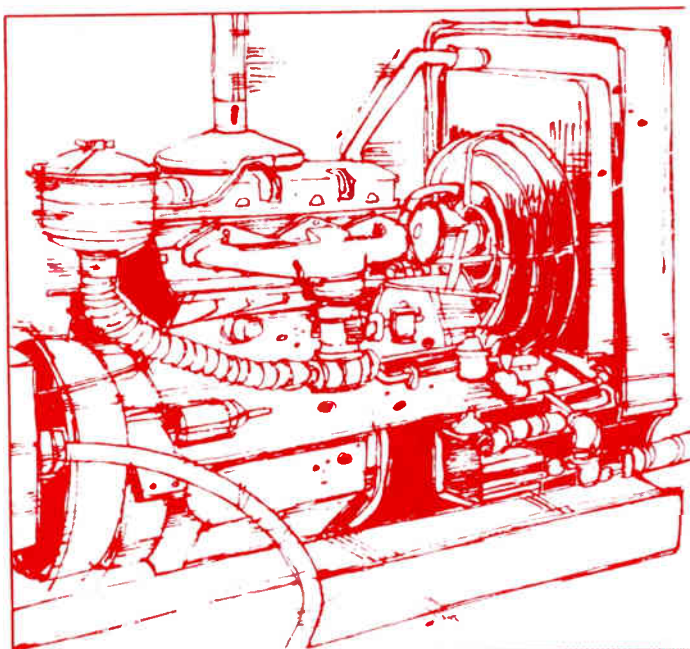
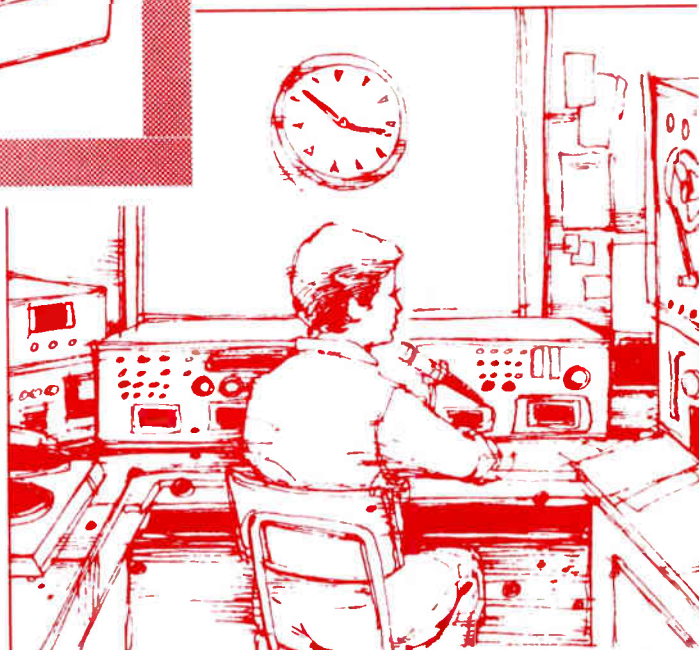


# BROADCAST STATION PROTECTION PROGRAM



EMERGENCY EQUIPMENT  
FALLOUT PROTECTION



FEDERAL EMERGENCY MANAGEMENT AGENCY



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**BROADCAST STATION PROTECTION PROGRAM**

- Emergency equipment
- Fallout protection

**FEDERAL EMERGENCY MANAGEMENT AGENCY**



## FOREWORD

The Broadcast Station Protection Program (BSPP) is designed to protect selected stations that are participants in the Emergency Broadcast System (EBS).

To assist in implementing the BSPP, an understanding of the concept of direction, control, and warning is necessary. Direction, control, and warning are essential functions of emergency preparedness and response operations. They provide the basic capacity for National, State, and local leaders to maintain control of government resources, communicate decisions to the public, and deploy assets to meet critical needs. The functions are essential to government providing the appropriate response in all major emergencies that result in saving lives, protecting property and in coordinating recovery operations.

A part of that emergency capability is the requirement for governments to provide information and instructions to the public, a function in which the Emergency Broadcast System plays a significant role. Only by protecting EBS broadcast stations and providing them with emergency equipment can governments be ensured of their ability to communicate with the public for life-saving purposes during all types of emergencies—natural, manmade, or acts of war. The BSPP has been designed to fulfill the need for communication with the public, a vital part of the Integrated Emergency Management System (IEMS) strategy.

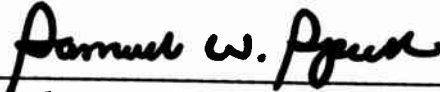
The BSPP is critical to the concept of direction, control, and warning. Each station receiving assistance under BSPP must be able to operate continuously for at least 14 days—an important factor in establishing and maintaining a total operational capability during emergencies. For these reasons, this document emphasizes the importance of broadcast stations making a commitment to the complete BSPP package, including electromagnetic pulse protection (EMP).

Station owners selected to participate arrange to supply a protected area in or adjacent to their stations and to procure with Federal funding assistance certain equipment, including an emergency generator, EMP protective devices (EMP and EBS planning are not discussed in this document, but are covered in separate publications), programming equipment, (where authorized) auxiliary remote pickup units (RPU), and if necessary, appropriate equipment to monitor or tie in to the EBS.

On satisfactory installation, the government pays the station owner's costs. Title to the shelter and EMP protective devices transfers to the station owner. Title to the generator and other equipment passes to the government. The station retains custody of the equipment under a loan agreement with the FCC. The equipment (except the RPU at the emergency operating center) may be used as needed in the owner's regular business operations.

Implementation of the program requires close coordination among the station owner and the architect-engineer; State and local emergency management officials; FEMA officials; and State and Operational (local) Area Emergency Communications Committees. In addition, the Federal Communications Commission (FCC) has worked closely with this program since its inception, and the agreement forms have been approved by the FCC.

This document is intended to help the FEMA representatives, the station owner, and the architect-engineer accomplish the desired results in a coordinated, efficient, and economical manner. A glossary is provided at the end of this document for easy reference.



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## CHAPTER I

## PRELIMINARIES

A. Purpose

The purpose of this document is to provide assistance to all persons involved in implementation of the Broadcast Station Protection Program (BSPP).

B. Selection

A station desiring to participate in the BSPP must be a participant in the EBS and must be a part of a state or local EBS operational area plan.

The BSPP selection process begins with the recommendation of the State Emergency Communications Committee and the State Emergency Management Director. No member or official of the FCC will be called on to propose a specific station for BSPP. The FCC may be asked for information regarding a station's technical facilities and coverage area. The final selection, however, rests with FEMA.

C. Participation

A station owner selected to participate in the Broadcast Station Protection Program may obtain Federal assistance for the protected area and the equipment necessary to operate for a minimum of 14 consecutive days under emergency conditions. The owner, in turn, must comply with the terms of the protected area agreement and the equipment loan agreement, both of which are discussed in Chapter II.

Partial participation may not be acceptable; that is, a station may not be permitted to provide a shelter without also agreeing to establish at least a 14-day operational capability, including an adequate emergency generator, programming facilities, EMP protection, and, if authorized, remote pickup units. The FEMA Regional Director may waive this requirement if, in his or her determination, it is in the best interest of the Federal government to do so. Ultimately, however, the total emergency operating capability must be attained.

D. Initial Conference

The purpose of the initial conference is to familiarize the station management with the BSPP.

To ensure proper coordination with all parties concerned and to give the station management first-hand knowledge of the part each agency plays in the protected area agreement, the following representatives may attend the initial conference:

1. FEMA Project Officer. The FEMA Project Officer is responsible for administering the BSPP. He or she will explain the program, answer questions, furnish copies of the agreements and instructions, and provide appropriate publications.

2. Station Owner or Licensee. The owner should be present or represented by his or her manager, chief engineer, and if possible, a member of the owner's legal staff. The manager or engineer should have full knowledge of the agreement and, if possible, should be prepared to make decisions if the owner is not present. If the owner has chosen an architect-engineer (A-E), it would be advisable, but not imperative, that he or she attend the initial conference. The architect-engineer's presence would enable the FEMA Engineer to discuss potential problems in designing or constructing the protected area. Although the FEMA Engineer is not responsible for preparing the design or supervising construction, he or she does review the plans and is responsible for bringing discrepancies to the attention of the owner. Therefore, the FEMA Engineer's advice and experience may prove valuable to the owner's A-E.

3. FEMA Engineer. During the conference, the FEMA Engineer will evaluate the site and other conditions affecting the proposed work, pointing out potential construction problems. Any station located in a questionable construction area may be eliminated before the agreement is signed. The FEMA Engineer will discuss the technical aspects of radiation shielding, if desired.

4. FEMA, State, and Local Representatives. Regional, State, and local emergency management officials should be available for expert advice on emergency management plans and how the station will fit into present and future plans. They will also be on hand to assure that preparedness objectives and policies are achieved.

5. State Emergency Communications Committee Representative (SECC). The SECC representative acts as a liaison between State emergency management officials and the broadcast licensee to establish plans for network capability, programming, interconnecting facilities, and accreditation and assignment of station personnel. If practical, the SECC representative should attend the initial conference to ensure proper coordination.

6. Operational (Local) Area Emergency Communications Committee (OAECC). The OAECC chairman will be invited to attend. The OAECC chairman acts as an advisor to the station management and to local emergency management officials.

## CHAPTER II

## THE AGREEMENTS

**A. Radio Facility Protected Area and Equipment Agreement**

The FEMA Assistance Officer will ask participating station owners to sign an agreement (Sample Radio Facility Protected Area and Equipment Agreement—Appendix A) to provide prescribed personnel protection and full operational capability for a minimum of 14 consecutive days under radioactive fallout conditions. Emergency generating equipment and facilities, emergency programming equipment, and where authorized, remote pickup units are to be procured by the station owner. FEMA will reimburse the station owner for the cost of these items, after which they become the property of the FCC. (EMP protective devices are provided by FEMA.) The station retains the equipment under terms of the loan agreement discussed in section B. Title to the shelter (protected area) and fixed air-conditioning or ventilation equipment remains with the station owner.

1. Competitive Procurement. In purchasing equipment and services, the station owner must, where possible, obtain competitive proposals from three reputable firms. The award should be made to that responsible bidder whose proposal, conforming to the invitation for bids, will be most advantageous, price and other factors considered. The owner must supply the Assistance Officer with evidence that this requirement has been met.

2. Design Costs. Shelter design costs are subject to the limitations in the protected area agreement. Such costs may be included in the low proposal or shown separately, as appropriate. Design costs may include the A-E and shelter analyst fees. Standard-design fallout shelters approved by FEMA are acceptable.

3. Government-Owned Stations. Stations owned by State and local governments or by public agencies, including colleges and universities, may construct shelters without soliciting three bids, provided the agency owning the station actually constructs the shelter using its in-house resources rather than awarding a contract to others. Where a station already has an active contract for other construction, the FEMA Assistance Officer may authorize the station owner to cover shelter construction without soliciting other bids. In either case, detailed cost estimates and records must be furnished to support the reimbursement requested.

4. Construction and Installation Time. The number of days in the agreement should be the lowest possible for the station owner to contract and perform the work in a sound and efficient manner. Normally, 180 days are sufficient, but longer periods are permitted when the Assistance Officer finds them necessary.

5. Duration of Agreement. No time is specified for the agreement to remain in force. That is intentional, since it is not possible to foresee how long the shelters will be needed. The agreement contemplates only that the station owner is to construct the shelter and install the required equipment. The station owner is, however, expected to maintain the shelter and all related emergency equipment until the need no longer exists.

**B. Equipment Loan Agreement**

The station will retain use of the emergency generating equipment and facilities, programming equipment, and remote pickup units through an equipment loan agreement negotiated between the licensee (owner) and the FCC. A sample equipment loan agreement is provided in Appendix B. The FEMA Project Officer is not a signatory, but acts as the processing agent for the FCC in these loan agreements. The original will be supplied to the FCC and will be signed by the licensee.

Only one equipment loan agreement is necessary for all equipment—including the generator, programming equipment, and the RPUs.

If equipment is located at more than one site, Section 5 of the agreement should state, "Refer to Schedule A." Schedule A should describe each site and the equipment located there.

The equipment loan agreement is not necessary if the station owner elects to provide all the required equipment at his or her own expense.

1. Emergency Generators. The generating equipment should have a 14-day minimum continuous operational capability. Adequate, but not lavish, equipment is authorized. It should be the product of a reputable firm regularly engaged in manufacturing that type of equipment.

Wiring panels, switches, etc., for connecting the generator are authorized costs.

In conformance with good maintenance practices, the generator should be operated regularly. Toward that end, it may be used as necessary for other than emergencies.

a. Shelters in Previous Years' Programs. Emergency generators are authorized for stations that have constructed or are constructing shelters under previous years' programs, subject to the following:

- (1) Emergency power is not now available; or
- (2) Available emergency power equipment is inadequate to meet the FEMA criteria in Chapter IV; or
- (3) Available emergency power is unreliable.

b. Generator Facilities. Normally, only one generator per station is authorized for Federal payment. However, if the shelter is not at the transmitter site, a second generator is permitted for operating the emergency programming equipment, RPUs, and lighting, ventilating, and cooling equipment.

FEMA policy authorizes an emergency generator large enough to permit full broadcast of assigned power plus additional capacity for lighting, cooling, and ventilating the shelter and equipment. FAA-required lighting of the broadcast station tower may be computed in the generator's capacity. Where AM and FM transmitters are co-located and can be programmed from the same shelter, the generator may be of sufficient size for both broadcasting operations.

Where the FM transmitter is not at the same site as the AM transmitter, no generator will be provided for the FM transmitter unless the FM station has been designated as an EBS Primary Relay Station, or the FM station has been designated a Common Program Control Station (CPCS-1) instead of the AM station. Designated stations already having a generator too small to meet these criteria may receive a generator under this program. The owner's generator may be relocated with government funds if it is necessary to power the required equipment.

2. Related Generator Facilities.

a. Fuel Storage Tank. A storage tank with sufficient capacity to assure fuel availability for at least 14 days is required. The piping, connections, and other items necessary to connect the fuel storage tank to the generator are considered related facilities.

The initial 14-day fuel supply is authorized for Federal payment. The station owner must maintain enough fuel for at least 14 days at all times.

b. Generator Housing. The station must include housing that will completely cover the emergency generator from weather elements and may permit short periods of maintenance under fallout conditions. Normally, the generator should not be inside the fallout shelter. If it must be, suitable soundproofing is authorized, subject to the overall cost limitations specified in the agreement.

A covered area for the owner's own generator is authorized where the generator is accessible to the shelter constructed under this program, and where the generator is required to service the fallout shelter and transmitter in an emergency.

3. Emergency Communications Equipment (RPUs).

a. The FEMA Regional Director will designate certain participating radio stations for installation of remote pickup units. These units will provide a communications link between the station (studio or transmitter) site and the EOC, also to be designated by the FEMA Regional Director. The designated station owner is normally authorized to provide one two-way RPU at the station and one at the EOC. Stations already having an RPU installation are not eligible for a second. Any exceptions, such as placing an RPU in more than one emergency operating center, must be approved by the FEMA Regional Director.

b. The equipment required for each RPU includes a transmitter, receiver, antenna, and necessary connections to existing equipment. The equipment should be suitable to carry programs of normal voice broadcast quality and should assure adequate communication between the station and the EOC. Each piece of equipment should be a product of recognized quality manufactured by a reputable firm and should conform to FEMA and FCC specifications (see Chapter V).

c. The station owner must provide the license enabling him or her to communicate on any requested frequency that has been approved for that station by the FCC. A multichannel RPU is permissible, with FEMA approval, subject to prescribed cost limitations.

d. The RPU installed at the EOC and the RPU at the radio station should be included in the station's overall equipment loan agreement. Mobile/portable RPUs may be authorized at certain emergency operating centers by the FEMA Regional Director.

e. Station owners installing RPUs must apply to the FCC for both authorization to install (construction permit) and a separate authorization to operate (license) the auxiliary radio broadcast equipment. The application, FCC Form 313 (Application for Authorization in the Auxiliary Radio Broadcast Services—Appendix C), should be filled out separately for each purpose. One set of two forms must be completed for the RPU at the radio station, and another set for the RPU at the EOC. A statement indicating the RPUs will be used as part of the EBS should be provided with the application to expedite the authorization.

f. Installation and maintenance of the RPUs are the responsibility of the radio station that filed FCC Form 313. Should that station be dropped from the program, its responsibilities will be assumed by a newly designated radio station that licenses the equipment.

g. The RPU installed at the EOC can be used only in accordance with FCC rules which limit it to transmitting EBS information or broadcasting on regular program channels as tests or checks on equipment. The licensee may also use the RPU at the radio station during the normal course of business in the interest of maintaining the equipment in top operating condition.

4. Emergency Programming Equipment. The emergency programming equipment listed below will be procured and installed by the station owner, with reimbursement by the government subject to the agreed upon cost limitations:

a. Wiring and terminal facilities for connecting shelter equipment to existing station equipment.

b. Channel mixer, control equipment, and remote amplifier.

c. Tape recorder/player.

d. Turntable, cart machine, or an additional tape recorder/player.

e. Microphone.

f. Console.

The station will retain these items through the equipment loan agreement with the FCC. The equipment should be new or carry a factory guarantee after it has been reconditioned. It should be fully serviceable and capable of performing continuously under emergency conditions. If the owner presently has programming equipment suitable for the task, he or she may install it permanently in the shelter instead of purchasing the items above. This must be done, however, at the owner's expense. In such a case, the owner retains title to the equipment and may use it in day-to-day operations.

In the interest of maintaining the equipment in top operating condition, the emergency programming equipment may be used in the normal course of operations. For example, the shelter might be utilized as a production facility for commercials or other regular taped programming.

5. Monitoring Equipment. This includes special equipment necessary for the station to monitor or tie in to the EBS system. It does not include the FM monitor and two-tone alert equipment. Where a station can monitor the EBS system, then no other moni-

toring equipment is necessary and will not be procured with Federal funds. (If an existing State system (microwave, TV, etc.) is used to activate the EBS and if additional equipment is necessary to complete tie-ins to CPCS-1 stations, funding for this equipment may be authorized by the State through the State and Local Direction, Control, and Warning Program. In that case, the equipment would become State property.)

6. Electromagnetic Pulse (EMP) Protection. Protection from electromagnetic pulse is required and must be included in the agreement. Funding for installation of EMP devices is authorized under this program (BSPP). The procurement of the devices is done by FEMA under the EMP protection program and they are provided at no cost to the stations. If the EMP work cannot be accomplished within the time agreed upon for completing the shelter and other equipment installation, the station owner must agree to allow for the installation of the EMP devices at a time convenient to the Federal government.

Existing protected stations that do not have EMP protection must agree to allow EMP protection prior to any repair or replacement of Federally provided equipment.

7. Marking for Tax Purposes. The FCC is responsible for supplying a means of marking items covered by the equipment loan agreement. To avoid possible listing as taxable property, the station owner should attach a tag or other notice in a prominent position on each piece of equipment on loan by the FCC. The tag should state that the item is owned by the Federal government and is loaned by the FCC to the station, citing the FCC equipment loan agreement number and date signed, together with the name and telephone number of the station owner or other station personnel to call for an explanation. A copy of the equipment loan agreement listing the items covered would be of value if placed adjacent to the equipment concerned.

8. Payments. The costs incurred by the station will be approved for payment by the FEMA Assistance Officer on presentation of evidence that the owner has completed the obligations under the protected area agreement unless advance payment has been authorized. Such evidence would include the normally required vendor invoices for materials and services, as well as any other documentation requested by the Assistance Officer.

Advance payments may be authorized by the FEMA Regional Director. When advance payments are to be made, the Assistance Officer should follow the policies and procedures set forth in Subpart 1-30 of both the Federal Procurement Regulations and the Federal Emergency Management Agency Procurement Regulations.

For audit purposes, stations owners should keep detailed records substantiating their costs. Interest charges are not allowable for Federal payment.

If advance payments have not been made, partial payments may be authorized when the Assistance Officer has determined that the owner has completed a separable part of the work. Partial payments will consist of full reimbursement for the separable work items, described in the succeeding paragraphs.

9. Protected Area. The government will pay the owner for protected areas up to 300 square feet. Included are: design and engineering costs, materials, construction labor, and other items related primarily to the shelter, such as lighting, wiring, and ventilation or air-conditioning, if authorized.

10. Emergency Generator. The generator and related facilities include design and engineering costs, equipment, material, labor on the foundation for the generator, and the generator itself, complete with housing, fuel and fuel storage tank, piping, electrical wiring, and switches.

11. Remote Pickup Units. The government will pay the costs of each two-way RPU, including antenna, cable, tower (where required), and installation parts and labor.

12. Programming Equipment. The government will pay for the programming equipment listed in Chapter VI. The owner must furnish any other equipment at his or her own expense.

13. Used Equipment. In addition to new equipment, payment will be made for used (reconditioned) programming equipment, provided it is in good working condition and of suitable quality. The government will not reimburse the owner for electing to install existing programming equipment in the shelter.

14. Insuring Against Vandalism and Loss. The government will not pay for insurance. If the owner adds the loan items to the insurance policy covering the station's other equipment, the extra expense should be nominal. In any event, the owner should take reasonable precaution to prevent damage to and loss or theft of the equipment.

If vandalism or loss occurs while the construction program is active, the owner should contact the FEMA Project Officer and payment will be made from the construction funds provided the loss is not covered by the station or contractor's insurance. If construction has been completed and the Assistance Officer is no longer involved, the station owner's point of contact will be the FCC, since it holds the lease agreement. Any actions by FEMA to replace equipment will depend on FCC investigation and funding availability.

15. Tests/Exercises. The owner must agree to test the RPU communications link with the applicable State or local EOC prior to receiving final payment. In addition, the owner must agree to test at least once a month in addition to participating in exercises with the applicable State or local government at least once annually. The purpose of these exercises is to test communications between the station and the applicable government and to cause the development or improvement of emergency procedures necessary for the saving of lives and the protection of property. As such, these exercises can be a valuable service to the local community.

Appendices D through G provide a series of checklists outlining conditions that must be met before payment can be authorized. The station owner will find a similar list of requirements in Appendix H.



## CHAPTER III

## THE SHELTER

The owner's architect-engineer is responsible for preparing shelter plans and specifications. The FEMA Project Officer will review and approve the plans and specifications, including dimensions, suitability, habitability, and adherence to FEMA criteria. FEMA approval will not extend to structural adequacy or to conformance with building codes. Potential problems or discrepancies noted by FEMA will be brought to the attention of the owner and the A-E.

The owner is responsible for the adequacy of structural features and equipment in accordance with FEMA requirements. The owner is also responsible for technical and FCC license considerations.

If the station owner is unsure about how to perform responsibilities under the agreement, FEMA should be contacted for general advice and suggestions. Those will normally cover the procedures for obtaining an A-E, procuring competitive bids for construction and equipment, awarding contracts, etc. FEMA will also furnish, on request, the names and addresses of certified shelter analysts and designers, or A-E firms with qualified shelter analysts on their staffs.

A. Architectural Considerations

Broadcasting essential information to the public under radioactive fallout conditions constitutes the basic reason for the protected area. The equipment layout and floor plan must reflect the importance of that task.

A minimum floor area of 150 square feet is required and a maximum of 300 square feet is authorized, as is a minimum ceiling height of 7 feet. The structural design must conform with local building codes. The protected area must be fire-resistant and removed from fire hazards.

The interior should be as utilitarian as possible to be in keeping with other portions of the structure or adjacent structures. Special acoustical treatment on the ceiling and walls is not authorized except when the generator is located inside the shelter. Normally, however, generators should not be inside the shelter. Support facilities for personnel in the protected area are to be austere, but habitable. Living and working conditions should enable personnel to function effectively for at least 14 days under radioactive fallout conditions.

B. Shelter Analysis

To economically incorporate radiation protection into a building, shielding principles must be considered in the planning phase. A great deal has been written about the nature of gamma radiation and the shielding principles used to protect against it. For example, entranceways must be designed to prevent the infiltration of radioactive fallout particles; geometric or barrier shielding should be applied to minimize the danger of gamma radiation leaking through structural openings. Filters, plenum chambers, or other areas where radioactive particles can accumulate in or adjacent to the shelter area must be properly shielded as well.

A certified shelter analyst must review and approve the plans for shelter construction or modification. Using FEMA-approved methods, the analyst should compute the protection factor, including in the calculations the radiation dose coming from entranceways, ventilation ducts, or other openings. The minimum required protection factor is 100 in all parts of the shelter. However, nothing prevents the station owner from exceeding that minimum, providing he or she pays the extra costs.

Once the shelter analyst approves the plans, certification should be placed on the first sheet of the set of drawings, and should contain the following statement:

"The designated fallout shelter area is clearly identified and meets current requirements as established by FEMA, Washington, D.C."

It should also show the following information:

1. Shelter area.
2. Protection factor.
3. Date.
4. FEMA certificate serial number of shelter analyst.
5. Signature.
6. Name of certificate holder.

### C. Technical Provisions

1. Site Selection. The station owner makes the final determination (after consulting with FEMA) about the location of the shelter. It can be constructed at either the studio or the transmitter. The transmitter is recommended because a studio location requires a generator for both sites if they are widely separated.

Many factors enter into selection of the most appropriate shelter location. Some of these factors are whether the site is owned or leased; its day-to-day use; operability (phone, newswire, 2-tone capability, etc.); enhanced capability (capability of simulcasting owner AM and FM, etc.); and utilization for peacetime emergencies.

The protected area should not be located near hazardous utility lines, such as steam or gas, unless the hazards can be eliminated before the shelter is occupied.

If the shelter will be constructed on premises owned by others, the station owner must obtain written permission from the building owner. In general, FEMA desires that a five-year lease be in effect before an agreement is signed. However, where such a lease is not in effect, each case will be judged on its merits. For example, if the building owner has previously allowed only a two-year lease, but has consistently renewed that lease over the years, and if there is no reasonable doubt that the lease will be further renewed, the Assistance Officer may sign the agreement. The criterion in such cases is the obvious intent of the parties concerned.

2. Structural Planning. In general, conventional design and construction methods for concrete, wood, steel, brick, structural tile, and other products will be followed. The engineer's objective is to provide the required fallout protection (minimum PF 100) and as much "bonus" thermal and low-level blast protection as possible within the funding limitations.

The ideal situation is to place the programming area in an existing building that already has a PF of 100 or over. If the existing structure does not meet PF 100, the first consideration should be to reduce the radiation contribution by geometric variation. However, adding mass to an existing building is a difficult and expensive proposition. If the station is planning to construct a new transmitter facility some time in the future, it may be more practical and economical to wait until the shelter can be incorporated into the design of the new building (see Chapter VII).

Separate shelters generally cost more than those in new or existing buildings. The separate underground shelter presents structural problems relative to wall and roof loads. Further, the underground shelter is difficult to keep dry where the water table is high. In areas with high ground water, consideration should be given to aboveground shelters or provisions made to prevent shelter flotation. If the shelter site is in the 100-year floodplain, the shelter should be elevated above the 100-year flood level or be designed with dry floodproofing features.

The engineer must analyze all the possibilities and arrive at the best plan, considering use, PF, and cost.

3. Ventilation. In general, much more fresh air will be available to the operating personnel than would be required for survival shelters. The shelter should have a ventilation rate sufficient to maintain a daily average effective temperature of not more than 82°F for at least 90 percent of the year (see FEMA Technical Regulation 87). If the shelter is not naturally ventilated, at least three cubic feet per minute of fresh air must be provided per person sheltered.

If the protected area is within a larger structure whose ventilation system is otherwise utilized, more attention must be given to meeting the minimum requirements for the shelter. Often the ductwork of the central fan system can be modified to serve the shelter by dampering off or bypassing sections not required under emergency conditions.

In some cases, it may be necessary to augment the ventilation rate with outside air for cooling equipment, controlling high relative humidities in the shelter, and reducing condensation on interior surfaces below the dew point temperature. When the shelter or intake duct is underground, the calculation of cooling requirements should allow for the conductive effect of the surrounding earth.

Keeping the shelter under a slight positive pressure, on the order of 1/4 inch of water, will help prevent infiltration of dust, toxic agents, or combustion gases. It would also be desirable to supply the air under enough pressure that it will exhaust through the engine generator room to the outside.

During the period of fallout, many of the descending particles can be prevented from entering the ventilation system by placing intake openings at least two feet above any surface (including snow) that might collect fallout, and by designing the intake so that the air turns through at least 90 degrees and enters in an upward direction at a low velocity, so that particles will tend to drop out. A system of baffles and settling

chamber in the intake duct is also a feasible method of excluding the large particles of early fallout from the air supply. Fresh air filters in the intake fixture are desirable, but not required. If filters are located in the building, shielding walls are required between the filter room and any occupied shelter space to protect the occupants from radiation collected in the filters. FEMA Technical Memorandum 71-1 provides design considerations for fallout shelter ventilating air intake systems.

Filtered fresh air supplied to the shelter may vary from a minimum in winter to 100 percent in summer, with corresponding variations in the amount of recirculated air. Fresh air fans and recirculating air fans should have the capacity and flexibility to adjust to these different requirements. Although positive displacement rotary blowers have a more constant delivery under varying static pressures, cost considerations usually favor centrifugal fans. The quantity of air delivered by a centrifugal fan at a given speed decreases as system resistance increases, but that effect can be corrected by variable inlet vanes, adjustable dampers, or a multispeed drive.

4. Heating, Air-Conditioning, and Humidifying or Dehumidifying Equipment. The protected area will not be as crowded as a public shelter. The two or three people staffing the area will not generate enough heat in a cold climate. As a result, it may be advisable either to tie into the heating system of the existing building or to provide an emergency heat and humidifying source. Open flame heat sources should not be used because of the fire hazard, oxygen depletion, and build up of carbon monoxide. Electric resistance heating or heat recovery from the cooling system of an engine generator may be used.

In areas of high summer heat and humidity, additional ventilation alone may not meet the prolonged occupancy and equipment operation requirements. The Project Officer may, in such cases, authorize an air-conditioning unit of up to one ton instead of the prescribed ventilation equipment. The capacity of the required emergency generator may be increased to provide for that unit. Larger air-conditioning units are subject to the FEMA Regional Director's approval.

If the shelter is in an area similar to the hot, dry climate of the California desert or the tropical climate of Puerto Rico, where all the stations are air-conditioned, it may be feasible to extend ducts into the protected area if it is adjacent to the air-conditioned building. If duct extension is not possible, a separate unit will be necessary. In either case, a large generator may be required to pull the extra load.

Air-conditioning or ventilation equipment installed in the shelter is considered part of the shelter and becomes the property of the owner after the government pays the costs specified in the agreement.

5. Lighting. Proper lighting is essential for efficient operation. The lighting intensity level recommended is 20 footcandles at the working level in those portions of the shelter used for operating purposes. An emergency battery-operated light should be provided for use during the period between the failure of commercial power and the starting of emergency power by manual or other approved means.

The lighting furnished for the shelter and generator is subject to the overall cost limitations in the agreement.

#### D. Special Requirements

1. Cutting Ground Radials. If it is necessary to cut ground radials for the construction of the protected area or fuel tanks, the owner must request permission from the Mass Media Bureau, Federal Communications Commission, Washington, D.C. 20554. The station owner remains responsible at all times for compliance with the terms of the FCC licenses.

2. Fire Resistance. In general, the shelter should be designed to minimize the danger of fire from both external and internal sources. The structural components of the shelter should, if feasible, have a fire resistance rating of at least one hour.

Flammable liquids or open flame devices should not be permitted in the shelter for cooking or any other purpose. Not only is an open flame a possible fire hazard, it is also a source of carbon monoxide.

Fire protection equipment should be provided, at the owner's expense, based on the requirements of state and local building and fire prevention codes modified by the restrictions imposed by continuous occupancy of a confined space and the specific purpose of the protected area. All equipment should be approved by Factory Mutual Laboratories, Underwriters Laboratories, or any other nationally recognized testing firm.

3. Foundation Problems. Soil differences account for the major variation in shelter costs. Wall and roof mass requirements increase loads on the footings far more than normal. It is, therefore, important to carefully analyze the bearing capacity and behavior of the soil before preparing the drawings and specifications.

If piling must be resorted to, existing data from structures in the immediate area should be used. In rare instances, and subject to FEMA approval, a complete soil analysis may be made and/or test piles driven and loaded to failure, the results being used in the final design.

4. Moisture in Shelters. During standby or unoccupied periods, moisture control may be necessary. If the shelter is located in an area with a high water table, complete waterproofing may be required.

As in all facilities involving long unoccupied periods without lighting or other heat sources, mildewing and other moisture effects are likely to occur. Conventional methods--such as dehumidifiers, silica gel, calcium chloride, etc.--can be used to control the standby environment. Funding for these items will be based on a case by case examination.

In a moderate climatic region, water condensation usually takes place during the initial phase of shelter occupancy while the wall temperature is relatively low. Whenever the dew point of the room air exceeds the wall or ceiling temperature, condensation will occur. Computer studies and shelter tests have shown this more likely during the summer. Under certain conditions, particularly in the absence of thick overburden, it may also happen in the winter. The tendency to condensation will be most pronounced in areas where the outside air dew point is high and the ground temperature is low.

### E. Habitability

FEMA would like the emergency broadcasting stations to be stocked with survival supplies. However, the government will not reimburse the owner for those supplies.

1. Water. The operating personnel should be supplied with as generous an amount of water as the situation permits. A minimum of three and one half gallons of potable water for each occupant should be available. In addition, it is highly desirable to have extra water for hygienic purposes. This amount must be furnished either from sources available to the shelter (trapped water) or from water storage containers.

2. Food. The basic food ration should furnish 10,000 calories per shelter space. This ration is adequate for the minimum 14-day period under relatively sedentary conditions. However, the special nutritional requirements of the operating personnel should be considered in the number of calories required and the selection of foods.

3. Sanitation. If the operating personnel have access to a toilet through a shielded adjacent area, it should be used as long as it is available during an emergency. An alternate emergency means must be provided in the absence of such equipment.

4. Radiation Detection. Every radio station in the program should have a radiological monitoring capability. Radiological instruments and information on training can be obtained from State emergency management organizations.

Dosimeters with chargers are available so shelter personnel can measure accumulated radiation exposure doses. This is particularly important when the operator must service the generator, thereby being exposed to radiation for brief periods. Provisions should be made so an estimated outside reading can be taken from inside the shelter.

### F. Tax Assessment

The case could arise where a local government assesses the shelter as an improvement, thus increasing the station's tax bill. If that occurs, the owner should seek the aid of the FEMA Project Officer and the local Emergency Program Manager in contacting the head of the local government or appropriate tax official and explaining the program in an effort to rectify the situation. Project Officers encountering this situation should immediately advise the FEMA Regional Director and the State Emergency Management Director.

## CHAPTER IV

## EMERGENCY GENERATORS AND RELATED FACILITIES

A. Emergency Generators

The FEMA Broadcast Station Protection Program authorizes emergency generators, fuel storage tanks, and other related facilities. The generating equipment should be able to support the required minimum 14-day operational capability. Adequate, but not lavish, equipment is authorized. No manufacturers are recommended; however, the equipment should be the product of a reputable firm regularly engaged in its manufacture.

New generators are desired except where existing generators are in place and can be modified if that is more economical. Such modifications might include installing larger fuel tanks, wiring, switches, voltage regulators, and moving the generator and other equipment. They do not include overhauling or repairing the owner's generator. The government pays for modifications without taking title to the generator. However, any related equipment added—such as tanks, switchgear, etc.—remain the property of the government and should be listed on the equipment loan agreement. The decision about whether the required work is a modification or a repair is left to the FEMA Project Officer.

Generators should provide sufficient power for broadcast operations, minimum lighting, and ventilation for shelter personnel and for cooling the operating equipment. In other words, the generator should be large enough to power the full licensed output of the transmitter. Where the AM and FM transmitters are located together, the generator should be able to service both.

A second generator is authorized where the shelter is not located at the transmitter site. The second generator should be capable of supporting both FM and AM facilities necessary for broadcasting.

1. Types. The relative merits of gasoline, diesel, and liquefied petroleum gas driven engines should be carefully considered. This program is austere, and low initial cost is important. Nevertheless, local code requirements, ease of maintenance, dependability, safety of operation, and storage characteristics of the various fuels must also be considered and may prove to be of overriding importance. (See Tables 1 and 2 for advantages and disadvantages of emergency generator engines, by fuel types, eligible under this program.)

Gasoline engine generators have a smaller initial cost than diesel units. Diesel engine generators have a heavier flywheel and drive shaft than gasoline units, resulting in greater ability to absorb load changes. Diesel engines are cheaper to operate than gasoline engines. The installation of a diesel engine does not require treating the space as a hazardous area. The exhaust gas temperature is several hundred degrees Fahrenheit lower than that of a gasoline engine, minimizing the problems of installing exhaust piping.

2. Starting Devices. If a second generator is required at the transmitter site, automatic starting is permitted, such that the generator will start itself when a drop of line voltage from commercial sources occurs. The equipment is not authorized if the

remote transmitter is attended. "NO INTERRUPTION" automatic starting is not authorized for payment, nor are expensive, elaborate load transfer devices.

3. Auxiliary and Control Equipment. Figure 1 schematically shows a suggested arrangement of the generator control system.

The following auxiliary and control equipment may be included in the protected area agreement:

- a. Running time meter.
- b. AC ammeter.
- c. AC voltmeter.
- d. Frequency meter (vibrating reed).
- e. DC ammeter.
- f. Generator set remote control unit.
- g. Miscellaneous wiring associated with the above items.

## B. Fuel Storage

1. Fuel Requirements. Engine suppliers usually specify one or more commercially available fuels for use in their engines. When fresh, those fuels will have a tolerable gum content, acceptable octane or cetane rating, and a vapor pressure adjusted for warm or cold weather use. Each type of engine has its own fuel requirements. The engine generator manufacturer should be consulted regarding fuel requirements. The following is general information regarding the two basic engines.

a. Compression-Ignition Engines. Fuel for a compression-ignition engine should meet the following standards: cetane rating, vaporization characteristics, sulphur content, corrosion properties, gum content, and carbon residue. Cetane rating is an indication of the ignition quality of the fuel. An adequate cetane rating is necessary for the engine to deliver full power. The cetane ratings of commercial diesel fuels vary widely. Ratings between 40 and 60 are acceptable for most diesel engines. Fuels with values below 40 cause engine smoking and power loss. The engine manufacturer should be consulted regarding exact fuel requirements.

b. Spark-Ignition Engines. Fuel for a spark-ignition engine should meet standards for octane rating, gum content, sulphur content, corrosion properties, and vaporization characteristics. The octane rating of a spark-ignition engine fuel is a measure of anti-knock characteristics. As a rule, an engine's octane requirements increase with load. Therefore, the fuel in storage must retain an octane rating suitable for full-load operation.

Operation of the spark-ignition engine requires that the fuel be vaporized before entering the combustion chamber. As a result, any nonvolatile constituents, such as dissolved gums, are largely dropped out in the carburetor, along the intake manifold, and on the intake valves and ports.



**TABLE 1  
ADVANTAGES OF EMERGENCY GENERATOR ENGINES, BY FUEL TYPES,  
ELIGIBLE UNDER THIS PROGRAM**

Gasoline	TYPE OF FUEL	
	Diesel	LPG*
<b>ADVANTAGES</b>		
1. Liquid, easily transported.	1. Liquid, easily transported.	1. Freely available.
2. Relatively cheaper engine, wide use, and familiarity.	2. 138,500 BTU/gallon.	2. Average BTU 3200/CF. Plant will deliver full rated output.
3. Fuel readily available.	3. Readily available.	3. Mixes readily with air. More complete combustion.
4. Wide availability of repair skills, tools, and "know-how."	4. Less fuel required.	4. No lead. Therefore, no engine deposits.
5. Lower initial cost.	5. Requires less servicing.	5. Cleaner running.
6. Easier to start under most conditions.	6. Twice the engine life of a gasoline engine.	6. Less service.
7. 115,000 BTU/gallon.		7. Longer engine life.
8. More suitable for portable power.		8. Fewer corrosive acids formed.
		9. Portable in smaller tanks or bottles.
		10. No deterioration in storage.

\*Liquefied petroleum gas.

**TABLE 2  
DISADVANTAGES OF EMERGENCY GENERATOR ENGINES, BY FUEL TYPES,  
ELIGIBLE UNDER THIS PROGRAM**

Gasoline	TYPE OF FUEL	
	Diesel	LPG*
<b>DISADVANTAGES</b>		
1. Volatile and flammable. Many code restrictions on storage.	1. Highest initial cost in low kilowatt range.	1. Regulators required to reduce storage pressure.
2. Requires more frequent servicing and maintenance due to constant speed operations.	2. Harder to start.	2. Less widespread maintenance skills.
3. Contains lead. Engine deposits.	3. Servicing must be done by trained diesel technician.	
4. Forms gum in tanks during long storage.	4. Much heavier construction.	
5. Exhaust temperatures are high. Heat exhaust problems.	5. Forms sludge in tanks during long storage.	

\*Liquefied petroleum gas.

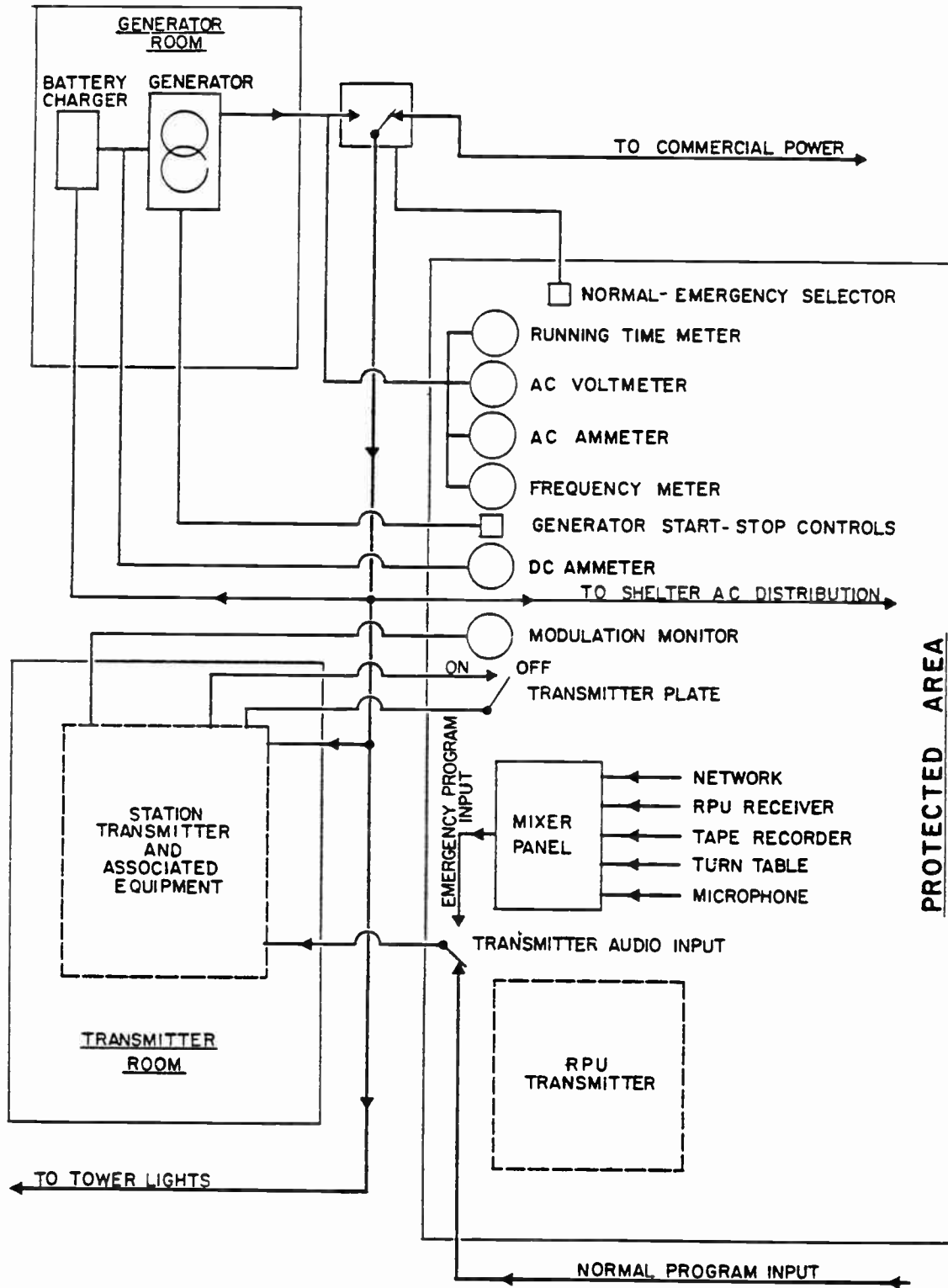


FIGURE 1. SUGGESTED ONE LINE DIAGRAM OF CONTROL SYSTEM

The petroleum fuels used in spark-ignition engines are gasoline and liquefied petroleum gas (LPG). Spark-ignition engines specifically designed to operate on LPG are available. Also, gasoline engines may be modified, with commercially available kits, for LPG operation. However, most kits do not change the octane requirements of the engine. Consequently, the gasoline engine modified for LPG operation cannot derive maximum benefits from the higher octane qualities of LPG.

A critical factor affecting the reliability of gasoline powered emergency standby equipment is gum formation in the carburetor jets during idle time. When an engine is not operating, slow fuel evaporation from the carburetor jets and the float chamber results in gum deposits at the point of evaporation. That is one reason weekly exercising of gasoline engines is frequently recommended. For longer periods of nonuse, the fuel should be removed from the carburetor.

2. Tank Capacity. To arrive at the storage requirements for a minimum of 14 days of continuous operation, the fuel consumption of the generator must be known. Table 3 shows fuel requirements for various generator sizes.

3. Storage Techniques. Many techniques are available to the A-E for storing liquid fuels. The most applicable techniques will be discussed here. In selecting a storage technique, the important considerations are: preventing deterioration, preserving combustion qualities, and meeting the requirements imposed by State and local fire and safety regulations. Regarding the latter, it is reasonable to expect that in some instances it will be necessary to obtain special permission to use the most satisfactory storage system.

Two basically different fuel storage techniques may be followed: active storage and long-term storage. In an active fuel storage program, a fuel would be replaced or replenished at regular intervals, and the storage tank requirements would be relatively unimportant. In a long-term storage program, the storage system should be designed to preserve the fuel for the longest possible time, and the fuel quality should be checked regularly so the first signs of deterioration can be detected before there is serious degradation of fuel qualities. Table 4 looks at several preventive procedures that might be used. The intervals between inspection and replacement would vary with the type and quality of the fuel, as well as the storage conditions.

Table 5 shows the approximate life for various fuels under different storage conditions. The values shown were arrived at by analyzing storage life data and opinions from a large number of organizations concerned with fuel storage. Unfortunately, not much research has been done on the problem. As a result, storage practices vary widely and tend to be conservative relative to opinions of maximum storage life. In view of the uncertainties regarding storage life and the many variables involved, the estimates given in Table 5 may be off by as much as 50 percent for any specific situation.

4. Underground Tank and Fuel Lines. The station owner contemplating installation of an underground tank should consult the tank manufacturer or a nearby petroleum company for suggestions. The tank should be protected against electrolytic action. If it is installed in wet soil, the tank must be prevented from surfacing when empty. Fill pipes and vent lines must be installed in accordance with safety regulations. Supply lines to the engine should be placed in conduits to shield them from damage. All tank and fuel line costs are paid under the protected area agreement.

TABLE 3  
FUEL REQUIREMENTS FOR 14-DAY (336-HR) OPERATION

## FUEL STORAGE

SIZE GEN KW	PROPANE FUEL STORAGE TANK				GASOLINE FUEL STORAGE TANK				DIESEL FUEL STORAGE TANK			
	GAL REQD	CAPAC GAL	DIAM	LGT	GAL REQD	CAPAC GAL	DIAM	LGT	GAL REQD	CAPAC GAL	DIAM	LGT
.5	100	250	30"	7'4"	71	110	26"	4'				
.75	110	250	30"	7'4"	78	110	26"	4'				
1.0	140	250	30"	7'4"	98	110	26"	4'				
2.0	200	250	30"	7'4"	141	285	38"	5'				
3.0	...	...	...	...	...	...	...	...	121	285	38"	5'
3.5	330	500	37"	10'0"	225	285	38"	5'	...	...	...	...
5.0	350	500	37"	10'0"	250	285	38"	5'	...	...	...	...
6.0	...	...	...	...	...	...	...	...	242	285	38"	5'
7.5	500	1,000	41"	16'0"	352	550	48"	6'	...	...	...	...
10.0	710	1,000	41"	16'0"	505	550	48"	6'	370	550	48"	6'
15.0	1,060	1,750	48"	20'0"	860	1,000	48"	11'	555	550	48"	6'
25.0					1,180	2,000	64"	12'	804	1,000	48"	11'
40.0					2,000	2,000	64"	12'	1,115	2,000	64"	12'
60.0					2,660	3,000	64"	18'	2,000	2,000	64"	12'
75.0					3,300	4,000	64"	24'	2,000	2,000	64"	12'
100.0					5,900	6,000	72"	29'	3,000	3,000	64"	18'
125.0									4,250	5,000	72"	24'
150.0									4,750	5,000	72"	24'
175.0									5,000	5,000	72"	24'
200.0									5,860	6,000	72"	29'
230.0									6,750	8,000	96"	22'
275.0									7,700	8,000	96"	22'
335.0									9,400	10,000	96"	27'

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**TABLE 4  
FUEL DETERIORATION PREVENTATIVE PROCEDURES, BY FUEL TYPES**

GASOLINE	DIESEL	LIQUEFIED PETROLEUM GAS
Freshen up every six months with a minimum of 15% fresh fuel.	Fuel to be stored should be mixed as follows: 80% No. 2 20% No. 1 The above mixture will minimize moisture problems. In addition, freshen up every 6 months by adding 20-25% of No. 1 diesel fuel.	No deterioration. May be stored indefinitely.

**TABLE 5  
ESTIMATED STORAGE LIFE OF REPRESENTATIVE FUELS**

FUEL	ABOVEGROUND VENTED TANK (a)	UNDERGROUND VENTED TANK (b)	UNDERGROUND SEALED TANK (b)	UNDERGROUND SEALED TANK WITH POSITIVE NITROGEN PRESSURE (b)
Commercial gasoline (about 90 octane) (c,d)	3 months	6 months	1 year	15 years
Straight-run gasoline (about 90 octane) (c,d)	1 year	2 years	5 years	8 years
Straight-run kerosene (d)	3 years	5 years	8 years	8 years
Premium-grade No. 2 diesel fuel (d)	1 year	3 years	4 years	5 years
Liquefied petroleum gas (LPG) (e)	...	...	10 years +	...

- (a) It is assumed that the fuel temperature varies from 20° F to 100° F throughout the year, and that the amount of fuel stored is at least 500 gallons.
- (b) It is assumed that the fuel temperature varies from 40° F to 80° F throughout the year and that the amount of fuel stored is at least 500 gallons.
- (c) Commercial gasoline denotes the typical service station regular-grade product. It is assumed that any commercially available additives that improve storage life will be added to the fuel.
- (d) It is assumed that for cold starting, the operator manually sprays ether aerosol into the air intake. That is, the fuel is not considered useless on the basis of poor cold starting due to the loss of the lower-boiling-point components.
- (e) In all instances, LPG is stored in a sealed tank.

5. Special Tank Protection. Where soil conditions will not permit an underground tank, a security fence may be necessary to protect an aboveground tank from thieves. In some sparsely populated rural areas, it may be necessary to use an earth cover or a concrete revetment to safeguard against hunters and vandals shooting holes in the tank.

C. Generator Housing

The generator shelters do not need to be heavily shielded since extensive maintenance or protracted refueling activities requiring long exposure of personnel should not be necessary, particularly in the early portion of the minimum 14-day period. The exceptions are in areas of extreme climate; for example, in the desert area of California, the generator must be adequately protected from sand blown by high winds. Tables 6 and 7 present recommended housing dimensions by generator type and size.

D. Guarantee

The generator, fuel storage system, and related work and equipment must be guaranteed for one year from date of acceptance, either for beneficial use or final acceptance, whichever is earlier, against latent defects in materials, design, and workmanship. The station owner should notify the manufacturer of any equipment failure during the guarantee period. New equipment or parts should be supplied promptly at the manufacturer's expense.

**TABLE 6  
HOUSING FOR DIESEL GENERATORS**

SIZE GEN KW	ENG GEN DIMENSIONS			RECOMMENDED BLDG SIZE		
	LENGTH	WIDTH	HEIGHT	LENGTH	WIDTH	HEIGHT
3(a)	33"	22"	26"	8'0"	6'8"	8'0"
6(a)	42"	33"	23"	8'0"	8'0"	8'0"
10	55"	27"	40"	10'8"	8'0"	8'0"
25	63"	33"	42"	10'8"	8'0"	8'0"
40	78"	33"	42"	12'0"	8'0"	8'0"
60	96"	39"	59"(b)	13'4"	12'0"	8'0"
75	122"	38"	67"(b)	16'0"	12'0"	10'0"
100	113"	37"	70"(b)	16'0"	12'0"	10'0"
125	113"	37"	70"(b)	16'0"	12'0"	10'0"
150	113"	40"	76"(b)	16'0"	12'0"	10'0"
175	113"	45"	76"(b)	16'0"	12'0"	10'0"
200	128"	48"	85"(b)	16'0"	12'0"	10'0"
230	128"	48"		16'0"	12'0"	10'0"
275	170"	61"		20'0"	12'0"	10'0"
335	180"	66"		20'0"	12'0"	10'0"

(a) Air cooled—remainder are water cooled.

(b) Skid mounted.

**TABLE 7  
HOUSING FOR GASOLINE OR LPG GENERATORS**

SIZE GEN KW	ENG GEN DIMENSIONS			RECOMMENDED BLDG SIZE		
	LENGTH	WIDTH	HEIGHT	LENGTH	WIDTH	HEIGHT
.5(a)	19"	15"	19"	8'0"	6'8"	8'0"
.75(a)	23"	15"	19"	8'0"	6'8"	8'0"
1.0(a)	23"	15"	19"	8'0"	6'8"	8'0"
2.0(a)	25"	16"	22"	8'0"	6'8"	8'0"
3.5(a)	27"	21"	21"	8'0"	6'8"	8'0"
5.0(a)	41"	18"	25"	8'0"	6'8"	8'0"
7.5(a)	37"	18"	25"	8'0"	6'8"	8'0"
10.0(a)	51"	20"	29"	10'8"	8'0"	8'0"
15.0(a)	56"	20"	29"	10'8"	8'0"	8'0"
25.0	71"	33"	42"	12'0"	8'0"	8'0"
40.0	73"	33"	42"	12'0"	8'0"	8'0"
75.0	85"	37"	53"	13'4"	12'0"	8'0"
100.0	104"	36"	66"(b)	14'8"	12'0"	8'0"

(a) Air cooled—remainder are water cooled.

(b) Skid mounted.



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## CHAPTER V

## REMOTE PICKUP UNITS

A. Frequencies

Part 74, subpart D, of FCC's rules and regulations governs the use of remote pickup broadcast stations, including identification of frequencies exclusively available for use under this service. The RPU manufacturer's local representatives and FCC field office may be able to assist the station owner in the frequency selection process.

A locally coordinated agreement should be made between the EBS station and other stations in the vicinity that will provide channels for emergency management purposes during an emergency.

B. Equipment Use

In each EBS operational area, there must be an RPU at the CPCS-1 and one EOC to be selected by the FEMA Regional Director.

Close coordination between the station owner and the State or local jurisdiction maintaining the EOC concerning selection of the RPU, the EOC, and its installation is necessary. Through this coordination, potential problem areas, such as dealing with multi-transmitter environments, can be addressed prior to equipment selection.

Mobile/portable RPUs may be authorized at certain emergency operating centers by the FEMA Regional Director.

C. Procurement Specifications

All equipment, associated accessories, and their components must meet the standards established by the Electronic Industries Association and should comply with FCC regulations. In addition, the specifications outlined in Appendix A, Attachment 2, should be used in procuring the remote pickup transmitting and receiving equipment. Multichannel RPUs are authorized within the cost limitations specified, as are installation costs. Transmitters must be in the continuous duty cycle category.



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## CHAPTER VI

## PROGRAMMING FACILITIES

A. Transmission Quality

The voice transmission quality of the programming equipment should be equal to that regularly in use. High-fidelity equipment of music-broadcasting quality is not required.

B. Equipment

The equipment listed below is the minimum that should be permanently installed in the shelter, ready for prompt operation in an emergency:

1. Wiring and terminal facilities for connecting shelter equipment to existing station equipment, as necessary.
2. Channel mixer, control equipment, and remote amplifier.
3. Tape recorder/player.
4. Turntable, cart machine, or an additional tape recorder/player.
5. Microphone.
6. Console.

Station owners are free to expand on the list if their concept of a minimum 14-day emergency calls for more than the minimum equipment listed. However, the owner will not be reimbursed for the additional programming equipment.

Only the items purchased at government expense are subject to transfer of title under the equipment loan agreement. Joint government-private ownership of any piece of equipment is prohibited. It is not permissible to tag and retain programming equipment outside the shelter.



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## CHAPTER VII

## DESIGN EXAMPLES

A. Incorporating a Shelter in a New Transmitter Building (Figure 2)

In this example, the radio station attempted to incorporate a shelter within the existing transmitter building. However, the cost of adding mass thickness to the existing walls plus the cost of additional foundation beams to support the extra weight far exceeded the funds allowable under the program. The station later announced that it was constructing a new transmitter building and was interested in the possibility of incorporating a shelter there. This was an ideal situation and a study revealed that the shelter could be placed in the new structure at a cost well within the allowable funds.

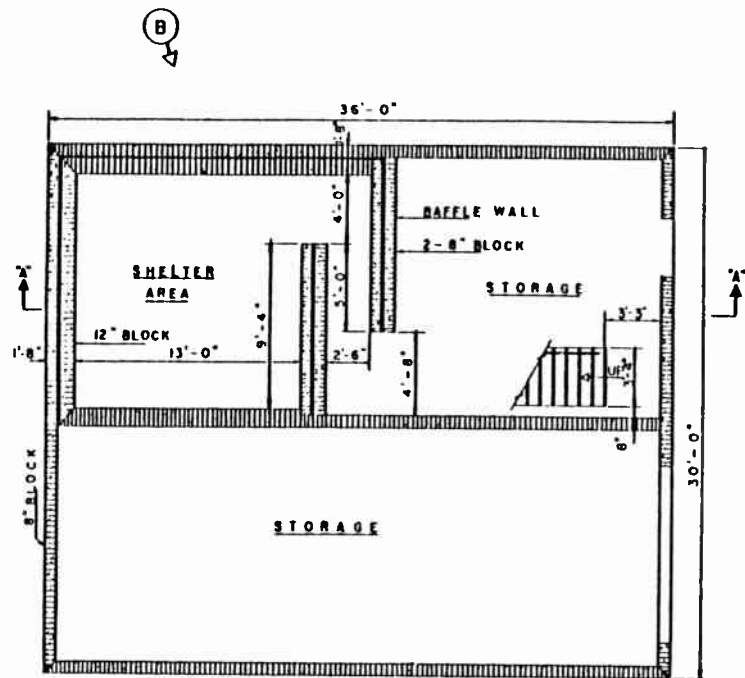
B. Incorporating a Shelter in an Existing Building (Figure 3)

This figure shows an example of a radio station where the shelter was constructed in part of an existing 12' x 30' room that had been added to the west end of the original building. The floor area was 150 square feet. The room's walls (on the south, west, and north) were eight-inch lightweight concrete masonry units (CMU), the roof was six-inch concrete slab, the floor was concrete slab on grade, and the interior wall was brick veneer over clay tile. Modifications consisted of converting the existing walls on the west, north, and east bounding the shelter area by adding an additional eight-inch CMU wall and filling the space between with sand. A baffled opening was constructed on the south with two 16-inch walls of heavy concrete masonry units (each wall two widths of eight-inch CMU). All cells were filled with grout. An additional six inches of concrete was added to the roof slab.

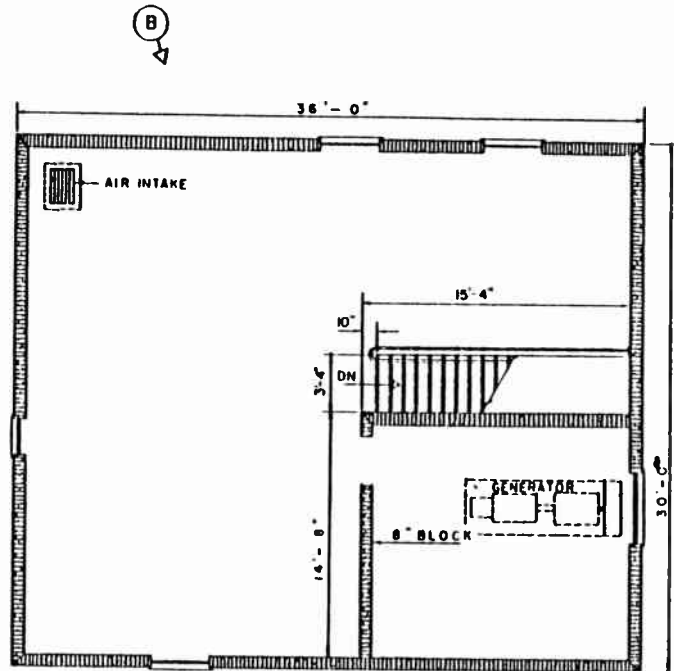
C. Shelter as an Addition to an Existing Building

1. Aboveground Addition. Figure 4 shows the protected area at a transmitter station and is a good example of an outdoor aboveground shelter built with concrete blocks and reinforced concrete slab on earth fill. The shelter is adaptable to regions where the water table or rock formation is close to the surface, making it impractical to build an underground shelter. The two walls of concrete blocks were separated by earth fill. The walls were held together with metal ties placed in the wet mortar as the walls were built. The material and labor costs were low enough so the A-E fee could be absorbed in the allowable funds.

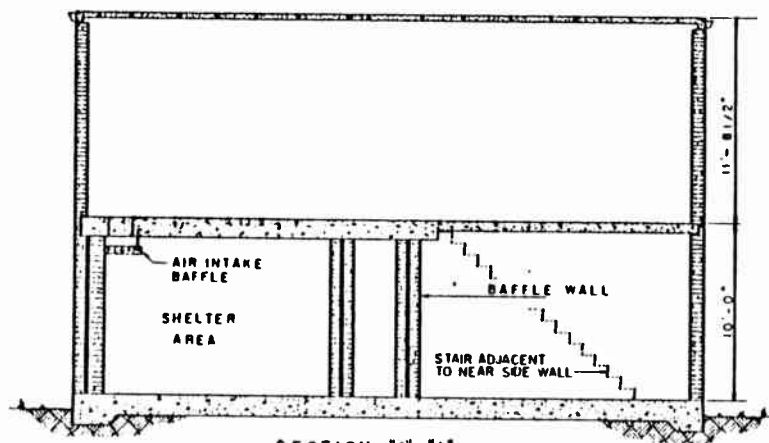
2. Underground Addition. Figure 5 shows a typical underground shelter and Figure 6 is an example of an actual shelter constructed below ground level and backfilled with earth to original grade. The floor elevation is approximately four feet below the basement floor of the transmitter building. Footings, steps, and floor and roof slabs are reinforced concrete. Walls are 8" x 8" x 16" concrete block reinforced with Dur-O-Wall steel every third course. Four inches of No. 46 stone was placed under the floor slab and covered with six mil. polyethylene film. Four-inch drain tile backfilled with 18 inches of No. 46 stone was placed around the footings and drains into an 18-inch diameter sump, provided with a domestic type of submersible sump pump, powered by a 110-V, 1/4-hp motor. One-half inch cement plaster was spread on the exterior surface of the walls and one trowel coat of waterproofing was applied to the exterior surfaces, walls, and roof



FIRST FLOOR



SECOND FLOOR



SECTION "A"-A

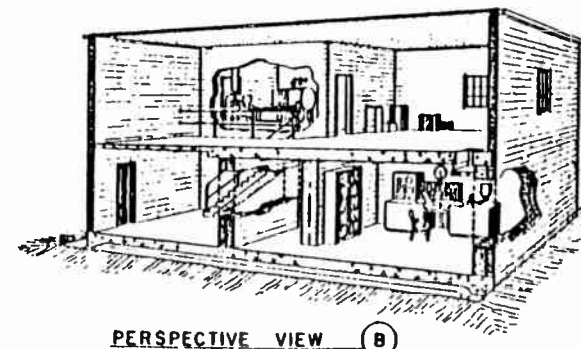
PORTLAND CEMENT CONCRETE BLOCKS WITH VOIDS FILLED WITH CONCRETE



PLAN

DETAIL FOR LAYING UP CONCRETE FILLED 16" B 20" CONCRETE BLOCK WALLS

NOTE: ALL CONCRETE TO BE STANDARD WEIGHT 144 LB/CY  
ALL CONCRETE BLOCK WALLS TO WEIGH APPROX. 180 LB/CY



PERSPECTIVE VIEW (B)

NOTE SECTIONAL CUT BEHIND NEAR SIDE WALL WHICH IS NOT SHOWN FOR CLARITY

MAY 10, 1984

VII-2

FIGURE 2. EXAMPLE OF INCORPORATING A SHELTER IN A NEW BUILDING

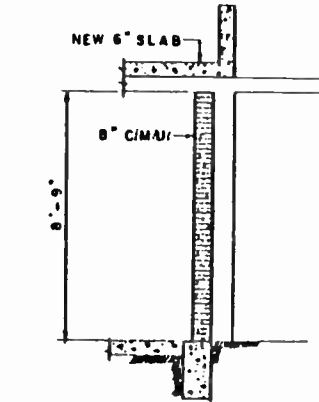
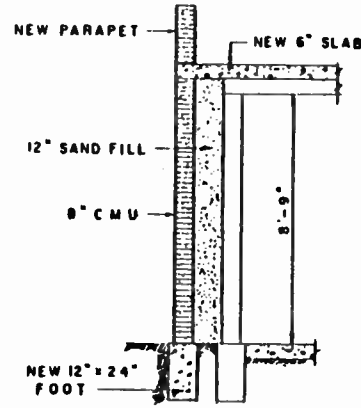
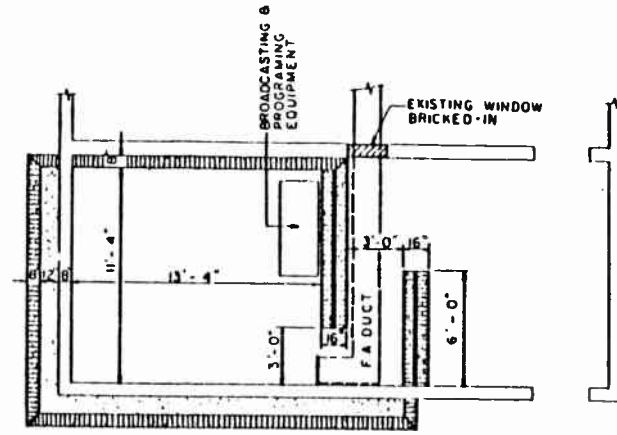
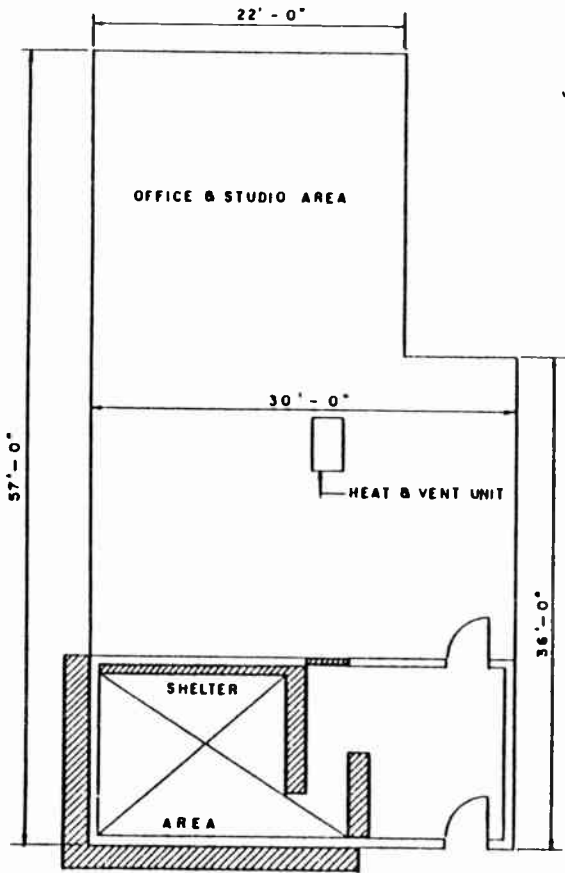


FIGURE 3. EXAMPLE OF INCORPORATING A SHELTER IN AN EXISTING BUILDING

slab prior to backfilling. A combination motorized-manual ventilator, powered by a 110-V, 1/4-hp motor with 80-CFM capacity and three-inch intake with filter and housing three feet above ground elevation was installed to provide adequate ventilation to the shelter. A three-inch gravity exhaust with housing was installed three feet above ground elevation. A two-circuit, 30-ampere fused switch box for the sump pump and ventilator was installed and power connected to the existing switch in the transmitter building. Two duplex outlets were installed. A 1-1/2-inch conduit was supplied for radio equipment wiring.

3. Standard Plans. Figure 7 is a typical fallout shelter addition. A word of caution on standard plans—they cannot be used blindly. The A-E must understand the problems peculiar to the climate, soil conditions, and geography, as well as the effects of construction costs and material procurement in the locale. With proper consideration of all the facets of the problem, however, a standard plan can assist the A-E in his or her design and save review time by FEMA. It can be used at the initial conference and can assist greatly in negotiating and signing the agreement.



VII-5

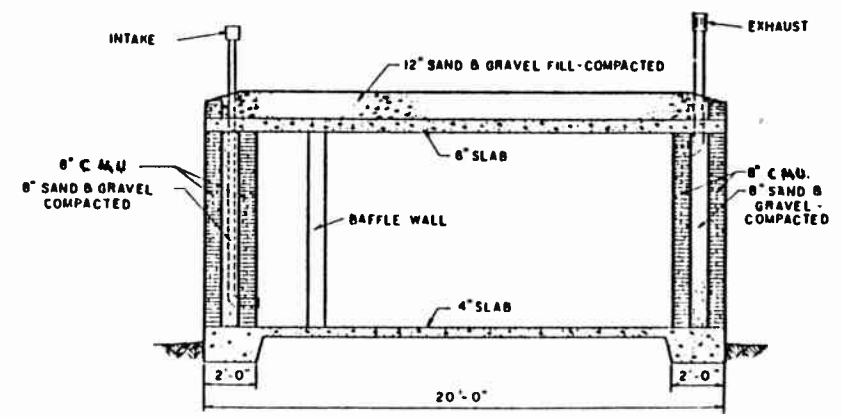
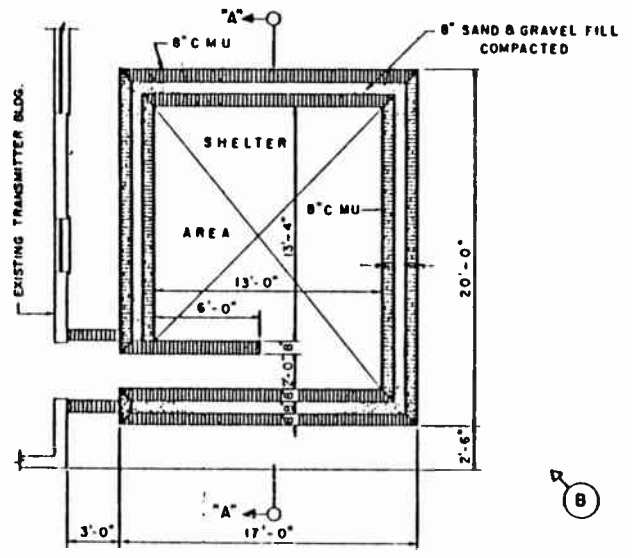
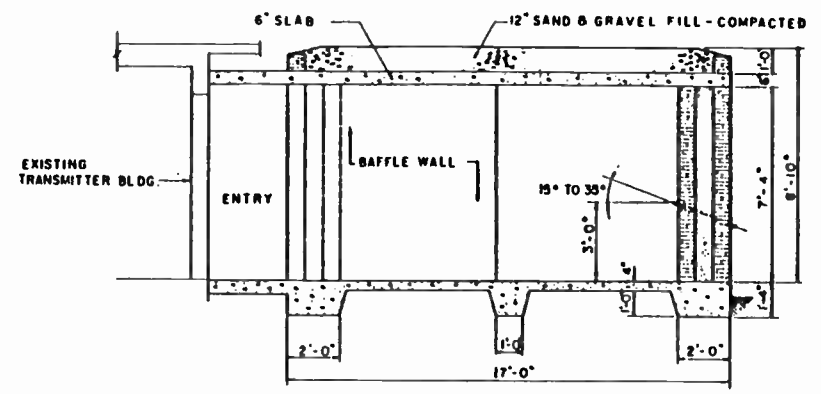
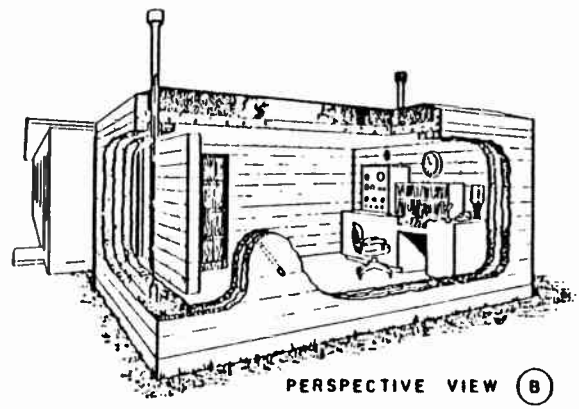


FIGURE 4. EXAMPLE OF A SHELTER AS AN ABOVEGROUND ADDITION TO AN EXISTING BUILDING

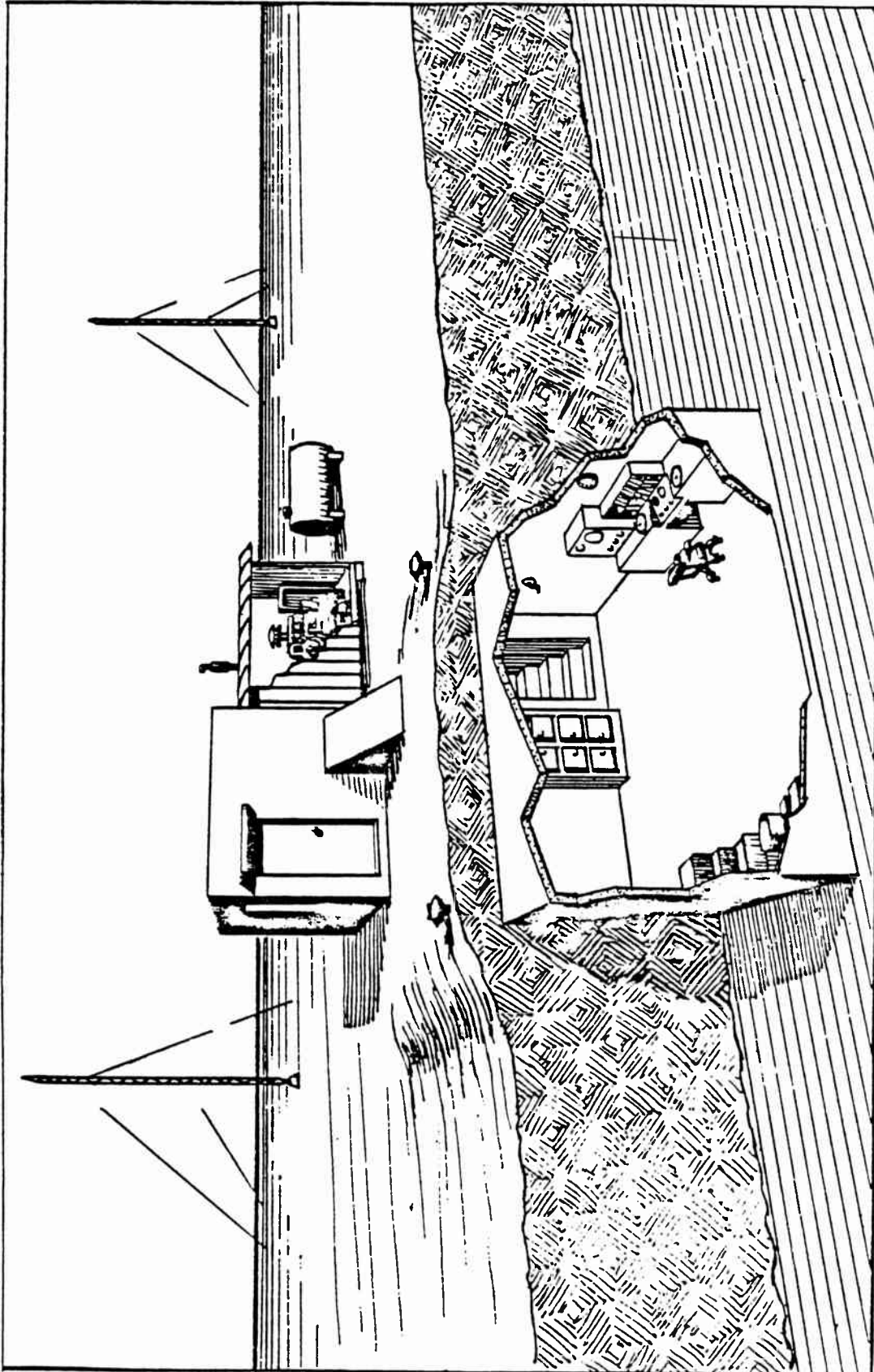


FIGURE 5. UNDER GROUND SHELTER

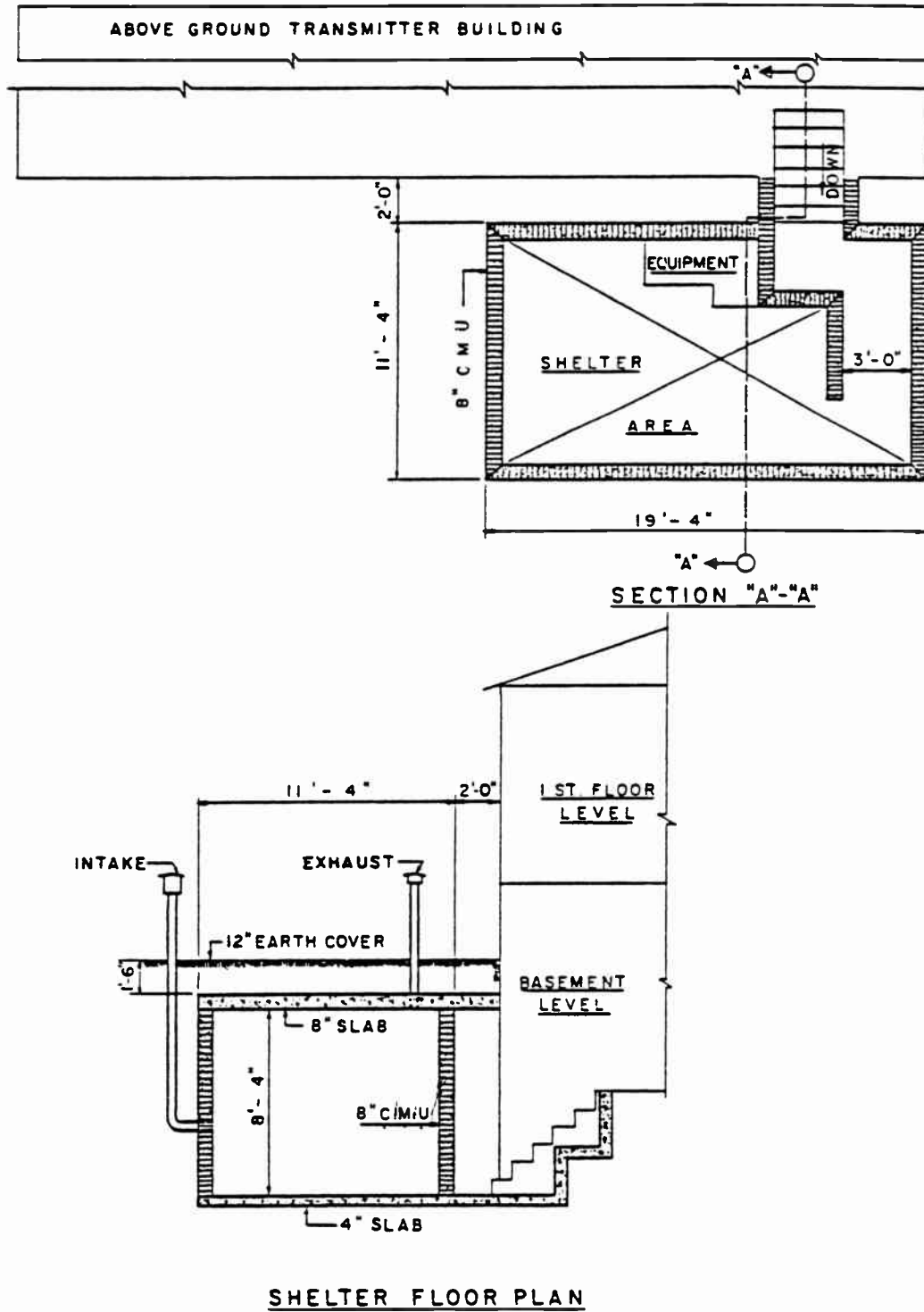
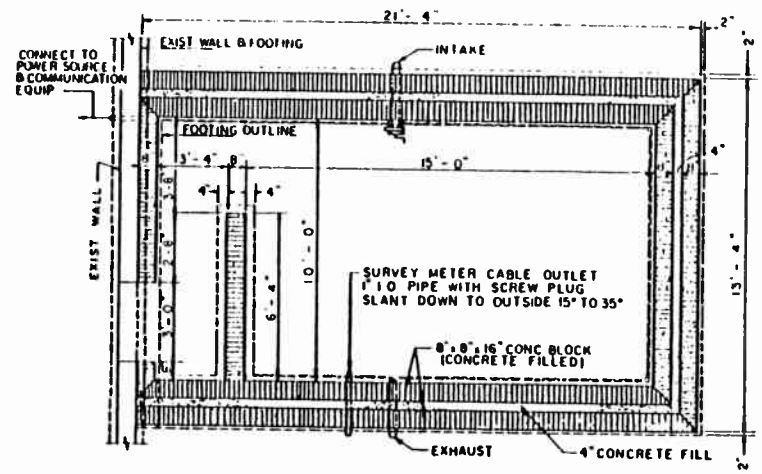
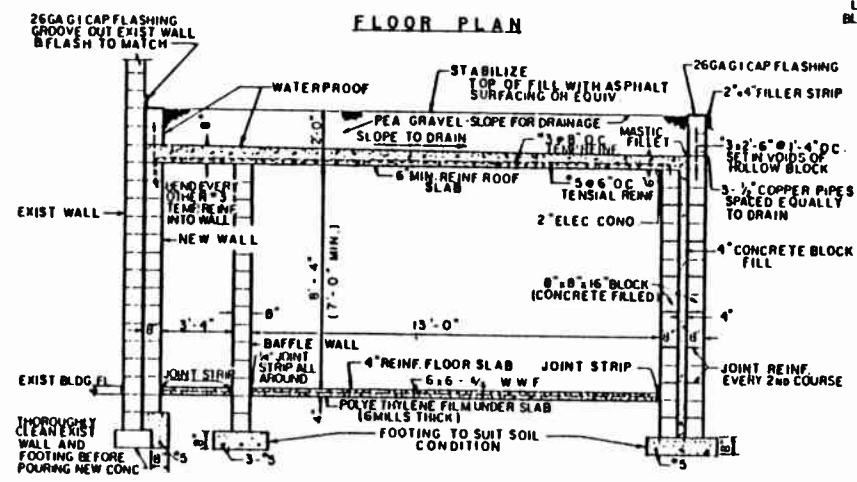


FIGURE 6. EXAMPLE OF A SHELTER AS AN UNDERGROUND ADDITION TO AN EXISTING BUILDING



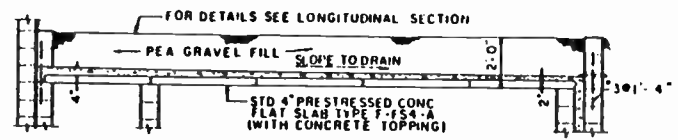
FLOOR PLAN



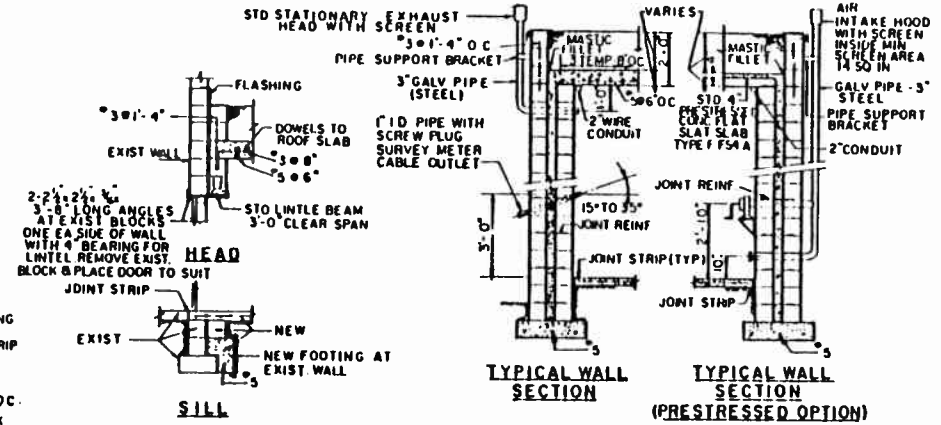
LONGITUDINAL SECTION

THIS DRAWING WAS TAKEN FROM A DESIGN OF "TYP 150 SQ FT FALLOUT SHELTER ADDITION" BY CORPS OF ENGINEERS, JACKSONVILLE, FLA

NOTE  
ELECTRICAL & COMMUNICATION FIXTURES AND OUTLETS  
SHALL BE POSITIONED TO SUIT.



ROOF SLAB DETAIL (PRESTRESSED OPTION)



TYPICAL WALL SECTION

TYPICAL WALL SECTION (PRESTRESSED OPTION)

SECTION AT DOOR

SPECIFICATIONS AND GENERAL NOTES

- 1 Soil bearing under footings shall support a min. pressure of 2,000 psf.
  - 2 Footings shall be placed on undisturbed soil or on compacted fill capable of supporting pressure as stated in item No. 1.
  - 3 Concrete in footings, floor, and roof slab to be 3,000 psi concrete.
  - 4 Pipes and exposed steel to be galvanized.
  - 5 Hollow blocks voids filled with concrete or mortar.
  - 6 Paint to suit owner.
  - 7 Hardware to suit owner.
  - 8 Blower and air intake supply a min. of 45 cfm of fresh air.
- NOTES APPLICABLE TO PRESTRESS OPTION
- 9 Prestressed items manufactured in accordance with the prestress concrete building code requirements and capable of supporting a superimposed load of 250 psf on a clear span of 10 feet.
  - 10 Prestressed items manufactured by other than active members of the prestressed concrete institute shall be accompanied by a design analysis of the prestressed item.
  - 11 Fill shall be well tamped and free of organic material.

FIGURE 7. TYPICAL 160 SQ. FT. FALLOUT SHELTER ADDITION

## CHAPTER VIII

## GLOSSARY

(including abbreviations)

A-E	Architect-engineer.
Assistance Officer	The FEMA representative executing the agreement on behalf of the Federal government.
Barrier Shielding	The ability of the mass thickness of building material to shield against fallout gamma radiation.
BSPP	Broadcast Station Protection Program
CPCS-1	Common Program Control Station-1.
EBS	The Emergency Broadcast System, authorized by the Federal Communications Commission to operate during national, State, or local emergencies.
EIA	Electronic Industries Association.
EMP	Electromagnetic pulse.
EOC	Emergency operating center, a protected or mobile facility from which officials can direct and control emergency operations before, during, and after a nuclear attack or civil emergency.
FAA	Federal Aviation Administration.
Fallout Shelter	A structure, room, or space designed to protect its occupants from fallout gamma radiation. For radio stations, a protection factor of at least 100 is required everywhere in the shelter.
FCC	Federal Communications Commission.
FEMA	Federal Emergency Management Agency.
Geometric Shielding	Protection from fallout gamma radiation accomplished by the shelter's size and shape, the detector's location, and the shelter's position relative to the contamination area.
LPG	Liquefied petroleum gas.
NIAC	National Industry Advisory Committee.

OA ECC	Operational (local) Area Emergency Communications Committee.
Owner/Licensee	Owner—The person executing the agreement on behalf of the radio station. Licensee—The same person executing FCC applications and permits.
PF	Protection factor, used to express the relation between the amount of fallout gamma radiation received by an unprotected person and the amount received if protected in the same location. (Example: An unprotected person would be exposed to 100 times more radiation than a person inside a shelter having a protection factor of 100.)
Project Officer	Assistance Officer's technical representative.
Protected Area	An area within a structure that protects its occupants from fallout gamma radiation and meets minimum FEMA technical requirements.
Roentgen	A unit of exposure to gamma (or X) radiation. One roentgen would result in the absorption of about 87 ergs of energy per gram of air.
RPU	Remote pickup unit, consisting of a transmitter and a receiver.
SECC	State Emergency Communications Committee.

**APPENDIX A  
SAMPLE RADIO FACILITY  
PROTECTED AREA AND EQUIPMENT AGREEMENT**

**FEDERAL EMERGENCY MANAGEMENT AGENCY  
ASSISTANCE AWARD/AMENDMENT**

<b>1. ASSISTANCE INSTRUMENT</b> Cooperative Agreement <span style="float:right">Grant</span>		<b>TYPE OF ACTION</b> Award <span style="float:right">Amendment</span>	
<b>3. INSTRUMENT NUMBER</b>	<b>4. AMENDMENT NUMBER</b>	<b>5. EFFECTIVE DATE OF THE ACTION</b>	<b>6. CONTROL NUMBER</b>
<b>7. RECIPIENT NAME AND ADDRESS</b>          <b>10. RECIPIENT PROJECT MANAGER</b>		<b>8. ISSUING/ADMINISTRATION OFFICE</b> Federal Emergency Management Agency          <b>9. PROJECT OFFICER</b>	
<b>11. ASSISTANCE ARRANGEMENT</b> Cost Reimbursement Cost Sharing Fixed Price Other		<b>12. PAYMENT METHOD</b> Treasury Check Reimbursement Advance Check Letter of Credit	
<b>13. PAYMENT OFFICE</b> Federal Emergency Management Agency Voucher Examiner, Accounting Branch		<b>14. ASSISTANCE AMOUNT</b>  Previous Amount _____ Amount this Action _____ Total Amount _____	
<b>15. ACCOUNTING &amp; APPROPRIATION DATA</b>			

**16. DESCRIPTION**

<b>17. Recipient is required to sign and return this document to the Issuing/ Admin Office in Block 8.</b>	<b>18. Recipient is not required to sign this document.</b>
<b>19. Recipient</b>  Name and Title <span style="float:right">Date</span>	<b>20. FEMA ASSISTANCE OFFICER</b>  Name and Title <span style="float:right">Date</span>

AGREEMENT WITH \_\_\_\_\_ FOR PROTECTED AREA  
 AND EQUIPMENT IN CONNECTION WITH STATION \_\_\_\_\_.

THIS AGREEMENT, entered into this \_\_\_\_\_ day of \_\_\_\_\_ 19 \_\_\_\_\_, between the UNITED STATES OF AMERICA (hereinafter called the "Government") represented by the Assistance Officer executing this Agreement, and \_\_\_\_\_, a Corporation organized with its principal office and place of business in the city of \_\_\_\_\_ (hereinafter called the "Owner"); WITNESSETH THAT:

WHEREAS, the Government, under the authority of the Federal Civil Defense Act of 1950, as amended (50 U.S.C. App. 2251 et seq.), and Reorganization Plan Number 3, 1978, desires to arrange for protected areas in connection with certain radio stations; and

WHEREAS, the Owner is the LICENSEE of a radio station, the continued operation of which is desirable under emergency conditions, including a radioactive fallout environment; and

WHEREAS, the Owner is willing to provide and equip a protected area for the aforesaid purpose; and

WHEREAS, it is desirable to provide emergency power and Remote Pickup Units to make possible continued operations during an emergency.

NOW THEREFORE, in consideration of the performance of the mutual covenants and agreements hereinafter set forth, it is mutually agreed as follows:

1. Obligations of the Owner

a. The Owner, within \_\_\_\_\_ days of the execution of this Agreement and in contemplation of participation by the Radio Station in an Emergency Broadcast System to advise the public of essential survival information in accordance with approved plans, will:

(1) Provide a protected area of at least 150 square feet for the purpose of enabling the Owner to operate his or her broadcasting facilities notwithstanding a radioactive fallout environment. The protected area will be added at the \_\_\_\_\_ site and will meet, as a minimum, Federal Emergency Management Agency criteria, copies of which are attached hereto and made a part hereof, and sketches, drawings, or specifications obtained by the Owner and approved by the Assistance Officer.

(2) Construct a generator shelter at the transmitter site,

(3) Procure, install, and ensure operational capability of a \_\_\_\_\_ KW generator in the shelter,

(4) Procure and install related power transfer equipment and fuel tank,

(5) Procure and install two (2) Remote Pickup Units in accordance with the specifications of Attachment 2,



Sample Radio Facility  
Protected Area and Equipment Agreement

(6) Install electromagnetic pulse protection (EMP). (The EMP protective devices will be provided by the Government.)

b. The Owner shall obtain, where possible, both for the construction of the protected facility and separately for the equipment, competitive proposals from not less than three (3) reputable firms. Awards shall be made to the bid most advantageous to the government, price and other factors considered and the Owner shall furnish to the Assistance Officer evidence of compliance with this requirement.

c. The Owner shall procure all necessary permits and licenses; obey and abide by all applicable laws, regulations, ordinances, and other rules of the United States of America, of the State, territory, or political subdivision thereof where the work is done, or of any other duly constituted public authority.

d. The Owner shall request payment from the Government for costs as prescribed below in paragraph 2, Obligations of the Government. A final inspection by the Government may be required on all purchased equipment prior to payment by the Government to the station Owner. Upon payment by the Government, the Owner will transfer the title to the \_\_\_\_\_ KW generator, related power transfer equipment, and two (2) RPU's to the Federal Communications Commission and enter into an Equipment Loan Agreement with the FCC providing for continued retention and use of the equipment by the station Owner. Title to all wiring, switchgear, piping, fuel storage tanks, and other equipment procured by the station Owner at Government expense for this program shall likewise be transferred to the Federal Communications Commission at this time.

2. Obligations of the Government

The Government agrees that in the manner hereinbelow described it will pay to the Owner as full consideration for the performance by the Owner of his or her obligations described above, the actual cost of accomplishing the work outlined in paragraph 1a above, not to exceed, however, the amount stated in the schedule below; provided that if the competitive proposals for the work and equipment solicited by the Owner indicate that the actual cost will exceed the applicable amount stated in the schedule, the Owner shall not be obligated to perform further under this Agreement and it shall thereupon become null and void, unless either the Government or the Owner elects to pay such excess cost.

a. SCHEDULE—PROTECTED AREA

For supplying the protected area, not to exceed \_\_\_\_\_.

b. SCHEDULE—EMERGENCY EQUIPMENT

For the purchase, installation, and shipping FOB destination of equipment listed in Attachment 1, not to exceed \_\_\_\_\_.

c. Payment of costs incurred by the Owner under the Schedule above, and subject to the limitation therein, will be made by the Assistance Officer upon presentation of evidence of completion of the Owner's obligations herein and such documentation as may be required by the Assistance Officer, unless an advance payment has been made. Subject to these requirements, partial payments may be made to the Owner when it is determined by the Assistance Officer that the Owner has completed a

May 10, 1984

Sample Radio Facility  
Protected Area and Equipment Agreement

separable part or parts of the work under this Agreement. Partial payments will consist of full payment for the cost of the separable work items concerned, as described below:

(1) Generator shelter construction, including A-E fees (if any), fuel tanks and piping, materials and labor, complete, in preparation for the installation of the generator as indicated in (2) below.

(2) Installation of EMP devices, emergency generator, automatic switchgear, electrical wiring, etc., required to connect the generator to the communications equipment, including equipment, materials and labor, and A-E fees (if any).

(3) Remote Pickup Units, including A-E fees (if any), RPU transmitter, receiver, antennas, wiring, connections, and related facilities or equipment required to operate the RPU installation.

3. Ownership and Conduct of the Work

The shelter facilities and ventilating equipment provided hereunder will remain the property of the Owner except for the emergency power generating facilities, programming facilities, and communications equipment separately provided for. The Owner shall be responsible for all work and services to be performed in providing the protected area. The Assistance Officer shall be available to the Owner for consultation and advice.

4. Inspection

The Government shall have the right to inspect the work to be performed hereunder at any time during its progress and to make final inspection upon completion thereof.

5. Release

The Owner will accept the payment provided for in paragraph 2 above as full and just compensation for any and all obligations of the Government hereunder.

6. Definitions

As used throughout this Agreement, the following terms shall have the meaning as set forth below:

a. The term "Owner" means the person executing this Agreement on behalf of the radio station licensee and any other officer or employee of the Owner duly authorized to act on his or her behalf.

b. The term "Assistance Officer" means the person executing this Agreement on behalf of the Government, and any other employee of the Federal Emergency Management Agency who is properly designated Assistance Officer, and the term includes, except as otherwise provided in this Agreement, the authorized representative of an Assistance Officer acting within the limit of his or her authority.

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Sample Radio Facility  
Protected Area and Equipment Agreement

Attachment 1

SCHEDULE OF EQUIPMENT AND WORK FOR RADIO FACILITY PROTECTED AREA

<u>Item No.</u>	<u>Quantity</u>	<u>Description</u>	<u>Value</u>
-----------------	-----------------	--------------------	--------------

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Sample Radio Facility  
Protected Area and Equipment Agreement

## Attachment 2

## RPU PROCUREMENT SPECIFICATIONS

1. General

All procurement specifications released by the broadcast stations for remote pickup transmitting and receiving equipment utilized under this program must use the performance specifications outlined below. Procurement of multichannel RPUs is authorized within cost limitations specified. Installation costs are also included subject to cost limitations specified.

2. Construction, General

This standard specification establishes the technical requirements for this program. No specific manufacturers are recommended. There is, however, a firm requirement for quality and sound engineering practices, together with certain features essential to the special needs of this service.

a. Material

The materials, component parts, and mechanical assemblies used in the construction of the equipment shall be of a quality consistent with the proposed and specified performance of the equipment. In general, the materials, component parts, and mechanical assemblies used in the equipment shall be the best commercially obtainable for each specific purpose or use. Nonflammable material shall be employed to the greatest extent practicable in the construction of equipment.

b. Maintenance

The electrical and mechanical layout and fabrication of the equipment shall be such that all parts which may require checking or servicing are readily accessible without the necessity of removing other parts. Design shall be such that slight misadjustments do not seriously affect performance. A minimum amount of service adjustment shall be required to maintain peak performance.

c. Safety Factor or Components

All components shall be conservatively rated to ensure long life and shall be in keeping with standards of good engineering practice. To ensure maximum efficiency and component utility, all electrical and mechanical parts shall not exceed the manufacturer's specified continuous duty rating. Tubes, transistors, and diodes shall not be operated in excess of the manufacturer's specified rating.

3. Specification, General

All equipment, associated accessories, and their component parts shall meet the applicable standards as established by the Electronic Industries Association (EIA) and the applicable Federal Communications Commission (FCC) rules and regulations.

Sample Radio Facility  
Protected Area and Equipment Agreement

a. Instruction Books and Drawings

Sufficient instruction books and drawings shall be furnished with each communications unit in order to facilitate complete installation, operation, and maintenance.

b. Warranty

All equipment shall be guaranteed against defective material for a period of not less than six months after installation. Transistors, diodes, and tubes shall carry the maximum obtainable warranty of the suppliers.

4. General Requirements

a. Power Output

The transmitter shall deliver not less than 100 percent of its rated carrier output, as required, into a pure resistive load of 50 ohms.

b. Duty Cycle

Transmitting equipment used for this service shall be capable of maintaining the required power output on a continuous basis for a period of at least 14 days. Receivers shall be capable of continuous service.

c. Safety Requirements

All equipment must be provided with fuses or circuit breakers to protect the equipment against excessive current. Suitable protection from dangerous voltages must be provided for operating personnel in accordance with current engineering practices.

d. Transmitter and Receiver Characteristics

All transmitter and receiver measurements are to be made in accordance with EIA test procedures.

5. Remote Pickup FM Transmitter

General. Fixed station transmitter for remote pickup broadcast stations. Design and construction of this equipment shall comply with applicable parts of paragraphs 1 through 4.

Transmitter Requirements

Power Output:	152-170 MHz	450-456 MHz
	Power is to be limited to that necessary to provide satisfactory service. (See section 74.461 of FCC Rules.)	
Frequency Stability of Carrier:	.0005%	.0005%
Output Impedance:	52 ohms nominal	
Modulation:	In accordance with appropriate FCC Rules and Regulations	
Power Supply:	The transmitter shall operate from 117 volt <u>±</u> 10%, 60 cycle power source	

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Sample Radio Facility  
Protected Area and Equipment Agreement

6. Remote Pickup FM Receivers

General. The fixed station receiver from remote pickup broadcast stations shall comply with applicable parts of paragraphs 1 through 4.

Receiver Requirements.

Sensitivity for 20 db+ receiver quieting:	152-170 MHz .6uV	450-456 MHz .8uV
--	---------------------	---------------------

Input Impedance: 52 ohms nominal

Power Supply: Receivers shall operate from a 117 volt  $\pm$  10%, 60 cycle power source

APPENDIX B

SAMPLE EQUIPMENT LOAN AGREEMENT

UNITED STATES OF AMERICA  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, D.C. 20554

LOAN AGREEMENT NO. \_\_\_\_\_

CALL LETTERS OF STATION \_\_\_\_\_

EQUIPMENT LOAN AGREEMENT BETWEEN THE FEDERAL COMMUNICATIONS COMMISSION AND \*

The equipment listed on attached Schedule A will be owned by the United States Government and will be charged to the Federal Communications Commission.

It is proposed that said equipment be made available on a loan basis to \* \_\_\_\_\_

It has been determined by the Federal Communications Commission that the loan of said equipment, for the purpose of establishing an Emergency Broadcast System and related emergency communications systems, is necessary for survival in the event of a national emergency, and will promote the national defense.

THEREFORE, the Federal Communications Commission, hereinafter referred to as Licensor, while asserting that title to said equipment will be retained by the United States Government, grants to \* \_\_\_\_\_

hereinafter referred to as Licensee, the custody and possession of equipment listed on attached Schedule A (hereinafter referred to as "the equipment"), at such time as Licensee assumes custody of said equipment subject to the following terms and conditions:

GENERAL

1. The term of this license will be concurrent with the station's regular broadcast authorization, and automatically renewed when the broadcast authorization is renewed, except that the Licensor reserves the right to revoke or amend this agreement for failure or refusal of the Licensee to comply with its terms.

2. This agreement may be terminated by the Government at any time, without notice. If so terminated, the Government (within 30 days) will remove all equipment owned by it, at Government expense, and without damage to the Licensee's property. The Licensee may terminate the agreement upon 120 days' notice. If so terminated, the Licensee will remove the Government-furnished equipment and return the equipment to such location as the Government may direct, but not to exceed a shipping radius of 300 miles, at no cost to the Government in the same condition as received, reasonable wear and tear excepted.

\*Name must be exactly as it appears on the FCC broadcast station authorization.

3. The Licensee shall make available space and provide services (including personnel) to operate its licensed facilities during periods of emergency conditions.

4. The Licensee agrees, at no cost to Licensee, to allow the Licensor to inspect the equipment at any time the Licensor may request.

5. The Licensee agrees that the equipment will be located at \_\_\_\_\_  
(Street, Number, City and County, or Geographical Coordinates)  
\_\_\_\_\_ and that it will not be removed from that location (hereinafter  
(State)  
referred to as "the site") without the prior written permission of the Licensor.

6. Licensee agrees to obtain, at his or her own expense, all necessary permits and licenses to allow installation and operation of the equipment.

7. The Licensee shall not publicize the installation of the equipment, nor the method of operation, in such a manner as to give the Licensee a competitive advantage over other radio stations in normal nonemergency periods.

8. The Licensee will be responsible for, and shall bear all costs associated with the operation and maintenance of equipment, including items installed as part of the EMP retrofit. Major replacement parts for the EMP protective system will be provided by FEMA.

9. The Licensee will furnish all replacement parts for the equipment at its own expense and the Licensor will not be required to furnish any materials other than those listed in Schedule A hereto.

10. The cost for major overhaul and replacement of major items of equipment may be funded by FEMA if said costs are necessary and not due to neglect of equipment by the Licensee. Authorization for funding must be obtained prior to purchase or repair of equipment.

11. The Licensee will take reasonable precautions to prevent damage to, loss or theft of, the equipment and shall promptly report to the Licensor any damage to, loss or theft of, equipment.

#### OPERATION

12. After installation, the Licensee will periodically test the equipment at its own expense to ensure that the equipment will be operational at all times.

13. The Licensor agrees to allow the Licensee to use the equipment provided that such use does not interfere with the capability of the equipment to function properly as a part of the Emergency Broadcast System and related emergency communications systems.

14. During periods of emergency the Licensee will broadcast, without exercising censorship, any and all program material furnished by and delivered to the Licensee's facilities by the Government to include live Presidential broadcasts during national emergencies.



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Sample Equipment Loan Agreement

15. If this agreement contemplates the loan of electric power generating equipment, Licensee agrees to purchase, and maintain at all times, a supply of fuel sufficient to operate the equipment for at least a continuous 14-day period.

16. The Licensor and Licensee agree to the terms of this license as indicated by the signatures of their duly authorized officers on the \_\_\_\_\_ day of \_\_\_\_\_ 19 \_\_\_\_.

\_\_\_\_\_  
FOR THE LICENSOR (Signature)

\_\_\_\_\_  
NAME AND TITLE (Type or Print)

\_\_\_\_\_  
FOR THE LICENSEE (Signature)

\_\_\_\_\_  
NAME AND TITLE (Type or Print)

\_\_\_\_\_  
ADDRESS

LOAN AGREEMENT NO. \_\_\_\_\_

LOAN AGREEMENT NO. \_\_\_\_\_

SCHEDULE A

<u>Item No.</u>	<u>Quantity</u>	<u>Description (Include Serial Numbers)</u>	<u>Value</u>
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Approved by OMB  
3060-0028  
Expires 8-31-84

Federal Communications Commission  
Washington, D.C. 20554

APPLICATION FOR AUTHORIZATION IN THE  
AUXILIARY RADIO BROADCAST SERVICES

(Carefully read instructions before filling out form)

DO NOT WRITE IN THIS BOX

File No. \_\_\_\_\_

1. LEGAL NAME OF APPLICANT

\_\_\_\_\_  
\_\_\_\_\_

2. MAILING ADDRESS (Street)

\_\_\_\_\_  
\_\_\_\_\_ (City)

STATE \_\_\_\_\_ ZIP CODE \_\_\_\_\_

3. CALL SIGN OF ASSOCIATED BROADCAST STATIONS

AM \_\_\_\_\_ FM \_\_\_\_\_  
TV \_\_\_\_\_ Translator \_\_\_\_\_

4. TYPE OF STATION PROPOSED (Check appropriate box)

- A. Remote Pickup
  - Base  Mobile  Automatic Relay  EBS
- B. Aural Microwave Station
  - STL  Intercity Relay
- C. TV Microwave Station
  - STL  Intercity Relay
  - Pickup  Translator Relay
- D. Low Power Auxiliary Station

5. PURPOSE OF APPLICATION (Check appropriate box)

- A. New Station.
- B. Reinstatement of expired license.
- C. Modification of existing authorization.

6. NATURE OF PROPOSED CHANGES

- Call Sign of existing station \_\_\_\_\_
- Change frequency  Change power
- Change antenna system  Change range of mobiles
- Relocate station  Replace equipment
- Add base station to system  Other (give as Exhibit No. \_\_\_\_\_ an explanation)

7. If this application is for a Remote Pickup or Low Power Auxiliary Station System, specify mobile range. \_\_\_\_\_  
Is transmitter type accepted?  Yes  No

8. FACILITIES REQUESTED (If more space is needed attach as Exhibit No. \_\_\_\_\_)

A. Frequency/ies (MHz)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

B. Power (w)

Transmitter Power Output (TPO) \_\_\_\_\_ Antenna Input Power \_\_\_\_\_ Effective Radiated Power (ERP) \_\_\_\_\_

C. Emission

\_\_\_\_\_

9. Details of station at a fixed location

A. Transmitter location

\_\_\_\_\_  
County \_\_\_\_\_ City \_\_\_\_\_ STATE \_\_\_\_\_  
North Latitude \_\_\_\_\_ West Longitude \_\_\_\_\_  
\_\_\_\_° \_\_\_\_' \_\_\_\_" \_\_\_\_\_° \_\_\_\_' \_\_\_\_" \_\_\_\_\_

B. Receiving

\_\_\_\_\_  
County \_\_\_\_\_ City \_\_\_\_\_ STATE \_\_\_\_\_  
North Latitude \_\_\_\_\_ West Longitude \_\_\_\_\_  
\_\_\_\_° \_\_\_\_' \_\_\_\_" \_\_\_\_\_° \_\_\_\_' \_\_\_\_" \_\_\_\_\_

10. Give the mobile area of operation:

A. Coordinates of the center of the area:

B. Radius of operation from those coordinates:  
miles: \_\_\_\_\_ km.: \_\_\_\_\_

11. If any of the circumstances in instruction 11 apply, attach as Exhibit Nos. \_\_\_\_\_ detailed statements.

12. Supply the following antenna information (Review Instructions)

A. Manufacturer	Model No.	Antenna Gain
_____	_____	_____
Antenna Polarization	Beamwidth (3db or 1/2 power points)	Elevation Angle
_____	_____	_____
B. If this is a directional antenna give azimuth of main lobe. _____		
C. Overall height above ground of antenna structure. _____ ft _____ meters		
D. Elevation of ground above mean sea level at antenna site. _____ ft _____ meters		
E. Elevation above ground of antenna center of radiation. _____ ft _____ meters		
F. Antenna sketch figure _____ . Passive reflector information attach as Exhibit No. _____		

13. Will an antenna be mounted on an existing antenna structure?  YES  NO  
If Yes, give call sign and licensee's name.

14. If this application is for a microwave station specify the following:  
Equipment Manufacturer \_\_\_\_\_ Type No. \_\_\_\_\_ Output Power \_\_\_\_\_

15. Has the FAA been notified of proposed construction?  YES  NO  
(Filing of FCC Form 714 not necessary—See Part 17 of the Rules.)  
If Yes, give date and office where notified.

Environmental Statement:

16. Would a grant of this application be a major action as defined by Section 1.1305 of the Commission's Rules?  
If Yes, attach as Exhibit No. \_\_\_\_\_ the required statement in accordance with Section 1.1311 of the Commission's Rules.  
If No, attach as Exhibit No. \_\_\_\_\_ an explanation.

FCC NOTICE TO INDIVIDUALS REQUIRED BY THE PRIVACY ACT

The Solicitation of personal information requested in this application is authorized by the Communications Act of 1934, as amended. The principal purpose(s) for which the information will be used is to determine if the benefit requested is consistent with the public interest. The staff, consisting variously of attorneys, accountants, engineers, and application examiners, will use the information to determine whether the application should be granted, denied, dismissed, or designated for hearing. If all the information requested is not provided, the application may be returned without action having been taken upon it or its processing may be delayed while a request is made to provide the missing information. Accordingly, every effort should be made to provide all necessary information.

THE FOREGOING NOTICE IS REQUIRED BY THE PRIVACY ACT OF 1974, P.L. 93-579, DECEMBER 31, 1974, 5 U.S.C. 552a(e)(3).

THE APPLICANT hereby waives any claim to the use of any particular frequency or of the ether as against the regulatory power of the United States because of the previous use of the same, whether by license or otherwise, and requests an authorization in accordance with this application. (See Section 304 of the Communications Act of 1934).

THE APPLICANT represents that this application is not filed for the purpose of impeding, obstructing or delaying determination on any other application with which it may be in conflict.

THE APPLICANT acknowledges that all the statements made in this application and attached exhibits are considered material representations, and that all the exhibits are a material part hereof and are incorporated herein as if set out in full in the application.

CERTIFICATION

I certify that the statements in the application are true, complete, and correct to the best of my knowledge and belief, and are made in good faith.

(This Section should not be signed and dated until all Exhibits have been prepared and attached.)

Signed and dated this \_\_\_\_\_ day of \_\_\_\_\_ 19 \_\_\_\_\_  
Signature \_\_\_\_\_

WILLFUL FALSE STATEMENTS MADE ON THIS FORM ARE PUNISHABLE BY FINE AND IMPRISONMENT. U.S. CODE, TITLE 18, SECTION 1001.

For further information, FCC should contact: \_\_\_\_\_ Name Typed \_\_\_\_\_

Name \_\_\_\_\_ (Check one box below for appropriate classification):  
 Officer and member of Corporation  Member of Partnership  
 Individual Applicant  Officer of Corporation  
 Official of Government Agency

**APPENDIX D**

**ASSISTANCE OFFICER'S CHECKLIST**

**ITEMS NEEDED BEFORE PAYMENT FOR PROTECTED AREA**

1. Copy of EBS authorization on FCC Form 392 (unless waiver is granted by the FEMA Regional Director).  
(To be furnished by owner.)
2. Copies of A-E plans and specifications certified by a shelter analyst.  
(To be furnished by owner.)
3. Three proposals for construction.  
(To be furnished by owner.)
4. Copy of construction contract.  
(To be furnished by owner.)
5. Record of Project Officer's inspection during construction or at completion.  
(To be furnished by Project Officer.)
6. Photographs (two views).  
(To be furnished by Project Officer.)
7. Contractor's receipted invoices for shelter construction, including A-E fees (if any), equipment, materials and labor, ventilation, lighting, electrical wiring, and other items related primarily to the shelter.  
(To be furnished by owner.)



**APPENDIX E**  
**ASSISTANCE OFFICER'S CHECKLIST**  
**ITEMS NEEDED BEFORE PAYMENT**  
**FOR**  
**EMERGENCY GENERATOR AND RELATED FACILITIES**

- \*1. Owner's signature on equipment loan agreement(s).  
(To be furnished by owner.)
2. Evidence of three separate proposals.  
(To be furnished by owner.)
3. Copy of purchase orders and/or contract for installation of generator.  
(To be furnished by owner.)
4. Ensure that inspection of protective construction is complete.  
(To be furnished by Project Officer.)
5. Inspection of installation and operation of generator and all related equipment.  
(To be furnished by Project Officer.)
6. Photographs (one of generator and one of fuel tank).  
(To be furnished by Project Officer.)
7. Contractor's receipted invoices, including equipment, materials and labor, A-E fees (if any), etc.  
(To be furnished by owner.)
8. Complete schedule of equipment, listing item, quantity, description (including serial numbers), and value.  
(To be furnished by owner.)
9. Make sure following statement appears on invoice presented by owner: "Upon payment by the government, the owner will transfer title of ownership for the equipment listed in the schedule of equipment to the Federal Communications Commission and enter into an equipment loan agreement with that agency providing for continued retention and use of the equipment by the station owner."

\*Need not separate emergency generator and related equipment; can be combined with RPU and programming equipment. One copy to FCC.





**APPENDIX F**  
**ASSISTANCE OFFICER'S CHECKLIST**  
**ITEMS NEEDED BEFORE PAYMENT**  
**FOR**  
**REMOTE PICKUP UNITS AND RELATED FACILITIES**

- \*1. Owner's signature on equipment loan agreement(s).  
(To be furnished by owner.)
2. Ensure that inspection of protective construction is complete.  
(To be furnished by Project Officer.)
3. Ensure that station owner has FCC authorizations to install and operate RPUs  
(FCC Form 313).  
(Evidence submitted by owner.)
4. Abstract of three bids (proposals).  
(To be furnished by owner.)
5. Copy of purchase order and/or contract for furnishing and installing equipment.  
(To be furnished by owner.)
6. Photographs (one of RPU installation, including programming equipment, and one of  
antenna).  
(To be furnished by Project Officer.)
7. Inspection of installation and on-air demonstration of RPU operation for Project  
Officer. (FCC need not be present.)
8. Contractor's receipted invoices including equipment, materials and labor, A-E fees  
(if any), and all related equipment to operate the RPU installation.  
(To be furnished by owner.)
9. Complete schedule of equipment, listing item, quantity, description (including  
serial numbers), and value.  
(To be furnished by owner.)
10. Make sure that the following statement appears on invoice presented by owner:  
"Upon payment by the government, the owner will transfer title of ownership for  
the equipment listed in the schedule of equipment to the Federal Communications  
Commission and enter into an equipment loan agreement with that agency provid-  
ing for continued retention and use of the equipment by the station owner."

\*Need not separate RPU and related equipment; can be combined with emergency generator and programming equipment. One copy to FCC.



**APPENDIX G**  
**ASSISTANCE OFFICER'S CHECKLIST**  
**ITEMS NEEDED BEFORE PAYMENT**  
**FOR**  
**PROGRAMMING EQUIPMENT**

- \*1. Owner's signature on equipment loan agreement(s).  
(To be furnished by owner.)
2. Ensure that inspection of programming area is complete.  
(To be furnished by Project Officer.)
3. Abstract of three bids (proposals).  
(To be furnished by owner.)
4. Copy of purchase orders.  
(To be furnished by owner.)
5. Photograph (one to show programming equipment, including interior RPU equipment).  
(To be furnished by Project Officer.)
6. Inspection of programming equipment:
  - a. Wiring and terminal facilities for connecting shelter equipment to existing station equipment.
  - b. Channel mixer, control equipment, and remote amplifier.
  - c. Tape recorder/player.
  - d. Turntable, cart machine, or an additional tape recorder/player.
  - e. Microphone.
  - f. Console.  
(To be furnished by Project Officer.)
7. Vendors' receipted invoices.  
(To be furnished by owner.)
8. Complete schedule of above items that are to be furnished at government expense, giving item, quantity, description (including serial numbers), and value.  
(To be furnished by owner.)

\*Need not separate programming equipment; can be combined with emergency generator and RPUs. One copy to FCC.

May 10, 1984

9. Make sure that the following statement appears on invoice presented by owner:  
"Upon payment by the government, the owner will transfer title of ownership for the equipment listed in the schedule of equipment to the Federal Communications Commission and enter into an equipment loan agreement with that agency providing for continued retention and use of the equipment by the station owner."

**APPENDIX H**  
**CHECKLIST OF**  
**ITEMS TO BE ACCOMPLISHED BY THE OWNER/LICENSEE**

1. Submit application for EBS authorization, if not already obtained.
2. On being granted EBS authorization and notified of station's selection, attend negotiation conference.
3. Sign protected area agreement.
4. Upon receipt of a fully executed copy of a Radio Facility Protected Area Agreement, arrange for an A-E firm to prepare plans and specifications.
5. Submit two copies of plans and specifications to Assistance Officer for approval.
6. On approval of drawings, obtain three proposals for construction and three proposals for all equipment to be purchased under the equipment loan agreement. Submit copies of all proposals to the Assistance Officer.
7. Accept bid most advantageous to the government, price and other factors considered, and begin construction and purchase of equipment.
8. Notify Assistance Officer that construction has started and submit copies of contract and purchase orders.
9. Advise Assistance Officer of progress and notify when construction has been completed and the equipment has been installed and is operational. Furnish all pertinent data on equipment, including serial numbers, capacity, location, etc.
10. After Project Officer's final inspection, prepare and submit invoices noting:  

"Upon payment by the government, the owner will transfer title of ownership for the equipment listed in the schedule of equipment to the Federal Communications Commission and enter into an equipment loan agreement with that agency providing for continued retention and use of the equipment by the station owner."
11. Sign one copy of the equipment loan agreement(s).
12. Sign release for final payment.





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