

LAW ENFORCEMENT ASSISTANCE ADMINISTRATION (LEAA)

POLICE TECHNICAL ASSISTANCE REPORT

SUBJECT Communications: Equipment Specifications Review

REPORT NUMBER 76-032/043

FOR Indiana Criminal Justice Planning Agency

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

CONSULTANT R. James Evans

CONTRACT NUMBER J-LEAA-002-76

DATE May 24, 1976

37625

FILE

FOREWORD

Agency requesting assistance:

Indiana Criminal Justice Planning Agency.

General statement of the problem area:

The problem confronting the Indiana Criminal Justice Planning Agency was the lack of adequate technical specifications for use in purchasing two-way radio equipment. The need for specifications has been apparent for a long period of time; however, it was not feasible or economical to add technical staff to perform this function. The present communications specialist has more than a full work load in the monthly processing of communication grant requests.

Name of consultant performing the assignment:

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## I. INTRODUCTION

The assignment was based upon the immediate need of non-restrictive radio equipment specifications. These specifications would permit the Indiana Criminal Justice Planning Agency (ICJPA) to assist the Federally funded agencies complying with Federal and State guidelines in their purchasing procedures for communications equipment. Under the present procedures the Federal guidelines were violated by having an equipment vendor supply system design criteria and specifications prior to procurement.

The Federal Procurement Guideline states:

All procurement transactions regardless of whether negotiated or advertized and without regard to dollar value shall be conducted in a manner so as to provide maximum open and free competition. (Contractors that develop or draft specifications, requirements, statements of work and/or R.F.P.'s for a proposed procurement shall be excluded from bidding or submitting a proposal to compete for the award of such procurement).

Since the I.C.J.P.A. did not have radio equipment specifications available for subgrantees, many smaller agencies found it necessary to request assistance from local vendors for system design and to provide some type of specification. Normally the specifications would be based upon the vendor's equipment and

therefore would be restrictive in nature. This procedure created problems and complaints from other vendors both to the local authorities and to the I.C.J.P.A.

The I.C.J.P.A. communications specialist has the capability of preparing specifications; however, he only works part-time and the heavy workload of communications grants that are processed each month prohibits this extra time-consuming task.

The technical requirements connected with the task of preparing non-restrictive radio system specifications were:

- a. Review of State and Federal documents for areas pertaining to the procurement of equipment.
- b. Lengthy discussions with the Communications Specialist to become acquainted with the needs and desires of the local governments and the I.C.J.P.A.
- c. Search of technical specifications of several radio equipment manufacturers in order to arrive at parameters that would be non-restrictive.

The program manager for communications at I.C.J.P.A. is Mr. Elmer Lombiotte. He was interviewed for several hours at various times during the on-site task to determine the scope of the problem and for the consultant to understand the procedures used in the state for funding and procurement.

Mr. Walter Weyland, Dpy. Director of I.C.J.P.A. was interviewed in the absence of Mr. Frank Jessup. Mr. Weyland expressed the need of non-restrictive specifications as an

important requirement to the communications funding in the State of Indiana.

## II. UNDERSTANDING THE PROBLEM

The main objective of the assignment was the preparation of radio equipment specifications that could be used by local governments for procurement on a competitive basis. To achieve the objective it was necessary to review the methods used for procurement in the State of Indiana, review the Federal and State procurement procedures and determine the items that would require specifications.

The lack of specifications appeared to affect the small cities or rural counties since they do not have technical personnel available to design their radio systems or write specifications. In these areas the vendors would assist the local governments in the above functions (Note: large agencies normally have in-house technical personnel who are capable of system design and specification preparation). When the vendor provides assistance it frequently happens that the specifications favor or are oriented toward a specific type or model of equipment, for example, mobile radio units requiring four frequency scan capability could be restrictive to some manufacturers.

There were no changes in the work plan as originally requested.

The internal and external influences can be summed up briefly as:

- a. External influence is usually created by a vendor wishing to have his client purchase his merchandise over and above any others.
- b. Internal influence on the problem was the lack of sufficient budget to hire personnel to prepare specifications. Internal influence was also created by the necessity to comply with Federal guidelines.

### III. ANALYSIS OF THE PROBLEM

The problem was analyzed after lengthy review and discussion with the Communications Project Director of the I.C.J.P.A.

The specifications were to address particular problems and regulations that are common to state and local government radio equipment purchases in Indiana. The final specifications were to be comprehensive and prepared in such a manner that the Planning Agency could separate sections for small purchases as well as large. Likewise the comprehensiveness would allow their use for large complicated systems as well as small designs.

While analyzing the problem it became apparent that the specifications should include all possible State and Federal regulations pertaining to procurement of communications equipment. The State of Indiana and the Federal guidelines were reviewed and portions used to some extent in the general sections of the specifications.

The problem of adequate time to prepare a set of comprehensive specifications was discussed and the Communications Specialist, Mr. Lambiotte, advised that technical specifications

that would be most valuable to him at this period should cover the following equipment items:

- a) Base stations, VHF frequency range
- b) Mobile radio units, VHF frequency range
- c) Portable radio units, VHF frequency range
- d) Control consoles
- e) Radio towers.

With this decision, it was possible to analyze the problem within a definite scope.

#### IV. FINDINGS AND CONCLUSIONS

The problem of vendor participation in system design and specification preparation as discussed in section II will be virtually eliminated when local government agencies use a non-restrictive specification. Some systems design will still be a necessary criteria and some assistance will be provided in this area by I.C.J.P.A. There will be a more competitive bid situation which results in lower prices for quality products.

By eliminating the vendor participation, in specification preparation the I.C.J.P.A. will be in compliance with the Federal Procurement guidelines.

## V. RECOMMENDATIONS

There were no alternatives to consider in this task.

The solution to the problem was to prepare a comprehensive non-restrictive bid specification that would cover major equipment items that were being funded presently by the Indiana Criminal Justice Planning Agency. (See attachment of completed specifications.)

The recommendations are listed below:

### 1. General

It is recommended that the specifications be used for all equipment purchases over \$2500.00 (Note: Indiana law states that purchases under \$4000.00 can be negotiated. Federal Guidelines state under \$2500.00 can be negotiated).

### 2. Specific Recommendations

- a) It is recommended that the specifications be used in a flexible manner by using only that portion that applies to the article funded in the grant.
- b) It is recommended that the entire specification be reviewed each six months to update both the general

section and the technical sections.

- c) It is recommended that major manufacturers selling equipment in the State of Indiana be provided with a copy immediately in order to determine if there are any conflicting areas. The consultant will then meet with Mr. Lambiotte in July of 1976 to review any complaints.

STATE OF INDIANA

CRIMINAL JUSTICE PLANNING AGENCY

RADIO SPECIFICATIONS

LEAA TECHNICAL ASSISTANCE PROGRAM  
ADMINISTRATED THROUGH, PUBLIC ADMINISTRATION SERVICES

PREPARED BY R.J. EVANS  
COMMUNICATIONS CONSULTANT

SPECIFICATION INDEX

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GENERAL

1.0 These specifications set forth minimum equipment standards required for a modern up-to-date radio communications system.

It is intended that an agency being funded for communications through the Indiana Criminal Justice Planning Agency will use these specifications for equipment procurement.

The specifications will be updated as manufacturers improve electronic design. All equipment items bid must be of current design and in production by the company that the vendor represents. It is the prerogative of the project director to request field tests and/or equipment samples if new designs are bid that have not been field tested.

The specifications are intended to be of a non-restrictive nature that will provide open and free competition among vendors. Only high quality radio equipment with proven field performance records will be acceptable. Distance to the nearest maintenance depot, parts availability, equipment delivery, and other factors will be considered in awarding the bid.

1A.1

SCOPE OF PROJECT

This project and the enclosed specification are designed to allow the purchase, installation, testing and warrantee of certain radio equipment items.

The following items are to be purchased:

ITEM	QUANTITY/TYPE	PAGE IDENTIFICATION
Base Station	_____	_____
Mobile Units	_____	_____
Portable Units	_____	_____

Emergency Power	_____	_____
Control Consoles	_____	_____
Control Centers	_____	_____
Tape Recorders	_____	_____
Radio Towers	_____	_____

1A.2

INSTRUCTIONS TO BIDDERS

Sealed bids will be received at the office of \_\_\_\_\_ on \_\_\_\_\_ to supply radio communications equipment and/or system for the \_\_\_\_\_ (city/county). Bids shall be in an opaque, sealed envelope unless otherwise authorized by the project director or the purchasing agent of the entity.

Prices on bids will be firm for 120 days. A minimum of thirty days will be allowed between the time that the bid request is sent to the vendors and the date that the bids are to be received.

Contracts shall be made only with responsible contractors who possess the potential ability to perform successfully under the terms and conditions of this proposed procurement. Consideration shall be given to such matters as contractor integrity, record of past performance, financial and technical resources, or accessibility to other necessary resources (from Federal Guideline Manual M1700.6, page 3-5).

Bids will be made in accordance with local bidding procedures and information contained in the Federal Guideline Manual Number M 7100.1A dated April 30, 1973 as amended (Note: vendors not familiar with these guidelines may review the document at the Indiana Criminal Justice Planning Agency, located in Indianapolis, Indiana). All vendors will comply with the Federal Guidelines.

The Federal Guidelines and Indiana State Law address the matter of competitive bidding as follows:

Adequate competition. All procurement transactions regardless of whether negotiated or advertised that exceed \$4000.00 shall be conducted in a manner so as to provide maximum open and free competition). (Contractors that develop or draft specification, requirements, statements of work and/or RFP's for a proposed procurement shall be excluded from bidding or submitting a proposal to compete for the award of such procurement).

Any vendor who plans to bid on a project may by written request obtain from the project director an interpretation on any part of the system design or the specifications. The written request must be received by the project director two weeks prior to the bid opening date. The project director's answers to the request will be to the best of his ability and he will not be held responsible for his interpretation of the specifications.

If installation is requested as part of the bid, then the vendor will state an installation date. The vendor will be responsible to the project director for installation completion.

1A.3

#### ALTERNATE PROPOSALS

An alternate bid may be submitted and will be evaluated upon its contents or merit. The prime bid will be the one that meets the specifications. The alternate bid or proposal will indicate in complete detail how it will benefit or be superior to a prime bid meeting the specifications.

1A.4

PAYMENTS TO VENDORS

Payments will be made to the vendors or contractors by the fiscal officer on the project.

The first payment will be made after the equipment has been received at the designated location. The amount of the first payment will be determined by the fiscal officer and usually is 50 to 80 percent of the invoice amount. These payments shall in no way constitute acceptance of the installation or operation of the equipment.

The final payment of all sums due the vendor or contractor shall be made within 30 days after complete installation and acceptance by the project director.

1A.5

BID BONDS AND BID SECURITY

Federal guidelines require bid bonds or bid security in certain contracts over \$100,000.00. The local purchasing agent or fiscal officer may, because of local regulations, require a bid security on contracts less than \$100,000. If so, this will be noted on the bid request.

Excerpts from federal guideline manual M1700.6, page 4-30-1 are as follows:

1. All bids shall be accompanied by one of the following forms of bidder's security:
  - a. Cash.
  - b. Cashier check made payable to the purchaser.
  - c. A certified check made payable to the purchaser.
  - d. A bidder's bond executed by a surety company authorized to do business in this state, made payable to the purchaser.

2. The security shall be in an amount equal to at least 5% of the amount bid.

3. If the contract is not awarded to the bidder, the security will be refunded within 3 days of the announcement of the award.

4. The bid bond will be returned to the successful bidder on receipt of the payment and performance bond. If the successful bidder fails to execute the contract, the amount of his security shall be forfeited to the purchaser.

1A.6

PERFORMANCE BONDS

Federal guidelines require performance bonds on certain contracts over \$100,000.00. The local purchasing agent or fiscal officer may, because of local policies or regulations, require a performance bond on contracts less than \$100,000.

The equipment and/or radio system must operate after installation to the satisfaction of the project director.

Excerpts from federal guideline manual M1700.6, page 4-31 are as follows:

1. The Contractor agrees to furnish to the governmental unit at his own expense a performance bond and a payment bond which shall become binding upon the award of the contract to the Contractor.

2. The performance bond shall be 100% of the contract amount, conditioned upon the faithful performance of the contract in accordance with the plans, specifications and terms thereof. The bond shall be solely for the purchaser.

3. The payment bond shall be fixed at 100% of the contract amount solely for the protection of claimants, as defined in paragraph 6 of this clause, supplying labor or materials to the principal Contractor or his subcontractors in the prosecution of the work provided for in the contract.

4. The bond shall be executed by a surety company authorized to do business in this state. The purchaser shall be the payee.

5. The bonds shall be filed in the purchaser's office within 7 days of the notification of the award of the contract.

6. A "Claimant" means a person having furnished labor, material or both, used or reasonably required for use, in the performance of the contract.

1A.7

INSURANCE

Any successful bidder to this project shall have approved insurance. The bidder or contractor and all subcontractors shall maintain for the life of the contract; Workman's Compensation, Public Liability, and Property Damage Insurance that will protect him from all claims which might result from operations under this contract either by his own employees or those of any subcontractor.

1A.8

CONTRACT DISPUTES AND APPEALS

The federal procurement manual M1700.6, page 6-21 covers adequately the matter of disputes that may arise during the course of a contract. It states as follows:

1. Responsibility of grantee. The grantee is the responsible authority, without recourse to LEAA regarding the settlement and satisfaction of all contractual and administrative issues arising out of procurements entered into, in support of a grant. This includes but is not limited to: disputes, claims, protests of award, source evaluation or other matters of a contractual nature.
2. Preferred method of resolution.
  - a. Most procurements are completed as planned. However, disagreements do arise from time to time. To avoid delays, the disputes procedures have been developed to adjust disagreements while work continued. This is an administrative method for resolving contract issues and is preferred over resorting directly to legal action. The preferred administrative method encourages the parties to agree to handle disputes by direct discussion or negotiation

and thus avoid this consuming and costly legal proceeding. In the event that a dispute cannot be resolved by the parties directly involved, the administrative procedure normally includes provisions for the contractor to appeal directly to a local jurisdictional body such as an Appeal Board, Arbitration Board or a Hearing Panel established in accordance with state or local policies, rules or regulations.

- b. The recourse for a contractor to settle disputes should be spelled out in a general provision in the grantee's contract.

1A.9

PERMITS AND REGULATIONS

STATE AND LOCAL

The subgrantee (project director) shall obtain all permits and licenses for use of permanent structures or roadways and right of ways for radio tower access. The contractor shall obtain all temporary permits or licenses necessary for his operation and shall comply with all laws, ordinances, rules, and regulations concerning the work assignment.

1A.10

COMPLIANCE WITH FCC, FAA  
EIA, IEEE, AND RETMA  
STANDARDS AND REGULATIONS

All contractors and their work, construction, and equipment must meet or exceed current standards and regulations as published by the Commissions or Associations:

- A. Federal Communications Commission (FCC)
- B. Federal Aviation Agency (FAA)

- C. Electronic Industries Association (EIA)
- D. Institute of Electrical and Electronic Engineers, Inc. (IEEE)
- E. Radio-Electronics-Television Manufacturing Association (RETMA)
- F. Environmental Protection Agency (EPA)

1A.11 CONTRACTOR WORK HOURS AND SAFETY STANDARDS ACT

All contractors shall abide by the Federal Act (40 USC 327-330) as stated below:

Where applicable, all contracts awarded by grantees and sub-grantees in excess of \$2,000 for construction contracts and in excess of \$2,500 for other contracts which involve the employment of mechanics or laborers shall include a provision for compliance with Sections 103 and 107 of the Contract Work Hours and Safety Standards Act (40 USC 327-330) as supplemented by Department of Labor Regulations (29 CFR, Part 5). Under Section 103 of the Act, each contractor shall be required to compute the wages of every mechanic and laborer on the basis of a standard work day of eight (8) hours and a standard work week of 40 hours. Work in excess of the standard work day or work week is permissible, provided that the worker is compensated at a rate of not less than 1½ times the basic rate of pay of all hours worked in excess of eight (8) hours in any calendar day or 40 hours in the work week. Section 107 of the Act is applicable to construction work and provides that no laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous or

dangerous to his health and safety as determined under construction, safety and health standards promulgated by the Secretary of Labor. These requirements do not apply to the purchases of supplies or materials or articles ordinarily available on the open market, or contracts for transportation or transmission of intelligence.

1A.12

EQUAL OPPORTUNITY

All vendors bidding upon these specifications shall abide with the Federal Equal Opportunity Act as explained the following excerpt from the ICJPA financial guide dated December 1, 1974 (Chapter IV, Section 20).

All contracts in excess of \$10,000 shall contain provisions to insure "Equal Employment Opportunity" for compliance with Executive Order No. 11246, as supplemented in the Department of Labor regulations (41 CFR, Part 60). Each contractor shall be required to have an affirmative action plan which declares that it does not discriminate on the basis of race, color, religion, creed, national origin, sex, or age; and which specifies goals and target dates to insure implementation of the plan. The sub-grantee shall establish procedures to insure compliance with this requirement by contractors and to insure that suspected or reported violations are promptly investigated.

1A.13

ANTI-KICK-BACK ACT

All vendors bidding upon these specifications shall abide with the Copeland "Anti-Kick-Back" Act.

A brief explanation of the Act is as follows: (from ICJPA financial guide dated December 1, 1974, Chapter IV, Section 20).

This Act provides that any contractor shall be prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public work to give up any part of the compensation to which he is entitled. The subgrantee shall report any suspected or reported violations to the Agency.

All construction contracts in excess of \$2,000.00 and other contracts in excess of \$2,500.00 shall include a provision for compliance with the Act.

1A.14                    EXAMINATION OF CONTRACTUAL RECORDS

Any successful vendor for this communications project shall agree to comply with provisions of the Federal guideline manual M1700.6, Chapter 4, Section 4, Page 4-38 relative to examination of contractual records if required. The following is an excerpt from the Federal guidelines:

All contracts awarded by grantees shall include a provision to the effect that the grantee, LEAA, and the Comptroller General of the United States, or any of their duly authorized representatives, shall have access for purpose of audit and examination to any books, documents, papers, and records of the contractor that are pertinent to the grants received under Title I. On all negotiated contracts pertinent records are deemed to include all cost estimating and actual cost data.

The contractor and the subgrantee must comply with guidelines as set forth in the National Environmental Policy Act of 1969 if applicable to the project. Excerpts from federal guideline manual M4100.1E dated January 16, 1976 states as follows:

The National Environmental Policy Act of 1969, Section 102(2)(C), (P.L. 91-190) and Guidelines issued by the Council on Environmental Quality (CEQ) require that prior to "Major Federal actions" significantly affecting the quality of the human environment an assessment of environmental consequences shall be made in the form of a (draft) environmental statement, which shall be circulated for comment by the Federal agency to Federal, State, and local agencies and the public as provided in CEQ Guidelines and then revised as needed. A final environmental statement must accompany the proposed action through LEAA's review and decision-making processes. Failure to comply with environmental clearance procedures at the time a grant application is being processed exposes LEAA and the SPA to litigation. See Guideline Manual M 4061.5, Environmental Procedures.

Actions on Which Environmental Evaluations or Environmental Impact Statements are Required:

- (1) New construction projects.
- (2) The renovation or modification of a facility which leads to an increased occupancy of more than 25 persons.
- (3) The implementation of programs involving the use of pesticides and other harmful chemicals.
- (4) The implementation of programs involving the use of microwaves or radiation.
- (5) Research and technology whose anticipated or intended future application could be expected to have a potential effect on the environment.
- (6) Other actions which require the substantial commitment of resources or trigger such a substantial commitment by another as determined by the responsible LEAA official to possibly have a significant effect on the quality of the environment.

1A.16

EQUIPMENT AND WORK WARRANTEE

All communications equipment supplied by the vendor shall have a warrantee period to be stipulated in the bid document. This period will be considered during the bid evaluation. The warrantee shall include all parts, sub-assemblies and complete assemblies and labor for repair during the period of warrantee.

The work warrantee will include all workmanship of installations, interconnections, equipment tests, and work of subcontractors.

The final acceptance of the system installation will be made by the project director or his designee. The system and all equipment must function properly and be completely installed before final acceptance.

If during the first year of operation there are excessive or repeated failures of equipment or components, the vendor shall correct the defect or replace the entire unit at no cost to the user agency.

The contractor or vendor shall warrant to the agency that all equipment supplied will meet the technical specifications, and shall be free of defects, in materials and workmanship.

When all equipment items are combined, the vendor guarantees a completely operational communications system.

1A.17

FCC LICENSE REQUIREMENT

The successful vendor shall not install or operate any transmitting equipment until all FCC licenses and FAA approval have been received. It will be the vendor's responsibility to provide radio equipment on the proper designated frequencies that are to be used by the agency.

Further, the ICJPA Policy Manual Number 424.3 contains the following statement relative to FCC licenses:

Request for base station equipment will be accompanied by a copy of the station license issued by the Federal Communications Commission (FCC).

If a change of the station license is needed or if additional frequencies are needed, a copy of the application to the FCC must accompany the grant application. If FCC action is required, the grant application will be approved with special condition that no equipment will be purchased until the frequency is licensed by the FCC.

1A.18

#### EVALUATION OF BIDS

The evaluation of bids will be made by the subgrantee personnel, which normally consists of the project director and the purchasing agent.

Communications project bids will include evaluation factors such as delivery date, bid price, bid consistent with bid request, compliance with equipment specifications, past record of vendor's company, maintenance availability and other factors that may be considered important by the project director or the purchasing director.

The following is an excerpt from the Federal guidelines Manual M1700.6, Page 3-10 relative to bid evaluation:

The fourth step is the evaluation of bids, which is the process of determining whether each offer has been submitted in conformance with the requirements of the invitation--what is offered and the contractual terms. Ordinarily, any bid that deviates in any

way from the essential requirements of the invitation will be rejected. The basic rules applied in determining deviations are whether the bidder's variance from the parameters of the invitation affects the price, quantity, delivery period or quality of the item, or the grantee's specific contract terms. Should any of these variances exist the bid must be rejected and the bidder cannot be permitted to remedy the defect in his offer. Particularly evident in this step is that no flexibility is permitted either the purchasing official or the bidder in the procurement method. Responsiveness to an IFB is an objective decision. In the evaluation step the grantee also determines the responsibility of the prospective contractor. If deemed desirable, the responsibility of a prospective contractor may be determined by a preaward survey as previously described.

1A.19

FREIGHT AND DELIVERY

The best and fastest delivery schedule shall be quoted in the vendor's bid. Each bid will reflect the point of delivery and the price indicated either as a separate item or included in equipment cost. It shall be the responsibility of the successful bidder to see that the equipment is delivered as per schedule at the designated point. If installation is requested as part of the bid the vendor will indicate a completion date.

1A.20

INSTALLATION

The installation of all equipment in this project will be performed in accordance with established standards recognized in the electronic field. Each installation worker shall be qualified for his respective trade.

When the agency desires to use their own technical personnel

for installation, the contractor shall furnish the agency with full information relative to every phase of the specific item to be installed.

When the agency installs any equipment the contractor will not be responsible for the installation; however, he will retain an equipment warrantee responsibility.

If special tools are required for certain installations, the vendor will advise the agency where the tools are available.

When installing base station equipment, control consoles, tape recorders, and etc. the agency will supply 120/240 VAC electrical power to the site or area of installation. The agency will be responsible for radio control lines or circuits to the area of installation. The agency will obtain property, rite of way, FAA and FCC permits and licenses.

The contractor or vendor will perform equipment tests, technical assistance to the agency on FAA and FCC permits if requested. The contractor will place the entire system into satisfactory operation and test all individual units to prove that they are performing according to specifications and FCC standards.

Frequency and modulation measurements will be made on all transmitters and a copy of the written record will be provided to the agency at the time of equipment tests.

1A.21

#### EQUIPMENT TESTS

The contractor or vendor will perform all equipment tests, unless otherwise noted by the requesting agency. All equipment tests on transmitters will be performed by a radio technician holding a second class radio telephone license or higher.

All tests will be performed by qualified personnel.

Examples of work in testing and adjusting may include:

1. Proper adjustment of radio tower guy wires by a qualified expert and to the tower manufacturer's specification.
2. Proper installation of coaxial cables and terminations of same on radio towers.
3. Level adjustments for proper db level on consoles and base station equipment. The person making these adjustments must be an expert in this area and able to follow technical engineering explanations supplied by the equipment manufacturer.
4. Adjustment of level controls on tape recording equipment to provide proper audio delivery without cross-talk on telephone circuits.

When the agency desires to have their own technicians install and adjust the equipment, the vendor will supply all technical information that is required to meet factory specifications and FCC rules and regulations.

The contractor will recommend the make, model and price of any special test equipment that is required to perform the necessary adjustments and tests.

1A.22

#### WORK INSPECTION

The contractor shall notify the project director when various phases of the project are completed, tested and in operation. The project director or his designee will jointly inspect the completed portions of the system.

Final inspection will be carried out in the same manner. The inspection by the project director does not indicate system acceptance.

1A.23

#### MAINTENANCE

The vendor must have available maintenance personnel within a reasonable distance from the project site. This maintenance must be available on a 24 hour basis.

Some bids may include a maintenance quote request; however, ICJPA does not fund this item.

The vendor maintenance technicians must possess FCC licenses and be able to produce high quality work in all types of modern solid state equipment.

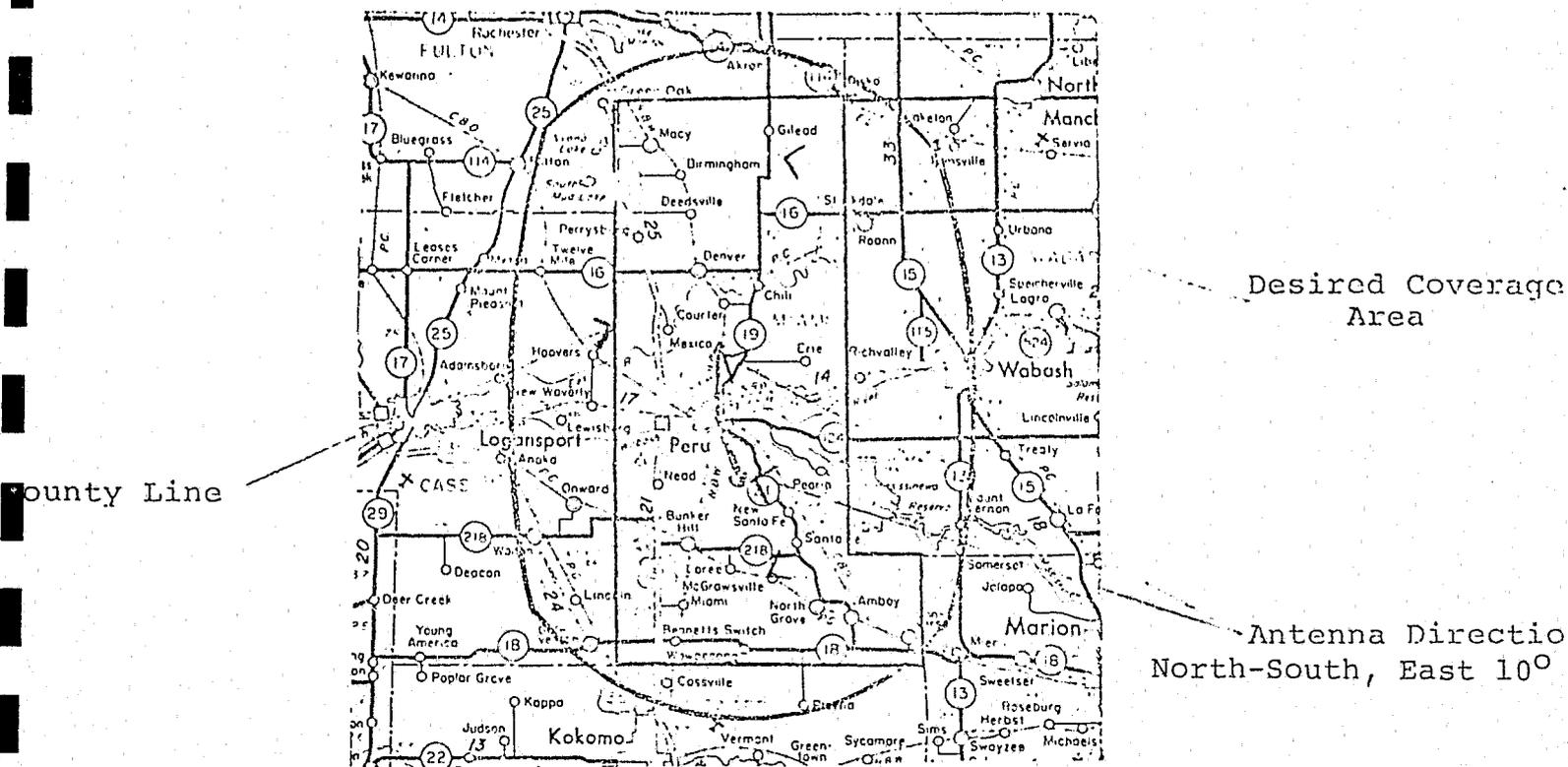
1A.24 CHART OF PROPOSED SYSTEM AND RADIO COVERAGE

If possible the agency requesting bids will provide the vendor a proposed system design chart. The chart will indicate as near as possible poor reception areas and desired areas of communications. Realizing the varied expertise available at agencies, some agencies may simply indicate the desired areas to be covered. In this case the vendors desiring to bid should recommend tower heights, antenna gain, antenna direction (if necessary) size of coaxial cable for minimum loss and transmitter output power.

Agencies with technical or engineering expertise available may indicate the design a system for the above factors and include them in the system specifications.

Simple proposed system charts are indicated on following pages:

SAMPLE CHART OR MAP  
DESIRED COMMUNICATIONS COVERAGE



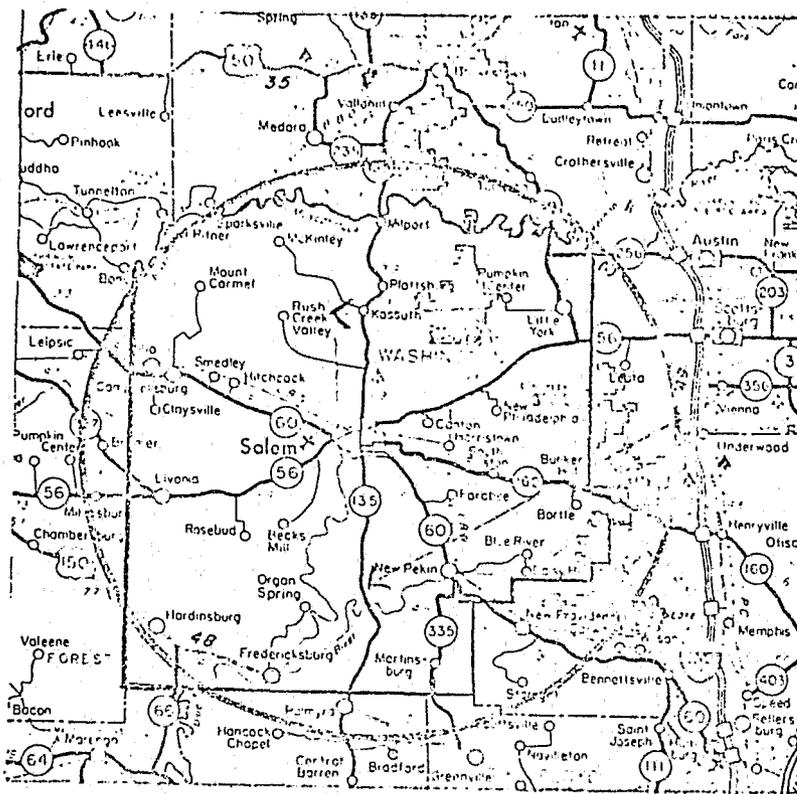
Data to be Supplied by Agency

- Proposed Location of Radio Tower
- Mean Sea Level at Location
- Latitude and Longitude
- Frequency Band to be Used
- Desired Area to Cover
- Any Difficult Terrain in Area of Operation
- Desired Type of Operation (90% F.3. Mod)?
  - Portable
  - Mobile
  - Mobile Repeater
- Any Other Pertinent Information

Data to be Considered in System Design by Vendor

- Height of Tower
- Power of Base Station
- Antenna Gain
- Antenna Direction
- Power for Mobiles
- Power for Portables
- Other Pertinent Information

SAMPLE CHART OR MAP  
DESIRED COMMUNICATIONS COVERAGE



Desired Coverage Area

Antenna Direction  
Omni

Data to be Supplied by Agency

- Proposed Location of Radio Tower
- Mean Sea Level at Location
- Latitude and Longitude
- Frequency Band to be Used
- Desired Area to Cover
- Any Difficult Terrain in Area of Operation
- Desired Type of Operation (90% F.3. Mod)?
  - Portable
  - Mobile
  - Mobile Repeater
- Any Other Pertinent Information

Data to be Considered in System Design by Vendor

- Height of Tower
- Power of Base Station
- Antenna Gain
- Antenna Direction
- Power for Mobiles
- Power for Portables
- Other Pertinent Information

The vendor will furnish prior to final acceptance of the system or equipment complete and final instruction manuals. They will include all latest revisions in the equipment and also any changes that occurred during installation and testing.

Quantity of Manuals Required

Base station	_____
Control Consoles	_____
Control Centers	_____
Mobile Units	_____
Portable Units	_____
Tape Recorders	_____
Emergency Power	_____

One manual will include all system inter-connections between consoles, base stations, tape recorder and etc. The manuals shall be 8½ x 11 inches and all pages fastened securely together. They will include complete service data and theory of operation. Information for ordering of all parts, transistors, sub-assemblies, as well as cables.

The manuals shall contain all current revisions. All equipment manufactured by sub-contractors will have manuals of equal quality and completeness.

All parts will have an identification number for ordering and will be kept in stock by the equipment manufacturer for a period to ten (10) years.

As a minimum, the instruction manual shall include:

1. Table of contents.
2. Complete parts description of each part and/or electrical sub-assembly.
3. Technical voltages, resistance, capacity of all electrical items.
4. Complete mounting instructions.
5. Schematic diagrams of all circuits.
6. Tuning instructions of all equipment capable of this action.
7. Operational block diagram and pictorial of parts location.

1A.26

TEST EQUIPMENT

The vendor or contractor shall recommend any special test equipment or tools required for maintenance of his equipment. Any special cables, plug-in electronic boards, extender boards for modules that are not supplied as a standard item with the equipment will be recommended.

1A.27

TRAINING

The vendor will provide factory training for a period of one week if the agency has their own technicians and is desirous of this need.

The training will include as a minimum basic two-way service training on the companies base stations, mobile units, portable units and control consoles and centers. The training will include as a minimum the principles of operation, alignment and tuning special circuits and use of special test equipment.

The term factory training is defined as either at the vendor's plant or at a field training session in the midwest.

2.0

BASE STATIONS VHF.

The base station radio specifications are prepared for the Indiana Criminal Justice Planning Agency for use by subgrantees using federal funding for the purchase of radio equipment.

The base station radio equipment must be, "off the shelf," meeting all FCC and EIA requirements. The past performance record will be considered in the evaluation of bids by the subgrantee and/or the funding agency.

The exact VHF radio frequencies, the transmitter output power, tone coded squelch frequencies (if required), and the number of frequencies will be noted at the time the bid document is prepared. A separate specification will be provided for radio towers, and antennas.

All upright base stations will have test meters provided for testing of major circuits in the transmitter and receiver.

Technical manuals, test microphone and speaker, will be included with each base unit.

2A.

GENERAL

Primary power-----115V.A.C., 60 Hz., single phase

Duty Cycle-----Continuous for 110 Watts and below

Circuitry-----Completely solid state

Cabinet Style-----Indoor upright style, 19" rack space.  
Height not to exceed 84 inches.

Type of modulation-----F.M.

Type of control-----Remote. 600 ohm termination.  
Tone or D.C. to be stated in bid.

Ambient temperature----- -30 to +60 degrees C.

Environmental-----10,000 feet.

2A.2

SPECIFIC DATA, Transmitter

Output impedance-----50 ohms.

Output power-----Will be stated on bid request.

FM noise----- -50 db.

Modulation-----16F3, +/-5 kHz.

Frequency stability----- +/- .0005%

Output distortion-----Less than 5%, 300 to 3000 Hz.

Audio response-----Within +1 and -3 db of 6 db per  
octave pre-emphasis 300 to 3000 Hz.

Spurious emission----- -80 db down

2A.3

SPECIFIC DATA, Receiver

Input impedance-----50 ohms

Modulation acceptance----- +/- 7 kHz.

Frequency stability----- +/- .0005 %

Sensitivity----- .35 uv. EIA 12db SINAD.

Selectivity----- -90 db, @ +/- 30 kHz.

Intermodulations----- -80 db. Min.

Spurious and Image Rejection----- -90 db. Min.

Audio output----- 5 watts.

Audio distortion----- 5% or less.

Audio response----- within +1 and -8db per octave de-  
emphasis 300 to 3000 Hz.

Hum and noise----- -40db down.

Number of receivers----- One per one frequency station, two  
for two frequency station. Remote,  
600 ohm termination.

2A.4

ADDITIONAL ITEMS FOR BID DOCUMENT

Station location----- \_\_\_\_\_

Number of frequencies----- Tx \_\_\_\_\_ Rx \_\_\_\_\_ exact.

Tone squelch----- Yes \_\_\_\_\_ No \_\_\_\_\_

Control console----- Tone \_\_\_\_\_ D.C. \_\_\_\_\_

Installation required----- Yes \_\_\_\_\_ No \_\_\_\_\_

Power output of transmitter----- \_\_\_\_\_

3.0

CONTROL CONSOLES, DESK MOUNTED

The control console must be a versatile unit for controlling a re-  
motely located base station over leased telephone lines. The unit may be  
ordered with either D.C. or tone signalling capability, depending upon the  
type of leased circuit and the terminal equipment.

The basic control unit shall be supplied for a minimum of two trans-  
mit and two receive control functions. Minimum accessories to be supplied  
are a 24 hour clock, a V.U. meter, an alert tone, and a transistorized  
dynamic microphone. Other options that are required or necessary in cer-  
tain design configurations will be stated in the bid request.

3A.1

TECHNICAL SPECIFICATIONS

Input voltage----- 115 V.A.C., 60 Hz., Single phase  
Temperature range----- -30 to +60 degrees C.  
Altitude----- 10,000 feet or less  
Distortion----- 3% or less, 300 to 3000 Hz.  
Receive audio output----- 5 watts.  
Frequency response----- +1, -3 dB, 300 to 3000 Hz.  
Compression----- With an audio increase of 30 dB beyond  
the start of compression, output level  
increases less than 3 dB.  
Termination impedance----- 600 ohms.  
Hum and noise----- -50 dB.  
Transmit audio output----- +11 dBm minimum to 600 ohm load.

4.0

RADIO TOWERS

GENERAL

All radio towers purchased by this specification shall meet the FAA, the FCC regulations and the EIA standards. All towers furnished must have a minimum 30 pound wind load factor with the required antennas installed.

4A.1

REQUIREMENTS

1. Tower painting must comply with FAA regulations.
2. Tower lighting must comply with FAA regulations. Both of the above items shall be supplied by the vendor if required.
3. A soil test shall be made by the successful vendor to determine footing specifications.



The exact VHF frequencies, number of channels to be equipped, the transmitter output power, and tone coded squelch frequencies (if required), will be noted at the time of the bid request.

The antenna and feed line will be supplied with the radio purchase. The antenna will be a quarter wave, zero gain type. If a mobile gain antenna is required it will be so stated in the bid request.

This specification requires that the vendor supply in addition to the two-way radio transmitter and receiver the antenna, microphone, cables, control head, speaker mounting hardware and instruction manual.

5A.1

GENERAL

Number of frequencies-----	Capable of four, exact number will be designated in the bid request. VHF band.
Primary power-----	12 VDC, Negative ground
Circuitry-----	Solid State design
Compliance-----	FCC and EIA current regulations
Temperature range-----	-30° to +60°C.
Type of Modulation-----	FM

5A.2

SPECIFIC DATA, TRANSMITTER

Power output-----	Will be stated in bid request.
Modulation-----	+/-5kHz, 16F3, FM
Frequency stability-----	+/- .0005%
*Frequency spread-----	2.0 kHz, full specifications

\*Vendors not meeting this requirement see Sec. 1A.3

RF impedance----- 50 ohms

Impulse noise rejection----- If required in noisy locations will  
be stated on bid request.

6.0

PORTABLE TRANSCEIVER UNIT VHF

The portable radio unit specification for transmitter/receiver combinations is prepared for the Indiana Criminal Justice Planning Agency for use by subgrantees using Federal funding for the purchase of radio equipment. The portable units must be "off the shelf" and meeting all current FCC and EIA requirements.

The equipment performance record in other agencies both in Indiana and the USA will be considered in order to provide Indiana Law Enforcement Agencies with the highest quality possible.

The exact frequencies and the number of channels to be equipped with crystals or channel units, the transmitter power output, the tone coded squelch frequencies (if required) and any other necessary information will be prescribed at the time of the bid request.

The general design of the portable unit shall be of light weight material, water, dust and shock resistant. The case shall be constructed of high impact plastic or equivalent material and be so designed to permit easy and simple battery change. Easy access to tuning adjustments and components is a basic criteria.

All portable units purchased by this specification shall have completely self contained transmitter, receiver, microphone/speaker, antenna, controls and power supply. The units must be compatible and work into the existing systems of other portables, mobiles and base units.

Accessories to be supplied will be a carrying case with belt loop and strap for "over shoulder" carrying, one nickel cadmium battery will be supplied with the unit. Chargers, extra batteries, and mobile receptacle (if required) will be stipulated in the bid request. The battery charger shall recharge the battery without damage to the battery and it shall be possible to store the battery in the charger indefinitely without damage. All batteries and chargers shall be supplied by the vendor of the portable radio and warranties shall cover all items of equipment.

External controls on the portable unit shall be:

- \*1. Frequency selector switch.
- 2. Press to talk switch.
- \*3. Tone disable (if tone squelch is used).
- \*4. Volume control.
- \*5. Squelch control.
- 6. Jack for external speaker/mike.

6A.1 USER SUPPLIED INFORMATION

The following information will be stipulated on the bid request. The vendor will price his bid according to the desired configuration.

Number of channels----- 1 to 6 Max. \_\_\_\_\_

Exact frequencies----- \_\_\_\_\_ MHZ.  
 \_\_\_\_\_ MHZ.

Power of unit Tr.----- (2 watts or 5 watts) \_\_\_\_\_

Tone squelch----- Yes \_\_\_\_\_ No \_\_\_\_\_

Spare batteries----- Yes \_\_\_\_\_ No \_\_\_\_\_ # \_\_\_\_\_

\*These controls shall be on top of unit.

Chargers----- Desk \_\_\_\_\_ Multi \_\_\_\_\_  
 Fast Chg \_\_\_\_\_ Reg chg \_\_\_\_\_

Vehicle mounting----- Yes \_\_\_\_\_ No \_\_\_\_\_

Other options----- \_\_\_\_\_

6A.2

GENERAL

Circuitry----- Solid state design

Compliance----- FCC and EIA

Temperature range----- -30 to +60 degrees C.

Type of modulation----- FM

6A.3

SPECIFIC DATA, TRANSMITTER

Power output----- 2 to 5 watts

Frequency stability----- +/- .0005%, -30 to +60 C.

Frequency spread----- .7 mHz. no degradation

Modulation----- 16F3 +/- 5 kHz.

Spurious and harmonics----- -50 dB

FM noise----- -50 dB

Audio response----- +1 and -3 dB of 6 dB/octave pre-emphasis. 300 to 3000 Hz.

Audio distortion----- 8% or less

Duty cycle----- Intermittent

R.F. impedance----- 50 ohms.

Note: In radio systems using receiver voting systems on the portable carrier frequency, the portables will be equipped with a carrier cut off timer.

6A.4

SPECIFIC DATA, RECEIVER

Channel spacing----- 30 kHz  
Sensitivity----- .35 uv. 12 dB SINAD  
Selectivity----- -80 dB  
Frequency stability----- +/- .0005%  
Spurious and image rejection----- -75 dB  
Modulation acceptance----- +/- 7.0 kHz  
Intermodulation----- -70 dB  
Audio output----- 500 milliwatts  
Audio distortion----- 5% or less  
Frequency spread----- .3 MHz. no degradation.  
R.F. impedance----- 50 ohms.

6A.5

SPECIFIC DATA, BATTERY CHARGERS

Primary power----- Stationary chargers, 115VAC, 60Hz.  
Vehicle chargers, 12 VDC.  
Environmental----- Stationary chargers, 0° to 50° C  
Vehicle chargers, -30° to +60° C  
Quick or rapid charge----- Battery to full charge, 4 hrs or less  
Regular charge----- Battery to full charge, 16 hrs or less  
Indicator lights----- One charge, one full charge. Minimum.

6A.6

SPECIFIC DATA, VEHICLE MOUNTING

A suitable mobile radio console will be provided (if requested on bid) by the vendor of the portable radio. The console shall have the following provisions, charging of the portable battery from the vehicle battery

with charge indicators, a hand-held microphone, a speaker, external antenna and coaxial lead, and a transmit indicator, the transmit power output shall be equal to or more than that of the portable. There shall be a key lock on the console that will lock the portable in position. The in-car console will be complete with mounting hardware, and complete instructions for mounting and technical maintenance. The audio output of the console will be 2.5 watts or more.

**END**

*7. 11. 1944*