

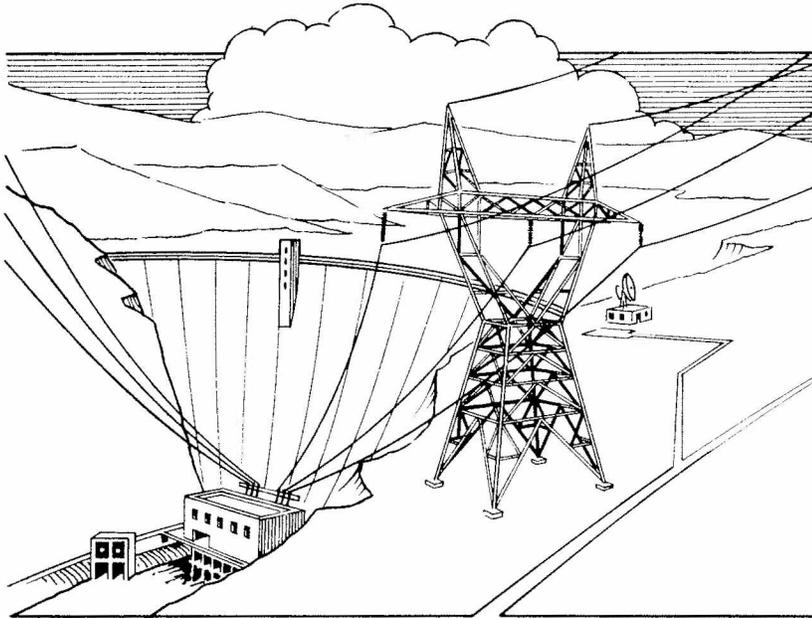


# POWER O. AND M. BULLETIN

NO. 26

OCTOBER 1971

POWER SYSTEM CLEARANCE PROCEDURE



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF RECLAMATION  
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Division of Power Operations

POWER O&M BULLETIN NO. 26

POWER SYSTEM CLEARANCE PROCEDURE

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## PREFACE

Throughout the Bureau all switching; placement, issuance, receipt, release, and removal of Clearances and Hot Line Orders; establishment of Special Conditions; and all other operations associated with the Bureau's power systems are to be performed by Authorized Personnel. This Bulletin is established to aid in accomplishing these operations as promptly as possible with maximum safety to personnel and equipment and with minimum chance for error.

All switching operations shall be guided and tested by the fundamental principle, "START WITH THE CORRECT PROCEDURE AND FOLLOW IT EXACTLY."

A basic principle pertaining to power system operation is that the lengths of time the equipment is abnormal or removed from service for work shall be kept to a minimum. The following will accomplish this principle:

- a. The equipment should be made available to the crews at the prearranged time.
- b. The crews should be ready to start work at the prearranged time.
- c. The crews should release the equipment promptly upon completion of the work.
- d. The power system equipment should be returned to service as soon as possible.
- e. Delays such as shift changes and lunch periods shall not unduly impede or delay returning equipment to normal.

## I. INTRODUCTION AND PURPOSE

1.1. The growing complexity and interconnected nature of the Bureau's power systems require increased emphasis on performance of power system operations in a uniform, highly disciplined manner.

1.2. The guides contained herein establish broad operating criteria which are mandatory and shall be complied with throughout the Bureau. Within these guides, each Region shall develop specific written procedures for use by all personnel concerned and, in addition, instruct such personnel in the proper use of these procedures.

1.3. This Bulletin will be reviewed annually and revised or updated as required by the Bureau's

power systems. Each Region shall likewise review its specific procedures annually to insure conformity with this Bulletin.

1.4. In case of an emergency, Authorized Personnel may modify or suspend any of these guides temporarily as may be considered necessary to permit proper handling of the specific emergency. However, in handling such emergencies, safety of personnel shall be given paramount consideration.

1.5. The successful application of Regional Procedures developed from these general guides depends upon their being thoroughly understood, properly applied, and strictly adhered to.

## II. DEFINITIONS

2.1. "Safe Clearance Procedure" is the method which shall be followed in requesting, placing, issuing, transferring, releasing, and removing a Clearance.

2.2. "Clearance" is a statement with documentation from the Operations Supervisor to the Job Supervisor declaring that the equipment to be worked on has been deenergized and isolated from hazardous sources of energy.

2.3. "Hot Line Order" is a statement with documentation from an Operations Supervisor to a Job Supervisor that specific work may be done on or near a line or other equipment without requiring that it be disconnected from all sources of electrical energy. The equipment is to be considered energized or "hot."

2.4. "Special Condition" means an unusual temporary condition pertaining to equipment, and is not associated with other protective procedures. This term indicates the requirement for special operating instructions and information on the current condition of the equipment.

2.5. "Special Work Permit" is a statement which formalizes and documents the preparation and coordination between Bureau and non-Bureau personnel for Clearances and Hot Line Orders to facilitate work by non-Bureau forces on or near Bureau power facilities.

2.6. "General Switching" is switching performed for line sectionalizing or system rearrangement for testing and/or changes in operating conditions. Such operations are not normally associated with Clearances, Hot Line Orders, or Special Conditions.

2.7. "Equipment" means any machine, device, or apparatus, either electrical or mechanical, including electrical circuits, transmission lines, piping systems, or waterways.

2.8. "Authorized Personnel" means selected personnel who have been properly trained, tested, and certified to perform the action being authorized. When certified, names shall be entered on the official lists of authorizations.

2.9. "Operations Supervisor" is any person authorized to issue Clearances, Hot Line Orders, Special Conditions, or General Switching; and who also may be authorized to direct General Switching and other operations required in the placing and removing the protection for Clearances, Hot Line Orders, and Special Conditions. Depending upon the station and the equipment, those authorized may include dispatchers, operators, foremen, and electricians.

2.10. "Job Supervisor" is any person authorized to request, receive, and release Clearances and/or Hot Line Orders and who is charged with the responsibility for the job.

2.11. "Workman" is any person authorized to inspect, service, repair, or otherwise be in contact with equipment. Those authorized may include electricians, testmen, linemen, mechanics, and inspectors.

2.12. "Switchman" is any person authorized to perform switching and tagging operations. Those authorized may include dispatchers, foreman, operators, linemen, and electricians.

#### 2.13. STATIONS.—

2.13.1. "Attended Station" means any station manned at all times.

2.13.2. "Semiattended Station" means any station which is normally manned parttime.

2.13.3. "Unattended Station" is any station not normally manned, and includes stations which are physically checked periodically by qualified personnel.

2.13.4. "Supervisory Controlled Station" means any station either manned or unmanned which is normally operated from a remote location.

### III. GENERAL RESPONSIBILITY AND AUTHORITY

3.1. Each Region has the responsibility to insure that procedures written within the guidelines of this Bulletin are (1) understood by all concerned, (2) properly applied, and (3) strictly adhered to. Each supervisor shall make certain that all appropriate persons under his jurisdiction are instructed concerning the procedures and their application.

3.2. Formal lists of Authorized Personnel are to be maintained. The appropriate supervisor shall determine through training, performance, or other acceptable evidence which persons are qualified to request, issue, or receive Clearances or Hot Line Orders or to perform switching or other operations within the system. It is the responsibility of each Region to advise its Workmen, Switchmen, Job Supervisors, and Operations Supervisors the extent of their authority. It is the responsibility of each employee to confine his activities within his authorization. A list shall be maintained of personnel, other than Bureau personnel, who are qualified to do switching at the request of the Operations Supervisor.

3.3. If emergency switching is required and an authorized Switchman is not available, effort shall be made to utilize other personnel. These may be either Bureau employees or employees of other systems deemed qualified to perform the switching.

3.4. Each employee engaged in power system operations, maintenance, or construction shall be required to know and understand the procedures which apply to the work he is to perform. Regional procedures developed from guides in this Bulletin take first precedence. Employees shall be subject to examination at any time on the procedures which apply to their duties.

### IV. MATERIALS FOR USE WITH THESE GUIDES

#### 4.1. SWITCHING PROGRAM FORM.—

4.1.1. PURPOSE. The Switching Program Form formalizes and documents each step in the process of establishing and releasing Clearances, Hot Line Orders, Special Conditions, and performing General Switching. The needs of the Regions vary; therefore, one standard form is not practical at this time. A typical Switching

Program Form is shown in Figure 1. Figure 1-a is a typical switching order form which may be used to supplement the Switching Program Form to facilitate switching at locations remote from the operations center. These forms are not available from Denver stock. Each Region shall develop forms for its specific needs, which provide documentation for three main categories: (1) "request and action taken" information; (2) switching placement program; and (3) switching removal program. Space for other information may be provided.

4.1.2. APPLICATION. A Switching Program Form, where applicable, shall be completed by the responsible Operation Supervisor and checked by a second qualified person, when possible, for all operations requiring a Clearance, Hot Line Order, Special Condition, or General Switching. It is desirable that copies of the appropriately filled in Switching Program Form be sent in advance to each location involved in the program for reference and use by the Switchman during the switching and tagging operation. In lieu of sending copies to each location in advance, the Operations Supervisor can provide the information by available communication channels to the Switchman or second Operations Supervisor who will write all information on the Switching Program Form pertinent for his location and repeat back the orders. The master Switching Program Form used by the Operations Supervisor shall clearly indicate those portions which are issued to each station as its part in placing the Clearance. It is intended that all documentation for operations covered by this Bulletin be done on the Switching Program Form, to eliminate duplication of information on other forms, logs or tags. Upon completion of the work, the Switching Program Form shall be kept as a supplement to the log.

4.1.3. NUMBERING. Each Switching Program Form shall be given a serial number. The necessary coding for year and facility shall be prescribed by the Regions. One series of consecutive numbers can be used for all programs or a separate series of consecutive numbers can be used for Clearances, Hot Line Orders, Special Conditions, and General Switching. The form shall indicate whether the action is a Clearance, Hot Line Order, Special Condition, or General Switching.

4.1.4. INFORMATION. "Switching for Placement" and "Switching for Removal" are the parts of the form to record in detail the exact operation required and the tagging information. Each operation shall be listed in the precise sequence to be performed including those operations or steps not requiring a tag. THE SWITCHMAN SHALL ALWAYS PERFORM OPERATIONS IN THE SEQUENCE LISTED ON THE SWITCHING PROGRAM FORM. Should a question arise at any point during the switching sequence, this question should be resolved before proceeding with the Switching Program. The location of the Safety Tags will define the boundaries for Clearances and Hot Line Orders.

4.2. LOG BOOK ENTRIES. All entries should preferably be in ink or other permanent marking material. Entries shall be made as soon as practical after the action has been accomplished. The name of the person making entries shall appear in the log. In addition to the documentation provided by the Switching Program Form, entries in the normal station log shall be made as follows:

4.2.1. PLACEMENT ACTION: After the placement operations are complete and the action has been issued, the Operations Supervisor or the Switchman shall log the "date \_\_\_\_\_," "time \_\_\_\_\_," type of action (Clearance, Hot Line Order, Special Condition or General Switching), "assigned No. \_\_\_\_\_" and "issued to \_\_\_\_\_."

4.2.2. REMOVAL ACTION: After a Clearance, Hot Line Order, or Special Condition has been released and the removal operations completed, the Operations Supervisor or Switchman shall log the "date \_\_\_\_\_," "time \_\_\_\_\_," type of action (Clearance, Hot Line Order, or Special Condition), "assigned No. \_\_\_\_\_," and "released by \_\_\_\_\_."

4.2.3. It is imperative that each Region develop a systematic method of keeping appropriate personnel informed concerning the status of Clearances, Hot Line Orders and Special Conditions. To accomplish this, the Regions may require but are not restricted to the following:

- a. The placement action log entry to be made in a distinctive color of ink.





b. A rubber stamp to be used to stamp the required format data in the log as shown in Paragraphs 4.2.1 and 4.2.2. A distinctive color of ink may also be used for placement and removal actions using this stamp.

c. A readily accessible file to be maintained of Switching Program Forms for active Clearances, Hot Line Orders and Special Conditions.

d. The Operations Supervisor to record outstanding Clearances and Hot Line Orders at the beginning of each workday at attended and semiattended locations.

e. Some means of striking out log entries for released Clearances, Hot Line Orders, and Special Conditions voided by a release by (1) drawing a line through the voided entry or by (2) making some identifying mark alongside the voided entry or by (3) maintaining a readily accessible file of Switching Program Forms for completed Clearances, Hot Line Orders, and Special Conditions.

4.3. SAFETY TAGS. These tags are used in connection with Clearances and Hot Line Orders to convey the warning, DO NOT OPERATE, as discussed in Sections V and VI. Only approved prenumbered red plastic-type Safety Tags shall be used. Unnumbered tags (see Figure 2) are stocked in the Denver Office (Code D-842) and are available on request. Each region shall designate and affix appropriate identifying numbers and/or letters to at least one side of each tag. The choice of tag identifying numbers and/or letters must assure that there is no possibility of confusion with other tags used in the same or an adjacent operating area.

4.4. HOT LINE TAGS. These tags are used in connection with Hot Line Orders to prevent reenergizing equipment, as discussed in Section VI. Only approved prenumbered and marked yellow plastic-type Hot Line Tags shall be used for this purpose. Unnumbered tags (see Figure 3) are stocked in the Denver Office (Code D-842) and are available on request. The front side of the tag is to be completed in permanent marking, showing the delay required before reenergizing. The tags shall be prenumbered in each Region.

4.5. SPECIAL CONDITION TAGS. These tags are used to designate special conditions affecting equipment as discussed in Section VII. Only

approved tags (see Figure 4) shall be used for this purpose. These tags are stocked in the Denver Office (D-842) and are available on request. The tag is to be numbered and completed in ink or typewritten.

4.6. SUPERVISORY CONTROL TAGS. These tags are to be used on supervisory control panels as discussed in Section VIII. The tags shown in Figure 5 are for illustrative purposes only, and show the minimum amount of information required. There is a wide variety of supervisory equipment in use in the Bureau and it is not possible to prepare a standard set of tags which will fit all supervisory control panels. Each Region is responsible for procuring tags for its own use, using the indicated color system. The tags shall be prenumbered in each Region.

4.7. DANGER TAGS. These tags may be used as discussed in Paragraphs 4.7.1 and 5.11. These tags (see Figure 6) are stocked in the Denver Office (Code D-842) and are available on request. The tag is to be completed in ink.

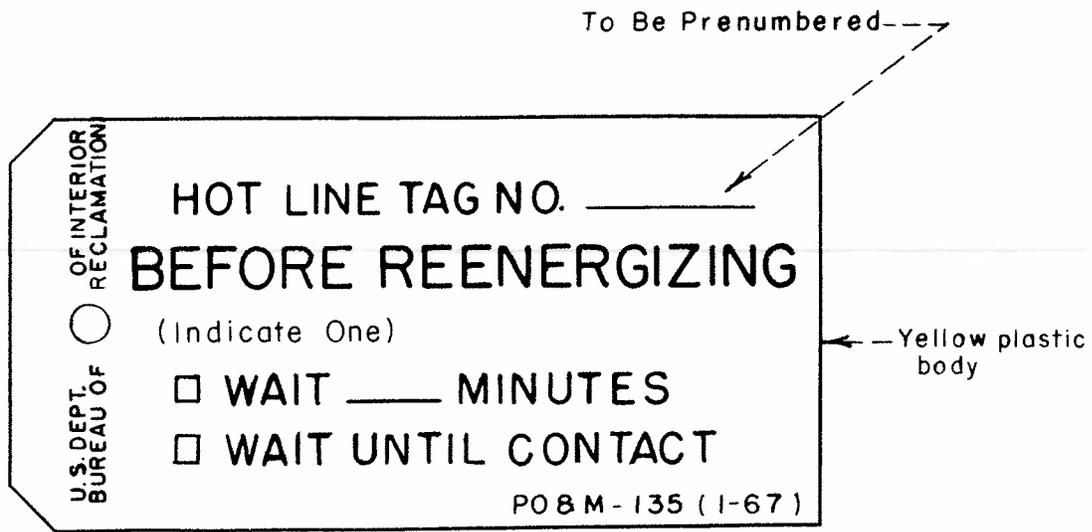
4.7.1. USE OF DANGER TAGS WITHOUT A CLEARANCE. Danger Tags may be used to prevent the operation of switches, valves, handwheels, latches, and other equipment not directly connected with the operation of the power system, when such operation might endanger workmen or equipment. They shall not be used on electrical circuits over 480 volts. The workman may place his own Danger Tag at the source of an electrical circuit or on a valve or other equipment which must not be operated. He shall sign and date each tag as it is placed. The workman is responsible for removing all Danger Tags he has placed when the work is completed, and shall restore the switch or valve to the "as found" position. If this is not done, he shall so inform the Operations Supervisor.

4.8. SPECIAL WORK PERMIT FORM. The Special Work Permit Form formalizes and documents the preparation and coordination between Bureau and non-Bureau personnel for Clearances and Hot Line Orders to facilitate work by contractors and non-Bureau construction or maintenance forces on or near Bureau Power facilities. The Special Work Permit Form (PO&M-169) is shown in Figure 7, and is available on request from the Denver Office (Code D-842). This form provides:

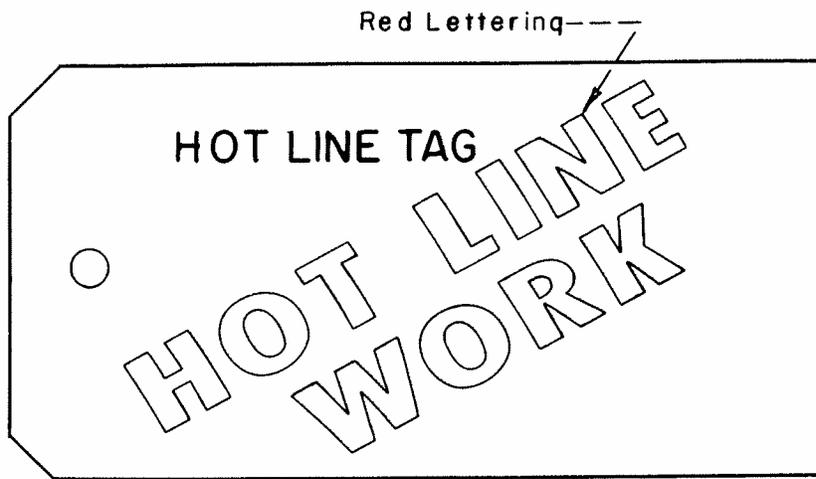
1. A listed protective action (Clearance or Hot Line Order) on a specified Bureau power facility.



FIGURE 2



FRONT



BACK

FIGURE 3



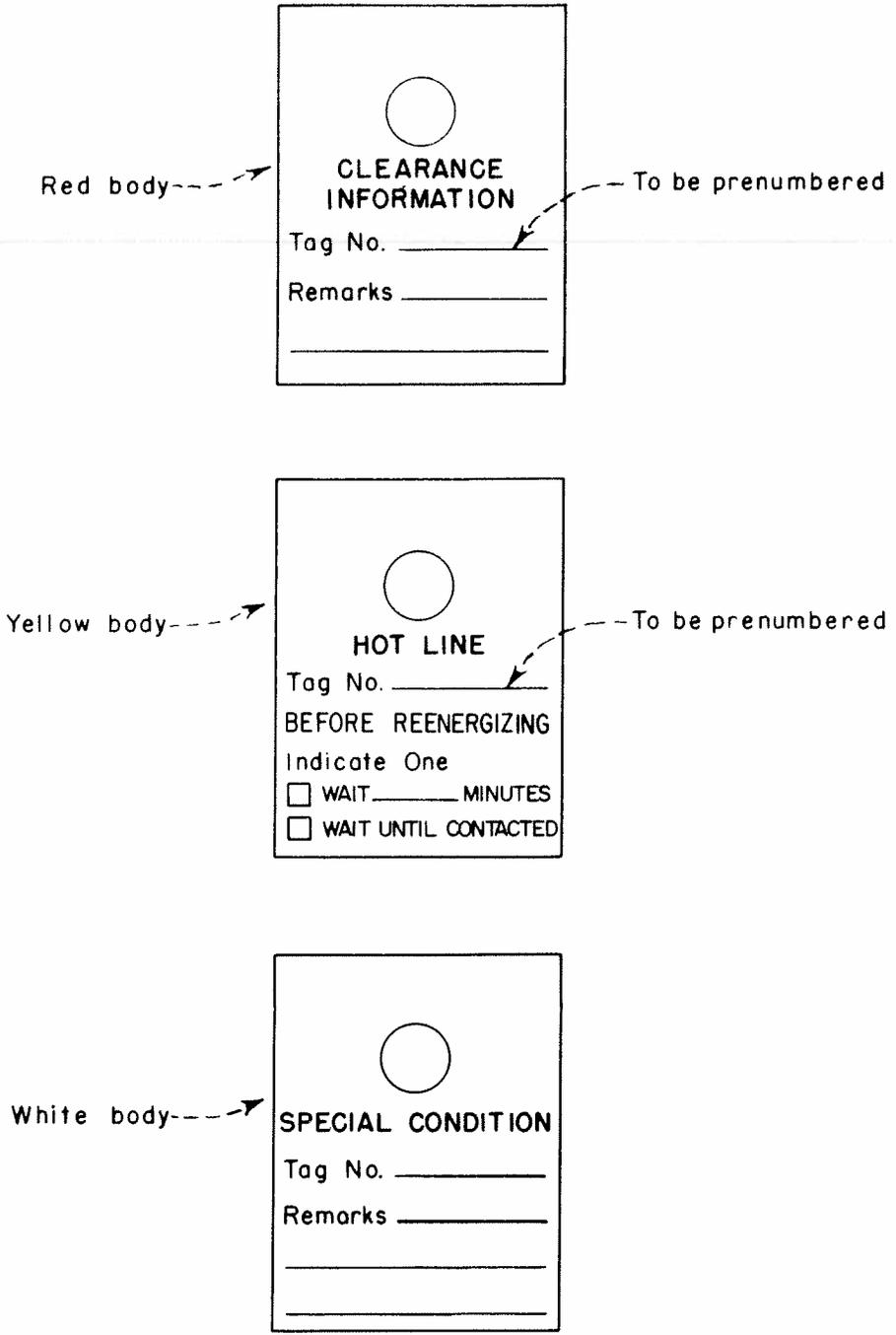


FIGURE 5

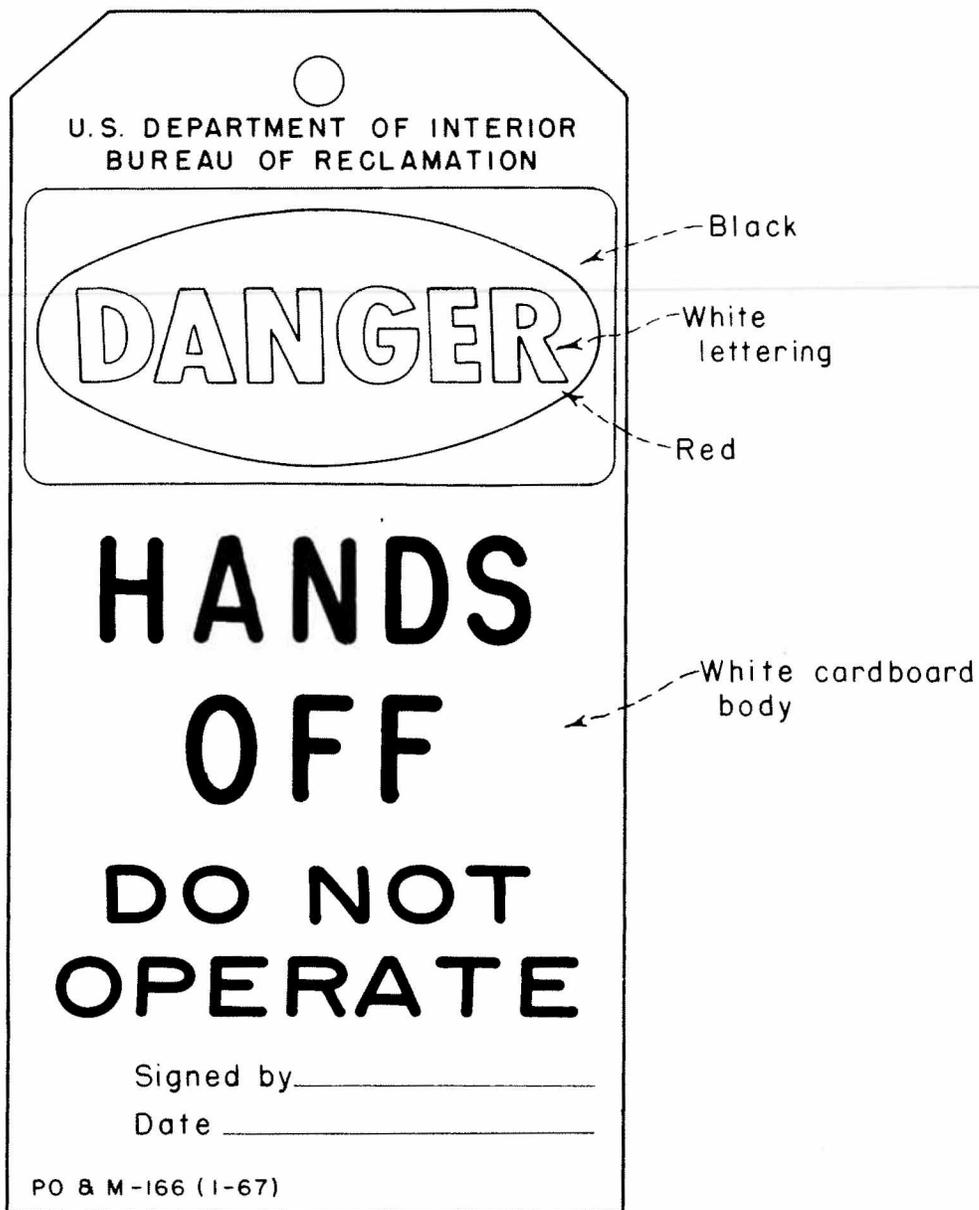


FIGURE 6

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF RECLAMATION  
**SPECIAL WORK PERMIT**

NUMBER \_\_\_\_\_

SOLICITATION NO. \_\_\_\_\_

A POWER SYSTEM (CLEARANCE)(HOT LINE ORDER) HAS BEEN ISSUED ON THE FOLLOWING FACILITY,  
(MARK ONE OUT)

TO PERMIT WORK BY CONTRACTOR FORCES. THE UNDERSIGNED HAVE DISCUSSED THE WORK TO BE DONE, REVIEWED THE DETAILS OF THE ABOVE LISTED PROTECTIVE ACTION FOR ADEQUACY, AND DEFINED THE LIMITS AND CONDITIONS OF THE SAFE WORKING AREA. THE LIMITS OF THE SAFE WORKING AREA ARE AS FOLLOWS:

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

NOTE: Draw sketches and/or single line diagrams on reverse side showing safe working limits and hazards if applicable.

CLEARANCE NO. \_\_\_\_\_ (Signature) \_\_\_\_\_

HOT LINE ORDER DATE \_\_\_\_\_ TIME \_\_\_\_\_ BUREAU EMPLOYEE HOLDING ACTION \_\_\_\_\_

This Work Permit issued at the worksite Date \_\_\_\_\_ Time \_\_\_\_\_  
and the contractor is authorized to proceed with the work in the area designated above.

\_\_\_\_\_  
(Signature)  
CONTRACTOR'S AUTHORIZED REPRESENTATIVE  
AT THE WORKSITE

\_\_\_\_\_  
(Signature)  
BUREAU REPRESENTATIVE IN CHARGE  
AT THE WORKSITE

**RELEASE OF SPECIAL WORK PERMIT**

I HEREBY CERTIFY THAT ALL PROTECTIVE GROUNDS AND BARRIERS HAVE BEEN REMOVED  
AND THAT ALL PERSONNEL ARE CLEAR OF THE AREA COVERED BY THIS WORK PERMIT.

CONTRACTOR'S AUTHORIZED REPRESENTATIVE (SIGNATURE) \_\_\_\_\_ DATE \_\_\_\_\_ TIME \_\_\_\_\_

FIGURE 7

2. A statement that the undersigned have discussed the work to be done, reviewed the details of the above listed protective action for adequacy, and defined the limits and conditions of the safe working area.

3. A written description and/or drawings of the limits of the safe working area.

4. Space for the signatures of the Bureau and contractor's representatives at the worksite indicating full agreement and understanding together with date and time it is satisfactory to proceed with the work.

5. A release statement to be signed by the contractor's representative that the work has been completed.

#### V. SAFE CLEARANCE PROCEDURE

5.1. PURPOSE. Safe Clearance Procedures are to establish, under a controlled discipline, a safe environment within which workmen can perform their assigned tasks. The Job Supervisor shall decide whether or not the degree of risk requires a Clearance, and if a Clearance is deemed necessary, he shall obtain a Clearance before starting the work. Clearances are accomplished by systematically isolating the equipment from all sources of hazardous energy (electrical, mechanical and hydraulic) and attaching Safety Tags (see Figure 2) to the operating points for these sources of energy. A SAFETY TAG SHALL BE CONSIDERED THE SAME AS A LOCK, AND THE TAGGED POINT IS NOT TO BE OPERATED WHILE THE SAFETY TAG IS IN PLACE. A CLEARANCE IS USED ONLY FOR PROTECTION OF PERSONNEL, BUT MAY INCIDENTALLY PROVIDE PROTECTION FOR EQUIPMENT. The Safe Clearance Procedure is intended to accomplish this protection with as little delay and inconvenience as possible.

#### 5.2 RESPONSIBILITY AND AUTHORITY.—

5.2.1. The power system dispatcher or his equivalent, as Operations Supervisor, is responsible for authorizing and issuing Clearances on all equipment affecting the power system. Authority for issuing Clearances may be delegated to other Operations Supervisors; normally this delegation will be established by prior administrative directive.

5.2.2. The Operations Supervisor in the power system dispatching office or its equivalent shall issue all Clearances and Hot Line Orders on equipment which requires protection at points distant from each other, such as on transmission lines.

5.2.3. Switchmen shall do all switching and operating of controls and isolating equipment such as circuit breakers, disconnecting switches, grounding switches, valves, gates, etc., and shall place locks where practical and safety tags where required by the switching order.

5.2.4. The Operations Supervisor is responsible for preparing a correct switching program and properly directing the switching and related operations. The Switchman placing the protection is responsible for it being properly executed. The JOB SUPERVISOR is responsible for CHECKING the protection provided to assure himself that it is adequate to carry out the assigned work in a safe manner. NO WORKMAN WILL BE REQUIRED TO WORK ON A JOB OR PIECE OF EQUIPMENT THAT HE CONSIDERS UNSAFE, and must request any additional protection he deems necessary to make the job safe.

5.2.5. The Job Supervisor shall notify each man working under the Clearance of the conditions and extent of the Clearance before work is started. He shall promptly notify each man working under the Clearance of any changes in conditions or status of the equipment. At the completion of the job the Job Supervisor shall see that all personnel under his Clearance are in the clear and that all temporary protection such as Danger Tags and personal grounds are removed, and that any unusual conditions are reported to the Operations Supervisor. The Job Supervisor shall then release the Clearance to the Operations Supervisor. The Operations Supervisor shall then direct the Switchman (or Switchmen) to perform the switching and related operations to remove the protection.

5.2.6. In cases where the work is being performed and communications with the Operations Supervisor are not available, a Job Supervisor may be authorized to perform the switching, issue, and release a Clearance. The Operations Supervisor shall explain in detail the

operations to be performed and the precautions to be taken before the Job Supervisor departs for the location.

5.2.7. In an emergency situation, where the Job Supervisor determines that a piece of equipment needs immediate attention and communications with the Operations Supervisor are not available, he shall provide his own Clearance protection. In placing and releasing his Clearance, he shall observe all the principles of switching, tagging, and logging as set forth in this Bulletin insofar as circumstances permit. He shall furnish a complete report of all operations he performed to the Operations Supervisor as soon as possible thereafter.

5.3. OBJECTIVE. The proper technique in applying a Clearance is to encircle the equipment to be worked on with a line of protection by opening switches, closing ground switches where provided, closing supply valves or gates, opening drain valves, and opening potential transformer or station-service transformer secondaries where these can be inadvertently energized from the low-voltage side. These devices shall be tagged, and locked wherever means for locking is provided. The equipment to be worked on should be free of Safety Tags as far as possible so as not to impede the work to be accomplished, and permit component parts to be moved.

#### 5.4. PLACING A CLEARANCE.—

5.4.1. The Job Supervisor shall request a Clearance from the Operations Supervisor as soon as practical (preferably at least 24 hours in advance, except in emergencies), and shall give the information required on the Switching Program Form.

5.4.2. Before switching is started the Operations Supervisor shall prepare the Switching Program Form which shows the sequence of the required switching and/or operations. All switching programs shall be checked by a second qualified person whenever possible. Each party shall be responsible for the correctness of the procedure.

5.4.3. Detailed instructions in the use of the Switching Program Forms, directing and reporting the switching, and disposition of the forms shall be prepared by each Region.

5.4.4. Every person involved in placing and issuing a Clearance shall analyze the switching orders. If there are any questions regarding the completeness or correctness of the switching orders, these questions are to be resolved before the switching is started. Should a question arise at any point during the switching sequence, this question should be resolved before proceeding with the Switching Program.

5.4.5. After verification by the Switchman at each location that all operations called for in the switching orders have been completed and that all Safety Tags have been placed, the Operations Supervisor shall prepare to issue the Clearance to the Job Supervisor. Before issuing the Clearance the Operations Supervisor shall clearly state to the Job Supervisor receiving the Clearance exactly what protection has been provided. This statement shall include the status of pertinent equipment such as breakers, disconnecting switches and grounding switches, the location of each Safety Tag, and finally that the equipment is isolated from hazardous sources of energy. The equipment must be correctly and definitely identified. In the case of a transmission line, it must be given its proper designation and all terminals between which the Clearance is given must be specifically identified. The Job Supervisor receiving the Clearance shall repeat to the Operations Supervisor the exact protection provided.

5.4.6. After the above requirements have been fulfilled, the Operations Supervisor shall issue the Clearance to the Job Supervisor designated to receive the Clearance. The Clearance information shall be logged by the Operations Supervisor.

5.5. OPERATING EQUIPMENT UNDER CLEARANCE. Within the perimeter of the Clearance, the Job Supervisor holding the Clearance may allow workmen to operate equipment for tests and adjustments. The Job Supervisor is responsible to see that the equipment is returned to the original position, i.e., open or closed.

5.6. CHECKS AND TESTS ON EQUIPMENT UNDER CLEARANCE. If it is necessary to energize the equipment under Clearance at its primary source of energy (electrical, mechanical, or hydraulic) for testing or checking purposes before the work is completed, the Clearance shall be

released in the usual manner, the applicable Safety Tags removed, the tests made, the Safety Tags replaced, and a new Clearance issued. For checks or tests not involving energizing the main equipment at its primary source of energy, but which require operation of auxiliary equipment controls with Safety Tags, the following procedure shall be observed:

5.6.1. The Job Supervisor holding the Clearance shall contact the Operations Supervisor and request that a check or test operation be made. The Job Supervisor shall explain exactly what tests are to be made and what equipment is to be operated.

5.6.2. The Operations Supervisor, after establishing that the equipment can be operated safely and that all personnel are in the clear and have been advised of the test, shall have the Switchman temporarily remove the necessary Safety Tags to permit the operation. The Operations Supervisor shall have the Switchman check the position of devices where tags were removed for agreement with the Switching Program Form and replace all Safety Tags immediately after the operational check is made and before work is resumed. This procedure requires close coordination between the Operations Supervisor, Job Supervisor, and Switchman.

#### 5.7. RELEASING A CLEARANCE.—

5.7.1. Upon completion of the work and after removal of all personal grounds, Danger Tags, and other devices attached to the equipment by workmen, the Job Supervisor shall release his Clearance by reporting to the Operations Supervisor. The Job Supervisor shall state that all personnel are clear of the equipment, that all personal grounds, Danger Tags, and other devices are removed, and the equipment is in safe operating condition. If any of the above conditions have not or cannot be met, he will so state giving full particulars. The Operations Supervisor will so note the release on the Switching Program Form and notify the stations involved.

5.7.2. The Job Supervisor who received the Clearance shall personally release his Clearance, except in an extreme emergency when it is necessary to release the Clearance through a second party due to an accident or other

emergency. In such case, the name of the second party shall be logged, along with the reason for the failure of the Job Supervisor to directly release his own Clearance.

5.7.3. The Operations Supervisor shall log the pertinent information regarding the releasing of the Clearance in accordance with detailed instructions prepared by each Region.

#### 5.8. RESTORING EQUIPMENT TO NORMAL.—

5.8.1. The Operations Supervisor shall notify the Switchman that the Clearance has been released and shall order the protection removed and the equipment returned to normal. The use of the Switching Program Forms, the responsibility for directing the switching operations, analysis of the completeness and correctness of the switching and instructions, and the reporting of the operations performed shall follow the same routine outlined under "Placing a Clearance," Paragraph 5.4.

5.8.2. At the discretion of the Operations Supervisor, it is permissible to delay the removal of Safety Tags at remote locations until it is practical to remove them. This permission to delay removal and the subsequent removal shall be recorded separately in the log.

5.9. IDENTICAL CLEARANCE. When it is desired to issue two or more concurrent Clearances on the same equipment requiring the same protection, the Operations Supervisor shall record ALL Clearances issued on the SAME Switching Program Form (or Power Dispatchers' Record of Clearance where used), which shall be marked distinctively to indicate an identical Clearance. This shall be done by filling in the Job Supervisor's name for each Clearance in the "Issued to \_\_\_\_\_" column. The same Clearance number, plus a different suffix letter (A, B, C, etc.) for each additional Clearance, should be used in the "NO. \_\_\_\_\_" column. No additional Safety Tags need be placed, and no protection is to be removed from the equipment until ALL Clearances have been released and so noted in the "Released by \_\_\_\_\_" column of the Operation Supervisor's Switching Program Form.

5.10. TRANSFER OF A CLEARANCE. If the Job Supervisor holding a Clearance desires to transfer his responsibility to another Job Supervisor, he must report to the Operations Supervisor and state his

intention. The second Job Supervisor shall then request and obtain an identical Clearance in the manner described in Paragraph 5.9, after which the first Job Supervisor shall release his Clearance. The second Job Supervisor will then be held responsible for the final release of his Clearance upon the completion of the work.

5.11. USE OF DANGER TAGS WITHIN A CLEARANCE. Danger Tags (see Paragraph 4.7) may be used within the perimeter of a Clearance for protection of workmen and/or equipment. Each tag shall be signed and dated as it is placed. The Danger Tag shall not be used as a substitute for the Safety Tag nor for protection which should properly be provided by the Clearance.

## VI. HOT LINE ORDER

### 6.1. PURPOSE.—

6.1.1. The Hot Line Order is to permit work to be done on or near energized equipment under certain conditions that are considered safe for qualified workmen. This is accomplished by removing from service all automatic reclosing features capable of energizing the equipment and by tagging these features with a Safety Tag. Also, by placing a Hot Line Tag on the appropriate control switches (local and/or supervisory) of all breakers connected to the equipment, the closing of the breakers is prevented before expiration of the prescribed time or until contact is made with the Job Supervisor.

6.1.2. The purpose of waiting the prescribed time as indicated on the Hot Line Tag, is to give the workmen time to get themselves in the clear. It is not to be used for the purpose of removing equipment that may have come in contact with the energized equipment.

6.1.3. Another important purpose of the Hot Line Order is to reduce the number of switching surges on the section of line where live-line, barehand, or hot-stick work is being performed. Since significant switching surges can be generated by reenergizing the line upon which work is being performed, automatic reclosers on breakers at the line terminals must be blocked, and manual reclosing should not be performed until provisions of the Hot Line Order are fulfilled. It must be recognized that even though reclosing is blocked, the line can be subjected to severe voltage transients from other causes and

strict adherence to hot line maintenance procedures is required at all times.

6.2. RESPONSIBILITY AND AUTHORITY. The responsibility and authority to issue and receive a Hot Line Order and to place and remove the protection is essentially the same as outlined for a Clearance under "Responsibility and Authority," Paragraph 5.2.

### 6.3. PLACING A HOT LINE ORDER.—

6.3.1. The Job Supervisor shall request a Hot Line Order from the Operations Supervisor as soon as practical (preferably at least 24 hours in advance, except in emergencies), and shall give the information required on the Switching Program Form.

6.3.2. The Operations Supervisor (normally the Power System Dispatcher or his equivalent) shall prepare the Switching Program Form which shows the sequence of the required switching and tagging operations. All switching programs shall be checked by a second qualified person whenever possible. Each party shall be responsible for the correctness of the procedure.

6.3.3. Every person involved in placing and issuing a Hot Line Order shall analyze the switching orders. If there are any questions regarding the completeness or correctness of the switching orders, these questions are to be resolved before the switching is started. Should a question arise at any point during the switching sequence, this question should be resolved before proceeding with the Switching Program.

6.3.4. After verification by the Switchman at each location involved that all associated automatic reclosing devices have been deactivated and tagged with Safety Tags, and all control switches (local and/or supervisory) for circuit breakers involved have been tagged with the proper Hot Line Tag, the Operations Supervisor shall issue the Hot Line Order to the Job Supervisor. In issuing the Hot Line Order, the Operations Supervisor shall state to the Job Supervisor exactly what protection has been provided. This statement shall include which circuit breakers are involved and which automatic reclosing devices have been deactivated, as well as the prescribed "wait" time interval shown on each Hot Line Tag. The Job Supervisor receiving the Hot Line Order shall

repeat back to the Operations Supervisor the exact protection provided. The Hot Line Order information shall be logged by the Operations Supervisor.

6.3.5. Some unattended substations and other remote power system facilities are equipped or capable of being equipped to disable power circuit breaker automatic reclosing circuits by means of supervisory control from a master control center. When remote stations are so equipped, and are additionally provided with a positive and reliable means of indication that a Hot Line Order is in effect, it is permissible to issue Hot Line Orders without the actual placement of Safety and Hot Line Tags at the remote stations. This type of action requires full recognition of the remote Hot Line Order indication by O&M personnel at the master and remote stations, and the establishment of highly disciplined procedures to ensure that the full protection afforded by the Hot Line Order is not compromised.

#### 6.4. REENERGIZING A LINE WHICH HAS TRIPPED OUT WHILE UNDER A HOT LINE ORDER.—

6.4.1. When a transmission line or other power facility which is under a Hot Line Order becomes deenergized by operation of an associated circuit breaker the Operations Supervisor shall determine that one or the other of the following conditions has been satisfied before ordering the breaker reclosed:

A. The prescribed "wait" time has elapsed after the breaker tripped.

B. The Job Supervisor holding the Hot Line Order has been contacted and has stated that it is satisfactory to reclose the circuit breaker to reenergize the line.

6.4.2. When the Job Supervisor notes that the "hot" line has become deenergized—whether or not his work or personnel are responsible for the outage, he shall immediately attempt to contact the Operations Supervisor and inform him of the details.

6.4.3. When a Switchman is ordered by the Operations Supervisor to reclose a circuit breaker which has tripped while under a Hot Line Order he shall:

A. Remove the Hot Line Tag from the control switch and check to assure that the conditions prescribed on the tag have been satisfied.

B. If the above conditions have been met, he will operate the control switch to close the circuit breaker.

C. After the circuit breaker has closed, he shall replace the Hot Line Tag on the control switch if the Hot Line Order is to be continued.

D. Record pertinent information on the tripout and reclosure in the Station Log.

#### 6.5. REMOVING A HOT LINE ORDER.—

6.5.1. Upon completion of the work for which the Hot Line Order was taken, the Job Supervisor shall release his Hot Line Order by reporting to the Operations Supervisor.

6.5.2. The Job Supervisor who received the Hot Line Order shall personally release his Hot Line Order, except in an extreme emergency when it is necessary to release the Hot Line Order through a second party. In such a case, the name of the second party shall be logged, along with the reason for the failure of the Job Supervisor to directly release his own Hot Line Order.

6.5.3. The Operations Supervisor shall log the pertinent information regarding the release of the Hot Line Order in accordance with detailed instructions prepared by each Region. He will then proceed to restore the line to normal status in accordance with instructions in Paragraph 5.8.

#### VII. SPECIAL CONDITION

7.1. PURPOSE. The Special Condition procedure is to provide temporary special operating or limiting instructions for equipment. Although a Special Condition may serve as temporary protection for equipment IT SHALL NEVER BE USED FOR PERSONNEL PROTECTION. The Special Condition procedure shall not be used for permanent instructions which should be given on permanent instruction plates or by other acceptable means. If used for an extended period of time, the Special Condition Tag should be replaced and updated annually to reflect current equipment and/or operating changes.

7.2. RESPONSIBILITY AND AUTHORITY. Any employee who observes that equipment is damaged or in a condition which may limit its serviceability or operation shall report such condition to the Operations Supervisor as soon as practical. The Operations Supervisor shall determine if the Special Condition procedure is applicable. Necessary instructions shall be issued by the Operations Supervisor.

7.3. PLACING PROCEDURE. If possible, application of the Special Condition shall be accomplished by attaching to the control device a Special Condition Tag which details the necessary instructions. Alternatively, the tag may be placed in a conspicuous location on the equipment. Placement of all Special Conditions shall be documented either by a Switching Program Form or in the log.

7.4. RELEASING PROCEDURE. When the condition requiring a Special Condition no longer exists, the Operations Supervisor shall order the removal of the Special Condition Tags. Such removal shall be documented.

#### VIII. TAGGING OF BREAKERS OPERATED BY SUPERVISORY CONTROL

8.1. CLEARANCES. When a Clearance is issued on equipment that is supervisory controlled, the supervisory control point shall be tagged with a tag similar to that shown in Figure 5, and placement of the tag shall be documented on the Switching Program Form or logged at the controlling substation. Although this tag is a part of the Safe Clearance Procedure IT SHALL NOT BE RELIED UPON TO PROTECT WORKMEN.

8.2. HOT LINE ORDER. When a Hot Line Order is issued on equipment that is supervisory controlled, the supervisory control point shall be tagged with a tag similar to that shown in Figure 5, and placement of the tag shall be documented on the Switching Program Form.

8.3. SPECIAL CONDITION. When a Special Condition Tag is required to be placed on equipment that is supervisory controlled, the supervisory control point shall be tagged with a tag similar to that shown in Figure 5.

#### IX. GENERAL SWITCHING

9.1. PURPOSE. General Switching is performed for line sectionalizing or system rearrangement for

testing and/or changes in operating conditions. Such operations are not normally associated with Clearances, Hot Line Orders, or Special Conditions.

9.2. PROCEDURE. A Switching Program Form shall be prepared and checked, if possible, for each application of General Switching. The operations shall be directed by the Operations Supervisor similar to switching performed for protection. The Switchman shall perform each step in sequence and complete the Switching Program Form as applicable. Tags are not required for this procedure. Local standing operating procedures may be used and the Switching Program Form is not needed for routine operation of powerplant, pumping plant, and switchyard equipment such as generators, pumps, compressors, etc., not involving operation of disconnect switches.

#### X. OPERATIONS ASSOCIATED WITH CONTRACTORS OR NON-BUREAU FORCES

10.1. SPECIAL WORK PERMIT. When a contractor or non-Bureau organization is involved in a construction or maintenance activity on or near equipment in a Bureau power facility, a Special Work Permit (see Figure 7) is required to authorize the contractor to proceed with the work. "Contractor" as used in this Section refers not only to Bureau contractors but also to construction and maintenance forces of non-Bureau organizations which are responsible to the Bureau for this work.

Normally, properly qualified and authorized Bureau O&M representatives will request the Clearances or Hot Line Orders, perform the required switching, receive the Clearance or Hot Line Order, and issue the Special Work Permit. When appropriate, the Project Manager may qualify and authorize an employee in the Bureau's Construction Office to perform power system switching, receive Clearances and Hot Line Orders, and issue Special Work Permits.

Under all conditions the requirements of CONSTRUCTION SAFETY STANDARDS, Section 23, "Stage Construction in Energized Substations," and Standard Specifications Paragraph C-250, "Safety Precautions in Energized Substations/Switchyards," shall be complied with when Bureau Contractors or non-Bureau forces are involved.

10.2. PROCEDURE INVOLVING A CLEARANCE. When the sequence of work requires

that facilities be deenergized, the contractor's authorized representative shall inform the Bureau's authorized representative in charge of his plan for accomplishing the work in such detail as may be necessary and shall request the Bureau's representative to arrange for the required outage. The request shall be made with sufficient advance notice to assure that the Power Operations Office can accommodate the action, and shall include the name of the contractor's supervisor who will be responsible for the work.

A. Following approval on an outage, an authorized Bureau employee will secure a Clearance which documents that the equipment to be worked on has been deenergized and isolated from hazardous sources of energy. A Special Work Permit form will be prepared in duplicate.

B. The Bureau employee holding the Clearance will, in turn, review with the contractor's representative the limits of the deenergized working area and any special conditions pertinent to the Clearance as follows:

1. When the work is the responsibility of a Bureau Construction Office, he shall acquaint both the authorized representative of the Bureau's Construction Office and the authorized representative of the contractor with the full details.

2. When non-Bureau construction or maintenance forces not under the jurisdiction of a Bureau Construction Office perform work in a Bureau facility, he shall give full details to the authorized representative of the organization that arranged for the work and is responsible to the Bureau.

C. After the circuit has been deenergized, the Bureau employee holding the Clearance, the Bureau's representative in charge at the worksite (both of whom may be the same individual), and the contractor's authorized representative shall inspect the worksite to verify the adequacy of the information on the Special Work Permit, which specifies what circuits and facilities have been deenergized, and defines the limits and conditions of the safe working area.

D. The Bureau representative(s) and the contractor's authorized representative shall then sign both copies of the Special Work Permit at

the worksite authorizing the contractor to proceed with the work and each representative shall retain a copy. No work shall be done until a Special Work Permit has been signed, nor shall any work be done in an area not specifically covered by the Special Work Permit.

E. After the Special Work Permit has been signed by all parties, and prior to commencement of any other items of work, the contractor shall, under the observation of the Bureau representative in charge, "feel out" and ground all phases on both sides of the work area. Single-phase grounds are prohibited. A hot stick shall be used to "feel out" and verify the fact that the circuit is deenergized. Grounding shall be done with hot-stick clamp-type grounds, placed and removed with a hot stick. Following the grounding, the contractor shall place necessary barricades and take whatever other safety measures are necessary before proceeding with the work.

10.3. PROCEDURE INVOLVING A HOT LINE ORDER. Where work must be performed in close proximity to energized facilities, and an outage on these facilities cannot be arranged, a Special Work Permit shall be issued specifying a Hot Line Order for the energized facilities to insure against reenergization should accidental contact be made with an energized circuit. The responsibilities of the Contractor's and Bureau's authorized representatives and the use of the Special Work Permit shall be as outlined under Paragraph 10.2.

10.4. RELEASE OF SPECIAL WORK PERMIT AND CLEARANCE OR HOT LINE ORDER. When the work has been completed, the contractor's authorized representative shall sign both copies of the Release of the Special Work Permit certifying that all personnel are clear of the area covered by the Special Work Permit and that all protective grounds and barricades have been removed. The Bureau employee holding the action will:

A. Check to determine that the equipment installed or modified is satisfactory for normal service or energization, or is in safe condition for the action to be released, with such determination fully described to the Operations Supervisor.

B. Inform the Operations Supervisor that the Special Work Permit has been released. The Clearance or Hot Line Order can then be released

in the normal manner, but in no case shall it be released until the Special Work Permit has been released.

10.5. TRANSFER OF RESPONSIBILITY FOR WORK PERFORMED UNDER A SPECIAL WORK PERMIT. Should it be necessary to transfer the responsibility for work under a Special Work Permit from one contractor's authorized representative to another, the existing Special Work Permit shall be released and a new Special Work Permit shall be issued as outlined in preceding paragraphs of this Section.

## XI. OPERATIONS ASSOCIATED WITH INTERCONNECTED SYSTEMS

### 11.1. INTERCONNECTED SYSTEM CLEARANCES AND HOT LINE ORDERS.—

11.1.1. PURPOSE. To provide for the protection of all personnel at all points of interconnection between Bureau and foreign power systems. The same procedures shall apply to interconnections between two Bureau systems under separate dispatching jurisdiction, either interregional or intraregional.

11.1.2. DEFINITION. An interconnected system Clearance or Hot Line Order (defined in various regions as "Intercompany," "Source of Power," or "Dispatcher's" Clearance or Hot Line Order) is a statement, with documentation, from one dispatching office to another that switching has been performed on one system as a partial or complete requirement for a Clearance or Hot Line Order on another system. The dispatching office receiving the interconnected system action is responsible for all other switching and for issuing the Clearance or Hot Line Order to the Job Supervisor.

11.1.3. RESPONSIBILITY. All interconnected system Clearances and Hot Line Orders and Special Conditions and General Switching between interconnected systems, including Bureau systems, shall be handled by dispatchers in accordance with the appropriate operating agreements, unless the facilities have been delegated to others by the operating agreements.

11.1.4. ISSUANCE TO FOREIGN SYSTEMS. When a Job Supervisor on a foreign system requires a Clearance or Hot Line Order that will require switching on a Bureau system,

he will arrange with his dispatching office to request an interconnected system Clearance or Hot Line Order from the Bureau dispatcher. The Bureau dispatcher will then:

A. Prepare a Switching Program Form clearly identified as "Interconnected System," "Intercompany," "Source of Power," or "Dispatcher's" and order switching in accordance with Paragraph 5.4 for a Clearance, or in accordance with Paragraph 6.3 for a Hot Line Order.

B. Verify with the Switchman at each location where switching was performed in the Bureau system that all switching has been completed and that all Safety Tags and/or Hot Line Tags have been placed.

C. State clearly to the foreign system dispatcher exactly what protection has been provided. This statement shall include the status of breakers, disconnecting switches, ground switches, reclosers, and other pertinent equipment, and the location of each Safety Tag and/or Hot Line Tag.

After the foreign dispatcher repeats back the exact protection provided and states that he is satisfied that the protection meets the requirements, the Bureau dispatcher will issue the interconnected system Clearance or Hot Line Order to the foreign dispatcher, documenting this action on the Switching Program Form and making an appropriate entry in the dispatchers' log. The foreign dispatcher is responsible for all switching on his system and for issuance of the Clearance or Hot Line Order to his Job Supervisor.

11.1.5. OBTAINING FROM A FOREIGN SYSTEM. When a Bureau Job Supervisor requires a Clearance or Hot Line Order which will require switching on a foreign system, he will arrange with the Bureau dispatcher to request the appropriate switching on the foreign system. When all operations required on the foreign system have been completed, and all Safety and/or Hot Line Tags (or equivalent) have been placed, the foreign dispatcher will so notify the Bureau dispatcher. The Bureau dispatcher will record this information on the Switching Program Form and satisfy himself that the protection thus provided is adequate. He will then receive an interconnected system Clearance

or Hot Line Order from the foreign dispatcher, and document this action on the Switching Program Form so that the interconnected system action becomes a part of the Clearance or Hot Line Order issued to the Bureau Job Supervisor. An appropriate entry shall also be made in the dispatchers' log.

11.1.6. RELEASE. The interconnected system Clearance or Hot Line Order cannot be released until the Job Supervisor has released his Clearance or Hot Line Order. The release of the interconnected system Clearance or Hot Line Order will be by the dispatching office which received it. Release actions shall be documented on the Switching Program Forms and noted in the dispatchers' log.

## XII. INSTRUCTIONS FOR POWER SYSTEM SWITCHING

### 12.1. SWITCHING ORDERS.—

12.1.1. Nonstandard abbreviations and terms shall be avoided. The switching order shall be given slowly enough to allow the Switchman receiving the message adequate time to write the complete instruction ON THE SWITCHING PROGRAM FORM. Equipment identification shall be by name and number only, and need not be further identified by type and/or usage unless the device is difficult to identify.

12.1.2. Every Switchman receiving switching instructions shall use a Switching Program Form. All switching instructions, no matter how simple, shall be written in exactly the same sequence as transmitted by the Operations Supervisor with special emphasis on the operation to be performed and to the correct identification of the device. After receiving and writing the instructions, the Switchman shall read them back to the Operations Supervisor slowly enough to enable the Operations Supervisor to verify that the correct instructions were received and correctly recorded. No switching shall be performed until the Operations Supervisor has verified all items of the written instructions. The verified written Switching Program Form shall be carried and referred to by the Switchman throughout the entire operation. Before each operation is performed, the Switchman shall doublecheck the instructions to make certain he is at the correct device and that he understands what action is to be done. After performing each

operation, and before proceeding with the next step of the switching instructions, he shall check the device to see that it operated properly, then complete the Switching Program Form as applicable.

12.1.3. When the switching operation has been completed, the Switchman shall report to the Operations Supervisor, stating the time each operation was completed.

### 12.2. SWITCHMAN'S RESPONSIBILITY. The Switchman shall be responsible for:

12.2.1. Checking to see that all blades are completely open or completely closed on a gang-operated disconnect switch after it has been operated and then, if possible, locking it in the position called for in the instruction.

12.2.2. Checking to see that all single-pole disconnect switches are either completely open or closed and latched as directed by the instruction.

12.2.3. Checking the position indicator on circuit breakers to see that it corresponds with the operation called for. Do not rely on the position indicating lights on the control board.

12.2.4. Checking all blades for proper position and seeing that the operating handle is locked, when instructions are to "check open" or "check closed" disconnect switches.

12.2.5. Checking the position indicator on the voltage regulator for neutral position—rather than the remote indicator—when bypassing this equipment.

12.2.6. Checking the operation indicators on all interrupter units, as well as the air break blades, to see that they correspond with the operation called for.

12.2.7. The Switchman performing the switching operation shall not proceed further if, (1) he does not clearly understand the instruction, (2) he believes the instruction is incorrect, (3) at any point in the operations an unexpected relay or breaker action occurs, or (4) he finds a device in a position other than assumed by the Operation Supervisor when the instructions were issued. If any of these conditions are encountered, the procedure shall be rechecked with the Operations Supervisor before proceeding further.