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**ARGX-87
Accident Response Group
Exercise-1987**

A Broken Arrow Mini Exercise

E. P. Schuld
D. F. Cruff

July 1987

This is an informal report intended primarily for internal or limited external distribution. The opinions and conclusions stated are those of the author and may or may not be those of the Laboratory.

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Glossary of Terms

| | |
|--------------|--|
| AFB | Air Force Base |
| AL | Albuquerque Operations |
| ALERT | Active Livermore Emergency Response Team |
| ARAC | Atmospheric Release Advisory Capability |
| ARG | Accident Response Group |
| DNA | Defense Nuclear Agency |
| DOD | Department of Defense |
| DOE | Department of Energy |
| EOC | Emergency Operations Center |
| ETA | Estimated Time of Arrival |
| ETD | Estimated Time of Departure |
| IRF | Initial Response Force |
| JNACC | Joint Nuclear Accident Coordinating Center |
| LLNL | Lawrence Livermore National Laboratory |
| MAC | Military Air Command |
| NMCC | National Military Command Center |
| RSP | Render Safe Procedures |
| SNLA | Sandia National Laboratories, Albuquerque |
| SNLL | Sandia National Laboratories, Livermore |
| SRF | Service Response Force |
| SSA | Senior Scientific Advisor |
| USAF | United States Air Force |

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Ext: 2-8790

September 2, 1987

TO: Distribution
FROM: D. F. Cruff
SUBJECT: Report - ARGX-87

The enclosed report was prepared to record the events of a Broken Arrow Mini Exercise -- Accident Response Group Exercise 1987 -- and is being sent to those on the distribution of this letter. Additional copies of the report may be obtained by calling Eric P. Schuld at 423-7790.

Very truly yours,


D. F. Cruff

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Enc1.

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ARGX-87

Accident Response Group

Exercise-1987

A Broken Arrow Mini Exercise

Summary

A Broken Arrow mini exercise dubbed "Accident Response Group Exercise-1987" (ARGX-87) was conducted on June 1, 1987 at the Lawrence Livermore National Laboratory (LLNL) and Sandia National Laboratories, Livermore (SNLL). The exercise started at 0445 PDT with a call from the Department of Energy (DOE)—EOC in Washington, D.C., to the Albuquerque Operations (AL)—EOC. AL, in turn, called the Laboratory off-hour emergency number (Fire Dispatcher), who called the Laboratory Emergency Duty Officer (LEDO). The LEDO then contacted the Accident Response Group (ARG) Senior Scientific Advisor. Calls were placed to assemble appropriate members of the ARG in the ALERT Center. No phone number for SNLL was available at the Albuquerque Operations EOC, so a controller injected a message to SNLL to get them involved in the exercise. The messages received at the Laboratory identified the Air Force line item weapon system involved in the accident and the accident location. As people arrived at the ALERT Center they began discussing the details of the accident. They also started working the deployment logistics and other issues. Travel arrangements for the HOT SPOT equipment and ARG personnel were made for immediate deployment to the accident site in North Dakota. The exercise was terminated at 0840 as planned.

While certain procedural deficiencies were noted, the exercise was considered a valuable learning experience. The results and observations from this experience will be used to refine the operating procedures and the training program.

Introduction

LLNL and SNLL maintain a group of specialists called ARG, who respond to emergencies dealing with nuclear weapons. When an accident involving a nuclear weapon occurs while the weapon is in the possession of the Department of Defense (DOD), the first response is made by an EOD team, which is part of a DOD Initial Response Force (IRF). The EOD team determines the extent of damage to the weapons and performs Render Safe Procedures (RSP) if they are required. Certain conditions of a warhead accident dictate that the DOE Joint Nuclear Accident Coordinating Center (JNACC) be notified and that assistance from the design laboratories be requested. An accident in which a nuclear weapon is severely damaged is called a "Broken Arrow."

This exercise was planned to include as much realism as possible by including participation of the United States Air Force Atmospheric Release Advisory Capability (ARAC) station at the Minot Air Force Base in North Dakota, the DOE Operations Centers in Washington, DC and the Albuquerque Operations Office in New Mexico.

The objectives of the exercise were to execute and evaluate the callout and assembly procedures of the Livermore ARG and to evaluate the operations of the LLNL ALERT Center.

MASTER

7/27/87 11:11:00 AM

Planning

The first planning meeting, held in September 1986, established the guidelines for the exercise. The participants, SNLL and LLNL, were asked to present possible scenarios at the next general meeting. Several weapons were considered and one was selected to be used in the scenario. Six subsequent meetings were held to discuss the details of the exercise and to assign controllers for the specific activities during the exercise. A set of injects, together with a timeline (see Appendix A), were prepared and given to the appropriate controllers.

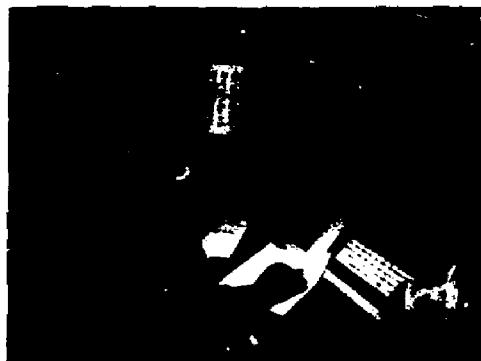
Scenario

An Air Force transporter van carrying Line Item 857 was struck by a concrete mixer truck on a bridge approximately 55 miles south of Minot Air Force Base on Route 37. The van plunged through the bridge railing and came to rest on its side, partially submerged. Reports of extensive damage to the van in the area of Line Item 857 were received.*

Exercise

Rice Trolan, in the DOE-EOC in Washington, DC, started the exercise at 0445 PDT with a call to the AL-EOC and gave Message No. 1 (see Appendix A). At 0502 AL-EOC called the Laboratory Fire Dispatcher, who then called the Laboratory Emergency Duty Officer (LEDO), Lynn Cleland, and transmitted Message No. 2.

Fire Dispatcher takes
call from AL-EOC, then
calls the Lab LEDO.



The LEDO then called the first available Senior Scientific Advisor, who was Bob Andrews. (Bill Nelson and Eric Schuld were excluded from the list due to planning participation in the exercise.) Andrews had to decline for business reasons and called Roger Ide, who accepted the position and started the sequence of calls to mobilize the ARG and activate the Building 111 ALERT Center. Ide arrived at the ALERT Center at 0600 and made several telephone calls from the phone booth in the Building 111 hall. The ALERT Center was opened by Fred Kloverstrom at 0624 and additional calls were made by the ALERT Center operators to ARG members.

ALERT CENTER

* Messages transmitted during the exercise are included in Appendix A.



**Kathy Anderson calls
ARG members.**

Arrival time at the LLNL Building 111 ALERT Center Morning Light Conference Room for the ARG members ranged from 0600 for the earliest to 0752 for the last.

SNLL did not receive a call from AL because AL-EOC did not have the telephone number, but was alerted by an exercise controller on the regular guard headquarters phone. This phone does not record, so no record of the call was made. The guards did act quickly and started the callout. The initial calls were based on an out-of-date list; however, the problem was recognized and the calls were completed in about 20 minutes. Three players arrived within 30 minutes from the start of calling, and the SNLL ARG room was activated. All of the players who responded arrived within 75 minutes. A couple of players were confused about what is the appropriate response to an out-of-hours call announcing an exercise.

**SNLL ARG members Don Bohrer
and Bill Hoover work the
problem.**



In the LLNL ALERT Center the vault with the combination lock was not opened until 0639. When opened, the drawings, manuals and related documents were made available to both SNLL and LLNL ARG members. The line number was correctly identified and after some discussion was established as the weapon system that was called for in the scenario. One message from AL (No. 4) requested that worst case conditions be addressed so that information could be passed to the Service Response Force On-Scene Commander at the accident site. The specific information (Message No. 6) was gathered and being put in the form of an information message to be sent by CATCOMS to the AL EOC.



ARG members discussing accident with SSA.

Jack Button, ARG Operations Coordinator, contacted two additional Operations Coordinators, Jerry Bardecker and Dick Partridge, and requested that they alert the HOT SPOT Mobile Laboratory personnel and prepare the equipment for possible deployment. Drivers, maintenance personnel, and supporting Health and Safety technologists were also contacted.



Jack Button calls in additional ARG members.

Travel arrangements were being made in the Travel Office by ARG members, Bill Hartman and Dorothy Bahl, while Jack Button, the Logistics ARG member, was in telephone contact with Travel from the ALERT Center. AL had requested names of people that were to deploy and their ETD/ETA. Dorothy Bahl and Bill Hartman began checking the various options for getting the ARG to the accident site. Button was informed that 15 seats were available out of Oakland Airport at 1030 hours. A change of planes in Salt Lake City made an arrival at Bismarck at 1714 hours, and then ground transportation to the accident site would result in an ETA at the accident site of approximately 1900 hours for the advance party. The Senior Scientific Advisor then designated the composition of the 15-person advance party.

The Travel support function operated very smoothly and would have provided the deploying ARG with the necessary travel arrangements and papers.



Bill Hartman and Dorothy Bahl make travel arrangements.

Military Air Command (MAC) was also investigated to transport the HOT SPOT equipment and the remainder of the ARG team to Minot Air Force Base. Departure from Travis Air Force Base was planned for 2000 hours, with an ETA at Minot 2300 hours.

The exercise was terminated at 0840 hours and the participants met at the Cafeteria for a delayed breakfast.

Conclusions

General

Exercises have artificialities that tend to lessen the need to operate in a prescribed manner. Previous exercises have pointed out deficiencies in the callout procedures, yet the same thing occurs in the next exercise. Checklists of things to do at the onset of the exercise were not evident as being used. The callout procedures for alerting the Sandia Livermore ARG have never worked as planned.

The ALERT Center was in a state of disarray due to remodeling, which may have contributed to the seeming lack of organization. Also, with exercises come "Controllers," who add to the number of people in a given area, which makes it more crowded than would be the case in a real accident callout.

Even so, the LLNL and SNLL ARG accomplished the exercise objective satisfactorily and could have provided the proper support for the DOE-ARG and the DOD-EOD.

Weapon Recovery

After some time the ARG members (SNLL and LLNL) were able to piece together the configuration of the weapon system from the line number, and determine the number of units involved. They correctly assessed the situation and made recommendations for inclusion in the response to AL.

Radiological Effort

The Laboratory ARAC Office and the Air Force ARAC station were in contact and provided plots of radioactive contamination in the event of a high explosive detonation. Health Physics, Explosives Safety, Criticality, and Industrial Safety personnel were activated and provided advice to the SSA. In addition, the HOT SPOT Mobile Laboratory was prepared for deployment to the accident site.

Support

The travel arrangements were made and the advance party of the ARG was set to deploy on a reasonable time scale to support the DOD-EOD at the accident site. Plans were also developed to deploy the HOT SPOT equipment and the remainder of the ARG personnel from Travis Air Force Base via MAC aircraft.

Problem Areas and Recommendations

The Callout

The call from AL-EOC came to the LLNL as planned; however, SNLL was not notified. Eric Schuld noted this and placed a call to the AL-EOC and requested that SNLL be notified. This call did result in the SNLL ARG callout and they did receive subsequent messages (Nos. 3 through 7) from AL-EOC.

Recommendation: This situation has occurred on the last four exercises, so it is difficult to make a recommendation except to again remind AL to place SNLL on its call checklist. Possibly frequent callout exercises would establish a routine. AL-EOC was reminded to follow their established procedures (E. Schuld and J. Marion) and to include SNLL in the callout.

ALERT Center Operation

There was no "checklist" for the Senior Scientific Advisor nor other key people, as recommended in the problem areas from the last exercise—JTX-85. Information on the accident was not delineated on the liquid chalk board, as was recommended in the JTX-85 report. (A portion of the first message only was put on the board.) An LLNL ARG member was given accident message information over the phone from the SNLL ARG Center.

Recommendation: This situation is similar to the last exercise and no corrections had been made. A meeting was held five days after the exercise and the following recommendations were made:

- a. A preliminary checklist will be prepared for review and comments. When finalized, this document will be given to each Senior Scientific Advisor with instructions to use it after receiving the call to respond to an accident or an exercise.

- b. The ALERT Center (Morning Light Conference Room) will be set up with chairs designated for the heads of specific ARG components (SSA, Health Physics, Criticality, HE, Stockpiled Weapons, etc.) and manned by one person. This person will maintain contact with his constituents, who are located in areas/offices near the ALERT Center. Information on the accident will be received from the SSA and promulgated to the technical people by the head of the disciplines. Feedback from them will be given to the SSA for inclusion in his summation of the accident situation.
- c. Display boards containing all information of the accident are hung on the walls of the ALERT Center and will be kept up to date with additional information as it becomes available.
- d. The people who operate the ALERT Center will be more efficiently utilized to take phone messages, send CATCOMS messages, pass written information from the technical people to the chair heads, and perform other tasks that the SSA may request.
- e. All ARG members will be made aware of the Weapon Data Books and their location in the ALERT Center area. The checklists have this item high on the list of material to assemble for evaluating accidents.
- f. All ARG members will be given a briefing, at least once a year, to refamiliarize them with their responsibilities with respect to callout procedures, reporting procedures, and ALERT Center operations.

Weapon Recovery Operation

The ARG was slow in assembling and was made up of some Laboratory people who are not on the callout list. It is not clear why people who are not on the pre-established list were called. Possibly the "old buddy system" may have been at work.

Recommendation: The checklist should specify the people to be called first. They, in turn, are free to call anyone they choose to assist in analyzing the situation, but must remember to keep the number of people in the ALERT Center to a minimum. Conferences should be held outside the ALERT Center and only the principle returns to inform the SSA of their recommendations.

Radiological Support

The Minot ARAC Station decided to put a little "action" into the exercise and reported a detonation.

Recommendation: Caution outside participating agencies to adhere to the prescribed scenario.

SNLL ARG Center

Once again SNLL did not receive a call directly from JNACC/AL EOC. The JNACC/AL EOC controller did not understand that he was to notify SNLL rather than go through SNLA.

Recommendation: SNLL has since sent AL unambiguous guidance regarding what SNLL telephone number to use when Livermore weapons are involved.

Communications between the SNLL ARG Center and the LLNL ALERT Center are not well established.

Recommendation: Telephone numbers of each ARG should be prominently displayed in each center.

The callout to potential exercise ARG players did not result in all responding in a minimum amount of time.

Recommendation: All ARG personnel have been instructed to respond when called for an accident or an exercise.

ARGX-87 Photo Story



"The Call"

LLNL Fire Department dispatch center takes call from AL-EOC.

The ALERT center operations start with calls to the ARG members.



DNA ARG member provides information on contacts at the service response force in accident area.



ALERT center provides facilities and staff for ARG operations in the ALERT center.



ALERT center operations.



ARG discussing exercise accident.



Senior scientific advisors (FTL and HTL) confer with ARG members.



The ALERT center is a hub of activity.



Security assists with ARG clearances--and provides a planner/controller.



ARG members discuss: high explosives, weapon design, health physics, plutonium, ARAC plots, criticality, and logistics.



The travel office prepares the itineraries and travel packets for the ARG.



Sandia ARG members discuss accident and provide information on weapons components.



The HOT SPOT and liquid abrasive cutter equipment team members report to the ALERT center.



Controllers observe and direct the exercise.



"End of Exercise" comments on the exercise and a thanks to all who participated.

Acknowledgments

The authors thank everyone who participated in the exercise. The time they devoted to their particular task was mostly "their own" because the exercise was ahead of normal working hours. The planners spent many hours in meetings preparing the scenario, developing coverage of the activities, and then acting as controllers during the exercise. The players, while not devoting as much time to the exercise as the planners, had to work under pressure to determine the accident situation based on somewhat limited information, and prepare for deployment. The overall seriousness and spirit exhibited by all participants made the effort worthwhile and is appreciated.

The time spent and lessons learned are beneficial for being better prepared in the event of a real accident. Thanks again for your contributions.

Planners

| | | |
|---------------------|---|------|
| E. P. Schuld | Exercise Leader Planner & Controller | LLNL |
| John E. Marion | Exercise Leader Planner & Controller | SNLL |
| John Clatworthy | Planner/Controller— Operations/Logistics | LLNL |
| Robert R. Compton | Planner/Controller— Business Services | LLNL |
| Delbert F. Cruff | Planner/Controller—Weapons | LLNL |
| Leonard E. Dighton | Planner/Controller | SNLL |
| James S. Dittig | Planner—Security | LLNL |
| George D. Greenly | Planner—ARAC | LLNL |
| Thomas F. Henderson | Planner/Controller | DNA |
| John S. Nasstrom | Controller—ARAC | LLNL |
| Michael K. Sheaffer | Planner/Controller | DNA |
| Kenneth F. Way | Photographer | LLNL |
| James A. Wells | Planner/Controller—Security | LLNL |
| R. Eugene Church | Observer | SNLA |
| Marie A. Dremalas | Controller | SNLL |

Players

| | | | |
|-------------------------|------|----------------------|------|
| Kathy S. Anderson | LLNL | Robert I. Jensen | LLNL |
| Robert T. Andrews | LLNL | Fred A. Kloverstrom | LLNL |
| Dorothy L. Bahl | LLNL | Jack Martinell | SNLL |
| Jerald E. Bardecker | LLNL | David S. Myers | LLNL |
| James F. Barham, Jr. | SNLL | Donna R. Padilla | LLNL |
| Donald J. Bohrer | SNLL | Richard D. Partridge | LLNL |
| John A. Button | LLNL | John S. Pearson | LLNL |
| Albert M. Celoni | LLNL | Arnold S. Rivenes | SNLL |
| Evelyn E. Chaney | SNLL | Jack L. Robbins | LLNL |
| Ronald M. Del Vasto | LLNL | Michael R. Ruggieri | LLNL |
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| Everett B. Guthrie | LLNL | Thomas H. Smith | LLNL |
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| Kathy A. Hermes | LLNL | Jerry W. Stengel | LLNL |
| Linwood O. Hester | LLNL | Carl W. Sundbeck | LLNL |
| William R. Hoover | SNLL | Joan B. Sweitzer | LLNL |
| William H. Hubbell, Jr. | LLNL | David G. Trombino | LLNL |
| Roger H. Ide | LLNL | Frank J. Wilson | DNA |
| William S. Inouye | LLNL | | |

Appendix A. Messages for ARGX-87

#1. Message: DOE-EOC to AL-EOC

"THIS IS AN EXERCISE" . . .

Date Time - 6/1/87 - 1145Z. NMCC advises that the Air Force has declared a Broken Arrow in a remote area of North Dakota. At approximately 1105Z (0605 CDT) a transporter van carrying Line Item 857 was involved in an accident. Place AARG on standby and prepare to assist in evaluating situation. More information will follow as soon as available.

THIS IS AN EXERCISE"

#2. Message: AL-EOC to Livermore Design Labs (Local Controller start at 0515 PDT if necessary)

"THIS IS AN EXERCISE" . . .

Date Time - 6/1/87 - 1200Z (0600 MDT). The Air Force has declared a Broken Arrow in a remote area of North Dakota. At approximately 1105Z (0605 CDT) a transporter van carrying Line Item 857 was involved in an accident. You are being notified to assemble your ARG to assist us in evaluating the accident situation. More information on the accident will be sent as soon as available.

THIS IS AN EXERCISE"

#3. Message: AL-EOC to LLNL Senior Scientific Advisor (Local Controller inject at 0545 if necessary)

"THIS IS AN EXERCISE" . . .

6/1/87 - 1230Z (0630 MDT). Follow-up message on Broken Arrow involving Line Item 857. Transporter van was struck by a concrete mixer truck on a bridge. Please call AL-EOC 8-846-1104 as soon as possible for additional information.

THIS IS AN EXERCISE"

#4. Message: Phone Information from AL-EOC (SSA call to AL-EOC when arriving at ALERT Center approximately 0600 PDT)

"THIS IS AN EXERCISE" . . .

The report from North Dakota indicates extensive damage to the van in the area where Line Item 857 was located. After being struck by the concrete truck the van plunged through the bridge railing and came to rest on its side, partially submerged. Air Force personnel have been removed from the wreckage. Please address worst case conditions and call AL-EOC 8-846-1104 as soon as possible so that we can advise On-Scene Commander of potential problems.

THIS IS AN EXERCISE"

#5. Message: AL-EOC to LLNL Senior Scientific Advisor

"THIS IS AN EXERCISE . . .

6/1/87 - 1300Z (0700 MDT). Follow-up message on Broken Arrow. Location of accident has been identified as approximately 55 miles south of Minot Air Force Base on Route 37. Navy EOD team has been notified and is preparing to respond.

THIS IS AN EXERCISE"

#6. Inject message to SSA if necessary

(ALERT Center Controller at 0630 PDT)

"THIS IS AN EXERCISE . . .

When replying to AL-EOC consider certain problems:

1. Criticality
2. HE detonation
3. Radioactive contamination
4. Status of ARAC plots

THIS IS AN EXERCISE"

#7. Message: AL-EOC to LLNL Senior Scientific Advisor

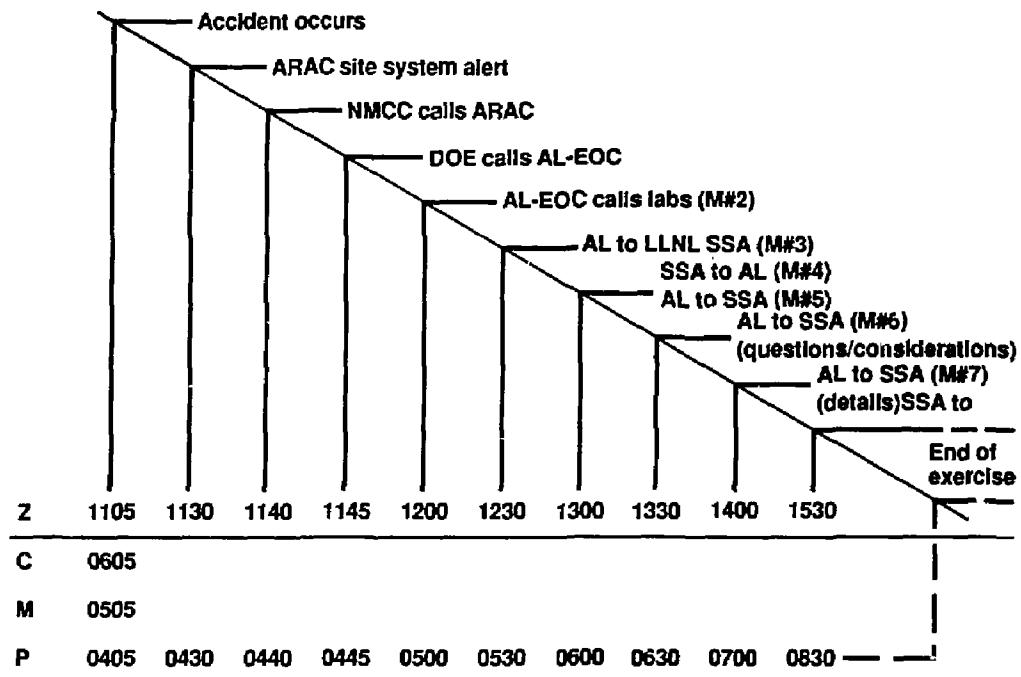
"THIS IS AN EXERCISE . . .

6/1/87 - 1400Z (0800 MDT). Navy EOD reports extensive damage to line item. A possibility exists that a pit has been breached. They are preparing to take water samples near the damaged area and will have them available for counting when HOT SPOT Mobile Lab arrives. Initial survey by the alpha and tritium monitors showed no contamination. EACT has authorized ARG deployment. Advise AL of safety concerns and possible action by Air Force personnel prior to ARG arrival. Please provide AL-EOC with list of personnel scheduled to deploy with ETD/ETA as soon as possible. End of messages.

THIS IS AN EXERCISE"

End exercise at approximately 0830/0900 PDT.

Time Line Chart



Controller Action

| | | | |
|----------------|---|-------|---|
| E. Schuld | F.D. Dispatch Center, B-313 ALERT Center, B-111 | 0430 | Observe & control Inject Messages #3 & #6 if necessary—control |
| J. Clatworthy | F.D. Dispatch Center, B-313 ALERT Center, B-111 | 0430 | Observe & control Inject Message #2 if necessary Observe & control HOT SPOT |
| J. Marion | SNLL—ARG CENTER | 0430 | SNLL Controller |
| L. Dighton | ALERT Center—B-111 | 0515* | SNLL Controller |
| G. Norris | SNLL—ARG Center | 0430 | SNLL Observer |
| M. Dremalas | SNLL—ARG Center | 0430 | SNLL observe & control |
| G. Greenly | ARAC Center | 0400 | Observe & control |
| M. Sheaffer | ALERT Center | 0515* | Observe & control |
| T. Hendrickson | ALERT Center | 0515* | Observe & control |
| K. Way | F.D. Dispatch Center, B-313 ALERT Center, B-111 Travel Office, T-2625 | 0430 | Photograph operation Photograph operation Photograph operation |
| R. Compton | ALERT Center, B-111 Travel Office, T-2625 | 0515* | Observe & control Observe & control |
| J. Dittig | ALERT Center | 0515* | Observe & control |
| D. Cruff | ALERT Center | 0515* | Observe & control |

* Meet in Lobby, B-111—go to ALERT Center when opened by Security.