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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

November 1, 1979

MEMORANDUM FOR: Distribution  
FROM: O. E. Bassett  
SUBJECT: INITIAL MEETING FOR NUCLEAR DATA LINK (NDL) SYSTEMS STUDY PROGRAM

The enclosed list of individuals met at 9:00, October 23, 1979, in the Incident Response Center (IRC) to conduct initial discussions on the forthcoming Nuclear Data Link (NDL) Systems Study which will produce NDL Phase I, a data link systems design to furnish nuclear plant operating and status data to the IRC to ensure that NRC Headquarters personnel will have immediate access to and understanding of pertinent operational parameters in an emergency situation.

V. Stello, Director, Office of Inspection and Enforcement (IE), opened the meeting by stressing the importance of rapid implementation of an improved IRC installation and emphasized the need for early operational capability of the Phase I data link system. Stello emphasized the need to avoid unduly sophisticated system design because it would result in long delays in reaching operational capability. He named E. Morris Howard of IE as his personal representative responsible for the management of the upgrading of the response center.

S. Levine, Director, Office of Nuclear Regulatory Research (RES), then addressed the purpose and scope of the NDL systems study which is intended to produce a Phase I system description by March 1, 1980. He emphasized that the goal of the Phase I system will be to provide an interim operational capability of information receipt, storage, processing, and display in the shortest practicable time, which now appears to be about two years from start of work on the system design. Levine introduced Warren Owen of Duke Power, who was present as an observer representing an Atomic Industrial Forum task force for industry response to the TMI situation. Levine stated that implementation of the Phase I system will demand maximum use of existing hardware and facilities and that neither time nor funds are available to develop an optimum system on the Phase I schedule. He anticipates implementing a Phase II study of a more comprehensive data transmission system to provide additional data and to support the IRC with computer diagnostic capabilities and a data bank covering operating nuclear facilities. The contemplated study of this Phase II improved capability would be completed by January 1, 1981. He identified O. E. Bassett of RES as project manager for the NDL System Study.

R. L. Tedesco, who has been designated by H. Denton, Director, Office of Nuclear Reactor Regulation (NRR), as his personal representative for the NDL systems study, stated that the Office of Nuclear Reactor Regulation will fully support the upgrading of the IRC to provide real time data for NRC personnel on the Emergency Management Team (EMT) and the Incident Response Action Coordination Team (IRACT)

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as well as supporting analysis groups. He stressed the importance of an early determination of the data list to be transmitted to the IRC and offered full NRR cooperation in its early definition. He named L. Beltracchi as NRR coordinator for data requirements.

A. W. Snyder of Sandia, expressed Sandia management interest in accomplishing the NDL system study. Snyder said he could not over emphasize the importance of early establishment of firm and well defined objectives for the IRC so that experience and time consuming changes would not occur downstream. Snyder introduced Glen Otey, in whose group the work will be accomplished and who will manage the project during this organizational phase pending designation of the Sandia NDL project manager. He also introduced L. Cropp and W. J. Beckett of Sandia.

O. E. Bassett discussed the NDL systems study effort as targeted to produce an integrated Phase I system description by March 1, 1980. The description would be sufficiently specific to permit initiation of procurement on a schedule which, with turnkey installation, would permit a meaningful initial operational capability by January 1, 1982. He also stressed the need for early definition of the functional requirements of the center and the data required of the operating plants. He stated that NRC expected Sandia to procure assistance as needed from outside vendors and that NRC would refer outside vendor expressions of interest to Sandia for consideration.

Bassett cited E. M. Howard's responsibility for management of the overall upgrading of the IRC and indicated that scheduling cost estimates, space layouts and other support efforts for this upgrading effort by Sandia and MITRE as subcontractor to Sandia will be included in the form 189 tasks to be submitted by Sandia and funded as part of the NDL effort.

Howard stated that preliminary estimates of space requirements and cost estimates, together with scheduling data in CPM format would be needed by November 10, 1979, to permit early planning of NRC needs. Bassett concurred in the use of best available information on NDL to meet this requirement, but expressed concern that NDL hardware costs might be unacceptably inaccurate pending better system definition by November 30, 1979.

Inasmuch as the NDL computer, display, and adjacent visual assess by EMT and IRACT spaces are in part a function of NDL systems design, and also form key elements of the overall upgraded IRC layout; there is NDL project interest in the development of these core elements of the IRC. Bassett stated that NDL project participation in the overall development of the center complex was off to a good start because of the earlier efforts of Howard and Weiss of IE, and the fact that Sandia, supported by MITRE personnel, will develop the new overall IRC layout in parallel with the NDL study. The resulting exchange of information should ensure that the NDL installation will meet functional objectives for development of the upgraded IRC complex.

He proposed further that minimum formal description of the systems study effort be required by a) Using meeting minutes as a running narrative of technical and management information, b) Correction and update of the minutes to be

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the responsibility of participants with the minutes file open to addenda and errata, c) Formal documentation of project progress to be determined as to scope and quantity by Sandia subject to NRC concurrence, and d) Deliverable project documents such as interim and final systems descriptions, block diagrams, specific option studies, data lists, functional descriptions and the like to be determined as to type and function by Sandia-NRC agreement and to comply only to the minimum level of document formality allowed by Sandia standards.

D. J. Donoghue, Director, Office of Administration, was present, supported by personnel from the Division of Facilities and Operations, and the Division of Automatic Data Processing Support, as well as representatives of A.T. & T. He stated that early competent estimates of space and cost requirements were absolutely essential to the goal of achieving operational capability by January 1, 1982. He cited the necessity for extraordinary negotiations with GSA, and perhaps the Congress in order to obtain the necessary space and unusual amenities such as raised floors, HVAC, and emergency power in the Bethesda area. He also mentioned the special administrative requirements connected with procurement of computers, and the necessity for early and close coordination with communication contractors. He reiterated that no gross change in requirements could be introduced into the discussions with GSA once they were underway, and that the discussions must be started very soon if the January 1, 1982, operational date is to be met.

At this point, IE (Woodruff) presented draft functional objectives for the upgraded IRC (Enclosure 1). The objectives included some information on data requirements and represented a first cut IE input to the definition of IRC functions and information needs.

NRR (Tedesco, Beltracchi) then described the status of the data lists being prepared to reflect the needs of the upgraded IRC. Tedesco said that the listings in Reg Guide 1.97 would serve as an excellent guide in preparation of detailed lists. Beltracchi reported that material assembled to date with the cooperation of IE (Woodruff) would be made available to Sandia.

IE (Howard) then reported that layout of the overall upgraded IRC was now in its initial phase at Sandia with the results of previous studies by IE and MITRE personnel having been discussed with Sandia on October 17 and 18, 1979. Sandia will proceed using subcontract assistance from MITRE to develop the overall layout with certain preliminary estimates (described above) due by November 10, 1979.

RES (Bennett) described the current concept of the NDL block diagram which does little more than describe some system functions. It is implicit in the current NDL concept that only a limited quantity of information can be conveyed, processed, and displayed in the Phase I system. His presentation material (Enclosure 2) indicated the general scope of effort required from Sandia in the systems definition study. Bennett stated that definition of the form 189 will be accomplished in the next few days to permit funding of the Sandia effort for both the overall IRC layout and the NDL study.

During the discussion of these reports by NRC, Sandia, and observers, comments on various aspects of the system were made. Since many of the viewpoints emerged from several inputs, the attributions do not necessarily reflect all participants in a given discussion.

- o It is the present intent of the NDL to handle data from NRC licensed installations only (Bassett).
- o Data requirements which are difficult to accomodate, will not be permitted to limit phase I system development (Levine). Sandia concurs, especially for late entries to the data list which will cost dollars and delay (Snyder).
- o Some concessions to oddball data requirements will be required to cover older plants in Phase I (Mattson).
- o A process state vector (a set of process variables that define the status of plant and status of ESF) will be needed (Mattson).
- o NRC may expect support from the industry in this and allied efforts, and the industry is ready to interface with NRC on hardware. Industry will probably support both on-site centers and off-site recovery centers. Vendors and A/E's may also need plant operational data. We should think of the IRC as a flight control center, rather than a cockpit of an airliner (Owen).
- o The data list will be assembled from two basic sources: Reg Guide 1.97 and a survey of NRR, NMSS, and IE branches interested. A safety state vector (a minimum set of parameters necessary to assess status of plant as a function of defense level status) will be needed (Beltracchi).
- o The data list should be compiled by a small group comprising Wenzinger (SD), Beltracchi (NRR), Woodruff (IE), and Owen (Duke Power) in a continuing discussion until the Phase I list emerges. (Mattson).
- o Information as to who will use the data and how it will be used is vital to the early design definition of NDL transmission system and displays. It seems data will be needed for both operational decisions and post mortems (Snyder).
- o The IRC NDL must be available continuously for its primary function in addition to possible use in checking plant status, training exercises and the like, so special consideration should be given to maintainability and logistic support to assure continuous standby and frequent full operational capability of the NDL (Bassett).
- o A task analysis of EMT and IRACT functions is needed to optimize the working space (Johnston). Sandia and MITRE will pursue this (Howard). MITRE study information and discussions with Sandia will afford early layout information for IRC display and working spaces (Howard).
- o Actual members of EMT and IRACT should be consulted for their opinions on IRC space and display layout (Levine).
- o Discussion and varying opinions as to the seismic and other natural event resistance of the on-site technical support center, the data link, and the IRC indicate that this matter should be addressed early in the study effort (Tedesco, Owens).

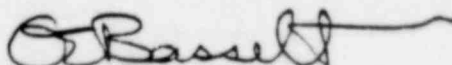
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- o We should consider how much data from each operating plant will be monitored continuously, and how much should be called up on the display entry during manning of the IRC (DiSalvo).

The meeting adjourned at 11:45 a.m. A smaller group convened in the afternoon to discuss Sandia inputs and formulate short range plans. This meeting will be reported separately.

  
O. E. Bassett

Enclosures:  
as stated

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OCTOBER 23, 1979

NUCLEAR DATA LINK

LIST OF ATTENDEES

<u>NAME</u>	<u>ORGANIZATION</u>	<u>PHONE</u>
Leo Beltracchi	NRC/NRR	301-429-7233
Gary Bennett	NRC/RES	301-427-4272
Glen Otey	Sandia	505-264-9945
A. W. Snyder	Sandia	505-264-8203
G. Kligfield	NRC/NMSS	301-427-4146
M. Garver	NRC/RES	301-427-4360
C. Troutman	NRC/ADPS	301-492-7713
John Winningham	NRC/ADPS	301-492-8304
J. J. Cunningham	NRC/IE	301-492-8188
J. R. Levine	NRC/HMB	301-492-8018
B. H. Weiss	NRC/IE	301-492-7246
R. W. Woodruff	NRC/IE	301-429-8180
Lou Cropp	Sandia	505-264-8723
Roger Mattson	NRC/NRR	301-492-7517
William Johnston	NRC/SIG	301-492-9822
R. Tedesco	NRC/NRR	301-492-7980
Dudley Thompson	NRC/IE	301-492-8177
Vernon Kerr	NRC/ADM/TB	301-492-8000
George Fetrow	NRC/ADM/FOS	301-492-8290
Nancy Ervin	NRC/IE/DSI	301-492-7077
Ed. Brady	MITRE Corp.	703-827-6896
Dan Donoghue	NRC/ADMIN	301-492-7335
O. E. Bassett	NRC/RES	301-427-4360
E. Morris Howard	NRC/IE	301-492-7650
Frank Fiorina	AT&T	202-457-3617
Jim Murray	AT&T	202-457-2642
M. J. Beckett	Sandia	505-264-2752
Joe Himes	MITRE	703-827-6894
Gordon Chipman	NRC/SIG	301-492-8924
Raymond DiSalvo	NRC/RES	301-492-8377
Warren Owen	Duke Power	704-373-4120
Saul Levine	NRC/RES	301-427-4341
Victor Stello	NRC/IE	301-492-7397

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## DEDICATED TELEPHONES

### Routine Use

- Operational status reports for each reactor

### Nonroutine Use

- Reactor not under control
- Prompt report

## POTENTIAL PROMPT REPORT RESPONSES

Activate NRC Operations Center

Dispatch An NRC Team

Suggest Or Demand Licensee Actions

Obtain Assistance

- Other Agencies
- Other Licensees
- Suppliers
- Military

Require Evacuation

## RELEASE INFORMATION

Media

Executive Branch

Legislative Branch

State Government

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POOR ORIGINAL



## LICENSEE ONSITE NUCLEAR SUPPORT CENTERS

### Schedule

- Establish interim facility by 1/1/80
- Fully implement by 1/1/81

### Initial Capability

- Telephones
- Interim data link

### Staffing In An Emergency

- Senior corporate people
- Senior onsite NRC people

## DATA LINK REQUIREMENTS

### Process Data

- Core
- Cooling systems
- Supporting systems

### Radiological & Meteorological Data

- Area & stack monitors
- Weather conditions

### Process and Instrumentation Diagrams?

- Actual valve alignments?

### Selective Data Plotting

### Data Storage

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NEDL DATA REQUIREMENTS

PWRs (Numerical Data)

Thermal Power

Pressurizer Pressurer  
" Level

Cold Leg Temp for Each Loop

Hot " " " " "

Reactor Coolant Pump Current for Each Loop

Letdown Flow

Makeup Flow

Top of Core T/Cs

Pressurizer Relief Tank Level

" " " Temp

" " " Pressure

Containment Sump Level

Containment Pressure

" Temp

HPSI Flow

" Pressure (Pump Discharge)

LPIS Flow

" Pressure (Pump Discharge)

Refueling Water Storage Tank Level

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Each Accumulator Level

" " Pressure  
Each Steam Generator Pressure  
" " Level  
" "  $\Delta T$

Feedwater Flow

Steam Flow

Reactor Coolant System Subcooling Temp

Boron Concentration

Each R/A Liquid Waste Tank Level

Each R/A Gaseous Waste Tank Pressure

Volume Control Tank Level

Component Cooling Water Flow to RH2 HXs

RH2 HX  $\Delta T$

Containment Spray Flow

" Ventilation Cooler Flow

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PWRs (Events & Times of Occurrence)

Reactor Trip

Turbine Trip

Safety Injection

Containment Spray

Reactor Coolant Pumps On/Off

Main Feedwater Pumps On/Off

Aux Feedwater Pumps On/Off

Makeup Pumps On/Off

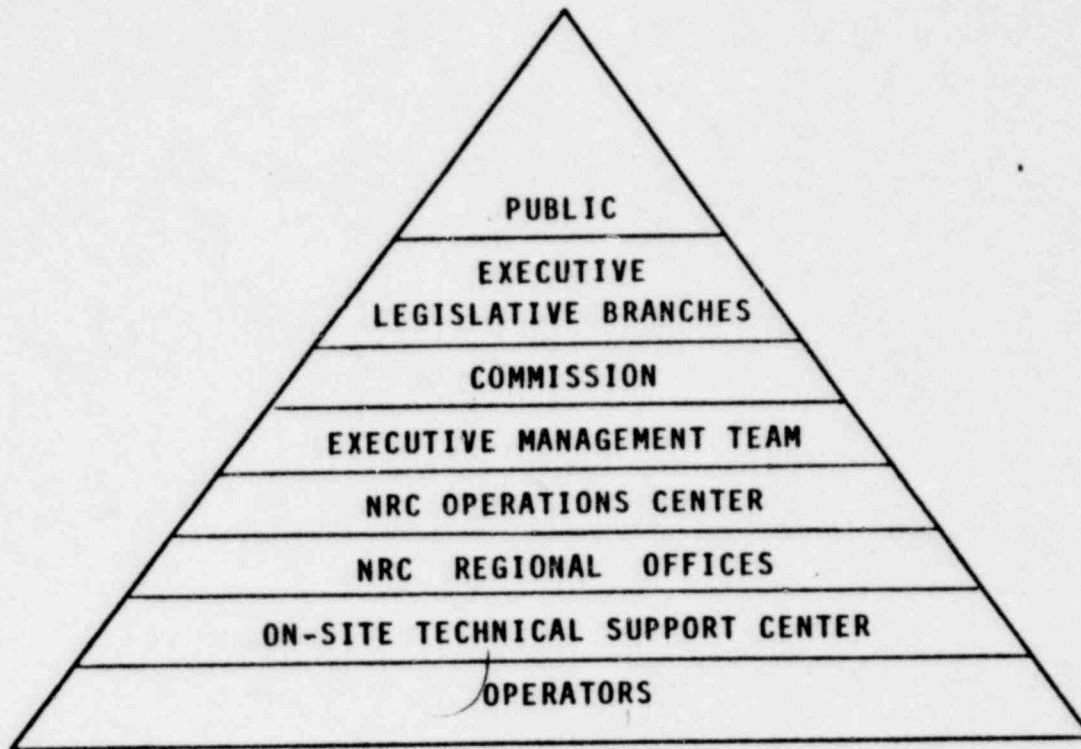
PORV Open/Closed

Main Steam Bypass Open/Closed

Containment Isolation

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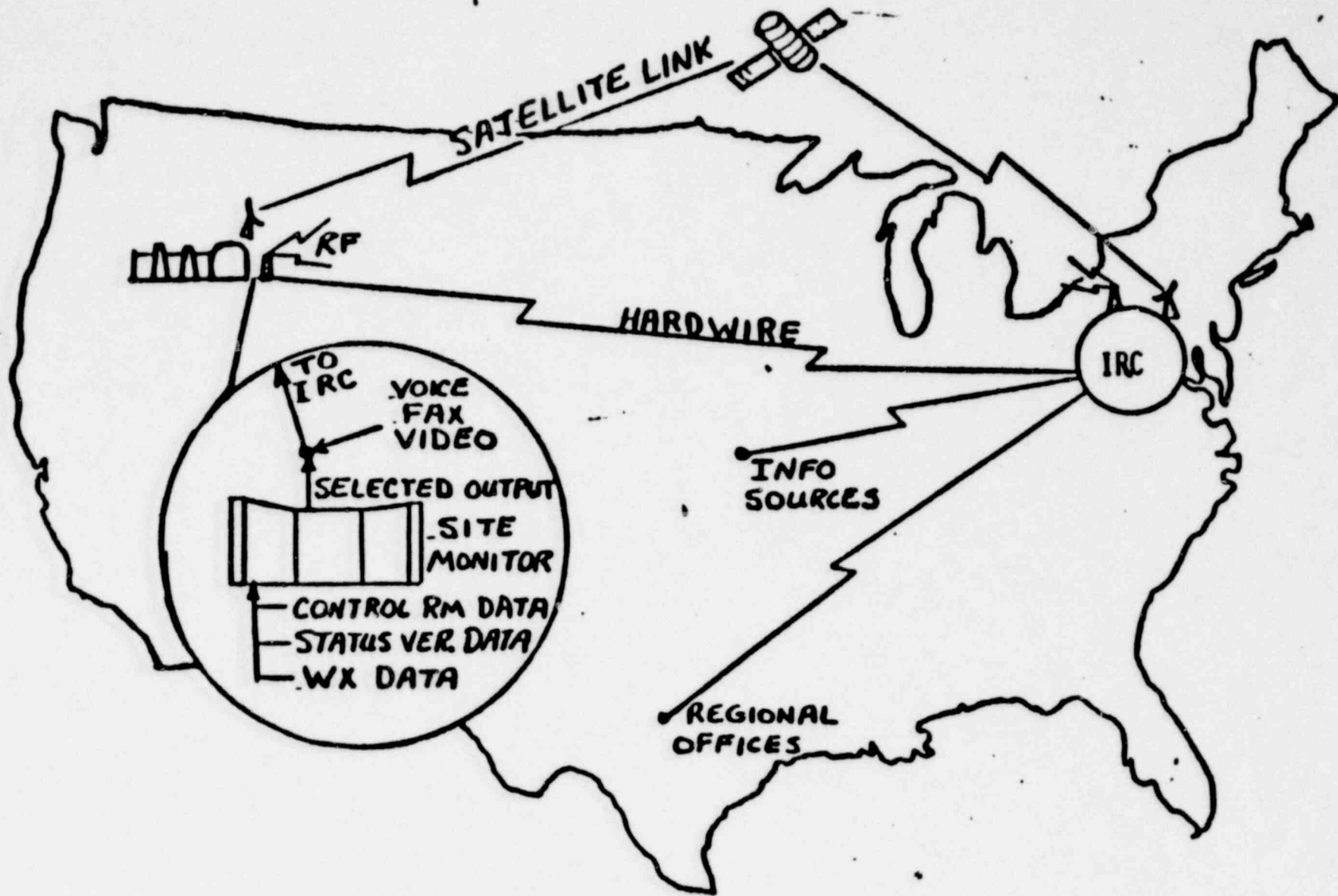
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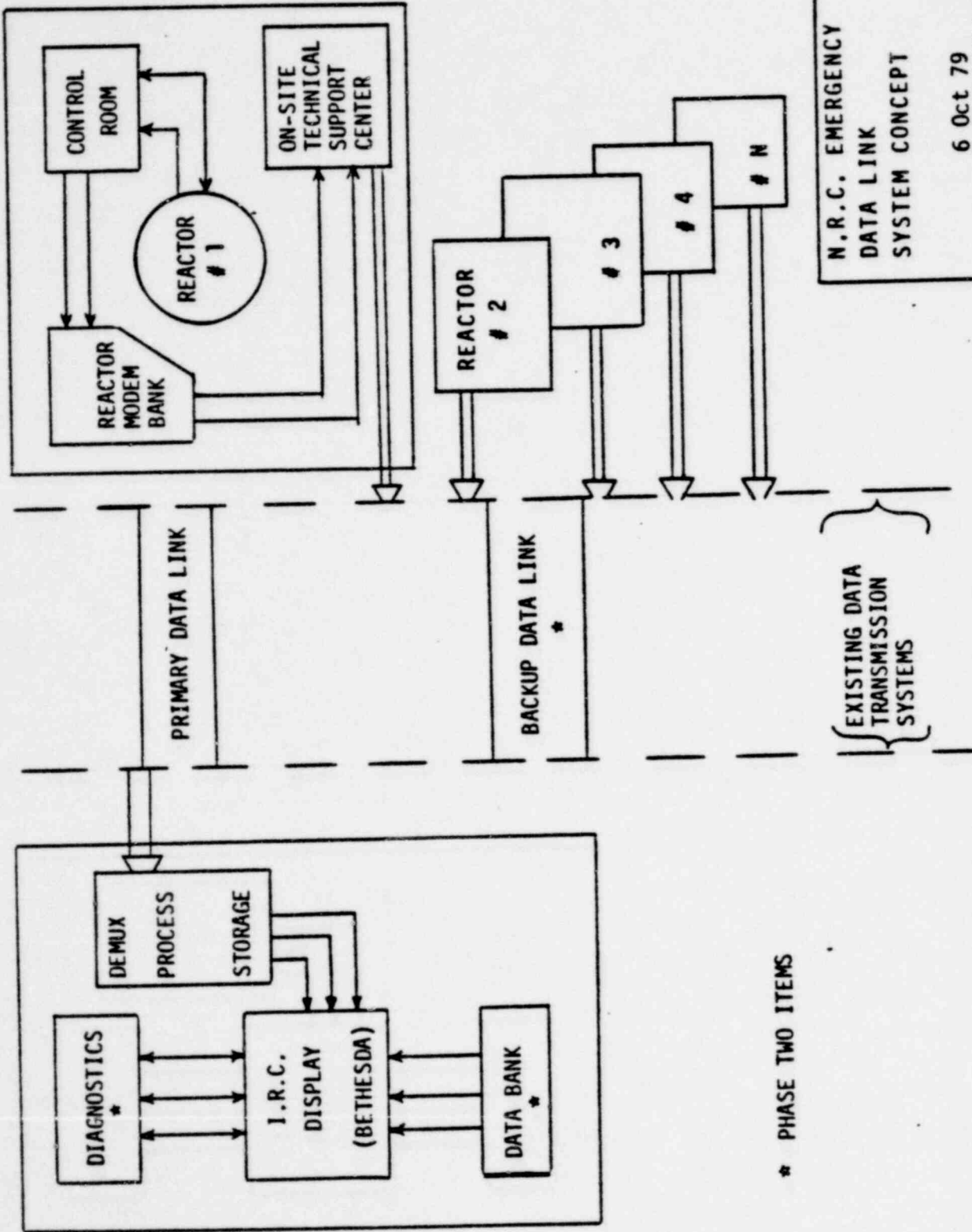
INFORMATION PYRAMID

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POOR ORIGINAL



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N.R.C. EMERGENCY  
 DATA LINK  
 SYSTEM CONCEPT  
 6 Oct 79  
 NRC/RES/NRR

\* PHASE TWO ITEMS

## NEDL SYSTEM ENGINEERING

- BASIC FUNCTIONAL DESCRIPTION OF NEDL
- PERFORMANCE REQUIREMENTS FOR NEDL
- DESIGN TRADE-OFF STUDIES
  - . ON-SITE
  - . DATA LINKS
  - . IRC
- NEDL DESIGN
- NEDL FLOWCHART
- DOCUMENTATION AND INTERFACE CONTROL
- HUMAN FACTORS
- TESTING
- EVALUATION

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NEDL WILL REQUIRE:

- SYSTEM PROJECT MANAGEMENT ORGANIZATION
  - . SYSTEM DESIGN AND ENGINEERING
  - . INTERFACE CONTROL
  - . SYSTEM ENGINEERING ANALYSIS AND EVALUATION
  - . SYSTEM INTEGRATION AND TEST
  
- CONSIDERATIONS OF
  - . OPERABILITY
  - . MAINTAINABILITY
  - . SAFETY
  - . RELIABILITY
  - . COST-EFFECTIVENESS

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SYSTEM METHODOLOGY

SPECIFIC OBJECTIVES OF SYSTEMS PLANNING

SYSTEMS PLANNING ACTIVITIES

PROJECT APPRAISAL

PROJECT INVESTIGATION

PROJECT PROPOSAL

PROJECT SPECIFICATION

PROJECT PROGRAMMING

PROJECT IMPLEMENTATION

PROJECT EVALUATION AND MAINTENANCE

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