NUREG-0729

Report to Congress on NRC Emergency Communications

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FOREWORD

Public Law 96-295 contains a request for NRC to provide three reports to Congress, all related to improvements in the NRC response to nuclear emergencies since the accident at Three Mile Island Unit 2 on March 28, 1979. The reports prepared to answer that request are:

NUREG-0728, "Report to Congress: NRC Incident Response Plan"
NUREG-0729, "Report to Congress on NRC Emergency Communications"
NUREG-0730, "Report to Congress on the Acquisition of Reactor Data for the NRC Operations Center"

These reports summarize the status of many of the actions taken to date and provide the basis for continued upgrading of the NRC Incident Response Program.

The NRC Incident Response Plan assigns responsibilities for performing the functions and making the decisions that comprise the NRC response. The NRC plan will be made consistent with plans being prepared by the Federal Emergency Management Agency.

The Report on Emergency Communications summarizes the findings of communications problems identified by the major reviews and investigations of the accident and response at Three Mile Island. The report also includes the status of corrective actions for the identified problems and presents an evaluation of current communication capabilities and future options needed to support the functions identified in the NRC Incident Response Plan.

The Report on Acquisition of Reactor Data for the NRC Operations Center describes alternatives for one major facet of the communications problem: acquiring data at a nuclear power plant and transmitting them to NRC headquarters. Such a data link can play a role in the NRC functions and decisions and provide broad support for the entire NRC Incident Response Plan.

Collectively, these reports to Congress provide a comprehensive outline of the actions and plans of the NRC for improving its response to any future accidents. It is anticipated that these documents will also provide the other possible participants in an accident (State and local agencies, licensees, vendors, etc.) with an understanding of the present manner in which NRC can be expected to respond and how the response will change in the near future.

ACKNOWLEDGMENT

This report was prepared by the Operations Support Staff of the Office of Inspection and Enforcement, U.S. Nuclear Regulatory Commission, from the work of many individuals in several headquarters and regional offices. Major contributions are hereby acknowledged from (listed alphabetically) Joe Himes, John Jones, Vernon Kerr, Richard Rosano, and Bernard Weiss. Other essential assistance was rendered by Dennis Allison, William Axelson, Larry Bell, Thomas Elsasser, Charles Gallina, Greg Gibson, Gerald Klingler, Robert Paulus, Steve Ramos, Gerald Troup, Richard Van Niel, and Eric Weinstein.

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NRC EMERGENCY COMMUNICATIONS

1. INTRODUCTION AND SUMMARY

This report summarizes the needs, capabilities, and plans for communications to be used in support of emergency response activities of the U. S. Nuclear Regulatory Commission (NRC). Many needs became acutely apparent during the accident at Three Mile Island (TMI). Some of the TMI problems were satisfied -- for the duration of the response, at least -- with the help of other agencies, local telephone companies, the American Telephone and Telegraph Company (AT&T), and the White House Communications Agency. More permanent improvements were started immediately after the accident, again to solve the most urgent problems first (such as those which impeded prompt notification of the accident to the NRC). In the meantime, NRC, other Federal agencies, States, and licensees began to revise or develop plans to guide a coordinated response to any future accident at a nuclear power reactor. In a similar manner, communications must be comprehensively planned to support the coordinated response effectively. The NRC is now in the process of revising its communication programs to support its newly revised Incident Response Plan.

Substantial communication improvements have been made since the TMI accident, but they have predominately involved modifications in hardware and procedures; personnel problems received less attention. NRC is continuing an intensive investigation into certain deficiencies in the flow of pertinent information during the TMI accident to assure that no problems are ignored and that the comprehensive improvements now under way consider all aspects of a solution - facilities, procedures, and people.

NRC has completed other reviews and investigations of the TMI accident. Section 2 and the Appendix to this report cite and summarize the communication-related findings of two of those investigations as well as the findings of four major independent investigations. The summary briefly describes each problem, its effect on NRC functions, and the status of actions taken to resolve it. For example, significant improvements were made in the notification functions soon after TMI. A requirement was established for prompt notification to the NRC of an incident, guidelines were issued to help licensees decide when to make such notifications, special dedicated telephones were installed to carry the notification reliably, and personnel were assigned at NRC headquarters to receive the calls.

On the other hand, the flow of information in the first few hours after the initial notification is not yet greatly improved, even during normal duty hours. During this potentially critical period there are not yet (and perhaps never can be) enough people in a reactor control room to perform the licensee's emergency functions and provide sufficient information to the NRC at the same time, and an automated data system is about four years away (NUREG-0730, Ref. 7). Better procedures and training are being initiated to help in the meantime.

As part of the continuing investigation into the Three Mile Island accident, deficiencies in the early flow of information are being investigated.

These deficiencies impeded various groups in their efforts to evaluate and respond to the events of the accident. One of the products of the investigation is expected to be the identification of people-related communication deficiencies which, when corrected, will improve the timeliness, completeness, and accuracy of the flow of information in the event of another accident.

There are other examples of significant improvements and remaining problems from TMI:

(1) Additional telephone lines have been, and will be, installed, but the small local telephone exchange serving a typical site would be saturated if another accident were to happen tomorrow. Means of bypassing the local exchange are being considered, but alternatives present other problems (such as high cost).

(2) Onsite and near-site facilities have been planned to relieve congestion in the control room and provide for better face-to-face coordination of response activities, but the specific role and staffing of each facility is still being discussed.

The NRC staff recognized that "quick fixes" for the problems at TMI would not necessarily provide the best communications capability in the event of some future, perhaps very different, accident. Section 3 of this report identifies the communication capabilities needed--who must communicate with whom, and how--to carry out each of the functions described in the current NRC plan for response to any kind of accident at a nuclear power reactor. (The NRC Incident Response Plan, NUREG-0728, Ref.8, is being submitted to the Congress in satisfaction of a separate requirement of Public Law 96-295).

Section 4 describes the adequacy of communication systems now in use or under development for satisfying each needed capability. Systems are assessed in terms of NRC capability to communicate by voice, written narrative, graphics, data, and face-to-face. Not all of the needs were apparent during TMI. For example:

(1) Hurricanes and other weather hazards can cause widespread outages in the telephone system. There is no reasonable backup available today, although adequate backup must be considered an essential part of any communication system for which high reliability is important.

(2) Too much data can be a problem. Not only does it tax the communication system unnecessarily, but it may also overwhelm the data evaluators. Some people fear that too much data sent offsite can lead to too much management from offsite. Procedures have been developed to guard against this problem but training and exercises will still be needed.

Section 5 discusses, briefly, potential options for solving some of the remaining problems--satellite systems for primary, augmented and backup communications, rapidly deployable communications vans, and radio systems. Important policy issues are involved:

(1) To what extent should NRC mandate communication system configurations for the licensees?

(2) How should system costs be shared?

(3) To what extent should NRC depend on FEMA and other Federal organizations for backup and augmentation?

(4) To what extent is communications privacy required?

No clear need for legislation can be defined until these issues are better resolved.

This document is, in part, a status report of efforts under way to improve NRC emergency communications; supplementary reports of more progress will be issued as NUREG documents. Continued progress does not depend on the NRC alone, however. Other Federal, State, local, and private organizations are also upgrading their communications, but too little effort to date has been directed toward joint planning of these improvements. Issues of compatibility, cost-sharing, and system management must be resolved before a truly coordinated interagency emergency response capability can exist. This document is intended to be a step in that direction.

2. COMMUNICATION PROBLEMS DURING THE ACCIDENT AT THREE MILE ISLAND

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2.1 Introduction

Each of the major reviews and investigations of the accident at Three Mile Island found significant communication problems. These problems, which affected several response activities, involved limitations in personnel and procedures as well as facilities and equipment. Steps have been taken to overcome each kind of limitation but all of the problems have not yet been completely resolved.

2.2 Method of Review

NRC personnel involved in various facets of the TMI response reviewed the following documents:

(1) Investigation into the March 28, 1979 Three Mile Island Accident by the NRC Office of Inspection and Enforcement (NUREG-0600; Ref. 1)

(2) Report of Special Review Group, Office of Inspection and Enforcement, on Lessons Learned from Three Mile Island (NUREG-0616; Ref. 2)

(3) Three Mile Island - A Report to the Commissioners and to the Public ("Rogovin Report"; Ref. 3)

(4) Report of the President's Commission on the Accident at Three Mile Island ("Kemeny Report"; Ref. 4)

(5) Report to the United States Senate: Nuclear Accident and Recovery at Three Mile Island ("Senate Report"; Ref. 5)

(6) Report of the Governor's Commission on Three Mile Island ("Governor's Report"; Ref. 6)

The reviewers cited references to communications problems in the documents, then summarized the problems in terms of their effects on response activities (see Appendix).

The problems were categorized according to which of the following response activities was most seriously affected in each case:

(1) Initial notifications from the licensee to NRC and to State and local agencies

(2) Communications into and out of the facility

(3) Communications among key NRC and licensee individuals and groups

(4) Communications with and among key Federal, State, and local individuals and groups

(5) Communications to the public.

Using their personal knowledge of the situation at Three Mile Island, the reviewers also assessed the corrective actions taken by the NRC and licensees since the accident to determine the degree to which the problems have been resolved. These actions are also included in the Appendix. The actions are summarized below.

2.3 Summary of Corrective Actions

Several major actions have been taken to date which, in whole or in part, are intended to overcome communication problems found at Three Mile Island. The actions are summarized in Sections 2.3.1, 2.3.2, and 2.3.3, below. They are discussed again in more detail and broader context as elements of the current and planned NRC capability, Section 4.

2.3.1 Facilities and Equipment

(1) Two dedicated telephone systems (sometimes called "hot lines" by users of the systems) have been installed between several locations at each reactor site, NRC regional offices, and NRC headquarters. One system, the Emergency Notification System (ENS), rings at NRC headquarters when taken off-hook at any onsite or offsite location at a licensee's facility; it is used for initial notifications and for subsequent voice transmission of reactor operations data. The second dedicated system, the Health Physics Network (HPN), is not truly a "hot line" and is intended for voice transmission of key radiological data after the notification is made.

(2) A concept for automatic transmission of plant status data from each site to NRC Headquarters is being considered by the Commission. (See NUREG-0730, Ref. 7.) Implementation specifications are being developed and a detailed concept of operations will be prepared in consonnance with the new NRC Incident Response Plan (NUREG-0728, Ref. 8).

(3) An onsite Technical Support Center and an offsite Emergency Operations Facility are to be built at each reactor site. They will provide more face-to-face information exchange without overcrowding the reactor control rooms. They will also serve as centers for information flow to and from each site during an emergency. There is an unresolved issue regarding who will specify, pay for, and manage the communications equipment needed at these locations (see Section 5).

(4) Upgraded Operations Centers are planned at NRC headquarters and regional offices to provide better coordination among all NRC executive, analysis, and liaison personnel. The Headquarters Operations Center will be the focus of the NRC response until an onsite authority is appointed; it will support the onsite authority thereafter.

(5) A test of high-frequency radios is under way in one region. If the test is successful, these radios will be used by NRC site teams to supplement short-range radios available from other agencies. They will also provide vital communications between an incident site and a regional office in case of a widespread outage of the telephone system (as caused by a hurricane).

2.3.2 Personnel

(1) Communicators with the necessary technical training have been designated in the NRC response teams at Headquarters and the regional offices. One communicator, a specialist in reactor operations, mans the ENS while another, a specialist in health physics, mans the HPN.

(2) Licensees are being required to provide communicators to maintain continuous communications over the ENS to relay data to NRC after notification.

(3) State emergency plans may provide for sending State and local representatives to the Emergency Operations Facility; adequate space will be made available in all such facilities. Plans are also being developed to exchange personnel among the headquarters of key Federal organizations.

(4) Better training is being required of all licensee personnel. Periodic exercises are required to test the training.

(5) The Resident Inspector Program has been significantly enlarged and accelerated by assigning additional Resident Inspectors to major operational reactor sites.

2.3.3 Procedures

(1) A new rule for emergency planning (10 CFR 50, Appendix E) has been published in the Federal Register (45 FR 55402) to be effective November 3, 1980. The rule requires that licensees and State and local governments have adequate emergency response capabilities. It also requires that a capability exist by July 1, 1981, for notification of the public within about 15 minutes after declaration of an emergency, and further requires yearly exercises to maintain proficiency.

(2) A new regulation (10 CFR 50.72) requires nuclear power reactor licensees to make prompt notification of significant events, giving more specific information to the NRC than was required at the time of the TMI accident.

(3) A new Incident Response Plan (NUREG-0728) has been developed to clarify NRC responsibilities for performing essential functions and for making key decisions. It will be exercised periodically.

(4) Interagency agreements and plans are being formulated to clarify responsibilities among the several Federal organizations which will respond to an incident at a power reactor. After formal agreements are reached, detailed implementing procedures must still be prepared.

The above actions are noted as appropriate in Table 1 in the Appendix. The table also includes page references to the specific findings in the documents from which the problem descriptions were paraphrased.

3. FUNCTIONAL REQUIREMENTS

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An improved NRC emergency communications system must be based on a broader assessment of needs than the TMI reviews alone. A new NRC Incident Response Plan (Ref. 8) has been developed to govern the response to any kind of accident at a nuclear power reactor; it will later be expanded to include other kinds of incidents. The plan describes responsibilities for performing essential functions and for making key decisions to fulfill the NRC role. Detailed procedures for performing most of the functions have evolved from experience before, during, and after the TMI accident. Based on those procedures, it is possible to determine who must communicate with whom to carry out each function.

Figure 1 presents the results of such an analysis. The functions which head each column correspond to the functions that are defined in Section 2 of the NRC Incident Response Plan. The plan (but not Figure 1) also lists the separate tasks that comprise each function. Each task was analyzed to determine who must talk to whom, and by what means, to fully satisfy the requirements of the task. Those persons or locations are noted in Figure 1 by dots, connected by lines for visual clarity. (If the same connectivity between persons or locations could serve another task within the same function, the line was not repeated in the figure.)

Because voice link requirements are so numerous, the principal task for which each is intended is described briefly below; the numbers correspond to the numbered voice links in Figure 1:

(1) Test of transmission of health physics and radiological data.
(2) Test of transmission of operational and plant status data.
(3) Test of notification of key personnel.
(4) Conference capability for line used to report site emergency.
(5) Conference capability for line used to transmit radiological data.
(6) Assessment of initial information by key NRC and licensee personnel.
(7) Communication between initial NRC members of response organization.
(8) Coordination of NRC decision-making at headquarters.
(9) Inputs to NRC decision and dissemination to regional office, site, and licensee.
(10) Coordination of NRC decision-making at headquarters.
(11) Notification of State and local authorities by licensee.
(12) Establishment of communication between NRC and newly activated EOF.
(13) Notification of other agencies by NRC.
(14) Transmission of health physics data.
(15) Establishment of communications between NRC/HQ and NRC Site Team.
(16) Entry of NRC Site Team onto health physics link.
(17) Notification of other agencies that NRC Site Team has assumed responsibility for NRC activities.
(18) Notification of State and local authorities by licensee.
(19) Coordination of continuing effort.
(20) Notification of other agencies.
(21) NRC decision and announcement to others.
(22) Assessment of radiological information.
(23) Evaluation of licensee actions by key NRC personnel.

(24) Evaluation of licensee actions by State and local authorities.
(25) Assessment of general consequences and communication of this information to other agencies.
(26) Assessment of radiological consequences.
(27) Communication of advice or direction to licensee and notification to others.
(28) Coordination of NRC direction and licensee response.
(29) Headquarters coordination and support.
(30) Identification of needs, and requests for resources, from other agencies.
(31) Headquarters and executive liaison.
(32) Operations liaison and coordination.
(33) NRC press releases and responses.
(34) Licensee press releases and responses.
(35) Site press conferences and releases.
(36) FEMA press conferences and releases.
(37) Communication of recommendations and coordination between concerned agencies.
(38) Licensee coordination with State and local authorities.
(39) Development of radiological recommendations.
(40) Coordination and communication of administrative needs.
(41) Development and communication of decision to deescalate.
(42) Monitoring by NRC.
(43) Coordination by licensee.

All communication linkages identified in Figure 1 are derived from the Incident Response Plan. Together, the linkages indicate the total communication capabilities required between major locations during response to an incident. Section 4 describes the degree to which these requirements are met by systems already in use or planned and under way.

FIGURE 1

Emergency Communications Linkages

(Sheet 1 of 5)

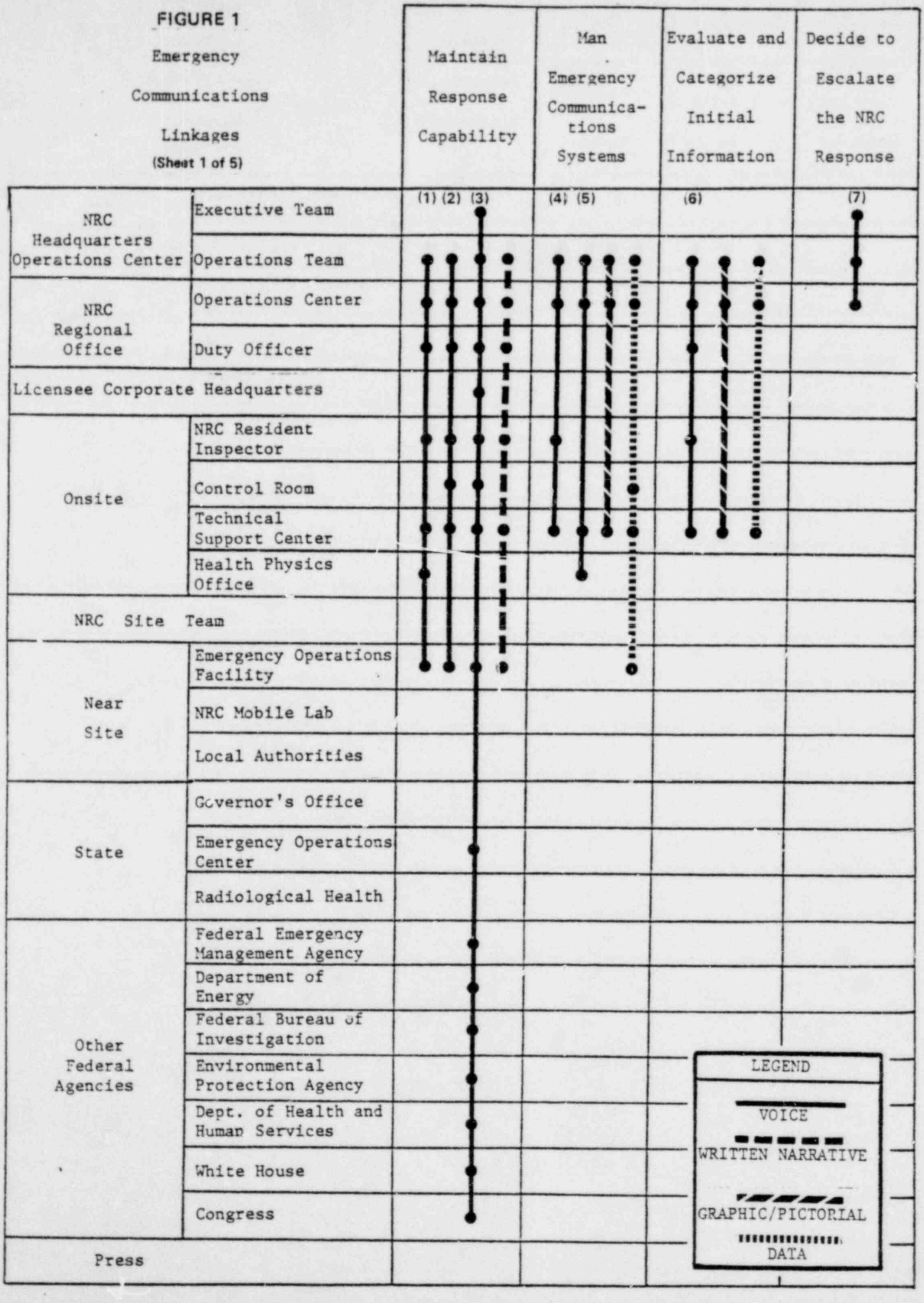


FIGURE 1

Emergency Communications Linkages

(Sheet 2 of 5)

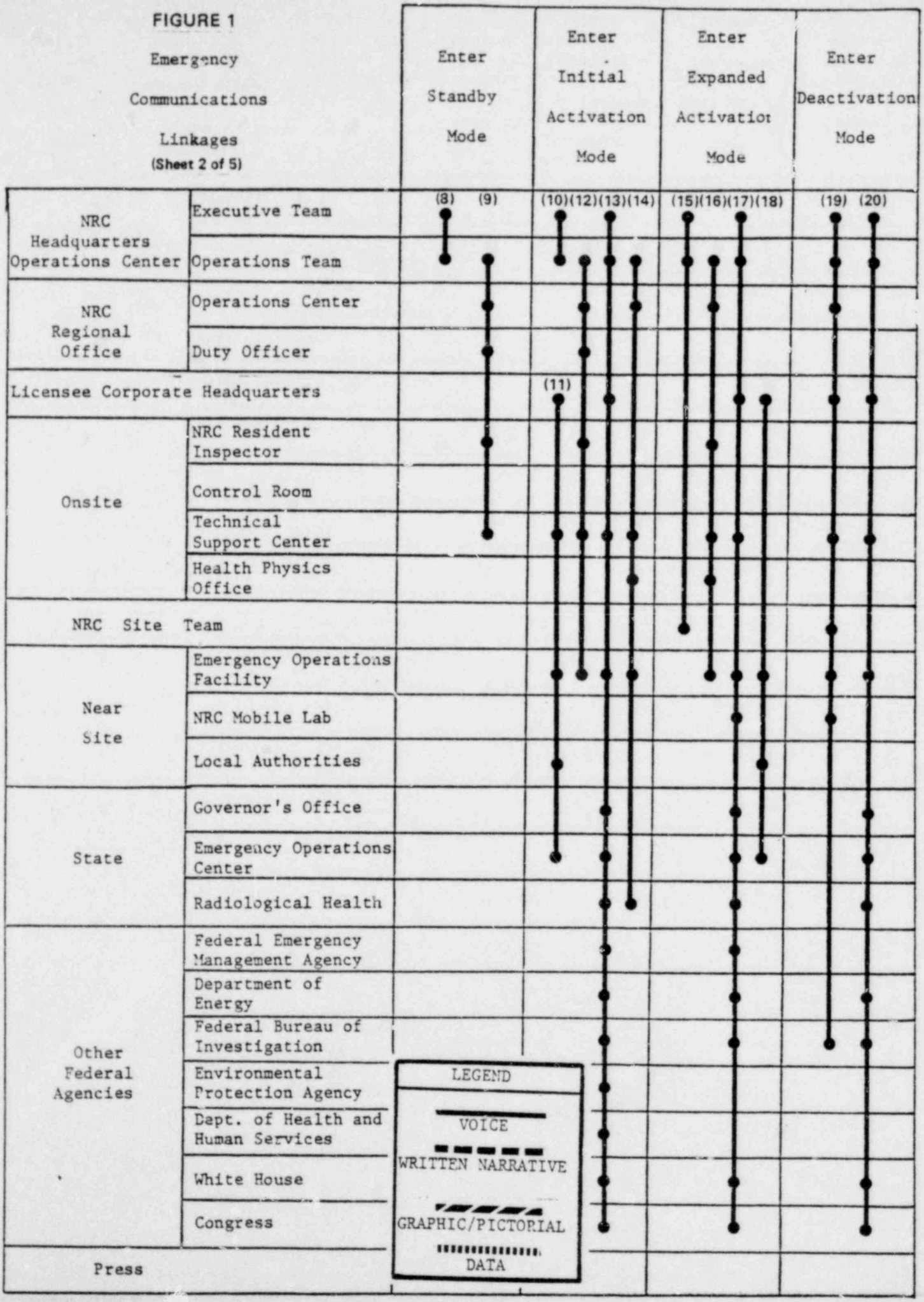


FIGURE 1

Emergency Communications Linkages

(Sheet 3 of 5)

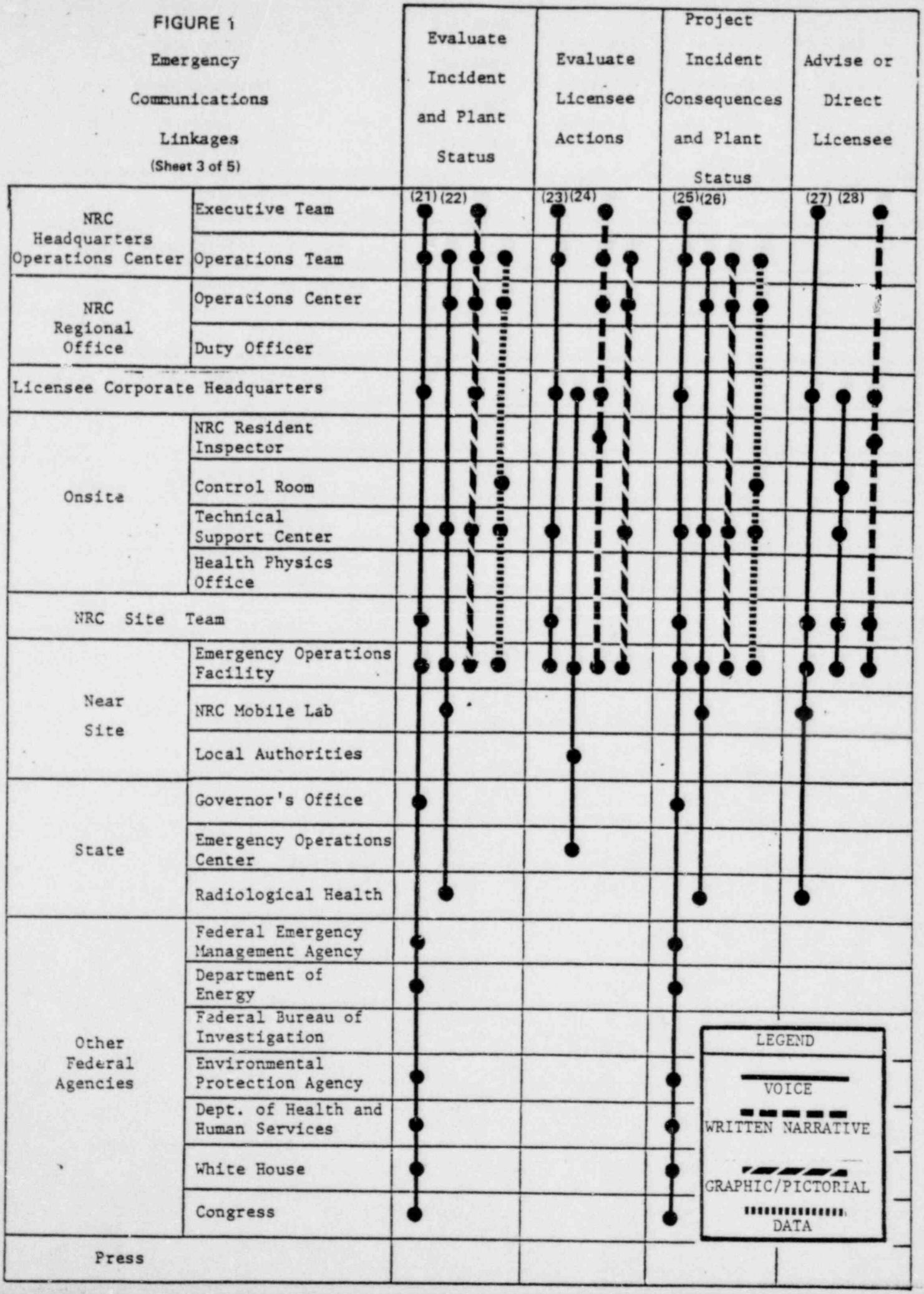


FIGURE 1

Emergency Communications Linkages

(Sheet 4 of 5)

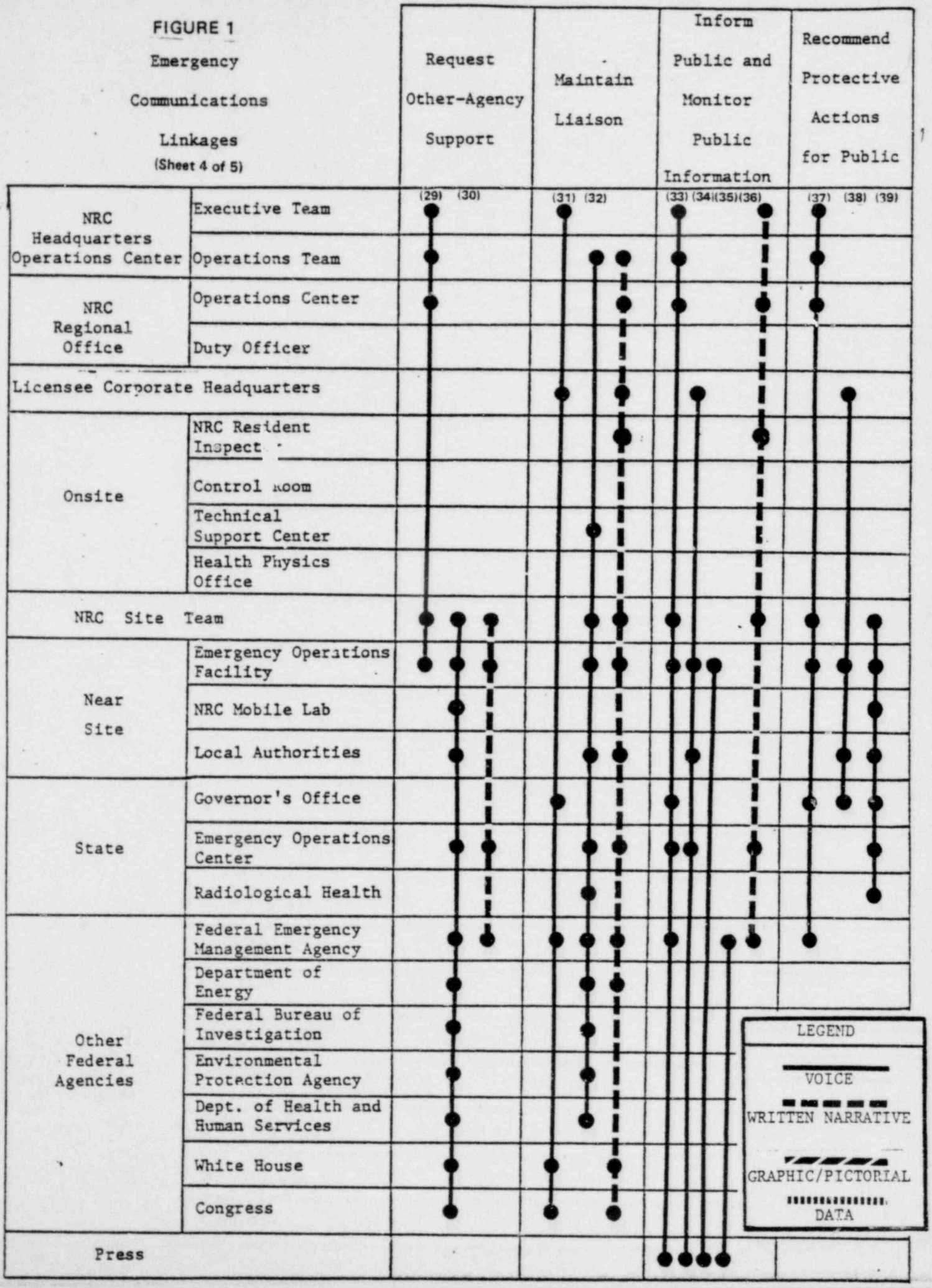
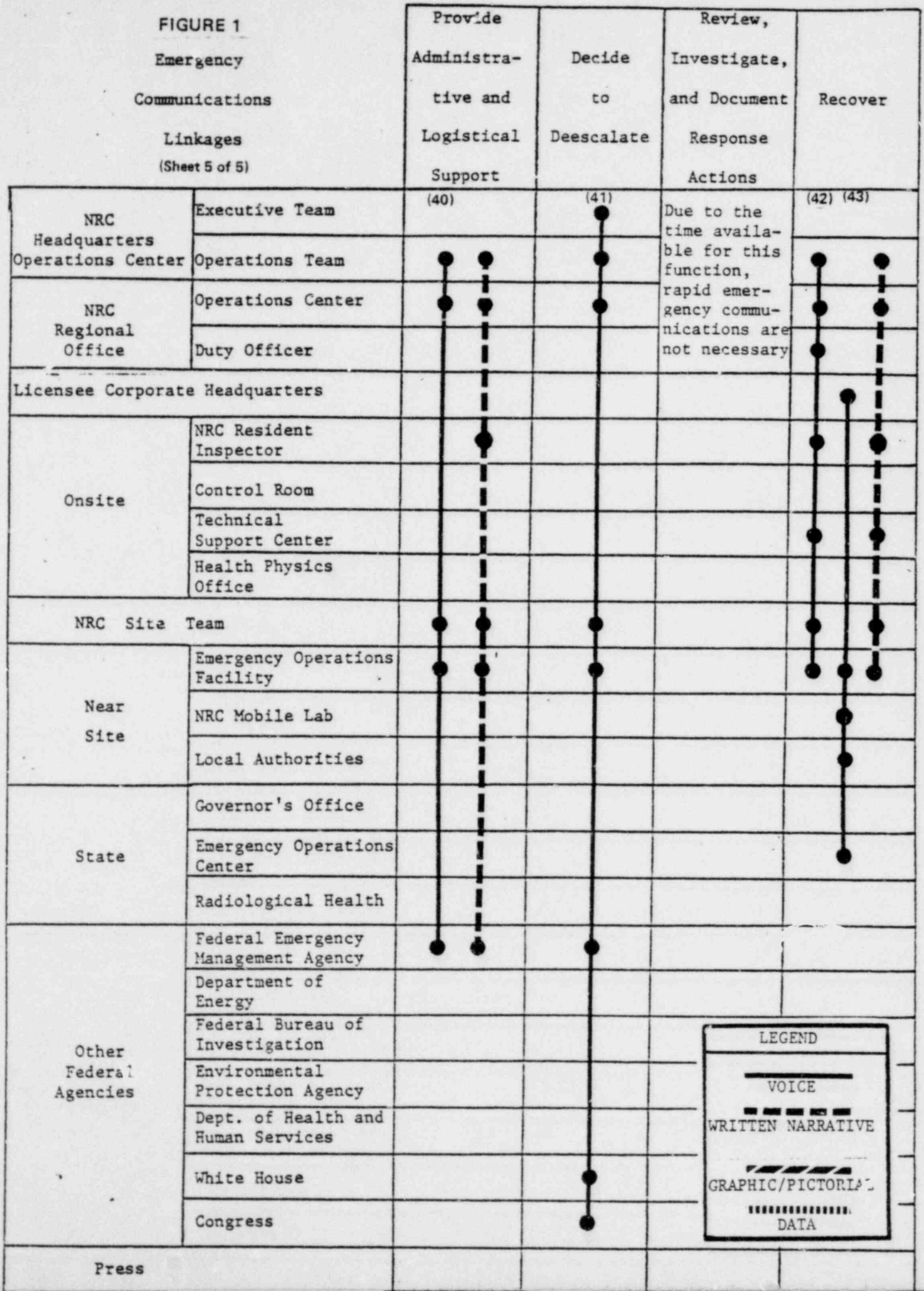


FIGURE 1

Emergency Communications Linkages

(Sheet 5 of 5)



4. CURRENT AND PLANNED CAPABILITIES

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4.1 Introduction

This section contains a discussion of the communication capabilities which are presently available or are being implemented. There is also an assessment of the adequacy of each system discussed. This assessment is based on the communication needs detailed in Section 3, the Three Mile Island (TMI) and other incident response experience, the knowledge that was obtained in developing the NRC Incident Response Plan (Ref. 8), the NRC Action Plan (Ref. 9), and discussions with the other organization that are potential participants in future incidents.

The various communication capabilities have been divided into five categories in order to permit a more efficient analysis and discussion of alternative modes for transmitting data, ideas, and documents. Capabilities have been significantly upgraded since the TMI accident, but developing requirements and emerging technology will drive further improvements. Major improvements and continuing concerns are noted below with more detailed discussion in Sections 4.2 through 4.6.

(1) Voice - Initial notification methods have greatly improved; direct and dedicated lines which are continuously monitored have been installed between nuclear power plants and the NRC; and licensee reporting requirements have been strengthened. However, augmentation of basic telephone lines and backup systems has not improved, and communication capability among NRC site team members during the early hours of an incident is very limited or not available.

(2) Written Narrative - Some increase in telephone facsimile and word processing capability is available to some participants but little coordination is evident to date.

(3) Graphic/Pictorial - Little change is evident.

(4) Data - Considerable interest has been evident in acquiring and transmitting reactor data offsite; NRC is developing a concept for transmitting such data to its Operations Center; National Weather Service Data is available to NRC continuously; and pilot studies using a computer system capable of sophisticated meteorological predictions is available to NRC, States, and licensees.

(5) Face-to-Face - Controlled face to face communications will be greatly enhanced by licensee onsite Technical Support Center and nearsite Emergency Operations Facility.

4.2 Voice

There are three major voice systems currently utilized by NRC in attempting to meet its basic voice requirements. They are the nationwide direct-dial system (Figure 2), the NRC dedicated Emergency Notification System (Figure 3) and the NRC dedicated Health Physics Network (Figure 4). Supplementary voice systems which have more limited use and capabilities are also discussed because of their significance in providing features which can be of vital importance.

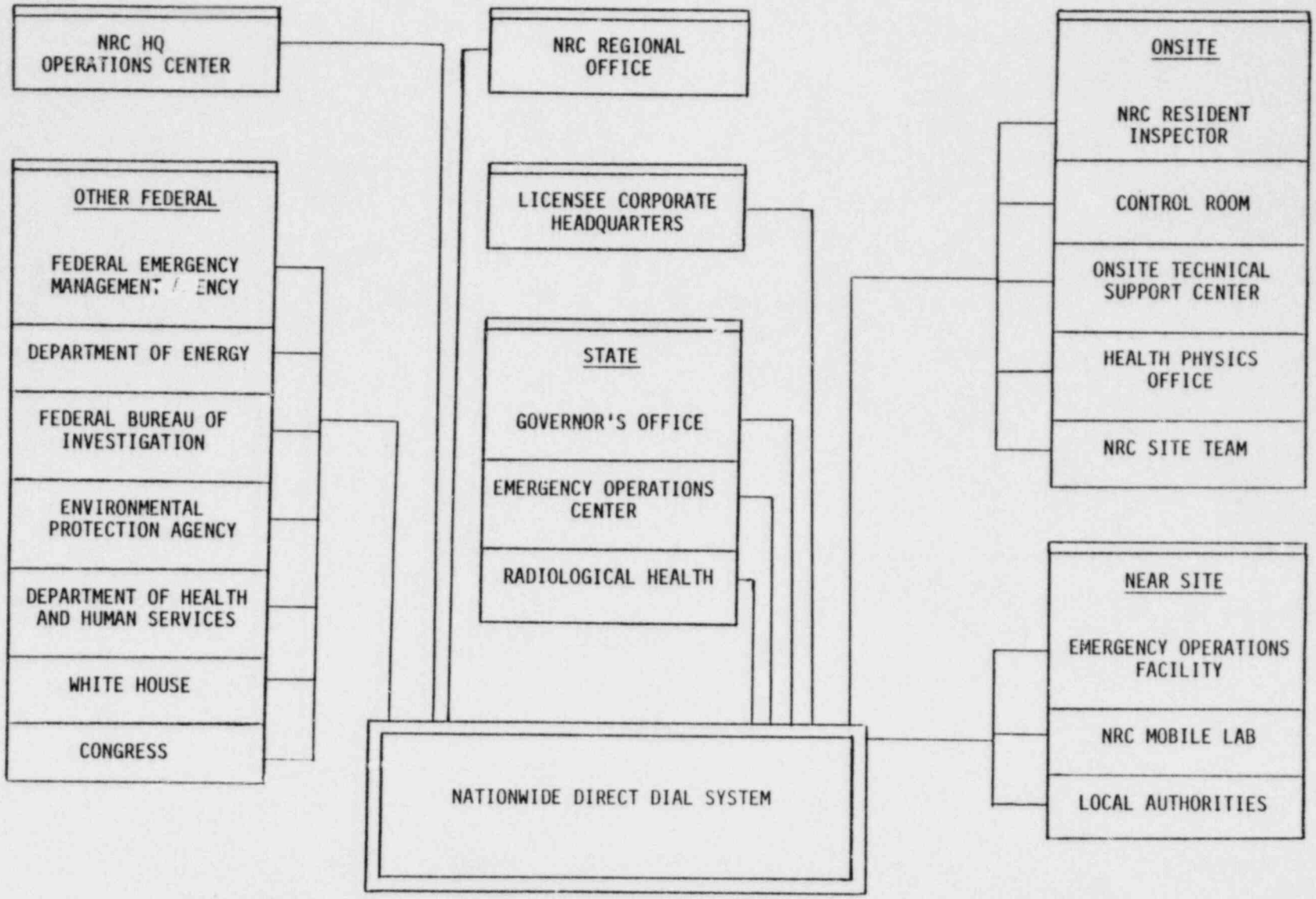

Figure 2. Emergency Communications Capabilities -- Nationwide Direct-Dial System

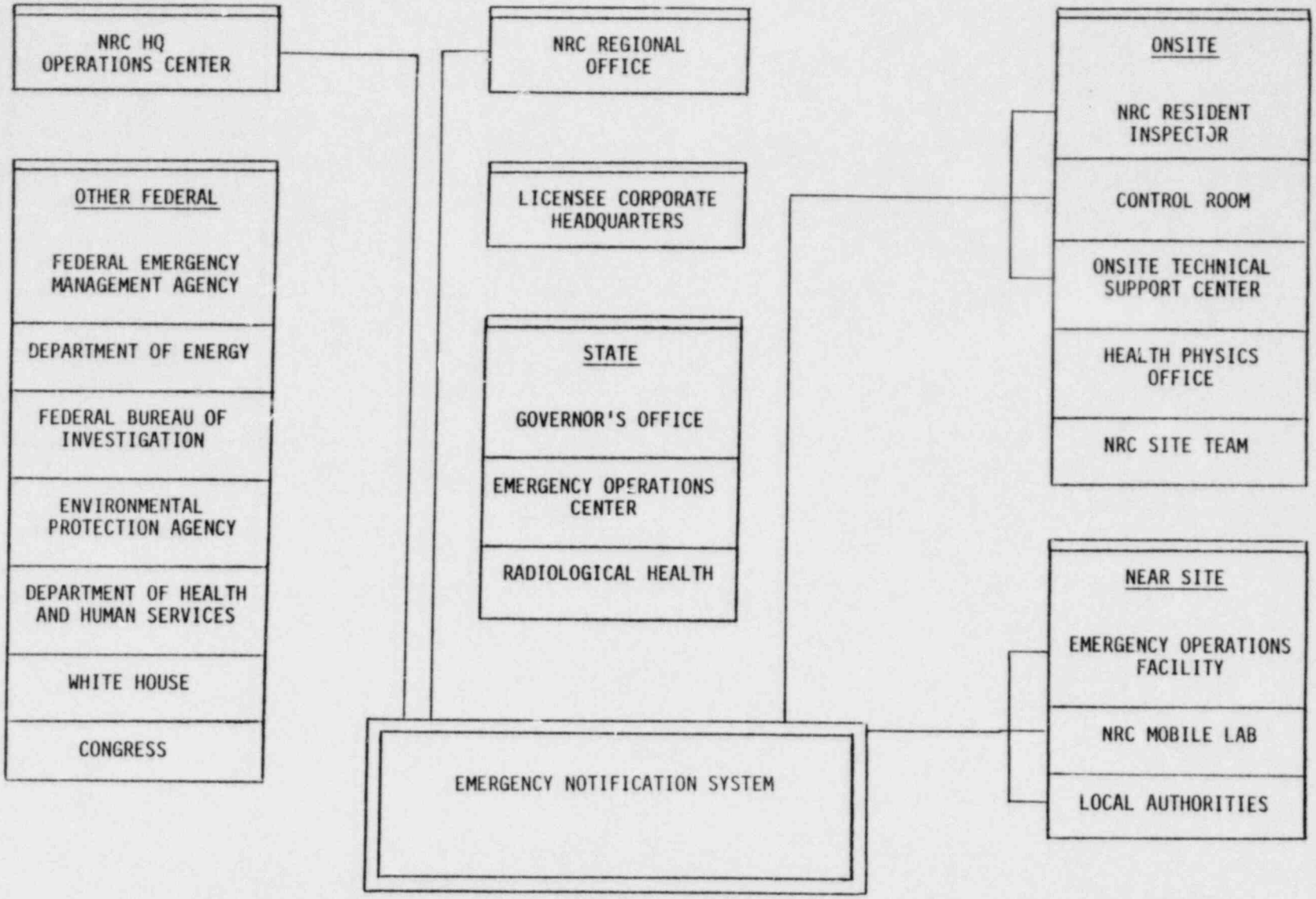

Figure 3. Emergency Communications Capabilities --
Emergency Notification System

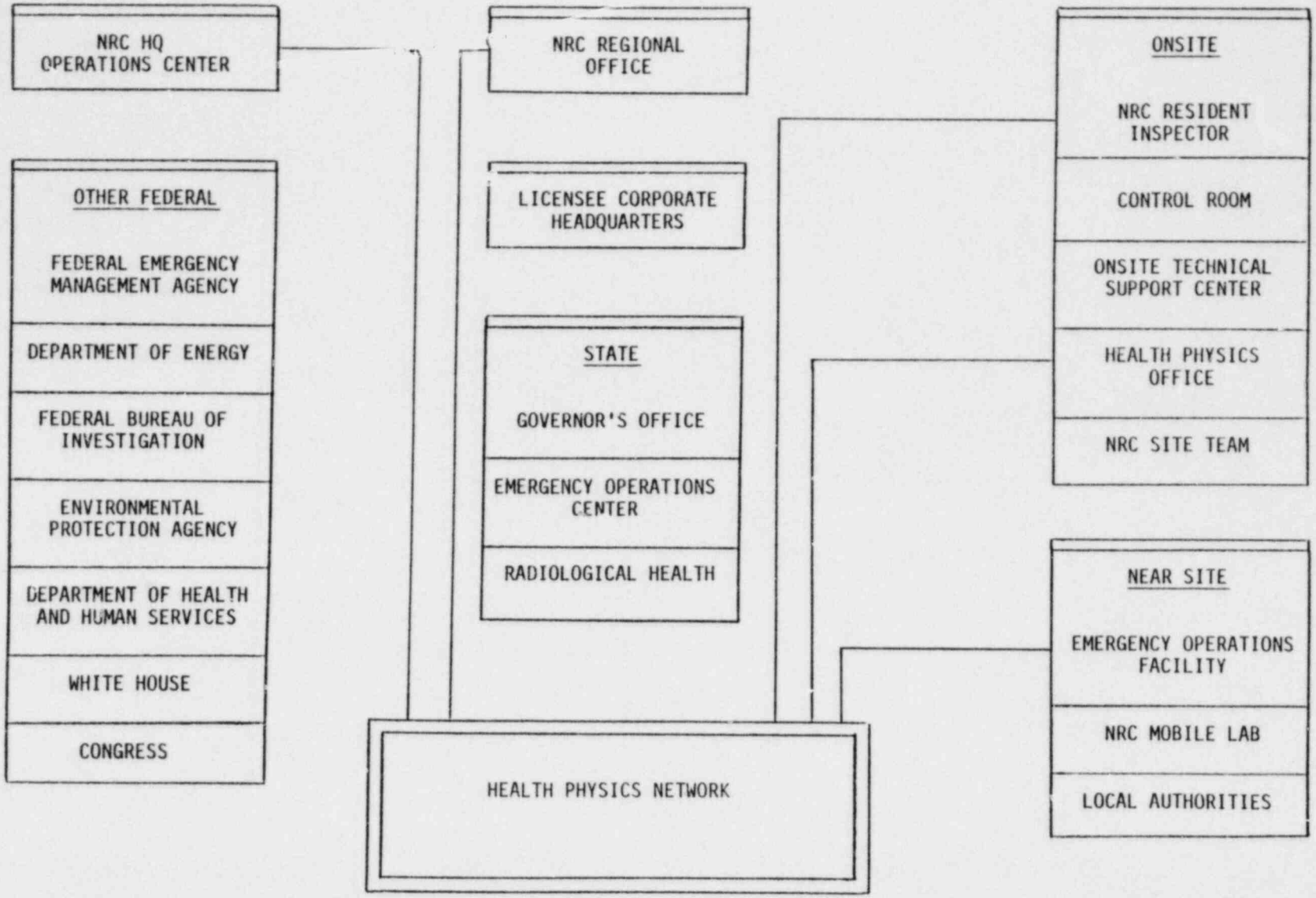

Figure 4. Emergency Communications Capabilities --
Health Physics Network

4.2.1 Nationwide Telephone Network

As can be readily seen in Figure 2, the nationwide direct-dial system is the most pervasive system available. It has the capability of joining together all response participants and has the bonus of being backed up by the administrative and technical capabilities of AT&T and local telephone companies. Consequently, in an emergency, telephone lines can be added in a few hours.

This network will always serve as the communications backbone of any emergency response. However, two significant problems place a severe limitation on this network. Although the telephone companies can respond rapidly (within hours) to expand telephone service in an emergency, this may not be quick enough in a fast-moving event. Direct and dedicated systems provide some relief from this problem. Other long range solutions, such as satellite communications, will be considered as NRC further defines its communication needs and reassesses its current capabilities. Internal studies are currently being conducted and others will be initiated as the communication requirements of licensees, other Federal agencies, and State and local officials are better defined.

The second concern relates to the large number of users. When a crisis is imminent, the users can overload the local telephone system which can overwhelm the network to the point that it is almost useless. Solutions are being considered. AT&T has developed an innovative concept to alleviate this problem, but the cost for a quickly deployable emergency system is relatively high and the administrative problems of funding such communication systems have not been solved (see Section 5).

4.2.2 Emergency Notification System

The NRC has had AT&T and the local telephone companies install a direct and dedicated telephone in the control room of each operating reactor with extensions at other key locations in and around that site, as shown in Figure 3. A licensee can contact the NRC Operations Center by merely lifting the receiver from its cradle. This action causes a ring at the Operations Center which is manned continuously by NRC technical staff "Duty Officers." NRC regulations (10 CFR 50.72) require licensees to report a broad spectrum of events and to stay on the line for the more significant events until relieved of that responsibility by NRC.

This system has been shown to be a reliable and necessary tool for responding to incidents in an expeditious manner. However, there have been occasions where lines were incapacitated due to general failures in the commercial system which resulted in NRC losing contact, on this system, with one or more sites simultaneously. In addition, because of the sensitivity of the automatic ringing feature, periodic false rings are common. This is normally merely annoying to the Duty Officer but it has the potential to interfere with the response to notification calls.

By design, only a limited number of response participants can be interconnected in this system. During an emergency these lines will be used almost exclusively for transmitting unevaluated data for which the audience is intentionally small.

4.2.3 Health Physics Network

This is a direct and dedicated telephone system, somewhat akin to a long distance intercom system. Extensions of this system appear at the plant health physics office, emergency operations facility, resident inspector's office and other locations at all sites where there is an Emergency Notification System telephone (Figure 4). In contrast to the latter system, the Health Physics Network telephones are not used for immediate notification. The system is activated by NRC in the beginning of an incident and will remain open throughout the incident, for the collection of radiological and environmental information.

This system has recently been completed. The NRC has had limited experience with the system and cannot at this time comment on any inadequacies. It is a system, however, which is limited to predesignated locations. It does not have the flexibility to add parties outside of its predetermined universe. Since this system is not used for immediate notifications, and since nonemergency conversations on any of the network circuits can be cleared by the NRC Operations Center by use of an "override" feature, the Health Physics Network will be used for routine business, particularly between the Regional Offices and the resident inspectors. This routine use is intended to improve familiarity with the system and facilitate identification of any inadequacies.

4.2.4 Supplementary Systems

The NRC operates a radiotelephone system in the Washington, D.C. area which permits continuous contact with key management officials in designated NRC vehicles. Telephone calls can than be interconnected into this system by the NRC Operator. While no such system is operated by NRC Regional Offices, each Region has been provided with commercial portable/mobile radio-telephone units. The quality of service is variable because of the high usage in urban locations and lack of coverage in some rural areas. For incident response, radiotelephones may sometimes be useful in providing a communication link to individuals enroute to an incident, but experience indicates that communication in some rural areas may be spotty. Radiotelephones may be able to provide some backup communications at the site, if the available lines are incapacitated or being utilized.

Radiotelephones are not sufficiently reliable for making the initial notifications necessary to assemble NRC response participants at Headquarters or the Regions. This task must be accomplished by effective use of telephone procedures and pagers.

When an emergency occurs, an NRC Headquarters Duty Officer (who is available 24 hours per day) receives the first call from the licensee and initiates a notification scheme to call in NRC staff and alert other Federal officials and participating agencies. Each contact is represented by several individuals so that the probability of reaching a contact is reasonably high. This system has worked well at Headquarters and is being tested periodically to maintain effectiveness and sensitize participants.

Pager systems are used extensively to aid in contacting key headquarters and regional office staff members. At the headquarters Operations Center, NRC operates its own paging system which covers the entire Washington Metropolitan

area. At the Regional Offices, commercial paging services are utilized. No such service is now provided for resident inspectors, but consideration is being given to the possible use of pagers if such services are available and can be utilized in particular situations.

Although the NRC operates two dedicated telephone systems, experience has shown that hardwired systems are vulnerable. On several occasions, a site has lost all telephone service for short periods of time (up to several hours). Evidently, there is a need to provide additional alternate communications to the operating facilities. Provision of this alternate capability is currently under study and could incorporate a high-frequency radio capability (either independent or for joint use with another Federal agency such as FEMA) or a satellite communications capability. A pilot study of high-frequency radio capability is in progress in Region II using FEMA frequencies. In addition, an agreement for NRC entry into FEMA high-frequency networks during emergencies has recently been approved. Should the high-frequency pilot program demonstrate the value of this type of radio communications for emergency use, consideration will be given to developing a larger network, including licensees, as a primary backup system.

Short-range VHF radio systems for regional office use have been under consideration for some time. These small lightweight radios would allow NRC inspectors to carry out tasks in or around the plant site while maintaining continuous two-way voice communication with the NRC Director of Site Operations. A prototype system was procured prior to the TMI accident and has demonstrated considerable usefulness. At TMI the system functioned satisfactorily but was severely limited by the small number of portable radios available for the site teams. A Field Incident Radio System has been defined and NRC frequencies have been assigned. Detailed specifications have been developed based on the extensive testing of the prototype system. This system will be procured by NRC when funding is available. Similar VHF radio capability can be made available to NRC in an emergency through the Department of Agriculture's National Fire Radio Cache and the Department of Energy's Nuclear Emergency Search Team. Both of these groups were present at the TMI accident and provided extremely effective local communications assistance. In any future accident, NRC will request their assistance. However, the need for at least a few short-range radios is acute as soon as NRC response teams arrive at the site 2 to 6 hours after notification and substantially before augmentation can be available. These other groups are highly mobile but will still require from 6 to 24 hours to arrive and be functional.

Secure voice terminals are available for the use of the NRC Commissioners, safeguards staff and security personnel. Additional voice terminals will be available for installation adjacent to the NRC Operations Center. The current secure voice terminals will be replaced with smaller, more versatile terminals when the new equipment becomes available.

At present, all telephones in the Headquarters Operations Center are recorded by a centralized multi-channel system. However, because of limited space in the Operations Center, most of the technical assessment team functions are conducted in rooms on the periphery of the Operations Center and are not recorded. Additional recording capability is being considered as the Operations Center is moved and/or expanded. Regional Office Operations Centers do

not record telephone communications currently, but plans are underway to provide these offices with the necessary equipment.

A continuing study effort is underway to determine what voice communications facilities and equipment are required for a prompt and sustained NRC response to emergencies. This effort will be integrated with other ongoing planning efforts, particularly those of licensees, FEMA, and State agencies.

4.3 Written Narrative

During any emergency, written narratives must be exchanged among the participants in order to lessen misunderstandings and provide accurate coordination. This subsection describes several major networks. No specific discussion of the U.S. Postal Service is included. The Postal Service serves as the primary system for transmitting routine written information. However, even with Express Mail Service, this system will not generally provide the speed necessary in a crisis situation.

4.3.1 Telephone Facsimile Service

Telephone facsimile transmission has become the major means by which NRC provides written documents to recipients during a crisis. The NRC Operations Center maintains a variety of facsimile machines in order to interface with almost all the facsimile machines available. However, consideration is being given to the concept of NRC specifying the type of high-speed facsimile machine (less than one minute per page) it will use to communicate with other participants. Any participant desiring NRC hard copy would obtain a compatible machine. This would allow transmission of general documents to multiple recipients at the same time and limit the transmission delays which were common during the TMI accident. Of all the written narrative systems discussed, facsimile service may be the only written narrative system which could be reasonably expected to be at, or quickly installed at, an incident site.

4.3.2 Word Processing

Modern word-processing systems are located within various NRC offices and have the capability to interconnect with other compatible word-processing terminals to transmit written material. This is currently being used extensively between the NRC Headquarters and their Regional Offices. As other Federal agencies, industry, and State groups obtain compatible equipment this system will be expanded.

4.3.3 Teletype

Dial-up teletype facilities are available and may be used extensively between Federal agencies. The availability for use with State, local and industry contacts is less sure. This system will be generally considered as a backup to other systems but may be utilized where some delay can be tolerated.

4.3.4 SACNET

This is a secure teletype system operated by the Department of Energy and serving that agency's operating locations, the National Laboratories, and selected contractors. The network also interfaces with the Department of

Defense Automatic Digital Network (AUTODIN) and thus has access to practically all U.S. military installations. The SACNET and AUTODIN handle both classified and unclassified message traffic. The full requirement for secure communication during a nuclear reactor emergency has not been defined, although certain safeguards information of a potentially classified nature would be exchanged in the event of hostile activity or threats which could result in an emergency. The capability to exchange classified messages is available at the NRC and will be expanded when and if necessary to satisfy the requirement for secure communications.

4.3.5 DEFCORD

The Defense Coordination Teletype Network (DEFCORD) is established to provide the Federal Emergency Management Agency with the capability for rapid dissemination of information relating to an emergency and guidance on the nature and scope of actions to be taken by the Federal departments and agencies during an emergency.

It is apparent that a number of unrelated systems capable of transmitting narrative information is available and functioning. These range from commercial message systems to dedicated governmental systems. The availability of terminals compatible with NRC systems at onsite and nearsite locations is currently being determined. Designers of onsite Technical Support Centers and nearsite Emergency Operations Facilities, as well as State and local officials, should take into consideration the capabilities available to the NRC when defining the specific communications support for these emergency management facilities.

4.4 Graphic/Pictorial

Transmission of graphic/pictorial information during an incident is primarily accomplished by telephone facsimile service, as described in Section 4.3.1 above. This method of communication is particularly useful for graphics but has limited utility for high resolution pictorial representations. Where time is not an urgent factor, express mail service or courier service can be utilized.

NRC Headquarters has the ability to receive and transmit slow scan TV pictures (i.e., single-frame TV pictures) via telephone at the rate of one frame every 50 seconds. A hard-copy machine is available to produce a permanent image. Currently, the only use of this system is for communication with the DOE Nuclear Emergency Search Team communication pod which would be dispatched to the site for communication support for DOE and NRC. This system was available during the TMI accident and was not utilized. Expansion of this capability is not being considered.

4.5 Data

The transmission of plant data from reactor facilities to the NRC and other response participants is undergoing considerable development. Licensees will provide certain plant variables to the onsite technical support center and the nearsite emergency operations facility. These data systems will be phased in over the next few years. In addition, it is anticipated that various nuclear industry groups that may possess specialized expertise will receive plant

information and some States may request plant data for their emergency operations centers.

The NRC is developing a nuclear data link, which is a data transmission system designed to send a set of specific plant variables to the NRC Operations Center. This system would receive a subset of the data required to be available at the licensee technical support centers and emergency operations facilities. A detailed discussion of acquisition of reactor data for the NRC Operations Center is the subject of a Report to Congress (NUREG-0730) which is being submitted concurrently with this report. Implementation of such a system is not expected until 1984.

Meteorological data is available at the NRC Operations Center from the National Weather Service in the form of teletype weather reports and facsimile weather maps. (NRC Region II in Atlanta also receives National Weather Service reports of severe weather conditions because of the high incidence of hurricanes in that region.) These data provide NRC meteorological staff with a limited capability to do dispersion calculations and perform predictive dose projections to aid in recommending protective actions for the public . More sophisticated capability is available through the Atmospheric Release Advisory Capability (ARAC) operated by Lawrence Livermore Laboratories for the Department of Energy. In conjunction with DOE, and FEMA, the States of New York, and California, and two nuclear reactor utility companies, the NRC is conducting a pilot study to determine the usefulness of this sophisticated computer system in emergency situations. By early 1981, interactive terminals will be installed at the NRC Operations Center, the Indian Point site, New York State, the Rancho Seco site, and California. A lengthy evaluation will assess the capabilities, value and cost-effectiveness of this capability.

At the present time, data transmission from a plant site to offsite authorities is almost non-existent. One or two States receive a very small amount of data which is of some limited value. Federal, State and nuclear industry interest in receiving remote data has increased markedly in 1980 and numerous systems are being designed for installation in the next few years. NRC is taking steps to provide industry with performance specifications so that an adequate minimum capability is assured and, further so that there is uniformity of data and units to assure that technical discussions among the various evaluation teams will not be hindered by incompatible or misinterpreted data.

Consideration may have to be given to assuring that there is not an overproliferation of plant data offsite. Although it would be useful in a crisis situation to receive as much expert advice as possible, there may also be problems with too many "cooks in the kitchen."

4.6 Face-to-Face

There is a specific aspect of human nature which provides an individual with better reassurance and understanding in face-to-face conversations than in more distant telephone or printed word communications. This aspect, along with the related desire to be close to the scene, was evident at TMI. Many of the significant emergency response changes since TMI take this into consideration.

The nearsite emergency operations facility which licensees are required to build will provide one location where the major response participants -- licensee management, NRC, FEMA, other Federal agencies, State and local officials, and the media -- can get together. This facility will be the hub of the overall management of offsite response activities.

At the national level, arrangements have been made among several Federal agencies to have representatives of one agency present in the Operations Center of the other. During TMI, representatives of FEMA, EPA, DOE, HEW and FAA were present at the NRC Operations Center (some continuously) to assist in the necessary liaison. This concept will be continued and expanded.

5. REMAINING REQUIREMENTS AND FUTURE OPTIONS

5. REMAINING REQUIREMENTS AND FUTURE OPTIONS

In addition to the communications improvements already made and those under way, others will be needed to resolve the remaining problems. Options are now in various stages of study, but the analyses are complicated by the uncertainties of future technologies and, to a large extent, by uncertainties in the requirements themselves.

NRC emergency communications must be fully adequate in three respects:

(1) Primary, full-time systems must be adequate; they provide the communications that must be available at all times for immediate use if an emergency should occur.

(2) Backup systems must be adequate to restore critical services quickly in case of failure of the primary systems for any reason.

(3) Augmentation systems must be adequate to support the full complement of response personnel by the time they arrive at the site.

NRC does not now have, in use or in plans, fully adequate primary, backup, and augmentation capabilities. The NRC shall develop, implement and maintain adequate communication systems. The problems are summarized in the following sections.

5.1 Primary Systems

At headquarters the need for direct lines to other Federal agency headquarters is under review. Additional telephone service will also be added to support a new Headquarters Operations Center and improvements at the regional offices, but no significant difficulties are foreseen. Telephone recording capability must be expanded at headquarters and regional offices also to assure that a complete sequential record of NRC response activities is retained.

In the vicinity of most sites local telephone service will again be overloaded if a serious incident occurs. No clear solution exists, but satellite systems or other means of bypassing the local exchange are being considered.

At the site the greatest need is to identify the most effective information flow among response participants. Once that is done, there may be some difficulty in assuring adequate manning of the communications terminals. Current analyses of information flow necessarily include that consideration. Of course, the best onsite communications system will be of little value if local exchanges are overloaded, as mentioned above.

Between headquarters, regional offices, and the site, current and planned systems leave room for improvement. Probably the most critical need is for adequate communications during the early stages of a response, prior to arrival at the site of an NRC Site Team. An automatic data acquisition system could reduce the need for telephone requests for plant status information, but the effect is still uncertain. No capability to transmit graphics (such as might be used in discussing a piping and instrumentation diagram) is now planned. The utility of a standard closed-circuit television link is less clear, but sufficient communications capacity is not now available from the site even if television proves to be useful.

Satellite systems are being considered as a way of providing more primary capacity, because satellites may also provide an important backup and augmentation capability which will bypass overloaded local exchanges. The best estimates of an adequate primary capability foresee a mix of satellite, microwave, and landline communications. The diversity of such a mix should also offer more survivable communications under adverse weather conditions, for example. A major drawback is the cost of a satellite system. Costs and use could be shared with another agency to improve the feasibility.

The requirement for secure communications between headquarters and the regional offices has been stated on numerous occasions. The nature of these communications has not been decided, but the prime candidates discussed are secure voice and secure facsimile communications. The installation of any form of secure communications in the regional offices will require extensive physical security arrangements costing considerably more than the secure devices themselves. Plans to satisfy this stated requirement are under way, but these are still in the early stages.

5.2 Backup Systems

Backup systems become the primary systems in case of widespread problems with the latter. They cannot usually carry the full capacity of the primary systems. NRC will evaluate the effectiveness of the high-frequency radios now being used on a trial basis in Region II and at headquarters. If this system offers the optimum method of providing backup communications, it will be implemented nationwide. Other possibilities for backup communications are very limited. Existing microwave links between each site and the licensee's load dispatch center (and, frequently, other offices) could be used for critical messages, but they are also needed by the licensee during an incident. The existing microwave capacities are also too small to offer significant backup. Should the need arise in the near future, NRC would request backup communications through FEMA from military, civil defense, and other organizations.

NRC is also reviewing preliminary proposals for a rapidly deployable communications center that would provide not only restoral but also augmentation communications out of the power plant site. Satellite communications transportable terminals play a major role in all such preliminary proposals investigated to date.

Within NRC Headquarters, only two telephone lines and the health physics network (HPN) in the Operations Center are routed around the main exchange serving headquarters. More protection against accidents and deliberately caused failures is being considered as part of plans for moving the center to another location.

5.3 Augmentation Systems

Information flow among a full complement of response personnel is still being analyzed. The FEMA National Contingency Plan, the NRC Incident Response Plan, and the licensee emergency plan all must be made to mesh, partly through the planned flow of information to, from, and among personnel at the site. Detailed requirements for augmenting the primary communications will be derived from a review of those plans.

In the meantime, NRC relies on AT&T to add telephone capacity as soon as possible; on the Forest Service to provide hand-held radios for communication among members of the NRC Site Team and among response personnel from other agencies; and on the Department of Energy to link key officials at the site by radio and into the public telephone system. These arrangements are expected to continue. Two telephone-related problems are current issues:

(1) New communications systems (such as the Emergency Notification System and the Health Physics Network) cannot be acquired by the NRC without GSA approval under Federal Property Management Regulations. While this prior approval presents no particular problems in routine or preplanned implementation of emergency communications, it could hinder the rapid implementation of emergency communications to satisfy requirements developed during the response to an emergency. NRC will attempt to reach agreement with GSA on methods which will overcome this potential delay during periods of emergency response.

(2) Authorization is needed from the Federal Communications Commission (FCC) to record incident-related telephone conversations without superimposing an audible signal, the so-called "beep" tone. NRC telephones now carry the tone when conversations are recorded, so several parties joined in a telephone conference hear separate tones for each party. (The tones are not synchronized because of technical limitations.) The multiple tones are a definite hindrance to good communications and should be unnecessary under the circumstances. The FCC is willing to consider an NRC request for exemption from the requirement to impose tones on the recorded lines.

5.4 Implementation Issues

In the process of rulemaking to improve the overall capability to respond to emergencies, NRC must decide several issues that will strongly affect the future of emergency communications:

(1) To what extent should NRC manage the details of the configuration of emergency communications systems to be provided by the licensees? Too little configuration control will lead to the licensees spending vast amounts on emergency communications with no assurance that the resulting systems would be compatible with one another or with NRC's systems. Too much configuration control exercised unilaterally by NRC would tend to be over-regulation and could stifle innovative approaches to solving emergency communication problems.

(2) To what extent should NRC fund emergency communications between NRC and the licensees, between States and NRC, and between other Federal agencies and NRC? NRC currently funds the Emergency Notification System, the Health Physics Network, and a pilot high frequency radio system working through the Federal Emergency Management Agency's Civilian Defense National Radio System networks. NRC must still determine what share of the costs of the nuclear data link must be borne by the licensees.

(3) To what extent should NRC depend upon the Federal Emergency Management Agency to provide restoral and augmentation communications capabilities during nuclear incidents? FEMA certainly has a role in planning for and responding to emergencies of all types. Proposals are being made by the communications industry to provide deployable emergency communications facilities and crews to restore severed communications or to augment existing communications at the site of a nuclear incident. NRC at this time has insufficient funds to proceed with any such proposals and additionally has an insufficiently clear picture of what, if any, similar capabilities FEMA will be providing for the use of all agencies in all types of emergencies.

(4) To what extent should NRC provide privacy protection equipment for its emergency communications? The monitoring of response communications by the press or public could lead to premature judgments which could be very harmful. Much of the coordination of response activities and the status of events at the site of an emergency is done by radio. The content of the conversations includes unanalyzed data, speculation, and technical information which could easily be misunderstood by persons not trained in the implications of such information. The reaction to the publication or widespread discussion of such information could cause unnecessary apprehension by persons in the vicinity or, at worst, could create a panic situation. On the other hand, unless all parties directly involved in the response had compatible privacy systems, necessary coordination and information exchange could be hampered.

Legislation may be required to implement a fully adequate emergency communication system, but the need is not yet clear. If the above problems cannot be resolved through other means, appropriate legislation will be requested by NRC.

6. REFERENCES

6. REFERENCES

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* Available for purchase from NRC/GPO Sales Program, U. S. Nuclear Regulatory Commission, Washington, DC 20555 and National Technical Information Service, Springfield, Virginia 22161.

** Available from the U. S. Government Printing Office, Washington, DC 20402, Attention: Superintendent of Documents, GPO Stock Number: 052-003-00718-51.

*** Available in NRC Public Document Room for inspection and copying for a fee.

APPENDIX

COMMUNICATIONS PROBLEMS

DURING THE ACCIDENT

AT

THREE MILE ISLAND

Table 1
TMI COMMUNICATION PROBLEMS

AFFECTED TMI RESPONSE ACTIVITY	INVESTIGATION DOCUMENTATION FINDING	CITATIONS	RESOLUTIONS	STATUS
1. Initial notifications from Licensee to NRC and to State and local agencies	a. Licensee slow in reporting event to State and Local agencies.	Kemeny Report: General comment Rogovin: 29	(1) Revisions to Federal regulations (10 CFR 50.72 and 10 CFR 50, Appendix E) require licensee to promptly inform NRC, State and local agencies of any emergency.	(1) In effect now for notification to NRC; in effect November 3, 1980 for 15-minute notification to State and local.
			(2) NUREG-0654 gives additional guidelines for reporting.	(2) In use as interim draft.
			(3) Direct telephone line installed to NRC HQ from each facility.	(3) In use.
	b. Initial notification to NRC Regional Office was received by answering service.	NUREG-0600: 1-3-39 Rogovin: 27 Senate: 118	(1) NRC Incident Response Plan requires all-hours staffing to receive emergency notification.	(1) Implemented through temporary assignments; permanent assignments being considered.
	c. Backup to telephones needed in case of failure.	Rogovin: 1043 NUREG-0616:119	(1) Two direct-line networks reduce chances of total failure.	(1) In use. Backup not yet adequate.
			(2) No backup installed, but high-frequency radios and satellite communications under study.	(2) Pilot study of radios underway in Region II.

AFFECTED TMI RESPONSE ACTIVITY	INVESTIGATION DOCUMENTATION FINDING	CITATIONS	RESOLUTIONS	STATUS
	d. Initial notification to the State did not portray the accident as serious.	Senate: 16, 121, 123 Rogovin: 47	(1) New emergency planning rule (10 CFR 50, Appendix E) requires licensee to categorize events.	(1) Published as final regulation (see 45 FR 55402); effective November 3, 1980.
2. Communications into and out of facility	a. Communications between NRC HQ and the site were totally inadequate.	Kemeny: 21, 39 Senate: 13, 120, 127 131, 137 Rogovin: 35, 48 107, 108, 853	(1) Two dedicated emergency telephone systems from each facility to NRC HQ, regions, and resident inspectors.	(1) In use. Overall reliability and capacity still inadequate.
			(2) New Emergency Operations Facilities will offer more communications.	(2) In various stages of construction by licensees.
			(3) Direct data acquisition system will send critical data to NRC HQ and regions from each	(3) Concept and implementation specifications in development.
	b. Facility was uncertain about the type of information to be reported to State and local agencies.	Senate: 13, 17, 79, 86, 136	(1) State emergency plans required to clarify needs.	(1) In view by FEMA.
	c. Senior NRC management unable to obtain up-to-date information.	Kemeny: 39 Senate: 13, 15, 82, 119, 131 Rogovin: 134	(1) Resident Inspector Program established to provide backup communications and assessment from the facility to senior NRC management.	(1) In use.

AFFECTED TMI RESPONSE ACTIVITY	INVESTIGATION DOCUMENTATION FINDING	CITATIONS	RESOLUTIONS	STATUS
			(2) Direct data acquisition system will provide continuous and timely plant status information.	(2) Concept and implementation specifications in development.
			(3) Incident Response Plan provides for improved flow of communications to senior management.	(3) Plan and procedures completed. Need exercises with regions.
	d. Communications did not improve until a senior NRC representative arrived at the site and took charge.	Kemeny: 39 Senate: 130	(1) New Incident Response Plan provides: ° Regional Office Director leaves for site when response is activated. ° Chairman may delegate authority to site when official arrives. ° Chain-of-command is shortened.	(1) NUREG-0728
			(2) 10 CFR 50, Appendix E requires a near-site Emergency Operations Facility (EOF) for senior NRC and facility management to coordinate the emergency response of all participants.	(2) In various stages of construction by licensees.

AFFECTED TMI RESPONSE ACTIVITY	INVESTIGATION DOCUMENTATION FINDING	CITATIONS	RESOLUTIONS	STATUS
	e. Many problems with the large number of incoming calls to the plant; too few incoming lines; no switchboard operator available.	Rogovin: 1043 NUREG-0600: II-A-18, II-2-24	(1) Predetermined emergency operations procedures for the facility and for State and local governments should limit the number of calls to each site and transfer them to the EOF.	(1) Uncertain effect; needs testing. No clear solution yet for avoiding overloads at local telephone exchanges.
	f. Too many uncoordinated demands for information from the plant's control room. No follow-up on these to ensure that questions were answered.	Rogovin: 36, 911 0600: I-A-66 Senate: 17	(1) Automatic Data System will reduce the demand for other plant status information during an emergency.	(1) Concept and implementation specifications in development.
			(2) NRC health physics dedicated telephone network from each plant will help to separate kinds of information according to sources at site.	(2) In use.
	g. Information reported out of the plant was not timely, accurate or descriptive	Rogovin: 62, 853, 911, 1043 NUREG-0600: Several references	(1) Trained communicators are needed at both ends of the communications links between facility and the NRC.	(1) NRC technical communicators are assigned; not all licensee communicators assigned.
		Senate: 13, 15, 16, 120, 135, 137	(2) Exercises and drills needed to demonstrate an effective training program required by 10 CFR 50, Appendix E.	(2) Exercises to be scheduled.

AFFECTED TMI RESPONSE ACTIVITY	INVESTIGATION DOCUMENTATION FINDING	CITATIONS	RESOLUTIONS	STATUS
			(3) Automatic data acquisition system.	(3) In development.
3. Communications among key NRC and licensee individuals and groups	a. Many key recommendations were made by individuals who did not have accurate information.	Kemeny: General comment Rogovin: 62, 63 Senate: 124, 130	(1) New NRC Incident Response Plan defines functions of all personnel.	(1) NUREG-0728
			(2) Drills, exercises and a training program to ensure effective plan implementation.	(2) NRC continuing exercises. Exercises involving licensees and others being planned.
	b. Role of Commission & entire decision-making process during the accident were ill-defined. No procedures for staff recommendations were explored & resolved prior to recommendation to the governor.	Kemeny: 40 Senate: 13, 134, 158	(1) Same as (1) and (2) for Finding (a), above.	(1) Same as above.
	c. Geographical spread between the various NRC offices in Washington caused communications problems.	Kemeny: 21 Rogovin: 35	(1) Commission consolidating offices.	(1) Site selected; effects of move uncertain.

AFFECTED TMI RESPONSE ACTIVITY	INVESTIGATION DOCUMENTATION FINDING	CITATIONS	RESOLUTIONS	STATUS
4. Communications with and among key Federal, State, and local individuals and groups	a. There existed a lack of proper communications channels between the Federal government (NRC) and the Commonwealth of Pennsylvania.	Governor: 82 Kemeny: 40 Rogovin: 1041 - 1043 Senate: 13	(1) Responsibilities for liaison are established in the NRC Incident Response Plan.	(1) NUREG-0728
	b. The Federal government should designate a single spokesperson to advise the Governor on coordinated Federal response and on-site technical matters.	Governor: 82, 122	(1) National Contingency Plan to provide for coordination.	(1) In preparation by FEMA.
	c. Communications between the Pennsylvania Emergency Management Agency (PEMA) and the Bureau of Radiation Protection (BRP) were incomplete and, therefore, ineffective.	Rogovin: 1043 Senate: 122 Governor: 77, 78	(1) State Radiological Emergency Response Plan requires liaison among all state organizations. NUREG-0654 requires better-defined roles.	(1) Revised plan in review. Other State plans also in review by FEMA. NUPEG-0654 in use as interim guide.
			(2) Dedicated communica- established between PEMA and BRP.	(2) In use.
			(3) Exercises and drills required.	(3) To be scheduled.

AFFECTED TMI RESPONSE ACTIVITY	INVESTIGATION DOCUMENTATION FINDING	CITATIONS	RESOLUTIONS	STATUS
	d. The flow of official information from the State (PEMA) to the counties regarding plant status and and radiological matters was virtually nonexistent. For the most part updated information did not exist at PEMA.	Rogovin: 1041 - 1043 Senate: 122, 123 Governor: 83, 84, 123	(1) Same resolutions as for finding (c).	(1) Same as above.
			(2) Dedicated phone lines established between PEMA and risk counties.	(2) Installed around TMI; not generally installed around other facilities.
			(3) State Plan requires PEMA representative to report to licensee's near-site Emergency Operations Facility.	(3) In effect.
	e. No mechanism existed for establishing reliable communications among the onsite and several offsite organizations responsible for various aspects of the emergency response.	Kemeny: 40 Rogovin: 65	(1) New rule for emergency planning (10 CFR 50) requires primary and backup communication systems from the facility to NRC HQ and Regional Offices, State and local governments, near site Emergency Operations Facility, Technical Support Center, and field assessment teams.	(1) Effective November 3, 1980.
			(2) Emergency Operations Center with liaison between the State, local government, and facility.	(2) In various stages of construction by licensees.

AFFECTED TMI RESPONSE ACTIVITY	INVESTIGATION DOCUMENTATION FINDING	CITATIONS	RESOLUTIONS	STATUS
	f. Key Federal agencies did not know what other Federal agencies were doing.	Kemeny: 17, 36 Senate: 16, 120	(1) The Federal Emergency Management Agency (FEMA) will provide stronger Federal coordination through the National Contingency Plan.	(1) Plan in preparation.
			(2) NRC Incident Response Plan provides for liaison with FEMA, DOE, HHS, FBI, EPA, FDA, Congress, And the White House.	(2) NUREG-0728.
			(3) NRC Incident Response Plan provides for liaison with State and local agencies.	(3) State liaison officers now located in each region.
	g. Status of the plant must be provided to all response personnel.	Kemeny: General comment Senate: 13-16	(1) NRC Incident Response Plan provides for status reports.	(1) NUREG-0728
			(2) Acquisition of reactor data for NRC Operations Center will improve the status reports.	(2) Concept in development.
			(3) Frequent exercises, drills and training will refine the contents of the reports to suit user needs.	(3) To be scheduled.

AFFECTED TMI RESPONSE ACTIVITY	INVESTIGATION DOCUMENTATION FINDING	CITATIONS	RESOLUTIONS	STATUS
			(4) The Emergency Operations Facilities will provide a forum for face-to-face discussions.	(4) In various stages of construction by licensees.
5. Communications to the public	a. NRC did not have adequate procedures for providing accurate and timely accident information to the public and the news media.	Kemeny: 57 Rogovin: 156 Senate: 148	(1) NRC Incident Response Plan requires coordination in preparing and disseminating press releases.	(1) NUREG-0728
	b. Public unaware of information about radiation and its effects.	Kemeny: 57 - 58, 77	(1) Public education program required by the new emergency planning rule (10 CFR 50, Appendix E).	(1) Effective November 3, 1980.
	c. NRC needs a systematic public information program and training for media.	Kemeny: 57 - 58, 78-79	(1) 10 CFR 50, Appendix E requires licensees to offer orientation program for media. FEMA is developing a program with NRC assistance.	(1) Rule effective November 3, 1980.
	d. NRC individuals who brief the press lacked technical expertise to explain the event. Reactor "jargon" is difficult for the press to understand.	Kemeny: 78	(1) Public affairs personnel will be assisted by technical experts.	(1) Incorporated in the Incident Response Plan, NUREG-0728.

AFFECTED TMI RESPONSE ACTIVITY	INVESTIGATION DOCUMENTATION FINDING	CITATIONS	RESOLUTIONS	STATUS
	e. A press center for major press briefing should be close to the site.	Kemeny: 78-79	(1) Emergency Operations Facilities will contain provisions for briefings	(1) In various stages of construction by licensees. May not be large enough. Some sites have identified other locations.
	f. A local broadcast method should be developed that will disseminate timely and accurate information.	Kemeny: 78-79	(1) 10 CFR 50, Appendix E, requires 15-minute warning to the public with provision for sending instructions to the public about protective measures.	(1) Rule Effective November 3, 1980. Difficulties may continue beyond implementation date (July 1, 1981).
	g. NRC was slow in confirming good news the status of the accident.	Kemeny: 18	(1) All status information to be routed to press officers for coordinating press releases.	(1) Required by NRC Inc.dent Response Plan, NUREG-0728.
	h. PEMA was not allowed to make public statements without first clearing them through the Governor's office, and the State rumor control center was established after the greatest need was over.	Rogovin: 1042-1044 Senate: 123	(1) Revisions to State plans clearly define how flow of information to the public is to be handled.	(1) In effect in Pennsylvania; plans for other states in preparation or review.