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# Computer-Aided Dispatching System Design Specification

Myrl Briggs

ICF-KH, Richland, WA 99352

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Abstract: This document defines the performance requirements for a graphic display dispatching system to support Hanford Patrol emergency response. This system is defined as a Commercial-Off-the-Shelf computer dispatching system providing both text and graphical display information while interfacing with the diverse reporting systems within the Hanford Facility. This system also provided expansion capabilities to integrate Hanford Fire and the Occurrence Notification Center and provides back-up capabilities for the Plutonium Processing Facility.

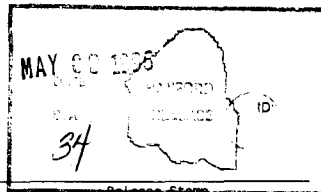
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WHC-SD-L251-SDS-001  
Rev. 0

PROJECT L-251  
HANFORD EMERGENCY ALARM DISPATCH SYSTEM  
(HEADS)  
200 EAST AREA, HANFORD, WASHINGTON

FOR

ICF KAISER HANFORD COMPANY  
P. O. Box 888  
Richland, Washington 99352

COMPUTER-AIDED DISPATCHING  
SYSTEM DESIGN  
SPECIFICATION

BY:  
SCM CONSULTANTS, INC.  
7601 West Clearwater Avenue  
Kennewick, Washington 99336

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**SCM** Consultants, Inc.  
Architects & Engineers

COMPUTER-AIDED DISPATCHING SYSTEM  
DESIGN SPECIFICATION

FOR


PROJECT L-251  
HANFORD EMERGENCY ALARM DISPATCH SYSTEM (HEADS)

Prepared By:

  
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Joseph L. Rumney, SCM Consultants, Inc., Kennewick, WA.

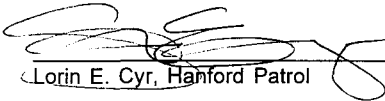
5/1/96  
Date

Approved By:

  
\_\_\_\_\_  
Gerald T. Caprio, SCM Consultants, Inc., Kennewick, WA.

5/1/96  
Date

Approved By:

  
\_\_\_\_\_  
Lorin E. Cyr, Hanford Patrol

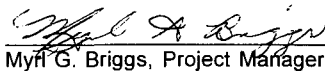
5/2/96  
Date

Approved By:

  
\_\_\_\_\_  
David E. Havens, Telecommunications Design Authority

5/3/96  
Date

Approved By:

  
\_\_\_\_\_  
Myrl G. Briggs, Project Manager

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**TECHNICAL SPECIFICATION****TABLE OF CONTENTS**

A	Acronyms/Abbreviations .....	3
1.0	Scope .....	5
2.0	Applicable Documents .....	8
3.0	System Configuration .....	9
3.1	General .....	9
3.1.1	Electrical .....	9
3.1.2	Environment .....	9
3.1.3	Dispatch Station Identification and Marking .....	9
3.1.4	Wiring and Connectors .....	10
3.1.5	Performance .....	10
3.1.6	Document Identification Requirements .....	11
3.1.7	Acceptance .....	13
3.2	System Hardware .....	14
3.2.1	CAD System .....	14
3.2.2	CAD Stations .....	14
3.2.3	CAD Station Components .....	15
3.2.3.1	CAD Computer .....	15
3.2.3.2	Monitor .....	15
3.2.3.3	Functional Keyboard .....	16
3.2.3.4	Radio/Telephone Switching Panel .....	16
3.2.3.5	CAD Station Consoles and Chairs .....	21
3.2.3.6	CAD System Assembly .....	22
3.2.4	Server (Central Processing Unit) .....	23
3.2.5	HLAN Computer .....	24
3.2.6	Disk Storage .....	25
3.2.7	Magnetic Tape Subsystem Storage .....	25
3.2.8	CD Recorder .....	25
3.2.9	Printers .....	25
3.2.9.1	High-Speed Event Printer .....	25
3.2.9.2	Laser Printer .....	26
3.2.10	Audio Tape Recording .....	27
3.2.11	General Information .....	28
3.2.12	Hardware Maintainability .....	29
3.2.13	Redundancy .....	29

TABLE OF CONTENTS (Continued)

4.0	System Software	30
4.1	General Requirements	30
4.2	Basic Features of CAD	30
4.3	Specific System Requirements	31
4.4	Call Taker Functionality	34
4.5	Dispatch Functions	38
4.6	Status Monitoring	42
4.7	Management Reports	44
5.0	System Functions	44
5.1	Display	44
5.2	Group Display	45
5.3	Alarm Summary Display	45
5.4	Alarm Annunciation	46
5.5	Alarm Acknowledgement and Clearing	46
5.6	CAD System	47
5.7	Display Definition	47
5.8	Graphics Editor	48
5.9	Configuration Documentation	48
5.10	Archiving	49
5.11	Display Selection	49
5.12	Alarming	49
5.13	Communications	50
5.14	Diagnostics	50
6.0	System Interface and Functions	51
6.1	General	51
6.2	Patrol Alarm Operations	51
6.3	Future Fire Alarm Operations	55
6.4	Radio Circuit Functions	60
	CAD Arrangement Drawing	65

**ABBREVIATIONS/ACRONYMS**

The following is a list of abbreviations and acronyms used within this document.

AC	-	Alternating Current
ALI	-	Automatic Location Information
AMP	-	Amperes
ANI	-	Automatic Number Identification
ATP	-	Acceptance Test Procedure
bps	-	bits per second
CAD	-	Computer Aided Dispatching
CD	-	Compact Disk
CFS	-	Central Fire Station
CLID	-	Calling Line Identification Directory Member
CRT	-	Cathode Ray Tube
CSA	-	Canadian Standard Association
dB	-	Decibel
dBm	-	Decibels of Power Reference to 1 Milliwatt
DC	-	Direct Current
DTMF	-	Dial Tone Multi-Frequency
EMS	-	Emergency Medical Service
ENS	-	Emergency Notification System
ESS	-	Electronic Switching System
FCC	-	Federal Communication Commission
FM	-	Factory Mutual
FSK	-	Frequency Shift Keying
HLAN	-	Hanford Local Area Network
HZ	-	Hertz
ID	-	Identification
I/O	-	Input/Output
KHz	-	Kilo Hertz
LED	-	Light Emitting Diode
Mb	-	Megabytes
MDT	-	Mobile Display Terminal
MIL-STD	-	Military Standard
ma	-	Milli Amperes
ms	-	milli Second
MUX	-	Multiplexer
NEC	-	National Electrical Code
NEMA	-	National Electrical Manufacturer's Association
NFPA	-	National Fire Protection Association
PPF	-	Plutonium Finishing Plant

**ABBREVIATIONS/ACRONYMS** (cont'd)

POC	-	Patrol Operations Center
PSK	-	Phase Shift Keying
PTT	-	Push To Talk
RAM	-	Random Access Memory
RCL	-	ReCaLI
RFAR	-	Radio Fire Alarm Reporting
ROM	-	Read Only Memory
SOPs	-	Standard Operating Procedures
TDD	-	Telephone Device for Deaf and Hearing Impaired
UL	-	Underwriter's Laboratory
VAC	-	Volts, Alternating Current



**1.0 SCOPE**

- 1.1 This specification establishes the requirements for an Emergency Alarm Dispatch System that shall be furnished and installed in the Patrol Operations Center located in Room 08, 08A and 11 of the 2721E Building in the 200 East Area on the Hanford Reservation in Richland, Washington.
- 1.1.1 It shall be a fully integrated, multi-element communications system comprised of radio/telephone systems, a computer aided dispatch system, alarm receiving systems, and radio/telephone switching systems. Section 6 describes the radio/telephone interface requirements. It shall have the hardware capability to add the fire alarm reporting system at a later date without the need to replace any significant component of the system. The operator consoles and servers should be of sufficient capability that they will not need to be replaced if the full fire dispatch capability is added in the future.
- 1.1.2 It shall provide for one main dispatch center consisting of four dispatch stations with one dispatch station designated for supervision and training. The supervisor's console shall have the capability to configure the functions at the other consoles.
- 1.1.3 It shall provide the capability to interface with the currently identified circuits plus provide 20% growth capability without degraded performance. The current circuit interface consists of 500 local/ industrial security sensors (See Section 6.2.10.1), 500 fire alarm (RS232) inputs, and 400 event blocks (RS232) from PFP. In addition, the system shall have the capability to expand to include 10,000 fire alarm inputs. It shall provide the capability to expand to meet new demands placed on it by growth. (See Section 6.2.10 for description of present inputs.) Sellers shall state the expansion capabilities of the system.
- 1.1.4 It shall provide the capability to dispatch patrol, fire, emergency medical, and sheriff services.
- 1.1.5 It shall provide the capability to display ALI and ANI information.
- 1.1.6 It shall provide the capability for an interface to existing alarm systems to automatically generate an event alarm upon detection of an intrusion, fire, panic, or specified environmental condition. The future interface to

the RFAR system must be accomplished without jeopardizing a Factory Mutual approval. It shall be capable of meeting the requirements of a Class 1 CAD system as specified in the present NFPA 1221, Section 3-12.

- 1.1.7 It shall provide for the future capability to interface with vehicle Mobile Display Terminals.
- 1.1.8 It shall provide the functionality of an emergency notification system (ENS).
- 1.1.9 It shall provide the capability to interface with a telephone device for the deaf and hearing impaired Callers (TDD).
- 1.1.10 It shall be the Seller's responsibility to interface with all incoming signals and required databases.
- 1.1.11 Recording
  - 1.1.11.1 Emergency calls (radio and telephone) and alarms shall be automatically recorded and the recording equipment shall be provided with instant playback capability.
  - 1.1.11.2 Alarm records shall be printed out on high-speed printers.
  - 1.1.11.3 Slow-speed printers shall be utilized to print records, reports, and any other printing requirements, including selectable output from the HLAN system.
- 1.1.12 Upon receipt of an alarm, the time and date shall be automatically recorded to both a hard disk and to a high speed printer.
- 1.2 The dispatch system shall function as follows:
  - 1.2.1 The computer-aided dispatching server shall be a redundant system. The secondary server shall be "hot stand-by" that shall be switched on-line in the event the primary server fails. Both servers shall share a mirrored database on redundant drives.

## 1.2.2 Annunciate Alarms

1.2.2.1 An audible tone shall be used to notify the operator when an alarm is received by the system. A different tone shall be used to differentiate between PFP secondary annunciations, local/industrial security alarms, and future fire alarms.

## 1.2.3 Display Alarms

1.2.3.1 Critical information shall be graphically displayed to the operator for appropriate actions.

1.2.3.2 The information shall be presented in the following forms:

1.2.3.2.1 Display of alarm information (type, location, conditions).

1.2.3.2.2 Special instructions, such as hazards and exposures, are provided for critical areas.

1.2.3.2.3 The potential for future decoded fire and trouble alarms. (This is the standard G. H. Harlow Company RFAR interface, see Section 6.3.)

## 1.2.4 Log Alarms

1.2.4.1 System activities are logged to a hard copy device and to disk file(s) for historical reference. The information logged includes, but is not restricted to, the following:

1.2.4.1.1 Alarm information (fire, local/industrial security alarms or PFP secondary annunciation).

- Date / Time
- Alarm State (e.g. -- alarm, reset, tamper, etc. From a minimum of 5 possible values, with a 6 character minimum length.)
- Alarm Class (e.g. -- security, fire, criticality, etc. From a minimum of 16 possible values, with a 16 character minimum length.)
- Sensor Identifier
- Sensor Type (e.g. -- microwave, Balanced Magnetic Switch, infrared, pull-box, etc. From a minimum of 50 possible values, with a 32 character minimum length.)

- Sensor Description (e.g. -- door number, room, box identification, etc. A text field having a minimum length of 64 characters.)
- Zone Description (e.g. -- area, facility, etc. A text field having a minimum length of 64 characters.)

1.2.4.1.2 Operator Actions (e.g. -- Transactions made to: log on/off system; acknowledge, assess, and dispose of the alarms; change operational mode of sensors between active, access, and inactive/maintenance; etc.)

1.2.4.2 Alarms in by-pass and alarm status need to be logged and available for recall.

1.2.5 Archival Storage (System Activity)

1.2.5.1 System activities shall be logged to disk and disk files as activity occurs. Disk storage is transferred to removable media (tape storage) on a periodic basis for analysis and long-term storage.

NOTE: Archival files shall contain all alarm activity information.

1.2.6 Network Status. The system shall monitor the health of the network communications and the connected systems.

1.2.6.1 Network Health Display

1.2.6.1.1 Symbols represent connected systems

1.2.6.1.2 Symbol colors represent operational status (operational, standby, inoperable).

## 2.0 APPLICABLE DOCUMENTS

NFPA 1221, 1994  
MIL-STD-1472D  
NFPA 70 (NEC) 1996

### **3.0 SYSTEM CONFIGURATION**

#### **3.1 General**

##### **3.1.1 Electrical**

3.1.1.1 The CAD communication and companion equipment shall operate on single phase 120 volt (+5, -15 volts) AC at 60 Hertz ( $\pm 1$  Hertz).

3.1.1.2 All AC power wiring and grounding of the CAD equipment shall be designed in accordance with the NEC.

3.1.1.2.1 All console equipment power cords shall be sufficient length and have a locking cap (NEMA L5-20P). (Reference Drawing H-2-825033)

3.1.1.3 The Seller shall submit a summary of the power requirements for each piece of equipment prior to furnishing the equipment.

3.1.1.4 All AC electrical equipment provided as part of the CAD shall be listed by a nationally recognized agency such as the Underwriter's Laboratory (UL), the Factory Mutual (FM), or the Canadian Standard Association (CSA).

3.1.1.5 All electronic equipment shall be fully solid-state and shall reflect the latest advances in the state-of-the-art. All equipment and material shall be new.

##### **3.1.2 Environment**

3.1.2.1 The normal operating environment for the dispatch stations shall be 65 to 80°F, however, the dispatch stations shall be rated for continuous operation over a temperature range of 50 to 104°F within a relative humidity range of 20% to 80% non-condensing.

##### **3.1.3 Dispatch Station Identification and Marking.**

3.1.3.1 Each dispatch station shall be permanently labeled with a unique identification number.

3.1.3.2 All major sub-assemblies and printed circuit boards shall be clearly identified and permanently marked with Seller's normal part numbering scheme.

- 3.1.4 Wiring and Connectors
  - 3.1.4.1 The Seller shall provide and install all interconnecting wire and cables required between system cabinets, assemblies, and sub-assemblies.
  - 3.1.4.2 All connectors shall be secured to their respective sockets by mechanical means, (e.g., clips, screws, etc.).
  - 3.1.4.3 Connectors used for high impedance, low current circuits shall have gold-plated contacts.
  - 3.1.4.4 All cables and wiring between sub-systems shall be clearly and permanently labeled. Labeling shall correspond to the wiring designations on the Seller's drawings and schematics.
  - 3.1.4.5 Wiring diagrams showing all cables, wiring, and wiring terminations shall be provided.
  - 3.1.4.6 The wiring diagram shall delineate the termination points for the Buyer Representative's field devices and provide space for the Buyer Representative to label each aisle point with the Buyer Representative's field instrumentation tag numbers.
- 3.1.5 Performance
  - 3.1.5.1 The CAD stations shall be capable of receiving all designated alarm points which include contact closures, serial data streams, telephone contacts, and radio contacts (See Section 6.2.10 for POC alarms and 6.3 for future RFAR alarms). It shall record all alarm and other transactions. It shall be capable of dispatching by voice.
  - 3.1.5.2 The CAD station shall be capable of monitoring, arbitrating, and updating all alarm points at a rate of at least two times per second.
  - 3.1.5.3 The CAD station shall be capable of monitoring, arbitrating, and updating all alarm status points at least one per second.
  - 3.1.5.4 Dynamic information on displays shall be updated with new information from the server at least once every three seconds, assuming any exceptions in reporting criteria has been met.

- 3.1.5.5 Alarms shall be annunciated within one second of sensing at the server input.
- 3.1.5.6 The server shall determine the priority of the alarms receive and queue the alarms in order of priority.
- 3.1.5.7 Graphic display call-up shall not require more than two seconds.
- 3.1.5.8 The high-speed printer shall produce a copy of an alarm received within two seconds.
- 3.1.6 Document Identification Requirements.
  - 3.1.6.1 All documentation shall be identified with a certified vendor information number. The number and format will be furnished by the buyer.
    - 3.1.6.1.1 The identification number shall be permanently located on the cover and the first page of all documents.
    - 3.1.6.1.2 All documentation shall be identified with a descriptive title. This title shall uniquely identify the information contained within the document.
  - 3.1.6.2 Technical Manuals and Drawings.
    - 3.1.6.2.1 All technical manuals developed for this system shall be standard 8 1/2" x 11" with the exception of drawings and foldouts which should be 11" x 17". Existing manuals may be expected in current format upon approval by the buyer.
    - 3.1.6.2.2 All manuals shall be accompanied by an electronic file that can be reproduced by the buyer. These files shall conform to the requirements established in the statement of work.
  - 3.1.6.3 Hardware Documentation.
    - 3.1.6.3.1 Dimensional drawings illustrating all major components of the CAD system shall be provided showing detailed information on system construction. This information shall clearly identify the component size and assembly.
    - 3.1.6.3.2 Hardware manuals shall be provided for all equipment and shall include description, maintenance and servicing instructions, schematic diagrams

and complete illustrative parts breakdown including a unique description of all parts for easy identification.

- 3.1.6.3.3 Maintenance manual shall contain detailed description to the board level of the equipment. The manual shall contain information required to troubleshoot the system to isolate problems to a board level. It shall include detailed operation and performance measurement information. The manual shall contain description, performance specifications, block diagrams, circuit diagrams, component locators and description of all option jumpers and switch charts. It shall be possible to isolate a system fault to the board level through use of this manual.
- 3.1.6.4 Operating System Manual
  - 3.1.6.4.1 Operating System manuals shall be provided for the programming language compiler, the operating system, computer operating software, installation and system debugging. This shall contain all the necessary information to troubleshoot and isolate operating system faults for identification.
- 3.1.6.5 CAD Operating Manuals
  - 3.1.6.5.1 An operating manual shall be provided that demonstrates how to use the CAD system and to assist the operators in using the system. This manual shall have a look-up table so an operator can find "how to instructions" to common operator questions. This look-up table shall be listed by easily identifiable phrases and questions.
  - 3.1.6.5.2 This operating manual shall identify how to use the CAD system from system log-on through all areas of operation.
- 3.1.6.6 CAD Configuration Manual
  - 3.1.6.6.1 A configuration manual shall be provided that delineates the method required to configure the system and assign users. This manual shall identify the supervisor control and monitor capability. It shall also include the instructions on how to configure and use the supervisor's console as a training console.



3.1.7 Acceptance

3.1.7.1 Acceptance shall be performed at the factory and at the site by the Buyer.

3.1.7.2 Factory acceptance shall be in three stages.

1. Thirty days after Notice To Proceed to verify all equipment shall be furnished as specified.
2. Midway through the equipment design and assembly to identify equipment configuration and layout.
3. The Seller shall completely assemble equipment prior to the factory acceptance.
4. Final factory acceptance to verify that all equipment and wiring is complete and the complete system performs as specified.

3.1.7.3 Site acceptance shall occur in two phases; hardware delivery and final acceptance. Final acceptance shall be after all systems have been brought on line and the system is operating as defined in the system's specification. The Seller shall provide a factory representative at the site for the duration of the final acceptance period.

3.1.7.4 A hardware delivery acceptance document will be signed by the Buyer when all hardware is physically installed. It is not essential that all equipment operate properly at this time. This acceptance is primarily to verify physical presence of all system equipment purchased.

3.1.7.5 The Seller will be provided with a security Acceptance Test Procedure (ATP) developed by the Buyer. The security ATP will be approved by the Buyer following successful operational testing of equipment and systems.

3.1.7.6 All peripheral equipment shall be tested individually for proper integration and operation. Only one CAD console shall be tested for integration and operation at a time. When all CAD consoles and peripheral equipment have been tested and accepted, the CAD system shall be brought on line. Only two CAD consoles and one each of the redundant peripheral equipment can be powered up and brought on line prior to disconnection of the existing POC equipment in Room 22. This requirement is

necessary so as not to exceed the power capabilities of the existing Uninterruptible Power Supply. The Seller shall work closely with the Buyer to verify that the transition from the existing CAD operation to the new CAD operation has minimum down time.

## 3.2 System Hardware

### 3.2.1 CAD System

3.2.1.1 The CAD system shall consist of four diskless CAD dispatching stations, each booting off the server. Three stations shall be dispatch stations with the fourth station designated as a supervisor station. The supervisor station shall be capable of performing the same functions as the other three. It shall also be used for instructional purposes, and control configuration. The CAD stations shall consist of a dual-screen color display monitor, computer, and keyboard with track ball designed for dispatch operations. The CAD station shall also have a centrally located radio/telephone switching panel. The CAD station shall combine special hardware and software integrating interactive mapping with dispatching and monitoring functions. Each CAD station shall have a HLAN system consisting of a computer, keyboard, and monitor separate from the CAD system. HLAN is located in the right section of the console.

3.2.1.2 The CAD system shall be used as a decision support tool. The CAD station shall integrate an interactive map display with the functions necessary to capture information received through emergency calls.

3.2.1.3 The CAD station shall dispatch and monitor service units, incident event status, and control the operations of emergency service vehicles.

### 3.2.2 CAD Stations

#### 3.2.2.1 Dispatch CAD Station

3.2.2.1.1 Each dispatch CAD station shall consist of the following:

1. One computer.
2. Two 19-inch color CRTs equipped with a video CRT screen pointer.

3. One function oriented keyboard with track ball.
4. One radio/telephone switching panel.
5. Dual 17-inch quad-split video monitors shall be installed above or to the left of the CAD displays. Video input to these monitors will employ manual switching of video selection and destination.

### 3.2.2.2 Supervisor's Console

3.2.2.2.1 One supervisor's console configured to see over the console in a sitting position.

### 3.2.3 CAD Station Components

#### 3.2.3.1 CAD Computer

3.2.3.1.1 The computer shall utilize a centralized database architecture to provide ease of database maintenance.

#### 3.2.3.2 Monitor

3.2.3.2.1 All CRTs shall be color and have a diagonal measurement of not less than 19 inches.

3.2.3.2.2 The CRT resolution shall be at least 1024 pixels horizontal by 768 pixels vertical and be sufficient to provide a clear, sharp display when used with the video generator format as specified.

3.2.3.2.3 The CRTs shall have a non-interlaced screen.

3.2.3.2.4 The CRTs shall have an anti-static glare guard.

3.2.3.2.5 The video generator shall provide a minimum of 256 colors, including black and white.

3.2.3.2.6 The video generator shall produce a text format of 40 lines by 80 characters minimum.

3.2.3.2.7 Adjustments for intensity and contrast shall be provided.

- 3.2.3.3 Functional Keyboard
  - 3.2.3.3.1 Each CAD station shall have a compatible full function keyboard which is designed for CAD usage.
  - 3.2.3.3.2 Keys shall be clearly and permanently labeled as to specific function.
  - 3.2.3.3.3 Labels shall be impervious to normal wear and usage for the expected life of the keyboard.
  - 3.2.3.3.4 There shall be a membrane incorporated below the keys to protect the keyboards from damage by liquid spillage.
  - 3.2.3.3.5 Audible or tactile feedback shall be provided.
  - 3.2.3.3.6 Dedicated and clearly labeled keys shall exist for the following functions:
    - 1. Call of all displays.
    - 2. Alarm acknowledgement.
    - 3. Entering the digit 0-9, sign (+/-), and decimal points.
  - 3.2.3.3.7 A track ball and mouse shall be provided for screen pointing, selectable by the operator.
- 3.2.3.4 Radio/Telephone Switching Panel
  - 3.2.3.4.1 The radio/telephone switching panel shall consist of fully distributed switching modules, interface modules to external circuits, speaker(s), microphone, and handset with earphones and microphone.
  - 3.2.3.4.2 The switching panel shall facilitate communications between console operators, radio channels and telephone lines.
  - 3.2.3.4.3 The switching panel shall be entirely modular and configurable. It shall include control modules consisting of a minimum of sixty (60) push-button and LED indicators to provide user-friendly controls and indicators designed for a high degree of operational ease and ergonomics.
  - 3.2.3.4.4 Switching panel shall utilize tactile line buttons. Each line button shall have a removable lens cap that can be engraved with a customer defined identification of up to two lines of six characters per line. Lens caps should be available in up to six colors.

- 3.2.3.4.5 Each switching panel shall include audio links for handset, microphone, select speaker and un-select speaker. The console system shall meet the following end-to-end performance specifications (Transmit and Receive).
- 1) Frequency Response: 300Hz to 3300Hz, +1, -3db referenced to 1 KHz.
  - 2) Harmonic Distortion: Less than 2% at rated output.
  - 3) Idle Channel Noise: 65 dB below rated output.
  - 4) Noise with Tone: 35 dB below rated output.
  - 5) Line Impedance: 600 ohms,  $\pm 10\%$ , balanced.
  - 6) Longitudinal Balance: 70 dB at 1 kHz.
  - 7) Microphone Sensitivity: -60 dBm to -22 dBm.
  - 8) Automatic Level Control: Output remains constant within 3 dB, over full sensitivity range.
- 3.2.3.4.6 Plug-in modules shall be used to interface up to eight telephone land-lines to the switching panel. Modules shall accommodate multiple land-lines in order to conserve common panel module slots.
- 3.2.3.4.7 Each land-line interface shall be a 600 ohm balanced line and shall include on-board DTMF/dial pulse signalling generator. The land-line interface shall be an FCC registered device and shall support DTMF and dial-pulse signalling and 20 Hz, 86VAC (+/-40VAC) Ring detection.
- 3.2.3.4.8 The minimum two-wire Return Loss of the interface shall be 21 dB and the minimum four-wire Return Loss shall be 40 dB when terminated with 600 Ohms.
- 3.2.3.4.9 The recorder Interface shall be capable of transmitting conventional channel, or telephone line audio to the logging recorder.
- 3.2.3.4.10 All signal links destined to external equipment not pertaining to the radio/telephone switching panel, such as base stations and telephone lines, shall be brought out to a cross-connect panel for purposes of

providing easy system modifications and accessibility with test instruments.

- 3.2.3.4.11 Each Radio/Telephone switching panel shall be equipped with a speaker, hand microphone, headset consisting of ear phones and a lip microphone, and a foot switch.
- 3.2.3.4.11.1 The speaker shall have an impedance of between 8 to 10 ohms and rated for 2 watts nominal power.
- 3.2.3.4.11.2 The hand microphone shall have an impedance of 50 to 200 ohms (dynamic type) or 600 ohms carbon type and be on a jack at the panel.
- 3.2.3.4.11.3 The headsets shall have padded ear phones and both ear phones and lip microphones shall be adjustable and be on a jack in the knee hole of the console.
- 3.2.3.4.11.4 The foot switch shall operate in parallel with the radio transmit push button on the panel and shall be on a jack in the knee well of the console.
- 3.2.3.4.11.5 Connecting the headset shall disable the panel microphone and speaker.
- 3.2.3.4.11.6 The panel shall be equipped with a red "dispatcher busy" LED indicator which shall light whenever receive push to talk audio is present at the speaker or headsets, or when the push to talk button is activated, or a telephone to intercom call is in progress at the panel.
- 3.2.3.4.11.7 The selected speaker or headset shall be capable of monitoring the receive audio from all channels and groups which are equipped at a console dispatchers position. "Receive audio" from all selected channels shall appear at the selected speaker or headset.
- 3.2.3.4.12 The following is a summary of functional requirements for each of the panel configurations:
  - 3.2.3.4.12.1 Telephone Requirements.
    - 1) Capability to answer: 30 lines.
    - 2) Touch tone dialing pad with DTMF tones.

- 3) Provide telephone handsets and headset.
- 4) Provide patch conference capability with automatic disconnect after either party hangs up within panel equipment.
- 5) Provide capability to record all calls automatically.
- 6) Provide visual indication of all calls which are patched, monitored, or conferenced.
- 7) Provide for 20% future growth of control positions or circuit capacity.
- 8) Provide for TDD calls.
- 9) Provide for the display of ANI and ALI information.

3.2.3.4.12.2 Each panel shall be capable of radio monitoring and controlling 30 conventional radio circuits. The radio control circuits are two-wire and four-wire. Each radio channel to be controlled at a console position shall have dedicated radio control module controls. A radio control module shall have the following control and indicators:

- 1) A push-button to select the channel. All select push-buttons at a panel position shall be interlocked such that only one radio may be selected at a time.
- 2) A LED to indicate that a channel is selected.
- 3) A LED to indicate that the channel is selected at another console.
- 4) A LED to indicate incoming audio.
- 5) A volume control knob for adjusting the receive volume of the speaker or headset.
- 6) A push-button for muting the channel audio.
- 7) The capability to select an individual radio channel. Channel selected must be compatible with present control equipment. See Section 6.4 for radio information.

- 8) The capability to select F1, F2, F3, F4 or F5 with visual indication of the selected function.
- 9) Any patched circuits should be able to be manually or automatically disconnected.
- 10) Patch capability between:
  - Radio to telephone line.
  - Radio to radio.
- 11) 2175 hz filters shall remove function tones and reduce signalling tone levels from headset/handsets and speakers.
- 12) Capability to monitor primary receive audio from any of the control circuit receivers. The console shall be capable of dynamically muting those control circuits, whose audio is not required.
- 13) A push-button and indicator shall be provided to permit the console operator to select up to six (6) channels for a patch operation. All patched channels shall be connected together through the common equipment on a simplex basis such that when one party is transmitting, all other parties are receiving. The console operator, after establishing a patch, shall be free to select another channel, or telephone line for communications. Two patches should be available per position.
- 14) A "transmitter on" indication during Push-To-Talk shall be provided.
- 15) Visual status display of each radio circuit:
  - Circuit idle.
  - Audio on circuit receive line.
  - Circuit selected for use at console position.
  - Circuit selected by another Central Dispatch position.
- 16) Parallel Push-To-Talk via:
  - Telephone handset/headset.
  - Foot switch.
  - Instant transmit button per channel.



- 3.2.3.4.13 The panel shall have the capability to provide DTMF decoder and display of ID information received from mobile units. (See Radio ID Formats, 6.4.1.6).
- 3.2.3.5 CAD Station Consoles and Chairs
  - 3.2.3.5.1 The CAD work station console shall be designed as a sit-down console. The console design shall comply with MIL-STD-1472D.
  - 3.2.3.5.2 The CAD work station console shall be designed so that the dispatcher shall be capable of reaching any pushbutton, switch, or operating device with a minimum of movement. It shall be large enough to accommodate an additional computer (HLAN) (see 3.2.5). A wrap-around configuration is desirable.
  - 3.2.3.5.3 The console surface height shall be 27.5 inches from the floor.
  - 3.2.3.5.4 A removable writing table shall be affixed to the front of the console and shall extend out 12 inches. The table shall extend the width of the console for documents and additional writing surface, keyboard, and mouse/track ball pointing devices.
  - 3.2.3.5.5 The horizontal sight line to the CRT display shall be approximately 19 inches.
  - 3.2.3.5.6 All CAD equipment shall be installed on slides to assist maintenance personnel in repairing and/or removing faulty equipment.
  - 3.2.3.5.7 No cabinet door shall have a swing radius exceeding 28 inches.
  - 3.2.3.5.8 The computer, communication equipment, and ancillary equipment shall be installed below the monitor.
  - 3.2.3.5.9 The operator consoles shall be designed so that they can be worked on front or back.
  - 3.2.3.5.10 The consoles shall be equipped with a rotary dimming switch suitable to control an incandescent task light with the dimming switch wired to a flanged inlet 20 amp, straight-blade plug (NEMA 5-20P) provided within 6 inches of the floor in the console knee well or on the back.

- 3.2.3.5.11 Provision shall be made to allow the dispatch equipment to have access through the console to wiring under the floor.
- 3.2.3.5.11.1 Each dispatch console shall have a "DURESS" push-button with an extended guard. It shall be red in color and have a normally open/normally closed contact rated for 300 volts at 10 amps or more. The Buyer will indicate the push-button location on the furnished console drawings.
- 3.2.3.5.12 The consoles shall be metal furniture with the top and front constructed of at least 16-gauge steel or greater. It shall be constructed such that a 200-pound person can sit on it with no oil canning of the surface. The sides may be open and if so, the legs shall be sturdy enough to carry the full weight of the dispatch equipment plus at least 300 pounds.
- 3.2.3.5.13 The consoles shall have one coat of acrylic primer and two coats of acrylic epoxy semi-gloss finish. The Buyer will select the finish color to be picked from a list of standard colors.
- 3.2.3.5.14 Console chair.
- 3.2.3.5.14.1 The console chair shall be furnished in accordance with MIL-STD-1472D, pages 146-147.
- 3.2.3.5.14.2 It shall be outfitted with arms, height adjustment which is variable from a minimum of 15 inches to 21 inches; seat tilt adjustment, and back tilt adjustment shall be provided. The height adjustment and seat tilt adjustment shall be via lever action for quick and convenient adjustment to accommodate rapid change of personnel at the consoles. A five caster supported chair shall be supplied for stability and safety.
- 3.2.3.6 CAD System Assembly
- 3.2.3.6.1 The Seller shall assemble console equipment and software information required for the configuration preparation, viewing, and printing of the dispatch control system data base, CRT displays, and graphic displays in advance of shipment.
- 3.2.3.6.2 The Buyer desires to configure his CRT displays well in advance of the receipt of the CAD system.

- 3.2.3.6.3 The Seller shall submit a sketch drawn to scale of the dispatchers station consoles to the Buyer for approval.
- 3.2.4 Server (Central Processing Unit)
  - 3.2.4.1 Two servers shall be provided. One server functions as a primary server and one functions as a back-up server. Both servers shall be identical with all the same features so that either can be identified as the primary server.
  - 3.2.4.2 Both servers shall be on line and have a mirrored data base. In the event one server fails, the other can continue operation with no interruption.
  - 3.2.4.3 Each server shall have a minimum of 48 megabytes of memory and one gigabyte disk drive.
  - 3.2.4.4 The primary server shall set the date and time for all system components.
  - 3.2.4.5 Each server shall be designed to deliver exceptional performance with a combination of power, speed and versatility. The proposed servers shall be suited for intensive compute, file and plot processing, and multi-tasking environments. Each server shall support the operating systems, software and hardware interfaces, networking, monitoring input and outputs routing information to disk storage and hard copy output to both high-speed and low-speed printers.
  - 3.2.4.6 The Seller shall provide any air filtering or fans required to operate the server in the specified environment.
  - 3.2.4.7 Conduit entry for field wiring shall be from the bottom. All conduit and wiring penetrations shall be protected by the installation of rubber grommets.
  - 3.2.4.8 Termination panels with barrier-type terminals shall be provided.
  - 3.2.4.9 All shield terminal points shall be internally connected to an isolated ground bus which will be connected by the Buyer to the instrumentation ground during installation.

- 3.2.4.10 Terminals shall be clearly marked with numbers and/or functional design designation as appropriate.
- 3.2.4.11 The termination panels shall be connected to the I/O system using Seller-provided pre-wired conductor cable with plug-in connectors.
- 3.2.4.12 Multiplexing of signals to the server may be accomplished in the server or with peripheral equipment at the Seller's option.
- 3.2.5 HLAN Computer
  - 3.2.5.1 The HLAN Computer shall consist of a 100 MHZ pentium unit with a 1.2 GB internal hard drive, 16 MB RAM, 256 KB cache, Quad-speed CD-ROM, 2 MB Graphic accelerator with MPEG 2MB RAM, and ETHERLINK III ISA TP network interface card, integrated sound blaster, headset, microphone and mouse, and P6 overdrive capability. It shall be delivered with a standard 101-key keyboard. The monitor shall be a 17-inch diagonal flat screen monitor with 256 colors and have a resolution of 1024 x 768 pixels.
  - 3.2.5.2 The CPU unit shall be installed below the top surface of the console to protect the unit from damage and allow access to the unit for maintenance. Cables shall be of sufficient length to allow for access to all cabling for connecting and disconnecting.
  - 3.2.5.3 The keyboard and mouse shall be installed on an adjustable swing arm retractable assembly with four degrees of freedom which allows the assembly to be stored under the writing surface when not in use. This assembly shall not use any ball-bearing movements. Cabling shall be secured to avoid interference to the operator and to prevent damage during either storage or in the operating positions.
  - 3.2.5.4 The HLAN monitor shall be installed in the upper right console area to provide visibility to the operator. It shall be installed in such a manner as to allow access to the monitor for maintenance and allow access to cabling and power connections.
  - 3.2.5.5 The HLAN printer output shall be directed to the laser printer by use of a selector to allow switching of the printer form the CAD system to the HLAN computer. This switching shall use automated control.

### 3.2.6 Disk Storage

3.2.6.1 Each server system shall include one gigabyte or more disk drive.

3.2.6.2 The redundant drive configuration shall provide additional reliability to the system by providing a continuous back-up of all data. Should the primary server fail or be taken off line, processing shall be shifted to the second server, which has a mirror disk containing all data stored on the primary disk.

3.2.6.3 The disk subsystem shall accommodate a required 90 days of on-line computer-aided dispatch events and location history files, as well as operating system software, applications software, and relational database system software.

### 3.2.7 Magnetic Tape Subsystem Storage

3.2.7.1 Each server system shall have a magnetic tape storage device to provide backup and archiving capability. The tape capacity shall be large enough to store all the data on the disk.

3.2.7.2 The magnetic tape subsystem shall have sufficient capacity to back up the hard disk drive, and shall be the current industry standard.

3.2.7.3 It shall utilize standard removable and re-writable current industry standard tape cartridges.

### 3.2.8 CD Recorder

3.2.8.1 A CD Recorder shall be provided to assist in software updates and provide CD archival data storage. This device shall provide the ability to make archival recordings using write once read many media. It shall be capable of writing at a 2X rate and reading at a 4X rate. It shall be capable of single session or multi-session recording. A single device is required but it shall be accessible from either server.

### 3.2.9 Printers

3.2.9.1 High-Speed Event Printer

- 3.2.9.1.1 The CAD system shall have two high-speed event printers for immediate on-line event logging and responding. Sound enclosures shall be provided for each printer.
- 3.2.9.1.2 Each printer shall meet the following minimum requirements:
  - 1) 132 characters per line minimum.
  - 2) 300 lines per minute minimum print speed.
- 3.2.9.1.3 Each printer shall provide a buffer such that no alarm information is lost due to slow printing speed.
- 3.2.9.1.4 Each printer shall utilize tractor/pin feed fan-fold paper.
- 3.2.9.1.5 It shall be possible to annotate and read the print copy while the paper is still in the machine.
- 3.2.9.1.6 The print head or mechanism shall not obscure the most recently printed line of characters. The printer may require a line feed button on the printer or an action on the dispatch consoles to send enough line feeds to the printer to enable the most recent line of text to be visible.
- 3.2.9.1.7 Each printer shall be supplied with a stand designed for holding the printers.
- 3.2.9.1.8 Each printer shall be supplied with a basket to hold printed paper output.
- 3.2.9.1.9 Each printer shall be supplied with the capacity to hold a box of paper in-feed.
- 3.2.9.1.10 Thermal printers are not acceptable.
- 3.2.9.2 Laser Printer
  - 3.2.9.2.1 The CAD system shall have two laser printers for logged historical data, system reconfiguration, and any other applicable applications.
  - 3.2.9.2.2 The laser printer shall be capable of interfacing with the CAD system as well as the HLAN system computer. It shall be a Laser Jet 3 or 4.

3.2.9.2.3 The laser printers shall meet the following minimum requirements:

- 1) Eight pages per minutes (8 1/2 x 11 page size)
- 2) Three hundred dots per inch
- 3) Two Mb RAM, expandable to 5Mb
- 4) Parallel and serial interfaces
- 5) 13 resident scalable fonts
- 6) 150 sheet paper tray
- 7) Automatic or single sheet feed

3.2.10 Audio Tape Recorder

3.2.10.1 Two audio tape automatic recording systems shall be provided.

3.2.10.2 The audio tape recording system shall record digitally and on receipt of incoming information shall automatically record the time and date. The recording shall include the ANI information from the telephone system.

3.2.10.3 The audio tape recorders shall be capable of being accessed from any of the four dispatch stations.

3.2.10.4 Each audio recording system shall consist of two digital audio tape drives and an instant playback module.

3.2.10.5 The instant playback module shall have a capacity of 30 hours.

2.3.10.6 Each digital audio tape drive shall have a capacity of 600 hours or more.

3.2.10.7 The audio recording system shall be capable of recording 32 channels simultaneously.

3.2.10.8 There shall be keys to provide for a ready, record, play, stop, and eject. Also, there shall be function keys for playback, fast forward, and rewind.

3.2.10.9 An LED display shall be provided and shall consist of a minimum of four lines with 40 characters per line. The display information shall be utilized to access recorded information. The recorded information shall be capable of being accessed by any of the four dispatch stations.

3.2.10.10 An end of tape and system failure alarm shall be provided. The alarm shall consist of both audio and visual. The visual signal shall be transmitted to the four dispatch stations.

- 3.2.10.11 The digital audio recorder shall have a channel monitor, channel mixing, simultaneous report and playback, fast forward and rewind in three speeds.
- 3.2.10.12 The search time for the instant playback module shall be in less than 5 milliseconds.
- 3.2.10.13 The average search time on the digital audio tape drive shall be 30 seconds. The search criteria shall be time/date, channel, next/previous, and contents.
- 3.2.10.14 The input characteristics per channel shall have a frequency response of a usable band of 300 to 3,300 Hertz and idle channel noise shall be less than 35 dB. System shall be capable of interfacing to ISDN interface.
- 3.2.10.15 Channel isolation shall be a minimum of 55 dB.
- 3.2.10.16 The unit shall have adjustable audio gain control.
- 3.2.10.17 Recording shall be initiated on voltage sensing.
- 3.2.10.18 Each channel shall be capable of generating a warning tone to the source being recorded.
- 3.2.11 General Information
  - 3.2.11.1 The CRTs, keyboards, and consoles shall be designed in accordance with the human factor guidelines given in Section 5.6 and Section 5.2 of Mil STD-1472D.
  - 3.2.11.2 The plane of each CRT face shall be capable of being tilted to compensate for various dispatch operator's height.
  - 3.2.11.3 Each CAD station shall provide an audible annunciator for alarms.
    - 3.2.11.3.1 The auditory alert subsystem provided by the CAD station shall not be similar to any Hanford plant emergency system, i.e., criticality alarm (AH-OH-GAH), wailing siren, wavering siren, steady siren, ringing bell, or clanging bell.
    - 3.2.11.3.2 The intensity of the auditory alert shall be adjustable with a maximum capability to achieve 80 decibel sound level at a distance of three feet. This adjustment shall be adjustable by maintenance personnel only and not accessible to the operators.



- 3.2.11.3.3 The frequency of the auditory alert shall be between 500 Hz and 3,000 Hz. However, a frequency of 1,000 Hz is preferred.
- 3.2.11.4 The CAD work station shall contain all processors, communication devices, and memory required to meet the performance requirements of this specification.
- 3.2.11.5 The console cabinets shall provide for cabling and communication via cable access for all equipment provided on top of the console of the cabinets.  
  
The Seller shall completely assemble each console and install all equipment and test prior to the installation. The final acceptance test shall be performed after the equipment has been installed in Room 08 of the 2721E Building.
- 3.2.12 Hardware Maintainability
  - 3.2.12.1 Modularity
    - 3.2.12.1.1 The local dispatch station, servers, signalling equipment, communication equipment, and peripheral equipment shall be modular in construction.
    - 3.2.12.2 Power-On Replacement
      - 3.2.12.2.1 Equipment at the dispatch station, communication equipment, monitors, computers, etc., shall be capable of being changed with the system power on with no damage to the system components.
  - 3.2.13 Redundancy
    - 3.2.13.1 System redundancy requirements are imposed in order to minimize the loss of one of the dispatch stations, servers, storage devices, and recording equipment.
    - 3.2.13.2 All redundant components shall be in hot-standby and their status (normal/failed) shall be continually monitored and shall share a mirrored data base.
    - 3.2.13.3 Whenever a redundant component is required by failure of the primary component, switching from the primary to the secondary component shall be automatic and occur within one second of a failure and be audibly annunciated.
    - 3.2.13.4 All automatic switching shall be logged on the log printer and appropriately displayed.

- 3.2.13.5 No single failure shall cause the loss of more than one of the two fixed mass storage devices or the loss of more than one mass storage device with removable storage media.
- 3.2.13.6 No single failure shall cause the loss of visibility to the dispatch stations.
- 3.2.13.7 Each station shall be capable of providing complete back-up for the other station.
- 3.2.13.8 The back-up mode shall be implemented by either automatically or manually loading a different configuration.

#### **4.0 SYSTEM SOFTWARE**

##### **4.1 General Requirements**

- 4.1.1 The proposed CAD application software shall be capable of supporting alarm and call intake, dispatch, unit status and management reporting and, at a minimum, provide the functions and features listed below.
- 4.1.2 It shall be the Seller's responsibility to verify that the software is virus free by a software virus scan. The software virus scan program shall be acceptable to the Buyer and the virus scan shall be performed in the presence of the Buyer.

##### **4.2 Basic Features of CAD**

- 4.2.1 The CAD software shall support dedicated, as well as combined call-taker and alarm monitoring plus dispatcher arrangements.
- 4.2.2 The CAD software shall support a single agency performing multiple functions, i.e., all fire, patrol and EMS activities. A single call or alarm entry must be routed to all dispatch positions simultaneously, or to any one station, or any combination of stations at the configuration of the system supervisor.
- 4.2.3 The CAD software shall produce an audit trail, logged to the server. This log shall occur immediately after the creation of a call for service or alarm, call dispatch, and after every status change.
- 4.2.4 All CAD terminals shall have multiple windows available. At least two windows shall be available upon command. At least two partial screens shall be able to be displayed at one time.
- 4.2.5 The software design shall make extensive use of table driven parameters allowing easy modification by the system supervisor without

the requirement for programmer support. These modifications shall be able to be made while the system is active.

- 4.2.6 A library of utility programs shall be supplied to maintain the data files. These programs shall be accessed through menus and be user friendly.
- 4.2.7 The operator shall be able to route the contents of the screen to any printer or terminal on the network.
- 4.2.8 Backup of the files shall be able to be accomplished without taking either system out of service or having any impact upon the response time or performance.
- 4.2.9 The systems shall make use of programmable function keys for all frequent operations, to reduce the number of required keystrokes.
- 4.2.10 Menus shall be provided to select the various functions that are available in the CAD programs. Access authorization shall control the functions that are available to each user. Only those functions which are allowed by access control shall be displayed on the screen.
- 4.2.11 The CAD systems shall have an on-line, context-sensitive help facility. The dispatcher shall be able to pick the correct selection from any list displayed by a single command from a function key or a track ball by pointing to that selection.
- 4.2.12 The CAD system shall have a "scratch pad" feature where information can be entered by category. The information contained in this file may be searched and displayed using the category name.
- 4.3 Specific System Requirements
  - 4.3.1 System Security
    - 4.3.1.1 The software shall provide a security system that contains a profile for each dispatcher/user. This profile will control:
      - 4.3.1.1.1 Which global functions the dispatcher/user can access.
      - 4.3.1.1.2 Which basic functions, call taking, dispatching, systems administration, etc., the dispatcher/user is authorized to perform.
      - 4.3.1.1.3 Which commands or function keys the dispatcher/user has the right to use.

- 4.3.1.2 Passwords
  - 4.3.1.2.1 The password files/records shall be protected against unauthorized access and viewing.
  - 4.3.1.2.2 Dispatcher/user passwords shall be of variable length, with a minimum length of six (6) characters.
  - 4.3.1.2.3 Each dispatcher/user's password shall be valid for a period as definable by system parameters.
  - 4.3.1.2.4 It shall be a desirable feature (without modifications to the operating system) that the system supports password aging.
  - 4.3.1.2.5 It shall be a desirable feature (without modifications to the operating system) that the system supports password generation.
  - 4.3.1.2.6 It shall be a desirable feature (without modifications to the operating system) that the passwords be required to contain at least one (1) non-alpha character.
  - 4.3.1.2.7 It shall be a desirable feature (without modifications to the operating system) that the system supports required use of password generation for changing of user passwords.
- 4.3.1.3 Dispatcher/user access to all system files shall be restricted based on access rights granted by the system, via the dispatcher/user profile, and the dispatcher/user ID.
  - 4.3.1.3.1 File access rights shall include, but not be limited to, read only, read/write, delete, and execute.
  - 4.3.1.3.2 It shall be a desirable feature (without modifications to the operating system) that all invalid file accesses be logged; the log information shall contain the date and time of the attempt, type of access requested, the ID of the dispatcher/user requesting the access, and the reason for failure.
  - 4.3.1.3.3 It shall be a desirable feature (without modifications to the operating system) that the information in the log shall be available for displaying and/or printing by a user with the proper security level.
  - 4.3.1.3.4 It shall be a desirable feature (without modifications to the operating system) that the information in the log shall be able to be purged by a user with the proper security level.

- 4.3.1.4 The software, under security level control, shall provide a facility to display CAD activity. This will be used to allow shift supervisors and any other authorized dispatcher/user to monitor the dispatch activity, without affecting the actual operation of the CAD.
- 4.3.2 Log On/Log Off Control
  - 4.3.2.1 All consoles shall be locked from all activity except log-on when a dispatcher/user is not logged onto it.
  - 4.3.2.2 The system shall provide a log-on of all unsuccessful attempts to log onto the CAD system.
    - 4.3.2.2.1 The log shall contain the date and time for the log-on attempt, the terminal/work station ID used, the attempting dispatcher/user identification and the reason for the failure.
    - 4.3.2.2.2 The information in the log shall be available for displaying and/or printing by a user with the proper security level.
    - 4.3.2.2.3 The information in the log shall be able to be purged by a user with the proper security level.
  - 4.3.2.3 Each work station dispatcher/user shall log on before being recognized by the system. The log-on identification of the dispatcher/user shall be validated, using a password, by the system before that dispatcher/user can perform system functions. The log-on identification will become part of the CAD call record for all calls created or dispatched by a dispatcher and for all alarm activity responded to, and sensor mode changes made, by a dispatcher.
  - 4.3.2.4 The CAD shall have the ability to quickly log a dispatcher/user off and log a new dispatcher/user on without having to exit from the CAD or re-start the program.
  - 4.3.2.5 A message shall be displayed to the user when they sign on indicating that their password has expired. The dispatcher/user shall be required to change their password prior to accessing the system functions.
- 4.3.3 CAD System Response Time
  - 4.3.3.1 Dispatching vehicles to calls for service received is often a time critical event. Because of this, the computer system cannot add appreciably to delays in responding to a call.
    - 4.3.3.2 Because of the above, the proposed CAD system shall be designed to meet the following general performance criteria:

- 4.3.3.2.1 Regardless of what the computer is doing, it shall have the capability of transferring an incident from the call taker to the dispatcher (in most cases this will be the same person) within a maximum of two seconds.
- 4.3.3.2.2 The system shall also have the capability of transferring partial incident information to the dispatcher after only the incident type and location have been entered. The call taker will continue to take additional information and enter it into the incident entry screen. Once they complete the incident, they will transfer the remainder of the incident information to the dispatcher. All information associated with the incident, including the "quick transfer" will be recorded in the audit trail.
- 4.3.3.2.3 The system shall optimize the use of hardware and software resources to obtain the highest possible throughput. Within the database area, specialized indexes shall be maintained to reduce I/O access to disk.
- 4.4 Call Taker Functionality
  - 4.4.1 Call Creation
    - 4.4.1.1 Upon receipt of a call for service, the software shall allow for the capture and maintenance of the following call information:
      - 4.4.1.1.1 Incident type (table-defined). The CAD software shall provide an on-line help function for valid incident types. If the operator enters an incorrect, or a partial incident type the system shall display a list of valid incident types. The user shall be able to select the correct incident type from that list. The selected incident type must then be filled in by the system in the call for service screen.
      - 4.4.1.1.2 Incident location (geo-processed) in CAD.
      - 4.4.1.1.3 Incident priority (table-defined based on entered incident type). The software shall allow the call-taker to override the table-defined priority value and enter a different priority level.
      - 4.4.1.1.4 Indication if the event is in progress. The default shall be set by the incident type, but modifiable by the call-taker.
      - 4.4.1.1.5 Complainant's name.
      - 4.4.1.1.6 Complainant's address.
      - 4.4.1.1.7 Complainant's telephone number.
      - 4.4.1.1.8 Call narrative/comments.

- 4.4.1.2 The software shall allow the call taker to capture the caller's information in any order. A facility shall be provided to input call for service information in either a command line entry, or by the use of numbered field or lines. The call taker shall be able to move around the input screen using any combination of field or line numbers, tabbing and/or by a next line key and/or track ball.
- 4.4.2 ALI and ANI Information
  - 4.4.2.1 The software shall be capable of interfacing with the existing 5ESS telephone switching system and the associated C-3 telephone database.
    - 4.4.2.1.1 The 5ESS is capable of providing calling line identification directory number (CLID) on all lines originating in the Hanford system (current version is Revision 5E7).
    - 4.4.2.1.2 The C-3 database holds real time information concerning the site location of all directory numbers in the Hanford system. This database is an oracle based database running on a UNIX platform, Version 2.3, (C-3 Version is currently revision 4.9).
    - 4.4.2.1.3 The C-3 database will file transfer an ASCII file composed of directory number, area, building and room via existing HLAN connection.
    - 4.4.2.1.4 Hanford PeopleCore Database will file transfer an ASCII file containing additional information related to directory number via an existing HLAN connection.
    - 4.4.2.3 If the location is not correct, the terminal user shall be able to input the correct location. The location of the 911 call shall be retained in the incident history.
  - 4.4.3 Location Validation
    - 4.4.3.1 Upon entry of the incident location, the application software shall provide a look-up to the geographic database. This process shall facilitate qualifying the given incident location and its' block range (if applicable) as a valid address and identify the appropriate patrol, fire, or EMS as defined. The geographic area information shall be capable of being read from an off-line graphic system. Currently this information is available on AutoCAD Release 12, Washington State Plane, South Zone, NAD83, metric.
    - 4.4.3.2 The system shall utilize a look-up for street names, intersections and common place names.

- 4.4.3.3 If the system is unable to provide an exact location match, a list of potential matches, shall be displayed to the call-taker.
- 4.4.3.4 The call-taker shall be able to select the correct location from the displayed list, scroll forward for other potential locations, or restart the location look-up with a new location. If the user selects from the displayed list the software shall automatically place the correct location in the incident location field.
- 4.4.4 Advisory Information
  - 4.4.4.1 The software shall also perform necessary look-ups to determine if any of the following conditions exist at the entered incident location:
    - 4.4.4.1.1 Location information. This information will be used for displaying hazards, or special instructions relating to a location. Notes shall be able to be associated with various geographic locations; grids, street segments, intersections, or specific addresses.
    - 4.4.4.1.2 Prior calls for service history at the incident location.
    - 4.4.4.1.3 Duplicate event detection. The software shall detect and notify the call-taker of the potential of a duplicate incident. The detection shall take into consideration location and time. The time parameters used by the software for this detection shall be user definable.
    - 4.4.4.1.4 Standard Operating Procedures (SOPs). CAD shall maintain a file of SOPs. Each CAD call type can have multiple related SOPs. These SOPs can be used to advise dispatch or patrol personnel on how that specific call type is to be handled. The detailed information on the SOP shall be displayed in a separate area or window on the screen, allowing the call to be displayed at the same time as the SOP.
  - 4.4.4.2 CAD shall flag the user of the existence of advisory information and display this information upon demand. This information shall be displayed without losing the call information from the screen. If a flag was displayed to the user, a record of that fact shall be made part of the call record.
  - 4.4.4.3 At any time during the life of an active call, the users shall be able to quickly display the advisory information for that particular call.
- 4.4.5 Urgent call "quick dispatch"
  - 4.4.5.1 The software shall allow the call-taker to pass an urgent, but incomplete call for service (containing only basic call type and incident location information), on for immediate dispatch, while the remainder of the call



intake information is being solicited. When the call-taker has completed the call, the up-dated information shall be sent to the dispatcher who is handling the call.

#### 4.4.6 Interruption of call intake for more urgent call

4.4.6.1 The software shall provide the ability to save multiple partially completed calls for service. A summary of all partially completed calls shall be displayed on the user's terminal. The call-taker shall be able to retrieve these partially completed calls.

#### 4.4.7 Alarm Calls

4.4.7.1 The software shall allow for the creation of calls for service using alarm numbers. The CAD shall have an alarm file that contains the location and description of the alarm. This information shall be displayed to the terminal user when the alarm is input. The CAD system shall automatically create an incident from a valid alarm activation from the future Fire Alarm System. The future fire alarm will have priority over all other alarms.

#### 4.4.8 Call Routing

4.4.8.1 Since the call-taker may also be the dispatcher, they shall be able to dispatch multiple units directly from the call screen. CAD shall automatically route a new call to the appropriate dispatcher based on the established parameters.

#### 4.4.9 Pending Call Queue

4.4.9.1 The software shall provide an interactive, dynamic call queue for maintaining calls for service awaiting dispatch. Calls awaiting dispatch in the call queue shall be stacked (sorted) first by priority and then within each priority by elapsed time since the call was received.

#### 4.4.10 Pending Call Display

4.4.10.1 The software shall provide for a display of pending calls on the same terminal that is used for dispatching (interactive terminal). This shall be in a split screen or separate window.

4.4.10.2 The dispatcher shall be able to scroll the pending incident display if there are more pending incidents than can be displayed at one time.

#### 4.4.11 Pending Call Timers

- 4.4.11.1 The software shall provide for timers, based on incident type, and whether in progress or not, for pending dispatches. The software shall highlight the display of any pending incident that has exceeded the timer. A function shall be provided to reset the timer, without having to recall the pending incident to the screen.
- 4.5 Dispatch Functions
  - 4.5.1 Selecting Pending Incidents
    - 4.5.1.1 The dispatcher shall be able to:
      - 4.5.1.1.1 Select the highest priority incident from the pending incident display with a single key stroke,
      - 4.5.1.1.2 Select calls from the pending queue in any order.
      - 4.5.1.1.3 Place a call back in the pending queue after reviewing it.
    - 4.5.2 Dispatch Screen
      - 4.5.2.1 The CAD software shall provide the following basic functions and/or information when a call for service is retrieved for dispatch:
        - 4.5.2.1.1 All call for service information obtained during call intake.
        - 4.5.2.1.2 Location advisory information. This information will be used for displaying hazards, or special instructions relating to a location. These notes shall be maintained by an on-line program. Notes shall be able to be associated with various geographic locations; grids, street segments, intersections, or specific addresses.
        - 4.5.2.1.3 Prior calls for service history.
        - 4.5.2.1.4 Duplicate event detection. The software shall detect and notify the call-taker of the potential of a duplicate incident. The detection shall take into consideration location and time. The time parameters used by the software for this detection shall be user definable.
        - 4.5.2.1.5 Standard Operating Procedures (SOPs). CAD shall maintain a file of SOPs. Each CAD call type may be able to have multiple related SOPs. These SOPs may be used to advise dispatch or patrol personnel on how that specific call type is to be handled. The detail information on the SOPs shall be displayed in a separate area or window on the screen, allowing the call to be displayed at the same time as the SOPs.

- 4.5.3 Unit Recommendation
  - 4.5.3.1 CAD shall automatically provide the dispatcher with a unit recommendation. This recommendation shall be composed of a specific unit identifier and shall be derived taking into account the following basic elements:
    - 4.5.3.1.1 Incident type to determine the type and number of units to recommend.
    - 4.5.3.1.2 Real-time unit status to determine unit availability. All unit recommendations shall correspond to the current, real-time status of all resources. The software shall never recommend a unit that is on another assignment or otherwise unavailable for dispatch. The software shall facilitate the definition and recommendation of second, third, etc., level units in the event a primary response unit is in an unavailable status.
    - 4.5.3.1.3 Patrol and unit recommendation shall be based on beat plans.
    - 4.5.3.1.4 Future fire unit recommendation and EMS shall be based on a user maintainable run card system.
    - 4.5.3.1.5 Future fire unit recommendation shall accommodate multiple alarm levels.
    - 4.5.3.1.6 The CAD system shall have the capability to provide in the future for temporary change of quarters of fire units. The dispatch recommendation will be based on the move to cover locations.
    - 4.5.3.1.7 The unit recommendation of future fire and EMS units shall show the station number and pager tone codes associated with each fire or EMS unit.
  - 4.5.4 Dispatching:
    - 4.5.4.1 The dispatcher shall have the capability to accept the system-provided unit recommendations with a single keystroke, or override these and provide one of his/her own.
    - 4.5.4.2 The dispatcher shall have the capability to select a unit that is on a lower priority call. A single keystroke shall remove the unit from the previous call (preempt) and assign it to the call to be dispatched. If the unit is the last one on a call, the call shall be automatically placed in the pending call queue and held for that specific unit.
    - 4.5.4.3 When that unit clears the higher priority call, the call they were preempted from shall automatically be recommended for dispatch. Call

times associated with assignment and re-assignment shall be kept in the call history file.

- 4.5.4.4 The dispatcher shall have the ability to change the primary unit at the time of dispatch or at any time during the handling of the call. The primary unit is the unit who is responsible for completing any reports.
- 4.5.4.5 CAD shall provide the ability to stack or assign low priority calls to a busy unit. These calls shall be time stamped, and displayed in the pending call display, with an indication that call has been stacked to a unit. When the unit clears from one call, the software shall provide an indication that the unit is now available for the stacked, or preempted call. CAD shall time stamp when the unit is en route to the new call.
- 4.5.4.6 Upon acceptance of a unit dispatch recommendation, or input of a dispatcher's own unit recommendation, the software shall automatically and dynamically update the status of all affected units throughout the CAD system. All CAD terminals shall be automatically updated with the new status information without operator intervention.
- 4.5.5 Call and Unit Status Maintenance
  - 4.5.5.1 The software shall dynamically and interactively track the status of all resources which are defined within the computer-aided dispatch system.
  - 4.5.5.2 The software shall track the following minimum call and unit status conditions, for each unit assigned to a call:
    - 4.5.5.2.1 Call Received
    - 4.5.5.2.2 Dispatched
    - 4.5.5.2.3 En Route
    - 4.5.5.2.4 Arrived on Scene
    - 4.5.5.2.5 Transporting
    - 4.5.5.2.6 Arrived Transport Destination
    - 4.5.5.2.7 Clear Unit and/or Call
  - 4.5.5.3 Recorded times (e.g., dispatched, arrived, etc.) shall be maintained in military (24-hour clock) format. The software shall capture both minutes and seconds. All unit status changes shall be automatically time stamped and become part of the call for service history.
  - 4.5.5.4 The clock time used by all applications shall be able to be reset while they are operational, and without having to log users off, or re-boot the system. If the systems are interfaced to an optional clock synchronization system, the synchronization system shall perform the clock resetting functions.

- 4.5.6            Updating Unit Status
  - 4.5.6.1        Dispatchers shall be capable of updating unit status through keyboard input of appropriate unit identifiers and a single function key.
  - 4.5.6.2        The software shall allow dispatchers to update a unit status while performing any call taking or dispatching function within the CAD system by providing easy accessibility to an interactive command line at all times. This command line shall allow multiple units to have the same status update at the same time.
  - 4.5.6.3        Updating unit status shall be able to be accomplished without losing the call information that is displayed on the screen. If the cursor is repositioned to perform the command, it shall be automatically returned to the correct screen and cursor position where the dispatcher left off without losing any information.
  - 4.5.6.4        The software shall allow an alternative method of inputting status changes that would accept a function key command first and then the unit number(s) or visa versa.
  - 4.5.6.5        The software shall provide dispatchers with the capability to clear all units with a single command or clear all units with the exception of specified ones.
- 4.5.7            Updating Calls
  - 4.5.7.1        The software shall allow either call-takers or dispatchers to review an active call and update the call with corrections or additions.
  - 4.5.7.2        The software shall allow assisting units to be added to a call after it has been dispatched.
  - 4.5.7.3        The dispatcher must be able to escalate the fire alarm level. CAD shall make additional unit recommendations based on the new alarm level and run card recommendations.
- 4.5.7.4        Releasing and Reassigning Units
- 4.5.7.5        The software shall allow units to be reassigned from one call to another. The previous call shall be returned to the pending queue if the reassigned unit is the last unit on the call.
- 4.5.8            Call Completion
  - 4.5.8.1        CAD shall allow either single units or all units on a call to be cleared with a command or function key. When the last unit on a call is cleared, CAD

shall require a disposition code and an indicator when a report is required before clearing the call.

4.5.8.2 The software shall provide for the capture of a user-maintainable call disposition code, an indicator that a report is or is not required, and call completion comments.

#### 4.5.9 Report Numbering

4.5.9.1 The software shall assign unique sequential case numbers, following numbering standards for those incidents in which a written report is to be taken. The software shall provide the option of either having the report number automatically generated, or generating the number upon demand.

4.5.9.2 The software shall allow for the resetting of the sequential numbers at any time to a desired number.

4.5.9.3 The software shall allow the reassignment of an existing related case number, instead of the system generated number.

#### 4.6. Status Monitoring

##### 4.6.1 Pending Calls

4.6.1.1 The software shall display the waiting call queue in a window of the screen. The dispatcher shall be able to quickly select the desired call to dispatch.

4.6.1.2 The waiting call queue display shall present all waiting calls for service in priority order, and within each priority elapsed time since call receipt. Displayed information shall include a minimum:

4.6.1.2.1 Call Priority

4.6.1.2.2 Incident Type

4.6.1.2.3 Location

4.6.1.2.4 Time of Call Receipt

##### 4.6.2 Active Call Status

4.6.2.1 The dispatcher shall be able to display a summary of all active calls by depressing a function key.

4.6.2.2 The active call status display shall include at a minimum:

4.6.2.2.1 Time Call Received

4.6.2.2.2 Call Number

- 4.6.2.2.3 Priority
- 4.6.2.2.4 Call Type
- 4.6.2.2.5 Call Type Description
- 4.6.2.2.6 Location
- 4.6.2.2.7 Units Assigned
- 4.6.2.2.8 Status Times Associated With Each Unit
- 4.6.2.2.9 Name of Person(s) Dispatched
  
- 4.6.2.3 The dispatcher shall be able to quickly select any call from the display for updating. The dispatcher shall be able to scroll the active call display, if there are more calls than can be displayed at one time.
  
- 4.6.3 Changing Duty/Roster/Shift Changes
  - 4.6.3.1 CAD shall provide the ability to quickly change the assignment of a single unit including, on or off duty, area of coverage, officer(s) assigned and whether recommended for dispatch.
  - 4.6.3.2 CAD shall also provide the ability to pre-build a shift and allow a dispatcher with the required access control the ability to review the roster and make any necessary changes.
  - 4.6.3.3 After the roster has been reviewed and updated, CAD shall provide a command to activate and deactivate shifts. Each shift shall be user-definable and allow for over-lapping shifts.
  
- 4.6.4 Calls for Service History
  - 4.6.4.1 Once an incident is closed out (all units cleared) and an incident disposition is captured, the software shall maintain the call detail as calls for service history. The call for service history shall include all information which was generated as part of the call intake, dispatch, and unit status tracking process specific to each incident.
  - 4.6.4.2 The calls for service history file shall allow for the on-line display of closed calls. Access control shall control which users have the ability to access closed calls and which users have the ability to update or change closed calls.
  
- 4.6.5 Unit History
  - 4.6.5.1 The CAD system shall capture non-call related unit history in a unit history file.
  - 4.6.5.2 The unit history file shall allow for the on-line inquiry and display of unit activity.

## 4.7 Management Reports

### 4.7.1 Pre-Formatted Reports

4.7.1.1 Users shall be able to generate management reports by selecting the desired type of report from a CAD menu and entering the desired selection criteria and date/time ranges. The system shall be able to create, delete, and modify pre-formatted reports as needed and place these reports into the CAD menu system. The reports to be provided include:

- 4.7.1.1.1 Call taker/dispatcher activity for a selected time period.
- 4.7.1.1.2 Response time summary.
- 4.7.1.1.3 Calls for selected unit for a given time period.
- 4.7.1.1.4 Response time analysis by unit.
- 4.7.1.1.5 Response time analysis by type of call.
- 4.7.1.1.6 Number of calls received by type and time of day, day of week.
- 4.7.1.1.7 Officer activity summary.
- 4.7.1.1.8 Summary by disposition code.
- 4.7.1.1.9 Activity by type and shift.
- 4.7.1.1.10 Hour of day statistics.
- 4.7.1.1.11 Day of week statistics.
- 4.7.1.1.12 Event priority overrides.

### 4.7.2 Ad-Hoc Reports

4.7.2.1 A capability of generating ad-hoc reports using any data field within CAD shall be made available. The generation of reports must take place as a secondary/background function of CAD so CAD response time is not affected.

### 4.7.3 Mapping Capabilities

4.7.3.1 Seller shall describe how their system incorporates computerized mapping into CAD. Seller shall include a detailed explanation regarding how their system's maps are updated.

## 5.0 SYSTEM FUNCTIONS

### 5.1 Display

5.1.1 All displays shall be organized in a logical hierarchical manner.

5.1.2 Each display shall be uniquely labeled and identified and shall include display of current date and time with resolution to two seconds.

5.1.3 Overview group alarm summary and status shall be performed.



- 5.1.4 Graphic displays shall be Buyer-formatted.
- 5.1.5 The representation of alarm status by color coding and flashing shall be consistent on all displays that provide alarm status.
- 5.1.6 Display software shall provide up to 16 colors.
- 5.1.7 Numerical values, such as alarm points, shall be Buyer-formatted.
- 5.1.8 Letter values shall be Buyer-formatted.
- 5.1.9 All displays shall be automatically updated when they contain status information.
- 5.1.10 All displays shall provide feedback and response to control actions.
- 5.2 Group Display
  - 5.2.1 Groups shall be uniquely identified by name and number.
  - 5.2.2 Alarm status shall be identified by color coding and flashing symbols.
  - 5.2.3 Discrete status shall be clearly indicated.
  - 5.2.4 Group displays shall provide graphical and textual representation of device, status, and alarms.
- 5.3 Alarm Summary Display
  - 5.3.1 Alarm summary displays shall provide a prioritized listing to read all current alarms.
  - 5.3.2 Information display shall include the time of the alarm, occurrence, tag name, alarm type, and alarm description.
  - 5.3.3 Alarm status activated and acknowledged shall be indicated by a combination of color coding, and flashing.
  - 5.3.4 Flashing shall be utilized for un-acknowledged alarms.
  - 5.3.5 Acknowledged alarms shall be steady.
  - 5.3.6 Alarms which have been cleared shall be removed and the display alarm list shall be restacked to eliminate blank lines.

- 5.4 Alarm Annunciation
  - 5.4.1 Activation of an alarm shall be annunciated visually and audibly such that attention is commanded without preempting current activities.
  - 5.4.2 Sufficient information shall be provided to enable rapid progression to display that will permit alarm acknowledgement by utilizing two key strokes or less.
  - 5.4.3 If the alarm is configured on the current display of the CRT, the display shall be dynamically updated.
  - 5.4.4 Alarm indication and all displays shall be color coded according to the level of importance.
  - 5.4.5 The capability shall be provided to allow the Buyer to assign a minimum of four colors to each alarm.
  - 5.4.6 Control of the displayed alarms shall be provided to prevent them from becoming a nuisance as in the case of simultaneous or chattering alarms.
  - 5.4.7 Alarm activation shall be automatically logged to the log printer and log file/database in the order of occurrence.
  - 5.4.8 Refer to Section 1.2.4 for log alarm information.
  - 5.4.9 Alarm shall appear on the alarm summary display in the order of priority.
- 5.5 Alarm Acknowledgement and Clearing
  - 5.5.1 Dispatcher alarm acknowledgement shall be provided.
  - 5.5.2 For an alarm to be acknowledged it must be acknowledged from any display showing the alarm.
  - 5.5.3 Acknowledgement of an alarm shall cause the alarm indicator to be set from flashing to steady and cause the audible annunciator to be silenced.
  - 5.5.4 Alarm acknowledgement shall be logged in the log printer and to the log file/data base.
  - 5.5.5 Logged information shall be logically linked to the alarm annunciation information and shall include date and time of acknowledgement, tag name, and alarm type.

- 5.5.6 The alarm shall remain active on all appropriate displays until it has cleared.
- 5.5.7 Alarm inhibit functions shall be provided.
- 5.5.8 Alarm inhibit is intended to suppress chronic alarms in the event of equipment failures.
- 5.5.9 Clearing of an alarm shall be logged on the log printer and to the log file/data base.
- 5.5.10 Logged information shall be logically linked to the alarm annunciation and acknowledgement information, and shall include date and time of clearing, tag name, reason for alarm activation, and alarm type.
- 5.5.11 Fire Alarm Bypass (future capability).
  - 5.5.11.1 Provision shall be provided to quickly bypass alarms by:
    - 5.5.11.1.1 Individual fire zones.
    - 5.5.11.1.2 Trouble alarms only.
    - 5.5.11.1.3 All fire and trouble alarms (with one user entry).
    - 5.5.11.1.4 Front button alarms.
- 5.6 CAD System
  - 5.6.1 The CAD system shall not require a knowledge of computer programming or special training other than the Seller's standard training classes.
  - 5.6.2 Changes to the operating configuration of the CAD station shall be possible without interrupting monitoring and control functions.
  - 5.6.3 Specifically, it shall be possible to add a point or delete point to or from the server configuration in a bumpless manner.
- 5.7 Display Definition
  - 5.7.1 An interactive display definition capability shall be provided to configure, construct, and perform a pre-formatted overview group alarm and summary displays.

- 5.7.2 The display definition capability shall provide the following functions:
  - 5.7.2.1 A menu-driven fill in the blanks approach to display generation.
  - 5.7.2.2 Fully support all features of pre-formatted displays.
  - 5.7.2.3 Reference process variables by tag name during display definition and construction.
  - 5.7.2.4 Add new displays and modify existing displays.
  - 5.7.2.5 Delete displays and automatically recover disk storage.
- 5.8 Graphics Editor
  - 5.8.1 An interactive graphics editor shall be provided that supports the definition and construction of the Buyer formatted graphics displays.
  - 5.8.2 The graphic editor shall provide the following functions:
    - 5.8.2.1 Fully support all features of the Buyer-formatted displays.
    - 5.8.2.2 Add new displays.
    - 5.8.2.3 Modify the content of existing displays.
    - 5.8.2.4 Delete existing displays and automatically recover disk storage.
    - 5.8.2.5 Build new displays from existing displays.
    - 5.8.2.6 Pre-define standard process symbols.
    - 5.8.2.7 Ability to create Buyer-defined symbols.
    - 5.8.2.8 Color selection for all symbols and tags.
    - 5.8.2.9 Random selected delete, copy, or move picture elements.
- 5.9 Configuration Documentation
  - 5.9.1 The Seller shall describe specifically how these requirements are met.
    - 5.9.1.1 A description of any special hardware or software shall be provided.
    - 5.9.1.2 The software shall provide a method to document the CAD monitoring and control configuration.

- 5.9.1.3 The Buyer shall be able to add annotated comments from within the control program generator to the documentation generated by functions and obtain hard copies of these results.
- 5.9.1.4 The software shall provide a method of generating a graphic depiction of the control function and their linkage.
- 5.9.1.5 The documentation shall occur during program generation and be a part of the program generator.
- 5.10 Archiving
  - 5.10.1 The archive system shall be capable of selectively archiving to the laser printer the following events and information:
    - 5.10.1.1 Modifications of the alarm points.
    - 5.10.1.2 Establishment of alarm inhibits.
    - 5.10.1.3 Alarm information.
  - 5.10.2 The archive system shall also indicate selective archiving to the removable off-line storage media.
  - 5.10.3 All archive information shall include date and time of occurrence.
- 5.11 Display Selection
  - 5.11.1 All displays shall be accessible in a logical, hierarchial manner that permits rapid progression vertically between levels and laterally within levels.
  - 5.11.2 All displays shall be directly accessible.
  - 5.11.3 Overview displays shall support the selection of group displays.
  - 5.11.4 Group displays shall support the following control functions; alarm acknowledgement, modification of output signals, change of output state on or off.
  - 5.11.5 Graphic displays shall support the following control functions: Alarm acknowledgement, change of output status on and off.
- 5.12 Alarming
  - 5.12.1 Alarms shall be generated on sensor, telephone, and radio inputs.

- 5.13            Communications
- 5.13.1        Communication capability shall be provided that links all CAD stations together on a common communication network.
- 5.13.2        The networks shall support peer-to-peer communication between all CAD stations.
- 5.13.3        Any network node shall have access to alarm information generated by other nodes unless that data is excluded under configuration control.
- 5.13.4        The communication protocol shall support error checking and re-transmission upon error detection.
- 5.13.5        The network shall automatically route around single communication link failures between any two nodes on the network.
- 5.13.6        The communication network shall be periodically monitored by an on-line diagnostic for faults.
- 5.13.7        Communication faults shall be displayed.
- 5.14            Diagnostics
- 5.14.1        The CAD station shall perform automatic self-diagnostics after power up or restart conditions.
- 5.14.2        A self diagnostics shall test memory and idle busses as a minimum and shall isolate faults to the module level.
- 5.14.3        The CAD stations shall also perform periodic on-line status diagnostics that determine if major components are operating correctly.
- 5.14.4        The status diagnostics shall test as a minimal all processors, memory, I/O busses, peripherals, and communication links that are critical to the CAD stations ability to perform monitoring and control.
- 5.14.5        Execution of status diagnostics shall not inhibit the CAD station from performing monitoring and control functions.
- 5.14.6        Indications of faults shall be clearly displayed at the CAD station.

## 6.0 SYSTEM INTERFACE AND FUNCTIONS

### 6.1 General

6.1.1 The CAD system shall interface with the Hanford Patrol and the Hanford Fire Department. It shall receive information from the protected area alarm system (secondary alarms), direct reporting local alarms, phone and radio. It shall also receive actual fire alarms from the Hanford Fire Department serial data streams. It shall have the capability to dispatch by radio or telephone. It shall also interface with the Benton County Sheriff's office, and Washington Central Computerized Enforcement Services System. Previous described equipment and software is what is expected of the CAD system and the following describes the interface requirements. Requirements may be duplicated in previous sections. The following information is an aid to the Seller.

### 6.2 Patrol Alarm Operations

#### 6.2.1 Secondary Alarm Reporting and Annunciation

This functionality provides the secondary reporting and annunciation of protected area (PFP) alarms and the secondary annunciation (courtesy) of fire alarms.

6.2.1.1 Alarms shall be annunciated by an audible tone and flashing light on the CAD station console when an alarm is received by the system.

6.2.1.2 Critical information shall be displayed to the dispatcher for appropriate actions. The information shall be presented in the following forms:

- Textual—Display of alarm information (type, location, condition).
- Instructions—Special instructions, such as for hazards and exposures, are provided for critical areas.

6.2.1.3 System activities shall be logged to a hard copy device for historical reference. The information logged shall include the following:

6.2.1.3.1 Date / Time.

6.2.1.3.2 Alarm Type (tamper, open, short, alarm, normal).

6.2.1.3.3 Alarm Class (security, fire, criticality).

6.2.1.3.4 Sensor Type (microwave, infrared).

6.2.1.3.5 Sensor Location (door number).

- 6.2.1.3.6 Zone Description (facility area).
- 6.2.1.3.7 Operator actions—Transactions made to acknowledge, assess, and dispose of the alarms.
- 6.2.1.4 System activities shall be logged to a disk file. The file shall be transferred to removable media on a periodic basis for analysis and long-term storage. NOTE: Archival files contain both secondary protected area alarms, local alarms, and fire alarm system activity information.
- 6.2.1.5 The system monitors the health of the network communications and the connected systems. Symbols represent connected systems. Symbol colors represent operational status (operational, standby, inoperable).
- 6.2.2 Local/Industrial Security Alarm Monitoring Function
  - 6.2.2.1 The function is to provide a monitoring point for alarms outside the boundaries of the protected areas (PFP).
  - 6.2.2.2 Alarms shall be annunciated by an audible tone and flashing light when an alarm is received by the system.
  - 6.2.2.3 Critical information shall be displayed to the dispatcher for appropriate actions. The information shall be presented in the following forms:
    - 6.2.2.3.1 Textual - Display of alarm information (type, location, condition).
    - 6.2.2.3.2 Graphical - Display a map of the area where the alarm occurred.
  - 6.2.2.4 System activities shall be logged to both a hard copy device and to a disk file for historical reference. The information logged includes the following:
    - 6.2.2.4.1 Date / Time.
    - 6.2.2.4.2 Alarm Type (tamper, open, short, alarm, normal).
    - 6.2.2.4.3 Alarm Class (security, fire, criticality).
    - 6.2.2.4.4 Sensor Type (microwave, infrared).
    - 6.2.2.4.5 Sensor Location (door number).
    - 6.2.2.4.6 Zone Description (facility area).
    - 6.2.2.4.7 Operator Log-On.



- 6.2.2.4.8 Sensor Mode Changes.
- 6.2.2.4.9 Transactions made to acknowledge, assess, and dispose of the alarms.
- 6.2.2.5 The system shall be capable of generating reports to a printer. The reports include the following:
- 6.2.2.5.1 All Sensors - List of all sensors in the system and their current status (mode and state).
- 6.2.2.5.2 Inactive Sensor - List of sensors in the inactive mode and their current state (alarm, open, short, tamper, normal).
- 6.2.2.5.3 Access Sensor - List of sensors in the access mode and their current state (alarm, open, short, tamper, normal).
- 6.2.2.5.4 All Zones - List of sensors per zone (facility area) and description of each zone.
- 6.2.2.5.5 Single Zone - List of sensors for a particular zone (facility area) and description of the zone.
- 6.2.2.5.6 Single Access - List of sensors that can be placed in an access Set mode as a group.
- 6.2.2.5.7 All Access Set - List of groups of sensors that can be placed into an access mode.
- 6.2.2.5.8 Event Sensor - List of sensors that generated the specified security event.
- 6.2.2.5.9 Sensor Verification Information as to the condition of a particular sensor.
- 6.2.2.6 The system shall be capable of modifying the modes of the sensors. The sensor modes shall include the following:
- 6.2.2.6.1 Secure - All sensor state changes are reported. State changes include "alarm," "tamper," "open," "short," and "normal."
- 6.2.2.6.2 Access - Sensor "alarms" are filtered; "tamper," "normal," "open," and "short" are reported.
- 6.2.2.6.3 Inactive - No sensor state changes are reported.

- 6.2.2.7 The system shall be capable of displaying sensor modes and states in real time. The information shall be displayed in the following forms:
- 6.2.2.7.1 Sensor Status - A matrix of sensors symbols with colors and Map characters that represent the modes and states of the sensors.
- 6.2.2.7.2 Graphics Map - Facility area maps containing symbols that represent the modes and states of the sensors.
- 6.2.2.8 The system shall monitor hardware and software health and report problems. The system health tests shall be performed on the following:
- 6.2.2.8.1 Dispatch and servers.
- 6.2.2.8.2 Peripheral equipment.
- 6.2.2.8.3 Programs.
- 6.2.3 Communications System. The POC uses radio and telephone equipment to receive site emergency calls and direct response forces. Communications shall be recorded for legal and historical reference.
- 6.2.4 Law Enforcement Radio Network. This network is used by the POC to communicate with law enforcement agencies outside the Hanford site.
- 6.2.5 Washington Central Computerized Enforcement Service System. The primary function is to provide the Benton County Sheriff's Department with information such as driver's license and vehicle registration checks, as well as wants or warrants. This system also provides for interagency communications.
- 6.2.6 Duress Monitoring System. The primary function is to identify patrol, fire, or important persons that are in duress.
- 6.2.7 Aircraft Communication System. This function of this system is to communicate with aircraft in the vicinity of the Hanford Site.
- 6.2.8 Telecommunication Alarm and Control System. The primary function of this system is to monitor alarms on the telecommunications equipment. This system also allows patrol to switch the radio repeater transceivers from Gable Mountain to Rattlesnake Mountain. This allows complete radio communication coverage for the Hanford Site.
- 6.2.9 Encrypted Telephone System. The primary function of this system is to allow classified or sensitive communications with other agencies.

- 6.2.10 The expected inputs to the new CAD system are:
- 6.2.10.1 Of the alarms coming into POC, there are about 500 security sensors that currently report to the MUX which will be converted to contact closure type inputs to the new system. These inputs may be either a single contact closure reporting only alarm/reset conditions; or, a dual contact closure reporting alarm/reset and tamper/reset conditions.
- 6.2.10.2 The 500 fire alarms that come into POC arrive as data streams on a RS-232 data line (300 bps), not as contact closures. Three (3) message types are received from CFS system:
- 1) CFS Restart: Send 80h; response none; action, counts as a heartbeat message.
  - 2) CFS Heartbeat: Sends 81h; response none; action, restart heartbeat fail timers. If heartbeat fail timer reaches some parametric value, the system shall notify the operator of a loss of communication with CFS.
  - 3) CFS Actual Fire Alarm with Dispatch: Sends 5-byte message beginning with 4wh, x, y, z, o; 4wh indicates the alarm subtype, where w may be 2 through B, current understanding shows that the message subtype sent and received is 4Bh indicating an actual fire alarm and that message subtype 42h through 4Ah are not sent.  
  
The x y, z parameters represent information about the origin of the fire alarm box from which the alarm was received. Information on decoding these values will follow at a later date.  
  
Response none; action, decode message and annunciate a fire alarm notification to the operator.
  - 4) Any other messages are to be ignored.
- 6.2.10.3 The inputs to POC from PFP for redundant alarm reporting will arrive at POC as data streams on a RS-232 data line (different from the incoming fire alarm data stream). The system at PFP will be a Graphic Link system from Scientific Approaches. The CAD system shall communicate with the PFP Graphic Link system. The format for the PFP Graphic Link messages and required responses will be provided by the Buyer.
- 6.2.10.4 A RS-232 data port shall be provided for an interface to an industrial/video alarm system. The CAD system shall be capable of communicating, through this port, with dedicated equipment for remote site monitoring.
- 6.3 Future Fire Alarm Operations
- 6.3.1 The main purpose of a Radio Fire Alarm Reporting (RFAR) System is to receive and record fire related alarms. The system shall be located in the Hanford Emergency Alarm Dispatch System Facility and at each of the

outlying fire stations (100, 200, 300, and 400 Areas). The functions provided by the RFAR System are described in the following sections.

The RFAR receiving system shall be supplied by the G. H. Harlow Company, P. O. Box 185, Lake Oswego, Oregon 97034. G. H. Harlow Company shall be contacted so the appropriate interfacing equipment and software will be supplied between the RFAR receiver and the CAD stations.

- 6.3.2 Radio fire alarm boxes, located in buildings around the Hanford Site are monitored for fire and trouble alarm messages. The 30 bit alarm messages are decoded into textual messages containing the following information:
  - 6.3.2.1 Alarm type.
  - 6.3.2.2 Date.
  - 6.3.2.3 Time.
  - 6.3.2.4 Box identification.
- 6.3.2.5 The decoded messages are transmitted to the Computer Aided Dispatch (CAD) System for further processing.
- 6.3.3 Decoded fire and trouble alarm messages are displayed to the dispatch operator for appropriate actions.
- 6.3.4 Decoded fire and trouble alarm messages are recorded to a hard copy device as a permanent record of alarm activity.
- 6.3.5 The CAD System shall upon receipt of a trouble or fire alarm activate an audible tone and flashing light. The audible tone is different for a trouble or a fire alarm.
- 6.3.6 Radio fire alarm box check-in messages are received for the purpose of recording, which boxes remain functional. Each fire alarm box is individually programmed to send its check-in message at a specified time (once per day).
- 6.3.7 The CAD System shall receive fire and trouble alarm signals from the RFAR System and provides the dispatcher with critical information about the alarm. The critical information consists of the following:
  - 6.3.7.1 Radio fire alarm box number.
  - 6.3.7.2 Building identification.
  - 6.3.7.3 Fire zone.

- 6.3.7.4 Time alarm was detected.
- 6.3.7.5 Date alarm was detected.
- 6.3.7.6 Recommended response equipment information.
- 6.3.7.7 Hazards.
- 6.3.7.8 Exposures (adjacent structures that may be threatened).
- 6.3.7.9 Graphical display of building and fire zone.
- 6.3.7.10 Types of alarm devices in zone (smoke detectors, pull boxes, etc.).
- 6.3.7.11 Special exposures (i.e., propane tank).
- 6.3.7.12 Radiation hazards.
- 6.3.8 This information is used to dispatch equipment to respond to the fire alarm. Dispatching of equipment can be performed automatically by the CAD System or dispatcher approval.
- 6.3.8.1 The CAD System shall allow a dispatcher to initiate an alarm manually. The normal use for this function would be when notification of an emergency situation was received other than through the RFAR System (i.e., phone). The operator inputs the description, location, and any other pertinent information concerning the emergency situation. If the emergency location is in the data base, the operator has the option of dispatching the recommended emergency apparatus; otherwise, the operator will have to use his/her own judgment to assign the necessary equipment to be dispatched.
- 6.3.8.2 The CAD System shall be capable of automatically controlling the activation of doors, interior lights, traffic lights, and bells in the area fire stations via existing remote relays. This feature may be disabled or enabled for each area fire station. This feature exists in Fire Station 200 and shall be installed in the POC facility.
- 6.3.8.3 The CAD System shall monitor the operational status (up or down) of the communication link to the following systems.
- RFAR Systems (2 systems).
  - Satellite CAD Systems (100, 200, 300, and 400 Areas).
- 6.3.8.4 A link status is visually displayed to the operator in the form of a colored symbol. The color is updated in real time when the status changes. The color green represents that the link is operational, while red represents that the link is inoperable. The color blue represents that communication was never established.
- 6.3.8.5 The CAD System shall be capable of controlling the reporting of alarms by box or zone from the RFAR System. The statuses that a box or zone can be in are as follows:

- 6.3.8.5.1 BYPASS - Alarms are ignored by the system. Alarms can be bypassed for an individual fire zone, for trouble alarms only, for all fire zones and trouble alarms, or for the front button alarm on the transmitter.
- 6.3.8.5.2 ACTIVE - All alarms for a box or zone are reported by the system.
- 6.3.8.5.3 CARRY-OVER (C-0) - Label used to document long-term alarm system impairments. All alarms shall report and annunciate.
- 6.3.8.5.4 TROUBLE - Label used to document short-term alarm system problems. All alarms shall report and annunciate.
- 6.3.8.6 The CAD System shall maintain a data base of information on the equipment (vehicles) used for emergency responses. The data base includes the following:
- 6.3.8.6.1 Equipment identification.
  - 6.3.8.6.2 Equipment location.
  - 6.3.8.6.3 Equipment status (in service, out of service, responding, on scene).
  - 6.3.8.6.4 Assigned backup.
  - 6.3.8.6.5 Comments (i.e., condition of equipment).
- 6.3.8.6.6 The CAD System shall allow for the Adding, Deleting, and Changing of any record in the data base, with the access level of the user determining what he/she is able to perform.
- 6.3.8.7 Maintain Building Data Base. The CAD System shall maintain a data base of Hanford building information. The CAD system shall be capable of reading this building information from any AutoCAD Release 12 database. The data base includes the following:
- 6.3.8.7.1 Radio fire alarm box number.
  - 6.3.8.7.2 Building identification.
  - 6.3.8.7.3 Fire zone(s).
  - 6.3.8.7.4 Fire alarm boxes.
  - 6.3.8.7.5 Hazards.
  - 6.3.8.7.6 Exposures (adjacent structures that may be threatened).
  - 6.3.8.7.7 Special exposures (i.e., propane tank).
  - 6.3.8.7.8 Notes (comments).
  - 6.3.8.7.9 Building graphics (floor plan).
  - 6.3.8.7.10 Radiation hazards.

- 6.3.8.8 The CAD System shall be capable of displaying reports to the screen or printing to a hard copy device. The reports available on the CAD System shall be as follows:
- 6.3.8.8.1 Alarm - Reports alarms received for a specified date and time.
  - 6.3.8.8.2 Equipment - Reports a list of all equipment and the current status of the equipment.
  - 6.3.8.8.3 User - Reports a list of users entered into the system.
  - 6.3.8.8.4 Building - Reports a list of buildings and the boxes and zones associated with those buildings. It also shows if a graphic (floor plan) exists for a particular zone.
  - 6.3.8.8.5 Alarm Status - Reports a list of boxes and their status changes for a specified time period. If time period is not within the current log archive file then the appropriate floppy disk must be inserted into the A drive. The report is printed in box order. Typical time period of this report is the last 24 hours.
  - 6.3.8.8.6 Alarm Carryover - Reports a list of all boxes currently on the alarm status list, including those carried over from previous time periods.
  - 6.3.8.8.7 Field Incident - Reports a list of all Field Incident Reports (FIR) stored in the system.
- 6.3.8.9 The CAD System shall have the capability to send and receive electronic mail messages to any other station or to a vehicle equipped with a Mobile Display Terminal (MDT). Sending a message to all stations and vehicles equipped with MDTs is also possible. The operator is notified upon receipt of mail messages both visually and with an audible tone.
- 6.3.8.10 The CAD System shall provide data protection through assignment of user authorization levels. The user is given capabilities equivalent to the authorization level at the time of logging onto the system.
- 6.3.8.11 The System Control functions shall be as follows:
- 6.3.8.11.1 Network Node - Allows the user to configure the eight set up communication ports and to assign the MDT units to the fire apparatus.

- 6.3.8.11.2 Control Port - Allows the user to activate or deactivate the Setup ability to raise doors, turn on lights, etc., in the outlying stations.
- 6.3.8.11.3 Graphics Update - Allows graphics to be updated from a floppy disk without exiting the program. Shall only update the graphic if the appropriate building/zone exists in the data base.
- 6.3.8.11.4 Exit - Allows the user to exit from the program.

#### 6.4 Radio Circuit Functions

6.4.1 The radio controllers/remotes are connected to the existing radios via leased telephone lines or other voice grade circuits. Each RCL circuit has the following functional parameters:

- 6.4.1.1 Circuit Type: The circuit has either a 2-wire or 4-wire voice requirement.
- 6.4.1.2 Frequency: The circuit is designated with Frequency 1 (F-1) or Frequency 2 (F-2).
- 6.4.1.3 Transmit Control: The circuit shall use DC (F-1+6.5 ma or F-2 +12 ma) or tones to control the transmit function.
- 6.4.1.4 Impedance: 600 ohm impedance (input and output) transformer isolated.
- 6.4.1.5 Talk Power: The normal voice levels are 0 dBm (adjustable -20 to plus 10 dBm) for both transmit and receive paths.
- 6.4.1.6 Proprietary Signaling Format: Some channels use proprietary and coded signaling format.

- 1) Duress system channels require Duress Decode and Unit ID Decoder capability. Two proprietary duress alarm systems are used in tandem.
  - a) System 1: A Motorola MDC-600 (to be upgraded to a MDC-1200) decoder provides a visual display, audible duress alarm and a RS-232C serial interface for a printer (selectable 300, 1200, 9600 or 76,800 bits per second). Known signaling characteristics are:
    - Modulation. Phase Shift Keying (PSK) modulation and demodulation.
    - Data Rate. 600 bits per second (bps).



- Carrier Frequency. 1500 Hz.
  - Packet Size. Data is transferred in bursts 290 ms in duration.
- b) System 2. A General Electric/Coded Communications Model MBD-5U uses the G-Star format. The decoder provides visual display, audible duress alarm and RS-232C serial interface for a printer at 110 or 300 bps. Known signalling characteristics are:
- Modulation. PSK modulation and demodulation.
  - Data Rate. 400 bps.
  - Carrier Frequency. 1600 Hz.

## 6.4.1.7

Signaling. Channel signalling is performed by current or tone for the selected functions. The most common function being Push-To-Talk (PTT) and frequency selection of a selected transmitter. The tones used are common industry standard tone format. The sequence when the PTT is pushed consists of a high level guard or "wake-up" tone, then a function tone, followed by a low-level PTT tone. The specific tone signalling is shown in Table I. All radios will eventually be tone controlled in the future.

**Table I - PTT Signalling**

Tone	Frequency (Hz)	Duration (ms)	Power (dBm)
Guard (Wake Up)	2175	130	+10
Function	1950 (F-1) 1850 (F-1)	40	0
PTT	2175	continuous	-20 plus voice

## 6.4.1.8

Supervisory Alarm/System (BRAMCO). This alarm system provides remote switching and alarm/status reporting of 20 contacts each at two remote locations. The known BRAMCO operating parameters are:

- 1) Circuit Type. Voice grade 4 wire telephone circuit.
- 2) Modulation. Frequency shift keying (FSK) tones of 660 Hz to Transmit, and 1020 Hz and 900 Hz to receive.

- 3) Coding. The coding technique is a 21 pulse binary word (20 functions plus parity), double scanned.

6.4.1.9 Alert Tone Generation.

6.4.2 Specific Functional Circuit Requirements

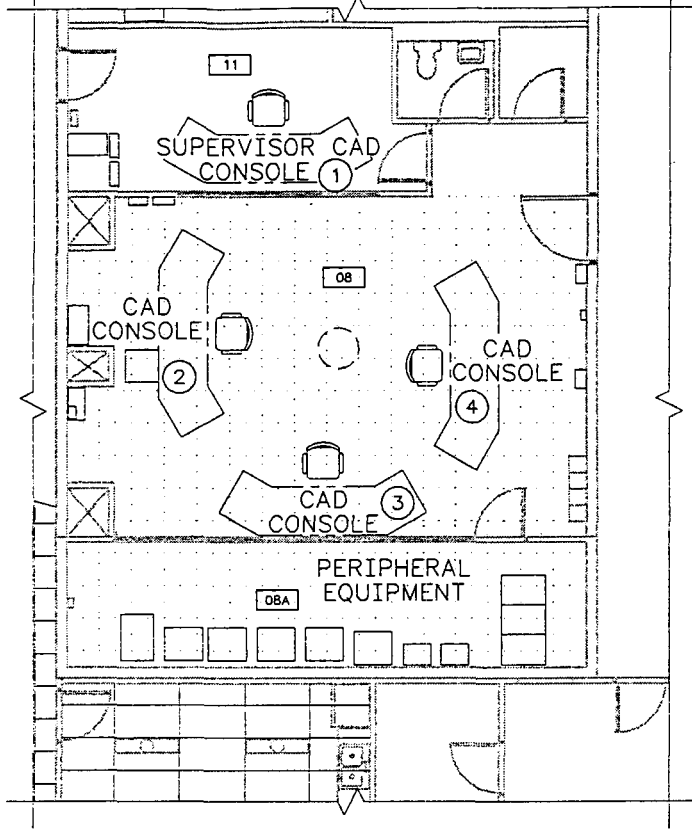
6.4.2.1 Twenty-one radio channels shall be connected to the control consoles. The specific circuit requirements are listed in Table II. Expansion capability is required to at least 30 channels.

Table II - Specific Radio Channels

Ckt No.	Assigned To:	Type	Signal	Freq.	Duress?	Notes
KKE-624	Patrol	4W	Tone	F-1 F-2	Yes	F-2 is DES
KFW-660	Fire	2W	DC	F-1		
KOK-219	TAC3 (local)	4W	Tone	F-1 F-2	Yes	F-2 is DES
KOK-219	TAC3 (South)	2W	Tone	F-1	Yes	
KOK-219	TAC3 (RSB)	2W	Tone	F-1	Yes	
KOK-219	TAC3 (405- CON)	2W	Tone	F-1	Yes	
KOK-219	TAC3 (4621- E)	2W	Tone	F-1	Yes	
KOK-219	TAC3 (Fed)	2W	Tone	F-1	Yes	
KOK-219	TAC3 (North)	2W	Tone	F-1	Yes	
KOB-743	Safety	2W	DC	F-1		
KRF-249	Transport- ation	2W	DC	F-1	Yes	
KMD-88	Coast Guard	2W	DC	F-1 F-2		
KHA-320	LERN	2W	DC	F-1		
KOM-785	Super LERN	4W	Tone	F-1		
KDC-574	BC Sheriff	2W	DC	F-1		
KZI-509	WPPSS	2W	Tone	F-1		
KOE-649	Fire TAC	2W	Tone	F-1		To be added
KKG-290	BCFPD #1	2W	Tone	F-1		To be added
KOO-9	Aircraft					Local control only for multiple frequency use
KGH-513	Tank Farms	2W	Tone	F-1		To be added
KKE-625	Trunked Radio	2W	Tone	F-1 thru F-5		Requires additional control tones: 1350Hz (F-3) 1250Hz (F-4) 1050Hz (F-5)

2W = Two-wire voice grade  
4W = Four-wire voice grade  
DC = Direct current voltage signaling  
DES = Data Encryption Standard  
F-1 = Frequency 1  
F-2 = Frequency 2

END OF SECTION



# PARTIAL PLAN - 2721E BLDG

SCALE:  $\frac{1}{8}'' = 1'-0''$

**NOTE**

THIS IS A SUGGESTED LAYOUT FOR THE CAD CONSOLES FOR THE HANFORD EMERGENCY ALARM DISPATCH SYSTEM.

**SCM** Consultants, Inc.  
Architects & Engineers, Kennewick, WA

**CAD ARRANGEMENT**

PROJ. No. 8522.030	DATE: 4/9/96	REV. 0
BY: RWS	CHKD. JLR	APVD. GTC

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DWG. No.

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