

AWARD/CONTRACT

1. THIS CONTRACT IS A RATED ORDER UNDER DPAS (15 CFR 350) RATING

2. CONTRACT NO. NRC-33-94-188 3. EFFECTIVE DATE 4. REQUISITION/PROJECT NO. IRM-93-197

5. ISSUED BY Code: U.S. NUCLEAR REGULATORY COMMISSION
DIVISION OF CONTRACTS & PROP. MGT.
CON. NEG. BRANCH #1
MAIL STOP P-1020
WASHINGTON, DC 20555

6. ADMINISTERED BY Code: (If other than Item 5)
US NUCLEAR REGULATORY COMMISSION
DIVISION OF CONTRACTS & PROP. MGT.
CONTRACT ADM. BRANCH #2
WASHINGTON, DC 20535

7. NAME AND ADDRESS OF CONTRACTOR
PRIME: US SMALL BUSINESS ADMINISTRATION
475 ALLENDALE ROAD
KING OF PRUSSIA, PA 19406-1415
Sub: PULSAR DATA SYSTEMS, INC
5000 PHILADELPHIA WAY, LANHAM, MD
Principal Investigator/Technical
Contact:
Telephone No:

8. DELIVERY
[] FOB ORIGIN
[X] OTHER (See below)

9. DISCOUNT FOR PROMPT PAYMENT
N/A

10. SUBMIT INVOICES (4 copies unless otherwise specified) TO THE ADDRESS SHOWN IN ITEM: 6

11. SHIP TO/MARK FOR CODE
SEE CLAUSE F.6

12. PAYMENT WILL BE MADE BY CODE
US NUCLEAR REGULATORY COMMISSION
DIV. OF ACCOUNTING & FINANCE,
MD. NATIONAL BANK BLDG., RM 11104
WASHINGTON DC 20555

13. AUTHORITY FOR USING OTHER THAN FULL AND OPEN COMPETITION
[] 10 U.S.C. 2304(c) [] [X] 41 U.S.C. 253(c) [5] Procurement Authority

14. ACCOUNTING AND APPROPRIATION DATA
B&R:410-20-615-600; JC:E1014; BOC:2542; APP:31X000.410
AMOUNT: \$1,171,129

15A. ITEM NO.	15B. SUPPLIES/SERVICES	15C. QUANTITY	15D. UNIT	15E. UNIT PRICE	15F. AMOUNT
The Pulsar Data Systems, Inc. technical proposals dated 9/17/93 and 11/10/93 are hereby incorporated into this contract and made a part hereof. See Section C for technical description.					

15G. ESTIMATED CEILING PRICE OF THE CONTRACT \$1,752,527

9402280090 53121
PDR CONTR
NRC-33-94-188 PDR

Dfoz

X SEC	DESCRIPTION	PAGE(S)
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CONTRACTING OFFICER WILL COMPLETE ITEM 17 OR 18 AS APPLICABLE

17. CONTRACTOR'S NEGOTIATED AGREEMENT (Contractor is required to sign this document and return 2 copies to issuing office.) Contractor agrees to furnish and deliver all items or perform all the services set forth or otherwise identified above and on any continuation sheets for the consideration stated herein. The rights and obligations of the parties to this contract shall be subject to and governed by the following documents: (a) this award/contract, (b) the solicitation, if any, and (c) such provisions, representations, certifications, and specifications, as are attached or incorporated by reference herein. (Attachments are listed herein.)

18. AWARD (Contractor is not required to sign this document.) Your offer on Solicitation Number _____ including the additions or changes made by you which additions or changes are set forth in full above, is hereby accepted as to the items listed above and on any continuation sheets. This award consummates the contract which consists of the following documents: (a) the Government's solicitation and your offer, and (b) this award/contract. No further contractual document is necessary.

19A. NAME AND TITLE OF SIGNER (Type of print) [Offie Adams Contracting Officer]	20A. NAME OF CONTRACTING OFFICER
19B. NAME OF CONTRACTOR by [Signature] (Signature of person authorized to sign)	20B. UNITED STATES OF AMERICA by [Signature] (Signature of Contracting Officer)
19C. DATE SIGNED 1/26/94	20C. DATE SIGNED 1-21/93

AWARD/CONTRACT

1. THIS CONTRACT IS A RATED ORDER UNDER DPAS (15 CFR 350)		RATING			
2. CONTRACT NO. <i>0303-94-1-00045</i>	3. EFFECTIVE DATE	4. REQUISITION/PROJECT NO. IRM-93-197			
5. ISSUED BY Code: U S SMALL BUSINESS ADMINISTRATION 475 ALLENDALE ROAD KING OF PRUSSIA, PA 19406-1415		6. ADMINISTERED BY Code: (If other than Item 5) US NUCLEAR REGULATORY COMMISSION DIVISION OF CONTRACTS & PROP. MGT. CONTRACT ADM. BRANCH #2 WASHINGTON, DC 20555			
7. NAME AND ADDRESS OF CONTRACTOR PULSAR DATA SYSTEMS, INC 5000 PHILADELPHIA WAY, SUITE H LANHAM, MD 20706 Principal Investigator/Technical Contact: Telephone No:		8. DELIVERY <input type="checkbox"/> FOB ORIGIN <input checked="" type="checkbox"/> OTHER (See below)			
10. SUBMIT INVOICES (4 copies unless otherwise specified) TO THE ADDRESS SHOWN IN ITEM: 6		9. DISCOUNT FOR PROMPT PAYMENT N/A			
11. SHIP TO/MARK FOR CODE SEE CLAUSE F.6	12. PAYMENT WILL BE MADE BY CODE US NUCLEAR REGULATORY COMMISSION DIV. OF ACCOUNTING & FINANCE, MD. NATIONAL BANK BLDG., RM 11104 WASHINGTON DC 20555				
13. AUTHORITY FOR USING OTHER THAN FULL AND OPEN COMPETITION <input type="checkbox"/> 10 U.S.C. 2304(c) <input type="checkbox"/> <input checked="" type="checkbox"/> 41 U.S.C. 253(c) [5] *negotiation Authority 1: U.S.C. 837 (a)					
14. ACCOUNTING AND APPROPRIATION DATA SEE PRIME CONTRACT					
15A. ITEM NO.	15B. SUPPLIES/SERVICES	15C. QUANTITY	15D. UNIT	15E. UNIT PRICE	15F. AMOUNT
See Prime Contract between U S Small Business Administration and the U S Nuclear Regulatory Commission entitled "Wide Area Network".					
15G. TOTAL AMOUNT OF CONTRACT					

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19A. NAME AND TITLE OF SIGNER

(Type or print)
WILLIAM W. DAVIS, SR.
PRESIDENT, CEO

20A. NAME OF CONTRACTING OFFICER

[Signature]

19B. NAME OF CONTRACTOR

by *[Signature]*
(Signature of person authorized to sign)

20B. UNITED STATES OF AMERICA

by *[Signature]*
(Signature of Contracting Officer)

19C. DATE SIGNED

12/16/93

20C. DATE SIGNED

1/26/94

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PART I - THE SCHEDULE

SECTION B - SUPPLIES OR SERVICES AND PRICES/COSTS

B.1 PROJECT TITLE

The title of this project is as follows:

WIDE AREA NETWORK ENHANCEMENT

[End of Clause]

B.2 BRIEF DESCRIPTION OF WORK (MAR 1987)
ALTERNATE 1 (JUN 1988)

(a) Brief description of work:

The Contractor shall provide all materials, equipment and support services for the implementation and maintenance of a Wide Area Network (WAN) capable of supporting the NRC current and future information requirements using a highly reliable and flexible multiplexer platform that provides for network management, reduction in long distance and local carrier access charges and recurring charges for service, a migration path to future transmission technologies such as Frame Relay and Asynchronous Transfer Mode. This is a Cost-Plus-Fixed Fee/Fixed Price Delivery Order contract.

(b) Orders will be issued for work required by the NRC in accordance with 52.216-18 - Ordering. Only Contracting Officers of the NRC or other individuals specifically authorized under this contract may authorize the initiation of work under this contract. The provisions of this contract shall govern all orders issued hereunder.

[End of Clause]

B.3 SCHEDULE OF COST/PRICES

CLIN	DESCRIPTION	COST/PRICE
	<u>Contract Years 1 - 3</u>	
0101	Design, fabricate, procure, integrate, install, travel, test and maintain a Wide Area Network in accordance with the Sow	
	Estimated Cost	\$1,004,539
	Fixed Fee	61,871
	Estimated Cost	
	Total CPFF	\$1,066,410
0102	Monthly Maintenance (18 months)	

B.3 (Continued)

	(See Clause J.5 for detailed breakout)	Fixed Price	72,764
0103	Training	Fixed Price	53,130
0104	Hardware		
	(See Clause J.5 for schedule of prices)	Fixed Price	516,844
0104a	Staging	Fixed Price	36,179
0105	Maintenance outside the Principal Period at the fixed price of \$150.00 per hour NOT TO EXCEED	Fixed Price	7,200
	TOTAL CPFF/FPF		\$1,752,527
FIRST OPTION YEAR (CONTRACT YEAR 4)			
0201	Design, fabricate, procure, integrate, install, travel, test and maintain a Wide Area Network in accordance with the SOW	Estimated Cost	\$ 248,019
		Fixed Fee	15,510
		Total CPFF	\$ 163,529
0202	Yearly Maintenance (See Clause J.5 for detailed breakout)	Fixed Price	48,509
0205	Maintenance outside the Principal Period at the fixed price of \$150.00 per hour NOT TO EXCEED	Fixed Price	2,400
	TOTAL CPFF/FPF		\$ 314,438
SECOND OPTION YEAR (CONTRACT YEAR 5)			
0301	Design, fabricate, procure, integrate, install, travel, test and maintain a Wide Area Network in accordance with the SOW	Estimated Cost	\$ 248,019
		Fixed Fee	15,510
		Total CPFF	\$ 163,519
0302	Monthly Maintenance (See Clause J.5 for detailed breakout)	Fixed Price	48,509
0305	Maintenance outside the Principal Period at the fixed price of \$150.00 per hour NOT TO EXCEED	Fixed Price	2,400
	TOTAL CPFF/FPF		\$ 314,428

CLINS 0101, 0201, AND 0301 ARE COST PLUS FIXED FEE. CLINS 0105, 0205, AND 0305 ARE AN HOURLY RATE OF \$150.00 PER HOUR, WITH A NOT TO EXCEED AMOUNT OF \$2,400 PER CONTRACT YEAR. THE REMAINING CLINS ARE FIRM FIXED PRICE. THE TOTAL MAXIMUM ESTIMATED CEILING COST PLUS FIXED FEE/FIRM FIXED PRICE FOR ALL CLINS FOR 5 YEARS IS

B.3 (Continued)

\$2,781,406.

[End of Clause]

B.4 CONSIDERATION AND OBLIGATION--DELIVERY ORDERS
(JUN 1988)

- (a) The total estimated amount of this contract (ceiling) for the products/services ordered, delivered, and accepted under this contract is \$ 1,752,527. The Contracting Officer may unilaterally increase this amount as necessary for orders to be placed with the contractor during the contract period provided such orders are within any maximum ordering limitation prescribed under this contract.
- (b) The amount presently obligated with respect to this contract is \$ 1,171,129. The Contracting Officer may issue orders for work up to the amount presently obligated. This obligated amount may be unilaterally increased from time to time by the Contracting Officer by written modification to this contract. The obligated amount shall, at no time, exceed the contract ceiling as specified in paragraph a above. When and if the amount(s) paid and payable to the Contractor hereunder shall equal the obligated amount, the Contractor shall not be obligated to continue performance of the work unless and until the Contracting Officer shall increase the amount obligated with respect to this contract. Any work undertaken by the Contractor in excess of the obligated amount specified above is done so at the Contractor's sole risk.

[End of Clause]

B.5 TEMPORARY OR PERMANENT PRICE REDUCTIONS

THE PRICES CONTAINED IN THE PRICE SCHEDULES (SEE CLAUSE J.5) ARE THE FIXED PRICES FOR ALL EQUIPMENT ORDERED UNDER THIS CONTRACT. THESE PRICES ARE SUBJECT TO DOWNWARD ADJUSTMENT BY MODIFICATION TO THIS CONTRACT.

The Contractor shall inform the Contracting Officer and the Project Officer in writing (Price Notice) of any "specials" or existing or impending temporary or permanent price reductions on or directly affecting any product or products on the schedule, and shall make a proposal for a temporary or permanent price reduction on the product(s) so affected (as appropriate), to be negotiated and incorporated into the contract as a modification. This Price Notice and proposal shall be provided soon enough to give the government reasonable time to take advantage of the offer.

B.5 (Continued)

Delivery times in such circumstances will be the same as elsewhere provided in the contract, inless the Contractor notifies the Contracting Officer and the PO within five working days of receipt of the order that delivery times may be subject to availability to the Contractor of any components required to meet the order. In that case, the order may be cancelled or may be adjusted at the discretion of the Contracting Officer.

The Contractor guarantees that all prices under this contract shall be "most favored customer" prices.

B.6 CONSIDERATION AND OBLIGATION -- COST PLUS FIXED FEE
CLIN 0101 ONLY

- (a) The total estimated cost to the Government for full performance of CLIN 0101 of this contract is \$1,066,410, of which the sum of \$1,004,539 represents the estimated reimbursable costs, and of which \$61,871 represents the fixed fee.
- (b) There shall be no adjustment in the amount of the Contractor's fixed fee by reason of differences between any estimate of cost for performance of the work under this contract and the actual cost for performance of that work.
- (c) The amount obligated by the Government with respect to this contract for CLIN 0101 is \$485,012.

SECTION C - DESCRIPTION/SPECIFICATIONS/WORK STATEMENT

C.1 BACKGROUND

C.1.1 GENERAL

The Nuclear Regulatory Commission (NRC) is located in six geographic areas of the United States with specific main organizational offices at the following locations:

- the Headquarters at One White Flint North (OWFN) 11555 Rockville Pike, Rockville, Maryland and four Bethesda, Maryland locations with consolidation of the Bethesda personnel to take place in early 1994 to a second building located at 11545 Rockville Pike, Rockville, Maryland;
- Region I Office at 475 Allendale Road, King of Prussia, Pennsylvania;
- Region II Office at 101 Marietta Street, Suite 2900 Atlanta, Georgia;
- Region III Office at 801 Warrenville Rd, Suite 200, Lisle, Illinois
- Region IV Office at 611 Ryan Plaza Drive, Suite 400, Arlington, Texas;
- Region V Office at 1450 Maria Lane, Walnut Creek, California;

with smaller offices at the following locations:

- Public Document Room, 2120 L Street, N.W. Washington, D.C.;
- Uranium Recovery Field Office at 730 Simms Street, Golden, Colorado;
- Technical Training Center, 5700 Brainerd Road, Chattanooga, Tennessee; and
- Southwest Research Institute, 6220 Culebra Road, San Antonio, Texas

Data communications between these locations and other computing resources outside the NRC is currently performed using a four tiered network consisting of asynchronous dial modem communications at the lowest level, a statistical time division multiplexer (STDM) network known as the Autodialing Network System (ANS), mini-to-mini and mini-to-mainframe computer communications utilizing mostly IBM's bisynchronous communications protocol, and Local Area Networking (LAN). The NRC also utilizes communications links of various speeds with other Federal Agencies and National

C.1 (Continued)

Laboratories to enhance the agency's corporate database and perform complex mathematical and scientific modeling related to the production of nuclear energy. The NRC also employs Remote Job Entry (RJE) printer technology from various computer facilities to the Headquarters and Regional Offices for print output of batch run programs.

C.1.2 SPECIFIC

C.1.2.1 DIAL ACCESS COMMUNICATIONS

The NRC is a geographically dispersed organization with five Regional Offices, one Technical Training Center, one Uranium Recovery Field Office, 88 Resident Inspectors (RI) located throughout the contiguous United States, a multi-building Headquarters in the Maryland area, and one Public Document Room located in Washington, D.C. The absence of its own mainframe computing environment necessitates the use of various outside computing facilities such as the National Institutes of Health (NIH), the Idaho National Engineering Laboratories (INEL), the Department of Treasury, and Oak Ridge National Laboratories (ORNL). The agency also utilizes various commercially provided data repositories such as Lexis/Nexis, Westlaw services, and the Institute of Nuclear Power Operations (INPO) in Marietta, Georgia.

The agency uses both low speed, 2.4 thousand bit per second (Kbps), modems as well as high speed, 14.4Kbps, asynchronous dial modems of various makes and models for much of its data input and retrieval with non-agency maintained databases and service providers.

C.1.2.2 AUTODIALING NETWORK SYSTEM (ANS)

The ANS is a STDM system comprised of government owned Tellabs 33X products. The network contains 13 nodal processors and 53 statistical multiplexers that provide approximately 1,432 ports. There is one nodal processor and a minimum of two statistical multiplexers in each Regional office. Eight nodal processors are located in the Headquarter's area with all Regional nodes being linked via dual dedicated 9.6Kbps FTS2000 digital transmission facilities to the Headquarters. Each nodal processor is capable of supporting combinations of eighteen synchronous links and thirty-two ports with a total aggregate input rate of 307.2Kbps. The ANS multiplexers can support asynchronous terminals, permanent virtual circuits at

C.1 (Continued)

a predetermined data rate, and bisynchronous communications on specific ports. Data link rates range from 9.6Kbps to 76.8Kbps with support for the CCITT X.25 standard being offered by the manufacturer, but not employed by the Government.

The ANS is used to provide terminal connectivity to the NRC minicomputer systems, two 2.4Kbps dial out modem banks, the agency protocol conversion facility for 3270 terminal emulation and communications with the various 3270 host machines. The ANS currently supports terminal emulation with the five 3270 host systems, two of which are on premise.

The speed limitation on the ANS network per port is 9.6Kbps with an average throughput of approximately 4.9Kbps when 3270 emulation is utilized. This throughput could be improved, but the cost in upgrading each pair of digital transmission facilities from 9.6Kbps to 56Kbps would not be justified by the increase in throughput. Technically, the ANS is capable of supporting file transfer between personal computers and one way file transfer to the Data General (DG) minicomputer platforms; however, improper use of communications software by the user community preempted this practice. The Agency plans to downsize and eventually disband the ANS network as synchronous and asynchronous gateways coupled with the implementation of the Transmission Control Protocol/Internet Protocol (TCP/IP) are incorporated into the Agency LANs. (See Figure 4, page A-V).

C.1.2.3 CPU TO CPU DATA TRANSMISSION

The NRC currently has a mixture of minicomputer platforms located in the various headquarters area buildings. With the consolidation of office space to the two collocated Rockville, Maryland buildings, the NRC plans to consolidate its computing platforms as well with the exception of the DG MV10000 platform located at a contractor's site known as the Ford Building at 7100 Wisconsin Avenue, Bethesda, Maryland. For the purposes of this solicitation, the NRC will be utilizing the platforms and locations shown in Table 1, page A-I, for implementation of the WAN with later migration to the configuration shown in Table 2, page A-II.

The Hewlett Packard (HP) 3000 machines serve as RJE controllers for print output from INEL (via an NRC IBM 9370/90 370 class machine), ORNL, NIH, and the Agency's IBM 9370/90 machines. The communication links for this support are 9.6Kbps digital to ORNL, 9.6Kbps analog to NIH, and a defined bisynchronous ANS port with a data rate of 9.6Kbps to INEL transported via the ANS Network.

C.1 (Continued)

The DG MV40000 platform currently utilizes DG's X.25 Xodiac communications software to link to various other Agency owned DGs; these mini-to-mini communication links will not be utilized after the consolidation of the Agency to the second building in Rockville, Maryland is complete with the exception of at least one 56Kbps Digital Data Service (DDS) to the NUDOCS contractor site. This platform will, in the future, be linked to the agency's LANs and utilize TCP/IP as the transport mechanism for terminal and host to host communications. Present applications that are scheduled for migration from their current platforms to this minicomputer will require 56Kbps and 19.2Kbps connectivity to the Department of Treasury in Hyattsville, Maryland in support of the agency's Integrated Financial Management Information System (IFMIS). The MV40000 platform will, in the near future, also require high speed connectivity to either Health and Human Services (HHS) in Washington, D.C., or to NIH in Bethesda, Maryland to support the cross servicing proposal currently being investigated by the NRC for its Payroll and Personnel Systems. These systems will be transferred to the MV 40000 platform prior to the consolidation to Two White Flint North (TWFN). (See Table 2, A-II, for post consolidation computer links).

The DG MV15000 that will support the agency's Information Library System (ILS) is a stand alone CPU and it is not envisioned that WAN host-to-host connectivity will be required on its current platform. The Library staff are entertaining the idea of procuring a similar application capable of being supported by a LAN platform using the Unix operating system; however, no particulars are known at this time.

The two IBM 9370/90 systems currently support communications links of 19.2Kbps and below to remote cluster controllers and also 9.6Kbps circuitry for host-to-host connectivity. Two 9.6Kbps analog circuits provide host support to NIH, two 9.6Kbps and two 56Kbps DDS circuits provide connectivity to the Center for Nuclear Waste and Regulatory Analysis (CNWRA) which has its main office in San Antonio, Texas and a local office in Crystal City, Virginia. The 9.6Kbps circuits support bisynchronous traffic, while the 56Kbps circuits support TCP/IP and Novell's proprietary protocol, Sequence Packet Exchange/Internet Packet Exchange (SPX/IPX), connectivity.

C.1.2.4 LAN TO LAN COMMUNICATIONS

In 1990, the NRC developed its Agency Upgrade of Technology for Office systems (AUTOS) network. This network is based upon local area networking (LAN) technology and was

C.1 (Continued)

specifically developed to replace the agency's aging IBM 5520 word processing system. The AUTOS environment initially offered word processing, electronic mail, and time management applications in stand alone LANs. As part of the replacement of the aging 5520 systems, the ability to link remote sites was a major requirement, thus providing the mandatory linking of all NRC LANs into what is now known as the AUTOS Wide Area Network (AWN). (See Figure 6, page A-VII, for current AWN).

Connectivity between remote sites is currently being provided by both local exchange carrier (LEC) and inter-exchange carrier (IXC) 56Kbps Digital Data Service circuits. As user demands continue to grow for more services and reduced delays in response times, the requirement for greater bandwidth between locations is becoming apparent with each new user that is added to the network. At the present time, all the agency's Regional Offices, the Technical Training Center in Chattanooga, Tennessee; the Uranium Recovery Field Office in Golden, Colorado; the SouthWest Research Institute (SWRI) in San Antonio, Texas; and the Center for Nuclear Waste Regulatory Analysis (CNWRA) in Arlington, Virginia; and the National Institutes of Health in Bethesda, Maryland are connected to the AWN. SWRI and CNWRA are full fledged members of the AWN protocol-wise with NIH being reachable by users of TCP/IP only. NIH has provided a T1 circuit between its campus in Bethesda, MD and the agency's OWFN location as well as the CPE necessary to provide the high speed TCP/IP link. It is via this linkage that the NRC has physical access to the Internet with membership to the Internet via the SouthEastern Universities Research Association Network (SURAnet). The AWN provides for local communications via Novell's SPX/IPX and is designed to rely on the TCP/IP protocol over the AWN.

One of the major goals of the AWN is to provide a "window to the world" for the agency's 3500 plus user population. The AWN will provide real time access to any resource attached to the net regardless of location. This includes PC to PC, PC to File Server, Server to Server, and PC to Host communications. This AWN was also designed to provide wide area connectivity for (non AUTOS) Host to Host and terminal to Host communications via the software routing protocols contained within the routing platforms.

The agency LANs use Novell Netware 386 as the network operating system (NOS) with the exception of approximately 50 Sparc and Sun workstations that utilize 10Base-T and the Sun NFS system. The current network interface cards (NICs) for token ring support operate at the 4 megabit bit per second (Mbps) rate.

C.1 (Continued)

The building block of the AWN is the intelligent concentrator hub by Synoptics, Inc. This hub is used to provide for network segregation as well as network diagnostics and problem resolution.

Network management is currently handled using the Simple Network Management Protocol (SNMP) and TCP/IP as the transport mechanism to query both hubs, routers, and any other network devices capable of providing an SNMP agent.

All NRC locations have a Wellfleet router whose capabilities are directly proportional to the site requirements. The backbone of the AWN is the Virtual Machine Environment (VME) bus of the router which operates at 330Mbps. All remote LANs are tied to one central router located at the Headquarters OWFN building, thus forming a collapsed backbone architecture.

As technology increases and the agency becomes more familiar with LAN services and applications, the requirement to support an ever increasing amount of traffic is becoming evident. It is anticipated that bandwidth requirements will be more than ten times the present capabilities in order to support the agency's communications requirements in the very near future.

C.2 PROJECT GOAL

The goal of this project is to implement and maintain a WAN capable of supporting the Agency's current and future information requirements using a highly reliable and highly flexible multiplexer platform that provides for (a) network management, (b) reduction in long distance and local carrier access charges as well as recurring charges for services, and (c) a migration path to future transmission technologies such as Frame Relay and Asynchronous Transfer mode. The duration and specific tasks to be performed under this project are discussed below in Section C.2.3. The primary carrier will be FTS2000 Network A (AT&T) for all long distance voice and data applications with site dependant Local Exchange Companies (LECs) providing local services.

C.3 SCOPE OF WORK

The Contractor shall provide any and all materials, equipment and support services that may be required for performance of the work herein. The Contractor shall have the resources, or be able to obtain the resources necessary to provide (a) personnel with specialized experience in advanced network design optimization, quality assurance and quality control, telecommunications analysis, migration support and retrofitting to a new architecture; (b) documentation development; (c) maintenance services; (d) installation

C.3 (Continued)

services; (e) cable fabrication services; (f) alternatives analysis in the implementation of a new system, including requirements analysis, and cost benefit analysis; and (g) for a property receiving facility for the configuration, testing, "burn-in", and certification of the Government's equipment prior to final shipment to the specific installation site.

Based upon the Government's acceptance of the Contractor's pre-award proposal which shall contain a market survey based on the requirements as described in Section J, an analysis of alternatives, associated cost matrix, proposed General Design, and a platform recommendation based upon the "best value" to the Government, the Contractor shall perform the following:

C.3.1 ORIENTATION

Upon execution of the contract, the NRC Project Officer will conduct an initial orientation briefing for all contractor personnel performing work under this contract to provide guidance on NRC policies, procedures, and operations. Estimated duration of the briefing is one day. The Contractor shall be responsible for briefing all subsequent replacement personnel.

C.3.2 TASK AREA ONE: PROJECT PLANNING, SYSTEM DESIGN, AND ACQUISITION

The Contractor shall perform the following functions, but shall not be limited to the following as part of this Task Area:

- (a) Perform validation of the network requirements using existing documentation provided by the Government.
- (b) Conduct interviews with identified Government officials to gain a better understanding of future networking requirements.
- (c) Based upon the current requirements validation and the Contractor's understanding of future NRC requirements, the Contractor shall modify, if necessary, the General Network Design. In addition, the design shall address those NRC locations that a multiplexer platform is not warranted. The General Network Design shall be documented in an electronic form, i.e. spreadsheets, database, flat files, and cable print images (DFX scanning) for ease of refinement using the Demonstration testing in Task Area Two as a "lessons learned" tool. The Final Network Design for Implementation/Installation purposes must be documented in an electronic form as

C.3 (Continued)

previously stated for the purposes of (i) documentation and integration into the NRC's Cable Plant Management System, and (ii) being modified by the Government to reflect moves, adds, and changes. The minimum items to be included are as follows: schematic identification of the end-to-end circuit configuration including the carrier(s) circuit identifiers, line speed and terminating equipment, such as routers, communication processors, DSUs, CSUs, encryption equipment, PBXs, CPUs, specific card optioning information of the multiplexer system itself, whether in software or in hardware settings and network control and management hardware and software.

- (d) Provide all materials, equipment, and services necessary to implement a fully functioning network.
- (e) Be solely responsible to ensure the proposed system is compatible with all other network switching systems, circuits, and facilities connected to or interfaced with the system.

C.3.3 TASK AREA TWO: SITE SURVEYS, SYSTEM DEMONSTRATION, FULL SYSTEM IMPLEMENTATION, AND SYSTEM DOCUMENTATION

As part of Task Area Two the Contractor shall perform site surveys; receive, inventory, and configure components for the NRC environment in a Contractor provided space; "burn-in" configured equipment; program and load software as required; ship configured systems to NRC and/or other identified locations; install and test an intelligent network link between the NRC Headquarters offices in Rockville, Maryland and the NRC's Region I Office in King of Prussia, PA; demonstrate the system; reconfigure the system as necessary based on the demonstration test results; install the remainder of the nodes in the network; test remaining network links; configure network management hardware and software to the NRC environment; and provide system documentation.

The Contractor shall:

- (a) Perform site surveys of those locations identified by the Government as being candidates for installation of the new platform to determine site modifications necessary for proper platform installation. (See Section C.7, for items required in site surveys).
- (b) Provide for a limited installation/demonstration between the NRC Headquarters (OWFN) and the Region I Office in King of Prussia, PA. This demonstration shall also

C.3 (Continued)

- include a system evaluation and certification report that will be utilized in the development of the final Network Design for all other locations.
- (c) Upon certification of the equipment as meeting the requirements of the validation test, validate and redesign (if necessary), provide detailed installation/implementation plans for the entire network, including site specific drawings.
 - (d) Deliver, install, test, place into service, and maintain one system, per site design, to each of the locations specified by the Government.
 - (e) Identifying any and all interface, device, and/or equipment connection, including correct ordering information, with the FTS2000 Network, the Public Switched Network (PSN), or common carrier, and inform the NRC Contracting Officer (CO) or designee to ensure adequate facilities are available as required to support the system.
 - (f) Not make any commitment to install, order, or place in service any type of equipment or service that would cause a financial obligation by the Government unless the NRC CO or designee has specifically requested such equipment/services.
 - (g) Furnish all system documentation and ensure the system performs to the specifications of this contract during all service conditions for the life of the contract.
 - (h) Ensure spare parts availability for the system life as described in Section J, Attachment A, Paragraph 3.12.2.

C.3.4 TASK AREA THREE: SYSTEM MAINTENANCE

The Contractor shall provide maintenance (labor and parts) and shall keep the equipment in good operating condition. Maintenance service does not include electrical work external to the equipment, the furnishing of supplies, and adding or removing accessories, attachments, or other devices. It does not include repair of damage resulting from accident; transportation between Government sites; neglect; misuse; failure of electrical power, air conditioning, humidity control; or causes other than ordinary use.

While the Contractor's personnel are at the Government facility, the Contractor is responsible for compliance with all laws, rules and regulations governing conduct with respect to health and safety - not only as they relate to its

C.3 (Continued)

employees and agents, but also to other personnel who are Government employees or agents of the Government and to property at the site regardless of ownership. While on Government premises and in possession of Government property, the Contractor shall be responsible for such property and any damages thereto.

Should the Government make alterations or install attachments which affect the maintenance of this system, the continuation of maintenance service on the system shall be subject to mutual agreement. Should the alternations or attachments increase or decrease the maintenance costs to the Contractor, adjustments to maintenance charges shall be made on an individual installation basis. If such alternations or attachments create a safety hazard, the Contractor may discontinue maintenance service on the hazardous equipment. In addition, should such be the cause of malfunction or downtime, such downtime shall not be creditable under the clause entitled "Maintenance Downtime Credits".

Contractor-sponsored alternations or attachments to the system shall be made only with the consent of the Government. Should the Contractor-sponsored alterations or install attachments which affect the maintenance of this system, the continuation of maintenance service on the system shall be subject to mutual agreement. Should the alterations or attachments increase or decrease the maintenance costs to the Contractor, adjustments to maintenance charges shall be made on an individual installation basis. If such alterations or attachments create a safety hazard, the Contractor may discontinue maintenance service on the hazardous equipment. In addition, should such be the cause of malfunction or downtime, such downtime shall not be creditable under the clause entitled "Maintenance Downtime Credits".

Contractor-sponsored alterations or attachments to the system shall be made only with the consent of the Government.

C.3.4.1 PRINCIPAL PERIOD OF MAINTENANCE (PPM)

The Principal Period of Maintenance (PPM) under this contract shall be Monday through Friday, 07:30 AM to 4:30 PM daily.

C.3.4.2 TYPES OF MAINTENANCE

Maintenance for the purposes of this contract shall consist of two types: (a) Remedial Maintenance and (b) Preventive Maintenance.

Remedial Maintenance (RM) is that maintenance required to

C.3 (Continued)

effectively repair the system to its functional operating condition. This maintenance includes, but is not limited to replacement of broken parts.

Preventive Maintenance (PM) is maintenance performed on a regularly scheduled basis to keep the system in good operating order. It includes, but is not limited to cleaning parts, removing dust, and replacing parts worn due to normal wear and tear.

C.3.4.2.1 REMEDIAL MAINTENANCE (RM)

Remedial Maintenance can be either On-Call or Per-Call. For the purpose of this contract, the Government requires On-Call Maintenance services during PPM and Per-Call Maintenance for those periods not covered by PPM.

C.3.4.2.1.1 ON-CALL MAINTENANCE

The Contractor shall provide on-call maintenance service with a two hour response time, with arrival on-site within three hours after the initial notification for service during the PPM at the fixed monthly charge shown in section B of this contract. Resident on-site maintenance is not required.

C.3.4.2.1.2 PER-CALL MAINTENANCE (Description of Per-Call Maintenance in Addition to On-Call Maintenance)

In addition to the specified maintenance service during the PPM or extension thereof, the Contractor shall provide per-call maintenance outside the PPM when a call is placed by the Government CO, PO, or their designee.

A response time of four hours is required for per-call maintenance, which shall be available Monday through Friday, 4:31 PM to 7:29 AM, and Friday 4:31 PM through Monday 7:29 AM.

Charges shall be computed to the nearest one-quarter of an hour. The maximum charge for any one per-call maintenance occurrence shall not exceed the total charge for an eight hour maintenance service call. This maximum total charge shall include the travel time to and from the installation site. Total chargeable travel time shall not exceed one hour per call.

The Contractor shall only be required to provide per-call maintenance for that equipment covered by on-call maintenance.

C.3.4.2.2 PREVENTIVE MAINTENANCE (PM)

The Contractor shall provide all labor, parts, and materials

C.3 (Continued)

required for preventive maintenance to keep the system operating at the NRC required levels. Maintenance shall include all Contractor furnished equipment and services. Broken, damaged, or deteriorated parts shall be replaced with either new or reconditioned (like new) parts. Electrical faults, such as leakage or poor insulation, noise induction, crosstalk, or poor transmission characteristics, shall be corrected. Maintenance services do not include electrical work external to the system or equipment, provision of supplies, attachments, or other devices.

The Contractor shall provide a schedule of preventive maintenance required by the system manufacturer. Preventive maintenance shall include periodic testing, and inspections of the system. Preventive maintenance shall be performed during the Government's PPM and extension thereof or periods contiguous thereto. The frequency and duration of the PM shall be that specified in an offer and agreed to by the Government prior to award. If a mutually agreeable schedule for PM cannot be established, the Government reserves the right to specify the schedule for performance of PM services, subject to the time constraints established by the manufacturer as a minimum.

C.3.4.3 NON-CHARGEABLE MAINTENANCE ITEMS

There shall be no additional charge for:

- (a) replacement parts, unless parts are required due to the fault or negligence of the government;
- (b) preventive maintenance, regardless of when performed;
- (c) remedial maintenance which was requested during the PPM (and extension thereof as specified in the contract), regardless of when maintenance is performed;
- (d) time spent by maintenance personnel after arrival at the site awaiting the arrival of additional maintenance personnel and/or delivery of parts, etc., after a service call has commenced;
- (e) remedial maintenance required on any equipment when the scheduled preventive maintenance for that equipment preceding the malfunction had not been performed unless preventive maintenance was omitted at the Government's request or the Contractor was denied access to the equipment;
- (f) remedial maintenance required within a 48-hour period due to a recurrence of the same malfunction.

C.3 (Continued)

C.3.4.4 SERVICE INTERRUPTION

Any scheduled service requiring the loss of or interruption of service shall be coordinated with and approved by the Government PO at least five working days in advance of the service interruption.

C.3.4.5 MALFUNCTION REPORTS

Upon completion of each billable maintenance call (or as otherwise specified by the Government), the Contractor shall provide the information listed below:

- (a) Date and time notified
- (b) Date and time of technician arrival on site
- (c) Type and serial numbers of equipment
- (d) Description of malfunction
- (e) Date and time device was returned as functional
- (f) Service call reference number of Government work order number
- (g) Description of action taken, repairs made, parts replaced
- (h) Other (specify)

C.3.4.6 MEAN TIME TO RESTORE (Catastrophic Failure)

The mean time to restore (MTTR) from a catastrophic system failure shall be 8 hours from the time of arrival on site and no longer than 12 hours from the time of notification by the Government. Catastrophic failure is defined for the purposes of this contract as failure of 50 percent or more of any one site specific system for any reason.

C.3.4.7 GOVERNMENT RESPONSIBILITY

Government personnel shall not perform maintenance or attempt repairs to equipment beyond the removal of defective printed circuit boards (PCBs) and insertion of functionally equivalent PCBs from the on-site spares kit while such equipment is under the purview of this contract unless agreed to by the Contractor. The Government action shall only be taken in an effort to re-establish service and shall not go beyond the above mentioned procedures and shall only be performed in accordance with the contractor's/manufacture's recommended procedures and practices.

Subject to security regulations, the Government shall permit access to the equipment which is to be maintained.

The Government shall provide adequate storage space for on-

C.3 (Continued)

site spare parts kit and adequate working space, including heat, light, ventilation, electric current and outlets, and telephones (for local calls only) for the use of maintenance personnel when on the Government's premises in response to a call for maintenance or for other maintenance services as described in Section C.3.4.3. These facilities shall be within reasonable distance of the equipment to be serviced and shall be provided at no charge to the Contractor.

The Government shall provide reasonable time for Contractor-sponsored modification(s) after being notified by the Contractor. The time allotted to the Contractor to make the modification(s) shall be outside the normal preventive maintenance hours unless another time is mutually agreed upon.

The Government shall maintain site requirements in accordance with the equipment environmental specifications furnished by the manufacturer and specified by the Contractor under Task Area Two.

C.3.5 TASK AREA FOUR: SUPPORT SERVICES

C.3.5.1 TRAINING

The Contractor shall provide to the Government unique training on the system platform and Network Management System prior to installation for up to 12 Government personnel. This training shall be at a contractor provided facility, unless otherwise negotiated, with actual hands-on equipment training facilities. The training shall include system operator/maintenance training and additional system administration training for the operators of the Network Management System. Proposed training instruction materials shall be provided to the Government ten working days in advance of scheduled training. The Contractor shall provide a guaranty of a least five years of follow-on operator/maintenance and system administration training courses for Government personnel.

C.3.5.2 SYSTEM MANAGEMENT SERVICES

C.3.5.2.1 Daily review of event and alarm logs with follow-up analysis for the purposes of:

- identifying the reason for event and/or alarm condition;
- providing an analysis of effect on the network;
- providing a comprehensive weekly report on recurring events; and

C.3 (Continued)

- recommending corrective action to prevent or lessen the effect on the network as a whole.

C.3.5.2.2 Daily analysis of statistical information for the purposes of trend analysis on link/application bandwidth usage and recommendations for bandwidth allocation/provisioning for each site as well as the entire system.

C.3.5.2.3 Compile monthly report summarizing the system's "health" to include:

- event/alarm summary with recommendations, actions taken, and results;
- statistical summary on circuit utilization with evaluation of the system's ability to handle the current and projected load(s);
- summary of maintenance records with outage statistics that show the specific reasons for each outage, the total duration of system outage, and procedures used to restore the system;
- monthly summary showing the current expenditures and projected expenditures under the contract; and
- compile monthly statistic reports for each site with trend analysis concerning bandwidth demands, circuit availability, circuit integrity, maintenance records, outage reports, etc.

C.3.5.3 TECHNOLOGY REVIEW AND EVALUATION

The Contractor shall perform ongoing reviews of new technology to facilitate the sharing and exchange of information within the NRC and with non-agency entities. The Contractor shall review NRC requirements, architectures, ADP and network hardware, software, and components. The Contractor shall also review industry and government standards and policies and assist in the development of strategic plans for mission-related computing and networking. The Contractor shall provide recommendations to enhance the integration and interoperability of NRC networks as part of the monthly report.

C.3.5.4 PROJECT MANAGEMENT, PERSONNEL AND ADMINISTRATION

The Contractor shall provide on-site project management to provide managerial oversight and support. The Contractor

C.3 (Continued)

shall provide qualified, competent and fully-trained personnel, as discussed in Section C.6 to perform integration and support activities delineated under this contract. It shall be the responsibility of the contractor to develop, implement, and maintain a training plan to ensure that key personnel maintain a current knowledge of network technology through formal class training, seminars, and reading current literature, especially as it relates to the NRC. The full cost of the training is the sole responsibility of the Contractor.

C.4 PERFORMANCE REQUIREMENTS

- C.4.1 All deliverables and work products shall include, but are not limited to, conformance with applicable Agency and FIPs documentation set forth in the standards and the references of the contract (see Section C.18), and established milestones. Such deliverables shall be inspected by the Government for compliance to standards, clarity, accuracy, and conformance to expressed or reasonable implied intent.
- C.4.2 Written documentation shall be concise, free of grammatical errors and conform to acceptable practices of the English language.
- C.4.3 The Contractor warrants against latent defects for a period of two years all analysis, designs, plans, and specifications produced under this contract.
- C.4.4 Any deliverable product not part of the initial implementation of the WAN shall be accepted or rejected in writing by the Government PO. The Government will have ten working days to complete the review of each deliverable and accept or reject the deliverable in writing. If the Government fails to complete the review within the specified review period the deliverable will become acceptable by default.
- C.4.5 The Government PO will have the right to reject or require correction of any deficiencies found in the deliverables that are contrary to the information contained in the contractor's accepted proposal. In the event of rejection of any deliverable the Contractor will be notified in writing by the Government PO of the specific reasons why the deliverable is being rejected. The Contractor shall have ten working days to correct the rejected deliverable and return it to the Government PO.

C.5 PERSONNEL REQUIREMENTS

C.5 (Continued)

The personnel assigned to the contract shall be knowledgeable, skilled, and possess recent (i.e., within the last two years) hands-on experience designing, installing, implementing, testing, and troubleshooting wide area networks and associated equipment. Such experience shall demonstrate a proficiency in their selection and use, and a working knowledge of their purpose and capabilities.

Hardware

- T1 multiplexers
- Channel Service Units
- Data Service Units
- Sub DS1 Statistical Time Division Multiplexers
- Digital Line Drivers
- Encryption Units
- Wire and cable terminations (i.e., 66 blocks, 110 blocks, RJ45-S, smart jacks, etc.)
- Modems (analog, digital, radio frequency, and fiber optic)
- DS1 test equipment including protocol analyzers
- Sub rate DS1 test equipment including protocol analyzers
- Central Processing Units (minimum of IBM compatible 486 class machines with desirable experience in UNIX based operating systems)
- Standard telephone test equipment for voice applications

Protocols

- TCP/IP and its related protocols
- IPX
- IBM Synchronous Data Link Control and BSC protocols
- GOSIP
- IEEE 802.3 Ethernet
- IEEE 802.5 Token Ring
- HDLC
- UUCP

Telecommunications

- ISDN
- SMDS
- Frame Relay
- CCITT X.25
- FTS2000 Services
- Network Management Systems

Software

- DOS Version 5.0
- Windows 3.1
- CAD/CAM
- WordPerfect 5.1
- dBase III
- Crosstalk or other similar communications package capable of VT100 emulation

C.5 (Continued)

C.5.1 Labor Categories

There are eight labor categories associated with this contract. They are as follows: Project Manager, Network Engineer, Data Communications Specialist, Technical Writer, Senior Technology Analyst, Network Management Specialist, Communications Technician, and Trainer.

Personnel qualifications set forth herein are the minimum qualifications acceptable for performance under this contract. Pertinent undergraduate study at an accredited college or university may be substituted for general ADP experience using the formula of one academic year of study for nine months of on-the-job experience. A maximum of four years of related undergraduate study may be substituted for up to three years of experience at the discretion of the Government PO. Related undergraduate study is in the academic disciplines of computer science, information systems management and mathematics or related field of study.

C.5.1.1 PROJECT MANAGER

The Project Manager shall be a working supervisor and shall possess all of the qualifications of the Network Engineer as described in that category. The individual shall have demonstrated experience in identifying and documenting application functional requirements, establishing project schedules, using life cycle methodologies, controlling the allocation and utilization of resources, tracking project status, and controlling product correctness and conformance to standards. The Project Manager shall represent the Contractor on all technical and administrative matters relating to the performance of the tasks described in the contract. The Project Manager shall be responsible to the Government PO.

The individual should possess experience in use of microcomputer software such as Timeline, Wordperfect 5.0 or later, and Lotus 123. Such experience should demonstrate actual use of project management charts (i.e., Gantt, PERT), and spreadsheets in solving office automation activities. Individuals in this category require relevant experience in the areas listed below.

Mandatory Experience

- (a) Individual shall have a minimum of 12 years general ADP experience.
- (b) Shall have recent familiarity with GOSIP and other Federal standards and regulations with respect to the procurement of data communications systems and networking

C.5 (Continued)

services.

- (c) For the past three years, the individual shall have managed substantial networks (over 10 nodes) or network support contracts which includes multiple projects.

Desirable Experience

- (a) Experience designing and installing (1) digital networks that interface with both local and long distance carriers at the DS1 level, (2) network management systems, (3) voice and data integrated services, and (4) emergency back-up communications provisioning.
- (b) Prepared detailed technical specifications for voice/data/video conferencing communication systems.

C.5.1.2 NETWORK ENGINEER

The Network Engineer shall be experienced in benchmarking and traffic analysis of existing systems, quantifying end-user functional and system requirements across the WAN, developing network physical and logical designs, and implementing network designs.

Mandatory Experience

- (a) Individuals shall have four years of technical work experience in DS1 network environments
- (b) Individuals shall have four years of work experience in designing, implementing, troubleshooting, and benchmarking WAN efficiency.
- (c) Individual shall have five years of network design experience, including the creation of detailed technical schematics for the physical design.

Desirable Experience - Demonstrated ability to perform protocol level analysis for TCP/IP, IPX, SNA, and CCITT X.25 networks.

C.5.1.3 DATA COMMUNICATIONS SPECIALIST

Individual shall have demonstrated experience designing communications networks that support multiple applications and protocols. Individual shall be able to properly size a large data communications network to meet design specific requirements. Individual shall have demonstrated experience in fault management, configuration management, and performance

C.5 (Continued)

management of data communications networks supporting multiple applications and protocols.

Mandatory Experience

- (a) Four years communications network control operations, especially experience in fault isolation procedures to the application level.
- (b) Five years experience in configuration and management of data communication equipment, including communications processors and digital patch and test facilities.
- (c) Three years experience in the operation and application of Network Management Systems.
- (d) Minimum of two years experience in the operation of sophisticated communications test equipment, and the ability to interpret and analyze information gathered by such devices to diagnose, isolate, and resolve data and voice communications network problems.
- (e) Functional knowledgeable of common carrier services; i.e., T1, Fractional T1, Digital Data Service, and analog transmission.

Desirable Experience

- (a) Functional knowledge of local area network concepts.
- (b) Knowledge of the new common carrier services; i.e., ISDN, SMDS, and Frame Relay.
- (c) Knowledge of telecommunications standards; i.e., ISO, CCITT, IEEE, AND EIA/TIA.
- (d) Functional knowledge of the IBM networking protocols.

C.5.1.4 TECHNICAL WRITER

Individuals in this category shall have demonstrated experience in the preparation and compilation of ADP related documentation, such as systems specifications, feasibility studies, functional descriptions, standards and guidelines, users manuals, and program maintenance documentation using word processing and computer aided graphics software on an IBM compatible personal computer. Individuals in this category require relevant experience in the areas listed below.

Mandatory Experience

C.5 (Continued)

- (a) Persons in this category shall have a minimum of two years experience in the preparation, compilation, and maintenance of complex technical documentation.
- (b) Persons shall have demonstrated the ability to edit and proof read technical documents. Individuals shall have experience in coordinating document production and distribution.

Desirable Experience

- (a) Functional knowledge in the use of Wordperfect 5.0 or later word processing software.
- (b) Functional knowledge in the use of dBase III database software.
- (c) Functional knowledge in the use of Lotus 123 spreadsheet software.

C.5.1.5 SENIOR TECHNOLOGY ANALYST

The Senior Technology Analyst assigned to this contract shall have demonstrated experience in evaluation of modern switching technologies together with advanced networking alternatives for their modernization. Individuals shall be knowledgeable in open systems architecture, the Government Open Systems Interconnect Profile (GOSIP), multiple protocol networks, emerging and adopted Federal and national standards relating to open systems and telecommunications, and a wide variety of telecommunications switching technologies including SMDS, Frame Relay, and cell switching advancements such as Asynchronous Transfer Mode (ATM) methodologies and products.

Mandatory Experience

- (a) Individuals shall have a minimum of ten years general ADP experience.
- (b) Persons shall have at least six years experience performing multiple tasks involving planning, establishing procedures and standards, analysis, evaluation and implementation of the various telecommunications protocols to ensure an optimum large-scale open, integrated network. Individuals shall have developed plans and strategies to integrate data,

C.5 (Continued)

imaging, voice, and video conferencing technologies. This experience shall have been within the last ten years.

- (c) Individuals shall have at least three years experience modeling, designing, and conducting performance evaluations of data communication networks.

Desirable Experience

- (a) Experience designing and implementing multi-server, multi-site TCP/IP and IPX networks.
- (b) Experience preparing technical specifications for data communication networks.
- (c) Integrating and transporting IBM's SNA over the WAN.

C.5.1.6 NETWORK MANAGEMENT SPECIALIST

Individuals shall have demonstrated experience in network management of medium to large scale networks using an integrated network management system. The individual shall have demonstrated experience in configuration management, performance management/analysis, and command and control functions.

Mandatory Experience

- (a) Individual shall have a minimum of 7 years general ADP experience.
- (b) Individual shall have at least five years experience performing network management functions of medium to large scale networks similar in nature to the technical level of effort required in this contract.
- (c) The individual shall be certified or be functionally familiar with the network management system procured in this contract as a result of the Phase One initiative.

Desirable Experience

- (a) Individual possess at least two years previous experience with the network management systems being procured in Phase One of the Project.
- (b) Experience with Simple Network Management Protocol (SNMP) standards to the functional level with operational experience in network management utilizing SNMP

C.5 (Continued)

functions.

C.5.1.7 COMMUNICATIONS TECHNICIAN

Individuals shall have experience in installing and troubleshooting data communications equipment, and resolving network line problems.

Mandatory Experience

- (a) Five years of hands-on experience in data communications to include installation, maintaining, and upgrading intelligent multiplexer systems.
- (b) Two years minimum experience in cable installation and the fabrication of data communications cables.
- (c) Shall have demonstrated a working knowledge of data communications interface standards including, but not limited to: CCITT V.35, EIA RS-232C, EIA RS-449, and TIA-530.

C.5.1.8 TRAINER

The trainer shall have demonstrated training experience with actual technical presentation of network technologies being proposed for the new network. The trainer shall have demonstrated experience in developing training courses.

Mandatory Experience

- (a) Three years experience in developing course material and training aids commensurate with the technical level of this Project.
- (b) Three years experience in conducting formal and informal class training for both technical and non-technical personnel.

Desirable Experience

- (a) Hands-on experience with networking technologies, i.e., protocols, communications equipment, and test equipment.
- (b) Be a certified by the manufacturer as being trained on the particular platform being procured in Phase One of this Project.

C.5 (Continued)**C.5.2 Proposed Staff****C.5.2.1 Resume Requirement**

The Contractor shall furnish a resume for each individual proposed for work under this Project. Each resume shall include all information in the following resume format:

C.5.2.2 Resume Format

(a) Name

(b) Proposed Labor Category

(c) Status within the Contractor's organization, e.g. full time, part-time, sub-contractor, etc.

(d) Education

(1) College attended (with dates)

- degree received or semester hours completed
- major subjects

(2) Technical schools attended (with dates)

- course title
- certificate received

(3) Approximate number of class hours

(4) Special courses, etc.

(e) Experience (in reverse chronological order)

(1) Employer

(2) Dates of employment (from/to)

(3) Detailed experience - list each position held with this employer and include (i) job title, (ii) description in detail of the work experience and length of service in each position. Include specific duties, including hardware, software, tools, etc., used in the performance of those duties. If in a supervisory position also indicated the number and type of personnel supervised.

C.5.2.3 Interview Stipulation

The Government will retain the option to approve any or all proposed candidates.

C.5 (Continued)**C.5.2.4 Key Personnel**

Key personnel are listed in Section H of this contract. Changes in the key personnel will be incorporated in the contract via amendments. Prior to diverting any key personnel, the contractor shall notify the CO two weeks in advance. No diversion shall be made by the Contractor without the written consent of the CO.

C.6 GOVERNMENT RESPONSIBILITIES/FURNISHED RESOURCES

Order from the local telephone company, FTS2000, and any other carrier, any interface requirement, identified by the Contractor in the proposal for all carrier provided services for the initial and subsequent system requirements. For any interface requirement(s) ordered by the Government as identified by the Contractor which are found to be in error, the Contractor shall reimburse the Government for all costs incurred by the error.

Provide adequate power, heating and cooling, telephone facilities, space, and other environmental conditions deemed necessary by the manufacturer to support the proper operation of the system throughout its life cycle.

Provide the Contractor with all available loading information, current network topology, near-term additions to the current network, and all DTE interfaces specifications of the current network.

C.6.1 FACILITIES, SUPPLIES, AND SERVICES

Should the Contractor's work be performed at any, but not limited to, of the locations listed in section C.1.1, the normal business hours of the Government or facility must be adhered to. Any variation will be approved by the Government PO prior to the commencement of such work.

The Government will not provide for storage space of multiplexer equipment that has been received, tested, and "burned-in", but not configured as part of a site specific system or a designated spares kit in support of a specific site. This is the responsibility of the Contractor until such time as the equipment is delivered as part of the system.

C.6.2 AUTOMATED DATA PROCESSING RESOURCES

The Government will not provide computer hardware, software, operating supplies, and services (terminals, data communications, etc.) required for the Contractor to accomplish the work required under this contract.

C.6 (Continued)**C.6.3 INFORMATION RESOURCES**

As questions arise, Government personnel familiar with the current system procedures and network applications will be provided to the Contractor for interviews. This assistance will be available only during the hours of 9:00 AM to 3:30 PM Monday through Friday. Any variation will be approved by the P/O in advance. Any and all such interviews will be made through the PO. The Government will provide the Contractor with access to existing network documentation, upon request.

C.7 COMPLIANCE WITH FIP STANDARDS

All equipment and software acquired under this acquisition shall conform to specified applicable Federal Information Processing Standards Publications (FIPS PUBS). For this contract the applicable FIPS PUBS are referenced below.

C.8 SYSTEM VALIDATION, IMPLEMENTATION AND INSTALLATION**C.8.1 VALIDATION PERIOD**

The Contractor shall meet with the Government CO and PO as soon as possible after contract award. The purpose of the initial meeting will be (a) the dissemination of specific detailed information concerning the Government locations to be serviced in the initial implementation of the system, (b) the specifications that must be met by the system/platform manufacturers, (c) the proposed implementation plans of the project, (d) negotiation of validation document due date, and (e) agreement upon any other initial contract deliverable.

The Contractor shall prepare a validation certificate document that describes in detail the existing WAN networking requirements of the Agency. This document shall not only validate, but shall also point out areas of deficiencies in the Agency provided information. It is recognized that this document represents a "snap-shot" of the requirements and does not hold either party to a specific level of performance or expected service. This Validation Period shall not exceed 30 days with delivery of the final certification documents no later than 45 days after contract award.

C.8.2 IMPLEMENTATION AND INSTALLATION

Installation/cutover dates shall be coordinated with the local telephone company, General Services Administration's Federal Telecommunications Services Network (FTS2000), and the Government. The Government will review and approve all

C.8 (Continued)

installation plans. The installation shall occur within 120 days after Government approval of the preliminary installation/implementation plan with application cut over taking place within 180 days of contract award. The plan shall ensure that no application is out of service for more than two hours during normal work hours due to cut over operations.

C.8.3 EQUIPMENT ROOM AND SITE PREPARATION

The Government will provide the installation site as specified in writing by the Contractor, within 30 days of the scheduled installation start date dependent upon delivery of the site preparation specifications no later than 90 days prior to the scheduled installation start date, unless otherwise agreed to in writing. Any alterations or modifications in site preparation which are directly attributed to incomplete or erroneous specifications provided by the Contractor causing additional expense to the government shall be made at the expense of the Contractor. The contractor may not propose an off-site facility as a location for the installation of any of the proposed "systems".

C.8.4 CLEAN UP

The Contractor shall clean all equipment and surrounding areas and make them free from bits of solder, wire, and other debris on completion of the system installation and prior to final acceptance by the Government. The contractor shall also clean up and dispose of all scrap materials used on a daily basis.

The Contractor shall provide all equipment not specified in the original system(s) design to provide for proper operation of the system should post cutover statistics provide that the system(s) are not operating as specified. The Contractor shall be reimbursed at contract prices for all hardware and software used to provide the contracted system; however, all installation and labor costs involved shall be borne by the Contractor. A period of 90 consecutive days from the date of cutover shall constitute the statistics gathering period. The Contractor shall not be responsible for failures or service degradation from the network service providers when evaluating the 90 day post cutover statistics. Should additional equipment or accessories be necessary for full functionality, all final initial system documentation shall be modified by the Contractor to reflect the appropriate changes, additions, and deletions to the system.

C.9 ACCEPTANCE TESTING

The Contractor shall prepare a test plan for Government

C.9 (Continued)

approval. This test plan shall cover the deliverable system configuration, demonstrating compliance with each delivered requirement. The Contractor shall provide any and all test equipment necessary for this testing. For those requirements which can not be tested due to limitations of the delivered system, the Contractor shall provide documentation which indicates compliance, and shall identify the hardware/software necessary for the Government to acquire to implement the requirement within the system.

The Contractor shall conduct system testing and record results as part of the system deliverables. These results shall be provided to the Project Officer as evidence of successful completion of the Acceptance Test. The Project Officer, or his designee, shall physically inspect each location after completion of the Acceptance Test to verify contract compliance. In order for any testing to be considered compliant, the testing shall be observed by a designated government representative. Acceptance by the Government will be based upon satisfactory completion of the Government approved Acceptance Test and completion of 30 consecutive days of network operations. Problems revealed within the 30 consecutive days of operations will be corrected as part of the warranty provisions. At the end of the 30 consecutive days of network operations the Government will provide a listing of any software configuration problems observed during operations, to include any problems with the Network Management System display capability. These software configuration problems shall also be corrected as part of the warranty provisions.

C.10 USED EQUIPMENT AND MATERIALS

Only new commercially available parts or parts equal in performance to new parts shall be used in effecting repairs. Parts which have been replaced shall become the property of the Contractor. Should equipment and materials to effect repairs be classified as used, they shall be identified as used and/or reconditioned/refurbished and shall be warranted the same as new materials by the Contractor.

C.11 CABLING

The Contractor shall be responsible for designing, furnishing, and installing all cable and wire for this contract in support of the system. The Contractor shall take all necessary precautionary measures to prevent induced interference, e.g. crosstalk, in the cable. Cable and cable terminations provided and installed by the Contractor shall be in accordance with all local regulations governing such installations and in accordance with the applicable standards

C.11 (Continued)

and recommendations cited in Section C.18. all cables shall be marked/tagged at both ends to adequately identify the functionality or purpose of the cable to facilitate trouble resolution procedures.

C.12 SUPPLIES

Rental and maintenance charges to not include consumable operational supplies, e.g., paper, tape, carbon, etc. Supplies used by the Government shall conform to the Contractor's technical specifications or equivalent.

C.13 WARRANTIES

The Contractor shall provide one year of warranty for all system parts and components from the date of acceptance by the government. Wherever a system failure can be diagnosed and repaired by on-site government personnel, the government will remove and replace the failed component, using parts from the contractor provided spare parts kit. the failed component will be express shipped by the government to the Contractor's designated depot level repair activity. the contractor shall ship either the repaired component or a suitable replacement for the failed component within ten working days of receipt by the repair activity.

For the first year of network operations, the Contractor shall pay all repair costs plus the cost to ship repaired components to the government site, provided that such repairs are not required due to negligence on the part of the Government.

C.14 DOCUMENTATION

The contractor shall provide nine sets of commercial manuals for each hardware item delivered. These manuals shall include any available operator's manuals, maintenance manuals, and any other manuals available and necessary for the Government's operation of the system. In addition to the commercial manuals provided, the contractor shall provide a complete set of engineering drawings, providing a system view, showing system interconnections, and providing detailed drawings of any NRC unique installations. At a minimum engineering drawings shall be required of the configuration of each rack of equipment built to satisfy these requirements. In addition, any specially constructed cables shall be documented in cable drawings to include specific "pin out" drawings. The contractor shall provide three sets of "E" size drawings and nine sets of "C" size engineering drawings as well as electronic versions for upload into the Agency's Cable Plant Management System.

C.15 APPLICABLE DOCUMENTS

The following Federal Standards, Federal Information Processing Standards, CCITT Recommendations, and Industry standards are included as applicable documents. The impact of each applicable standard shall be as specified in a text reference in Section 3 of this document.

C.15.1 FEDERAL STANDARDS

FED-STD-1037B, Telecommunications: Glossary of Telecommunications Terms, 3 June 1991

MIL-STD-1472D, Human Engineering Design Criteria for Military Systems, Equipment, and Facilities, Revision D, 14 March 1989

C.15.2 FIPS PUBLICATIONS

FIPS 22-1 Synchronous Signaling Rates Between Data Terminal and Data Communications Equipment, September 1, 1977 (Same as ANSI X3.1-1976)

FIPS 41 Computer Security Guidelines for Implementing the Privacy Act of 1974, May 30, 1975

FIPS 46-1 Data Encryption Standard, January 22, 1988

FIPS 74 Guidelines for Implementing and Using the NBS Data Encryption Standard, April 1, 1981

FIPS 81 DES Modes of Operations, December 2, 1980

FIPS 94 Guideline on Electrical Power for ADP Installations, September 21, 1983

FIPS 138 Electrical Characteristics of Balanced Voltage Digital Interface Circuits, September 24, 1975 (National counterpart: EIA RS-422-A)

FIPS 139 Interoperability and Security Requirements for Use of the Data Encryption Standard in the Physical Layer of Data Communications, August 3, 1983

FIPS 140 General Security Requirements for Equipment Using the Data Encryption Standard, April 4, 1985

FIPS 142 Electrical Characteristics of Unbalanced Voltage Digital Interface Circuits, January 31, 1980 (National Counterpart: EIA RS-423-A)

FIPS 143 General Purpose 37-Position and 9-Position Interface Between Data Terminal Equipment and Data Circuit Terminating

C.15 (Continued)

Equipment, June 10, 1985 (National Counterpart: EIA RS-449)

FIPS 146-1 Government Open Systems Interconnection Profile (GOSIP), April 3, 1991

FIPS 147 Group 3 Facsimile Apparatus for Document Transmission, August 19, 1981 (National Counterpart: EIA RS-466)

FIPS 148 Procedures for Document Facsimile Transmission, April 14, 1982 (National Counterpart: EIA-RS-466)

FIPS 149 General Aspects of Group 4 Facsimile Apparatus, November 4, 1988 (National Counterpart: EIA 538-1988)

C.15.3 NIST PUBLICATIONS

NIST Special Publication 500-163, Government Open Systems Interconnection User's Guide, August 1989

NIST Special Publication 500-183, Stable Implementation Agreements for Open System Interconnection Protocols, Version 4, 1 December 1990

NIST Special Publication 500-192, Government Open Systems Interconnection Profile User' Guide, Version 2, October 1991

C.15.4 CCITT RECOMMENDATIONS

V.21: 300 bps Duplex Modem Standardized for Use in the General Switched Telephone Network

V.22: 1200 bps Duplex Modem Standardized for Use on the General Switched Telephone Network and on Leased Circuits

V.22bis: 2400 bps Duplex Modem Using the Frequency Division Technique Standardized for use on the General Switched Telephone Network and on Point-to-Point 2-wire Leased Telephone-Type Circuits

V.24: List of Definitions for Interchange Circuits Between Data-Terminal Equipment and Data Circuit-Terminating Equipment

V.28: Electrical Characteristics for Unbalanced Double-Current Interchange Circuits

V.32: 2-Wire, Full Duplex Modems Operating at Data Signalling Rates of up to 9600 bps for Use on the General Switched Telephone Network and on Leased Telephone-Type Circuits

C.15 (Continued)

V.32bis: 2-Wire, Full Duplex Modems Operating at Data Signalling Rates of up to 14,400 bps for Use on the General Switched Telephone Network and on Leased Telephone-Type Circuits

V.35: Data Transmission at 48 kbps Using 60-108 kHz Group Band Circuits

C.15.5 INDUSTRY STANDARDS

C.15.5.1 Electronics Industry Association (EIA):

EIA/232-D: Interface Between Data Terminal Equipment and Data Communications Equipment Employing Serial Binary Data Interchange

EIA RS-422-A Electrical Characteristics for Balanced Voltage Digital Interface Circuits

EIA RS-423-A Electrical Characteristics for Unbalanced Voltage Digital Interface Circuits

EIA RS-449 General Purpose 37-Position and 9-Position Interface Between Data Terminal Equipment and Data Circuit Terminating Equipment

EIA RS-465 Group 3 Facsimile Apparatus for Document Transmission

EIA/TIA-568 Commercial Building Telecommunications Wiring Standards, July 1991

EIA TIA-492AAAA-1989 Detail Specifications for 62.5 micron Core Diameter Class Ia Multimode Graded-index Optical Waveguide Fibers

C.15.5.2 American National Standards Institute (ANSI):

ANSI T1.101-1987 Synchronization Interface for Digital Networks

ANSI T1.107-1988 Digital Hierarchy -- Formats Specifications

ANSI T1.110 -- 1987 Signalling System Number 7, General Information

ANSI T1.216 -- 1991 ISDN Management -- Basic Rate Physical Layer

C.15 (Continued)

- ANSI T1.217 -- 1991 ISDN Management -- Primary Rate Physical Layer
- ANSI T1.301 -- 1987 Adaptive Differential Pulse Code Modulation (ADPCM)
- ANSI T1.302 -- 1989 Digital Processing of Voice-band signals -
- 32 kbits/s ADPCM Line Format Standard
- ANSI T1.303 -- 1989 Digital Processing of Voice-band signals -
- Algorithm for 24, 32, and 40 kbits/s ADPCM
- ANSI T1.308-1990 Central Office Equipment -- Electrostatic Discharge Requirements
- ANSI T1.310-1991 Digital Processing of Voice-Band Signals -- Algorithms for 5-, 4-, 3-, and 2-Bit/Sample Embedded ADPCM
- ANSI T1.401 Interface Between Carrier and Customer Installations -- Analog Voicegrade Switched Access Lines Using Loop-Start and Ground-Start Signalling
- ANSI T1.403-1989 Carrier to Customer Installation, DS1 Metallic Interface Specification
- ANSI T1.601-1988 Integrated Services Digital Network (ISDN) -- Basic Access Interface for Use on Metallic Loops for Application on Network Side of the NT (Layer 1 Specification)
- ANSI T1.602-1989 ISDN Signalling
- ANSI T1.603-1990 ISDN -- Minimal Set of Bearer Services for the Primary Rate Interface
- ANSI T1.604-1990 ISDN -- Minimal Set of Bearer Services for the Basic Rate Interface
- ANSI X3.92-1981 -- Data Encryption Standard
- ANSI X3.105-1983 -- Data Encryption Standard

C.15.5.3 Other Standards:

- OSHA 1910.22 Occupational Safety and Health Standards (29CFR22) General Industry, Revised June 1981
- NFPA National Fire Protection Association 70-90, National Electrical Code
- RFC 1157 Simple Network Management Protocol (SNMP), May 1990

C.15 (Continued)

The National Electrical Safety Code

BOCA Building Official Code Administrator Guidelines on
Electrical Power for ADP Installations

C.15.6 OTHER DOCUMENTS

AT&T Technical Reference Pub 54016: "Requirements for
Interfacing Digital Terminating Equipment to Services
Employing the Extended Superframe Format", September 1989.

AT&T Technical Reference Pub 54075, "Subrate Data
Multiplexing", November 1988.

AT&T Technical Reference Pub TR62411, "Accunet T1.5 Service
Description and Interface Specifications", December 1990

AT&T Technical Reference Pub 62421, "ACCUNET Spectrum of
Digital Services", December 1989.

AT&T Technical Reference Pub 62310, "Digital Data Systems,
Channel Interface Specifications", November 1987,

AT&T Technical Reference Pub TP 41449, "ISDN PRI Interface
Specifications".

AT&T Technical Reference Pub TP 41459A3, "ISDN PRI & Special
Application Specifications User Interface Description --
Addendum 3".

Data Communications, "Fractional T1 Compatibility: What it
means for Muxes", November 1989, pp. 45-46

C.16 MOVEMENT OF EQUIPMENT

No equipment shall be removed from NRC facilities without
presenting a property pass to the NRC guards. The signed
property pass shall be provided by the NRC Project Officer.
The pass shall include a description and the NRC serial number
of the equipment being removed for repair or replacement. A
copy of the pass will be retained by the NRC PO. The
Contractor shall be accountable for the equipment until its
return to the NRC site or inventory.

[End of Clause]

C.17 NRCAR 2052.215-83 TRAVEL APPROVALS (JAN 1993)

- (a) All domestic travel requires the prior approval of the project officer.
- (b) All foreign travel must be approved in advance by the NRC on NRC Form 445 and must be in compliance with FAR 52.247-63 Preference for U.S. Flag Air Carriers. Foreign travel approval must be communicated in writing through the contracting officer.

[End of Clause]

SECTION D - PACKAGING AND MARKING

D.1 PACKAGING AND MARKING (MAR 1987)

The Contractor shall package material for shipment to the NRC in such a manner that will ensure acceptance by common carrier and safe delivery at destination. Containers and closures shall comply with the Interstate Commerce Commission Regulations, Uniform Freight Classification Rules, or regulations of other carriers as applicable to the mode of transportation. On the front of the package, the Contractor shall clearly identify the contract number under which the product is being provided.

[End of Clause]

SECTION E - INSPECTION AND ACCEPTANCE

E.1 52.252-2 CLAUSES INCORPORATED BY REFERENCE (JUN 1988)

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available.

I. FEDERAL ACQUISITION REGULATION (48 CFR CHAPTER 1) CLAUSES

NUMBER	TITLE	DATE
52.246-3	INSPECTION OF SUPPLIES - COST-REIMBURSEMENT	APR 1984
52.246-5	INSPECTION OF SERVICES - COST-REIMBURSEMENT	APR 1984
52.246-2	INSPECTION OF SUPPLIES - FIXED-PRICE	JUL 1985
52.246-4	INSPECTION OF SERVICES - FIXED-PRICE	FEB 1992

[End of Clause]

E.2 PLACE OF INSPECTION AND ACCEPTANCE (MAR 1987)

Inspection and acceptance of the deliverable items to be furnished hereunder shall be made by the Project Officer at the destination.

[End of Clause]

E.3 STANDARD OF PERFORMANCE AND ACCEPTANCE OF ADP SYSTEM EQUIPMENT (JUN 1988)

- (a) General. This clause establishes a standard of performance which must be met before any ADP system delivered under this contract is accepted by the Government. This also includes replacement machines, substitute machines, and machines which are added or field modified (modifications of a machine from one model to another) after a successful performance period.
- (b) Performance Period and Effectiveness Level. The performance period shall begin on the installation date and shall end when the equipment has met the standard of performance for a period of 30 consecutive days by operating in conformance with the Contractor's technical specifications and functional descriptions, or as quoted in the Contractor's

E.3 (Continued)

proposal, which must satisfy the requirements of this contract at an effectiveness level of 99.95 percent or more.

- (c) Continuance of Performance Period. If the system does not meet the standard of performance during the initial 30 consecutive days, the performance period shall continue on a day-by-day basis until the standard of performance is met for a total of 30 consecutive days.
- (d) Failure to Meet Standard Performance. If the system fails to meet the standard of performance after 30 calendar days from the installation date or start of the performance period, whichever is later, the Government may at its option request a replacement or terminate the contract and request the immediate removal of the equipment.
- (e) Effectiveness Level Computations. The effectiveness level for a system is computed by dividing the operational use time by the sum of the operational use time plus system failure downtime.
- (f) Changes in Systems. The effectiveness level for systems added, field-modified, or substituted, or for a replacement machine is a percentage figure determined by dividing the operational use time of the machine by the sum of that time plus downtime resulting from equipment failure or the machine being tested.
- (g) Operational Use Time for System. Operational use time for performance testing for a system is the accumulated time during which the Central Processing Unit is in actual operation, including any intervals of time between the start and stop of the processing of the programs.
- (h) Operational Use Time for Equipment. Operational use time for performance testing for a machine added, field-modified, or substituted or for a replacement machine is defined as the accumulated time during which the machine is in actual use.
- (i) System Failure Downtime. System failure downtime is that period of time during which the scheduled productive workload, or simulated workload, being used for acceptance testing cannot be continued on the system due to machine(s) failure. If simulated workload is being used for acceptance testing, it must be consistent with the data processing requirements set forth elsewhere in this contract.
- (j) Start of Downtime. Downtime for each incident shall start from the time the Government contacts the Contractor's designated representative at the prearranged contact point until the system(s) is (are) returned to the Government in

E.3 (Continued)

proper operating condition, exclusive of actual travel time required by the Contractor's maintenance personnel but not in excess of one hour on each day such services were requested. However, at the request of the Contractor, the Government shall make available not only the failed equipment, but also those machines which must be used by the Contractor to accomplish such repairs. The Contractor shall provide an answering service or other continuous telephone coverage to permit the Government to make such contact.

- (k) Equipment Use During System Downtime. During a period of system failure downtime, the Government may use operable equipment when such action does not interfere with maintenance of the inoperable equipment. The entire system will be considered down during such periods of use. Whenever the operable equipment is not released to the Contractor upon request, all such usage periods shall be considered system operational use time in computing the effectiveness level.
- (l) Machine Failure Downtime. Machine failure downtime for a machine added, field-modified, or substituted, or for a replacement machine after the system has completed a successful performance period is that period of time when such machine is inoperable due to its failure.
- (m) Minimum of Use Time. During the performance period for a system/machine, a minimum of 160 hours of operational use time with scheduled productive or simulated work will be required as a basis for computation of the effectiveness level. However, in computing the effectiveness level, the actual number of operational use hours shall be used when that number exceeds the minimum of 160 hours. Machines added, field modified and substitute machines are subject to the 160 hours minimum use time requirement. However, the Government shall accept such machine(s) without the addition of simulated work solely to achieve the minimum of 160 hours use time, provided the average effectiveness for the 30 day acceptance period is equal to or better than the level specified in paragraph b above.
- (n) Date of Acceptance. The Government shall not accept the system and shall not pay charges until the standard of performance is met. The date of acceptance shall be the first day of the successful performance period.
- (o) Daily Records. The Government shall maintain appropriate daily records to satisfy the requirements of this clause and shall notify the Contractor in writing of the date of the first day of the successful performance period.
- (p) Measurement of Operational Use Time. Operational use time

E.3 (Continued)

and downtime shall be measured in hours and whole minutes.

- (q) Delay of Start of Performance Period. If necessary, the Government may delay the start of the performance period, but such delay shall not exceed 5 consecutive days; therefore, the performance period must start not later than the 5 day after the installation date. Should the Government delay the start of the performance period, rental charges shall accrue for that period of time between the installation date and the start of the performance period and shall be paid only upon completion of the successful performance period.
- (r) Remote Devices. For remote devices the standard of performance shall be determined in accordance with paragraph m, above. A remote device is defined as any contractor-supplied device which is connected to the Central Processing Unit by way of data transmission lines rather than contractor-supplied direct cable connection. The effectiveness level for equipment supplied by the Contractor shall be computed in accordance with paragraph f, above, and shall exclude downtime attributable to related equipment, cables, transmission lines, wires, etc., not supplied by the Contractor.

[End of Clause]

SECTION F - DELIVERIES OR PERFORMANCE

F.1 52.252-2 CLAUSES INCORPORATED BY REFERENCE (JUN 1988)

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available.

I. FEDERAL ACQUISITION REGULATION (48 CFR CHAPTER 1) CLAUSES

NUMBER	TITLE	DATE
52.212-13	STOP-WORK ORDER Alternate I (APR 1984)	AUG 1989

[End of Clause]

F.2 NRCAR 2052.212-70 PREPARATION OF TECHNICAL REPORTS (JAN 1993)

All technical reports required by Section C and all Technical Progress Reports required by Section F are to be prepared in accordance with the attached Management Directive 3.8, "Unclassified Contractor and Grantee Publications in the NUREG Series." Management Directive 3.8 is not applicable to any Contractor Spending Plan (CSP) and any Financial Status Report that may be included in this contract. (See Section J for List of Attachments).

[End of Clause]

F.3 NRCAR 2052.212-71 TECHNICAL PROGRESS REPORT

The contractor shall provide a monthly Technical Progress Report to the project officer and the contracting officer. The report is due within 15 calendar days after the end of the report period and must identify the title of the project, the contract number, Financial Identification Number (FIN), project manager and/or principal investigator, the contract period of performance, and the period covered by the report. Each report must include the following for each discrete task/task order:

- (a) A listing of the efforts completed during the period, and milestones reached or, if missed, an explanation provided;
- (b) Any problems or delays encountered or anticipated and recommendations for resolution. If the recommended resolution involves a contract modification, e.g., change in work

F.3 (Continued)

requirements, level of effort (cost) or schedule delay, the contractor shall submit a separate letter to the contracting officer identifying the required change and estimated cost impact.

- (c) A summary of progress to date; and
- (d) Plans for the next reporting period.

[End of Clause]

F.4 NRCAR 2052.212-72 FINANCIAL STATUS REPORT

The contractor shall provide a monthly Financial Status Report to the project officer and the contracting officer. The report is due within 15 calendar days after the end of the report period and must identify the title of the project, the contract number, Financial Identification Number (FIN), project manager and/or principal investigator, the contract period of performance, and the period covered by the report. Each report must include the following for each discrete task:

- (a) Provide total estimated cost (value) of the project as reflected in the contract, the amount of funds available in the contract to date, and the balance of funds required to complete the work as follows:
 - (1) Total estimated contract amount.
 - (2) Total funds obligated to date.
 - (3) Total costs incurred this reporting period.
 - (4) Total costs incurred to date.
 - (5) Provide a detail of all direct and indirect costs incurred during the reporting period for the entire contract or each task, if it is a task ordering contract. Provide a summary of the labor hours expended by job category.
 - (6) Balance of obligations remaining.
 - (7) Balance of funds required to complete contract/task order.
 - (8) Contractor Spending Plan (CSP) status:
 - (i) Projected percentage of completion cumulative through the report period for the project/task order as reflected in the current CSP.

F.4 (Continued)

(ii) Indicate if there has been a significant change in the original CSP projection in either dollars or percentage of completion. Identify the change, the reasons for the change, whether there is any projected overrun, and when additional funds would be required. If there have been no changes to the original NRC-approved CSP projections, a written statement to that effect is sufficient in lieu of submitting a detailed response to item 8.

(9) A revised CSP is required with the Financial Status Report whenever the contractor or the contracting officer has reason to believe that the total cost for performance of this contract will be either greater or substantially less than what had been previously estimated.

(b) If the data in this report indicates a need for additional funding beyond that already obligated, this information may only be used as support to the official request for funding required in accordance with the Limitation of Cost (LOC) Clause (FAR 52.232-20) or the Limitation of Funds (LOF) Clause FAR 52.232-22.

[End of Clause]

F.5 PLACE OF DELIVERY--REPORTS (JUN 1988)

The items to be furnished hereunder shall be delivered, with all charges paid by the Contractor, to:

(a) Project Officer (3 copies)

U. S. Nuclear Regulatory Commission
Mail Stop P-612
Washington, DC 20555

(b) Contracting Officer (1 copy)

[End of Clause]

F.6 PLACE OF DELIVERY--EQUIPMENT (MAR 1987)
ALTERNATE 1 (MAR 1987)

The items to be furnished hereunder shall be delivered, with all charges paid by the Contractor, to:

U.S. Nuclear Regulatory Commission

F.6 (Continued)

Contract Number: NRC-33-94-188

(SEE STATEMENT OF WORK C.1.1 FOR NRC LOCATIONS).

[End of Clause]

F.7 DURATION OF CONTRACT PERIOD (MAR 1987)
ALTERNATE 2 (MAR 1987)

This contract shall commence on (See SF26, Line 20C) and will expire three years later. The term of this contract may be extended at the option of the Government for an additional 2 years.

[End of Clause]

SECTION G - CONTRACT ADMINISTRATION DATA

G.1 NRCAR 2052.215-72 PROJECT OFFICER AUTHORITY
ALTERNATE 1 (JAN 1993)

- (a) The contracting officer's authorized representative, hereinafter referred to as the project officer for this contract is:

Name: Stanley D. Wood

Address: U. S. Nuclear Regulatory Commission
Mail Stop P-612
Washington, DC 20555

Telephone Number: 301-492-7723

- (b) The project officer shall:

- (1) Place delivery orders for items required under this contract.
- (2) Monitor contractor performance and recommend to the contracting officer changes in requirements.
- (3) Inspect and accept products/services provided under the contract.
- (4) Review all contractor invoices/vouchers requesting payment for products/services provided under the contract and make recommendations for approval, disapproval, or suspension.

- (c) The project officer may not make changes to the express terms and conditions of this contract.

[End of Clause]

G.2 NRCAR 2052.215-82 TRAVEL REIMBURSEMENT
- ALTERNATE 1 (JAN 1993)

- (a) The contractor is encouraged to use Government contract airlines, AMTRAK rail services, and discount hotel/motel properties in order to reduce the cost of travel under this contract. The contracting officer shall, upon request, provide each traveler with a letter of identification which is required in order to participate in this program. The Federal

G.2 (Continued)

Travel Directory (FTD) identifies carriers, contract fares, schedules, payment conditions, and hotel/motel properties which offer their services and rates to Government contractor personnel traveling on official business under this contract. The FTD, which is issued monthly, may be purchased from the U.S. Government Printing Office, Washington, DC 20402.

- (b) The contractor will be reimbursed for reasonable travel costs incurred directly and specifically in the performance of this contract. The cost limitations for travel costs are determined in accordance with the specific travel regulations cited in FAR 31.205-46, as are in effect on the date of the trip. Travel costs for research and related activities performed at State and nonprofit institutions, in accordance with Section 12 of Pub. L. 100-679, shall be charged in accordance with the contractor's institutional policy to the degree that the limitations of Office of Management and Budget (OMB) guidance are not exceeded. Applicable guidance documents include OMB Circular A-87, Cost Principles for State and Local Governments; OMB Circular A-122, Cost Principles for Nonprofit Organizations; and OMB Circular A-21, Cost Principles for Educational Institutions.
- (c) When the Government changes the Federal Travel Regulations, or other applicable regulations, it is the responsibility of the contractor to notify the contracting officer in accordance with the Limitations of Cost clause of this contract if the contractor will be unable to make all of the approved trips and remain within the cost and fee limitations of this contract due to the changes.

(End of Clause)

G.3 NRCAR 2052.216-73 INDIRECT COST RATES -
ALTERNATE 2 (JAN 1993)

- (a) For this contract, the amount reimbursable for indirect costs is as follows:

Overhead @ 130.00%		
G&A	@	7.66%
M&H	@	2.30%

- (b) In the event that indirect rates developed by the cognizant audit activity on the basis of actual allowable costs are less than the ceiling rates, the rates established by the cognizant audits must apply. The Government may not be obligated to pay any additional amounts for indirect costs above the ceiling rates set forth above for the applicable period.

(End of Clause)

SECTION H - SPECIAL CONTRACT REQUIREMENTS

H.1 NRCAR 2052.204-71 SITE ACCESS BADGE
REQUIREMENTS (JAN 1993)

During the life of this contract, the rights of ingress and egress for contractor personnel must be made available as required. In this regard, all contractor personnel whose duties under this contract require their presence on-site shall be clearly identifiable by a distinctive badge furnished by the Government. The Project Officer shall assist the contractor in obtaining the badges for the contractor personnel. It is the sole responsibility of the contractor to ensure that each employee has proper identification at all times. All prescribed identification must be immediately delivered to the Security Office for cancellation or disposition upon the termination of employment of any contractor personnel. Contractor personnel must have this identification in their possession during on-site performance under this contract. It is the contractor's duty to assure that contractor personnel enter only those work areas necessary for performance of contract work, and to assure the safeguarding of any Government records or data that contractor personnel may come into contact with.

[End of Clause]

H.2 NRCAR 2052.210-71 DRAWINGS, DESIGNS, SPECIFICATIONS,
AND OTHER DATA (JAN 1993)

All drawings, sketches, designs, design data, specifications, notebooks, technical and scientific data, and all photographs, negatives, reports, findings, recommendations, other data and memoranda of every description relating thereto, as well as all copies of the foregoing relating to the work or any part thereto, are subject to inspection by the Commission at all reasonable times. Inspection of the proper facilities must be afforded the Commission by the contractor and its subcontractors. These data are the property of the Government and may be used by the Government for any purpose whatsoever without any claim on the part of the contractor and its subcontractors and vendors for additional compensation and must, subject to the right of the contractor to retain a copy of the material for its own use, be delivered to the Government, or otherwise disposed of by the contractor as the contracting officer may direct during the progress of the work or upon completion or termination of this contract. The contractor's right of retention and use is subject to the security, patent, and use of information provisions, if any, of this contract.

H.2 (Continued)

[End of Clause]

H.3 NRCAR 2052.215-70 KEY PERSONNEL (JAN 1993)

- (a) The following individuals are considered to be essential to the successful performance of the work hereunder:

John J. Gilbride, Program Manager
Charles S. Clark, Network Engineer

The contractor agrees that personnel may not be removed from the contract work or replaced without compliance with paragraphs (b) and (c) of this section.

- (b) If one or more of the key personnel, for whatever reason, becomes, or is expected to become, unavailable for work under this contract for a continuous period exceeding 30 work days, or is expected to devote substantially less effort to the work than indicated in the proposal or initially anticipated, the contractor shall immediately notify the contracting officer and shall, subject to the concurrence of the contracting officer, promptly replace the personnel with personnel of at least substantially equal ability and qualifications.
- (c) Each request for approval of substitutions must be in writing and contain a detailed explanation of the circumstances necessitating the proposed substitutions. The request must also contain a complete resume for the proposed substitute and other information requested or needed by the contracting officer to evaluate the proposed substitution. The contracting officer or his/her authorized representative shall evaluate the request and promptly notify the contractor of his or her approval or disapproval in writing.
- (d) If the contracting officer determines that suitable and timely replacement of key personnel who have been reassigned, terminated, or have otherwise become unavailable for the contract work is not reasonably forthcoming, or that the resultant reduction of productive effort would be so substantial as to impair the successful completion of the contract or the service order, the contract may be terminated by the contracting officer for default or for the convenience of the Government, as appropriate. If the contracting officer finds the contractor at fault for the condition, the contract price or fixed fee may be equitably adjusted downward to compensate the Government for any resultant delay, loss, or damage.

[End of Clause]

**H.4 GOVERNMENT FURNISHED EQUIPMENT/PROPERTY - NONE PROVIDED
(JUN 1988)**

The Government will not provide any equipment/property under this contract.

[End of Clause]

H.5 RISK OF LOSS OR DAMAGE--PURCHASE (MAR 1987)

- (a) The Government is relieved of all risks of loss or damage to the equipment, up to and including the day prior to the first day of a successful performance period, except for:
- (1) Loss or damage caused by nuclear reaction, nuclear radiation, radioactive contamination, war, insurrection, civil strife, rebellion, weapons of war; or
 - (2) Negligence on the part of the Government or its agents, provided, however, that the Government shall be relieved of the liability for such risks of loss or damage due to negligence if any commercial customer of the Contractor is relieved of such liability under like circumstances.
- (b) If the Government is liable for loss or damage of a machine, the Contractor shall have the option to restore the machine to its previous condition, in which event the Government shall pay the Contractor to perform such restoration at the Contractor's then-current prices, terms, and conditions. If the Contractor elects not to restore the machine, the Government may, at its own expense, restore the machine to its previous condition. If, however, the machine is lost or damaged beyond repair, the Government shall pay to the Contractor the same price for the machine as the Government would have paid had it purchased the machine on the day prior to the loss or damage under the provisions of this contract. This clause shall govern risk of loss or damage, notwithstanding any other provisions of this contract relating to title, payment, or ownership.

[End of Clause]

H.6 REPLACEMENT PART AVAILABILITY (ADPE) (MAR 1987)

The Contractor guarantees that replacement parts for each piece of equipment in this contract will be available for the system's (item's) life of 5 years. The Contractor shall notify the Government 1 year before the end of the system's (item's) life as to the continuing availability of parts subsequent to this period.

If parts will not be available from the Contractor, then the Government may require the Contractor to furnish data that is available to assist the Government to obtain such parts from another source.

H.6 (Continued)

[End of Clause]

H.7 ENGINEERING CHANGES (ADP REQUIREMENTS) (JUN 1988)

- (a) After contract award, the Government may solicit, and the Contractor is encouraged to propose independently, engineering changes to the equipment, software specifications or other requirements of this contract. These changes may be proposed to save money, to improve performance, to save energy, or to satisfy increased data processing requirements. However, if proposed changes relating to improved performance are necessary to meet increased data processing requirements of the user, those requirements shall not exceed the contract requirements by more than 25 percent. If the proposed changes are acceptable to both parties, the Contractor shall submit a price change proposal to the Government for evaluation within 30 days of such acceptance. Those proposed engineering changes that are acceptable to the Government will be processed as modifications to the contract.
- (b) As a minimum, the following information shall be submitted by the Contractor with each proposal:
- (1) A description of the difference between the existing contract requirement and the proposed change, and the comparative advantages and disadvantages of each;
 - (2) Itemized requirements of the contract which must be changed if the proposal is adopted, and the proposed revision to the contract for each such change;
 - (3) An estimate of the changes in performance and cost, if any, that will result from adoption of the proposal;
 - (4) An evaluation of the effects the proposed change would have on collateral costs to the Government such as Government-furnished property costs, costs of related items, and costs of maintenance and operation; and
 - (5) A statement of the time by which the change order adopting the proposal must be issued so as to obtain the maximum benefits of the changes during the remainder of this contract, also, any effect on the contract completion time or delivery schedule shall be identified.
- (c) Engineering change proposals submitted to the Contracting Officer shall be processed expeditiously. The Government shall not be liable for proposal preparation costs or any delay in acting upon any proposal submitted pursuant to this

H.7 (Continued)

clause. The Contractor has the right to withdraw, in whole or in part, any engineering change proposal not accepted by the Government within the period specified in the engineering change proposal. The decision of the Contracting Officer as to the acceptance of any such proposal under this contract shall be final and shall not be subject to the "Disputes" clause of this contract.

- (d) The Contracting Officer may accept any engineering change proposal submitted pursuant to this clause by giving the Contractor written notice thereof. This written notice may be given by issuance of a modification to this contract. The Contractor shall remain obligated to perform in accordance with the terms of the existing contract.
- (e) If an engineering change proposal submitted pursuant to this clause is accepted and applied to this contract, an equitable adjustment in the contract price and in any other affected provisions of this contract shall be made in accordance with this clause and other applicable clauses of this contract. When the cost of performance of this contract is increased or decreased as a result of the change, the equitable adjustment increasing or decreasing the contract price shall be in accordance with the "Changes" clause rather than under this clause, but the resulting contract modification shall state that it is made pursuant to this clause.
- (f) The Contractor is requested to identify specifically any information contained in the engineering change proposal which it prefers not be disclosed to the public. The identification of information as confidential and/or proprietary is for information purposes only and shall not be binding on the Government to prevent disclosure of such information. The Contractor is advised that such information may be subject to release upon request pursuant to the Freedom of Information Act (5 U.S.C. 552).

[End of Clause]

H.8 GLOSSARY OF ADP TERMS (JUN 1988)

The definitions and explanations set forth in this glossary are an integral part of the terms and conditions of this contract.

- (a) Data Processing Equipment System and/or Subsystem. The complement of individual machines and operating software furnished by the Contractor and acquired to operate as an integrated group.
- (b) Equipment. An all inclusive term which refers either to an individual machine or to the total complement of machines

H.8 (Continued)

- required to operate as an integrated group.
- (c) Equipment and/or Operating Software Failure. A malfunction in the contractor-supplied equipment and/or operating software, excluding all external factors, which prevents the accomplishment of the job.
 - (d) Installation Date. The date by which the Contractor must have the ordered equipment ready for use by the Government.
 - (e) Machine. An individual unit, including features installed thereon, of a data processing system, or subsystem, identified by a type and/or model number, such as a central processing unit, additional memory module, a tape unit, a card reader, etc.
 - (f) Mechanical Replacement. The replacement of one machine for another occasioned by the mechanical condition of the equipment: being replaced.
 - (g) Operating Software. Those routines that interface directly with hardware (including peripheral devices), the computer operations, applications and utility programs.
 - (h) Operational Use Time. The time during which equipment is in actual operation, exclusive of idle time, standby time, or maintenance time due to machine failure; not synonymous with "power-off" time.
 - (i) Preventive Maintenance. That maintenance performed by the Contractor which is designed to keep the equipment in proper operating condition. It is performed on a scheduled basis.
 - (j) Principal Period of Maintenance. Any 9 consecutive hours per day, including an official meal period not to exceed 1 hour per day, between the hours of 7:30 a.m. and 4:30 p.m., Monday through Friday, excluding holidays observed at the NRC installation.
 - (k) Extended Maintenance Period Option. Option to require maintenance service during any extension of the Principal Period of Maintenance at a fixed price for such period, regardless of the number of calls requested during such period.
 - (l) Remedial Maintenance. That maintenance performed by the Contractor which results from Contractor supplied equipment or operating software failure. It is performed as required and is therefore on an unscheduled basis.
 - (m) System - The system is defined as the Wide Area Network (WAN)

H.8 (Continued)

which includes all hardware, software, and firmware.

(n) Total Monthly Charges.

- (1) Rental. All monthly charges for the use (rental) of equipment and software and for maintenance thereof.
 - (2) Maintenance of Government-owned. All monthly charges for the maintenance of equipment and software supplied under this contract.
- (o) Alteration. An alteration is defined as any change to a machine which deviates from the physical, mechanical, or electrical machine design (including microcode), whether or not additional devices or parts are required.
- (p) Attachment. An attachment is defined as the mechanical, electrical, or electronic interconnection of equipment manufactured by other than the original equipment manufacturer and connected to the machine or system.

[End of Clause]

H.9 SITE PREPARATION PROVISIONS (JUN 1988)

- (a) Equipment environmental specifications shall be furnished in writing by the Contractor in its proposal. These specifications shall be in such detail as to ensure that the equipment to be installed shall operate efficiently from the point of view of environment.
- (b) The Government will prepare the site at its own expense and in accordance with the equipment environmental specifications furnished by the Contractor in the proposal.
- (c) Any alterations or modifications in site preparation which are directly attributed to incomplete or erroneous equipment environmental specifications provided by the Contractor, which would involve additional expenses to the Government, shall be made at the expense of the Contractor.
- (d) Any such site alterations or modifications as specified in paragraph c above which cause a delay in the installation date will also result in liquidated damages for equipment as specified under "Liquidated Damages".
- (e) The Government agrees to have the site prepared in accordance with the Contractor's written site specifications by thirty (30) days prior to the scheduled installation date, unless a shorter period of time is agreed to in writing.

H.9 (Continued)

(f) The Government will provide the Contractor with access to the site for the purpose of installing the equipment prior to the scheduled installation date. The Contractor shall specify in writing the time required to install the equipment.

[End of Clause]

H.10 FIPS PUBS AND STANDARDS COMPLIANCE (MAR 1987)

In no case shall the Contractor or any subcontractor take any action or use any replacement parts that would result in equipment that is not in compliance with applicable FIPS PUBS and Standards (See SOW for applicable FIPS PUBS) without written approval of the Contracting Officer.

[End of Clause]

H.11 TECHNOLOGY SUBSTITUTION

All hardware, software and support services (installation, upgrades, warranty and maintenance repairs, and technical support services) shall be the most modern and cost-effective available at the time of delivery and installation. The Contractor shall propose substitute items whenever the Contractor or its subcontractor is offering replacement or substitutes for the components in question and the contractor offers the particular product to any of its commercial or Government customers. The Government may request that those items be substituted for comparable items originally offered. The Government reserves the right to accept or reject proposed substitutions.

The substitute item shall meet or exceed the applicable requirements and specifications of this solicitation.

Any substitute item shall be fully compatible with NRC hardware and software installed at the time the substitute is proposed for use.

The substitute item shall have capacity and performance characteristics equal to or better than those of the component it is to replace. The criteria used originally for testing the Contractor's hardware will be used to determine acceptability of substitute items.

The substitute item shall offer the same or increased function as the item it is to replace.

The price of the item shall be equal to or more cost-effective than the item it is to replace.

To propose a substitute item, the Contractor shall submit a written proposal to the Contracting Officer, addressing each of the applicable qualifications in Section C and any other attributes of the substitute item of which the Government should be aware. Additionally, the

H.11 (Continued)

Contractor agrees to demonstrate the proposed item prior to delivery, if requested by the Government.

No hardware shall be substituted until the Contractor has submitted a proposal to the NRC Contracting Officer with adequate supporting justification, an agreement between the NRC Contracting Officer and the Contractor is reached to effect such substitution, and authorized by written, bilateral modification to the Contract. The Government may allow component substitutions when, in the opinion of the NRC Contracting Officer, it is in the best interest of the Government to do so. The best interest means at least equivalent performance with significant economic benefit, significantly enhanced performance at no additional cost to the Government, or a combination of both the above.

All proposed technology modifications, substitutions, and additions to the Contract shall be evaluated as to their benefit to the Government. In determining the comparative life cycle costs of such proposals, the performance costs over the remaining life of the Contract shall be included.

PART II - CONTRACT CLAUSES

SECTION I - CONTRACT CLAUSES

I.1 52.252-2 CLAUSES INCORPORATED BY REFERENCE (JUN 1988)

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available.

I. FEDERAL ACQUISITION REGULATION (48 CFR CHAPTER 1) CLAUSES

NUMBER	TITLE	DATE
52.202-1	DEFINITIONS	SEP 1991
52.203-1	OFFICIALS NOT TO BENEFIT	APR 1984
52.203-3	GRATUITIES	APR 1984
52.203-5	COVENANT AGAINST CONTINGENT FEES	APR 1984
52.203-7	ANTI-KICKBACK PROCEDURES	OCT 1988
52.203-10	PRICE OR FEE ADJUSTMENT FOR ILLEGAL OR IMPROPER ACTIVITY	SEP 1990
52.203-12	LIMITATION ON PAYMENTS TO INFLUENCE CERTAIN FEDERAL TRANSACTIONS	JAN 1990
52.209-6	PROTECTING THE GOVERNMENT'S INTEREST WHEN SUBCONTRACTING WITH CONTRACTORS DEBARRED, SUSPENDED, OR PROPOSED FOR DEBARMENT	NOV 1992
52.210-5	NEW MATERIAL	APR 1984
52.210-7	USED OR RECONDITIONED MATERIAL, RESIDUAL INVENTORY, AND FORMER GOVERNMENT SURPLUS PROPERTY	APR 1984
52.215-1	EXAMINATION OF RECORDS BY COMPTROLLER GENERAL	FEB 1993
52.215-2	AUDIT - NEGOTIATION	FEB 1993
52.215-23	PRICE REDUCTION FOR DEFECTIVE COST OR PRICING DATA - MODIFICATIONS	DEC 1991
52.215-25	SUBCONTRACTOR COST OR PRICING DATA - MODIFICATIONS	DEC 1991
52.215-26	INTEGRITY OF UNIT PRICES Alternate I (APR 1991)	APR 1991
52.215-27	TERMINATION OF DEFINED BENEFIT PENSION PLANS	SEP 1989
52.215-33	ORDER OF PRECEDENCE	JAN 1986
52.215-39	REVERSION OR ADJUSTMENT OF PLANS FOR POSTRETIREMENT BENEFITS OTHER THAN PENSIONS (PRB)	JUL 1991
52.216-7	ALLOWABLE COST AND PAYMENT	JUL 1991

I.1 (Continued)

NUMBER	TITLE	DATE
52.216-8	FIXED FEE	APR 1984
52.219-8	UTILIZATION OF SMALL BUSINESS CONCERNS AND SMALL DISADVANTAGED BUSINESS CONCERNS	FEB 1990
52.219-13	UTILIZATION OF WOMEN-OWNED SMALL BUSINESSES	AUG 1986
52.219-14	LIMITATIONS ON SUBCONTRACTING	JAN 1991
52.220-3	UTILIZATION OF LABOR SURPLUS AREA CONCERNS	APR 1984
52.222-20	WALSH-HEALEY PUBLIC CONTRACTS ACT	APR 1984
52.222-26	EQUAL OPPORTUNITY	APR 1984
52.222-28	EQUAL OPPORTUNITY PREAWARD CLEARANCE OF SUBCONTRACTS	APR 1984
52.222-35	AFFIRMATIVE ACTION FOR SPECIAL DISABLED AND VIETNAM ERA VETERANS	APR 1984
52.222-36	AFFIRMATIVE ACTION FOR HANDICAPPED WORKERS	APR 1984
52.222-37	EMPLOYMENT REPORTS ON SPECIAL DISABLED VETERANS AND VETERANS OF THE VIETNAM ERA	JAN 1988
52.223-2	CLEAN AIR AND WATER	APR 1984
52.223-6	DRUG-FREE WORKPLACE	JUL 1990
52.225-11	RESTRICTIONS ON CERTAIN FOREIGN PURCHASES	MAY 1992
52.225-17	BUY AMERICAN ACT - SUPPLIES UNDER EUROPEAN COMMUNITY AGREEMENT	MAY 1993
52.227-1	AUTHORIZATION AND CONSENT	APR 1984
52.227-19	COMMERCIAL COMPUTER SOFTWARE - RESTRICTED RIGHTS	JUN 1987
52.228-7	INSURANCE - LIABILITY TO THIRD PERSONS	APR 1984
52.229-4	FEDERAL, STATE, AND LOCAL TAXES (NONCOMPETITIVE CONTRACT)	JAN 1991
52.232-17	INTEREST	JAN 1991
52.232-20	LIMITATION OF COST	APR 1984
52.232-23	ASSIGNMENT OF CLAIMS	JAN 1986
52.232-25	PROMPT PAYMENT	SEP 1992
52.232-28	ELECTRONIC FUNDS TRANSFER PAYMENT METHODS	APR 1989
52.233-1	DISPUTES	DEC 1991
52.233-3	PROTEST AFTER AWARD Alternate I (JUN 1985)	JUN 1985
52.242-1	NOTICE OF INTENT TO DISALLOW COSTS	APR 1984
52.242-13	BANKRUPTCY	APR 1991
52.244-2	SUBCONTRACTS (COST-REIMBURSEMENT AND LETTER CONTRACTS)	JUL 1985
52.246-25	LIMITATION OF LIABILITY - SERVICES	APR 1984
52.249-6	TERMINATION (COST-REIMBURSEMENT)	MAY 1986

I.1 (Continued)

NUMBER	TITLE	DATE
52.249-14	EXCUSABLE DELAYS	APR 1984
52.253-1	COMPUTER GENERATED FORMS	JAN 1991
52.232-1	PAYMENTS	APR 1984
52.232-8	DISCOUNTS FOR PROMPT PAYMENT	APR 1989
52.249-2	TERMINATION FOR CONVENIENCE OF THE GOVERNMENT (FIXED-PRICE)	APR 1984
52.249-8	DEFAULT (FIXED-PRICE SUPPLY AND SERVICE)	APR 1984

[End of Clause]

I.2 52.203-9 REQUIREMENT FOR CERTIFICATE OF PROCUREMENT INTEGRITY--MODIFICATION (NOV 1990)

- (a) Definitions. The definitions set forth in FAR 3.104-4 are hereby incorporated in this clause.
- (b) The Contractor agrees that it will execute the certification set forth in paragraph (c) of this clause when requested by the Contracting Officer in connection with the execution of any modification of this contract.
- (c) Certification. As required in paragraph (b) of this clause, the officer or employee responsible for the modification proposal shall execute the following certification:

CERTIFICATE OF PROCUREMENT INTEGRITY--
MODIFICATION (NOV 1990)

(1) I, [Name of certifier] _____, am the officer or employee responsible for the preparation of this modification proposal and hereby certify that, to the best of my knowledge and belief, with the exception of any information described in this certification, I have no information concerning a violation or possible violation of subsection 27(a), (b), (d), or (f) of the Office of Federal Procurement Policy Act, as amended* (41 U.S.C. 423), (hereinafter referred to as "the Act"), as implemented in the FAR, occurring during the conduct of this procurement (contract and modification number).

(2) As required by subsection 27(e)(1)(B) of the Act, I further certify that to the best of my knowledge and belief, each officer, employee, agent, representative, and consultant of [Name of Offeror] _____ who has participated personally and substantially in the preparation or submission of this proposal has certified that he or she

I.2 (Continued)

is familiar with, and will comply with, the requirements of subsection 27(a) of the Act, as implemented in the FAR, and will report immediately to me any information concerning a violation or possible violation of subsections 27(a), (b), (d), or (f) of the Act, as implemented in the FAR, pertaining to this procurement.

(3) Violations or possible violations: (Continue on plain bond paper if necessary and label Certificate of Procurement Integrity--Modification (Continuation Sheet), ENTER NONE IF NONE EXISTS)

[Signature of the officer or employee responsible for the modification proposal and date]

[Typed name of the officer or employee responsible for the modification proposal]

* Subsections 27(a), (b), and (d) are effective on December 1, 1990. Subsection 27(f) is effective on June 1, 1991.

THIS CERTIFICATION CONCERNS A MATTER WITHIN THE JURISDICTION OF AN AGENCY OF THE UNITED STATES AND THE MAKING OF A FALSE, FICTITIOUS, OR FRAUDULENT CERTIFICATION MAY RENDER THE MAKER SUBJECT TO PROSECUTION UNDER TITLE 18, UNITED STATES CODE, SECTION 1001.

(d) In making the certification in paragraph (2) of the certificate, the officer or employee of the competing Contractor responsible for the offer or bid, may rely upon a one-time certification from each individual required to submit a certification to the competing Contractor, supplemented by periodic training. These certifications shall be obtained at the earliest possible date after an individual required to certify begins employment or association with the contractor. If a contractor decides to rely on a certification executed prior to the suspension of section 27 (i.e., prior to December 1, 1989), the Contractor shall ensure that an individual who has so certified is notified that section 27 has been reinstated. These certifications shall be maintained by the Contractor for a period of 6 years from the date a certifying

I.2 (Continued)

employee's employment with the company ends or, for an agency, representative, or consultant, 6 years from the date such individual ceases to act on behalf of the contractor.

- (e) The certification required by paragraph (c) of this clause is a material representation of fact upon which reliance will be placed in executing this modification.

[End of Clause]

I.3 52.216-18 ORDERING (APR 1984)

- (a) Any supplies and services to be furnished under this contract shall be ordered by issuance of delivery orders by the individuals or activities designated in the Schedule. Such orders may be issued from date of contract award through date of expiration of the contract.
- (b) All delivery orders are subject to the terms and conditions of this contract. In the event of conflict between a delivery order and this contract, the contract shall control.
- (c) If mailed, a delivery order is considered "issued" when the Government deposits the order in the mail. Orders may be issued orally or by written telecommunications only if authorized in the Schedule.

[End of Clause]

I.4 52.216-19 DELIVERY-ORDER LIMITATIONS (APR 1984)

- (a) Minimum order. When the Government requires supplies or services covered by this contract in an amount of less than \$100.00, the Government is not obligated to purchase, nor is the Contractor obligated to furnish, those supplies or services under the contract.
- (b) Maximum order. The Contractor is not obligated to honor--
- (1) Any order for a single item in excess of Ceiling price of the contract;
 - (2) Any order for a combination of items in excess of ceiling price of the contract; or
 - (3) A series of orders from the same ordering office within term of the contract days that together call for quantities exceeding the limitation in subparagraph (1) or (2) above.
- (c) If this is a requirements contract (i.e., includes the

I.4 (Continued)

Requirements clause at subsection 52.216-21 of the Federal Acquisition Regulation (FAR)), the Government is not required to order a part of any one requirement from the Contractor if that requirement exceeds the maximum-order limitations in paragraph (b) above.

- (d) Notwithstanding paragraphs (b) and (c) above, the Contractor shall honor any order exceeding the maximum order limitations in paragraph (b), unless that order (or orders) is returned to the ordering office within N/A days after issuance, with written notice stating the Contractor's intent not to ship the item (or items) called for and the reasons. Upon receiving this notice, the Government may acquire the supplies or services from another source.

[End of Clause]

I.5 52.216-22 INDEFINITE QUANTITY (APR 1984)

- (a) This is an indefinite-quantity contract for the supplies or services specified, and effective for the period stated, in the Schedule. The quantities of supplies and services specified in the Schedule are estimates only and are not purchased by this contract.
- (b) Delivery or performance shall be made only as authorized by orders issued in accordance with the Ordering clause. The Contractor shall furnish to the Government, when and if ordered, the supplies or services specified in the Schedule up to and including the quantity designated in the Schedule as the "maximum." The Government shall order at least the quantity of supplies or services designated in the Schedule as the "minimum."
- (c) Except for any limitations on quantities in the Delivery-Order Limitations clause or in the Schedule, there is no limit on the number of orders that may be issued. The Government may issue orders requiring delivery to multiple destinations or performance at multiple locations.
- (d) Any order issued during the effective period of this contract and not completed within that period shall be completed by the Contractor within the time specified in the order. The contract shall govern the Contractor's and Government's rights and obligations with respect to that order to the same extent as if the order were completed during the contract's effective period; provided, that the Contractor shall not be required to make any deliveries under this contract after 6 months after expiration of the contract.

[End of Clause]

I.6 52.217-9 OPTION TO EXTEND THE TERM OF THE
CONTRACT (MAR 1989)

- (a) The Government may extend the term of this contract by written notice to the Contractor within 60 days; provided, that the Government shall give the Contractor a preliminary written notice of its intent to extend at least 60 days before the contract expires. The preliminary notice does not commit the Government to an extension.
- (b) If the Government exercises this option, the extended contract shall be considered to include this option provision.
- (c) The total duration of this contract, including the exercise of any options under this clause, shall not exceed 5 years.

[End of Clause]

I.7 52.219-11 SPECIAL 8(A) CONTRACT CONDITIONS
(FEB 1990)

The Small Business Administration (SBA) agrees to the following:

- (a) To furnish the supplies or services set forth in this contract according to the specifications and the terms and conditions hereof by subcontracting with an eligible concern pursuant to the provisions of section 8(a) of the Small Business Act, as amended (15 U.S.C. 637(a)).
- (b) That in the event SBA does not award a subcontract for all or a part of the work hereunder, this contract may be terminated either in whole or in part without cost to either party.
- (c) Except for novation agreements and advance payments, delegates to the U S Nuclear Regulatory Commission the responsibility for administering the subcontract to be awarded hereunder with complete authority to take any action on behalf of the Government under the terms and conditions of the subcontract; provided, however, that the U S Nuclear Regulatory Commission shall give advance notice to the SBA before it issues a final notice terminating the right of a subcontractor to proceed with further performance, either in whole or in part, under the subcontract for default or for the convenience of the Government.
- (d) That payments to be made under any subcontract awarded under this contract will be made directly to the subcontractor by the U S Nuclear Regulatory Commission.
- (e) That the subcontractor awarded a subcontract hereunder shall have the right of appeal from decisions of the Contracting Officer cognizable under the "Disputes" clause of said subcontract.

I.7 (Continued)

- (f) To notify the U S Nuclear Regulatory Commission Contracting Officer immediately upon notification by the subcontractor that the owner or owners upon whom 8(a) eligibility was based plan to relinquish ownership or control of the concern.

[End of Clause]

I.8 52.219-12 SPECIAL 8(A) SUBCONTRACT CONDITIONS
(FEB 1990)

- (a) The Small Business Administration (SBA) has entered into Contract No. NRC-33-94-188 with the U S Nuclear Regulatory Commission to furnish the supplies or services as described therein. A copy of the contract is attached hereto and made a part hereof.
- (b) The PULSAR DATA SYSTEMS, INC, hereafter referred to as the subcontractor, agrees and acknowledges as follows:
- (1) That it will, for and on behalf of the SBA, fulfill and perform all of the requirements of Contract No. NRC-33-94-188 for the consideration stated therein and that it has read and is familiar with each and every part of the contract.
 - (2) That the SBA has delegated responsibility, except for novation agreements and advance payments, for the administration of this subcontract to the U S Nuclear Regulatory Commission with complete authority to take any action on behalf of the Government under the terms and conditions of this contract.
 - (3) That it will not subcontract the performance of any of the requirements of this subcontract to any lower tier subcontractor without the prior written approval of the SBA and the designated Contracting Officer of the U S Nuclear Regulatory Commission.
 - (4) That it will notify the U S Nuclear Regulatory Commission Contracting Officer in writing immediately upon entering an agreement (either oral or written) to transfer all or part of its stock or other ownership interest to any other party.
- (c) Payments, including any progress payments under this subcontract, will be made directly to the subcontractor by the U S Nuclear Regulatory Commission.

[End of Clause]

I.9 52.219-17 SECTION 8(A) AWARD (FEB 1990)

- (a) By execution of a contract, the Small Business Administration (SBA) agrees to the following:
- (1) To furnish the supplies or services set forth in the contract according to the specifications and the terms and conditions by subcontracting with the Offeror who has been determined an eligible concern pursuant to the provisions of section 8(a) of the Small Business Act, as amended (15 U.S.C. 637(a)).
 - (2) Except for novation agreements and advance payments, delegates to the U S Nuclear Regulatory Commission the responsibility for administering the contract with complete authority to take any action on behalf of the Government under the terms and conditions of the contract; provided, however that the contracting agency shall give advance notice to the SBA before it issues a final notice terminating the right of the subcontractor to proceed with further performance, either in whole or in part, under the contract.
 - (3) That payments to be made under the contract will be made directly to the subcontractor by the contracting activity.
 - (4) To notify the U S Nuclear Regulatory Commission Contracting Officer immediately upon notification by the subcontractor that the owner or owners upon whom 8(a) eligibility was based plan to relinquish ownership or control of the concern.
- (b) The offeror/subcontractor agrees and acknowledges that it will, for and on behalf of the SBA, fulfill and perform all of the requirements of the contract.

[End of Clause]

I.10 52.225-9 BUY AMERICAN ACT--TRADE AGREEMENTS
ACT--BALANCE OF PAYMENTS PROGRAM (APR 1991)

- (a) This clause implements the Buy American Act (41 U.S.C. 10), the Trade Agreements Act of 1979 (19 U.S.C. 2501-2582), and the Balance of Payments Program by providing a preference for domestic end products over foreign end products, except for certain foreign end products which meet the requirements for classification as designated country end products or Caribbean Basin country end products.

"Caribbean Basin country end product," as used in this clause, means an article that (1) is wholly the growth, product, or manufacture of a Caribbean Basin country (as defined in

I.10 (Continued)

section 25.401 of the Federal Acquisition Regulation (FAR)), or (2) in the case of an article which consists in whole or in part of materials from another country or instrumentality, has been substantially transformed into a new and different article of commerce with a name, character, or use distinct from that of the article or articles from which it was so transformed. The term includes services (except transportation services) incidental to its supply; provided that the value of those incidental services does not exceed that of the product itself. It does not include service contracts as such. The term excludes products that are excluded from duty free treatment for Caribbean countries under the Caribbean Basin Economic Recovery Act (19 U.S.C. 2703(b)). These exclusions presently consist of (i) textiles and apparel articles that are subject to textile agreements; (ii) footwear, handbags, luggage, flat goods, work gloves, and leather wearing apparel not designated as eligible articles for the purpose of the Generalized System of Preferences under Title V of the Trade Act of 1974; (iii) tuna, prepared or preserved in any manner in airtight containers; (iv) petroleum, or any product derived from petroleum; and (v) watches and watch parts (including cases, bracelets and straps), of whatever type including, but not limited to, mechanical, quartz digital or quartz analog, if such watches and watch parts contain any material that is the product of any country to which the Tariff Schedule of the United States (TSUS) column 2 rates of duty apply.

"Components," as used in this clause, means those articles, materials, and supplies incorporated directly into the end products.

"Designated country end product," as used in this clause, means an article that (1) is wholly the growth, product, or manufacture of the designated country (as defined in section 25.401 of the Federal Acquisition Regulation (FAR)), or (2) in the case of an article which consists in whole or in part of materials from another country or instrumentality, has been substantially transformed into a new and different article of commerce with a name, character, or use distinct from that of the article or articles from which it was so transformed. The term includes services (except transportation services) incidental to its supply, provided that the value of those incidental services does not exceed that of the product itself. It does not include service contracts as such.

"Domestic end product," as used in this clause, means (1) an unmanufactured end product mined or produced in the United States, or (2) an end product manufactured in the United States, if the cost of its components mined, produced, or manufactured in the United States exceeds 50 percent of the

I.10 (Continued)

cost of all its components. A component shall also be considered to have been mined, produced, or manufactured in the United States (regardless of its source in fact) if the end product in which it is incorporated is manufactured in the United States and the component is of a class or kind (i) determined by the Government to be not mined, produced, or manufactured in the United States in sufficient and reasonably available commercial quantities of a satisfactory quality, or (ii) to which the agency head concerned has determined that it would be inconsistent with the public interest to apply the restrictions of the Buy American Act.

"End products," as used in this clause, means those articles, materials, and supplies to be acquired under this contract for public use.

"Foreign end product," as used in this clause, means an end product other than a domestic end product.

- (b) The Contracting Officer has determined that the Trade Agreements Act applies to this acquisition. Unless otherwise specified, the Act applies to all items in the schedule. The Contractor agrees to deliver under this contract only domestic end products unless, in its offer, it specifies delivery of foreign end products in the provision entitled "Buy American Act--Trade Agreements Act--Balance of Payments Program Certificate." An offer certifying that a designated country end product or a Caribbean Basin country end product will be supplied requires the Contractor to supply a designated country end product or a Caribbean Basin country end product or, at the Contractor's option, a domestic end product. Contractors may not supply a foreign end product for line items subject to the Trade Agreements Act unless the foreign end product is a designated country end product or a Caribbean Basin country end product (see FAR 25.401), or unless a waiver is granted under section 302 of the Trade Agreements Act of 1979 (see FAR 25.402(c)).
- (c) Offers will be evaluated in accordance with the policies and procedures of Subpart 25.4 of the FAR.

[End of Clause]

I.11 52.227-23 RIGHTS TO PROPOSAL DATA (TECHNICAL) (JUN 1987)

Except for data contained on pages N/A, it is agreed that as a condition of award of this contract, and notwithstanding the conditions of any notice appearing thereon, the Government shall have unlimited rights (as defined in the Rights in Data--General" clause contained in this contract) in and to the technical data contained in the proposal dated 9/17/93, upon which this contract

I.11 (Continued)

is based.

[End of Clause]

I.12 201-39.5202-3 PROCUREMENT AUTHORITY (OCT 1990 FIRMR)

This acquisition is being conducted under the regulatory blanket delegation of GSA's exclusive procurement authority for FIP resources.

I.13 201-39.5202-6 WARRANTY EXCLUSION AND LIMITATION OF DAMAGES (OCT 1990 FIRMR)

Except as expressly set forth in writing in this agreement and except for the implied warranty of merchantability, there are no warranties expressed or implied.

In no event will the Contractor be liable to the Government for consequential damages as defined in the Uniform Commercial Code, section 2-715, in effect in the District of Columbia as of January 1, 1973, i.e.--

Consequential damages resulting from the seller's breach include--

(a) Any loss resulting from general or particular requirements and needs of which the seller at the time of contracting had reason to know and which could not reasonably be prevented by cover or otherwise; and

(b) Injury to person or property proximately resulting from any breach of warranty.

I.14 TRADE AGREEMENTS ACT (MAY 1991)

(a) This clause implements the Trade Agreements Act of 1979 (19 U.S.C. 2501-2582) by providing a preference for U.S. made end products, designated country end products, and Caribbean Basin country end products over other products.

"Caribbean Basin country end products," as used in this clause, means an article that: (1) is wholly the growth, product, or manufacture of a Caribbean Basin country (as defined in section 25.401 of the Federal Acquisition Regulation (FAR)), or (2) in the case of an article which consists in whole or in part of materials from another country or instrumentality, has been substantially transformed into a new and different article of commerce with a name, character, or use distinct from that of the article or articles from which it was so transformed. The term includes services (except transportation services) incidental to its supply;

I.14 (Continued)

provided that the value of those incidental services does not exceed that of the product itself. It does not include service contracts as such. The term excludes products that are excluded from duty free treatment from Caribbean countries under the Caribbean Basin Economic Recovery Act (19 U.S.C. 2703(b)). These exclusions presently consist of (i) textiles and apparel articles that are subject to textile agreements; (ii) footwear, handbags, luggage, flat goods, work gloves, and leather wearing apparel not designated as eligible articles for the purpose of the Generalized System of Preference under title V of the Trade Act of 1974; (iii) tuna, prepared or preserved in any manner in airtight containers; (iv) petroleum, or any product derived from petroleum; and (v) watches and watch parts (including cases, bracelets and straps) of whatever type including, but not limited to, mechanical, quartz digital or quartz analog, if such watches or watch parts contain any material that is the product of any country to which the Tariff Schedule of the United States (TSUS) column 2 rates of duty apply.

"Designated country end product," as used in this clause, means an article that (1) is wholly the growth, product, or manufacture of the designated country (as defined in section 25.401 of the Federal Acquisition Regulation (FAR)), or (2) in the case of an article which consists in whole or in part of materials from another country or instrumentality, has been substantially transformed into a new and different article of commerce with a name, character, or use distinct from that of the article or articles from which it was so transformed. The term includes services (except transportation services) incidental to its supply, provided that the value of those incidental services does not exceed that of the product itself. It does not include service contracts as such.

"End products," as used in this clause, means those articles, materials, and supplies to be acquired under this contract for public use.

"U.S. made end product," as used in this clause, means an article which (1) is wholly the growth, product, or manufacture of the United States, or (2) in the case of an article which consists in whole or in part of materials from another country or instrumentality, has been substantially transformed in the United States into a new and different article of commerce with a name, character, or use distinct from that of the article or articles from which it was so transformed.

"Nondesignated country end products," as used in this clause, means any end product which is not a U.S. made end product or designated country end product.

I.14 (Continued)

"United States," as used in this clause, means the United States, its possessions, Puerto Rico, and any other place which is subject to its jurisdiction, but does not include leased bases or trust territories.

- (b) The Contractor agrees to deliver under this contract only U.S. made end products, designated country end products, Caribbean Basin country end product, or, if a national interest waiver is granted under section 302 of the Trade Agreements Act of 1979, nondesignated country end products. Only if such waiver is granted may a nondesignated country end product be delivered under this contract(s).
- (c) Offers will be evaluated in accordance with the policies and procedures of part 25 of the FAR except that offers of U.S. made end products shall be evaluated without the restrictions of the Buy American Act or the Balance of Payments Program.

[End of Clause]

PART III - LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS

SECTION J - LIST OF ATTACHMENTS

J.1 ATTACHMENTS (MAR 1987)

<u>Attachment Number</u>	<u>Title</u>
1	Billing Instructions
2	NRC Handbook 3.8
3	Contractor Spending Plan (CSP) Instructions
4	System Equipment Specification
5	Master CLIN List

12/17/91

BILLING INSTRUCTIONS FOR
FIXED PRICE CONTRACTS

General: The contractor shall prepare vouchers or invoices as prescribed herein. FAILURE TO SUBMIT VOUCHERS/INVOICES IN ACCORDANCE WITH THESE INSTRUCTIONS WILL RESULT IN REJECTION OF THE VOUCHER/INVOICES AS IMPROPER.

Form: Claims shall be submitted on the payee's letterhead, voucher/invoices, or on the Government's Standard Form 1034, "Public Voucher for Purchases and Services Other than Personal," and Standard Form 1035, "Public Voucher for Purchases Other than Personal--Continuation Sheet." These forms are available from the US Government Printing Office, 720 North Capitol Street, Washington, DC 20401.

Number of Copies: An original and three copies shall be submitted. Failure to submit all the required copies will result in rejection of the voucher/invoice as improper.

Designated Agency Billing Office: Vouchers/invoices shall be submitted to the following address:

US Nuclear Regulatory Commission
Division of Contracts and Property Management
Contract Administration Branch, P-902
Washington, DC 20555

HAND-DELIVERY OF VOUCHERS/INVOICES IS DISCOURAGED AND WILL NOT EXPEDITE PROCESSING BY THE NRC. However, should you choose to deliver vouchers/invoices by hand, including delivery by any express mail service or special delivery service which uses a courier or other person to deliver the vouchers/invoices in person to the NRC, such vouchers/invoices must be addressed to the above Designated Agency Billing Office and will only be accepted at the following location.

US Nuclear Regulatory Commission
One White Flint North - Mail Room
11555 Rockville Pike
Rockville, MD 20852

HAND-CARRIED SUBMISSIONS WILL NOT BE ACCEPTED AT OTHER THAN THE ABOVE ADDRESS

Note that the official receipt date for hand-delivered vouchers/invoices will be the date it is received by the official agency billing office in the Division of Contracts and Property Management.

Agency Payment Office: Payment will continue to be made by the office designated in the contract in Block 13 of the Standard Form 26 or Block 25 of the Standard Form 33, whichever is applicable.

Frequency: The contractor shall submit a voucher or invoice only after the NRC's final acceptance of services rendered or products delivered in performance of the contract unless otherwise specified in the contract.

Preparation and Itemization of the Voucher/Invoice: The voucher/invoice shall be prepared in ink or by typewriter (without strikeovers). Corrections or erasures must be initialed. To be considered a proper voucher/invoice, all of the following elements must be included:

1. Contract number
2. Sequential voucher/invoice number
3. Date of voucher/invoice
4. Project Officer's name and mail stop as designated in the contract.
5. Payee's name and address. (Show the name of the contractor and its correct address. In addition, when an assignment of funds has been made by the contractor, or a different payee has been designated, include the name and address of the payee.) Indicate the name and telephone number of the individual responsible for answering questions which the NRC may have regarding the voucher/invoice.
6. Description of articles or services, quantity, unit price, and total amount.
7. Weight and zone of shipment, if shipped by parcel post.
8. Charges for freight or express shipments. Attached prepaid bill if shipped by freight or express.
9. Instructions to consignee to notify the Contracting Officer of receipt of shipment.
10. For Indefinite Delivery contracts or contracts under which progress payments are authorized, the final voucher/invoice shall be marked "FINAL VOUCHER" or "FINAL INVOICE."

Currency: Billings may be expressed in the currency normally used by the contractor in maintaining his accounting records and payments will be made in that currency. However, the U.S. dollar equivalent for all vouchers/invoices paid under the contract may not exceed the total US dollars authorized in the contract.

Supersession: These instructions supersede any previous billing instructions.

BILLING INSTRUCTIONS FOR
COST-REIMBURSEMENT TYPE CONTRACTS

General: The contractor shall prepare vouchers/invoices for reimbursement of costs in the manner and format described herein. A sample voucher/invoice is provided for your reference. FAILURE TO SUBMIT VOUCHERS/INVOICES IN ACCORDANCE WITH THESE INSTRUCTIONS WILL RESULT IN REJECTION OF THE VOUCHER/INVOICE AS IMPROPER.

Number of Copies: An original and three copies, including supporting documentation shall be submitted. A copy of all supporting documents must be attached to each copy of your voucher/invoice. Failure to submit all the required copies will result in rejection of the voucher/invoice as improper.

Designated Agency Billing Office: Vouchers/invoices shall be submitted to the following address:

U.S. Nuclear Regulatory Commission
Division of Contracts and Property Management
Contract Administration Branch, P-902
Washington, D.C. 20555

HAND DELIVERY OF VOUCHERS/INVOICES IS DISCOURAGED AND WILL NOT EXPEDITE PROCESSING BY NRC. However, should you choose to deliver vouchers/invoices by hand, including delivery by any express mail services or special delivery services which use a courier or other person to deliver the voucher/invoice in person to the NRC, such vouchers/invoices must be addressed to the above Designated Agency Billing Office and will only be accepted at the following location:

U.S. Nuclear Regulatory Commission
One White Flint North
11555 Rockville Pike
Mail Room
Rockville, Maryland 20852

HAND-CARRIED SUBMISSIONS WILL NOT BE ACCEPTED AT OTHER THAN THE ABOVE ADDRESS.

Note that the official receipt date for hand-delivered vouchers/invoices will be the date it is received by the official agency billing office in the Division of Contracts and Property Management.

Agency Payment Office: Payment will continue to be made by the office designated in the contract in Block 12 of SF 26 or Block 25 of SF 33, whichever is applicable.

Frequency: The contractor shall submit claims for reimbursement once each month, unless otherwise authorized by the Contracting Officer.

Form: Claims should be submitted in the format depicted on the attached sample form entitled "Voucher for Purchase and Services Other than Personal" (see Attachment 1). The sample form is provided for guidance only. The form is not required for submission of a voucher/invoice. Alternate formats are permissible provided all requirements of the billing instructions are addressed. Additional copies of the form are available from the Contracting Officer. The instructions for preparation and itemization of the voucher/invoice are included with the sample form (see Attachment 2).

Task Ordering Contracts: If the contractor bills for more than one task order under a voucher/invoice, detailed cost information for each individual task order shall be submitted, together with a cumulative summary of all charges billed on the voucher/invoice. This includes all applicable cost elements discussed in paragraphs (a) through (p) of the attached instructions, together with appropriate supporting information (see Attachment 3 for a sample of support information).

Fee Recovery Billings: Pursuant to the provisions of 10 CFR Parts 170 and 171 on license fees, the NRC must recover the cost of work performed. Accordingly, the contractor must provide the total amount of funds billed during the period, fiscal year to date and the cumulative total for each task or task assignment by facility or report. The fee recovery billing reports shall be on a separate page, and shall be in the format provided in Attachment 4. The billing period for fee recovery costs should be from the first day of each calendar month to the last day of the same month. Each separate fee billing report must be attached to the monthly invoice and cover the same period as the invoice.

Each report will contain a docket number or other unique identifier. The NRC will provide a unique identifier for all work performed. Costs should be reported as whole number to the nearest cent. For work that involves more than one facility at the same site, each facility should be listed separately and the costs should be split appropriately between the facilities. Common costs, as defined below, shall be identified as a separate line item in the fee recovery billing report each month.

Common costs are those costs that are not licensee unique and associated with the performance of an overall program that benefit all similar licensees covered under that program or that are required to satisfactorily carryout the program. Common costs include costs associated with the following: preparatory or startup efforts to interpret and reach agreement on methodology, approach, acceptance criteria, regulatory position, or technical reporting requirements; efforts associated with the "lead plant" concept that might be involved during the first one or two plant reviews; meetings and discussions involving the above efforts to provide orientation, background knowledge or guidance during the course of a program; any technical effort applied to a docket or other unique identifier; and project management. Common costs must be reported monthly for each docket or unique identifier. Common costs must be computed based on the proportion of direct cost incurred against each docket or unique identifier for the billing period.

Billing of Cost After Expiration of Contract: If costs are incurred during the contract period and claimed after the contract has expired, the period during which these costs were incurred must be cited. To be considered a proper expiration voucher/invoice, the contractor shall clearly mark it "EXPIRATION VOUCHER" or "EXPIRATION INVOICE".

Final vouchers/invoices shall be marked "FINAL VOUCHER" or "FINAL INVOICE".

Currency: Billings may be expressed in the currency normally used by the contractor in maintaining his accounting records; payments will be made in that currency. However, the U.S. dollar equivalent for all vouchers/invoices paid under the contract may not exceed the total U.S. dollars authorized in the contract.

Supersession: These instructions supersede any previous billing instructions.

VOUCHERS FOR PURCHASES AND SERVICES OTHER THAN PERSONAL

SAMPLE VOUCHER

Official Agency Billing Office
 U.S. Nuclear Regulatory Commission
 Division of Contracts and Property
 Management, P-902
 Washington, DC 20555
 Payee's Name and Address

- (a) Contract Number _____
- Task Order No. (If Applicable) _____
- (b) Title of Project _____
- _____
- (c) Voucher Number _____
- (d) Project Officer _____
- (e) Date of Voucher _____
- (f) Contract Amount _____
- (g) Fixed Fee _____

Individual to Contact
 Regarding This Voucher:
 Name: _____
 Tel. No.: _____

(h) This voucher represents reimbursable costs from _____ thru _____

		Amount Billed	
		(l) Current Period	(m) Inception to Date
(i)	Direct Costs		
(1)	Direct Labor *	_____	_____
(2)	Fringe Benefits _____ % If computed as percentage	_____	_____
(3)	Capitalized Nonexpendable Equipment *	_____	_____
(4)	Materials, Supplies and Noncapitalized Equipment *	_____	_____
(5)	Premium Pay _____	_____	_____
(6)	Consultants *	_____	_____
(7)	Travel - Domestic * _____ Foreign * _____	_____	_____
(8)	Subcontract *	_____	_____
(9)	Other Costs *	_____	_____
	Total Direct Costs	_____	_____
(j)	INDIRECT COSTS		
(A)	Overhead _____ % of _____ (Indicate Base)	_____	_____
	Subtotal	_____	_____
(B)	General & Administrative Expense _____ % of Cost Elements Nos. _____	_____	_____
	Total Costs	_____	_____
(k)	FIXED-FEE EARNED (Formula)	_____	_____
(n)	Total Amount Claimed	_____	_____
(o)	Adjustments	_____	_____
	Outstanding Suspensions	_____	_____
(p)	Grand Totals	_____	_____

* (REQUIRES SUPPORTING INFORMATION—SEE ATTACHED)

VOUCHERS FOR PURCHASES AND SERVICES OTHER THAN PERSONAL

Official Agency Billing Office:
 U. S. Nuclear Regulatory Commission
 Division of Contracts and Property
 Management, P-902
 Washington, D.C. 20555
 Payee's Name and Address
 ABC Corporation The National Bank
 100 Main Street or Anywhere, U.S.A.
 Anywhere, U.S.A. Assignee for ABC Corp.
 Anywhere, U.S.A.
 (When Payments Assigned)
 Individual to Contact
 Regarding This Voucher:
 Name: Harry Murphy
 Tel. No.: 215-321-8654

(a) Contract Number NRC-10-81-624
 Task Order No. (If Applicable) 002
 (b) Title of Project "Study of Nuclear
 Waste Concepts"
 (c) Voucher Number 003
 (d) Project Officer _____
 (e) Date of Voucher _____
 (f) Contract Amount _____
 (g) Billing Period _____

(h) This voucher represents reimbursable costs from 3/1/82 thru 3/30/82

	Amount Billed	
	(l) Current Period	(m) Inception to Date
(i) Direct Costs		
(1) Direct Labor *	\$2,400	\$6,800
(2) Fringe Benefits @ 16.5% (if computed as percentage)	600	1,200
(3) Capitalized Nonexpendable Equipment *	5,000	8,000
(4) Materials, Supplies and Noncapitalized Equipment *	2,000	4,000
(5) Premium Pay	100	150
(6) Consultants *	100	100
(7) Travel - Domestic *	200	200
Foreign *		200
(8) Subcontract *	200	9,000
(9) Other Costs *	3,000	\$29,650
<u>Total Direct Costs</u>	<u>\$13,600</u>	
(j) INDIRECT COSTS		\$29,650
A) Overhead 100% of Total Direct Costs (Indicate Base)	\$13,600	
<u>Subtotal</u>	<u>\$27,200</u>	<u>\$59,300</u>
B) General & Administrative Expense 12% of Cost Elements Nos. 1-9.A	3,264	6,450
<u>Total Costs</u>	<u>\$30,464</u>	<u>\$65,750</u>
	1,523	3,400
(k) FIXED-FEE EARNED (Formula)	\$31,987	\$69,150
(n) Total Amounts Claimed		
(o) Adjustments	1,700	1,700
Outstanding Suspensions		
(p) Grand Totals	\$30,287	\$67,450

* (REQUIRES SUPPORTING INFORMATION.)
 (SEE ATTACHED.)

INSTRUCTIONS FOR PREPARING
COST INFORMATION FOR NRC CONTRACTS

Preparation and Itemization of the Voucher/Invoice: In order to constitute a proper invoice, the contractor shall furnish all the information set forth below. These notes are keyed to the entries on the sample voucher/invoice.

Official Agency Billing Office: Address the original and 3 copies of the voucher/invoice, together with supporting documentation attached to each copy to: U. S. Nuclear Regulatory Commission, Division of Contracts and Property Management, P-902, Washington, D. C. 20555.

Vouchers/invoices delivered by hand, including delivery by an express mail services or special delivery services which use a courier or other person to deliver the voucher/invoice in person to the NRC, should be addressed in accordance with the foregoing and delivered to: U. S. Nuclear Regulatory Commission, One White Flint North, 11555 Rockville Pike, Rockville, Maryland 20852. Hand-delivered vouchers/invoices will not be accepted at other than the above address. Note, however, that the official receipt date for hand-delivered vouchers/invoices will be the date it is received by the official agency billing office in the Division of Contracts and Property Management.

Payee's name and address. Show the name of the contractor as it appears in the contract and its correct address. When an approved assignment has been made by the contractor, or a different payee or addressee has been designated, insert the name and address of the payee. Indicate the name and telephone number of the individual responsible for answering any questions that the NRC may have regarding the invoice.

- (a) Contract Number. Insert the NRC contract number
Task Order Number, if applicable. Insert the task order number.
- (b) Title of Project. List the full title of the project being performed under the contract.
- (c) Sequential voucher/invoice number. The appropriate sequential number of the voucher/invoice, beginning with 001 should be designated. Contractors may also include individual internal accounting numbers, if desired, in addition to the 3-digit sequential number.
- (d) Project Officer's name as designated in the contract.
- (e) Date of voucher/invoice. Insert the date the voucher/invoice is prepared.
- (f) Contract Amount. Insert the total estimated cost of the contract, exclusive of fixed-fee. Include this information as it applies to individual task orders as well.

- (g) Fixed-Fee. Insert total fixed-fee. Include this information as it applies to individual task orders as well.
- (h) Billing Period. Insert the beginning and ending dates (day, month, year) of the period during which costs were incurred and for which reimbursement is claimed.
- (i) Direct Costs. Insert the major cost elements:

- (1) Direct Labor. This consists of salaries and wages paid (or accrued) for direct performance of the contract itemized as follows:

Labor Category	Labor Hrs. Negotiated	Hours Billed	Rate	Total	Cumulative Hours Billed
-------------------	--------------------------	-----------------	------	-------	----------------------------

- (2) Fringe Benefits. This represents fringe benefits applicable to direct labor and billed as a direct cost. Where a rate is used, indicate the rate. Fringe benefits included in direct labor or in other indirect cost pools should not be identified here.
- (3) Direct Equipment. For educational institutions, list each item costing \$500.00 or more and having a life expectancy of more than one year. For contractors other than educational institutions, list each item costing \$200.00 or more and having a life expectancy of more than one year. List only those items of equipment for which reimbursement is requested. A reference shall be made to the following (as applicable): (a) the item number for the specific piece of equipment listed in the property schedule of the contract; (b) the Contracting Officer's approval letter if the equipment is not covered by the property schedule; or (c) be preceded by an asterisk (*) if the equipment is below the approval level. Further itemization of vouchers/invoices shall only be required for items having specific limitations set forth in the contract.
- (4) Materials, Supplies, or Other Expendable Items. These are consumable materials, supplies, and equipment other than that described in (3) above.
- (5) Premium Pay. This is remuneration in excess of the basic hourly rate. (Requires written approval of the Contracting Officer.)
- (6) Consultant's Fee. The supporting information must include the name, hourly or daily rate of the consultant, and reference the NRC approval (if not specifically approved in the original contract).

- (7) Travel. Domestic travel is travel within the United States, its territories, possessions, and Canada. It should be billed separately from foreign travel.

All costs associated with each trip must be shown in the following format:

Date		Traveler	Destination		Purpose	Cost
From	To		From	To		

- (8) Subcontracts. Include separate detailed breakdown of all costs paid to approved subcontractors during the billing period.
- (9) Other. List all other direct costs by cost element and dollar amount separately.
- (j) Indirect Costs - Overhead. Cite the formula (rate and base) in effect during the time the cost was incurred and for which reimbursement is claimed.
- (k) Fixed Fee. If the contract provides for a fixed fee, it must be claimed as provided for by the contract. Cite the formula or method of computation. The contractor may bill for fixed fee only up to 85% of total fee.
- (l) Amount Billed for Current Period. Insert the amount billed for the major cost elements, adjustments, and total amount for the period.
- (m) Cumulative Amount from Inception to Date of Current Billing. Insert the cumulative amounts billed for the major cost elements and adjusted amounts claimed during this contract.
- (n) Total Amounts Claimed. Insert the total amounts claimed for the current and cumulative periods.
- (o) Adjustments. This includes cumulative amounts billed that have been suspended or disallowed.
- (p) Grand Totals.

SAMPLE
SUPPORTING INFORMATION

1) Direct Labor - \$2400

<u>Labor Category</u>	<u>Labor Hours Negotiated</u>	<u>Hours Billed</u>	<u>Rate</u>	<u>Total</u>	<u>Cumulative Hours Billed</u>
Senior Engineer I	2400	100	\$14.00	\$1400	975
Engineer	1500	50	\$10.00	\$500	465
Computer Analyst	700	100	\$5.00	\$500	320
				<u>\$2400</u>	

3) Direct Equipment

Spectrometer - General Electric (as approved in Property Schedule) \$5,000

4) Materials, Supplies & Other Expendable Items

10 Radon Tubes @ \$110.00	=	\$1100.00
6 Pairs Electrostatic Gloves @ \$150.00	=	\$900.00
		<u>\$2000.00</u>

5) Premium PayWalter Murphy - 10 hours @ \$10.00 Per Hour = \$100
(This was approved by NRC in letter dated 3/6/89.)6) Consultants' Fee

Dr. Carney - 1 hour @ \$100 = \$100

7) Travel

<u>Date</u>	<u>Traveler</u>	<u>Destination</u>	<u>Purpose</u>	<u>Costs</u>
<u>From</u> <u>To</u>		<u>From</u> <u>To</u>		
3/1/89 3/6/89	William King	Chicago, IL Wash., DC	Meeting with Project Officer	\$200

8) Subcontracts

XYZ CORP. (CPFF)

Direct Labor:	- 80 hours @ \$20.00 per hour	= \$1600.00
O/H	@ 50%	= \$800.00
Travel - 2 Trips - Wash., DC	@ \$200	= \$400.00
	to Boston, MA	
Profit	@ 7%	= \$200.00
TOTAL:		<u>\$3000.00</u>

(k) Fixed-Fee (Formula)

(5%)

$\$350,000 \times 5\% = \$17,500$ Total Fixed Fee for this Contract

$\$27,200 \times 5\% = \1360 Fee Billed for this Period

(o) Adjustments

\$1700 - Indicates amount withheld from voucher #001, now approved by Contracting Officer letter 3/10/89.

ATTACHMENT 4

MONTHLY CONTRACTUAL COST SUMMARY REPORT FOR FEE BILLING

FIN: _____

Facility Name or Report Title: _____

TAC or Inspection Report Number: _____
(or other unique identifier)

Docket Number (if applicable): _____

<u>Cost Categories</u>	<u>Period Amount</u>	<u>Period Cost Incurred</u>	<u>Fiscal Year To Date Costs</u>	<u>Total Cumulative Costs</u>
Labor				
Materials				
Subcontractor/ Consultant				
Travel				
Other (specify)				
Common Costs				
Total				

Remarks:

Unclassified Contractor and Grantee Publications in the NUREG Series

Directive

(Formerly
MC 3202) **3.8**

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U. S. Nuclear Regulatory Commission

Volume: 3 Information Management

Part 1: Publications, Mail, and Information
Disclosure

ADM

Unclassified Contractor and Grantee Publications in the NUREG Series Directive 3.8

Policy

(3.8-01)

This directive and handbook govern the publishing of (1) unclassified NRC contractor, consultant or grantee formal reports, books, and international agreement reports, in the NUREG/CR, NUREG/GR, and NUREG/IA series; (2) reports and books by contractors of the U.S. Department of Energy (DOE); and (3) publications prepared for NRC under memoranda of understanding and interagency agreements.

Objectives

(3.8-02)

- To ensure the production and dissemination of information and publications as required by the Energy Reorganization Act of 1974 and the Freedom of Information Act. (a)
- To ensure the technical and management reviews of formal reports and books prior to publication. (b)
- To ensure that national security, patent rights, copyrights, proprietary rights, and rights in other sensitive unclassified information, including those specified in interagency and international agreements and memoranda of understanding, are not compromised by the release or publication of information by NRC. (c)
- To ensure that all unclassified NRC contractor or grantee publications in the NUREG series carry the registered Government identification NUREG/CR-0000, NUREG/GR-0000, or NUREG/IA-0000, with the exception of some publications

**Unclassified Contractor and Grantee
Publications in the NUREG Series
Part 1 - Publications, Mail, and Information Disclosure
Directive 3.8**

Objectives

(3.8-02) (continued)

- prepared by grantees, and indicate the availability of source material used in these publications. (d)
- To ensure that NRC-sponsored book manuscripts receive proper peer review from experts within and outside NRC. (e)
 - To provide uniform procedures for publishing formal reports and books prepared by NRC contractors or grantees. (f)

Organizational Responsibilities and Delegations of Authority

(3.8-03)

Executive Director for Operations (EDO)

(031)

Delegates to the Deputy Executive Directors for Operation decisionmaking authority for the resolution of differences between NRC and contractors about the contents of publications, about granting contractors permission to publish NRC-sponsored information in the open literature, and about permitting contractors to issue press or other media releases concerning NRC-sponsored information.

Deputy Executive Director for Nuclear Reactor Regulation, Regional Operations and Research

(032)

As delegated from the EDO, makes final decisions in the following areas for the Office of Nuclear Reactor Regulation, Office of Nuclear Regulatory Research, and Regional Offices:

- When an Office Director refuses to publish an NRC-sponsored document because of irreconcilable differences between themselves and the author(s) about the contents of the document. (a)
- When an Office Director refuses to permit a contractor's principal investigator to publish NRC-sponsored information in the open literature. (b)

**Deputy Executive Director for
Nuclear Reactor Regulation,
Regional Operations and Research**
(032) (continued)

- When an Office Director refuses to permit a contractor to issue a press or other media release about an NRC-sponsored publication. (c)

**Deputy Executive Director for
Nuclear Materials Safety, Safeguards,
and Operations Support**
(033)

As delegated from the EDO, makes final decisions in the following areas for the offices reporting to this official:

- When an Office Director refuses to publish an NRC-sponsored document because of irreconcilable differences between themselves and the author(s) about the contents of the document. (a)
- When an Office Director refuses to permit a contractor's principal investigator to publish NRC-sponsored information in the open literature. (b)
- When an Office Director refuses to permit a contractor to issue a press or other media release about an NRC-sponsored publication. (c)

Directors of Offices
(034)

- Ensure that publications will be reviewed in draft prior to final printing and distribution for acceptability by determining that they are consistent with agency policy, management decisions, and that they raise no significant legal issues. (a)
- Ensure that statements of work include statements requiring contractor* compliance with this directive and handbook and Government Printing and Binding Regulations. (b)

*"Contract" in this context encompasses the "Standard Order for DOE Work" (NRC Form 173), interagency and international agreements, and grants.

**Unclassified Contractor and Grantee
Publications in the NUREG Series
Part 1 - Publications, Mail, and Information Disclosure
Directive 3.8**

**Directors of Offices
(034) (continued)**

- Sign, or delegate signature authority for, the NRC Form 426A, "Release to Publish Unclassified NRC Contractor, Consultant, or Conference Proceedings Reports," and for memoranda requesting reprints of contractor publications. (c)

**Director, Office of Administration (ADM)
(035)**

As delegated from the Deputy Executive Director for Nuclear Materials Safety, Safeguards, and Operations Support, administers NRC's programs and policies for publishing unclassified contractor and grantee reports and books in the NUREG series.

**Director, Division of Freedom of
Information and Publications
Services, ADM
(036)**

- Develops and administers, as delegated from the Director, ADM, NRC's program and policies for publishing unclassified contractor, consultant, and grantee formal reports, books, and international agreement reports in the NUREG/CR, NUREG/GR, and NUREG/IA series. (a)
- Applies the policy, procedures, standards, and guides for the documentation, formatting, composition, printing, and dissemination of NRC-sponsored publications in the NUREG series consistent with the mission of the agency and in accordance with the requirements of the Government Printing and Binding Regulations issued by the Joint Committee on Printing, U.S. Congress. (b)
- Develops and administers the central agency publication numbering system for identifying, producing, and retrieving unclassified NRC-sponsored publications in the NUREG series. (c)

**Director, Division of Contracts and
Property Management, ADM
(037)**

Ensures that those requests for proposals, invitations for bids, and grant proposals, and the ensuring contracts and grants that require

Unclassified Contractor and Grantee
Publications in the NUREG Series
Part 1 - Publications, Mail, and Information Disclosure
Directive 3.8

**Director, Division of Contracts and
Property Management, ADM**
(037) (continued)

publications as deliverables, include provisions requiring contractor compliance with this directive and handbook and Government Printing and Binding Regulations.

Applicability
(3.8-04)

Employees
(041)

This directive and handbook apply to and must be followed by all NRC employees.

Other Publications
(042)

The provisions of this directive and handbook do not apply to NRC staff publications in the NUREG series, NRC docket material, or documents created by NRC boards, panels, advisory committees, and offices that report to the Commission.

Handbook
(3.8-05)

Detailed guidelines for the preparation of publications are contained in Handbook 3.8.

References
(3.8-06)

1. Executive Order 12291—Federal Regulation, February 17, 1981.
2. Title 17, U.S. Code, Copyrights.
3. Government Printing and Binding Regulations, S. Pub. 101-9, February 1990.

References

(3.8-06) (continued)

4. DOE-NRC Memorandum of Understanding, February 24, 1978.
5. Title 44, U.S. Code, "Public Printing and Documents," Chapter 3, Government Printing Office.
6. U.S. Government Printing Office *Style Manual*, 1984.
7. Energy Reorganization Act of 1974 (42 U.S.C. 5801, et seq.).
8. The Freedom of Information Act (5 U.S.C. 522).
9. Public Law 95-224, The Federal Grant and Cooperative Agreement Act, February 3, 1978.
10. Grants and Agreements with Institutions of Higher Education, Hospitals, and Other Nonprofit Organizations, OMB Circular A-110, July 1976.
11. Cost Principles for State and Local Governments, OMB Circular A-87, January 1981.
12. NUREG-0650, Revision 1, "Publishing Documents in the NUREG Series," November 1990.

**Unclassified Contractor and
Grantee Publications in the
NUREG Series**

Handbook

(Formerly
Appendix 3202) **3.8**

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Introduction

This handbook specifies the procedures necessary for Nuclear Regulatory Commission (NRC) contractors and grantees to follow when preparing the following kinds of publications for the NRC.

- Final NUREG Reports
- International Agreement Reports
- Books
- Grant Publications

The handbook is divided into five major parts and includes a glossary and exhibits. Part I provides general information for staff consideration in the preparation of statements of work. Parts II, III, IV, and V provide publishing guidelines specific to, respectively, **contractor reports, international agreement reports, books, and grantee publications.**

Contractor means a private contractor, consultant, expert, another State or Federal agency working under an interagency agreement, or a DOE facility or subcontractor, such as the National Laboratories, working under the DOE/NRC Memorandum of Understanding of February 24, 1978, and any subcontractors of these organizations.

This directive and handbook, as well as a copy of "Publishing Documents in the NUREG Series" (NUREG-0650, Revision 1), must be included or referenced in all contracts, interagency and international agreements, and grants for which the publications listed above are contract deliverables or grant obligations. In addition to the guidelines specific to each type of publication that appear in subsequent parts of this handbook, all statements of work must contain the applicable guidelines outlined in Part I.

Part I

Preparing Publication Requirements for Statements of Work for Contracts

Specifying Publication Requirements (A)

List and describe the type of technical reports required from each project, task or subtask, as applicable. State when, how many, and to whom they should be submitted and the scope of information they should contain. These reports may be unclassified, sensitive unclassified, or classified. For guidelines and requirements covering sensitive unclassified and classified publications, refer to NRC Management Directive 12.2, NRC Information Security Program (formerly MC 2101).

This directive and handbook pertain to publications that will be issued in the NUREG/CR, NUREG/IA, and NUREG/GR series.

Publishing Formal Reports (B)

NUREG series reports will be printed and distributed by NRC from camera-ready copy submitted by the contractor to the Regulatory Publications Branch, MS P-223, U.S. Nuclear Regulatory Commission, Washington, DC 20555. The camera-ready copy is to be prepared in accordance with the provisions of this handbook. Recommended guidelines for the organization and format of formal reports are specified in "Publishing Documents in the NUREG Series" (NUREG-0650, Revision 1).

When the report contains sensitive unclassified or classified information, the contractor must comply with Management Directive 12.2, NRC Information Security Program (formerly MC 2101).

Publishing Formal Reports (B) (continued)

If a draft is desired prior to completion of a final report, specify in the statement of work (SOW) the due date for delivering the final camera-ready copy after receiving NRC or participant comments (if applicable) on the draft. State that all draft material be submitted to the cognizant NRC contact.

When the contractor is to submit draft material for comment prior to the preparation of the final report, state that if there are NRC program or participant comments (if applicable), the contractor will be asked to make changes. If agreement on the changes is reached, the NRC contact will authorize the contractor to prepare the final copy and submit it to the NRC contact, if it is a letter report or input to a Safety Evaluation Report or an Environmental Statement, or to the Director, Division of Freedom of Information and Publications Services (DFIPS), if it is a camera-ready copy for printing and distribution. This is to be done to ensure proper publication, handling, distribution and, among other things, to preclude further changes that might nullify the agreement.

If special caveats were agreed to between the contractor and the NRC contact, the caveats should accompany Form 426A (Exhibit 1) for approval when it is sent to the NRC contact. A copy of special caveats should also accompany the camera-ready copy sent to DFIPS.

If agreement on changes to a formal technical report to be issued in the NUREG/CR series is not reached, the NRC contact may request the contractor to prepare the camera-ready copy with, in addition to the standard disclaimer required on all contractor formal reports (see Section II.F. below), any caveats deemed necessary to cover NRC objections. Such caveats may range from "The views expressed in this report are not necessarily those of the U.S. Nuclear Regulatory Commission" to the addition of a preface setting forth the NRC opinion or footnotes at appropriate locations within the text.

If NRC objections cannot be covered in this manner, NRC can refuse to publish the report. In the case of DOE/National Laboratory reports, the DOE Operations Office Manager responsible for that laboratory should be informed by the NRC Office Director or Regional Administrator of the decision and the reasons therefor, with a copy to the Laboratory Director. In the case of another Federal agency, a State, or a private contractor, the person who entered into the contract should similarly be informed by the NRC contracting officer. The contractor is then free to publish the report without NRC

Publishing Formal Reports (B) (continued)

being identified as the funding sponsor of the report and without the NRC disclaimer. Office Director or designee decisions may be appealed to the appropriate Deputy Executive Director for Operations.

Publishing Unclassified Information in Open Literature and Presenting Papers (C)

Specify whether the contractor's principal investigator is permitted to publish in the **open literature** instead of submitting a final report and/or to present papers at public or association meetings during the course of the work. If that arrangement is authorized, add the following statement to the Statement of Work (SOW):

The principal investigator(s) may publish the results of this work in the open literature instead of submitting a final report and/or present papers at public or association meetings at interim stages of the work.

If the NRC contact wants to review the paper or journal article prior to presentation or submission for publication, state so in the SOW, as follows:

The principal investigator(s) may publish the results of this work in the open literature instead of submitting a final report and/or present papers at public or association meetings at interim stages of the work, if the article or paper has been reviewed by the NRC contact in draft form and agreement has been reached on the content.

If the agreement is not reached, NRC may also require that the paper include in addition to the standard statement "Work supported by the U.S. Nuclear Regulatory Commission," any caveats deemed necessary to cover NRC objections. If NRC objections cannot be covered in this manner, NRC may refuse to authorize publication in the open literature and/or presentation of papers.

In the latter case, NRC will inform the contractor of the decision, as stated above. The contractor is then free to publish without NRC being identified as the funding sponsor of the information. Office Director

Publishing Unclassified Information in Open Literature and Presenting Papers (C) (continued)

or designee decisions may be appealed to the appropriate NRC Deputy Executive Director for Operations.

If the contractor proposes to publish in the **open literature** or present the information at meetings *in addition* to submitting the required technical reports, approval of the proposed article or presentation should be obtained from the NRC. The NRC shall take one of the following actions: approve the material as submitted, approve it subject to NRC-suggested revisions, or disapprove it. In any event, the NRC may disapprove or delay presentation of papers on information that is subject to Commission approval that has not been ruled upon or which has been disapproved.

If the contractor requests permission to publish in the open literature even though the contract does not explicitly provide for this type of publication, the contract can be modified to provide for such presentations.

When the contractor submits journal articles for publication, each must be accompanied by the following statement:

The submitted manuscript has been authored by a contractor of the U.S. Government under Contract* No. _____. Accordingly, the U.S. Government has a nonexclusive, royalty-free license to publish or reproduce the published form of this contribution, or allow others to do so, for U.S. Government purposes.

All published papers and articles must include the following disclaimer:

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, or any of their employees, makes any warranty, expressed or implied, or assumes any legal liability or responsibility for any third party's use or the results of such use, of any information, apparatus, product or process disclosed in this report, or represents that its use by such third party would not infringe privately owned rights. The views expressed in this paper are not necessarily those of the U.S. Nuclear Regulatory Commission.

*For DOE work orders the appropriate FIN number is applicable

Publishing Unclassified Information in Open Literature and Presenting Papers (C) (continued)

Should the contractor be requested by the journal or other publisher to transfer the copyright, the contract author will respond to the journal or other publisher in writing in accord with the sample letter shown as follows:

Dear (Copyright Holder's Name):

We recently received a document for signature assigning copyright and republication rights in the submitted article (title) to (name of publication). This letter is offered in lieu of the document as a means of completing the transfer of ownership. Accordingly, we hereby expressly transfer and assign our rights of ownership in the above-cited work to (name of publisher).

You are advised, however, that the above assignment and any publication or republication of the above-cited work is subject to the following Government rights:

The submitted manuscript has been authored by a contractor of the U.S. Government under Contract No. _____. Accordingly, the U.S. Government has a nonexclusive, royalty-free license to publish or reproduce the published form of this contribution, or allow others to do so, for U.S. Government purposes.

Sincerely,

If NRC approves open literature publication and page charges and travel costs are required for the presentation of papers, see Management Directive 3.10, NRC Contractor Unclassified Papers, Journal Articles, and Press or Other Media Releases on Regulatory and Technical Subjects (formerly MC 3206).

Reports Containing Sensitive Unclassified and Classified Information (D)

Examples of the proper marking of reports designated Official Use Only, Limited Official Use, Proprietary Information, Safeguards

Reports Containing Sensitive Unclassified and Classified Information (D) (continued)

Information, and Classified (Confidential, Secret, and Top Secret) are provided in Management Directive 12.2, NRC Information Security Program (formerly MC 2101).

Conference and Workshop Proceedings (E)

If NRC approves publication of compilations of papers presented at NRC-sponsored or cosponsored meetings, conferences, and symposia, see Management Directive 3.11, Conferences and Conference Proceedings (formerly MC 3207).

Distribution of Reports to Contractors (F)

Up to 50 copies of printed unclassified NUREG/CR, NUREG/GR, and NUREG/IA reports will be bulk shipped to the contractor by NRC. (Joint Committee on Printing's *Government Printing and Binding Regulations* permit contractors to receive up to 50 copies of reports they have produced for NRC free of charge.) If fewer than 50 copies are needed, indicate the desired quantity on NRC Form 426A (Exhibit 1). Contractors requesting single copies for specific individuals in organizations other than the contractor's organization who are not included in the distribution requested by the NRC contact may address such request(s), with written justification, to the NRC contact. If the additional distribution is approved by the NRC contact, the contractor shall send address labels with the camera-ready copy to the Regulatory Publications Branch, DFIPS, USNRC, Washington, DC 20555, and that distribution will be made along with the standard distribution.

Coordinating Contractor Press or Other Media Releases of Information (G)

A contractor may request permission to issue a press or other media release on the work being done. That request must be made to the NRC Office Director or designee, who will consult with the Public Affairs staff. The contractor must not issue a press release on nonroutine information without this prior approval. This approval may be obtained by a telephone call to the Office Director or designee to expedite the request. The contractor may appeal decisions not to authorize the release of information or delays in handling the request to the appropriate Deputy Executive Director for Operations.

Part II

Draft and Final NUREG Reports

Identification Information (A)

NUREG Number (1)

Each contractor report published by NRC must be identified by a unique alphanumeric designation controlled and maintained by the Division of Freedom of Information and Publications Services (DFIPS). To obtain an NRC report number, call the Regulatory Publications Branch, DFIPS, at FTS 49-27001 or (301)49-27001.

The NRC identification numbers will have one of the following forms:

- NUREG/CR-0000
- NUREG/GR-0000
- NUREG/IA-0000

where CR indicates **contractor report**, GR indicates **grant report**, and IA indicates **international agreement report**. The contractor report number, if any, will be placed below the NUREG number on the title page and cover.

When a report consists of more than one volume or binding or is issued in more than one edition, an appropriate volume, number, supplement, part, addendum, or revision designation must appear immediately below the NRC report number and the contractor's report number, if any.

Author Names (2)

Authors' names routinely appear on the report cover and title page, unless doing so is impractical, as for an annual report having many contributors. Editors or compilers with subject-area expertise may also be identified as such on the cover and title page. Author

Identification Information (A) (continued)

Author Names (2) (continued)

affiliations need not be listed unless the affiliation differs from the organization creating the report.

Organizational Identification (3)

The Regulatory Publications Branch, DFIPS, prepares the covers and title pages for all reports and will list information about the organization that created the report as it is provided.

Previous Reports in Series (4)

If the report being prepared is one in an ongoing series, list all previous reports in the series. Include report numbers and issuance dates. Place this list on the back of the title page.

Report Dates (5)

The report dates are shown on the title page. These dates include the month and year the report is completed, and the month and year it is published.

Report Organization and Components (B)

The organization and components of contractor reports vary somewhat, depending on their purpose and scope. Recommended format and organizational guidelines appear in "Publishing Documents in the NUREG Series" (NUREG-0650, Revision 1).

Each draft and final report prepared for NRC must include an abstract of 200 words or less that appears on a separate page preceding the table of contents. The abstract must also appear on the Bibliographic Data Sheet, NRC Form 335 (Exhibit 2A). The back of Form 335 contains instructions for completing the form (Exhibit 2B). Guidelines on the special writing requirements for preparing abstracts appears in Section 5.5 of NUREG-0650, Revision 1.

Pre-Publication Reviews (C)

Patent Review (1)

Patent implications must be considered prior to approval of reports for public release so that disclosure will not adversely affect the patent rights of NRC or the contractor. If the work being reported is contractually managed through another Government agency (e.g., DOE National Laboratories), that Government agency should be requested by the contractor to perform the patent review. The result of the review must be reported on NRC Form 426A under item 8 (Exhibit 1).

If NRC directly administers the contract, or the contractor is unable to obtain a patent clearance from the Government agency administering the contract, the responsible NRC contracting officer must be consulted, and the responsible NRC technical contact shall consider the patent implications. If there is no need for patent review because of the certainty that the report contains no description of novel technical developments that may be of an inventive nature, mark "N/A" on the NRC Form 426A in the space for the Patent Counsel's signature. If there is a possibility that there is disclosure of developments of an inventive nature, the contracting officer shall request assistance from the NRC Assistant General Counsel for Administration, Office of the General Counsel, on FTS 49-21553 or (301)49-21553.

Security Review (2)

Should a report of sensitive unclassified or classified work be required, the NRC contact must work with the NRC Division of Security to establish the appropriate procedures and inform the contractor of these procedures through the contracting officer. The standards for marking and handling these reports are given in Management Directive 12.2, NRC Information Security Program (formerly MC 2101).

Copyright Review (3)

Copyrighted material must not appear in NRC-sponsored publications without written permission from the copyright holder. See NUREG-0650, Revision 1, Section 3.4, for information about obtaining copyright permission.

Color Printing (D)

Regulations issued by the Joint Committee on Printing (JCP) restrict the use of color in printed materials to those uses that are of demonstrable value. JCP regulations specify that "Demonstrably valuable multicolor printing..." includes the following categories:

- Maps and technical diagrams where additional color is necessary for clarity. (a)
- Object identification (medical specimens, diseases, plants, flags, uniforms, etc.). (b)
- Safety programs, fire prevention, savings bonds programs, and competitive areas of personnel recruiting. (c)
- Areas wherein clearly identifiable savings in costs can be soundly predicated on multicolor use. (d)
- Printing for programs required by law, whose relative success or failure is in direct ratio to the degree of public response, and where that response can be logically attributable to the number of colors planned and the manner in which they are proposed to be used. (e)
- Color for promotional or motivational purposes such as programs concerning public health, safety, consumer benefits; or to encourage utilization of Government facilities such as programs for Social Security, Medicare, and certain areas of need for veterans would come within this category. (f)

The regulations indicate that the following categories do not meet the "demonstrable value" criteria.

- Printed items wherein additional color is used primarily for decorative effect. (a)
- Printed items where additional color is used primarily in lieu of effective layout and design. (b)
- Printed items where additional color is used excessively, i.e., four colors when two or three will fulfill the need; three colors when two are adequate; two colors when one is adequate. (c)
- Printed items wherein the inclusion of multicolor does not reflect careful, competent advanced planning which recognizes the contribution that the use of color is expected to make to the ultimate end-purpose. (d)

Color Printing (D) (continued)

If color printing is anticipated when the statement of work or Standard Order for DOE work is being prepared, contact the Regulatory Publications Branch, DFIPS. Prior approval must be granted by the Director of DFIPS. If a requirement for color printing arises as the report is being prepared, submit a written justification for its use to the Director of DFIPS.

Microfiche (E)

NRC contractors and DOE Laboratories submitting microfiche with reports must submit a hard copy of each microfiche, include headers on each microfiche, as shown in Exhibit 3, and conform to the following NRC specifications.*

1. Microfiche must conform to either the 24/98 format for source documents with 14 columns and 7 rows (reduction ratio of 1:24) or the 48/270 format for computer output microfilm with 18 columns and 15 rows (reduction ratio of 1:48).
2. The microfiche sheet must be standard 105 mm x 148 mm.
3. The microfiche must be either a silver-halide master or a black or blue-black diazo placed in acid free envelopes.
4. The microfiche must contain headers as shown in the sample in Exhibit 3. Specifically, the first block of the header must contain the NUREG number (include volume or revision, if applicable), the contractor identification number, and the classification (e.g., unclassified, proprietary). The second block must contain the description of the microfiche and may include the contractor name. The third block must contain the publication date and sheet identification.
5. The header information must be eye readable on a clear background.
6. A foldout page must be microfilmed in sections if the page is too large to be microfilmed in a double frame. No less than 25 mm overlap of original material is acceptable.

*With the exception of items 3, 4, and 8, these specifications are consistent with the American National Standard for Micrographics-Microfiche, ANSI/AIIM M55-1985. Copies of this Standard are available from the American National Standards Institute, ATTN: Sales Department, 1430 Broadway, New York, NY 10018 (212)354-3300, or from the Association for Information and Image Management, ATTN: Publications Section, 1100 Wayne Avenue, Silver Spring, MD 20910 (301)598-8202.

Microfiche (E) (continued)

7. The first frame must be blank (on the first sheet only), and the second frame must contain the National Institute of Standards and Technology's Reference Material resolution target in Microcopy Test Charts (NBS SRM 1010A).
8. Jacketed microfiche is unacceptable.

Disclaimer (F)

The following notice will be added by the Regulatory Publications Branch, DFIPS, before the printing process on the inside front cover:

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, or any of their employees, makes any warranty, expressed or implied, or assumes any legal liability or responsibility for any third party's use, or the results of such use, of any information, apparatus, product or process disclosed in this report, or represents that its use by such third party would not infringe privately owned rights.

The following additional statement, "The views expressed in this report are not necessarily those of the U.S. Nuclear Regulatory Commission" will be printed below the standard disclaimer, if appropriate. Other qualifying statements may be added, if needed.

Availability Information (G)

Reference Availability (1)

Reports or other documents referenced in text, reference sections, bibliographies, and appendixes of unclassified regulatory and technical reports in the NUREG series must be available to the public either in the public domain (as in a public library, at the Government Printing Office (GPO), at the National Technical Information Service (NTIS), or at other reference or sales outlets) or in the NRC Public Document Room (PDR). This means that references should not be made to personal communications and interviews, unpublished information and information with restricted distribution (e.g.,

Availability Information (G) (continued)

proprietary, national security, official use only, etc.). If the unretrievable information is important and unrestricted, it can be quoted in the text, in footnotes, or in appendixes. If credit is due to individuals, they can be mentioned in the text or in an acknowledgement section. Availability may be stated collectively for all entries.

Guidelines for developing and presenting reference material are provided in NUREG-0650, Revision 1.

Report Availability (2)

Most final reports are sold by the GPO and NTIS. A statement indicating this availability is added to each report, as appropriate, by the Regulatory Publications Branch, DFIPS, before the report is printed.

Draft reports for which comments are requested are typically announced in the *Federal Register* as being available from the NRC. These reports are not sold at GPO or at NTIS.

Forms (H)

Bibliographic Data Sheet (NRC Form 335) (1)

All published NRC reports must include an NRC Form 335 as the final right-hand page of the manuscript. Instructions for completing the form appear on the back of the form. A completed Form 335 must be submitted to the Regulatory Publications Branch, DFIPS, with the camera-ready copy of the report. Exhibit 2A shows a completed Form 335.

Release to Publish Unclassified NRC Contractor, Consultant, or Conference Proceedings Reports (NRC Form 426A) (2)

The NRC contact must submit a completed NRC Form 426A (Exhibit 1) with the camera-ready copy of the report to the Regulatory Publications Branch, DFIPS. NRC Form 426A must be signed by the staff member designated by the appropriate Office Director.

Printing and Reprinting (I)

The Regulatory Publications Branch, DFIPS, will review the camera-ready report submitted for printing for its adherence to the standards and requirements set forth in this directive and handbook, as well as any relevant guidelines from NUREG-0650, Revision 1. Unsatisfactory manuscripts will be returned to the NRC contractor for appropriate action.

Submit a memorandum requesting a **reprint** to the Director, DFIPS, for approval. Include with the request a written justification and the approval of the Office Director or designee for reprinting. Send address labels for recipients of the reprinted copies, if appropriate.

Distribution (J)

Distribution arrangements will be made by the Regulatory Publications Branch, DFIPS, for all copies of unclassified formal contractor reports in accordance with instructions on NRC Form 426A (Exhibit 1). The Regulatory Publications Branch, DFIPS, will also arrange automatic distribution of these reports to the NRC NUDOCS, the NRC PDR, NTIS, GPO, and the Depository Library Service.

Distribution of sensitive unclassified and classified reports will be made by the NRC sponsoring office on a case-by-case basis.

Part III

International Agreement Reports

Background and Rationale (A)

NRC has cooperative nuclear safety research programs that involve either or both foreign governments and organizations and U.S. industry. These programs include monetary contributions, information exchange, and comments on program plans and results as authorized in 42 U.S.C. 5801. To this end, international and U.S. industry agreements have been signed that provide for transmitting unclassified technical information from foreign participants to NRC. These procedures apply only to NRC-managed work.

The interests of all NRC international nuclear safety research program participants are served best by formal dissemination of information on these programs or codes developed for or in cooperation with NRC.

Identification Information (B)

Cover and Title Page (1)

These will contain a title, subtitle (if appropriate), authors, performing organization, and NRC office sponsoring the project. The cover and title page will be prepared by the Regulatory Publications Branch, DFIPS.

NRC Report Number (2)

Each report must be identified by an NRC-controlled alphanumeric number as the prime number unique to that report. The centralized document control system for unique identification is maintained by DFIPS. Numbers may be obtained by calling Regulatory Publications Branch at FTS 49-24954 or (301)49-24954.

The NRC identification number will have the form:

- NUREG/IA-0000

Identification Information (B) (continued)

NRC Report Number (2) (continued)

where IA indicates "international agreement." The foreign participant's report number, if any, may be inserted below the NUREG number on the cover, if desired.

When a report consists of more than one volume or binding or is issued in more than one edition, an appropriate volume, number, supplement, part, addendum, or revision designation must appear below the report number and the foreign participant's report number, if any.

Previous Reports in Series (3)

If the report being prepared is one in an ongoing series, list all previous reports in the series. Include report numbers and issuance dates. Place this list on the back of the title page.

Report Organization and Components (C)

The organization and components of cooperative agreement reports vary somewhat, depending on their purpose and scope. Each of these reports must include an abstract of 200 words or less that appears on a separate page before the table of contents. The abstract must also appear on the Bibliographic Data Sheet, Form 335 (Exhibit 2A). Instructions for completing the form appear on the back (Exhibit 2B). Guidance on the special writing requirements for preparing abstracts appears in Section 5.5 of NUREG-0650, Revision 1.

Availability Information (D)

References and Bibliographies (1)

Reports or other documents referenced in text, reference sections, bibliographies, and appendixes of unclassified regulatory and technical reports in the NUREG series must be available to the public either in the public domain (as in a public library, at GPO, at NTIS, or at other reference or sales outlets) or in the NRC PDR.

This means that references should not be made to personal communications, interviews, and unpublished information with restricted distribution (e.g., proprietary, national security, official use only). If the unretrievable information is important and unrestricted, it

Availability Information (D) (continued)

References and Bibliographies (1) (continued)

can be quoted in the text, in footnotes, or in appendixes. If the title of a document containing proprietary information is unclassified, it can also be quoted in the text, in a footnote, or in appendixes. If credit is due to individuals, they can be mentioned in the text or in an acknowledgement section. Availability may be stated collectively for all entries. Guidelines for developing and presenting reference material are provided in NUREG-0650, Revision 1.

Report Availability (2)

These reports will be made available for sale by GPO and NTIS.

Disclaimer (E)

The following notice will be added by the Regulatory Publications Branch, DFIPS, on the inside front cover prior to printing.

NOTICE

This report was prepared under an international cooperative agreement for the exchange of technical information. Neither the United States Government nor any agency thereof, or any of their employees, makes any warranty, expressed or implied, or assumes any legal liability or responsibility for any third party's use, or the results of such use, of any information, apparatus, product, or process disclosed in this report, or represents that its use by such third party would not infringe privately owned rights.

Forms (F)

Bibliographic Data Sheet (NRC Form 335) (1)

A typed NRC Form 335 (Exhibit 2A) must be submitted with the camera-ready copy to the Regulatory Publications Branch, DFIPS, as the final right-hand page.

Forms (F) (continued)

Release to Publish Unclassified NRC Contractor, Consultant, or Conference Proceedings Reports (NRC Form 426A) (2)

An NRC Form 426A (Exhibit 1) must be completed and signed by the Office Director or designee and submitted with the camera-ready copy of the report to the Regulatory Publications Branch, DFIPS.

Classified or Sensitive Unclassified Information (G)

The NRC contact should refer to Management Directive 12.2, NRC Information Security Program (formerly MC 2101), or call the Division of Security for answers to questions about the status of classified or sensitive unclassified information in NUREG/IA reports.

Part IV

Books

These guidelines apply to books written by contractors and grantees that are printed by NRC. See Section V below for guidance on publications, including books, by grantees.

Definition (A)

A book refers to a publication intended as a permanent reference or as a textbook or major critical review of a technical or regulatory topic.

Format (B)

Books are usually 6 x 9 inches in trim size, but size will be based on such requirements as ease of use and legibility for graphics, foldouts, and the like. The binding (casebound or paperback) will be chosen according to the need for durability. Additional guidance on manuscript preparations can be found in the U.S. Government Printing Office *Style Manual* and in *The Chicago Manual of Style* (13th edition). Refer also to NRC's "Publishing Documents in the NUREG Series" (NUREG-0650, Revision 1).

The contractor shall submit to the NRC project manager the typeset (photocomposed) manuscript suitable for printing. The NRC contact shall submit the manuscript to the Chief, Regulatory Publications Branch, DFIPS, where it will be reviewed for adherence to the standards set forth and referenced in this directive and handbook. The manuscript will also undergo a printing acceptability review by the Printing, Audiovisual, and Mail Services Branch, DFIPS. Unsatisfactory manuscripts will be reported to the NRC contact for appropriate contractual action by the NRC contracting officer or, in the case of Government agency or interagency agreement work, the publications manager of the performing organization.

Format (B) (continued)

DFIPS will approve design of the cover and title page to contain the appropriate information concerning:

- (1) author names(s)
- (2) organizational identification
- (3) public availability and sales.

All books must include a comprehensive subject index of the book's contents, unless it is made up almost exclusively of graphical or tabular matter. See NUREG-0650, Revision 1, or *The Chicago Manual of Style* (13th ed.) for guidelines on creating an index.

NRC Document Number (C)

Each book must be identified by an NRC-controlled alphanumeric code unique to that book. The alphanumeric code will have the form: NUREG/CR for contractor-prepared books and NUREG/GR for grantee-prepared books.

When a book consists of more than one volume or binding, or is issued in more than one edition, an appropriate volume, number, supplement, part addendum, or revision designation must appear directly below the document number.

Numbers are assigned by the Regulatory Publications Branch, DFIPS. The number may be obtained in advance of the time that the manuscript is submitted to DFIPS for printing by calling the Regulatory Publications Branch at FTS 49-24954 or (301)49-24954. The DFIPS staff will arrange to meet with the NRC contact for the project and when appropriate, the author(s), to discuss the publication production requirements and schedule for the book.

Availability of Reference Materials (D)

The guidelines for availability of reference material applicable in Section II.G. of this handbook also apply to contractor-prepared and grantee-prepared books published by NRC.

Reviews (E)

Peer (1)

NRC published books must undergo peer review from experts within and outside NRC. Peer review refers to a critical evaluation of the technical contents of a publication. These reviews may be conducted anonymously by reviewers from the author's own or a related field who are totally independent of the work leading to the manuscript.

Reviewers should be chosen by the NRC Office sponsoring the book from the potential audience for the publication and should provide an independent judgment about whether the publication successfully accomplishes the author's aims. Peer reviewers should be chosen for their expertise in the subject matter of the book. They may come from academia, the National Laboratories, other Federal agencies, or from other research institutes or consulting firms. They may be identified from the membership rolls of professional societies, ANSI subcommittees, and the like. Do not choose more than one reviewer from the same organization.

When assessing potential peer reviewers, screen for demonstrated competence and achievement in a specific discipline or research specialty. Assess competence based on the quality of research accomplished, publications in refereed journals, and other significant technical activities, achievements, and honors. Consider the judgement, perspective, and objectivity of reviewers. Consider also the personal integrity of those selected to ensure the confidentiality of information reviewed. Finally, avoid real or perceived conflicts of interest. Do not choose reviewers who are licensees or consultants to licensees nor reviewers from intervenor groups. Likewise, do not choose reviewers who may profit financially from influencing the information reviewed.

The services of reviewers from outside the agency may be acquired through consultant services contracts. The decision as to whether to reimburse peer reviewers should be made on a case-by-case basis, however. Recognize that reimbursing peer reviewers may give the appearance of a conflict of interest, suggesting to some that because NRC is paying for this service, the agency will seek only reviewers thought to be favorably disposed to the material reviewed. One way to offset this impression is to seek recommendations for peer reviewers from independent organizations, like the American Physics Society.

Reviews (E) (continued)

Peer (1) (continued)

the American Nuclear Society, the American Society of Mechanical Engineers, or appropriate universities. Reimbursement could then be made to the organization.

Copyright (2)

Copyrighted material must not be reproduced in NRC books without the written permission of the copyright holder. See NUREG-0650, Revision 1, Section 3.4, for information about obtaining copyright permission.

Security (3)

Based on knowledge of the information sources used, the author is responsible for ensuring that the manuscript does not contain classified or other access-controlled information. If there is uncertainty with respect to the security classification of a reference document or manuscript, an authorized classifier or the NRC Division of Security should be contacted for assistance. See also Management Directive 12.2, NRC Information Security Program (formerly MC 2101).

Patent (4)

The patent-review guidelines for draft and final formal reports specified in Section II.C of this handbook also apply to contractor- and grantee-prepared books.

Publishing Authorization Form (F)

A completed NRC Form 426A (Exhibit 1), signed by the Office Director or designees or by a DOE National Laboratory-authorized official if the publication is done for the Office of Nuclear Regulatory Research, if applicable, must be submitted to DFIPS with the book manuscript.

Disclaimers (G)

The following standard U.S. Government notice will be added prior to printing:

Disclaimers (G) (continued)

This document was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, or any of their employees, makes any warranty, expressed or implied, or assumes any legal liability or responsibility for any third party's use, or the results of such use, of any information, apparatus, product, or process disclosed in this document, or represents that its use by such third party would not infringe privately owned rights.

The following additional statement may be printed below the standard disclaimer, if authorized by the NRC Office Director or designee.

This document was prepared under U.S. Nuclear Regulatory Commission (NRC) Contract No. _____. The opinions, findings, conclusions, and recommendations expressed herein are those of the author(s) and do not necessarily reflect the views of the NRC.

Other qualifying statements may be added, if needed.

Printing (H)

Book manuscripts must be submitted by DFIPS to GPO for printing. The printing cycle requires from 6 to 8 weeks.

Distribution and Sales (I)

Distribution will be arranged by the DFIPS staff in accordance with distribution guidance provided by the NRC project manager on NRC Form 426A (Exhibit 1).

Free distribution should be limited to those who contributed materially to the book or to those for whom the book's subject matter bears directly on their work at or for NRC.

DFIPS will arrange to make the book available for sale through GPO. DFIPS will also arrange to have it made available at the NRC PDR and the GPO Depository Library Program.

Part V

Grant Publications

Background and Rationale (A)

The Nuclear Regulatory Commission funds grants for educational and nonprofit institutions, State and local Governments, and professional societies for the expansion, exchange, and transfer of knowledge and ideas pursuant to the Atomic Energy Act of 1954, as amended, Sections 31.a. and 141.b.

Publication of Results (B)

The grant will specify the publication requirements of the award. Grant results may be published by NRC, by the grantee, or in the open literature.

Publication by NRC (1)

This publication option must be governed by the guidelines specified in Part I of this handbook for reports or in Part III of this handbook for books, as appropriate. See Identification of Grant Publications in the paragraphs under V.C.

Publication by a Grantee (2)

When the grant specifies that the grantee is to publish the results, the grantee must grant to the Government a royalty-free, nonexclusive, irrevocable license to reproduce, translate, publish, use, and dispose of all copyrightable material first produced or composed in the grantee's performance under the grant.

Open Literature Publication by Grantee (3)

When the grantee submits journal articles for publication, each must be accompanied by the following statement:

Publication of Results (B) (continued)

Open Literature Publication by Grantee (3) (continued)

The submitted manuscript has been authored by a grantee of the U.S. Government under Grant No. _____. Accordingly, the U.S. Government has a nonexclusive, royalty-free license to publish or reproduce the published form of this contribution, or allow others to do so, for U.S. Government purposes.

All open literature publications prepared under this grant must contain the following statement:

This paper was prepared with the support of the U.S. Nuclear Regulatory Commission (NRC) under Grant No. _____. The opinions, findings, conclusions, and recommendations expressed herein are those of the author(s) and do not necessarily reflect the views of the NRC.

Should the grantee be requested by the journal or other publisher to transfer the copyright, the grantee author will respond to the journal or other publisher in writing in accord with the sample letter shown as follows:

Dear (Publisher's Name):

We recently received a document for signature assigning copyright and republication rights in the submitted article (title) to (name of publication). This letter is offered in lieu of the document as a means of completing the transfer of ownership. Accordingly, we hereby expressly transfer and assign our rights of ownership in the above-cited work to (name of publisher).

You are advised, however, that the above assignment and any publication or republication of the above-cited work is subject to the following Government rights:

The submitted manuscript has been authored by a grantee of the U.S. Government under grant No. _____. Accordingly, the U.S. Government has a nonexclusive, royalty-free license to publish or reproduce the published form of this contribution, or allow others to do so, for U.S. Government purposes.

Sincerely,

Publication of Results (B) (continued)

Reprints of Open Literature Publications (4)

When any article resulting from work under the grant is published in a scientific, technical, or professional journal, two reprints of the publication must be sent to the cognizant NRC Program Officer, clearly labeled with the grant number and other appropriate identifying information.

Identification of Grant Publications (C)

Each report or book published by NRC that results from a grant must be identified by an alphanumeric number, as follows:

- NUREG/GR-0000

When the publication consists of more than one volume, number, supplement, part, or binding, or is issued in more than one edition, an appropriate volume, supplement, part, or revision designation must appear below the NUREG/GR number.

Numbers may be obtained from the Regulatory Publications Branch at FTS 49-24954 or (301)49-24954.

Pre-Publication Reviews (D)

The U.S. Congress characterizes the relationship between a Federal agency and a grant recipient as one in which "the recipient can expect to run the project without agency collaboration, participation, or intervention as long as it is run in accordance with the terms of the instrument...."

Glossary*

- Book.** A publication intended as a permanent reference or textbook or as a major critical review of a technical or regulatory topic. It may be *casebound* (hardback) or paperbound.
- Camera-ready copy.** Pages ready for printing by the offset printing process. This is a colloquial term used even though the printing process may not involve the so-called copy camera (see also *reproducible masters*).
- Casebound.** Term denoting a book with a hard cover.
- Compose.** To arrange letters, in type or film, for printing. Usually synonymous with *typesetting*.
- Composition.** The process of setting type by hot-metal casting, phototypesetting, or electronic character generating devices (e.g., computers) for the purpose of producing *camera copy*, negatives, a plate, or image to be used in the production of *printing* or microform.
- Contractor report.** Record of work done (a report) prepared in accordance with the provisions of a contract or under or pursuant to an interagency agreement.
- Copyright.** A form of protection provided by the laws of the United States (Title 17, U.S. Code), to the authors of "original works of authorship" including literary, dramatic, musical, artistic, and certain other intellectual works. This protection is available to both published and unpublished works. Copyrighted material may not be reproduced without the permission of the author or publisher.
- Disseminate.** To announce the publication of reports and make them available for free distribution, sale, or copying.

*Words in *italics* in definitions are also defined in the glossary

Glossary (continued)

- Manuscript.** A handwritten, typewritten, or *composed* version of a document, as distinguished from a printed copy.
- NRC project manager.** The NRC staff member responsible for the work performed by consultants or contractors and their subcontractors, or for work performed under or pursuant to an interagency agreement.
- Paperback.** A *book* with a flexible paper cover.
- Peer review.** A critical evaluation of the technical contents of a publication. These reviews are conducted by reviewers from the author's own or a related field who are totally independent of the work leading to the *manuscript*. Reviewers should be chosen from the potential audience for the publication and should provide an independent judgment about whether the publication successfully accomplishes the author's aims.
- Photocomposition.** *Typesetting* performed when photosensitive paper or film is exposed to light in the form of letters and characters. Photocomposition is to be distinguished from hot metal and typewriter *composition*.
- Printing.** As defined by the Joint Committee on Printing, includes and applies to the process of *composition*, platemaking, presswork, collating, and microform; the equipment used in such processes; or the end product produced by such processes and equipment.
- Proprietary information.** Trade secrets; privileged or confidential research, development, commercial or financial information, exempt from mandatory disclosure under 10 CFR Part 2 (Sections 2.740 and 2.790) and under 10 CFR Part 9 (Section 9.17); and other information submitted in confidence to the NRC by a foreign source and determined to be unclassified by the NRC.
- Public domain.** Materials on which *copyright* never existed, such as U.S. Government publications, or on which copyright has expired.
- Publicly available documents.** Information (reports and references) that is available in the NRC Public Document Room (PDR) for public inspection and copying or available in the *public domain*.

Glossary (continued)

Distribute. To dispense reports to specific organizations and individuals to ensure their participation in the regulatory process and support of research and technological investigations. Such distribution may be accomplished by the use of standard distribution data banks established and maintained by the Division of Information Support Services, Office of Information Resources Management, at the request of the originating office or region.

Documentation. Classification and associated markings required for classified or sensitive unclassified documents, the NRC report number unique to the report, title (and subtitle, if any), author or correspondent (if any), organization identification and contract number (or FIN number), date, and availability.

Edition. All copies of a book printed from the same type. Edition also refers to format, such as *paperback*, *casebound*, or to the text, as revised, expanded, and so on. If extensive revisions have been made to the text and the book is reprinted, the revised version is the new edition.

Grant. A legal instrument which defines the relationship between the Government and a recipient for the transfer of money, property, services or anything of value to the recipient for the accomplishment of a public purpose of support or stimulation authorized by law. A grant presumes a limited amount of involvement by the agency in the performance by the recipient.

Grant Report. A record of work done prepared in accordance with the provisions of *grant*.

Index. An alphabetical list of all major topics discussed in a *book*. It cites the page numbers where each topic can be found. The index comes as the last section of a book.

International agreement. Cooperative nuclear safety research programs that involve either or both foreign governments and organizations and U.S. industry. Such involvement, authorized under 42 U.S.C. 5801, includes monetary contributions, information exchanges, and comments on program plans and results.

International agreement report. A record of work done prepared in accordance with the provisions of an *international agreement*.

Glossary (continued)

Reproducible masters. *Camera-ready copy* that includes (1) originals of line drawings (or prints that can be copied); (2) glossy prints of black and white photographs; (3) original *typeset* or printed text, tables, cover, title page, contents, and abstract; or (4) other forms of the materials that a printer can reproduce.

Trim size. The final size of the whole page, margins included.

Typesetting. The placement of type on a page (letters, numbers, and other characters) in conformance with specific style and layout instructions.

Unique identification. NRC identification (NUREG number) used on a report and its attachments, revisions, and supplements, that is not used on any other publication.

Unclassified Contractor and Grantee
 Publications in the NUREG Series
 Part 1 - Publications, Mail, and Information Disclosure
 Handbook 3.8 Exhibits

Exhibit 1

NRC Form 426A U.S. NUCLEAR REGULATORY COMMISSION RELEASE TO PUBLISH UNCLASSIFIED NRC CONTRACTOR, CONSULTANT, OR CONFERENCE PROCEEDINGS REPORTS (Please Type or Print)		1. REPORT NUMBER (if any) NUREG/CR-5627 BNL-NUREG-52257 <small>Obtain from the Technical Publications Section on PSD 795.</small>
2. TITLE AND SUBTITLE (Class or full as shown on abstracts) Alternate Modal Combination Methods in Response Spectrum Analysis		3. FUND OR GRANT NUMBER (Do not use DOE contract number) A-3955
4. AUTHORS (If more than three, write first author followed by "and others") P. Bezler and others		
5. CONTRACTOR Brookhaven National Laboratory Department of Nuclear Energy		MAILING ADDRESS (Number and Street, City, State and ZIP Code) Building 129 Upton, NY 11973 TELEPHONE NUMBER 665-2447
6. TYPE OF DOCUMENT (Check appropriate box) <input checked="" type="checkbox"/> A. TECHNICAL REPORT <input checked="" type="checkbox"/> FORMAL <input type="checkbox"/> LETTER REPORT <input type="checkbox"/> B. CONFERENCE PAPER (If so, complete items 11, 12, and 13 below) (1) TITLE OF CONFERENCE PAPER (2) DATE(S) OF CONFERENCE (3) LOCATION OF CONFERENCE <input type="checkbox"/> C. OTHER (Indicate type of other)		
7. DISTRIBUTION (If an NRC distribution exists, provide mailing address for reports distributed and received by NRC staff, provide name and mail room area, if external, provide complete mailing address.) RA 50 copies: Judy Liu, Technical Information Division, Bldg. 477B, Brookhaven National Laboratory, Upton, NY 11973 10 copies: Nilesh Chokshi, RES, NL/S-217		
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9. AUTHORIZATION A. DOE LAB AUTHORIZED OFFICIAL (If applicable) (Type or Print Name) SIGNATURE DATE R.A. Bari <i>R.A. Bari</i> 9/25/90 B. NRC RESPONSIBLE STAFF MEMBER SIGNATURE OFF/DIV TELEPHONE MAIL STOP DATE A. Murphy <i>Ambrose J. Murphy</i> 442-3360 NLS217A 10/10/90		

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2. TITLE AND SUBTITLE Pressure-Dependent Fragilities for Piping Components: Pilot Study on Davis-Besse Nuclear Power Station		1. REPORT NUMBER <small>(Assigned by NRC, AEC, OR, State, Fed, and Acquisition Numbers, if any.)</small> NUREG/CR-5403 EGG-2607
		3. DATE REPORT PUBLISHED <small>MONTH YEAR</small> October 1990
5. AUTHOR(S) D.A. Wesley, T.R. Kipp, D.K. Nakaki, H. Hadidi-Tamjed		4. FIN OR GRANT NUMBER B5699
		6. TYPE OF REPORT Technical
8. PERFORMING ORGANIZATION - NAME AND ADDRESS <small>(If NRC, please Division, Office or Region, U.S. Nuclear Regulatory Commission, and mailing address, if available, provide.)</small> ABB ImPELL Corporation 27401 Los Altos, Suite 480 Mission Viejo, CA 92691		7. PERIOD COVERED <small>(Month-Date)</small> Under contract to: Idaho National Engineering Laboratory EG&G Idaho, Inc. Idaho Falls, ID 83415
9. SPONSORING ORGANIZATION - NAME AND ADDRESS <small>(If NRC, give "Name of Office" of contractor, provide NRC Division, Office or Region, U.S. Nuclear Regulatory Commission, and mailing address.)</small> Division of Safety Issue Resolution Office of Nuclear Regulatory Research U.S. Regulatory Commission Washington, D.C. 20555		
10. SUPPLEMENTARY NOTES		
11. ABSTRACT <small>(200 words or less)</small> The capacities of four, low-pressure fluid systems to withstand pressures and temperatures above the design levels were established for the Davis-Besse Nuclear Power Station. The results will be used in evaluating the probability of plant damage from Interfacing System Loss of Coolant Accidents (ISLOCA) as part of the probabilistic risk assessment of the Davis-Besse nuclear power station undertaken by EG&G Idaho, Inc. Included in this evaluation are the tanks, heat exchangers, filters, pumps, valves, and flanged connections for each system. The probabilities of failure, as a function of internal pressure, are evaluated as well as the variabilities associated with them. Leak rates or leak areas are estimated for the controlling modes of failure. The pressure capacities for the pipes and vessels are evaluated using limit-state analyses for the various failure modes considered. The capacities are dependent on several factors, including the material properties, modeling assumptions, and the postulated failure criteria. The failure modes for gasketed-flange connections, valves, and pumps do not lend themselves to evaluation by conventional structural mechanics techniques and evaluation must rely primarily on the results from ongoing gasket research test programs and available vendor information and test data.		
12. KEY WORDS/DESCRIPTORS <small>(List words or phrases that will assist researchers in locating this report.)</small> pressure-dependent fragilities piping components Interfacing System Loss of Coolant Accidents (ISLOCA) probabilistic risk assessment Davis-Besse Nuclear Power Station		13. AVAILABILITY STATEMENT Unlimited
		14. SECURITY CLASSIFICATION <small>(If not Page)</small> Unclassified <small>(If not Page)</small> Unclassified
		15. NUMBER OF PAGES
		16. PRICE

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15. **NUMBER OF PAGES.** Leave blank. (Added by NTIS)
16. **PRICE.** Leave blank. (Added by NTIS)

U.S. GOVERNMENT PRINTING OFFICE: 1980 5-344-541

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The Nuclear Regulatory Commission (NRC) requires that the CSP be completed for cost reimbursement contracts when the award amount is expected to exceed \$100,000 and the period of performance is expected to exceed 6 months. For task order type contracts, a CSP is required when an individual cost reimbursement task order is expected to exceed the above thresholds. When a contract or task order modification increases the contract or task order amount of a cost reimbursement contract or task order to over \$100,000 and the period of performance from the effective date of the modification to the contract or task order expiration exceeds 6 months, a CSP is required for all contract work to be performed after the effective date of the modification.

Submission

1. A CSP is required:
 - a. as part of the cost proposal for a cost reimbursement contract or individual task order, or modification to a contract or task order which meets the above thresholds;
 - b. as part of the Best and Final Offer (if requested) as a result of negotiations;
2. Updated CSP information is required on a monthly basis or as approved by the CO as part of the "Financial Status Report" (Ref: Section F.3, "Financial Status Report").

Format

The attached CSP sample format may be duplicated and used by the Contractor, or modified to permit more accurate reporting or to meet other needs of the contractor. For instance, the sample format provides spaces to report projected costs for 12 months, but the contractor may wish to alter the sample format for shorter or longer contract/task order periods. The contractor may also wish to alter the sample format for ease of typing or automated production. So long as complete information is provided on actual and projected costs or accomplishments, changes to the format to improve relevance to the circumstances are encouraged.

It is up to the discretion of the offeror to determine the appropriate level of cost detail to be presented based on the complexity of the effort. This plan reflects only the minimum requirements for submission of cost details which will be considered for completeness, reasonableness, and as a measure of effective management of the effort. The Contracting Officer reserves the right to request additional cost information, if deemed necessary.

NRC-33-94-188

Section J
Attachment No. 4

SPECIFICATION OF THE
U. S. NUCLEAR REGULATORY COMMISSION'S
ENHANCED WIDE AREA NETWORK

November 30, 1993

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1.0 BACKGROUND

1.1 Overview

This specification documents the hardware specification parameters to be provided by the contractor for an intelligent network in support of the U.S. Nuclear Regulatory Commission's Wide Area Network (WAN). This network platform shall support integration of voice, data, facsimile and video into a single, integrated network, using wide area transmission facilities provided by the General Service Administration's (GSA) Federal Telecommunications System 2000 (FTS2000) Network "A". The contractor shall provide the NRC with a total system including design, integration, installation, testing, and management services (optional). The individual components of the system shall be selected by the contractor to fulfill the requirements in accordance with Section C.2 and Section J. Attachment A Paragraph 3.0.

1.2 Scope of Specification

Requirements for the system will consist of mandatory requirements, delivered during systems installation and tested prior to Government acceptance; growth requirements which are a future or growth capability of the system, and must be supported by the delivered system through the purchase of additional off-the-shelf hardware which has been identified by an associated vendor part number; and non-mandatory capabilities which are desired future growth options.

For the purpose of ease of discussion of the requirements for this system, this document is written to describe intelligent multiplexor technology as time division multiplexing technology. This technology is older and is easily understandable by the authors of this document. Where vendors can offer the same functionality as a time division multiplexor by using a different technology, such as frame relay, cell relay or whatever new technology satisfies the requirement, the vendor will be considered compliant as long as the functionality is provided. Time division multiplexing is not a requirement of this specification.

The network is planned to have a service life of at least 10 years. For this reason, the equipment selected shall be capable of being used in several different operating modes. Throughout this document, requirements will be identified which must be satisfied by the deliverable system, but may not be incorporated into the deliverable suite of equipment. As an example, the NRC

plans to integrate voice circuits into the WAN at a future date, and has defined an analog voice interface, with the capability to digitize the input voice for transmission on the network, as a required capability; yet this capability will not be incorporated into the initial deliverable system. The analog voice interface is a requirement designed to satisfy a future capability of the network.

Over the life of the network, the NRC WAN will grow to incorporate several different station interfaces, including voice, data, facsimile, and video. Similarly, over time, the NRC intends to redesign the WAN to utilize emerging technologies such as Frame Relay, Asynchronous Transfer Mode (ATM), Switched Multi-megabit Data Service (SMDS), or some other form of Cell Relay as the aggregate bandwidth between NRC sites. As in the case of the station interfaces, the NRC requires that vendors provide a flexible system capable of being expanded or growing to incorporate these new technologies.

The system shall be capable of providing each of the identified interfaces for the system, as described in the remainder of this section, through the addition of new system hardware and software, with minimum modification to the delivered system.

The remainder of this specification documents the functional performance, maintenance, documentation, training and testing requirements for the NRC's Wide Area Network system.

2.0 DEFINITION OF TERMS AND PHRASES

For the purposes of this specification, the following terms shall be used as described:

- the verb "shall" is used to define mandatory requirements which must be satisfied by the contractor, and are subject to verification by testing;
- the verb "will" is used to define non-mandatory requirements, or is used as a description of the Government's intent to perform the described tasks;
- the term "system" shall be construed to mean the entire suite of hardware required to satisfy the performance requirements specified in this document;
- the phrase "minimum modification to the delivered system" shall be construed to mean addition or replacement of

mounting hardware and printed circuit boards at a cost to the Government of less than 20% of the cost of the installed equipment at that node;

- throughout this document, the definition of standard telecommunications terms are as defined in Federal Standard 1037B;
- the term "station" is intended to describe those communications lines from an end communications user to the system.

3.0 PERFORMANCE REQUIREMENTS

3.1 General Requirements

This specification defines the performance requirements for the total system. The definition of the interfaces between system components shall be the responsibility of the contractor. The Government intends to monitor and test performance of the system at the boundaries of the system, i.e. between the system and Government furnished communications circuits or Data Terminal Equipment (DTE).

3.2 Initial System Implementation

The initial implementation of the system shall be in a star configuration, with the hub of the star (the central node of the network), being located at the NRC's Two White Flint North (TWFN) office building. The spokes of the system shall be the NRC's five Regional Headquarters, with locations as defined in Section C.1.1. While the NRC's initial implementation of the WAN will be a star configuration, the implementation shall be configured with equipment which can grow, or expand, to become a mesh network, allowing future connections from one Regional Office, or similarly configured network node, to another.

3.2.1 Deliverable Configuration

The deliverable system shall consist of a similarly configured suite of equipment at each of the five NRC Regional Headquarters plus a suite of equipment at the NRC Headquarters. On the premise that Fractional T-1 service is available from FTS2000, the deliverable configuration shall support FTS2000 connectivity in a star configuration from each Regional Office via Fractional T-1 communications at 128 and 256 kbps to the NRC Headquarters node. The deliverable configuration shall also support

connectivity from NRC Headquarters at 128 and 256 kbps to Regions I, II, III, and IV, with Region V being connected to Region IV at 128 kbps and relayed from Region IV to Headquarters. Should Fractional T-1 not be offered at the time of installation/implementation, the contractor shall provide the necessary network configuration to support the identified Government requirements.

Each of the Regional Office nodes shall be configured to support communications from Data Terminal Equipment at each node using the station interfaces identified in Table 3.2.1-1. Each of these station interfaces shall be connected to similarly configured input/output ports in the Headquarters node, so that the station interface capacity of Headquarters shall be at least five times the capacity of each of the Regional Nodes. In Region IV, the node shall support the additional interfaces necessary to terminate FTS2000 circuits from Region V, URFO, and SWRI and route those circuits onto the 256 kbps aggregate FTS circuit to Headquarters. (This capability is considered an optional configuration. The Government will select one configuration or the other based upon an analysis of the circuit costs for each alternative and the availability of fractional services from the carrier.)

Table 3.2.1-1 Regional Office Station Interfaces

Channels	Data Rate	Protocol
5	9.6 kbps	RS-232C or D Synchronous
1	56 kbps	V.35 Synchronous
1	56/64/128 kbps	RS-422 Synchronous

3.2.2 Equipment Required

At the Headquarters node and at each of the Regional Office nodes the system shall include all of the consoles, cabinets, power supplies and accessory equipment required to support the above system capability. In addition the contractor shall provide two Network Management Consoles configured and with all necessary features to support the management and testing of the delivered NRC network. In addition to this system configuration, the contractor shall provide a complete package of any and all necessary spares in order to support the maintenance concept defined in Section C.12.

3.3 Deliverable Growth Capability

The deliverable system shall also provide the additional hardware/software necessary to provide the mandatory growth capabilities defined in Table 3.3-1 and Section C.2. This capability shall include any and all hardware and software necessary to completely provide the growth capability defined, whether that hardware/software is necessary at one of the Regional Office Nodes, or at the NRC Headquarters node.

Table 3.3-1 Mandatory Growth Capability

1. Increase the aggregate bandwidth from any Regional Headquarters to NRC Headquarters to a full ESF configured T-1 (@ 1.544 Mbps).
2. Provide eight Full Duplex ADPCM PBX voice trunks at 32 kbps using E&M signalling between each Regional Headquarters and NRC Headquarters.
3. Provide one synchronous data card employing the RS-422 protocol at a configurable data rate of from 56 kbps to 1.536 Mbps.
4. Provide two synchronous data cards for interface to Video Conferencing equipment using the V.35 protocol at 56 and/or 64 kbps.

3.4 Architecture

The architecture of the system is the responsibility of the contractor. For the purposes of this specification, the discussion of the requirements has been broken down into a functional architecture, where requirements are grouped into a logical functional organization. This grouping is for the convenience of the Government in describing the functional requirements. The deliverable system will be required to satisfy all the functional requirements; but, it will not be required to be organized into mechanical components which follow this organization.

The functional architecture for the system is shown in Figure 3.4-1. This architecture consists of the aggregate circuit interface to FTS2000, the CSU/DSU functionality, the intelligent multiplexor (or cell switch) functionality, the station interface functionality, the network management functionality, the power supply functionality, the security functionality, and the

mechanical and accessory (including cables) functionality. Within this conceptual architecture, the intelligent multiplexor component is further broken down as shown in Figure 3.4-2, into its own power supply, the main processing unit, the internal bus, the network interface, the station interface and the network management interface. This functional architecture is provided to aid in the understanding of the organization of the requirements documented in the remainder of this specification.

3.4.1 Equipment Commonality

Within the general architecture defined above, the contractor shall provide maximum equipment commonality. The Government does not require that the equipment used at the Central hub node match the equipment used at each of the Regional Office nodes. In fact the relay requirements for the Central Hub are greater than the requirements for the Regional Hubs, and may therefore require a more capable architecture in the Central Hub. However, the system shall use the same architecture and equipment suite for each Regional Hub, with commonality across each system component for the installed system at each of these nodes. The Government also desires that the system provide maximum commonality between the Central Hub node and the Regional Hub nodes. It is desired that the station interface printed circuit boards and the communications circuit interface printed circuit boards be the same for both Regional and Central Hub nodes.

3.4.2 Intelligent Multiplexor Functional Requirements

The system will be used to provide a communications backbone connection for NRC voice, data, facsimile, and video communications requirements. Given these communications requirements, the system shall enable the input station interfaces into an aggregate communications circuit. In addition to transport of the station interfaces from one node to the other, the system shall provide communications between the network hardware and the network management system. The requirements for network management functionality are described in Paragraph 3.7. These requirements mandate that the system pass status and control information between nodes in the network. Due to the fact that the Extended Super Frame (ESF) standard communications interface (as defined in AT&T TR 54016) is considered to provide inadequate bandwidth to pass all of the command and status reports necessary to support the network management functional requirements, the Government anticipates that a non-standard communications protocol with assigned,

reserved bandwidth will be necessary. The amount of reserved bandwidth shall be limited, so that the efficiency of the system shall provide an average of at least 95.2% of the aggregate bandwidth available to support station to station communications. This 95.2% average will be exclusive of any bandwidth necessary to provide transparent signalling and/or timing between two station interfaces connected via the network. It shall include any network overhead (8 kbps), any ls density transmission requirements and any network management control or testing overhead.

The Intelligent Multiplexor shall support the Routing, Timing, and built-in-test capabilities described in the following paragraph.

3.4.3 Routing Performance

Due to the fact that communications circuits are currently priced based upon a combination of distance and bandwidth, with longer and higher bandwidth circuits being more expensive than shorter and lower bandwidth, the NRC may find it advantageous to employ "Network Routing" in the system. In this case, "Network Routing" is intended to mean that a single network node can support multiple aggregate bandwidths into and from several different system nodes. As shown in Figure 3.4.3-1, in the Central Node, the system could support as many as seven aggregate trunk interfaces to the wide area communications network, with the network configured in a pure star configuration. In addition, Figure 3.4.3-2 shows how in a partial mesh network, the system could perform drop and insert functionality at several key nodes, thereby lowering the total communications circuit costs.

3.4.4 Digital Drop and Insert Functionality

The system shall have the ability to route traffic on a channel-by-channel basis. Any inbound channel to one network node shall be able to be routed, using operator commands or pre-set stored configuration parameter definitions, to any other similarly configured station or outbound channel in that node, or in any other node in the system. In particular, the NRC requires the capability for WAN traffic generated at Region V and at the SouthWest Research Institute, in San Antonio, Texas, to be routed to Region IV for relay to the Headquarters node. (The supposition is that long distance links are more expensive than short distance links, and that the total cost of the circuits will be less by using Region IV as a relay point.) The routing function in the network hardware shall support at least three

intermediate nodes between the source and the end destination. Routing shall support "drop and insert" capability on a channel by channel basis and shall provide the ability to "bypass" or be relayed at any node to any other node. From source to destination the system shall be capable of supporting a total of 5 nodes (originator, 3 intermediate nodes, and destination node.)

Channel Routing capability shall include the ability to designate channel priorities (with at least 3 different priority levels) and to authorize automatic "bumping" or replacement of lower priority channels with higher priority channels in the event of a failure.

Bandwidth contention channels shall be capable of being designated. Switched 56 kbps digital data channels shall be capable of being designated as contention channels, and activated only when the system receives a request for access to these channels. Channel request shall be provided by transition of the EIA control leads Ready to Send and Data Terminal Ready for digital channels. Where a request for a contention circuit can not be supported due to resource availability constraints, the systems shall set Clear to Send and Data Terminal Ready to off on that digital line.

Communications circuits which are designated as permanent, non-contention trunks shall be automatically connected, and/or initialized upon start-up, or restoration of the aggregate communications trunk and upon restoration of power for any reason.

3.4.5 System Hardware Test and Diagnostic Capabilities

The system hardware at each node shall be configured to provide diagnostic capability to a contractor provided terminal. This test capability shall provide an operator with the capability to perform diagnostics on the system hardware, obtaining maintenance data on the nature and location of any failed components. This test capability shall allow troubleshooting of maintenance problems on the hardware to the circuit board level, enabling a maintenance person to identify a failed component and remove and replace that component, using maintenance procedures as defined in Section C.12.

In addition to operator controlled diagnostics as defined in the above paragraph, the system hardware shall perform a complete self test upon power up. The results of this self test shall be reported to a system terminal.

The system shall provide the capability for remote reporting of diagnostic data via the Network Management console and equipment. This requirement can be supported by a portion of the non-standard communications overhead defined in Paragraph 3.4.2, above, or can be provided by a dedicated link from an alternate terminal port, via the network to the remote Network Management console. This remote diagnostic shall provide all the reports and alarms that would be provided to a locally connected terminal, with the exception that any failure which would result in loss of the aggregate communications link, will also result in failure of the remote diagnostic capability. Paragraph 3.7 of this document describes how the Network Management System shall handle remote diagnostic capabilities.

3.4.6 Input/Output Timing

The system shall be able to provide timing for each station and network interface circuit. Each network node shall be able to generate timing for each input/output link, be capable of accepting external timing for these links, or be capable of deriving the necessary timing from the network's timing source.

The Network Hub at NRC Headquarters in Rockville, Maryland (TWFN and OWFN Office Buildings) will be the master node for each wide area network link terminating in the Headquarters. For those mesh network links which do not terminate in the Network Hub, the network node closest to the Headquarters Network Hub will be the timing reference for that link. In every wide area network link, the master network node shall provide the timing reference for that link. The slave node shall receive timing from the master multiplexor. For each master network node, the system shall be capable of either internally generating clocking for each network link, or of receiving clocking from an external source and relaying that clocking to the slave node via the wide area network circuit. For cell switching equipment, the requirements of this section shall be considered satisfied if the timing requirements of the FTS2000 trunks and synchronous station trunks are satisfied.

Each network node shall be able to generate clocking internally for both the wide area network link and for synchronous local (station) interfaces by using an internal clock rated at Stratum 3 clock accuracy level or better (Clocking shall be accurate to at least 4.6 parts in 1 million or approximately 7 Hz @ 1.544 MHz.)

Each master network node shall provide the ability to generate

timing for the network trunk from an external clock reference such as network provided clocking from a DDS circuit, or from an external master clock such as a stratum 1 or 2 station clock.

Each network node shall be capable of either generating timing reference for a station link, of receiving timing reference from the Data Terminal Equipment (DTE) on that link, or of using an external timing reference such as a station clock or DDS circuit clock as the timing reference for local, station synchronous interfaces. The system shall be capable of supporting any combination of either internally generated timing or received timing for each local, station interface.

3.4.7 Aggregate Trunk Capacity Central Hub Only

For the NRC's Network Hub located in Rockville, Maryland the system shall support up to 7 full duplex trunks each between this location and from 1 to 7 different network nodes. The node shall be sized to provide a capacity of up to 7 T-1s to and from this node. The node shall be capable of being configured to support communications with a minimum of 50 total nodes in the network.

3.4.8 Aggregate Trunk Capacity Regional Offices

For each of the 5 Regional Offices the node shall be configured with a capacity of up to 2 full duplex trunks to/from this node. The minimum input/output capacity from the node shall be 2 T-1 trunks. The Regional Offices nodes shall be configured to support processing/relay of traffic to up to 3 different network nodes.

3.4.9 Network Synchronization and Timing

The system shall comply with the synchronization and timing requirements mandated by the FTS2000 network and identified in Section 6 and Appendix B to AT&T TR 62411. As specified in this document for a network using AT&T Central Office features, the system shall: 1. Be capable of accepting the external FTS2000 network provided Stratum 1 timing source, 2. Be capable of accepting timing from an external source which is independent of the network such as a station clock, and 3. Be capable of providing Stratum 3 level (Stratum 2 accuracy, to 1.6×10^{-8} , is desired) timing from an internal clock source provided by the system. The system shall be capable of defining a single clock reference as the clock source for the entire network, and shall be capable of defining a redundant, automatically implemented fall-back timing source with at least three levels of available

redundancy, which will accommodate a failure of a primary and/or secondary timing source, leaving the network running on the secondary or tertiary timing reference as required. The system shall automatically monitor timing accuracy of the clock source in use and shall switch from one timing source to another with minimum disruption of the network. Switchover from one timing source to another shall be accomplished when the timing reference exceeds the error thresholds defined in Appendix B to AT&T TR 62411.

3.5 Network Interface Functionality

The system shall be capable of interfacing to the FTS2000 communications network via several different protocols and timing arrangements. The NRC intends to employ this system for at least ten years, and in this time span anticipates that the most economical communications protocol may change from dedicated Dataphone Digital Service (DDS) to Fractional T-1 during the initial implementation to full T-1 and eventually to some sort of high speed multi-access switched digital network such as cell relay (Asynchronous Transfer Mode [ATM]), Switched Multimegabit Data Service (SMDS), Frame Relay, or even Integrated Services Digital Network (ISDN) Primary Rate Interface (PRI). For this reason, the NRC will implement a system based upon the Fractional T-1 and/or T-1 network interface using the Extended Super Frame (ESF) protocol as defined in AT&T TR 62411, but our requirements for the system interfaces to the network include several different protocols which will not be employed in the initial implementation.

3.5.1 CSU/DSU Functionality

The system shall provide an integrated CSU/DSU functionality to support T-1.544 Extended Super Frame (ESF) communications between the system hardware and the Network. The CSU/DSU shall support conversion of the output of the system into the appropriate FTS2000 Digital Signal Level 1 (DS-1) format as defined in AT&T TR 62411. The CSU/DSU functionality shall also support the line build out for the system, allowing the setting of line signal levels and equalization. The CSU/DSU functionality shall generate the appropriate pulse density using the Bipolar Eight Zero Substitution (B8ZS) electrical protocol to connect to the network. In addition the CSU/DSU shall support provision of the Customer Premises Equipment (CPE) characteristics as defined in Paragraph 5 of AT&T TR 62411 including monitoring the CRC-6 error detection protocol, and responding to network alarms, control

signals and status requests. These signals from the system to the network and from the network to the system shall include Alarm Indications Signals (AIS), and orders for line and payload loopbacks (LLB and PLB) to enable testing and fault isolation. The CSU/DSU shall also support reporting of errors as defined in Section 7 of AT&T TR 62411. The CSU/DSU shall support switchover from the primary communications path to a secondary communications path as defined in Paragraph 3.5.11, below and shall support restoration of communications via the primary path after the failure is corrected. The integrated CSU/DSU shall provide an interface to the Network Management component of the system to enable monitoring of link status and reporting of link failures by system hardware, as defined in Paragraph 3.7, below.

The CSU/DSU functionality shall also be capable of being modified, or replaced to support additional Wide Area Network access technologies such as Fractional T-1, Switched 56 kbps, Frame Relay, and/or Cell Relay.

3.5.2 Mandatory Framing Protocols Supported

The system shall support communications over the FTS2000 network via the T-1, 1.544 Mbps, Extended Super Frame (ESF) format, with a B8ZS data protocol, both channelized in 24 x 64 kbps Digital Signal Level Zero (DS0) increments, and unchannelized, in accordance with ANSI T1.101-1987, ANSI T1.403-1989 and AT&T Publications TR62411, TR62421, and 54016. In addition the system shall support Fractional T-1 in channelized increments via the FTS2000 network. The FTS2000 network is in the processes of being modified to provide for Fractional T-1 Service, compatible with AT&T's commercially available Fractional T-1 service, using SDIS access service on an unchannelized T-1, with intermediate data rates of 128, 256, 384, 512, and 768 kbps, with the intelligent multiplexor providing the multiplexing of the input signals into the appropriate transmission format.

3.5.3 Electrical Protocol and Bit Density

The system shall support network communications over the FTS2000 network via the DS-1 Electrical Protocol as defined in ANSI Standard T1.403-1989 and AT&T TR 62411, with Bipolar Eight Zero Substitution (B8ZS) Bit density per AT&T TR 62411 or ANSI T1.403-1989. In addition the system shall support the following additional protocols: Fractional T-1 compatible with AT&T's currently available, commercial Fractional T-1 Service, ISDN with B8ZS and/or 2B1Q electrical protocol on primary rate interface (PRI); D4 framed DS-1 with Alternate Mark Inversion (AMI);

switched 56 kbps over FTS2000 SDIS service; and DDS service at 56 kbps and 64 kbps. These additional protocols are currently available on the FTS-2000 network and may be used as a back-up communications path should the primary path fail.

3.5.4 Signalling

The system shall support the signalling necessary to effect a connection using the Switched 56 communications service. The system shall also support Robbed Bit Signalling, ISDN PRI Signalling per AT&T TR 62411, and/or vendor proprietary signalling with clear channel DS0 communications using a vendor proprietary frame structure. While the NRC's preliminary plans do not immediately include using the robbed bit or ISDN signalling capability, this signalling requirement is included as a growth capability for a network back-up to be incorporated when ISDN costs are reduced.

3.5.5 Network Interface Connector

The network interface connector shall be compatible with FTS2000. The contractor shall be solely responsible for effecting the coordination with FTS2000 to ensure compatibility.

The following is the Government's current understanding of the FTS2000 interface. FTS2000 uses a Universal Service Ordering Codes (USOC) RJ-48C or RJ-48X, 8 pin, network interface connector (RJ-48X preferred). The pin out for access to FTS2000 T-1 service is as shown in Figure 3.5.5-1, with pins 1&2 used for Receive from Network (network transmits to DTE) Tip (T1) and Ring (R1), and pins 4&5 used for Transmit to Network (network receives from DTE) Tip (T) and Ring (R). The pairs of cables used to connect from the DSU/CSU to the network interface RJ-48 socket must be individually shielded. The outlet connector from the CSU/DSU hardware may be a DA-15 connector, but the network interface connector on the cable must conform to the FTS2000 connector shown in Figure 3.5.5-1. FTS2000 frequently uses Large DSU/CSUs for compatibility with the network; but, for this procurement the vendor is responsible for selecting the DSU/CSU and for ensuring compatibility with the FTS2000 network. The Government will accept any CSU/DSU that the contractor can make work on FTS2000. A working network is the Government's ultimate requirement.

3.5.6 Network Interface Data Rate

The system shall support access to the FTS2000 network at a nominal data rate of 1.544 Mbps +/- 50 bps. The system shall

also be able to support access to FTS2000 via Fractional T-1 at data rates of 128, 256, 384, and 768 kbps. The system shall also support growth to communications at the following data rates: Switched 56 kbps, clear channel 64 kbps, and E-1 at 2.048 Mbps. In this case growth is defined as having the capability available through the purchase of additional off-the-shelf hardware, covered by a vendor part number.

3.5.7 Effective Throughput

The effective throughput of the aggregate network link is anticipated to be limited by the cyclic redundancy check (CRC), synchronization, error detection, and other overhead required. The minimum effective throughput provided by the system shall never be less than 95.2 percent of the available bandwidth. That is the average station side input/output shall be greater than or equal to 95.2 percent of the aggregate network bandwidth, exclusive of any bandwidth allocated for network overhead (8 kbps), to provide station-to-station timing (station timing independent of the system master clock) and to provide control lead status (used for flow control).

3.5.8 Anticipated Transmission Operating Environment

The system shall be fully operational when operated on the FTS2000 network, as long as the network is operating within its specified operating environment.

3.5.8.1 Bit Error Environment On Network Aggregate Bandwidth Trunk

The FTS2000 environment is specified to provide up to 215 errored seconds per day, with 99.75 percent error free seconds per day, and 20 severely errored seconds per day. Over the long term, FTS2000 is specified to provide 99.83 percent availability over a year, and 99.77 percent availability over a quarter. Given this error rate environment, and the propensity of burstiness in errors it is likely that a burst of errors on the network may cause a temporary bit error rate of 10⁻² or worse for an interval of less than 2.5 seconds, resulting in an out of frame condition. The system shall continue to operate and clear this condition without the necessity for repair action. For error conditions which result in greater than 2.8 seconds of out of frame condition, the system shall generate a "Red" alarm as defined in Section 7.4 of AT&T TR 54016 and a "Yellow" Alarm Signal down the trunk to the source of the errored signal.

3.5.8.2 Jitter/Wander Tolerance

Short term variations of a digital signal from their ideal positions in time, or jitter will be present in the FTS2000 Network. In addition longer-term variations of the same digital signals, generally below 10 hertz, called wander, will also be present. The jitter environment for FTS2000 is defined in AT&T TR 62411, paragraph 4.7 and Appendix A. The NRC's wide area network system shall be fully operational, without measurable degradation, when operated within the "acceptable level" of jitter/wander specified in AT&T TR 62411, paragraph 4.7 and Figures 24 and 25.

3.5.9 Future Protocols

The system shall provide a growth path to implement communications via the following protocols: Cell Relay including Asynchronous Transfer Mode (ATM), Primary Rate ISDN using the National ISDN standards (National ISDN 2 and 3) as they become available, Switched Multi-megabit Data Service (SMDS), and Frame Relay. While it is not envisioned that any single product can currently provide all of these interfaces, the Government's requirement can be satisfied by a product with the architectural diversity to incorporate growth to include new services, and an active developmental effort to incorporate some of these future interfaces. Vendors with a past history of providing product improvements and an ongoing program to develop new interfaces will be considered having met this requirement. Compliance with this requirement will not require any hardware.

[The National ISDN 1 protocol is a mandatory interface requirement as defined in Paragraph 3.5.3, above. The ISDN protocol with 23B+D channelization using 2B1Q, and/or B8ZS electrical protocol is defined in the following compliance documents: ANSI T1.110-1987, ANSI T1.216-1991, ANSI T1.217-1991, ANSI T1.601-1988, ANSI T1.603-1990, ANSI T1.604-1990, and AT&T Technical Reference Publications TP 41449 and TP 41459A3 (Appendix 3).]

3.5.10 Optional Network Interface Protocols

The ability to implement different interface protocols without a significant modification to the system is considered a positive attribute to any vendors' system. The following network interface protocols are considered as optional and are not mandatory: V.35, EIA RS-422 (CCITT V.11), a capability to perform inverse multiplexing using increments of Switched 56 or ISDN BRI "B" channels, European Standard E-1, Fiber Optic T-1 using 62.5/125 micron multi-mode fiber, and/or Dynamic bandwidth

allocation allowing aggregate data rates from 56 kbps to 2.048 Mbps. Vendors are encouraged to document the flexibility of their architecture, showing the ability of their system to support these optional interfaces.

3.5.11 Failure Mode

In the event of a failure of the primary network communications trunk, the system shall provide a capability to automatically switchover to an alternate communications path. Types of alternative communications paths which are considered acceptable are: ISDN Primary Rate Interface, one or more switched 56 kbps circuits to carry one or more high priority circuits, or a DDS circuit at 9.6, 56, or 64 kbps. Failure of the primary path and switchover to an alternate path shall be communicated to the network management system and displayed as described in Paragraph 3.7.3, below.

3.6 STATION INTERFACE FUNCTIONALITY

The system shall provide communications from end-to-end for digital data, voice, facsimile, and video as defined in the following paragraphs. Station interfaces are those interfaces which must be supported by the system with an available, off-the-shelf interface board which can be purchased. The NRC does not intend to implement all of these interfaces in the initial deliverable configuration, but requires the capability to add these interfaces in the future. The specific interface configuration to be delivered with the system is defined in Paragraph 3.2.1, Deliverable Configuration.

3.6.1 Digital Data Communications

The system shall provide the capability for digital data communications via all the common communications protocols. Specific protocols and data rates which must be supported are defined in Table 3.6-1. The system shall also provide the data communications, multiplexing and timing capabilities defined in the following paragraphs.

Table 3.6-1 Mandatory Digital Data Station Interface Protocols

Protocol	Timing	Data Rates
kbps RS-232C or D	Asynchronous	1.2, 2.4, 4.8, 9.6, and 19.2
kbps RS-232C or D	Synchronous	1.2, 2.4, 4.8, 9.6, and 19.2
kbps V.24	Asynchronous	1.2, 2.4, 4.8, 9.6, and 19.2
kbps V.24	Synchronous	1.2, 2.4, 4.8, 9.6, and 19.2
kbps V.28	Asynchronous	1.2, 2.4, 4.8, 9.6, and 19.2
kbps V.28	Synchronous	1.2, 2.4, 4.8, 9.6, and 19.2
V.35	Synchronous	56, 64, 128, and 256 kbps
RS-422A	Synchronous	56, 64, 128, 256, 384, 512, 768 kbps and 1.536 Mbps
and		
RS-423A	Asynchronous	9.6, 14.4, 19.2, and 38.4 kbps
RS-449 (FIPS 143)	Asynchronous	9.6, 14.4, 19.2, and 38.4 kbps
RS-449 (FIPS 143)	Synchronous	56, 64, 128, 256, 384, 512, 768 kbps and 1.536 Mbps
and		
FIPS 22-1	Synchronous	56, 64, 128, and 256 kbps
FIPS 138	Synchronous	56, 64, 128, and 256 kbps
FIPS 142	Asynchronous	1.2, 2.4, 4.8, 9.6, 19.2 and 38.4 kbps
FIPS 142	Synchronous	1.2, 2.4, 4.8, 9.6, 19.2 and 38.4 kbps

3.6.1.1 Sub-rate Multiplexing

The system shall provide the capability to multiplex up to 5 sub-rate channels into a 64 kbps DS0 for from 1 to 23 DS0's per T-1 carrier as defined in AT&T TR 54075. The system shall also provide the capability to multiplex up to 5 channels of data at data rates less than or equal to 9.6 kbps into either an FTS2000 switched 56 kbps channel, or an FTS2000 dedicated digital 56 kbps circuit. Vendor proprietary sub-rate multiplexing protocols

which satisfy this requirement will be considered acceptable.

3.6.1.2 Support to Packet Data Communications

The system shall support transparent communications by synchronous packet communications, including the CCITT Recommendation X.25 Packet Switched protocol, GOSIP (FIPS 146-1), the Synchronous Data Link Control (SDLC) protocol, and the High-level Data Link Control (HDLC) protocol. In effect the system will pass these synchronous protocols without perturbation from the source to the destination.

3.6.1.3 Timing Protocols Supported

The system shall support communications with data terminal equipment (DTE) using the following timing protocols: Asynchronous data (timing not included with the data), Synchronous data (timing included with the data stream), Isochronous data (synchronous data without clock, synchronized to clock supplied from the network clock) at speeds up to 1.344 Mbps, and Plesiochronous data (synchronous data that is supplied with a clock which is not locked to the System clock.)

3.6.1.4 High Bandwidth Station Communications Interface

The system shall provide the ability to employ unchannelized communications circuit bandwidths of $N \times$ DS0 using RS-422A or CCITT Recommendation V.35 electrical protocols. At a minimum the following bandwidths must be supportable with off-the-shelf input/output boards: 64 kbps, 128, 256, 384, and 768 kbps and 1.536 Mbps.

3.6.1.5 Compatibility with DES Encryption Devices

The system shall provide the ability to provide clear channel 56 or 64 kbps circuits compatible with DES encryption devices. These circuits shall allow operation of the synchronous encryption devices without system generated framing or synchronization errors. (Network generated errors are beyond the capability of the system to eliminate.)

3.6.1.6 ISDN Compatibility

The system shall provide the capability to accept input of and transport to another network node ISDN Bearer (B) channels and Data (D) channels using the National ISDN-1 standard interface.

This capability is available from the Washington Interagency Telecommunications System (WITS), and is planned to be used to support video conferencing by 1995. The system shall be upgradeable to enable transport of National ISDN-2 and 3 standards, as they become available.

3.6.1.7 Flow Control Protocols

The system shall transparently pass flow control between station input/output channels using the operator selectable protocols XON/XOFF, or via toggling the control leads Clear to Send and Data Set Ready from on to off.

3.6.1.8 Digital Facsimile

The system shall support transmission of Group IV facsimile at 56 and 64 kbps as defined in FIPS 149, and EIA 538-1988.

3.6.2 Analog Communications

The system shall accept analog (voice or modem) input and shall provide toll quality output of the signals at the destination. The system shall also provide the ability to employ compression of voice communications, enabling transport of at least 48 non-toll quality voice circuits over a single T-1. The system shall support analog communications as described in the following paragraphs:

3.6.2.1 Input Levels

The system shall accept and provide toll quality transport for 500 Ohm +/- 10% (resistive) analog input signal levels from 0 dBm to - 20 dBm in the frequency range of from 300 to 3,400 Hz. The system shall provide a return loss for these signals of at least 20 dB.

3.6.2.2 Channel Gain

The channel gain shall not exceed .5 dBm at 1004 hz.

3.6.2.3 Digitization Techniques

The system shall have available off-the-shelf analog input/output boards employing either Pulse Code Modulation (PCM) or Adaptive Digital Pulse Code Modulation (ADPCM) digitization of analog signals.

3.6.2.3.1 Pulse Code Modulation

The system shall provide off-the-shelf input/output boards with the capability to digitize input analog signals via PCM at 64 kbps. The result of this digitization shall produce a circuit which is "toll quality" as defined by standard industry practices. This PCM digitization shall employ Mu Law companding. "A" Law companding is desired as an option but is not required. Envelope Delay Distortion for the PCM digitized communications between a frequency of 600 Hz to 2600 Hz shall not exceed 0.75 milliseconds.

3.6.2.3.2 Adaptive Digital Pulse Code Modulation

The system shall provide off-the-shelf input/output boards with the capability to digitize input analog signals via ADPCM as defined in ANSI T1.301-1987, ANSI T1.302-1989, ANSI T1.303-1989, and ANSI T1.310-1991. The ability to provide ADPCM data rates of 32 kbps is required. ADPCM communications capability at 56, 24 and 16 kbps is desired.

3.6.2.4 Analog interface types

The system shall provide the capability to provide communications for voice circuits, PBX trunk circuits, modem circuits, and facsimile circuits.

3.6.2.4.1 Point-to-Point Voice Circuits

The system shall provide the ability to communicate via Point-to-Point 2-wire and 4-wire voice circuits. For 2-wire analog circuits, the system shall provide the ability to add echo cancellation capability to minimize the echo created in the 2-wire to 4-wire hybrid.

3.6.2.4.2 PBX Trunk Circuits

The system shall provide the capability to communicate between two Private Branch Exchanges (PBXs). This capability shall be provided in 2-wire, and 4-wire circuits with E&M, Loop Start, or Ground Start signalling. The system shall provide the capability to support Types I, II, III, V PBX Tie Trunks. The PBX Tie Trunks provided at data rates of 32 kbps or greater shall be compatible with relay of Dual-Tone Multi-Frequency (DTMF) signalling between the PBXs. The system shall also provide the capability to provide a Central Office Trunk Interface as defined in ANSI T1.401.

3.6.2.4.3 Modem Interfaces Supported

Analog trunks digitized using PCM at 64 kbps shall be compatible with communications of digital data using analog modems. The modem protocols which shall be supported are CCITT Recommendations V.21, V.22, V.22bis, V.32, and V.32bis, with V.42 and V.42bis error correction and data compression. The signalling rates available with these modem protocols shall include 1.2, 2.4, 4.8, 9.6, and 14.4 kbps where applicable.

3.6.2.4.4 Analog Facsimile Protocols Supported

The system shall support analog transmission of facsimile data as defined in FIPS 148, and EIA RS-466. The system shall support transmission of Group III facsimile over PCM analog circuits at speeds of 2.4, 4.8, and 9.6 kbps, as defined in FIPS 147, and EIA RS-465.

3.6.3 Capacity of Input/Output Channels Per Node

The system shall have the capacity for input/output station communications capability as defined in the following paragraphs.

3.6.3.1 Headquarters Node Input/Output Channels

The Headquarter's node(s) of the NRC's Wide Area Network shall have a capacity for at least 120 available input/output channels at a bandwidth of from 300 bps up to 1.536 Mbps. While the Government does not intend to implement this number of channels in the initial implementation of the network, the system shall provide adequate internal bus bandwidth and input/output card slots to enable growth to this number of stations.

3.6.3.2 Regional Offices Node Input/Output Channels

The Regional Office Nodes of the NRC's Wide Area Network shall have the capacity for at least 30 available input/output channels at a bandwidth of from 300 bps to 1.536 Mbps. Again, the Government does not intend to implement this number of channels in the initial implementation of the network; but, the system shall provide adequate internal bus bandwidth and input/output card slots to enable growth to this number of stations at each Regional Office.

3.7 Network Management Functionality

Each node in the system shall have an vendor provided operator's console attached to the system. The operator's console shall be capable of controlling the local hardware and receiving locally generated alarms and reports. In addition the system shall provide two (one plus a spare) fully configured, color graphic Network Management Console workstations. The primary location for the Network Management console will be at the NRC Headquarters node, located in Rockville, Maryland. Alternate locations may be at any of the other network nodes. The Government will provide the operators for each operator's console and the Network Management Consoles.

The system shall provide all network management functionality from a single console, and shall be capable of supporting the same Network Management functionality at multiple consoles. Each Network Management Console shall provide the ability to monitor network status and generate alarms; to maintain records of network operations, and status, and generate appropriate reports; to display network status, alarms and reports on the Network Management Console in a user friendly format; to control and monitor maintenance and diagnostic testing of network hardware and trunks; to control and reconfigure the network in response to failures/restoration of equipment or trunks; and to provide security for the network to ensure that an unauthorized operator does not assume control of the network. Specific requirements for monitoring, control, record keeping, display and security are provided in the following paragraphs.

3.7.1 Network Status/Alarms Monitored

The Network Management System shall continuously monitor the status of the network hardware and trunks and shall generate alarms to be provided to the Network Management Console or Consoles when conditions warrant. Alarms are considered to be unsolicited reports on system status, automatically generated based upon attainment of a preset condition threshold, providing audio (bell characters or other audible notification to the operator), text indicating the nature and location of the alarm condition, and visual (graphic diagrams showing location and nature of the failed component or network link).

3.7.1.1 Trunk Monitoring

Monitoring of the network trunks shall detect both intermittent, random, short duration errors and longer bursts of continuous errors. The system shall employ a combination of monitoring of

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3.7.1.1 Trunk Monitoring

Monitoring of the network trunks shall detect both intermittent, random, short duration errors and longer bursts of continuous errors. The system shall employ a combination of monitoring of

the status messages inherent in the transmission protocol (such as the CRC-6 cyclic redundancy check employed in the ESF T-1 format) combined with system generated error checking on network trunks. Reports of link outages shall be made available to the Network Management Console operator immediately. Reports of intermittent errors, indicating a degraded but still functional link shall be made available to the Network Management Console Operator whenever the error rate exceeds an operator selected threshold. Below that threshold, errors shall be recorded and maintained for review by the Network Management Console Operator whenever the operator requests a report on link status as described in Paragraph 3.7.2.

Specific T-1 ESF alarms which shall be monitored include those alarms defined in AT&T TR 54016 and those alarms defined in Section 7 to AT&T TR 62411. The network alarm conditions which shall be monitored include at a minimum the following as defined in AT&T TR 54016: CRC-6 Errored Seconds (ES) per unit time, Out of Frame (OOF) violations, Severely errored Seconds (SES), loss of frame count (LOFC), Unavailable Seconds (UAS), Short Failure Event Count (SFEC), and the following additional alarms as defined in Section 7 to AT&T tr 62411: red and yellow Carrier Failure alarms, and loss of signal (LOS). The system shall also allow an operator to preselect alarm thresholds for the following conditions: link failure on any link exceeding operator selected time, CRC-6 error rate on any link exceeds operator selected threshold, and loss of frame count exceeds operator selected threshold. The following additional alarms are desired but not mandatory: Bi-polar violations per operator selectable unit of time, and Pulse Density Violations per operator selectable unit of time.

In addition to the alarms which are generated by monitoring the T-1 ESF protocol, the NRC requires the system to generate alarms which are independent of the ESF alarms. In particular, the NRC plans on implementing Fractional T-1 service, Switched 56 kbps, and Clear Channel Communications using a 64 kbps DS0 channel. In each of these cases the T-1 ESF alarms will enable monitoring only the local exchange carrier provided T-1, but will not monitor end-to-end connectivity for the network circuit. The system shall provide an error detection and testing capability which is independent of the T-1 ESF error detection and alarm generation. This independent error detection capability shall continuously monitor each network trunk for Bit Error Rate (BER) and shall generate an alarm whenever the BER exceeds an operator selectable threshold. These alarms shall be presented to the Network Management Console Operator.

It is anticipated that up to 4.8% of the aggregate bandwidth may have to be reserved as an overhead channel to enable the system to pass status messages, control messages, and perform an inherent bit error rate test on each trunk. The protocol to be employed on the system overhead channel on each network trunk will be selected by each vendor. The Government believes that an accepted national or international standard for this function does not exist.

3.7.1.2 Hardware Alarms

The system shall monitor the status of the system's hardware and shall provide an alarm to the locally connected operator's console whenever an element of the system fails. The system shall provide the ability for the Network Management Console Operator to view the hardware configuration of every network node, and shall modify the display of the system to allow an operator to readily view the location of a failed component. Hardware generated alarms shall include as a minimum reports of failure for the following items: local input/output boards, primary power supply or cooling fan, common logic, on-line or back-up processor, and CSU/DSUeip1149Xfailure.

3.7.1.2.1 Remote Alarms

When a hardware alarm occurs at a Regional Headquarters, not directly connected to the Network Management Console Operator position, the system shall report the alarm condition via the network to the remote Network Management Console. The system shall have the ability to identify up to six different Network Management Consoles. Whenever an alarm condition exists at any network node, the system shall ensure that all of the designated Network Management Consoles are notified of the alarm condition, and each Network Management Console shall notify their associated operator of the alarm condition.

3.7.1.2.2 Locally Generated Alarms

Hardware alarms generated at the network hub(s) at NRC Headquarters, or on any other node with a Network Management Console attached, shall be reported directly to the Network Management Console at that node. Whenever communications are available, the Network Management Console shall be capable of performing any actions which are available to the locally

attached operator's console. At the Headquarters node(s), the NRC shall be able to employ the Network Management Console to replace the operator's console.

3.7.2 Reports Generated

The system shall maintain a record of every network management function performed whether manually initiated or as a result of an automatic process. The record keeping capability shall include the alarms and status reports defined in AT&T TR 54016 and 62411. This record keeping shall support preparation of operator requested reports which provide the operator with the past status for each individual parameter during an operator selectable time period. As an example, the system shall maintain a record of Errored seconds (ES) per the operator selected time interval, percentage error free seconds per the time interval (%EFS), Bipolar violations (BPV) within the time interval, Severely errored seconds within the interval (where an SES is defined by more than 320 CRC-8 errors per second), and Error Free Seconds (EFS) for the time interval. The system shall provide the ability to flexibly configure reports, selecting the time interval for the reported statistic from as short as the last 15 minutes or hour, to as long as monthly or quarterly.

The reporting capability shall also include the ability to record and reconstruct an event log of all automatically monitored status parameters including hardware failures, trunk BER, and trunk failures, and all operator ordered configuration or reconfiguration instructions. Any alarm generated, the results of periodic testing, and any order to revise the network configuration or conduct regular, or operator ordered testing, and the results of that testing shall be included in the event log. For each of these incidents, the system shall record a description of the event (hardware failure, trunk failure, alarm generated, or operator command) and the time the event occurred.

The system shall have the storage capacity to maintain a complete record for at least the past three months of events, and shall provide an off-line method for maintaining a record for up to a full year. The system shall provide the capability to store the event log off-line on magnetic media or other permanent off-line storage media.

The event log shall be maintained in a manner which shall support analysis of monthly trends within the network system. In particular, trend analysis will be used to determine if a pattern of hardware failures exists, or if trunk conditions are

improving, degrading, or remaining stable. The Report Generation ability provided by the network management functionality shall support preparation of reports on network operations, status, throughput and efficiency.

The system shall provide the capability to print out event log entries on a network designated printer. Failure of the printer for the event log is not considered to constitute a system failure; therefore, a single event log printer shall be provided to support the two Network Management Consoles at the NRC Headquarters node.

3.7.3 Display Capability

The system shall provide a graphical representation of the network using hierarchical drawing principles. The highest level network drawing shall be a color graphics map of the United States showing the 6 nodes of the NRC network and the trunks between these nodes. The next lower level of the hierarchical drawing representation of the network shall be the individual nodes or trunks. Selecting this second layer view shall enable the operator to obtain the status on that node or trunk group. Similarly, the system shall support lower level drawings until, ultimately, the system shall provide a view of the equipment, and the board sets within the equipment, showing the location of both operable and inoperable components. The representations of the equipment shall be drawn to display a scaled down version of the equipment, showing the location of each critical piece of equipment. The lowest level views of the system shall allow the operator to view details of the network including on-board alarms and the status of digital link control leads (i.e., carrier detect = on, data terminal ready = off, etc.) The status of each node and trunk in the system shall be indicated in color, using a logical color representation (i.e. green = good, yellow = working with some problems, and red = failure). This status shall be updated as events indicate a change in status.

The amount of detail expected in the hierarchical representation of the network will preclude display with conventional computer monitors. The display for the Network Management Console shall be a high resolution, color graphics monitor with at least 256 available colors.

The network diagram provided shall be automatically updated without any operator involvement. The diagram shall update whenever an event is reported which changes the status of any node or trunk. Events which shall result in a change in network status shall include trunk failure, BER exceeding threshold

indicating impairment of a network trunk, and hardware failures or restorations. Updates to the network diagram shall occur in real time, with minimum delays beyond the time required to relay the status report from a remote location. The network management architecture shall include sufficient processing capacity so that the display can be updated within two seconds of any operator generated command.

The Network Management Console shall allow an operator to review the hardware status of any node in the network, and the trunk status of any trunk in the network. This view shall allow an operator to obtain feedback from the system based upon automatically generated alarms, events, and maintenance feedback based upon onboard diagnostics and built in test capabilities.

The colors used for the display shall be pleasing to the eye to minimize operator eye fatigue. The system shall allow the operator some latitude to change background and text colors. The basic color red shall only be used to represent failure, with yellow only used to represent marginal operations or a slightly degraded condition, and green only used to represent fully operational.

The display system shall provide an operator with the ability to add or delete network nodes, trunks and system hardware. This capability will enable the NRC to modify the network as new nodes are added, or old nodes are moved or deleted. The system shall provide the ability to modify and/or generate every level of network diagram, including the national map, the node display, the hardware display and the trunk status display.

3.7.4 Maintenance/Diagnostic Capability

The system shall provide the ability to monitor the status of network hardware and trunks and shall provide the tools to perform network diagnostics and fault isolation. This maintenance/diagnostic capability shall include full period monitoring of the status of each system trunk, and of the hardware at each network node. The specific requirements for hardware and trunk monitoring and network diagnostics are describe in the following paragraphs.

3.7.4.1 Testing of System Hardware

Each major element of network hardware shall provide a status indication to the network management system and shall update that status condition as the status changes. Each major element of hardware shall also perform a complete self test upon power-up or

reset. Each element of hardware shall automatically become functional (come on line) upon power-up or reset, at the completion of reporting on the status of the self test.

The system shall perform some level of self test on each major element of the system, to include the CSU/DSU functionality, the Intelligent Multiplexors or cell switch, every board within the multiplexors or switch, and the network management functionality. This level of testing shall identify failure of one of these hardware items within one minute of occurrence at least 95% of the time. The level of self test shall be adequate to enable isolation of the problem to a single board at least 90% of the time. Wherever the failure mode enables the controller of the system hardware at that node to continue communications with the network management functionality, the failure shall be reported to the Network Management Console and displayed for the operator. The network management functionality shall generate an alarm as detailed in Paragraph 3.7.1 whenever the system detects that any element has failed, degraded, or exceeded a preset threshold.

The Government desires the maximum amount of available on-line testing capability consistent with the requirement that this capability be provided with off-the-shelf, non-developmental items. Custom designed hardware or software is not acceptable.

3.7.4.2 Testing of System Trunks

The system shall provide a continuous, on-line, non-destructive Bit Error Rate Test (BERT) or equivalent functional tests to determine trunk integrity on every internode trunk. This testing shall be independent of any testing provided by the T-1 ESF protocol. As defined in Paragraph 3.7.1, the system shall also monitor the T-1 ESF alarms and status reports. This level of testing shall provide continuous monitoring of the status of inter-node trunk interfaces and shall provide event reports to the network management functionality whenever there is a degradation of the inter-node link, or a failure of the link. The on-line BERT is expected to require use of reserved bandwidth and concomitant reduction in network throughput. As described in Paragraph 3.5.7, this reduction in throughput shall never be greater than 4.8%.

3.7.4.3 Diagnostic Capability

The system shall provide the operator with the capability to fault isolate 90% of the system hardware or link failures to an individual printed circuit board or network trunk. This ability

to fault isolate shall be supported by the ability of the system to transmit control and status reports over a reserved portion of the network trunk.

The control and status reports shall enable the system to perform destructive BERT, by causing the entire network bandwidth to be looped back. By employing operator controlled loop back testing, using the BERT, an operator shall be able to determine the location of a local or remote failure. The system shall allow an operator to perform a local analog loop-back, a remote analog loop-back and a remote digital loop-back. An analog loop-back shall consist of looping back the BERT at the CSU/DSU, whether it is local (within that node) or remote. A remote digital loop-back shall enable the system to perform a BERT at either the input to the system or on a channel by channel basis, at the remote channel input/output card.

The system shall provide the operator with the ability to employ BERT using a vendor defined BERT pattern and shall display the location of any loop back in progress on the appropriate network view. The ability to select from multiple BERT patterns (like alternating 1's and 0's, is desired but not mandatory.

The system shall also provide the ability to monitor and display the status of the EIA control leads on an appropriately configured local or remote station input. This capability shall include the ability to monitor the status of the Ready to Send (RTS), Clear to Send (CTS), Carrier Detect (CD), Data Set Ready (DSR), and Data Terminal Ready (DTR) control leads at a minimum.

3.7.5 Ability to Control Network Configuration

The system shall provide the operator with the ability to monitor the network's status (as described in Paragraph 3.7.3) and to direct configuration of the network in response to changing network conditions. The Network Management Console Operator shall be able to reconfigure the network either locally or remotely. The ability to reconfigure the network shall include the ability to direct routing of any station channel at one network node to be connected to any other station channel at any other node of the network. This capability shall also include the ability to redirect a channel via a different route in a mesh network. For example a channel which normally is connected directly from node A to node B via their shared network trunk, should be capable of being rerouted from node A to node C and from node C to Node B in the event that the network trunk from node A to node B failed.

The ability to provide the Network Management Console Operator with the ability to develop, store and use Macro command strings in place of repetitive command tasks is desired but not required. In particular this capability would enable the Network Management Console Operator to identify and store pre-programmed reconfiguration orders in response to alarm situations such as failure of network links. The system should provide the ability to execute these reconfiguration orders in the event of a failure, both manually as ordered by the operator, or automatically, upon receipt of a previously designated status condition. The NRC plans to utilize this capability of the Network Management functionality to designate alternate routes for network trunks, should the primary route fail. The alternate routes used for automatic response to a network failure may be configured to be dedicated, full-period circuits, or may be switched data circuits such as ISDN Primary Rate Interface or switched 56 kbps circuits, with the system placing the call to activate the data service (i.e. the system would place an ISDN PRI call to re-establish the network trunk in the event that the primary dedicated trunk fails.) In addition, the system shall support use of operator configured back-up circuits such as a dial-up modem circuit allowing the operator to order reconfiguration of the network to use the manually initiated circuit.

3.7.6 Network Management Security

The Network Management functionality shall provide security for the Network Management Console to ensure that an unauthorized user, or hacker, can not obtain access and/or control over the Network Management functionality. The security protection for the Network Management console and associated data ports shall include use of protected log-on features including a requirement to input a valid user ID, and password prior to access to the system. This security protection shall mandate that passwords have a minimum of four (preferably six) characters, and shall ensure that a user is logged-off the system after several (preferably three) invalid attempts to log-in to the system. An alarm to the Network Management Console Operator shall be generated whenever a second console operator attempts to log-in to the network and fails to successfully enter a valid password. The system shall maintain a record, or audit trail of valid users' requests for access.

The system shall provide a minimum of three different privilege levels for Network Management Console Operators. The "System" privilege level shall enable a user to access and employ any capability of the system. Users with the "System" privilege

level shall be able to request a listing of the authorized users of the system and shall support these users in the changing of their passwords on a periodic basis. The "Net Management" operator level of privilege shall allow a user to operate the system, including ordering reconfiguration of the network, but will not enable that user to reconfigure the Network Management functionality, or to add or delete authorized users. The lowest level of the system shall be the "Monitor" level, which shall enable operators at each region or at headquarters to monitor status of the network and attached hardware, without the ability to alternate route, or change any system configuration item.

3.7.7 Network Management Interface Protocol

The Government understands that the interface to each hardware vendors equipment may be unique, non-standard, and not subject to change. While this situation is considered to be acceptable, the Network Management system shall support the Simple Network Management Protocol (SNMP) interface as an available interface to other, as yet unidentified systems. The CMIP protocol defined in FIPS Pub 146 is considered to be a desirable future interface, but is not mandatory.

3.7.8 Configuration of Network Management System

The contractor shall completely install and configure the Network Management System to provide a complete, fully functional, totally turnkey system. The network map will be configured and entered into the system, and all primary and alternate configurations will be identified and supported with appropriate macro command strings. The complete testing configuration defined herein shall be configured into the Network Management System, integrated with the display, and available to the Government upon cutover of the system.

3.8 Security Functionality

The security functionality for the system shall provide two capabilities. 1) The system shall support secure wide area digital communications between the NRC's Local Area Network (LAN) routers. These circuits are expected to be dedicated, full-period, synchronous digital data circuits using the EIA RS-422A or CCITT V.35 interfaces at data rates of 56, 64, 128, or 256 kbps. The system shall pass the encrypted signal from the Government furnished Data Encryption Standard (DES) encryption device transparently to the remote termination. The system shall maintain data and timing integrity to ensure that the encrypted communications remain in synchronization, and without

unacceptable error levels.

2) The system shall be designed for a future implementation of trunk encryption using the DES encryption standard. This design shall include identification of the encryption device by manufacturer's name and part number, and the design for any new cables, or configuration settings for either the network hardware or for the encryption devices. The system design shall also identify a methodology for obtaining and distributing network security key materials. The resulting design for network security shall satisfy FIPS 41 requirements for communications privacy, and shall satisfy FIPS 45-1, FIPS 74, FIPS 81, FIPS 140, ANSI X3.92-1981, and ANSI X3.05-1983 requirements for the Data Encryption Standard.

3.9 Power Supply Functionality

The system shall be provided power by the power supply functionality. The power supply functionality shall be in compliance with FCC Part 15, Subpart B, Class A, Part 68, Subpart D, and Section 8.1.3 of FCC Tariff Number 9. Compliance with Underwriters Laboratory is desired.

The power supply functionality shall receive power from the Government furnished facility and shall distribute that power to every item of the system. The power supply functionality shall provide transient and surge suppression, to ensure that every element of the system is adequately isolated from power line fluctuations including nearby lightning strikes. The power supply functionality shall also provide protection against loss of power, with an unvented uninterruptible power supply system (UPS). The UPS shall be sized to provide at least two (2) hours of system power continuously available in the event of a loss of system power at any individual node. Switchover to UPS power shall be essentially immediate, so that no system functionality is lost during the shift.

Within any element of the system, the power supply functionality shall be fully redundant, in that it shall automatically switch over to a back-up power supply should the primary power supply fail.

The Government furnished input power will be standard commercial 60 hertz, power. Single phase 120 volt power is the preferred power, but systems which require 220 volt or three phase power will also be deemed compliant. The power supply functionality shall condition the input power so that the power supplied to the system's hardware complies with FIPS 94 requirements for ADP

power and with ANSI TR-308-1990 requirements for isolation from electrostatic discharge.

Site specific power capabilities and requirements shall be identified by the contractor after contract award. Data may be provided in response to written questions prepared by the contractor or during a site survey to each site. Vendors whose power requirements are other than 120 volt, single phase, 60 hertz power will be required to comply with local ordinances and obtain necessary licenses to upgrade the power at each location.

In the event of a power failure, each element of system equipment shall automatically revert to either a default operating condition or the last ordered operating condition after restoration of power.

3.10 Mechanical and Accessory Functional Requirements

Each element of the system (except the Network Management Console) shall be mounted in contractor supplied, standard 19 inch cabinets with two sides and a front and back door. The front door of the cabinets shall be clear to enable an operator to view alarms, or status lights on the face of the equipment. The cabinets shall be fitted with standard 19 inch RETMA rails for mounting of the installed hardware. The maximum height of each cabinet shall be equal to or less than 7 feet tall. The cabinets shall be constructed of a welded solid frame consisting of angled steel or aluminum structural members with a thickness of 1/8th to 3/16th inches. Sides of the cabinets shall be 1/16th to 3/16th inches thick steel or aluminum. The maximum weight of any one cabinet, when fully loaded, shall not exceed 500 lbs, with a maximum of 150 lbs per square foot floor loading.

Cabinets shall be loaded so that they do not become a safety hazard. The cabinets shall be loaded with a stable center of gravity, so that the cabinet will not easily tip over. Any cabinet which when inclined 15 degrees from the vertical and released does not right itself is considered to be a safety hazard.

Each element of equipment within a cabinet shall be mounted to facilitate ease of maintenance including mounting on slides or rails where indicated. The equipment within a cabinet shall be mounted so that the 5th percentile female can service the equipment (as defined in the U.S. anthropomorphic model, MIL-STD-1472). The cabinets shall facilitate servicing of mounted hardware both from the front and back of the cabinet via front

and rear doors as described above. Each cabinet shall also be fitted with a single power switch, mounted facing the front door of the cabinet, so that an operator/maintainer can secure (turn off) power to all items in the cabinet through a single switch.

Cabinets shall be configured with appropriate side ventilation slots to be placed on solid flooring (not raised computer room flooring) and to maintain proper ventilation for every element of equipment. Where air flow and cooling requirements indicate that cabinet mounted fans are required, the system shall provide fans. The contractor shall ensure that adequate air flow is provided to enable operation of the system's hardware in an ambient temperature environment of 90 degrees fahrenheit at a relative humidity of 95%, non-condensing. The operating altitude for the system shall be from sea level to 6,000 feet (operational). Every item of system hardware shall be mounted to provide adequate heat dissipation, within the defined environment.

The Network Management Consoles shall be capable of being mounted on a Government supplied table or tables.

The Government has a heat dissipation budget for the Headquarters node of the system of 6,000 BTUs and for the Regional Headquarters nodes of 3,000 BTUs. The contractor shall notify the Government if the system exceeds that heat budget.

3.11 System Reliability Requirements

The system shall provide high availability through minimum single points of failure consistent with the requirement that the system be developed of off-the-shelf components with readily available spare parts. The system shall be easy to maintain, with minimum mean time to repair, so that system operators can readily reconstruct the system after a failure. In an effort to maintain a high availability, the system shall employ redundancy of critical elements as described in this section and ease of maintenance as defined in Paragraph 3.12.

Critical elements like power supplies and disk drives shall be fully redundant, with automatic switchover from the primary to the built-in secondary system. The system configuration at any one time is considered to be vital system information. The configuration shall be stored in a redundant manner to preclude loss of operating configuration with single system component failure. Wherever possible, other system critical elements shall be provided redundantly.

The contractor shall identify to the Government any single points of failure which remain in the final delivered architecture. With system availability based upon a 12 to 15 hour day, with preventative maintenance scheduled on a not-to-interfere basis, the contractor shall identify any preventative maintenance or other measures which the Government can employ to ensure maximum system availability.

3.12 Maintainability Functional Requirements

The system shall be maintainable to the printed circuit board level by trained Government technicians. In excess of 95% of the possible system failures shall be correctable by the simple removal and replacement of a circuit board. As defined in Paragraph 3.7.4, the system shall provide built in diagnostics, able to detect 90% of the possible system failures, and providing reports of failed components to the system control console and/or to the Network Management Console. Specific life cycle maintainability requirements are defined below.

3.12.1 Life Cycle Maintenance Requirements

The system shall provide built in diagnostic support, both on-line and off-line to assist in locating failed system components. Each major element of network hardware shall provide a status indication to a control console and to the network management system and shall update that status condition as the status changes. Each major element of hardware shall also perform a complete self test upon power-up or reset and shall report successful completion of the self test to the control console or network management system. Whenever built in redundant equipment is automatically switched on-line in response to a failure, the built in diagnostic routine shall also include notification to the control console and network management system of the failure and automatic replacement of the component.

3.12.2 On-site Spares Kit

In support of system repair by Government on-site personnel, the contractor shall provide a spares kit for each network node. The spares kit shall consist of one of each part required to operate the system plus six months supply (based upon projected usage data) of the most frequently needed spare parts required to maintain the system. Passive system components like system

chassis, with no past record of failure, will not be required in the spare parts kit. In addition spares will not be required for any item with a projected failure rates of once in every 10,000 hours or greater. Wherever items of spares require lead times for replacement of longer than 1 working days, the vendor shall notify the Government of these long-lead items. The Government desires that vendors provide maximum equipment commonality between spare parts used at Regional nodes and spare parts used at the NRC headquarters node. The Government's goal is to provide at least 80% board level commonality among all nodes in the network.

3.12.3 Spares Replacement Approach

The Government intends to employ contractor assets to perform depot level repair of faulty circuit boards for minor maintenance and repair functions with major maintenance functions as described in Section C.12.3. The contractor shall provide a replacement approach where a failed component can be replaced with onboard spares, shipped to the contractor (or agent for the contractor) for repair/replacement, and the contractor (or agent) ships a replacement to the Government within ten (10) working days.

The contractor (or designated agent) shall also provide support in the troubleshooting of those failures which are not readily repaired by simple replacement of a circuit board. The level of support shall include at a minimum telephonic access to trained system technicians. The contractor shall provide on site service as described in Section C.12.3 when the above troubleshooting means have been exhausted and at the discretion of the Government.

3.12.4 Powered Replacement Capability

In the event of a partial failure of a network node, which does not result in failure of every communications channel in the node, the system shall allow replacement of at least 80% of the system modules without powering down or disconnecting other, serviceable modules in the system.

Innovative maintenance concepts which can demonstrate a system availability of 99.9% or greater will be considered compliant, and will be exempted from strict compliance with the spare part requirements identified above

00000003

Police Data Systems Pricing
 Municipal Regulatory & Compliance
 Solicitors RS Item 93 137
 Master City Ltd
 November B 13993

CLIN	Timeplex Product Description	Part Number	Supplier	Qty	Order's Unit Cost	Order's Ext. Cost	2.30% MAM	7.66% GSA	5.26% Fee	NRC's Unit Price	NRC's Ext. Price	Unit Mounting Material Price	Base Price	5.00% FEE	NRC's Total Price
00001	Link 2 + Chassis Redundant Multicast Control Unit Price Includes Maintenance 2 ea Network Modem/Cluster Phase 10 SoftLoad 2 ea Power Supplies (PSU1) 1 ea BIP Cable 1 ea 15' MD11 Data Link Cable 1 ea Users Guide	120201-SL	Templex	3	\$11,892.80	\$31,802.80	\$271.48	\$924.89	\$813.75	\$13,812.90	\$435.21	\$2,156.86	\$435.21	\$2,156.86	\$21,192.28
00002	Redundant Expansion Maintenance Price Includes Maintenance/Control 2 ea Power Supplies (PSU1) 1 ea Redundant Drive Module (DR2) 1 ea Redundant Drive Module (DR1) 1 ea Power Supply Chassis	120210-C	Templex	3	\$7,125.00	\$16,125.00	\$163.88	\$558.33	\$431.24	\$8,338.45	\$435.21	\$2,156.86	\$435.21	\$2,156.86	\$15,717.83
00003	Link 2 + Aggregate Trunk Modules Integrated Trunk Module supports 4 x 56Kbps bandwidth output (PSK, Vbr/Tx) Redundant 3.0.1 Module w/ADPCM options, DSK 1 Interface Bipolar Module Bipolar Training Module Inhibit Module for LNK2 RS422 Interface w/Phase 10 SoftLoad Link Framing Module supports Nx59/64Kbps output LFM 10 Network Module w/Phase 10 SoftLoad NCLSL Driver Module w/On Board Redundancy Control Unit DRE2 Drive Module w/On Board Redundancy Expansion DRE1 Power Supply (115/230VAC) PSU1	96-01	Templex	1	\$6,460.00	\$6,460.00	\$148.58	\$506.22	\$445.39	\$7,560.19	\$435.21	\$2,156.86	\$435.21	\$2,156.86	\$7,560.19
00004	4 Port Sync Data Module RS 232	05C	Templex	1	\$2,401.60	\$2,401.60	\$55.24	\$188.19	\$165.58	\$2,810.61	\$435.21	\$2,156.86	\$435.21	\$2,156.86	\$2,810.61
00015	4 Port Sync Data Module RS 422	QSC 2	Templex	1	\$2,401.60	\$2,401.60	\$55.24	\$188.19	\$165.58	\$2,810.61	\$435.21	\$2,156.86	\$435.21	\$2,156.86	\$2,810.61
00016	4 Port Sync Data Module V.35	QSC 4	Templex	1	\$2,910.80	\$2,910.80	\$66.95	\$228.10	\$200.58	\$3,406.54	\$435.21	\$2,156.86	\$435.21	\$2,156.86	\$3,406.54
00017	4 Port Sync Polling Module RS 422	OSP 2	Templex	1	\$4,104.00	\$4,104.00	\$94.39	\$321.80	\$282.95	\$4,802.94	\$435.21	\$2,156.86	\$435.21	\$2,156.86	\$4,802.94
00018	4 Port Sync Polling Module V.35	GSP 4	Templex	1	\$4,598.00	\$4,598.00	\$105.75	\$360.31	\$317.01	\$5,381.07	\$435.21	\$2,156.86	\$435.21	\$2,156.86	\$5,381.07
00019	4 Port Sync Polling Module, 2 ea, RS422 V.35	OSP 8	Templex	1	\$4,351.00	\$4,351.00	\$100.07	\$340.95	\$299.88	\$5,092.00	\$435.21	\$2,156.86	\$435.21	\$2,156.86	\$5,092.00
00020	4 Port Voice Module ADPCM/PCM	DVM 3	Templex	1	\$2,329.40	\$2,329.40	\$53.58	\$182.54	\$162.60	\$2,726.12	\$435.21	\$2,156.86	\$435.21	\$2,156.86	\$2,726.12
00021	Channel Service Units TM05 1400 3.5" Basic Configuration holds 2 CSU's Z297942 TM05 1400 10.5" Basic Configuration holds 14 CSU's Z297943	Z297941 Z297942 Z297943	Templex	1	\$2,565.00	\$2,565.00	\$59.00	\$201.00	\$176.85	\$3,001.85	\$435.21	\$2,156.86	\$435.21	\$2,156.86	\$3,001.85
00024	Time View 2000 Network Management System Time View System Hardware/Star Platform SPARC 10 Network Attachment Cable 50' Texas Instruments Microstar PS17 Link 2 + Network Management Software License Link 2 + Network Management Software License (copy) Access License for up to 10 Nodes 2297865 Teleview 9320A Terminal	T/V 1034CD T/V CABLS T/V 10PH T/V 2000 T/V 2000 T/V 2000 T/V 2000 T/V 2000 T/V 2000	Templex	1	\$22,415.00	\$22,415.00	\$515.55	\$1,755.48	\$1,545.41	\$26,232.44	\$435.21	\$2,156.86	\$435.21	\$2,156.86	\$26,232.44
00025	Network Attachment Cable 50'	T/V CABLS	Templex	1	\$90.00	\$90.00	\$2.07	\$7.05	\$6.20	\$105.32	\$435.21	\$2,156.86	\$435.21	\$2,156.86	\$105.32
00026	Texas Instruments Microstar PS17	T/V 10PH	Templex	1	\$3,095.00	\$3,095.00	\$71.19	\$242.53	\$213.39	\$3,622.11	\$435.21	\$2,156.86	\$435.21	\$2,156.86	\$3,622.11
00027	Link 2 + Network Management Software License	T/V 2000	Templex	1	\$4,275.00	\$4,275.00	\$98.33	\$335.00	\$294.74	\$5,003.07	\$435.21	\$2,156.86	\$435.21	\$2,156.86	\$5,003.07
00028	Link 2 + Network Management Software License (copy)	T/V 2000	Templex	1	\$2,137.50	\$2,137.50	\$49.16	\$167.50	\$147.37	\$2,501.53	\$435.21	\$2,156.86	\$435.21	\$2,156.86	\$2,501.53
00029	Access License for up to 10 Nodes	T/V 2000-1	Templex	1	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
00030	Teleview 9320A Terminal	Z297865	Templex	1	\$510.00	\$510.00	\$11.73	\$39.96	\$35.16	\$596.85	\$435.21	\$2,156.86	\$435.21	\$2,156.86	\$596.85

Public Data Systems Pricing
 Network Regulatory Commission
 Solicitation 93-00M 93-197
 Master Cost List
 November 8, 1993

CLIN	Part Number	Supplier	Qty	Unit Cost	Est. Cost	M&M	7.66% GSA	6.26% Fee	NRC's Unit Price	NRC's Est. Price	5.00% Base Unit Monthly Maint. Price	FEE 5.00% Base Unit Monthly Maint. Price	NRC's Total Price
Auxiliary Equipment													
0031	GC232 50'	Timesplex	1	\$176.95	\$176.95	\$1.77	\$6.03	\$5.31	\$90.06	\$90.06	\$0.00	\$0.00	\$90.06
0032	DCE-RS-110 Port 50' Cable(M or F)	Timesplex	1	\$171.00	\$171.00	\$1.93	\$13.40	\$11.79	\$200.12	\$200.12	\$0.00	\$0.00	\$200.12
0033	DCE-RS-448 Port 50' Cable(M or F)	Timesplex	1	\$107.35	\$107.35	\$2.47	\$8.41	\$7.40	\$125.63	\$125.63	\$0.00	\$0.00	\$125.63
0034	Cable-Bluel	Timesplex	1	\$2,074.80	\$2,074.80	\$47.72	\$162.59	\$143.05	\$2,428.16	\$2,428.16	\$0.00	\$0.00	\$2,428.16
0035	Telco Adapter to Punch Driven 50 pin Cable	Timesplex	1	\$129.25	\$129.25	\$3.95	\$10.05	\$8.84	\$150.09	\$150.09	\$0.00	\$0.00	\$150.09
0036	Punch Driven Block for Voice Cable Termination	PTB	1	\$91.70	\$91.70	\$1.98	\$6.40	\$5.63	\$95.61	\$95.61	\$0.00	\$0.00	\$95.61
0037	Telco Adapter for DVM 3	Timesplex	1	\$95.00	\$95.00	\$2.18	\$7.44	\$6.55	\$111.18	\$111.18	\$0.00	\$0.00	\$111.18
0038	Manufacturing of Special Cables - \$2.50 per foot Special Order												
Time Design Software													
0039	Base Application 10 Notes	Timesplex	1	\$6,125.00	\$6,125.00	\$142.03	\$483.88	\$425.74	\$7,226.65	\$7,226.65	\$339.13	\$678.26	\$11,974.47
0040	Access Timesplex Device Library	Timesplex	1	\$4,940.00	\$4,940.00	\$113.62	\$367.11	\$340.59	\$5,781.32	\$5,781.32	\$0.00	\$0.00	\$5,781.32
0041	Design Toolkit	Timesplex	1	\$2,850.00	\$2,850.00	\$65.55	\$223.33	\$196.49	\$3,335.37	\$3,335.37	\$0.00	\$0.00	\$3,335.37
0042	Data Debugger	Timesplex	1	\$2,375.00	\$2,375.00	\$54.83	\$186.11	\$163.75	\$2,778.49	\$2,778.49	\$0.00	\$0.00	\$2,778.49
0043	Test Manager	Timesplex	1	\$2,850.00	\$2,850.00	\$65.55	\$223.33	\$196.49	\$3,335.37	\$3,335.37	\$0.00	\$0.00	\$3,335.37
0044	Annual Taint Subscription Service	Timesplex	1	\$3,800.00	\$3,800.00	\$87.40	\$297.77	\$261.99	\$4,447.16	\$4,447.16	\$0.00	\$0.00	\$4,447.16
0045	Printer Driver	Timesplex	1	\$1,852.50	\$1,852.50	\$42.61	\$145.17	\$127.72	\$2,168.00	\$2,168.00	\$0.00	\$0.00	\$2,168.00
0046	Co-Existence Software (Optional)	Timesplex	1	\$4,750.00	\$4,750.00	\$109.25	\$372.22	\$327.49	\$5,558.96	\$5,558.96	\$0.00	\$0.00	\$5,558.96
0047	Distric Power Rte Pro 1.92KVA Uninterruptible Power Supply	Deltec	1	\$1,325.00	\$1,325.00	\$30.48	\$103.83	\$81.35	\$1,550.66	\$1,550.66	\$0.00	\$0.00	\$1,550.66
Router Products													
0048	Enterprise Router Chassis w/1 ea. P.S. Module 15 ea. Modbus	ERIC15	1	\$14,763.00	\$14,763.00	\$339.55	\$1,156.86	\$1,017.84	\$17,277.25	\$17,277.25	\$148.96	\$1,051.30	\$20,092.07
0049	Enterprise Router Chassis w/2 ea. P.S. Modules 15 ea. Modbus	ERIC15R	1	\$7,328.00	\$7,328.00	\$394.54	\$1,357.85	\$1,194.88	\$20,279.07	\$20,279.07	\$145.96	\$1,051.30	\$22,042.59
0050	Power Supply (1) P/S per (5) Independent Routing Processors/PP's	ERP-PS-1	1	\$2,365.00	\$2,365.00	\$54.40	\$185.33	\$163.06	\$2,767.79	\$2,767.79	\$0.00	\$0.00	\$2,767.79
0051	4 Port Ethernet R/P	ER-4E	1	\$11,685.00	\$11,685.00	\$288.76	\$978.19	\$850.63	\$13,675.05	\$13,675.05	\$174.03	\$746.09	\$16,657.17
0052	2 Port Token Ring R/P	ER-2T	1	\$12,483.00	\$12,483.00	\$287.11	\$978.19	\$850.63	\$14,608.94	\$14,608.94	\$185.39	\$823.04	\$17,760.57
0053	1 Port FDDI R/P	ERP	1	\$12,996.00	\$12,996.00	\$288.91	\$1,018.39	\$896.01	\$15,209.31	\$15,209.31	\$193.31	\$926.95	\$18,150.77
0054	4 Port V.35 Wide Area Serial R/P	ER4W/V35	1	\$8,778.00	\$8,778.00	\$201.89	\$687.86	\$605.20	\$10,272.95	\$10,272.95	\$131.13	\$621.74	\$12,468.25
0055	4 Port V.11 Wide Area Serial R/P	ER4W/V11	1	\$8,778.00	\$8,778.00	\$201.89	\$687.86	\$605.20	\$10,272.95	\$10,272.95	\$131.13	\$621.74	\$12,468.25
0056	SDM R/P w/ (1) Slot, BR Interfaces and (1) WAN Interface	ER1-BRI	1	\$11,400.00	\$11,400.00	\$262.20	\$893.32	\$785.98	\$13,341.50	\$13,341.50	\$169.56	\$813.91	\$15,376.22
0057	1 Port Wide Area R/P w/ Slot, P/S1 50 Pin SCSI/2 Interface	ERHSS	1	\$17,043.00	\$17,043.00	\$391.99	\$1,335.52	\$1,175.03	\$19,945.54	\$19,945.54	\$0.00	\$0.00	\$19,945.54
0058	Enterprise Router Std. Software	ERSW	1	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
0059	Enterprise Router Std. Software with Frame Relay	ERSW-FR	1	\$712.50	\$712.50	\$16.39	\$55.83	\$49.12	\$833.84	\$833.84	\$0.00	\$0.00	\$833.84
0060	Enterprise Router Std. Software w/ Frame Relay Ext. Dtd Security	ERSW-FRIG	1	\$950.00	\$950.00	\$21.85	\$74.44	\$65.50	\$1,111.79	\$1,111.79	\$0.00	\$0.00	\$1,111.79
0061	Enterprise Router Std. Software w/ Ext. Dtd Security	ERSWIG	1	\$950.00	\$950.00	\$21.85	\$74.44	\$65.50	\$1,111.79	\$1,111.79	\$0.00	\$0.00	\$1,111.79
0062	Manual Set, User Guide, Reference, Install and Maintenance	ERUG	1	\$190.00	\$190.00	\$4.37	\$14.89	\$13.10	\$222.36	\$222.36	\$0.00	\$0.00	\$222.36

Police Data Systems Inc.
 10000 Highway 100
 Suite 100
 Dallas, TX 75243

Q194	Description	Part Number	Supplier Qty	Police's Unit Cost	Police's Est. Cost	2.30% Police Mktg	Police's Unit Cost	Police's Est. Price	5.30% Police's Est. Price	Police's Est. Price	5.00% Base Monthly Maint. Price	Police's Est. Price	Police's Est. Price
00010	Network Module w/ Probe 10 Serial Card	00010	1	\$2,976.00	\$2,976.00	\$69.30	\$3,045.30	\$3,424.32	\$3,593.64	\$3,424.32	\$0.00	\$3,424.32	\$3,424.32
00011	Device Module w/ On Board Performance Monitor Unit	00011	5	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
00012	Device Module w/ On Board Performance Expansion	00012	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
00013	Integrated Tank Module - supports AS/400 AS/400	00013	1	\$1,400.00	\$1,400.00	\$32.20	\$1,432.20	\$1,630.82	\$1,717.02	\$1,630.82	\$0.00	\$1,630.82	\$1,630.82
00014	Module w/ADPCM option, 25K x frequency	00014	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
00015	Backup Module	00015	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
00016	Report Training Module	00016	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
00017	Link Training Module supports AS/400 AS/400	00017	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
00018	4 Port Sync Data Module 65 232	00018	1	\$2,401.60	\$2,401.60	\$55.24	\$2,456.84	\$2,810.81	\$2,956.11	\$2,810.81	\$0.00	\$2,810.81	\$2,810.81
00019	4 Port Sync Data Module 65 422	00019	1	\$2,401.60	\$2,401.60	\$55.24	\$2,456.84	\$2,810.81	\$2,956.11	\$2,810.81	\$0.00	\$2,810.81	\$2,810.81
00020	4 Port Sync Training Module V 35	00020	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
00021	4 Port Sync Training Module V 35	00021	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
00022	4 Port Sync Training Module V 35	00022	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
00023	4 Port voice Module ADPCM/PCM	00023	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
00024	Power Supply 115/230 VAC	00024	1	\$1,845.40	\$1,845.40	\$42.84	\$1,888.24	\$2,155.52	\$2,268.36	\$2,155.52	\$0.00	\$2,155.52	\$2,155.52
TOTALS: Subcontractor's Cost													
\$4,469.96 \$179,641.15													

Pulsar Data Systems Pricing
 Nuclear Regulatory Commission
 Specification NS-RM-93-197
 BASIC DESIGN for Headquarters'5 Regional Sites
 November 9, 1993

Code	Description	Part Number	Supplier	Qty	Pulsar's Unit Cost	Pulsar's Tot. Cost	2.00% Pulse Mktg	7.00% Pulsar's G&A	6.25% Pulsar's Fee	NRC's Unit Price	NRC's Tot. Price	FEE	FEE	NRC's Total Price
												5.00% Base Monthly Maint. Price	5.00% Base Install Price	
Equipment Pricing for 5 Regional Sites														
0001	Link 2 + chassis	220201	Tandem	5	\$11,002.80	\$55,014.00	\$2,751.46	\$924.89	\$613.75	\$13,812.90	\$65,068.50	\$425.21	\$2,156.86	\$105,961.40
Redundant Multimesh Control Unit Price includes Mainframe 2 ea. Network Modules(Nx56/64kbit Phase 10 Softload) 2 ea. Power Supplies (PSU's) 1 ea. BIF Cable 1 ea. 15' MD11 Data Link Cable 1 ea. Link Guide														
Link 2 + Aggregate Trunk Modules														
0002	Integrated Trunk Module - supports N x 56/64kbit bundled output DSX interface	ICQ 1	Timeplex	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
0004	Redundant R.O. 1	ICQ 1	Timeplex	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
0005	Module w/ADPCM option, DSX 1 Interface	ICQ 1	Timeplex	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
0006	Bypass Module	BPM	Timeplex	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
0007	Signal Framing Module	BFM	Timeplex	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
0008	Interlink Module for LINK 2-RS422 Interface w/Phase 10 Softload	IC 2-2/S	Timeplex	5	\$2,295.20	\$11,476.00	\$57.38	\$179.86	\$158.24	\$2,684.09	\$13,430.45	\$0.00	\$0.00	\$13,430.45
0009	Link Framing Module supports Nx56/64kbit output	LFM 10	Timeplex	5	\$1,664.40	\$8,322.00	\$38.28	\$130.43	\$114.75	\$1,947.86	\$9,739.30	\$0.00	\$0.00	\$9,739.30
Link 2 x 100 Modules														
0014	4 Port Sync Data Module RS-232	DSX 2	Timeplex	10	\$2,401.60	\$12,008.00	\$55.24	\$188.19	\$165.58	\$2,810.61	\$14,053.05	\$0.00	\$0.00	\$14,053.05
0015	4 Port Sync Data Module V 35	DSX 2	Timeplex	5	\$2,401.60	\$12,008.00	\$55.24	\$188.19	\$165.58	\$2,810.61	\$14,053.05	\$0.00	\$0.00	\$14,053.05
0016	4 Port Sync Polling Module RS-422	DSP 2	Timeplex	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
0017	4 Port Sync Polling Module V 35	DSP 2	Timeplex	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
0018	4 Port Sync Polling Module 2 ea. RS422/V 35	DSP 4	Timeplex	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
0019	4 Port Voice Module ADPCM/PCM	GVM 3	Timeplex	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Channel Service Units														
0021	INDS 1400 3.5" Basic Configuration Node 2 CSU's	2297947	Timeplex	9	\$2,565.00	\$12,825.00	\$59.00	\$201.00	\$176.85	\$3,001.85	\$15,009.25	\$38.43	\$339.15	\$19,010.70
0023	INDS 1401 INDS CSU Line Module	2297948	Timeplex	5	\$2,085.25	\$10,426.25	\$47.96	\$163.40	\$143.77	\$2,440.38	\$12,201.90	\$31.65	\$0.00	\$14,100.90
Ancillary Equipment														
0031	DCE RS-232 10 Port 50' Cable/M or F1	LC232-50	Timeplex	30	\$76.95	\$2,308.50	\$1.77	\$6.03	\$5.21	\$90.06	\$2,701.80	\$0.00	\$0.00	\$2,701.80
0032	DCE V 35 10 Port 50' Cable/M or F1	DCCE 50'	Timeplex	5	\$171.00	\$855.00	\$3.91	\$13.40	\$11.79	\$200.12	\$1,000.60	\$0.00	\$0.00	\$1,000.60
0033	DCE RS 449 10 Port 50' Cable/M or F1	LC449 50'	Timeplex	5	\$107.35	\$536.75	\$2.47	\$8.41	\$7.40	\$125.63	\$628.15	\$0.00	\$0.00	\$628.15
0034	Cables/Bus	93734 3'	Timeplex	5	\$2,024.80	\$10,124.00	\$17.72	\$162.54	\$143.05	\$2,428.16	\$12,140.80	\$0.00	\$0.00	\$12,140.80
0035	Telco Adapter for Punch Down 50 pair Cable	Telco Cable	Timeplex	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
0036	Punch Down Block for Voice Cable Termination	POB	Timeplex	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
0037	Telco Adapter for QVM 3	Telco Adpr	Timeplex	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
0038	Teletype 9320A Terminal	2297865	Timeplex	5	\$510.00	\$2,550.00	\$11.73	\$39.96	\$35.16	\$596.85	\$2,984.25	\$6.78	\$169.56	\$4,238.85
Spare Parts Kit														
0010	Network Module w/Phase 10 Softload	NC1/S	Timeplex	5	\$2,526.00	\$12,630.00	\$67.30	\$229.29	\$201.73	\$3,424.32	\$17,121.80	\$0.00	\$0.00	\$17,121.80
0011	Driver Module w/On Board Redundancy Control Unit	DR2	Timeplex	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
0012	Driver Module w/On Board Redundancy Expansion	DR2	Timeplex	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
0003	Integrated Trunk Module - supports Nx56/64kbit	ICQ 1	Timeplex	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
0005	Module w/ADPCM option, DSX 1 Interface	ICQ 1	Timeplex	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
0006	Bypass Module	BPM	Timeplex	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
0007	Signal Framing Module	BFM	Timeplex	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
0008	Interlink Module for LINK 2-RS422 Interface w/Phase 10 Softload	IC 2-2/S	Timeplex	5	\$2,294.20	\$11,471.00	\$57.27	\$179.78	\$158.17	\$2,684.92	\$13,424.60	\$0.00	\$0.00	\$13,424.60
0009	Link Framing Module supports Nx56/64kbit output	LFM 10	Timeplex	5	\$1,664.40	\$8,322.00	\$38.28	\$130.43	\$114.75	\$1,947.86	\$9,739.30	\$0.00	\$0.00	\$9,739.30
0014	4 Port Sync Data Module RS-232	DSX 2	Timeplex	5	\$2,401.60	\$12,008.00	\$55.24	\$188.19	\$165.58	\$2,810.61	\$14,053.05	\$0.00	\$0.00	\$14,053.05
0015	4 Port Sync Data Module V 35	DSX 2	Timeplex	5	\$2,401.60	\$12,008.00	\$55.24	\$188.19	\$165.58	\$2,810.61	\$14,053.05	\$0.00	\$0.00	\$14,053.05
0016	4 Port Sync Polling Module RS-422	DSP 2	Timeplex	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
0017	4 Port Sync Polling Module V 35	DSP 2	Timeplex	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
0018	4 Port Sync Polling Module 2 ea. RS422/V 35	DSP 4	Timeplex	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
0019	4 Port Voice Module ADPCM/PCM	GVM 3	Timeplex	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
0020	Power Supply 115/230 VAC	PSU 1	Timeplex	5	\$1,645.40	\$8,227.00	\$37.94	\$128.94	\$113.44	\$1,925.62	\$9,629.10	\$0.00	\$0.00	\$9,629.10
TOTALS (All Regional Sites)					347,310.75	\$250,283.50	\$1,088.16	\$3,707.37	\$3,261.86	\$56,369.14	\$293,145.25	\$512.07	\$2,865.56	\$337,197.20
SUB TOTALS (Headquarters'5 Regional Sites)					\$140,961.80	\$284,094.20	\$,742.29	\$1,046.51	\$9,219.09	\$184,975.89	\$449,508.72	\$14,850.27	\$1,535.45	\$516,838.35
Equipment Staging Price						\$17,551.55		\$1,344.45	\$1,192.89	\$20,078.89	\$20,078.89			\$20,078.89
TOTALS (Headquarters'5 Regional Sites)														\$536,917.24