

ALERT & NOTIFICATION SYSTEM

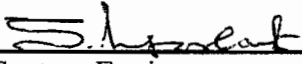
For


COMANCHE PEAK STEAM ELECTRIC STATION

FINAL REPORT

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**Alert & Notification System  
For  
Comanche Peak Steam Electric Station  
(Final Report)**

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## INTRODUCTION

This report was prepared by personnel from TXU Power Company. It describes the Alert & Notification System utilized for Comanche Peak Steam Electric Station, and addresses the guidance of NUREG-0654/FEMA-REP-1, Appendix 3, "Means for Providing Prompt Alerting & Notification of Response Organizations and the Population" and FEMA-REP-10, "Guide for the Evaluation of Alert and Notification Systems for Nuclear Power Plants". This report has been reviewed by personnel from Hood and Somervell County government and the Governor's Division of Emergency Management, State of Texas.

### NUREG 0654 FEMA REP-1 PLANNING STANDARD: E NOTIFICATION METHODS & PROCEDURES

"Procedures have been established for notification, by the licensee of state and local response organizations and for notification of emergency personnel by all response organizations; the content of initial and follow-up messages to response organizations and the public has been established; and means to provide early notifications and clear instruction to the populace within the plume exposure pathway Emergency Planning Zone have been established".

#### E.5 Evaluation Criterion

"State and local government organizations shall establish a system for disseminating to the public appropriate information contained in initial and follow-up messages received from the licensee including the appropriate notification to appropriate broadcast media, e.g., the Emergency Broadcast System (EBS)."

Note: The Emergency Alert System (EAS) has replaced EBS and will be so referenced throughout this report.

#### E.5.2 Acceptance Criteria

1. Lists the broadcast stations and broadcasting systems that are to be selected so as to ensure that:
  - Transmission signal(s) are of adequate strength within the coverage area under review; and
  - Capability exists to broadcast official information 24 hours a day, 7 days a week. If a selected station does not have a backup power supply, then an alternate station should be identified and included in the emergency plan.
2. Depicts procedures and individual responsibilities for each organization and commitments between agreeing parties to honor

these responsibilities in case of an offsite radiological emergency. These procedures should address activation authorization and designate individuals, by title, responsible for notification system activation. Actual authentication codes should not be identified.

3. References or includes some form of documentation, available for review, that states the station's or broadcast system's ability to participate in the public notification process. The emergency plan should identify, by title, points of contact accessible 24 hours a day, 7 days a week. Participation in a "Local Emergency Broadcast System Operational Area Plan" is considered satisfactory.
4. Clearly defines intervals for broadcasting official information statements for each class of nuclear power plant emergency action level. It is recommended that the maximum broadcast interval be no more than 15 minutes (for official information during actual general emergencies) until the emergency is declared officially to be over.
5. Includes a commitment that the Emergency Operations Center (EOC) or the media center will have the capability to monitor the broadcast of official information messages (radio and television). Incorrectly transmitted information should be immediately identified to the station(s) by the EOC's authorized point of contact.

### Discussion

WBAP, located in Arlington, Texas, is the Primary EAS broadcast facility for the counties in north Texas that make up EAS District 7. The station operates 7 days a week, 24 hours a day and has an output power of 50,000 watts. The station provides the EAS broadcast to all other media including television. The station has backup power and is a participant in the State of Texas EAS Plan.

The State of Texas Emergency Management Plan, Section V A, 10 requires local government to establish an emergency management program which includes the development of means or methods to provide warning and emergency information to the general public. Annex A, "Warning" outlines the State responsibilities for warning including EAS operation and use by local governments.

In Section VI of both county plans, responsibility for informing citizens of emergency situations and recommended public action is assigned to the executive group (County Judge/Mayor/Council Members County

Commissioners). This section of the plan also directs the County Sheriff and Chiefs of Police to maintain the capability to warn the general public and to disseminate warning when required. Annex W, "Fixed Nuclear Facility Response" to each of the County Emergency Management Plans further outlines procedures to be followed in the dissemination of public information and warning for each emergency classification level.

Attachment F to Appendix 8 of Annex W of the Hood and Somervell Counties Emergency Management Plans states that when protective actions are recommended, the public will be informed over the Emergency Alert System – WBAP 820 Fort Worth. WBAP is the Primary Emergency Alert Station in this area and is a participant in the State of Texas Emergency Alert System Plan which commits to Local Area Activations in the event of a local emergency. Samples formats of EAS messages are included in Attachment E.5.1.

The State of Texas Emergency Alert System Plan does not address broadcast frequency but WBAP does agree to act when called upon for assistance. The requested broadcast frequency will be decided by the County Judges based on the severity of the situation.

EAS broadcasts will be monitored in the county EOCs and the Joint Information Center's Rumor Control function so that incorrect information can be corrected.

To inform the public about the Emergency Alert System and actions which may be required, Emergency Public Information is distributed annually to the population within 10 miles of Comanche Peak Steam Electric Station. Additionally, posters are located in public areas, inserts in telephone directories and brochures placed in motel rooms and other locations where transients are likely to gather or lodge. All of these publications contain directions to the populace to direct them to tune to the EAS station if the alerting system sounds.

## E.6 Evaluation Criterion

“Each organization shall establish administrative and physical means, and the time required for notifying and providing prompt instructions to the public within the plume exposure pathway Emergency Planning zone. (See Appendix 3.) It shall be the licensee’s responsibility to demonstrate that such means exist, regardless of who implements this requirement. It shall be the responsibility of the State and local governments to activate such a system.”

### E.6.2 Acceptance Criteria

Administrative Procedures A description of acceptable administrative procedures should include, at a minimum:

- Specification of those organizations or individuals, by title, responsible for activating the alert and notification system, including any alternates necessary to ensure that such organizations or individuals will be notified and mobilized in time to perform their responsibilities.
- Discussion of the alert and notification activation procedures and an analysis of the amount of time required to implement these procedures, demonstrating that once the appropriate official has decided to activate the alert and notification system, the 15-minute design objective of NUREG-0654/FEMA-REP-1, Revision 1, p. 3-3, will be met.
- Specification of procedures and safeguards employed to ensure that a legitimate and clearly understood command to activate the alert and notification system is conveyed from the appropriate officials to the persons responsible for physically activating the system, and that these persons recognize, understand, and take appropriate actions in response to such a command.

Physical Means As specified in Appendix 3 of NUREG-0654/FEMA-REP-1, Revision 1, the physical means must effectively alert the public:

The minimum acceptable design objectives for coverage by the system are:

- Capability for providing both an alert signal and an informational or instructional message to the population on an area wide basis throughout the 10-mile EPZ, within 15 minutes.

- The initial notification system will assure direct coverage of essentially 100% of the population within 5 miles of the site.
- Special arrangements will be made to assure 100% coverage within 45 minutes of the population who may not have received the initial notification within the entire plume exposure EPZ.

### Discussion

The controls for the alert and notification (sirens) system are located in the county law enforcement offices which are manned 24 hours per day. The entire system can be activated from either county control point (CCP).

Annex W, "Fixed Nuclear Facility Response" of each of the county Emergency Management Plans, defines the County Judge as the individual who will authorize information to the public and the County Sheriff will disseminate warning as required.

Alternates for each assigned emergency function are identified in the County Emergency Management Plans and Annexes. Additionally, Attachment C of Appendix 8 of Annex W "Fixed Nuclear Facility Response" of the County Emergency Management Plans specifies the verification procedure to be followed if information is received via any means other than dedicated line, law enforcement teletype or law enforcement radio before further action is taken.

Local officials are notified of an incident at Comanche Peak in accordance with Attachment D of Appendix 8 of Annex W "Fixed Nuclear Facility Response" of the County Emergency Management Plans. Call lists are maintained in the County Dispatch centers and updated as needed. Attachment F of Appendix 8 of Annex W contains detailed instructions for public warning. This is depicted graphically in Attachment E.6.1 of this document.

Since the controls for the alerting system are maintained in the manned law enforcement center, there is no delay between a decision to use the system and its activation. This satisfies the 15 minute requirement.

The siren system coverage provides 60 dB levels for essentially 100% of the populated area of the 10-mile EPZ.

In the event that one or more sirens do not activate, mobile route alerting using emergency vehicles with public address systems will be initiated with a goal of completing notification within 45 minutes of the decision to activate the sirens. Detailed instructions for this activity are found in

**Attachment F of Appendix 8 of Annex W of the County; Emergency Management Plans.**

**INTRODUCTION**

This document describes the initial alerting system for the Plume Exposure Emergency Planning Zone (EPZ) surrounding the Comanche Peak Steam Electric Station (CPSES). The alerting system will be utilized as described in Section 3.0 of the CPSES Emergency Plan Manual.

**1.0 FACILITY DESCRIPTION AND LOCATION**

The Comanche Peak Steam Electric Station (CPSES) is located in Somervell County, Texas on the shores of the Squaw Creek Reservoir, an impoundment made by a dam constructed on Squaw Creek, approximately 4 ½ miles upstream of its confluence with the Paluxy and Brazos rivers. The plant site is approximately 65 miles southwest of the Dallas – Fort Worth Metropolitan Area. TXU Power Company is responsible for the operation of the CPSES.

The nearest incorporated communities are De Cordova, Texas (approximately 10 miles northeast), Glen Rose, Texas (approximately 4.5 miles south – southwest); Granbury, Texas (approximately 9.8 miles north); and Tolar, Texas (approximately 10 miles northwest). Numerous unincorporated developments are located on or near Lake Granbury (approximately 7 to 10 miles north to northeast). Attachment 1 shows the location of these communities with respect to the CPSES.

Two Emergency Planning Zones are defined in the CPSES Emergency Plan. One is the Ingestion Exposure EPZ, the area within a 50 mile radius of the site, and the second is the Plume Exposure EPZ, the area within a 10 mile radius of the site. The CPSES initial alerting system was designed to provide a 60dB alerting signal to essentially 100% of the population within 10 miles of the site.

**2.0 ALERTING SYSTEM DESCRIPTION**

**HISTORICAL INFORMATION**

The initial alerting system for the Comanche Peak SES as officially approved by FEMA on July 15, 1985 consisted of a network of 65 sirens located throughout the 10-mile EPZ. The sirens were radio controlled and tone activated by duplicate encoders located in the Somervell County Sheriff's office and in the Hood County Sheriff's office. The siren system was divided into four quadrants, each of which could be activated from either sheriff's office. Further, each quadrant could be activated independently, or in conjunction with any other or all other quadrants.



The initial alerting system employed Federal Signal Corporation "Thunderbeam Model RSH10A 240" Sirens. These sirens are rated by the manufacturer to produce 128dB(C) at 100 feet. The sirens were mounted on the top of wooden poles 50 feet above the ground. Sitting and spacing of the sirens to achieve the desired coverage was determined by consideration of the topography and demography of the 10-mile EPZ. The design coverage is in accordance with the design objectives specified in Appendix 3 of NUREG-0654 / FEMA-REP-1, Revision 1 (Reference 7.4).

The sirens are capable of producing the civil defense "ALERT" signal (a steady tone) and the civil defense "ATTACK" signal (a slow wavering tone). The sirens are capable of being recycled to produce a 3-minute signal of either type as often as needed. The "ALERT" signal was selected as the tone to be used in the event of an incident at Comanche Peak.

On or about October 8, 1986, siren number 66 (Federal Thunderbeam Model RSH10A 240) was added in the City of Glen Rose.

In 1993, an upgrade to the siren control system was installed. It made use of a Supervisory Control and Data Acquisition (SCADA) system designed and installed by Acoustic Technologies Inc. (ATI). The system provided for activation of the sirens and data feedback via a DOS based computer program to the control points. The change also incorporated the use of a 900 MHZ trunking radio system. This upgrade was installed to correct the problem of false activations due to spurious radio transmissions on the old VHF radio system and no siren to controller verification.

System age and issues regarding reporting accuracy and maintenance prompted TXU to once again seek to upgrade the siren system in 2002. Following the submission and evaluation of bids, the decision was made to upgrade the siren control system to the Federal Signal Corporation's Federal Commander Digital System (FCDS) and make use of the station's UHF radio system. The FCDS makes use of "flash memory" and a "windows" based computer feedback system.

In addition to the control up-grade, three additional sirens were added to the system. The sirens were Federal "Model 2001" with battery back-up. The sirens were installed as follows: Siren 67 was added to zone 2A just south of the plant, Siren 68 was added to zone 4B approximately 5.0 miles northeast of the plant and Siren 69 was added at the entrance to the City of De Cordova approximately 10.0 miles northeast of the plant. These sirens are also rated by the manufacturer to produce 128dB(C) at 100 feet. The sirens were mounted on the top of wooden poles 50 feet above the ground. Sitting and spacing of the sirens to achieve the desired coverage was determined by consideration of the topography and demography of the 10-mile EPZ.

The sirens are also capable of producing the civil defense "ALERT" signal (a steady tone) and the civil defense "ATTACK" signal (a slow wavering tone). The sirens are capable of being recycled to produce a 3-minute signal of either type as often as needed.

September 23, 2003 a letter verifying reasonable assurance that the system is adequate to alert and promptly notify the public in the event of a radiological emergency at the site was sent to the USNRC from FEMA Region VI.

In December, 2003, Siren number 70 (Model 2001 with battery back-up) was installed on TXU property just west of the plant and overlooking zone 2A.

On March 8, 2004, a letter was sent to FEMA Region VI requesting prior approval for the following change to the system:

- Add sirens 71 and 72 to enhance siren coverage to the City of Granbury
- Change sirens 6 and 9 from Federal RSH10 Thunderbeam sirens to Federal 2001 sirens. Both siren models are rated at 128 db at 100 feet. This change in siren model will not change siren coverage, but will increase the area covered by battery back-up equipped sirens within 5 miles of the plant. Siren 9 will also provide a siren with battery back-up for the City of Glen Rose.

#### THE PRESENT CPSES SIREN SYSTEM

The present alerting system which incorporates the changes submitted to FEMA, for the Comanche Peak SES consists of a network of 72 sirens located throughout the 10-mile EPZ. The sirens are radio controlled and activated by Federal Commander Digital Controller SS2000 encoders which provide computer based data feedback located in the Somervell County Sheriff's office and in the Hood County Sheriff's office. A third control point is located at the CPSES site and is used for diagnostic purposes, verification of test data and post-maintenance testing. The control points located in the two county law enforcement centers are the controllers used to activate the siren system during an emergency. As originally designed, the siren system is divided into four quadrants, each of which could be activated from either sheriff's office. Further, each quadrant could be activated independently, or in conjunction with any other or all other quadrants.

The CPSES siren system employs two types of sirens, the Federal Signal Corporation's "Thunderbeam", Model RSH10A\*240 (siren numbers 1-5, 7, 8, 10-43, 45-46, and 48-66) and "FDS-2001" with battery back-up (siren numbers 6, 9, 44, 47, 67-72). Both models of sirens are rated by the manufacturer to produce 128dB(C) at 100 feet.

The sirens are mounted at the top of wooden poles 50 feet above ground level. Sitting and spacing of the sirens to achieve the desired coverage was determined by consideration of the topography and demography of the 10-mile EPZ. The design coverage is in accordance with the design objectives specified in Appendix 3 of NUREG-0654 / FEMA-REP-1, Revision 1 (Reference 7.4).

The sirens are capable of producing the civil defense “ALERT” signal (a steady tone) and the civil defense “ATTACK” signal (a slow wavering tone). The sirens are capable of being recycled to produce a 3-minute signal of either type as often as needed. The “ALERT” signal was selected as the tone to be used in the event of an incident at Comanche Peak.

### 3.0 SIREN SYSTEM DESIGN CRITERIA

#### 3.1 NRC – FEMA Criteria

- A. The NRC-FEMA acceptance criteria for the design objectives of an initial alerting system are prescribed by Appendix 3 of NUREG-0654 / FEMA-REP-1, Revision 1 to be as follows:
1. Within the plume exposure EPZ the system shall provide an alerting signal and notification by commercial broadcast (e.g. Emergency Broadcast System, now Emergency Alert System) plus special systems such as NOAA radio. A system which expects the recipient to turn on a radio receiver without being alerted by an acoustical alerting signal or some other manner is not acceptable.
  2. The minimum acceptable design objectives for coverage by the system are:
    - a. Capability for providing both an alert signal and an informational or instructional message to the population on an area wide basis throughout the 10 mile EPZ, within 15 minutes.
    - b. The initial notification system will assure direct coverage of essentially 100% of the population within 5 miles of the site.
    - c. Special arrangements will be made to assure 100% coverage within 45 minutes of the population who may not have received the initial notification within the entire plume exposure EPZ.
- B. Detailed requirements from Appendix 3 of NUREG-0654 / FEMA-REP-1, Revision 1 for the initial alerting system design were delineated to be:
1. The basis for any special requirements exceptions (e.g., for extended water areas with transient boats or remote hiking trails) must be documented.

2. Assurance of continued notification capability may be verified on a statistical basis.
  3. Every year, or in conjunction with an exercise of the facility, FEMA, in cooperation with the utility operator, and/or the State and local governments will take a statistical sample of the residents of all areas within about ten miles to assess the public's ability to hear the alerting signal and their awareness of the meaning of the prompt notification message as well as the availability of information on what to do in an emergency. [This is no longer required (AN-1, 1987)].
  4. The system plan must include a provision for corrective measures to provide reasonable assurance that coverage approaching the design objectives is maintained.
- C. Specific requirements from Appendix 3 of NUREG-0654/FEMA-REP-1, Revision 1 for the design objectives of a siren system were defined as:
1. The design concept and expected performance of the siren system must be documented.
  2. The design must take into account the demography and topography of the areas being considered.
  3. The siren system should compliment rather than substitute for institutional alerting mechanisms already in place (e.g., schools, hospitals, factories, shopping centers, jails, and centralized offices).
  4. The target sound level for the siren system should be a sound level 10dB above average ambient background.
  5. The maximum sound levels received by any member of the public should be lower than 123dB.
  6. Where siren systems are proposed without field sound surveys, the following requirements apply:
    - a. Figure 1 of FEMA CPG-1-17 must be used as the design criterion for siren systems in areas with population densities above 2000 persons/mi<sup>2</sup>.
    - b. For areas with population densities below 2000 persons/mi<sup>2</sup>, the system must be designed to produce a minimum of 60dB.

- c. An attenuation factor of 10dB loss per distance doubled should be used to determine siren range in the absence of special geographical features.
- 7. The siren signal shall be a 3 to 5 minute steady signal as described in Paragraph IV E of FEMA CPG-1-17 and capable of repetition.
- 8. The actual population density in the plume exposure EPZ must be considered in the design of a siren warning system.
- 9. The basic criterion needed for the design of a siren system is the acceptable dissonant sound level as described in FEMA CPG-1-17. As an acceptable criteria at most locations, 10dB above average daytime ambient background noise is suggested as a target level for the design of an adequate siren system.

### 3.2 CPSES Siren System Design Criteria

The CPSES siren system was designed in accordance with the NRC-FEMA guidelines as presented in Section 3.1 of this report. Specifically, the siren system design basis was as follows:

- 3.2.1 The siren system shall be continuously capable of providing an alerting signal that is at least 10dB above the ambient background noise level throughout the 10-mile EPZ within 15 minutes while exposing no member of the public to sound levels in excess of 123dB.
- 3.2.2 Direct coverage of essentially 100% of the population within 5 miles of the site shall be a design objective.
- 3.2.3 A review of the topography within the 10-mile EPZ identified four significant topographic features:
  - a. The Brazos River Basin and Lake Granbury
  - b. The Paluxy River Basin
  - c. The Squaw Creek Basin and reservoir
  - d. Comanche Peak (plateau)

The placement of sirens was such as to account for the sound attenuation effects of these features. The remainder of the plume exposure EPZ was considered to be without significant topographical features.

- 3.2.4 The population density within the plume exposure EPZ was reviewed. No population center had a density of greater than 2000 persons/mi<sup>2</sup>. For the cities of Glen Rose and Granbury, siren sound level coverage was determined in accordance with the CPG-1-17 guidelines for suburban and rural areas.
- 3.2.5 No special requirements exceptions were taken. The parks and public recreational areas within the Plume Exposure EPZ were to be adequately covered by the siren system. The alerting requirements for industrial sites and institutions were determined with consideration given to existing alerting mechanisms.
- 3.2.6 In order to ensure the capability of the siren system to perform its design function, the reliability of the electrical service was investigated and found to be very high. A maintenance program was established for the siren system with annual inspections to be performed on each siren. A test program was initiated which includes:
- a. A monthly activation of the entire system for a period of 30 seconds.
  - b. A monthly report of the siren system effectiveness summarized quarterly and submitted to the State and FEMA.
  - c. A process to identify and implement improvements in the system.
- 3.2.7 The CPSES siren system was designed without a field sound survey. Over 90% of the entire 10-mile EPZ was designed to receive a siren sound of at least 60dB based on an attenuation factor of 10dB loss per distance doubled. Exceptions to this criteria were in the conservative direction as discussed in Sections 3.2.3 and 3.2.4. The siren signal is presently set to sound for slightly over 3 minutes and may be repeated as often as necessary.

## 4.0 CPSES SIREN SYSTEM DESIGN

### 4.1 Topography

In consideration of the four significant topographical features identified in the siren design basis review, sirens were located as required to compensate for the sound attenuation to be expected from each topographic feature.

#### 4.1.1 Brazos River Basin and Lake Granbury

Approximately 40 river miles of the Brazos River and 10 river miles of Lake Granbury lie within the 10 mile EPZ. For the most part, the Brazos river basin as well as the shoreline of Lake Granbury consists of gently sloping inclines up from the river bed and outward. This type of topographical feature does not significantly attenuate sound. Sirens were, therefore, located such that essentially 100% of the Brazos River and Lake Granbury within the 10 mile EPZ were subjected to the design basis siren level of 60dB.

#### 4.1.2 Paluxy River Basin

The Paluxy River and its tributaries are west and south of the plant site. The topography of this area, which encompasses essentially one-fourth of the entire 10 mile EPZ, is dominated by the Paluxy River Basin. The Basin is relatively flat and varies from one-half to one-mile in width. The terrain surrounding the basin is moderately rugged with numerous small peaks and valleys. Most of the resident population in this area lives either in the Paluxy River Basin or in one of the smaller valleys. An increase in the transient population may be evident on weekends and especially during hunting season. The Dinosaur Valley State Park is located on the banks of the Paluxy River and approximately 3.0 miles west of the city of Glen Rose. In order to compensate for the expected attenuation of siren sound in this relatively rough region of the 10 mile EPZ, sirens were located in the Paluxy River basin area such that the entire basin is subjected to the 60dB design basis sound level. The resident population in the area was reviewed and other sirens were located such that essentially 100% of the populated areas were within the 60dB radius of siren.

#### 4.1.3 Squaw Creek Reservoir and Basin

The Squaw Creek Reservoir encompasses approximately 3300 acres and is located entirely within a 5 mile radius of the site. The portion of the Squaw Creek basin below the impoundment is characterized to the east by gently sloping, rolling hills, and to the west by relatively steep rises thickly covered with low (10-15 feet tall) cedar trees. There is no Public access to the Squaw Creek Reservoir. There are no public parks or

recreational areas on Squaw Creek below the reservoir. In order to ensure notification of the Squaw Creek Park authorities, a siren was located to provide a minimum of 70dB at the park headquarters. The entire Squaw Creek Reservoir is subjected to the design basis 60dB warning level.

Sirens were located in the Squaw Creek Basin such that essentially 100% of the resident population were within the 60dB radius of a siren.

#### 4.1.4 Comanche Peak

The Comanche Peak, elevation 1230 feet, is a small plateau rising roughly 300 feet above the surrounding terrain. The area surrounding the park is characterized by small thick patches of cedar with numerous open fields. There is no resident population on Comanche Peak. A small development is located on all sides of the plateau. In consideration of the expected attenuation due to the proximity of Comanche Peak, and with regards to the resident population, sirens were located both north and south of the peak and within one-half mile of the peak. This siren configuration ensures that the entire area surrounding Comanche Peak is subjected to the design basis sound level of 60dB.

#### 4.1.5 Topography of the Remainder of the Plume Exposure EPZ

The remainder of the 10 mile EPZ is characterized by gently rolling, low hills, sparsely covered with mesquite, oak, and cedar trees with a few areas of relatively dense cedar brakes or small forests of hardwoods. One relatively large orchard, the approximately 3000 acre Leonard Brothers Pecan Farm, known as "Pecan Plantation" has been developed into a residential area where the majority of the population is located on the extremities of the pecan orchard. Sirens were located with some overlapping coverage such that essentially 100% of the populated areas were subject to the design basis coverage of 60dB.

In summary, the CPSES initial notification siren system was designed with adequate consideration of the topography of the Plume Exposure EPZ.

## 4.2 Demography

The CPSES Plume Exposure EPZ is predominately a rural agricultural area. The only four incorporated communities having more than 100 residents are De Cordova, Granbury, Glen Rose, and Tolar. None of these communities has a population density of 2000 persons/mi<sup>2</sup> (actual density is less than 1000 persons/mi<sup>2</sup>). Numerous small residential developments may be found along the shores of Lake Granbury. The placement of sirens within the Plume Exposure EPZ considered population density.



#### 4.2.1 De Cordova, Granbury, Glen Rose, and Tolar

The City of De Cordova is located on the shores of Lake Granbury 10 miles northeast of the site. Two sirens were placed such that essentially 90% of the residences within the 10 mile EPZ were subjected to the 70dB coverage of a siren. The remainder is within the 60dB radius of a siren.

The City of Granbury is located on the shores of Lake Granbury, 9.8 miles north of the site. Five sirens were placed such that essentially 100% of the residences within the 10 mile EPZ were subjected to the 70dB coverage of a siren. Further, the entire city of Granbury is within the 60dB radius of a siren.

The city of Glen Rose is located within the Paluxy River Basin approximately 4.5 miles south – southwest of the site. Four sirens were located within the river basin such that all areas of the city of Glen Rose were subjected to a minimum of 70dB sound level.

The city of Tolar is located approximately 10 miles north-west of the site. One siren was located southeast of Tolar such that essentially 100% of the city is within the 70dB coverage of the siren.

Although none of the above identified cities have actual population densities in excess of 1000 persons/mi<sup>2</sup> (est. 2000), the design coverage of the siren system was in accordance with Figure 1 of CPG-1-17 for suburban and rural areas (over rooftops).

#### 4.2.2 Residential Developments on Lake Granbury

Both shores of the 10 river miles of Lake Granbury that lie within the Plume Exposure EPZ have numerous small residential developments. These communities characteristically have a number of single family dwellings with a small area typically reserved for mobile homes.

Anticipating growth along the shores of Lake Granbury, sirens were located such that a design sound level of 70dB would cover the majority of existing or potential developments. The remainder of this area would be subjected to the design basis sound level of 60dB.

#### 4.2.3 Hood and Somervell Counties

The average population density within the 10 mile EPZ was determined to be approximately 96 persons per square mile. In fact, the rural population is somewhat more concentrated in Hood County and the south and south eastern portion of Somervell County. Although much of southwestern

Hood County and the western half of Somervell County is very thinly populated, only one area of the Plume Exposure EPZ was defined as being uninhabited. This area is south-southwest and southwest of the plant site, and 5 to 7.5 miles from the plant site. Most of this area is covered by several large privately owned ranches.

In the rural areas of Hood and Somervell counties, sirens were located to provide 60dB coverage for essentially 100% of the population within the 10 miles EPZ. The resultant coverage provides a 60dB SPL for over 90% of the area of the 10 mile EPZ.

In summary, the CPSES initial notification siren system was designed with consideration of the actual population distribution throughout the Plume Exposure EPZ.

#### 4.3 Special Facility Identification and Alerting Requirements

Industrial locations, schools, institutions, campgrounds, retail trade centers, private clubs, and public gathering facilities were collectively identified as special facilities. The alerting requirements for each facility or type of facilities was determined with consideration given to existing alerting mechanisms (e.g. page systems, intercoms, bells, and local sirens, etc.)

##### 4.3.1 Industrial Locations

A review of the Plume Exposure EPZ resulted in identification of six industrial locations.

Three of these locations were: the Unimin Company, 9.2 miles east of the site; Lattimore Materials Company, 7.8 miles east-southeast of the site; and Ingram Sand and Gravel Company, 4.5 miles east of the site. These facilities are gravel pit operations with sound levels exceeding 70dB at the actual excavation points; but there are offices on each site where the typical noise level is 60dB. Sirens were located such that each office would be subjected to a 70dB outdoor warning level.

Two of the industrial locations were: The Wolf Hollow Generating Plant, 5.4 miles northeast of the site, and the DeCordova Bend Steam Electric Station, 8.9 miles north-east of the site. The noise level at these plants is approximately 90dB with a 70dB level present in the respective offices. Sirens were located to provide 80dB outdoor coverage at each plant's respective office.

The sixth industrial location was the Comanche Peak Steam Electric Station itself. The plant site and its permanently occupied office structures had warning systems installed. One siren was installed on the plant site to

alert personnel who may be outside or who are in temporary structures not covered by the in-plant warning system. The Nuclear Offsite Support Facility, an office structure 1.2 miles west of the site is tied in to the plant All Page system and a siren is located to cover the office building with an 80dB outdoor sound level.

#### 4.3.2 Public Schools

There were three public schools identified within the Plume Exposure EPZ: the Glen Rose ISD, 4.5 miles south southeast of the site; the Tolar ISD, 10.0 miles northwest of the site, and Granbury ISD, 10.0 miles north of the site.

Each of the Superintendents offices were within the 70dB radius of coverage of a siren. Once alerted by the sirens, it is the school's official's responsibility to determine what the emergency is and to respond accordingly. Each school building in the three school systems has some form of alerting system.

#### 4.3.3 Institutions

Nine institutions were identified within the Plume Exposure EPZ

Currently there are six active medical / health care facilities: the Glen Rose Nursing Home and Medical Center Hospital, 4.5 miles south southeast of the site; the Cherokee Rose Nursing Home , 4.5 miles south southeast of the site, the Granbury Care Center, 9.9 miles north of the site; the Granbury Villa 9.1 miles north northwest of the site, and the Lake Granbury Medical Center Hospital, 9.2 miles north of the site. Sirens were located such that each of these facilities were provided with 70dB coverage.

Two institutions identified were: the Hood County Law Enforcement Center and Jail, 10.0 miles north of the site, and the Somervell County Jail, 4.3 miles south southeast of the site. These facilities are located within the 70dB coverage of a siren.

The last institution identified was the "Happy Hill Farm" Children's Home and Vocational Training Center Academy, a private school located 3.3 miles east of the site. A siren was located such that 70dB coverage of the administration office and at least 60dB coverage of the entire farm would be ensured.

#### 4.3.4 Campgrounds

Within the Plume Exposure EPZ, ten public or private recreational areas with camping facilities were identified: ; Camp Arrowhead, 4.6 miles east of the site; Camp & Fish, 5.4 miles east-southeast of the site; Camp Tres Rios, 5.1 miles southeast of the site; Riverbend Retreat Center, 8.2 miles southeast of the site; Dinosaur Valley State Park, 4.0 miles south-southwest of the site; the Pecan Plantation Campground, 9.0 miles east-northeast of the site; the Cedar Brake Campground, 4.8 miles southwest of the site; the Glen Lake Methodist Camp, 4.9 miles south-southeast of the site, the Country Side RV Park 10.0 miles north-northeast of the site, and Oakdale Park, 4.6 miles south of the site.

The Fossil Rim Wildlife Center is a drive-through wildlife park with a visitor's center, offices and overnight lodging located 7.5 miles south-southwest of the site.

Sirens were located such that each of the offices at these campgrounds would be within the 70dB radius of coverage. Additionally, each recreational area is covered with a minimum of 60dB which is adequate to alert any persons engaged in outdoor activities (e.g. camping, fishing, swimming, and hiking).

#### 4.3.5 Retail Trade Centers and Public Gathering Places

Within the Plume Exposure EPZ, concentrations of population may be found at times at area retail trade centers or at public gathering places.

Retail trade centers include: shopping centers, department stores, grocery stores and the downtown area of both Granbury and Glen Rose. Each retail center is within the 70dB radius of coverage of a siren.

Six major public gathering places were identified: the Granbury High School athletic field, 9.8 miles north of the site; the Granbury downtown square, 10.0 miles north of the site; the Glen Rose downtown square, 4.5 miles south southeast of the site; the Glen Rose High School athletic field, 4.6 miles south-southwest of the site; the Somervell County Amphitheater, 4.3 miles southeast of the site, and the Somervell County Expo Center, 4.5 miles southeast of the site.

Each of these public gathering places is within the 70dB radius of coverage of a siren.

In each of the facilities described above, the CPSES siren system design accounted for the increased alert level required. The required alerting level was

based upon guidance provided by Table 5.4 of NUREG/CR-2654, PNL-4227. In all cases, a minimum sound level of 70dB was designed to cover the office of headquarters of each facility.

#### 4.4 Determination of Coverage and Siren Placement

An attenuation factor of 10dB loss per distance doubled was used as the design basis for determination of siren coverage for the CPSES siren system. Actual placement of the sirens was determined by the local topography, demography and special requirements of a particular siren site.

##### 4.4.1 Siren Sound Pressure Level (SPL) Contours

The Federal Signal "ThunderBeam" siren is a single-frequency (675 hertz) siren capable of producing a 128dB sound level at 100 feet. Details of this rating and a copy of a generic test report by Federal Signal are attached to this report, (Attachment 3). As verification of the vendor's rated output, sound level measurements were taken 50 feet in the air at 100 feet from a siren. Maximum siren output was recorded to be 126dB(C). Attachment 4 is a copy of the report of this test. As the data taken in the field was within 2dB of the manufacturer's rating, the full rated siren output of 128dB was used as the design basis for the siren SPL.

The Federal Signal "Model 2001" siren is a single-frequency (750 hertz) siren capable of producing a 128 dB(C) at 100 feet. Details of this rating and a copy of a generic test report by Federal Signal are attached to this report, (Attachment 3). No independent verification measurement of the output sound levels of this siren as the ratings are assumed to be equivalent to the Federal Signal "ThunderBeam" siren previously tested.

The maximum sound level to be expected at a given distance from each siren was determined based on a factor a 10dB loss per distance doubled:

<u>Sound Level (dB)</u>	<u>Distance (Feet)</u>
128	100
118	200
108	400
98	800
88	1600
80	2800 (logarithmic interpretation)
70	5600
60	11200
50	22400

The design of the CPSES siren system assumed a circular SPL contour for each siren. As discussed in Section 4.1, sirens were sited with consideration to the local topography to compensate for areas where a circular SPL would probably not be obtained.

Data taken during the annual siren system performance test has generally supported the CPSES assumption of a circular SPL contour based on the above table.

#### 4.4.2 Siren Installation

Federal Signal Corporation, the siren manufacturer, recommends installation of the "ThunderBeam" siren 50 feet above ground on a class 2 utility pole. The sirens of the CPSES system were installed in accordance with this recommendation. The actual field location of a siren was determined in the field. With design information in hand, each proposed siren location was visited and specific site characteristics (e.g. nearby homes, availability of electric service, actual topography, accessibility for maintenance) were considered prior to a final location for a siren being chosen. Once a location was selected, a review was performed to ensure that the actual site met the design objectives of the proposed site.

Acceptance testing of a number of sirens determined that the maximum sound level measured around any actual siren installation, at ground level 100 feet from the siren, was 123dB.

SIREN LIST			
Unique Identifier	Siren Type	Sound Output Level @ 100 Feet	Mounting Height
1	FS Thunderbeam	123 dB	50 Feet
2	FS Model 2001	123 dB	50 Feet
3	FS Model 2001	123 dB	50 Feet
4	FS Model 2001	123 dB	50 Feet
5	FS Model 2001	123 dB	50 Feet
6	FS Model 2001	123 dB	50 Feet
7	FS Model 2001	123 dB	50 Feet
8	FS Model 2001	123 dB	50 Feet
9	FS Model 2001	123 dB	50 Feet
10	FS Thunderbeam	123 dB	50 Feet
11	FS Thunderbeam	123 dB	50 Feet
12	FS Thunderbeam	123 dB	50 Feet
13	FS Model 2001	123 dB	50 Feet
14	FS Thunderbeam	123 dB	50 Feet
15	FS Thunderbeam	123 dB	50 Feet
16	FS Thunderbeam	123 dB	50 Feet

Change 2, April 30, 2008

17	FS Thunderbeam	123 dB	50 Feet
18	FS Model 2001	123 dB	50 Feet
19	FS Thunderbeam	123 dB	50 Feet
20	FS Thunderbeam	123 dB	50 Feet
21	FS Model 2001	123 dB	50 Feet
22	FS Thunderbeam	123 dB	50 Feet
23	FS Thunderbeam	123 dB	50 Feet
24	FS Thunderbeam	123 dB	50 Feet
25	FS Thunderbeam	123 dB	50 Feet
26	FS Thunderbeam	123 dB	50 Feet
27	FS Thunderbeam	123 dB	50 Feet
28	FS Thunderbeam	123 dB	50 Feet
29	FS Thunderbeam	123 dB	50 Feet
30	FS Thunderbeam	123 dB	50 Feet
31	FS Model 2001	123 dB	50 Feet
32	FS Thunderbeam	123 dB	50 Feet
33	FS Thunderbeam	123 dB	50 Feet
34	FS Thunderbeam	123 dB	50 Feet
35	FS Thunderbeam	123 dB	50 Feet
36	FS Thunderbeam	123 dB	50 Feet
37	FS Thunderbeam	123 dB	50 Feet
38	FS Thunderbeam	123 dB	50 Feet
39	FS Thunderbeam	123 dB	50 Feet
40	FS Model 2001	123 dB	50 Feet
41	FS Model 2001	123 dB	50 Feet
42	FS Model 2001	123 dB	50 Feet
43	FS Model 2001	123 dB	50 Feet
44	FS Model 2001	123 dB	50 Feet
45	FS Model 2001	123 dB	50 Feet
46	FS Thunderbeam	123 dB	50 Feet
47	FS Model 2001	123 dB	50 Feet
48	FS Model 2001	123 dB	50 Feet
49	FS Thunderbeam	123 dB	50 Feet
50	FS Thunderbeam	123 dB	50 Feet
51	FS Thunderbeam	123 dB	50 Feet
52	FS Thunderbeam	123 dB	50 Feet
53	FS Thunderbeam	123 dB	50 Feet
54	FS Thunderbeam	123 dB	50 Feet
55	FS Thunderbeam	123 dB	50 Feet
56	FS Thunderbeam	123 dB	50 Feet
57	FS Thunderbeam	123 dB	50 Feet
58	FS Thunderbeam	123 dB	50 Feet
59	FS Thunderbeam	123 dB	50 Feet

Change 2, April 30, 2008

60	FS Thunderbeam	123 dB	50 Feet
61	FS Thunderbeam	123 dB	50 Feet
62	FS Thunderbeam	123 dB	50 Feet
63	FS Thunderbeam	123 dB	50 Feet
64	FS Thunderbeam	123 dB	50 Feet
65	FS Thunderbeam	123 dB	50 Feet
66	FS Model 2001	123 dB	50 Feet
67	FS Model 2001	123 dB	50 Feet
68	FS Model 2001	123 dB	50 Feet
69	FS Model 2001	123 dB	50 Feet
70	FS Model 2001	123 dB	50 Feet
71	FS Model 2001	123 dB	50 Feet
72	FS Model 2001	123 dB	50 Feet

#### 4.4.3 Siren Ownership and Actuation

The CPSES siren system was originally designed and installed by TUGCo (now TXU Power). Although control of the system was turned over to local officials of Somervell and Hood Counties, maintenance and testing of the system will continue to be the responsibility of TXU Power.

Actuation of the siren system may be performed at either county Sheriff's office. The system is divided into four quadrants, Hood County east and west and Somervell County east and west. Any quadrant or a combination of quadrants may be activated from either Sheriff's office, although normally each county only activates sirens in their respective counties. To activate the sirens, a digital code is transmitted through the 450 MHz radio system and repeater owned and licensed to TXU Power. A receiver at each siren site reviews the transmission and, if the code matches the code of that siren, the siren is activated to generate the particular signal dictated. A field strength measurement of the transmitted radio signal was taken near each siren location and it was determined that the signal was strong enough, in all cases, to actuate the siren.

### 5.0 MAINTENANCE AND TEST PROGRAMS

#### 5.1 Periodic Maintenance

The vendor recommendations for maintenance of the CPSES siren system were reviewed, and it was determined through operational experience that, on an annual basis, each siren would have extensive preventative maintenance. The result of the maintenance program, as it currently exists, has been a highly reliable siren system.

Change 2, April 30, 2008



### 5.1.1 Annual Maintenance for Thunderbeam Sirens

The annual maintenance of each siren is performed and documented in accordance with Maintenance Instruction, MSE-PO-9328 "Emergency Alerting System Inspection". Specific instructions include the following steps:

1. Check general condition of the siren, pole, and weather proofing on the control cabinet. Ensure that all nuts, bolts and terminals are tight.
2. Check the speed reducer gear box oil level.
3. Check the two nylon couplings for wear.
4. Check the motor brushes
5. Perform a growl test of the siren by manual activation followed by activation by remote activation.
6. Return siren to standby conditions.

### 5.1.2 Annual Maintenance for Model 2001 Sirens

1. Check general condition of the siren, pole, and weather proofing on the control cabinet. Ensure that all nuts, bolts and terminals are tight.
2. Check and adjust drive band if necessary.
3. Inspect and replace, if necessary, drive belt.
4. Inspect gear assembly and adjust as necessary.
5. Inspect and replace, if necessary, motor brushes.
6. Perform a quiet test of the siren by manual activation followed by quiet test activation by remote activation.
7. Return siren to standby conditions.

Change 2, April 30, 2008

Change 4, July 24, 2008

If any siren is found to be inoperable, or needs repair, it must be reported to the Emergency Planning Siren Coordinator and returned to service as quickly as possible.

## 5.2 Siren System Performance Testing

Emergency Planning Staff Guideline 12 “Alert and Notification System Surveillance” describes the testing of the CPSES Siren System as follows:

1. Sirens are sounded for approximately 30 seconds the first Monday of every month except for major holidays. This is referred to as a Sound Test.
2. For the test, the entire siren system is activated from the Somervell County Sheriff’s Office during even numbered months, the Hood County Sheriff’s Office during odd numbered months.
3. If the first Monday of any month is a major holiday, or if severe weather or a discretionary decision of the County Judge to cancel the test is implemented, the Sound Test is cancelled and a Quiet Test (Growl Test) is performed in lieu thereof on any day during the month.
4. A Quiet Test (Growl Test) of the system is performed each third Monday from the alternate Sheriff’s Office from which the Sound Test was performed on the first Monday of the month.
4. The reports data are collected from each control point and reviewed for accuracy and consistency.
5. A successful siren test is defined as each individual siren on the RTU Status Report indicating Status: Standby; Last Function: either “Sound Test” or “Quiet Test” (depending on the type of test conducted) with the correct date; Current: Pass; and in the case of the FCD 2001 Sirens, Rotation: Pass. If a siren is indicating questionable data, a field observer present at the siren location at the time of the test can verify a successful test by an observation of the siren sounding and rotating when tested.
6. The test results are forwarded to the State Division of Emergency Management and FEMA for review and reported to the USNRC for inclusion in Plant Performance Indicators.

Change 3, June 16, 2008

The original design report concluded that each area monitored within the 10 mile EPZ receives a 60dB siren SPL or, in the most remote areas with little or no resident population, a siren SPL that is 10dB above the ambient background level.

Based upon that conclusion, and that the present siren coverage exceeds the coverage of the original design report there is, therefore, no rationale for further sound level testing at this time.

### 5.3 Summary of Maintenance and Testing

The maintenance program has not found and sirens that were incapable of being activated upon demand. Minor problems discovered include low oil in the gear box, water leakage into control boxes, and sirens out of plumb more than five degrees. Prompt attention to these minor problems provides a high degree of confidence that each siren will perform its design function when required.

The annual siren system performance test was first run in June, 1983 when only 40 sirens were installed. Although part of the siren system did not operate due to radio transmission interference, a review of the data taken during the test and an analysis of the questionnaires resulted in the following conclusions:

1. The siren system of 40 sirens generally met the design criteria for an outdoor warning system (i.e. sound level coverage of the 10 mile EPZ that was 10dB above measured ambient background).
2. For the initial alerting system to alert a large proportion of the resident population, more sirens would need to be added.
3. Some means to verify that a signal to actuate the sirens was transmitted needed to be installed in each sheriff's office.

Based upon these conclusions, the siren system as prescribed by this design report was installed. Conservative consideration of each of the design objectives as listed in Section 3.2 of this report and specific consideration of topography, demography and special facilities siren coverage requirements as prescribed in Section 4.0 of this report resulted in twenty-five sirens being added to the then existing system:

1. Nine were added to the Paluxy River Valley including two with 80dB coverage of Glen Rose and one near the remote hiking area of Dinosaur Valley State Park.

Change 3, June 16, 2008

2. One siren was located with 70dB coverage of Squaw Creek Park Restaurant, office and campground.
3. Seven sirens were placed in heavily populated areas along Lake Granbury
4. One siren was placed on the southern slope of Comanche Peak.
5. The seven remaining sirens were located throughout the Squaw Creek and Brazos River drainage areas where there were concentrations of population, or between existing sirens to give an overall increase in the siren SPL in these areas.

After installation of the additional sirens, the siren system performance test was re-performed. Data was taken at twelve randomly chosen locations in areas between sirens. The data indicated a siren SPL coverage well above 60dB throughout the 10 mile EPZ. A sound level of 80dB was evident in both Granbury and Glen Rose. A statistical analysis of the questionnaires returned from the public indicated that over 80% of all persons within the 10 mile EPZ heard the sirens and further that over 90% of those persons outdoors heard the sirens. A copy of this test report is attached. (Attachment 2)

In that the first annual performance test of the siren system resulted in a review and recommendation to upgrade the warning sound level, it was demonstrated that the CPSES emergency alerting program has adequate controls to ensure the continued acceptability of coverage.

Since the completion of that initial test the following changes were installed:

1. One siren was added in Glen Rose at the Big Rocks Park near the center of town.
2. The siren control system was upgraded to include feedback and polling in 1993.
3. The siren control system was again upgraded in 2002 to improve the overall operation of the system and provide for more effective maintenance capability
4. Six sirens with battery backup were added to improve coverage in the 10 mile EPZ

Change 3, June 16, 2008

5. Two sirens were converted from Thunderbeam to Model 2001 sirens to enhance battery back up capability within 5 miles of the plant.
6. A plan is in place to convert all of the sirens within 5 miles of the plant to Model 2001 sirens at the rate of 8 per year and then replace other sirens in populated areas with the goal being to replace all of the Thunderbeam Sirens.

#### 5.4 Silent Test

Siren testing guidance provided by Appendix 3 to NUREG-064 / FEMA-REP-1, Revision 1, included a recommendation that a "silent test" be performed on the siren system every two weeks. Rather than perform this type of test, a monthly sounding of the siren system is performed.

#### 5.5 Life Cycle Management

The Life Cycle Management of the Alert and Notification System is in line with the 40-year life of the power plant. The aggressive program of maintenance and testing of the sirens extends the life of each individual unit. The Life Cycle Management plan for the system is executed as follows.

1. Industry Operating Experience is monitored for problems and occurrences at other utilities with their ANS system. When a common problem is identified, steps are taken to mitigate the problem.
2. As part of the annual inspection and preventive maintenance program, each unit is evaluated for problems identified with aging such as rust, pole defects and excessive parts wear. Corrective actions are taken if not immediately, soon thereafter.
3. As a particular model of an individual siren nears obsolescence and repair becomes valueless, upgraded replacements compatible with the system are purchased and integrated into the system.
4. An inventory of spare parts is maintained in accordance with Station Procurement and Maintenance Procedures following vendor recommendations and maintenance experience.
5. Siren failures and repairs are tracked in the Station Corrective Action Program and plans for upgrading and or replacement are developed to minimize failures and frequently failing components.

Change 3, June 16, 2008

## 6.0 TOPOGRAPHICAL MAPS

### 6.1 List of Maps

The following United States Department of the Interior Geological Survey Maps (Scale 1:24000) are attached:

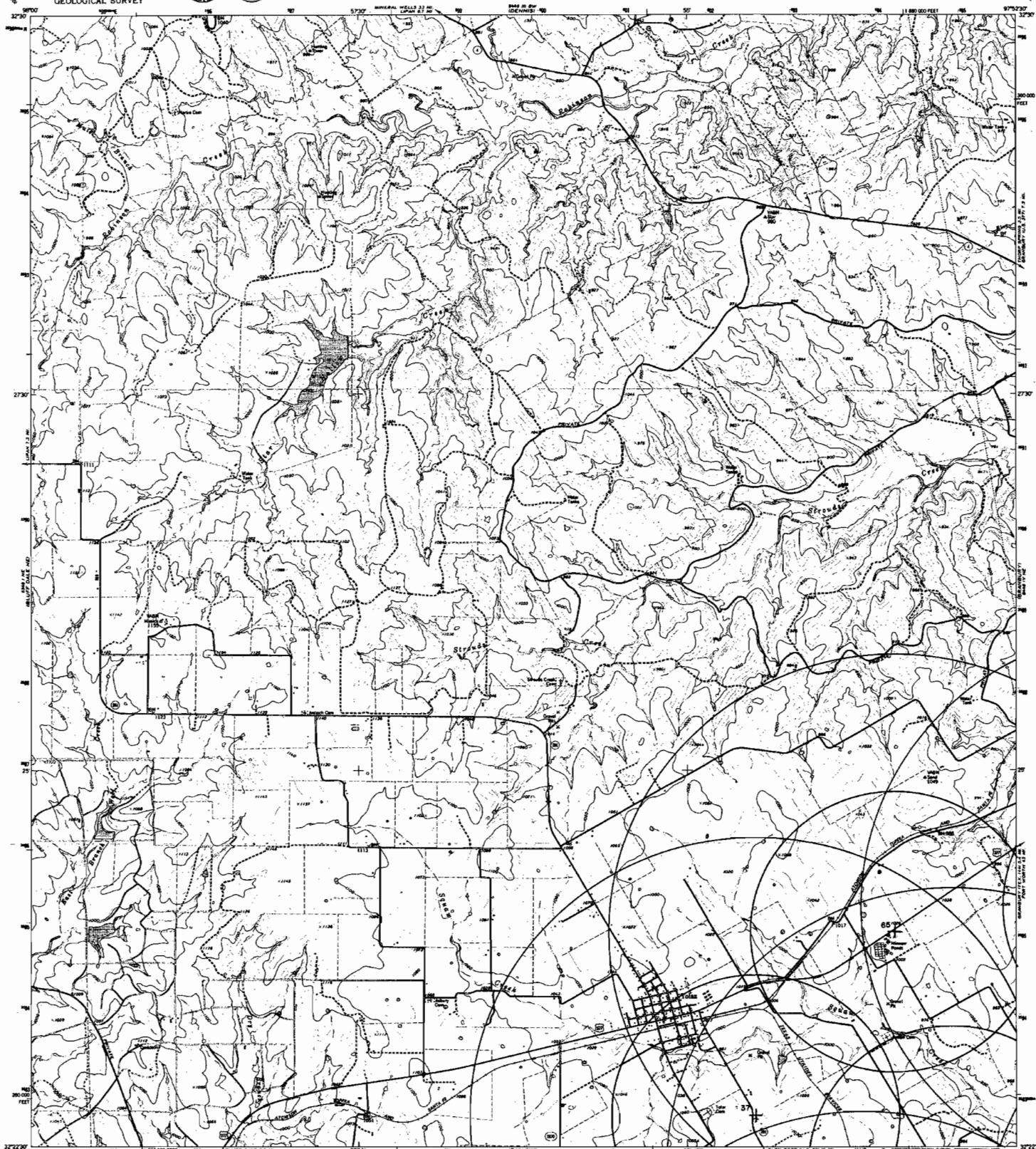
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6.1.2	Granbury, TX	N3222.5-W9745/7.5
6.1.3	Acton, TX	N3222.5-W9737.5/7.5
6.1.4	Paluxy, TX	N3215-W9752.5/7.5
6.1.5	Hill City, TX	N3215-W9745/7.5
6.1.6	Nemo, TX	N3215-W9737.5/7.5
6.1.7	Chalk Mountain, TX	N3207.5-W9752.5/7.5
6.1.8	Glen Rose West, TX	N3207.5-W9745/7.5
6.1.9	Glen Rose East, TX	N3207.5-W9737.5/7.5

### 6.2 Description of Information on Maps

Each map is marked as follows:

- 6.2.1 Siren locations
- 6.2.2 Each siren's 70dB radius of coverage (5600') is shown.
- 6.2.3 Each siren's 60dB radius of coverage (11,200') is shown.
- 6.2.4 Location of data recorders for 9-22-83 test and dB(C) SPL recorded at that site are marked.

Change 2, April 30, 2008



Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

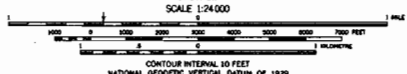
Topography by photogrammetric methods from aerial photographs taken 1958. Field check 1960.

Photographic projection. 1927 North American datum. 10,000-foot grid based on Texas coordinate system, north center zone.

1000-meter Universal Transverse Mercator grid zone 14, shown in blue.

Five red dashed lines indicate adjacent fences and field lines where generally visible on aerial photographs. This information is uncheckered.

Revisions shown in purple and red and compiled from aerial photographs taken 1976 and other source data. This information not field checked. Map without 1979.



SCALE 1:24,000  
CONTOUR INTERVAL 10 FEET  
NATIONAL GEODESIC VERTICAL DATUM OF 1929

ROAD CLASSIFICATION

Primary highway, all weather, hard surface	Light duty road, all weather, improved surface
Secondary highway, all weather, hard surface	Unimproved road, fair or dry weather

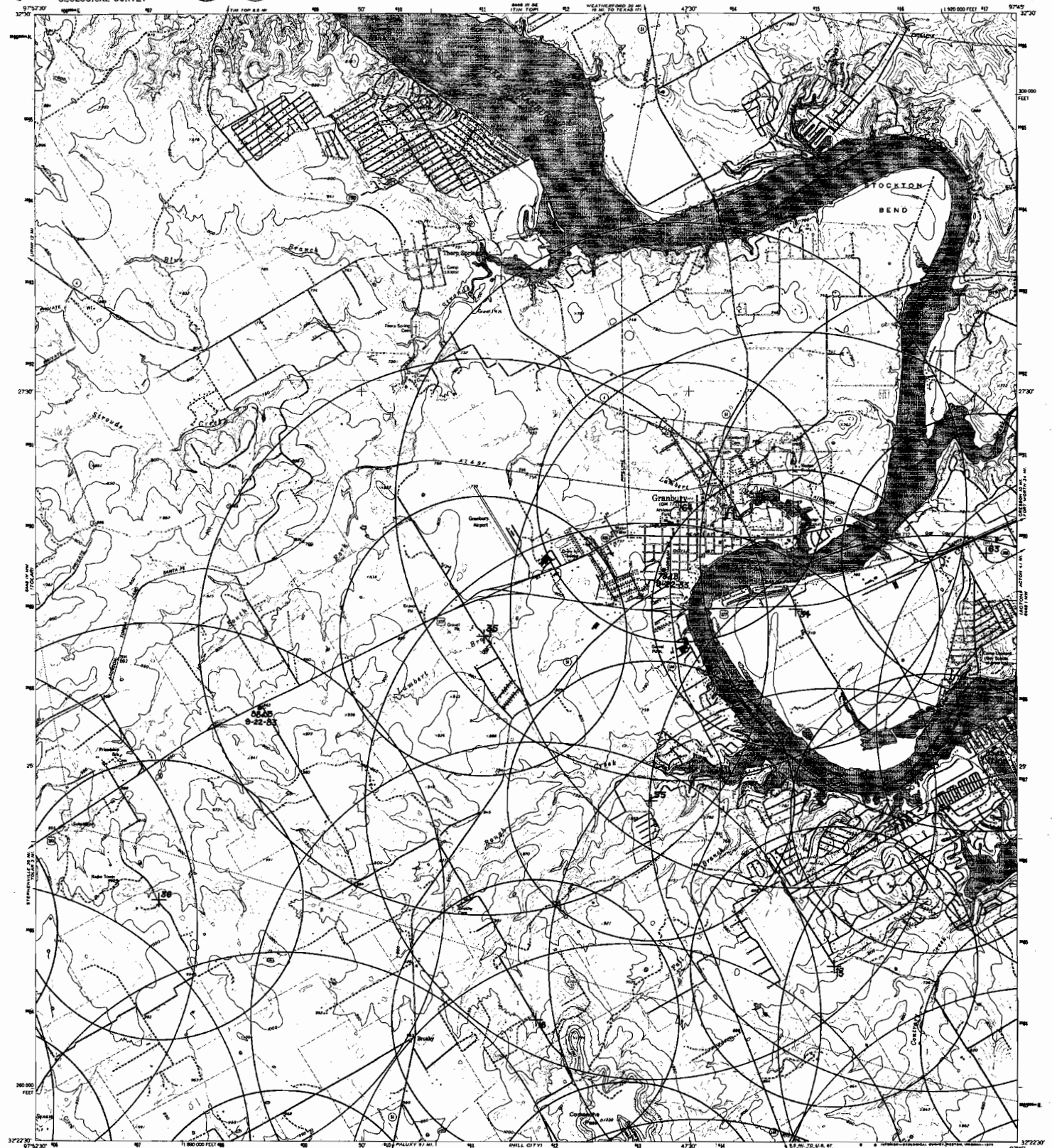
Interstate Route     U.S. Route     State Route



UNDESIGNATED LOCATION  
3287-233

TOLAR, TEX.  
N3225-W9752.5/7.5  
1960  
PHOTOREVISED 1979  
ANS 6449 BY HW-SERIES 7602





Mapped, edited, and published by the Geological Survey  
Control by USGS and USCAGS  
Topography by photogrammetric methods from aerial  
photographs taken 1956; field checked 1961  
Photographic projection: 1927 North American datum  
10,000-foot grid based on Texas coordinate system,  
south central zone  
1000-meter Universal Transverse Mercator grid ticks,  
zone 14, shown in blue  
Red ink indicates area in which only landmarks, buildings are shown  
Faint and dashed lines indicate selected fences and field lines where  
generally visible on aerial photographs. This information is unclassified  
Revisions shown in purple and woodblock compiled from  
aerial photographs taken 1976 and other source data  
This information not field checked. Map edited 1979



SCALE 1:24,000  
CONTOUR INTERVAL, 10 FEET  
DOTTED LINES REPRESENT 5 FOOT CONTOURS  
NATIONAL GEODETIC VERTICAL DATUM OF 1929



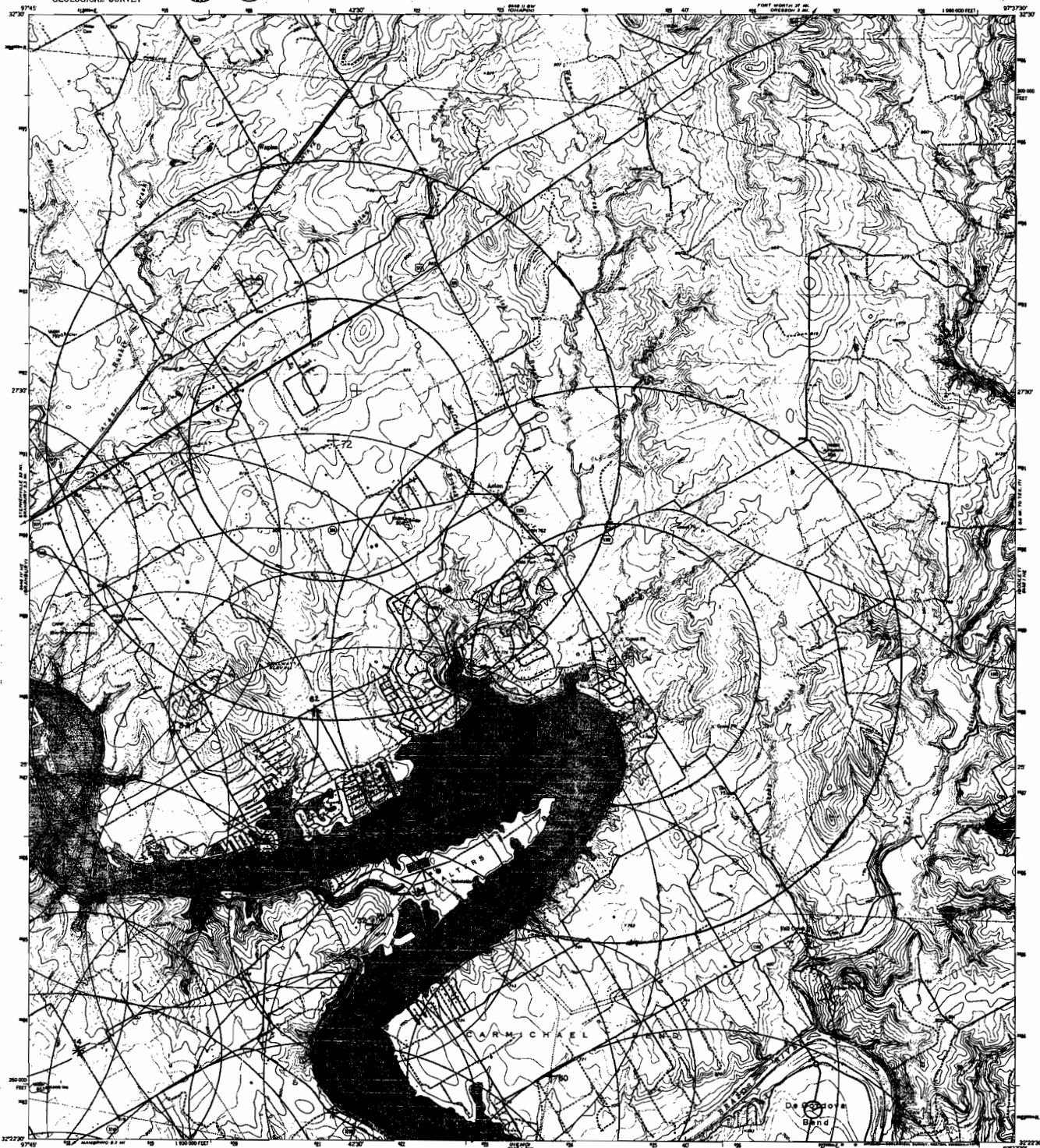
ROAD CLASSIFICATION  
Heavy-duty Light-duty  
Medium-duty Unimproved dirt  
U.S. Route State Route

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS  
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092  
A FOLDER INCLUDING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

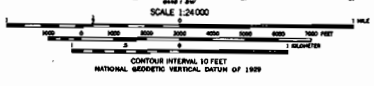
ALLSTATE MAP STORES  
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FORT WORTH, 76102 817/852-1111  
GRANBURY, TEX.  
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1961  
PHOTOCOPYED 1979  
AMS 6448 TV NS-3223 1988

3287-234





Mapped, edited, and published by the Geological Survey  
Control by USGS and USCGS  
Topography by photogrammetric methods from aerial  
photographs taken 1958. Field checked 1961  
Photographic projection: 1927 North American datum  
10,000-foot grid based on Texas coordinate system,  
north central zone  
1500-meter Universal Transverse Mercator grid scale,  
zone 14, shown in blue  
Fire red dashed lines indicate selected fence and field lines where  
generally visible on aerial photographs. This information is an analytical  
feature shown in purple and modified compiled from  
aerial photographs taken 1976 and other source data.  
This information not field checked. Map edited 1979



SCALE 1:24,000  
CONTOUR INTERVAL 10 FEET  
NATIONAL GEODESIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS  
FOR SALE BY U.S. GEOLOGICAL SURVEY, BOXES OF RESTON, VIRGINIA 22092  
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

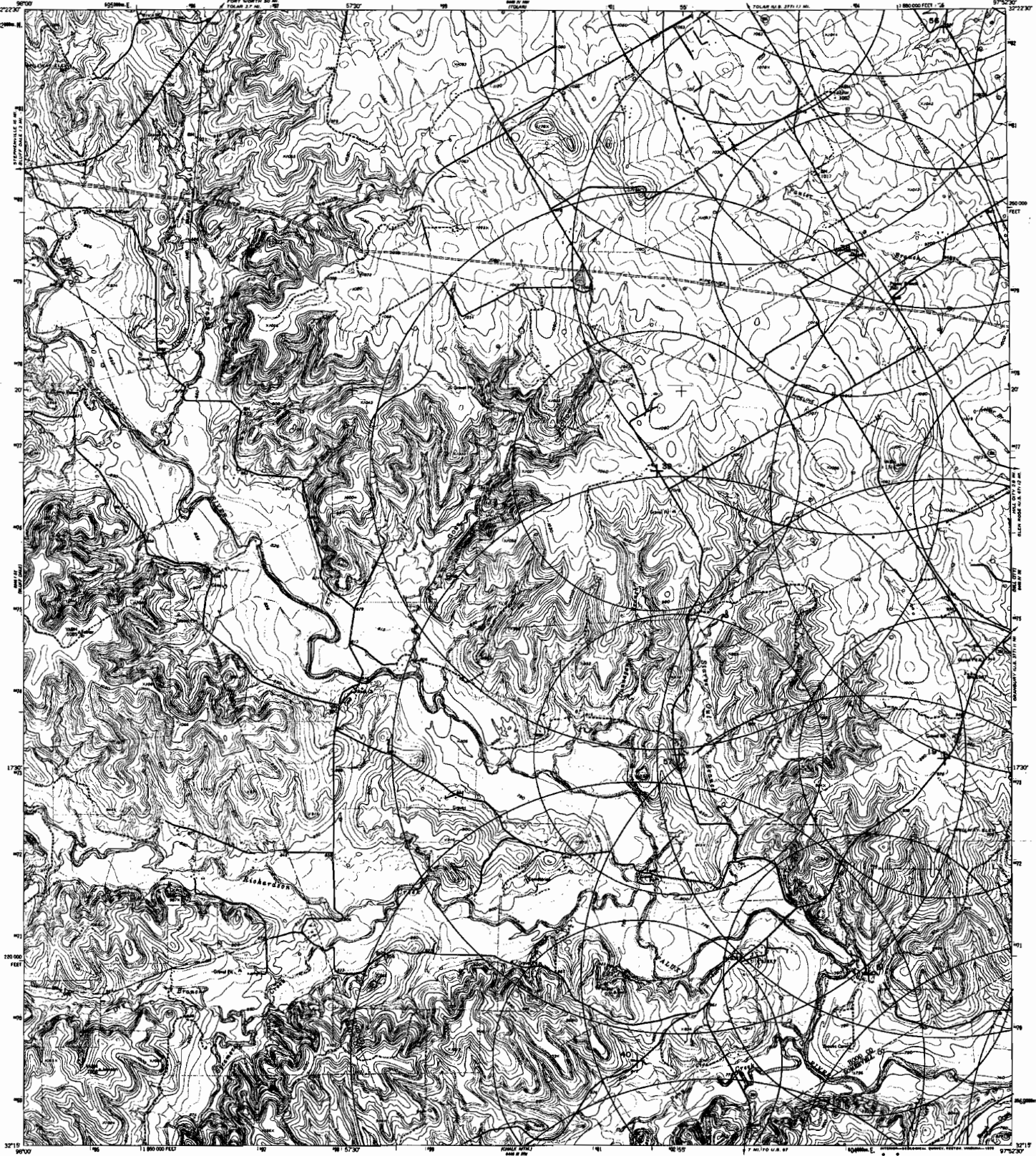


3297-243

ROAD CLASSIFICATION

Primary highway, all weather, hard surface	Light-duty road, all weather, improved surface
Secondary highway, all weather, hard surface	Unimproved road, fair or dry weather
○ Interstate Route	□ U. S. Route
	○ State Route

ACTON, TEX.  
N32218-49737 5/7 5  
1961  
PHOTOREPRODUCED 1979  
AMS 5448 1 PW-SERIES 504



Mapped, edited, and published by the Geological Survey

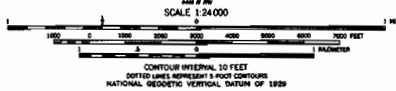
Control by USGS and USCGS

Topography by photogrammetric methods from aerial photographs taken 1958. Field checked 1961

Polyconic projection, 1927 North American datum, 10,000-foot grid based on Texas coordinate system, north-south zone, 1000-meter Universal Transverse Mercator grid lines, zone 14, shown in blue

Five red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is uncheckered  
Revisions shown in purple and woodland compiled from aerial photographs taken 1976 and other source data  
This information not field checked. Map edited 1979

UTM 82D AND 1973 MAGNETIC NORTH  
DECLINATION AT CENTER OF SHEET



ROAD CLASSIFICATION

Primary highway, all weather, hard surface	Light-duty road, all weather, improved surface
Secondary highway, all weather, hard surface	Unimproved road, fair or dry weather
○ Interstate Route	□ U. S. Route
	○ State Route



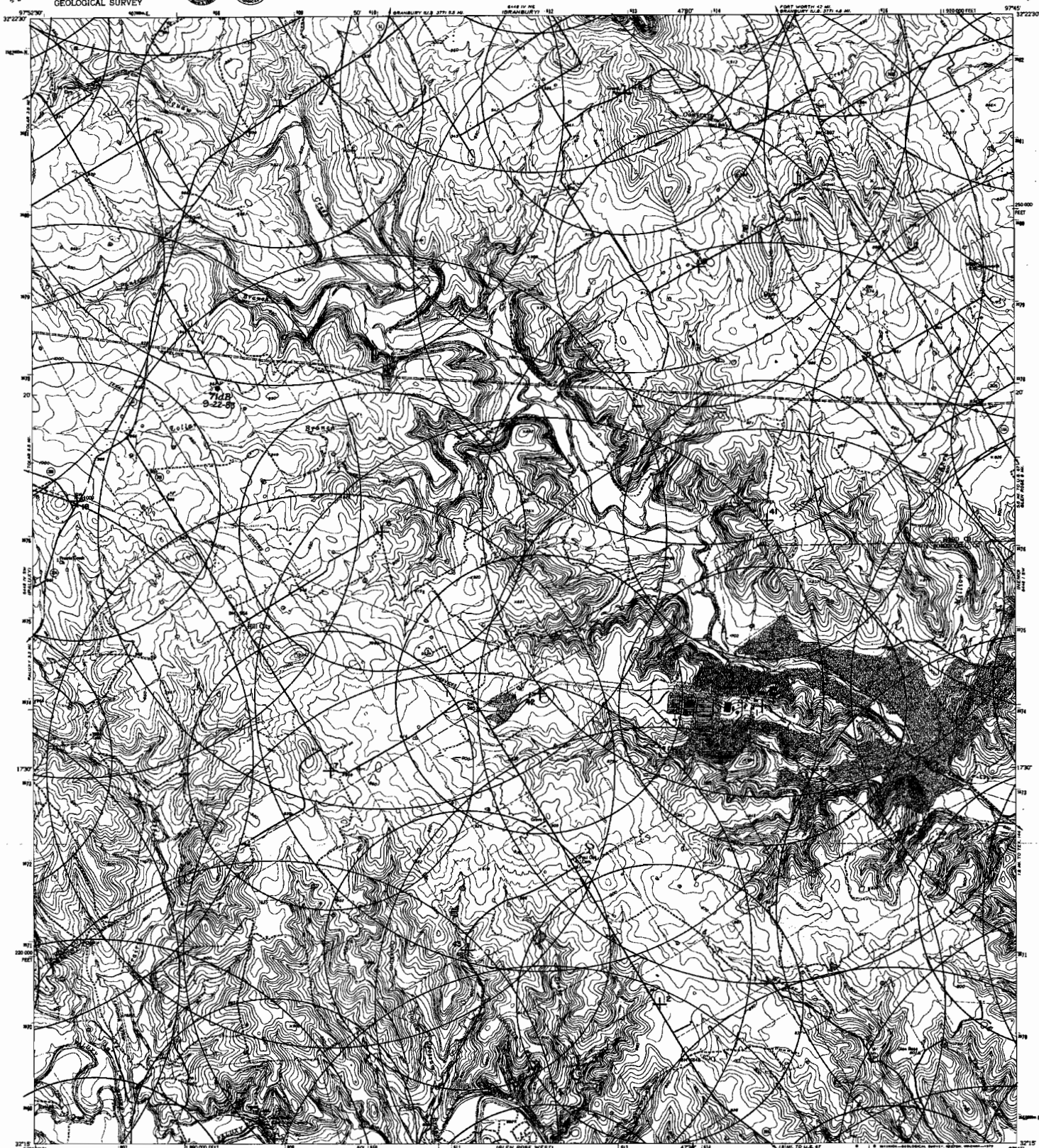
CAMPBELLVILLE LOCATION

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS  
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092  
A FOLDER SYSTEMIC TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

3297-232

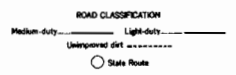
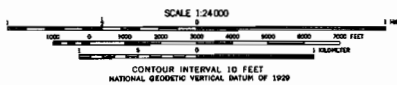
PALUXY, TEX.  
18319-W752.57.5  
1961  
PHOTOREVISED 1979  
AND 1944 IV 99-BEN289 Feet





Mapped, edited, and published by the Geological Survey

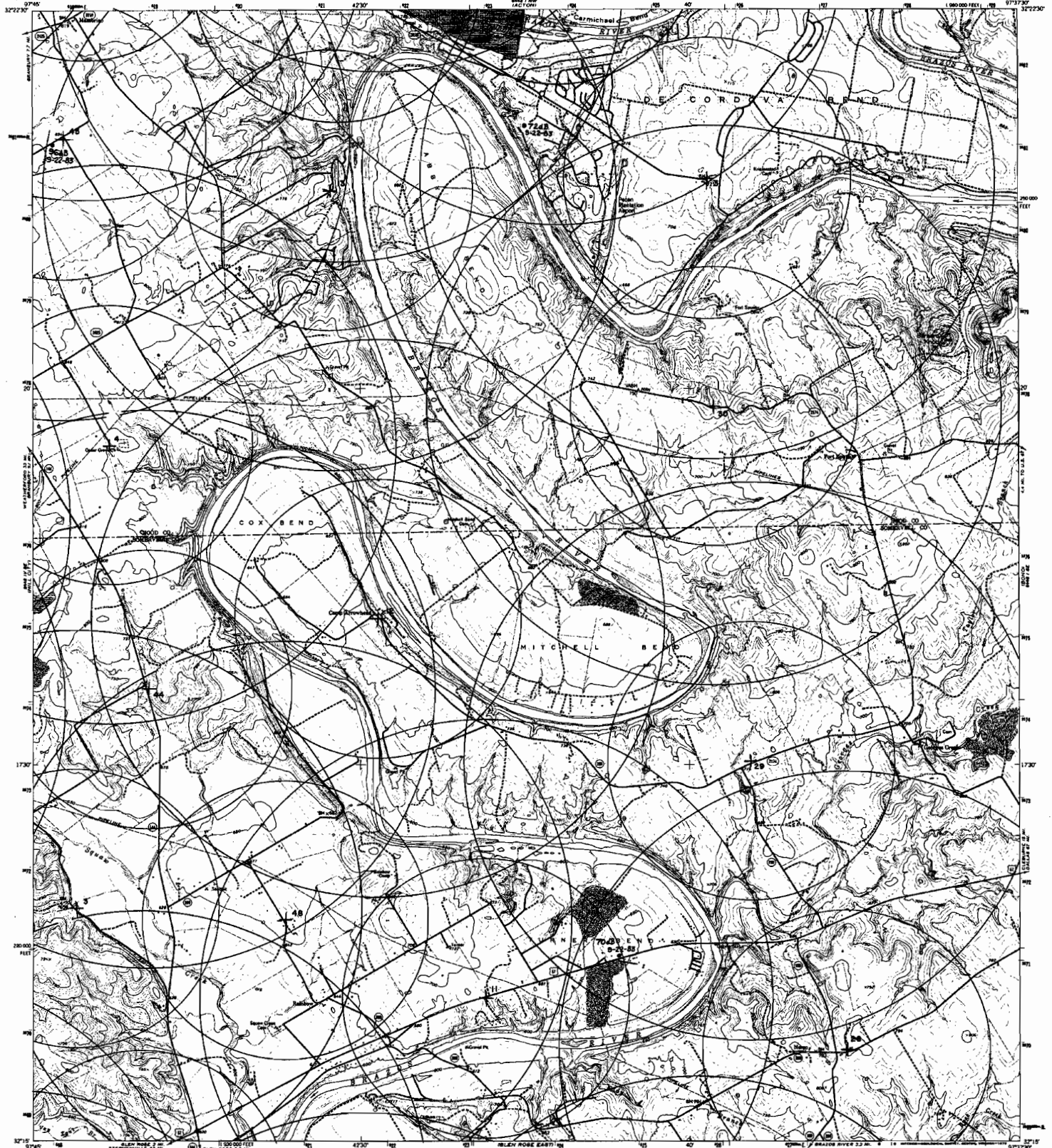
Control by USGS and USCGS  
Topography by photogrammetric methods from aerial photographs taken 1958. Field checked 1961.  
Photocentric projection. 1927 North American datum. 10,000-foot grid based on Texas coordinate system, north central zone. 1000-meter Universal Transverse Mercator grid ticks, zone 14, shown in blue.  
Five red dashed lines indicate selected fence lines.  
There may be private landings within the boundaries of the National or State reservations shown on this map.  
Revisions shown in purple and woodland compiled from aerial photographs taken 1978 and other source data. This information not field checked. Map edited 1979.



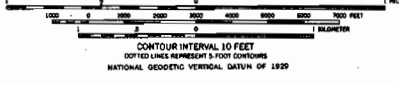
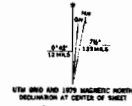
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3297-231

HILL CITY, TEX.  
H2215-W9745/7.5  
1963  
PHOTOENHANCED 1978  
ANS 8448 14 SE-SERIES 1962



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Control by USGS and USC&GS  
Topography by photogrammetric methods from aerial  
photographs taken 1956. Field checked 1961  
Polyconic projection. 1927 North American datum  
10,000-foot grid based on Texas coordinate system,  
north central zone  
1000 meter Universal Transverse Mercator grid zone,  
zone 14, shown in blue  
Fine red dashed lines indicate selected fences and field lines where  
generally visible on aerial photographs. This information is unclassified  
Revisions shown in purple and woodland compiled from  
aerial photographs taken 1977 and other source data  
This information not field checked. Map edited 1979



**ROAD CLASSIFICATION**

Heavy-duty	Light-duty
Medium-duty	Unimproved dirt

U.S. Route       State Route

**NEMO, TEX.**  
N3215-W0737.5/7.5  
1961  
PHOTOREPRODUCED 1979  
AND 6448 1 20-SERIES VMS

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A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

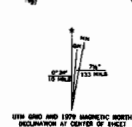


3297-242





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Control by USGS and USC&GS  
Topography by photogrammetric methods from aerial  
photographs taken 1965. Field checked 1966  
Polyconic projection. 1927 North American datum  
10,000-foot grid based on Texas coordinate system,  
north central zone  
1000-meter Universal Transverse Mercator grid zone,  
zone 14, shown in blue  
Five red dashed lines indicate selected fence lines  
Relief shown in purple and woodland compiled from  
aerial photographs taken 1976 and other source data.  
This information not field checked. Map dated 1979



SCALE 1:24000  
CONTOUR INTERVAL 10 FEET  
NATIONAL GEODESIC VERTICAL DATUM OF 1989

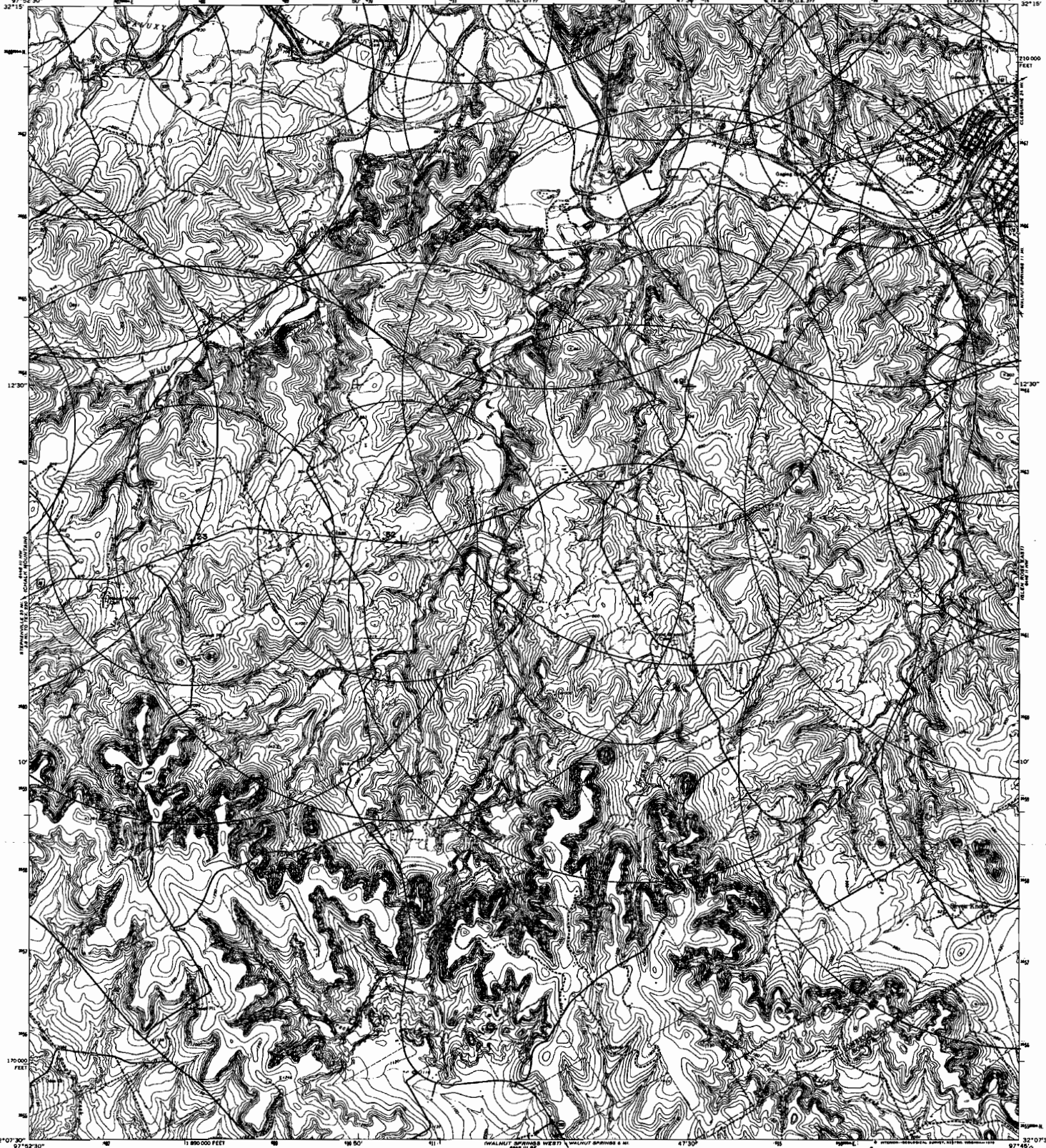
ROAD CLASSIFICATION  
Heavy-duty Light-duty  
Medium-duty Unimproved dirt  
U.S. Route State Route

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS  
FOR SALE BY U.S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 20192  
A POLAR PROJECTION TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST



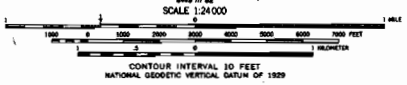
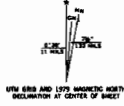
CHALK MOUNTAIN, TEX.  
N3207.5-W9752.5/7.5  
1966  
PHOTOREVISED 1979  
AMS 6448 III 97-SERIES 1982

3257-223



Mapped, edited, and published by the Geological Survey  
Control by USGS and USC&GS

Topography by photogrammetric methods from aerial  
photographs taken 1955. First checked 1968  
Polyconic projection. 1927 North American datum  
10,000-foot grid based on Texas coordinate system,  
north central zone  
1000-meter Universal Transverse Mercator grid ticks,  
zone 14, shown in blue  
Flow red dashed lines indicate selected issue lines.  
Revisions shown in purple and woodblock compiled from  
aerial photographs taken 1976 and other source data.  
This information not field checked. Map edited 1979



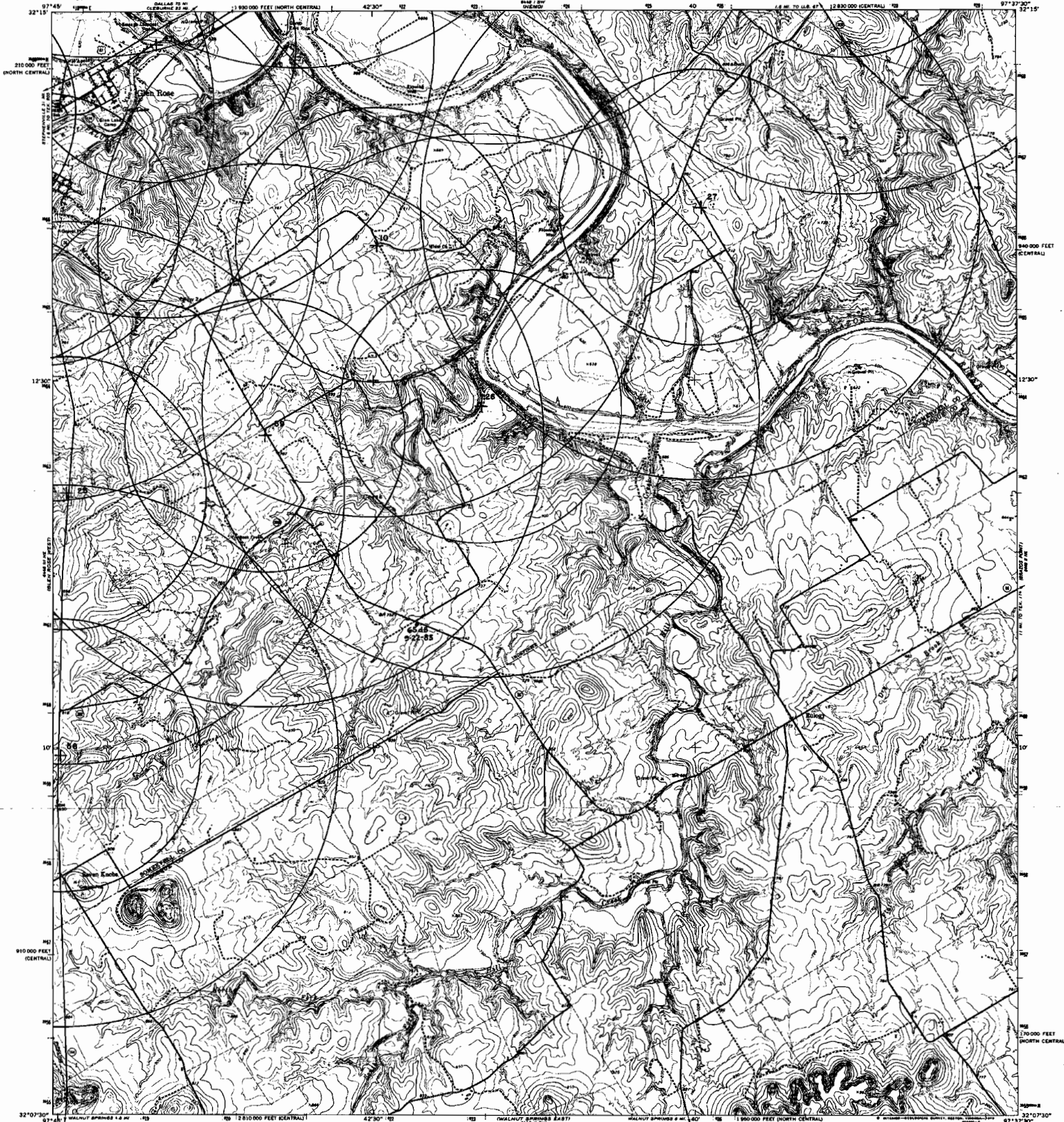
ROAD CLASSIFICATION

Heavy-duty	Light-duty
Medium-duty	Unimproved dirt
U.S. Route	State Route

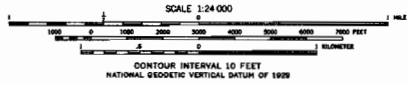
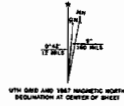
THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS  
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092  
A FOLDER CONTAINING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

GLEN ROSE WEST, TEX.  
N32075-W9748/7.5  
1968  
PHOTOREVISED 1979  
AMS 5448 III PG-SERIES 1982





Mapped, edited, and published by the Geological Survey  
Control by USGS and USCGS  
Topography by photogrammetric methods from aerial  
photographs taken 1965. Field checked 1967  
Photonic projection. 1927 North American datum  
10,000-foot grids based on Texas coordinate system,  
central and north control zones  
1000-meter Universal Transverse Mercator grid ticks,  
zone 14, shown in lines  
Flow and dashed lines indicate selected fence lines  
Map published 1977  
No major culture or drainage changes observed



ROAD CLASSIFICATION

Heavy-duty	Light-duty
Medium-duty	Unimproved dirt
U.S. Route	State Route

OLEN ROSE EAST, TEX.  
N3207.5-W9737.5/7.5  
1967  
PHOTOINSPECTED 1977  
DMA 6446 II IV—SERIES 1962

THIS MAP COMPLEYS WITH NATIONAL MAP ACCURACY STANDARDS  
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A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

## 7.0 REFERENCES

- 7.1 Comanche Peak Steam Electric Station, Emergency Plan, Revision 31; June 20, 2003
- 7.2 Comanche Peak Steam Electric Station, Final Safety Analysis Report
- 7.3 Federal Signal Public Notification System Service Manual; Manual No. CPF-6227-001
- 7.4 Federal Signal Corporation Model DCFCT Installation, Operation and Service Manual 255302 Rev. H 06/02
- 7.5 Federal Signal Corporation Model FCT Installation, Operation and Service Manual 255326 Rev. D 11/01
- 7.6 Federal Signal Corporation 2001 Siren Installation and Operating Instructions Manual 255232M1 Rev. M1 700
- 7.7 NUREG-0654 / FEMA-REP-1, Revision 1; "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants."
- 7.8 FEMA CPG-1-17, March 1, 1980, - "Outdoor Warning Systems Guide".
- 7.9 NUREG / CR-2654, PNL-4227; "Procedures for Analyzing the Effectiveness of Siren Systems for Alerting the Public".
- 7.10 FEMA-REP-10/November 1985 "Guide for the Evaluation of Alert and Notification Systems for Nuclear Power Plants".
- 7.11 State of Texas Emergency Alert System Plan

Change 2, April 30, 2008



NUREG -0654 FEMA REP-1 PLANNING STANDARD: F EMERGENCY COMMUNICATIONS

“Provisions exist for prompt communications among principal response organizations to emergency personnel and to the public.”

F.1 Evaluation Criterion

“The communication plans for emergencies shall include organizational titles and alternates for both ends of the communication links. Each organization shall establish reliable primary and backup means of communication for licensees, local and state response organizations. Such systems should be selected to be compatible with one another. Each plan shall include:

- a. provision for 24 hour per day notification to and activation of the state/local emergency response network; and at a minimum, and telephone link and alternate, including 24-hour per day manning of communications link that initiate emergency response actions.
- b. provision of communications between the nuclear facility and the licensee’s near-site Emergency Operations Facility, state and local emergency operations centers and radiological monitoring teams.

Discussion

Section 4 of the Comanche Peak Emergency Plan describes the emergency communications system available at Comanche Peak for communication with offsite authorities. These systems include the public telephone, direct telephone lines to the system dispatcher who can relay messages, direct telephone lines to state regional and local emergency operations centers, the NRC emergency notification system, the NRC Health Physics network dedicated telephone and two-way radio between Comanche Peak security and the county EOC’s.

Facsimile communications capability is provided via the telephone system between the Comanche Peak Emergency Operations Facility and NRC. High speed telecopiers are available in the county EOC’s.

All of the communication links connecting the Comanche Peak Emergency Operations Facility state EOC’s and county EOC’s are manned 24 hours per day.

Annex B, Section VI of each of the county emergency plans assigns communications responsibility to the County Sheriff. Annex W Attachment A to the manual of procedures for each county describes the

use of public telephones, law enforcement radio, law enforcement teletype, dedicated telephone lines for communication with Comanche Peak and state agencies. Attachment F.1.1 graphically describes the communication capability of the county EOC's.

## NUREG-0654 FEMA REP-1 PLANNING STANDARD: N EXERCISES AND DRILLS

“Periodic exercises are (will be) conducted to evaluate major portions of emergency response capabilities, periodic drills are (will be) conducted to develop and maintain key skills, and deficiencies identified as a result of exercises or drills are (will be) corrected.”

### N.1.a Evaluation Criterion

“An exercise is an event that tests the integrated capability and a major portion of the basic elements existing within the emergency preparedness plans organizations. The emergency preparedness exercise shall simulate an emergency that results in offsite radiological releases which would require response by offsite authorities. Exercises shall be conducted as set forth in NRC and FEMA rules.”

### N.1.b Evaluation Criterion

“An exercise shall include mobilization of state and local personnel and resource adequate to verify the capability to respond to an accident scenario requiring response. The organization shall provide for a critique of the annual exercise by federal and state observers/evaluators. The scenario should be varied from year to year such that all major elements of the plans and preparedness organizations are tested within a five- year period. Each organization should make provisions to start an exercise between 6:00 p.m. and midnight, and another between midnight and 6:00 a.m. once every six years. Exercises should be conducted under various weather conditions. Some exercises should be unannounced.”

### Discussion

The first full-scale exercise for Comanche Peak in accordance with the state and local emergency plans was conducted December 14, 1983. A FEMA evaluation report was filed on June 25, 1984. Since that date and in accordance with Federal Requirements, evaluated exercises have been conducted and reports filed at least every two years.

Exercise and training requirements for the two counties is described in Annex W Attachment T to the manual of procedures for each county (both counties' Attachment T are identical). See Attachment N.1.1.

The State Health Departments (now referred to as the Texas Department of State Health Services) commitment for drills and exercises is addressed in Attachment 4 to the Fixed Nuclear Facility Response Plan (see Attachment N.1.2).

## N.2 Evaluation Criteria

“A drill is a supervised instruction period aimed at testing, developing and maintaining skills in a particular operation. A drill is often a component of an exercise. A drill shall be supervised and evaluated by a qualified drill instructor. Each organization shall conduct drills, in addition to the annual exercise at the frequencies indicated below:

### a. Communication Drills

Communications with state and local governments within the plume exposure pathway Emergency Planning Zone shall be tested monthly. Communications with federal emergency response organizations and states within the ingestion pathway shall be tested quarterly. Communications between the nuclear facility, state and local emergency operations centers and field assessment teams shall be tested annually. Communication drills shall also include the aspect of understanding the content of messages.”

### Discussion

These drills are described in the attachment to criterion N.1.

## N.3 Evaluation Criterion

“Each organization shall describe how exercises and drills are to be carried out to allow free play for decision making and to meet the following objectives. Pending the development of exercise scenarios and exercise evaluation guidance by NRC and FEMA the scenarios for use in exercises and drills shall include but not be limited to, the following:

- a. The basic objective(s) of each drill and exercise and appropriate evaluation criterion;
- b. The date(s), time period, place(s) and participating organizations;
- c. The simulated events;
- d. A time schedule of real and simulated initiating events;
- e. A narrative summary describing the conduct of the exercises or drills to include such things as simulated casualties, offsite fire department assistance, rescue of personnel, use of protective clothing, deployment of radiological monitoring teams and public information activities; and

- f. A description of the arrangements for and advance materials to be provided to official observers.”

Discussion

This criteria can only be addressed by reviewing the scenario for a given exercise. Scenarios are routinely submitted to FEMA at least 60 days prior to a scheduled exercise.

N.4 Evaluation Criterion

“Each organization shall establish means for evaluating observer and participant comments on areas needing improvement, including emergency plan procedural changes and for assigning responsibility for implementing corrective actions. Each organization shall establish management control used to ensure that corrective actions are implemented.”

Discussion

This is addressed in the attachment to the discussion of criterion N.1

Additionally, EPP-100, Attachment 5 of the Comanche Peak Steam Electric Station Emergency Plan requires the Operations Support Department to correct any deficiencies identified in the critique conducted after each drill or exercise.