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# Conceptual Design of the NRC Headquarters Operations Center

## User Needs for Nuclear Data Link Information

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Prepared by J. Hannan, J. Himes\*, D. Wolfe

\*Presently with the U.S. Nuclear Regulatory Commission

The MITRE Corporation

Prepared for  
U.S. Nuclear Regulatory  
Commission

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User Needs for Nuclear Data Link Information

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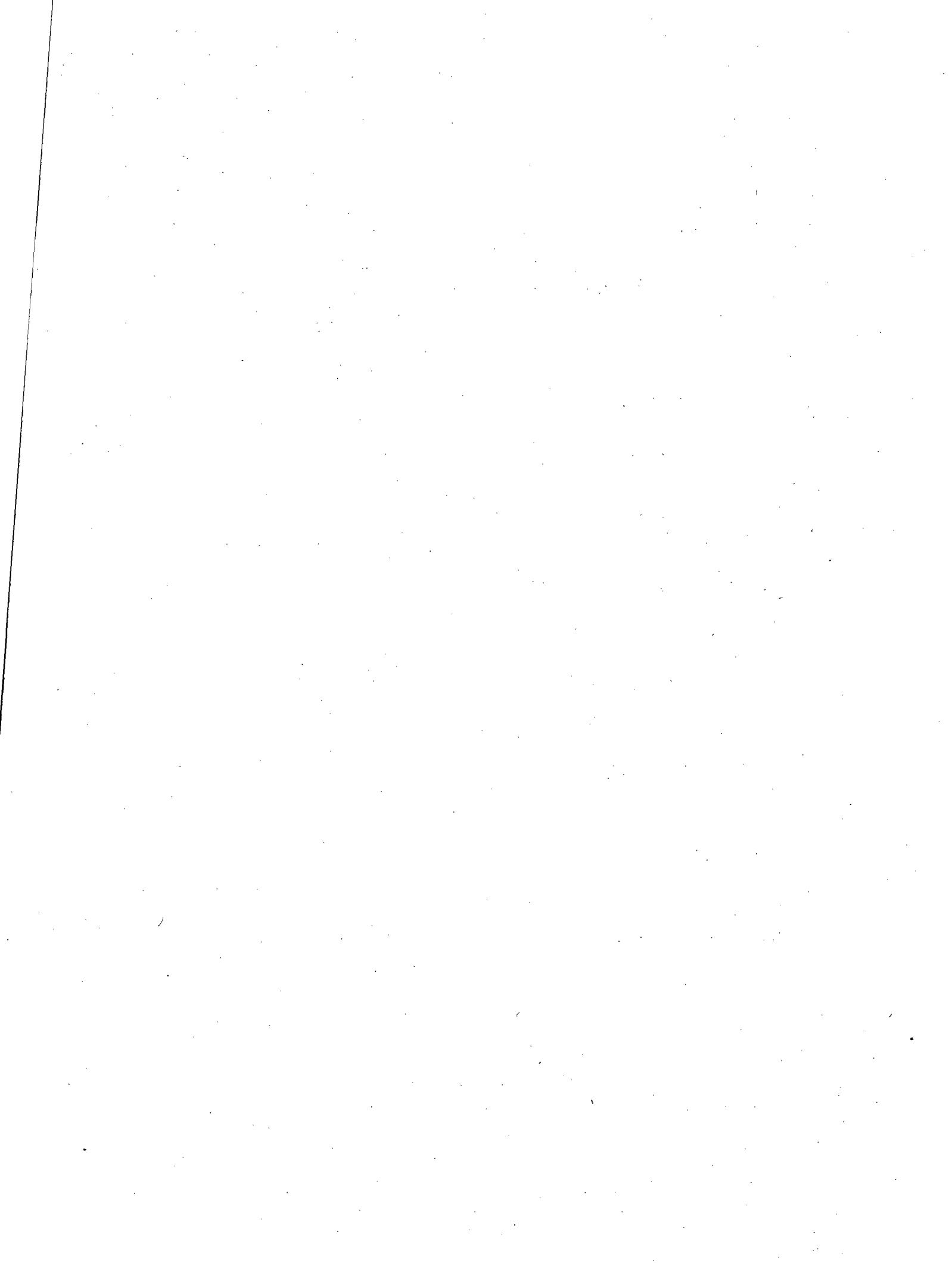
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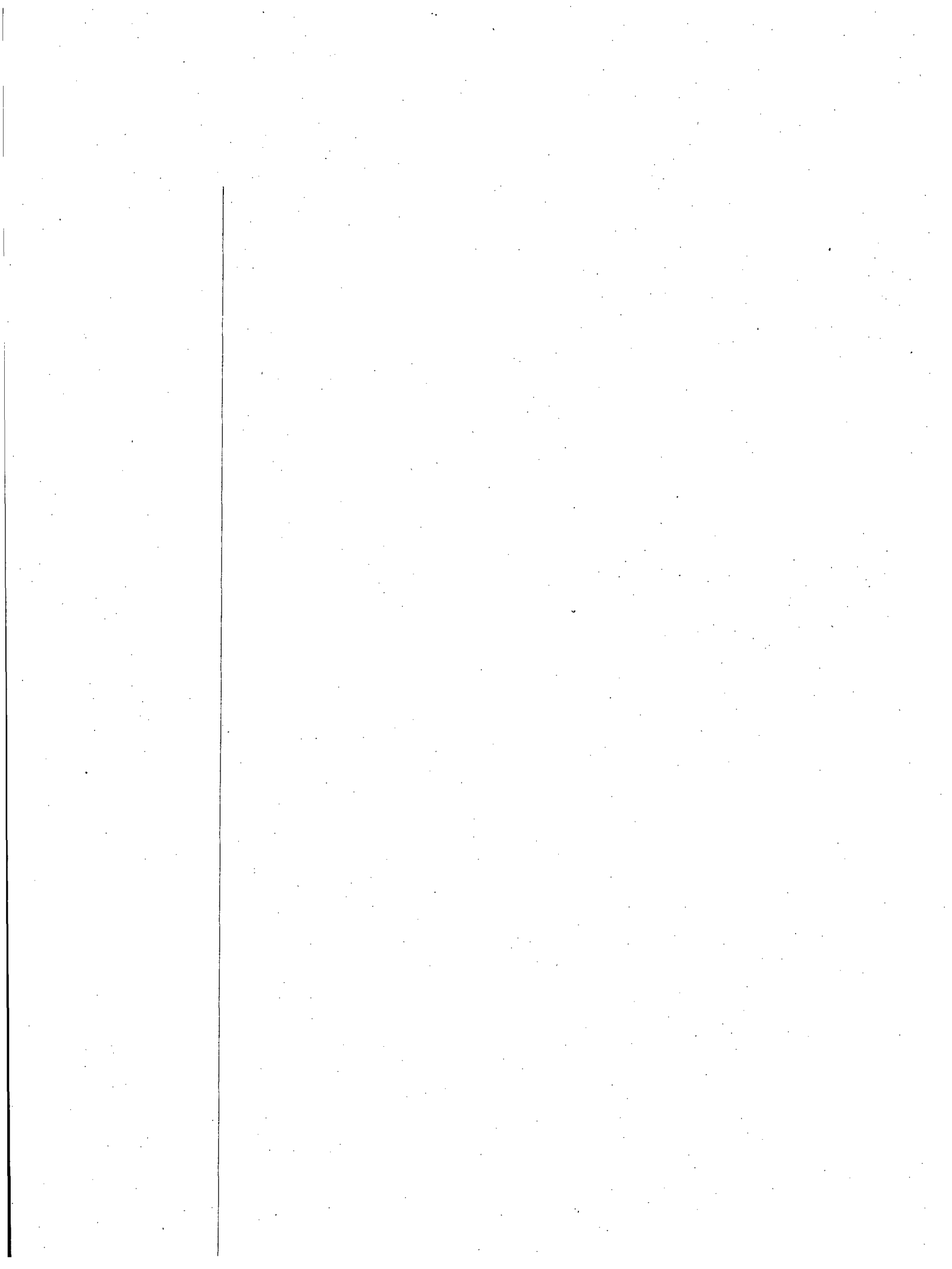
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## ABSTRACT

The MITRE Corporation is assisting in the development of a new Operations Center at the Headquarters of the Nuclear Regulatory Commission (NRC). This report identifies the response teams required to staff the center during an incident, describes the functions which each team contributes to the NRC response, and defines the needs of each team for the kinds of technical data which are now being considered for telemetering directly to the center from each operating power reactor.



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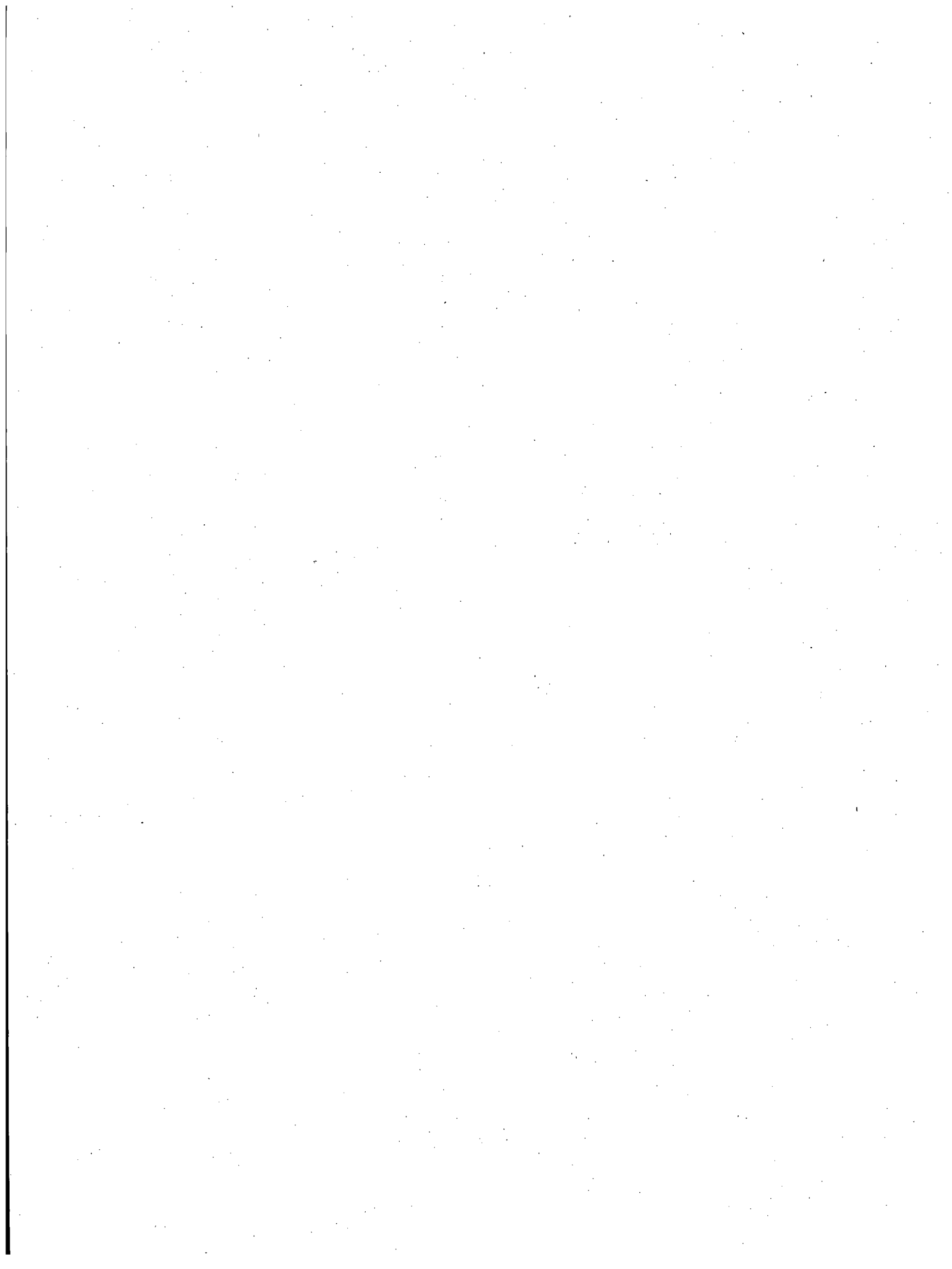


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## 1.0 INTRODUCTION

### 1.1 Background

The Nuclear Regulatory Commission (NRC) is planning to develop a Nuclear Data Link (NDL) to help manage its response to serious nuclear incidents, such as occurred at the Three Mile Island (TMI) plant. The data link will collect, transmit, process, store, and display data from the process and safety systems of each operating power reactor. In conjunction with this program, the NRC is planning to relocate and expand its current Operations Center. The necessary computer and display systems to support the Nuclear Data Link will be located in this new center. In addition, the center must be capable of supporting NRC emergency response efforts in reaction to other serious nuclear incidents such as at fuel and medical facilities, or during transport of nuclear materials. The first phase of the NDL and the new center is scheduled for operation no later than 1 January 1982.

Planning for the NDL and a new Operations Center is part of a major effort to improve the NRC's capability to respond to any future incident involving its licensees. The President's Commission on the incident at Three Mile Island recommended, among other things, that the NRC increase its emphasis on "inspection and enforcement functions and systematic evaluation of operating plants."<sup>(1)</sup> The President responded to that recommendation by directing several actions; one of these was that the NRC evaluate "the need for federal presence in the control room of operating reactors, such as by observers or continual computer monitoring of vital plant parameters."<sup>(2)</sup> The NRC may use both approaches to increase the federal presence. Resident Inspectors are being trained and assigned to the operating reactors, and the NDL is being planned to monitor (via a computer) "vital plant parameters."

As a part of the general NRC program for improvement in its incident response capabilities, MITRE has proposed an analysis of potential roles for the NRC in such incidents and described how this spectrum of activities influences the need for different capabilities in the Operations Center.<sup>(3)</sup>

The NDL Program is now in its concept definition and design phase. The NRC effort is being supported by both Sandia National Laboratories and The MITRE Corporation. In November of 1979, MITRE prepared a preliminary description of the new center to include major functions, as well as personnel, space, and equipment requirements.<sup>(4)</sup>

As a direct extension of the preliminary description, this report discusses the types of data which are likely to be needed in the center. Central to current planning, and to this document, are the data which will be telemetered via the Nuclear Data Link itself. The exact list of data to be provided via this method is not yet determined. NRC has prepared a preliminary list based upon analysts' estimates of the minimum essential safety data and additional data which would be necessary for particular types of analyses related to a nuclear incident. As a part of its specification of potential sensor and computer hardware, Sandia is identifying specific data which could actually be acquired from existing reactor sites. (This list is constrained by the requirement that the initial NDL be functioning by early 1982, otherwise more significant modifications could be made to existing reactor equipments to collect greater amounts of data.) It is expected that the final data list will not differ from the current preliminary list to a great enough degree to invalidate recommendations made in this report.

## 1.2 Context and Scope of Work

As stated above, the basic thrust of this document is to detail information needs (within the Operations Center) which can be satisfied by utilizing data which is telemetered via the Nuclear Data Link itself. However, the total information needs of the NRC's Operations Center significantly exceed the subset of data to be collected and transmitted via the Nuclear Data Link. Such information requirements can only be properly addressed within the context of a broadbased operational concept for the center. Such an effort has not yet been initiated by the NRC.

Nonetheless, certain aspects of the broader need for information are clear. In preparing this document the scope of work has been expanded beyond that minimum required by the Nuclear Data Link Program to include other basic information needs. To facilitate the analysis this report categorizes information needs based upon the source and means of transmitting the data, and presents recommendations for the formation of teams within the center. The report also describes the functions of these teams within the context of an Operations Center which has a Nuclear Data Link as well as other sources of information.

The categorization of information presented herein should not be misinterpreted as a requirement for multiple data displays. Comprehensive planning, at an early stage, for the display and provision of hard copy of all information requirements should result in an integration of Nuclear Data Link requirements with other data needs so that proper computer data base design will allow access from a display to data in such a way that the actual source of data is irrelevant.

In addition to this report, MITRE will soon publish a report addressing specific data requirements and recommended display formats for radiological and meteorological data which will not be telemetered to the Operations Center.

It is essential, however, that the NRC place emphasis as soon as feasible upon the concept definition and operational design of the Operations Center itself -- rather than allowing these requirements to evolve as secondary to the development of the Nuclear Data Link. Key tasks which should be addressed by the NRC in such an effort include:

- Analysis of requirements for the extensive corollary information which is expected to originate from sources other than the reactor and plant (such as reacting teams of various agencies, state and regional offices, and licensee management groups) but which will be critical to the successful use of the center for controlling the NRC response
- Design of computer data bases and development of appropriate processing algorithms to integrate and manipulate total information requirements (the NDL program addresses only a subset of the data requirement)
- Test and evaluation of proposed information display devices and other hardware
- Evaluation of all telecommunications capabilities required to support the Operations Center during an incident (the NDL program only addressed telemetering of that data)
- Evaluation of personnel skills and the functional organization of personnel within the center and into mobile response teams. Incident response exercises must be conducted to test and evaluate alternative modes of operation and to train personnel.

## 2.0 SUMMARY

This section first summarizes a concept of operations for the NRC Headquarters Operations Center -- its purpose, principles of operation, and personnel (Section 2.1). The concept of operations is a refinement of the preliminary description in Reference 1 and takes into account the results of two subsequent NRC exercises, an evolving reorganization of responsibilities within the agency, and ongoing discussions of related responsibilities of other agencies.

Section 2.2 summarizes the needs of headquarters response personnel for detailed technical data of the sort which is now being planned for telemetering directly from each operating reactor site to NRC Headquarters.

### 2.1 Concept of Operations

The requirements for any specific kind of information depend on the purposes to be served. Section 2.1.1 summarizes the purpose of the NRC Headquarters Operations Center and the context in which it will operate. Section 2.1.2 summarizes the principles of operation defined and used by MITRE to determine the preferred flow of information to, from, and within the center. Section 2.1.3 then defines the different kinds of information which will be available during an incident and concludes with a brief description of the distinct groups of people ("response teams") who will use the information at headquarters to fulfill NRC responsibilities.

#### 2.1.1 Purpose of the Headquarters Operations Center

The NRC must be able to follow the course of an incident, and of all consequent response activities, closely enough to decide when further NRC action is needed and what it should be. Even though the precise limits and certain other aspects of the NRC role during an incident are not yet fully defined, the NRC responsibility for

protecting the public dictates that the President, the Congress, State and local officials, and the public, in general, be able to rely on the agency for information and advice. The information must be as complete as possible and factual; the advice must be accepted by most of the public as an adequate response to any threat from the incident. It is important that the NRC maintain a clear principal focus for management of, and information about, its response activities. The Headquarters Operations Center should serve that purpose.

The activities which must be coordinated by personnel in the center are diverse and far-flung. Currently, NRC personnel are employed at several headquarters locations in the Washington, D.C. area, at five Regional Offices throughout the country, and (as Resident Inspectors) at each operating reactor. When a serious incident occurs, predesignated persons from headquarters assemble at the Operations Center, others are dispatched from one or more Regional Offices to the incident site, and all other staff are on call for support. Any number of additional persons may be dispatched to the site (from headquarters and the Regional Offices) as an incident evolves, and headquarters may choose to delegate some of its authority to an on-site team leader. In any situation, however, Operations Center personnel must receive enough information to maintain an effective overview of the NRC response and to support decisions regarding modifications to the response effort are needed.

Other organizations also depend on the Operations Center for information. Fundamentally, all organizations involved in a response should be viewed as both potential sources and potential users of NRC information because of the breadth of the NRC role. Essential information will range from technical details of an incident and its effects to policy decisions from government and



licensee executives. Operations Center personnel must:

- Receive, screen, verify, correlate, and distribute both detailed and summary information
- Identify and research issues and options for executive decisions
- Make, promulgate, and monitor the implementation of decisions
- Maintain a dynamic overview of an incident and of response activities
- Assist other organizations in coordinating the total response to an incident.

#### 2.1.2 Principles of Operation

If the response operation were very small and uncomplicated, one team could gather in a single room to do everything necessary to carry out the tasks listed in the preceding section. As response needs become more complex, the number and magnitude of tasks requiring special expertise increases and specialized groups must be formed to do them. On the other hand, overspecialization can slow down the overall response. In reviewing the very complex demands of an NRC response, emphasis should be placed upon using minimum information to maintain an effective response. To this end, this report defines specialized operational teams only as necessary to satisfy one of the following needs:

- To divide a projected heavy workload of varied tasks. This need is exemplified by the liaison teams. (Section 2.1.3 lists, and Section 3.0 describes in detail, all of the component teams recommended for the Operations Center.) NRC liaison with state agencies and with other federal organizations will each frequently require approximately the same expertise -- detailed understanding of the NRC role, broad understanding of NRC technical operations, and political acumen. The probable total workload is sufficiently great, however, that the liaison will be more thorough

if the responsibility is divided. Therefore, it is recommended that separate teams be formed for state and federal liaison.

- To provide substantial special expertise which is likely to be needed in most incidents. The Data Services Team is an example. The data support systems (including the Nuclear Data Link) for the center will be sufficiently complex so that trained personnel -- the Data Services Team -- will be needed to monitor the equipment to correct minor malfunctions, and to handle unanticipated requests for processed data during an incident.

Other principles which underlie the conceptual design for information flow in the center are:

- Teams must have clearly defined, non-overlapping responsibilities for information exchange with other teams in the center and with other organizations.
- Whenever possible, other organizations should have a single point of contact in the center. This will not always be entirely possible because in an intensive response, additional contacts may be needed to assure timely information flow. When multiple contacts become necessary, a primary contact should be designated and should be kept aware of all other contacts.
- When the intensity of the response requires multiple NRC contacts with the licensee, one contact should be maintained between the respective executives and two or more contacts (as needed) should be maintained between technical specialists. The executive contact should be primary.
- There should be a single team in the center which is capable of either accurately referring or answering all questions from other NRC response personnel.
- All response personnel require feedback on the uses or results of their analyses, reports, or decisions.

### 2.1.3 Headquarters Incident Response Teams

Clearly, a massive information flow is needed to carry out NRC response operations. To ease the analysis of specific information requirements, the total information flow has been divided into the following discrete "subsystems." (The division is based on differences in the way the information will be acquired, processed, or used because those factors affect hardware and software requirements.)

- Subsystem 1 consists of technical data acquired automatically at the site, telemetered to the Operations Center, processed, and displayed in predetermined formats. The only manual interface with Subsystem 1 occurs when the user selects a particular display from among those that are available.
- Subsystem 2 consists of the same telemetered data as Subsystem 1, but the data is accessed by request to an advisor who can explain the data and supplement it with computer utility programs which, while prepared in advance, may not be on-line at all times.
- Subsystem 3 consists of technical data which must be sent to the center via some means other than telemetry. The data will be manually entered for computer processing. Outputs may be in the same formats as used for data in Subsystems 1 and 2. Examples may include technical data from sensors not yet connected for telemetry, or from sites not yet included in the telemetry system.
- Subsystem 4 consists of non-technical information from any source (but not telemetered) which can be readily processed for display in a predefined format. An example is summary information exchanged by preagreement with other federal agencies.
- Subsystem 5 consists of non-technical information from any source (but not telemetered) which will require some manual processing to put it into a usable format. Examples are reports from various organizations operating near an incident site.

- Subsystem 6 consists of information to answer ad hoc queries which cannot be answered readily with available data and computer programs. An example is a request for a projection of the likely consequences of some proposed action which has never before been considered. Technical and computer assistance from other organizations may be required.

The total information flow (i.e., all subsystems) was considered and the principles listed in Section 2.1.2 were applied by MITRE to identify the specialized response teams which together can most effectively carry out the purpose and functions defined in Section 2.1.1. The teams and their suggested responsibilities are based on MITRE's detailed reviews of NRC statutory responsibilities and the current organization of the response to the incident at Three Mile Island (TMI), and of a series of NRC incident response exercises both before and after TMI. (The responsibilities of each team are defined in more detail in Section 3.0.) Some of the teams could be staffed entirely by personnel from an existing office in the NRC organization, as shown in parentheses. The other teams listed below would consist of personnel from more than one office. Specialized teams are recommended for each of the following responsibilities:

1. Policy Team (The Commissioners) - Responsible for determining NRC policy and for response overview.
2. Executive Team - Responsible for managing the response and for its coordination with the responses of other organizations.
3. Public Liaison Team (Office of Public Affairs) - Responsible for press releases and other media contacts.
4. Congressional Liaison Team (Office of Congressional Affairs) - Responsible for liaison with individual members of the House and Senate, with legislative committees, and with member and committee staffs.
5. Federal Liaison Team - Responsible for coordinating NRC activities with those of other federal organizations.

6. State Liaison Team (Office of State Programs) - Responsible for liaison with state and local governments.
7. Operation Support and Control Team - Responsible for keeping abreast of all NRC activities, for accurately referring or answering queries from other teams, and for providing additional support as needed.
8. Operations Analysis Team - Responsible for detailed analyses of reactor operations and for similar analyses during incidents which do not involve reactors.
9. Protective Measures Analysis Team - Responsible for detailed radiological analyses. (The NRC at this time has identified two subgroups within both the Operations Analysis Team and the Protective Measures Analysis Team. One subgroup in each addresses current status, the other addresses projections.)
10. Technical Support Teams - Responsible for assisting the Operations Analysis and Protective Measures Analysis Teams with detailed technical analysis as needed. (These "teams" would be composed of staff members working in or near their normal offices away from the Operations Center. The entire NRC Headquarters technical staff might be on call to provide this support.)
11. Administrative Services Team - Responsible for providing secretarial, telecommunications, reprographics, library, and similar support response personnel.
12. Data Services Team - Responsible for providing computer and other data support to response personnel.

Analysis indicates that the twelve teams listed above represent the distinct, major specialties into which headquarters response personnel should be grouped. The recommended specialties supplement the current headquarters organization and are not in disagreement with it.

The specialties were derived as distinct operational requirements without initial regard to who would staff each team (except for the Commissioners, who are clearly responsible for overall policy). In practice, certain specialty teams, as noted in the list,

are fully staffed by personnel from a single NRC office; it is recommended that the formal names applied to such teams reflect the names of the staffing offices to avoid any possible confusion over nomenclature. The other teams should be formally named according to their specialties. That practice is followed throughout the remainder of this document.

## 2.2 Summary of User Needs for Telemetered Data

Having defined the specialty teams which will fulfill headquarters responsibilities in an NRC response, the specific needs of each team for the kinds of data likely to be telemetered to the Headquarters Operations Center were analyzed (i.e., Subsystems 1 and 2 of the list in Section 2.1.3). As noted earlier, requirements for some of the non-telemetered data (specifically, for radiological and meteorological data) of Subsystem 3 are being analyzed in a follow-on to the task reported in this document. There is no current plan for a detailed analysis of the requirements for using the other kinds of data and information described in Section 2.1.3.

The exact list of technical data to be telemetered from operating reactor sites to NRC Headquarters has not yet been finally determined.\* The latest draft list (as of this writing) contains approximately 100 variables, of which about 60 are related to reactor operations and about 40 are related to protective measures. The list of data finally approved, together with trends computed from the data,

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\*The needs of various NRC technical experts are being coordinated by L. Beltracchi (NRC Office of Nuclear Reactor Regulation) and R. Woodruff (NRC Office of Inspection and Enforcement). The NRC and Sandia Laboratories are jointly determining the availability of the data at each site.

will specify the complete subset of incident response information which is defined as Subsystem 1 of the total Operations Center information flow system.

Some response personnel (such as the analysis teams) require continual direct access to all of the detailed data -- temperatures, pressures, etc. -- contained in Subsystem 1. Teams less directly involved with the detailed analyses must also have access to the data from time to time, but they will be able to use the data better if an advisor is also available to provide context and explanations. The advisor, for example, should be able to explain ongoing analyses and inferences being drawn from the data by the analysis teams. The definition of Subsystem 2 incorporates this advisor. The key difference between the information flow for Subsystem 1 and that for Subsystem 2, therefore, is the presence of the advisor in the latter information loop. By controlling the Subsystem 2 display units remotely, the advisor can, in effect, use those units for short technical briefings. The following operational procedures for the two subsystems are envisioned:

- Subsystem 1 data, input automatically, should be accessed on Subsystem 1 display units directly by the user. The exact method of access may be one or more of several possible methods now being studied by both MITRE and Sandia, but the display will be entirely under the control of the user. In addition to a simple list of data and computed trends, a user may wish to see all current data related to a derivation of the radiological source terms, for example. If so, he selects that question from a menu and inputs a number code which controls his display. The system may be designed to indicate both known data and needed data in a step-by-step derivation of the source terms. MITRE is currently investigating the practicality of such a display format.

- Subsystem 2 users should call an advisor to obtain detailed data. Subsystem 2 display units will be slaved to a master unit controlled by the advisor. To be most effective, the advisor should be designated by, and physically located with, the analysis teams. (Actually, two advisors -- one from each analysis team -- will probably be necessary.) The advisor should be able to select any data or information from Subsystem 1, from other information subsystems, and from the outputs of special utility programs for display on any individual Subsystem 2 display unit. If, for example, a member of the Executive Team wishes to know specific stack readings, the advisor will be able to display the readings and trends on the member's Subsystem 2 display unit. At the same time, the advisor can tell the member whether the analysis teams have found the stack readings to be consistent with other data, for example, or how the readings and meteorological data have influenced the deployment of off-site survey teams.

The following sections contain summaries of headquarters requirements for Subsystems 1 and 2 in two different forms. Section 2.2.1 lists the headquarters teams and summarizes the number and uses of display units for each one. Section 2.2.2 identifies and locates on a center floor plan all the users of each of the two subsystems. Section 3.0 contains the detailed analyses from which those summaries are drawn.

#### 2.2.1 Needs for Telemetered Data, Arranged by Incident Response Team

This section contains a summary of the requirements for the data which is likely to be telemetered from reactor sites to the center. The requirements are listed for each of the incident response teams identified in Section 2.1.3. After first identifying the functions for which each team would be responsible, the requirements were defined by successively:

- Identifying in a preliminary information flowchart each step that a team should take to perform each function



- Indicating in each preliminary chart when, in the process of performing a particular function, the responsible team should interface with another team
- Reviewing and refining each chart, following the principles listed in Section 2.1.2, after all preliminary charts were finished
- Identifying on each final flowchart the steps for which Subsystem 1 and/or Subsystem 2 data is required.

The summary below lists the recommended general uses of telemetered data. (See Section 3.3.2 for detailed flowcharts which define the uses more specifically.) Preliminary estimates of the number of display units needed by each group, based on estimates of the frequency and duration of accesses required, are also shown. The estimates are only preliminary because they do not yet incorporate requirements for data other than that which is likely to be telemetered from reactor sites.

1. The Commissioners (not including the Commission Chairman, who has been designated as leader of the Executive Team)-
  - No need for either Subsystem 1 or Subsystem 2. When present in the center, the Commissioners will be able to share the facilities of the Executive Team.
2. Executive Team -
  - Needs Subsystem 2 (two display units) to fulfill its management responsibilities with respect to an evolving incident.
3. Public Affairs -
  - Needs Subsystem 2 (one display unit) to draft press releases and other statements.
4. Congressional Affairs -
  - Needs Subsystem 2 (one display unit) to respond to Congressional inquiries.

5. Federal Liaison -
  - Needs Subsystem 2 (one display unit) to resolve federal coordination problems.
6. State Programs -
  - Needs Subsystem 2 (one display unit) to resolve state coordination problems.
7. Operations Support and Control -
  - Needs both Subsystem 1 (two display units) and Subsystem 2 (one display unit) to perform its essential monitoring and coordination functions within the Operations Center.
8. Operations Analysis Team (OAT) -
  - Needs Subsystem 1 (one display unit in each room of OAT area) and Subsystem 2 (one display unit in each room of OAT area) to monitor incident in real time, provide additional technical information for all other groups, and perform assigned tasks and analyses. Advisor has input control for Subsystem 2.
9. Protective Measures Analysis Team (PMT) -
  - Needs Subsystem 1 (one display unit in each room of PMT area) and Subsystem 2 (one display unit in each room of PMT area) to monitor incident in real time, provide additional technical information for all other groups, and analyses. Advisor has input control for Subsystem 2.
10. Technical Support to Operations Analysis Team and to Protective Measures Analysis Team -
  - Needs Subsystem 1 (at least one display unit in each building with Technical Support offices) and Subsystem 2 (at least one display unit in each building with Technical Support offices) in order to assist the two analysis teams and advisors in their assigned work, including technical analyses, resolving discrepancies, and identifying problems.
11. Administrative Services Team -
  - No need for either Subsystem 1 or Subsystem 2.

12. Data Services Team -

- Needs Subsystem 1 (one display unit with control terminal) to control and monitor inputs.
- Needs Subsystem 2 (one display unit) to monitor operation.

2.2.2 Needs for Telemetered Data, Arranged by Subsystem

Figure 1 shows recommended room locations of Subsystem 1 display units. The floor plans are those recommended by MITRE in Reference 3. Data Services Team personnel in the Data Control Center should control inputs to the displays. (The Data Control Center is adjacent to the principal Subsystem 1 users, the analysis teams, to facilitate discussion of any NDL problems which arise.) Each of the two analysis teams should designate one "advisor" in the analysis area to answer technical questions via Subsystem 2.

The internal floor plans of the analysis team areas have not been finalized, so an exact number of display units cannot yet be recommended. The following is an approximate summary of Subsystem 1 display unit needs.

Protective Measures Analysis

Team Leader. . . . .	1
Major Rooms. . . . .	4
Subsystem 2 Advisor. . . . .	1
Technical Support (Remote Offices) . . . . .	2

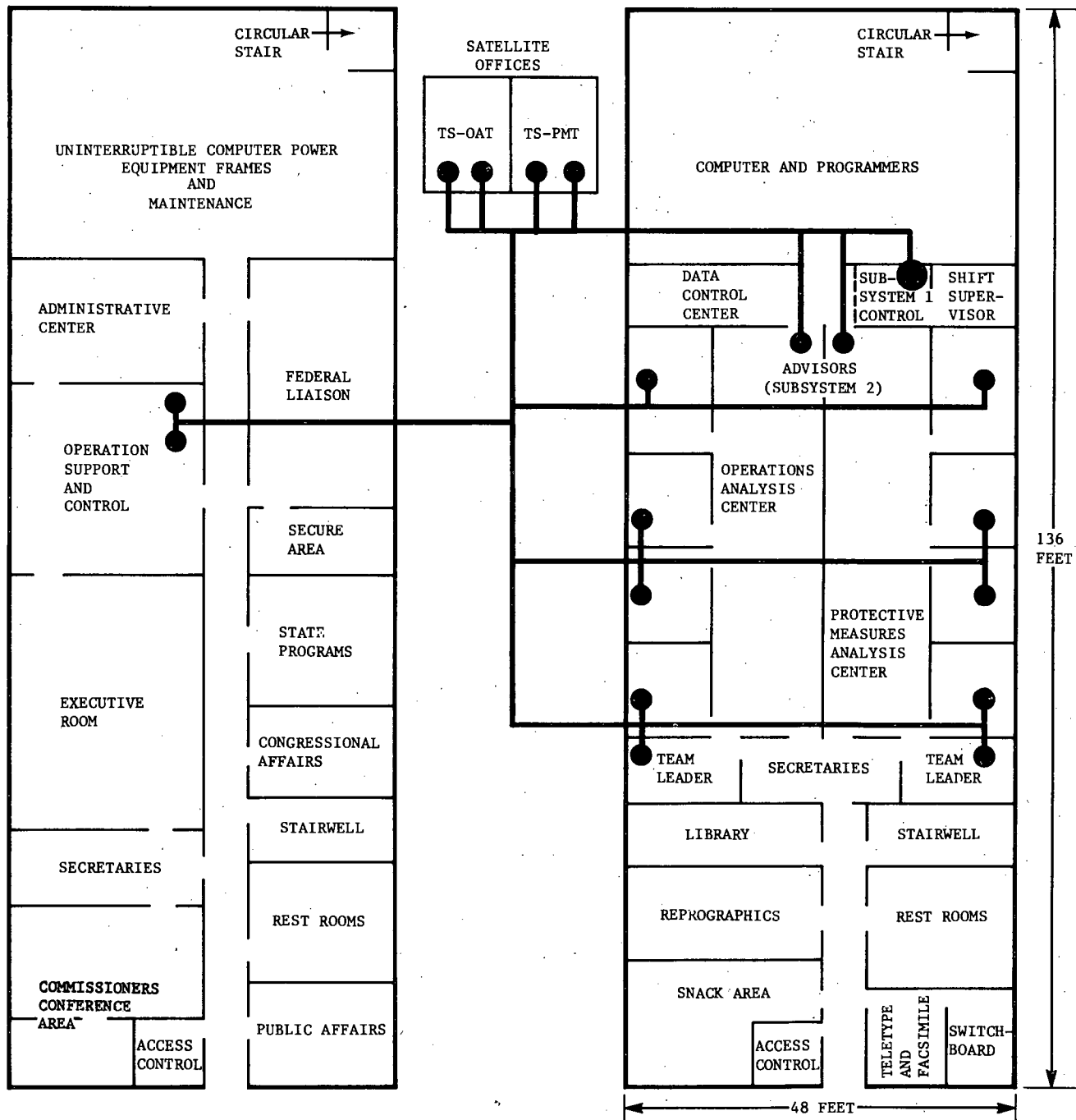
Operations Analysis

Team Leader. . . . .	1
Major Rooms. . . . .	4
Subsystem 2 Advisor. . . . .	1
Technical Support (Remote Offices) . . . . .	2

Operation Support and Control . . . . . 2

Data Control Center . . . . . 1

Total 19

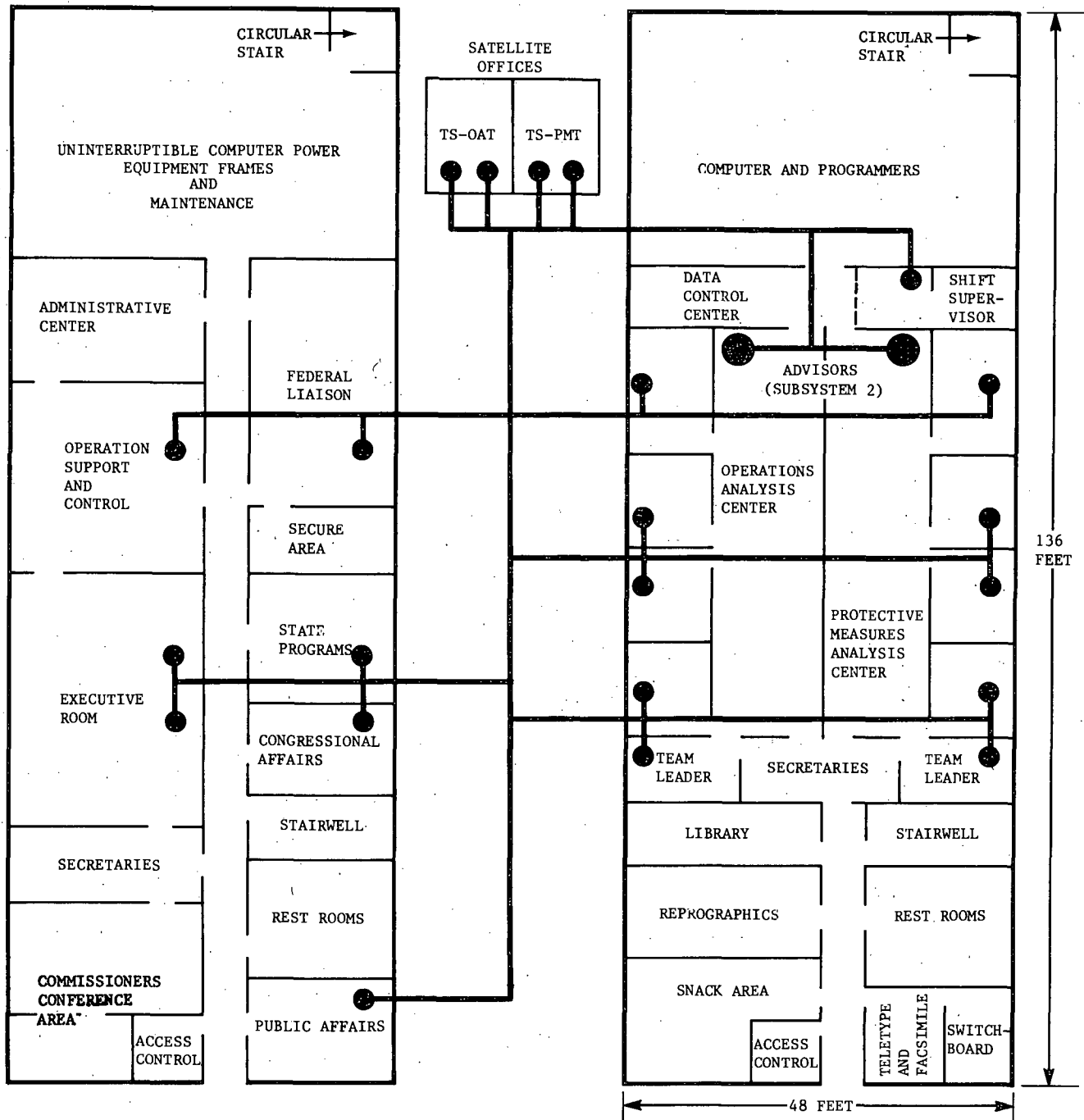


**FIGURE 1**  
**LOCATIONS OF SUBSYSTEM 1 DISPLAY UNITS**

This total is exclusive of monitors required by equipment maintenance and support personnel. It is recommended that all Subsystem 1 equipment be capable of displaying both reactor operations data and protective measures data as selected by the users. This flexibility will aid the analysis teams in meeting the different needs of different kinds of incidents.

Figure 2 shows the recommended room locations of Subsystem 2 display units. Users will access telemetered data by using a telephone (or other voice link) to request specific information from the advisors. Each advisor will be a specialist either in reactor operations or in protective measures. The advisors will control the displays on Subsystem 2 units. The two analysis teams and their technical support groups will use additional Subsystem 2 display units to assist the advisors, as needed, and to request special computer utility programs which may not be on-line at all times on Subsystem 1.

As noted in the summary of Subsystem 1 needs, the current uncertainty in room layouts for the analysis teams makes a precise count of required display units impossible at this time. There is another factor which affects only the Subsystem 2 count: The number of utility programs which will only be available by request is still unknown. Depending on the content of those programs, the analysis teams may use them extensively at times. For that reason, current planning should allow for one Subsystem 2 display unit, together with the Subsystem 1 display unit, in every major room in the analysis area.



**FIGURE 2**  
**LOCATIONS OF SUBSYSTEM 2 DISPLAY UNITS**

The following is an approximate summary of Subsystem 2 display unit needs:

Protective Measures Analysis

Team Leader. . . . .	1
Major Rooms. . . . .	4
Subsystem 2 Advisor. . . . .	1
Technical Support (Remote Offices) . . . . .	2

Operations Analysis

Team Leader. . . . .	1
Major Rooms. . . . .	4
Subsystem 2 Advisor. . . . .	1
Technical Support (Remote Offices) . . . . .	2

Executive Team. . . . . . 2

Liaison groups, 1 display each. . . . . . 4

Operation Support and Control . . . . . 1

Data Control Center . . . . . 1

Total 24

This total is exclusive of any monitors that may be required by equipment maintenance and support personnel.

### 3.0 INFORMATION FLOW

In responding to a nuclear incident, the NRC must reduce uncertainty regarding the incident as much as possible at all times and must be prepared to modify its role as the evolving situation dictates. Efficient and effective information flow in the Operations Center is essential. This section describes the proposed information flow and control processed for the center based on the following:

- Response teams required for a major incident
- Responsibilities and functions of each team
- Information needs to fulfill these responsibilities.

Only needs for the data which are likely to be telemetered from reactor sites to headquarters have been analyzed in detail.

#### 3.1 Response Teams

Reference 3 provides a preliminary definition of the headquarters response teams and their interrelationships. Those results have since been modified by changes in the NRC organization and procedures, and by the results of two subsequent incident response exercises. Currently the recommended incident response teams are:

##### 3.1.1 The Commissioners

NRC Commissioners determine NRC policy and are ultimately responsible for NRC actions. The Chairman is the principal executive officer and the official spokesman for the Commission. It is not expected that the Commissioners will be in continuous session in the center throughout an incident. For example, one or more Commissioners may be NRC policy spokesmen at the headquarters of the Federal Emergency Management Agency (FEMA), which is responsible for all off-site activities during an incident.



### 3.1.2 Executive Team

The Executive Team is currently headed by the Chairman of the Commission when he is present. Other members are the Executive Director for Operations (EDO), the Director of the Office of Inspection and Enforcement (IE), and the Director of either the Office of Nuclear Reactor Regulation (NRR) or the Office of Nuclear Material Safety and Safeguards (NMSS), depending on details of the incident. The EDO heads the team in the Chairman's absence. The Executive Team should be in continuous session to manage the NRC response and its coordination with the responses of other organizations. Assisting the Executive Team are:

- An Executive Team Coordinator for liaison between the Executive Team and other NRC personnel
- A Status Officer for liaison between the Executive Team and non-NRC personnel.

### 3.1.3 Public Affairs

External liaison with the public will be carried out through the existing Office of Public Affairs, which will draft press releases for technical review by Operation Support and Control and for final approval by the entire Executive Team. Public Affairs will also inform the Executive Team of the current media reactions, and will coordinate access of media to site activities. Public Affairs should conduct press conferences and arrange interviews at a location separate from the Operations Center.

### 3.1.4 Congressional Affairs

The existing Office of Congressional Affairs maintains liaison with Congressional committees and members of Congress, providing them with status reports, special reports, and answers to queries. Congressional Affairs will coordinate Congressional visits and other reviews of NRC activities.

### 3.1.5 Federal Liaison

No separate NRC office yet exists solely for coordinating NRC activities with those of other federal organizations, other than with the Congress. Federal liaison during incidents should be a function distinct from liaison with state and local groups. A Federal Liaison Team should be the primary NRC contact with FEMA and should monitor all aspects of that relationship. Primary contacts and formal information exchange will also be established directly with some other federal organizations as designated in the NRC Incident Response Plan and as otherwise required.

### 3.1.6 State Programs

Liaison with state and local organizations will be carried out through the existing Office of State Programs. This office will establish a primary contact in each state government which will monitor state activities, disseminate NRC information, identify impending issues, and coordinate NRC actions. Liaison with local governments should also be maintained through the State Programs team.

### 3.1.7 Operation Support and Control

Personnel on this team will provide a sharper incident management focus without actual imposition of another layer of management, because their role is defined principally as one of internal operational coordination. They will monitor all executive, liaison, and technical support activities. This team is the focus for information exchange and will be responsible, for example, for answering all reports of conflicting NRC activities or information. The team will maintain a general status display, not analyzed in this report, and will directly support the Executive Team, for example, by assuring a thorough technical review of press releases.

Personnel requirements for the team only partially match the existing organization. The team should include a director (e.g., the current ET Coordinator is a possibility) and a deputy, two specialists for monitoring the activities of each analysis support group, and two specialists to work with the liaison offices. Specialists will tend to be junior but knowledgeable, which will help the office to maintain its coordination role and not assume a management posture.

### 3.1.8 Operations Analysis Team

This team must monitor the status of reactor and safety systems (or other facilities) involved in an incident. Personnel will also monitor licensee and NRC actions taken to bring the incident under control. They will work closely with Operation Support and Control, Regional Offices, the licensee's Technical Support Center, and other personnel near or on-site to define issues and requirements for analyses. The team's personnel will lead the required analyses, drawing on technical support as necessary from NRC staff and consultants not in the Operations Center. At present, this team is divided into two groups which the NRC has designated:

- Current Status
- Evaluation (responsible for projections of future status).

This subdivision is being evaluated in incident response exercises, but the outcome will not affect display requirements for telemetered data. Sufficient display flexibility is recommended to accommodate operational requirements which may change over time or even over the course of a single incident.

### 3.1.9 Protective Measures Analysis Team

This team must monitor and coordinate the collection of environmental data and must maintain summaries of current, cumulative, and projected radiological effects on people and the environment. Team personnel will monitor evacuation plans and activities and will be prepared to advise, as necessary, on all aspects of an evacuation which are related to radiological effects, for example. (FEMA may eventually absorb some of this function, but it is not yet prepared to do so. This team will have to advise the Executive Team regardless of FEMA participation.) The team will work closely with Operation Support and Control, Regional Offices, the licensee's Technical Support Center, and other personnel near or on-site to define issues and requirements for analyses. Team personnel will lead the required analyses, drawing on technical support, as necessary, from NRC staff and consultants not in the Operations Center. At present, this team, like Operations Analysis, is subdivided into two groups and the same comments apply. The Protective Measures Analysis Team and the Operations Analysis Team will, of course, work closely together throughout the progress of an incident.

### 3.1.10 Technical Support Teams

The entire NRC staff should be available to assist as needed in an incident response. The Operations Center will be designed to accommodate only the staff necessary to meet predictable requirements of a response. While the center design will allow for some staff augmentation, much of the technical support which will be needed in a serious incident will be more effective if additional personnel do not crowd the center. Technical Support Teams should aid both the Operations Analysis and Protective Measures Teams, with staff working in or near their normal offices remote from the center. These support teams would be under the direction of the Operations

Analysis and Protective Measures Analysis Team Leaders in the center. They must have access to the same information as personnel in the center in order to provide effective support and to reduce the temptation for team members to gravitate to the center.

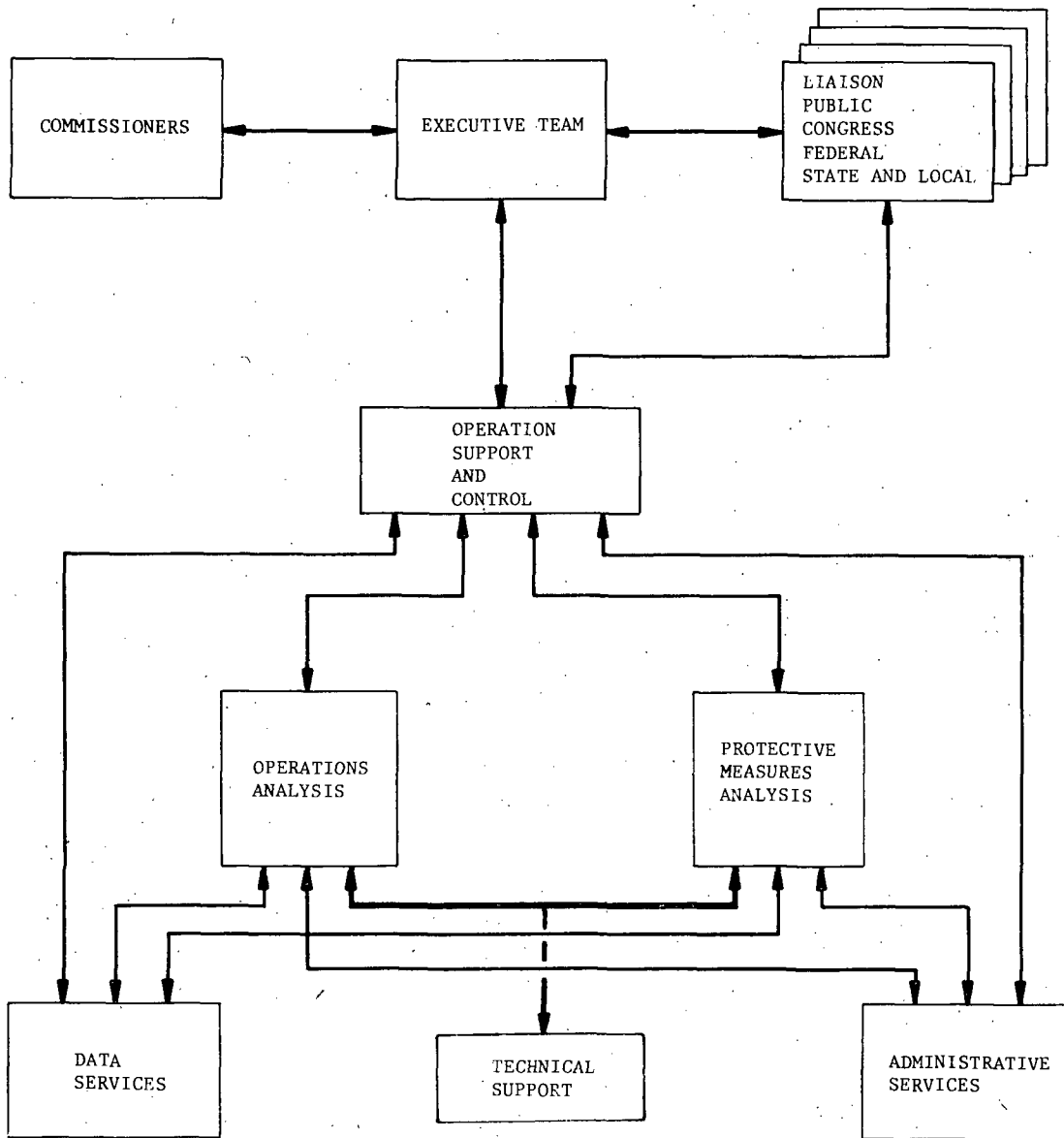
Figure 3 shows how the response groups are functionally related to each other during a response. Basic information flow will follow the functional links. Figure 3 should be compared with Figure 4, a chart provided by the NRC of the current incident response organization. The comparison shows, for example, that Operation Support and Control is functionally located to coordinate and compile information for the Executive Team and the liaison groups. It is not (and should not be) organizationally in a position to direct or manage activities of the analysis teams.

#### 3.1.11 Administrative Services Team

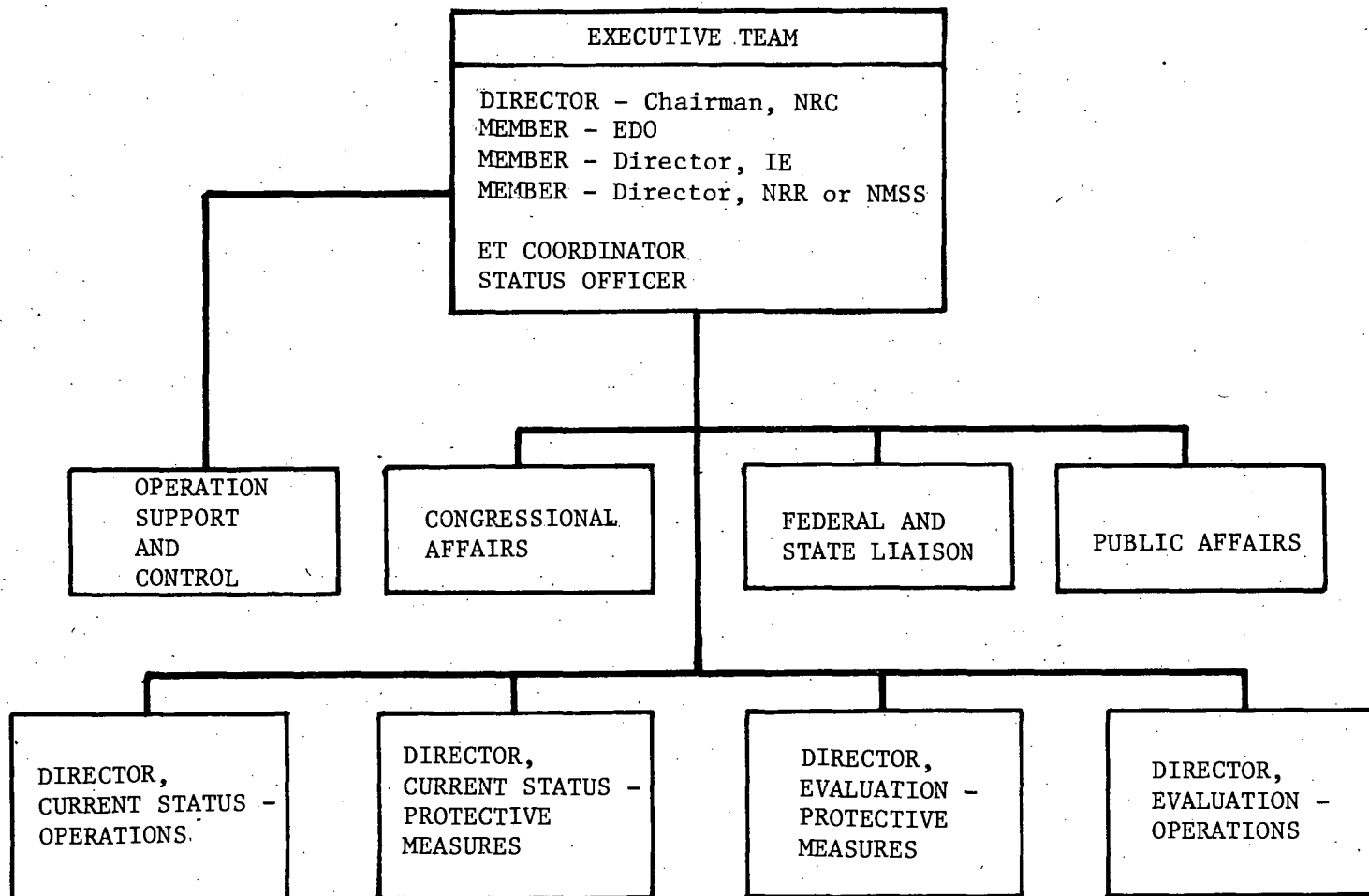
Administrative Services personnel will provide such support as telecommunications, reprographics, and library services. The Office of the Executive Officer for Operations Support will direct this group, with assistance from other NRC offices as necessary. The detailed functions of the recommended group are, at this time, at least partially the responsibilities of various NRC offices. Although the offices have worked well together during TMI and exercises, a formal group with designated authority and responsibilities should be formed for incident response.

#### 3.1.12 Data Services Team

Like Administrative Services, the Data Services Team also does not yet formally exist. It is needed to assure coordinated support to meet the computer and other data needs of response personnel. All handling of telemetered data and the associated



**FIGURE 3  
NRC HEADQUARTERS RESPONSE GROUPS**



**FIGURE 4**  
**CURRENT NRC ORGANIZATION FOR INCIDENT RESPONSE**

displays and all maintenance of data equipment should be within the responsibilities of this group. Team personnel will operate the Data Control Center and will control data inputs to Subsystem 1 displays.

### 3.2 Response Team Functions

Table I lists major functions of each response team. The table also includes a column that indicates whether or not the team requires telemetered data to perform a given function. If telemetered data is required, reference is made to the flowchart in Section 3.3 on which the data use is described and explained in detail.

MITRE developed the list of functions from current modifications to the NRC Response Manual, from observations of the TMI response, and from evaluation of incident response exercises. Each function was then reviewed to determine if and how detailed technical data could be useful to the team performing the function.

### 3.3 Information Needs

The total information needs of the Operations Center have been defined in terms of six "subsystems" described in Section 2.1.3. Section 3.3.1 contains a brief perspective on the use in the center of non-telemetered data and information. Details of the use of telemetered data are contained in Section 3.3.2.

#### 3.3.1 Needs for Non-Telemetered Data

This report examines in detail the needs of NRC Headquarters for data which probably will be telemetered from reactor sites to the Operations Center; it is likely for the foreseeable future that there will be a greater quantity of essential information which is not telemetered. The definitions of Subsystems 4 through 6 in Section 2.1.3 demonstrate the breadth of requirements in the center



TABLE I

RESPONSE TEAM FUNCTIONS

RESPONSE TEAM	FUNCTIONS	REQUIREMENT FOR TELEMETERED DATA
<u>Commissioners</u>	<ul style="list-style-type: none"> <li>● Determine NRC policy.</li> </ul>	No.
<u>Executive Team</u>	<ul style="list-style-type: none"> <li>● Interact with President.</li> <li>● Coordinate policy with directors of other organizations.</li> <li>● Provide ad hoc advice and direction within NRC.</li> <li>● Maintain liaison with licensee.</li> <li>● Request and approve press releases.</li> <li>● Perform usual non-transferable managerial duties of individual members.</li> </ul>	<p>Yes. See flowchart ET-1.</p> <p>No.</p> <p>Yes. See flowchart ET-2.</p> <p>Yes. See flowchart ET-3.</p> <p>Yes. See flowchart PA-1.</p> <p>No.</p>

TABLE I (CONTINUED)

RESPONSE TEAM	FUNCTIONS	REQUIREMENTS FOR TELEMETERED DATA
<u>Public Affairs</u>	<ul style="list-style-type: none"> <li>● Prepare press release.</li> <li>● Coordinate NRC release with other government agencies.</li> <li>● Inform ET of media reaction.</li> <li>● Conduct press conferences.</li> <li>● Coordinate media access to site.</li> </ul>	<p>Yes. See flowchart PA-1.</p> <p>No.</p> <p>No.</p> <p>Yes. See flowchart PA-2.</p> <p>No.</p>
<u>Congressional Affairs</u>	<ul style="list-style-type: none"> <li>● Maintain liaison with Congress on federal issues as well as on state and local issues.</li> <li>● Coordinate with other governmental agencies.</li> </ul>	<p>Yes. See flowchart CA-1.</p> <p>No.</p>

TABLE I (CONTINUED)

RESPONSE TEAM	FUNCTIONS	REQUIREMENTS FOR TELEMETERED DATA
<u>Federal Liaison</u>	<ul style="list-style-type: none"> <li>● Coordinate with other federal agencies, as well as with other liaison groups within incident response organization.</li> <li>● Maintain specialized directory.</li> </ul>	<p>Yes. See flowchart FL-1.</p> <p>No.</p>
<u>State Programs</u>	<ul style="list-style-type: none"> <li>● Coordinate with state and local agencies, maintaining status record of their activities; also coordinate with other liaison teams in incident-response organization.</li> </ul>	<p>Yes. See flowchart SP-1</p>

TABLE I (CONTINUED)

RESPONSE TEAM	FUNCTIONS	REQUIREMENTS FOR TELEMETERED DATA
<u>Operation Support and Control</u>	<ul style="list-style-type: none"> <li>● Provide ad hoc advice and direction to other teams.</li> </ul>	<p>Yes. See flowchart OSC-1.</p>
	<ul style="list-style-type: none"> <li>● Review technical content of press releases.</li> </ul>	<p>Yes. See flowcharts OSC-2 and PA-1.</p>
	<ul style="list-style-type: none"> <li>● Summarize status of incident.</li> </ul>	<p>Yes. See flowchart OSC-3.</p>
	<ul style="list-style-type: none"> <li>● Define technical analysis needs.</li> </ul>	<p>Yes. See flowcharts OSC-1, OSC-3, and ET-1.</p>
	<ul style="list-style-type: none"> <li>● Provide technical support to ET and liaison teams.</li> </ul>	<p>Yes. See flowcharts ET-1, PA-1, PA-2, SP-1 and FL-1.</p>
	<ul style="list-style-type: none"> <li>● Provide feedback to technical support teams.</li> </ul>	<p>Yes. See flowcharts OSC-3, PMI-2, and OAT-2.</p>
	<ul style="list-style-type: none"> <li>● Maintain liaison with other government operations.</li> </ul>	<p>No.</p>

TABLE I (CONTINUED)

RESPONSE TEAM	FUNCTIONS	REQUIREMENTS FOR TELEMETERED DATA
<u>Operations Analysis Team</u>	<ul style="list-style-type: none"> <li>● Real-time monitoring and assessment of incident-related events, and projections for future.</li> <li>● Answer inquiries and requests for assistance.</li> </ul>	<p>Yes. See flowcharts OAT-1 and OAT-2.</p> <p>Yes. See flowcharts OAT-1 and OAT-2.</p>
<u>Protective Measures Analysis Team</u>	<ul style="list-style-type: none"> <li>● Real-time monitoring and assessment of incident-related events, and projections for future.</li> <li>● Answer inquiries and requests for assistance.</li> </ul>	<p>Yes. See flowcharts PMT-1 and PMT-2.</p> <p>Yes. See flowcharts PMT-1 and PMT-2.</p>
<u>Technical Support Teams</u>	<ul style="list-style-type: none"> <li>● Assist Operations Analysis and Protective Measures Analysis Teams.</li> </ul>	<p>Yes. See flowcharts TS(OAT) and TS(PMT).</p>

TABLE I (CONCLUDED)

RESPONSE TEAM	FUNCTIONS	REQUIREMENTS FOR TELEMETERED DATA
<u>Administrative Services Team</u>	<ul style="list-style-type: none"> <li>● Provide such administrative services as telecommunications, reprographics, and library services.</li> </ul>	<p>No.</p>
<u>Data Services Team</u>	<ul style="list-style-type: none"> <li>● Assure coordinated support to meet data needs of response personnel.</li> </ul>	<p>Yes. Controls and monitors telemetered data; not shown in flowchart.</p>

for such information. While division of the total information flow into subsystems is an analytic convenience, the information ultimately must be presented in the most useful combinations and format for personnel in the center. For example, should an incident occur at a reactor site not yet included in the telemetry systems, technical data, which is here defined as part of Subsystem 3, will be received by telephone and partially processed by hand, but the data should be displayed in the same format and preferably the same display units as are used for telemetered data from other sites.

A complete summary of information flow in the center must await detailed analyses of the requirements for non-telemetered data. It is clear, however, that additional displays will be needed for non-technical information. For example, at least three summary displays should be provided:

- Situation summary, with key details which indicate the current status of an incident
- Action summary, listing major activities and decisions of all participating response organizations
- Current task summary, an overview of pending decisions and of analyses in progress.

### 3.3.2 Needs for Telemetered Data

This report describes users' needs for telemetered data. A preliminary analysis showed that some response personnel require continuous direct access to raw data; others do not. Two distinct subsystems of telemetered data have therefore been identified.

- Subsystem 1 consists of technical data acquired automatically at the site, telemetered to the Operations Center, processed, and displayed in predetermined formats. The only manual interface with Subsystem 1 occurs when the user selects a particular display from those that are available.

- Subsystem 2 consists of the same telemetered data as Subsystem 1, but the data is accessed by request to an advisor who can explain the data and supplement it with computer utility programs which, while prepared in advance, may not be on-line at all times.

The flowcharts and associated text contained in this section describe the information flow and procedures associated with all response functions for which Subsystem 1 or 2 data will be useful. (Subsystems 1 and 2 are denoted in the charts by NDL-1 and NDL-2, respectively, for brevity.) Details of the flowcharts are based on:

- Published NRC responsibilities and procedures
- Observation and analysis of the TMI response
- Observation and analysis of incident response exercises
- MITRE experience in planning major command, control, and communications systems.

Flowchart OAT-2 exemplifies some of the factors which were considered in deriving detailed procedures for information flow.

- AT&T's Electronic Blackboards that were used in Exercise 10<sup>(5)</sup> effectively validated the need for some kind of summary display of the technical situation in an incident.
- The exercise also highlighted some potential errors in display usage. For example, expertise and formal procedures are needed to decide what to display in a summary, i.e., all data is too much; the wrong selection of data will not give the correct overview. Therefore, maintaining the display is properly a responsibility of the analysis teams.
- Feedback from the Operations Analysis Team to information sources was not possible via the Electronic Blackboards in Exercise 10, nor was interaction with the Protective Measures Team. Both are needed.



- The value of the "ET Coordinator" as a channel to the Executive Team was demonstrated in the exercise, but so were some of the procedural difficulties. The chart (OAT-2) assumes that the Coordinator would use Operation Support and Control to help him carry out his responsibilities, allowing him to remain with the Executive Team nearly all the time.
- The usefulness of paper copies of information was highlighted by their absence in Exercise 10. The chart indicates for which processes either "hard copy" (HC), which is printed automatically from a display, or typewritten copy (TC) is needed. (In practice, handwritten copy may substitute for typewritten material if it proves to be practical in future exercises.)

The following legend provides a key to understanding the charts:

GENERAL DESCRIPTION OF CHARTS

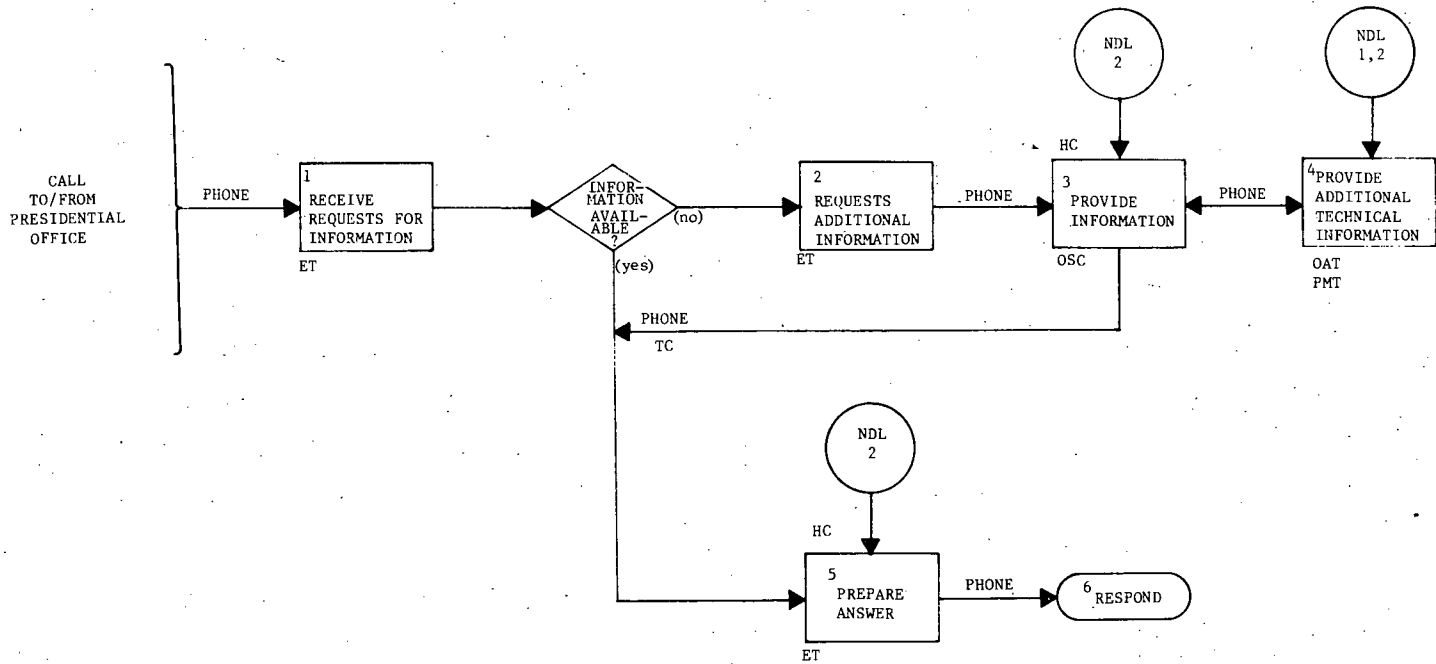
<u>Heading</u>	- Identifies Functional Group
<u>Sub-Heading</u>	- Identifies primary function and abbreviated chart title
<u>Circle</u>	- Identify input (NDL or data from previous chart)
<u>Rectangle</u>	- Identifies action to be taken
<u>Diamond</u>	- Identifies a decision point
<u>Parallelogram</u>	- Identifies input from another chart
<u>Oval</u>	- Identifies an end point
<u>Arrow</u>	- Indicates direction of flow
<u>HC</u>	- Indicates hard copy will be provided to the user of NDL data
<u>TC</u>	- Indicates typed or written correspondence
<u>NDL-1</u>	- Subsystem 1 of the NDL
<u>NDL-2</u>	- Subsystem 2 of the NDL

EXECUTIVE TEAM

FUNCTION: INTERACT DIRECTLY WITH THE PRESIDENT (ET-1)

During a nuclear-related incident, the Executive Team (ET) must often interact directly with the President of the United States.

- a. ET receives a request for information from that office (see Step 1 in diagram).
- b. ET may have to communicate with OSC to obtain more detailed information.  
OSC uses the Nuclear Data Link Subsystem 2 (NDL-2), in this case (Steps 2 and 3).
- c. OSC in turn may have to go to PMT/OAT for technical information derived from analysis of NDL data (Subsystems 1 and 2) (Step 4).
- d. ET uses the information from OSC (PMT/OAT) as well as NDL-2 to prepare an answer for the President. (Step 5).



**FIGURE 5**  
**EXECUTIVE TEAM-INTERACT DIRECTLY WITH THE PRESIDENT**  
**(ET-1)**

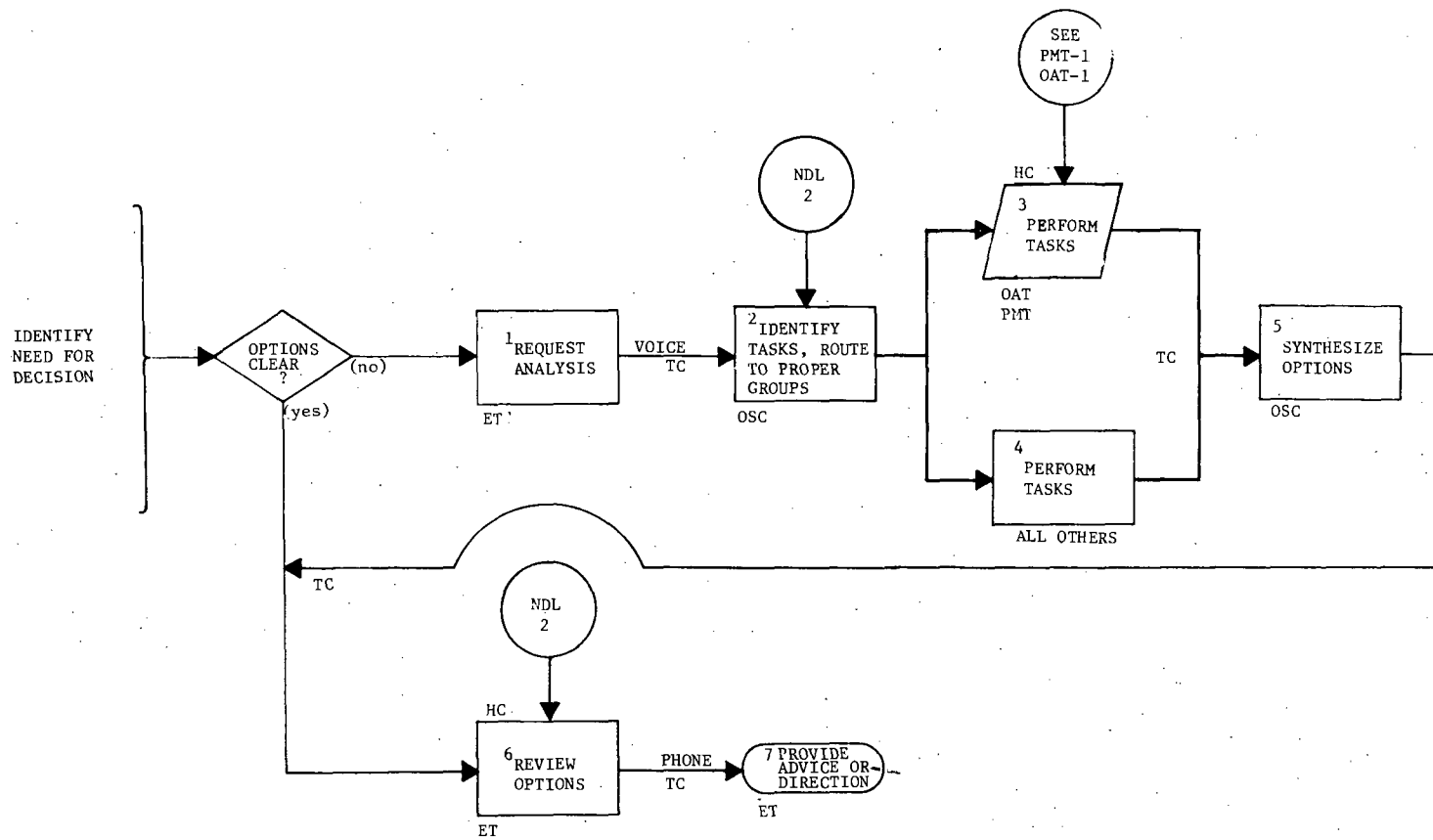
## EXECUTIVE TEAM

FUNCTION: AD HOC ADVICE AND DIRECTION (ET-2)

This chart describes ET activities in providing ad hoc advice and direction. (Chart OSC-1 provides a look at this function from an OSC perspective.)

When the developing incident somehow surfaces a need for decision, the ET can act as follows:

- a. ET requests OSC to analyze a given situation (see Step 1 in diagram).
- b. OSC then reviews the request to determine which teams/groups should address it in more detail, using NDL-2 (Step 2).
- c. Required analytic tasks are performed by OAT, PMT, or TS, using NDL-1 and NDL-2.
- d. Results are provided to OSC who prepares a list of options (Step 5).
- e. ET reviews the options set (using NDL data) from a variety of viewpoints (Step 6).
- f. ET decides, advises, and directs (Step 7).



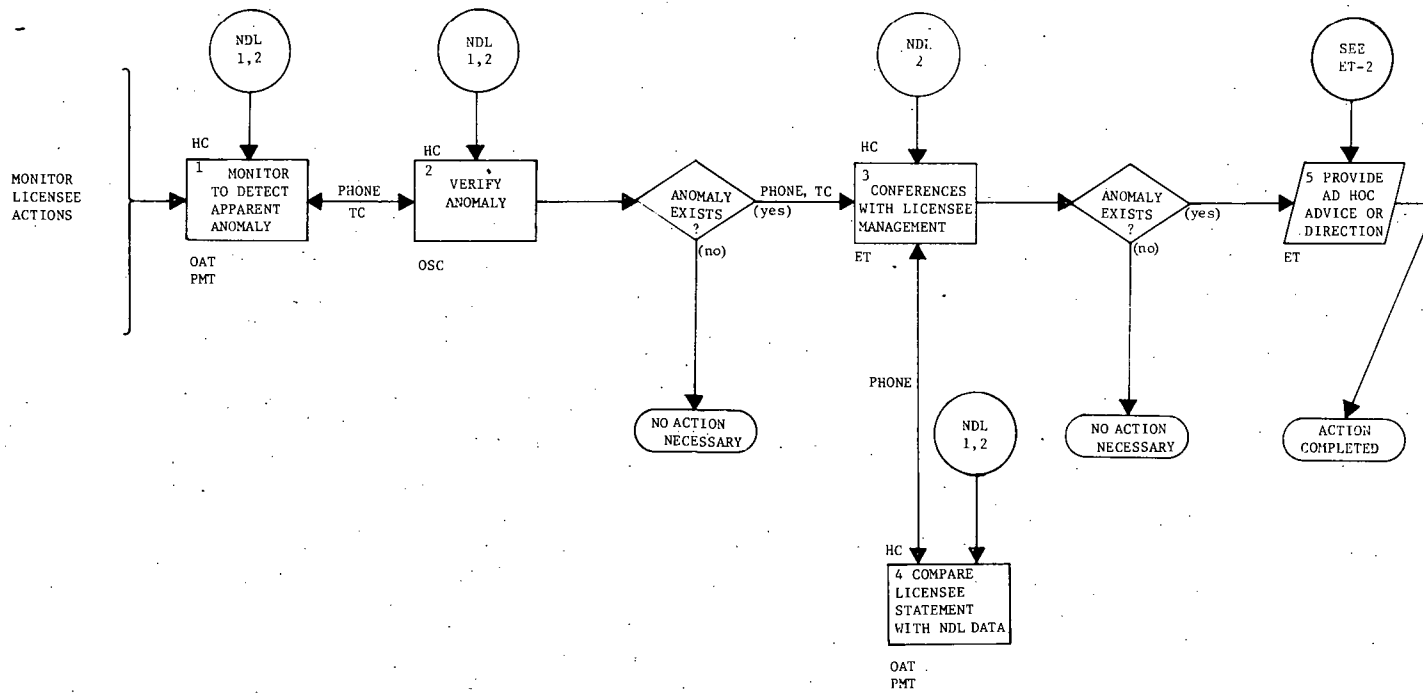
**FIGURE 6**  
**EXECUTIVE TEAM-AD HOC ADVICE AND DIRECTION**  
**(ET-2)**

EXECUTIVE TEAM

FUNCTION: LICENSEE LIAISON (ET-3)

During a nuclear incident, it is imperative that the Executive Team be apprised of any licensee actions requiring immediate executive attention;

- a. The analytic teams (OAT and PMT) monitor the incident using NDL-1 and NDL-2 (see Step 1 in diagram).
- b. Anomalous data inputs are identified and discussed in detail with OSC, using NDL-1 and NDL-2 (Step 2).
- c. OSC can recommend that ET explore the matter (using NDL-2) with licensee management (Steps 3 and 4).
- d. ET can elect to provide the licensee with ad hoc advice/direction, as described in Function ET-2 (Step 5).



**FIGURE 7**  
**EXECUTIVE TEAM-LICENSEE LIAISON**  
**(ET-3)**

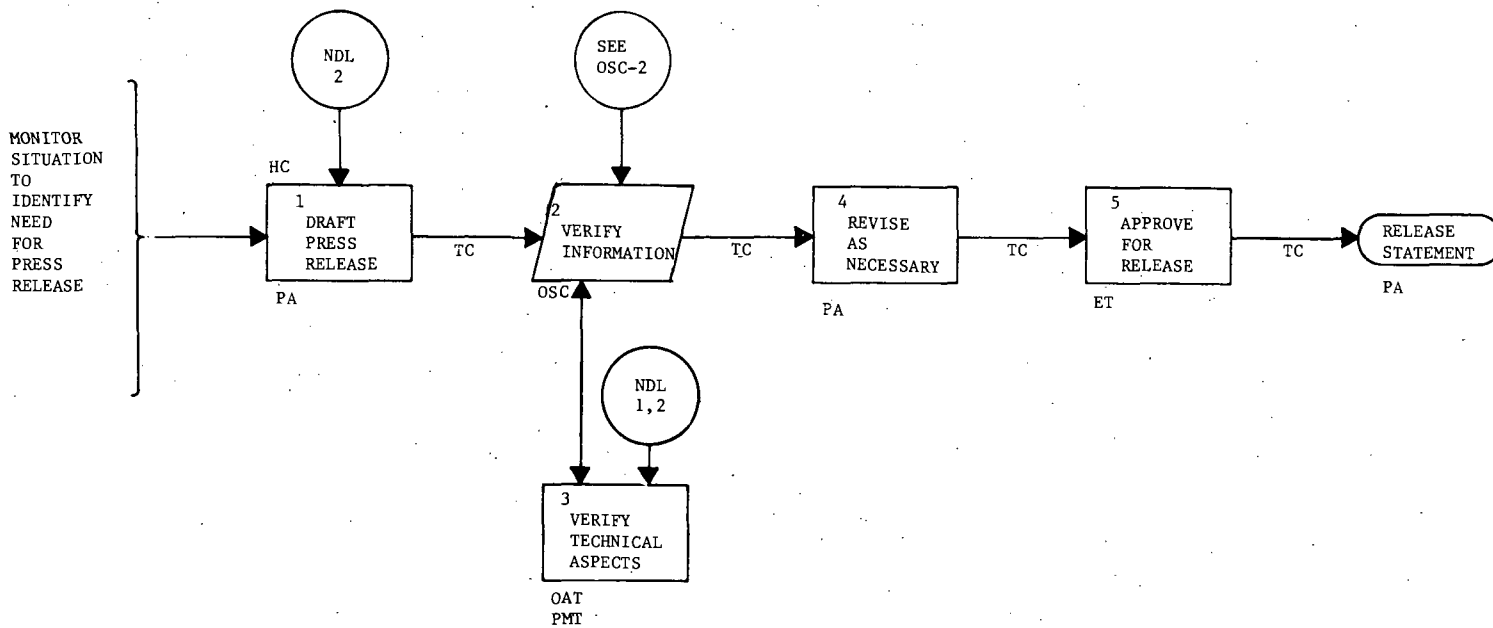
PUBLIC AFFAIRS

FUNCTION: PREPARE PRESS STATEMENT (PA-1)

The Public Affairs (PA) group performs the critical function of preparing and releasing press statements during the process of a nuclear incident:

- a. PA monitors the evolving situation, using NDL-2 and determines appropriate time for press release. An initial draft is written by PA, using NDL-2 (see Step 1 in diagram).
- b. Most aspects of the statement are verified with OSC (Step 2).
- c. Technical aspects may be verified with OAT and PAT. (NDL-1 and NDL-2 may be used.) (Step 3.)
- d. After appropriate revisions, the PA submits the press statement to ET for review (Steps 4 and 5).
- e. When approved by ET, the statement is released by PA (Step 6).





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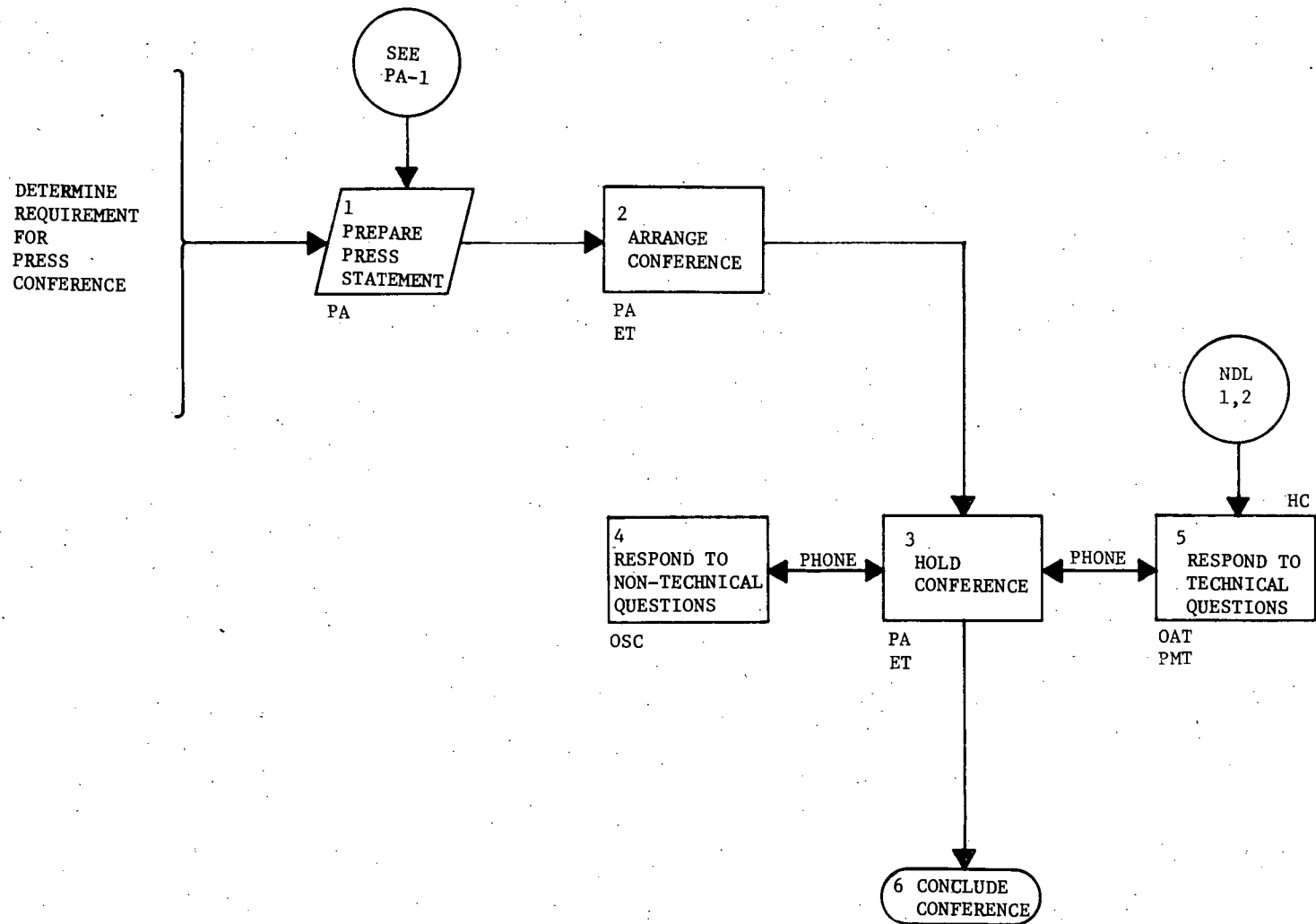
**FIGURE 8**  
**PUBLIC AFFAIRS—PREPARE PRESS STATEMENT**  
**(PA-1)**

PUBLIC AFFAIRS

FUNCTION: CONDUCT PRESS CONFERENCES (PA-2)

The Public Affairs (PA) group arranges and conducts press conferences usually in conjunction with preparation of a press statement (see Function PA-1):

- a. PA finalizes press statement (see Step 1 in diagram).
- b. PA works with ET to arrange press conference (Step 2).
- c. PA and ET conduct press conference (Step 3).
- d. During the press conference, questions can be referred to OSC (non-technical) or to OAT/PMT (technical). OAT and PMT use NDL-1 and NDL-2 to respond. (See Steps 4 and 5.)
- e. PA and ET determine when to conclude press conference (Step 6).



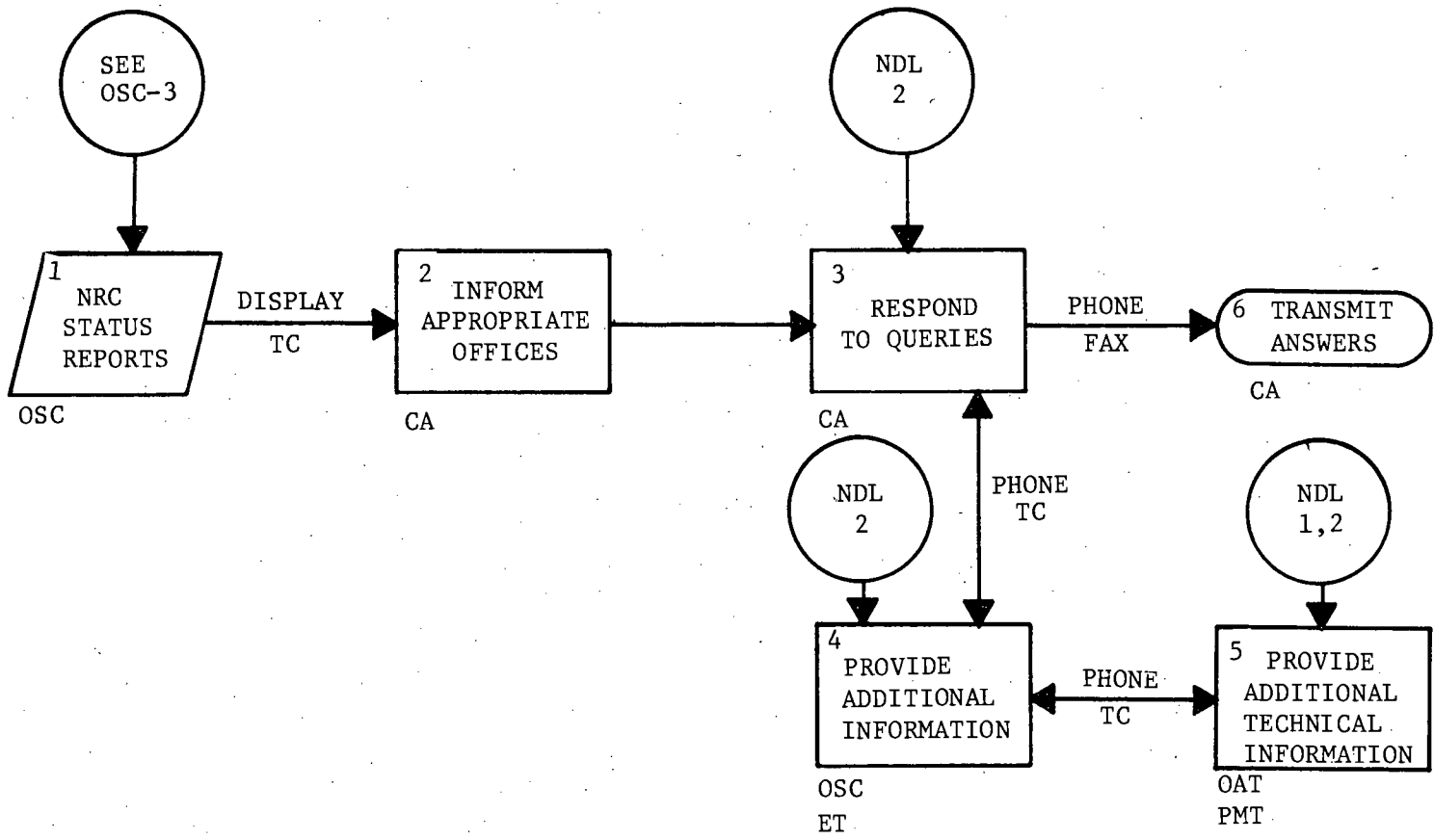
**FIGURE 9**  
**PUBLIC AFFAIRS—CONDUCT PRESS CONFERENCES**  
**(PA-2)**

CONGRESSIONAL AFFAIRS

FUNCTION: COORDINATE ACTIVITY BETWEEN NRC AND CONGRESS (CA-1)

The Congressional Affairs (CA) group functions are as follows:

- a. CA continuously monitors the developing situation via OSC-prepared status reports (reference OSC-3). (This is shown in Step 1 of diagram.)
- b. Appropriate Congressional offices are kept informed (Step 2).
- c. The CA group uses NDL-2 to respond to queries from Congress (Sept 3).
- d. If more information is needed, CA can go direct to OSC/ET or, via OSC, to OAT/PMT. (See Steps 4 and 5.)
- e. Answers are provided in Step 6.



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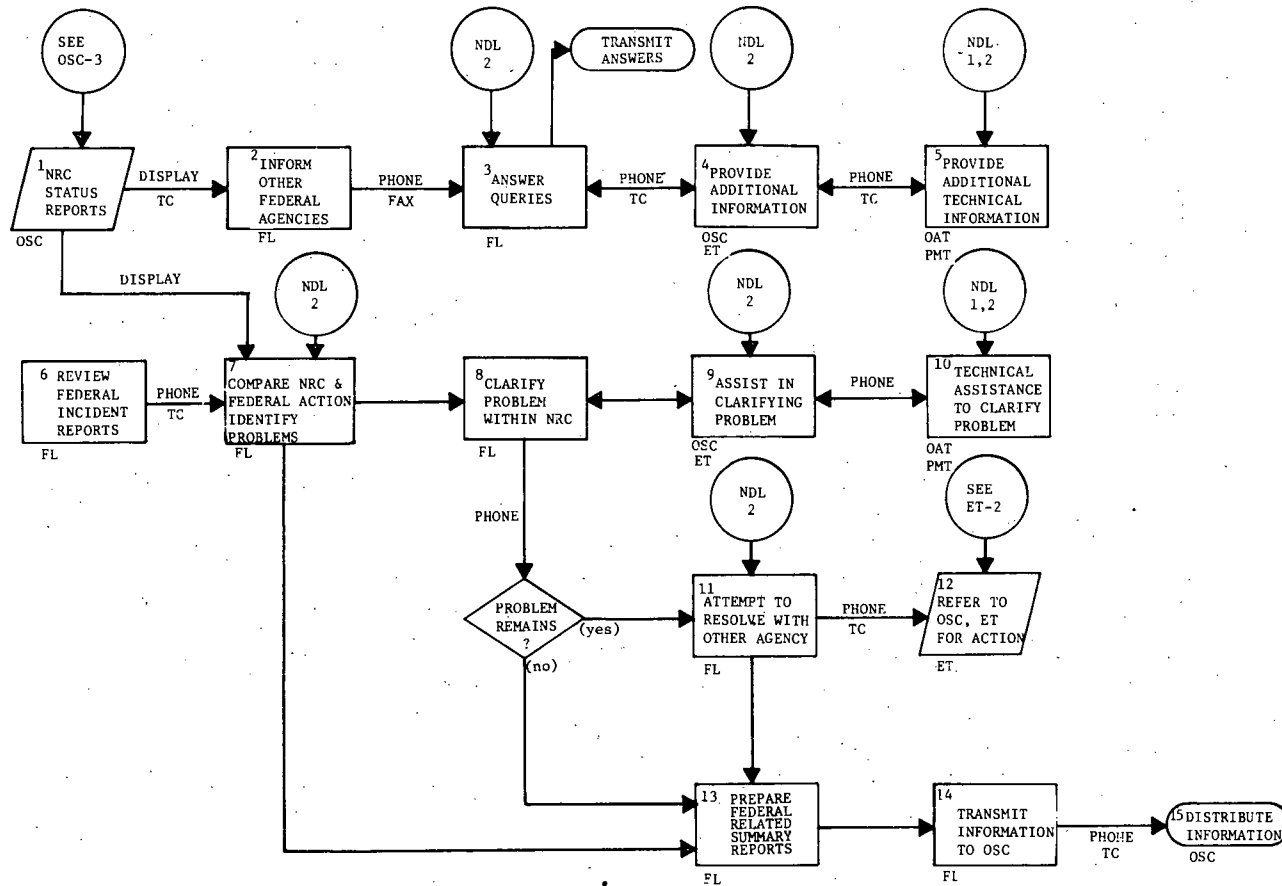
**FIGURE 10**  
**CONGRESSIONAL AFFAIRS—PROVIDE CONGRESSIONAL LIAISON**  
**(CA-1)**

## FEDERAL LIAISON

FUNCTION: COORDINATE NRC ACTIVITIES WITH OTHER FEDERAL AGENCIES (FL-1)

Two complementary processes are involved in the Federal Liaison (FL) function. The FL group must keep other agencies informed of NRC actions and must also insure that other federal agencies' actions are compatible:

- a. FL monitors the OSC-produced status displays (see Function OSC-3). (This is shown in Step 1.)
- b. FL insures that interested federal agencies are kept informed (Step 2).
- c. FL uses NDL-2 to respond to queries from other federal agencies (Step 3).
- d. If help is needed in responding, FL turns to OSC (NDL-2) and through them to PMT/OAT (Subsystems 1 and 2). (See Steps 4 and 5.)
- e. During its continuing reviews of NRC actions and other federal actions, FL remains alert to the possibility of conflicting reports (Steps 6 and 7).
- f. If such anomalies or discrepancies are detected, FL attempts resolution within NRC (using NDL-1 and NDL-2) by contacting OSC/ET and, through them, the PMT/OAT. (See Steps 8, 9, 10.)
- g. If the problem cannot be resolved within the NRC, an attempt is made to do so by working with the other federal agencies (Step 11).
- h. When resolution occurs, the information from other federal agencies is distributed within NRC (by OSC). (See Steps 13, 14, 15.)
- i. If the problem cannot be resolved, it is forwarded to ET for their attention (Step 12).



**FIGURE 11**  
**FEDERAL LIAISON—COORDINATE NRC ACTIVITIES**  
**WITH OTHER FEDERAL AGENCIES**  
**(FL-1)**

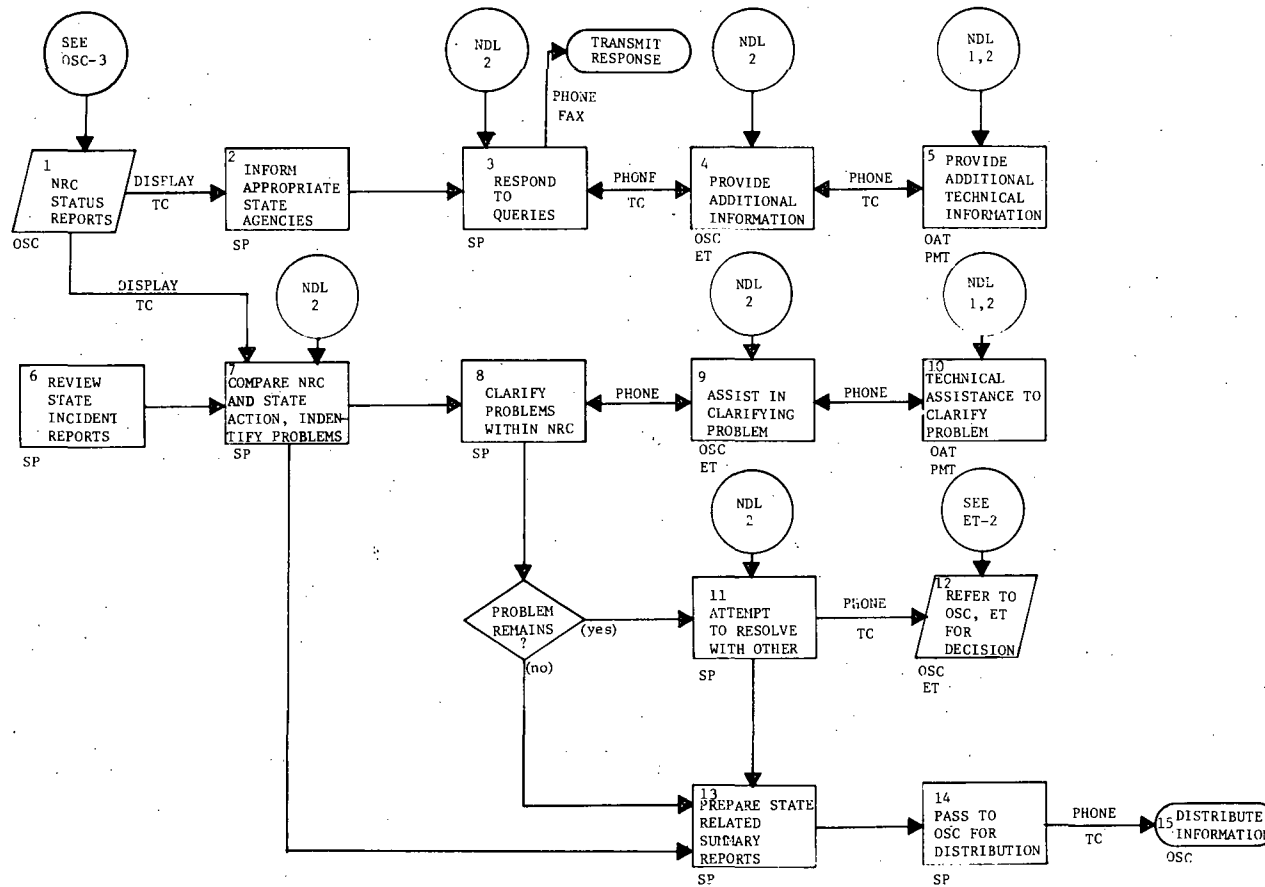
## STATE PROGRAMS

FUNCTION: COORDINATE STATE ACTIVITIES WITH PUBLIC AFFAIRS AND OTHER GOVERNMENT AGENCIES (SP-1)

A key function of the State Programs (SP) group is to insure that incident-related state activities are closely coordinated with the NRC's Public Affairs group and with other government agencies, as described below:

- a. SP monitors the OSC-produced status reports (see function OSC-3). (See Step 1 and Step 2 in diagram.)
- b. In parallel, SP reviews state-produced incident reports (Step 6).
- c. When status queries are received, SP uses NDL-2 to provide answers (Step 3).
- d. If more information is needed (to respond to queries) SP contacts OSC/ET who may go to PMT/OAT for in-depth technical detail, using NDL-1 and NDL-2 (Steps 4, 5).
- e. SP continues to review state-produced incident reports, comparing them with information provided by OSC's status reports (Steps 6 and 7).
- f. Any problems noted must be resolved. This is first attempted within the NRC, in conjunction with other operational groups (Steps 8, 9, 10).
- g. If necessary, SP goes back to the state agency to attempt to resolve the discrepancy (Step 11).
- h. Unresolved problems are referred via OSC to ET for action (see Function ET-2). (See Step 12.)
- i. When all problems are resolved or if no problems are seen to exist, SP prepares state-related summary reports (Step 13).
- j. SP passes the summary reports to OSC for distribution (Steps 14 and 15).





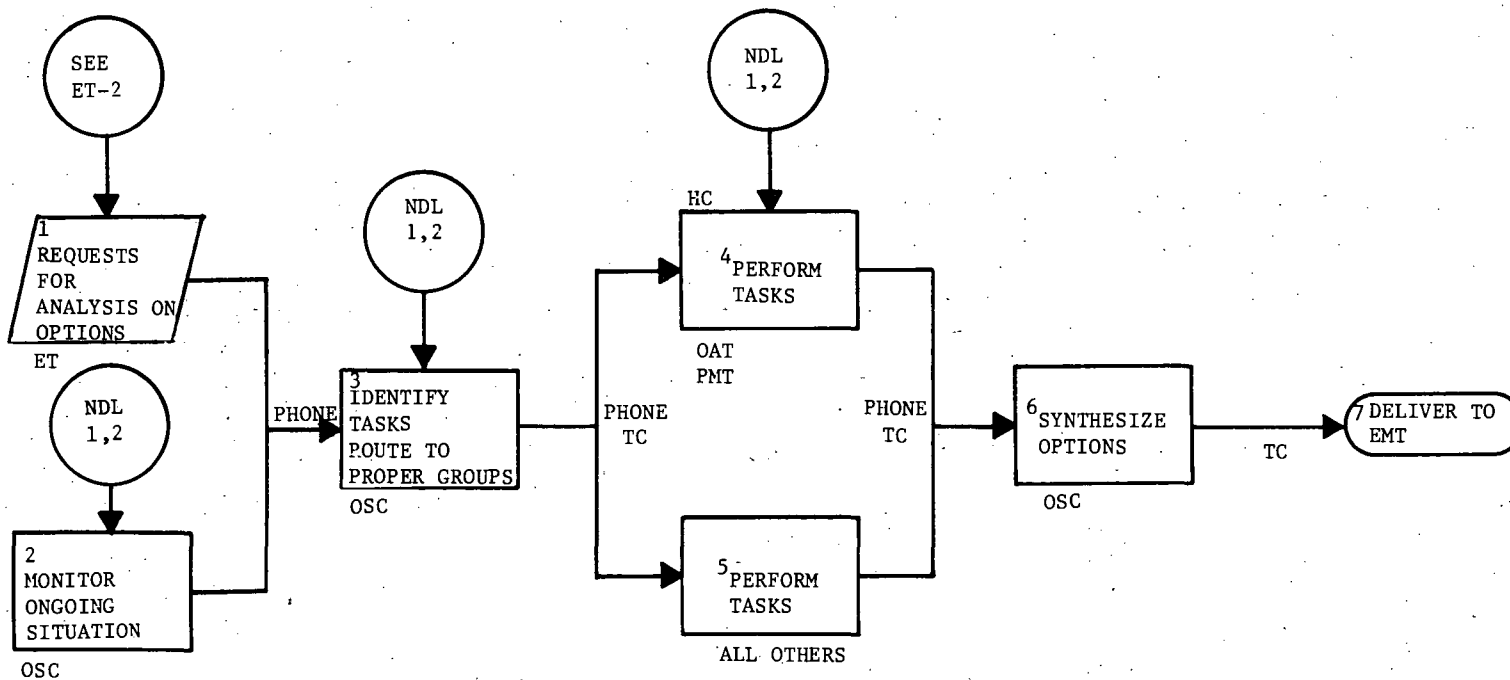
**FIGURE 12**  
**STATE PROGRAMS—COORDINATE STATE ACTIVITIES**  
**WITH PUBLIC AFFAIRS AND OTHER GOVERNMENT AGENCIES**  
**(SP-1)**

OPERATION SUPPORT AND CONTROL

FUNCTION: PROVIDE AD HOC ADVICE (OSC-1)

The Operation Support and Control (OSC) group is required to provide ad hoc advice and direction to the Executive Team (ET):

- a. OSC monitors the ongoing situation (Step 2 in diagram).
- b. When ET requests analysis of options, OSC uses NDL-1 and NDL-2 to determine recommendations (Steps 1 and 3).
- c. OAT and PMT can provide inputs to this process, using NDL-1 and NDL-2 (Steps 4 and 5).
- d. OSC delivers its response with recommended options to ET (Steps 6 and 7).



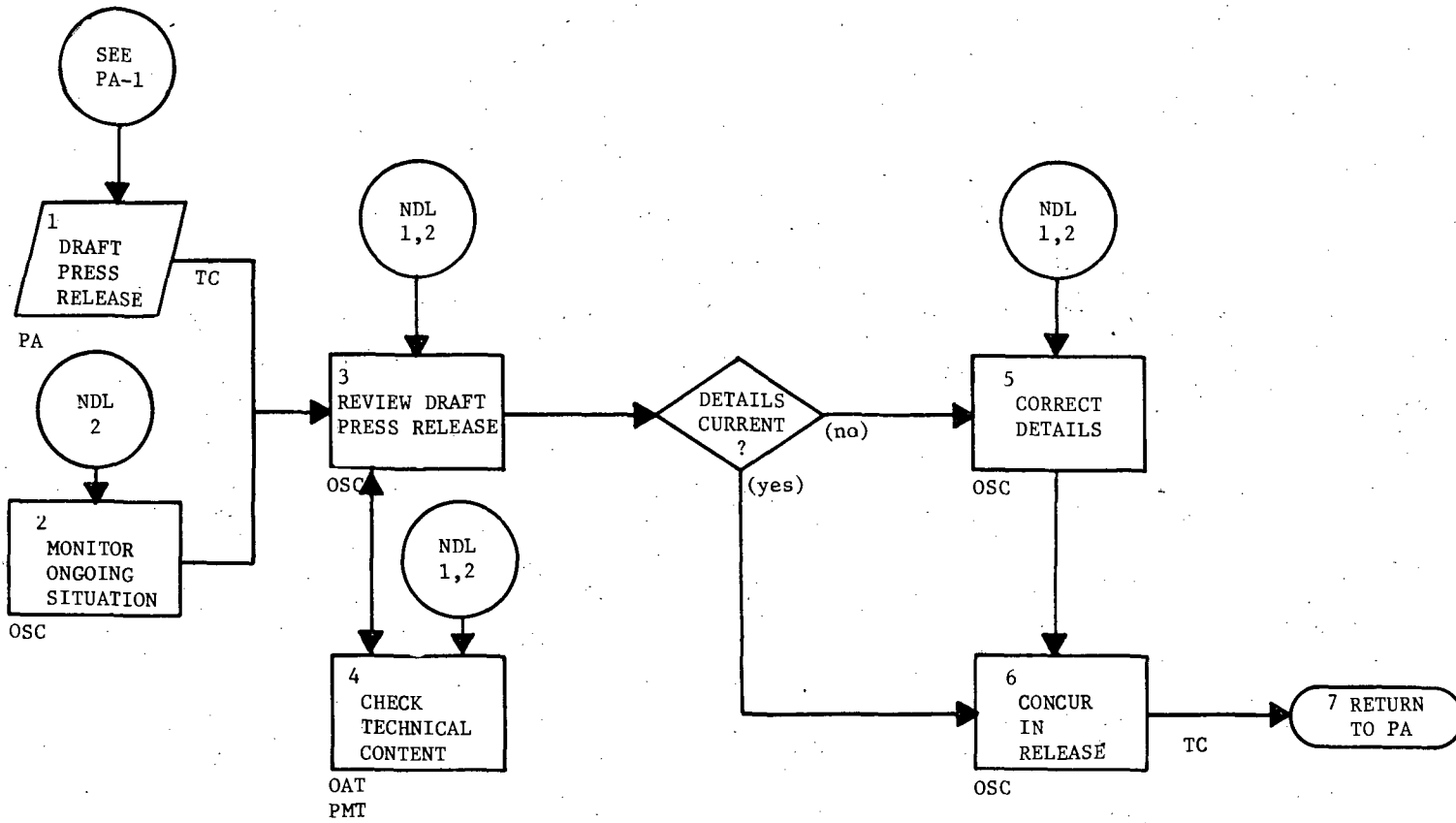
**FIGURE 13**  
**OPERATIONS SUPPORT AND CONTROL—PROVIDE AD HOC ADVICE**  
**(OSC-1)**

OPERATION SUPPORT AND CONTROL

FUNCTION: VERIFY PRESS RELEASES (OSC-2)

The Operation Support and Control (OSC) group responds to the Executive Team (ET) in verifying the content of the prepared press release:

- a. Any anomalies or discrepancies are resolved by OSC, using both ND-1 and ND-2 and interacting with OAT/PMT and liaison groups as necessary (Steps 1, 2, 3 and 4).
- b. OSC verifies the accuracy of the press statement (Step 5).
- c. It is returned to PA with the content verified correct or corrected (Steps 6, 7, 8).



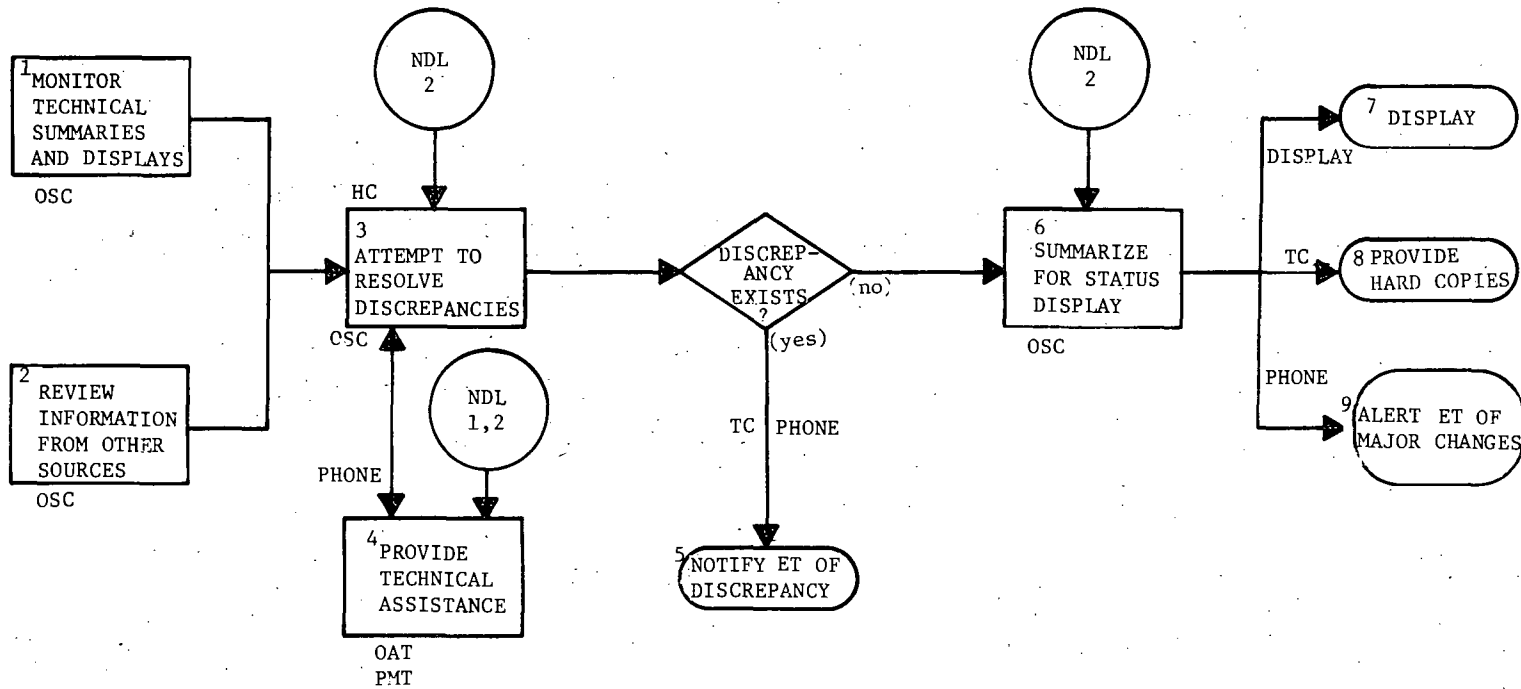
**FIGURE 14**  
**OPERATIONS SUPPORT AND CONTROL—VERIFY PRESS RELEASES**  
**(OSC-2)**

OPERATION SUPPORT AND CONTROL

FUNCTION: SUMMARIZE STATUS (OSC-3)

The Operation Support and Control (OSC) group has the responsibility of summarizing the current status of an ongoing nuclear incident and making this information available to the Executive Team (ET) as follows:

- a. Monitors the technical summary displays (reference PMT-2 and OAT-2), maintained by the Protective Measures Analysis Team (PMT) and Operations Analysis Team (OAT) (Step 1).
- b. Reviews incoming data from all other sources, e.g., liaison groups (Step 2).
- c. Evaluates inputs for anomalies or discrepancies, using NDL-2 (Step 3).
- d. If necessary, uses existing interfaces with PMT and OAT to resolve anomalies/discrepancies (PMT and OAT use NDL-1 and NDL-2) (see Step 4).
- e. If resolution cannot be made, refers the matter to ET for appropriate action (Step 5).
- f. Distills incoming data into information which is summarized for display purposes (Step 6).
- g. Provides status display to ET, alerting them to any major changes (Steps 7 and 9).
- h. Generates hard-copy reports from the status display for distribution to other groups (Step 8).



**FIGURE 15**  
**OPERATIONS SUPPORT AND CONTROL—SUMMARIZE STATUS**  
**(OSC-3)**

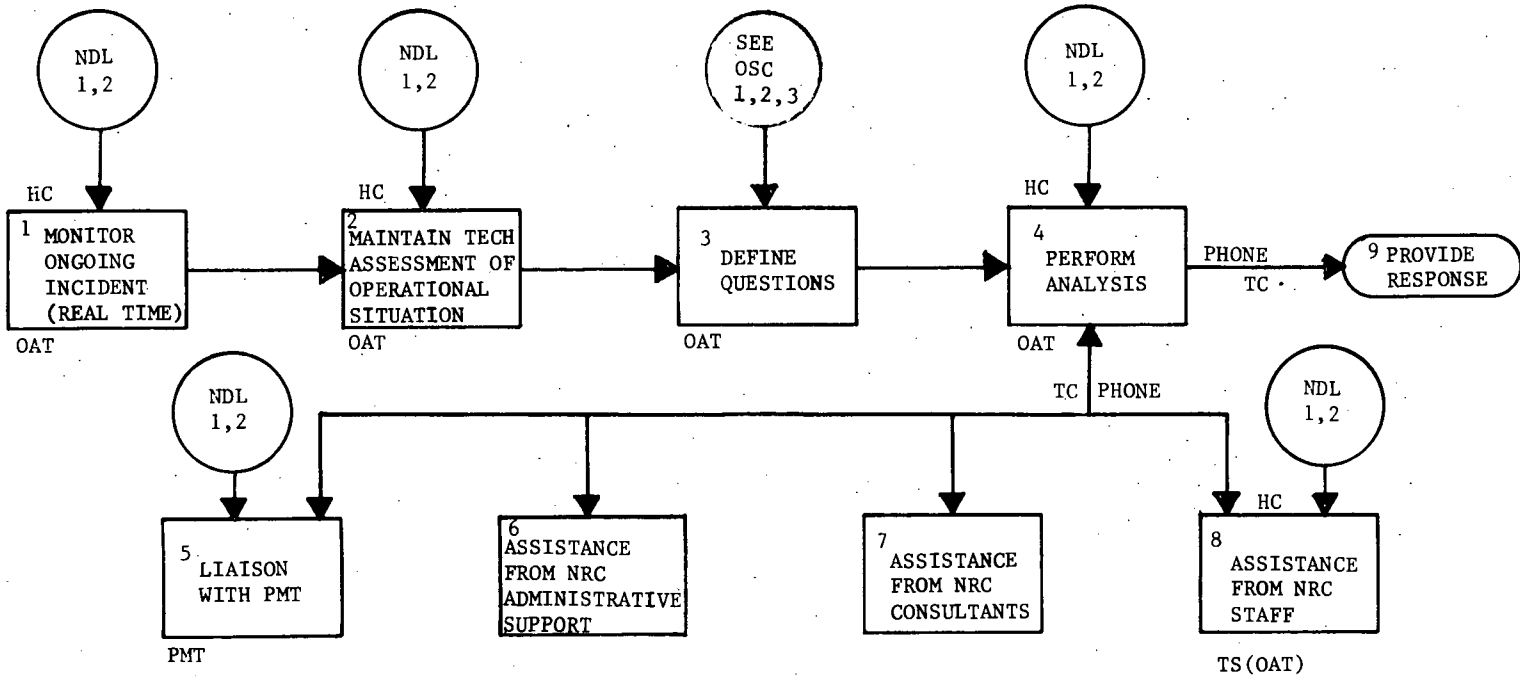
OPERATIONS ANALYSIS TEAM

FUNCTION: PROVIDE OPERATIONAL ASSESSMENT AND ANALYSIS (OAT-1)

The Operations Analysis Team (OAT) functions as follows:

- a. Using NDL-1 and NDL-2, OAT monitors the ongoing incident (Step 1).
- b. OAT maintains current technical assessment of the operational situations (Step 2).
- c. OAT defines questions to be answered (Step 3).
- d. OAT analyzes questions using NDL-1 and NDL-2 (Step 4).
- e. If assistance is needed, OAT goes direct to PMT (or other analytical groups).  
(See Steps 5, 6, 7, 8.)
- f. Response is provided to OSC (Step 9).





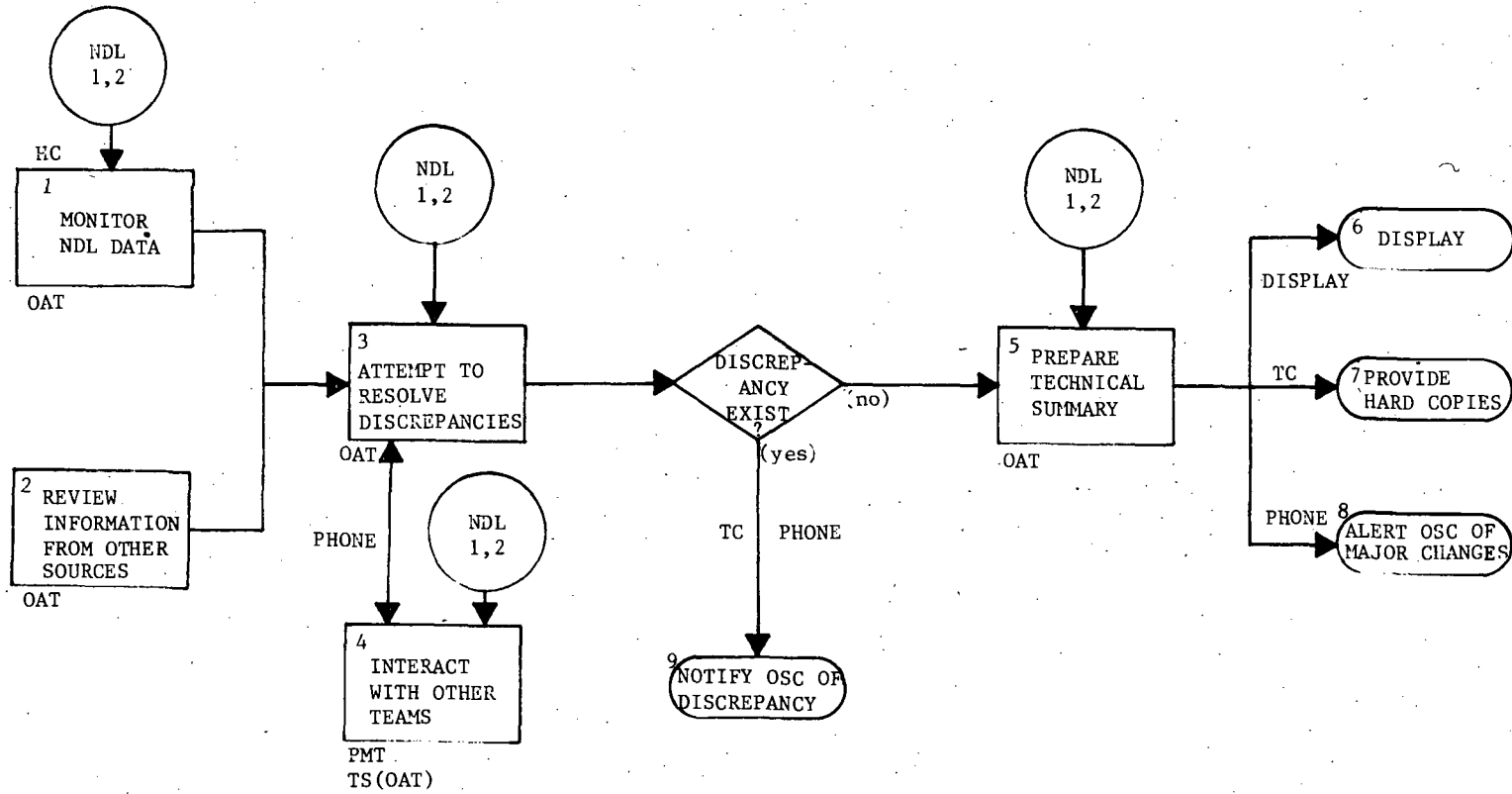
**FIGURE 16**  
**OPERATIONAL ANALYSIS TEAM—PROVIDE OPERATIONAL**  
**ASSESSMENT AND ANALYSIS**  
**(OAT-1)**

OPERATIONS ANALYSIS TEAM

FUNCTION: SUMMARIZE TECHNICAL STATUS (OAT-2)

The Operations Analysis Team (OAT):

- a. Uses NDL-1 and NDL-2 to monitor the evolving situation (Step 1).
- b. Reviews incident-related information from other available sources (Step 2).
- c. Attempts to resolve discrepancies, interacting with technical support elements and the Protective Measures Team (PMT), who also use NDL-1 and NDL-2. (See Steps 3 and 4.)
- d. Prepares a technical summary for display and distribution (Steps 5-8).
- e. Alerts Operation Support and Control (OSC) to any noted major changes (Step 9).



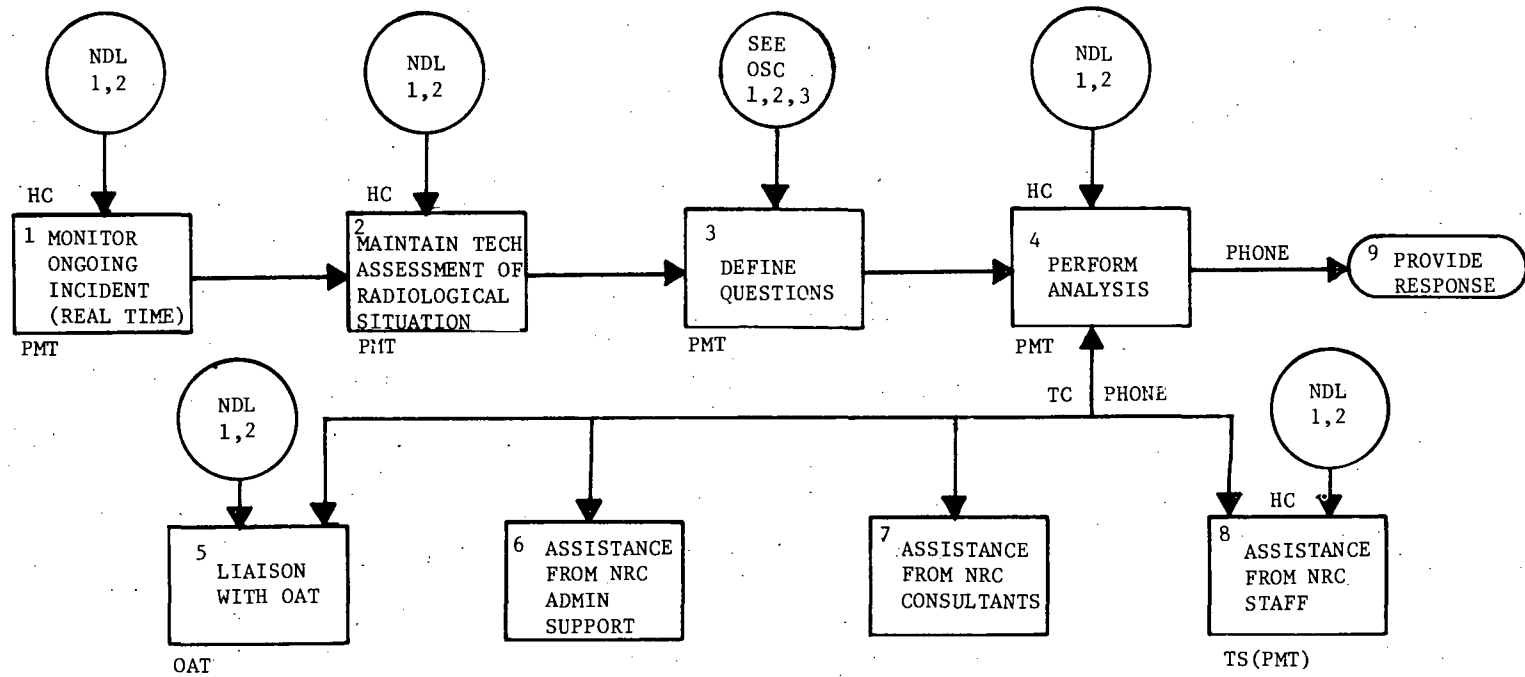
**FIGURE 17**  
**OPERATIONAL ANALYSIS TEAM—SUMMARIZE TECHNICAL STATUS**  
**(OAT-2)**

PROTECTIVE MEASURES ANALYSIS TEAM

FUNCTION: PROVIDE RADIOLOGICAL ASSESSMENT AND ANALYSIS (PMT-1)

The Protective Measures Analysis Team (PMT) functions as follows:

- a. Using NDL-1 and NDL-2, PMT monitors the ongoing incident (Step 1).
- b. PMT maintains current technical assessment of the operational situations (Step 2).
- c. PMT defines questions to be answered (Step 3).
- d. PMT analyzes query using NDL-1 and NDL-2 (Step 4).
- e. If assistance is needed, PMT goes direct to OAT (or other analytical groups).  
(See Steps 5, 6, 7, 8.)
- f. Response is provided to OSC (Step 9).



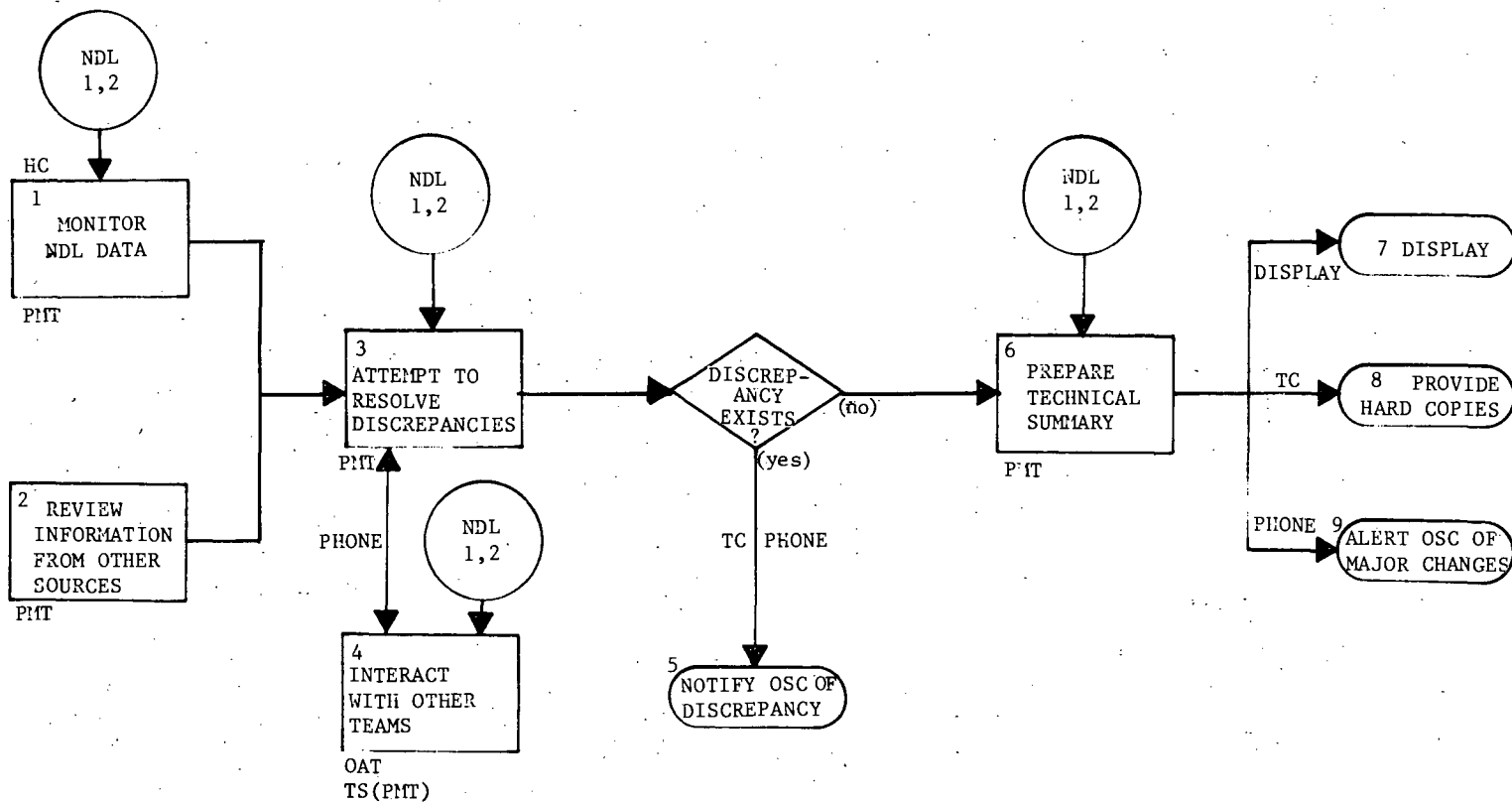
**FIGURE 18**  
**PROTECTIVE MEASURES ANALYSIS TEAM—PROVIDE**  
**RADIOLOGICAL ASSESSMENT AND ANALYSIS**  
**(PMT-1)**

PROTECTIVE MEASURES ANALYSIS TEAM

FUNCTION: SUMMARIZE TECHNICAL STATUS (PMT-2)

The Protective Measures Analysis Team (PMT):

- a. Uses NDL-1 and NDL-2 to monitor the evolving situation (Step 1).
- b. Reviews incident-related information from other available sources (Step 2).
- c. Attempts to resolve any discrepancies, interacting with technical support elements and Operational Analysis Team (OAT), who also use NDL-1 and NDL-2 (Steps 3, 4).
- d. Prepares a technical summary for display and distribution (Steps 5, 6, 7, 8).
- e. Alerts Operations Support and Control (OSC) to major changes (Step 9).



**FIGURE 19**  
**PROTECTIVE MEASURES ANALYSIS TEAM—SUMMARIZE**  
**TECHNICAL STATUS**  
**(PMT-2)**

TECHNICAL SUPPORT TO OAT (TS-1)

The Operations Analysis Team (OAT) is provided technical support by NRC personnel who are not necessarily in the Operations Center or the headquarters building:

- a. Technical support personnel remain abreast of the evolving incident by direct access to NDL-1 and NDL-2 (Step 1).
- b. If they isolate a potential problem, they analyze it using NDL-1 and NDL-2 and refer it to OAT (Steps 3 and 4).
- c. Technical support personnel also respond to direct requests from OAT (Step 2).
- d. NDL-1 and NDL-2 are used to help prepare the appropriate response (Steps 5 and 6).

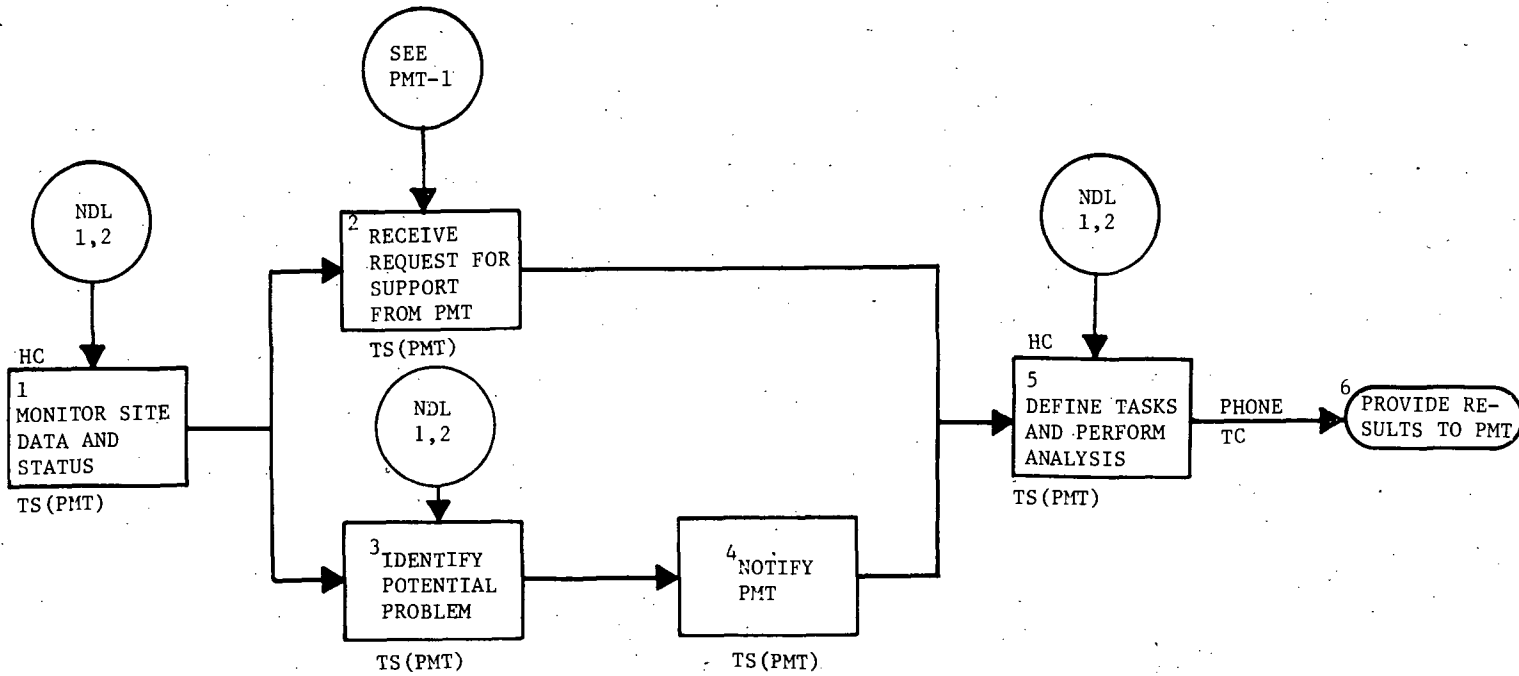




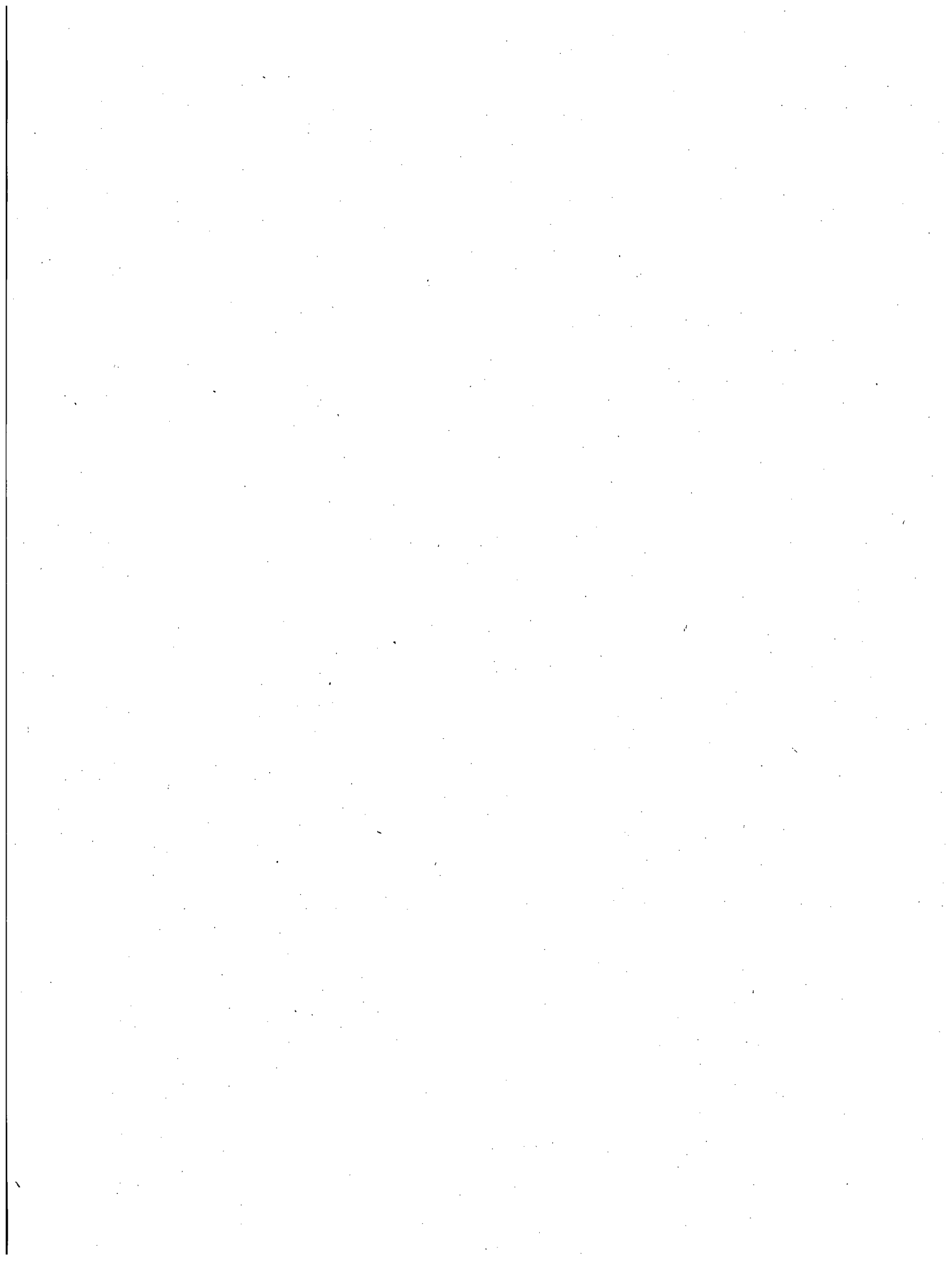
## TECHNICAL SUPPORT TO PMT TS (PMT)

The Protective Measures Analysis Team (PMT) is provided technical support by NRC personnel who are not necessarily in the Operations Center or the headquarters building:

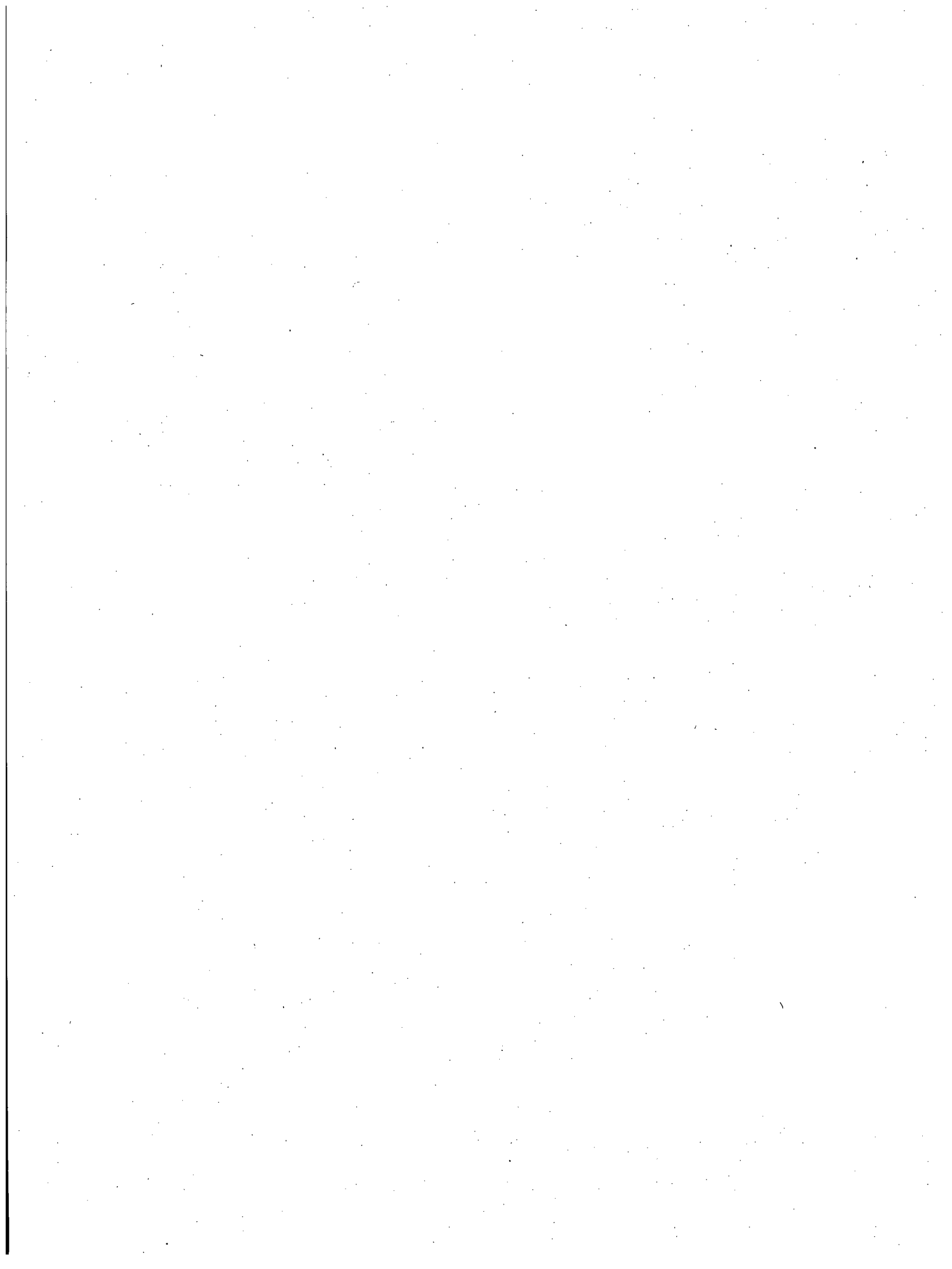
- a. Technical support personnel remain abreast of the evolving incident by direct access to NDL-1 and NDL-2 (Step 1).
- b. If they isolate a potential problem, they analyze it using NDL-1 and NDL-2 and refer it to PMT (Steps 3 and 4).
- c. Technical support personnel also respond to direct requests from PMT.
- d. NDL-1 and NDL-2 are used to help prepare the appropriate response (Steps 5 and 6).



**FIGURE 21**  
**TECHNICAL SUPPORT TO PMT TS**  
**(PMT)**



APPENDIX  
PROPOSED STANDARD DEFINITIONS



Some confusion has arisen over the definitions of many of the terms related to development of a new Headquarters Operations Center. The confusion is likely to grow unless the NRC compiles and maintains a list of standard definitions; the list contained in this Appendix is intended to be a beginning. The use of a list of standard definitions does not imply that the names cannot change, but when they change, everyone concerned will know about it. The list below is divided into names of persons, places, and things.

#### PERSONS

##### Analysis Team Advisors

The two persons (one from each analysis team) designated to provide and explain technical data in answer to requests from persons having NDL-2 display units. (See "DISPLAY.")

##### Designated Response Team

Those persons who are preassigned by name or position to specific written responsibilities in case of a nuclear incident. The designated response team forms the core of a response and is supplemented, as needed, by other response personnel.

##### Executive Team Coordinator

The person responsible for liaison between the Executive Team and other NRC personnel. (He is presently called the "Executive Management Team Coordinator" by the NRC.) The ET Coordinator may be the logical director of OSC, also, but the role of OSC in the flow of non-telemetered information should be analyzed before that decision is made.

Executive Team Status Officer

The person responsible for liaison between the Executive Team and non-NRC personnel.

Headquarters Duty Officer

The person designated to answer calls on the NRC emergency telephone number or on the direct lines from operating reactor sites.

Response Team

Any number of response personnel collectively designated to carry out specific functions or responsibilities. Thirteen such groups and teams are proposed for the Headquarters Operations Center. They are defined in Section 3.1 and relisted here for convenience. MITRE first designated teams according to their responsibilities (e.g., State Liaison), but it is suggested that the standard group name be that of an existing NRC office (e.g., State Programs) when the functions are parallel. The suggested names are:

NRC Commissioners  
Executive Team (ET)  
Public Affairs (PA)  
Congressional Affairs (CA)  
Federal Liaison (FL)  
State Programs (SP)  
Operation Support and Control (OSC)  
Operations Analysis Team (OAT)  
Protective Measures Analysis Team (PMT)  
Administrative Services Team (AS)  
Data Services Team (DS)  
Technical Support OAT (TS-OAT)  
Technical Support PMT (TS-PMT)



### Response Personnel

All persons engaged in a response to an incident at any given time. They may be further defined as "NRC response personnel," "licensee response personnel," etc.

### PLACES

#### Operations Center

The contiguous rooms from which the NRC response to an incident is directed. The existing Center consists of:

- An Executive Room
- An Operations Room
- Three smaller adjoining rooms.

The new larger Center, as now conceived, will be divided into three main areas:

- Management Area
- Analysis and Support Area
- Press and Rest Area.

Rooms in the first two of these areas are indicated in Figure 1, Section 2.2.2.

#### Satellite Offices

Offices outside the Operations Center which are used to support the response personnel. Currently, offices around the periphery of the existing Operations Center are commandeered during an exercise or an incident. In the future, the use of designated areas near the technical support groups should be planned in advance to support the new center.

## THINGS

### Display

A specific kind of information and format to be presented on display units. Two displays are recommended in this report:

- NDL-1, automatic display of detailed, telemetered operational and protective measures data. (A display of "Subsystem 1" data as defined in Section 2.1.1)
- NDL-2, a display of NDL-1 and other technical data which is controlled by an advisor who can explain the data to non-specialists. (A display for "Subsystem 2" as defined in Section 2.1.1.)

Displays of non-telemetered data and information will also be needed, but specific requirements have not yet been analyzed.

### Hard Copy

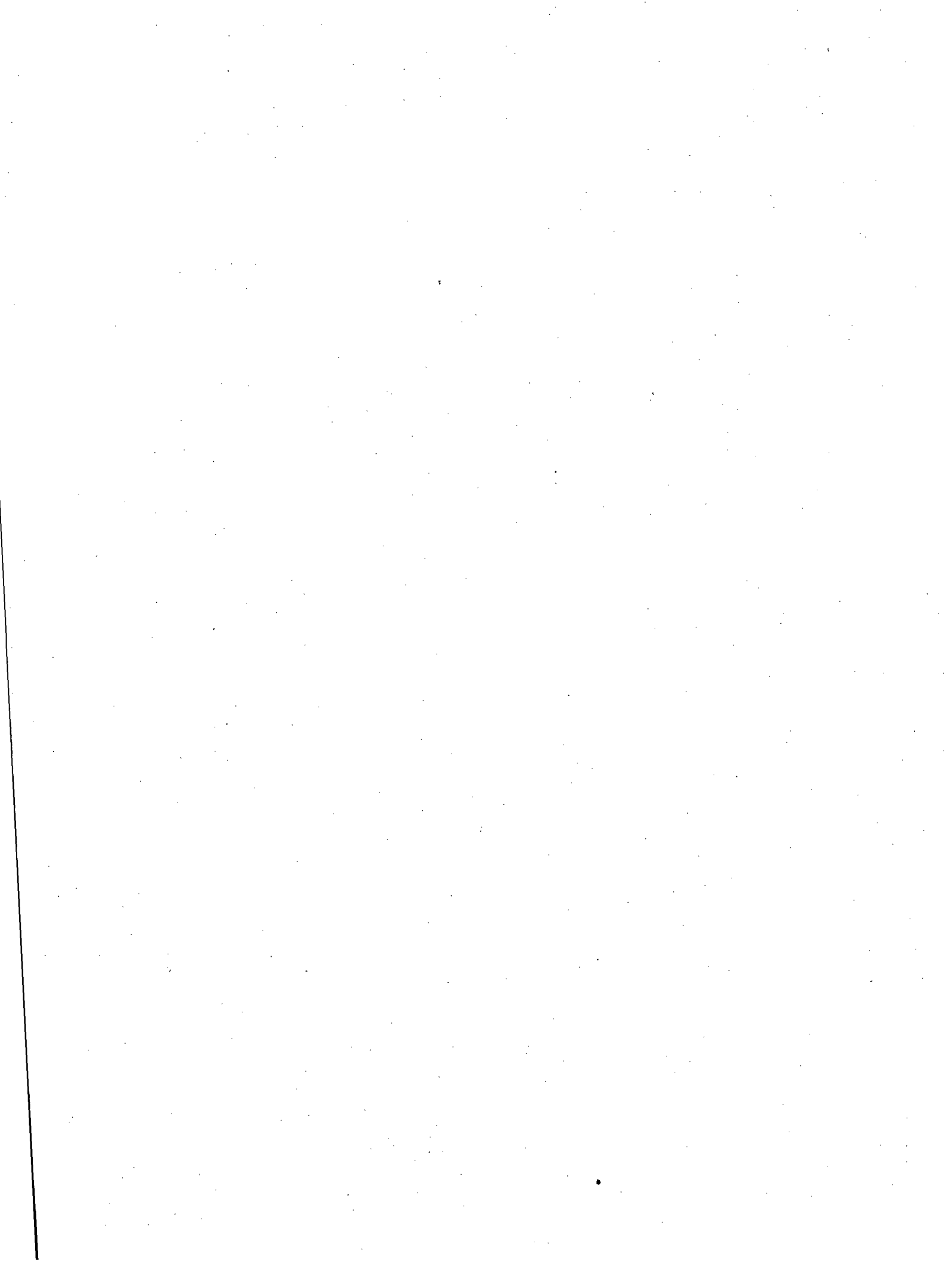
Any mechanically-produced permanent copy of a display.

### Nuclear Data Link

The equipment needed to acquire, process, transmit, store, and display data automatically. All other information displays and data support should be considered part of the NDL because such facilities may be used in common with telemetered data.

## GLOSSARY

AS	Administrative Services
CA	Congressional Affairs
EDO	Executive Director for Operations
ET	Executive Team
FEMA	Federal Emergency Management Agency
FL	Federal Liaison
HC	Hard Copy
IE	Office of Inspection and Enforcement
NDL	Nuclear Data Link
NMSS	Office of Nuclear Material Safety and Safeguards
NRC	Nuclear Regulatory Commission
NRR	Nuclear Reactor Regulation
OAT	Operations Analysis Team
OSC	Operation Support and Control
PA	Public Affairs
PMT	Protective Measures Analysis Team
SP	State Programs
TC	Typewritten Copy
TMI	Three Mile Island

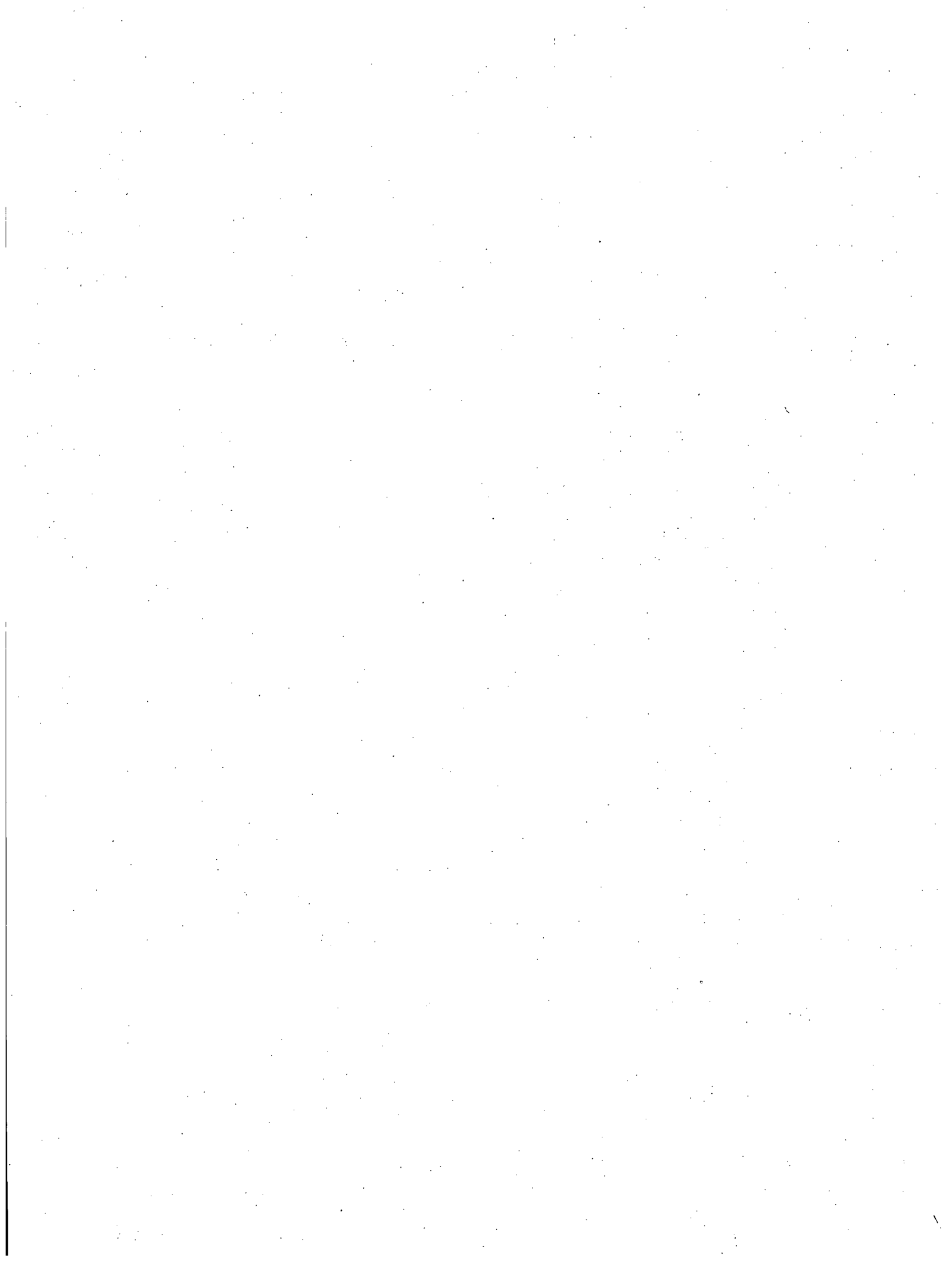


#### REFERENCES

1. Report of the President's Commission on the Accident at Three Mile Island, J. Kemeny, Chairman, U.S. Government Printing Office, Washington, D.C., October 1979.
2. The White House, Fact Sheet: The President's Response to the Recommendations of the President's Commission on the Accident at Three Mile Island, Washington, D.C., December 7, 1979.
3. The MITRE Corporation, Operational Implications of Alternative NRC Roles in Incidents, MTR-80W00120, E. Janicik, M. Ottenberg, McLean, VA, May 1980.\*
4. The MITRE Corporation, Communications and Control to Support Incident Management: Initial Operations Center Design Considerations, WP-79W00797, J. Gasparotti, J. Himes, E. Janicik, D. Wolfe, McLean, VA, December 1979.\*
5. The MITRE Corporation, NRC Incident Response Exercise 10, WP-80W00121, J. Hannan, J. Himes, D. Wolfe, McLean, VA, March 1980.\*

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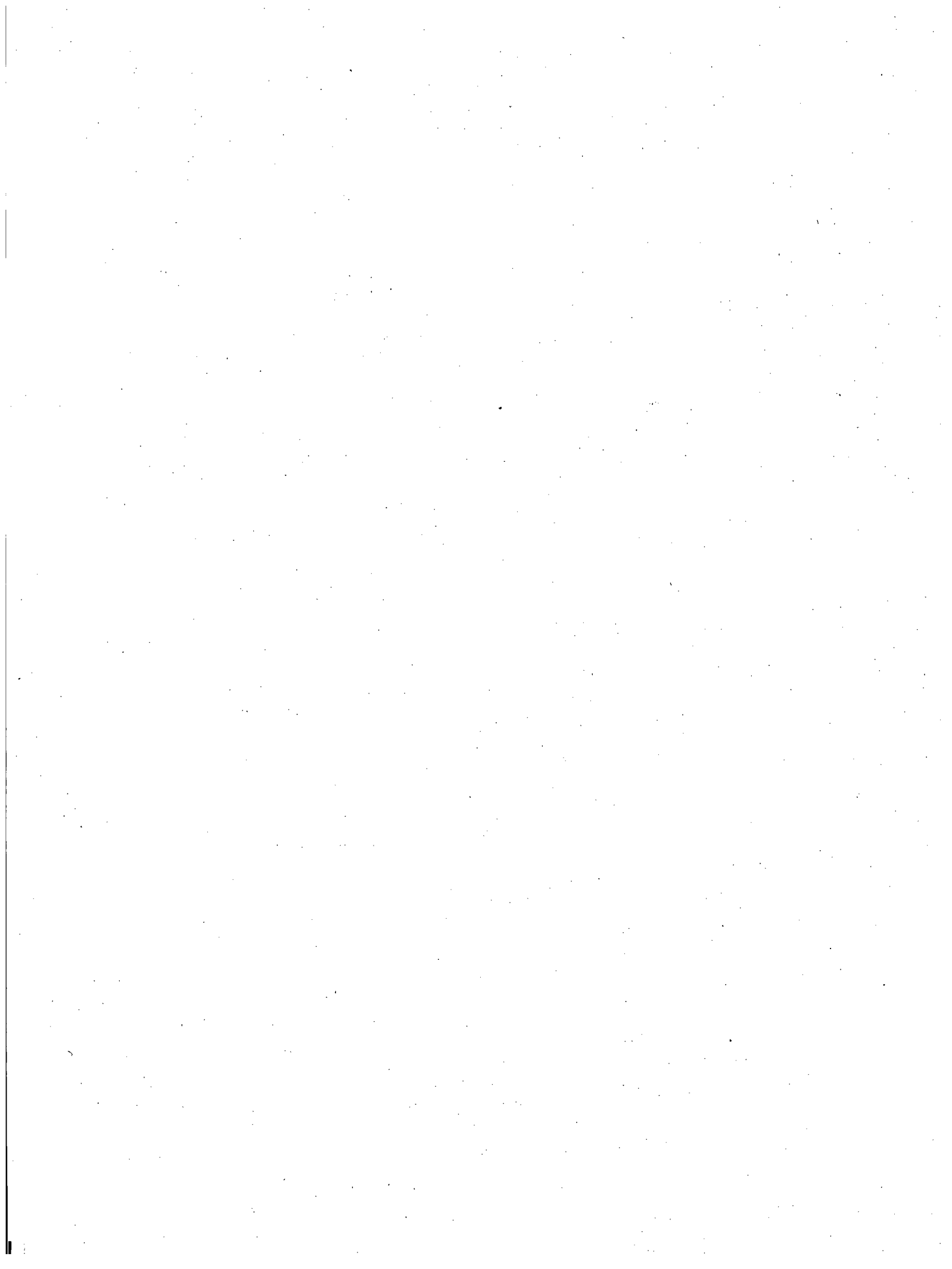
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