8.0 RADIOLOGICAL CONTINGENCY PLAN

The B&W Fuel Company, Commercial Nuclear Fuel Plant shall maintain and execute the capability for handling emergencies in accordance with the Radiological Contingency Plan submitted to the Commission on October 17, 1990.

The B&W Fuel Company, Commercial Nuclear Fuel Plant will make no changes to the Plan which would decrease its effectiveness without prior approval of the USNRC.

Changes, which do not decrease the effectiveness of the Emergency Plan, will be reported within six months of the change to the Chief, Fuel Cycle Safety Branch, Division of Industrial and Medical Nuclear Safety, NMSS, Washington, D.C. 20555.

The requirements of the Plan shall be implemented through approved written procedures maintained by the licensee.

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FACILITY DESCRIPTION

1.0 Licensed Activity Description

The Commercial Nuclear Fuel Plant fabricates nuclear fuel assemblies for commercial nuclear reactors utilizing relatively low enriched (≤ 4.1% U-235) uranium oxide powder or pellets as feed material. Solid and liquid wastes (i.e., LSA, filter media, oil) are shipped offsite for recycle or burial. Possession limits for licensed materials are as specified in Chapter 1 of SNM-1168.

1.1 Site and Facility Description

The B&W Fuel Company, Commercial Nuclear Fuel Plant (CNFP) is located on a 76 acre site in Campbell County, Virginia approximately 4 miles from the Lynchburg City limits. The CNFP site is adjacent to the Babcock and Wilcox NNFD and NNFD-RL plant sites. A detailed discussion of the site is given in Section 9.4 of SNM-1168. The following maps are given in Chapter 9 of SNM-1168 to clearly define the site and its relationship to other geographic points of interest:

Figure 9.1 - Physical Layout of the CNFP Site
Figure 9.2 - Physical Layout of the Mt. Athos Site
Figure 9.3 - Points of Interest in the Vicinity of the CNFP
Figure 9.4 - Physical Features Within Five Miles of the CNFP
Figure 9.5 - The Relationship of the CNFP to Major Virginia Population Centers

1.2 Process Description

The plant layout and operational description are described in detail in Chapter 10 of SNM-1168. Figure 9.1 of SNM-1168 shows a detailed overhead view of the CNFP. Figure 1 is a flowchart of the fuel assembly fabrication process.

2.0 Engineered Provisions For Abnormal Operations

As described in Chapter 10 of SNM-1168, the CNFP operating scope is relatively uncomplicated. Operations consists primarily of simple mechanical materials handling devices which are controlled by unit operators and supervision. By virtue of the localized nature of the unit operations and the opportunity for direct visual contact with the handling process, any abnormal conditions are noted and corrected without creating circumstances with the potential of releasing radioactive material.

2.1. Criteria for Accommodation of Abnormal Conditions

2.1.1 Process Systems

Plant process systems are as described in other chapters of SNM-1168. Specifications and design criteria for purchased or locally fabricated equipment where clear and radiological safety considerations are involved are approved by a knowledgeable representative of Health-Safety. Before being released for production operation, new equipment is tested to assure that safety specifications are satisfied. Where operational safety is based wholly or in part on the use of electrical or mechanical interlocks, the proper functioning of the interlocks shall be verified upon installation and on an annual basis thereafter.

The safety interlock system was designed to take certain action on specified process equipment that developed malfunctions such as: loss of ventilation, loss of gas, or an open door. No equipment is used after being removed from service until an equipment checkout for continued effectiveness of safety related parameters is performed.

2.1.2 Alarm Systems and Release Prevention

2.1.2.1 Criticality Monitoring System

A criticality monitoring system shall be maintained in compliance with the appropriate section of 10 CFR 70. This system automatically initiates an evacuation of the facility in the event of a criticality accident. The system is maintained as indicated in Chapter 4 of SNM-1168. This alarm system can also be activated manually if necessary. The monitor locations are shown in Figure 2.

2.1.2.2 Fire Alarm

There are various fire alarms strategically located within the CNFP main building to provide proper coverage. These are all manual type evacuation alarms and are positioned as shown in Figure 1.2 of this Plan.

2.1.2.3 Air Effluent Release Prevention

Air effluent streams which are potentially contaminated with radioactive materials are prefiltered and then HEPA filtered. Constant representative samples are collected following filtration and analyzed on a routine basis. The samplingprogram is conducted in accordance with Chapter 3 of SNM-1168. Gaseous effluents to unrestricted areas are controlled to the limits specified in 10 CFR 20.

2.1.2.4 Liquid Effluent Release Prevention

Potentially contaminated liquid effluent is evaporated and processed through our air effluent system as described in Chapter 5 of SNM-1168. The air effluent release prevention features are as previously described.

2.1.3 Support Systems

2.1.3.1 EARTHQUAKE

The CNFP is located in an area classified as Zone 2 on the Seismic Risk Map of the United States and corresponds to an intensity of VII on the Modified Mercalli Scale. This intensity has an acceleration range of 0.06 and 0.14 g and implies variable damage to building. It is assumed there would be no loss of integrity of the metal frame, sheet-metal-covered CNFP facility, due to the metal's ductility.

2.1.3.2 Support Systems

TORNADO

The CNFP is not designed to withstand the direct impact of a tornado. However, the CNFP is located in a relatively low probability area for tornadoes. The probability of a tornado actually striking the site in any given year is estimated to be 3.0×10^{-4}, with a recurrence interval of 3,333 years.

2.1.3.3 FLOODS

The possible effects of flooding at the CNFP are considered to be zero since the estimated 500 year flood would have a stage of 497 feet, while the floor of the CNFP is at 547 feet. The Standard Project Flood projected by the Corps of Engineers would reach 502 feet, still 45 feet below the CNFP floor. Elevations are above sea level.

2.1.3.4 Accidents At Neighboring Activities

Babcock & Wilcox operates the NNFD and NNFD-RL facilities on the site adjacent to the CNFP. A criticality accident at those facilities would probably activate the CNFP criticality monitoring system which would sound the evacuation alarms.

2.1.3.5 Confinement Barriers & Systems

The confinement barriers in the CNFP are defined as the building walls and roof, the prefilters and HEPA filters in the ventilation system, and evaporator system sump.

2.1.3.6 Access and Egress of Operating Personnel and Emergency Response Teams

Onsite

Egress of plant personnel and the emergency teams from the CNFP are assured by emergency lighting and exit doors throughout the facility. Evacuation routes are shown in Figure 4.

Near-Site

Access to and egress from the CNFP are achieved via State Route 726, the main access road to U.S. 460. State Route 726 is a two-lane road that is susceptible to blockage as a result of flooding or forest fire. An alternate route is to go north exiting the plant and travel through the sub-division and eventually access 460.

2.1.3.7 Fire and Explosion Resistance and Suppression

The CNFP facilities are constructed of fire resistant materials. Accumulation of flammable materials is kept to a very low level and handling of flammable liquids is restricted.

Areas where significant combustibles are routinely stored have sprinkler systems.

2.1.3.8 Shielding

Extensive radiation shielding is required for the x-ray unit and for the rod scanner at the CNFP. The x-ray unit utilizes a lead lined cinder block wall for personnel radiation protection. The rod scanner is a 1 mg Cf-252 sealed source that is housed in an extensively shielded cylindrical container. The container incorporates moderating and shielding components so that radiation emanating from the source passes successively through

2 inches of polyethylene
6 inches of D_2O
2 inches of polyethylene
12.5 inches of borated WEP (Water Expanded Polyester) and lead
1 inch of lead
0.5 inches of steel

Personnel exposure at this station is restricted to a maximum of 2.0 mrem/hour.

2.1.4 Control Operations

The steps taken to assure safe operation of plant activities are outlined in Chapters 1 through 7 of SNM-1168.

2.2 Demonstration of Engineered Provisions For Abnormal Operations

The criticality accident alarm system is maintained in accordance with the criteria stated in Chapter 4 of SNM-1168. The criticality alarm, fire alarm, and public address systems are supplied with battery power backup, in case of a loss of utilities. Loss of utilities merely results in a totally safe halt in operations. Those situations which have a potential for a radioactive material release are from a criticality, major fire or explosion. In these cases, provision has been made to remotely shut down ventilation and/or water systems from Substation #1 shown on Figure 5 to mitigate the dispersal of radioactive material if situations dictate.

3.0 Classes of Radiological Contingencies

The classification scheme specified in Section IV of Appendix E of 10 CFR Part 50, i.e., Unusual Event, Alert, Site Area Emergency, and General Emergency, shall be used as indicated in Section 3.2.

An analysis of the CNFP was performed to identify the potential environmental impact of postulated conceivable accidents. These potential emergencies have been grouped into the specified levels to provide for emergency planning.

Using assumptions from the Standard Format and Content for Radiological Contingency Plans for Fuel Cycle and Materials Facilities and the accident analyses in Section 5 of BAW-1412, Environmental Report, B&W Commercial Nuclear Fuel Plant (12/74), it was determined that no postulated accident would have the potential for serious radiological consequences to public health and safety.

The following criteria will be used as a basic guideline to determine how to classify specific events.

3.1 Description of Radiological Contingencies

3.1.1 Unusual Event

These are situations that can be recognized as creating a hazard potential that was previously nonexistent or latent. The situation has not yet caused damage to the plant nor harm to personnel and does not necessarily require an immediate change in plant operating status. No releases of radioactive material requiring offsite response or monitoring are expected. Specific events that would be classified as an unusual event are:

- Minor fire/explosion - (a small localized fire restricted to the CNFP site not requiring offsite support and assistance).
- Bomb Threat
- Civil Disturbance - (threatening to personnel or plant)
- Severe Weather Condition - (i.e., hurricane/tornado, flooding, or other weather phenomena that presents a significant hazard to personnel or plant).

3.1.2 Alert

These are generally accidents within the plant requiring staff emergency organization response. Initial evaluation would indicate that the potential for offsite hazard is minimal.

Examples of events that would be classed under 'ALERT' would be:

. Major fire/explosion - (a large spreading fire on or threatening to the CNFP site that would require offsite support and assistance.

. Release of toxic gas

3.1.3 Site Area Emergency

A Site Area Emergency would be situations more severe than plant emergencies which have significant potential for offsite release, but that are not expected to exceed EPA Protective Action Guideline exposure levels except near the site boundary.

This classification includes the following situation:

. Criticality accident

3.1.4 General Emergency

A General Emergency would be a condition which would involve actual or imminent loss of containment integrity. Releases can be reasonably expected to exceed EPA Protective Action Guidelines exposure level offsite for more than the immediate site area.

Postulated accident evaluations demonstrate this level of accident is not credible for the CNFP.

3.2 Emergency Response Actions

The following is a general summary of the different actions taken for each emergency classification.

3.2.1 Unusual Event

- Transition to a state of readiness by the Emergency Response Organization and plant personnel and possibly offsite support organization.
- Possible termination of certain plant operations and initiation of certain precautionary measures that may be required by the particular situation.
- Escalate to a more severe class, or downgrade to a less severe class as appropriate.

3.2.2 Alert

- Plant Emergency Organization will be mobilized.
- In most cases, plant personnel able to handle the situation.
- Plant evacuation or isolation of certain affected plant areas or possible termination of plant processes may be necessary.
- Environmental monitoring may be initiated.
- Depending on the situation, offsite support agencies would be requested to assume alert condition or provide assistance.
- Escalate to a more severe class, or downgrade to a less severe class as appropriate.
- Notify offsite authorities when the emergency is terminated.

3.2.3 Site Area Emergency

- Plant evacuation would be necessary.
- Emergency organization will be mobilized.
- Contact will be made with offsite support agencies and state and local government Emergency Response Organizations as necessary.
- Environmental monitoring will be initiated.
- Escalate to a more severe class, or downgrade to a less severe class as appropriate.
- Notify offsite authorities when the emergency is terminated.

3.3 Range of Postulated Accidents

The maximum impact on the facility and the surrounding environment would result from a criticality accident. The probability of such an incident is considered to be very low due to design and process and administrative controls.

Radioactive material could be released from the facility as a result of a major fire or explosion if building containment and uranium process equipment were breached. Due to uranium and process characteristics, fire loading and plant ventilation design and flexibility, the potential is low.

These and other postulated accidents are discussed further in Chapter 16 of SNM-1168 and in BAW-1412, "Environmental Report, B&W Commercial Nuclear Fuel Plant" (12/74).

Battelle Pacific Northwest Laboratories performed the accident analyses for CNFP as presented in BAW-1412. The analyses, including projected dose calculations and atmospheric dispersions, are based on conservative assumptions, and as such should be considered as upper limits.

3.3.1 Radiological Accidents

In the event of a radiological accident, the CNFP Radiological Monitoring Team would make radiation surveys and collect environmental samples for either onsite or offsite analysis. The radiation surveys would be used in conjunction with published EPA or NRC dose projection monograms to determine offsite doses. Atmospheric dispersion calculations would be based on NNFD-RL or other meteorological data and ground level release graphs found in Regulatory Guide 3.34.

Two plant evacuation alarm systems (criticality and fire) are provided to alert personnel and the Emergency Response Organization to the emergency. All controlled area effluents are monitored and the CNFP has an environmental air monitoring network to assess releases.

Based on the accident analysis and size of the site, evacuation to offsite locations, except for personnel requiring hospitalization, would not be required. Although offsite impact is considered to be remote, necessary monitoring capability and offsite notification is provided for.

3.3.2 Non-Nuclear Emergency

Non-nuclear emergencies are handled as would be a nuclear emergency since the potential for involving radioactive material is always present. However, there is no significant offsite impact from a non-nuclear emergency. Examples of major non-nuclear emergencies are: Major fire and explosion.

Manpower and communication needs are met in that the Emergency Response Organization is geared to handle the more potentially severe nuclear emergencies.

3.3.3 Minor Emergency

Minor emergencies: Minor fires, radioactive material spills, minor utility loss, and personnel emergencies. These emergencies are usually handled by plant operating and support groups, but could require Emergency Team assistance and some offsite support.

4.0 Organization For Control of Radiological Contingencies

4.1 Normal Plant Operations

Emergencies are reported to the highest level of supervision and management onsite at the time of occurrence.

In the event an evacuation alarm sounds, the Emergency Response Organization is activated to assess and respond to the situation. The Emergency Response Organization musters as planned to direct the emergency operations.

Alternate locations may be provided based on as assessment of prevailing conditions.

The structure of CNFP's Emergency Response Organization is outlined in the following Section, 4.2. Key positions within the response organization are selected on the basis of experience and/or qualifications for the specific duty involved. Alternates are designated for key positions including the Plant Manager, Emergency Officer, Evacuation Officer, Health-Safety Officer, and Security Officer. Emergency Monitoring and Emergency Rescue Teams contain sufficient personnel to make designations of alternates unnecessary. Emergency personnel assignments are specified by name in implementing procedures along with office and home telephone numbers.

4.2 Onsite Radiological Contingency Response Organization

The specific authorities, responsibilities, and duties of key positions of the Emergency Response Organization are outlined in detail in the Emergency Procedure. The procedure is organized

so as to define the individual's responsibilities. In the event designated emergency organization personnel are not present or are otherwise unable to fulfill the function, appropriate alternative designations may be made. Responsibilities of key personnel are summarized as follows and illustrated in Figure 6.

4.2.1 PLANT MANAGER (PM)-

The Plant Manager is the primary interface and will be in charge of coordinating the offsite agency support effort. He has overall responsibility for all activities during the emergency situation. He evaluates the recommendations of the Emergency Response Organization and decides on a continued course of action. He has the authority to shut down the facility, the authority to terminate the emergency alarm status, and the responsibility for contacting or delegating contact with outside agencies, as appropriate.

4.2.2 EMERGENCY OFFICER (EMO)-

The Emergency Officer has the responsibility for initiating and coordinating emergency operations. He makes recommendations to the Plant Manager from the information gathered by the Evacuation Officer, Health-Safety Officer, and Security Officer. He is responsible for directing Emergency Team operations.

4.2.3 HEALTH-SAFETY OFFICER (HSO) -

The Health-Safety Officer is responsible for directing and evaluating surveys, personnel exposure, and effluent release data. He reports to the Emergency Officer (EMO).

4.2.4 EVACUATION OFFICER (EVO) -

The Evacuation Officer is responsible to account for all site personnel and consolidate necessary records pertaining to the incident. He reports to the Emergency Officer (EMO).

4.2.5 EVACUATION OFFICER ASSISTANT (EVOA) -

The Evacuation Officer Assistant coordinates the accounting of personnel. The Evacuation Officer Assistant reports to the Evacuation Officer (EVO).

4.2.6 SECURITY OFFICER (SO) -

The Security Officer is responsible for assuring traffic control is maintained and coordinating communications with NNFD Security. He reports to the Emergency Officer (EMO).

4.2.7 EMERGENCY TEAM -

The Emergency Team consists of a Radiation Monitoring Team, the Fire Brigade and the First Aid Team. The Emergency Team provides emergency support, with team leaders reporting to the Emergency Officer (EMO) when the Emergency Team is activated.

4.2.8 SUPPORT AVAILABLE INTERNALLY -

Plant personnel emergency assignments are identified in Section 5.0. Members of CNFP management and supervision present who have expertise in specific areas are on standby in the event their assistance is required. These functions include:

- Facilities & Services (service and equipment)
- Maintenance (repair and damage control)
- Nuclear Materials Control

4.2.9 NNFD SUPPORT -

The neighboring NNFD facility can provide additional technical support in the event it is deemed necessary. These capabilities include:

- Health physics, monitoring, and personnel decontamination support (Naval Nuclear Fuel Division)

- Nuclear safety engineering
- Industrial engineering (site services)
- First aid and ambulance service
- Emergency Rescue Team support
- Hazardous chemicals control
- Crowd and traffic control
- Meteorological data

4.3 Offsite Assistance to Facility

Offsite support agreements have been made with the following agencies/organizations either directly or through existing support arrangements:

4.3.1 Lynchburg General Hospital

Lynchburg General Hospital has agreed to accept victims of accidents. The hospital, however, relies on site personnel to supply the necessary radiation control equipment and personnel to access and monitor any radiation and contamination levels.

4.3.2 Campbell County Sheriff's Department

The Campbell County Sheriff's Department has agreed to provide assistance to the CNFP in an emergency. This assistance includes coordination with other civil authorities as necessary, traffic control, and control of civil disturbances.

4.3.3 Concord Fire Department

The fire department has agreed to respond to emergency calls at the CNFP. Through a mutual aid agreement between volunteer and Lynchburg fire groups, Concord will call upon Lynchburg Fire Department for assistance as needed. If the response is for a fire involving radioactive

material, the Emergency Response Organization of the CNFP will provide the necessary monitoring to protect the fire department personnel.

4.4 Coordination With Participating Government Agencies

In the event their assistance is required, the following agencies can be contacted to provide assistance as specified in applicable statutes:

1. DOE, Oak Ridge Operations, Oak Ridge, Tennessee

   - Radiological Monitoring

2. Virginia Office of Emergency Services
   Richmond, Virginia 23235

   Available: 24 hours

   - Radiological Monitoring
   - Hazardous Chemical Control

3. Virginia State Police

4. Campbell County Sheriff's Department

   - Crowd and Traffic Control

Offsite traffic control and evacuation of the public are the responsibility of the affected political jurisdiction and will be coordinated with the onsite response management as needed through the NNFD Security Organization.

5.0 Radiological Contingency Measures

The following is a summary of emergency measures, actions taken to activate the Emergency Organization and offsite agency notifications. The following areas will be addressed for each emergency condition identified in 3.1:

- Activation of Emergency Organization
- Assessment Actions
- Corrective Actions
- Offsite Support Agency Notifications

5.1 Unusual Event

5.1.1 Minor Fire/Explosion

5.1.1.1 Activation of Emergency Organization

- Person discovering the fire contact the Guard via the telephone system.
- Guard page Code 10-70.
- Emergency Rescue Team is activated.

5.1.1.2 Assessment and Corrective Actions

The Emergency Rescue Team, Rad Monitoring Team Captain, and EMO will proceed to the scene and assess the situation. The Emergency Rescue Team will respond to the event using appropriate fire fighting methods depending on the nature of the fire.

5.1.1.3 Offsite Support Agency Notifications

- Offsite support agency notifications are coordinated through NNFD.

5.1.2 Bomb Threat

5.1.2.1 Activation of Emergency Organization

- Person receiving threat contact PM or SO.
- PM or SO determine need for evacuation.
- If evacuation is necessary, announce over PA and sound fire alarm.

- Evacuate to muster areas.
- EVOA initiate headcount.
- SO coordinate search effort.
- PM determine when to resume plant operations.

5.1.2.2 Assessment and Corrective Actions

Upon notification of bomb threat, the Plant Manager and/or Security Officer will determine need for evacuation.

The Security Officer will coordinate search effort. The search will not be conducted for 1 hour before or after expected detonation time.

5.1.2.3 Offsite Support Agency Notifications

The PM or his designee shall make the required notifications.

5.1.3 Civil Disturbance

5.1.3.1 Activation of Emergency Organization

- Guard will secure all perimeter gates.
- Guard will contact NNFD Security.
- Guard will contact PM, EMO, and SO.

5.1.3.2 Assessment and Corrective Actions

The EMO will assess the need to call local law enforcement. The objectives will be to secure the facility from unauthorized entry and to protect facilities and personnel.

5.1.3.3 Offsite Support Agency Notifications

Offsite support agency notifications are coordinated through NNFD.

5.1.4 Severe Weather Conditions

5.1.4.1 Activation of Emergency Organization

The Emergency Organization will monitor weather reports during periods when the CNFP is threatened. The PM will decide if evacuation is necessary.

5.1.4.2 Assessment and Corrective Actions

The assessment and corrective actions for Severe Weather Conditions are the same as the measures taken to activate the Emergency Organization as indicated previously.

5.1.4.3 Offsite Support Agency Notifications

Depending upon the severity of the inclement weather, request assistance from offsite support agencies. The agencies to be contacted depends upon the potential damage to the facilities and personnel injury.

5.2 Alert

5.2.1 Major Fire/Explosion

5.2.1.1 Activation of Emergency Organization

Person discovering the fire/explosion activate the fire alarm.

- Personnel evacuate and proceed to the muster area.
- EVOA initiate head count.
- EVO issue incident forms.
- EMO direct the Emergency Rescue Team to accident location.
- HSO set up environmental air samples and contamination control point if radioactive material is involved.

5.2.2.2 Assessment and Corrective Actions

The fire alarm will be activated and the plant evacuated. The Emergency Rescue Team will respond to protect the facilities and personnel. The Concord Volunteer Fire Department and/or NNFD Fire Brigade will be requested through the CNFP Guard. The Emergency Officer will continually monitor and assess the situation in order to maintain personnel and public safety.

5.2.2.3 Offsite Support Agency Notifications

- EMO request Concord Volunteer Fire Department and/or NNFD Fire Brigade through CNFP Guard.

- PM or his designee shall make necessary offsite offsite notifications.

5.2.2 Release of Toxic Gas

5.2.2.1 Activation of Emergency Organization

- Person discovering toxic gas release contact CNFP Guard.

- Guard page Code 10-70.

- EMO assess whether or not the plant should be evacuated.

- If release involves a liquid spill, request NNFD Spill Team.

5.2.2.3 Assessment and Corrective Actions

The Emergency Officer will continually monitor the situation in order to maintain personnel and public safety. The Emergency Rescue Team will attempt to terminate the release; if the release involves liquid, the NNFD Spill Control Team will be requested.

The Rad Monitoring Team will stand by in case radioactive material becomes involved. The Concord Volunteer Fire Department and NNFD Fire Brigade will be requested if necessary.

5.2.3.4 Offsite Support Agency Notifications

The Emergency Officer will evaluate the need for assistance from offsite support agencies.

5.3 Site Area Emergency

5.3.1 Criticality Accident

5.3.1.1 Activation of Emergency Organization

The CNFP is monitored so that a criticality will automatically activate the evacuation alarm.

- Personnel proceed to muster area.

- EVOA initiate head count.

5.3.1.2 Assessment and Corrective Actions

- Rad Monitoring Team initiate:

  muster area survey, plant radiation survey, and environmental air samples.

- HSO confirm criticality accident has occurred.

- EMO coordinate any rescue reentry operations with Emergency Organization.

- EMO coordinate termination of plant services.

- PM coordinate offsite notification.

- EMO coordinate any relocation of muster areas.

5.3.1.3 Activation of Emergency Organization

- EVOA distribute incident forms.
- HSO initiate indium foil survey.
- Plant Manager, through coordination with the Emergency Organization and the nuclear criticality safety analysis organization select a method to render the criticality safe.
- EMO coordinate recovery operations.
- HSO determine need for hospitalization of personnel.
- EVO maintain all records.

5.3.1.4 Offsite Support Agency Notifications

The PM or his designee shall make the necessary notifications.

5.4 Protective Action

5.4.1 Personnel Evacuation from Site and Accountability

Situations not requiring staff response for control, containment and recovery are brought to the attention of appropriate personnel directly or by means of a coded announcement over the PA system or by telephone. Examples of this type of situation include localized radioactive material spills, personnel injuries, and localized fires.

Audible alarms are utilized to initiate plant evacuations. One system functioning in conjunction with the criticality monitoring systems provides an automatic evacuation signal upon a high level (> 20 mR/hr) signal from any two criticality monitors. This system may also be triggered manually. An additional manual fire alarm system can also initiate a plant evacuation. The PA system, criticality alarm, and fire alarm have emergency backup power.

Following evacuation, response of key personnel and support groups such as the Monitoring Team and Emergency Rescue Team will be predicated on the staff's analysis of the situation and initial monitoring results. Either of the above alarms will result in total plant evacuation. In the event of a plant evacuation, visitors and contractor personnel are the responsibility of the plant employee being visited. A visitors' register of CNFP visitors is kept at the Guard Station and is available to the Evacuation Officer (EVO).

The Evacuation Officer is responsible for accounting for all site personnel. A missing persons check may be made through a system of defined muster areas. Each employee is issued an identification badge which has an indium foil attached. The Health-Safety Officer will initiate radiological monitoring of evacuees, decontamination, and selection for medical attention.

5.4.2 Use of Protective Equipment and Supplies

Rad Monitoring Team and Emergency Rescue Team members are trained in the use of respirators and protective clothing. To become qualified, each of these individuals must pass an appropriate medical examination. The EMO will decide when the protective equipment needs to be issued.

Supplies and equipment are located in the CNFP First Aid Office and in lockers in the Guard House and emergency equipment building outside the plant building. The distribution of supplies and equipment will be coordinated by Health-Safety and as outlined in the CNFP Emergency Procedure.

5.4.3 Contamination Control Measures

A contamination control line, if needed, will be established as close as possible to the contaminated area. The control line will be designated by a physical barrier if possible. All equipment, material, and personnel coming out of the contaminated area should pass through the control line for surveying.

Contaminated equipment and material will be put in plastic bags or wrapped in plastic. Contaminated personnel will be decontaminated and sent to the muster area. Injured personnel will be decontaminated prior to leaving the controlled area, if injuries permit. In the event the personnel cannot be decontaminated, the contaminated areas will be wrapped and injured personnel transported to the appropriate facilities.

Criteria for permitting return to normal use is covered in Section 9.3.

The emergency organization is responsible for the implementation of the planned measures.

5.5 Exposure Control in Radiological Contingencies

5.5.1 Exposure Guidelines

	NON-LIFE SAVING OPERATIONS	LIFE-SAVING OPERATIONS
	Whole Body	Whole Body
A. Removal of injured	25 rem	75 rem
B. Undertaking corrective action	25 rem	N/A
C. Performing assessment actions	25 rem	N/A
D. Providing first aid	25 rem	75 rem
E. Performing personnel decontamination	25 rem	75 rem
F. Providing ambulance service	25 rem	N/A
G. Providing medical treatment services	Not Available On Site	Not Available On Site

5.5.2 Radiation Protection Program

In any case involving radiation exposure, efforts will be made to satisfy ALARA criteria. However, the exposure necessary to save a life or terminate an incident must be evaluated on a risk/benefit basis. The EMO is responsible for authorization of workers receiving emergency doses. Contamination control is outlined in the CNFP Emergency Procedure.

5.5.3 Monitoring

Dose estimation techniques may be subdivided into several categories.

a. TLD badges are worn by selected CNFP employees to monitor beta gamma exposure.

b. Indium foils are worn by all CNFP personnel to provide prompt sorting capabilities and rought dose estimates for neutron exposure.

c. Criticality dosimeters are located within the plant building which, when recovered and evaluated, provide spectrum information and assist in reconstruction of a criticality incident.

d. Air sampling is used in situations involving airborne dispersal of uranium.

e. Bioassay sample collection (fecal, urine, and nose smears) may be used for assessing exposure to internal emitters.

Dose records are evaluated by the HSO and maintained by the Evacuation Officer.

5.5.4 Decontamination of Personnel

Personnel decontamination, in the event of a minor, or localized, incident not involving plant evacuation is accomplished by using standard health physics practice. Available facilities in this situation include personnel showers for whole body decontamination and a decontamination kit for localized contamination involving a limited body area. Effectiveness of decontamination efforts is evaluated by Health-Safety personnel. Procedures specifying the extent of decontamination efforts may be undertaken without medical supervision are available. To support personnel decontamination during a plant evacuation, a decontamination kit, including selected decontamination agents is included with the emergency supplies. This kit will enable prompt gross decontamination or complete decontamination where low levels are involved. Additional decontamination support is available onsite through both NNFD and NNFD-RL.

Action levels for determining the need for personnel decontamination and the means for decontamination of personnel, wounds, supplies, instruments, and equipment are outlined in the CNFP Emergency Procedure.

5.6 Medical Transportation

Transport of injured personnel, who may also be radiologically contaminated, is provided by the NNFD ambulance and Concord Volunteer Rescue Squad. A written agreement (see Exhibit A) has been established with the Concord Volunteer Rescue Squad.

5.7 Medical Treatment

A written agreement (see Exhibit B) has been established with the Lynchburg General-Marshall Lodge Hospital to handle contaminated injured personnel. In addition, a local physician affiliated with the hospital will handle any B&W radiation accident patients.

6.0 Equipment and Facilities

6.1 Control Point

Emergency control for those situations not requiring plant evacuation will be established, as appropriate, by the responding unit (Emergency Rescue Team, Radiation Monitoring Team, etc.) and will normally be in the immediate vicinity of the incident, taking into consideration such factors as exposure levels and smoke.

During plant evacuation, initial control will be established in the primary muster area.

If a radiation survey shows that the primary muster area is not safe, the Emergency Organization will designate an alternate area based on factors such as prevailing wind, evacuation routes, and need for rapid assembly and accounting of personnel.

6.2 Communication Equipment

Telephone and radio communications will be available to the emergency staff in the Guard Station located near the front entrance. Should the Guard Station not be accessible due to radiation levels or for other reasons, radio communication capability is maintained through portable units, which are used by the CNFP Guards on a routine basis. The radio link noted above connects with NNFD Security which, in turn, has radio communications links with area law enforcement agencies, rescue squad, and volunteer fire department.

6.3 Facility for Assessment Teams

Buildings presently set up on the CNFP site remote from the CNFP main building would be suitable for use by the staff performing post accident, recovery assessment, and protective action functions. At least one of the buildings is telephone linked and portable radios are available, if necessary. A copy of the Emergency Procedure, which contains necessary graphs, charts, tables, drawings, etc., is maintained in emergency equipment storage. In the event the buildings could not be used, mobile trailers could be brought in, or a staff center could be established at NNFD-RL or NNFD.

6.4 Onsite Medical Facilities

Onsite facilities at NNFD, NNFD-RL and CNFP are equipped to provide first aid assistance. The CNFP maintains an emergency kit which contains a supply of standard first aid equipment for use should access to the CNFP First Aid Room not be possible.

6.4.1 First Aid Supplies

Typical stock in the emergency kit includes such items as scissors, assorted bandages, soap, blankets, first aid ointment, gauze, tweezers, splints, stretcher, etc.

6.5 Emergency Monitoring Equipment

6.5.1 Onsite Systems and Equipment

1. Criticality monitoring system for plant areas provides automatic initiation of evacuation alarm, and provides local area display at levels less than 20 mR/hr.

2. Portable beta/gamma monitoring instruments; high and low range.

3. Portable alpha monitors.

4. Pocket dosimeters; high and low range.

5. Laboratory analytical capability for alpha and beta emitters.

6. Airborne particulate samplers in effluent stacks.

7. Portable air samplers.

The emergency equipment building and Guard House jointly house the emergency equipment specified in 2, 3, 4, and 7 above. In addition to the listed instrumentation, the emergency supplies contain miscellaneous items such as tape, flashlights, anti-contamination clothing, and respirators. Maintenance of the emergency supplies is the responsibility of Health-Safety. Inventories are conducted at least quarterly and include functional tests of instrumentation. Criticality monitor calibration is accomplished in accord with the requirements of SNM-1168, Chapter 4.

6.5.2 Support Systems and Equipment

In addition to the equipment listed, the following support or information may be made available:

1. Meteorological data from NNFD-RL Weather Monitoring Station

2. Laboratory analytical capability at the NNFD-RL and NNFD (gross alpha, beta, gamma counting spectrum analysis).

3. Portable instrumentation from NNFD-RL and NNFD.

4. Meteorological information from the National Weather Services Station or from the Virginia Office of Emergency Services.

7.0 Maintenance of Radiological Contingency Preparedness Capability

7.1 Written Procedures, Review, and Updating

The Manager, Quality and Safety is responsible for assuring that the Emergency Procedure is reviewed for technical correctness and applicability at least once each year, and updated as appropriate. Revised procedures are approved by cognizant members of plant management. Procedures distribution and control shall be the responsibility of plant supervision.

Health-Safety procedures are approved in writing by members of plant management/supervision if it is determined by Quality and Safety that their area of responsibility is affected by the procedure.

7.2 Training

Training in emergency response begins with the indoctrination of each new employee. Health-Safety conducts the new employee indoctrination in accord with 10 CFR 19. A formal documented retraining of radiation workers shall be conducted by Health-Safety at least annually.

The Emergency Rescue Team and Radiation Monitoring Teams receive annual training programs which include fire fighting techniques and rad monitoring techniques, respectively. Both teams are familiarized with new and old equipment. The teams are familiarized with the unique hazards associated with radioactive materials. The teams are trained in the use of protective equipment and are medically qualified annually for respirator use.

Members of the local fire department tour the plant on an annual basis or as otherwise mutually agreed.

General employee training requirements for emergency monitoring personnel is specified in Chapter 2 of SNM-1168.

7.3 Tests and Drills

Emergency drills and exercises are conducted to test the adequacy of timing and content of implementing procedures, to test emergency equipment, and to ensure that emergency organization personnel are familiar with their duties. A planned evacuation will be conducted annually for CNFP personnel. Emergency drills (or a combined drill) of plant medical emergency and radiological monitoring capabilities will be held at least biennually.

7.4 Maintenance and Inventory of Radiological Emergency Equipment, Instrumentation, and Supplies

Equipment, supplies, and instruments held in readiness for emergency use are inventoried and functionally tested or a quarterly basis. Calibration of instruments is performed semi-annually.

8.0 Records and Reports

8.1 Records of Incidents

Record forms are maintained in the CNFP Emergency Procedure. The record forms will document personnel statements concerning the incident, radiation survey data, evacuation checks, Health-Safety checks, Radiation Monitoring, and Environmental Monitoring. Logbooks or equivalent will be used to record the cause of the incident, corrective actions taken to terminate the emergency including the extent of injury or damage, offsite assistance requested, offsite assistance actually received, and offsite organizations to which the situation was reported, and the action taken or planned to prevent a recurrence of the incident.

The Evacuation Officer will be responsible to assure employee record maintenance. The records will be retained for a minimum of five years.

8.2 Records Assuring Adequate Preparations

Records are maintained by Health-Safety on training, retraining, drills, exercises, inventory and maintenance of emergency equipment and supplies. Agreements with the following offsite support organizations are reviewed every two years and updated if necessary: Concord Rescue Squad, Concord Volunteer Fire Department, and the Lynchburg General Hospital. The Emergency Procedure is reviewed every year as required by SNM-1168. The appropriate personnel and offsite agencies are notified when the Plan and Procedures are updated, provided the change affects such offsite agencies.

8.3 Reporting Arrangements

The arrangements for reporting accidents and the titles and telephone numbers of the offices that must be notified are specified in the CNFP Emergency Procedure. The notification will be performed by telephone, telegram, mailgram, or facsimile. The CNFP Plant Manager or his designee will notify and keep the appropriate agencies informed of the current state of events.

The key personnel and their respective telephone numbers for CNFP and offsite organizations to include regulatory agencies shall be verified quarterly and the call lists in the Emergency procedure will be updated accordingly.

9.0 Recovery

9.1 Reentry

Following a plant evacuation, no one will be allowed to reenter the plant unless authorized by the Plant Manager, except Emergency Team Operations, which are authorized by the EMO. Exposure to radiation or radioactive materials during rescue operations, termination or reduction of accident effects, or recovery of deceased victims will be governed by radiological criteria stated in Section 5.5. All other exposures to personnel performing recovery and cleanup operations will be governed by 10 CFR 20 limits for exposure to radiation and radioactive material.

9.2 Plant Restoration

Plant restoration will be achieved by the Emergency Organization with assistance from other groups.

1. Determine the necessary actions to reduce or prevent any ongoing releases of radioactive or other hazardous material.

2. Assess the actions necessary to prevent any further accidents.

3. Take the necessary actions to return the criticality alarm system to normal operations.

4. Determine actions to decontaminate to an acceptable level.

9.3 Resumption of Operations

Resumption of routine plant operations will be made after the following conditions are met:

1. Radiation levels approach pre-accident levels.

2. Airborne activity levels are less than 25 percent of the appropriate 10 CFR 20 limits.

3. Surface contamination levels do not present a personnel hazard through resuspension or direct radiation exposure.

4. The cause of the incident has been investigated and measures to prevent recurrence have been developed.

5. Plant safety systems are operational or an acceptable substitute has been installed.

FIGURE 1

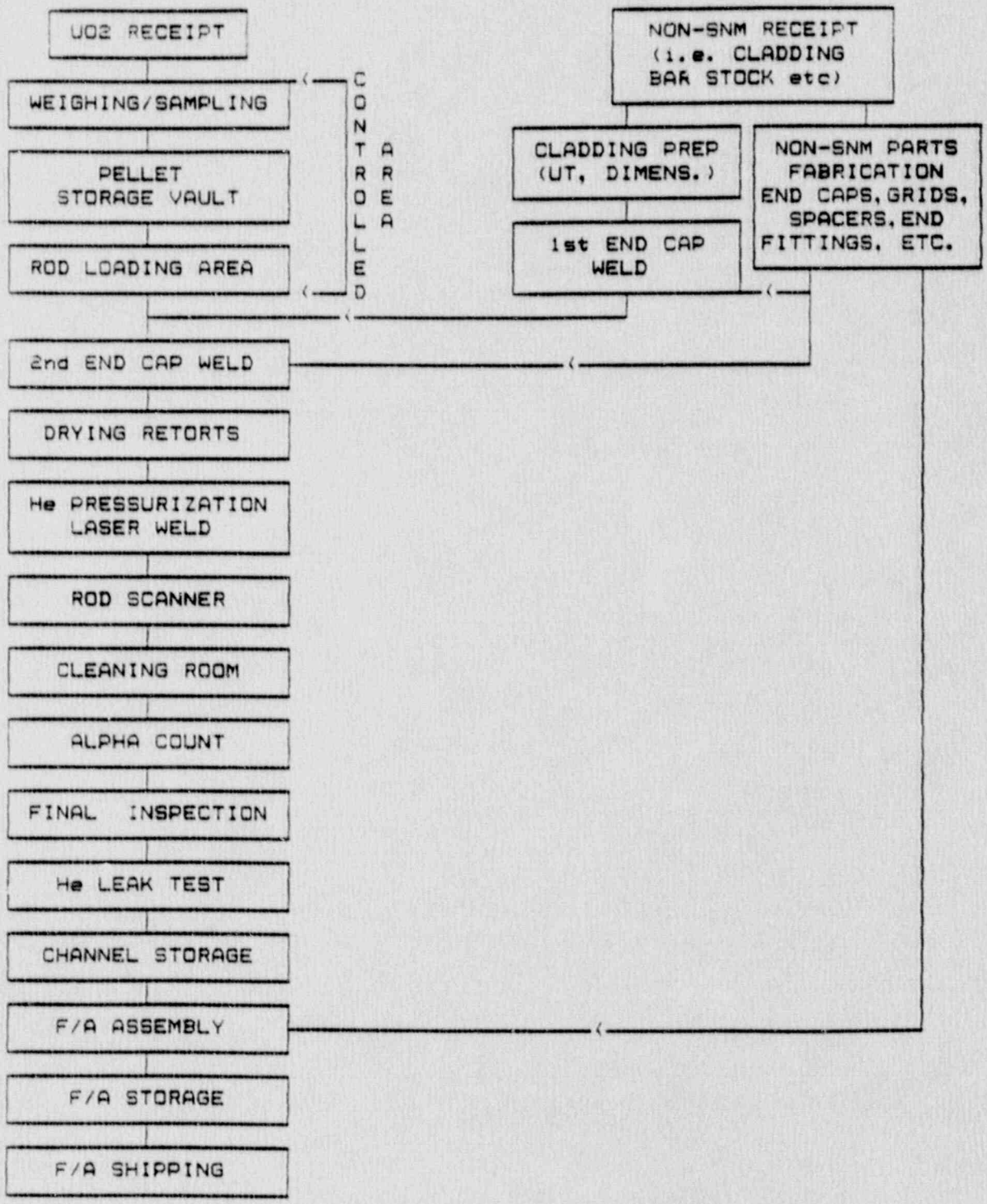

UO2 RECEIPT
WEIGHING/SAMPLING
PELLET STORAGE VAULT
ROD LOADING AREA
CONTROLLED AREA
NON-SNM RECEIPT (i.e. CLADDING BAR STOCK etc)
CLADDING PREP (UT, DIMENS.)
1st END CAP WELD
NON-SNM PARTS FABRICATION END CAPS, GRIDS, SPACERS, END FITTINGS, ETC.
2nd END CAP WELD
DRYING RETORTS
He PRESSURIZATION LASER WELD
ROD SCANNER
CLEANING ROOM
ALPHA COUNT
FINAL INSPECTION
He LEAK TEST
CHANNEL STORAGE
F/A ASSEMBLY
F/A STORAGE
F/A SHIPPING

FIGURE 2

Pull Station & Monitor Locations

LEGEND:
* Area Radiation Monitor
+ Parallel Radiation Detector
F Fire Alarm Pull Station
R Radiation Alarm Pull Station

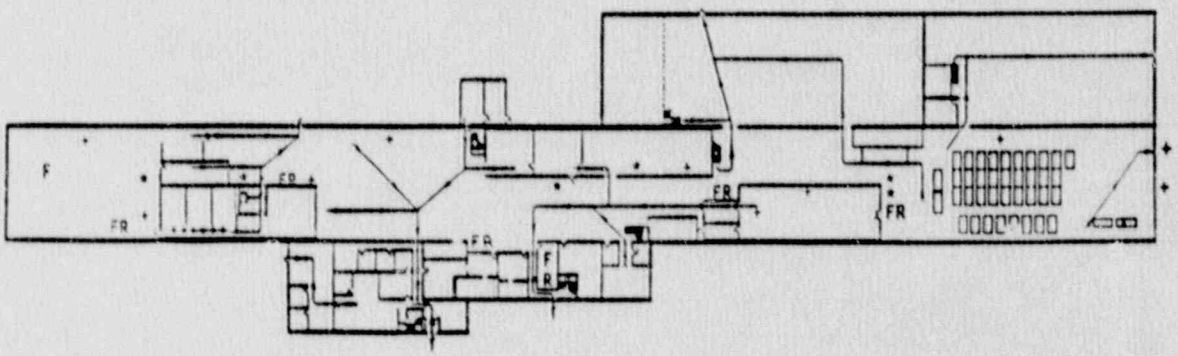


FIGURE 3

FLOW CHART OF LIQUID WASTE DISPOSAL SYSTEM

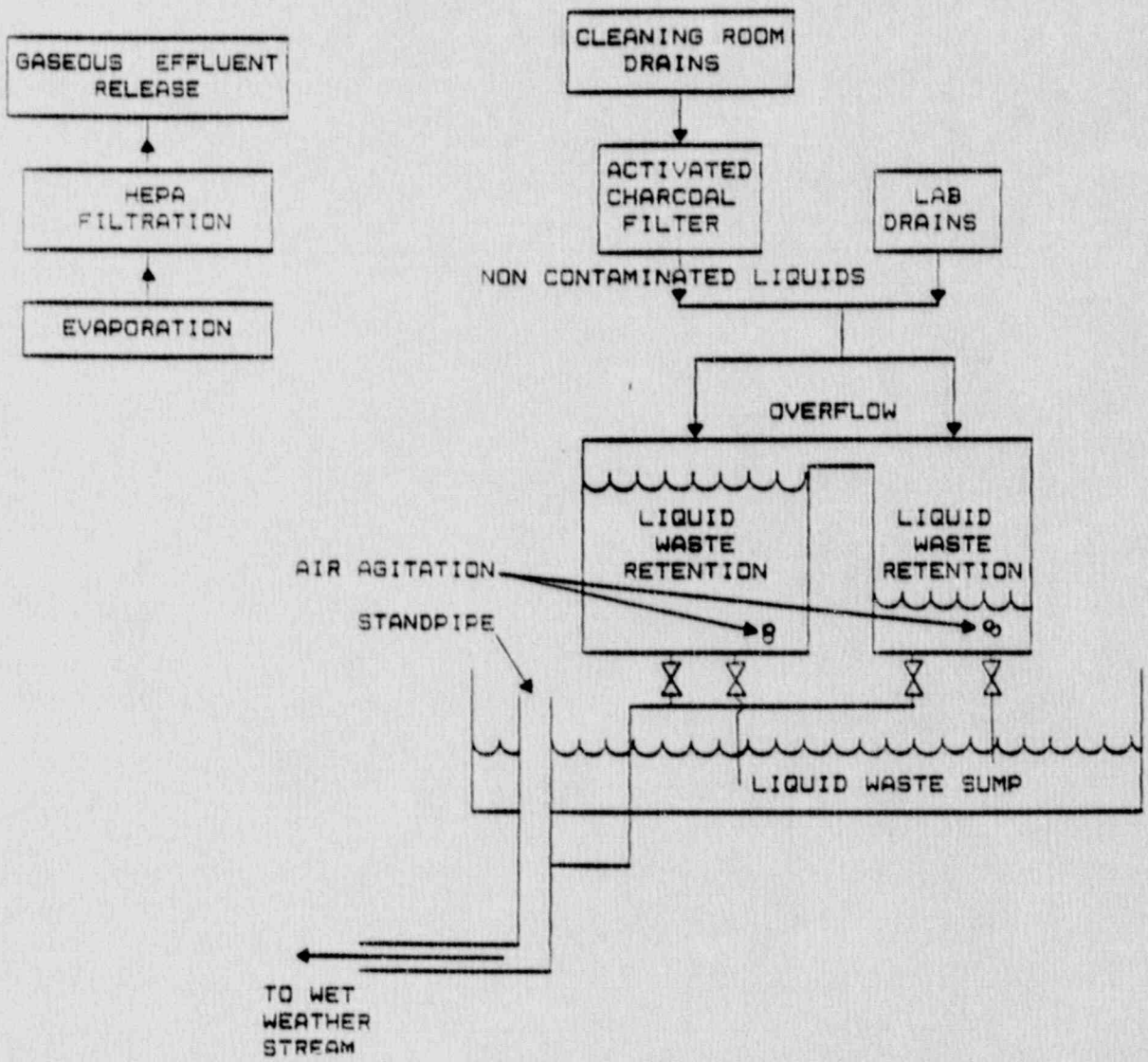


FIGURE 4

MUSTER AREAS:
1) Visitors
2) Facilities & Services, Finance & Accounting, Production & Materials Control
3) Manufacturing Engineering, Quality Assurance, Health-Safety, Field Operations
4) Manufacturing Operations
5) Emergency Response Organization
6) Emergency Team
7) Purchasing, Information Services, Specialty Manufacturing, Incore Detector, Information Services
8) Inspection
9) Maintenance and Machine Shop

NOTE: Plant Manager & Secretary should report to Muster Area 3.

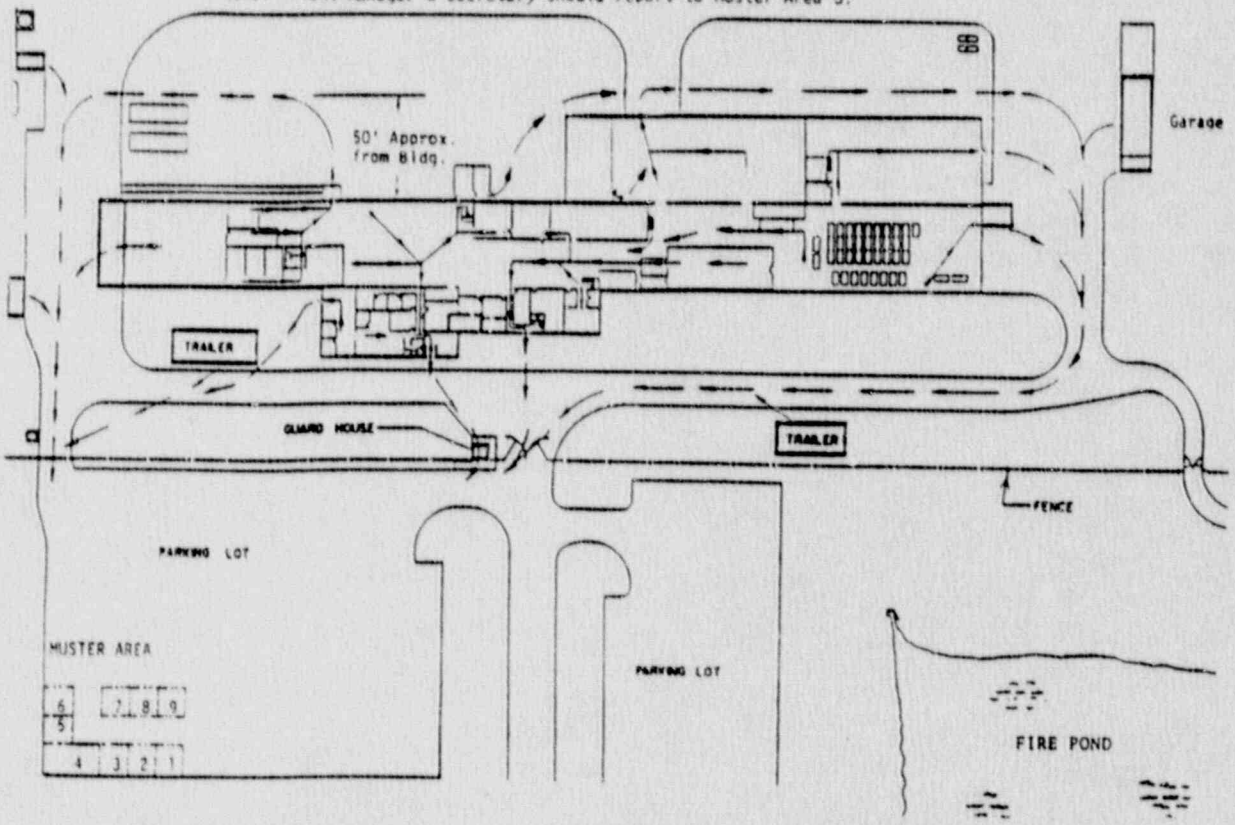


FIGURE 5

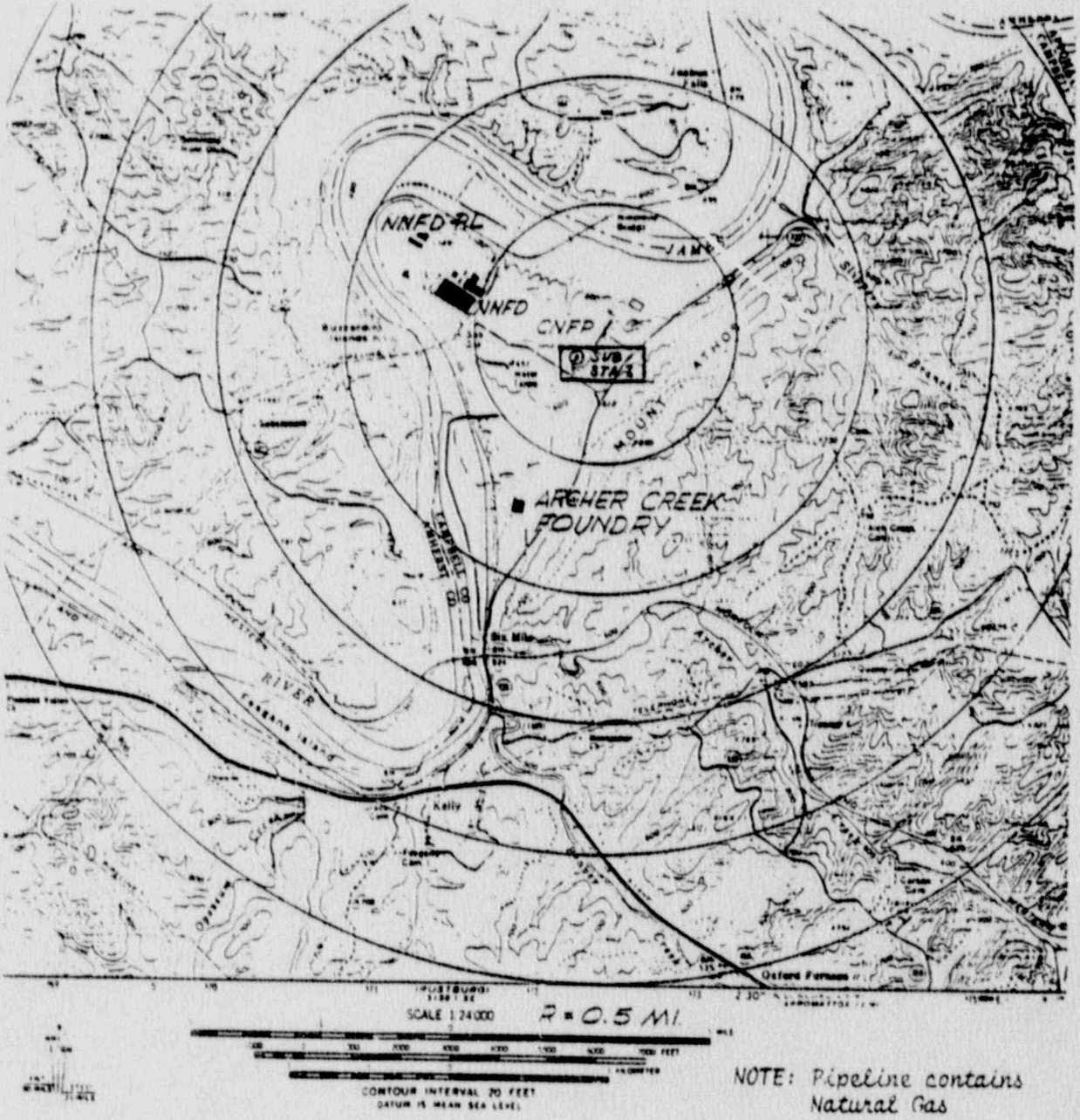

NNFD RL
UNFD
CNFD
JAM
MOUNT ATHOS
ARCHER CREEK FOUNDRY
RIVER
Kelly
Oxford Furnace
SCALE 1:24000
R = 0.5 MI.
CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL
NOTE: Pipeline contains Natural Gas

FIGURE 6

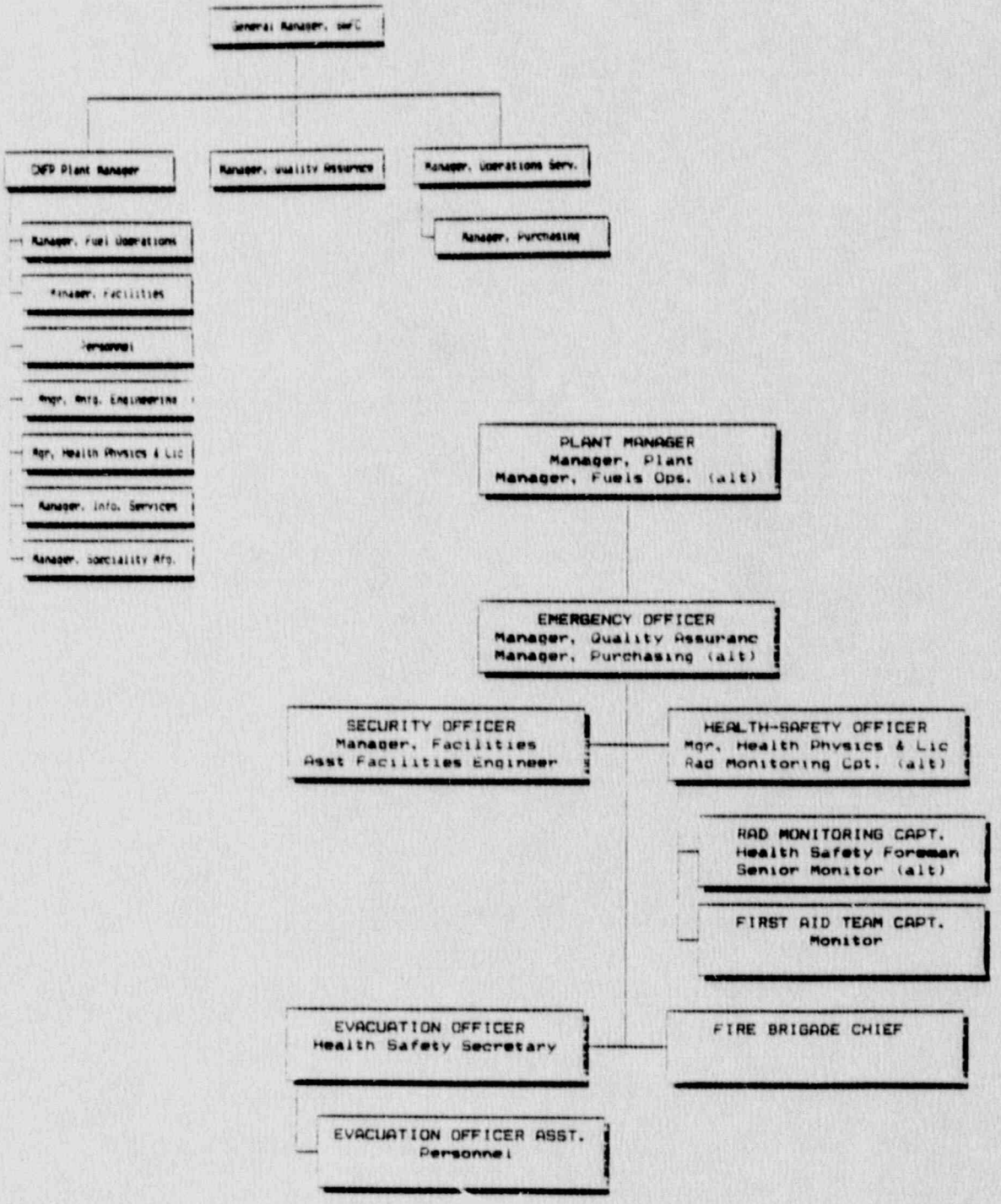

General Manager, NFC
CNFP Plant Manager
Manager, Quality Assurance
Manager, Operations Serv.
Manager, Purchasing
Manager, Fuel Operations
Manager, Facilities
Personnel
Mgr, Mfg. Engineering
Mgr, Health Physics & Lic
Manager, Info. Services
Manager, Speciality Mfg.
PLANT MANAGER
Manager, Plant
Manager, Fuels Ops. (alt)
EMERGENCY OFFICER
Manager, Quality Assuranc
Manager, Purchasing (alt)
SECURITY OFFICER
Manager, Facilities
Asst Facilities Engineer
HEALTH-SAFETY OFFICER
Mgr, Health Physics & Lic
Rad Monitoring Cpt. (alt)
RAD MONITORING CAPT.
Health Safety Foreman
Senior Monitor (alt)
FIRST AID TEAM CAPT.
Monitor
EVACUATION OFFICER
Health Safety Secretary
FIRE BRIGADE CHIEF
EVACUATION OFFICER ASST.
Personnel

EXHIBIT A

CONCORD RESCUE SQUAD
P. O. BOX 48
Concord, Virginia 24538
Phone 993-2166

September 8, 1989

BABCOCK & WILCOX
Naval Nuclear Fuels Division
P. O. Box 785
Lynchburg, Va. 24504

Attn: Mr. Dave Ward, Manager Industrial Safety

Dear Mr. Ward:

The following provided for your records.

The Concord Rescue Squad serves the Concord, Va. area which includes the Babcock & Wilcox Mt. Athos facilities. We are available twenty four hours a day and will respond to calls for emergency rescue and first aid assistance as required. Our emergency phone number is 993-2166.

We currently have 3 ambulances (one of which is a four wheel drive vehicle) two boats and one crash truck.

Our membership is required to be certified in an EMT (Emergency Medical Technician) and EVOC (Emergency Vehicle Operations Course). In addition we have members holding certification as shock trauma technician, cardiac technician and one member who is a paramedic. Other training certificates are held by most of our members in light & basic rescue, vertical rescue, hazard materials and other various rescue training courses.

Concord Rescue Squad stands ready and willing to respond to any emergency situation. Please feel free to call on us at anytime.

Yours very truly,

Bruce Stratton
Captain

EXHIBIT B

Lynchburg General Hospital
1901 Tate Springs Road, Lynchburg, Virginia 24501-1107 804-528-2000

February 1, 1989

Mr. Larrie K. Trent
Manager, Safety Department
BABCOCK & WILCOX
P. O. Box 785
Lynchburg, Virginia 24505-0785

Dear Mr. Trent:

This letter will serve as a reply to your communication of January 23, 1989 concerning compliance with Federal and State hazardous waste regulations. Lynchburg General Hospital is happy to continue to provide hospital support to Babcock & Wilcox in the event of any accident that requires medical treatment.

I have forwarded your letter to Estell R. Ripley, Administrative Director, of our Emergency Department for maintenance in her files. If we currently do not have medical treatment protocol on any of the chemicals you have listed, we will contact you in an attempt to obtain copies of the materials safety data sheets which you maintain.

Thank you for your communication to us. If you have any additional questions or comments or if I may be of any further service, please feel free to call me at 528-2100.

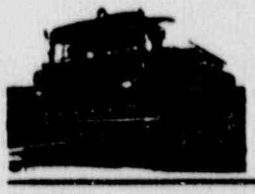
Sincerely yours,

W. Scott Burnette
Vice President/Operations

prw

pc: L. Darrell Powers, President (please note spelling in future communiques)
Estell R. Ripley

EXHIBIT C



Concord Volunteer Fire Department, Inc.

P.O. BOX 28 CONCORD, VIRGINIA 24538 993-2322

January 10, 1990

BABCOCK & WILCOX
Naval Nuclear Fuel Division
P. O. Box 785
Lynchburg, Virginia 24504

Attn: Mr. Dave Ward, Manager Industrial Safety

Dear Mr. Ward:

The Concord Volunteer Fire Department is responsible for the fire protection of an area east of Lynchburg, which includes all of the Babcock & Wilcox facilities in the Mt. Athos area, is available twenty four (24) hours a day and will respond to calls for fire suppression and associated emergencies.

Our forty (40) member organization has a high degree of training and experience. This training consist of monthly training drills, local fire schools as well as many state certified classes. Our certification ranges from Fire Fighter 1 thru Adjunct Fire Instructors.

Our equipment consist of five (5) pieces of Fire Apparatus equipted to maintain a Class A rating.

Concord Fire Department's willingness to assist our community during emergency situations extends to your facility as well as to the community.

Please feel free to contact us anytime we may be of assistance.

Yours very truly,

Gerald W. Inge
President