroid exposure first being made by a responsible health official (i.e., LERO Radiological Health Coordinator). See additional comments for element J.10.f in this review. Procedures OPIP 3.6.2 (Section 5.2.2.d) and OPIP 3.6.5 (Attachment 14, Section 5, page 64 of 75) are inconsistent with regard to when all school bus drivers will take their KI tablet. OPIP 3.6.2 states that school bus drivers will take a KI tablet upon hearing of a declaration of a General Emergency on EBS radio or when	I

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actually implementing a school evacuation. OPIP 3.6.5 states that school bus drivers will only take KI upon hearing of a General Emergency (via EBS). Regardless of the inconsistency of these procedures, the use of KI by any emergency workers is unacceptable without a dose projection of thyroid exposure first being made by a responsible health official (i.e., LERO Radiological Health Coordinator). See additional comments for element J.10.f in this review.

KI has been added to the equipment inventories in OP. 5.3.1 for all of the companies slated to supply buses for school evacuation.

OPIP 3.6.5 also specifies that two (2) KI tablets have been added to the LERO School Bus Driver Assignment Packets (Attachment 14, p. 1 of 3).

Copies of the LILCO letters that offer training to non-LILCO organizations that do not receive training have been provided to FEMA.

J.10.f

Procedure OPIP 3.6.2 specifies the means by which emergency workers will be instructed to ingest KI after iodine dose equivalent has been determined by the LERO Radiation Health Coordinator. As provided in Section 5.2.2.a of this procedure, the Dosimetry Coordinator is responsible for communicating KI instructions to the Traffic Control Coordinator who is in turn responsible for contacting Traffic Guides if they have already been deployed to the field from the Staging Areas. This means of administering KI has been clarified in OPIP 3.3.4, Attachment 8 which now delineates instructions given by Lead Traffic Guides to Route Alert Drivers as distinguished from other emergency workers at the Staging Areas.

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The directive for specified emergency workers (e.g., school bus drivers and route alert drivers) to take KI at the declaration of a General Emergency ECL is not in accordance with Federal guidance which states that the use of KI is appropriate at projected doses of 25 Rem thyroid. Although the more conservative 10 rem trigger level contained in the LILCO plan is acceptable, the use of KI without a dose projection of thyroid exposure

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first being made by a responsible health official is not acceptable.

During the 1988 exercise there was misunderstanding among school bus drivers about the use of KI. The LERO controller information was unclear as to the status of the emergency at the start of the school evacuation which was out of sequence with the plume portion of the exercise. In addition, some school bus drivers were unaware of the use of the KI record form for recording their use of KI. This result reinforces the need for KI use to be based upon a dose projection of thyroid exposure first being made by a responsible health official.

J.10.g

Nursery schools have been added to OPIP 3.6.5 Attachments 3, 3a and 19 and have had buses allotted for their evacuation. The plan and the public information brochure are now consistent except that the public information brochure also lists the Maryhaven Therapeutic Pre-school/day Residential School and the St. Charles Exceptional and Therapeutic Center as nursery schools. The plan in OPIP 3.6.5, Attachment 2, lists Maryhaven and St. Charles as handicapped facilities. LILCO clarified in an informal transmittal to FEMA dated 7/25/88 that for planning purposes, several schools have been listed as Health Care Facilities in OPIP 3.6.5, Attachment 2 because of their special transportation needs for evacuation. However, since parents send children to these facilities for educational purposes, they are listed as schools in the public information brochure. The facilities treated in this manner are as follows:

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- Little Flower U.F.S.D.
and Children's Services
- Maryhaven
 - Therapeutic Preschool
 - Day Residential School
- Preschooler's Place for Learning

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- St. Charles
 - Educational and Therapeutic Center
 - Learning Center of BOCES II

(See also comments on element G.1.a-e regarding nursery schools).

Results of the confirmatory letters sent to bus companies citing the number of first-call buses available from each were provided to FEMA in LILCO's informal transmittal of 7/25/88 and these confirm a number of 200 spare buses (i.e., not used by school districts on a daily basis) which is 47 in excess of the 153 first-call buses required by the plan. It is understood that the bus yard contracts in question are going to be renegotiated. When these contracts are finalized by 12/31/88, they will specify first-call buses to be supplied by each yard. At that time all contracts with bus yards providing first-call buses will specify the number of these vehicles.

- It has been determined in view of the fact that OPIP 3.6.4, Attachment 3 and OPIP 3.6.5, Attachment 3a contain a list of the bus companies where buses for school evacuation are obtained, that it is not necessary to include this information in Table XIIIC of Appendix A as requested in the Rev. 9 review comments. However, if this information is not to be included in that table, the statement on page IV-180 of Appendix A that "Table XIIIC presents ... (the third bullet) Bus companies where vehicles are obtained" should be removed.

Section 2.1, page 2.1-1 of the plan has been revised to specify that "LERO School Bus Drivers will provide a 100% backup of the Regular School Bus Drivers that normally transport EPZ school children. At bus yards that do not normally support EFZ transportation LERO will assign 150% of the complement required." This is consistent with the previous statement in the Plan that it is LERO's goal to have approximately 150% of the personnel available to respond to an emergency. However, the enumeration of school bus drivers assigned to bus yards should be provided to FEMA. A summary of assignments from the LERO School Bus Driver call-out sheets specified in Attachment 14 (item p. 1 of 3, #1) of OPIP 3.6.5 could satisfy this request.

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	<p>The plan has been revised (see OPIP 3.6.4, Attachment 1, Section 10; and OPIP 4.1.1) to provide direct radio communications from the Transfer Point Coordinators at their Transfer Points to the Bus Coordinator at the LERO EOC.</p> <p><i>The comprehensive needs vs. resources charts for the vehicles intended for relocation have not been provided to FEMA. Also, inconsistencies previously noted in the number of buses available for Suburbia, Bruno, Coram, WE Transport and Towne bus companies have not been addressed.</i></p>	
J.10.h	<p>No change of the plan could be located in response to an earlier comment on Rev. 9, regarding inclusion in the plan of a list of potential reception hospitals.</p>	A
J.10.j	<p>The 1988 exercise revealed that Rev. 10 of the plan does not contain preplanned access control points to restrict access to evacuated ERPAs when a sheltering advisory is rescinded. Such an access control plan should be developed for any subset of ERPAs where an evacuation advisory is in effect.</p> <p>In addition, the 1988 exercise revealed that during the reentry phase, traffic guides at access control points were not fully knowledgeable about who should be allowed access and what areas were specifically restricted. The plan should be revised to include instructions for traffic guides regarding how they are to be informed of restricted areas and how they are to handle allowing access to restricted areas.</p> <p>The plan has been revised (see OPIP 3.6.3, Sec. 5.2.7) to provide Traffic Guides with direct radio communications to the Evacuation Support Communicators at the LERO EOC.</p> <p><i>Per comments on Rev. 9, revision of Procedure OPIP 3.6.3 regarding directions for the Evacuation Coordinator to contact FAA as called for by the plan (see Figure 3.4.1) could not be located in Rev. 10.</i></p>	I
J.10.k	<p>Procedure OPIP 3.6.3 has been revised to include procedures for the Traffic Engineer (Section 5.11).</p>	A

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The Towns of Brookhaven and Riverhead have been added to the list of local snow removal organizations to be notified per OPIP 3.6.3, Section 5.1.8. This addresses one of the areas for improvement suggested in the Rev. 9 review.

The 1988 exercise revealed a discrepancy between the description of route spotter route #1004 in Attachment 6 of OPIP 3.6.3 and the route map provided to the route spotter during the exercise. The procedure and/or the map should be revised so they agree.

J.10.m

The current LERO plan is not in accordance with current FEMA policy regarding PARs for severe core melt sequences. FEMA, and the NRC, have concluded that for the population within 2-3 miles, in severe core melt accident sequences, the PA should be evacuation, unless external conditions absolutely prohibit evacuation. The LERO plan, OPIP 3.6.1 (Attachment 5 and 6), does not use this PA philosophy. The plan should be revised to reflect this position.

A²

J.11

Procedure OPIP 3.6.6 (Section 5.1.3) has been revised to specify that PAs for milk or any other food should not be taken until response levels are actually exceeded in sampled foodstuffs.

A

The plan specifies in Section 2.2 and 3.8 and in OPIP 3.1.1 (Attachment 8, Ingestion Pathway) that LERO will rely upon the States of New York and Connecticut to distribute written instructions to the agricultural community within 50 miles of the plant in an emergency. According to Section 3.8, p. 3.8-1 of the plan, LILCO will assure that a brochure of ingestion pathway information is distributed to all farmers, distributors and food processing facilities within 10 miles of Shoreham on an annual basis. To comply with FEMA Guidance Memorandum (GM) IN-1, the final version of the

¹Although this exercise issue is not sufficient to rate the element inadequate, this issue should be corrected.

²The plan must be revised to address this issue in order to conform with FEMA policy prior to the next plan review.

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brochure should be ready by December 31, 1988. In attempting to finalize its written materials, for FEMA evaluation and for distribution, LILCO should consider the following:

- USDA's comments,
- FEMA's and its contractor's comments, and
- The Guidance of GM IN-1.

It should also be noted that USDA is developing a "generic" agricultural brochure which will be applicable to the entire 50-mile ingestion zone and could be used to satisfy the GM IN-1 public information requirements.

LILCO should submit its agricultural brochure within 60 days after the final publication of the USDA generic agricultural brochure.

During the 1988 exercise, an actual milk sample was taken at the Poole residence in Shoreham. This location is shown as a sampling site in the LILCO on-site plan, but is not shown in Rev. 10 of the LERO off-site plan (see OPIP 3.6.6). During the exercise, it was learned that two dairy locations in an eastern direction, identified in OPIP 3.6.6, Attachment 9, page 1 of 3, are no longer milk-producing locations. The plan should be reviewed and revised to include accurate, up-to-date information for New York and Connecticut concerning the ingestion pathway.

Section 2.2, pages 2.2-6 and 2.2-6a list responsibilities in the ingestion pathway that are to be carried out (1) by the State of New York under the "best efforts" assumption of the NRC regulations and (2) by the State of Connecticut under letters of agreement or the "best efforts" assumption depending on the status of agreements between LILCO and Connecticut.

¹Although this exercise issue is not sufficient to rate the element inadequate, this issue should be corrected.

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<u>Element</u>	<u>Review Comment(s)</u>	<u>Rating</u>
	<p>In response to comments on Rev. 9., OPIP 3.6.6 has been revised and Section 2.5 of that procedure now contains reference to the Connecticut Radiological Emergency Response Plan that would be used by the Connecticut Department of Health to implement PARs for the ingestion pathway.</p> <p>In response to comments on Rev. 9. reference to OPIP 3.5.3, which does not exist in the LERO plan, has been removed as a reference in Section 6 of OPIP 3.6.6.</p>	
J.12	<p>Procedure OPIP 3.6.5 (Section 5.2.2.d) has been revised in response to the earlier RAC comment regarding provisions for school evacuations in the event there has been a release of radioactivity. If populations in particular zones are directed to report to reception centers for monitoring, the School Relocation Supervisors are instructed by the Special Facilities Evacuation Coordinator to direct buses arriving from schools in these designated zones to report to the Hicksville reception center for monitoring. This adequately addresses the problem of unnecessarily risking additional exposure to school children in affected zones while they await being reunited with their parents at the School Relocation Centers.</p> <p>However, procedures for the receipt, tracking and handling of school children forwarded to the Hicksville Reception Center could not be located in the plan.</p> <p>During the 1988 exercise, there was no demonstration of how school children and other bus passengers (e.g., teachers and administrative personnel) would be directed after disembarking their buses at the School Relocation Center(s). A school bus driver was unaware of the need to give school officials a school children log out form or relocation center location assignment diagrams and charts from his packet. Procedures should be developed for the receipt, tracking and handling of school children at the School Relocation Centers.</p> <p><i>No change in OPIP 3.9.2 could be located which responds to the Rev. 9 comment that decontamination efforts should be halted if the skin becomes abraded or broken.</i></p>	I

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<u>Element</u>	<u>Review Comment(s)</u>	<u>Rating</u>
	LILCO does not have written agreements for a sufficient number of buildings beyond the 10-mile EPZ for sheltering and feeding relocatees. Also, as noted under element J.10.h (page 58 of 90) of the Rev. 9 review, it is not clear that the facilities to be utilized for congregate care of relocatees by the American Red Cross (ARC) are known to LERO. Nevertheless, this issue has been resolved based on NRC interpretation (see CLI-87-05) of the level of cooperation required to be demonstrated by ARC with LERO in the planning effort. Based upon these decisions which interpret ARC policy to adequately provide assistance in a radiological emergency, planning for the availability of ARC resources (i.e., buildings for the sheltering and feeding of relocatees) is considered adequate.	
K.	<u>Radiological Exposure Control</u>	
K.3.a	In response to Rev. 9 comments, OPIP 2.1.1, page 14 of 79, paragraph C has been revised by deleting the reference to Record Keepers calibrating dosimeters. Copies of the LILCO letters that offer training to non-LILCO organizations that do not receive training have been provided to FEMA (see also comments for J.10.e in this review).	A
K.3.b	Emergency worker radiological exposure control procedures have been specified in greater detail in OPIP 3.6.5 for school bus drivers. Section 7 of Attachment 14 of procedure OPIP 3.6.5 instructs school bus drivers to read their DRDs at 15 minute intervals. However, as recommended in the Rev. 9 review comments, the Emergency Worker Dose Record Form (Attachment 2 of OPIP 3.9.1) has not been revised to specifically instruct emergency workers to read their DRDs at 15 minute intervals.	I

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<u>Element</u>	<u>Review Comment(s)</u>	<u>Rating</u>
	<i>During the 1988 exercise, at least four school bus drivers believed that they could stop reading their DRDs when they had left the 10-mile EPZ, which is not stated in the LERO procedures. Revision of the Emergency Worker Dose Record Form is needed to reinforce training that will be given to LERO school bus drivers as well as those regular school bus drivers that are to be accompanied by LERO personnel (per OPIP 3.6.5, Attachment 14).¹</i>	
K.4	<p>School Bus Drivers are now included in the drill in the drill matrix (OPIP 5.1.1, Attachment 2) for LERO Integrated Facility Drills (DR 1) and training continues to be offered to non-LERO personnel with emergency responsibilities envisioned by the plan. In addition, where real school bus drivers are to be utilized for school evacuation, these drivers will be accompanied by LERO personnel trained in emergency worker exposure control procedures (OPIP 3.6.5, Attachment 14).</p> <p>During the school evacuation demonstration for the 1988 exercise, a bus driver who was approximately four and one-half months pregnant and accompanied by a LERO back-up driver was allowed to drive the route without question. Upon FEMA's review of training rosters, the driver was found to have attended LERO training at which the dangers of radiation exposure to an unborn child had been covered. However, the driver was not reminded of the subject at the time of the simulated evacuation. NRC Regulatory Guide 8.13 and the Appendix thereto were not listed among the materials included in the assignment packet (LERO School Bus Driver Procedure, OPIP 3.6.5, Attachment 14). Regulatory Guide 8.13 and the Appendix thereto should be listed in the LERO school bus driver assignment packet. Materials issued to female bus drivers should include a specific query and/or consent form to assure that they are aware of this information.</p> <p>No change(s) to pages 3.9-2 and 3 of the plan could be located which respond to the previous Rev. 9 comment that the plan should be revised to remove the impression</p>	I

¹Although this exercise issue is not sufficient to rate the element inadequate, this issue should be corrected.

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<u>Element</u>	<u>Review Comment(s)</u>	<u>Rating</u>
	that an emergency worker could be authorized by an immediate supervisor to remain in the EPZ with an off-scale O-5R dosimeter.	
K.5.b	No change(s) to OPIP 3.9.2 could be located which responds to the previous Rev. 9 comment that no instructions are given for what to do with an essential vehicle which is contaminated above the limits after three (3) decontamination attempts.	A
L.	<u>Medical and Public Health Support</u>	
L.1	Section 2.2 (page 2.2-8) of the plan has been revised to specify that Mid-Island Hospital has been added as the backup hospital for the evaluation and treatment of contaminated injured persons. However, the language in Section 3.7 (page 3.7-1) concerning which hospital is primary or backup needs to be clarified.	A
P.	<u>Responsibility for the Planning Effort</u>	
P.5	The Table of Contents section of Rev. 10 has been updated to include documentation of the pages changed for this revision. Page viii specifies that Rev. 10 became effective 5/16/88.	A
P.8	The NUREG-0654 cross reference has been revised as recommended in the review comments for Rev. 9.	A

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Rating Rev. 10

A.1.a	A
A.1.b	A
A.1.c	A
A.1.d	A
A.1.e	A
A.2.a	A
A.2.b	A
A.3	A
A.4	A
C.1.a	A
C.1.b	A
C.1.c	A
C.2.a	A
C.3	A
C.4	A
C.5	A
D.3	A
D.4	A
E.1	A
E.2	A
E.5	A
E.6	A
E.7	A
E.8	A
F.1.a	A
F.1.b	A
F.1.c	A
F.1.d	A
F.1.e	A
F.2	A
F.3	A
G.1.a-e	A
G.2	A
G.3	A
G.4.a	A
G.4.b	A
G.4.c	A
G.5	A

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H.3	A
H.4	A
H.7	A
H.10	A
H.11	A
H.12	A
I.7	A
I.8	A
I.9	A
I.10	A
I.11	A
J.2	A
J.9	A
J.10.a	A
J.10.b	A
J.10.c	A
J.10.d	A
J.10.e	I
J.10.f	I
J.10.g	A
J.10.h	A
J.10.i	A
J.10.j	I
J.10.k	A
J.10.l	A
J.10.m	A
J.11	A
J.12	I
K.3.a	A
K.3.b	I
K.4	I
K.5.a	A
K.5.b	A
L.1	A
L.3	A
L.4	A
M.1	A
M.3	A
M.4	A

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M.1	A
M.3	A
M.4	A
N.1.a	A
N.1.b	A
N.2.a	A
N.2.c	A
N.2.d	A
N.2.e	A
N.3.a-f	A
N.4	A
N.5	A
N.6	A
O.1	A
O.4	A
O.5	A
O.6	A
P.1	A
P.2	A
P.3	A
P.4	A
P.5	A
P.6	A
P.7	A
P.8	A
P.10	A
P.11	A

- LIST OF ACRONYMS -

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- A -

ARC American Red Cross
ASLB Atomic Safety and Licensing Board

- B -

BHO DOE's Brookhaven Area Office

- C -

CPI Coordinator of Public Information
CPM counts per minute

- D -

DOC U.S. Department of Commerce
DOD U.S. Department of Defense
DOE U.S. Department of Energy
DOT U.S. Department of Transportation
DRD Direct Reading Dosimeter

- E -

EBS Emergency Broadcast System
ENC Emergency News Center
EOC Emergency Operations Center
EOF Emergency Operations Facility
EPA U.S. Environmental Protection Agency
EPC Emergency Preparedness Coordinator
EPIP Emergency Plan Implementing Procedure
EPZ Emergency Planning Zone
ERPA Emergency Response Planning Area
EWDF Emergency Worker Decontamination Facility

- F -

FAA Federal Aviation Administration
FCC Federal Communications Commission
FEMA Federal Emergency Management Agency
FRERP Federal Radiological Emergency Response Plan
FRMAP Federal Radiation Monitoring Assistance Program

- H -

HHS U.S. Department of Health and Human Services

- K -

KI Potassium Iodine

- LIST OF ACRONYMS -

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- L -

LERO Local Emergency Response Organization
LILCO Long Island Lighting Company
LIRR Long Island Railroad

- N -

NCS National Communications System
NEST Nuclear Emergency Search Team
NRC Nuclear Regulatory Commission

- O -

OPIP Offsite Plan Implementing Procedure
ORS Offsite Radiological Survey

- P -

PA Protective Action
PAG Protective Action Guide
PAR Protective Action Recommendation

- R -

RAC Regional Assistance Committee
RAP Radiological Assistance Program
RECS Radiological Emergency Communications System
REMP Radiological Environmental Monitoring Program

- S -

SNPS Shoreham Nuclear Power Station

- T -

TLD Thermoluminescent Dosimeter
TSC Technical Support Center
TSO Time Sharing Option (computer)

- U -

USCG U.S. Coast Guard
USDA U.S. Department of Agriculture

- V -

VA U.S. Veterans Administration



POST-EXERCISE ASSESSMENT

June 7-9, 1988, Exercise of the Local
Emergency Response Organization (LERO),
as specified in the LILCO Local Off-Site
Radiological Emergency Response Plan for

SHOREHAM NUCLEAR POWER STATION

Shoreham, New York

September 2, 1988

Federal Emergency Management Agency

Region II

26 Federal Plaza, New York, N.Y. 10278

POST-EXERCISE ASSESSMENT

June 7-9, 1988

Exercise of the Local Emergency Response Organization (LERO),
as specified in the LILCO Local Off-Site
Radiological Emergency Response Plan for

SHOREHAM NUCLEAR POWER STATION
at Shoreham, New York

September 2, 1988

Federal Emergency Management Agency
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26 Federal Plaza
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GOVERNMENTAL AND ORGANIZATIONAL PARTICIPATION

PARTICIPATING:

- Local Emergency Response Organization
- Long Island Lighting Company
- Shoreham-Wading River School District
- U.S. Department of Energy, Brookhaven Area Office
- U.S. Coast Guard
- Teledyne Isotopes Laboratory
- Mid Island Hospital
- Brunswick Hospital

NONPARTICIPATING:

- New York State
- Nassau County
- Suffolk County
- American Red Cross
- State of Connecticut

ABBREVIATIONS

ANL	Argonne National Laboratory
AVS	automatic verification system
BHO	Brookhaven Area Office
BNL	Brookhaven National Laboratory
DOC	U.S. Department of Commerce
DOE	U.S. Department of Energy
DOH	Department of Health (New York State)
DOI	U.S. Department of the Interior
DOT	U.S. Department of Transportation
DRD	direct-reading dosimeter
EAL	emergency action level
EBS	Emergency Broadcast System
ECCS	emergency core cooling system
ECL	emergency classification level
EMS	emergency medical service
ENC	emergency news center
EOC	emergency operations center
EOF	emergency operations facility
EPA	U.S. Environmental Protection Agency
EPZ	emergency planning zone
ERPA	emergency response planning area
EWDF	emergency worker decontamination facility
FAA	Federal Aviation Administration

FDA	U.S. Food and Drug Administration
FEMA	Federal Emergency Management Agency
FSAR	final safety analysis report
GM	guidance memorandum
HHS	U.S. Department of Health and Human Services
IN-EL	Idaho National Engineering Laboratory
KI	potassium iodide
LERO	Local Emergency Response Organization
LILCO	Long Island Lighting Company
LIRR	Long Island Railroad
LOCA	loss-of-coolant accident
MOU	memorandum of understanding
NRC	U.S. Nuclear Regulatory Commission
NUE	notification of unusual event
OGC	Office of General Counsel
OSC	operations support center
PAG	protective action guideline
PAR	protective action recommendation
PIO	public information officer
RAC	Regional Assistance Committee
RAP	radiological assessment plan
RBSVS	reactor building stand-by ventilation system
REA	radiation emergency area
RECS	Radiological Emergency Communications System

REPP	radiological emergency preparedness plan
RERP	radiological emergency response plan
RO	radiation officer
RSC	radiation support center
RSO	radiation safety officer
SNPS	Shoreham Nuclear Power Station
SSO	supervising service operator
TCP	traffic control point
TLD	thermoluminescent dosimeter
TP	transfer point
TSC	technical support center
TSO	time sharing option (computer)
USDA	U.S. Department of Agriculture

SUMMARY

On February 8, 1988, the Nuclear Regulatory Commission (NRC) asked FEMA, under the terms of the FEMA/NRC Memorandum of Understanding (MOU) of April 1985, to conduct an exercise to test off-site preparedness at the Shoreham Nuclear Power Station (SNPS).

From June 7-9, 1988, a team of 68 Federal evaluators evaluated an exercise of the Long Island Lighting Company (LILCO) Local Off-Site Radiological Emergency Response Plan for the Shoreham Nuclear Power Station (SNPS), which is located in the Town of Brookhaven, New York. Included was an evaluation of the level of preparedness of the LILCO Local Emergency Response Organization (LERO). The exercise was conducted over three days to accommodate demonstrations of plume exposure pathway, ingestion pathway, and recovery/reentry activities.

Following the exercise, an evaluation was conducted by the Federal evaluator team, and a preliminary briefing for exercise participants was held at the LILCO Training Center in Hauppauge, New York. After the preliminary briefings, the detailed evaluations were compiled and presented in this report.

The Federal evaluators evaluated the following:

- LERO Emergency Operations Center
- Emergency Operations Facility
- Brookhaven Area Office
- Contract Laboratory (Teledyne Isotopes Laboratory)
- Emergency News Center
- Port Jefferson staging area
- Patchogue staging area
- Riverhead staging area
- Transfer Points
- Emergency Worker Decontamination Facility
- Reception centers
- Medical drills

- Bus evacuation of school children and members of the general population
- Evacuation of institutionalized and noninstitutionalized mobility-impaired people
- Traffic control points
- Route alerting for the deaf
- Impediments to evacuation
- Radiological field monitoring (plume exposure pathway) and sampling (ingestion pathway)
- School interviews
- Recovery/Reentry
- Warning Point (SSO)
- EBS station (WPLR)
- Rumor Control
- Estimation of total population exposure.

A public meeting for the general public on the plans and the exercise took place at 1700 hours on June 15, 1988, at the Mediterranean Manor in Patchogue, New York.

1 INTRODUCTION

1.1 EXERCISE BACKGROUND

On December 7, 1979, the President directed the Federal Emergency Management Agency (FEMA) to assume lead responsibility for all off-site nuclear planning and response. FEMA's responsibilities in radiological emergency planning for fixed nuclear facilities include the following:

- Taking the lead in off-site emergency planning and in reviewing and evaluating radiological emergency response plans developed by state and local governments.
- Determining whether such plans can be implemented on the basis of observation and evaluation of exercises of the plans conducted by state and local governments.
- Responding to requests by the U.S. Nuclear Regulatory Commission (NRC) pursuant to the Memorandum of Understanding [MOU] between NRC and FEMA Relating to Radiological Emergency Planning and Preparedness (50 Fed. Reg., 15485, April 18, 1985).
- Coordinating the activities of the following Federal agencies with responsibilities for radiological emergency planning:
 - U.S. Department of Commerce (DOC)
 - U.S. Nuclear Regulatory Commission (NRC)
 - U.S. Environmental Protection Agency (EPA)
 - U.S. Department of Energy (DOE)
 - U.S. Department of Health and Human Services (HHS)
 - U.S. Department of Transportation (DOT)
 - U.S. Department of Agriculture (USDA)
 - U.S. Department of the Interior (DOI).

These agencies are represented on the Regional Assistance Committee (RAC), which is chaired by FEMA.

Radiological emergency preparedness plans for the SNPS, which is located in the Town of Brookhaven, New York, have not been submitted to FEMA either by the State or by affected local jurisdictions. Instead, the Long Island Lighting Company (LILCO), the applicant for an NRC license to operate SNPS, established its own Local Emergency Response Organization (LERO), relying on LILCO employees, contractors, private organizations, and DOE. On May 26, 1983, LILCO filed a series of five alternate plans with the NRC, each embodying a somewhat different approach to emergency planning. On June 10, 1983, the Atomic Safety and Licensing Board hearing the LILCO application ruled that only the plan entitled "LILCO Transition Plan" would be considered.

At the request of NRC, pursuant to the FEMA/NRC MOU, the FEMA Region II RAC reviewed the LILCO Transition Plan (Rev. 9) against the standards and evaluative criteria in NUREG-0654/FEMA-REP-1, Rev. 1, Interim Supp. 1, dated November 1987. Inherent in the latter document are three basic assumptions, which were factored into the FEMA evaluation. In an actual radiological emergency, state and local officials that have declined to participate in emergency planning will:

1. Exercise their best efforts to protect the health and safety of the public.
2. Cooperate with the utility and follow the utility's plan.
3. Have sufficient resources to implement those portions of the utility off-site plan that necessitate state and local responses.

FEMA Region II RAC found that 17 of the 135 planning elements evaluated were inadequate and recommended a negative finding on Rev. 9 of the LERO plan, stating that the plan did not provide reasonable assurance that adequate protective measures could be taken in the event of a radiological emergency at SNPS. This recommendation was adopted by FEMA Headquarters and on May 31, 1988, FEMA transmitted a negative findings to NRC.

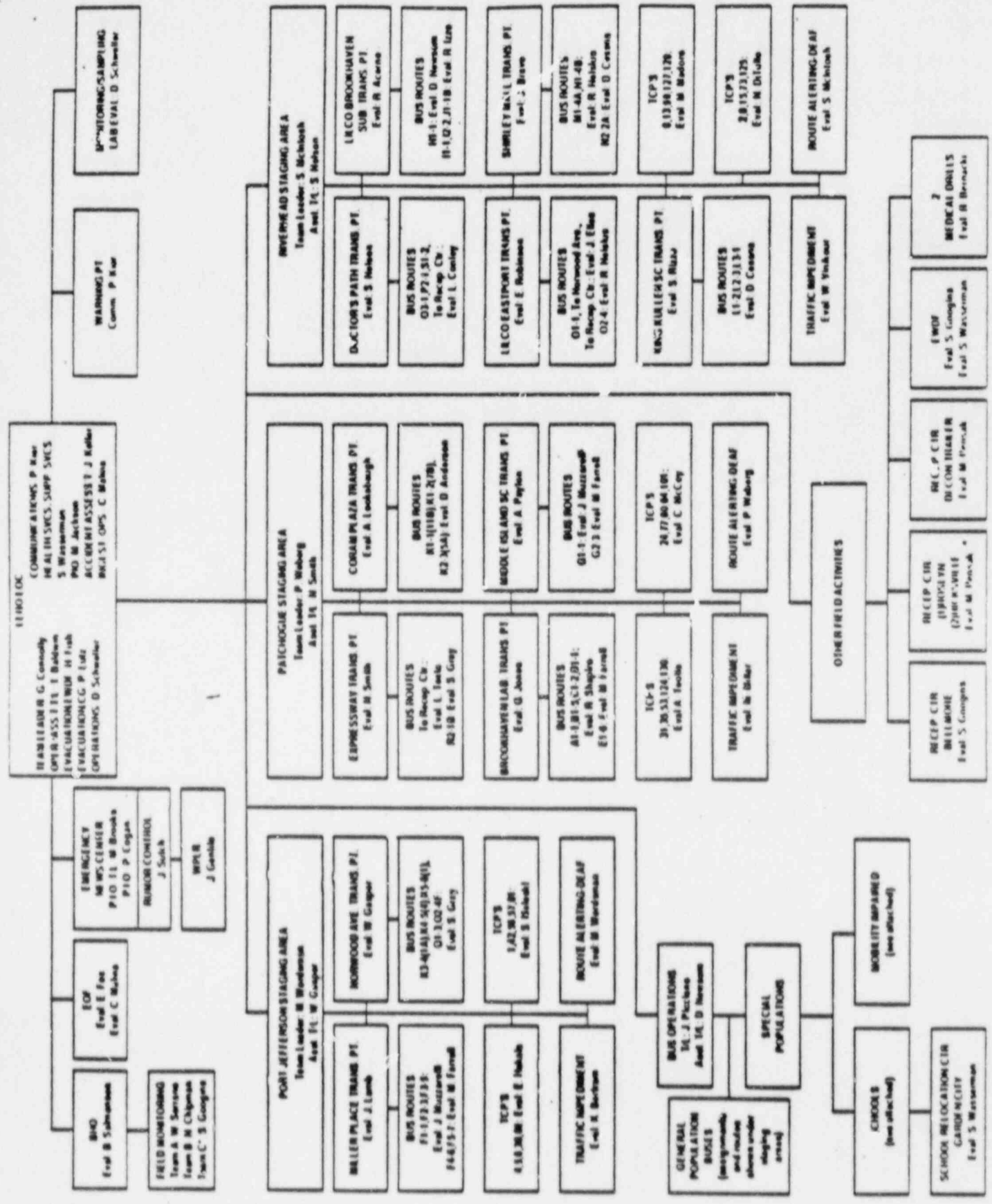
Planning for the exercise was allowed to proceed for the following reasons. LILCO provided FEMA and the RAC with proposed changes to the plan that addressed the inadequacies. These changes were incorporated into Rev. 10 of the plan prior to the exercise. Of the 17 inadequacies, 11 required relatively minor changes to the plan, while the remaining 6 required substantial revisions. For the six inadequate elements requiring more substantive revision, FEMA determined that five of these would not affect the conduct of the exercise. FEMA Region II provided technical assistance to the utility to expedite the resolution of the remaining inadequacy requiring substantial revision, concerning the monitoring and decontamination of school children (J.12). The NRC requested that the Revision 10 changes be incorporated into the exercise play of the Shoreham exercise. Based on a cursory review by FEMA Region II, FEMA Headquarters concurred with the regional conclusion that the inadequacy had been addressed in a manner sufficient to permit an adequate demonstration of the monitoring and decontamination function in the exercise.

The exercise was conducted on June 7-9, 1988, with plume exposure pathway emergency planning zone (EPZ) activities conducted on June 7th, ingestion pathway EPZ activities conducted on June 8-9, and recovery/reentry activities conducted on June 9th.

1.2 FEDERAL EVALUATORS

The 68 Federal evaluators who evaluated off-site emergency response functions were organized as shown in Fig. 1.1. The names of these individuals, along with their affiliations and their exercise assignments, are given below.

FIGURE 1.1 Organization of Shoreham Exercise Evaluators



Shoreham Pathway Field Completion Chart

DISTRICT	SCHOOL	BUS DRIVER	EVALUATOR	BUS GARAGE	DISTRICT	SCHOOL	BUS DRIVER	EVALUATOR	BUS GARAGE
Shoreham	Brickell Miller Ave Middle School High School Wad. Rte. School	SWR SWR SWR SWR	W. Gargner J. Lamb M. Smith A. Looklaugh G. Jones	Seaman Shoreham Seaman Shoreham Seaman Shoreham Seaman Shoreham	Paul Jefferson	Jr. High Elem. Vanderbilt H.S.	LEBO LEBO LEBO	S. Gray E. Haskins S. Melisak	Bravo-Lake Road Bauman Bohemia Bauman Northport
Rocky Point	Jos. A. Edgar Jr. Sr. High Elementary	LEBO LEBO LEBO	D. Crestina S. Rizzo M. Miller	Bauman - 4 Bohemia Bauman - 4 Bohemia Bauman Bohemia	Commerique	Clinton Ave. Sr. High Terryville JFK Jr. High	LEBO LEBO LEBO LEBO	W. Luaders D. Karvelas R. Bertram M. Post	Medi Bus Port Jett Suffolk Bayshore Starline E. N. port Medi Bus Port Jett
Longwood	Ridge Elementary West Mid. Caram Elem. Longwood High Chas. E. Walters Longwood	LEBO LEBO LEBO LEBO LEBO LEBO	A. Payton R. Melkus D. Anderson R. Shapiro J. Beave J. Muzzarelli	Bauman Riverhead Caram Caram Suburban Middle Isl. Bauman Smith Suburban Bohemia Suburban Middle Isl.	Pelchugue Medford	Engle Elem.	LEBO	L. Testa	United Caram
Miller Place	Mo. Country Rd. Andrew Miller Sound Beach High School	LEBO LEBO LEBO LEBO	M. DeTullo C. McCoy W. Vinikour M. Farrell	Suburban Middle Isl. Suburban Middle Isl. WE St. James WE Bay Shore	South Manor	So. Street Dayton Ave.	LEBO LEBO	R. Arcene J. Elias	Adelweith E'port Adelweith E'port
St. Paul	Jr. High Elementary	LEBO LEBO	H. Rhude F. Wilson	Harborside Caram Harborside Caram	Riverhead	Riley Ave Pulsell St. Jr. High High School	LEBO LEBO LEBO LEBO	L. Conley S. Melkus R. Rizzo E. Robinson	School District School District School District School District
					Nursery Schools	Wadg. R. Play Sound Beach Pre. Caram Child Care Cent. B'ym. H-wd St.	LEBO LEBO LEBO LEBO	T. Carroll A. Tondis J. Wang C. Hanchler	Ambony Sedachet Ambony Sedachet Ambony Bohemia Ambony Bohemia
					Preschool Schools	St. Imogene M. Shore Christian	LEBO LEBO	M. Melrose E. Sears	WE/Tomona Trans. - St. Joes. Educant. Copague

MOBILITY IMPAIRED

PICK-UP POINT(S)	VEHICLE	DE/PATCH LOCATION	EVALUATOR
CBSD/HMBD CBSD/HMBD	Van E Bus L.M.N.R	Pelchugue S/A Pelchugue S/A	M. Post M. Post
CBSD/HMBD CBSD/HMBD	Van F2 Bus G	Pelchugue S/A Pelchugue S/A	W. Luaders W. Luaders
CBSD/HMBD CBSD/HMBD	Bus B.C.D Van F4	Pelchugue S/A Pelchugue S/A	D. Karvelas D. Karvelas
HMBD Zone A HMBD Zone B	Ambulance Ambulance	EWDF EWDF	F. Wilson F. Wilson
HMBD Zone C HMBD Zone E	Ambulance Ambulance	EWDF EWDF	H. Rhude H. Rhude
HMBD Zone A HMBD Zone B	Ambulance Ambulance	EWDF EWDF	J. Wang J. Wang
Riverhead Nurs. Home Central Suffolk Hosp.	Ambulance Ambulance	Precinct Amb. Co EWDF	T. Carroll T. Carroll
Our Lady of Prep 3 Hope Ridge SCHS	Bus Bus	Pelchugue S/A Pelchugue S/A	E. Sears E. Sears
Gordon Heights Woodhaven Nurs. Home	Ambulance Ambulance	EWDF EWDF	C. Hanchler C. Hanchler

*Phone Vehicle

Evaluator	Agency	Exercise Location (Function(s))
I. Huser	FEMA	(Region II RAC Chairman, oversight evaluation)
J. Seiderfeld	FEMA	(oversight evaluation)
G. Connolly	FEMA	LERO Emergency Operations Center (EOC) (team leader)
T. Baldwin	ANL	LERO EOC (operations)
D. Schweller	ANL	LERO EOC (operations; Teledyne Isotopes Laboratory)
H. Fish	DOE	LERO EOC (evacuation)
P. Lutz	DOT	LERO EOC (evacuation)
P. Kier	ANL	LERO EOC (warning point; communications)
S. Wasserman	DOC	LERO EOC (health services); Emergency Worker Decontamination Facility (EWDF); school relocation
M. Jackson	FEMA	LERO EOC (public information officer [PIO])
J. Keller	INEL	LERO EOC (accident assessment)
E. Fox	NRC	Emergency Operations Facility (EOF)
C. Malina	USDA	EOF; LERO EOC (ingestion pathway decisions)
M. Brooks	FEMA	Emergency News Center (ENC) (team leader)
P. Cogan	FEMA	(ENC PIO)
J. Gentile	FEMA	WPLR Radio (Emergency Broadcast System [EBS] activation)
J. Sutch	ANL	(rumor control)
B. Salmonson	INEL	Brookhaven Area Office (BHO) (team leader)
N. Chipman	INEL	(plume field monitoring, ingestion pathway field sampling)
W. Serrano	INEL	(plume field monitoring, ingestion pathway field sampling)

Evaluator	Agency	Exercise Location (Function[s])
S. Googins	EPA	Reception center; EWDF; (ingestion pathway field sampling)
M. Pensak	EPA	Reception center; decontamination trailer
R. Bernacki	FDA	(medical drills)
M. Wordsman	FEMA	Port Jefferson (team leader; route alerting for the deaf)
B. Gasper	ANL	Port Jefferson (staging area; transfer point [TP]; school evacuation; school interviews)
E. Hakala	ANL	Port Jefferson (staging area; traffic control points [TCPs]; school evacuation)
S. Meleski	ANL	Port Jefferson (TCPs; school evacuation)
K. Bertram	ANL	Port Jefferson (impediments; school evacuation)
P. Weberg	FEMA	Patchogue (team leader; route alerting for the deaf)
N. Smith	ANL	Patchogue (staging area; TP; school evacuation)
A. Teotia	ANL	Patchogue (staging area; TCPs; school evacuation)
C. McCoy	FEMA	Patchogue (TCPs; school evacuation)
M. M'lar	ANL	Patchogue (impediments; school evacuation)
S. McIntosh	FEMA	Riverhead (team leader; route alerting for the deaf)
S. Nelson	ANL	Riverhead (staging area; TP; school evacuation)
M. Madore	ANL	Riverhead (staging area; TCPs; school evacuation)
N. DiTullo	ANL	Riverhead (TCPs; school evacuation)
W. Vinikour	ANL	Riverhead (impediments; school evacuation)
J. Picciano	FEMA	(bus operations; team leader)
D. Newsom	ANL	(bus operations; assistant team leader; general evacuation bus route)

Evaluator	Agency	Exercise Location (Function[s])
J. Lamb	FEMA	Port Jefferson (TP; school evacuation; reentry bus)
A. Lookabaugh	ANL	Patchogue (TP; school evacuation; reentry bus)
G. Jones	FEMA	Patchogue (TP; school evacuation; reentry bus)
L. Payton	FEMA	Patchogue (TP; school evacuation)
R. Acerno	FEMA	Riverhead (TP; school evacuation)
E. Robinson	ANL	Riverhead (TP; school evacuation; reentry bus)
J. Bravo	FEMA	Riverhead (TP; school evacuation)
S. Rizzo	FEMA	Riverhead (TP; school evacuation)
S. Gray	FEMA	(general evacuation bus route; school evacuation; reentry bus)
M. Farrell	FEMA	(general evacuation bus route; school evacuation; reentry bus)
L. Testa	FEMA	(general evacuation bus route; school evacuation; reentry bus)
D. Anderson	FEMA	(general evacuation bus route; school evacuation; reentry bus)
R. Shapiro	FEMA	(general evacuation bus route; school evacuation; reentry bus)
J. Muzzarelli	ANL	(general evacuation bus route; school evacuation; reentry bus)
L. Conley	ANL	(general evacuation bus route; school evacuation; reentry bus)
R. Izzo	ANL	(general evacuation bus route; school evacuation; reentry bus)
J. Elias	ANL	(general evacuation bus route; school evacuation; reentry bus)
R. Neisius	ANL	(general evacuation bus route; school evacuation; reentry bus)

Evaluator	Agency	Exercise Location (Function[s])
E. Cessna	FEMA	(general evacuation bus route; school evacuation; reentry bus)
J. Karvelas	ANL	(mobility impaired [home]; school evacuation)
M. Post	FEMA	(mobility impaired [home]; school evacuation)
W. Lueders	ANL	(mobility impaired [home]; school evacuation)
T. Carroll	ANL	(mobility impaired [special facilities]; school evacuation)
F. Wilson	ANL	(mobility impaired [home]; school evacuation)
H. Rhude	ANL	(mobility impaired [home]; school evacuation)
J. Wang	ANL	(mobility impaired [home]; school evacuation)
E. Sears	ANL	(mobility impaired [special facilities]; school evacuation)
C. Hunckler	ANL	(mobility impaired [special facilities]; school evacuation)

1.3 FEMA CONTROLLERS

To assist in its evaluation of the exercise objectives, FEMA Region II executed certain control functions through controllers. Their responsibilities included injecting exercise messages and exercise data to specified exercise participants. Controllers were specifically prohibited from providing exercise information to the exercise participants regarding scenario development or specific advice on the resolution of problem areas encountered. As stated in the FEMA Guidance Memorandum (GM) EX-3 Amendment dated March 7, 1988, "FEMA will evaluate ... interfaces between utility off-site response organization personnel through interactive communications and exchanges with controllers and evaluators. While the controllers will not function as stand-ins, they will provide appropriate opportunities for the players to demonstrate the knowledge and interface capabilities of utility off-site response organization personnel."

FEMA used information obtained by both exercise controllers and evaluators to assess the utility off-site response organization's interface and liaison capabilities. Controllers were not used as evaluators since the control cell function was primarily to request information from LERO liaisons in order to demonstrate the knowledge and skills of LERO. Ten individuals served as FEMA controllers. Their names, affiliations, and assignments during the exercise follow.

Throughout this PEA document, wherever references are made regarding requests for information from the Federal, State, and local response organizations, it is to be recognized that the organization's role is being performed via the FEMA control cell.

Controller	Agency	Assignment
R. Donovan	FEMA	Senior FEMA controller
M. Hopler	FEMA	Local Government Controller
M. Russo	FEMA	Local Government Controller
R. Screen	FEMA	Local Government Controller
R. Jaske	FEMA	State Government Controller Local Government Controller
V. Wingert	FEMA	State Government Controller
W. McNutt	FEMA	State Government Controller
V. Adler	FEMA	Federal Government Controller State Government Controller Local Government Controller
L. Angelo	FEMA	Federal Government Controller State Government Controller Local Government Controller American Red Cross
W. Cumming	FEMA/OGC*	Legal advisor to senior FEMA controller

*OGC = Office of General Counsel.

1.4 EVALUATION CRITERIA

The exercise evaluations presented in Sec. 2 of this report are based on applicable planning standards and evaluation criteria set forth in NUREG-0654/FEMA-REP-1, Rev. 1, Interim Supp. 1, November 1987. For the purpose of exercise assessment, FEMA uses evaluation method to apply the NUREG-0654 criteria. FEMA classifies exercise inadequacies as Deficiencies or Areas Requiring Corrective Actions. Deficiencies are demonstrated and observed inadequacies that would cause a finding that off-site emergency preparedness was not adequate to provide reasonable assurance that appropriate measures can be taken to protect the health and safety of the public living in the vicinity of a nuclear power facility in the event of radiological emergency. Because of the potential impact of Deficiencies on emergency preparedness, they must be corrected promptly through appropriate remedial actions, including remedial exercises, drills, or other actions. Areas Requiring Corrective Action (ARCAs) are demonstrated and observed inadequacies of performance, and although their correction is required, they are not considered, by themselves, to adversely impact public health and safety. An ARCA which is not corrected in future exercises may be reclassified as a deficiency. In addition to these inadequacies, FEMA identifies Areas Recommended for Improvement (ARFIs), which are problem areas observed during an exercise that are not considered to adversely impact public health and safety. While not required, correction of these would enhance an organization's level of emergency preparedness.

1.5 EXERCISE OBJECTIVES

Objectives for the exercise were developed by LILCO and submitted to FEMA for review by the RAC. Following the review process, FEMA requested LILCO to revise the proposed objectives based on review comments. Upon FEMA's approval of the revised objectives, they were sent to NRC for review. NRC stated in a memorandum to FEMA dated May 20, 1988, that "... these objectives are sufficient to constitute a 'qualifying' exercise under 10 CFR Part 50, Appendix E, Section IV.F.1. ...". This NRC staff position was again confirmed in a memorandum of May 26, 1988.

The objectives of this exercise included the demonstration of LERO's ability to mobilize needed personnel and equipment and LERO's familiarity with procedures required to manage an emergency at SNPS. The exercise was to involve activation and participation of staff and response facilities at SNPS, as well as at LERO and its facilities. Federal agencies were to be notified during the exercise according to existing protocols. Federal agencies with radiological emergency preparedness responsibility were not to participate actively in the play of the exercise, except for commitments under the plan by DOE for radiological field monitoring and ingestion pathway sampling and by the U.S. Coast Guard for notification of waterborne traffic inside the 10-mile EPZ.

The exercise was to endeavor to demonstrate by actual performance a number of primary emergency preparedness functions. At no time was the exercise to interfere with actual operation of SNPS or with normal State or County activities. The scope of the exercise was defined by the objectives listed below. These objectives are grouped according to the location responsible for their demonstration and identified as being part

of the plume exposure pathway or the ingestion pathway and recovery/reentry phases of the exercise.

Thirty-four of the 36 FEMA objectives from Guidance Memorandum (GM) EX-3 were tested during the exercise. As provided for in the March 7, 1988, amendment to GM EX-3, an additional objective (#37) was added to test other items identified in NUREG-0654/FEMA-REP-1, Rev. 1, Supp. 1. The three objectives that were not demonstrated are:

1. Objective 17: Use of Potassium Iodide (KI) for the General Public. This was consistent with the New York Public Health Law, New York State radiological emergency preparedness practices, and the Shoreham REPP, that the distribution and administration of KI to the general public is not an acceptable protective action.
2. Objective 22: Congregate Care Center Operations. This objective was not demonstrated because the American Red Cross did not participate in the Shoreham exercise.*
3. Objective 36: Unannounced and Off-Hours Exercises. This omission is consistent with GM EX-3, which states that an off-hours, unannounced exercise is not a requirement for a qualifying exercise.

The text of the objectives evaluated during the exercise are taken directly from FEMA GM EX-3, which is entitled Managing Pre-Exercise Activities and Post-Exercise Meetings, and was dated February 26, 1988. The objectives below are identified by number as they appear in GM EX-3. Because these objectives were evaluated at various facilities and locations (e.g., EOC, BHO, and ENC), and on different days during the plume exposure pathway, ingestion pathway, and recovery/reentry phases of the exercise, the results of these evaluations are keyed in this report to the location at which each was evaluated and to the GM EX-3 objective number (e.g., EOC 1). The following list incorporates all objectives for demonstration in the exercise agreed upon by LILCO, as confirmed in the June 2, 1988 memorandum from FEMA Region II to LILCO.

L. Plume Exposure Pathway

LERO Emergency Operations Center (EOC)

- Objective 1: Demonstrate the ability to monitor, understand, and use emergency classification levels (ECLs) through appropriate implementation of emergency functions and activities corresponding

*An NRC memorandum to FEMA, dated May 11, 1988, stated that "the Commission in Long Island Lighting Co. ... recognized that the American Red Cross charter from Congress and its national policy require that the American Red Cross provide aid in 'any radiological or natural disaster,' whether or not there are letters of agreement...."

to ECLs as required by the scenario. The four ECLs are notification of unusual event, alert, site area emergency, and general emergency.

- Objective 2: Demonstrate the ability to fully alert, mobilize, and activate personnel for both facility- and field-based emergency functions.
- Objective 3: Demonstrate the ability to direct, coordinate, and control emergency activities.
- Objective 4: Demonstrate the ability to communicate with all appropriate locations, organizations, and field personnel.
- Objective 5: Demonstrate the adequacy of facilities, equipment, displays, and other materials to support emergency operations.
- Objective 6: Demonstrate the ability to continuously monitor and control emergency worker exposure.
- Objective 10: Demonstrate the ability, within the plume exposure pathway, to project dosage to the public via plume exposure, based on plant and field data.
- Objective 11: Demonstrate the ability to make appropriate protective action decisions, based on projected or actual dosage, EPA PAGs, availability of adequate shelter, evacuation time estimates, and other relevant factors.
- Objective 12: Demonstrate the ability to initially alert the public within the 10-mile EPZ and begin dissemination of an instructional message within 15 minutes of a decision by appropriate state and/or local officials.
- Objective 13: Demonstrate the ability to coordinate the formulation and dissemination of accurate information and instructions to the public in a timely fashion after the initial alert and notification has occurred.
- Objective 16: Demonstrate the ability to make the decision to recommend the use of KI for emergency workers and institutionalized persons, based on predetermined criteria, as well as to distribute and administer it once the decision is made, if necessitated by radioiodine releases.
- Objective 18: Demonstrate the ability and resources necessary to implement appropriate protective actions for the impacted permanent and transient plume EPZ population (including

transit-dependent persons, special needs population, handicapped persons, and institutionalized persons).

- Objective 19: Demonstrate the ability and resources necessary to implement appropriate protective actions for school children within the plume EPZ.
- Objective 20: Demonstrate the organizational ability and resources necessary to control access to evacuated and sheltered areas.
- Objective 26: Demonstrate the ability to identify the need for assistance and call upon Federal and other outside support agencies for that assistance.
- Objective 34: Demonstrate the ability to maintain staffing on a continuous, 24-hour basis by an actual shift change.
- Objective 35: Demonstrate the ability to coordinate the evacuation of on-site personnel.
- Objective 37:* Demonstrate the capability of utility off-site response organization personnel to interface with nonparticipating state and local governments through their mobilization and provision of advice and assistance.

Emergency Operations Facility (EOF)

- Objective 1: Demonstrate the ability to monitor, understand, and use ECLs through appropriate implementation of emergency functions and activities corresponding to ECLs as required by the scenario. The four ECLs are notification of unusual event, alert, site area emergency, and general emergency.
- Objective 2: Demonstrate the ability to fully alert, mobilize, and activate personnel for both facility- and field-based emergency functions.
- Objective 3: Demonstrate the ability to direct, coordinate, and control emergency activities.
- Objective 4: Demonstrate the ability to communicate with all appropriate locations, organizations, and field personnel.

*FEMA HQ memorandum: Guidelines for Regions to Use in Implementing NUREG 0654/FEMA-REP-1, Rev. 1, Supp. 1, with Qualifying Exercises, March 7, 1988, GM EX-3 Amendment.

- Objective 5: Demonstrate the adequacy of facilities, equipment, displays, and other materials to support emergency operations.
- Objective 10: Demonstrate the ability, within the plume exposure pathway, to project dosage to the public via plume exposure, based on plant and field data.
- Objective 34: Demonstrate the ability to maintain staffing on a continuous, 24-hour basis by an actual shift change.
- Objective 35: Demonstrate the ability to coordinate the evacuation of on-site personnel.

Brookhaven Area Office (BHO)

- Objective 1: Demonstrate the ability to monitor, understand, and use ECLs through appropriate implementation of emergency functions and activities corresponding to ECLs as required by the scenario. The four ECLs are notification of unusual event, alert, site area emergency, and general emergency.
- Objective 2: Demonstrate the ability to fully alert, mobilize, and activate personnel for both facility and field-based emergency functions.
- Objective 3: Demonstrate the ability to direct, coordinate, and control emergency activities.
- Objective 4: Demonstrate the ability to communicate with all appropriate locations, organizations, and field personnel.
- Objective 5: Demonstrate the adequacy of facilities, equipment, displays, and other materials to support emergency operations.
- Objective 7: Demonstrate the appropriate equipment and procedures for determining field radiation measurements.
- Objective 8:* Demonstrate the appropriate equipment and procedures for measurement of airborne radioiodine concentrations as low as 10^{-7} microcurie per cm^3 in the presence of noble gases.

*This objective is applicable only to the plume-exposure-pathway phase of the exercise, although it was originally identified as an ingestion-pathway objective, based on the June 2, 1988 letter from FEMA Region II to LILCO.

- Objective 9: Demonstrate the ability to obtain samples of particulate activity in the airborne plume and promptly evaluate data.
- Objective 10: Demonstrate the ability, within the plume exposure pathway, to project dosage to the public via plume exposure, based on plant and field data.
- Objective 11:* Demonstrate the ability to project radiation dosage to the public via plume exposure, based on plant data and field measurements, and to recommend appropriate protective measures to LERO, based on PAGs, and effectively communicate them to the LERO EOC. LERO, with permission from state and local officials, is responsible for final decision on protective action recommendations (PARs).

Contract Laboratory (LAB)

- Objective 7:† Demonstrate the appropriate equipment and procedures for determining field radiation measurements.

Emergency News Center (ENC)

- Objective 2: Demonstrate the ability to fully alert, mobilize, and activate personnel for both facility- and field-based emergency functions.
- Objective 4: Demonstrate the ability to communicate with all appropriate locations, organizations, and field personnel.
- Objective 5: Demonstrate the adequacy of facilities, equipment, displays, and other materials to support emergency operations.
- Objective 13: Demonstrate the ability to coordinate the formulation and dissemination of accurate information and instructions to the public in a timely fashion after the initial alert and notification has occurred.

*This objective replaces GM EX-3, objective 11, to accommodate the DOE-RAP Brookhaven Area Office (BHO), which provides technical support to LERO.

†This objective was demonstrated and evaluated at the Teledyne Isotopes Laboratory as agreed upon by LILCO and FEMA.

- Objective 14: Demonstrate the ability to brief the media in an accurate, coordinated, and timely manner.
- Objective 15: Demonstrate the ability to establish and operate rumor control in a coordinated and timely fashion.
- Objective 34: Demonstrate the ability to maintain staffing on a continuous, 24-hour basis by an actual shift change.
- Objective 37: Demonstrate the capability of utility off-site response organization personnel to interface with nonparticipating state and local governments through their mobilization and provision of advice and assistance.

Staging Areas (SA)

- Objective 1: Demonstrate the ability to monitor, understand, and use ECLs through appropriate implementation of emergency functions and activities corresponding to ECLs as required by the scenario. The four ECLs are notification of unusual event, alert, site area emergency, and general emergency.
- Objective 2: Demonstrate the ability to fully alert, mobilize, and activate personnel for both facility- and field-based emergency functions.
- Objective 3: Demonstrate the ability to direct, coordinate, and control emergency activities.
- Objective 4: Demonstrate the ability to communicate with all appropriate locations, organizations, and field personnel.
- Objective 5: Demonstrate the adequacy of facilities, equipment, displays, and other materials to support emergency operations.
- Objective 6: Demonstrate the ability to continuously monitor and control emergency worker exposure.
- Objective 16: Demonstrate the ability to make the decision to recommend the use of KI for emergency workers and institutionalized persons, based on predetermined criteria, as well as to distribute and administer it once the decision is made, if necessitated by radioiodine releases.
- Objective 18: Demonstrate the ability and resources necessary to implement appropriate protective actions for the impacted

permanent and transient plume EPZ population (including transit-dependent persons, special needs population, handicapped persons, and institutionalized persons.)

- Objective 20: Demonstrate the organizational ability and resources necessary to control access to evacuated and sheltered areas.
- Objective 34: Demonstrate the ability to maintain staffing on a continuous, 24-hour basis by an actual shift change.

Emergency Worker Decontamination Facility (EWDF)

- Objective 2: Demonstrate the ability to fully alert, mobilize, and activate personnel for both facility- and field-based emergency functions.
- Objective 6: Demonstrate the ability to continuously monitor and control emergency worker exposure.
- Objective 25: Demonstrate the adequacy of facilities, equipment, supplies, procedures, and personnel for decontamination of emergency workers, equipment, and vehicles, and for waste disposal.
- Objective 34: Demonstrate the ability to maintain staffing on a continuous, 24-hour basis by an actual shift change.

Field Activities (FA)

- Objective 2: Demonstrate the ability to fully alert, mobilize, and activate personnel for both facility- and field-based emergency functions.
- Objective 4: Demonstrate the ability to communicate with all appropriate locations, organizations, and field personnel.
- Objective 6: Demonstrate the ability to continuously monitor and control emergency worker exposure.
- Objective 7: Demonstrate the appropriate equipment and procedures for determining making field radiation measurements.
- Objective 8: Demonstrate the appropriate equipment and procedures for measurement of airborne radiiodine concentrations as low as 10^{-7} microcurie per cm^3 in the presence of noble gases.

- Objective 9: Demonstrate the ability to obtain samples of particulate activity in the airborne plume and promptly perform laboratory analyses.
- Objective 16: Demonstrate the ability to make the decision to recommend the use of KI for emergency workers and institutionalized persons, based on predetermined criteria, as well as to distribute and administer it once the decision is made, if necessitated by radiiodine releases.
- Objective 18: Demonstrate the ability and resources necessary to implement appropriate protective actions for the impacted permanent and transient plume EPZ population (including transit-dependent persons, special needs population, handicapped persons, and institutionalized persons).
- Objective 19: Demonstrate the ability and resources necessary to implement appropriate protective actions for school children within the plume EPZ.
- Objective 20: Demonstrate the organizational ability and resources necessary to control access to evacuated and sheltered areas.
- Objective 21: Demonstrate the adequacy of procedures, facilities, equipment, and personnel for the registration, radiological monitoring, and decontamination of evacuees.
- Objective 23: Demonstrate the adequacy of vehicles, equipment, procedures, and personnel for transporting contaminated, injured, or exposed individuals.
- Objective 24: Demonstrate the adequacy of medical facility equipment, procedures, and personnel for handling contaminated, injured, or exposed individuals.
- Objective 37: Demonstrate the capability of utility off-site response organization personnel to interface with nonparticipating state and local governments through their mobilization and provision of advice and assistance.

District Offices (DO)

- Objective 15: Demonstrate the ability to establish and operate rumor control in a coordinated and timely fashion.

II. Ingestion Pathway and Recovery/Reentry Objectives

Local Emergency Response Organization (LERO)

- Objective 3: Demonstrate the ability to direct, coordinate, and control emergency activities.
- Objective 4: Demonstrate the ability to communicate with all appropriate locations, organizations, and field personnel.
- Objective 6: Demonstrate the ability to continuously monitor and control emergency worker exposure.
- Objective 13: Demonstrate the ability to coordinate the formulation and dissemination of accurate information and instructions to the public in a timely fashion after the initial alert and notification has occurred.
- Objective 25:* Demonstrate the adequacy of facilities, equipment, supplies, procedures, and personnel for decontamination of emergency workers, equipment, and vehicles, and for waste disposal.
- Objective 26: Demonstrate the ability to identify the need for assistance and call upon Federal and other outside support agencies for that assistance.
- Objective 28:‡ Demonstrate the appropriate laboratory operations and procedures for measuring and analyzing samples of vegetation, food crops, milk, meat, poultry, water, and animal feeds (indigenous to the area and stored).
- Objective 29: Demonstrate the ability to project radiation dose to the public via the ingestion pathway and to determine appropriate protective measures, based on field data, FDA PAGs, and other relevant factors.
- Objective 30: Demonstrate the ability to implement both preventive and emergency protective actions for ingestion pathway hazards.
- Objective 31: Demonstrate the ability to estimate total population exposure.

*Objective 25 was demonstrated at the EWDF, not at the LERO EOC.

‡Objective 28 was demonstrated at Teledyne Isotopes Laboratory, not at the LERO EOC.

- Objective 32: Demonstrate the ability to determine appropriate measures for controlled reentry and recovery based on estimated total population exposure, available EPA PAGs and other relevant factors.
- Objective 33: Demonstrate the ability to implement appropriate measures for controlled reentry and recovery.
- Objective 37: Demonstrate the capability of utility off-site response organization personnel to interface with nonparticipating state and local governments through their mobilization and provision of advice and assistance.

Emergency Operations Facility (EOF)

- Objective 1: Demonstrate the ability to monitor, understand, and use ECLs through appropriate implementation of emergency functions and activities corresponding to ECLs as required by the scenario. The four ECLs are notification of unusual event, alert, site area emergency, and general emergency.
- Objective 2: Demonstrate the ability to fully alert, mobilize, and activate personnel for both facility- and field-based emergency functions.
- Objective 3: Demonstrate the ability to direct, coordinate, and control emergency activities.
- Objective 4: Demonstrate the ability to communicate with all appropriate locations, organizations, and field personnel.
- Objective 5: Demonstrate the adequacy of facilities, equipment, displays, and other materials to support emergency operations.
- Objective 29: Demonstrate the ability to project radiation dose to the public for ingestion pathway exposure and determine appropriate protective measures based on field data, FDA PAGs, and other relevant factors.
- Objective 31: Demonstrate the ability to estimate total population exposure.
- Objective 32: Demonstrate the ability to determine appropriate measures for controlled reentry and recovery based on estimated total population exposure, available EPA PAGs, and other relevant factors.

DOE-RAP Brookhaven Area Office (BHO)

- Objective 2: Demonstrate the ability to fully alert, mobilize, and activate personnel for both facility- and field-based emergency functions.
- Objective 3: Demonstrate the ability to direct, coordinate, and control emergency activities.
- Objective 4: Demonstrate the ability to communicate with all appropriate locations, organizations, and field personnel.
- Objective 27: Demonstrate the appropriate use of equipment and procedures for collection and transport of samples of vegetation, food crops, milk, meat, poultry, water, and animal feeds (indigenous to the area and stored).
- Objective 29:* Demonstrate the ability to project radiation dose to the public via the ingestion pathway, based upon laboratory analysis results and field measurements, and to recommend appropriate protective measures to LERO, based on FDA PAGs, and effectively communicate them to the LERO EOC. LERO, with permission from state and local officials, is responsible for the final decision on PARs (except for the Connecticut portion of the 50-mile EPZ).

Contract Laboratory (LAB)

- Objective 28:† Demonstrate the appropriate laboratory operations and procedures for measuring and analyzing samples of vegetation, food crops, milk, meat, poultry, water, and animal feeds (indigenous to the area and stored).

Emergency News Center (ENC)

- Objective 4: Demonstrate the ability to communicate with all appropriate locations, organizations, and field personnel.
- Objective 13: Demonstrate the ability to coordinate the formulation and dissemination of accurate information and instructions to

*This objective replaces GM EX-3, objective 29, to accommodate the DOE-RAP Brookhaven Area Office (BHO), which provides technical support to LERO.

†This objective was transferred from the LERO EOC to the Teledyne Isotopes Laboratory where it was demonstrated.

the public in a timely fashion after the initial alert and notification has occurred.

- Objective 14: Demonstrate the ability to brief the media in an accurate, coordinated, and timely manner.
- Objective 15: Demonstrate the ability to establish and operate rumor control in a coordinated and timely fashion.
- Objective 37: Demonstrate the capability of utility off-site response organization personnel to interface with nonparticipating state and local governments through their mobilization and provision of advice and assistance.

Staging Areas (SA)

- Objective 33: Demonstrate the ability to implement appropriate measures for controlled reentry and recovery.

Field Activities (FA)

- Objective 33: Demonstrate the ability to implement appropriate measures for controlled reentry and recovery.

1.6 EXERCISE SCENARIO

1.6.1 Major Sequence of Events on Site

Given below is a listing of exercise events, and the approximate times that they were projected to occur by the scenario:

Drill Day 1 - June 7, 1988

Projected by Scenario (hours)	Event
0355	Predrill briefing
0405	Initial conditions: <ul style="list-style-type: none"> - SNPS is operating at 100% power near the end of core life - Residual heat removal pump 1E11-P-014D is out of service - Reserve station service transformer is out of service - Carbon dioxide fire protection system B header is out of service - Control rod drive pump 1C11-P-17A is out of service - Hydrogen recombiner test - Wind direction is 85° at 12-14 mph
0425	Unidentified leak in drywell begins
0435	Drywell leak exceeds 5 gpm
0450	Notification of unusual event, because of a primary system leak rate in excess of technical specifications
0455	Identify failure of hydrogen recombiner valve 1T43*MOV-032A
0535	Fire in uninterruptible power supply #2; therefore lose: <ul style="list-style-type: none"> - Process computer - Rod position indication system

Projected by Scenario (hours)	Event
	- Safety parameter display system
0600	Alert, because of a fire condition that "potentially" affects a safety system
0610	Fire extinguished
0630	Uninterruptible power supply #2 power restored
0655	Normal station service transformer lockout; loss of off-site power; scram
0659	Drywell pressure high; emergency core cooling system (ECCS) initiates
0701	High-pressure coolant injection and reactor core isolation cooling trip on high level
0702	Suppression pool spray valve 1E11 * MOV-40A fails
0720	Emergency mobile diesels fail
0725	Loss-of-coolant accident (LOCA) in A reactor recirculation loop; Loop A recirculation valves fail
	Site area emergency, because of high drywell pressure combined with reactor vessel water level below top of active fuel
0730	Core spray pump A fails
0735	Drywell spray valves fail; residual heat removal loop cross-tie valve fails
0925	Loss bus 102; loss of ECCSs
	General emergency, because of loss of two out of three fission product barriers, with a potential to lose the third
1055	Primary containment recombiner valve 1T48 * MOV-037A opens
	Downstream pipe rupture
	Ground level release begins

Projected
by Scenario
(hours)

Event

1125	Normal power and bus 102 restored (elevated release)
	Hydrogen recombiner valve 1T48 * MOV-32A closed
1125- 1155	Wind shifts from west to east
1700	Day 1 ends

Drill Day 2 - June 8, 1988

0800	<p>Wind direction is 230°</p> <p>Release below technically specified limits; reactor building stand-by ventilation system (RBSVS) and station exhaust booster fans in operation</p> <p>HEPA filter on "A" RBSVS failed; "B" train in service</p> <p>A circulation pump A suction and discharge valves are closed</p> <p>Containment is isolated</p> <p>Plant conditions are stable</p>
1600	Day 2 ends

Drill Day 3 - June 9, 1988

0800	<p>Assume timestep to June 10, 1988</p> <p>Wind direction to northeast</p> <p>RBSVS in service</p> <p>Release below technical specifications</p> <p>Footprint data available</p> <p>Stable plant conditions</p>
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Review by operations committee revised emergency action level (EAL) Cat. 15, GE 4

1200	Time advance to June 27, 1988
1300	Normal station service transformer repaired and in service
	EDG 102 repaired
	All four EMDs and EMD bus have been repaired
1600	Exercise is terminated

1.6.2 On-Site Scenario Overview

The exercise scenario begins at 0405 hours with SNPS operating at 100% power with a reactor core approaching its end of life. The plant has been at 100% power for the last five months. All systems are operating normally, with the following exceptions:

- Residual heat removal pump 1E11*P-014D is out of service because an electrical fault in the motor breaker tripped on overload during a surveillance test and a megger showed a phase-to-ground fault. The pump was declared inoperable 48 hours ago and is isolated mechanically and electrically. Motor replacement has commenced by a simulated maintenance crew and is expected to be completed within 48 hours. Technical specification LCO 3.5.1 allows continued operation for a total of seven days with this pump out of service.
- The reserve station service transformer is out of service because of a cracked bushing on the A-phase primary winding. The transformer is isolated from the 69KV System, with MOD 623 tagged open. All seven breakers from the transformer to the 4KV switchgear are tagged open and racked out. The transformer was declared inoperable as of 0800 hours yesterday. Maintenance is in progress by a simulated crew and is expected to be completed within eight hours. With the transformer declared inoperable, technical specification LCO 3.8.1.1 applies. Action statement "a." allows operation for a total of 72 hours, providing surveillances have been completed on schedule and are due again at 0800 hours today.
- The carbon dioxide fire protection system feeding the B carbon dioxide header is out of service because of damage to the B discharge line. The line is tagged out while the header is being cut out for replacement. The line had been broken while Colt tie-in work was in progress in the area. This header supplies the relay room and control room. A simulated, continuous fire water has been established in the relay and computer rooms in accordance

with technical specification LCO 3.7.7.3 action statement "a." Maintenance is in progress on the broken line by a simulated crew, and repairs are expected to be completed within three hours.

- The control rod drive pump 1C11-P-17A is out of service because of a failed pump bearing. The bearing overheated and seized yesterday at 1342 hours. A simulated maintenance crew is working to repair the pump, and it is expected to be returned to service in 12 hours.
- The previous operating shift performed a functional test of the B loss-of-coolant post-LOCA hydrogen recombiner 1T48*RC-002B, in accordance with the recombiner functional test procedure SP24.402.01. The operations shift on the day watch is responsible for verifying the valve positions in the recombiner system as a condition for completing the functional test.
- Weather conditions are expected to be fair and seasonable, with the wind out of the east at 12-14 mph.

The scenario begins when the nuclear station operator recognizes an increase in drywell pressure, temperature, and humidity, as alarms and indications show that the drywell unidentified leakage is beginning to trend upward. The unidentified leakage has been steady at 1 gpm for the past two months; within 10 minutes, it increases to above 5 gpm. Technical specification LCO 3.4.3.2 requires a controlled shutdown to hot shutdown within 12 hours. This shutdown is assumed to begin at this time. If a primary system leak rate is exceeded, the technical specification requires notification of an unusual event (Cat. 1, UE No. 5) per EPIP 1-0. The watch engineer will then assume the duties of emergency director and implement the SNPS emergency plan.

Meanwhile, the operator assigned to complete the valve lineup verification for the post-LOCA hydrogen recombiner functional test identifies that containment isolation valve 1T48*MOV-032A failed to close. The series isolation valve 1T48*MOV-037A did close. Several electrical problems are postulated as preventing the 1T48*MOV-032A valve from closing. These problems are investigated and eventually the valve is closed, but not until the release has occurred. Because the valve is inside the drywell, it is inaccessible for manual closure. Technical specification LCO 3.6.3 requires the valve to be fixed within four hours, or 1T48*MOV-037A must be deactivated and secured in the isolated position.

Approximately one hour into the drill, a fire breaks out in uninterruptible power supply 1R36-INV-02 located in the relay room. As System B of the carbon dioxide system is out of service because of the damaged line, the carbon dioxide system will not automatically inject into the room. The simulated fire watch in the area notes smoke and flames coming from the panel and reports it to the control room. The fire is in bay 5 on the east end of the panel and threatens to endanger safety-related panels 1H21*P101C and D. The SNPS fire brigade is activated to manually extinguish the fire. The fire continues for approximately 30 minutes from its initial discovery until it is extinguished. Deenergized 1R36-INV-02 will be reenergized, thereby restoring its loads.

This fire condition that "potentially" affects a safety system requires an alert (Cat. 8, Alert No. 13) to be declared per EPIP 1-0. The Technical Support Center (TSC), Operations Support Center (OSC), EOF, ENC, and LERO EOC are activated at this time.

At approximately two-and-one-half hours into the scenario, a loss of off-site power occurs when the normal station service transformer trips because of a ground on one of the secondary windings. This transformer electrical fault causes the main generator output breakers 1310 and 1330 to open, as well as the opening of grid isolation breakers 1350 and 1360. These events lead to a generator load reject, turbine trip, and reactor scram. Of significant importance with the loss of normal power is the simultaneous loss of the condensate/feedwater system.

On the loss of power to the emergency buses, emergency diesel generators 101, 102, and 103 autostart normally and reenergize all emergency switchgear. The loss of voltage to 4KV bus 11 causes the emergency mobile diesel generators to automatically start and begin to autosynchronize to one another while the emergency mobile diesel bus feeder breaker to bus 11, ACB11-1B, trips open in response to the undervoltage signal. As the second emergency mobile diesel generator attempts to synchronize, its output breaker closes when its generator is 180° out of phase with the emergency diesel generator mobile bus, causing extreme damage to the bus and the two breakers involved. The two emergency mobile diesels trip, and the bus is rendered unusable.

In addition, power is lost to the drive mechanisms for the SRMs and IRMs, and power-level indication is lost within 13 minutes following the scram. Following significant core damage later in the drill, it is postulated that even after power is restored, the detectors cannot be inserted because the in-core instrument tubes have collapsed, resulting in a complete loss-of-power-level indication for the remainder of the drill.

Following the reactor scram, the main system isolation valves isolate because of loss of power to the RPS buses, which feed NS4, the nuclear steam supply shut-off system. With the valves closed, the reactor pressure is limited by opening the SRVs and initiating RCIC. Because of the loss of normal AC power to the emergency buses, power is lost to the drywell cooler fans via the shunt trips. With the small primary system leak continuing, drywell pressure and temperature quickly rise. When the drywell pressure reaches 1.69 psig, RBCLCW is automatically isolated to the drywell coolers, precluding restoration of drywell cooling. Also, at the drywell high-pressure setpoint, all ECCSs are initiated. The HPCI pump quickly raises the vessel level; both HPCI and RCIC then trip on a high-vessel-level signal. The core spray pumps run, with flow through their minimum flow valves. One loop of RHR is expected to be aligned in the suppression pool spray mode per EOP DW/F, while the other is aligned for low-pressure coolant injection, with flow through the minimum flow line. If an attempt is made to initiate suppression pool spray, suppression pool cooling/spray valve 1E11*MOV-040A will be found to have a cracked stem. The shaft has cracked inside the body, and a part of the fractured piece has jammed into the packing. In this way, control of suppression pool pressure and temperature with RHR system A is lost. The B loop of RHR in suppression pool spray mode operates as designed. Because of the drywell conditions of high temperature and low pressure, procedures do not permit the use of drywell sprays at this time.

At three hours into the drill, a double-ended shear of the A reactor recirculation loop occurs. The break is postulated to be between the recirculation pump and the pump discharge valve. This LOCA will rapidly drop the reactor vessel water level and pressure while the drywell pressure and temperature increase. The conditions of high drywell pressure, combined with a reactor vessel water level below top of active fuel, necessitates a site area emergency (Cat. 1, SAE No. 1) to be declared per EPIP 1-0. A restricted area evaluation is called for at this time, and personnel accountability is called for. Personnel accountability begins.

It is postulated that the recirculation line break produces a jet of steam and water directed at the A recirculation loop discharge valve. 1B31*MOV-031A fails to close if attempted because of a thermal overload. The break is essentially between the recirculation pump A suction and discharge valves and cannot be isolated at this time.

The LOCA reduces reactor pressure, allowing low-pressure coolant injection and core spray injection into the vessel. Low-pressure coolant injection with RHR pump B is successful, but the discharge of RHR pumps A and C is directed into the broken recirculation loop and flows directly out the break. Core spray pumps A and B inject into the core as designed. Five minutes after the accident, however, core spray pump A fails because of a failed upper motor bearing that has no oil present for lubrication. As the upper bearing seizes, the pump motor trips on overload.

Following the LOCA, drywell conditions change greatly, but procedures still prevent the use of drywell spray. The operators should not attempt to initiate drywell spray; if they do, however, drywell spray valve 1E11*MOV-038A suffers a mechanical failure, preventing its successful operation. A failure of the motor torque switch causes the valve to be jammed in its seat so that it cannot be opened. In this way, control of drywell pressure with RHR system A is lost. Similarly, the B RHR loop drywell spray valve 1E11*MOV-038B also fails to open because of mechanical binding, if attempts are made to open it. With these failures, all drywell spray capability is lost.

At this time, the reactor vessel coolant level has recovered to two-thirds core height with RHR pump B and core spray pump B and is gradually increasing. RHR pumps A and C are only injecting into the leak. RHR loop cross-tie valve 1E11*MOV-050 fails to open, if the attempt is made, as does the ultimate cooling water connection valve 1P41*20V-0020. Supplemental sources of injection water, such as condensate transfer and fire hoses aligned to the feedwater system, are delayed because of malfunctions as well.

At approximately five hours into the drill, emergency bus 102 power is lost because of a failed exciter on EDG 102. This event causes the diesel to trip on an overspeed condition. As the RHR pump B's are powered from emergency bus 102, these pumps lose power and stop their injection into the reactor vessel. At this point, the plant is essentially without ECCS capability. All drywell and suppression pool spray capability is lost at this time as well.

With the loss of core cooling, the core begins to boil dry, leading to failure of the fuel cladding. Primary containment temperature and pressure will continuously increase, leading to the potential for a primary containment failure. With the reactor coolant

pressure boundary and fuel cladding already breached, a general emergency (Cat., GE No. 2) is declared per EPIP 1-0. A GE No. 6C and/or GE No. 6B are also applicable and may be declared as well. At this time, appropriate PARs are made to off-site agencies.

One and one-half hours after the loss of emergency bus 102, the post-accident hydrogen recombiner outboard isolation valve 1T48*MOV-037A opens because of a malfunction in the control switch on the primary containment atmosphere control panel. Because the series isolation valve 1T48*MOV-032A had previously failed to close, the steam atmosphere of the drywell rushes through these valves and ruptures the piping downstream, carrying fission products into the reactor building. The increased activity levels in the reactor building are detected by the refuel floor exhaust radiation monitor and RBSVS. The secondary containment atmosphere is exhausted to the atmosphere via that system. This action is initiated on the loss of power to 4KV bus 11.

One-half hour after the primary containment failure, station power is restored by completion of the RSST bushing replacement. The station's normal and emergency buses are reenergized, restoring power to RHR pump B, core spray pump B, and the condensate and condensate booster pumps. RHR and core spray pumps are restarted, reflooding the reactor vessel. At the same time, repairs are completed to the failed post-LOCA hydrogen recombiner valve 1T48*MOV-032A. The valve is closed, and the primary containment is isolated. The restoration of power to the normal buses also allows the operators to restart the station exhaust booster fans, changing the release from a ground-level one to an elevated one.

Following reflooding of the core, core conditions are established, and the radiological release and in-plant radiation levels begin to decrease. The information presented to the players at this time indicates that plant conditions are improving and that radiological hazards are under control.

Shift changes for both on-site and LERO groups are planned and demonstrated. After the shift change, the second shift continues with exercise play until the end of the first day's activities. Following suspension of play, key management, operations, and dose assessment staffs discuss the activities they expect to carry out during the night. Plans to repair equipment and for environmental sampling are discussed. On the basis of these plans, the controllers are to develop the information requested by the players.

When the exercise resumes on the second day, it is assumed that the accident has progressed in real time and that 0800 hours on drill day 2 is in fact 0800 hours on June 8, 1988. Plant conditions are stable, with the leak isolated and all containment isolation valves closed. However, for purposes of this exercise and to meet the objectives stated in Sec. 1 of this report, it is assumed that the ventilation rate from the reactor building is much greater than the normal RBSVS flow rate. This artificiality allows the stack release rate to be reduced below technical specification values by approximately 0400 hours on the morning of June 8, 1988. Players are briefed on this exercise artifice the evening before, so that resumption of play is not delayed the next day. For purposes of deposition calculations only, the normal release rate and duration are used in making ingestion pathway calculations. The following two assumptions assure that there would be high iodines and particulates in the environment to ensure that objectives in the ingestion pathway phase are met:

1. Rain showers occur overnight on eastern Long Island Sound and in southeastern Connecticut.
2. High differential pressure across the RBSVS filter train causes gasket failure and filter blow-by.

Due to LILCO controller intervention, approved by the RAC Chairman, at the beginning of day 2 play time was picked up from the end of day one play. The time jump discussed above commenced at approximately 1030 hours.

When play resumes on June 8, 1988, players brief their management on the data collected overnight and the recommendations made, based upon the program developed on the previous night.

Initial ground deposition readings (μ R) are provided to establish a preliminary footprint of the plume. Based upon these preliminary data, specific survey missions are assigned. Teams are dispatched to collect samples of vegetation, soil, food stuffs, and other consumables. These samples are prepared for shipment to an outside contract laboratory for analysis. The sample results are evaluated, and the results are compared with EPA guidance and ingestion pathway PAGs. On the basis of this evaluation and comparison, the initial PARs (plume exposure) may be lifted and PARs for the ingestion pathway formulated. Additional sampling and survey planning occur to better define the extent of the ingestion pathway radiological hazard.

Following collection and transport of the samples to the laboratory, activities are suspended for drill day 2. A briefing for drill day 3 activities is conducted, including development and presentation of the data collected in response to the players' sampling program.

At the start of exercise activities on drill day 3, it is postulated that time has advanced another 40 hours (i.e., that the time is 0800 hours on the fourth day of the accident, or June 10, 1988). The sample data collected during the time jump are made available to the players. The scenario provided for the deescalation to an Alert ECL for recovery and reentry purposes. The sample results are evaluated and the results compared with EPA guidance and ingestion pathway PAGs. On the basis of this evaluation, the PARs may be lifted. By noon on day 3 of the exercise, another time warp occurs that advances the time 17 days to three weeks after the release, or June 27, 1988. Again, sample results are given to the players for refining their PARs. The purpose of these time jumps is to demonstrate reentry planning capabilities. Due to controller intervention and the completed demonstration of reentry planning activities the last time warp was not played.

When it is determined that the exercise objectives have been achieved, the exercise is terminated.

1.8.3 Description of Local Emergency Response Organization (LERO) Resources

LERO was to be responsible for ensuring that its resources were deployed in adequate numbers to reasonably test its notification, mobilization, command, coordination, accident assessment, and government interface capabilities during a three-day exercise of both the plume exposure pathway and ingestion pathway and reentry/recovery scenarios.

In order to demonstrate the government interface capabilities, utility off-site response organization personnel in facilities were to make telephone calls and forward information to control cells. For utility off-site response organization personnel in the field, evaluators were to use directed questions to determine their ability to carry out their interface capabilities. LERO was to obtain permission from the control cell to implement the portions of its plan for which it required legal authority. The control cell was to give authorization in accordance with the LERO plan. This approach was to ensure the requisite demonstration of LERO resources, in accordance with the three assumptions mentioned under Exercise Background.

The personnel and resources to be deployed by LERO to demonstrate the capabilities of its emergency resources are described in the following sections.

Public Alert and Notification

During the exercise, the alert and notification system was to be demonstrated by the decision to activate (simulate) the siren system and telephonic transmission of an EBS message to the designated radio station for broadcast (simulate) within the 15-minute guideline. All but the actual broadcast of an EBS message was to be evaluated. Because the LILCO Transition Plan provides a system for notification of the deaf, Federal evaluators also evaluated this system. The system consists of preplanned routes driven by LERO route alert drivers who stop at pre-identified addresses to notify deaf persons of an emergency at SNPS. During the exercise, a Federal evaluator was assigned to follow from each staging area, the route alerting vehicles required for deaf notifications and to interview the drivers regarding their knowledge of their responsibilities and procedures.

Radiological Field Monitoring Teams

In addition to the off-site radiological field monitoring teams dispatched by SNPS, BHO-Radiological Assistance Plan (RAP) field monitoring teams were to be demonstrated, as provided for in the LERO plan. Three BHO-RAP teams were to be demonstrated (two evaluated) during the plume exposure pathway portion of the exercise and five teams were to be demonstrated (three evaluated) during the ingestion pathway portion of the exercise. The BHO-RAP teams were accompanied in the field by a LILCO controller and a Federal evaluator. The controllers were given simulated field data, which they provided to the teams to determine local dose rate readings consistent with the scenario.

BHO-RAP teams were to demonstrate the equipment necessary to determine gamma dose rates, airborne radiiodine concentrations, and ingestion pathway sample collection for laboratory analysis. The monitoring teams were not to be suited up in anticontamination clothing. Emphasis was to be on rapid deployment of teams, rapid gathering of data, communication of data to BHO and proper handling of sample media.

Radiological Exposure Control

All emergency workers in the 10-mile EPZ were to have thermoluminescent (TLDs) and direct-reading dosimeters (DRDs), access to thyroid blocking agents (i.e., KI), and radiological exposure record cards. They were to be familiar with procedures for radiological exposure control (i.e., at what exposure levels to contact the EOC and with procedures for obtaining clearance for excess exposures).

Transportation for Transit-Dependent Evacuees

Each of the locations designated in the LILCO Transition Plan as playing a part in evacuation of the 10-mile EPZ was to activate all of the routes and vehicles it would use in an actual accident with FEMA evaluating a selected number of these routes. Resources to complete all evacuations were to be activated out of sequence with the scenario, based on free-play messages inserted at the EWDF (for ambulances and ambulettes), staging areas, and TPs (for general population evacuation buses). Bus routes were not to be preassigned. The Federal evaluators, in concert with the LILCO controllers, were to ensure that the selected routes did not affect normal public transportation.

The drivers were to assemble at their normal dispatch locations and be assigned routes, but they were not to pick up any evacuees. The drivers selected by FEMA at the LERO facilities were to actually pick up the vehicles to be used for route demonstrations. Upon completion of the routes, selected drivers were to report to the reception centers to drop off the simulated evacuees, and thence to the EWDF for monitoring and decontamination of the drivers and vehicles. There were to be no time constraints on running the routes, other than those in the LILCO Transition Plan. In addition, routes were to be demonstrated for simulated transportation of evacuees during reentry. The number of transit-dependent evacuation routes to be evaluated by FEMA is specified in Table 1.1.

School Evacuation Demonstration

The LERO primary/auxiliary school evacuation bus drivers were to be exercised out of sequence on day 2 of the exercise. To be included were the activation and mobilization of all LERO school evacuation bus drivers, as well as five drivers from the Seaman Bus Company, which were to be assigned to the Shoreham-Wading River School District. Upon notification, bus drivers were to report to their assigned bus yards and receive a school evacuation route assignment. Forty of these assignments were to be

TABLE 1.1 Number of Transit-Dependent Evacuation Routes

Originating Location	Transit-Dependent Population			School Children	Reentry
	General Population	Noninstitutionalized Mobility Impaired	Institutionalized Mobility Impaired (special facilities)		
Port Jefferson staging area	10	0	0	0	0
Patchogue staging area	11	6	2	0	10
Riverhead staging area	15	0	0	0	0
EWDF (co-located with LERO EOC)	0	3 ambulance, 3 ambulette	2 ambulance, 1 ambulette	0	0
Peconic Ambulance Company	0	0	1 ambulance	0	0
LERO primary and backup bus drivers	0	0	0	35	0
Seaman Bus Co. drivers (Shoreham-Wading River schools)	0	0	0	5	0
Total	36	12	6	40	10

free-play inputs from FEMA evaluators. Drivers were not to stop at either their assigned schools or school relocation centers, but were to drive by the facilities. After driving by the Reception Centers, but before reporting to the EWDF, all bus drivers were to first stop at LILCO's Garden City facility where they were to receive the instructions they would have received at the school relocation centers had those facilities been activated for the exercise. A number of bus drivers were to be directed to report to the Hicksville Reception Center from Garden City, simulating that the school children they were carrying came from areas that were potentially contaminated by the passing plume. The number of school evacuation routes to be evaluated by FEMA is specified in Table 1.1.

Traffic Guides

LERO was to deploy traffic guides from all three staging areas to simulate activation of a suitable sample of TCPs within the 10-mile EPZ. The TCPs were not to be preassigned, nor were the traffic guides to be prepositioned. To avoid interfering with the normal flow of traffic, FEMA was not to request that traffic guides demonstrate the functions they would implement during an actual incident at SNPS. Instead, the traffic guides were to remain in their legally parked vehicles upon arriving at each TCP and to submit to an interview by the Federal evaluator concerning their responsibilities, procedures, and equipment. FEMA evaluated 30 traffic guides deployed from Staging Areas to TCPs as follows:

Staging Area	Number of TCPs
Port Jefferson	10
Patchogue	10
Riverhead	10
Total	30

In addition to the above chart, 10 TCPs were to be evaluated during the reentry portion of the exercise.

Impediments to Evacuation

Federal evaluators were to introduce free-play messages to test appropriate procedures for removing impediments from evacuation routes and/or rerouting evacuation traffic around impediments. The free-play messages to be given to a LERO field worker were to state that a simulated impediment had been discovered at a given location. These demonstrations were to include, where appropriate, the actual dispatch

of appropriate emergency vehicle(s) to the scene, as specified in the LILCO Transition Plan.

Emergency Worker Decontamination

The LERO EWDF, located in the basement of the LERO EOC, was to set up and demonstrate the monitoring and decontamination of LERO workers and emergency vehicles. The processing of emergency workers who had completed their participation in the exercise was to be demonstrated during the exercise. Decontamination actions were to be simulated, although all necessary equipment was to be assembled at the EWDF and all procedures were to be explained to the Federal evaluators.

Reception Centers

The LILCO facilities in Hicksville, Roslyn, and Bellmore, designated in the LILCO Transition Plan as reception centers for all evacuees, were to be opened and staffed in accordance with the plan and in sequence with the exercise. The LERO personnel were to obtain estimates on how many evacuees would be arriving had the exercise been a real emergency. They were then to estimate the supplies required for the potential evacuees. Some volunteers were to be processed through the initial procedure. Procedures and equipment for monitoring evacuees and their vehicles were to be demonstrated. The capabilities of all four trailer teams were to be evaluated on day 2 of the exercise. Decontamination was to be simulated at the storage location of one of the trailers (i.e., on the SNPS site).

Medical Drills

Two medical drills were to be conducted — one on June 7 and one on June 8 — to evaluate the emergency medical response of the LERO ambulance medical technicians as well as that of Mid Island and Brunswick hospitals. A separate scenario was to be developed for each drill, in which a simulated victim suffered a simulated contamination injury. The patient was to be treated by ambulance personnel, transported to either hospital, and treated at the hospital. A Federal evaluator evaluated each drill.

Volunteer Organizations

Response organizations identified in the LILCO Transition Plan were to participate in the exercise. Because members of volunteer organizations have other responsibilities, including earning a livelihood, that take precedence over their participation in an exercise, the staffing of these volunteer organizations for exercise purposes was to be on an as-available basis.

Contract Laboratory Demonstration

Teledyne Isotopes Laboratory, LILCO's contracted laboratory, was to be exercised during both the plume exposure pathway and ingestion pathway portions of the exercise. On day 1 of the exercise, a FEMA evaluator was to observe the transportation, handling, and analysis of air samples taken in the simulated radioactive plume. On day 2, a FEMA evaluator was to observe Teledyne Isotopes Laboratory's capabilities for handling and analyzing various samples from the ingestion pathway.

1.6.4 Actual and Simulated Off-Site Events Summary

The following list summarizes all of the activities that were actually demonstrated or simulated during the June 7-9, 1988, exercise.

- Simulated
 - All plant parameter data
 - All radiological data
 - All meteorological data
 - Station evacuation
- Actual
 - Declaration of emergencies
 - Activation of warning point, EOF, TSC, OSC, ENC, and LERO (including staging areas)
 - Radiological field monitoring teams
 - Ingestion-pathway sample collection and analysis
 - Accident assessment
 - PAR decisions
 - Formulation of EBS messages
 - Issuance of EBS message (timeliness to be coordinated with siren activation)
 - Issuance of press releases
 - Conduct of press conferences
 - Demonstration of a shift change
 - Emergency medical response to a contaminated injured man (on site)
 - Operation of LERO reception centers
 - LERO reception center decontamination trailer operation (at SNPS)
 - LERO school evacuation bus driver program demonstration (using LERO and regular bus drivers)
 - Transportation for transit-dependent evacuees
 - Impediments to evacuation
 - EWDF
 - TCPs
 - Response to off-site contaminated injured man (MS-1 demonstration)
 - Reentry TCPs and bus routes

1.6.5 Exercise Timeline

Tables 1.2 and 1.3 provide detailed timelines of events during the June 7-9, 1988, exercise. Table 1.2 details the escalation of the ECLs, times when emergency response personnel were notified, and times when notification was received of radiological release information by various facilities. Table 1.3 details protective action decisions and the time at which these decisions were issued to the public via EBS.

TABLE 1.2 Emergency Classification and Event
Timeline for the Shoreham Exercise (hours)

Emergency Classification Notification	LILCO Declared	EOF	LERO EOC	DOE-RAP (BHO)
Unusual event	0429		0436 ^a	
Alert	0540		0549 ^b	0606
Facility declared operational	N/A ^c	0716	0709	0750
Site area emergency	N/A	0731	0733	0734
General emergency	N/A	0928	0934	0934
Release started	1100	1100	1100	1101
Release terminated	N/O ^d	N/O	N/O	N/O
Downgraded to Alert ^e (day 4)	0930	0930	0930	N/A

^aObserved at Supervising Service Operator (SSO), LILCO Hicksville facility, via activation of pager system.

^bObserved at SSO, LILCO Hicksville facility, via activation of Radiological Emergency Communications System (RECS) and pager systems.

^cN/A = not available.

^dN/O = not observed.

^eFor scenario purposes.

TABLE 1.3 Plume Pathway Protective Action Timeline

Event	EOF		LERO EOC				Siren		EBS		DOE-RAP (BHO)	
	Recommendation Made		Recommendation Received		Decision Made		Activation		Activation		Recommendation Received	
	Time (hours)	ERPAs ^a	Time (hours)	ERPAs	Time (hours)	ERPAs	Time (hours)		Time (hours)		Time (hours)	ERPAs
Protective action #1 School closing					0559	Early school closing		0613 ^b		0613 ^b		
Protective action #2 Shelter for animals					0800	A,B,C, D,E		0810 ^b		0810 ^b		
Protective action #3 Shelter	0934	K,L,M, W,Q,R	0937	K,L,M, N,Q,R	1020	K,L,M, N,Q,R					1030	K,L,M, N,Q,R
Evacuate	0934	A-J, O,P,S	0937	A-J, O,P,S	1020	A-J, O,P,S		1023		1026 ^b	1030	A-J O,P,S

^aERPA = emergency response planning area.^bSimulated.

2 EXERCISE EVALUATION

2.1 LOCAL EMERGENCY RESPONSE ORGANIZATION EMERGENCY OPERATIONS CENTER (LERO EOC)

The LERO EOC is located at the LILCO Brentwood operations facility. This facility is involved 24 hours per day with LILCO business activities. A portion of this facility is dedicated to emergency response activities during radiological emergencies.

2.1.1 Plume Exposure Pathway Activities

There were eighteen objectives demonstrated by LERO EOC Operations during the plume exposure pathway exercise, with sixteen objectives being fully met, and two objective being partially met.

EOC 1. The objective of demonstrating the ability to monitor, understand, and use ECLs through appropriate implementation of emergency functions and activities corresponding to ECLs was met. Initial notification of unusual event (NUE) ECL was received by the Supervising Service Operator (SSO) at LILCO's Hicksville facility by pager at 0436 hours. At approximately 0442 hours, the NUE was received by the SSO via the RECS line. Notification of the alert was received by the SSO at Hicksville at approximately 0549 hours. After the RECS function was transferred to the LERO EOC in Brentwood at approximately 0701 hours, the RECS communicator there received and recorded notification of the site area emergency and general emergency ECLs at 0733 and 0934 hours, respectively. Because notification of ECL changes was received via the RECS line, verification was not required. ECLs were prominently displayed and kept current at the LERO EOC.

EOC 2. The objective of demonstrating the ability to fully alert, mobilize, and activate personnel for both facility- and field-based emergency functions was met. The computerized Automatic Verification System (AVS) was used to alert and mobilize LERO EOC personnel and to verify receipt of such notice. Seven key LERO EOC staff members were alerted at the NUE ECL and verified receipt of their pager notification within three minutes. Other LERO EOC personnel were alerted and mobilized at the alert and site area emergency ECLs. An AVS computer printout indicated that nearly all LERO EOC personnel called AVS to verify receipt of notice of ECLs. Those not calling AVS were contacted by SSOs at three LILCO district offices. The LERO EOC was staffed by 102 persons having 32 titles. LERO EOC staff first began to log in at approximately 0610 hours, with most staff members having arrived by 0700 hours. The LERO EOC was fully staffed by 0800 hours. All first-shift staff members were on the roster, which was last revised on May 31, 1988.

EOC 3. The objective of demonstrating the ability to direct, coordinate, and control emergency activities was met. Overall management of the LERO EOC was very

good. The staff mobilized expeditiously and demonstrated adequate knowledge and capability to respond to scenario events. The Director of Local Response was in command and coordinated the decision-making process, including making protective action recommendations (PAR). Protective action decisions were coordinated with LERO EOC personnel. The ability to coordinate with state and local authorities was demonstrated. Periodic briefings were conducted. LERO EOC officials followed the plan and demonstrated the ability to direct, coordinate, and control emergency activities.

The Bus Coordinator clearly demonstrated the ability to muster, direct, coordinate, and control emergency bus operations.

Messages received from traffic guides and route spotters in the field were properly logged and followed up. Directions and instructions to these field personnel, as required to implement the evacuation and to respond to the free-play impediment messages introduced in the field, were properly coordinated, following the LERO EOC's established procedures, through the Traffic Control Coordinator.

EOC 4. The objective of demonstrating the ability to communicate with all appropriate locations, organizations, and field personnel was partially met. Use of a number of communications systems was demonstrated. These systems, along with the locations communicated with, included: (1) the RECS line for receiving ECLs and for communicating with the EOF; (2) short-wave radios for communicating with transfer points (TP), traffic guides, route spotters, road crews, helicopters, and the U.S. Coast Guard; (3) dedicated telephones for communicating with staging areas, the ENC, EBS station (WPLR), and BHO; (4) telecopiers for receiving hard copies of RECS messages and for communicating with the ENC and the FEMA control cell; (5) a personal computer for communicating with the ENC; (6) a time-sharing option (TSO) computer for communicating with LILCO district offices and the ENC for rumor control; and (7) commercial telephone for communicating with various locations.

These communications systems functioned well, except as follows. Direct radio communications with field workers in the vicinity of the Port Jefferson staging area was lost between approximately 1100 and 1120 hours. The Evacuation Support Communicator for staging areas indicated that the secondary system of dedicated telephones to the staging area and of radio to the field workers was being implemented. For some time thereafter, significant static caused a delay of 10-15 minutes in the receipt of the first free-play evacuation impediment message and verification of that message to the satisfaction of the Traffic Control Coordinator. During activation of the LERO EOC, a few telephones did not function; this problem was promptly corrected by New York Telephone personnel. An early problem with a telecopier was corrected by facility staff. There was some delay in using the Director of Local Response's speaker telephone, which provided a primary conferencing capability. Between 1300 and 1400 hours, when all three evacuation impediments were active, traffic on the radio of the Evacuation Support Communicator for road crews, road spotters, and helicopters was very heavy. The involved staff responded appropriately by giving priority to communications concerning the evacuation impediments. Additional impediments might have resulted in delays in some priority messages. In extreme situations, route spotters could communicate with the LERO EOC via commercial telephone.

Generally, message handling was excellent. Message forms were completed by coordinators, or their administrative assistants, and by communicators. They were distributed promptly to the addressee or to those on the distribution list and the Lead Communicator. In addition to completing RECS and message forms, administrative assistants kept logs of messages for key coordinators. Messages between the LERO EOC and field workers were generally transcribed accurately. Prompt dissemination of accurate messages helped the LERO EOC respond appropriately to free-play evacuation impediments in a timely manner.

Although message protocols were generally followed, one evacuation support communicator recorded additional messages concerning evacuation impediments on his copy of the standard message form after the other copies had been distributed to the addressee and the Lead Communicator.

EOC 5. The objective of demonstrating the adequacy of facilities, equipment, displays, and other materials to support emergency operations was met. The LERO EOC was controlled for security with access limited to authorized individuals, who logged in as they entered the facility. Security personnel were posted at appropriate locations. The facility was appropriately equipped with status boards, maps, key-event logs, PAR logs, and resource allocation boards. Lighting, sound control, and ventilation were excellent. The facility is capable of continuous, around-the-clock operation and is equipped with back-up power and accommodations to lodge emergency management personnel. Operational equipment (e.g., telephones, and duplicating and telecopying machines) was available in sufficient quantity to meet needs.

Display boards were present in the command and control room but were not hung on the walls which inhibited their prompt utilization, especially in the case of the sector map showing the ERPAs and the plume. All relevant status boards should be hung.

Actions have been taken to modify and enlarge the dose assessment status board to accommodate separate data from the BHO-RAP and LILCO field monitoring teams; reducing the crowding in the command and control room; and employing a key-event status board.

A previous ARCA (LERO EOC 3) from SNPS PEA dated April 17, 1986 has been corrected and verified.

EOC 6. The objective of demonstrating the ability to continuously monitor and control emergency worker exposure was met. The exposure control staff established contact with the dosimetry record keepers at the staging areas to ensure that sufficient staff and equipment were available. Records of emergency worker doses were reviewed at the conclusion of each day's activities to ensure that no worker exceeded preset dose limits. When an emergency worker reported that one of his two DRDs was reading off scale, instructions were issued to obtain a reading of that worker's TLD.

EOC 10. The objective of demonstrating the ability, within the plume-exposure pathway, to project dosage to the public via plume exposure, based on plant and field data was met. The dose assessment staff, including the BHO-RAP team liaison, made several hypothetical dose projections based on a gap release and design-basis LOCA prior to any release of radioactivity. Current and projected wind direction data were used throughout the dose projection process, and new geographic areas of concern were identified as conditions changed. The projected doses were compared with those made by the EOF and BHO Radiation Support Center (RSC) staffs. The coordination between the BHO-RAP team liaison and the EOF staff in positioning the available field monitoring teams was excellent. After the release of radioactivity began, the field monitoring teams effectively defined the plume. Field measurements were compared with projected values. The field data were plotted and displayed in the accident assessment room. All projected doses were clearly shown as projections, and all actual measurements were clearly designated as measurements. A single system for distances was used to correctly log all field data on the status board.

Two previous ARCA (LERO EOC 4, 5) from SNPS PEA dated April 17, 1986 have been corrected and verified.

EOC 11. The objective of demonstrating the ability to make appropriate protective action decisions, based on projected or actual dosage, EPA PAGs, availability of adequate shelter, evacuation time estimates, and other relevant factors was met. The PARs were made by the Director of Local Response, after consultation with the accident assessment staff. Projected dose calculations, PAGs, evacuation time estimates, and other relevant information were considered. The Director of Local Response included PAR decisions in appropriate EBS messages. The LERO EOC recommended evacuation of most zones (Table 1.3), and the governor/county-executive concurred, therefore reducing the need for further PARs. The only school district with which there was an agreement to participate in the exercise was the Shoreham-Wading River District.

EOC 12. The objective of demonstrating the ability to initially alert the public within the 10-mile EPZ and begin dissemination of an instructional message within 15 minutes of a decision by appropriate state and/or local officials was met. Dissemination of instructional messages was effectively coordinated and timely. The 15-minute guideline for siren activation and broadcast of simulated EBS messages was met (Table 1.3). The EBS station (WPLR) was prepared and equipped to carry out all phases of EBS message broadcast. The public information team had excellent liaison with all LERO EOC components. The Coordinator of Public Information displayed outstanding judgment and management expertise throughout the day. He used his staff efficiently, delegating responsibilities to his deputy and other members of his staff, as appropriate. The ability of a private firm, Marketing Evaluations, Inc., to verify siren operation was demonstrated, based on actual siren failures that occurred when the system was activated. However, the 15 minute design objective was met and the issue of the actual siren failure will be dealt with through the maintenance and operability requirements of FEMA REP-10. Therefore, a previous ARCA (LERO EOC 7) from SNPS PEA dated April 17, 1986 has been corrected and verified.

EOC 13. The objective of demonstrating the ability to coordinate the formulation and dissemination of accurate information and instructions to the public in a timely fashion after the initial alert and notification has occurred was partially met. In general, EBS messages were processed effectively and efficiently, and no problems were observed in issuance of EBS messages within the 15-minute guideline.

EBS messages were generally detailed and comprehensive; however, new and important information was usually inserted in the middle or at the end of previous announcements rather than at the beginning where new information should be carried. Due to the excessive length of EBS messages listeners might not stay tuned to the entire EBS message thereby potentially missing pertinent information. This planning inadequacy will be addressed in the evaluation of Revision 10 of LERO off-site Radiological Emergency Response Plan for Shoreham, by the RAC.

EBS message #3 was sent to the ENC by TSO computer at 1035 hours, and according to LILCO documentation, received at the ENC at 1037 hours. The content of this message was also communicated to the ENC by telephone.

Due to a controller inject designed to stimulate certain school evacuation procedures, EBS message #3 indicated that Rocky Point School was remaining open, although the ERPA in which the school is located was to be evacuated. This EBS message was broadcast at 1026 hours. At 1032 hours, it was reported that evacuation discussions were initiated for the Rocky Point School. EBS message #4 which was recommended at 1130 hours, and approved at 1206 hours after concurrence of county officials stated that the Rocky Point School District has implemented the evacuation of all students by bus. Once approved, EBS message #4 was processed in a timely fashion. EBS message #7, which did not result in a change of PARs, was issued after lengthy conversations with county and state officials in which concurrence with the message was discussed in detail over a three hour period.

EBS messages #4, #5, #6, and #7 contained incorrect information that, based upon radiation measurements, small doses of radiation were projected at the site boundary. At the time these messages were broadcast, projected doses based on measurements beyond the site boundary were in excess of the U. S. Environmental Protection Agency's (EPA) guidelines requiring protective actions.

The fact that emergency information is contained in telephone books was not referenced until the second half of EBS messages. Because experience has shown that many people do not retain emergency booklets, telephone books may be the only source of such information at some homes and offices. EBS messages should explain as close to their beginning as possible that emergency information is provided in their telephone book.

EOC 16. The objective of demonstrating the ability to make the decision to recommend use of KI for emergency workers and institutionalized persons*, based on predetermined criteria, was met. The dose assessment staff had performed hypothetical dose projections that indicated a potential need for KI use. When actual field data became available, staff members calculated thyroid dose rates and made dose projections based on a default exposure time. This projected emergency worker dose was in excess of the trigger level in the plan (10 REM) for use of KI for emergency workers. The Radiological Health Coordinator passed this dose projection through the system, and the decision was ultimately made to administer KI to emergency workers.

The Radiological Health Coordinator and the Health Services Coordinator were both aware of the EPA PAG for use of KI by emergency workers and members of the public who could not be evacuated. They were also aware that the LILCO plan uses a more conservative PAG. A previous ARCA (LERO EOC 6) from SNPS PEA dated April 17, 1986 have been corrected and verified.

EOC 18. The objective of demonstrating the ability and resources necessary to implement appropriate protective actions for the impacted permanent and transient plume EPZ population (including transit-dependent persons, special needs populations, handicapped persons, and institutionalized persons) was met. The Bus Coordinator demonstrated the ability to implement protective actions for transit-dependent persons and for special needs populations. The status of resources was continually monitored and managed. Close and effective coordination was maintained with the traffic section to ensure proper routing.

The Special Facilities Evacuation Coordinator expertly identified special needs populations (i.e., the homebound, the deaf, and those in nursing homes, hospitals and other health facilities, and schools). He determined the resources required to assist in the evacuation of these groups and deployed the resources in a timely manner.

The coordination of response to the three free-play evacuation impediment problems that were introduced in the field after the evacuation began was very good. Staff at the LERO EOC demonstrated outstanding ability in dealing with impediments to evacuation. The traffic control section included a Traffic Engineer whose expertise was well used. Communications personnel made persistent and successful efforts to get all the information needed to deal with an impediment. Situations were carefully analyzed, and information was continually passed laterally as well as vertically to ensure coordination. Finally, the situation on impediments was announced at intervals to the entire LERO EOC. The bus evacuation route affected by the impediment on Center Moriches - Wading River Road was promptly ordered to be rerouted by the Transportation Coordinator as warranted by the problem presented.

*As described in the plan, there is no institutionalized population within the EPZ which requires demonstration of this portion of the objective.

EOC 19. The objective of demonstrating the ability and resources necessary to implement appropriate protective actions for school children within the plume EPZ was met. When the implementation of school evacuation was simulated on day 1 of the exercise, the Special Facilities Evacuation Coordinator promptly initiated evacuation discussions at 1032 hours, employing 47 buses to move 2366 students from Rocky Point schools to the Nassau Coliseum School Relocation Center. The Hicksville center had earlier been put on alert and had established necessary controls to receive the student evacuees. However, it was later determined that these students were coming from a possibly contaminated area and would therefore need to be redirected from the Coliseum to the Hicksville Reception Center for monitoring. It was confirmed that four monitors per bus could complete the monitoring task in two and one-half hours. After monitoring, the students were returned to the Coliseum to await pickup by family members. This activity was completed at 1645 hours.

EOC 20. The objective of demonstrating the organizational ability and resources necessary to control access to evacuated and sheltered areas was met. The traffic control group at the LERO EOC did an outstanding job in analyzing evacuation problems and coordinating the evacuation decisions made during the exercise. The Traffic Control Coordinator, assisted by the Traffic Engineer and Traffic Control Point Coordinator, thoroughly assessed traffic flow and demonstrated familiarity with the evacuation routes and the traffic control plan. Prior to the decision to evacuate, the Traffic Control Coordinator requested information from county police officials. This information was used to assess the effect of normal construction and highway repair work on evacuation time estimates. After the evacuation decision was made, the progress of the evacuation was carefully monitored, based on information communicated by route spotters to the Evacuation Route Coordinator.

At approximately 1535 hours, the access control plan was completed, and information about the details of the plan was discussed with the county police commissioner. The access control plan was telefaxed to the county police commissioner at approximately 1545 hours. Receipt of the plan was acknowledged at about 1602 hours.

Pending further discussion and coordination with the county regarding relaxation of sheltering in those zones, this initial access control plan was only for the perimeter of the 10-mile EPZ and did not include the locations where traffic guides would be stationed to limit access to the evacuated zones. There was extensive discussion, in conference calls conducted between 1640 and 1710 hours, between LERO officials at the EOC and county officials regarding unsheltering the affected zones as a condition for implementing access control points that would restrict entry into the evacuated zones which constituted the interior portion of the access control plan. The exercise revealed that Revision 10 of the plan does not contain preplanned access control points to restrict access to evacuated ERPAs when a sheltering advisory is rescinded. Such an access control plan should be developed for any subset of ERPAs where an evacuation advisory is in effect. This planning issue will be addressed in the evaluation of Revision 10 of LERO off-site Radiological Emergency Response Plan for Shoreham, by the RAC.

The second-shift traffic control group actively participated in coordinating the proposed access control plan with county officials until the exercise was suspended at approximately 1800 hours on day 1. At the time the exercise was suspended, concurrence on the plan to cordon off the western boundary of the evacuated portion of the EPZ had not been received from county officials. When the exercise resumed on day 2, the LERO EOC recommended unsheltering the sheltered zones. County concurrence was obtained to implement cordoning off the interior zones, with police resources being provided to assist LERO in this effort. Internal communication, as demonstrated by lateral information flow and vertical flow to and from the Evacuation Coordinator and the Manager of Local Response, was also very good. Throughout the evacuation, the Evacuation Coordinator and the Traffic Control Coordinator contacted county officials, either to provide information or to request assistance.

Verification by route spotters of free-play evacuation impediments introduced in the field through traffic guides following vertical and lateral coordination at the LERO EOC was timely.

A previous Deficiency (LERO EOC 1) and a previous ARCA (LERO EOC 3) from SNPS PEA dated April 17, 1986 have been corrected and verified.

EOC 26. The objective of demonstrating the ability to identify the need for assistance and to call upon Federal and other outside support agencies for that assistance was met. The U.S. Coast Guard was notified of the Alert ECL at 0720 hours. A safety voice broadcast (simulated) was initiated after the Site Area Emergency ECL at 0837 hours, and a safety zone was established at 0913 hours, prohibiting traffic in a zone of 10-mile radius from the mouth of the Wading River. The dispatch of three cutters to enforce the safety zone was simulated. Two Coast Guard liaisons arrived at the LERO EOC at 0915 hours to coordinate Coast Guard involvement.

The Federal Aviation Administration (FAA) and the LIRR were contacted at 0957 hours. The FAA agreed to restrict air traffic within a 10-mile radius; the LIRR agreed to stop traffic between Yaphank and Riverhead.

Two previous ARCAs (LERO EOC 1 and 2) from SNPS PEA dated April 17, 1986 were corrected and verified.

EOC 34. The objective of demonstrating the ability to maintain staffing on a continuous, 24-hour basis by an actual shift change was met. The LERO EOC demonstrated this ability excellently. The shift change occurred in various phases, starting approximately at 1450 hours and ending at 1630 hours. The first phase was a briefing of the Manager of Local Response by first-shift coordinators on major issues still current. The second-shift personnel assembled and were kept in a holding area to reduce noise and prevent overcrowding. While the second-shift personnel were assembling, key second-shift coordinators were individually briefed by their first-shift counterparts. The turnover briefing by the primary Radiation Health Coordinator was very detailed (e.g., it covered log books and written information) and far too long. Between 1537 and 1600 hours, the incoming Manager of Local Response briefed the incoming coordinators

on major pending actions. At 1610 hours, first-shift personnel were asked to go to a holding area in the cafeteria until officially released from the building. At 1720 hours, first-shift management personnel were released to go home.

The shift change for the traffic control group was staggered from that of other LERO EOC staff. At approximately 1505 hours, the traffic control group was developing an access control plan for the 10-mile perimeter and for cordoning off the sheltered portion of the EPZ. At this time, the group was directed by the Director of Local Response to postpone its shift change until the access control plan was completed.

The shift change of the Evacuation Coordinator and Traffic Control Coordinator, and their respective staffs, was then initiated at approximately 1600 hours. Second-shift personnel were properly briefed, and the shift change was completed at approximately 1630 hours. Both first- and second-shift traffic and evacuation personnel adequately demonstrated their knowledge of the plan and their ability to coordinate implementation of recommended protective activities.

EOC 35. The objective of demonstrating the ability to coordinate the evacuation of on-site personnel was met. On-site personnel contacted the Traffic Control Coordinator during the site area emergency ECL at approximately 0840 hours to ascertain whether there were any conditions that would affect evacuation of on-site personnel. The Traffic Control Coordinator reported that there were such conditions in the form of construction on Sunrise Highway. The evacuation of nonessential on-site personnel was announced in a briefing at the LERO EOC at approximately 0915 hours.

EOC 37. The objective of demonstrating the capability of utility off-site response organization personnel to interface with nonparticipating state and local governments through their mobilization and provision of advice and assistance was met. LERO EOC personnel discussed all operations on a continual basis with officials of New York, Connecticut, Suffolk County, and Nassau County. Conversations took place several times each hour. The Director of Local Response assumed a leadership role in suggesting policies, procedures, and recommendations associated with emergency status and off-site activities. All information received at the LERO EOC (e.g., from the EOF) was promptly shared with the nonparticipating state and local governments.

The Traffic Control Coordinator and the Evacuation Coordinator made many telephone calls to Suffolk County and Nassau County officials. In addition to informing these officials of evacuation-related events, they requested information on road construction and repair work to assess the effect of such work on evacuation time estimates. They also requested assistance to augment their traffic guides and route spotters.

2.1.2 Ingestion Pathway and Recovery/Reentry Activities

There were eleven objectives to be demonstrated at the LERO EOC during the ingestion pathway and recovery/reentry exercise, with ten objectives being met, and one objective being partially met.

EOC 3. The objective of demonstrating the ability to direct, coordinate, and control emergency activities was met. Overall management of the LERO EOC was very good, as it had been during the plume exposure pathway phase of the exercise. On day 3 of the exercise, LERO EOC management successfully demonstrated its ability to coordinate responsive ingestion pathway and recovery/reentry decision making.

EOC 4. The objective of demonstrating the ability to communicate with all appropriate locations, organizations, and field personnel was met. During the ingestion pathway and recovery/reentry phases of the exercise, there were considerably fewer field workers deployed who communicated with the LERO EOC than during the plume exposure pathway phase. Nevertheless, there was still considerable communications traffic between the accident assessment group and the BHO-RAP field monitoring teams, and between the public information group and the ENC. Among the other locations contacted from the LERO EOC were bus yards to confirm the arrival of LERO EOC bus drivers and traffic guides deployed to access control points during reentry. The communications systems operated without breakdown, and the excellent message handling demonstrated during the plume exposure pathway phase was sustained during these phases of the exercise.

EOC 6. The objective of demonstrating the ability to continuously monitor and control emergency worker exposure was met. The exposure control staff at the LERO EOC continued their contacts with the dosimetry record keepers at the staging areas to ensure that sufficient staff and equipment were available. Records of emergency worker doses were reviewed at the conclusion of each day's activity to ensure that no worker exceeded preset dose limits.

EOC 13. The objective of demonstrating the ability to coordinate the formulation and dissemination of accurate information and instructions to the public in a timely fashion was met. In general, coordination between the LERO EOC and the ENC was good during the ingestion pathway and recovery/reentry phases of the exercise. All LERO EOC managers displayed excellent leadership, especially the Manager of Local Response, in their actions to keep the public informed.

In addition to EBS messages, the LERO EOC staff produced summary sheets of most EBS messages that were sent to the ENC, district offices, and staging areas via the TSO computer. They also produced "LERO Updates" that provided EBS message information as well as additional information obtained in response to press inquiries.

EOC 26. The objective of demonstrating the ability to identify the need for assistance and to call upon Federal and other outside support agencies for that assistance was met. The Director of Local Response discussed Federal assistance with the FEMA Coordinator during the ingestion pathway and recovery/reentry phases of the exercise. FEMA and other Federal agencies were requested to participate in the Recovery Action Committee, and the Director of Local Response agreed to brief the other Federal agencies. The American Red Cross representative was requested to manage the congregate care facilities.

In addition to the assistance of the U.S. Coast Guard, which is discussed in EOC 33, the LERO EOC received simulated assistance from USDA, EPA (for radiological monitoring), and the NRC.

EOC 29 and BHO 29. The objective of demonstrating the ability to project radiation dose to the public via the ingestion pathway and to determine appropriate protective measures was partially met. The BHO-RAP dose assessment team relocated to the LERO EOC for the ingestion pathway and recovery/reentry phases. Overall, the dose assessment staff assessed ingestion pathway doses and projected recovery/reentry doses excellently. All factors of ingestion dose projection were examined in more than adequate detail. The ingestion dose assessment function was impacted by errors in the scenario data. Resolution of these errors required considerable time during day 2 of the exercise, which slowed the overall progress of the ingestion pathway phase.

The ingestion pathway PARs were well thought out and were based on appropriate PAGs; however, they were very slow to be developed. The apparent reason for this slow development was the management decision to have the dose assessment staff focus on reentry and relocation issues. Sufficient scenario information was available the morning of day 2 of the exercise to provide the basis for low-impact, ingestion pathway PARs as suggested in Sec. 5.2.2 of OPIP 3.6.6. However, it was not until mid-morning of day 3 that actual PARs were developed for the 10-to 50-mile area in New York State.

EOC 30. The objective of demonstrating the ability to implement both preventive and emergency protective actions for ingestion pathway hazards was met. Following completion of radiological field monitoring for the plume pathway, the Radiological Health Coordinator, his staff, and BHO-RAP response personnel on day 2 of the exercise began to focus on the following ingestion pathway activities:

1. At 0906 hours, EBS message #8 was issued by the LERO EOC. It addressed several food safety issues, including the instruction not to eat locally grown fruits and vegetables until further analysis could be performed. The EBS message also stated that all milk-producing animals in the 10-mile EPZ should be moved into shelters and placed on stored feed. This step was initially accomplished on day 1 of the exercise. The same advisory was issued again at 1135 hours.

2. A priority sampling plan was developed, based on field team measurements and radiation readings from a "fly-over" contour map developed by DOE.
3. Ingestion/pathway teams were sent out to gather samples of grass, water, milk, vegetables, and soil from areas within the 50-mile EPZ in New York State.
4. Beef, fruit, vegetable, and duck farmers, as well as dairy processors and milk suppliers, in the affected area were notified of the sample collection activities.

However, no ingestion pathway PARs were made during day 2 for New York State.

Additionally, an EBS message was issued at the end of day 2, recommending that all milk-producing animals within a 10-mile radius of Old Lyme, Connecticut, should be moved into shelters and placed on stored feed. In the areas recommended for protective actions in Connecticut, milk should be held until sampled by State of Connecticut local health departments.

The Radiological Health Coordinator, his staff, and BHO-RAI response personnel continued to focus on food safety issues involving the ingestion pathway during day 3 of the exercise. The following actions were taken:

1. Assessment priorities were developed, using laboratory results and "fly-over" and field monitoring data.
2. Notification of ingestion pathway PARs was carried out as follows. Milk suppliers in areas where sampling results had showed contamination levels that exceeded emergency PAGs were directed to place animals on stored feed and water and not to ship their milk. Samples were to be picked up by a survey team. Milk suppliers were asked to provide the LERO EOC with a list of distribution points for the milk and the amount and location of any that had been shipped. Farm-stand operators, fruit farmers, and vegetable farmers outside the 10-mile EPZ were advised that all locally grown fresh produce and leafy vegetables stored in the area should be washed, scrubbed, or peeled to remove surface contamination. Farm-stand operators in areas within the 10-mile EPZ where contamination levels exceeded preventive PAGs were advised that their products were not safe for consumption and that they would be collected for reimbursement by LILCO.
3. Other PARs were issued as follows. Several EBS messages advised that locally grown fruits and vegetables may not be safe for consumption, pending further sampling and analysis. They also advised, as a precautionary measure, that all fruits and vegetables stored outside prior to the incident should be washed and peeled.

before consumption. Local tap water supplies were being continually sampled and analyzed. Tap water was safe to consume. Instructions were given to place all livestock within a 50-mile radius on stored feed and water. Residents and farmers with milk from local farms within the affected area were cautioned in EBS message #19 to consume only dry or canned milk in closed containers or fresh milk on hand prior to the incident and stored in closed containers.

4. Seafood and beef animals were declared safe for consumption because samples showed less-than-detectable levels of radiation.

In addition to these actions, LILCO purchased stored feed for use by farmers in the affected area. The Radiological Health Coordinator and his staff had information on the food products and water indigenous to the area.

During the exercise an actual milk sample was taken at the Poole residence in Shoreham. This location is shown as a sampling site in the LILCO on-site plan, but not in Revision 10 of the LERO off-site plan (see OPIP 3.6.6). During the exercise, it was learned that two dairy locations in an easterly direction, identified in OPIP 3.6.6, Attachment 9, page 1 of 3, are no longer milk-producing locations. The plan should be reviewed and revised to include accurate, up-to-date information concerning the ingestion pathway. This planning issue will be addressed in the evaluation of Revision 10 of LERO off-site Radiological Emergency Response Plan for Shoreham, by the RAC.

EOC 31. Evaluation of the objective of demonstrating the ability to estimate total population exposure was met. LILCO submitted a detailed report documenting the results of a task force assigned to perform its total population dose estimate. This report was prepared and submitted in accordance with the guidelines established by the RAC chairman. The following dose pathways were considered: plume exposure, ground shine including resuspension, and ingestion. While there are minor concerns with a few calculational assumptions, the report demonstrates the ability to perform total population dose estimation.

EOC 32. The objective of demonstrating the ability to determine appropriate measures for controlled reentry and recovery, based on estimated total population exposure, available PAGs and other relevant factors was met. The evacuation and traffic control groups successfully demonstrated implementation and monitoring of recovery/reentry activities. After de-escalation of the emergency to an alert ECL, the Traffic Engineer, upon direction from the Traffic Control Coordinator, developed a preliminary reentry control plan to direct the reentry of residents into the evacuated zones. This preliminary plan was coordinated with the county, both by telephone and by hard copy. Plan approval and police assistance to implement the plan were subsequently obtained in a conference call involving key LERO EOC coordinators and county officials at approximately 1035 hours on day 3 of the exercise. The reentry traffic control plan, the analysis of transportation requirements, and the allocation of necessary personnel

and resources for directing traffic and transporting the transportation-dependent evacuated population were very well coordinated by the Evacuation Coordinator and his support staff. Discussion and consideration of resettlement policies were not demonstrated because the recovery/reentry phase of the exercise was terminated with final approval of the reentry plan.

EOC 33. The objective of demonstrating the ability to implement appropriate measures for controlled reentry and recovery was met. When the exercise resumed on June 8th (day 2 of the exercise), the Evacuation Coordinator and his staff were mainly planning actions leading to recovery. Plans were made both for evacuating the remaining persons in the evacuation areas and for returning persons previously excluded from entering the sheltered area.

Fifteen additional access control points were established along the westerly perimeter of the evacuated area in coordination with county officials. The county police commissioner agreed to provide police officers for each post, and the LERO EOC provided dosimetry to the police. Traffic guides were reassigned as necessary, and relief of first-shift traffic guides was arranged. Two helicopters kept the EPZ under surveillance. At 0930 hours, sheltering of the western part of the EPZ was lifted, and the access control points were lifted on the perimeter of the area previously sheltered. At 0950 hours, the unsheltering was considered complete. No one was permitted to enter the evacuated areas without permission of the Suffolk County Commissioner of Health.

At 1236 hours, the U.S. Coast Guard was requested to reduce the perimeter of the excluded area to the shore but to retain boat patrols for security of the evacuation areas. This request was relayed by the Coast Guard liaison at the LERO EOC to the Coast Guard Command at New Haven, Connecticut, who reduced the exclusion area to one mile and commenced simulated patrolling one mile off shore from 10 miles east of SNPS to 10 miles west of SNPS.

Actual implementation of the plan for controlled reentry was demonstrated out of sequence (day 3 of the exercise), for purposes of field evaluation. Twelve traffic guides were actually deployed from the Patchogue staging area. All but one, who was delayed by an actual traffic impediment, arrived at their posts within 40 minutes of deployment. An evacuation support communicator established radio communication with these traffic guides, and they were effectively managed by the Traffic Control Coordinator and the Traffic Control Point Coordinator.

The Bus Coordinator, Special Facilities Evacuation Coordinator, and Ambulance Coordinator demonstrated the ability to prepare for reentry of persons needing transportation. LILCO's district office in Hicksville was chosen as the location for persons from scattered locations to congregate because of its proximity to a major LIRR station. Buses were allocated for persons at eight congregate care centers and Hicksville. Ambulances were allocated for persons at relocated hospitals and other special care facilities.

EOC 37. The objective of demonstrating the capability of utility off-site response organization personnel to interface with nonparticipating state and local governments was met. LERO EOC personnel continued to discuss all operations with and seek assistance and necessary approvals from officials of New York and Connecticut and Suffolk and Nassau counties at the FEMA control cell during the ingestion pathway and recovery/reentry phases.

Deficiencies

No Deficiencies were observed at the LERO EOC during the exercise.

Areas Requiring Corrective Action

1. **Description:** An evacuation support communicator recorded additional messages on his copy of the standard LERO EOC message form after the other copies had been forwarded to the addressee and the Lead Communicator. (NUREG-0654, Supp. 1, II, E.1)

Recommendation: EOC personnel should be trained that the recording of additional messages requires a new message form rather than being added to previous message forms.

2. **Description:** EBS messages #4, #5, #6, and #7 contained incorrect information that, based upon radiation measurements, small doses to radiation were projected at the site boundary. At the time these messages were broadcast, projected doses based on measurements beyond the site boundary were in excess of the U. S. Environmental Protection Agency's (EPA) guidelines requiring protective actions. (NUREG-0654, Supp. 1, II, E.5, I.A)

Recommendation: All EBS messages should be screened to ensure that cumulative information is appropriate to the changed conditions (projected doses).

3. **Description:** PARs for the ingestion pathway in New York State beyond the 10-mile EPZ were slow to be developed due to management decision to have dose assessment staff focus on reentry and relocation issues. (NUREG-0654, Supp. 1, II, J.11)

Recommendation: Priorities in the overall dose assessment function should be reviewed. There are more than an adequate number of competent dose assessment staff members.

Areas Recommended for Improvement

1. **Description:** There was some delay in using the Director of Local Response's speaker telephone, which provided a primary conferencing capability.

Recommendation: Ongoing training should include techniques required for effective telephone conferencing. Speaker telephone equipment should be tested to ensure its operational capability.

2. **Description:** Display boards present in the command and control room were not hung on the walls and were therefore of limited utility.

Recommendation: Relevant display boards should be hung on the walls.

3. **Description:** The fact that emergency information is contained in telephone books is not explained until the second half of EBS messages. Experience has shown that many people do not retain emergency booklets, telephone books may be the only source of such information at some homes and offices.

Recommendation: EBS messages should explain as close to the beginning as possible that telephone books contain emergency information.

4. **Description:** The briefing given at the shift change by the primary Radiation Health Coordinator was far too long.

Recommendation: All necessary information should be included in the turnover briefing at a shift change; however, log books and written information should not be reviewed item by item.

2.2 EMERGENCY OPERATIONS FACILITY (EOF)

The EOF is located at the LILCO Training Center, just west of Veterans Memorial Highway off the Long Island Expressway. The EOF is 18.5 miles from the SNPS site.

2.2.1 Plume Exposure Pathway Activities

All eight objectives to be demonstrated by the EOF during the plume exposure pathway exercise were fully met.

EOF 1. The objective to demonstrate the ability to monitor, understand, and use ECLs through appropriate implementation of emergency functions and activities corresponding to ECLs was met. The Response Manager and his key staff at the EOF developed appropriate ECLs in response to actions dictated by plant status and exercise scenario events. Notification of each ECL was promptly communicated to all of the appropriate organizations. The ECLs were prominently displayed in the command center, and frequent briefings were held by the Response Manager to keep the EOF staff aware of the current ECLs.

EOF 2. The objective to demonstrate the ability to fully alert, mobilize and activate personnel for both facility- and field-based emergency functions was met. Notification of EOF emergency personnel was accomplished in a timely manner. Initial calls to alert the staff were made by the Control Room Communicator using radio pagers. Staff were notified at the alert ECL, beginning at 0645 hours. The facility was declared operational at 0716 hours when all key emergency response personnel were in place.

EOF 3. The objective of demonstrating the ability to direct, coordinate, and control emergency activities was met. Although an internal tracking system was not used for all incoming or outgoing messages, the various sections logged messages with respect to various staff functions. The RECS forms were logged in and distributed, as were the field monitoring forms. Section members maintained logs of decisions and completed procedures forms.

EOF 4. The objective of demonstrating the ability to communicate with all appropriate locations, organizations, and field personnel was met. Field monitoring teams were in contact with the dispatcher at the EOF, and ample commercial telephone lines were available for all elements at the EOF, including FEMA and NRC. Telephones were also available for both New York State and Suffolk County should their representatives arrive. A real-time loss of commercial telephone service from the site occurred; however, back-up telephones (tie lines and direct lines) were used. If these had

been lost, radios were available. Back-up systems had already been checked and their operation verified at the start of the exercise.

EOF 5. The objective of demonstrating the adequacy of facilities, equipment, displays, and other materials to support emergency operations was met. Eleven rooms in the LILCO Training Center were identified for EOF operations, including separate work areas for FEMA, NRC, New York State, and Suffolk County. Access control and security were maintained at the EOF throughout the exercise. Photo identification was required for all personnel requesting entrance to the Training Center and again upon entering the EOF area. The required display maps and status boards were posted in the Command Center and were continually updated with current emergency data.

EOF 10. The objective to demonstrate the ability within the plume exposure pathway, to project dosage to the public via plume exposure, based on plant and field data was met. Utility teams were deployed in advance of releases. Projected doses were compared to simulated actual readings once the releases began. Teams were maneuvered before wind shifts to protect the teams from being in the plume.

EOF 34. The objective to demonstrate the ability to maintain staffing on a continuous, 24-hour basis by an actual shift change was met. The shift change at 1500 hours was followed by the emergency response managers and major staff members briefing each other, with the exception of the LILCO Emergency Preparedness Advisor. After the briefing, the new Emergency Response Manager briefed all new members of his staff. Another briefing was then conducted with the new manager and his key staff and the old manager and his staff. The dose assessment staff staggered their shift change to maintain continuity during analysis of the plume data. Field monitoring teams were replaced when they returned with samples and were decontaminated, including their vehicles. Completion of the shift change was announced at 1500 hours, and the new Emergency Response Manager assumed command. The LILCO Emergency Preparedness Advisor demonstrated shift-change capability via a roster. Those trained for this position could not be used in the exercise because they were knowledgeable about the scenario.

EOF 35. The objective to demonstrate the ability to coordinate the evacuation of on-site personnel was met. The on-site personnel were evacuated following the appropriate procedure. The LILCO Emergency Preparedness Advisor contacted the LERO EOC to advise of the on-site evacuation. There was no radiological release, and nonessential personnel were evacuated through normal exits. Monitoring and decontamination, if needed, is to be performed on site as they leave.

2.2.2 Ingestion Pathway Activities

There were eight objectives to be demonstrated by the EOF during the ingestion pathway exercise with seven objectives being met, and a determination being made that one objective was not applicable for the EOF.

EOF 1-5. These objectives are covered in Sec. 2.2.1 (Plume Exposure Pathway Activities).

EOF 29. The objective to demonstrate the ability to project radiation dose to the public for ingestion pathway exposure and determine appropriate protective measures based on field data, FDA PAGs, and other relevant factors was met. During the ingestion pathway phase of the exercise, the EOF dose assessment staff evaluated projected and actual dose measurements to facilitate LERO EOC efforts and to control the collection of data by the environmental teams through the dispatcher.

EOF 31. Evaluation of the objective of demonstrating the ability to estimate total population exposure was met. (See Section 2.1.2 Ingestion Pathway and Recovery/Reentry Activities, EOC 31)

EOF 32. The objective to demonstrate the ability to determine appropriate measures for controlled reentry and recovery is not applicable for the EOF. The EOF is not directly involved in the recovery/reentry phase, but does provide support to the LERO EOC in obtaining necessary data for decision making.

Deficiencies

No Deficiencies were observed at the EOF during the exercise.

Areas Requiring Corrective Action

No Areas Requiring Corrective Action were observed at the EOF during the exercise.

Areas Recommended for Improvement

No Areas Recommended for Improvement were observed at the EOF during the exercise.

2.3 BROOKHAVEN AREA OFFICE (BHO)

The BHO is located at Brookhaven National Laboratory (BNL) in Upton, New York.

2.3.1 Plume Exposure Pathway Activities

All 10 objectives to be demonstrated by the BHO during the plume exposure pathway exercise were fully met.

BHO 1. The objective to demonstrate the ability to monitor, understand, and use ECLs through appropriate implementation of emergency functions and activities corresponding to ECLs was met by the BNL police and BHO staff. BNL police promptly contacted the appropriate BHO-RAP responders when notified of the alert ECL at 0606 hours.

BHO 2. The objective to demonstrate the ability to fully alert, mobilize and activate personnel for both facility- and field-based emergency functions was met. Notification of the BHO-RAP Team Captain was completed by 0615 hours, and the Team Captain arrived at the BHO RSC at 0648 hours. By this time, the Team Captain had already contacted key responders. Other team members were notified, beginning at 0705 hours; the call-out was completed by 0720 hours. The last field team members arrived by 0800 hours. By 0815 hours, the two field monitoring teams were ready to be deployed to the field, having completed their equipment checkout procedures and loaded their equipment into vehicles.

During the exercise, individuals were contacted by telephone to identify which BNL staff members were available to fill second-shift positions for the RSC and the field teams. Two field teams having two members each were used during the first shift. Three additional teams were identified for use during the first shift, if needed. A full complement of five teams (10 members) were identified for the second shift.

BHO 3. The objective of demonstrating the ability to direct, coordinate, and control emergency activities was met. The Team Captain was effectively in charge of the BHO response. Accident assessment staff were kept well informed of changes in plant status and protective actions in effect. Incoming messages were copied and distributed by the administrative support person. Outgoing messages were relayed by telephone, with a hard-copy telefax follow-up to the LERO EOC. Protective action recommendations were discussed with the BHO-RAP liaison at the LERO EOC.

BHO 4. The objective of demonstrating the ability to communicate with all appropriate locations, organizations, and field personnel was met. The primary communications link between the RSC and other off-site facilities was commercial

telephone. At least one telephone had a dedicated "hot line" (i.e., no need to dial) direct to the BHO-RAP liaison at the LERO EOC. Communication between the RSC and the LERO EOC via facsimile machine hard copy was demonstrated. The BHO-RAP field monitoring team demonstrated its ability to communicate with all appropriate locations, organizations, and field personnel. The communications system used was the Motorola Model MX-360 with encoding capabilities and the clear-channel option. Teams 1 and 2 were issued portable, hand-held radios, along with spare batteries. The equipment was encoded and tested by contacting the dispatcher at the RSC before the teams left the dispatch area. The radios worked quite well in the field, with no communication delays being reported. Spare radios and batteries, which could be delivered to the field teams from the dispatch area, were available for back up. There was also the option for communicating over the clear channel; this option was demonstrated because one of the radios lost its encryption code.

BHO 5. The objective of demonstrating the adequacy of facilities, equipment, displays, and other materials to support emergency operations was met. The BHO-RAP RSC is located on the site of BNL, which is a major national research center with all the resources that such facilities offer. The RSC has adequate facilities, equipment, and displays necessary to carry out emergency radiological response functions over an extended period of time. It is located in the BNL Meteorology Building Library. Minimal time is required to convert the library into an operational RSC. All emergency response support equipment is stored in an adjacent building, the Instrument Maintenance and Calibration Facility.

BHO 7 and FA 7. The objective to demonstrate the appropriate equipment and procedures for making field radiation measurements was met by the BHO-RAP field monitoring teams. The hand-held radiation monitoring equipment consisted of a Ludlum Model 12S micro-R meter (low level), a high-range Victoreen 471A ion chamber (high-level), and a Ludlum Model 3 GM beta-gamma detector (pancake). Spare equipment in operating condition was available at the dispatch location for transport to the field teams via courier.

All equipment was battery and source checked before the teams left the dispatch site. All equipment had valid calibration stickers. Field measurements were made at the 4-foot and 4-inch height, in both window-open and window-closed conditions. The instruments were not enclosed in plastic bags before team members entered the expected areas of the plume. All data were logged on BNL standard sample log forms having places for location, time, and date entries.

In general, the monitoring locations were found in a reasonable amount of time. However, legible maps showing street names should be available to the field teams to reduce the amount of time required to find specific locations. The teams were well trained in field radiation monitoring and equipment use. This exercise was an application of their normal job description and duties at BNL. The field measurement data were reported carefully and correctly, with special emphasis on measurement location.

BHO 8 and FA 8. The objective to demonstrate the appropriate equipment and procedures for measurement of airborne radioiodine concentrations as low as 10^{-7} $\mu\text{Ci}/\text{cm}^3$ in the presence of noble gases was met by the BHO-RAP field monitoring teams. The sampling equipment consisted of a BNL air pump, powered from the vehicle's 12-V system, a particulate filter, and a charcoal cartridge. Silver-based sample cartridges were also available in the kits, but were not used during the exercise. All pieces of equipment had calibration stickers and were calibrated within the last year.

Air samples (25 ft^3) were taken using the required air flow rate and time duration. The samples were taken within the plume and then bagged and sealed before transporting them to an area of low background radiation outside the plume area for counting. The samples were counted in a fixed geometry with a CDV 700 with a #6306 probe. The samples were rebagged after counting. All samples were properly identified and the results of the counting transmitted to the RSC. Some samples were transported to a "runner," who transported the samples via helicopter to Teledyne Isotopes Laboratory for additional analysis. Team members demonstrated proper techniques for avoiding contamination of the sample media and cross contamination of other samples.

BHO 9 and FA 9. The objective to demonstrate the ability to obtain samples of particulate activity in the airborne plume and promptly transport the samples to a "runner" was met by the BHO-RAP field monitoring teams. These samples, along with the radioiodine samples discussed above, were transported by air to Teledyne Isotopes Laboratory in Westwood, New Jersey. About 55 minutes elapsed from the time the airborne plume sample was taken until it was delivered to the "runner." During this time period, the team moved to a low-background-radiation area to make initial field measurements of the samples. One of the air samples was delivered to BNL for demonstration purposes. The sample was received one hour after the field team gave the samples to the courier. This transport time is not totally realistic because the same courier stopped en route to deliver other air samples to the "runner" for air transport to Teledyne. At BNL a five-minute sample count was used to qualitatively determine the ratios of specific radionuclides to total activity. With such a short counting time, only radioiodines were detected. The counting procedure involved a quick count of the whole sample cartridge — both the silver silica gel canister and the particulate filter. Proper contamination control procedures were used, both for initial sample screening and for preparing the samples for counting on laboratory instrumentation.

BHO 10. The objective to demonstrate the ability, within the plume exposure pathway, to project dosage to the public via the plume exposure pathway based on plant and field data was met by the BHP-RAP RSC accident assessment group. Timely dose projections were made. These projections were initially based on changing plant conditions and considered both filtered and unfiltered release pathways. While the release was in progress, dose projections were revised, based on field measurements. As field monitoring data became available, they were plotted on an area map to provide an indication of the current plume location. Meteorological data and weather forecasts were continually reviewed to estimate the areas that could be affected because of changes in the direction of plume travel. Field team controller errors caused much of

the team 2 field data to be lost. Although the loss created some player concern and confusion, no major problems were observed with respect to dose assessment.

BHO 11. The objective to demonstrate the ability to project radiation dosage to the public via plume exposure, based on plant data and field measurements, and to recommend appropriate protective measures to LERO, based on PAGs, and effectively communicate them to the LERO EOC was met. The Team Captain discussed with the BHO-RAP liaison at the LERO EOC the conditions leading up to the PAR. The Team Captain used information provided by the RSC group nuclear engineer regarding plant status information and trend analysis. "What if"-type dose projections were performed by the dose assessment group to help determine what type of protective actions should be implemented and how far the protective action should extend. When PARs were issued by the LERO EOC, the Team Captain closely questioned why certain ERPAs were omitted.

2.3.2 Ingestion Pathway Activities

There were five objectives demonstrated by BHO during the ingestion pathway exercise, with four objectives being fully met and one objectives being partially met.

BHO 2. The objective to demonstrate the ability to fully alert, mobilize and activate personnel for both facility- and field-based emergency functions was met. At the start of day 2 of the exercise, the BHO dose assessment team relocated to the LERO EOC for the ingestion pathway phase of the exercise. Team members brought their own reference material and calculators. All other resources were available at the LERO EOC. Although day-2 exercise play was delayed until completion of carry-over day-1 activities, no problems were encountered in this relocation. The day-2 ingestion pathway dose assessment function activated as smoothly as scenario constraints would permit.

BHO 3. This objective is covered in Sec. 2.3.1 (Plume Exposure Pathway Activities).

BHO 4. The objective to demonstrate the ability to communicate with all appropriate locations, organizations, and field personnel was met by the BHO-RAP field sampling teams. The communications system was a cellular telephone in the vehicles, which was issued to each field team, along with portable, hand-held radios for communications while near the BNL dispatch office. While in the field, the cellular telephones worked well, with no significant delays in communication. The back-up for the cellular telephone system was commercial, land-line telephones.

BHO 27. The objective to demonstrate the appropriate use of equipment and procedures for collecting and transporting samples of soil, vegetation, water, and milk

was met by the three BHO-RAP field sampling teams. Each team was issued the appropriate sampling equipment. Team members were well trained in the use of the equipment and in proper procedures. They were familiar with the area and arrived at sampling locations promptly, using appropriate maps.

During the exercise, standard operating procedures were followed to obtain the field samples of soil, vegetation, water, and milk. A preservative was added to the milk sample. The collected samples were handled and packaged to prevent cross contamination. They were properly identified and labeled, and the data were logged on a BNL standard form. Each team member was capable of taking any of the samples. The samples were field monitored, with the results being reported to the LERO EOC. The samples were delivered to a sample collection center for subsequent transport to a radiation measurement laboratory for analysis. The teams defined the deposition area with little direction from the LERO EOC field team communicator.

BHO 29. This objective is covered in Sec. 2.1.1 (LERO EOC).

2.3.3 Emergency Worker Radiological Exposure Control

BHO 6. While this objective was not negotiated for evaluation during the exercise, evaluators assigned to field monitoring teams made the following observations. The BHO-RAP field monitoring teams demonstrated the ability to continuously monitor and control emergency worker exposure. Team members were each issued a TLD and two DRDs, which they wore throughout the exercise. The DRDs had ranges of 0-200 mR and 0-5 R. Dosimeter chargers were available, and each DRD was zeroed before being issued. The DRDs were read at approximately 15 minute intervals, and the individual exposure received (simulated) for each team member was recorded on a standard form and reported to the RSC. Team members were knowledgeable about exposure limits and who could authorize additional exposure. Also, team members knew the proper procedures should they receive an exposure higher than previously authorized. All team members were well trained in and had an excellent knowledge of the use of personal dosimetry.

The BHO demonstrated its ability to distribute and administer KI. Each field monitoring kit contained an adequate supply of KI for the team members. Each sealed bottle of KI tablets was within its expiration date. Team members knew who could authorize the administration of KI and the factors upon which such a decision would be based. Team members knew of the possible, but highly unlikely, allergic reactions to KI and the symptoms of this reaction. The Team Captain and RSC dose assessment group routinely evaluated the need to administer KI to their emergency worker field teams. The projected dose estimates based on field air sample measurements indicated that emergency worker thyroid exposures would not exceed 25 rem. Therefore, use of KI was not recommended for BHO-RAP field teams. This decision was consistent with RAP emergency response procedures.

Deficiencies

No Deficiencies were observed in the BHO activities during the exercise.

Area Requiring Corrective Action

No Areas Requiring Corrective Action were observed in the BHO activities during the exercise.

Areas Recommended for Improvement

1. **Description:** Field monitoring equipment was not always adequately protected from contamination when BHO-RAP field teams were in the plume.

Recommendation: When the team is in the plume, equipment should be protected from contamination by plastic bags, or the equipment should remain in closed kits.

2. **Description:** Legible maps clearly showing street names should be available to each team to reduce the amount of time driving in the plume to find specific locations.

Recommendation: Packets of legible maps should be available to each team.

2.4 CONTRACT LABORATORY

The Teledyne Isotopes Laboratory, located in Westwood, New Jersey, approximately 65 air miles from the SNPS, is the prime off-site laboratory for this facility.

2.4.1 Plume Exposure Pathway Activities

LAB 7. The objective to demonstrate the appropriate equipment and procedures for determining field radiation measurements was met. Samples of particulate activity in the airborne plume were obtained and laboratory analyses promptly performed. The sample pick-up team (runner) was fully briefed, equipped, and informed of all aspects of this operation prior to leaving the EOF. Coordination was arranged with Teledyne and Island Helicopter, which was stationed at BNL. Radio checks were made prior to departure from the EOF area, and alternate telephone communication was provided. Actual and projected meteorological data were provided before the team left the EOF. Five field monitoring teams (three LILCO and two BHO-RAP) were monitoring the plume area. The pick-up of iodine and particulate filters from four of these teams was coordinated through the EOF and accomplished. Contamination control was excellent; good records were maintained. Transfer from the teams and transport to the helicopter was expeditious. Samples taken shortly after 1100 hours were en route to New Jersey by 1303 hours and being counted at Teledyne by 1410 hours.

Teledyne demonstrated excellent contamination control procedures and rapidly readied samples for the counting process. The professional capability to properly handle and process these samples was demonstrated. Correct procedures were followed. Although no data were available from these simulation samples at Teledyne, discussions with Teledyne personnel indicated that data from these samples would be sent via telephone and telecopier to the LERO EOC and EOF as appropriate. Teledyne can trace its standards to the National Bureau of Standards. It also complies with NRC standards for laboratories of this type. Teledyne is regularly audited by the nuclear utilities it services.

2.4.2 Ingestion Pathway Activities

LAB 28. The objective to demonstrate the appropriate laboratory operations and procedures for measuring and analyzing samples of vegetation, food crops, milk, water, and soil was met at the Teledyne Isotopes Laboratory. Teledyne demonstrated excellent radiation-protection, contamination-control, and record-keeping practices. Procedures were followed, and samples were expeditiously put into the counting process. Within one hour of arrival at Teledyne, one sample of each type was being counted. The Teledyne facility is a full-scale radioanalysis laboratory, with the capability of measuring all types of samples to high precision, with known geometries. It performs this service for 21 nuclear utilities. It is regularly audited by these utilities and the State of New Jersey. It

conducts its own vigorous internal audit program. On average, an audit of Teledyne operations is performed every three weeks. Standards traceable to the National Bureau of Standards are used to calibrate the various instruments.

Deficiencies

No Deficiencies were observed in the laboratory operations at Teledyne Isotopes Laboratory during the exercise.

Areas Requiring Corrective Action

No Areas Requiring Corrective Action were observed in the laboratory operations at Teledyne Isotopes Laboratory during the exercise.

Areas Recommended for Improvement

No Areas Recommended for Improvement were observed in the laboratory operations at Teledyne Isotopes Laboratory during the exercise.

2.5 EMERGENCY NEWS CENTER (ENC)

The ENC is located in the LILCO Training Center in Hauppauge, New York.

2.5.1 Plume Exposure Pathway Activities

All eight objectives demonstrated at the ENC during the plume exposure pathway exercise were fully met.

ENC 2. The objective to demonstrate the ability to fully alert, mobilize, and activate personnel for both facility- and field-based emergency functions was met. Activation of the ENC occurred in a timely fashion at 0714 hours, and emergency personnel were in their required positions, as described in LERO procedures.

ENC 4. The objective to demonstrate the ability to communicate with all appropriate locations, organizations, and field personnel was met. The office equipment and facilities to electronically receive, reproduce, and distribute information to the press were excellent. Everything was in good working condition, and adequate back-up systems for hard-copy transmittal were available.

ENC staff had three hard-copy communications systems in operation: a telefax machine, a personal computer software system (PC-NET), and a Teletype 387 computer. Copying capabilities for the distribution of information to rumor-control personnel and EBS messages to media personnel were timely. Receipt of EBS messages from the LERO EOC via a telefax machine resulted in a clean hard copy that could be reproduced and distributed.

A previous Deficiency (ENC 1) and previous ARCA (ENC 2) from SNPS PEA dated April 17, 1986 have been corrected and verified.

ENC 5. The objective to demonstrate the adequacy of the facility, equipment, displays, and other materials to support emergency operations was met. Security measures and screening controls were in place and met the necessary objectives.

The EBS messages were written, authorized, and sent to the ENC from the LERO EOC. The three hard-copy systems were used for sending EBS messages and other communications to the LERO EOC, EOF, and ENC. The availability of hard-copy press releases and EBS messages was accomplished by posting each item, in the order of their release, on a bulletin board, and by putting numerous copies into distribution bins that were available to media personnel.

The ENC had maps and status boards in appropriate locations for use by media personnel, but the current weather conditions were not always updated. Meteorological conditions, including wind speed and direction, were not posted initially. When such information was posted in the briefing area, it was not updated regularly. The

meteorological conditions posted in the government working area were not updated, and no one was apparently assigned to do so until the second shift. Maps posted identified the various zones and other critical information. There was an aerial photograph that included the 10-mile EPZ. Maps displaying the plume EPZ and ERPAs and status boards giving the ECLs and times of declaration were available for the media.

Press releases and other hard-copy documents were posted for easy reading and review. Delays occurred in the writing, producing, and distribution of hard-copy releases to the media from the verbal press briefings, given at the ENC. A previous ARCA (ENC 1) from SNPS PEA dated April 17, 1986 has been corrected and verified.

ENC 13. The objective to demonstrate the ability to coordinate the formulation and dissemination of accurate information and instructions to the public in a timely fashion after the initial alert and notification was met (Table 1.3). The ENC operations were executed as planned. The necessary ENC functions, including communications, were carried out.

The first EBS message was broadcast (simulated) to the public via radio at 0613 hours. This message described the current Alert ECL, which had been activated through the EBS. Subsequent EBS messages were formulated and issued for radio broadcast, although some of these messages were too lengthy to be effective.

ENC 14. The objective to demonstrate the ability to brief the media in an accurate, coordinated, and timely manner was met. The timely activation and mobilization of ENC staff allowed for adequate communications with the media. Eight press briefings were conducted on the first day, and six on each of the next two days. LERO also provided a spokesperson for follow-up interviews after each press briefing. The ENC staff also conducted sessions before the press briefings to prepare media representatives for the upcoming briefing. LERO provided a radiation health spokesperson who was not included in the plan. This planning issue will be addressed in the evaluation of Revision 10 of LERO off-site Radiological Emergency Response Plan for Shoreham, by the RAC.

The press briefings by the ENC staff were transmitted through the ENC facility by closed-circuit television. The audio portion of press briefings was transmitted to the LERO EOC in Brentwood. A LERO spokesperson was available to the media during each shift.

ENC 15 and DO 15. The objectives of demonstrating the ability to establish and operate rumor control in a coordinated and timely fashion were met. Rumor-control functions include (1) prompt handling of incoming calls from the district offices and call boards, (2) reviewing media calls and inquiries about plant conditions, and (3) constant monitoring of radio and television programs to respond to or correct inaccurate information. The rumor-control staff referred media calls to media staff at the ENC. After checking the response, rumor-control staff called back district offices of rumor

control to complete the loop. The rumor-control staff members received individual copies of both EBS messages and press releases, so that their responses were correct and timely. Communications with district offices of rumor control were performed through the computer networks. The rumor-control staff of nine had eight public rumor-control telephone lines, nine media information telephone lines, and a single insurance inquiries telephone line.

LILCO staffs and operates 11 district offices, which are equipped to function as rumor-control centers. Four of these offices include LILCO call boards that provide response assistance to customers for normal electrical service problems or repairs. These four call boards are available to support the 11 rumor-control operations at the district offices.

During the exercise, four of the rumor-control operations were evaluated: Port Jefferson, Riverhead, and two at Brentwood (one call board and one district office). Each of these operations has four to eight operators who are normally involved with customer service and have been trained in rumor-control procedures. Using hard copies of press releases, speeches, and other applicable information, the rumor-control operators answered telephone questions concerning the emergency situation. If these operators were unable to provide sufficient information, then the ENC's rumor-control staff were contacted and requested to provide clarification.

More than 900 telephone calls were received by the district offices and call boards. Approximately 215 of these had to be referred to the ENC for additional information. Timely and accurate responses were made by rumor-control personnel.

ENC 34. The objective to demonstrate the ability to maintain staffing on a continuous, 24-hour basis was met by an actual shift change. During the exercise, the rumor-control staff and the other staff functions at the ENC executed a successful shift change at about 1400 hours. The first shift spokesperson conducted a detailed debriefing session with second shift personnel. Additional assistance was provided to the second shift spokesperson in preparation of their initial press briefing, who in turn did an excellent job. Furthermore, the first shift spokesperson asked staff to remain an additional 15 minutes to assist their counterparts to assure a smooth transition. Third shift ENC personnel were available if needed.

ENC 37. The objective to demonstrate the capability of utility off-site response organization personnel to interface with nonparticipating state and local governments was met. At the ENC, LERO personnel maintained continual contact and interacted well with nonparticipating governmental organizations. LERO ENC staff verified information with these organizations and when clarification was necessary, referred to their plan.

2.5.2 Ingestion Pathway Activities

All five objectives to be demonstrated at the ENC during the ingestion pathway exercise were fully met.

ENC 4, 13, 14, 15, and 37. These objectives are covered in Sec. 2.5.2 (Plume Exposure Pathway Activities).

Deficiency

No Deficiencies were observed at the ENC during the exercise.

Areas Requiring Corrective Action

No Areas Requiring Corrective Action were observed at the ENC during the exercise.

Areas Recommended for Improvement

1. **Description:** Meteorological conditions, including wind speed and direction, were not posted initially. When such information was posted in the briefing area, it was not updated regularly. The meteorological conditions posted in the government working area were not updated, and no one was apparently assigned to do so until the second shift.

Recommendation: The procedures should be reviewed and revised, as required. Appropriate training should be conducted. Position descriptions should be revised to identify the position(s) responsible for this function.

2. **Description:** Hard-copy releases covering ENC verbal press briefings were not written, reproduced, and distributed to the media in a timely enough manner.

Recommendation: Releases covering ENC verbal press briefings should be produced faster and distributed to the media within 20 minutes of the end of each briefing.

2.6 PORT JEFFERSON STAGING AREA

The Port Jefferson staging area is located at the LILCO fossil fuel plant in Port Jefferson. The main part of the staging area is the turbine deck for one of the generator units. Briefing areas were set up in two rooms that open onto the turbine deck. Another briefing area, the Staging Area Coordinator's office, and a communications room were set up in an adjacent office area.

2.6.1 Staging-Area Operations

Plume Exposure Pathway Activities

All eight objectives to be demonstrated by the Port Jefferson staging area during the plume exposure pathway exercise were fully met.

SA 1. The objective to demonstrate the ability to monitor, understand and use ECLs through appropriate implementation of emergency functions and activities corresponding to ECLs as required by the scenario was met. The staging area was promptly notified of each ECL as it occurred during the exercise. Appropriate emergency functions were implemented by the staging-area staff for each ECL. The lead staff were equipped with pagers activated by LERO for each ECL. A public-address system at the staging area was used to brief the staff on pertinent information and to announce any changes in the ECL. The public-address system worked well, and each change in ECL was broadcast promptly; however, on several occasions, staging-area personnel did not know the current ECL. The staff appeared to ignore the information broadcast over the public-address system, waiting instead for hard-copy notification. Also, the ECLs were displayed on a status board in the coordinator's office and in the dosimetry briefing room.

SA 2. The objective to demonstrate the ability to fully alert, mobilize, and activate personnel for both facility- and field-based emergency functions was met. Activation of the staging area was initiated at the alert ECL and was accomplished in a timely manner. Radio pagers were used to notify key personnel of the alert. The Staging-Area Coordinator, Bus Dispatcher, lead traffic guides, dosimetry record keepers, and support staff arrived promptly and set up the physical arrangements and equipment necessary for the facility's emergency functions. At 0658 hours, the LERO EOC was notified that the Port Jefferson staging area was activated, with all key personnel present and prepared for emergency operations. Following receipt of the site area emergency ECL, notification procedures were initiated to alert and mobilize the remaining emergency staff. Computerized roster lists with telephone numbers were used to call the staff and later, upon arrival, to sign them in.

SA 3. The objective to demonstrate the ability to direct, coordinate, and control emergency activities was met. The emergency response at the Port Jefferson staging area was effectively administered and managed by the Staging-Area Coordinator and his assistant, who were kept informed of all staging-area activities. They ensured that written procedures were used and followed. Periodic briefings were conducted to update the staff on the current situation.

SA 4. The objective to demonstrate the ability to communicate with all appropriate locations, organizations, and field personnel was met. Communication with the LERO EOC was generally good. Dedicated telephones (primary), commercial telephones, and LILCO radio were used to communicate with the LERO EOC throughout the exercise. Internal message handling and distribution also were good. Incoming messages were recorded on message forms, reproduced, and distributed to appropriate staff.

SA 5. The objective to demonstrate the adequacy of facilities, equipment, displays, and supplies were adequate to support emergency operations was met. The main part of the staging area is the turbine deck. This area provided ample space for field personnel awaiting assignments. Three separate briefing rooms were used for briefing personnel prior to dispatch: one for dosimetry distribution, one for briefing bus drivers, and one for briefing route alert drivers, route spotters, traffic guides, and road crews. Command, control, and communications were conducted in a separate room. The status board in the coordinator's office was kept up to date with appropriate information.

SA 18. The objective to demonstrate the ability and resources necessary to implement protective actions for the impacted permanent and transient plume EPZ population was met through actions taken at the staging area. Personnel were dispatched from the staging area to perform their field assignments in support of this objective. These personnel were prepared to provide the necessary assistance.

SA 20. The objective to demonstrate the organizational ability and resources necessary to control access to evacuated and sheltered areas was met by the staff at the Port Jefferson staging area by establishment of TCPs. Fifty-eight TCPs were established and were staffed by 72 traffic guides from the staging area shortly after their dispatch into the field from the staging area, beginning at 0314 hours.

SA 34. The objective to demonstrate the ability to maintain staffing on a continuous, 24-hour basis by an actual shift change was met at the Port Jefferson staging area at 1530 hours. Second-shift staff were appropriately briefed by the outgoing staff and by the second-shift coordinator. The transition from the first to the second shift occurred smoothly and effectively, with the staff moving quickly to their positions and carrying out their emergency response functions, consistent with current plans and procedures.

Ingestion Pathway and Recovery/Reentry Activities

SA 33 and FA 33. The objectives to demonstrate the ability to implement appropriate measures for controlled reentry and recovery were met. The Port Jefferson staging area was activated and remained operational during the ingestion pathway and recovery/reentry phases of the exercise. The primary function of the staging area was to provide assistance to its personnel in the field and to other staging areas. The Port Jefferson staging area was requested to assist the Patchogue staging area by supplying three traffic guides, some dosimetry equipment, and bus drivers.

Deficiencies

No Deficiencies were observed at the Port Jefferson staging area during the exercise.

Areas Requiring Corrective Action

No Areas Requiring Corrective Action were observed at the Port Jefferson staging area during the exercise.

Area Recommended for Improvement

1. **Description:** Although each change in ECL was broadcast over the public-address system, staff members on several occasions were not aware of the changes until they were notified of them by hard copy.

Recommendation: Personnel should be trained to pay attention to the public-address-system broadcasts. A whistle or loud noise, to draw attention, could precede each broadcast.

2.6.2 Implementation of Field Activities

All five objectives to be demonstrated through field activities originating at the Port Jefferson staging area, were fully met. These field activities were generally well organized and implemented according to the plan.

FA 2. The objective to demonstrate the ability to fully alert, mobilize, and activate personnel for both facility- and field-based emergency functions was met. Personnel with field assignments from the Port Jefferson staging area were notified to report by either the pager system or telephone. Mobilization of emergency workers to the staging area occurred promptly, and each worker was briefed prior to dispatch into

the field. These briefings consisted of information on dosimetry use and detailed instructions on specific assignments. Preparing personnel prior to dispatching them into the field was accomplished quickly and efficiently. Personnel assigned as route spotters were ready for deployment about two hours following receipt of notification to report to the staging area, well within the allotted time.

FA 4. The objective to demonstrate the ability to communicate with all appropriate locations, organizations, and field personnel was met. Communications with personnel in the field were effectively demonstrated by the equipment provided and its operation. Personnel were able to use the portable radios in their vehicles to communicate with the LERO EOC. Appropriate radio protocol was used, and the equipment operated without failure.

FA 18. The objective to demonstrate the ability and resources necessary to implement appropriate protective actions for the impacted permanent and transient plume EPZ populations was met. Personnel were dispatched from the staging area to perform their field assignments in support of this objective. These personnel were prepared to provide the necessary assistance.

Route alert drivers were dispatched (out of sequence) to notify (simulated) all deaf residents in the affected area. Routes were actually run, and "pass-bys" of their residences were made. There were some minor problems observed with identification of houses and routes. The address numbers on several of the houses could not be located, and one of the drivers had difficulty in locating the area in which the route was to be run. The Atomic Safety and Licensing Board has concluded [Long Island Lighting Company (Shoreham Nuclear Power Station Unit 1), LBP-85-12, April 17, 1985, 21 NRC 853-854 (1985)] that "... a 4 hour notification period does not subject the deaf to any special hazard to their health and safety since they can still be evacuated in about the same time frame as the general public."

FA 20. The objective to demonstrate the organizational ability and resources necessary to control evacuation traffic flow and to control access to evacuated and sheltered areas was met. Personnel and resources from the Port Jefferson staging area were used to demonstrate TCPs and the ability to deal with a traffic impediment.

The staging area established 58 TCPs, using 72 traffic guides; 10 of these TCPs (1, 4, 5, 6, 38, 42, 56, 57, 81, and 86) were evaluated. Concise briefings were given prior to dispatching the traffic guides, and all were issued an information packet concerning protective actions and evacuation. Generally, the traffic guides had a complete and adequate understanding of the functions and responsibilities of their assignments. However, the traffic guide at TCP 38 was not familiar with evacuation routes peripheral to that location. Overall, traffic control was well executed.

A free-play message -- interjected TCP 47 at 1125 hours -- identified a simulated impediment to evacuation in the form of a blockage of a bridge near to TCP 47

on an evacuation route. There were three elements to the impediment (1) a partially collapsed bridge; (2) a dump truck with its wheel through the bridge deck; and (3) a stalled, out-of-gas car at one end of the bridge. Initially, the personnel at the TCP had difficulty in communicating the details of the impediment to the LERO EOC because of an apparent dead spot in the radio coverage. After the vehicle equipped with the radio was relocated (a short distance away, but still at the site of the impediment), the message was transmitted to the LERO EOC. Instructions were received, and communication was completed without any further difficulties. The appropriate resources were dispatched to the site of the impediment, and applicable procedures were used to remove the vehicles and route the traffic accordingly. The impediment was removed at 1245 hours and the bridge remained closed to traffic.

FA 37. The objective to demonstrate the capability of utility off-site response organization personnel to interface with nonparticipating state and local governments through their mobilization and provision of advice and assistance was met based on the traffic guides knowledge of procedures. Traffic control personnel were aware of the possibility of interfacing with area police and were prepared to relinquish the TCPs to law enforcement officers, but would offer to remain and assist as specified in the traffic guides procedure.

Deficiencies

No Deficiencies were observed in the field activities of personnel dispatched from the Port Jefferson staging area during the exercise.

Areas Requiring Corrective Action

No Areas Requiring Corrective Action were observed in the field activities of personnel dispatched from the Port Jefferson staging area during the exercise.

Areas Recommended for Improvement

1. Description: The traffic guide TCP 38, out of the Port Jefferson staging area, was not familiar with evacuation routes peripheral to that location.

Recommendation: The traffic guides should be informed at the briefing given prior to dispatch into the field that they should review the information on evacuation routes provided in their packets.

2. Description: Two problems were observed during the demonstration of notification of the deaf. The address numbers on

several of the houses could not be located, and one of the drivers had difficulty in locating the area in which the route was to be run.

Recommendation: Drivers should receive instructions from staging area personnel on how to locate their route areas.

2.6.3 Emergency Worker Radiological Exposure Control

SA 6 and FA 6. The objectives to demonstrate the ability to continuously monitor and control emergency worker exposure were met by the emergency workers with field assignments from the Port Jefferson staging area. All field personnel were issued dosimetry kits and were thoroughly briefed on their use prior to being dispatched. The briefings were detailed, informative, and structured to cover all appropriate aspects of exposure control. The kits issued to each worker contained a low-range (0-200 mR) DRD, a mid-range (0-5 R) DRD, a TLD, and assorted instructional, consent, and record-keeping forms. All personnel evaluated in the field were knowledgeable in exposure control equipment and practice.

SA 16 and FA 16. The objectives to demonstrate the ability to distribute and administer KI were met. All field personnel were given a briefing on KI use at the staging area prior to being dispatched, including why it would be administered, authorization procedures for use, and the danger posed to iodine-allergic individuals. Emergency workers were supplied with KI (simulated) along with their dosimetry kits. The decision to recommend the use of KI for all emergency workers was received at the staging area at approximately 1106 hours. Except for the route alert staff, most of the other field personnel had been dispatched prior to the KI recommendation. Staging-area staff took the appropriate actions to notify the workers in the field to ingest KI, and the route alert staff were informed at the staging area.

Deficiencies

No Deficiencies were observed in radiological exposure control for emergency workers assigned to the Port Jefferson staging area during the exercise.

Areas Requiring Corrective Action

No Areas Requiring Corrective Action were observed in radiological exposure control for emergency workers assigned to the Port Jefferson staging area during the exercise.

Areas Recommended for Improvement

No Areas Recommended for Improvement were observed in radiological exposure control for emergency workers assigned to the Port Jefferson staging area during the exercise.

2.7 PATCHOGUE STAGING AREA

The Patchogue staging area is at a LILCO district office in Patchogue, situated at 460 East Main Street at the intersection with Clinton Avenue. The entire first floor of the two-story building is used as the staging area. An equipment storage building located across Conklin Avenue is where such items as dosimetry, protective clothing, radios, and mobile loudspeakers are stored.

2.7.1 Staging-Area Operations

Plume Exposure Pathway Activities

All eight objectives to be demonstrated by the Patchogue staging area during the plume exposure pathway exercise were fully met.

SA 1. The objective to demonstrate the ability to monitor, understand, and use ECLs through appropriate implementation of emergency functions and activities corresponding to ECLs as required by the scenario was met. The Staging-Area Coordinator informed the staff as each ECL was declared. The ECLs were prominently displayed. All response activities were implemented in a manner consistent with LERO's emergency plan.

SA 2. The objective to demonstrate the ability to fully alert, mobilize, and activate personnel for both facility- and field-based emergency functions was met. The staging area was activated, and emergency personnel were briefed and dispatched to their assigned locations. By 0635 hours, security was established and the reception room for incoming emergency workers was organized. There was a delay of about 30 minutes in posting a guard at the equipment storage building where the lead traffic guides were temporarily obtaining supplies. Security arrangements and a procedural change had all staff entering via the north entrance.

The staging area was declared activated at 0650 hours, and the first briefing for key staff was conducted at 0658 hours. Field deployments commenced 25 minutes after the site area emergency ECL notification at 0735 hours and were completed by 0950 hours. A previous Deficiency (Patchogue 2) and three previous ARCAs (Patchogue 1, 3 and 9) from SNPS PEA dated April 17, 1986 have been corrected and verified.

SA 3. The objective to demonstrate the ability to direct, coordinate, and control emergency activities was met by the Staging-Area Coordinator. Periodic briefings were held to update staff on the emergency. Message logs were kept for all incoming and outgoing messages and transmissions. The lead traffic guides and bus dispatchers were clearly in charge of their respective activities. Emergency workers were briefed by the lead traffic guides and bus dispatchers on dosimetry and its use, and were given instructional packets.

SA 4. The objective to demonstrate the ability to communicate with all appropriate locations, organizations, and field personnel was met. Personnel at the Patchogue staging area communicated with various locations and field personnel. A dedicated telephone line with the LERO EOC, commercial telephone lines, and a two-way radio were the three means of communication. Communications were established with the LERO EOC, other staging areas, traffic guides, and TP coordinators. The dedicated telephone line with the LERO EOC handled communications without undue delays.

SA 5. The objective to demonstrate the adequacy of facilities, equipment, displays, and other materials, to support emergency operations was met. Sufficient telephones were available on the main floor to perform emergency functions. Parking for emergency workers was available, and the equipment storage building was adequate for the warehousing of emergency supplies and equipment. A security guard was posted at the south door. Two previous ARCAs (Patchogue 2 and 4) from SNPS PEA dated April 17, 1986 have been corrected and verified.

SA 18. The objective to demonstrate the ability and resources necessary to implement appropriate protective actions for the impacted permanent and transient plume EPII population was met. Bus drivers, traffic guides, route spotters, and road crew from the general population were deployed to their respective locations. Route alert drivers for the deaf and the transporting of the mobility impaired were evaluated out of sequence. All field emergency workers were thoroughly briefed and equipped for their assigned functions. A previous ARCA (Patchogue 8) from SNPS PEA dated April 17, 1986 was corrected and verified.

SA 20. The objective to demonstrate the organizational ability and resources necessary to control access to evacuated and sheltered areas was met. Twenty-eight TCPs were established and staffed by 41 traffic guides dispatched from the Patchogue staging area. Prior to deployment, the traffic guides were briefed on their assignments and instructed on the measure to control access to designated areas. Dispatching began at 0815 hours and they arrived at their posts 35-55 minutes after dispatch.

SA 34. The objective to demonstrate the ability to maintain staffing on a continuous, 24-hour basis by an actual shift change was met. The shift change began at 1500 hours. Approximately 35 second-shift personnel replaced 43 first-shift personnel. The transition went very smoothly, with all staff being phased in within one hour of the time announced for the shift change. Each incoming person was briefed on the present situation and the status of their particular assignment. The first-shift Staging-Area Coordinator personally briefed his relief for 30 minutes on the status of the exercise.

Ingestion-Pathway and Recovery/Reentry Activities

SA 33 and FA 13. The objectives to demonstrate the ability to implement appropriate measures for controlled reentry and recovery were met. Twelve traffic guides were briefed and dispatched by approximately 1130 hours. They arrived at their posts approximately 40-45 minutes later. In several cases, the traffic guides did not appear to fully understand their duties as to who should be allowed access and what areas were specifically restricted. This planning issue will be addressed in the evaluation of Revision 10 of LERO off-site Radiological Emergency Response Plan for Shoreham, by the RAC.

Deficiencies

No Deficiencies were observed at the Patchogue staging area during the exercise.

Area Requiring Corrective Action

No Areas Requiring Corrective Action were observed at the Patchogue staging area during the exercise.

Area Recommended for Improvement

1. Description: A delay of about 30 minutes occurred in posting a security guard at the equipment storage building.

Recommendation: This post should be established at the same time the other security posts are established, that is, upon activation of the staging area.

2.7.2 Implementation of Field Activities

All five objectives to be demonstrated through field activities originating at the Patchogue staging area were fully met.

FA 2. The objective to demonstrate the ability to fully alerting, mobilizing, and activate personnel was met, with emergency workers with field responsibilities being briefed prior to being dispatched into the field.

FA 4. The objective to demonstrate the ability to communicate with all appropriate locations, organizations, and field personnel was met. Traffic guides and

route spotters were issued portable radios that plugged into vehicle cigarette lighters. Communication between emergency workers in the field and the LERO EOC was reliable.

FA 18. The objective to demonstrate the ability and resources necessary to implement appropriate protective actions for the impacted permanent and transient plume EPZ population was met. The traffic guides at the TCPs were knowledgeable about their assignments, including the information they should provide to the general population. Also, the route alert drivers for notification of the deaf knew their routes, how to locate the routes, and the correct procedures for their assignment. A previous ARCA (Patchogue 5) from SNPS PEA dated April 17, 1986 was corrected and verified.

FA 20. The objective to demonstrate the organizational ability and resources necessary to control evacuation traffic flow and to control access to evacuated and sheltered areas was met. The TCPs established in preparation for an evacuation functioned smoothly. The personnel involved were fully knowledgeable about and aware of their duties. An impediment was located approximately one-quarter mile west of a TCP 68 on Granny Road at the intersection with Blue Ridge Drive, which was outside of the 10-mile EPZ. When the free-play message for the traffic impediment was inserted at 1200 hours, it took 8 minutes to read a less-than-30-word message twice to the LERO EOC and then receive confirmation. At about 1245 hours, two road crews responded to TCP 68, where they were advised by the LERO EOC to stand by to assist Suffolk County police and fire rescue personnel. The road crews proceeded to the impediment when instructed to do so by the EOC at 1315 hours. The road crews reported to the EOC that the impediment could be removed by 1430 hours. The road crews were knowledgeable about the capabilities of the required equipment and exercised appropriate judgement.

The exercise revealed a discrepancy between the description of spotter route 1004 in Attachment 6 of OPIP 3.6.3 and the route map provided to the route spotter. The procedure and/or the map should be revised so they agree. This planning issue will be addressed in the evaluation of Revision 10 of LERO off-site Radiological Emergency Response Plan for Shoreham, by the RAC. The minor discrepancy did not have an adverse effect on the public health and safety. A previous ARCA (Patchogue 6) from SNPS PEA dated April 17, 1986 was corrected and verified.

FA 37. The objective to demonstrate the capability of utility off-site response organization personnel to interface with nonparticipating state and local governments through their mobilization and provision of advice and assistance was met. Because representatives of nonparticipating state and local governments were not present, this objective was evaluated by questioning LERO emergency workers in the field on what they would do if governmental personnel had been directed to assume the functions they were performing. Those most affected would be the traffic guides at TCPs where police could be directed to assume their functions. The traffic guides understood how to deal with such situations. They indicated they would (1) brief the police officers, (2) provide

them with KI tablets (with appropriate instructions), (3) provide them with dosimetry, and (4) turn over the responsibility for traffic control to them.

Deficiencies

No Deficiencies were observed in the field activities of personnel dispatched from the Patchogue staging area during the exercise.

Area Requiring Corrective Action

No Areas Requiring Corrective Action were observed in the field activities of personnel dispatched from the Patchogue staging area during the exercise.

Areas Recommended for Improvement

1. Description: It took eight minutes for a traffic guide to transmit to the LERO EOC and confirm a relatively short message about a traffic accident that was blocking traffic.

Recommendation: Training should be provided in transmitting and receiving radio messages.

2.7.3 Emergency Worker Radiological Exposure Control

SA 6 and FA 6. The objectives to demonstrate the ability to continuously monitor and control emergency worker exposure were met. The briefings on these subjects were thorough and well presented. The dosimetry issued to each emergency worker was checked. The potential exposure of all workers was continuously monitored through frequent dosimeter readings. The use of protective clothing on instructions from the LERO EOC also demonstrated a means of controlling worker exposure. The emergency workers deployed knew how to monitor their individual exposures and what to do if the prescribed limits of 200 mR, 3.5 R, and 5.0 R were exceeded. Three previous ARCAs (Patchogue 10, 12 and 14) from SNPS PEA dated April 17, 1986 have been corrected and verified.

SA 16 and FA 16. The objectives to demonstrate the ability to make the decision to recommend the use of KI for emergency workers and institutionalized persons, based on predetermined criteria, as well as to distribute and administer it once the decision is made, if necessitated by radiiodine releases, were met. During the dosimetry briefings for all emergency workers at the staging area, KI and its use were described, and the circumstances under which it should be ingested were explained. The traffic guides simulated ingestion of KI after the order to ingest had been issued. They also indicated

that they knew that a record was to be kept of their individual doses. A previous ARCA (Patchogue 13) from SNPS PEA dated April 17, 1986 was corrected and verified.

Deficiencies

No Deficiencies were observed in radiological exposure control for emergency workers assigned to the Patchogue staging area during the exercise.

Areas Requiring Corrective Action

No Areas Requiring Corrective Action were observed in radiological exposure control for emergency workers assigned to the Patchogue staging area during the exercise.

Areas Recommended for Improvement

No Areas Recommended for Improvement were observed in radiological exposure control for emergency workers assigned to the Patchogue staging area during the exercise.

2.8 RIVERHEAD STAGING AREA

The Riverhead staging area is located in the basement of a LILCO facility on Doctors Path in Riverhead, New York. A large work space is divided into an office for the Staging-Area Coordinator and sections for the administrative support staff and communications staff. Several other rooms are specified for field personnel and related staff.

2.8.1 Staging-Area Operations

Plume-Exposure-Pathway Activities

All eight objectives to be demonstrated by the Riverhead staging area during the plume exposure pathway exercise were fully met.

SA 1. The objective to demonstrate the ability to monitor, understand, and use ECLs through appropriately implementing emergency functions and activities at each ECL was met. Staging-area staff were knowledgeable about ECLs. They knew what the ECLs meant and what to do when notified of a change by the LERO EOC.

SA 2. The objective to demonstrate the ability to fully alert, mobilize, and activate personnel for both facility- and field-based emergency functions was met. Staging-area staff were mobilized after notification of the alert ECL. Sufficient staff to operate arrived promptly and activated the staging area at 0700 hours. Staffing was completed at 0800 hours. Upon notification of a site area emergency at 0731 hours, bus drivers, traffic guides, route spotters, and route alert drivers were called in. As soon as they arrived, they were issued their equipment and dispatched in accordance with their functions. Mobilization was completed by about 0945 hours.

SA 3. The objective to demonstrate the ability to direct, coordinate, and control emergency activities was met. The Staging-Area Coordinator and the Deputy Coordinator (a new position) were in charge of the facility's emergency response role. The Staging-Area Coordinator exercised effective control, initially assigning staff to several functions until enough staff had arrived. All responsibilities were quickly covered. The Deputy Coordinator traveled around the staging area to facilitate operations and locate problems, while the Staging-Area Coordinator stayed in the operations area where he could be easily reached if a decision needed to be made or if he needed to be informed of events elsewhere. Briefings were held for key staff, who in turn briefed their staff (e.g., traffic guides), as appropriate. A copy of the plan was available. All incoming and outgoing messages were logged. The entire operation was handled competently and professionally.

SA 4. The objective to demonstrate the ability to communicate with all appropriate locations, organizations, and field personnel was met. Telephones and radios, respectively, were the primary and secondary communication systems. In addition, the Staging-Area Coordinator had access to a telefax machine. All communication systems functioned properly throughout the exercise.

SA 5. The objective to demonstrate the adequacy of facilities, equipment, displays, and other materials, to support emergency operations was met. The lighting was good, the ventilation was adequate, space and furnishings were sufficient, back-up power was available, and parking was provided. Office equipment and supplies were sufficient for the limited paperwork requirements of this operation. Access to the facility was controlled, with at least one security person at each door. Maps with the plume EPZ, evacuation routes, relocation centers, TPs, and TCPs were displayed and were appropriately controlled. The status board was prominently displayed and updated promptly whenever new information was provided. A staffing board was updated every half hour until the full complement of staff had arrived. A previous ARCA (Riverhead 1) from SNPS PEA dated April 17, 1986 has been corrected and verified.

SA 18. The objective to demonstrate the ability and resources necessary to implement appropriate protective actions for the impacted permanent and transient plume EPZ population was met. The staging area was responsible for deploying traffic guides and route spotters to the field, bus drivers to their buses and to the assigned TPs, TP coordinators, and route alert drivers for the deaf. These workers were at the staging area only long enough to pick up their assignment, dosimetry, receive briefings, and in some cases pick up traffic control equipment. Staging-area personnel began notifying these workers at 0731 hours; by 0945 hours, the last field worker had been processed and dispatched. The handling, briefing, and dispatching of personnel were promptly and professionally performed by appropriate staff.

SA 20. The objective to demonstrate the organizational ability and resources necessary to control access to evacuated and sheltered areas was met. Staging-area staff called up the traffic guides and route spotters, outfitted them, briefed them, and dispatched them in a timely manner. Staff members provided information on evacuation routes, relocation centers, and access control point locations, and briefings on sheltering, evacuation, and special facilities. These efforts were in addition to prior training. This outfitting and briefing constitute the entire function of the staging area for traffic guides. Most traffic guides were in place before the general emergency ECL. A previous Deficiency (Riverhead 1) from SNPS PEA dated April 17, 1986 has been corrected and verified.

SA 34. The objective to demonstrate the ability to maintain staffing on a continuous, 24-hour basis by an actual shift change was met. The notification of the need for second-shift staffing came at 1320 hours, and call-out of staff began within a minute or two. Second-shift personnel began to arrive at 1420 hours. By 1452 hours, the

Staging-Area Coordinator and his assistant began a thorough briefing of their second-shift counterparts. The former then conducted a general briefing for administrative support staff. The lead traffic guide, dosimetry record keeper, and bus driver coordinator then conducted detailed briefings of their second-shift counterparts. The entire staff change, including signing in, briefings, and personnel exchange, was completed by 1540 hours. Interviews conducted with second-shift staff members indicated that they had been well briefed and were aware of their appropriate duties and responsibilities. All relevant functions and activities were implemented consistent with the LERO plan.

Ingestion-Pathway and Recovery/Reentry Activities

SA 33 and FA 33. The objectives to demonstrate the ability to implement appropriate measures for controlled reentry and recovery by simulating the dispatch of workers to access control points were met. No other activities were required of this staging area.

Deficiencies

No Deficiencies were observed at the Riverhead staging area during the exercise.

Areas Requiring Corrective Action

No Areas Requiring Corrective Action were observed at the Riverhead staging area during the exercise.

Areas Recommended for Improvement

No Areas Recommended for Improvement were observed at the Riverhead staging area during the exercise.

2.8.2 Implementation of Field Activities

There were five objectives to be demonstrated through field activities originating at the Riverhead staging area, with three objectives being fully met, one objective being partially met, and one objective was not observed.

FA 2. The objective to demonstrate the ability to fully alert, mobilize, and activate personnel for both facility- and field-based emergency functions workers was met, with emergency workers with field responsibilities being briefed prior to being dispatched into the field.

FA 4. The objective to demonstrate the ability to communicate with all appropriate locations, organizations, and field personnel was met. The traffic guides communicated with all appropriate locations, organizations, and field personnel. Mobile emergency radios provided communication links among the traffic guides, the LERO EOC, the Riverhead staging area, and the transfer points. The radios were new, lightweight, and easily transportable. They plugged into vehicle cigarette lighters. The radios generally functioned well, with the radios at eight TCPs operating without problems. Two radios failed. One failed immediately after the traffic guide contacted the LERO EOC for a radio test. Within minutes of the failure, the LERO EOC, the Riverhead staging area, and two nearby TCPs were unable to contact the traffic guide, and the staging area arranged for a replacement radio to be delivered. Meanwhile, the traffic guide proceeded to the nearest TCP and reestablished contact. After its prompt delivery, the replacement radio worked well. A second radio failed to function properly. In this instance, the traffic guide went to an adjacent TCP and notified the LERO EOC. The staging area again delivered a replacement radio, which resolved the problem in a timely manner. All traffic guides evaluated displayed good radio technique and demonstrated knowledge of radio operations procedures.

FA 18. The objective to demonstrate the ability and resources necessary to implement appropriate protective actions for the impacted permanent and transient plume EPZ population was met. Evacuation was the only protective action for the affected area in the Riverhead staging area's jurisdiction. The traffic guides were issued sufficient traffic control equipment, traffic cones and lights, traffic direction gear, and emergency flares, along with detailed instructions to control evacuation at the TCPs observed in the field. The traffic guides also demonstrated a working knowledge of TCP setup and traffic direction. They implemented activities and functions for evacuation consistent with the LERO plan. They were aware of the proper information to furnish motorists regarding relocation centers. When questioned, they answered that they would instruct motorists to tune in to the appropriate EBS radio station for information on the reception centers to which evacuees were being directed. The route alert drivers for the deaf were able to locate all of the addresses provided. They also were able to provide written instructions on the appropriate protective actions. The routes were all run in a timely manner.

FA 20. The objective to demonstrate organizational ability and resources necessary to control evacuation traffic flow and to control access to evacuated and sheltered areas was partially met. The traffic guides were equipped, briefed, and deployed to the field from the staging area in about 40 minutes. Deployment time was less than 30 minutes. Most guides arrived at their posts before the general emergency ECL was declared (0934 hours), and all were there well in advance of evacuation (1026 hours). The traffic guides had the resources necessary to control traffic at the TCPs and were able to establish and maintain contact with the LERO EOC.

The route spotter being observed notified the LERO EOC once, upon his arrival at his route. He then proceeded to run his route, driving within the normal traffic speed limit. He failed to cover a portion of his assigned route, missing a triangular segment

southeast on North County Road and west on 25A back to Wading River Road. At 1259 hours, the route spotter arrived at the scene of an impediment. He immediately tried to notify the LERO EOC by radio, calling it three times with no response. Leaving the scene, he went one-half mile south to an intersection. From that location, he was able to contact the LERO EOC. He described the impediment twice, ending the communication at 1307 hours and proceeding back to the impediment. He called the LERO EOC at 1314 hours and was informed that two road crews were in route.

The first road crew arrived at the impediment at 1322 hours. They immediately notified the LERO EOC of their arrival. A second crew called the EOC at 1322 hours to say they were at the road intersection one-half mile south of the impediment. Adequate discussion was held on the procedures and the time it would take to clear the impediment. The EOC was informed that about 30 minutes would be needed to clear the impediment at 1333 hours. At 1337 hours, the road crews notified the EOC how the people involved in the accident would be evacuated. One lane was reopened at 1343 hours. At 1400 hours, the impediment was cleared; at 1405 hours, the EOC instructed the road crews to return to their station. During later questioning, the route spotter described the very reasonable method he would have used to handle traffic backed up by the impediment.

In response to a simulated impediment, a traffic guide was relocated to an intersection closer to the impediment, from which he directed traffic down an alternate route, that is, Wading River - Manorville Road rather than Schultz Road. The alternate route is at a fork in the road. The traffic guide thought the right fork was Schultz Road and that Wading River - Manorville Road went straight and mistakenly directed traffic directly toward the impediment.

FA 37. The objective to demonstrate the capability of utility off-site response organization personnel to interface with nonparticipating state and local governments through their mobilization and provision of advice and assistance was not observed in the field for activities related to the Riverhead Staging Area.

Deficiencies

No Deficiencies were observed in the field activities of personnel dispatched from the Riverhead staging area during the exercise.

Areas Requiring Corrective Action

1. Description: A route spotter failed to cover a portion of his assigned route. (NUREG-0654, Supp. 1, II, J.10.k).

Recommendation: The route spotters should study their route maps more thoroughly to ensure that they are completely familiar with their routes. As a check, the route spotters could go over the route maps with the supervisor during the route briefing.

2. **Description:** Because of a misinterpretation of road names, a traffic guide directed traffic directly toward an impediment. (NUREG-0654, Supp. 1, II, J.10.k)

Recommendation: The traffic guides should consult road maps so that they are aware of the impediment location and can more readily determine how traffic should be routed.

Areas Recommended for Improvement

No Areas Recommended for Improvement were observed in the field activities of personnel dispatched from the Riverhead staging area during the exercise.

2.8.3 Emergency Worker Radiological Exposure Control

SA 6 and FA 6. The objectives to demonstrate the ability to continuously monitor and control emergency worker exposure were met. The handling of dosimetry distribution and the knowledge of the field workers demonstrated the ability of the staging-area staff to brief field personnel and disseminate exposure control information.

All field emergency workers were issued a dosimetry packet, which consisted of a TLD, 0-200 mR and 0-5 R DRDs, an exposure record, and KI. They were then briefed on proper dosimetry procedures, and written instructions were handed out before they were dispatched. All DRDs were zeroed, read, and readings recorded before distribution.

The emergency workers were aware of proper dosimetry procedures. They could explain the difference between low- and mid-range DRDs. They knew the maximum authorized dose and who to contact for authorization for exposures in excess of the authorized dose. Finally, they understood what to do when an excessive dose has been received.

Additional dosimetry was available for the staging-area staff should it have been necessary for any of them to be deployed to the field or for dosimetry to be delivered to emergency workers already in the field.

A previous ARCA (Riverhead 4) from SNPS PEA dated April 17, 1986 has been corrected and verified.

SA 16 and FA 16. The objectives to demonstrate the ability to make the decision to recommend the use of KI for emergency workers and institutionalized persons, based on predetermined criteria, as well as to distribute and administer it once the decision is made, if necessitated by iodine releases, were met. KI was distributed as part of

the dosimetry package. Workers were briefed on KI use during the dosimetry briefing. They were instructed to take KI either when told to do so by their supervisor or when they were informed of a general emergency ECL. The traffic guides also carried extra KI for policemen. All the field workers interviewed knew when to take KI. The field workers who were observed simulated taking KI when told to do so by the appropriate person.

Deficiencies

No Deficiencies were observed in radiological exposure control for emergency workers assigned to the Riverhead staging area during the exercise.

Areas Requiring Corrective Action

No Areas Requiring Corrective Action were observed in radiological exposure control for emergency workers assigned to the Riverhead staging area during the exercise.

Areas Recommended for Improvement

No Areas Recommended for Improvement were observed in radiological exposure control for emergency workers assigned to the Riverhead staging area during the exercise.

2.9 EMERGENCY WORKER DECONTAMINATION FACILITY

2.9.1 EWDF Operations

The EWDF is located in the basement of the LERO EOC, 1650 Islip Avenue, Brentwood, New York. All three objectives to be demonstrated at the EWDF were fully met.

EWDF 2. The objective to demonstrate the ability to fully alert, mobilize, and activate EWDF staff was met. Mobilization of the EWDF staff was not observed by the evaluator; however, the times of call-out and full staffing were obtained from the sign-in log and the logs of the EWDF controllers. The sign-in logs indicated that the EWDF supervisors arrived at 0650 hours, that two dosimeter clerks arrived at 0650 hours, and that radiation/decontamination personnel arrived between 0815 and 0900 hours. The controller logs showed that the facility was fully activated at 0939 hours.

EWDF 25. The objective to demonstrate the adequacy of facilities, equipment, supplies, procedures, and personnel for decontamination of emergency workers, equipment, and vehicles, and for waste disposal, was met. EWDF workers wore adequate protective clothing and were aware of the limits regarding contamination of personnel and vehicles. Decontamination procedures were actually demonstrated on automobiles and personnel. Proper handling of injured/contaminated and contaminated personnel was demonstrated. A simulated injured person was directed to a hospital for further care. The decontamination leader had been a military medic and was well qualified for this assignment. Adequate parking for contaminated vehicles was available in the facility lot. RM-14s with HP-210, 260, and 270 probes were available in sufficient numbers, as were back-up units.

During the observation time on day 1 of the exercise, the EWDF processed in excess of 200 emergency workers. To demonstrate procedures, simulated contaminated workers and vehicles were provided by the controllers at a rate of approximately 10 per hour. Contaminated workers and vehicles were separated and decontaminated according to procedures that were also posted in the personnel decontamination area.

While this objective was not negotiated for evaluation during day 2 of the exercise, an evaluator was present at the EWDF and made the following observations. Approximately 600 LERO school bus drivers were processed during this out of sequence portion of the exercise. The monitoring of 40 school bus drivers by 15 monitors were observed. Monitoring of eight emergency workers took approximately 150 seconds each to perform, while the monitoring average of the other emergency workers was approximately 90 seconds.

At 15-minute intervals, the personnel monitors read their dosimeters and surveyed the grounds surrounding the monitoring stations for contamination.

EWDF 34. The objective to demonstrate the ability to maintain staffing on a continuous, 24-hour basis by an actual shift change was met. A shift change was observed at 1500 hours. A supervisory personnel overlap of one and one-half hours assured that everyone was fully informed of ongoing issues, the status of contaminated personnel, and the status of the accident. The transition occurred smoothly and without incident.

Deficiencies

No Deficiencies were observed in the operation of the EWDF during the exercise.

Areas Requiring Corrective Action

No Areas Requiring Corrective Action were observed in the operation of the EWDF during the exercise.

Area Recommended for Improvement

No Areas Recommended for Improvement were observed in the operation of the EWDF during the exercise.

2.9.2 Emergency Worker Radiological Exposure Control

EWDF 6. The objective to demonstrate the ability to continuously monitor and control emergency worker exposure was met. All EWDF emergency workers were fully cognizant of exposure limits (200 mR, 3.5 R, and 5 R) and knew to call in to their supervisors. All workers indicated that they were briefed and provided dosimetry (i.e., a TLD and two DRDs) prior to deployment. The dosimetry staff recorded the exposures of returning emergency workers. They followed proper procedures and instructed those workers who had taken KI that they must return each day to the EWDF to receive subsequent KI doses.

Deficiencies

No Deficiencies were observed in radiological exposure control for emergency workers at the EWDF during the exercise.

Areas Requiring Corrective Action

No Areas Requiring Corrective Action were observed in radiological exposure control for emergency workers at the EWDF during the exercise.

Areas Recommended for Improvement

No Areas Recommended for Improvement were observed in radiological exposure control for emergency workers at the EWDF during the exercise.

2.10 RECEPTION CENTERS

Of the three objectives to be demonstrated through Reception Center Operations two were fully met, and one objective was partially met. Reception center activities were conducted in sequence with the plume portion of the exercise at centers established on LILCO properties in Roslyn, Hicksville, and Bellmore. On day 1 of the exercise, decontamination teams from Bellmore, Hicksville, and Roslyn initially reported to their assigned reception centers; following demonstration of their mobilization, they were released. The same teams reported to the decontamination trailer on day 2 of the exercise. Evacuee decontamination capabilities were evaluated out of sequence on day 2 of the exercise at a trailer located on the SNPS site.

FA 2. The objective to demonstrate the ability to fully alert, mobilize, and activate personnel for both facility- and field-based emergency functions was met. Key staff responsible for operation of the reception centers were notified by personal pagers activated by SNPS. They then notified dosimetry coordinators and other personnel through a fan-out notification system. The reception centers were fully activated by 0955 hours. Dosimetry coordinators and other staff arrived early to begin setting up the dosimetry room.

FA 6. The objective to demonstrate the ability to continuously monitor and control emergency worker exposure was met. Emergency workers received a TLD and two DRDs (0-200 mR and 0-5 R). Dosimetry coordinators instructed personnel in the proper use and care of personal dosimetry and reviewed record-keeping requirements. Female workers were questioned regarding the possibility of being pregnant and were given NRC Regulatory Guide 8.13 for review. Pregnant workers were advised that they would be assigned to work locations outside areas having a potential for radiation contamination. Emergency workers were knowledgeable about personal monitoring techniques, contamination control procedures, and personal exposure limits.

FA 21. The objective to demonstrate the adequacy of procedures, facilities, equipment, and personnel for the registration, radiological monitoring, and decontamination of evacuees was partially met. Monitoring teams, along with traffic guides, directed cars and buses through monitoring lanes. Once monitored, vehicles and occupants were sent to their respective clean or contaminated areas for further processing. Generally, individuals were monitored within the 90-second timeframe and vehicles were monitored as specified in the LERO plan. LILCO has documentation which assures the availability of a sufficient number of trained radiological monitors to adequately conduct monitoring at a 90 second timeframe for all arriving general population at reception centers. At the Roslyn Reception Center a monitor placed a pen on a potentially contaminated vehicle and then picked it up. A potentially contaminated emergency worker drove a clean vehicle away from the decontamination center without first having himself monitored. Finally, survey probes occasionally touched evacuees.

Decontamination teams from reception centers at Bellmore, Hicksville (2 teams), and Roslyn each had 12-13 members. Overall, the teams performed satisfactorily in the areas of evacuee monitoring, contamination control procedures, and decontamination procedures.

All the decontamination leaders were well trained. Each coordinated his team's activities, reminding team members to regularly check dosimetry and background readings and generally making himself available to arrange the transport of individuals who were injured or who could not be decontaminated. Each team was given one hour to set up the trailer, and each completed the task within the time allotted. Following a demonstration of various decontamination scenarios, each team dismantled the trailer, paying attention to basically sound contamination control procedures. However, some problems were noted during observation of decontamination activities and are listed below.

Bellmore Decontamination Team

1. A contaminated person was sent into the showers without being instructed in proper decontamination procedures.
2. During the breakdown of the trailer, workers removed their cotton gloves before removing their boots. Gloves should be the last item of clothing removed.

Roslyn Decontamination Team

1. A tag was removed from a bag of contaminated clothing and handed to a person in the clean area.
2. Women going through the decontamination showers had numerous questions for the decontamination leader. The presence of a female decontamination leader would have been useful.
3. Most of the team members improperly recorded a "clean" thyroid scan as having been 20 cpm, which is the background reading.

Hicksville Decontamination Team #1

1. Workers were observed monitoring an individual in the men's clean area with the meter probe closed.
2. A worker, after having been told that a woman had a reading of 60 cpm, following the woman's second attempt at decontamination, sent her back into the shower for a third attempt. According to OPIP 3.9.2, such a reading is considered "clean."

3. A team member did not remove his gloves last, when removing protective clothing.

Hicksville Decontamination Team #2

1. An evacuee was told to put a clean foot down on a contaminated step-off pad.
2. Survey readings from a shoe were improperly recorded under a heading for "unclothed," rather than under the heading for "clothed" on the decontamination record form.
3. A monitor's initials were not recorded in the appropriate place on the decontamination monitoring sheet.

A previous ARCA (Reception Center 1) from SNPS PEA dated April 17, 1986 has been corrected and verified.

Deficiencies

No Deficiencies were observed at reception centers during the exercise.

Area Requiring Corrective Action

1. Description: Monitoring and decontamination workers were inconsistent in their use of contamination control procedures. Specific examples are cited in Section 2.10 of this report, Objective FA 21. (NUREG-0654, Supp. 1, II, J.12)

Recommendations: Workers should receive ongoing training in contamination control procedures prior to the next exercise.

Areas Recommended for Improvement

No Areas Recommended for Improvement were observed at reception centers during the exercise.

2.11 MEDICAL DRILLS

Of the four objectives being demonstrated through Medical drills, two were fully met, one was partially met, and one was determined to be not applicable. Medical drills were conducted on days 1 and 2 of the exercise in order to evaluate the emergency medical response of personnel from LERO, Brunswick Hospital, Mid Island Hospital, and participating ambulance companies. The drills required responses to two different medical/radiological emergency situations, each occurring on a different day.

Activity on day 1 of the exercise involved injury of a member of a LERO emergency worker's family. The injuries sustained (simulated) included an open compound fracture of the left forearm, a lacerated right forearm, and radiation contamination. Activity on day 2 of the exercise involved transport of an injured, contaminated person from the Hicksville reception center to the Brunswick Hospital emergency room.

FA 6. The objective to demonstrate the ability to continuously monitor and control emergency worker exposure was met. All emergency workers observed were provided with a TLD and two DRDs (0-500 mR and 0-5 R). Dosimeters were read at regular 15-minute intervals, and the readings were recorded on appropriate forms. Authorization to receive exposures in excess of EPA PAGs was not applicable, since both hospitals are located outside the 10 mile plume EPZ.

FA 16. The objective to demonstrate the ability to make the decision to recommend the use of KI for emergency workers and institutionalized persons was not applicable. Radiiodine was not a factor during the medical drills because both hospitals were located outside the plume exposure pathway.

FA 23. The objective to demonstrate the adequacy of vehicles, equipment, procedures, and personnel for transporting contaminated, injured, or exposed individuals was met. In the first drill (day 1) following simulation of the injury, the victim was immediately treated to stop bleeding and was monitored. The patient's status was then communicated to the LERO decontamination leader, who requested an ambulance at 1222 hours. The ambulance arrived at 1255 hours, and the victim was received at Mid Island Hospital by 1347 hours. During the medical-assessment and patient-transport periods, LERO personnel provided monitoring support to the ambulance crew. Data concerning contamination levels and patient vital signs were reported to the hospital by radio.

The second medical drill revolved around an unconscious, contaminated person found in a vehicle at the Hicksville reception center monitoring station. On day 1, the victim was assessed as to medical condition and monitored to determine contamination level. On the next day, the activity resumed with the arrival of an ambulance and crew at the reception center. A victim was not actually transported, so the ambulance crew was not evaluated. Data concerning the simulated victim's vital signs and contamination

level were transmitted to Brunswick Hospital. The ambulance arrived at the hospital at 1052 hours, but the driver had difficulty in locating the radiation emergency area (REA). Once the proper entrance was found, no hospital staff were present to remove an access barricade. The total delay experienced was approximately 15 minutes. After ambulance staff contacted emergency room staff, a simulated victim was made available for simulated treatment/decontamination.

FA 24. The objective to demonstrate the adequacy of medical facility equipment, procedures, and personnel for handling contaminated, injured, or exposed individuals was partially met. In the first drill, the victim arrived at the hospital at 1347 hours and was taken into the emergency room for treatment and decontamination. A properly calibrated Ludlum 3-B survey meter was used for patient monitoring. Samples were taken, properly labeled, and sent to the laboratory. Procedures were improperly followed by the Mid Island Hospital radiation safety officer (RSO), as some surveys were conducted too rapidly, with the probe positioned too far away from the victim. Readings taken under the previously described conditions would not have provided an accurate assessment of radiation exposure. Additionally, only one individual was present to monitor the patient, hospital staff, ambulance and crew, as well as to conduct staff exit procedures. Procedures for contamination control were weak; windows left open for ventilation purposes could have produced drafts that would have contributed to the spread of contamination. During patient decontamination, a plastic sheet caught potentially contaminated water that should have drained off into a waste barrel. Containment of contaminated water could have recontaminated the victim. The patient was transferred onto a clean gurney from the original stretcher without first checking the patient's back and the stretcher for contamination. The hospital RSO conducted exit monitoring of all staff leaving the treatment/decontamination area. As with the victim monitoring, the RSO used rapid monitoring times, with some as brief as 5-10 seconds.

For the second drill, the patient was received into the REA and was promptly examined for medical problems and surveyed for radiation contamination. Excellent contamination control procedures were exhibited by REA staff as they decontaminated the victim and properly took samples, labeling them for referral to the laboratory. The patient exit processing was done well, except that the patient gurney was removed from the area prior to being monitored.

The use of a single RSO created some difficulty during the staff exit processing. The physician and nurse were properly monitored by the RSO. When the RSO was ready to exit the REA, another individual monitored him but failed to check the RSO's legs and feet.

Deficiencies

No Deficiencies were observed during the medical drills.

Areas Requiring Corrective Action

1. **Descriptions:** Procedures were improperly followed by the Mid Island Hospital RSO; survey scans were conducted too rapidly, and the probe was held too far from the subject being monitored. (NUREG-0654, Supp. 1, II, L.1)

Recommendations: Hospital monitoring staff should receive ongoing training in proper monitoring procedures.

2. **Descriptions:** A sufficient number of trained monitoring personnel were not available, at each hospital, to perform all monitoring functions for victim, ambulance and crew, and hospital staff. (NUREG-0654, Supp. 1, II, L.1)

Recommendations: At least one additional trained monitoring person should be available to assist in performing monitoring functions at each hospital.

3. **Descriptions:** At the Mid Island Hospital, open windows in the decontamination area could have produced drafts that would have contributed to the spread of contamination. In addition, the containment of potentially decontaminated water beneath the victim, and the failure to monitor the victim's back prior to placing the victim on a clean gurney could have resulted in recontamination of the victim or cross-contamination of hospital equipment. (NUREG-0654, Supp. 1, II, L.1)

Recommendations: Hospital staff should receive ongoing training in contamination control procedures.

Areas Recommended for Improvement

1. **Descriptions:** An ambulance crew was unfamiliar with the location of the REA.

Recommendations: Ambulance personnel should receive ongoing training regarding the location of radiation treatment areas at local hospitals.

2. **Descriptions:** Hospital staff were not at the entrance to remove an access barricade for the ambulance.

Recommendations: Security guards should be available to direct the ambulance to the appropriate entrance and remove access barricades.

3. Description: A potentially contaminated patient gurney was removed from the REA prior to being monitored.

Recommendation: Hospital staff should receive ongoing training regarding proper contamination control procedures.

2.12 SCHOOL INTERVIEW

FA 19. The objective to demonstrate the ability and resources necessary to implement appropriate protective actions for school children within the plume EPZ was met. Briarcliff Elementary School was visited during the exercise, and the principal was interviewed. The interview focused on the availability and the degree of knowledge of emergency response plans for implementation by the school staff in the event of a radiological incident at SNPS. The Briarcliff School is located in the town of Shoreham and is part of the Shoreham-Wading River School District.

A copy of the plan for the Briarcliff Elementary School was available at the school, and the principal was familiar with its purpose and content. She indicated that the school can implement three options: early dismissal, evacuation, and sheltering. She was familiar with the procedures for each option. In the event of a PAR that affected the students at Briarcliff, the principal would be notified by the superintendent of the school district as to which action to take.

The school is equipped with several communication capabilities: three commercial telephone lines, a private telephone line for use by the principal during emergencies, and a tone alert radio, which is supplied, maintained, and tested by LILCO. Upon receipt of instructions to provide emergency care for the students, the principal would authorize the staff to begin notifying parents of the children, using the established fan-out notification scheme as indicated in the plan. Parents of all children would be notified and informed of the actions being taken by the school.

Teachers at the school have received information concerning their responsibilities and roles in the event that a protective action were implemented for the school. Each teacher would be responsible for the students in his or her class and are to remain with them during the incident. Emergency information containing details on school protective action procedures have been distributed to all families with school children in the district.

Several staff members have received training so that they could assist the principal or assume her position, if required, during an event. Knowledge of the plan and confidence in the ability to implement it were displayed by the principal.

The issue of non-participation of other school districts, the subject of a previous ARCA (LERO EOC 9) from SNPS PEA dated April 17, 1986 has been addressed by the NRC letter to FEMA dated May 11, 1988, and three (3) assumptions addressed by NUREG-0654/FEMA-REP-1, Rev. 1, Supp 1.

Deficiencies

No Deficiencies were observed during the school interview.

Areas Requiring Corrective Action

No Areas Requiring Corrective Action were observed during the school interview.

Areas Recommended for Improvement

No Areas Recommended for Improvement were observed during the school interview.

2.13 TRANSIT DEPENDENT EVACUATION OPERATIONS

2.13.1 Implementation of Transfer Points

Plume Exposure Pathway Activities

FA 4. The objective to demonstrate the ability to communicate with all appropriate locations, organizations, and field personnel was met during observed operations at all Transfer Points (TPs). The single-channel TP LERO radio communications system performed flawlessly during the exercise. A communications link between the TP coordinators and the LERO EOC was established and maintained without failure. TP coordinators demonstrated good working knowledge of proper radio protocol.

FA 18. The objective to demonstrate the ability and resources necessary to implement appropriate protective actions for the impacted permanent and transient plume EPZ population was met during observed operations at all TPs. Buses were allocated to TPs by 0805 hours, and LERO bus drivers were dispatched from the staging areas by about 0844 hours. All bus drivers were able to follow assigned routes from the staging areas to bus garages, and from there to their respective TPs. TP coordinators verified that the drivers were at the correct TPs. Full operations were observed at 11 TP locations, although the evacuation order affected only six TPs. All TP coordinators in areas requiring protective action were notified between 1040 and 1043 hours by the LERO EOC dispatcher.

A previous Deficiency (Patchogue 2) and a previous ARCA (Riverhead 2) from SNPS PEA dated April 17, 1986 have been corrected and verified.

Recovery/Reentry Activities

FA 33. The objective to demonstrate the ability to implement appropriate measures for controlled reentry and recovery was met. For the purposes of demonstration, a limited number of buses were dispatched from the Patchogue staging area to two TPs. These TPs were promptly set up according to plan when reentry decision making began. A minimum of two bus routes were run out of each TP, with no observed problems.

Deficiencies

No Deficiencies were observed at the TPs during the exercise.

Areas Requiring Corrective Action

No Areas Requiring Corrective Action were observed at the TPs during the exercise.

Areas Recommended for Improvement

No Areas Recommended for Improvement were observed at the TPs during the exercise.

2.13.2 Vehicle/Driver Mobilization and Activation

General Population

FA 2. The ability to fully alert, mobilize, and activate personnel for both facility- and field-based emergency functions was met, based upon exercise activity observed during simulated evacuation of the general population on day 1.

General population evacuation bus drivers received notification to report to their respective garages between 0730 and 0858 hours. The last bus driver arrived at 0949 hours and was deployed to a TP by 0956 hours. Overall, drivers for the general population evacuation were notified, mobilized, and activated in a prompt and efficient manner.

Mobility Impaired

FA 2. The ability to fully alert, mobilize, and activate personnel for both facility- and field-based emergency functions was met, based upon exercise activity observed during simulated evacuation of the mobility-impaired population on day 1.

Drivers for evacuation of the mobility impaired were notified between 0730 and 0745 hours. The drivers promptly arrived at their designated staging areas, with the latest arrival occurring at 0830 hours. The demonstration of mobility-impaired evacuation occurred out of sequence on day 1. Sufficient numbers of drivers were available at all staging areas to implement the evacuation procedure.

School Evacuation

FA 2. The objective to demonstrate the ability to fully alert, mobilize, and activate personnel for both facility- and field-based emergency functions was met, based

upon exercise activity observed during the simulated evacuation of schools which were evaluated out of sequence on day 2 of the exercise.

School evacuation bus drivers were notified to report to their appropriate bus garages between 0900 and 0910 hours. The last bus drivers arrived at the garages by 1030 hours and were deployed to the appropriate school by 1115 hours. The length of time from arrival to deployment is largely attributable to an extensive safety inspection conducted by LERO drivers prior to driving the assigned buses.

Deficiencies

No Deficiencies were observed related to vehicle/driver mobilization and activation during the exercise.

Area Requiring Corrective Action

No Areas Requiring Corrective Action were observed related to vehicle/driver mobilization and activation during the exercise.

Areas Recommended for Improvement

No Areas Recommended for Improvement were observed related to vehicle/driver mobilization and activation during the exercise.

2.13.3 Emergency Worker Radiological Exposure Control

General Population

FA 6 and FA 16. The objective to demonstrate the ability to continuously monitor and control emergency worker exposure was partially met. The objective to demonstrate the ability to distribute and administer KI once the decision has been made was met during observed activities at all TPs and general evacuation bus routes.

All TP coordinators and general evacuation bus drivers were equipped with the proper dosimetry (0-200 mR and 0-5 R DRDs and TLDs) and briefed on correct procedures for their use. All personnel showed familiarity with dosimetry procedures. Most personnel read their dosimeters every 15 minutes, pausing in their routes, if necessary, to do so. However, two drivers from the Riverhead staging area did not read their dosimeters every 15 minutes while driving their routes, although they were aware of correct procedures. Personnel were equipped with dose record forms. All personnel knew the exposure limits for reporting to their supervisor and knew what to do if exposure limits were met or exceeded.

All TP coordinators and general evacuation bus drivers were issued simulated KI and knew that they were to take it only upon instruction from their supervisor. The announcement to take KI, made at about 1045 hours at the LERO EOC, was communicated to all TP coordinator dispatch locations by 1100 hours. TP coordinators conveyed instructions to drivers immediately or as soon as drivers returned to the TPs from bus routes in progress. All personnel promptly took their simulated KI. Some drivers were unaware of the use of the KI record form for recording the use of KI.

Three previous ARCAs (Patchogue 11, Port Jefferson 1, and Riverhead 5) from SNPS PEA dated April 17, 1986 have been corrected and verified. However, ARCA (Riverhead 3) remains uncorrected.

Mobility Impaired

FA 6 and FA 16. The objective to demonstrate the ability to continuously monitor and control emergency worker exposure was met. The objective to demonstrate the ability to distribute and administer KI once the decision has been made was partially met. All mobility-impaired transportation drivers were equipped with the proper dosimetry and used it correctly. Thorough briefings about the use of dosimetry were held for the drivers before dispatch. All personnel knew the exposure limits and what to do if the limits were met or exceeded.

All mobility-impaired transportation drivers were issued simulated KI and knew that they were to take it only upon instruction from their supervisor. Thorough briefings about the use of KI were held for the drivers before dispatch. The announcement to take KI was communicated to all mobility-impaired transportation dispatch locations by 1110 hours. Mobility-impaired transportation dispatchers conveyed instructions to drivers immediately. Most personnel promptly took their simulated KI. However, in one instance, the Peconic ambulance crew was instructed to take KI if they entered the 10-mile EPZ. The crew judged that they never entered the EPZ. So, they never took KI, even though one of their destinations was the Riverhead Nursing Home, which is listed in OPIP 3.6.5 as being in Zone P. In another instance, bus drivers assigned out of the Patchogue staging area to Our Lady of Perpetual Hope and to Ridge SOICF said that they would take KI only if instructed to do so by their own bus dispatcher.

A previous ARCA (LERO EOC 13) from SNPS PEA dated April 17, 1986 has been corrected and verified. However, ARCA (LERO EOC 11) remains uncorrected.

School Evacuation

FA 6 and FA 16. The objective to demonstrate the ability to continuously monitor and control emergency worker exposure was partially met during observed activities for all school evacuation bus routes. The objective to demonstrate the ability

to distribute and administer KI once the decision has been made was met for school evacuation bus routes.

LERO school bus drivers thoroughly understood dosimetry and its use. LERO drivers were equipped with 0-200 mR and 0-5 R DRDs and TLDs, with additional TLDs for regular school bus drivers. However, out of the 40 drivers evaluated, two did not read their dosimetry every 15 minutes. Four other drivers believed they could stop reading their dosimeters when they had left the EPZ. This planning issue will be addressed in the evaluation of Revision 10 of LERO off-site Radiological Emergency Response Plan for Shoreham, by the RAC.

Of the 40 school bus drivers evaluated, most knew the exposure limits and what to do if the limits were met or exceeded. However, one briefing held for drivers prior to dispatch did not fully explain such information. Upon questioning, two other drivers showed limited knowledge about the authorized exposure limits, and one did not know who to contact for authorization to incur excess exposure.

There was a clear misunderstanding among school bus drivers about the use of KI. In general, the LERO drivers had adequate knowledge relating to the purpose and use of KI. The simulated supply of KI was adequate for LERO drivers and any regular drivers that they would accompany. However, because the LERO controller information was unclear as to the status of the event at the start of the out-of-sequence school evacuation, LERO drivers made different assumptions about administering KI. Upon questioning, some assumed that a general emergency had already occurred, so they would have already taken KI. Others would take KI automatically upon initiation of a route. Most would await notification of a general emergency ECL or the implementation of a school evacuation. At least two drivers indicated that KI was to be taken only at the direction of their supervisors. Although the school bus driver procedure clearly states that KI is to be taken at the general emergency ECL, some drivers simulated taking KI immediately upon initiating their routes. This action may have resulted from lack of information about the status of the event from LERO controllers, or from driver unfamiliarity with procedures on KI ingestion. One evaluator noted that because his observed bus was not equipped with a radio, the driver would not be able to hear any notification of general emergency while en route. This planning issue will be addressed in the evaluation of Revision 10 of LERO off-site Radiological Emergency Response Plan for Shoreham, by the RAC. Previous ARCA (LERO EOC 12) from SNPS PEA dated April 17, 1986 has been reclassified as a planning inadequacy rather than a performance ARCA.

In one instance, a school bus driver who was four and one-half months pregnant and accompanied by a LERO back-up driver was allowed to drive the bus without question. Upon FEMA's review of training rosters, the driver was found to have attended LERO training at which the dangers of radiation exposure to an unborn child had been covered. However, the driver was not reminded of the subject at the time of the simulated evacuation. NRC Regulatory Guide 8.13 and the Appendix thereto were not listed among the materials included in the assignment packet (LERO School Bus Driver Procedure, OPIP 3.6.5, Attachment 14). Materials issued to female bus drivers should include a specific query and/or consent form to assure that they are aware of this

information. This planning issue will be addressed in the evaluation of Revision 10 of LERO off-site Radiological Emergency Response Plan for Shoreham, by the RAC.

A previous ARCA (LERO EOC 10) from SNPS PEA dated April 17, 1986 has been corrected and verified. However, a previous ARCA (LERO EOC 14) has not been corrected.

Deficiencies

No Deficiencies concerning radiological exposure control for bus operations were observed during the exercise.

Areas Requiring Corrective Action

1. **Descriptions:** During the exercise two school bus drivers and two general population bus drivers did not read their dosimetry every 15 minutes. (NUREG-0654, Supp. 1, II, K.3.b)

Recommendations: In the ongoing training in dosimetry usage, an added emphasis should be provided for school bus drivers to read dosimetry every 15 minutes.

2. **Descriptions:** A pregnant school bus driver was allowed to drive a bus without question. The driver was not reminded of the dangers of radiation exposure to an unborn child at the time of the simulated evacuation. NRC Regulatory Guide 8.13 and Appendix were not listed among the materials included in the assignment packet. (NUREG-0654, Supp. 1, II, K.4)

Recommendations: Briefings upon arrival at bus yards should include reminders to women school bus drivers regarding the dangers of radiation exposure to an unborn child.

3. **Descriptions:** Some general population bus drivers were unaware of the use of the KI record form for recording the use of KI. (NUREG-0654, Supp. 1, II, J.10.e)

Recommendations: Ongoing training should continue to be provided to general population bus drivers regarding the use of the KI form.

4. **Descriptions:** Some ambulance and ambulette crews are not aware of when to take KI. In one instance, the Peconic ambulance crew was instructed to take KI if they entered the 10-mile EPZ. The crew failed to take KI prior to departure for the Riverhead Nursing Home, which is listed in the 10-mile EPZ. (NUREG-0654, Supp. 1, II, J.10.e)

Recommendation: Ongoing training should be provided to ambulance and ambulate crews regarding procedures for the administering of KI.

Area Recommended for Improvement

No Areas Recommended for Improvement concerning radiological exposure control for bus operations were observed during the exercise.

2.13.4 Implementation of Evacuee Transportation

General Population

FA 18. The objective to demonstrate the ability and resources necessary to implement appropriate protective actions for the impacted permanent and transient plume EPZ population was partially met during the simulated evacuation of the general population.

Generally, evacuation routes were run without difficulty. Of the 36 routes evaluated, there was one bus route in which the driver missed a portion of his assigned route.

Mobility Impaired

FA 18. The objective to demonstrate the ability and resources necessary to implement appropriate protective actions for the impacted permanent and transient plume EPZ population was met during the simulated evacuation of the mobility impaired. Drivers and attendants completed their assigned routes and tasks with a high degree of competence.

Two previous ARCAs (Patchogue 7 and 8) from SNPS PEA dated April 17, 1986 have been corrected and verified.

School Evacuation

FA 18. The objective to demonstrate the ability and resources necessary to implement appropriate protective actions for the impacted permanent and transient plume EPZ population was partially met during the demonstration of evacuation for schools. This activity was conducted out of sequence on day 2 of the exercise.

In general, the running of routes went well. No drivers were lost because of unfamiliarity with designated routes. Of the 40 routes and drivers evaluated, seven drivers took routes other than those assigned. Some of those seven took other routes they considered more efficient in evacuating the school children. However, other pertinent planning factors, such as traceability of routes, traffic volumes during evacuation, and relationships of school bus routes to other traffic evacuation routes, were not considered in these decisions.

A discrepancy was noted between the marking of Long Island Expressway exit signs and exit notations on driver route maps. No exit sign was observed on the Long Island Expressway marked "William Floyd Parkway," as indicated on the drivers map.

Recovery/Reentry

FA 33. The objective to demonstrate the ability to implement appropriate measures for controlled reentry and recovery was met during implementation of evacuee transportation. Exercise play occurred on day 3. With one exception noted below, bus drivers and TP coordinators demonstrated knowledge of plan procedures for reentry.

Bus drivers received dosimetry and route briefings prior to being assigned routes. Upon receipt of their instruction packets, drivers proceeded to their designated bus yards and on to the appropriate reception centers and TPs. Generally, the simulated return of transit-dependent evacuees to their homes went according to plan. However, one driver failed to follow his assigned route from the staging area to the bus company and was not provided with maps to his assigned reception center and TP; therefore, he could not complete his reentry route as stipulated in the plan.

Deficiencies

No Deficiencies were observed during exercise activities involving the evacuation of the general population, the mobility impaired, and the school population, or during the simulated reentry of evacuees.

Areas Requiring Corrective Action

1. Description: A general evacuation bus driver missed a portion of his assigned route. (NUREG-0654, Supp. 1, II, J.10.g)

Recommendation: Drivers should receive specific briefing information with regard to the need to complete the route they are assigned, following the route as indicated on the maps issued with their bus assignments.

2. **Description:** Seven school bus drivers failed to follow their assigned routes, making one or more deviations during the course of the simulated evacuation. (NUREG-0654, Supp. 1, II, J.10.g)

Recommendation: School bus drivers should be trained not to deviate from their assigned routes. If exceptions are permissible, those exceptions should be identified in the plan.

3. **Description:** During the school evacuation, a discrepancy was noted between the marking of Long Island Expressway exit signs and exit notations on driver route maps. (NUREG-0654, Supp. 1, II, J.10.a)

Recommendation: Driver route maps should be reviewed to assure that exit and street markings are comparable to those on actual signs.

Area Recommended for Improvement

1. **Description:** One reentry bus driver failed to follow his assigned route from the Patchogue staging area to the bus company and was not provided with maps indicating the routes to be taken from the bus company to his assigned reception center and from the reception center to the assigned TP.

Recommendation: Drivers should receive ongoing training stressing the need to follow assigned routes. Prior to their distribution, driver packets should be checked to assure that all relevant materials are included.

2.13.5 Relocation Centers

Mobility Impaired

PA 1. The objective to demonstrate procedures, facilities, equipment, and personnel for registration, monitoring, and decontamination of evacuees was met, based on observed activities at relocation centers for mobility-impaired evacuees.

As a condition of the exercise, transporters of mobility-impaired evacuees only drove by the relocation centers. Routes to these locations were followed accurately and in a timely manner. Monitoring of vehicles and passengers was demonstrated at the Riverhead and Patchogue staging areas; monitoring and decontamination of emergency workers were demonstrated at the EWDF. (See Sec. 2.9 for the evaluation of the EWDF.)

School Evacuation

FA 2. The objective to demonstrate the ability to fully alert, mobilize, and activate the staff was met for the school relocation centers. School relocation center staff were paged at 0905 hours to report to Garden City. Staff began to report immediately, because some of them were normally located in the building. Staff signed in on a register preprinted with their names. A supervisor gave the staff who had reported a status update at 0940 hours. Other staff were given an update as they reported. Staff who had reported left for the relocation centers at 0943 hours, taking needed materials with them. Staffing was completed by 1015 hours. The total staff was 33. The school relocation centers at Nassau Community College and Veterans Memorial Coliseum were simulated to have been activated at 1015 hours.

FA 19. The objective to demonstrate the ability and resources necessary to implement appropriate protective actions for school children within the plume EPZ was partially met at the school relocation centers. The first bus arrived at 1045 hours. As buses arrived, they were asked to identify themselves and what school they were from. Checkers who greeted the buses had a list of possibly contaminated buses, and those were directed to go to the Hicksville reception center for monitoring and decontamination. Those buses that were later found to be clean at Hicksville were returned to the relocation center with a tag verifying them as clean. After admission to the relocation center, bus drivers signed in and were then directed to a briefing area where they were assigned jobs at the relocation center, primarily controlling traffic flow.

Initially, the total number of contaminated buses expected was not posted, nor was a prearranged procedure in place for totaling the number of contaminated buses sent to Hicksville from the entrance to each school relocation center. These problems were corrected later in the exercise.

One school bus driver had the standard packet of forms for school officials accompanying the bus, however, he was unaware of the need to give school officials a school children log out form or relocation center location assignment diagrams and charts.

There was no demonstration during the exercise of how school children and other bus passengers would be directed after they left the buses. This planning issue will be addressed in the evaluation of Revision 10 of LERO off-site Radiological Emergency Response Plan for Shoreham, by the RAC.

Deficiencies

No Deficiencies were observed during exercise activities at the relocation centers.

Area Requiring Corrective Action

1. Description: A bus driver was unaware of the need to give school officials a school children log out form or relocation center location assignment diagrams and charts from his packet. (NUREG-0654, Supp. 1, II, J.12)

Recommendation: Ongoing training is necessary for school evacuation bus drivers in submitting school children log out forms to officials at the school relocation center.

Area Recommended for Improvement

1. Description: Initially, the total number of contaminated buses expected was not posted, nor was a prearranged procedure in place for totaling the number of contaminated buses sent to Hicksville from each entrance to the school relocation center. These problems were corrected later in the exercise.

Recommendation: The ad hoc procedures developed during the exercise should be incorporated into the planned procedures for accounting for the total number of potentially contaminated buses arriving at the school relocation centers.

3 SUMMARY OF DEFICIENCIES AND AREAS REQUIRING CORRECTIVE ACTION

Section 3 of this report provides a listing of Areas Requiring Corrective Action noted during the June 7-9, 1988 exercise.

Tables 3.1.1 through 3.1.7 summarize recommendations to correct those Areas Requiring Corrective Action during the exercise. These tables also include Deficiencies and ARCAs identified in the previous exercises which remain unresolved or have been rectified during this exercise. FEMA requests that LILCO submit a schedule of actions they have taken or intend to take to correct these inadequacies.

TABLE 3.1.1
SHOREHAM NUCLEAR POWER STATION
SUMMARY OF DEFICIENCIES
JUNE 7-9, 1988
LERO EOC

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No.	Recommended Corrective Action	WUREC-0654 FEMA-REP-1 Rev. 1, Supp. 1 Reference	FEMA Objective*	Exercise Date		Present Status
				June 7-9, 1988	Previous Exercise	
1.	Delays in responding to the two (2) evacuation impediment free-play messages inserted at the LERO EOC were caused by the failure to inform the Evacuation Coordinator in a timely manner. In addition there was a lack of internal communication in response to these impediment problems. Pertinent information was not included on the 1045 and 1106 LERO Message Forms from the Evacuation Route Coordinator to the Evacuation Support Communicator for Route Spotters/Road Crews regarding the simulated impediment involving the gravel truck and fuel truck problems. As a result of this lack of information, the impediment problems were not analyzed in a timely fashion and incomplete equipment was dispatched to handle the gravel truck impediment in the field. Internal communications procedures should be reviewed and revised as necessary to ensure that information on impediments is promptly passed both up the chain of command to the Evacuation Coordinator and downward and laterally to all lead coordinators under the Evacuation Coordinator and their staffs. Additional training is needed to ensure that the procedures, whether new or current, are properly implemented. All coordinators at the EOC, and those who initiate messages, must be trained to include all pertinent information on the LERO message forms and to analyze the equipment requirements to clear impediments.	J.10.k	20		X	C

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TABLE 3.1.2
SEABOARD NUCLEAR POWER STATION
SUMMARY OF AREAS REQUIRING CORRECTIVE ACTION
JUNE 7-9, 1988
LERO EOC

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No.	Recommended Corrective Action	NUREG-0654 FEMA-REP-1 Rev. 1, Supp. 1 Reference	FEMA Objective ⁴	Exercise Date		Present Status
				June 7-9, 1988	Previous Exercise	
1.	An evacuation support communicator recorded additional messages on his copy of the standard LERO EOC message form after the other copies had been forwarded to the addresses and the Lead Communicator. EOC personnel should be trained that the recording of additional messages requires a new message form rather than being added to previous message forms.	E.1	4	X		1
2.	ESS messages #4, #5, #6, and #7 contained incorrect information that, based upon radiation measurements, small doses to radiation were projected at the site boundary. At the time these messages were broadcast, projected doses based on measurements beyond the site boundary were in excess of the U.S. Environmental Protection Agency's (EPA's) guidelines requiring protective actions. All ESS messages should be screened to ensure that cumulative information is appropriate to the changed conditions (projected doses).	E.5, 1.6	13	X		1
3.	PARs for the ingestion pathway in New York State beyond the 10-mile EPZ were slow to be developed due to management decision to have dose assessment staff focus on reentry and relocation issues. Priorities in the overall dose assessment function should be reviewed. There are more than an adequate number of competent dose assessment staff members.	J.11	29	X		1
4.	During the exercise two school bus drivers and two general population bus drivers did not read their dosimetry every 15 minutes. In the ongoing training in dosimetry usage, an added emphasis should be provided for school bus drivers to read dosimetry every 15 minutes.	K.3.b	6	X		1
5.	A pregnant school bus driver was allowed to drive a bus without question. The driver was not reminded of the dangers of radiation exposure to an unborn child at the time of the simulated evacuation. NRC Regulatory Guide 8.13 and Appendix were not listed among the materials included in the assignment packet. Briefings upon arrival at bus yards should include reminders to women school bus drivers regarding the dangers of radiation exposure to an unborn child.	K.4	6	X		1
6.	Some general population bus drivers were unaware of the use of the KI record form for recording the use of KI. Ongoing training should continue to be provided to general population bus drivers regarding the use of the KI form.	J.10.a	16	X		1

TABLE 3.1.2
SHOREHAM NUCLEAR POWER STATION
SUMMARY OF AREAS REQUIRING CORRECTIVE ACTION
JUNE 7-9, 1988
LERO EDC

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No.	Recommended Corrective Action	NUREC-0654 FEMA-REP-1 Rev. 1, Supp. 1 Reference	FEMA Objective ^a	Exercise Date		
				June 7-9, 1988	Previous Exercise	Present Status
7.	Some ambulance and ambulance crews are not aware of when to take K1. In one instance, the Peconic ambulance crew was instructed to take K1 if they entered the 10-mile EPZ. The crew failed to take K1 prior to departure for the Riverhead Nursing Home, which is listed in the 10-mile EPZ. Ongoing training should be provided to ambulance and ambulance crews regarding procedures for the administering of K1.	2.13.3	6	X	X	I
8.	A general evacuation bus driver missed a portion of his assigned route. Drivers should receive specific briefing information with regard to the need to complete the route they are assigned, following the route as indicated on the maps issued with their bus assignment.	J.10.g	18	X		I
9.	Seven school bus drivers failed to follow their assigned routes, making one or more deviations during the course of the simulated evacuation. School bus drivers should be trained not to deviate from their assigned routes. If exceptions are permissible, those exceptions should be identified in the plan.	J.10.g	19	X		I
10.	During the school evacuation, a discrepancy was noted between the marking of Long Island Expressway exit signs and exit notations on driver route maps. Driver route maps should be reviewed to assure that exit and street markings are comparable to those on actual signs.	2.13.4	18	X		I
11.	A bus driver was unaware of the need to give school officials and school children log out forms or relocation center location assignment diagrams and charts from his packet. Ongoing training is necessary for school evacuation bus drivers in submitting school children log out forms to officials at the school relocation center.	J.12	19	X		I
12.	There was some confusion regarding the method for notifying the Federal Aviation Administration (FAA).	F.1.c	2.4		X	C
	(1) The LERO procedures should be reviewed and revised as necessary to ensure that a point of contact with the FAA has been designated.					
	(2) The LERO EDC staff should be trained in the appropriate procedures so that the FAA can be notified in a timely manner.					

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TABLE 3.1.2
SHOREHAM NUCLEAR POWER STATION
SUMMARY OF AREAS REQUIRING CORRECTIVE ACTION
JUNE 7-9, 1988
LERO EOC

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No.	Recommended Corrective Action	MUREC-0654 FEMA-REP-1 Rev. 1, Supp. 1 Reference	FEMA Objective*	Exercise Date		
				June 7-9, 1988	Previous Exercise	Present Status
13.	Since there are no procedures for notification of the Long Island Railroad (LIRR) in the Plan, the LIRR was not notified during the exercise. (1) The LERO procedures should be revised to establish a point of contact and a means for notifying the LIRR. (2) The LERO EOC staff should be trained in the revised procedures so that the LIRR can be notified in a timely manner.	E.1, F.1.a	2,4		X	C
14.	The dose assessment status board in the accident assessment area had to accommodate both DOE RAP and LILCO field monitoring data. There were not enough columns on the board to keep the two (2) sources of data separated. LERO should enlarge the dose assessment status board to accommodate a clear separation between the data reports from the DOE RAP and LILCO field monitoring teams.	I.10	10		X	C
15.	The downwind distance of the sample was incorrectly reported as 7000 meters instead of 700 meters for one of the thyroid doses reported by a DOE RAP field monitoring team. This error was caused by a decimal point misplaced during the conversion of the distance units and meant that the initial calculation of thyroid dose based on this measurement was 9000 mRem/hr at 4.3 miles downwind instead of 9000 mRem/hr at about 0.5 miles downwind. About five (5) minutes elapsed before this error was found and corrected. All downwind distances from the field should be reported consistently in either miles or meters.	I.10, F.1.d	10		X	C
16.	During the reporting of the initial DOE RAP thyroid doses, only one field measurement, the 1400 mRem/hr measurement made at about 1204 at two (2) miles from the plant, was available. This value was used at the LERO EOC to extrapolate values at other distances. These extrapolated data were reported as actual measurements at other distances rather than as projected data on the dose assessment status board. It took two and one half (2.5) hours to identify and correct this error. LERO reporting procedures should be reviewed to ensure proper coordination and proper reporting.	I.10	10		X	C

TABLE 3.1.2
SHOREHAM NUCLEAR POWER STATION
SUMMARY OF AREAS REQUIRING CORRECTIVE ACTION
JUNE 7-9, 1988
LERO EOC

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No.	Recommended Corrective Action	NUREG-0654 FEMA-REP-1 Rev. 1, Supp. 1 Reference	FEMA Objective ^a	Exercise Date		Present Status
				June 7-9, 1988	Previous Exercise	
17.	Although he later quoted the PAC correctly when asked to do so by a Federal evaluator, during a briefing held at the LERO EOC at about 1110, the Health Services Coordinator misstated the EPA PAC as being mandatory evacuation when the projected thyroid dose was five (5) Rem. The Health Services Coordinator should review the EPA PAC guidance in order to avoid any possible confusion that could result due to misinformation given during briefings.	I.10	10		X	C
18.	Prior to the exercise, LILCO management made the decision that the siren system would not be activated as part of the February 13, 1988 exercise. Activation of the siren system should be actually tested in the future.	E.6	12		X	C
19.	There was a delay of about forty-five (45) minutes between the LERO EOC's first attempt to have Route Spotter #1005 verify the fuel truck impediment and the dispatch of that spotter from the Port Jefferson Staging Area. This delayed timely verification of the impediment. Personnel need to be trained in the development of alternative approaches when delays are reasonably anticipated in the field verification of impediments to evacuation. Development of alternatives should include consultation between, at a minimum, the Evacuation Coordinator and the Evacuation Route Coordinator.	E.2	20		X	C
20.	Only the Shoreham-Wading River School District participated in the February 13, 1988 exercise. Prior to the exercise, LILCO management made the decision that other school districts were not to be included in the exercise. In the future all schools must be included in all Federally evaluated exercises and drills.	J.10.g	19		X	C ^b
21.	Dosimetry and training have not been provided to the Bus Drivers used for school evacuation.	K.3, K.5.a	6		X	C
	(1) Bus Drivers used for school evacuation should be trained in the use of dosimeters.					
	(2) Adequate supplies of dosimetry should be provided for Bus Drivers used for school evacuation.					

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TABLE 3.1.2
SHOREHAM NUCLEAR POWER STATION
SUMMARY OF AREAS REQUIRING CORRECTIVE ACTION
JUNE 7-9, 1988
LERO EOC

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No.	Recommended Corrective Action	NUREG-0654 FEMA-REP-1 Rev. 1, Supp. 1 Reference	FEMA Objective ^a	Exercise Date		Present Status
				June 7-9, 1988	Previous Exercise	
22.	Some of the Ambulette Drivers were not aware of when to take their KI. Training on KI procedures should be given to the Ambulette Drivers.	J.10.e	16	X	X	C ^c
23.	Bus Drivers used for school evacuation have not been trained in KI policy and the use of KI. Sufficient supplies of KI are not available for school evacuation Bus Drivers.	J.10.e	16	X	X	C ^d
	(1) Bus Drivers used for school evacuation should be trained in KI policy and the use of KI.					
	(2) Adequate supplies of KI should be provided for Bus Drivers used for school evacuation.					
24.	Ambulette Drivers were not all trained regarding who can authorize doses in excess of and what to do in the event of exposure above the general public PACs. Ambulette Drivers should be trained on excessive exposure authorization and applicable procedures.	K.4	6		X	C
25.	Bus Drivers used for school evacuation have not been trained regarding who can authorize exposure in excess of the general public PACs. Bus Drivers used for school evacuation should receive training regarding who can authorize exposure in excess of the general public PACs.	K.4	6	X	X	I

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TABLE 3.2.1
SHOREHAM NUCLEAR POWER STATION
SUMMARY OF DEFICIENCIES
JUNE 7-9, 1988
EMERGENCY OPERATIONS FACILITY

Page 1 of 1

No.	Recommended Corrective Action	MUREC-0654 FEMA-REP-1 Rev. 1, Supp. 1 Reference	FEMA Objective*	Exercise Date		Previous Exercise	Present Status
				June 7-9, 1988			

NO RECOMMENDATIONS

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TABLE 3.2.2
SHOREHAM NUCLEAR POWER STATION
SUMMARY OF AREAS REQUIRING CORRECTIVE ACTION
JUNE 7-9, 1988
EMERGENCY OPERATIONS FACILITY

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No.	Recommended Corrective Action	NUREG-0654 FEMA-REP-1 Rev. 1, Supp. 1 Reference	FEMA Objective*	Exercise Date		
				June 7-9, 1988	Previous Exercised	Present Status

NO RECOMMENDATIONS

TABLE 3.3.1
SHOREHAM NUCLEAR POWER STATION
SUMMARY OF DEFICIENCIES
JUNE 7-9, 1988
BROOKHAVEN AREA OFFICE

Page 1 of 1

No.	Recommended Corrective Action	NUREC-C654 FEMA-REP-1 Rev. 1, Supp. 1 Reference	FEMA Objective*	Exercise Date		
				June 7-9, 1988	Previous Exercise	Present Status

NO RECOMMENDATIONS

TABLE 3.3.2
 SHOREHAM NUCLEAR POWER STATION
 SUMMARY OF AREAS REQUIRING CORRECTIVE ACTION
 JUNE 7-9, 1988
 BROOKHAVEN AREA OFFICE

Page 1 of 1

No.	Recommended Corrective Action	NUREC-0654 FEMA-REP-1 Rev. 1, Supp. 1 Reference	FEMA Objective*	Exercise Date		
				June 7-9, 1988	Previous Exercise	Present Status

NO RECOMMENDATIONS

TABLE 3.4.1
SHOREHAM NUCLEAR POWER STATION
SUMMARY OF DEFICIENCIES
JUNE 7-9, 1988
EMERGENCY NEWS CENTER

Page 1 of 1

No.	Recommended Corrective Action	NUREG-0654 FEMA-REP-1 Rev. 1, Supp. 1 Reference	FEMA Objective*	Exercise Date		
				June 7-9, 1988	Previous Exercise	Present Status
1.	<p>Insufficient copying capabilities at the ENC resulted in delays in the distribution of information. These delays affected the following two (2) areas:</p> <ul style="list-style-type: none"> * Hard copies of EBS messages were not provided to the media in a timely manner. * Rumor control personnel were not able to answer questions received from the public because they were not given accurate up-to-date status reports. <p>LERO should make provisions for reliable and rapid equipment to reproduce, in hard copy, all appropriate messages for distribution to the ENC staff.</p>	G.4.b, G.4.c	1A		X	C

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TABLE 3.4.2
SHOREHAM NUCLEAR POWER STATION
SUMMARY OF AREAS REQUIRING CORRECTIVE ACTION
JUNE 7-9, 1988
EMERGENCY NEWS CENTER

Page 1 of 1

No.	Recommended Corrective Action	NUKEC-0654 FEMA-REP-1 Rev. 1, Supp. 1 Reference	FEMA Objective ⁴	Exercise Date		Present Status
				June 7-9, 1988	Previous Exercise	
1.	Maps and displays in the media briefing room were insufficient. The following displays should be posted in an area easily visible to reporters: * An EPZ map which tracks protective actions and plume pathway. * A status board which provides ECLs and their times of declaration.	J.10.b	5		X	C
2.	Some hard copies of EBS messages that were provided to the press contained extraneous information (clearly marked for deletion) that should have been omitted to avoid possible confusion. Hard copies of EBS messages posted in the ENC for use by the press should contain only that information which was broadcast to the public.	C.3.a	14		X	C

TABLE 3.5.1
 THOREMAN NUCLEAR POWER STATION
 SUMMARY OF DEFICIENCIES
 JUNE 7-9, 1988
 PORT JEFFERSON STAGING AREA

Page 1 of 1

No.	Recommended Corrective Action	NUREG-0654 FEMA-REP-1 Rev. 1, Supp. 1 Reference	FEMA Objective*	Exercise Date		
				June 7-9, 1988	Previous Exercise	Present Status

NO RECOMMENDATIONS

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TABLE 3.5.2
SHOREHAM NUCLEAR POWER STATION
SUMMARY OF AREAS REQUIRING CORRECTIVE ACTION
JUNE 7-9, 1988
PORT JEFFERSON STAGING AREA

Page 1 of 1

No.	Recommended Corrective Action	NUREG-0654 FEJA-REP-1 Rev. 1, Supp. 1 Reference	FEHA Objective*	Exercise Date		
				June 7-9, 1988	Previous Exercise	Present Status
1.	One (1) bus driver neglected to read his DRD at any time during the seventy-five (75) minutes he was in the EP2.	K.3.a, K.3.b	6		X	C
	All bus drivers should be trained to read their DRDs every fifteen (15) minutes as described in LERO Procedures.					

TABLE 3.6.1
SHOREHAM NUCLEAR POWER STATION
SUMMARY OF DEFICIENCIES
JUNE 7-9, 1988
PATCHOGUE STAGING AREA

Page 1 of 1

No.	Recommended Corrective Action	M/REG-0654 FEMA-REP-1 Rev. 1, Supp. 1 Reference	FEMA Objective ^a	Exercise Date		Present Status
				June 7-9, 1988	Previous Exercise	
1.	Bus drivers were not dispatched until two (2) hours after receipt of the Site Area Emergency ECL declaration.	J.9, J.10.g	1B		X	C ^b
	(1) An additional area should be established for the distribution of dosimetry to reduce Bus Driver processing time.					
	(2) Additional trained staff should be provided to the Bus Dispatcher to assist him in deploying over three hundred (300) drivers and Transfer Point Coordinators who are deployed from the Patchogue Staging Area.					
2.	A bus driver took two (2) hours and ten (10) minutes to proceed from the staging area to the transfer point. Another driver went to the wrong transfer point, and his mistake was not recognized by the Transfer Point Coordinator. Yet another driver missed a segment of an assigned evacuation route.	J.9, J.10.g	1B		X	C
	(1) Bus drivers for general population evacuation routes should receive training to assure their ability to follow directions given to them so they can (a) follow routes from the staging area to bus garages and then to transfer points, and (b) follow an assigned bus route.					
	(2) OPIP 3.6.4, Attachment 2 (Pages 13-14) and Attachment 1 (Pages 10-12) should be revised to require, respectively, the Bus Driver to present, and the Transfer Point Coordinator to verify, each Bus Driver's copy of the Bus/Van Dispatching Form (OPIP 3.6.4, Attachment 2, Page 62) to assure that the Bus Driver has arrived at the proper Transfer Point.					

TABLE 3.6.2
SHOREHAM NUCLEAR POWER STATION
SUMMARY OF AREAS REQUIRING CORRECTIVE ACTION
JUNE 7-9, 1988
PATCHOGUE STAGING AREA

Page 1 of 3

No.	Recommended Corrective Action	NUREC-0654 FEMA-REP-1 Rev. 1, Supp. 1 Reference	FEMA Objective*	Exercise Date		Present Status
				June 7-9, 1988	Previous Exercise	
1.	OPIP 4.7.1 specifies that the only personnel entrance is to be the Main Entrance on the Conklin Avenue side of the building. The entrance actually used for this purpose was the one on the north side of the building (Main Street). Since the system actually used seems to be superior to the Plan due to reduced congestion, OPIP 4.7.1 should be revised to indicate that personnel are to enter the Patchogue Staging Area through the Main Street entrance to the building.	N/R	3		X	C
2.	LERO personnel entered the upper floor repeatedly to use telephones for emergency notification. This practice is explicitly prohibited by OPIP 4.7.1 (page 38, item #3). Either OPIP 4.7.1 should be revised to reflect the actual practice of using telephones on the second floor of the Patchogue Staging Area building, or more telephones should be provided on the first floor for LERO personnel to perform their emergency notifications.	N/R	4		X	C
3.	The south door was not locked for security as specified in OPIP 4.7.1. All doors required to be locked by the Plan should be verified as actually locked by the Staging Area Coordinator or a designee.	N/R	5		X	C
4.	Unauthorized entrance to the staging area could be achieved through the open fire escape on the second floor of the east side of the building. The fire escape on the second floor of the east side of the building should be designated as a guard post in the Plan and an individual should be assigned to staff this guard post.	N/R	5		X	C
5.	Traffic Guides do not have complete or correct information on the appropriate destination for evacuees. All Traffic Guides should be trained to advise motorists with questions to tune to the EBS station (WALK) for the latest information on all matters related to the emergency, including the location of the Reception Center.	J.9, J.10.g	20		X	C
6.	Appropriate personnel and equipment were not dispatched to clear the multiple vehicle accident simulated as an impediment to evacuation. The appropriate personnel at the Patchogue Staging Area should be trained to request more information from the LERO EOC when impediments to evacuation are indicated.	J.10.k	20		X	C

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TABLE 3.6.2
SHOREHAM NUCLEAR POWER STATION
SUMMARY OF AREAS REQUIRING CORRECTIVE ACTION
JUNE 7-9, 1988
PATCHOGUE STAGING AREA

Page 2 of 3

No.	Recommended Corrective Action	MUREC-0654 FEMA-REP-1 Rev. 1, Supp. 1 Reference	FEMA Objective*	Exercise Date		Present Status
				June 7-9, 1988	Previous Exercise	
7.	Instructions for the driver of the non-institutionalized mobility-impaired bus to proceed to the Reception Center were not properly transmitted to the Bus Driver at the Brookhaven National Laboratory Transfer Point. Transfer Point Coordinators should be trained to follow instructions forthcoming from the staging area regarding directions that are to be given to special population evacuation route Bus Drivers, since they are trained to return to the transfer point for instructions as specified in the LERO Plan.	J.10.d	18		X	C
8.	Residences of some noninstitutionalized mobility-impaired persons were difficult to find. Drivers designated to pick up non-institutionalized mobility-impaired evacuees at their residences should be provided with more detailed maps and clearer descriptions of pickup points.	J.10.d	18		X	C
9.	It took forty (40) minutes from receipt of a LERO request to dispatch a Bus Driver to simulate the evacuation of forty (40) school children. The Bus Dispatcher at the Patchogue Staging Area should be provided with trained staff support so that Bus Drivers can be dispatched in a more timely manner.	J.9, J.10.g	19		X	C
10.	The Patchogue Staging Area Bus Dispatcher made repeated statements with a bullhorn which emphasized only that general population evacuation route Bus Drivers were to call in at a reading of 3.5 was reached on their DRD. He did not give the units associated with the 3.5 number nor mention the use of the 0-200 mRem DRD which is supposed to trigger the first call-in at a reading of or above 200 mRem. The verbal instructions given to the general population evacuation route Bus Drivers by the Patchogue Bus Dispatcher over the bullhorn should be more precise to emphasize the proper use of both dosimeters and the careful reading of exposure control instructions for emergency workers.	K.3, K.4	6		X	C
11.	One general population evacuation route Bus Driver read DRDs only twice at the instructions of the Transfer Point Coordinator and another read his DRDs only when it was convenient. General population evacuation route Bus Drivers should be trained to read their dosimeters approximately every fifteen (15) minutes when they are inside the 10-mile EPZ, stopping the bus to do so if necessary.	K.3.a, K.3.b	6		X	C

TABLE 3.6.2
SHOREHAM NUCLEAR POWER STATION
SUMMARY OF AREAS REQUIRING CORRECTIVE ACTION
JUNE 7-9, 1988
PATCHOQUE STAGING AREA

Page 3 of 3

No.	Recommended Corrective Action	NUREG-0654 FEMA-REP-1 Rev. 1, Supp. 1 Reference	FEMA Objective ^a	Exercise Date		Present Status
				June 7-9, 1988	Previous Exercise	
12.	Traffic Guides at two (2) TCPs did not know dose authorization limits. Train the Traffic Guides so that they know the dose authorization limits.	K.3.a, K.3.b	6		X	C
13.	The Route Alerting Driver observed believed he would receive KI authorization in an ESS scenario. This is inconsistent with OPIP, Attachment 1, Item #9. Route Alert Drivers should be trained to know that KI authorization is to be issued to them by their supervisor as specified in the LERO Plan.	J.10.e, J.10.f	16		X	C
14.	Traffic Guides at two (2) TCPs did not fully understand that the chain of command for excess exposure authorization gives the Lead Traffic Guide authority to authorize excess exposure by radio, and some Traffic Guides indicated that they might question the authority of the Lead Traffic Guide to issue the authorization for excess exposure. All Traffic Guides should be trained to know that the Lead Traffic Guide can authorize exposure in excess of the general population PACs by radio.	K.4	6		X	C

TABLE 3.7.1
SHOREHAM NUCLEAR POWER STATION
SUMMARY OF DEFICIENCIES
JUNE 7-9, 1988
RIVERHEAD STAGING AREA

Page 1 of 1

No.	Recommended Corrective Action	NUREG-0454 FEMA-REP-1 Rev. 1, Supp. 1 Reference	FEMA Objective*	Exercise Date		
				June 7-9, 1988	Previous Exercise	Present Status
1.	The time between deployment of Traffic Guides from the staging area and their arrival at TCPs was excessive, taking between fifty (50) and seventy (70) minutes; approximately thirty (30) minutes was spent in line at the staging area receiving field kits and procedures. A more expeditious means of dispatching the Traffic Guides from the staging area to the field should be developed.	J.10.3	2		X	C

TABLE 3.7.2
 SHOREHAM NUCLEAR POWER STATION
 SUMMARY OF AREAS REQUIRING CORRECTIVE ACTION
 JUNE 7-9, 1988
 RIVERHEAD STAGING AREA

Page 1 of 1

No.	Recommended Corrective Action	MUREC-0654 FEMA-REP-1 Rev. 1, Supp. 1 Reference	FEMA Objective ^a	Exercise Date		Present Status
				June 7-9, 1988	Previous Exercise	
1.	A route spotter failed to cover a portion of his assigned route. The route spotters should study their route maps more thoroughly to ensure that they are completely familiar with their routes. As a check, the route spotters could go over the route maps with the supervisor during the route briefing.	J.10.k	20	X		I
2.	Because of a misinterpretation of road names, a traffic guide directed traffic directly toward an impediment. The traffic guides should consult road maps so that they are aware of the impediment location and can more readily determine how traffic should be routed.	J.10.k	20	X		I
3.	While the status board was updated periodically, the time was not always included when new information was posted. Personnel should be trained to record the time that updated information is posted on the status board.	M/R	5		X	C
4.	The access road at the Brookhaven Substation Transfer Point was narrow and curving and could be impassable in inclement weather. Consideration should be given to relocating the Brookhaven Substation Transfer Point to a different location.	H	18		X	C
5.	One (1) of the drivers for the general population evacuation bus routes dispatched from the Riverhead Staging Area did not read his DRDs every fifteen (15) minutes as stated in OPIP 3.9.1. Bus drivers for the general population bus routes should be given additional training to read their low- and mid-range DRDs every fifteen (15) minutes.	K.J.b	6	X	X	I
6.	Two (2) of the eight (8) traffic guides did not fully understand the difference between low- and mid-range DRDs. Traffic guides should be given additional training in the use of low- and mid-range DRDs.	K.J.b	6		X	C
7.	One (1) bus driver simulated the ingestion of his KI tablet prematurely, prior to being assigned an evacuation route. Bus Drivers should be given additional training in procedures for ingesting KI.	J.10.e	16		X	C

TABLE 3.8.1
SHOREHAM NUCLEAR POWER STATION
SUMMARY OF DEFICIENCIES
JUNE 7-9, 1988
EMERGENCY WORKER DECONTAMINATION FACILITY

Page 1 of 1

No.	Recommended Corrective Action	NUREG-0654 FEMA-REP-1 Rev. 1, Supp. 1 Reference	FEMA Objective*	Exercise Date		
				June 7-9, 1988	Previous Exercise	Present Status

NO RECOMMENDATIONS

TABLE 3.8.2
SHOREHAM NUCLEAR POWER STATION
SUMMARY OF AREAS REQUIRING CORRECTIVE ACTION
JUNE 7-9, 1988
EMERGENCY WORKER DECONTAMINATION FACILITY

Page 1 of 1

No.	Recommended Corrective Action	NUREC-0654 FEMA-REP-1 Rev. 1, Supp. 1 Reference	FEMA Objective*	Exercise Date		
				June 7-9, 1988	Previous Exercise	Present Status

NO RECOMMENDATIONS

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TABLE 3.9.1
 SMOKELAND NUCLEAR POWER STATION
 SUMMARY OF DEFICIENCIES
 JUNE 7-9, 1988
 RECEPTION CENTERS

Page 1 of 1

No.	Recommended Corrective Action	NUREG-0654 FEMA-REP-1 Rev. 1, Supp. 1 Reference	FEMA Objective*	Exercise Date		
				June 7-9, 1988	Previous Exercise	Present Status

NO RECOMMENDATIONS

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TABLE 3.9.2
SHOREHAM NUCLEAR POWER STATION
SUMMARY OF AREAS REQUIRING CORRECTIVE ACTION
JUNE 7-9, 1988
RECEPTION CENTERS

Page 1 of 1

No.	Recommended Corrective Action	MUREG-0654 FEMA-REP-1 Rev. 1, Supp. 1 Reference	FEMA Objective*	Exercise Date		
				June 7-9, 1988	Previous Exercise	Present Status
1.	Monitoring and decontamination workers were inconsistent in their use of contamination control procedures. Specific examples are cited in Section 2.10 of this report, Objective FA 2i. Workers should receive additional training in contamination control procedures prior to the next exercise.	J.12	2i	X		I
2.	On several occasions, personnel radiological monitoring took approximately four (4) to five (5) minutes per individual, which is considerably longer than the ninety (90) seconds specified in the LERO Procedures. All monitoring personnel assigned to the Reception Center should be trained to monitor individuals within ninety (90) seconds as prescribed in the LERO Procedures.	J.12	2i		X	C

TABLE 3.10.1
SHOREHAM NUCLEAR POWER STATION
SUMMARY OF DEFICIENCIES
JUNE 7-9, 1988
CONGREGATE CARE CENTERS

Page 1 of 1

No.	Recommended Corrective Action	NUREG-0654 FEMA-REP-1 Rev. 1, Supp. 1 Reference	FEMA Objective ^a	Exercise Date		
				June 7-9, 1988	Previous Exercise	Present Status

NO RECOMMENDATIONS

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TABLE 3.10.2
SHOREHAM NUCLEAR POWER STATION
SUMMARY OF AREAS REQUIRING CORRECTIVE ACTION
JUNE 7-9, 1988
CONGREGATE CARE CENTERS

Page 1 of 1

No.	Recommended Corrective Action	NUREG-0654 FEMA-REP-1 Rev. 1, Supp. 1 Reference	FEMA Objective ^a	Exercise Date		Present Status
				June 7-9, 1988	Previous Exercise	
1.	Neither of the two (2) congregate care facilities activated for the February 13, 1986 exercise are identified in the latest submission of the LERO Plan. The Plan should be revised to include all facilities intended for use as shelter facilities during a radiological emergency at SNPS. These facilities should be included in the list attached to LERO's letter of agreement with the American Red Cross.	J.10.h	22		x	c ^b

TABLE 3.11.1
 SHOREHAM NUCLEAR POWER STATION
 SUMMARY OF DEFICIENCIES
 JUNE 7-9, 1988
 MEDICAL DRILL

Page 1 of 1

No.	Recommended Corrective Action	NUREG-0654 FEMA-REP-1 Rev. 1, Supp. 1 Reference	FEMA Objective ^a	Exercise Date		
				June 7-9, 1988	Previous Exercise	Present Status

NO RECOMMENDATIONS

TABLE 3.11.2
SHOREHAM NUCLEAR POWER STATION
SUMMARY OF AREAS REQUIRING CORRECTIVE ACTION
JUNE 7-9, 1988
MEDICAL DRILL

Page 1 of 1

No.	Recommended Corrective Action	NUREG-0654 FEMA-REP-1 Rev. 1, Supp. 1 Reference	FEMA Objective ^a	Exercise Date		
				June 7-9, 1988	Previous Exercise	Present Status
1.	Procedures were improperly followed by the Mid Island Hospital RSO; survey scans were conducted too rapidly, and the probe was held too far from the subject being monitored. Hospital monitoring staff should receive ongoing training in proper monitoring procedures.	L.1	24	X		I
2.	A sufficient number of trained monitoring personnel were not available, at each hospital, to perform all monitoring functions for victim, ambulance and crew, and hospital staff. At least one additional trained monitoring person should be available to assist in performing monitoring functions at each hospital.	L.1	24	X		I
3.	At the Mid Island Hospital, open windows in the decontamination area could have produced drafts that would have contributed to the spread of contamination. In addition, the containment of potentially decontaminated water beneath the victim, and the failure to monitor the victim's back prior to placing the victim on a clean gurney could have resulted in recontamination of the victim or cross-contamination of hospital equipment. Hospital staff should receive ongoing training in contamination control procedures.	L.1	24	X		I

^aObjective number is from GM-EX3 (dated February 26, 1988).

^bThis issue was addressed by the NRC letter to FEMA dated May 11, 1988 and three (3) assumptions upon which NUREG-0654/FEMA-REP-1, Rev. 1, Supp. 1 is based.

^cThis ARCA has been incorporated into ARCA LERO EOC 7.

^dThis previously identified performance ARCA has been reclassified as a planning inadequacy which is being addressed in Revision 10 of LERO's off-site Radiological Emergency Response Plan for Shoreham.

^eWithdrawn as a deficiency upon review of LILCO Emergency Response Plan subsequent to SNPS PEA dated April 17, 1986.

4 STATUS OF OBJECTIVES

The objectives for radiological emergency preparedness exercises are developed to correspond to the observable elements of NUREG-0654/FEMA-REP-1, Supp. 1. FEMA has defined thirty-seven (37) core objectives to test major portions of emergency response capabilities. Table 4 lists the status of these objectives for the LER/O and local jurisdictions by exercise date.

FEMA Objectives ¹	Exercise Date	Lero EOC	EOF	BHO	Contract Lab	EOC	Staging Areas	EWDF	Field Activities
1. Demonstrate the ability to monitor, understand and use emergency classification levels (ECL) through the appropriate implementation of emergency functions and activities corresponding to ECL's as required by the scenario. The four ECL's are notification of unusual event, alert, site area emergency and general emergency.	2/13/86 6/7-9/88	M	M	M			M		
2. Demonstrate the ability to fully alert, mobilize and activate personnel for both facility and field-based emergency activities.	2/13/86 6/7-9/88	M	M	M		M	M	M	M
3. Demonstrate the ability to direct, coordinate and control emergency activities.	2/13/86 6/7-9/88	P	M	M		M	P		
4. Demonstrate the ability to communicate with all appropriate locations, organizations and field personnel.	2/13/86 6/7-9/88	P	M	M		M	M		M
5. Demonstrate the adequacy of facilities, equipment, displays and other materials to support emergency operations.	2/13/86 6/7-9/88	M	M	M		N/M	M		
6. Demonstrate the ability to continuously monitor and control emergency worker exposure.	2/13/86 6/7-9/88	P		M			P	M	P
7. Demonstrate the appropriate equipment and procedures for determining field radiation measurements.	2/13/86 6/7-9/88			M	M				M
8. Demonstrate the appropriate equipment and procedures for the measurement of airborne radiiodine concentrations as low as 10^{-7} microcurie per cc in the presence of noble gases.	2/13/86 6/7-9/88			M					M

FEMA Objectives ¹	Exercise Date	Lero EOC	EOF	BHO	Contract Lab	ENC	Staging Areas	EWDF	Field Activities
9. Demonstrate the ability to obtain samples of particulate activity in the air-borne plume and promptly perform laboratory analyses.	2/13/86 6/7-9/88			M					M
10. Demonstrate the ability, within the plume exposure pathway, to project dosage to the public via plume exposure, based on plant and field data.	2/13/86 6/7-9/88		M	M					
11. Demonstrate the ability to make appropriate protective actions decisions, based on projected or actual dosage, EPA PAC's availability of adequate shelter, evacuation time estimates and other relevant factors.	2/13/86 6/7-9/88	P		M					
12. Demonstrate the ability to initially alert the public within the 10-mile EPZ and begin dissemination of an instructional message within 15 minutes of a decision by appropriate state and/or local officials.	2/13/86 6/7-9/88	P					P		
13. Demonstrate the ability to coordinate the formulation and dissemination of accurate information and instructions to the public in a timely fashion after the initial alert and notification has occurred.	2/13/86 6/7-9/88	M				M			
14. Demonstrate the ability to brief the media in an accurate, coordinated and timely manner.	2/13/86 6/7-9/88					P			
15. Demonstrate the ability to establish and operate rumor control in a coordinated and timely fashion.	2/13/86 6/7-9/88					M/M			

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TABLE 4 STATUS OF OBJECTIVES - SHOREHAM NUCLEAR POWER STATION

Page 4 of 6

FEMA Objectives ¹	Exercise Date	Lero EOC	EOF	BHO	Contract Lab	ENC	Staging Areas	EWDF	Field Activities
22. Demonstrate the adequacy of facilities, equipment and personnel for congregate care of evacuees.	2/13/86 6/7-9/88								M
23. Demonstrate the adequacy of vehicles, equipment, procedures and personnel for transporting contaminated, injured or exposed individuals.	2/13/86 6/7-9/88								M M
24. Demonstrate the adequacy of facilities, equipment, supplies, procedures and personnel for handling contaminated, injured or exposed individuals.	2/13/86 6/7-9/88								M P
25. Demonstrate the adequacy of facilities, equipment, supplies, procedures and personnel for decontamination of emergency workers, equipment and vehicles for waste disposal.	2/13/86 6/7-9/88							M M	
26. Demonstrate the ability to identify the need for and call upon Federal and other outside support agencies' assistance.	2/13/86 6/7-9/88	M M							
27. Demonstrate the appropriate use of equipment and procedures for collection and transport of samples of vegetation, food crops, milk, meat, poultry, water and animal feeds (indigenous to the area and stored).	2/13/86 6/7-9/88			M					
28. Demonstrate the appropriate lab operations and procedures for measuring and analyzing samples of vegetation, food crops, milk, meat, poultry, water and animal feeds (indigenous to the area and stored).	2/13/86 6/7-9/88				M				

TABLE 4 STATUS OF OBJECTIVES - SHOREHAM NUCLEAR POWER STATION

Page 5 of 6

FEMA Objectives ¹	Exercise Date	Lero EOC	EOF	BHO	Contract Lab	ENC	Staging Areas	EWDP	Field Activities
29. Demonstrate the ability to project dosage to the public for ingestion pathway exposure and determine appropriate protective measures based on field data, FDA PAC's and other relevant factors.	2/13/86 6/7-9/88	P	M	P					
30. Demonstrate the ability to implement both preventive and emergency protective actions for ingestion pathway hazards.	2/13/86 6/7-9/88	M							
31. Demonstrate the ability to estimate total population exposure.	2/13/86 6/7-9/88		M						
32. Demonstrate the ability to determine appropriate measures for controlled reentry and recovery based on estimated total population exposure, available EPA PAC's and other relevant factors.	2/13/86 6/7-9/88	M	N/A						
33. Demonstrate the ability to implement appropriate measures for controlled reentry and recovery.	2/13/86 6/7-9/88	M					M		M
34. Demonstrate the ability to maintain staffing on a continuous 24-hour basis by an actual shift change.	2/13/86 6/7-9/88	M		M		N/O	M	M	M
		M	M			M	M	M	
35. Demonstrate the ability to coordinate the evacuation of on-site personnel.	2/13/86 6/7-9/88	M	M						
36. Demonstrate the ability to carry out emergency response functions (i.e., activate EOC's, mobilize staff that report to the EOC's, establish communications linkages and complete telephone call down) during an unannounced off-hours drill or exercise.	2/13/86 6/7-9/88								

FEMA Objectives ¹	Exercise Date	Lero EOC	EOF	BHO	Contract Lab	ENC	Staging Areas	EWDF	Field Activities
37. Demonstrate the capability of utility off-site response organization personnel to interface with nonparticipating State and local governments through their mobilization and provision of advice and assistance.	2/13/86 6/7-9/88	M				M	M		M

LEGEND: Blank = Not an exercise objective
M = Objective met
P = Objective partially met
N/M = Objective not met
N/O = Not observed by FEMA
N/A = Not applicable

FOOTNOTE:

Note 1: Objectives are from GM EX-3 (dated February 26, 1988).

Note 2: Objective 15 was also demonstrated at L/LCO district offices.