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DOE STANDARD GUIDE TO GOOD PRACTICES FOR COMMUNICATIONS



**U.S. Department of Energy
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Guide to Good Practices for Communications

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FOREWORD

The purpose of this Guide to Good Practices is to provide Department of Energy (DOE) contractors with information that can be used to validate and/or modify existing programs relative to Conduct of Operations. This Guide to Good Practices is part of a series of guides designed to enhance the guidelines set forth in DOE Order 5480.19, *Conduct of Operations Requirements for DOE Facilities*.

KEYWORDS

Face to Face
Portable Radios
Sound Powered Phones

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DEFINITIONS

Communications	The process of sending and receiving information.
Emergency Communications	Urgent messages transmitted during an emergency situation concerning the operation of the facility.
Face-to-Face Communications	The act of directly communicating verbally without the aid of mechanical or electrical communications equipment.
Public Address (Paging) System	A communication system designed to be heard in all areas of a facility.
Operational Communications	Messages concerning the operation of the facility.
Portable Radios	Any radio communications system where at least one station is remote and portable.
Sound-Powered Phones	A party or dedicated line providing communications among two or more specific stations without the need for external power.
Verbal Communications	Messages that are transmitted by voice and received by ear (written notes or other physical aids may be used in conjunction with verbal communication to aid in remembering the specific details of the message).

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GUIDE TO GOOD PRACTICES FOR COMMUNICATIONS

1. INTRODUCTION

This Guide to Good Practices is written to enhance understanding of, and provide direction for, Communications, Chapter IV of Department of Energy (DOE) Order 5480.19, *Conduct of Operations Requirements for DOE Facilities*. The practices in this guide should be considered when planning or reviewing communication programs. Contractors are advised to adopt procedures that meet the intent of DOE Order 5480.19.

"Communications" is an element of an effective Conduct of Operations program. The complexity and array of activities performed in DOE facilities dictate the necessity for high reliability in communications to promote safe and efficient operations.

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2. OBJECTIVE

The objective and criteria are derived from DOE Order 5480.19. They are intended to aid each facility in meeting the intent of the order.

Communications, both normal and emergency, are highly reliable and provide accurate transmission of information within the facility.

Criteria:

1. Communication methods are implemented to ensure timely and reliable contact with essential personnel such as supervisors or on-shift operators.
2. Only facility approved abbreviations and acronyms are used in facility communications.
3. Communications are clear, concise, and correctly understood.
4. Portable radio use is monitored and controlled to prevent electronic interference in sensitive instrument areas.
5. A facility paging system is effectively used and controlled to ensure the impact of important announcements is not reduced.
6. An Emergency Communications System is implemented to ensure all facility personnel are promptly alerted to facility emergencies.

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3. DISCUSSION

All of us depend on verbal communication for the exchange of information or instructions. Depending on the job, an individual may be responsible for transmitting or receiving information in the form of operating instructions, feedback on the results of operations, reports of operational data, or emergency warnings and instructions. Whether face-to-face or electronic communication, this information has to be transmitted and received; it has to be accurate and complete; most importantly, it has to be understood.

Communication problems have caused many adverse situations in Department of Energy (DOE) facilities. Inadequate communication can be identified as a causal or contributing factor in human performance-related events. Principal areas in which poor communications can cause problems include shift turnover, pre-job briefings, and during job performance. Facilities can reduce the contribution to adverse situations by ensuring that verbal communications are conducted in a formal and disciplined manner and that communication systems are properly used. Formality in communication is especially important when personnel safety is involved or complex evolutions are performed.

Just as there are different messages to be communicated, there are different methods of audible communication (e.g., face-to-face, party-line, point-to-point, and public address announcements). Each method requires the use of specific techniques to effectively communicate the necessary information. This guide presents communication techniques that have proved successful in the commercial industry, government, and the military.

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4. GOOD PRACTICES

4.1 Oral Instructions and Informational Communications

4.1.1 Attributes

Verbal instructions should be clear, concise, and correct. Before sending instructions, a sender should plan what to say, then say it to him/herself to ensure that it has all of the message attributes. Then the sender should say it to the intended receiver.

4.1.1.1 Clear

Operational communications must be free from ambiguity. Messages that contain words with multiple meanings or similar sounds may be confusing (e.g., use "raise" and "lower" instead of "increase" and "decrease"). Slang and expletives should not be used. Equipment noun names and numbers should be used (e.g., "Open feedwater pump discharge valve one six."). When communicating alphanumeric information, both sender and receiver should use a phonetic alphabet to ensure clarity. Appendix A is a suggested phonetic alphabet. An exception to this practice is the use of approved standard abbreviations such as "ACW" for auxiliary cooling water.

Only facility-approved terminology, equipment identifications, and abbreviations should be used. A list should be developed of standardized and facility-specific terminology to be used during communications. This list should include the terms, applicable written abbreviations, and verbal acronyms.

4.1.1.2 Concise

Operational communications should be as brief as possible. The key is to keep the message as short as possible while still effectively communicating the information. Using approved verbal acronyms should keep messages short. This is especially important during emergencies (e.g., when a work station reports an emergency condition to the control area). However, when using the public address system to announce emergencies (e.g., evacuation, fire, take cover) the use of acronyms should be avoided so that all personnel, including new employees and visitors, clearly understand the actions they are to take.

4.1.1.3 Correct

The message should be specific to ensure that the correct unit or component (Alpha or Bravo; 1 or 2) is identified. Noun names and equipment numbers should be used together to ensure that the message is properly transmitted and received.

4.1.2 Format

Operational communication should use a standard format to ensure consistency and effectiveness. The suggested format, in the appropriate order is:

- Establish communication
- Transmit message
- Repeat back message
- Confirm repeat back

4.1.2.1 Establishing Communications

Before transmitting a message, communications must be established between the sender and the intended receiver. The sender should identify the intended receiver and then him/herself. Either formal names or work station titles may be used as identification, however, work station titles are preferred.

Example: "Control Room Operator, this is the Auxiliary Operator."

This lets the person receiving the message know who is directing an action or requesting information. When answering a phone, radio, etc., the receiver should identify the work station followed by his/her title or name.

Example: "Control Area, Control Room Operator."

This lets the sender know if he/she has contacted the intended location and person.

4.1.2.2 Transmitting the Message

Once communications have been established, the message text can be transmitted. The message attributes presented earlier should be used during transmission.

Example: "Building Operator, this is the Control Area Operator. Open Cooling Water Suction Valve, Foxtrot two five."

The receiver should make notations when receiving complex or lengthy communications to ensure that important information is not forgotten. For example, operators should write down valve numbers and final valve position when directed to reposition valves in a specific sequence. This ensures that actions are correct and in the required sequence. If the receiver does not understand the message, he/she should ask the sender to repeat or rephrase the message.

If the message is an abnormal or emergency condition report, personnel should exercise additional care to speak slowly, clearly, and accurately. These reports should include the nature, severity, and location of the problem. During abnormal or emergency reports, communication lines should be kept open for subsequent reports (i.e., stay on the line,

unless directed otherwise or where environmental conditions or personnel hazards require evacuation for personnel safety). If conditions require immediate evacuation, contact should be made with the Control Area after successful evacuation.

4.1.2.3 Repeatback

In operational communications, the receiver should repeat the message back to the sender. This is especially important when receiving instructions involving operation of facility equipment to assure the sender that the instruction is correctly understood. A verbatim repeatback is preferred, although paraphrasing may be used as long as the intent of the message is clearly stated. If notations of equipment, numbers, and positions were made during the original transmission, the repeatback should contain the same information.

Example: "Control Area, this is the Building Operator. Understand, open Cooling Water Suction Valve, Foxtrot two five."

The sender must listen carefully to repeated messages to ensure the receiver understands the message. If the receiver repeats the message incorrectly, the sender should immediately correct the receiver by saying "Wrong" and repeat the message until properly received.

4.1.2.4 Confirmation

After the repeatback, the sender should confirm or correct the receiver. The absence of the confirmation step may result in miscommunication because the receiver may have misheard the instructions and repeated erroneous information. A lack of response by the sender may be misinterpreted as silent confirmation that the repeated message was correct. However, the receiver should not carry out the action until confirmation is received.

Example: "Building Operator, this is the Control Area Operator. That is correct."

4.1.2.5 Reportbacks

Another part of operational communication is the reportback. When directed to perform a task, a report should be made concerning the completion of the task or difficulties encountered as soon as possible. The appropriate supervisor or control area operator should acknowledge this communication so that the sender is confident the report was received.

4.1.2.6 Briefings for Operators

Briefings can provide information to operators during normal and emergency operating conditions. Information should be concisely transferred among the operators by well organized briefings. Managers can ask questions or

review assignments to verify that the operators understand the information presented, after completion of the briefings.

During facility operation, the briefings should be held before facility activities such as surveillances, maintenance troubleshooting, or component manipulations. Briefings should be conducted frequently, for abnormal or emergency operating conditions, to confirm that operators understand facility conditions and emergency operating procedures.

4.2 Face-to-Face Communication

Face-to-face communication is performed when the sender and the receiver are in the presence of each other. The sender's title may be omitted from the message, however, the sender should ensure that the intended receiver receives the message when two or more people are in the immediate area. The use of sign language in lieu of audible communications should only be performed in accordance with prescribed guidelines (e.g., hand motions for crane operators).

Example: Face-to-face operator communications to increase Service Air Header pressure:

Control Room Operator (CRO) to Facility Equipment Operator (FEO):

"Facility Equipment Operator, raise Service Air Header pressure to one five zero pounds."

Response by FEO Operator:

"Raise Service Air Header pressure to one five zero pounds."

Acknowledgment by CRO:

"That's correct."

4.3 Communication Systems

Communications systems should be implemented to ensure that control areas can quickly contact personnel throughout the facility. In addition, these systems should allow contact between personnel outside of the control area.

4.3.1 Party-line Communication Systems

A party-line communication system allows more than two work stations to communicate on the same communication line at the same time. If a party line communication system is used, the sender should check the line to verify that the line is clear prior to establishing communications. This should prevent "cutting in" on other conversations. In addition, the sender and receiver identification should be included in each message. To gain access to a party line in the event of an emergency, the phrase "Silence on the line, this is an emergency" should be used to clear the line for priority communications.

Example party-line radio communications concerning filling and venting of Service Water piping:

Auxiliary Operator (AO) to Outside Facility Equipment Operator (FEO):

"Outside FEO, this is the AO. Vent service water header one Bravo using valve Sierra Whiskey one seven."

Response by Outside FEO:

"AO, this is the Outside FEO. Vent service water header one Bravo using valve Sierra Whiskey one seven."

Acknowledgment by the AO:

"Outside FEO, this is the AO. That is correct."

4.3.2 Point-to-Point Communication Systems

A point-to-point communication system allows only two work stations to communicate on a communication line at one time. If a point-to-point circuit is used, the sender and receiver identification need only be established on the initial contact.

Example point-to-point telephone communications concerning a Waste Evaporator Distillate Tank:

Radwaste Facility Equipment Operator (FEO) to Control Room Operator (CRO):

"CRO, this is the Radwaste FEO. The Waste Evaporator Distillate Tank is full. Request to pump the Waste Evaporator Distillate Tank to Waste Holdup Tank Alpha."

CRO to Radwaste FEO:

"Radwaste FEO, pump the Waste Evaporator Distillate Tank to Waste Holdup Tank Alpha."

Response by Radwaste FEO:

"Pump the Waste Evaporator Distillate Tank to Waste Holdup Tank Alpha."

Acknowledgment by CRO:

"That's correct."

4.3.3 Public Address (Paging) Systems

Public address (paging) systems may be used to update facility personnel of the status of an abnormal or emergency condition, changes in facility status, or major facility events either in progress or anticipated. Administrative policies and procedures should address the effective control of the public address system. Public address systems, if used, should be designed to be heard throughout a facility. When using the public address system, senders should speak slowly, deliberately, and in a normal tone of voice. Since the paging system is heard throughout the facility, the sender normally need not specify a receiver. An exception to this rule would be during casualties when the control area would direct actions using the public address system.

Announcements of abnormal or emergency conditions should be made twice. If an audible alarm signal is used in conjunction with the public address system to warn personnel of an abnormal or emergency condition, the alarm should be activated once, before the announcement. The alarm signal will alert personnel to listen for the message that follows. Where noise levels are excessive, other means of communicating emergencies should be considered, such as flashing lights. Repeatbacks and the identification of sender and receiver may be omitted.

When using the public address system to announce remote starting of major equipment, the announcement should be made, followed by a short pause, and then the equipment started. The pause is required to allow personnel to move away from the equipment.

If other communication systems are used to access the public address system (e.g., facility dial phone number that actuates the public address system), the control area should have the capability to override those systems. The use of the override should be authorized only for emergency announcements and authorized tests. Policies and procedures should clearly define when and who may use the public address system from these other sources.

4.4 Communication Equipment

4.4.1 Portable Radios

Portable radios are considered any communication system where at least one station is remote and portable. They are an effective means of communicating with personnel who tour large work stations, especially when the tour takes them away from stationary communication equipment. Portable radios used in normal facility operations may also be used in an emergency to communicate with mobile units.

Prior to assigning a portable radio to a work station, it should be tested from all areas within the work station. This test will ensure that communications can be established, especially during emergency situations. Because of structural interference (e.g., concrete walls, large equipment, I-beams), power output of the radio may be insufficient to communicate. In this situation, consideration may be given to raising the output power of the radio. If a portable radio cannot be used from specific areas within a work station, alternate communication equipment must be supplied.

Since portable radios are a large contributor to control area noise levels and radio frequency interference, their use must be controlled. A list of all electronic cabinets that are susceptible to radio frequency interference should be established and posted with signs prohibiting use. It is advisable not to key portable radios within approximately 10 feet of posted electronic cabinets.

Facilities may dedicate specific channel frequencies for different organizations. For example:

- Channel 3 (three) for Operations Department personnel and for other personnel when reporting abnormal operational conditions to the control area (In this case the control area should continuously monitor channel three.)
- Channel 4 (four) for dedicated support groups, such as maintenance and facility services
- Channel 5 (five) for Security Force personnel.

4.4.2 Sound Powered Phones

Sound powered phones allow communications between two or more specific stations without the need for external power. Sound powered phones may be used with party-line or point-to-point communication systems. Since sound-powered phones require no external power, they can be used during power outages. When available, this is the preferred communication equipment for routine testing, post-maintenance testing, or special operational situations that require coordination through communication.

4.4.3 Personal Pagers

Personal pagers may be provided to operating personnel working in areas where the facility paging system cannot be heard. Personnel pagers that vibrate and can be felt may also be used in work areas with high noise levels.

4.4.4 Dial Telephones

Dial telephones, those used for normal telephone communication, are an acceptable form of facility communications. Since telephone lines already exist in most facilities, spending additional money to install extra systems may not be needed. One drawback to standard telephone systems is that they are normally point-to-point systems and, if an emergency announcement is needed to be made, the sender may get a busy signal. Alternate emergency communication devices should be used to preclude this situation.

4.5 Emergency Communication Systems

The facility emergency communication system should ensure that all personnel can be promptly alerted to facility emergencies. The public address system should normally be used to make emergency announcements. Alternate methods, such as flashing lights, personal pagers, and individuals dedicated to notifying in person should be used to alert personnel in high-noise areas. The emergency communications system should also allow personnel from any point in the facility to make emergency communications to the control area. Designated facility telephone numbers should be established to report concerns or problems. Numbers should be easy to remember, such as:

- 111 (Security problem)
- 222 (Radiological concern)
- 333 (Fire, personnel injury, abnormal or emergency operational condition. Channel 3 on the public address system, while normally used for operations, may also be used for emergency communications.)

Direct telephone communication lines should be provided between the control area and the emergency response facilities to improve emergency response to accidents. These communication links should only be used during a declared emergency event, during authorized testing, or when authorized by the shift supervisor. Specific guidance for the use of these communication links should be in the site emergency plan and implementing procedures.

4.6 Testing Communication Systems

Policies and procedures should address testing of communication systems. At a minimum, emergency communication systems should be tested periodically to ensure that they are operable. Although, it is advisable to periodically test all communication systems. Testing periodicity for certain emergency communication

systems is generally governed by federal requirements (e.g., communication systems used for life safety). The test periodicity for non-emergency communication systems should correlate to the risk associated with not being able to use the communication system. In addition, a test of a communication system should be performed prior to conducting procedures that require use of the system, and anytime system operability is in doubt. A physical inspection of all communication equipment, system connections, transmitters, and antennas should also be performed.

A check of all facility areas should be periodically performed to make certain that facility personnel can be alerted to emergency conditions. As part of the operability check of the emergency communication system, personnel throughout the facility should make reports to the control area, acknowledging an acceptable test.

The following external emergency communication systems/paths should be periodically tested:

- Communications between the facility and DOE
- Communications between the facility and state and local government agencies
- Communications between the control area and offsite facility support centers, if they exist.

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APPENDIX A
PHONETIC ALPHABET

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PHONETIC ALPHABET

To minimize misinterpretation, use the phonetic alphabet when alphanumeric information is being communicated:

A - Alpha

N - November

B - Bravo

O - Oscar

C - Charlie

P - Papa

D - Delta

Q - Quebec

E - Echo

R - Romeo

F - Foxtrot

S - Sierra

G - Golf

T - Tango

H - Hotel

U - Uniform

I - India

V - Victor

J - Juliett

W - Whiskey

K - Kilo

X - X-ray

L - Lima

Y - Yankee

M - Mike

Z - Zulu

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CONCLUDING MATERIAL

Review Activities:

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