WESTINGHOUSE ASTRONUCLEAR
EXPERIMENTAL FACILITY
REACTOR OPERATIONS MANUAL
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Nuclear and Radiation Design
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Intent of Rule 4. It is the purpose of this rule to ensure that, at any time when increases in the reactivity of the core are being made remotely, the method used for inserting the positive reactivity be also capable of removing it at a faster rate than the rate of insertion. It is intended that remote positioning of detectors that have a small reactivity effect can be accomplished with equal insertion and withdrawal speeds.

Rule 5. Manual additions of positive reactivity can be made to the core only when the reactor is subcritical, and it has been clearly demonstrated that the reactor will remain subcritical throughout the operation.

Intent of Rule 5. The intent of this rule is to protect personnel from the effects of an accidental criticality by ensuring that all manual changes in core reactivity are evaluated prior to making the change. The method of making manual changes to the core reactivity is covered by the "Manual Reactivity Change Procedure," SOP-5.4.

Rule 6. Reactivity may be added in only one manner at a time. The reactivity rate of insertion for PAX must not exceed 0.064$/sec. when the core is shutdown by less than 3.25$ (3.40$ for PAX/R-1). The reactivity rate of insertion for FCX must not exceed 0.20$/sec. when the core is shutdown by less than 10.0$.

Intent of Rule 6. A critical assembly operator should not be expected to anticipate the effects of simultaneous additions of reactivity. There are circumstances under which it would be possible to increase reactivity by more than one method simultaneously, for example, when moving counters in the core or when performing danger coefficient dynamic measurements. Normal operating procedures will not allow such operational freedom unless all
but one of the effects has been demonstrated to be very small.

Under all circumstances, the combined reactivity insertion rate should not exceed that specified in the rule. The values of 0.064$/sec for the PAX cores and 0.20$/sec for FCX has been chosen as a maximum rate of reactivity insertion by any given manner. The conservativeness of this rate of reactivity insertion is justified by the following:

1. PAX (0.064$/sec.)
   a) it would take about 15 seconds to become prompt critical from the delayed critical condition,
   b) a full second at the maximum rate produces a period of about 155 seconds, and,
   c) the response time of the safety instrumentation for inserting control drums completely into the core is less than one second.

2. FCX (0.20$/sec.)
   a) It would take about 5 seconds at the maximum rate to become prompt critical from the delayed critical condition but since the FCX is limited to a maximum excess of 0.50$ the prompt critical condition could not be attained and thus the minimum period that could be attained would be about 5 seconds, and
   b) The response time of the safety instrumentation for inserting the control elements completely into the core is less than one second.
1.3 EXPERIMENTAL DETAILS CHECKLIST

The EDC provides the basic mechanism by which a reactor experiment is reviewed and approved for nuclear safety. Usually written in response to a test request, it describes the materials required, the hazards involved, the general method and the experimental procedure to be employed, and the data required to complete the experiment successfully. (A sample outline is shown in Figure 1-2). No reactor experiment may be performed without a properly approved EDC. Previously approved EDC's can be utilized for the performance of equivalent experiments.

An EDC is prepared using the test request, if one is available, together with the physical design requirements for reactor experiments as given in Section 7.4 of the revised WANEF Safety Report as guides. Applicable portions of Standard Operating Procedures (SOP's) or previously approved EDC's may be incorporated by reference. The EDC must be reviewed and recommended for approval by the Scientist-in-Charge. If the Manager, Nuclear and Radiation Design, decides that it is within the limits of the Operating Limits document, and is consistent with portions of one or more SOP's in the Reactor Operations Manual and does not involve either unevaluated questions of safety* or operations which are expected to exceed the radiation exposure limits (AEC Manual Chapter 0524), then he will approve it and send information copies to cognizant non-line personnel. If it does not fall clearly into this category, he must submit it to the Nuclear Safety Committee (NSC) for review and a determination as to whether or not it does fall into the above category. If the NSC finds that it does fall into the category, it will recommend for approval to the Project Manager. If the NSC finds, however, that it does not fall into the above category, a description of the experiment will be submitted to AGC and SNPO with a request for approval. The request for approval will include a supporting safety analysis and/or a description of the appropriate engineered safeguards.

* Unevaluated questions of safety exist if 1) there is a possibility of an accident occurring which has not been analyzed in the WANEF Safety Report or its Supplements, or if 2) there is an increase in either the probability of an accident previously analyzed or if 3) there is an increase in the consequences of an accident previously analyzed.
Figure 1.2 Form of Experimental Details Checklist
1.4 WEEKLY OPERATIONAL MEMORANDA

The Scientist-in-Charge will submit a weekly forecast of experimentation for the forthcoming week to the Manager, Nuclear and Radiation Design. This forecast, known as the "Weekly Operational Memorandum" supplements the Experimental Details Checklists in providing the principal written means used by the Scientist-in-Charge in communicating with the Nuclear and Radiation Design Department on matters relating to nuclear safety. Because it broadly identifies the experimental activities to be followed, it provides a means for keeping non-line personnel abreast of the experimental program. Information copies will be sent to the Chairman of the Nuclear Safety Committee, the WREC manager and the Waltz Mill Site Health Physics Supervisor.

The Weekly Operational Memorandum is divided into major sections as described below:

1. Prior Operations:
   Under this section the operation covered by the period of the previous memorandum will be discussed. Mention should be made of unanticipated events occurring during prior operations such as loading errors, unusual mechanical troubles and scrams and other similar events which relate to nuclear safety. Also, mention should be made of the status of any experiments covered under the previous memorandum.

2. Proposed Operations:
   In this section specific statements should be made indicating the experiments to be performed in the forthcoming week.

3. Additional Items:
   Other items outside the scope of the experimental test plan should also be discussed in brief. These items could include such things as status of modifications underway at WANEF, proposed changes in operating procedures, proposed changes in non-critical systems, and changes in personnel responsibilities.
1.5 LOGS AND RECORDS

1.5.1 General

Accurate records of all pertinent information concerning the operation of a facility is a necessity. This information offers not only evidence of adequate safety practices, but provides basic data sources of value in current operations and data which can be applied to future safe practices. Standard practices to be followed in keeping the various logs at WANEF are given below.

1.5.2 WANEF Reactor Operations Log

The WANEF Reactor Operations Log is the primary evidence of compliance with the restrictions imposed by the WANEF Operating Limits document and any other restrictions placed on the reactor operation by WANL or AGC/SNPO. Thus, it is important that accurate entries are made in the Log and all pertinent information concerning the operation of the reactor is entered.

The Log will consist, where applicable, of one or more of the following completed forms which are chronologically filed and identified by consecutive page numbers:

- Daily Checkout
- Manual Change Checklist
- Reactor Loading Sheet
- Pre-Startup Checklist
- Reactor Run Sheet
- Periodic Maintenance Checklists.

1.5.3 WANEF Facility Log

The WANEF Facility Log is a book in which daily events affecting, or possibly affecting, the operation of the facility are recorded. Entries in the Facility Log should be precise and should contain enough detail to provide clarity of the entry. Examples of some of the types of entries to be made in the Facility Log include: unusual
CHAPTER 2
PERSONNEL RESPONSIBILITIES

2.1 GENERAL

The protection of all personnel at a critical facility from nuclear as well as non-nuclear accidents is the responsibility of all persons connected with the operation of the facility and this responsibility follows the usual lines of organizational authority.

The purpose of this chapter is to set forth the responsibilities of the personnel insofar as safety is concerned and to indicate the various methods to be employed in ensuring personnel safety.

2.2 PROJECT LINE RESPONSIBILITY

2.2.1 Higher Management Responsibility

The Manager, Nuclear and Radiation Design has a major responsibility for nuclear safety at WANEF. He approves the Experiment Details Checklists providing that they are within the limits specified in Chapter 5 of the Operating Limits document. He also must concur with the Scientist-in-Charge on certain changes to the reactor, the test stands and facility as specified in the Operating Limits document.

The member of line management next above the Manager, Nuclear and Radiation Design, is responsible for any corrective action which must be taken as a result of the periodic inspections which are made by competent technical personnel outside of the WANEF line organization to assure conformance to the established nuclear safety requirements.

2.2.2 Scientist-in-Charge

2.2.2.1 General

The direct responsibility for preventing injury to personnel at WANEF rests with the Scientist-in-Charge. He is responsible for ensuring that no accidents or injuries to personnel result from the operation of the facility or reactors. Within the
latitude of the minimum safeguard requirements which have been established by WANL
policy and AGC/SNPO regulations, the Scientist-in-Charge has the authority to
institute whatever provisions he deems necessary to discharge his safety responsibilities.
In no case may he deviate from the safety measures which have been established by
WANL management as in the Operating Limits document or the WANEF Safety Report.
Whenever, in the judgment of the Scientist-in-Charge, conditions exist in the area of the
reactor which compromise personnel safety, he will not start up the reactor, or if operating
he will shutdown and take whatever corrective action is required to eliminate the unsafe
condition. He will report promptly to higher management and to AGC/SNPO any change
in the physical condition of the reactor or its operating characteristics that might, in his
judgment, affect the safe operation of the reactors. He will shutdown the reactor immediately
whenever so instructed by AGC/SNPO or higher management.

2.2.2.2 Specific Responsibilities

The Scientist-in-Charge is responsible for:

1. The safe operation of the WANEF facility.
2. Reviewing and recommending for approval to the Manager, Nuclear and Radiation Design, the WANEF Experimental Details Checklists.
3. Requesting reviews by the WANL Nuclear Safety Committee of all procedures which require changes in this manual or the "WANEF Operating Limits" document or which involve an unevaluated safety question.*
4. Requesting a review and a recommendation for approval by the WANL Nuclear Safety Committee for changes in this manual.
5. Training and qualification of operating and maintenance personnel.

* Defined in Section 1.3
2.2.2.3 Authority

The Scientist-in-Charge is authorized to:

1. Review and recommend for approval the Experimental Details Checklist and submit copies to the Manager, Nuclear and Radiation Design, and the test requester.

2. Execute the weekly program submitted to the Manager, Nuclear and Radiation Design.

3. Approves modifications and additions to the WANEF facility which do not represent an unevaluated safety question and are within the limits of the Operating Limits document.

2.2.2.4 Accountability

The Scientist-in-Charge is accountable for:

1. The safe operation of the WANEF facility.

2. The existence of an approved Experimental Details Checklist and procedure for each reactor operation, reactor experiment and reactor modification.

3. Obtaining reviews by the WANL Nuclear Safety Committee of all:
   a. Changes in this manual
   b. Modifications and additions to the WANEF facility which represent an unevaluated safety question or are not within the limits of the Operating Limits document.

4. Obtaining a semi-annual review by the WANL Nuclear Safety Committee
2.2.3 Specific Responsibilities of Experimentalist-in-Charge

The Experimentalist-in-Charge is responsible for execution of approved programs including reactor operation in accordance with the approved procedures. In the absence of the Scientist-in-Charge he is authorized to conduct such programs and is responsible for the safe operation of the facility.

2.3 WANEF STAFF

2.3.1 General

An important part of the safe operation of any critical facility is the clear designation of the personnel responsibilities and limitations. To ensure that all personnel are cognizant of their responsibilities and that each person is properly qualified for the position he holds, a list of position descriptions and the required minimum qualifications for each position is presented below.

2.3.2 Position Descriptions

1. Scientist-in-Charge (WANEF Manager)

The Scientist-in-Charge has the overall final responsibility for the operation and safety of the WANEF. He makes decisions concerning personnel employed, operating procedures, equipment purchased, visitors admitted, personnel training program, and all other matters that concern the safe and efficient operation of the WANEF. These decisions are subject to review and approval by higher management, but this does not relieve him of the final responsibility for the decisions. He also serves as the Security Officer for WANEF.

2. Experimentalist-in-Charge

The Experimentalist-in-Charge assists the Scientist-in-Charge in meeting his responsibility for reactor operation. He has the authority to execute the experimental plan established by the Scientist-in-Charge, but not to change it in any way.

3. Experimentalist

The Reactor Experimentalist assists the Scientist-in-Charge or the Experimentalist-in-Charge to execute the experimental plan.
CHAPTER 3
FACILITY DESCRIPTION

3.1 GENERAL

The WANEF facility contains a test cell, a vault, a fuel assembly room, a reactor control room, a counting room, storage space and offices which are described in Section 3.2. General building services, shared with the Westinghouse Reactor Evaluation Center (WREC) which is a part of the Westinghouse Atomic Power Divisions, are described in Section 3.3.

3.2 PHYSICAL DESCRIPTION

3.2.1 Experimental Areas

Figure 3.1 is an aerial photograph and Figure 3.2 is a floor plan of the WANEF facility. The basic structure of the building is concrete building block while the test cell walls and roof are of reinforced concrete. The test cell is 50 ft. high, 40 ft. wide and 40 ft. long with a 22 ft. deep basement. A storage shelf is located across the northern end. The cell is equipped with a 10 ton crane and test stands for the PAX and FCX reactors. A concrete labyrinth is located at the entrance to the test cell for protection against radiation streaming during reactor operations. A vault, of solid block construction covered with a poured concrete roof and equipped with a merchandise type vault door, is used for the storage of fuel. A description of the storage array may be found in the "WANEF Nuclear Safety Manual," WANL-TME-646. An adjacent room with a pass-through to the vault is used for clustering fuel elements.

3.2.2 Reactor Control Room

3.2.2.1 General Description

The control room (Figure 3-2) for the PAX and FCX reactors is arranged as shown in Figure 3.3. It contains the reactor control console, the main 120-volt AC entrance service power panel (BP1); the key-locked relay interlock panel (A), and main circuit wiring panel (B). Also located in this room are the Auxiliary Detector System control console, with its separate 120-volt AC power entrance panel (BP2), and a panel (AA) which contains coaxial circuits leading to the test cell area and the counting room for interconnection of pulse circuitry.
Figure 3.1. WANEF-WREC Facility, Aerial View
K16 - PAX SELECT RELAY
K17 - FCX SELECT RELAY
K5 - KEY SWITCH
K14 - CRM FLUX UP
K15 - START-UP TIME DELAY RELAY
K24 - KEY-CAPTURE BYPASS CIRCUIT RELAY
K50 - AC POWER RELAY
K51 - BYPASS RELAY
K70 - PAX/R-1 EMERGENCY DRUM DRIVE-IN RELAY

Figure 4.2 PAX/FCX Patch Panel Logic
4.3 Control Element Drive System

A functional presentation of the control element drive system is given in Figures 4.3, 4.4, and 4.5. The system design has incorporated a number of features which insure that the required safety of operation of the system is maintained. These features are as follows:

1. All actuating drive switches are spring loaded in the deenergized direction to insure that positive pressure is necessary to add reactivity to the core.

2. All actuating "IN" switches must always have the capability of driving the control element "IN" regardless of the operating conditions.

3. The control element "IN-OUT" switches are designed to allow only one element to be moved in an outward direction at a time. This can be seen in Figure 4.6.

4. Relays inserted into the system must be energized to add reactivity. Relay failure interrupts the operation.

5. The control element speeds are designed to allow speeds from 7.5 degrees/minute to a maximum of 90 degrees/minute for PAX and 5 inches/minute to 40 inches/minute for FCX. Also, the speed changes are provided in five equal steps.

6. In the event that a motor overload condition arises due to a "stuck rod" or other malfunction, the control elements automatically scram and the drive "out" motor power supply is turned off automatically.

7. Each control element is equipped with a "capture key lock" and prior to "withdrawal" of the element, the key must be in the lock.

8. Prior to withdrawal of any control elements, the "flux up" interlock and the "warning horn" interlocks must be satisfied.

9. The control element drive is coupled to the control element through an electromagnetic clutch which must be energized to permit withdrawal. Power or electromagnet failure results in the rapid insertion of the control element.

10. Multiple control element insertion is possible by depressing the "Multiple In" switch which energizes all drives in the "IN" direction. This can be seen in Figure 4.3.
Figure 4.5 Schematic Diagram of FCX Control Rod Drive
experiments, consideration must be given not only to the configuration of interest but also to the accidental displacement of the experiment into a more reactive position. Reference should be made to the applicable Experimental Details Checklist.

5.4.2.2 Course of Action for Changes to PAX

1. General

In the preliminary determination, the Experimentalist shall ensure that neither the minimum shutdown limit of 3.25$ for the isolated reactor nor the maximum excess reactivity limit of 6.2$ is exceeded at any time during the change. A single direct reactivity change of up to +50$ is permitted on PAX. Larger reactivity changes (up to +2.50$) can be accomplished by compensating for the change with poison wires first. After the change is made, the wires are removed in increments whose worth is no greater than +50$. Still larger reactivity insertions can be made by poisoning the core to the extent that after the change is made, it will be shut down by at least 10$. The initial criticality and clean criticality procedures (SOP 5.5.2 and 5.5.3) will then be followed to remove the poison wires.

2. Changes to the PAX Assembly

1) Only one type of reactor change can be made at one time.

2) Up to 75 fuel elements may be interchanged before a criticality measurement must be made providing that the net reactivity increase from the interchange is less than 50$. The core assembly frame will be used when more than three adjacent clusters or more than a total of four clusters are out of the core at one time.

3) Before a control drum is removed from or inserted into a beryllium sector in the NRX PAX, the shutdown of the reactor will be increased by at least 1.0$ by the insertion of poison wires into the core. After the control drum change is completed, a reactivity measurement will be made with the poison wires in place. After assurance that the control drum change has not compromised the minimum shutdown margin, the poison wires will be removed in reactivity steps of +50$ or less. Only one control drum may be removed at one time.
Before a control drum is removed from or inserted into a beryllium sector at the PAX/R-1, the shutdown of the reactor will be increased by at least 0.80$ for a PAX drum or 0.60$ for each R-1 mockup drum by the insertion of poison wires into the core. After the control drum change is completed, a reactivity measurement will be made with the poison wires in place. If the control drum change has not compromised the minimum shutdown margin, the poison wires will be removed in reactivity steps of +50¢ or less. Only one PAX control drum may be removed at one time. All three R-1 mockup drums may be removed at one time.

4) Reflector sector changes may be made in the NRX PAX, one sector at a time, providing the net increase in reactivity is first compensated for by the introduction of a corresponding negative reactivity by means of poison wires. Any drum changes associated with a sector change is assumed to contribute a net reactivity increase of 1.0$. After the interchange has taken place, a reactivity measurement will be made. After assurance that the change has not compromised the minimum shutdown margin, the poison wires will be removed in reactivity steps of 50¢ or less. Only one sector may be removed at one time.

Reflector sector changes may be made in the PAX/R-1, two sectors at a time, providing the net increase in reactivity is first compensated for by the introduction of a corresponding negative reactivity by means of poison wires. Any drum change associated with a sector change is assumed to contribute a net reactivity increase of 80¢ for a PAX drum or 60¢ for each R-1 mockup drum. After the interchange has taken place, a reactivity measurement will be made. If the change has not compromised the minimum shutdown margin, the poison wires will be removed in reactivity steps of 50¢ or less. Only two sectors may be removed at one time. The 60° reflector segment may be interchanged for two PAX sectors. Before the R-1 sector is put in place, the Experimentalist will insure that the drums are locked in the full in (0°) position. This information will be recorded on the appropriate PRE-STARTUP/MANUAL CHANGE CHECKLIST.

3. PAX In-Core Experiments

The Experimentalist shall insure that the evaluation of the reactivity change considers not only the reactivity associated with the configuration of interest
but also that due to a displacement of the in-core experiment, such a displacement must not
compromise the minimum shutdown margin of 3.25$, nor may it produce a net reactivity change
of 1.0$. Inserts which are supported independently of one another are considered to be
separate in-core experiments. The Experimentalist shall further insure that the structural
design of these supports will have a minimum load safety factor of five based on ultimate
strength and gears, pulleys, cables and parts subject to wear will have a safety factor of
eight. Reference should be made to the Experimental Details Checklist (EDC).

4. PAX Out-of-Core Experiments

The Experimentalist shall insure that the following conditions are met:

1) The effects of neutron reflectron will not reduce the shut­
down reactivity below the minimum margin for planned placement (2.8$ with personnel
present) nor override the control capability of the drums during failure.

2) The mechanical design of the experiment employs engineered
safeguards against a failure that would permit the material to be displaced to a more reactive
5.5.4 PAX In-Core Experiments

1. Objective

1) To determine the reactivity worth or effect of materials and structures in PAX.

2) To determine the spatial and spectral behavior of the neutron and gamma fluxes in the reactor.

2. Special Precautions and Limitations

1) The structural design of the experimental supports shall have a minimum load safety factor of five based on ultimate strength and gears, pulleys, cables and parts subject to wear will have a safety factor of eight.

2) Inserts which are supported independently of one another are considered to be separate in-reactor experiments.

3) Any displacement of the experiment must not compromise the minimum shutdown margin (3.25$ for the NRX PAX, 3.40$ for PAX/R-1) nor may it produce a net reactivity change in excess of 1.0$.

4) The detailed design of experiments involving liquids together with procedural safeguards must be reviewed by the WANL Nuclear Safety Committee to insure that no credible accident can result in a reactivity increase in excess of 1.0$.

5) Positive addition of reactivity will be made by only one means at a time. Thus, control drums may not be withdrawn while neutron or gamma detectors are being moved remotely.

6) The limits and procedures in the WANEF Operating Limits document and the Reactor Operations Manual will be governing. In particular, the installation and removal of experiments will be governed by SOP-5.4 and the operation of the reactor by SOP-5.2.
3. General Methods
   1) Reactivity Worths

   Material and structural reactivity worths, usually expressed in units of cents per kilogram, will be obtained by measuring the change in core reactivity (e.g. period measurements or changes in delayed critical control drum positions) due to the insertion or removal of a known mass of material.

   2) Power and Flux Measurements

   The spatial and spectral distribution of the neutron and gamma fluxes will be determined by positioning detectors with different spectral responses at specified locations in and about the reactor. The detectors will be in the form of limited amounts of material (wire, foil, fuel material, powder, etc.) which are removed after the irradiation for activation analysis or may be small electronic devices which provide on-line data during operations. These latter may be moved remotely during operations to provide axial or radial flux distributions.

4. Hazards Considerations

   This procedure, when performed within the limitations described herein and in the WANEF Operating Limits document is within the intent of the WANEF Safety Report and presents no unevaluated safety hazard.

5.5.5. PAX Out-of-Reactor Experiments

   1. Objective

      1) To determine the reactivity worth or effect of materials and structures adjacent to or in the vicinity of PAX.

      2) To determine the effect of environment upon the reactor.

      3) To determine the spatial and spectral behavior of the neutron and gamma fluxes outside of the reactor.
5.8.4 Semi-Annual Maintenance Checks

1. Nuclear Instrumentation

The following instrumentation should be checked and calibrated according to the instructions in the "WANEF Console Operating and Service Manual."

- Startup Range System
- Linear Channels No.'s 1, 2, and 3
- Log Channels No.'s 4 and 5
- Log-Lin Recorder
- Area Gamma Monitoring System

2. PAX Control Element Drives

Inspect each of the items listed below on all of the PAX drive mechanisms.

1) Magnet Clutch
   (1) Gap between rotor and armature
   (2) Mechanical couplings of rotor to shaft

2) Mechanical Stops
   (1) Fastening bolts, torque as required
   (2) Max. and min. positions
   (3) Shaft key

3) Scram Mechanism
   (1) Fastening bolts, torque as required
   (2) Oil leakage

4) Limit Switches
   (1) Spring loaded actuators
   (2) Switch electrical and mechanical operation
5) Position Indicators
   (1) Gear alignment
   (2) Operate all elements of the system

3. FCX Control Rod Drives
   Inspect each of the items listed below on each of the FCX control rod drive mechanisms,
   1) Magnet
      (1) Universal joint and pins
      (2) Cable connections
      (3) Magnet and armature alignment
   2) Limit Switches
      Check operation and positioning of each of the limit switches.
   3) Position Indicators
      (1) Gear alignment
      (2) Operate all elements of the system
   4) Shock Absorbers
      Check each of the shock absorbers to ensure proper operating characteristics and inspect for oil leakage. Ascertain that the tank is safe for entrance per Divisional Procedure 583 - "Confined Spaces".

4. Cell Sump Pump System
   Inspect the following items for proper operation
   1) Float and float switch
   2) Pump
   3) Check valve

5. Assembly Room Ventilation
   Inspect all coarse and absolute filters on the system
1. Reactor Excursion or Uncontrolled Criticality
   (1) Scientist-in-Charge, WANEF (if not at WANEF)
   (2) Senior site supervisors
   (3) Site Health Physics
   (4) Site Security Guard

2. Fire
   (1) Site Fire Brigade
   (2) Senior site supervisors
   (3) Scientist-in-Charge, WANEF (if not at WANEF)
   (4) Site Health Physics

3. Radioactive Materials Spill
   (1) Scientist-in-Charge, WANEF (if not at WANEF)
   (2) Site Health Physics

4. Additional Notification (Only as required)
   Additional notification responsibilities are assigned as follows:
   (1) Senior Staff Member:
       Pennsylvania State Police
       Westmoreland Hospital
       WANL Thermal & Nuclear Design
       WANL Industrial Hygiene
   (2) Scientist-in-Charge
       Pennsylvania Department of Health
       SNPO Health and Safety
       REON, AGC
   (3) Site Security Guard
       WAPD Security Officer
       WANL Security Officer
5.9.5 Emergency Drills

Periodic emergency drills will be conducted to ensure that all personnel recognize and understand the various alarm signals and the emergency action associated with the alarm.

5.9.6 Emergency Notification Roster

1. Scientist-in-Charge, WANEF
   Name: F. S. Frantz
   Address: 325 McClellan Drive, Pittsburgh, Pa. 15236
   Home Phone: 653-5522
   Office Phone: 722-5220, 5240

2. Senior Site Supervisors
   1) General Manager, Advanced Reactor Division
      Name: J. C. R. Kelly
      Address: Marlee Acres, Box 232 R. D. No. 3, Export, Pa.
      Home Phone: 327-4660
      Office Phone: 722-5111, 5112
   2) Manager, WREC
      Name: E. G. Taylor
      Address: 9 Stoden Drive, Greensburg, Pa.
      Home Phone: 834-1053
      Office Phone: 722-5278, 5281
   3) Manager, Analytical Services and Post-Irradiation Facility
      Name: D. T. Galm
      Address: 403 Pleasant Drive, Greensburg, Pa.
      Home Phone: 834-0424
      Office Phone: 722-5212, 5213
   4) Manager, Test Engineering, Waltz Mill Site
      Name: J. Santavy
      Address: 805 Brookview Drive, Greensburg, Pa.
      Home Phone: 834-5417
      Office Phone: 722-5476, 5423
   5) Manager, Plant Services
      Name: C. J. Ferrell
      Home Phone: 887-8995
      Office Phone: 722-5267, 5268
6) Supervisor, WANHES  
Name: L. A. Salvador  
Address: 299 Constitution Dr., Pittsburgh, Pa.  
Home Phone: 653-5475  
Office Phone: 722-5271

3. Site Health Physics  
Manager, Industrial Hygiene and Safety  
Name: R. G. Kitzer  
Address: Box 131 F.R.D. 1, Greensburg, Pa. 15601  
Home Phone: 837-9247  
Office Phone: 722-5384

4. Site Fire Brigade  
1) Site Central Control Office (HP Office)  
   Phone: 722-5243, 5244  
2) Fire Marshall  
   Name: E. F. McDonough, Jr.  
   Address: 1908 Bower Street, N. Braddock, Pa.  
   Home Phone: 824-6648  
   Office Phone: 722-5232  
3) Chief - Fire Brigade  
   Name: D. W. Gray  
   Address: 2441 Skidmore Rd., Greensburg, Pa.  
   Home Phone: 834-4379  
   Office Phone: 722-5257

5. Yukon Fire Department  
   Phone: 722-3101 (Cicci Motors) 722-3128 (Central Hotel)

6. Pennsylvania State Police  
   Phone: 834-4400

7. Westmoreland Hospital  
   Phone: 837-0100 - Nursing Supervisor

8. WANL Nuclear & Radiation Design  
   Manager: W. P. Kovacik  
   Home Phone: 837-0494  
   Office Phone: 892-5600, Ext. 6608-6272
9. **WANL Industrial Hygiene**
   Manager: M. R. Beebe
   Home Phone: 531-8737
   Office Phone: 892-5600, Ext. 5159, 6457

10. **Pennsylvania Department of Health**
    Phone: Area 717, 787-2480, Ext. 849 - Tom Gerusky (Health Physicist)
    787-2480, Ext. 5027 - Mr. Gilbertson

11. **SNPO Health and Safety**
    R. Hartfield
    Phone: Area 216, 433-4000, Ext. 6821

12. **WANL Medical**
    A. A. Spritzer, M. D.
    Medical Director, Westinghouse Astronuclear Laboratory Large, Pennsylvania
    Phone: 892-5600, Ext. 6345
    Office Phone: 242-7520
    Home Phone: 242-8553

13. **NRO**
    C. C. Ross
    Vice President, Nuclear Rocket Operations
    P. O. Box 15847
    Sacramento, California 95813
    ATTENTION: S. Klein
    Phone: Area 916, 355-5255