



November 13, 1989

US Nuclear Regulatory Commission  
Division of Contracts and Property Management  
Mail Stop P-1020  
Washington, DC 20555

ATTN: Teresa McLearn

SUBJECT: Solicitation RS-IRM-90-191  
Proposal 89128B

Dear Ms. McLearn,

This submission is a clarification of our previous Proposal 89128 and the amendment (89-128A) dated October 31, 1989.

The sheet containing the price and rate breakdown has been clarified regarding the reference to materials. The revised page dated November 13, 1989 is enclosed.

In regard to Item 11 of the NRC letter dated 10/13/89, we have clarified our answer as discussed. A revised sheet (Questions and Answers 10 and 11) dated November 13, 1989 is enclosed.

The above mentioned enclosed pages contain the only clarifications, updates or changes to our previous submissions.

Sincerely

*Richard S. Rothermel*  
Richard S. Rothermel  
Manager of Marketing

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NRC LETTER 10/13/89  
RESPONSE

Proposal 89128B

QUESTION 10: The hourly rates for technicians appear to be low given the level of experience required by NRC.

ANSWER: The rates exceed those of the equivalent technician contained in the Area Wage Survey, U.S. Department of Labor for Washington, DC - Maryland Virginia Metropolitan Area dated March 1988. This also applies for the minimum rates contained in Section I of the solicitation.

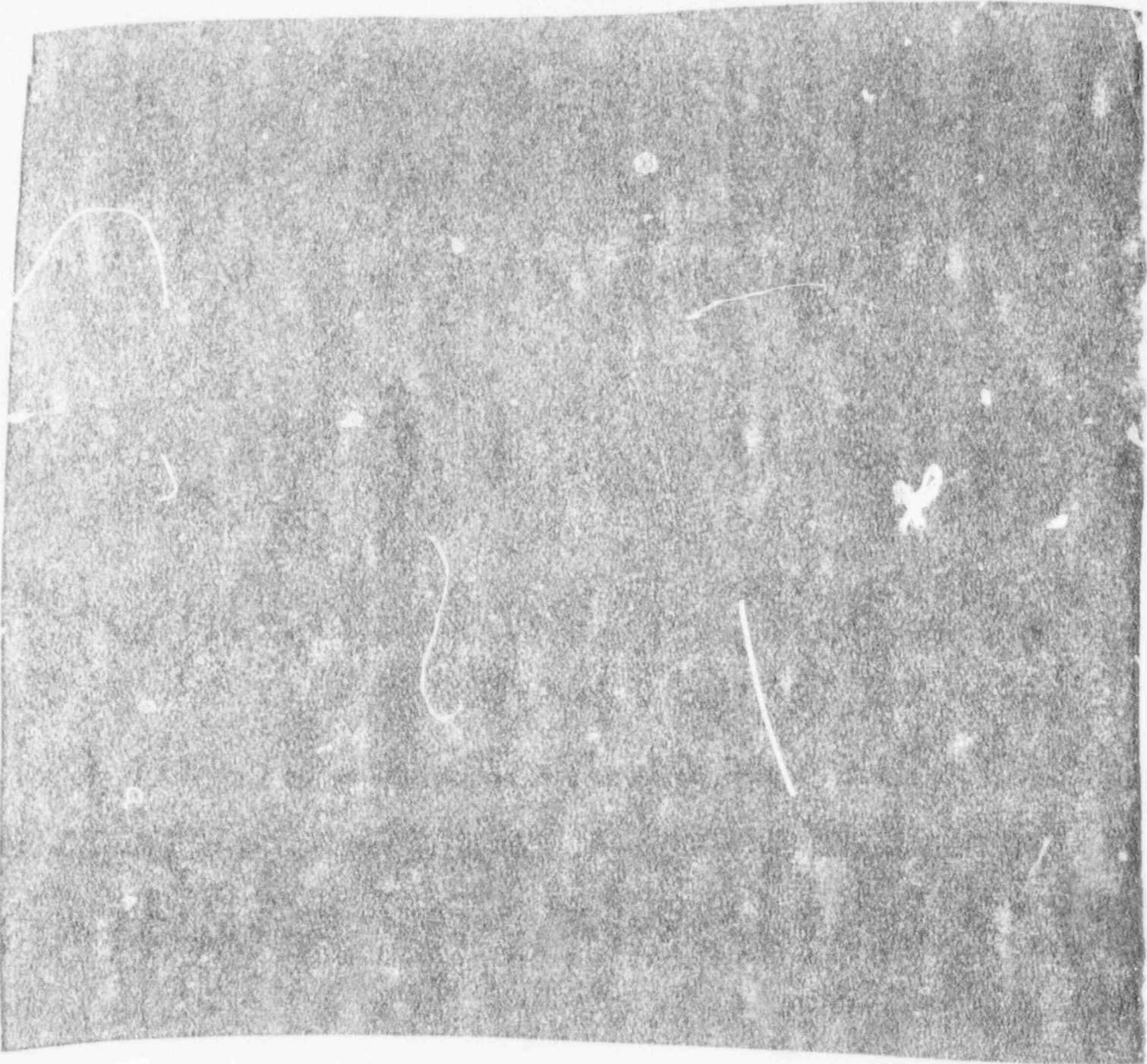
QUESTION 11: Be prepared to discuss material handling costs.

ANSWER: As requested and required by the provisions of the RFP we will provide material at cost. The material billing (at cost) will be F.O.B. our warehouse in Newington, Virginia.

November 13, 1989

PRICE BREAKDOWN

PROPOSAL 89128 B



November 13, 1989

APPENDIX D

Proposal 89128

Rev. 2/23/89

STATEMENT OF QUALIFICATIONS

The Company

Vector Communications is a wholly owned subsidiary of Henkels & McCoy, Inc. which was founded in 1923 and is currently the largest independently held communications engineering, construction, and maintenance firm in the United States. Headquartered in Blue Bell, Pennsylvania, a northern suburb of Philadelphia, Henkels & McCoy offers one of the largest networks of qualified individuals available in the communications industry through fourteen divisions and wholly owned subsidiaries with permanent offices and operations facilities strategically located across the nation. We employ a staff of as many as 5,300, 75% of whom are engaged in various aspects of communications work, providing the design, installation and service needs for your communications system, regardless of its size or complexity, from facilities analysis and engineering to its installation and maintenance.

Henkels & McCoy began its service to the communication industry by trimming trees along aerial cable runs. As our clients came to trust our capabilities and integrity, they requested us to expand with them by placing poles and stringing cable, splicing, terminating and burying cable. Our work next expanded to inside plant construction, namely placing stations, house cabling and wiring and switching equipment, and then to the testing and maintaining of all phases of inside and outside plant work. As the technologies changed we grew into the design and engineering aspects of all communications work to supply an ever-growing need created by a rapidly changing industry. Today we offer a full service capability to both private and utility customers for all their communications networks. In fact, over the last 5 years, Vector/Henkels & McCoy, Inc. has installed more fiber optic cable in the U.S. than any other contractor.

Vector Communications specializes in design, engineering, installation and maintenance of low voltage wiring systems and customized CADD programs for cable and facilities management. Vector has extensive experience in:

- \* Cabling - fiber, twinax, coax, twisted pair, RS232 for data and telecommunications
- \* Local Area Networks
- \* Security Systems
- \* Distributed Audio Systems

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EXPERIENCEA. General

Vector/Henkels & McCoy for many years has served all the major and most of the smaller telephone operating companies in the United States. In addition, we provide system integration and other services for the government and many [REDACTED] companies.

We have installed over 12,000,000 telephones and the necessary inside plant, outside plant and central offices to insure their function. This equates to more telephones than presently exist in New York City, Chicago and Washington, D.C. combined.

Daily, we provide technicians to the operating telephone companies to construct and/or maintain their systems. These technicians routinely perform services such as:

- install analog and digital central office equipment
- set pole lines
- place aerial cable
- plow, trench and direct bury cable
- build manholes and conduit systems
- place fiber optic cable inside and outside
- install CATV electronics and cable
- pull riser cable and house wire
- install PBX's, MDF's and station/terminal equipment
- splice copper and fiber (single and multi-mode)

These forces have engineering support thoroughly qualified to design the systems we install. They are extremely knowledgeable in:

- All forms of outside plant, central office and inside plant projects
- Customer Training
- Network Design
- Conduit and Manhole Designs
- Records Reconciliation
- Operating Assistance
- Inspection and Supervision Services
- Cable Management Systems
- Local Area Networks

Vector/Henkels & McCoy has responded to needs growing out of the partially deregulated telephone industry by developing into a nationwide company with experience and resources to handle all aspects of communications. Services are available through offices at these locations:

Mobile, Alabama  
Fontana, California  
Manteca, California  
San Carlos, California  
Denver, Colorado  
Portland, Connecticut  
New Castle, Delaware  
Gainesville, Florida  
Jacksonville, Florida  
Tampa, Florida  
Dublin, Georgia  
Griffin, Georgia  
Macon, Georgia  
Salem, Illinois  
Elkhart, Indiana  
Lebanon, Kentucky  
Monroe, Louisiana  
Streveport, Louisiana  
Baltimore, Maryland  
Rising Sun, Maryland  
Alpena, Michigan  
Detroit, Michigan  
Grand Rapids, Michigan  
Burlington, New Jersey  
Newark, New Jersey  
Rahway, New Jersey  
Columbus, Ohio  
Oklahoma City, Oklahoma  
Eugene, Oregon  
Portland, Oregon  
Blue Bell, Pennsylvania  
Delaware Water Gap, Pennsylvania  
Oreland, Pennsylvania  
Pittsburgh, Pennsylvania  
York, Pennsylvania  
Davisville, Rhode Island  
Austin, Texas  
Houston, Texas  
Lewisville, Texas  
Odessa, Texas  
Salt Lake City, Utah  
Chantilly, Virginia  
Richmond, Virginia  
Tacoma, Washington  
Milwaukee, Wisconsin  
Washington, D.C.

Rev. 2/23/89

Localities not listed are serviced through our network of approved subcontractors to insure complete cost effective national coverage.

B. Engineering Services

Through our own staff of highly trained, multi-disciplined engineers and consultants, we are able to offer engineering related services to aid the end-user in comprehensive and advantageous communications systems planning.

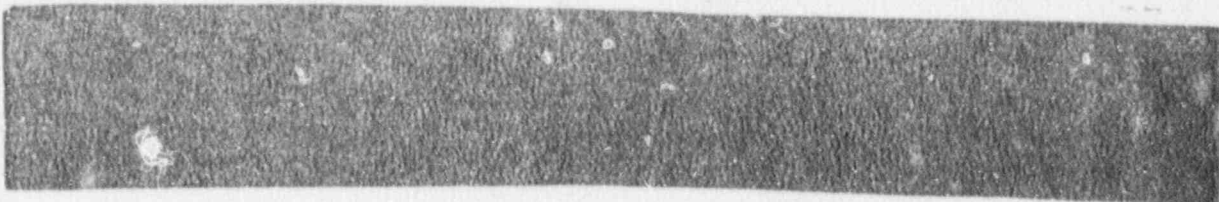
Our engineers or teams of engineers can provide any or all of the following services:

- Physical site surveys
- Study of current and projected communications (voice, data and video) needs
- Development of equipment requirement matrix, including building renovations as needed.
- System design detailing switch and station equipment
- Audit and evaluation of inside and outside plant and design of new plant as necessary.
- Development of a cable management system
- Preparation of vendor request for proposals
- Solicitation of proposals from qualified vendors
- Vendor evaluation and selection recommendation
- Contract negotiations

Following are samples of some communications engineering projects:







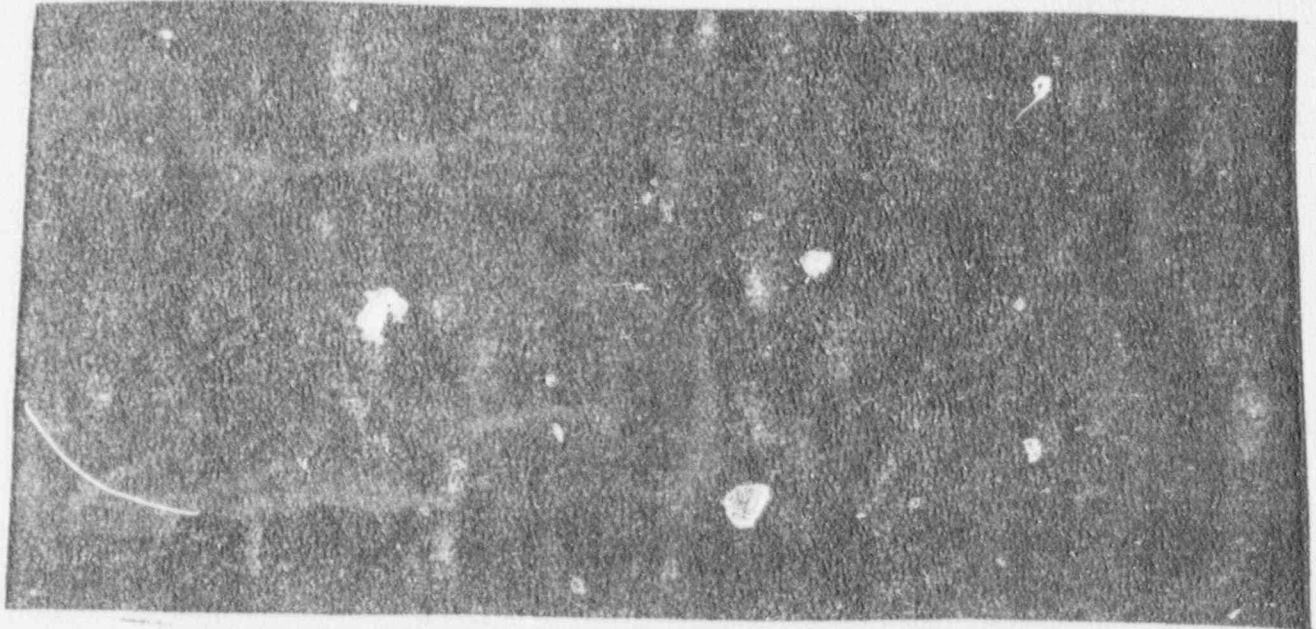
C. Project/Construction Management

In an effort to aid our clients in the successful implementation of all phases of their project, we provide both Project Management and Construction Management Teams. These teams are comprised of experienced managers and various technical and administrative personnel whose resources will be combined to oversee each project.

The Project Management Team can augment our client's staff, or can provide all of the expertise required to lead a communications contract to fruition. Acting as the customer's "right hand", the Project Management Team provides a combination of engineering and management to develop and organize a communication package.

The services of these teams are available in combination, or individually, whichever better suits the needs of our clients.

A few notable projects include:



- U.S. Department of the Interior  
Engineering, project management, supply, and installation of the voice and data cabling system to support the Washington Interagency Telecommunications System. This was the first such cabling system let by the U.S. Government for the WITS program. The system, as designed, will support over 6000 users.



D. Transmission Systems

Our telecommunications experience also includes construction of transmission systems such as:

FIBER OPTICS

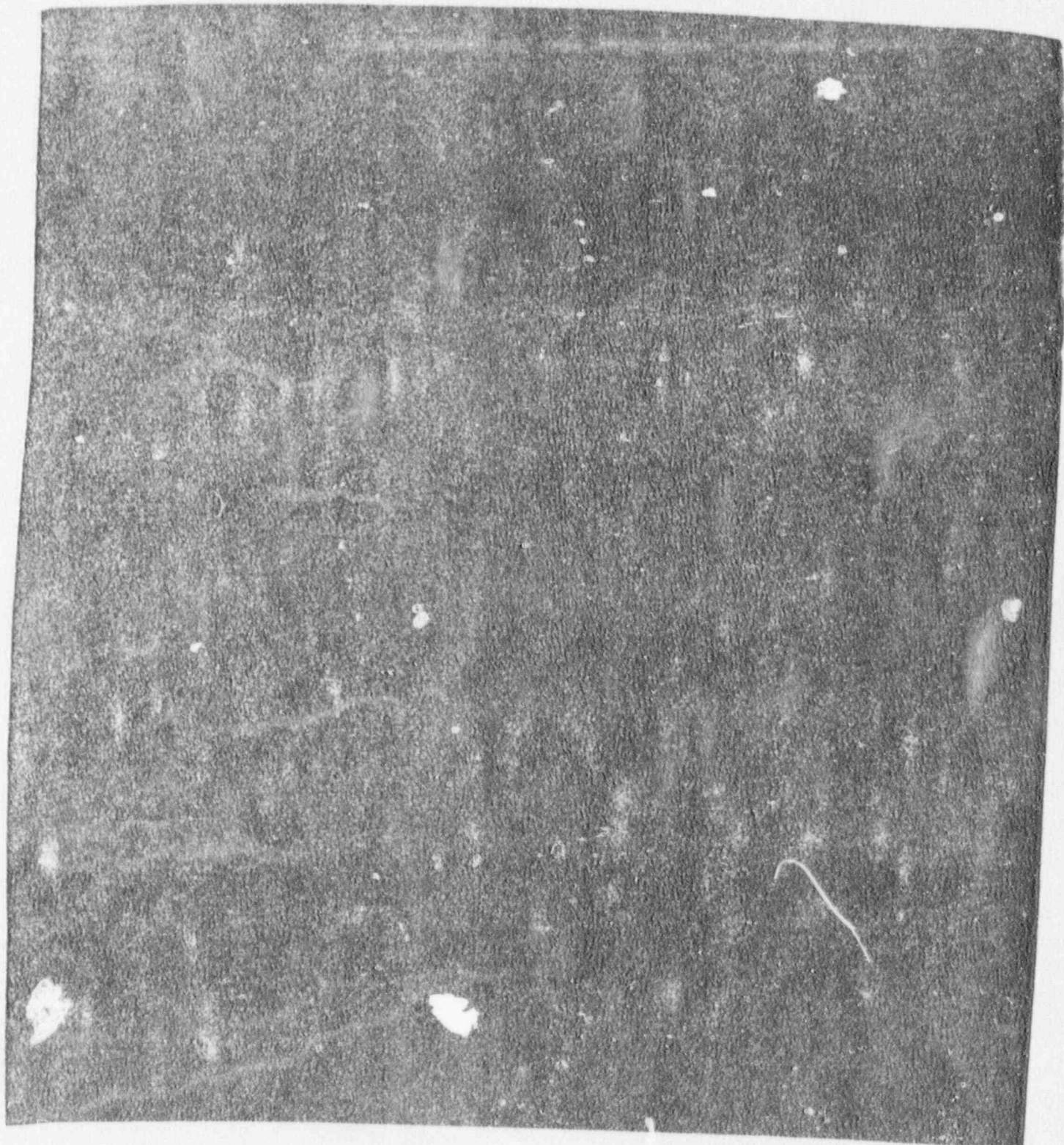
Vector/Henkels & McCoy is a leader in the communications industry today, with special skills in the field of fiber optic cable systems. We have been involved with fiber optic design and installation for more than seven years, and have been labeled "system authorities" by companies such as U.S. West.

We have the expertise and resources across the nation and throughout our company divisional office network to handle all phases of fiber optic work including:

1. Outside plant design engineering including route selection survey and staking, detail engineering for bridge attachment, submarine crossings and tunnels, etc. for the placement of inner duct and/or fiber cables.
2. Development of scope of work including all specifications and the preparation of drawings.
3. Installation of fiber optic systems including conduit, inner duct and other cable plant components by conventional construction methods, i.e., aerial, buried, and underground.
4. "On-track" plowing of fiber optic cable and inner duct on railroad right-of-way through use of Henkels & McCoy developed and patented railroad plow.
5. Lightguide engineering - high and electronics.
6. Project management, scheduling and supervision.

The following list gives specific information on some of the fiber optic projects we have completed or have currently in progress.







LOCAL AREA NETWORKS (LAN'S)

With the advances in broadband network technology, Vector/Henkels & McCoy finds itself again at the forefront of the industry development with the burgeoning local area network (LAN) market. Our engineers and technicians are prepared to work with the various LAN manufacturers to meet the diverse needs of our customers.

We provide the resources necessary to design, install and service a LAN - regardless of its size - from facilities analysis and engineering to installation and maintenance. Our experience includes the integration of copper, fiber optic, coaxial, ethernet, and IBM's "ECL" cables into local area networks using various system topologies.

Our staff of highly trained engineers offers all services to aid the prospective LAN contractor in comprehensive and advantageous network planning.

- a. Need Analysis - the definition of all requirements for the LAN will be created. Information will include all low voltage systems to be networked, such as voice, data, security systems, fire alarms, life support, safety systems, and MAP/TOP, etc. Interviews will be held with the owner's representatives for clear, concise definition of needs. Utilizing the information from the analysis, we will develop a need matrix to graphically show the requirements for a LAN.
- b. Network Design - complete LAN design will be provided.
  1. development of system specification
  2. cable selection and placement - copper, fiber, coaxial, IBM cabling
  3. selection and placement of equipment: switches, central retransmission units, multiplexers, modulators, processors, active and passive on-line components, power supplies, end-user components, etc.
  4. route definition - inside plant  
- outside plant
  5. detailed drawings and materials list necessary for installation
  6. cost analysis
  7. facilities records (including as-build drawings)
- c. Bid Package - Vector/Henkels & McCoy will assist the contractor with the construction bid package. We will aid the writing of the RFP, soliciting of bids from qualified vendors, evaluation of proposals, leading vendor presentations, recommending bidder and fielding technical questions during contract negotiations.

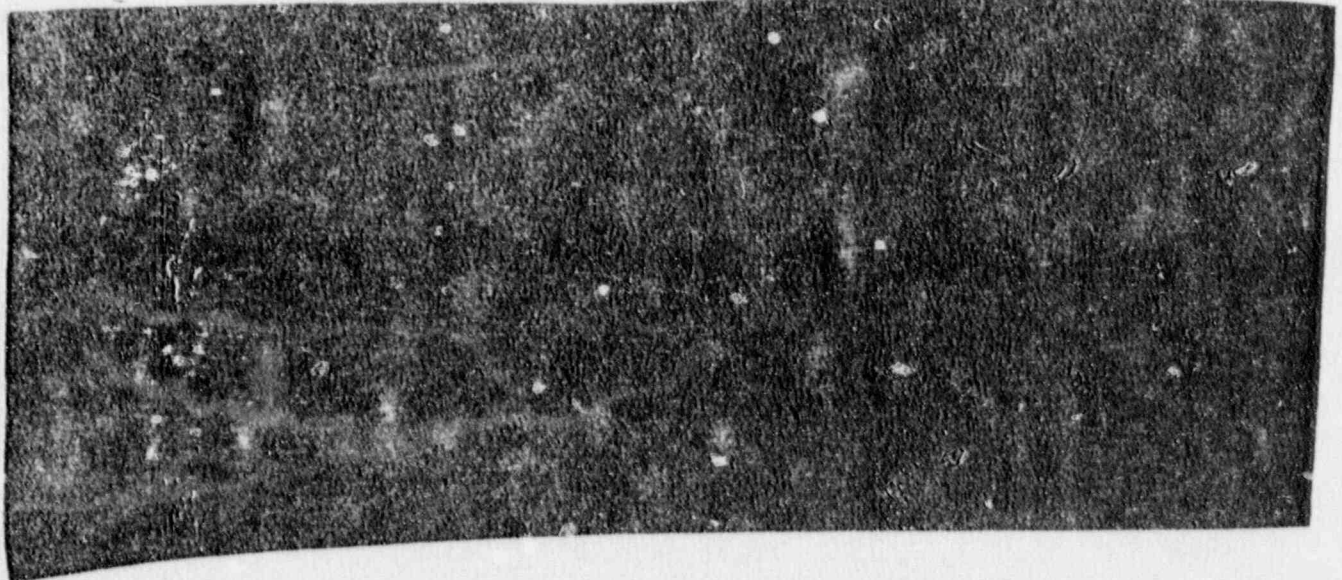
Vector/Henkels & McCoy has the expertise to build the foregoing LAN's with any client in any location nationwide. The process for the construction of a LAN by Vector/Henkels & McCoy begins with the assignment of the work to the relevant Division Office, then in turn to a construction management team. Material procurement is initiated based on the design specifications. Construction services will be for all phases of work:

- Aerial Construction
- Underground and Buried Construction
- Inside Installation
- System Turn-on, test and analysis necessary for certification

We place great emphasis on continuous and long-term service programs. Trained technicians are available on a 24 hours per day, 7 days per week, 365 days per year basis to ensure fast response and the commitment to serve our customers today and in the future.

We have developed an education program to provide network-owner employed personnel with the operational training for the LAN system. This can be accomplished either on customer premises via mobile training lab or in our permanent training facilities.

A few of our LAN customers are:





MICROWAVE

Vector/Henkels & McCoy has performed site preparation, building foundation and structure with associated back-up systems for:



ALTERNATIVE TRANSMISSION SYSTEMS

- Infra red
- Satellite up/down links



E. Training Services

The Training Services Department of the Engineering Division offers to businesses and the communications industry a service like no other

- Training - in all definitions of the word:

- training of customer employees to operate, maintain, or service communications equipment
- training of communications personnel in new fields, or as refresher instruction
- training of unskilled personnel in any phase of inside plant and outside plant communications work

Training Services will design a course to a customer's exact application. Design will dictate duration and schedule of course, curriculum content and class size. Courses can be offered at our locations, or at the customer's premises, whichever is most advantageous.

Training Services will supply instructors to do the teaching, team teach with your own personnel, or simply provide minimal assistance.

Training Services is well aware of federal and state monies available to companies to defray training costs. Tax credits may also be available as compensation for training cost expenditures.

Contracts will be accepted for a complete package of the foregoing, or in any combination of phases. Training ranges from simplistic basic telephones to sophisticated switch program or outside techniques.

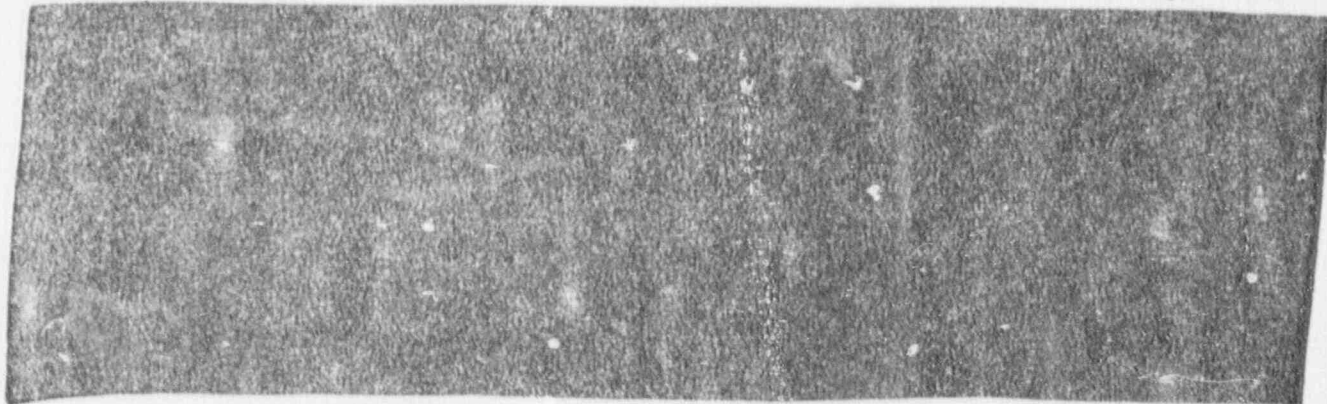


F. Telecommunications

Nationally, we have been a prime or subcontracting source for many private telecommunications projects as this partial list illustrates:

Prime Contracts

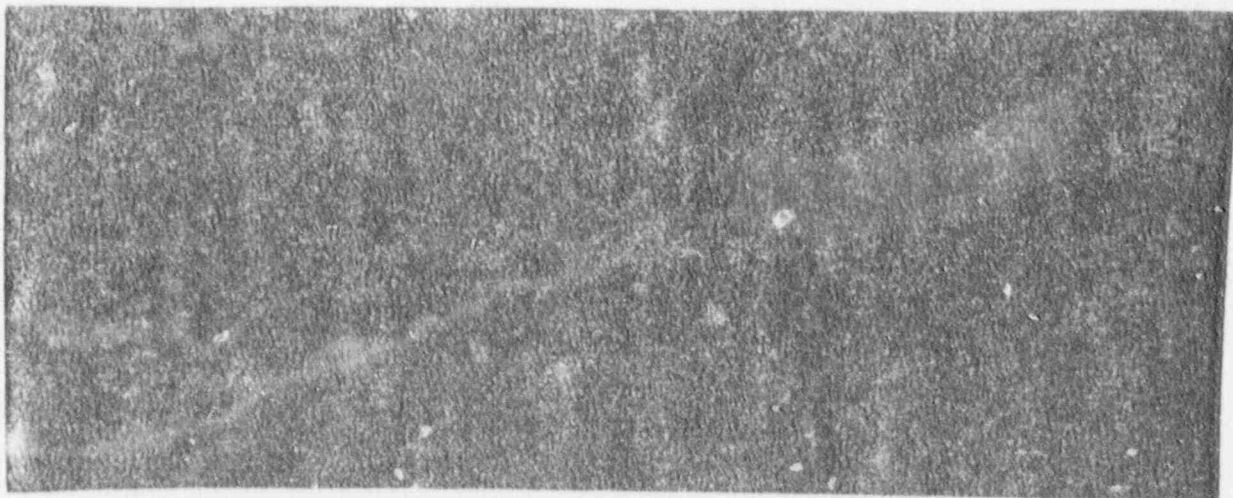
We have designed, installed and maintains numerous client telephone systems. The following is a partial listing of some of our systems:



The complete list includes companies from all areas of business and industry in all major U.S. cities.

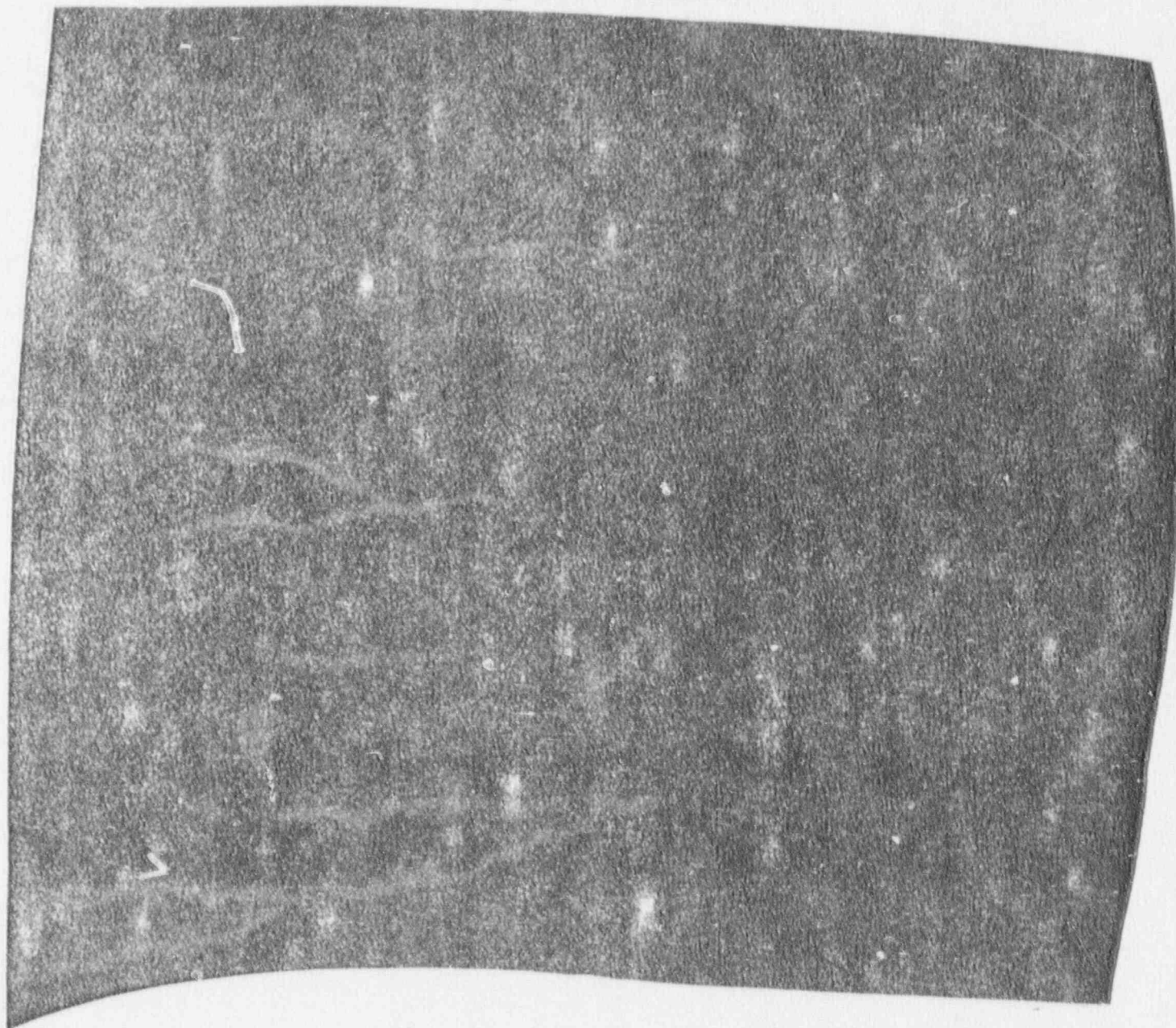
Subcontracts

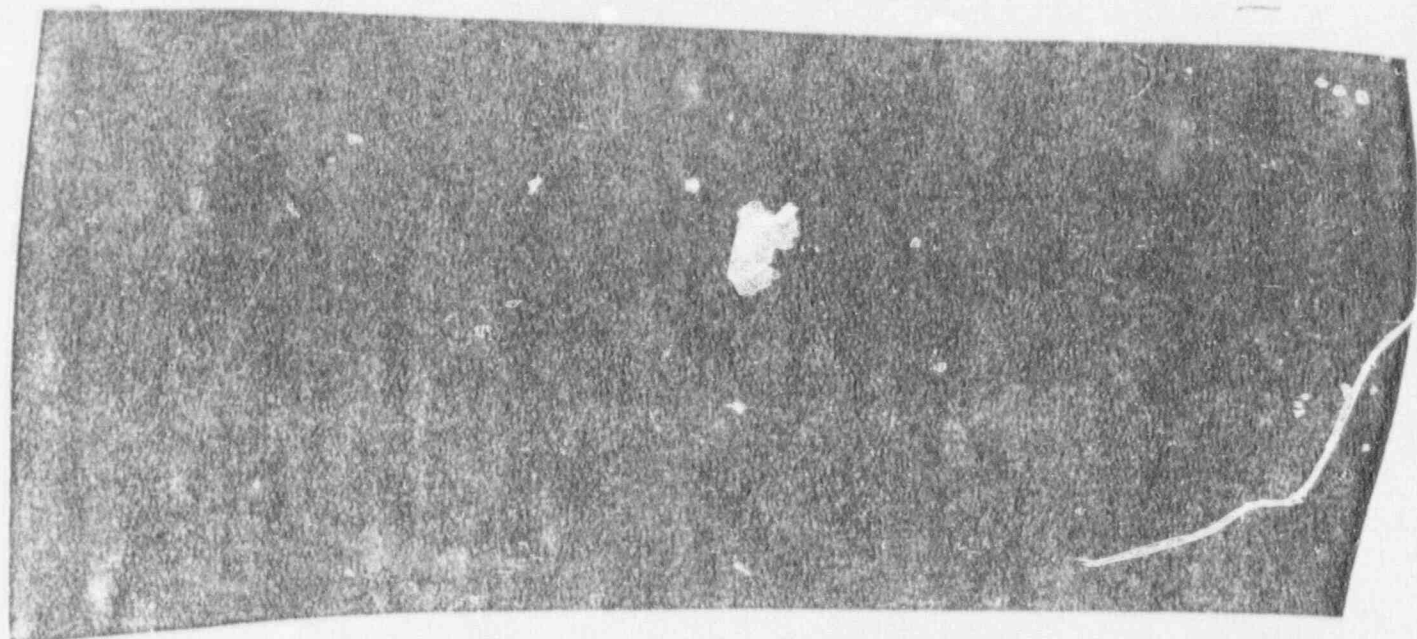
V.A. Hospitals, nationwide



G. International

In addition to domestic projects, Vector/Henkels & McCoy operates overseas through Henkels & McCoy International which shares the Vector Communications office in Washington, D.C. Some of the more prominent overseas jobs completed include:





PERFORMANCE HAS BUILT OUR BUSINESS.....

Over the past six decades, we have served a diverse number of clients worldwide. As our company has grown, we have continued to provide the best and most timely service possible in every endeavor we undertake. We are proud of our long list of clients - including our first two - who continue to turn to Vector/Henkels & McCoy because of our excellent capabilities. The reputation we have built over the years continues to be the standard by which we do our work. Clearly, our business has been built on the quality of our performance. We extend to you this same commitment to quality in the design, project management, installation and maintenance of your communications system.

Thank you again for your interest and we look forward to being of service to you and your organization.



# U.S. Nuclear Regulatory Commission

In response to  
Solicitation RS-ARM-89-135  
FOR DATA AND VOICE TELECOMMUNICATIONS  
INSTALLATION AND MAINTENANCE

## PROPOSAL

PART 3  
TECHNICAL AND MANAGEMENT PROPOSAL  
COPY NUMBER 3



Vector Communications, Inc.  
8530 Cinderbed Road  
Suite 1000  
Newington, VA 22122  
(703) 339-1600

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Contact: Richard S. Rothermel

Date: 05 April 1989

Proposal Number 89128

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# TECHNICAL AND MANAGEMENT PROPOSAL

Proposal 89128

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## TECHNICAL AND MANAGEMENT PROPOSAL

PROPOSAL 89128

### 1.0 GENERAL

Vector has performed services, similar to the services required by the solicitation, on a multi-year contract for a client where, like the NRC, there are a number of buildings which are geographically dispersed in the metropolitan area. Like the situation described in the Statement of Work, much relocation activity is involved in that contract. In performance of their duties, the personnel use mainly public transportation between locations that are not within walking distance. Collapsible luggage carts are often used for equipment, tools, test equipment and other materials.

### 2.0 TRANSPORTATION

Public transportation is not an alternative for all the NRC locations. Where public transportation and/or government transportation is not available there are other alternatives, which by mutual agreement could be used under the reimbursement provisions of the resulting contract.

### 3.0 EQUIPMENT CATEGORIES

a. Vector is accustomed to maintenance contracts where equipment is installed under a leasing agreement. The technicians routinely coordinate with manufacturers on repair and return authorizations as well as technical problems. They are required to maintain equipment and cable records on every project in which they participate.

b. The technicians assigned to this contract will have the knowledge and experience to troubleshoot networks and systems to isolate trouble. They also will be able to install, remove and replace the variety of cabling and equipment in the NRC facilities.

### 4.0 DUTIES OF TECHNICIANS

The assigned technicians will:

a. Inspect, remove, install, fabricate, and maintain the voice and data cabling and equipment at NRC facilities.

b. Troubleshoot systems, networks and equipment to isolate the problem using adjustment, replacement or repair remedies to restore.

c. Maintain cable records. Tag all removed equipment with full explanation of trouble symptoms, serviceability, dates and disposition action. Label cables and equipment in accordance with NRC instructions.

d. Employ built in diagnostic features of equipment to isolate and/or identify a problem or check levels of performance. This includes diagnosing status of remote units when such diagnostic features are available or can be accomplished via assistance of a second person at the remote location.

e. Coordinate with manufacturer's on equipment problems and repair-and-return transactions. In accomplishing this the technicians will establish good working relationships with key people so as to insure the responsiveness of the manufacturer (or vendor).

f. Pack and prepare for shipment including the required documentation equipment that is being returned to the manufacturer (or vendor).

g. Perform minor repairs, within the limits of documentation and parts availability.

h. Perform indoctrination training in the operation of systems and equipment.

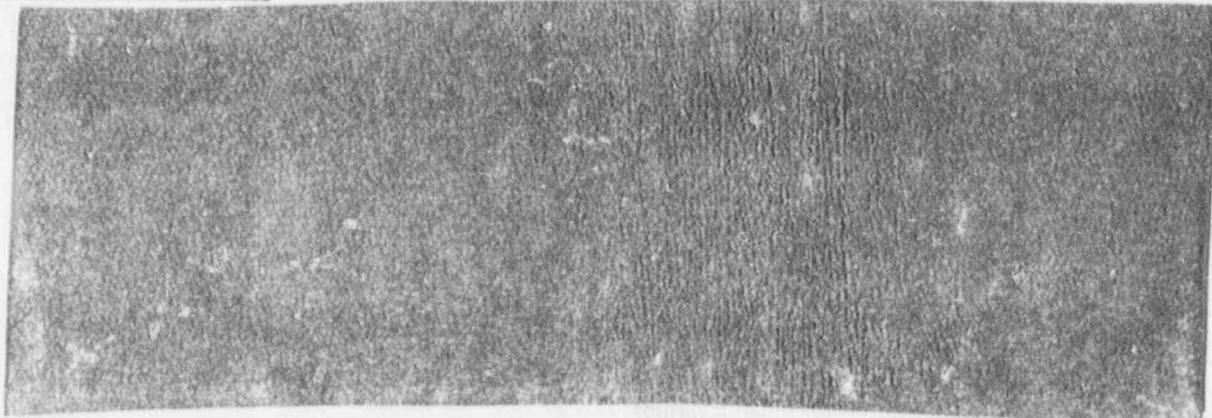
i. Submit recommendations to the PO for improvement of systems performance, better utilization of assets, and any action that might avert failures or degradation of performance.

j. Prepare material requirements and submit to the PO for processing. Proceed on the acquisition of material in accordance with the instructions and approvals of the PO.

#### 5.0 MOVE TO WHITE FLINT TWO

Vector understands that it is the prerogative of NRC to use the assigned technicians to move equipment to White Flint Two. Vector has the capacity to provide additional personnel with the necessary qualifications if required by NRC.

#### 6.0 WORK/STORAGE AREA





## 7.0 COORDINATION WITH PO

The Senior Technician will meet with the PO to plan the contractor provided services. It is strongly recommended that these meetings be on a daily basis as stated. In addition, it is suggested that a long term workload projection be discussed weekly so scheduling of the Helper is timely and other long term projects properly planned.

## 8.0 NORMAL WORKING HOURS

### 8.1 ALL PERSONNEL

Vector Communications will provide the contracted personnel to NRC during the life of this contract. They will report for work at the place designated by the Project Officer at 7:30 AM or, by mutual agreement, a more accommodating time for the circumstances that may from time to time present themselves. The normal workdays are Monday through Friday with the exception of NRC holidays. The personnel will work a full eight (8) hours as regular work hours. The regular time to end work for the day will be 4:15 PM.

### 8.2 HELPER

The Helper will report for work when requested by the Project Officer through the Senior Technician or another Vector staff member designated by mutual agreement. It is Vector's intent to attempt to provide the same individual for each request. However, circumstances may be such that it will not be possible to assign that individual. Obviously the earlier the request the better the chance of assigning that individual. In the interest of providing the above described continuity of familiarity with the NRC project, Vector hopes that the Project Officer's request will be as timely as possible. One week or more is desirable and except in very unusual circumstances at least 36 hours notice is appropriate.

## 9.0 OVERTIME

### 9.1 UNPROGRAMMED

When required to complete critical work the personnel will work overtime in accordance with the terms of the contract. Such overtime would be unprogrammed and, therefore, it is assumed that consideration for critical personal will be afforded and alternative overtime hours selected on another of the Vector personnel assigned to the task.

## 9.2 PROGRAMMED

When overtime is required because of workload, which is not due to critical equipment or system malfunctions, it is assumed that proper and adequate programming of such overtime will exist in order for the Vector personnel to be able to schedule personal commitments.

## 9.3 DEFINITION

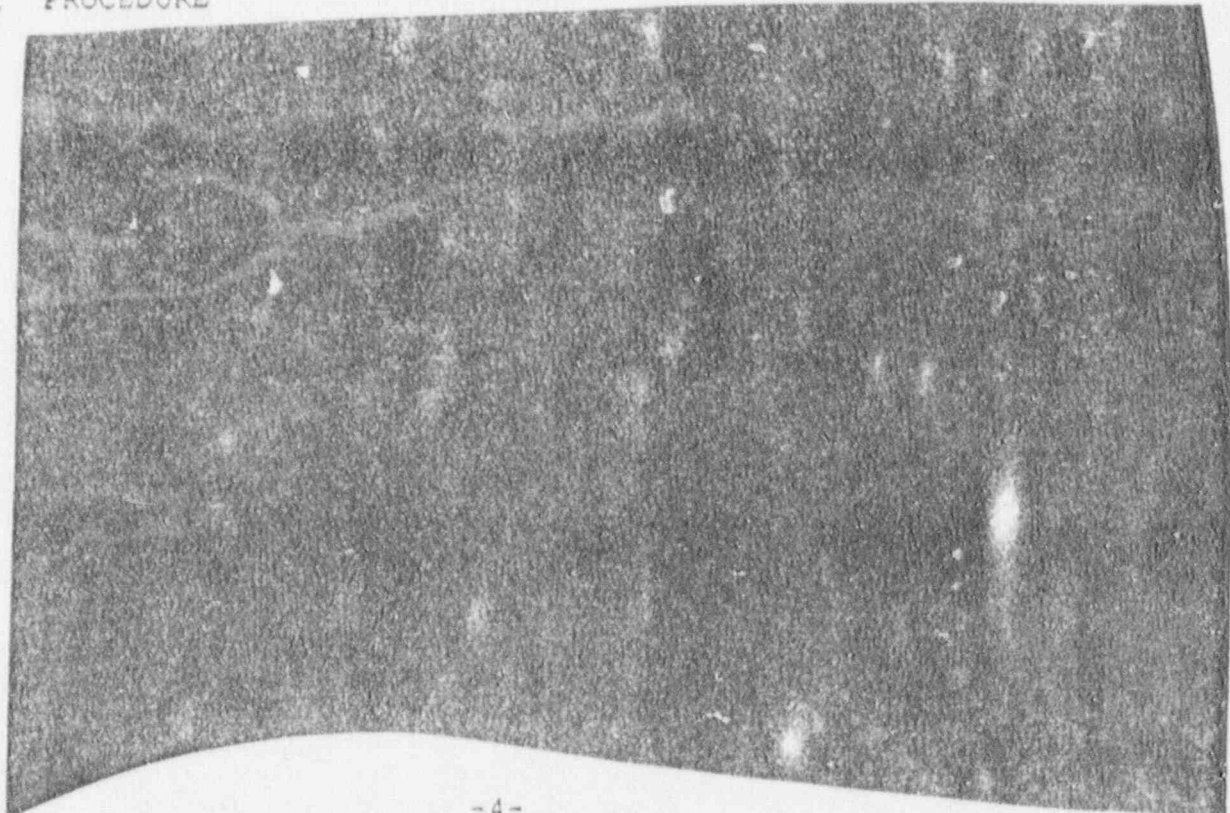
Overtime is any time the number of hours worked by an individual is more than eight (8) hours in one day or more than forty (40) hours a week. Additionally, whenever an individual is requested to provide on-call emergency maintenance support after normal duty hours the hours will be overtime.

## 10.0 EMERGENCY RESPONSE

### 10.1 PERSONNEL

Vector provides emergency maintenance support for other clients in the metropolitan D.C. area. In providing this service Vector has never experienced problems providing compliant response with on-contract personnel. With a compliment of three (3) technicians on the NRC contract there should be no problem meeting the two (2) hour maximum response time seven (7) days per week, twenty four (24) hours per day using the assigned technicians. In any case Vector will provide qualified personnel for emergency maintenance within two (2) hours in accordance with the terms of the contract.

### 10.2 PROCEDURE



c. Vector has found the above procedure to be more responsive than

d.

## 11.0 TOOLS AND TEST EQUIPMENT

### 11.1 TOOLS

Vector certifies that the technicians will have all required tools in adequate quantities to provide service in compliance with the requirements of the contract.

### 11.2 TEST EQUIPMENT

a. The test equipment which is routinely used in performance of the required services will be supplied and stored in the designated storage area. Appendix A contains a list of test equipment that Vector anticipates would be required.

b. Test equipment that would only be required occasionally to provide the service in accordance with the contract, will be provided on an as-needed basis from Vector's headquarters in Newington, Virginia. The listing in Appendix A includes this test equipment.

## 12.0 MATERIALS

### 12.1 GENERAL

Vector is a volume buyer of most of the material which will be used in performance of this contract. The warehouse is located in Newington, Virginia. Unless

specifically directed otherwise, by the Project Officer, Vector will special order material for this contract only when the ordered item(s) is not in the warehouse inventory. Maintenance of inventory is an element of cost.

## 12.2 ORDERS

An order is defined as a valid delivery order issued in accordance with the provisions of the contract. When received, an order for materials will be expeditiously processed and delivery estimates furnished to the NRC Project Officer and /or the Contracting Officer. Unless specifically stated otherwise in the resulting contract, delivery will be from Vector's inventory to the extent the material is available therefrom, or by special order from vendor.

Vector will exert best efforts and influence to obtain materials to meet the NRC delivery requirements. Unless instructed otherwise, expedited transportation will be used if required to meet NRC requested delivery dates. The Project Officer will be informed no less than weekly on the status of an outstanding order. Order processing is an element of cost.

## 12.3 DELIVERY

Delivery from the source and from the warehouse to the NRC designated storage area will be by the most cost effective method unless otherwise directed by the Project Officer. Delivery is an element of cost.

## 12.4 STORAGE

When a materials delivery order is received from the Contracting Officer the materials will be delivered to NRC. Providing there is space available in the designated storage area, Vector suggests that the materials be stored in that location. Vector does not intend to store any Vector owned materials (only tools and test equipment) in the designated storage area.

## 12.5 SOURCES

Vector purchases only quality materials which are warranted by the manufacturer. For these materials Vector assumes responsibility for handling warranty transactions at no additional cost to NRC. If NRC directs the use of specific materials which Vector does not consider to be of adequate quality it is proposed that (1) the materials be GFE by NRC or (2) NRC assume all responsibility for any costs incurred by Vector if Vector is required to handle warranty transactions.



## 12.6 PROCEDURES

Vector proposes that procedures for handling delivery, orders and other matters related to material, which are not delineated in the contract, be developed by mutual agreement.

## 13.0 QUALITY CONTROL

### 13.1 PRODUCT/MATERIAL SELECTION

Vector maintains a well defined and stringent quality control program which begins with vendor selection. The Engineering Department is responsible for the quality control function for equipment and materials. Engineers routinely evaluate equipment and materials to establish suitability for application, quality and reliability. When approved it is recommended for inclusion in the Parts Catalog. Only the highest quality products are approved. Any product subsequently suspected to be below the Vector standards of quality, reliability or useability is re-evaluated and removed from the Parts Catalog if found to be substandard.

### 13.2 PRODUCT/MATERIAL INSPECTION

The Vector Material Department performs routine physical inspection on incoming material. Initial shipments of newly added items are checked by the Engineering Department. These tests vary depending upon the individual item. Subsequent random testing is performed based on the results of initial testing and experience in the field.

### 13.3 FIELD MONITORING FOR PRODUCT/MATERIAL QUALITY

Project Managers are responsible for enforcing the field Q policy. The Senior Technician assigned to NRC will be similarly responsible. At anytime the Senior Technician or one of the the other personnel encounter a quality deficiency it will be reported to the Engineering Department by the Senior Technician. An expedited determination will then be made regarding the action to take to insure that the quality meets Vector's standards. This might be (1) using a replacement item from another approved source or (2) obtaining quality replacements from the original supplier.

### 13.4 WORKMANSHIP QUALITY

a. All Vector personnel assigned to any contract have been qualified for the work they perform. Vector does not employ untrained, inexperienced personnel. The methods and source of training are covered elsewhere in this proposal. Each installer and technician is instructed to have a very responsible attitude towards quality. Remedial action is taken if an individuals attention to

quality workmanship is not adequately maintained. This same procedure will apply to the personnel assigned to the NRC contract.

b. The quality of the workmanship will be monitored by the Senior Technician. He will be responsible for maintaining workmanship quality. He will discuss any deficiencies with the Vector Project Manager for the NRC contract who will take appropriate action, when required, to assure the Vector standards of workmanship quality are maintained.


#### 14.0 QUALITY ASSURANCE

Vector will assign a Project Manager for the NRC contract. Among other things that person will be responsible for Quality Assurance. This responsibility is executed through periodic discussions with the NRC Project Officer plus reviews and inspections conducted jointly with the Senior Technician. This "check and balance" approach ensures that the contract requirements and Vector's standard of quality are maintained. Vector hopes that NRC will approve of this procedure and allow the Project Manager to perform these periodic reviews and inspections in the interests of maintaining quality and insuring Vector's work is satisfactory to NRC.

#### 15.0 PERSONNEL QUALIFICATIONS

##### 15.1 GENERAL

a. The candidate technicians are experienced in the proper installation of



Any technician assigned to the staff will have the experience required by the contract and be capable of performing the work involved.

b. The Helper will have all the experience required to perform the work in accordance with the requirements of the contract.

c. Resumes of current employees who are candidates for the technician positions are included in this proposal (see Appendix B). Vector has other similar contracts and prospective contracts for technicians and installers. As Vector would for any contract, including any contract that results from this proposal, Vector assigns personnel with the intention of providing long term continuity and stability. Availability of these candidates depends on the timing of the NRC award. However, Vector has the depth to provide equally qualified technicians in the case that one or more of these candidates is no longer available for assignment to NRC.

#### 15.2 SENIOR TECHNICIAN

The Senior Technician will be experienced in both voice and data communications. The candidate for this position is [REDACTED]. He has [REDACTED] years experience.

#### 15.3 VOICE TECHNICIAN

The Voice Technician will be experienced in the installation of telephone wiring, troubleshooting of private telephone systems and fault isolation. The candidate for this position is Jerry Jeffries. He has [REDACTED] years experience.

#### 15.4 DATA TECHNICIAN

The Data Technician will be experienced in the installation of the variety of data cables, the troubleshooting of local data circuits, and fault isolation of both local networks and remote equipment by using diagnostic features and test equipment. The candidate for this position is James D. Sarge. He has [REDACTED] years experience with Information Systems.

#### 15.5 HELPER

Helper personnel assigned upon the request of the Project Officer will meet or exceed the experience requirements. Typically the personnel assigned will have no less than one year experience in fault isolation of data communications networks. In addition, the individual will be proficient in cable termination, installation and removal. While the individual may not be proficient in telephone system troubleshooting he or she will be proficient in the installation and testing of station cabling. The individual will also be capable of installing equipment such as modems, multiplexers, telephones, transceivers, bridges, etc.




15.6 BACKUP PERSONNEL

a. Vector has over fifty (50) skilled engineers, technicians and installation personnel in the Washington, D.C. area. When required, Vector uses the personnel available from the parent company, Henkels & McCoy. Henkels & McCoy has over 5400 employees over 500 of whom have the necessary qualifications for these positions.

b. Vector has



c. There are additional



d. Vector's

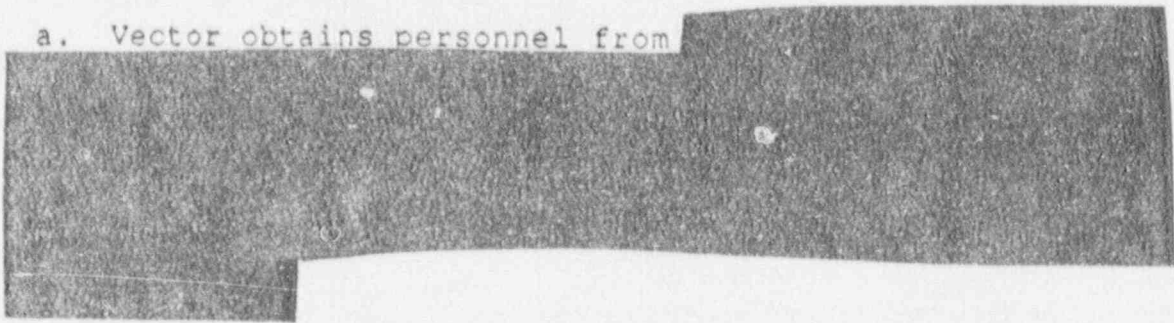


When a Vector field technician or installer encounters a difficult technical problem the engineers are available to help. Problems are solved in minutes not hours or days.

e. Resumes for a few of the backup personnel are included in this proposal (See Appendix B).

15.7 SOURCES OF PERSONNEL

a. Vector obtains personnel from





b. A second source is by [REDACTED]

c. The third source is from the [REDACTED]

[REDACTED] More information regarding training is included in this proposal (see Appendix C)

d. Vector plans to continue obtaining personnel from the three (3) sources mentioned above. Vector is also [REDACTED]

[REDACTED] Henkels & McCoy conducts training for this purpose.

#### 16.0 SUBCONTRACTS

Vector is a respected supplier of the type of services required by the proposed contract. Considering the resources and capability of Vector and Henkels & McCoy, and the nature of the services involved, Vector will not subcontract any portion of this contract.

#### 17.0 CURRENT COMMITMENTS

a. While Vector is currently engaged in and will continue to be engaged in a variety of engineering, service, and installation projects for a number of clients - including The Department of Interior, The Department of Labor, The Bureau of National Affairs, [REDACTED]

[REDACTED] and others - it is not anticipated that these activities will in any way impinge upon our performance at NRC.

b. It is Vector's intent to maintain proper staffing for ongoing projects and contracts so that the personnel assigned to NRC may be dedicated solely to NRC and will not be withdrawn for any other projects. The [REDACTED]

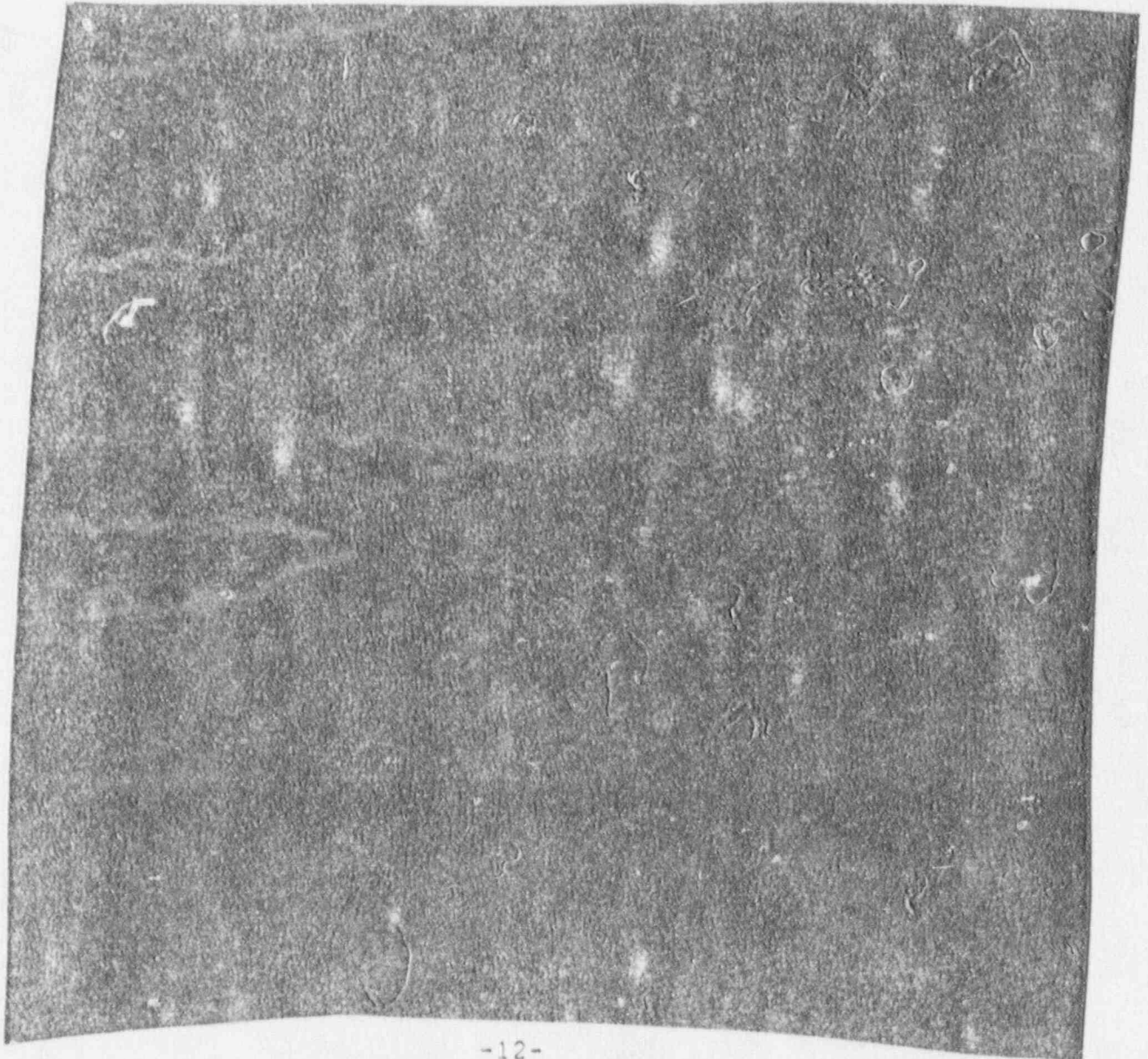
[REDACTED]


c. Current and/or future commitments will not impede Vector's ability to provide fully compliant and capable personnel to NRC. There are more than seventy five (75) current employees available within a reasonable distance that are qualified to perform the services required by the proposed contract. Additionally, Vector routinely plans to have one (1) technician and two (2) installers uncommitted to long term projects so they are available and can be used for unforeseen and short-fuse requirements.


18.0 CORPORATE EXPERIENCE

18.1 LONG TERM EXPERIENCE

- a. Corporate experience is contained in Appendix D. Summaries of a sampling are:







b. Vector personnel participated in many of the listed projects. Vector provides all the personnel for 

18.2 RECENT RELATED WORK (VECTOR ONLY)

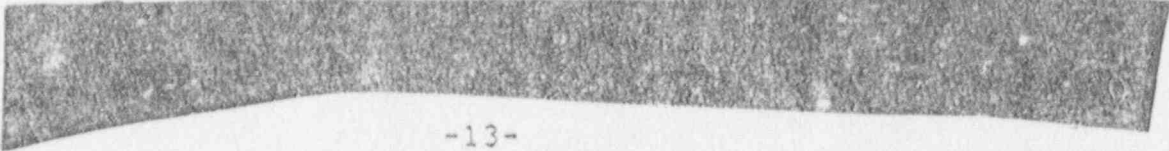
U.S. Department of the Interior. Engineering, supply and installation of voice and data cabling system to support WITS. Consists of approximately 9000 stations. The project is approximately 85% complete (July 1989 scheduled completion).



19.0 REFERENCES



b. U.S. Department of the Interior Design and installation of voice and data cabling system for over 9000 stations. Contract number 14-01-0001-88-C-11 will be completed in July, 1989. Ray Lindquest is the most knowledgeable person to contact. His number is (202) 343-4156.





systems and began second three year contract in November, 1988.  
[REDACTED]  
are the persons responsible for the Vector Services.

20.0 DEFAULTED CONTRACTS

Vector has not defaulted on any contract or order in its 15 years of existence.

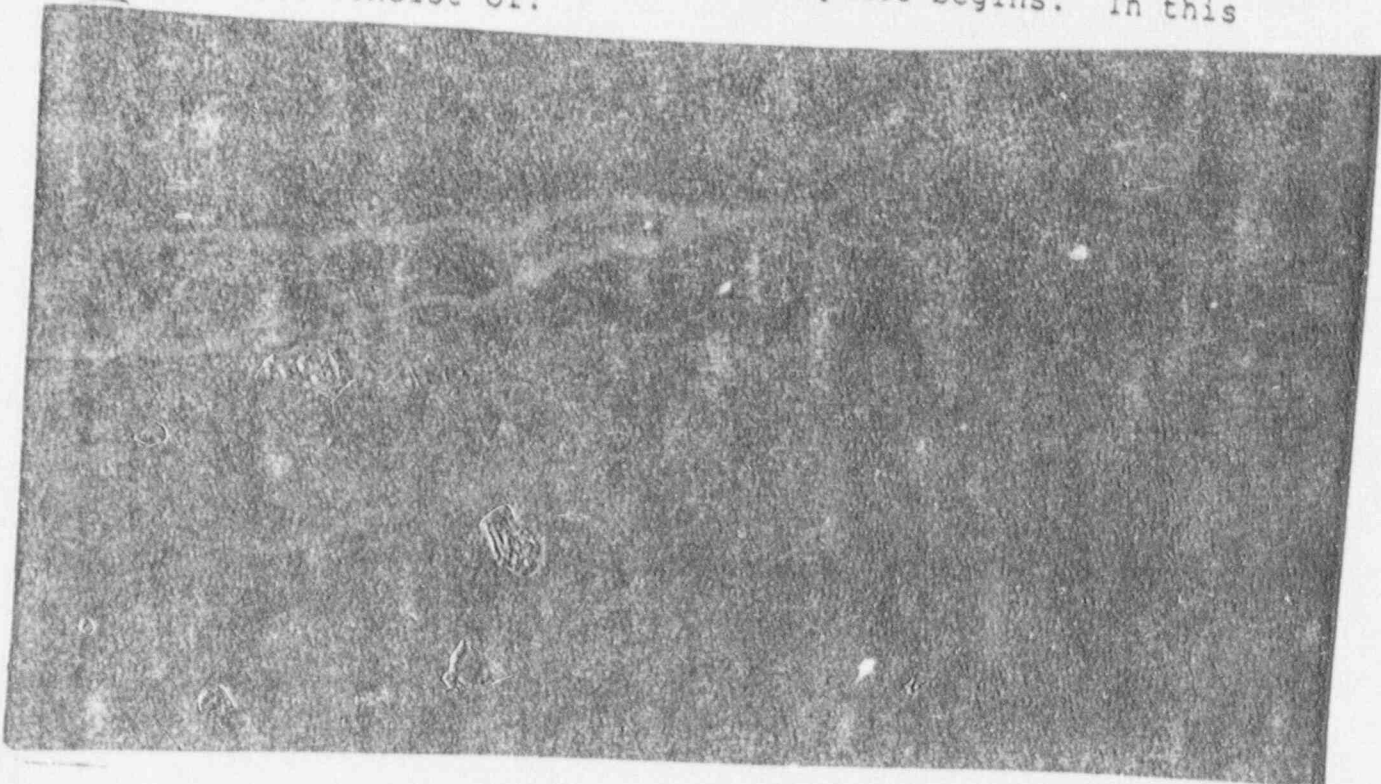
21.0 PHASE-IN PLAN

GENERAL

The phase-in process can be very uncomplicated and handled in a manner which is least disruptive to the NRC organization. There are two segments to the phase-in process. The first takes place before the Vector personnel actually report for duty. Vector classifies this phase as "Preliminary Prep." The second occurs when contract activity begins and is classified "Task Indoctrination". The latter could occur more than once during the life of the contract if new and distinctly different equipment and/or tasks are introduced.

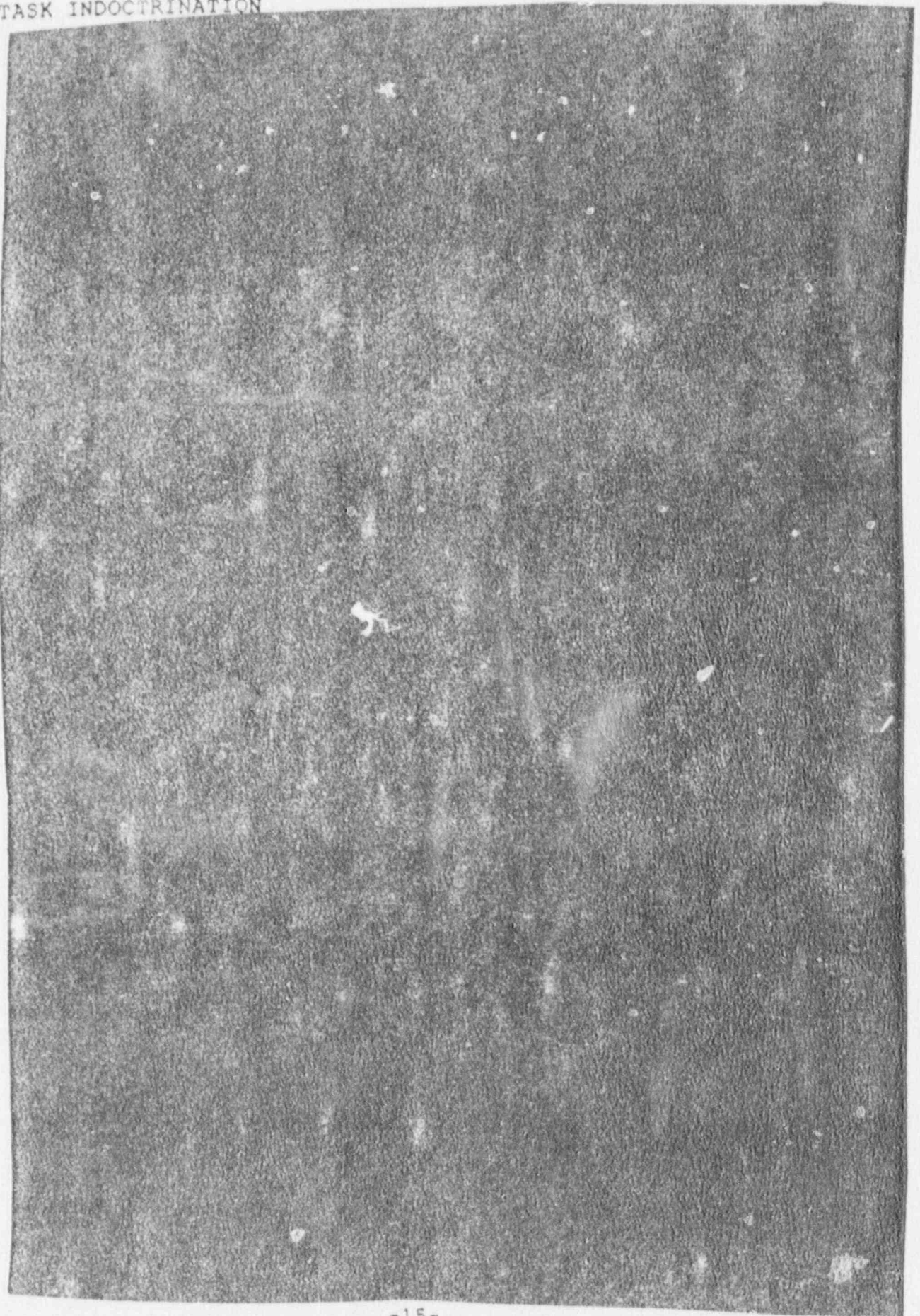
PRELIMINARY PREP

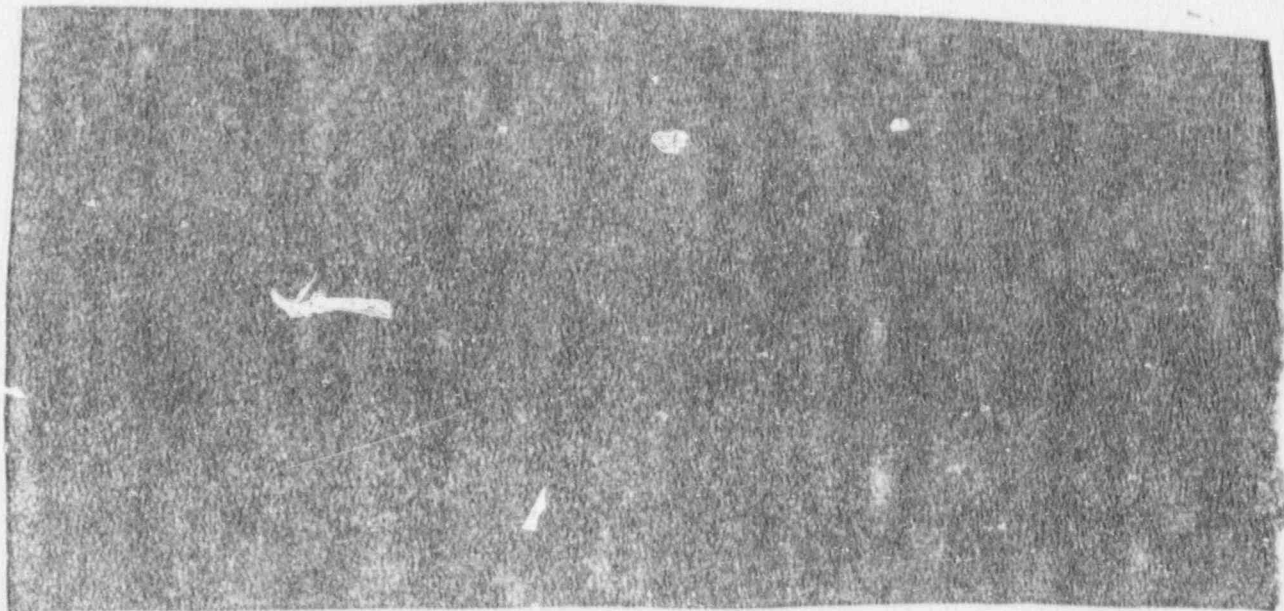
Normally during pre-contract discussions there is an exchange of information specifically to investigate and evaluate the capabilities, requirements and other details. Once Vector feels that a contract is a reasonable possibility and has an estimated time for commencement, the preparation phase begins. In this case it would consist of:





TASK INDOCTRINATION



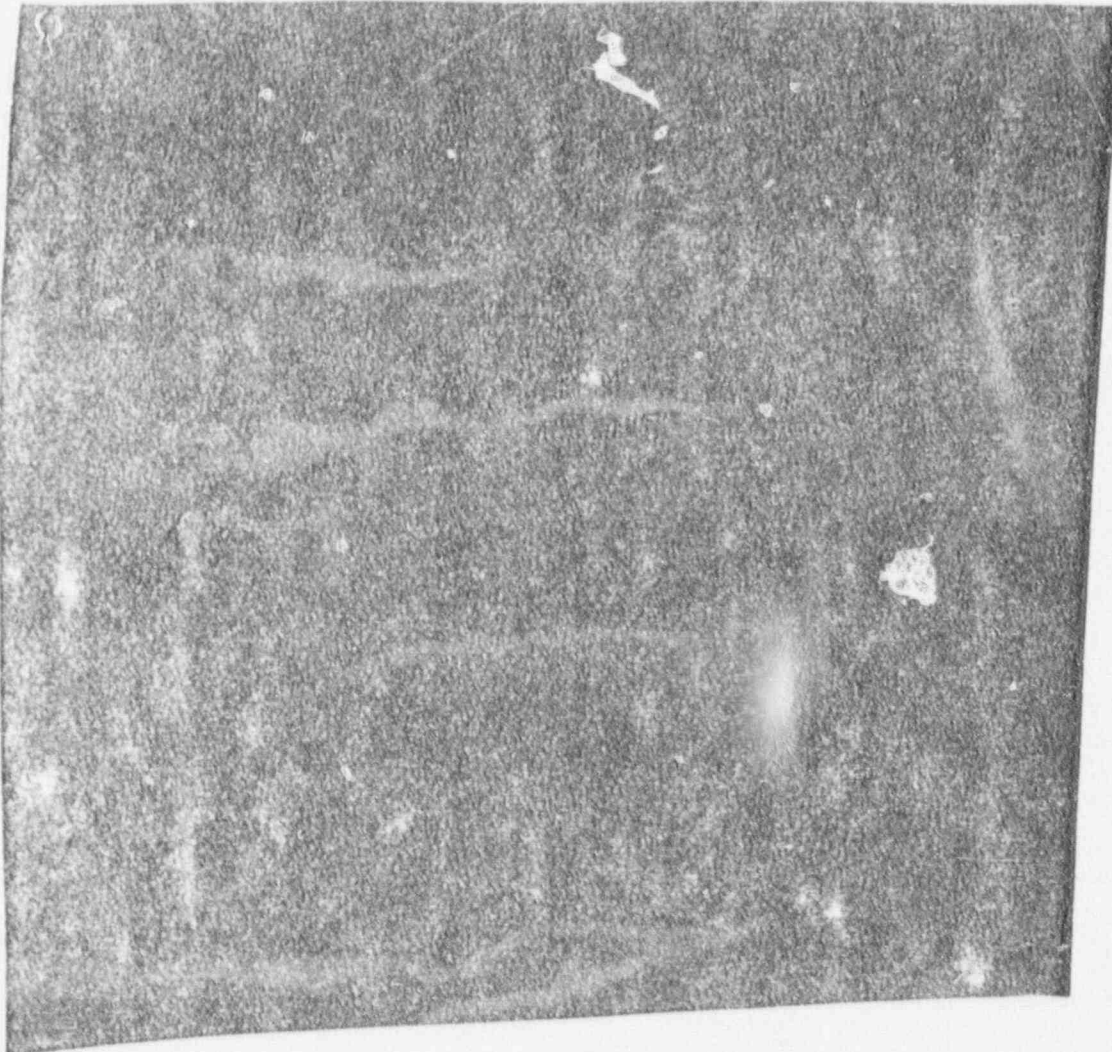


Any Phase-In Plan, to be valid, must be prepared to a schedule. The schedule, as mentioned earlier, will be established within five days after a post award meeting with the PO to coordinate and finalize the Task Indoctrination activities.

APPENDIX A

Proposal: 89128

TEST EQUIPMENT

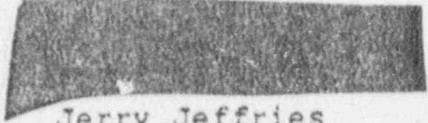


APPENDIX B

RESUMES

The candidates for the positions at NRC are listed below and their resumes are included in this Appendix.

Senior Technician



Voice Technician

Jerry Jeffries

Data Technician

James D. Sarge

Several other resumes for backup are also included in this Appendix.



## APPENDIX C

### TRAINING

Henkels & McCoy (H&M) is a leading source of formal training for telecommunications, information and security systems. H&M conducts technical training courses on contract to the U.S. Government as well as many major telecommunication services companies. More than 900 students were graduated in the past twelve months. A staff of over 27 full time instructors are employed nationally.

H&M conducts seminars as well as formal courses for technicians and installation personnel. The seminars and courses include Fiber Optics, Local Area Networks, Cable Television, Electronic Security, Key Systems, PABX Systems, and Telecommunications Transmission. Courses and seminars can be customized for specific needs and presented at a H&M location, at a customer's location or at a Facility nearby the customer's location.

The lesson plan for two of these courses, a 13 week course for Telephone Interconnect and Electronic Security Systems and a 10 week course for Telephone Interconnect Installation and Service follow in this Appendix.

Vector conducts training for operation of equipment and systems installed by Vector. Generally such training is informal. In most instances the objective is to train operator personnel, familiarize management and secondary operators or custodians with equipment or system and its operation.

TELEPHONE INTERCONNECT INSTALLATION & SERVICE  
10 WEEKS/35 HOURS PER WEEK

TELEPHONE INTERCONNECT INSTALLATION AND SERVICE  
10 WEEKS/35 HOURS per week/350 HOUR PROGRAM

## WEEK 1

## DAY 1

- I. Orientation Hours 1 & 2
  - A. Personal Introductions
  - B. Registration
  - C. Course Goals & Objectives
  - D. Class Rules
  - E. Methods of Evaluation
  - F. Grading Structure
- II. Overview of the Telephone Industry Hours 3 & 4
  - A. History of Telephony
  - B. Operating Telephone Companies
    - 1. Central Offices (as related to subscribers)
    - 2. Network (CO relationship to each other)
    - 3. Numbering Scheme (call progression)
  - C. Interconnect Companies
- III. Equipment Identification and Demonstration Hours 5 - 6½
  - A. Demonstrate
    - 1. 1A2 Key Equipment
    - 2. Electronic Key Equipment
    - 3. PABX Equipment
  - B. Students use Equipment
- IV. Course Material Handouts and Tool Issue Hours 6½ - 7½
  - A. Book Issue
  - B. Tool Issue
    - 1. Sign Personal Tool List'
    - 2. Mark Tools

## DAY 2

- I. Basic Electricity Hours 1 - 4
  - A. Fundamentals of Direct Current (DC)
    - 1. Ohms Law
    - 2. Series Circuits
    - 3. Parallel Circuits
  - B. Alternating Current (AC)
    - 1. Frequency
    - 2. Capacitor Functions
    - 3. Transformer Functions
    - 4. Diode Functions
  - C. Components
    - 1. Unit
    - 2. Unit of Measure'
    - 3. Schematic Symbol

## DAY 3

- I. Same structure and continuation  
of material of day 2 Hours 1 - 7½

## DAY 4

- I. Same structure and continuation  
of material of day 2 Hours 1 - 7½

## DAY 5

- I. Weekly Quiz Hour 1  
A. Fundamentals of the Indus  
B. Basic Electricity  
C. Meter Construction and us  
II. Development of Life & Employment Skills Hours 2 - 5

## WEEK 2

## DAY 1

- I. Disassembly and reassembly of single line phones Hours 1 - 2  
A. Disassembly & Reassembly  
B. Identification of components  
C. Schematic and wiring diagrams  
D. Trouble shooting and fault correction  
II. Practical Hours 3 - 7½

## DAY 2

- I. Disassembly and reassembly of multi line phones Hours 1 - 2  
A. Disassembly & Reassembly  
B. Identification of components  
C. Schematic and Wiring Diagrams  
D. Trouble shooting and fault correction  
II. Practical Hours 3 - 7½

## DAY 3

- I. Cable Color Code Hours 1 - 4  
A. As related to multi-line phone  
B. Amphenol Connectors  
C. 3M Type Connectors  
D. 66 Type Blocks  
E. Multi-Quad Cables  
II. Practical Hours 5 - 7½  
A. Amphenol Connectors  
B. 3M Connectors  
C. 66 Type Connectors

## DAY 4

- I. Installation Procedures Hours 1 - 4  
A. Cabling and Wiring different types:  
1. Walls  
2. Ceilings  
3. Floors



- B. Tools
- C. Hardware
- II. Practical Hours 5 - 7½
  - A. Connector Wiring (Continued from Day 3)
  - B. Installation Procedures (Support Morning Lecture)

## DAY 5

- I. Weekly Quiz Hour 1
  - A. Telephone Instruments
  - B. Color Codes
  - C. Connectors
- II. Development of Life & Employment Skills Hours 2 - 5

## WEEK 3

## DAY 1

- I. Cable Distribution Hours 1 - 4
  - A. Feeders
  - B. Risers
- II. Continue Practical Hours 5 - 7½

## DAY 2

- I. Protectors and Grounding Methods Hours 1 - 4
  - A. System Grounding
  - B. Gas and Carbon Protectors
  - C. Bonding
  - D. Static Protection
- II. Continue Installation and Cabling Practical Hours 5 - 7½

## DAY 3

- I. Review of first block of training Hours 1 - 2
- II. First Quarter Examination Hours 3 - 4
- III. Overview of 1A2 Key Systems Hours 5 - 7½
  - A. Comparison of 501, 512, & 584C
  - B. Mounting of the KSUs
  - C. Power Supply Voltages

## DAY 4

- I. Power Distribution in a 1A2 Key System Hours 1 - 4
  - A. Power tracing in a 501 using wiring diagram
    - 1. Power Supply
    - 2. C Block
    - 3. Interrupter
    - 4. Backplane
    - 5. Equipment Blocks
    - 6. Compare to 512 & 584C
- II. Practical Hours 5 - 7½
  - A. Wiring Power Supply in the KSU

## DAY 5

- I. Weekly Quiz Hour 1
- A. Power Distribution in a 1A2 System
- II. Development of Life & Employment Skills

## WEEK 4

## DAY 1

- I. The 400-E Line Card Hours 1 - 4
  - A. Incoming Calls
    - 1. All ring options
    - 2. Operation of "L" relay
    - 3. Operation of "B" relay
    - 4. Audio/Visual signals (all options)
  - B. Seizure
    - 1. Tip & Ring Connection
    - 2. "A" Lead Control
    - 3. Operation of "C" relay
    - 4. Release of the "B" relay
    - 5. Hold of the "L" relay
    - 6. Status change of the signal leads
    - 7. Open interrupter start lead
  - C. Placing a call on hold
    - 1. Interruption of "A" lead
    - 2. Operate "B" relay
    - 3. Ground removal from "A" lead
    - 4. Hold path for "C" relay
    - 5. Interrupter start
    - 6. Change in lamp lead
  - D. Outgoing Calls
    - 1. Ground on the "A" lead
    - 2. Tip and Ring connection
    - 3. Operate the "C" relay
    - 4. Steady lamp signal
- II. Practical
  - A. Prepare cables for KSU Installation Hours 5 - 7½

## DAY 2

- I. Key System Wiring Diagrams Hours 1 - 4
  - A. Trace C.O. Lines from 400E card to demark
  - B. Trace T & R, A & A1, L & LG leads from card to equipment blocks
  - C. Correlate 501 wiring to 512 & 584C
- II. Practical-Complete MDF Construction Hours 5 - 7½
  - A. Equipment Blocks
  - B. Station Blocks
  - C. Option Blocks
  - D. Hardware
  - E. Grounding

## DAY 3

- I. Review and Discussion of 400E Line Card Hours 1 - 2
- II. Review and Discussion of KSU wiring Hours 3 - 4
- III. Practical Hours 5 - 7½
  - A. Complete MDF Construction

## DAY 4

- I. Cross Connections Hours 1 - 4
  - A. Method of programming CO Lines to Phone Buttons
  - B. Common Audible
  - C. Signal Devices
  - D. Card slot Modification and use of 259 B Panel
- II. Practical-Cross Connect using key sheets Hours 5 - 7½

## DAY 5

- I. Weekly Quiz Hour 1
- II. Development of Life and Employment Skills Hours 2 - 5

## WEEK 5

## DAY 1

- I. Ancillary Equipment Hours 1 - 4
  - A. Diode Matrix
  - B. 401 Manual Intercom
  - C. Electronic Intercom
  - D. Paging Units with Speakers
  - E. Busy Lamp Fields
  - F. Music on Hold (403 card & 4201 tuner)
- II. Practical Hours 5 - 7½
  - A. Units taught in the AM

\*Note: Due to the subject material the lecture and practice may be intermixed throughout the day.

## DAY 2

- I. Continue material outlined for Week 5, Day 1 Hours 1 - 4
- II. Practical same format as Week 5, DAY 1 Hours 5 - 7½

## DAY 3

- I. Continue material outline for Week 5, Day 1 Hours 1 - 4
- II. Practical same format as Week 5, Day 1 Hours 5 - 7½

## DAY 4

- I. Practical Continued Hours 1 - 2
- II. Review Hours 3 - 4
- III. Quarterly Exam Hours 5 - 6
- IV. Review Exam Hours 7½

## DAY 5

- I. Weekly Quiz Hour 1
- II. Development of Life Employment Skills Hours 4 - 7½

## WEEK 7

## DAY 1

- I. ITT 401 Hours 1 - 4
  - A. Installation
  - B. Site Programming
  - C. Maintenance
- II. Practical Hours 5 - 7½
  - A. Crew 4 assigned to NC 616
  - B. Crew 5 assigned to Tie 612
  - C. Crew 6 assigned to ITT 401
  - D. Remainder of class continue on 1A2 Systems

## DAY 2

- I. North Comm 616 Hours 1 - 4
  - A. General Description
  - B. Features Description
- II. Practical Hours 5 - 7½
  - A. Crew 4 assigned to ITT 401
  - B. Crew 5 assigned to NC 616
  - C. Crew 6 assigned to Tie 612
  - D. Remainder of the class continue work on 1A2 Systems

## DAY 3

- I. North Comm 616 Hours 1 - 4
  - A. Installation
  - B. Programming
  - C. Functional test procedures
- II. Practical Hours 5 - 7½
  - A. Crew 7 assigned to Tie 612
  - B. Crew 8 assigned to ITT 401
  - C. Crew 9 assigned to NC 616
  - D. Remainder of class continue work on 1A2 Systems

## DAY 4

- I. Review and discussion on all Electronic Systems Hours 1 - 4
- II. Practical Hours 5 - 7½
  - A. Crew 7 assigned to the NC 616
  - B. Crew 8 assigned to the Tie 612
  - C. Crew 9 assigned to the ITT 401
  - D. Remainder of class continue work on 1A2 Systems

## DAY 5

- I. Weekly Quiz Hours 1
- II. Development of Life & Employment Skills Hours 2 - 5



## WEEK 8

## DAY 1

- |      |   |              |
|------|---|--------------|
| I.   | Practical                                 | Hours 1 - 4  |
|      | A. Crew 7 assigned to the ITT 401         |              |
|      | B. Crew 8 assigned to the NC 616          |              |
|      | C. Crew 9 assigned to the Tie 612         |              |
|      | D. Remainder of class work on IA2 Systems |              |
| II.  | Review                                    | Hour 5       |
| III. | Quarterly Exam                            | Hours 6 - 7½ |

## DAY 2

- |      |   |              |
|------|---|--------------|
| I.   | Introduction to PBX System                          | Hours 1 - 2  |
|      | A. Compared with Key Systems                        |              |
|      | B. Mitel Manual Overview                            |              |
|      | C. System Overview and Configuration                |              |
| II.  | Installation of SX-50                               | Hours 3 - 4  |
| III. | Practical   | Hours 5 - 7½ |
|      | A. Crew 1 assigned to SX-50                         |              |
|      | B. Remainder of the class continue Key Systems work |              |

## DAY 3

- |     |  |               |
|-----|--|---------------|
| I.  | Features and Service of SX-50                      | Hours 1 - 3½  |
| II. | Practical  |               |
|     | A. Crew 2 assigned SX-50                           | Hours 3½ - 5½ |
|     | B. Crew 3 assigned SX-50                           | Hours 5½ - 7½ |
|     | C. Remainder of class continue work on Key Systems |               |

## DAY 4

- |     |  |               |
|-----|--|---------------|
| I.  | Programming the SX-50                              | Hours 1 - 3½  |
| II. | Practical  |               |
|     | A. Crew 4 assigned SX-50                           | Hours 3½ - 5½ |
|     | B. Crew 5 assigned SX-50                           | Hours 5½ - 7½ |
|     | C. Remainder of class continue work on Key Systems | Hours 3½ - 7½ |

## DAY 5

- |     |   |             |
|-----|---|-------------|
| I.  | Weekly Quiz                             | Hour 1      |
| II. | Development of Life & Employment Skills | Hours 2 - 5 |

## WEEK 9

## DAY 1

- |     |   |               |
|-----|---|---------------|
| I.  | Toll Control in the SX-50                             | Hours 1 - 3½  |
| II. | Practical   |               |
|     | A. Crew 6 assigned to SX-50                           | Hours 3½ - 5½ |
|     | B. Crew 7 assigned to SX-50                           | Hours 5½ - 7½ |
|     | C. Remainder of class continue to work on Key Systems |               |

## DAY 2

- I. Operational Test and Trouble-shooting the SX-50 Hours 1 - 3½
- II. Practical
  - A. Crew 8 assigned to SX-50 Hours 3½ - 5½
  - B. Crew 9 assigned to SX-50 Hours 5½ - 7½
  - C. Remainder of class continue work on Key Systems

## DAY 3

- I. SX-50 Console and Speedcall Hours 1 - 3½
- II. Practical
  - A. Crew 10 assigned to SX-50 Hours 3½ - 5½
  - B. Remainder of class continue work on Key Systems Hours 3½ - 5½
  - C. Entire class begins trouble shooting all systems Hours 5½ - 7½

## DAY 4

- I. SX-50 SMDR, RMATS and Supersets Hours 1 - 3½
- II. Practical
  - A. Trouble-shooting all systems Hours 3½ - 7½

## DAY 5

- I. Weekly Quiz Hour 1
- II. Development of Life & Employment Skills Hours 2 - 5

## WEEK 10

## DAY 1

- I. Practical Hours 1 - 7½
  - A. Trouble-shooting all systems

## DAY 2

- I. Practical Hours 1 - 7½
  - A. Trouble-shooting all systems

## DAY 3

- I. Practical Hours 1 - 3
  - A. Trouble-shooting all systems
- II. Review Hours 4 - 5½
- III. Quarterly Examination Hours 5½ - 7½

## DAY 4

- I. Review Quarterly Examination Hours 1
- II. Development of Life & Employment Skills Hours 2 - 7½

## DAY 5

- I. Development of Life & Employment Skills Hours 1 - 4
- II. Graduation and Open House Hours 5½ - 7½

During the practical portion of the program on ELeCTronic Key Systems and the Mitel SX-20, it is suggested that the class be divided into crews of no more than two people. The remainder of the class are to be given definite assignments on the other equipment. Upon course completion each and every student will have completed every task on every piece of equipment in a competent manner.

TELEPHONE INTERCONNECT/ELECTRONIC SECURITY  
13 WEEKS/35 HOURS PER WEEK/405 HOUR PROGRAM



TELEPHONE INTERCONNECT/ELECTRONIC SECURITY  
13 WEEKS/35 HOURS PER WEEK/405 HOUR PROGRAM

WEEK 1, DAY 1

- I. ORIENTATION Hour 1
- A. Personal Introductions
  - B. Registration
  - C. Course Goals and Objectives
  - D. Class Rules
  - E. Method of Evaluation
  - F. Grading Structure
- II. TELEPHONE INDUSTRY OVERVIEW Hours 2 & 3
- A. History of Telephone
  - B. DDD Network
  - C. Inter connect companies
- III. COURSE MATERIAL & TOOL ISSUE Hour 4
- A. Tool Issue
    - 1. Sign Personal Tool List
    - 2. Tag tools with student number
- \*NOTE: Books, note books, pens etc. should be placed at each student's place prior to 1st day of class.
- IV. BASIC ELECTRICITY Hour 5 - 7
- A. Fundamental commonant I.D. & Symbols
    - 1. Schematic Symbols
    - 2. DC theory, AC theory
    - 3. Basic Math Skills
- V. LIFE SKILLS
- A. Begin Resume Development
  - B. Hand out Resume Fact Sheet

WEEK 1, DAY 2

- I. BASIC ELECTRICITY Hours 1 - 4
- A. OHMS Law
  - B. Units of Measure
  - C. Series of CKT Problems
- II. PRACTICAL (support morning lecture) Hours 5 - 7½
- A. Bread Board CKTs
  - B. Meter usage

## WEEK 1, DAY 3

- |     |                           |              |
|-----|---------------------------|--------------|
| I.  | Basic Electricity         | Hours 1 - 4  |
|     | A. Resistor color code    |              |
|     | B. Parallels CKT problems |              |
| II. | PRACTICAL (same as day 2) | Hours 5 - 7½ |

## WEEK 1, DAY 4

- |      |                                  |               |
|------|----------------------------------|---------------|
| I.   | BASIC ELECTRICITY                | Hours 1 - 4   |
|      | A. Series/Parallels CKT problems |               |
| II.  | PRACTICAL (same as day 2)        | Hours 5 - 6½  |
| III. | REVIEW OF WEEK                   | Hours 6½ - 7½ |

## WEEK 1, DAY 5

- |     |                                 |              |
|-----|---------------------------------|--------------|
| I.  | QUIZ                            | Hour 1 - 2   |
|     | A. Basic electricity            |              |
|     | B. Meter usage                  |              |
| II. | LIFE SKILLS                     | Hours 2 - 5½ |
|     | A. Collect Resume Fact Sheet    |              |
|     | B. Discuss Interview Procedures |              |

## WEEK 2, DAY 1

- |     |                        |              |
|-----|------------------------|--------------|
| I.  | CABLE COLOR CODE       | Hours 1 - 3  |
|     | A. Multi line phone    |              |
|     | B. Amphonol connectors |              |
|     | C. 3m connectors       |              |
|     | D. 66 type blocks      |              |
|     | E. Quad wire           |              |
| II. | PRACTICAL              | Hours 4 - 7½ |
|     | A. AMP connectors      |              |
|     | B. 3m connectors       |              |
|     | C. 66 blocks           |              |

## WEEK 2, DAY 2

- |    |                                   |             |
|----|-----------------------------------|-------------|
| I. | INSTALLATION & CABLE DISTRIBUTION | Hours 1 - 4 |
|    | A. Cabling wiring                 |             |
|    | B. Cable Distribution             |             |
|    | 1. Feeders                        |             |
|    | 2. Risers                         |             |

- C. Grounding & Protection
  - 1. System Ground
  - 2. Gas & Carbon Protectors
  - 3. Bonding
  - 4. Static Protection

II. PRACTICAL Hours 5 - 7½

#### WEEK 2, DAY 3

- I. PRACTICAL Hours 1 - 5½
  - A. 66 Blocks
  - B. Single line jacks
  - C. Amp & 3m connectors

II. REVIEW TO DATE Hours 6½ - 7½

#### WEEK 2, DAY 4

- I. FIRST BLOCK EXAM Hours 1 - 3
  - A. Review and critique exam

II. OVERVIEW OF 1A2 KEY SYSTEMS Hours 4 - 5½
 

- A. Mounting of Key Systems

#### WEEK 3, DAY 1

- I. POWER DISTRIBUTION IN A 1A2 KEY SYSTEM Hour 1 - 4
  - A. Power Supply Voltages
  - B. Tracing in a 5C1 using wiring diagram
    - 1. power supply
    - 2. 1c block
    - 3. interrupter
    - 4. back plane
    - 5. equipment blocks
    - 6. compare to 512 and 584C

II. PRACTICAL Hours 5 - 7½
 

- A. Wiring KSU Power Supplies

#### WEEK 3, DAY 2

- I. THE 400 E LINE CARD
  - A. Incoming call
    - 1. all ring options
    - 2. operation of "L" relay
    - 3. operation of "B" relay
    - 4. audio/visual signals (all options)

- B. Seizure
  - 1. tip and ring connections
  - 2. "A" lead control
  - 3. operation of "C" relay
  - 4. release of "B" relay
  - 5. hold of the "L" relay
  - 6. status change of the signal leads
  - 7. open interrupter start lead
- C. Placing a call on hold
  - 1. interruption of "A" lead
  - 2. operate "B" relay
  - 3. ground removal from "A" lead
  - 4. hold path for "C" relay
  - 5. interrupter state
  - 6. change in lamp leads
- D. Outgoing calls
  - 1. ground on "A" lead
  - 2. tip and ring connection
  - 3. operate the "C" relay
  - 4. steady lamp signal

II. PRACTICAL Hours 5 - 7½

WEEK 3, DAY 3

- I. KEYSYSTEM WIRING DIAGRAM Hours 1 - 4
  - A. Trace co lines from 400E card to demark
  - B. Trace T & R, A & A1, LG & L Leads from cards to equipment blocks
  - C. Correlate 501 wiring to 512 & 584C
- II. PRACTICAL - BEGIN MDF CONSTRUCTION Hours 5 - 6½
  - A. Equipment blocks
  - B. Station blocks
  - C. Option blocks
  - D. Hardware
  - E. Grounding
- III. REVIEW 400E LINE CARD Hours 6½ - 7½

WEEK 3, DAY 4

- I. REVIEW OF KSU WIRING Hours 1 - 2
- II. COMPLETE MDF CONSTRUCTION Hours 3 - 7
- III. BRIEF REVIEW OF WEEK



## WEEK 3, DAY 5

- |     |             |              |
|-----|-------------|--------------|
| I.  | QUIZ        | Hours 1 - 2  |
| II. | LIFE SKILLS | Hours 3 - 5½ |

## WEEK 4, DAY 1

- |     |   |              |
|-----|---|--------------|
| I.  | CROSS CONNECTIONS   | Hours 1 - 4  |
|     | A. Method of programming co lines to pick-up keys             |              |
|     | B. Common audible   |              |
|     | C. Signal devices   |              |
|     | D. Card slot modification and use of expansion panels (k259B) |              |
| II. | PRACTICAL - CROSS CONNECT USING KEY SHEETS                    | Hours 5 - 7½ |

## WEEK 4, DAY 2

- |     |   |              |
|-----|---|--------------|
| I.  | ANCILLARY EQUIPMENT   | Hours 1 - 4  |
|     | A. Diode matrix   |              |
|     | B. Music on hold (K403A, SB4201A)                               |              |
| II. | PRACTICAL - UNITS TAUGHT IN AM                                  | Hours 5 - 7½ |
|     | **NOTE: lecture and practical may be intermixed through the day |              |

## WEEK 4, DAY 3

- |     |  |             |
|-----|--|-------------|
| I.  | ANCILLARY EQUIPMENT                      | Hours 1 - 4 |
|     | A. Electronic intercom                   |             |
|     | B. Electronic page units, speakers & BGM |             |
| II. | PRACTICAL SAME FORMAT AS DAY 2           |             |

## WEEK 4, DAY 4

- |      |                                 |              |
|------|---------------------------------|--------------|
| I.   | ANCILLARY EQUIPMENT             | Hours 1 - 3  |
|      | A. Comdial BSND                 |              |
|      | B. ITT 2835 10BTN set with BLF  |              |
| II.  | PRACTICAL SAME FORMAT AS DAY 2  | Hours 4 - 6½ |
| III. | REVIEW OF 2ND BLOCK OF TRAINING |              |

## WEEK 4, DAY 5

- |      |              |             |
|------|--------------|-------------|
| I.   | BLOCK 2 EXAM | Hours 1 - 3 |
| II.  | REVIEW EXAM  | Hours 4 - 5 |
| III. | LIFE SKILLS  | Hours 5½    |

## WEEK 5, DAY 1

- |     |                                    |              |
|-----|------------------------------------|--------------|
| I.  | OVERVIEW OF ELECTRONIC KEY SYSTEMS | Hours 1 - 4  |
|     | A. Comparison to 1A2 Key           |              |
|     | B. Cabling and wiring              |              |
|     | C. Generic feature descriptions    |              |
|     | D. Methods of programming          |              |
| II. | PRACTICAL                          | Hours 5 - 7½ |
|     | A. Assign group 1 to ITT 401       |              |
|     | B. Assign group 2 to tie 612       |              |
|     | C. Assign group 3 to NC 616        |              |
|     | D. Remainder of class on 1A2 key   |              |

## WEEK 5, DAY 2

- |     |  |              |
|-----|--|--------------|
| I.  | ARIES 401                              | Hours 1 - 4  |
|     | A. Installation and service            |              |
|     | B. Features description and operation  |              |
|     | C. Programming                         |              |
| II. | PRACTICAL                              | Hours 5 - 7½ |
|     | A. Assign group 1 to tie 612           |              |
|     | B. Assign group 2 NC 616               |              |
|     | C. Assign group 3 to ITT 401           |              |
|     | D. Remainder of class continue 1A2 key |              |

## WEEK 5, DAY 3

- |     |  |              |
|-----|--|--------------|
| I.  | NORTH COM 616                          | Hours 1 - 4  |
|     | A. Installation and service            |              |
|     | B. Features description and operation  |              |
|     | C. Programming                         |              |
| II. | PRACTICAL                              | Hours 5 - 7½ |
|     | A. Assign group 1 to NC 616            |              |
|     | B. Assign group 2 to Aries 401         |              |
|     | C. Assign group 3 to tie 612           |              |
|     | D. Remainder of class continue 1A2 key |              |

## WEEK 5, DAY 4

- |      |  |               |
|------|--|---------------|
| I.   | TIE 612                                | Hours 1 - 4   |
|      | A. Installation and service            |               |
|      | B. Features description and operation  |               |
|      | C. Programming                         |               |
| II.  | PRACTICAL                              | Hours 5 - 6½  |
|      | A. Assign group 4 tie 612              |               |
|      | B. Assign group 5 to ITT 401           |               |
|      | C. Assign group 6 NC 616               |               |
|      | D. Remainder of class continue 1A2 key |               |
| III. | REVIEW ELECTRONIC KEY                  | Hours 6½ - 7½ |

## WEEK 5, DAY 5

- I. THIRD BLOCK EXAM

## WEEK 6, DAY 1

- |      |  |              |
|------|--|--------------|
| I.   | INTRODUCTION TO PBX SYSTEMS            | Hours 1 - 2  |
|      | A. Compare with key systems            |              |
|      | B. Mitel manual overview               |              |
|      | C. System overview and configuration   |              |
| II.  | PRACTICAL                              | Hours 3 - 5  |
|      | A. Assign group 1 to SX50              |              |
|      | B. Assign group 4 to 616               |              |
|      | C. Assign group 5 to 612               |              |
|      | D. Assign group 6 to 401               |              |
|      | E. Remainder of class continue 1A2 key |              |
| III. | PRACTICAL                              | Hours 6 - 7½ |
|      | A. Assign group 4 to 401               |              |
|      | B. Assign group 5 to 616               |              |
|      | C. Assign group 6 to 612               |              |
|      | D. Remainder of class continue 1A2 key |              |

## WEEK 6, DAY 2

- |     |  |               |
|-----|--|---------------|
| I.  | FEATURES DESCRIPTION AND SERVICE OF SX50 | Hours 1 - 3½  |
| II. | PRACTICAL                                | Hours 3½ - 5½ |
|     | A. Assign group 2 to SX50                |               |
|     | B. Assign group 7 to 612                 |               |

- III. PRACTICAL Hours 5½ - 7½
- A. Assign group 3 to SX50
  - B. Assign group 7 to 616
  - C. Assign group 8 to 612
  - D. Assign group 9 to 401
  - E. Remainder of class continue IA2 key

## WEEK 6, DAY 3

- I. PROGRAMMING THE SX50 Hours 1 - 3½
- II. PRACTICAL Hours 4 - 5½
- A. Assign group 4 to SX50
  - B. Assign group 7 to 401
  - C. Assign group 8 to 616
  - D. Assign group 9 to 612
  - E. Remainder of class continue IA2 key
- III. PRACTICAL Hours 5½ - 7½
- A. Assign group 5 to SX50
  - B. Remainder of class continue on key systems

## WEEK 6, DAY 4

- I. TOLL CONTROL IN THE SX50 Hours 1 - 3½
- II. PRACTICAL
- A. Assign group 6 to SX50 Hours 3½ - 5½
  - B. Assign group 7 to SX50 Hours 5½ - 7½

## WEEK 6, DAY 5

- I. REVIEW OF WEEKS LESSONS Hour 1
- II. QUIZ SX50 Hours 2 - 3
- III. LIFE SKILLS Hours 3 - 5½

## WEEK 7, DAY 1

- I. TEST PROCEDURES AND TROUBLE SHOOTING SX50 Hours 1 - 3½
- II. PRACTICAL
- A. Assign group 8 to SX50 Hours 3½ - 5½
  - B. Assign group 9 to SX50 Hours 5½ - 7½
  - C. Remainder of class begin troubleshooting all systems.



## WEEK 7, DAY 2

- |     |                                 |              |
|-----|---------------------------------|--------------|
| I.  | SX50 CONSOLE OPERATION          | Hours 1 - 4  |
| II. | PRACTICAL                       | Hours 4 - 7½ |
|     | A. Trouble shooting all systems |              |

## WEEK 7, DAY 3

- |     |                           |              |
|-----|---------------------------|--------------|
| I.  | SUPERSETS 3 and 4         | Hours 1 - 4  |
| II. | PRACTICAL (same as day 2) | Hours 4 - 7½ |

## WEEK 7, DAY 4

- |      |   |               |
|------|---|---------------|
| I.   | SMDR & R.MATS                             | Hours 1 - 3   |
| II.  | INVENTORY AND PACKAGE TELEPHONE EQUIPMENT | Hours 3 - 6½  |
| III. | REVIEW TO DATE                            | Hours 6½ - 7½ |

## WEEK 7, DAY 5

- |     |  |              |
|-----|--|--------------|
| I.  | 4th BLOCK EXAM                         | Hours 1 - 3  |
| II. | BEGIN SIMULATOR CONVERSION TO SECURITY | Hours 3 - 5½ |

## WEEK 8, DAY 1

- |      |  |              |
|------|--|--------------|
| I.   | OVERVIEW OF SECURITY INDUSTRY                  | Hour 1       |
|      | A. History of Security                         |              |
|      | B. Security today and tomorrow                 |              |
| II.  | WIRE AND CABLE INDUSTRY RELATED                | Hours 2 - 3  |
|      | A. Types and sizes (standard usage)            |              |
|      | B. Wire splicing methods and applications      |              |
|      | C. Soldering methods and solderless connectors |              |
| III. | COMPLETE SIMULATOR CONVERSION                  | Hours 4 - 7½ |

## WEEK 8, DAY 2

- |    |                    |             |
|----|--------------------|-------------|
| I. | FISHING TECHNIQUES | Hours 1 - 2 |
|    | A. Interior walls  |             |
|    | B. Exterior walls  |             |
|    | C. Ceilings        |             |
|    | D. Conduit         |             |

- II. PRACTICAL Hours 3 - 7½
  - A. Fish tape games (timed)
  - B. Fish wires through simulator

## WEEK 8, DAY 3

- I. DETECTION CIRCUITS Hours 1 - 4
  - A. N/C switch VS N/C device
  - B. Series CKTS (industry related)
  - C. N/O switch VS N/O devices
  - D. Parallel CKTS (industry related)
- II. PRACTICAL Hours 5 - 7½
  - A. Support AM lecture on simulator with contact switches.

## WEEK 8, DAY 4

- I. REVIEW N/O AND N/C CIRCUITS Hour 1
- II. SUPERVISED CIRCUITS Hour 2
  - A. Explain use of E.O.L.
  - B. Wiring of E.O.L. in relation to last device
- III. WIRING DIAGRAMS (Industry related) Hours 3 - 4
  - A. Industry symbols
  - B. Burglary CKT design
  - C. Fire CKT design (class A & B)
- IV. PRACTICAL Hours 5 - 7½
  - A. Drawing CKTS from assignments on board
  - B. Wiring same CKTS on simulator

## WEEK 8, DAY 5

- I. QUIZ
- II. LIFE SKILLS

## WEEK 9, DAY 1

- I. INTRO TO DETECTION DEVICES Hours 1 - 4
  - A. Magnetic contact switches (all types)
  - B. Physical reaction devices
    - 1. plunger
    - 2. ball traps
    - 3. pressure mats etc. (window foil)

- II. PRACTICAL Hours 5 - 7½  
 A. Construct CKTs using devices discussed in AM lecture

## WEEK 9, DAY 2

- I. VOLUMETRIC DETECTION Hours 1 - 2  
 A. Pir  
 B. Ultrasonic  
 C. Microwave  
 D. Dual Peak
- II. INTRO TO RELAY CONTROL AND SWITCHES Hours 3 - 4  
 A. SPST  
 B. DPDT  
 C. SPDT
- III. SHUNTING (switches and relays) Hours 5 - 7½  
 A. Series shunts  
 B. Parallel shunts  
 C. Supervised shunts

## WEEK 9, DAY 3

- I. FIRE SYSTEMS Hours 1 - 4  
 A.  
 1. pull stations  
 2. fixed therm  
 3. ROR  
 4. SMK detectors (ionized and photo elect.)
- II. PRACTICAL Hours 5 - 7½  
 A. Shunting  
 1. Series CKTs  
 2. Parallel CKTs  
 B. Wiring Fire Devices

## WEEK 9, DAY 4

- I. FIRE SYSTEMS CONTINUED Hours 1 - 4  
 A. Auxillary controls  
 B. Responsibility of Fire system (life & death)
- II. PRACTICAL Hours 5 - 6½  
 A. Same as day 3

III. REVIEW DETECTION Hour 7½

WEEK 9, DAY 5

I. EXAM DETECTION Hours 1 - 3

II. LIFE SKILLS Hours 4 - 7½

WEEK 10, DAY 1

I. INTRODUCTION TO CONTROL PANELS Hours 1 - 4

A. MNFG Nomenclature

B. System layout

C. Technical reference using system manuals

II. PRACTICAL Hours 5 - 7½

A. Panel assignments

B. Bench tests

C. Begin simulator installation

WEEK 10, DAY 2

I. SECURITY SYTEM DESIGN Hours 1 - 3

A. Site survey

B. Plan of installation

II. PRACTICAL Hours 4 - 7½

A. Continue simulator assignments

WEEK 10, DAY 3

I. SECURITY SYSTEM DESIGN Hours 1 - 4

A. Floor plans

1. residential

2. industrial

3. merchantile

B. Areas of special consideration

1. control panels

2. key pads

3. volumetric

4. fire devices

II. CONTINUE SIMULATOR ASSIGNMENTS Hours 5 - 7½



## WEEK 10, DAY 4

- |     |  |              |
|-----|--|--------------|
| I.  | INTRODUCTION TO PROGRAMMING (overview) | Hours 1 - 4  |
|     | A. NAPCO Pro 410                       |              |
|     | B. FBI 110C                            |              |
|     | C. Radionics 5100 Bar code             |              |
|     | D. Keypad programming                  |              |
| II. | PRACTICAL                              | Hours 5 - 7½ |
|     | A. Continue simulator assignments      |              |
|     | B. Custom programming of panels        |              |

## WEEK 10, DAY 5

- |     |                               |              |
|-----|-------------------------------|--------------|
| I.  | QUIZ                          | Hours 1 - 2  |
|     | A. Technical referencing      |              |
|     | B. Manufacturing nomenclature |              |
| II. | LIFE SKILLS                   | Hours 3 - 5½ |

## WEEK 11, DAY 1

- |     |                                   |              |
|-----|-----------------------------------|--------------|
| I.  | PROGRAMMING                       | Hours 1 - 4  |
|     | A. Operation and use of Pro 410   |              |
|     | B. NAPCO features and forms       |              |
| II. | PRACTICAL                         | Hours 5 - 7½ |
|     | A. Continue simulator assignments |              |
|     | B. Burning of NAPCO chips         |              |

## WEEK 11, DAY 2

- |     |                                     |              |
|-----|-------------------------------------|--------------|
| I.  | PROGRAMMING                         | Hours 1 - 4  |
|     | A. FBI 110C                         |              |
|     | B. Ademco 690                       |              |
| II. | PRACTICAL                           | Hours 5 - 7½ |
|     | A. Simulator assignments            |              |
|     | B. Burning chips for FBI and Ademco |              |

## WEEK 11, DAY 3

- |    |                             |             |
|----|-----------------------------|-------------|
| I. | PROGRAMMING                 | Hours 1 - 4 |
|    | A. Radionics 5100 Bar Codes |             |
|    | B. ITT hand held            |             |

- II. PRACTICAL Hours 5 - 7½
  - A. Simulator assignments
  - B. Load programs to 5100
  - C. Program ITI devices

## WEEK 11, DAY 4

- I. PROGRAMMING Hours 1 - 4
  - A. Key Pad Programming
    - 1. user options
    - 2. system features (Z1100 & S911)
- II. PRACTICAL Hours 5 - 6½
  - A. Programming Z1100 & S911
  - B. Programming and use of user options
- III. GENERAL REVIEW TO DATE Hour 7½

## WEEK 11, DAY 5

- I. EXAM Hours 1 - 3
  - A. Control Panels
  - B. Control Devices
- II. Life Skills

## WEEK 12, DAY 1

- I. INTRODUCTION TO REACTIONARY DEVICES Hours 1 - 3
  - A. Tape Dialers
  - B. DCU's
  - C. Bells, Horns, Sirens strobes
  - D. Siren Drivers
  - E. Aux. Functions
    - 1. Burglary
    - 2. Fire
- II. PRACTICAL Hours 4 - 7½
  - A. Simulator assignments

## WEEK 12, DAY 2

- I. Sirens, Siren drivers, and Speakers Hours 1 - 2

- |     |  |              |
|-----|--|--------------|
| II. | PRACTICAL                              | Hours 3 - 7½ |
|     | A. Begin final task                    |              |
|     | B. Remainder of class trouble shooting |              |

## WEEK 12, DAY 3

- |     |  |              |
|-----|--|--------------|
| I.  | DCU's, Tape Dialers, and RJ38X         | Hours 1 - 3  |
| II. | PRACTICAL                              | Hours 4 - 7½ |
|     | A. Continue final task                 |              |
|     | B. Remainder of class trouble shooting |              |

## WEEK 12, DAY 4

- |      |  |             |
|------|--|-------------|
| I.   | TELCO LINE SEIZURE                     | Hours 1 - 2 |
|      | A. Single pole and double pole seizure |             |
|      | B. Anti jam                            |             |
| II.  | PRACTICAL                              | Hours 3 - 7 |
|      | A. Continue final task                 |             |
|      | B. Continue trouble shooting           |             |
| III. | REVIEW OF WEEK                         | Hour ½      |

## WEEK 12, DAY 5

- |     |             |              |
|-----|-------------|--------------|
| I.  | QUIZ        | Hours 1 - 2  |
| II. | LIFE SKILLS | Hours 3 - 5½ |

## WEEK 13, DAY 1

- |     |                                    |              |
|-----|------------------------------------|--------------|
| I.  | BELLS AND STROBES                  | Hour 1       |
| II. | PRACTICAL                          | Hours 2 - 7½ |
|     | A. Final task and trouble shooting |              |

## WEEK 13, DAY 2

- |     |                                 |              |
|-----|---------------------------------|--------------|
| I.  | AUX FUNCTIONS                   | Hour 1       |
|     | A. Burglary                     |              |
|     | B. Fire                         |              |
| II. | PRACTICAL                       | Hours 2 - 7½ |
|     | A. Trouble shooting all systems |              |

WEEK 13, DAY 3

- I. TEAR DOWN Hours 1 - 6½
  - A. Inventory
  - B. Pack for shipping
  - C. Disassemble simulator
  
- II. GENERAL REVIEW TO DATE Hour 7½

WEEK 13, DAY 4

- I. FINAL EXAM Hour 1 - 3
  
- II. COMPLETE TEAR DOWN

WEEK 13, DAY 5

- I. GRADUATION CEREMONY!



SOLICITATION REVIEW

PROPOSAL 89128

SECTION C - DESCRIPTION/SPECIFICATION/WORK STATEMENT

The intent of documenting the review of this Section is to assure NRC that Vector 1) understands the statements (Understood) 2) complies with the requirement (Compliance) or 3) does not comply with the requirement (Non-compliance). Supporting details are contained in the proposal as directed by Section L of the solicitation. Further clarification, when needed, is contained herein.

C.1.1 Understood

C.1.2 Understood

C.1.3 Compliance with all subparagraphs with the following clarification:

Subparagraph (e) - Validation by the LEC does not verify that the trouble, in fact, was not due to malfunction, interruption, or substandard quality of the LEC service. Proof that the problem was found to be in the NRC facilities verifies that the contractor was at fault. To remove any ambiguity it is Vector's understanding that only malfunctions which are reported by the contractor as problems attributable to the LEC and later verified as problems within the NRC facilities maintained by the contractor are attributable to the contractor.. Such verification cannot be unilaterally validated by the LEC. The PO or at least one of the contractor's personnel must verify that the reported malfunction was, in fact, in the NRC facilities maintained by the contractor.

C.1.4 Compliance with all subparagraphs.