

LAW ENFORCEMENT ASSISTANCE ADMINISTRATION (LEAA)

POLICE TECHNICAL ASSISTANCE REPORT

SUBJECT Radio Equipment Standards  
REPORT NUMBER 75-119-031  
FOR State of Arkansas Commission on Law Enforcement

CONTRACTOR Public Administration Service  
1776 Massachusetts Avenue Northwest  
Washington, D.C. 20036

CONSULTANT S. A. Yefsky

CONTRACT NUMBER J-LEAA-002-76

DATE March 22, 1976

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FOREWARD

The State of Arkansas' Commission on Crime and Law Enforcement submitted a technical assistance request to Region VI LEAA on November 24, 1975. Mr. Larry B. Cockrell, Grants Administration Supervisor, requested assistance to review radio equipment specifications to determine if the specifications developed by the SPA would prohibit any vendor from responding, as well as determining if any additional specifications were needed.

Mr. Fred W. Graffweg, Director, Program Development/Technical Assistance Division, processed this request and assigned a task to the Public Administration Service on December 18, 1975. The consultant, CES Telecommunications of Chicago, Illinois, was assigned the task on January 7, 1976.

CES assembled the previous written specifications and met with the SPA on January 14, 1976. CES determined that the present specifications would require revision in order to permit competitive bidding and achieve the maximum benefit in the small procurements anticipated. Further, additional specifications would be required because fifteen items of equipment were required and only ten specifications had been prepared.

This report contains the bid package consisting of the instructions and contract elements for use in implementing the advertised procurements and the fifteen specifications which were prepared.

## SECTION II

### UNDERSTANDING OF THE PROBLEM

On January 8, 1976, CES Telecommunications contacted the State of Arkansas' Commission on Crime and Law Enforcement to initiate the program. Mr. Larry B. Cockrell forwarded the eleven previously prepared specifications for review by CES. On January 14, 1976, an on-site visit was made to the SPA in Little Rock by Mr. Sidney Cohen of CES. During this visit, CES held discussions with SPA personnel and thoroughly reviewed the anticipated procurements and needs for equipment in the State of Arkansas.

The following specifications were reviewed with the SPA.

- . Low Band Base Station, Single Frequency, Two Frequency
- . High Band Base Station
- . High Band Mobile Relay Station, Single Frequency, Two Frequency
- . Remote Control Console
- . Low Band Mobile Radio
- . High Band Mobile Radio
- . Low Band Portable Radio
- . Low Band Monitor Receiver
- . Low Band/High Band Scanning Monitor Receiver
- . Self-Supporting Tower

In addition to the above specifications, the following equipment would also be required:

- . Low Band Multi-Unit Portable Battery Charger
- . High Band Portable Radio/Multi-Unit Portable Battery Charger
- . Magnetic Tape Recorder
- . Guy Tower
- . High Band Monitor Receiver

The requirement for writing additional specifications was thus defined during the course of this on-site visit. At this time, the SPA

advised that procurements would be made at the local level. It was concluded that a set of standard procurement guidelines would be highly desirable for sub-grantees to utilize as a package in which the equipment specifications would be included. -

SECTION III

ANALYSIS OF THE PROBLEM

CES reviewed the existing specifications. It was determined that the specifications were not optimum for the intended application and would potentially result in procurement problems for several reasons. Firstly, the specifications contained a number of vendor restrictions, while at the same time they did not guarantee that the equipment bid would be appropriate for the intended public safety service. Additionally, the equipment bid as a result of these specifications could vary as to quality depending upon the manufacturer. The local procuring agency would not have the expertise to resolve bidding disputes which would likely occur. These reasons resulted in a recommendation made by CES to re-write all of the specifications. CES proposed to write those specifications which had not been written.

With regard to a basic procurement package, CES concurred with the SPA and also proposed to write a general specification which the sub-grantees' purchasing agent could utilize.

CES determined that the aforementioned work would require additional days. PAS authorized a total of three additional days on January 26, 1976, bringing the total allowed days to eight.

SECTION IV

FINDINGS AND CONCLUSIONS

Enclosed herewith is the State of Arkansas' Radio Equipment Standards. These are divided into several sections. The first section contains the Invitation For Bid Form and the General Conditions and Instructions to the Bidders. This contains such general terms as the bid deposit, basis for award, insurance, damages, etc. The second section contains the Bid Technical Requirements which details the terms general to all equipment. These include contractor responsibility, warranty, lightning protection, etc. The final section consists of the specifications for fifteen Items of equipment.

The format selected for these specifications utilizes brand name and model number equivalents with specific features appropriate for the application. This approach enables the sub-grantee, without technical support, to readily evaluate bidder submissions and assures a given level of equipment bids. These specifications should be reviewed and updated by the State of Arkansas on an annual basis.

A draft of the specifications were forwarded to the State of Arkansas Commission on Crime and Law Enforcement on February 7, 1976. The specifications were reviewed by Mr. Larry Cockrell and comments were forwarded to CES. On Thursday, February 26, 1976, Mr. Cockrell approved the draft specifications. CES then prepared the final specifications as enclosed.

This completes the work under this task assignment.

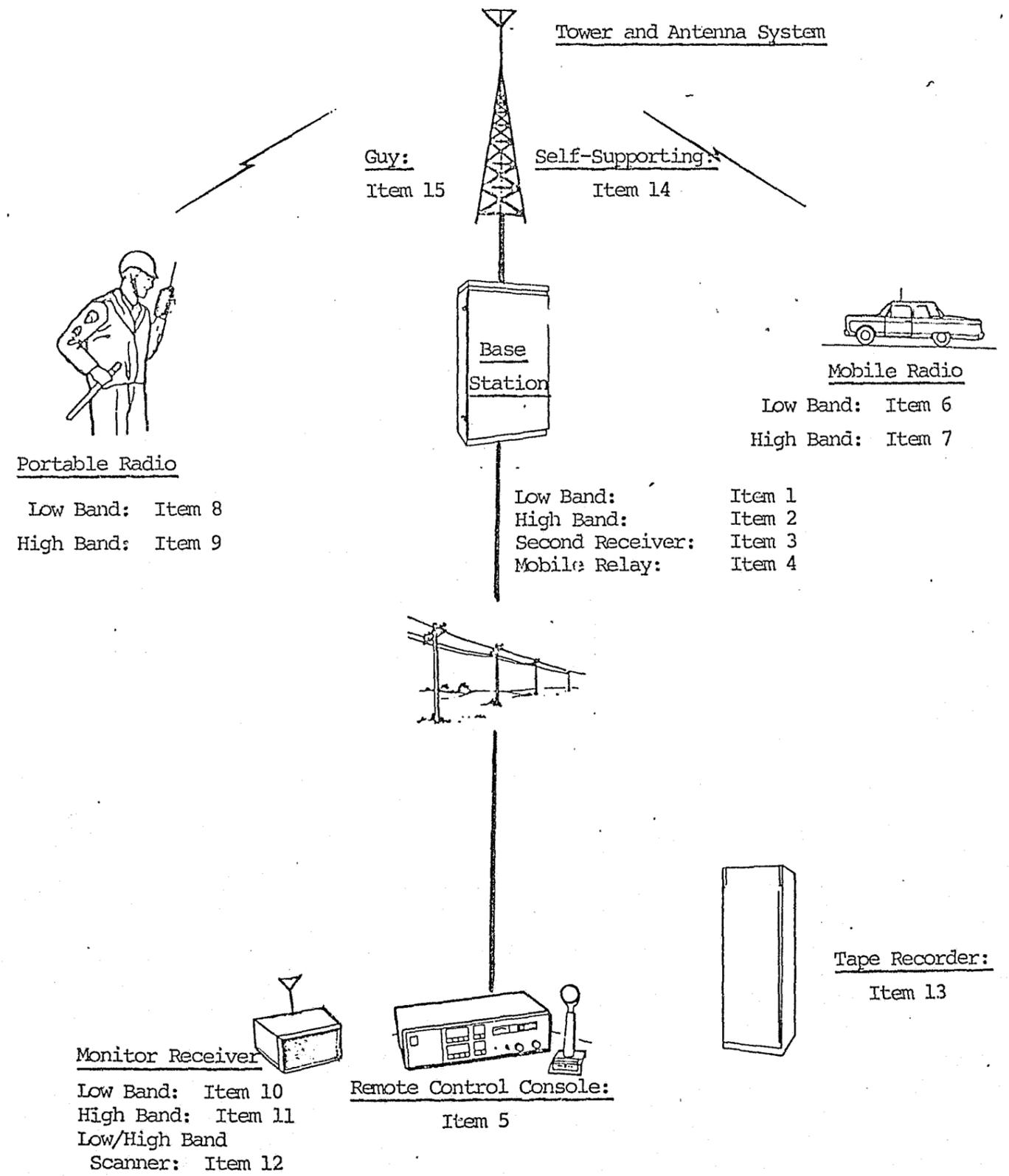
SECTION V

STATE OF ARKANSAS  
COMMISSION ON LAW ENFORCEMENT  
RADIO EQUIPMENT STANDARDS

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STANDARD EQUIPMENT ITEMS



Portable Radio  
Low Band: Item 8  
High Band: Item 9

Mobile Radio  
Low Band: Item 6  
High Band: Item 7

Low Band: Item 1  
High Band: Item 2  
Second Receiver: Item 3  
Mobile Relay: Item 4

Monitor Receiver  
Low Band: Item 10  
High Band: Item 11  
Low/High Band  
Scanner: Item 12

Remote Control Console:  
Item 5

Tape Recorder:  
Item 13

INVITATION FOR BID

Page 1 of 1

BID FORM

Bid must be made on these forms.

Item Nr.	Quan.	EQUIPMENT Description	Unit Price Quoted.			Totals
			Equipment	Installation	Maintenance	
		Bid for the _____ includes all Equipment, Delivery, Installation, Check-Out, System Optimization, Manuals, Warranty, First Twelve Months Parts and Labor Maintenance, and Documentation in accordance with the Contract Documents for the following Items:				

STATE OF ARKANSAS

COMMISSION ON CRIME AND LAW ENFORCEMENT

1.0

GENERAL CONDITIONS AND INSTRUCTIONS TO BIDDERS

1.1 Definitions.

- . The term "Purchaser" shall mean:
  
- . The term "User" shall mean:
  
- . The term "Architect" shall mean:
  
- . The term "Engineer" shall mean:
  
- . The term "Contractor" shall mean any Bidder with whom the Purchaser executes a contract in accordance with the terms and provisions of this Invitation For Bid.
  
- . The "Invitation For Bid" shall mean the Bid Form, the General Conditions and Instructions to Bidders, Bid Technical Requirements, Detailed Specifications, and Addendum.

The term "Contract Documents" shall mean the Invitation For Bid, Notice of Award, Purchase Equipment Schedule, Contract of Purchase and Sale, and any documents made part thereof through formal inclusion by the Purchasing Agent.

1.2 Vendor Qualifications.

Only United States manufacturers of FM radio communications equipment in common use in the public safety services in the United States for a period of at least ten (10) years will be considered as responsible Bidders.

1.3 Bidders Conference.

Date:

Time:

Place:

1.4 Notice to Bid.

Bidders who desire to submit bids are requested to notify the Purchasing Agent by completing the following statement and forwarding it seven (7) calendar days prior to the Bidders Conference.

This certifies that \_\_\_\_\_  
(Name of Bidder)

plans to submit a bid.

Bidder: \_\_\_\_\_

Authorized Signature: \_\_\_\_\_

Title: \_\_\_\_\_

1.5 Interpretation of Contract Documents.

The Purchasing Agent is the only one authorized to interpret the Contract Documents. Only that information issued by the Purchasing Agent in written form, prior to the bid date, will be considered as part of the Contract Documents.

1.6 Questions and Clarifications of Specifications.

Bidders are requested to submit all questions in writing where possible five (5) working days prior to the Bidders' Conference.

All questions from bidders will be considered formal and public knowledge. Answers to all questions of a nature material to the specifications, whether the questions are submitted verbally or in writing will be sent to all bidders in the form of written addenda at least fourteen (14) calendar days prior to the bid opening.

No bidder communications will be accepted within fourteen (14) calendar days of the bid opening date except for information regarding bid procedure.

1.7 Exceptions to Specifications.

The Purchaser will not grant exceptions to specifications which affect the design or performance of the system. Bidders may request formal approval for a change in specification which meets or exceeds the requirements of this specification and which departs only in specific detail. The bidder may request such exceptions only if he is able to certify that he is unable to comply with the specification as written. Bidders must submit formal requests to the Purchasing Agent at least five (5) calendar days before the Bidders Conference. The bidder will complete and enclose the following certification statement in his request for each and every exception to Detailed Specifications or Contract Documents he requests:

Notwithstanding the fact that this Bidder has the privilege of electing any course of action in the future, this Bidder herewith certifies that he cannot submit a bid which is responsive with Specification Paragraph No. \_\_\_\_\_ (fill in) if exception to the specification detailed below is not granted.

Bidder: \_\_\_\_\_  
Authorized Signature: \_\_\_\_\_  
Title: \_\_\_\_\_

The Purchasing Agent will advise the bidder of the approval or denial of any request within fourteen (14) days after the Bidders Conference. Approvals will constitute an Amendment to the Contract Documents and sent to all bidders.

The Purchasing Agent reserves the right to approve as an equal, or reject as not being equal, any exception or article that the bidder proposes to furnish which contains major or minor variations from the specifications or which may comply substantially therewith.

1.8 Bid Items

Bidders must bid all Items on the Bid Forms. The Purchasing Agent reserves the right to accept any optional Items at his sole discretion. One security deposit is required from each Bidder at the Bidder's highest cost options.

1.9 Execution of the Bid.

The bidder shall prepare his bid and execute the Contract Documents in triplicate. Signatures are required on the Bid Form and Contract for Purchase and Sale. The Secretary and President shall execute the bid and affix the corporate seal to all copies.

For persons signing bids other than those cited above, the Bidder must submit a certified copy of the authority granted by the Bidder to that person to execute the Contract Documents.

1.10 Submission and Withdrawal of Bids.

All Bidders shall submit sealed bids on or before the time and date indicated in the Invitation For Bid. The Bidder may withdraw his bid any time prior to the opening of his Bid. The Bid shall remain in force for ninety (90) days from the opening date of the bid.

The Bid Forms shall be read into a public abstract of the Bid Opening proceedings. Complete bid submissions shall be available for public inspection upon award of a Contract.

1.11 Bid Security.

All Bidders will submit a certified or cashier's check or a bid bond in the amount of five percent (5%) of the Bid, payable to the Purchaser. The bid security will be returned to all Bidders immediately upon execution of the Contract with the successful Bidder or within ninety (90) days of the opening date of the bids, whichever occurs first. Any bids submitted without bid security will be rejected by the Purchasing Agent.

1.12 Rejection of Bids.

The Purchasing Agent may reject without further consideration any bid not compliant with the Detailed Specifications, any bid submitted by a bidder not compliant with the bid procedures detailed in the General Conditions and Instructions to Bidders, and any bid not fulfilling the Bid Technical Requirements.

1.13 Basis for Award.

The award shall be made to the responsible bidder offering the lowest price in a bid which is responsive to the Invitation For Bid. Purchaser reserves the right to reject

any and all bids. The Purchaser shall be the sole judge of the Bidder responsiveness (Compliance) to the Contract Documents and responsibility.

1.14 Notice of Award.

The Purchasing Agent will notify the successful Bidder within ninety (90) days from the opening date of the Bid.

1.15 Performance and Payment Bond.

The successful Bidder, upon notification of award by the Purchasing Agent, shall provide within ten (10) working days a surety performance and payment bond from a company authorized to do business by the State of Arkansas in the amount of 100% of the bid price. Said bond shall guarantee Contractor's compliance with all terms and conditions of the Contract Documents. The bond shall remain in force for twelve (12) months from date of acceptance of the system by the Purchaser. In the event that the successful Bidder fails to furnish the performance and payment bond as provided above, the Bidder will forfeit his bid security (Paragraph 1.2) as liquidated damages. The bidder now agrees that the amount of his bid security is the damages that the Purchaser will sustain due to the Bidder's failure to furnish said bond and successfully execute a contract. The Purchasing Agent may then select another successful Bidder.

1.16 Execution of Contract.

The Contract of Purchase and Sale will be executed by the Purchaser on behalf of the Users upon the successful Bidder's delivery of the Performance and Payment Bond in accordance with the Notice of Award. The Contract shall contain all applicable requirements of the Arkansas Commission on Crime and Law Enforcement and LEAA Guideline Manual M1700.6.

1.17 Waiver.

The Purchasing Agent reserves the right to waive all formalities and reject all bids.

1.18 Award.

The Purchaser is presently funded by Arkansas Commission on Crime and Law Enforcement for Items \_\_\_\_\_ through \_\_\_\_\_. The initial Contract award to the Contractor and any subsequent additions shall be based upon availability of funds.

The Purchasing Agent may delete any Item or Items of equipment from said award and award the remaining Items on a Purchase Equipment Schedule. He may increase or decrease the quantity of any Item award and make said award at the unit cost of the bid. The Purchasing Agent may order any quantity of any Item bid at the unit cost bid for a period of twelve (12) months from the award of Contract.

1.19 Licenses and Permits.

The Contractor is responsible for obtaining, at his own cost, all licenses and permits in accordance with Federal, State, and local laws and ordinances.

1.20 Insurance.

The Contractor, in addition to any insurance required by state or local law, shall maintain in force during the term of this Contract, the following insurance:

- (A) Comprehensive general liability insurance, including owner's protective liability insurance and contractual liability insurance covering personal injury

and property damage in the amount of \$500,000 per person and \$1,000,000 per occurrence for personal injury, including death, and \$300,000 per occurrence for property damage.

- (B) Comprehensive automobile liability insurance in the amounts specified above, covering all owned, non-owned and hired vehicles used in the performance of the Contract.

Within ten (10) days after execution of this Contract, Contractor shall provide Purchaser with certificates of insurance for all insurance required hereunder. Such policies shall contain an undertaking by the respective insurers that no such policy will be cancelled without at least fifteen (15) days prior written notice to each named insured.

1.21 Performance.

The Contractor shall commence work described herein upon execution of the Contract, and shall complete all deliveries of equipment in accordance with the Delivery Schedule which is in \_\_\_ days, Sunday, and holidays included. Complete installation of said equipment shall be made by no later than 30 days thereafter, Sundays and holidays included. If the Contractor completes his delivery, installation, or testing after the applicable dates specified herein, the actual damages to the Purchaser resulting from the delay will be impossible to determine. In lieu thereof should the Contractor fail to substantially deliver all Items listed in the Bid Form within the specified in the Delivery Schedule, the Contractor agrees to pay to the Purchaser as fixed and agreed liquidated damages, and not as a penalty, the sum of five percent (5%) of the total contract price. For any equipment installed

and/or tested by the Purchaser after the times specified in said Schedule, the Contractor agrees additionally to pay to the Purchaser either the sum of one-tenth percent (.1%) of the total contract price for each day of delay on completion of installation and each day of delay on completion of testing or the full value of the contract, whichever is less. Said penalties apply only to the initial delivery, installation, and tests and do not apply to any equipment that may be supplied or any additional tests that may be required as a result of the initial tests. The Contractor shall not be charged with damages or excess costs when the delay in delivery, installation, or testing is due to acts of God, war, and strikes. In the event of such delay, the date of delivery or of performance shall be extended for a period equal to the time lost by reason of the delay.

The rights and remedies of the Purchaser provided in this part shall not be exclusive and are in addition to any other rights and remedies provided by law or under this Contract.

1.22 Contractor Payment.

Sixty percent (60%) of the total Contract price upon completion of delivery. Twenty percent (20%) of the total contract price upon completion of all installations. Twenty percent (20%) after system acceptance. The amounts due for said installments shall be paid in single installments.

STATE OF ARKANSAS

COMMISSION ON CRIME AND LAW ENFORCEMENT

2.0

BID TECHNICAL REQUIREMENTS

2.1 Contractor Responsibility.

The Contractor is responsible for furnishing and installing all items of equipment, labor, parts, material, appliances, fixtures, supplies, machinery, tools, administration and any other commodity, item, or expenditure that may be necessary to complete the installation of a functional radio communications system which shall meet User requirements and shall bear any and all expenses related to the aforementioned items of equipment, labor, parts, material, appliances, fixtures, supplies, machinery, tools, and administration that may be required to complete said contract requirements whether or not these are specifically enumerated as Items or quantities of Items in the Contract Documents. Unless specifically stated herein, the Purchaser will provide only a 120 VAC power panel in the same building or general area of installation, and tariffed radio telephone lines as presently available from the local telephone company. The Contractor is responsible for field coordination of all power and telephone lines and shall provide any necessary liaison with the Architect and the local telephone company.

2.2 Applicable Standards.

In addition to the specifications herein, all equipment must meet or exceed current standards of the Electronic

Industries Association (EIA). All radio communications equipment must have type acceptance from the Federal Communications Commission (FCC).

2.3 Equipment Data Sheets.

The Bidder will include a specifications sheet for each item of equipment bid. All data sheets furnished for radio communications equipment shall include, as a minimum, the following information:

General:

- Size
- Weight
- Controls
- Duty Cycle
- Temperature Range
- Channel Capability

Receiver:

- Sensitivity (12db SINAD)
- Sensitivity (20db Noise Quieting)
- Selectivity
- Spurious and Image Response
- Intermodulation
- Frequency Stability
- Audio Response
- Audio Power and Distortion

Transmitter:

- Power Output
- Spurious and Harmonic Emission
- Frequency Stability
- FM Noise
- Audio Response
- Audio Distortion

2.4 Warranty.

The Contractor shall warrant that all equipment shall conform to its published specifications and be free from defects in material, workmanship, and title.

The labor warranty for all items and components shall be ninety (90) days.

The minimum warranty period for all parts, except vacuum tubes, shall be one (1) year.

The warranty period will begin upon acceptance by the Purchaser.

2.5 Maintenance.

The Contractor must offer to supply a maintenance contract covering all equipment supplied. Said contract may be serviced through a franchise service station(s). However, ultimate control and responsibility must remain with the Contractor to assure total system responsibility.

The Bidder must furnish in his bid, the name, location, and capabilities of the service station(s) which will provide any and all warranty service. If this station(s) is not wholly owned by the Bidder, a copy of the franchise agreement(s) between the Bidder and the service facility shall be submitted with the bid. This agreement shall clearly show the nature and duration of the agreement.

Service shall be provided as follows:

Base station transmitters and control equipment--  
24 hour, 7 days. Response time shall be within  
two (2) hours.

Mobile and portable radio equipment--8 hours,  
5 week days. Total turnaround time shall be by  
the next weekday.

All other equipment response time shall be six  
(6) hours.

The twelve (12) months maintenance period shall commence on the day of acceptance of the equipment by the Purchaser.

2.6 Instruction Manuals.

The Contractor shall provide complete instruction manuals for the equipment supplied. The manuals shall include a material guide which shall contain the replacement part numbers and description of all components used. The manuals shall provide sufficient, concise information, including schematics, layout drawings, test and alignment procedures, intercabling diagrams, and parts list, to permit quick and efficient maintenance and repair of the equipment by a qualified technician. Drawings which are supplied must be reproduced by such means as to preclude fading.

The Contractor must maintain a file on all manual information so that he is in a position to replace the manual in whole or part for a period of ten (10) years.

Quantities of manuals to be furnished by the Contractor shall be no less than two (2) per Item with the following rate for quantity purchases:

Mobile Radios: One (1) manual per ten (10) units.  
Portable Radios: One (1) manual per ten (10) units.

2.7 Lightning and Surge Protection.

The Contractor shall furnish and install lightning and surge protection at the Purchaser's transmitter and control center sites equivalent to the following equipment:

2.7.1 AC Power Panels.

Install Joslyn Model 1265-01 AC protectors across the AC service at all power panels providing power to any and all radio equipment and/or control center equipment. The protectors shall be grounded at the panel with a No. 4 AWG copper wire connected directly to the building ground.

2.7.2 Telephone Lines.

Install a Joslyn Model 2357-02 line protector across all telephone lines connected to any and all equipment.

The protector ground shall be connected to the sheath ground with a No. 12 AWG copper wire. Connect the telephone ground to the building ground with a No. 4 AWG copper wire.

2.7.3 Transmission Lines.

All transmission lines shall be grounded at the base of the tower and point of entry to the building. The cable grounding clamp shall be connected directly with a No. 6 AWG copper wire to the tower ground loop and building as appropriate.

A Phelps Dodge Model 395-509 gap type arrestor will be installed at the equipment cabinet where the transmission line is connected to the radio equipment. The equipment cabinet will be connected directly to the building ground with a No. 6 AWG copper wire.

2.7.4 Equipment Cabinets.

The base station equipment cabinet shall be connected to a building ground with a No. 6 AWG copper wire.

2.7.5 Towers.

All towers shall be directly grounded to a primary ground system as follows:

2.7.6 Item 14, Self Supporting Tower.

A minimum ground shall consist of 5/8" diameter ground rods driven not less than eight feet (8') into the ground adjacent to each leg and bonded with a lead of not smaller than No. 2 AWG copper wire connected to the leg using three Rohn BGKE Grounding Kits or equivalent. The three ground rods shall be interconnected

with a ground ring of No. 2 AWG copper wire running in a circle outside the concrete anchors. Connect the ground ring to the building ground with a No. 2 AWG copper wire. External connections by the Caldwell process.

2.7.7 Item 15, Guy Tower.

A minimum ground shall consist of two 5/8" diameter ground rods driven not less than eight feet (8') into the ground, six inches (6") below grade, adjacent to the tower base on opposite sides, and bonded with a lead of not smaller than No. 2 AWG copper wire connected to the tower base. Two Rohn BGK base grounding kits or equivalent will be used. Connect the tower base to the building using a No. 2 AWG copper wire.

At each guy wire location, guy wire grounding clamps will be installed on each guy interconnected by a lead of not smaller than No. 2 AWG copper wire connected to a 5/8" diameter rod driven not less than eight feet (8') into the ground, six inches (6") below grade. One Rohn G-1 AGK anchor grounding kit or equivalent will be used at each guy location.

2.7.8 Item 5, Remote Control Console.

Install a Joselyn Model 1250-02 secondary arrester across the AC supply inside the control station cabinet. Connect a building ground with a No. 6 AWG copper wire to the cabinet.

Install a Joselyn Model 2357-02 telephone protector across each telephone line at the building entrance. Ground protectors to common building ground.

Telephone and power ground should be common by connecting to a buried metallic water pipe or some other approved grounding electrode (see NEL Code).

DETAILED SPECIFICATIONS

ITEM 1

LOW BAND BASE STATION

1 Basic.

The Contractor shall deliver and install as directed by the Purchaser, low band FM base station transmitter/receiver radio communications equipment equivalent to the following:

General Electric:	Model DC74RBS23A (MASTR II)
Motorola:	Model C71RCB1115 (MICOR)
RCA:	Model CRFM7A-RJB-B02a (Series 1000)

2 Tone Squelch.

None to be furnished.

3 Control Signal.

DC remote control.

4 Cabinet.

Indoor type, approximate four foot (4') height. Sufficient space shall be available to add a second receiver of the same type furnished, and a receiver multi-coupler.

5 Lightning Protection.

Paragraph 2.7.

6 Transmitter.

6.1 Transmit Power.  
90 watts minimum.

6.2 Duty Cycle.  
Continuous.

6.3 Channels.  
Two (2) minimum. Frequency to be furnished to the Contractor.

7 Receiver.

7.1 Channels.  
One (1). Frequency to be furnished the Contractor.

DETAILED SPECIFICATIONS

ITEM 2

HIGH BAND BASE STATION

1 Basic.

The Contractor shall deliver and install as directed by the Purchaser, high band FM base station transmitter/receiver radio communications equipment capable of operation in the 150.8 - 174 MHz bands equivalent to the following:

General Electric:	Model DC76RAS66 (MASTR II)
Motorola:	Model C73RCB1115 (MICOR)
RCA:	Model CRCM6B-RJB-RJ-B06A (Series 1000)

2 Tone Squelch.

To be furnished to the Contractor.

3 Control Signal.

DC remote control.

4 Cabinet.

Indoor type, approximate four foot (4') height. Sufficient space shall be available to add a second receiver of the same type furnished, and a receiver multi-coupler.

5 Lightning Protection.

Paragraph 2.7.

6 Transmitter.

6.1 Transmit Power.

75 watts minimum.

6.2 Duty Cycle.

Continuous.

6.3 Channels.

Two (2) minimum. Frequencies to be furnished the Contractor.

7 Receiver.

7.1 Channels.

One (1). Frequency to be furnished the Contractor.

DETAILED SPECIFICATIONS

ITEM 3

SECOND RECEIVER

1 Basic.

The Contractor shall include as part of the base station furnished in Item 1 or Item 2 a second receiver and inter-cabling equivalent to the following:

General Electric:	Model S14AS23A or S16AS66A
Motorola:	Model N01RTB1100 or N03RTB1100
RCA:	Model RA or RJ

2 Channels.

One (1). Frequency to be furnished the Contractor.

3 Tone Squelch.

None to be furnished.

4 Multi-Coupler.

Sinclair Model CR2-104DF (30 - 50 MHz) or Model CR2-2C03DF (132 - 174 MHz) or approved equal and associated terminal strip.

DETAILED SPECIFICATIONS

ITEM 4

HIGH BAND MOBILE RELAY STATIONS

1 Basic.

The Contractor shall deliver and install all solid-state mobile relay station equipment equivalent to the following:

General Electric:	Model DC76UAU66 (MASTR II)
Motorola:	Model C73RCB3105T (MICOR)
RCA:	Model CZCM6B-QJA-TO-B05C-B125 (Series 1000)

2 Tone Squelch.

To be furnished to the Contractor.

3 Control Signal.

Remote operation by DC control.

4 Cabinet.

Indoor type, approximate four foot (4') height.

5 Lightning Protection.

Paragraph 2.7.

6 Duplexer.

A Sinclair Radio Laboratory's "Q", "P", or "R" 200 series duplexer or equivalent compatible with transmitter and receiver frequency separation.

7 Repeater Disable.

The repeat function in each repeater station shall have the capability to be disabled by remote control from the remote control console of Item 5 or other compatible remote control unit.

8 Transmitter.

8.1 Transmit Channels.

One (1) channel. Frequency to be furnished the Contractor.

8.2 Transmit Power.

75 watts minimum.

8.3 Duty Cycle.

Continuous duty operation.

9 Receiver.

9.1 Receive Channels.

One (1). Frequency to be furnished the Contractor.

DETAILED SPECIFICATIONS

ITEM 5

REMOTE CONTROL CONSOLE

1 Basic.

The Contractor will deliver and install as directed by the Purchaser wire line radio remote control consoles with desk microphone equivalent to the following:

General Electric:           Model 539R1S1

Motorola:                    Model T1607M/TLN4993

RCA:                         Model 82AC

2 Color.

Color to be furnished to the Contractor.

3 Transmit Controls.

Two (2) frequency transmitter minimum.

4 Receive Controls.

Two (2) single receivers minimum.

5 Control Signal.

Remote operation by DC control of base station located at a remote location.

6      Clock.

A twenty-four (24) hour electronic digital clock.

7      Alert Tone.

1000 Hz alert tone.

8      Power Source.

120 VAC power with battery standby capability to switch over to a 12VDC battery source (not to be furnished).

9      Lightning Protection.

Paragraph 2.7.

10     Location.

To be furnished to the Contractor.

DETAILED SPECIFICATIONS

ITEM 6

LOW BAND MOBILE RADIO EQUIPMENT

1 Basic.

The Contractor shall deliver and install all solid-state mobile radio equipment equivalent to:

General Electric:	Model MC74KFS23A (MASTR II)
Motorola:	Model T73TN1190 (MICOR)
RCA:	Model MBA19-DA11 (ML 1000)

2 Channel Capacity.

Four (4) channel minimum. Frequencies will be furnished to the Contractor. Unused channels will be strapped.

3 Power Output.

100 watts minimum.

4 Tone Squelch.

None to be supplied.

5 Transmitter Control Timer.

A timer shall be furnished to limit the transmitter on time, adjustable to one (1) minute.

6 Receiver Channel Monitor.

A two-channel automatic receiver monitor with selectable priority shall be furnished. The priority channel shall be selected by the selector switch. The non-priority channel (No. 1) shall be hard-wired.

7 Power Source.

Twelve (12) volt negative ground vehicle power supply.

OPTION

8 Antenna.

A base loaded antenna equivalent to Antenna Specialists Model ASP-730 series shall be available from the Contractor.

DETAILED SPECIFICATIONS

ITEM 7

HIGH BAND MOBILE RADIO EQUIPMENT

1 Basic.

The Contractor shall deliver and install all solid-state mobile radio equipment equivalent to:

General Electric:	Model MC76KFU66A (MASTR II)
Motorola:	Model T73RTN3190K (MICOR)
RCA:	Model MBA39-DB11 (ML1000)

2 Channel Capacity.

Four (4) channel minimum. Frequencies will be furnished to the Contractor. Unused channels will be strapped.

3 Power Output.

110 watts minimum.

4 Tone Squelch.

To be furnished to the Contractor.

5 Transmitter Control Timer.

A timer shall be furnished to limit the transmitter on time, adjustable to one (1) minute.

6 Receiver Channel Monitor.

A two-channel automatic receiver monitor with selectable priority shall be furnished. The priority channel shall be selected by the selector switch. The non-priority channel (No. 1) shall be hard-wired.

7 Power Source.

Twelve (12) volt negative ground vehicle power supply.

OPTION

8 Antenna.

A 3.0 db gain antenna equivalent to Antenna Specialists Model ASPS 577 series shall be available from the Contractor.

DETAILED SPECIFICATIONS

ITEM 8

LOW BAND PORTABLE RADIO EQUIPMENT

1 Basic.

The Contractor shall furnish and deliver portable radios having hand-held, remote microphone, and vehicular charger operational capability. The units shall be equal to:

General Electric:	Model PE54KSDCX (PE Series)
Motorola:	Model H21TTN1174 (Handi Com)
RCA:	Model CPFJ1A-PNR (Personalfone Series)

2 Channels.

Four (4) channels. Frequencies will be furnished to the Contractor. Unused channels will be strapped.

3 Transmitter Power.

1.5 watts minimum.

4 Tone Coded Squelch.

None to be furnished.

5 Battery Power.

Rechargeable nickel cadmium battery. The minimum battery capacity when charged for sixteen (16) hours shall be at

least eight (8) hours of service at 25°C at a duty cycle of 5% transmit, 5% receive, and 90% standby.

6 Carrying Case.

Leather carrying case and cover for belt mounting.

7 Antenna.

Base loaded telescoping.

8 Single Unit Charger

The charger shall be equivalent to the following:

General Electric:	Model 361L1A1X
Motorola:	Model NLN8005
RCA:	Model 810-154-02

8.1 Capacity.

One (1) minimum radio or rechargeable nickel cadmium battery.

8.2 Charge Cycle.

A maximum of sixteen (16) hours to fully charge the battery and automatically switch to trickle charge.

8.3 Mechanical.

Desk top.

8.4 Power.

120 VAC.

DETAILED SPECIFICATIONS

ITEM 8A

MULTI-UNIT BATTERY CHARGER: LOW BAND PORTABLE

AC DESK TYPE

1 Basic.

The charger will be equivalent to the following:

General Electric: Model 362L1C1X

Motorola: Model NLN8205

RCA: Model 810-152-01

2 Capacity.

Minimum of four (4) Item 8 portables and/or batteries.

3 Charge Cycle.

A maximum of sixteen (16) hours to fully charge the battery and automatically switch to trickle charge.

4 Mechanical.

Desk top.

5 Power.

120 VAC.

DETAILED SPECIFICATIONS

ITEM 9

PORTABLE RADIO EQUIPMENT

1 Basic.

The Contractor shall furnish and deliver portable radios having hand-held, remote microphone, and vehicular charger operational capability. The units shall be equal to:

General Electric:	Model PE66KHWHHX
Motorola:	Model H43AAU 3180N
RCA:	Model PSNT4-LS-HH

2 Channels.

Four (4) channels. Frequencies will be furnished to the Contractor. Unused channels will be strapped.

3 Transmitter Power.

5.0 watts minimum.

4 Weight.

34 ounces or less.

5 Volume.

36 cubic inches or less.

6 Tone Coded Squelch.

Frequency to be furnished to the Contractor.

7 Battery Power.

Rechargeable nickel cadmium battery, rapid charge capability. The minimum battery capacity when charged for seven (7) hours shall be at least eight (8) hours of service at 25°C at a duty cycle of 5% transmit, 5% receive, and 90% standby.

8 Carrying Case.

Leather carrying case and cover for belt mounting.

9 Antenna.

Helical antenna.

10 Single Unit Charger.

The charger shall be equivalent to the following:

General Electric: Model 361LL1A1X

Motorola: Model NLN8005

RCA: Model 810-154-02

10.1 Capacity.

One (1) minimum radio or rechargeable nickel cadmium battery.

10.2 Charge Cycle.

A maximum of sixteen (16) hours to fully charge the battery and automatically switch to trickle charge.

10.3 Mechanical.

Desk Top.

10.4 Power.

120 VAC.

DETAILED SPECIFICATIONS

ITEM 9A

MULTI-UNIT PORTABLE BATTERY CHARGER

AC DESK TYPE

1 Basic.

The charger will be equivalent to the following:

General Electric: Model 362L3C1X

Motorola: Model NLN8989

RCA: Model MI559720-F

2 Capacity.

Minimum of ten (10) Item 9 portables and/or batteries.

3 Charge Cycle.

A maximum of seven (7) hours to fully charge the battery and automatically switch to trickle charge.

4 Mechanical.

Desk top.

5 Power.

120 VAC.

DETAILED SPECIFICATIONS

ITEM 10

LOW BAND MONITOR RECEIVER

1 Basic.

The Contractor shall furnish and deliver all solid-state low band monitor receiver equipment equivalent to the following:

General Electric: Model NS04MAS

Motorola: Model M01CNB1100

2 Channels.

One (1) minimum. Frequency in the 40 - 50 MHZ band to be furnished to the Contractor.

3 Tone Squelch.

None to be furnished.

4 Selective Call.

None to be furnished.

5 Mechanical.

Desk top.

6 Power.

120 VAC

7 Antenna.

Wire antenna with connector for attachment to rear of radio receiver.

DETAILED SPECIFICATIONS

ITEM 11

HIGH BAND MONITOR RECEIVER

1 Basic.

The Contractor shall furnish and deliver all solid-state high band monitor receiver equipment equivalent to the following:

General Electric: Model NS06MAS

Motorola: Model M03CNB1100

2 Channels.

One (1) minimum. Frequency in the 40 - 50 MHz band to be furnished to the Contractor.

3 Tone Squelch.

None to be furnished.

4 Selective Call.

None to be furnished.

5 Mechanical.

Desk top.

6 Power.

120 VAC.

7 Antenna.

Wire antenna with connector for attachment to rear of radio receiver.

**CONTINUED**

**1 OF 2**

DETAILED SPECIFICATIONS

ITEM 12

LOW BAND/HIGH BAND SCANNING MONITOR RECEIVER

1 Basic.

The Contractor shall furnish and deliver all solid-state low band/high band monitor receiver equipment equivalent to the following:

E. F. Johnson	Model 241-0390-030 "Duo-Scan" Series
Bearcat/Electra	Model BC3LH "Bearcat III" Series
SBE	Model Sentinel I Series

2 Channels.

Eight (8) minimum capable of sequential operation on any combination of low band and high band frequencies.

3 Monitor Scan.

The unit will be equipped with a scanning capability such that all channels can be scanned in sequence, or any number of channels may be disabled with the remaining active channels scanned.

4 Tone Coded Squelch.

None to be furnished.

5 Mechanical.

Accessories for both desk top and under dash in-vehicle shall be furnished.

6 Power.

Accessories for both 120 VAC and 12VDC vehicle operation shall be furnished.

7 Antenna.

Monitor antenna equivalent to Antenna Specialists Model MDN-13 with trunk lip mount, plus fifteen (15) feet minimum RG/58 transmission line and connector.

DETAILED SPECIFICATIONS

ITEM 13

MAGNETIC TAPE RECORDER

1 Basic.

The Contractor will furnish and install a dual transport tape logging system equivalent to the following:

Dictaphone: Model 4000 Series  
Magnasync/Moviola: Model 1700 Series

2 Channels.

Ten (10) channels minimum.

3 Recording Tape.

The system will be supplied with thirty-five (35) reels of recording tape as recommended by the recorder manufacturer.

4 Time Generator - Reader.

The system will have both time generator and time reader.

5 Tape Eraser.

The system will be supplied with a bulk tape eraser.

6 Head Demagnetizer.

The system will be supplied with a head demagnetizer and cleaning kit.

7 Installation.

The Contractor will install the new tape logging system and interconnect the transmitter/receiver radio channels and the emergency telephone lines as directed by the Purchaser.

8 Maintenance.

The Contractor shall furnish twelve (12) month maintenance.

9 Lightning and Surge Protection.

Paragraph 2.7.

10 Location.

To be furnished to the Contractor.

DETAILED SPECIFICATIONS

ITEM 14

SELF SUPPORTING TOWER

AND ANTENNA SYSTEM

1 Basic.

The Contractor will furnish and erect a self-supporting tower and install associated antenna system(s) equivalent to the following:

Rohn Tower

Model SSV Series

2 Wind Loading.

30 pounds per square foot (Zone A) with two (2) antennas.

3 Lightning Protection.

Paragraph 2.7.

4 Height and Location.

\_\_\_ feet as indicated in the Bid Documents.

5 Antenna.

Antenna equipment compatible with the system to be purchased by the Purchaser.

5.1 Low band antenna equivalent to Decibel Products Model DB-201.

5.2 High band antenna equivalent to Decibel Products Model DB-224.

6 Transmission Line.

Sufficient transmission line to connect the antenna(s) and the base station(s) shall be furnished.

- 6.1 Transmission line for all runs in excess of 150 feet shall be 7/8" jacketed copper foam type Andrew Model FHJ5 Heliac or equal.
- 6.2 Transmission line for all runs less than 150 feet shall be 1/2" jacketed copper foam type Andrew Model FHJ4 Heliac or equal.
- 6.3 All connectors are to be "N" type at the antenna end.
- 6.4 Stainless steel wraplock equivalent to Andrew Model 12395-1 will be used.
- 6.5 One length of jumper cable not exceeding eight feet (8') of RG8/U with one (1) UHF type connector may be used by the Contractor at the base station end of the antenna installation.

DETAILED SPECIFICATIONS

ITEM 15

GUY TOWER AND ANTENNA SYSTEM

1 Basic.

The Contractor will furnish and erect a guyed tower and associated antenna system(s) equivalent to the following:

Rohn Tower

Model 25G

2 Wind Loading.

30 pounds per square foot (Zone A) with two (2) antennas.

3 Lightning Protection.

Paragraph 2.7.

4 Height and Location.

\_\_\_\_\_ feet indicated in the Bid Documents.

5 Antenna.

Antenna equipment compatible with the system to be purchased by the Purchaser.

5.1 Low band antenna equivalent to Decibel Products Model DB-201.

5.2 High band antenna equivalent to Decibel Products Model DB-224.

6 Transmission Line.

Sufficient transmission line to connect the antenna(s) and the base station(s) shall be furnished.

- 6.1 Transmission line for all runs in excess of 150 feet shall be 7/8" jacketed copper foam type Andrew Model FHJ5 Heliax or equal.
- 6.2 Transmission line for all runs less than 150 feet shall be 1/2" jacketed copper foam type Andrew Model FHJ4 Heliax or equal.
- 6.3 All connectors are to be "N" type at the antenna end.
- 6.4 Stainless steel wraplock equivalent to Andrew Model 12395-1 will be used.
- 6.5 One length of jumper cable not exceeding eight feet (8') of RG8/U with one (1) UHF type connector may be used by the Contractor at the base station end of the antenna installation.

**END**

7 11/22/11