ABB
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April 6, 1992
ML-92-024

Docket No. 70-36
License No. SNM-33

Mr. John W. Hickey, Chief
Fuel Cycle Safety Branch
Division of Industrial and Medical Nuclear Safety
Office of Nuclear Materials Safety and Safeguards
U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington D.C. 20555

Subject: **Hematite Emergency Plan**

Reference: Letter, M. Tokar (NRC) to J. A. Rode (C-E) dated February 13, 1992

Dear Mr. Hickey:

In accordance with the reference letter, we are submitting the Emergency Plan for the Hematite Nuclear Fuel Manufacturing Facility for NRC approval. Enclosure I to this letter provides the Plan. As required by 10 CFR § 70.22, we have allowed offsite response agencies sixty (60) days to review and comment on the Plan. Comments received during the sixty day period have been included as Enclosure II to this letter.

During Mr. S. Soong's visit to the Hematite facility in March 1992, we agreed to revise the License Renewal Application to reflect this submittal of the Emergency Plan instead of the currently referenced Radiological Contingency Plan. We will provide the appropriate Renewal change page(s) when we respond to other NRC questions concerning the License Renewal Application.

NF12, 1/4

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Upon your approval of the Plan, we request that 180 days be granted to implement revised procedures and complete training for responsible personnel. If I can be of any further assistance in this matter, please fell free to call me or Mr. Tom Cameron of my Staff at (203) 285-5109.

Very truly yours,

COMBUSTION ENGINEERING, INC.

John F. Conant
Manager,
Nuclear Materials Licensing

JFC:kda
Enclosures: As Stated

cc: S. Soong (NRC)
G. France (NRC Region III)

Enclosure 1 to
ML-92-024

EMERGENCY PLAN FOR THE COMBUSTION ENGINEERING HEMATITE NUCLEAR FUEL MANUFACTURING FACILITY

COMBUSTION ENGINEERING, INC.

HEMATITE, MISSOURI

HEMATITE NUCLEAR FUEL FACILITY EMERGENCY PLAN

APRIL 6, 1992

LICENSE NO. SNM-33

DOCKET NO. 70-36

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1.0 DESCRIPTION OF FACILITY

This section contains a discussion of the activities performed under NRC License SNM-33 and a description of the plant facility site.

1.1 Description of Licensed Activity

Combustion Engineering's Nuclear Fuel Manufacturing Facility (NFM) is located in Hematite, Missouri, and is authorized under NRC License SNM-33 to use Special Nuclear Materials (SNM) for research, development, and fabrication of nuclear fuel pellets.

1.1.1 Site Location

The Combustion Engineering Inc., Hematite Nuclear Manufacturing Facility is located in Jefferson County, Missouri, approximately 35 miles south of the city of St. Louis (Figure 1-1). The plant is located on Highway P, approximately 3/4 of a mile northeast of the unincorporated town of Hematite (Figure 1-2).

1.1.2 Authorized Activities

Licensed activities conducted at the Hematite Plant of Combustion Engineering, Inc., are:

Receive, possess, use and transfer Source Material under Part 40 of the Regulations of the Nuclear Regulatory Commission.

Receive, possess, use and transfer Special Nuclear Material under Part 70 of the Regulations of the Nuclear Regulatory Commission in order to manufacture nuclear reactor fuel utilizing low-enriched uranium (up to 5.0 weight percent in the isotope U-235).

Deliver materials to a carrier for transportation under Part 71 of the Regulations of the Nuclear Regulatory Commission.

A further discussion of these activities on a step-by-step basis is described below:

Pellet Manufacturing

UF_6 Receipt and Storage - UF_6 is received in standard 2½ ton cylinders in approved shipping packages. Upon receipt, the cylinders are placed in the UF_6 cylinder storage area. Additional cylinders may be located adjacent to the vaporizers near the cylinder scale, or in shipping packages on the oxide building dock.

UF_6 to Oxide Conversion - As needed, a UF_6 cylinder is removed from its shipping package or storage and connected to the conversion equipment. In the first step of the process UF_6 is vaporized by heating the UF_6 cylinder in a steam chamber.

During normal operations, the vaporized UF_6 leaves the cylinder through a line passing into the Oxide Building. It passes through metering valves and is carried to the third level of the Oxide Building, where it enters the conversion equipment.

The UF_6 to UO_2 conversion is accomplished in three series connected reactor vessels. In the first fluidized bed reactor (R-1), the UF_6 is reacted with dry steam to form uranyl fluoride (UO_2F_2) and hydrogen fluoride gas.

The gaseous HF and excess steam exit R-1 through porous metal filters. The UO_2F_2 particles move to second and third reactors (R-2 and R-3) where they are pyrohydrolyzed in a reducing atmosphere of dissociated ammonia and steam to remove any residual fluoride and reduce the UO_2F_2 to UO_2. Offgases from these reactors are filtered through porous metal filters and routed with offgases from R-1 to scrubbers filled with limestone. The scrubbers remove most of the HF prior to discharging to the atmosphere. UO_2 from R-3 is cooled and pneumatically transferred to one of the two receivers.

UO_2 Blending and Agglomeration - UO_2 powder is withdrawn from a receiver into the bulk storage hoppers and stored until use in the North corridor of Building 255 or the North end of Building 254. The UO_2 powder is withdrawn from the bulk storage hoppers into the micronizer, where recycle material may also be added. The UO_2 is then transferred by vacuum to the blenders.

After leaving the blender, the UO_2 is next combined with a poreformer material and mixed in a conical screw mixer. The UO_2 then passes through a slugging press, a granulator, a lubricant mixer, and into the pellet press feed hopper.

Pellet Pressing - Granulated UO_2 powder is gravity fed into the pellet press from the feed hopper mounted above each press. Pellets produced by the rotary press are then placed into sintering boats.

Pellet Dewaxing - "Green" pellets are processed through a dewaxing furnace to remove the additives.

Pellet Sintering - Dewaxed pellets are passed through a high temperature controlled atmosphere sintering furnace where they densify and achieve the desired ceramic characteristics.

Pellet Grinding - Sintered pellets are sized using a centerless grinder, air dried, and then prepared for shipment.

Packaging - The pellets are packaged in licensed shipping containers in accordance with the Certificates of Compliance.

Support Operations

Quality Control Laboratory - Analytical services are provided in several laboratory areas. The laboratories are divided into sections consistent with the testing techniques employed. They include general lab area, physical testing areas, office areas and storage.

The material handled includes feed material samples, process control samples, final product samples, and residue samples. Such samples may be liquid or solid.

Analyses are performed using destructive and nondestructive techniques. Unused sample portions are returned to the process streams. Analytical residues are collected, analyzed, and removed from the area for

solidification for shipment to a licensed burial site or stored for recovery.

Recycle Operations - All SNM processing operations yield scrap SNM materials in liquid or solid form. A variety of other SNM bearing scrap materials or waste products are derived by routine clean-up operations, liquid, solid and gaseous effluent control systems, maintenance operations, assay change operations, solid waste reduction programs, etc.

Scrap SNM is designated as either clean or contaminated based on sample analysis and/or source. The following briefly describes some of the recycle operations performed at the Hematite facility.

UF_6 Heel Removal - The 2½ ton cylinders are cold-trapped into an 8A cylinder to reduce the UF_6 heel prior to their return to the enrichment facility for refilling.

UF_6 Cylinder Washing - Prior to their five year recertification, 2½ ton cylinders may be washed to remove the UF_6 heel. Cylinders are washed by introducing four gallons of water, rolling on the cylinder roller, and pumping the resulting solution into a five gallon pail. This pail is transferred to approved storage. The above steps are repeated using ammonium carbonate until the heel is removed.

Scrap Recovery - Scrap recovery steps include: (1) Oxidation and reduction, (2) dissolution, (3) filtration, storage and dilution, (4) precipitation,

(5) separation, (6) furnace scrubbers, (7) waste incineration. License SNM-33 discusses each of these steps in detail.

Waste Processing - Liquid wastes that contain uranium compounds such as mop water and wet recovery filtrates are evaporated and sent to burial. Laundry water is filtered and discarded to the sanitary waste treatment plant.

Process ventilation air is filtered and vented through exhaust stacks to atmosphere.

Solid wastes are assayed, incinerated if combustible, or packaged for shipment to a licensed low level waste burial site.

1.1.3 Exemptions and Special Authorizations

The following specific activities are authorized under License SNM-33:

a) Treat or dispose of waste and scrap material containing uranium enriched in the U-235 isotope, and/or source material, by incineration pursuant to 10 CFR 20.302.

b) Release of equipment and materials from the plant to offsite or from controlled to uncontrolled areas onsite.

1.1.4 Location Where Material Will Be Used

All manufacturing activities are carried out within the security fenced area located on the central site tract. Manufacturing activities utilizing radioactive materials are housed in several buildings containing

equipment for conversion of UF_6 to UO_2, pellets and related processes.

The activities that are authorized to be conducted in the respective buildings and facilities on the Hematite site are described as follows:

Number	Name	Present Utilization
101	Tile Barn	Emergency Center and Equipment Storage
110	New Office Building	Guard Station and Offices
120	Wood Barn	Equipment Storage
-	Oxide Building	UF_6 to UO_2 Conversion, UF_6 Receiving
235	West Vault	Source Material Storage
240	240-1	Offices and Cafeteria
	240-2	Recycle and Recovery Area
	240-3	Incinerator, SNM Storage and Waste Processing
	240-4	Laboratory and Maintenance Shop
252	South Vault	Radioactive Waste Storage
253	Utility Building	Steam Supply, SNM Storage and Offices
254	New Pellet Plant	UO_2 Storage, Pellet Fabrication and Packaging and UO_2 Oxidation and Reduction
255	255-1	Future Special Pellet Line
	255-2	Future Special Pellet Line
	255-3	Storeroom
256	Warehouse	Shipping, Receiving and Storage

1.1.5 Material possession limits, buildings and authorized activities are identified in the license (SNM-33).

1.1.6 The list of materials and chemicals used in significant quantities in the Hematite NFM facility is stated in Table 1-2.

1.2 Description of Surrounding Area

1.2.1 General Description

A review of the general area map, as shown on figure 1-3, indicates the immediate area (within a one mile radius) surrounding the Hematite site to the east consists of a mixture of farmlands and woods, to the north and west wooded rolling hills, and to the south the unincorporated town of Hematite, with a population of approximately 125 people.

1.2.2 Regional Demography

Jefferson County is predominately rural and characterized by rolling hills with many sizable woodland tracts. The land area is classified as 51% forest, 33% agricultural with crops such as grain and hay, and approximately 16% as urban, suburban, commercial and unused or developed.

The county is part of a dynamic, growing urban region of the St. Louis Standard Metropolitan Statistical Area. Although extensive development has resulted from this growth, agricultural land use is still predominant in the site's environs. Some areas, generally 1/2 to five miles from the plant site, have been developed as small to moderate-size subdivisions.

1.2.3 Population Centers

The Hematite Facility is located in Jefferson County, Missouri. The average population density of this county is 259 people per square mile based on the total estimated 1990 population of 171,380 persons and an area of 661 square miles. As shown in Figure 1-2, several towns and unincorporated settlements are wholly or partly within the five mile radius of the Hematite site. Festus/Crystal City, located 3.5 miles east of the site and having a population of about 12,200 people is the nearest town of significant size.

Towns and settlements within a five mile radius from the C-E Hematite site are:

Town	General Direction From Site	Distance (miles) From Site	Population 1990 Estimate
Crystal City	E	4.5	4088
Deerfield	E	1.5	95*
DeSoto	SW	5.0	5993
Festus	E	3.5	8105
Hematite	SW	0.5	125
Hillsboro	NW	5.0	1625
Horine	NE	5.0	1043
Lake Wauwanoka	NW	3.5	800*
Mapaville	N	3.5	100
Olympia Village	S	5.0	752
Victoria	SW	3.0	100

* Denotes 1980 Census

Figure 1-2 depicts the area within a 1 mile radius of the Nuclear Fuel Manufacturing Facility.

1.2.4 Evacuation Routes

Referring to Figure 1-3, there are no river crossings, drawbridges, railroad grade crossings, or other potential transportation obstacles or interferences within a one (1) mile radius of the Hematite site which could impede the flow of traffic during an emergency. Evacuation can be made using local roads shown in Figure 1-2 and 1-3.

1.2.5 Location of Emergency Organizations

The location of emergency organizations such as fire department, police and hospitals, are also labelled on Figures 1-2 and 1-3. The location and distance from the Hematite site, and the anticipated response times for offsite support are provided in Table 1-1.

1.2.6 Sites of Emergency Significance

The Missouri Pacific Railroad line runs within 100 yards of the Hematite facility perimeter fence.

1.3 Description of Facility and Site

1.3.1 Land Use Onsite

All manufacturing operations are conducted within the fenced area located on the center site tract. The fenced area, parking lot and barns occupy about six acres. The remainder of the fifteen acre center tract is a grassy area which is kept mowed, as is the two acre West tract. The North, East and South tracts, totaling 136 acres, remain undisturbed. Thus, only about four percent of the site is being utilized, while the remaining 96% consists of woodlands, streams and open spaces.

1.3.2 Locations of Buildings Onsite

Figure 1-4 shows the location of and identifies the buildings and facilities on the Hematite site. Figure 1-5 shows the layout of the six contiguous production buildings and the equipment within the buildings. Three of these buildings, 253, 254 and 256, were added in 1989 and replace two demolished buildings that previously occupied the same area. Production activities, including in-process transfer of materials, equipment and product, take place within the six adjoining buildings. A summary of the type of production activity in each building follows.

In the Oxide building, UF_6 is converted into UO_2 granules, loaded into large hoppers, and transported to Building 254 for milling, blending and pelletizing.

Building 254 has two parallel pelletizing lines added in 1989. The UO_2 is received as granules in large hoppers from the Oxide building. Each line has equipment for milling, blending, pelletizing and packaging. (In the future, Building 255 will contain a complete pellet line for producing small batches of special pellets.)

The remaining three buildings contain support facilities for production. Building 256, added in 1989, is the site warehouse for shipping and receiving pellets and for receiving site supplies. Building 253, also added in 1989, contains various site utilities, Boiler Room, storage and maintenance

areas, UO_2 storage and offices. Building 240 contains laboratory and maintenance areas, a recycle recovery area, a waste incineration area, personnel areas and offices.

1.4 Hazardous Chemicals

The chemicals discussed below are used or stored in sufficient quantities to pose a potential safety hazard if spilled or mishandled. Table 1-2 identifies typical quantities stored on-site and locations where the chemicals are stored.

Ammonia - Approximately 550,000 pounds used per year as a reducing gas in the production of UO_2 powder, pellets, and in the preparation of material for recycle.

Potassium Hydroxide - Approximately 1,000 pounds used per year. Mixed with process water and used as wet scrubber liquor to remove hydrofluoric acid from the recycle pyrohydrolysis process effluent.

Sodium Hydroxide - Approximately 4500 pounds per year to regenerate the demineralizers.

Hydrochloric Acid - Approximately 3000 pounds used per year to regenerate the demineralizer.

Nitric Acid - Approximately 9,850 pounds used per year to dissolve the U_3O_8 wet recovery process feed material.

Hydrogen Peroxide - Approximately 20,000 pounds per year used to precipitate the uranium in the wet recovery process.

Trichlorethane - Approximately 2,000 pounds per year used for cleaning purposes.

Nitrogen - Approximately 8,000 gallons of liquid nitrogen are stored on-site. Nitrogen is used as an inert gas in various processes throughout the facility and as an emergency purging gas in the UO_2 powder and pellet processing areas.

TABLE 1-1

LOCATION OF EMERGENCY ORGANIZATIONS

EMERGENCY ORGANIZATION	LOCATION	DISTANCE FROM HEMATITE SITE (MILES)	ESTIMATED RESPONSE TIME TO SITE (MIN.)
Medical Assistance			
Ambulance - Joachim/Plattin District	Festus	4 Miles	10 Minutes
Fire Fighting Assistance			
Hematite Fire Department	Hematite	2.5 Miles	20 Minutes
Festus Fire Department	Festus	7 Miles	20 Minutes
Police Assistance			
Sheriff's Office	Hillsboro	6 Miles	15 Minutes
Highway Patrol	Creve Coeur	Various	<15 Minutes
FBI	St. Louis	35 Miles	45 Minutes

TABLE 1-2

MATERIALS and CHEMICALS USED BY NFM

(The chemicals listed are used or stored in sufficient quantities to pose a potential safety hazard if spilled or mishandled)

CHEMICAL	LOCATION	TYPICAL QUANTITY STORED
Anhydrous Ammonia	Outside Bldg. 240 (South Side)	<10,000 Gallons
Nitric Acid	Bldg. 240 & South Vault	<10,000 Lbs.
Trichlorethene	Bldg. 255	< 3,000 Lbs.
Sodium Hydroxide	Bldgs. 240, 253	< 1,000 Lbs.
Hydrogen Peroxide	Bldg. 240 & South Vault	<10,000 Lbs.
Nitrogen	Outside Bldg. 240 West Wall	75,000 Lbs.
Potassium Hydroxide	Bldgs. 240, 256 & South Vault	< 1,000 Lbs.
Hydrochloric Acid	Bldg. 240 & 253	< 1,000 Lbs.

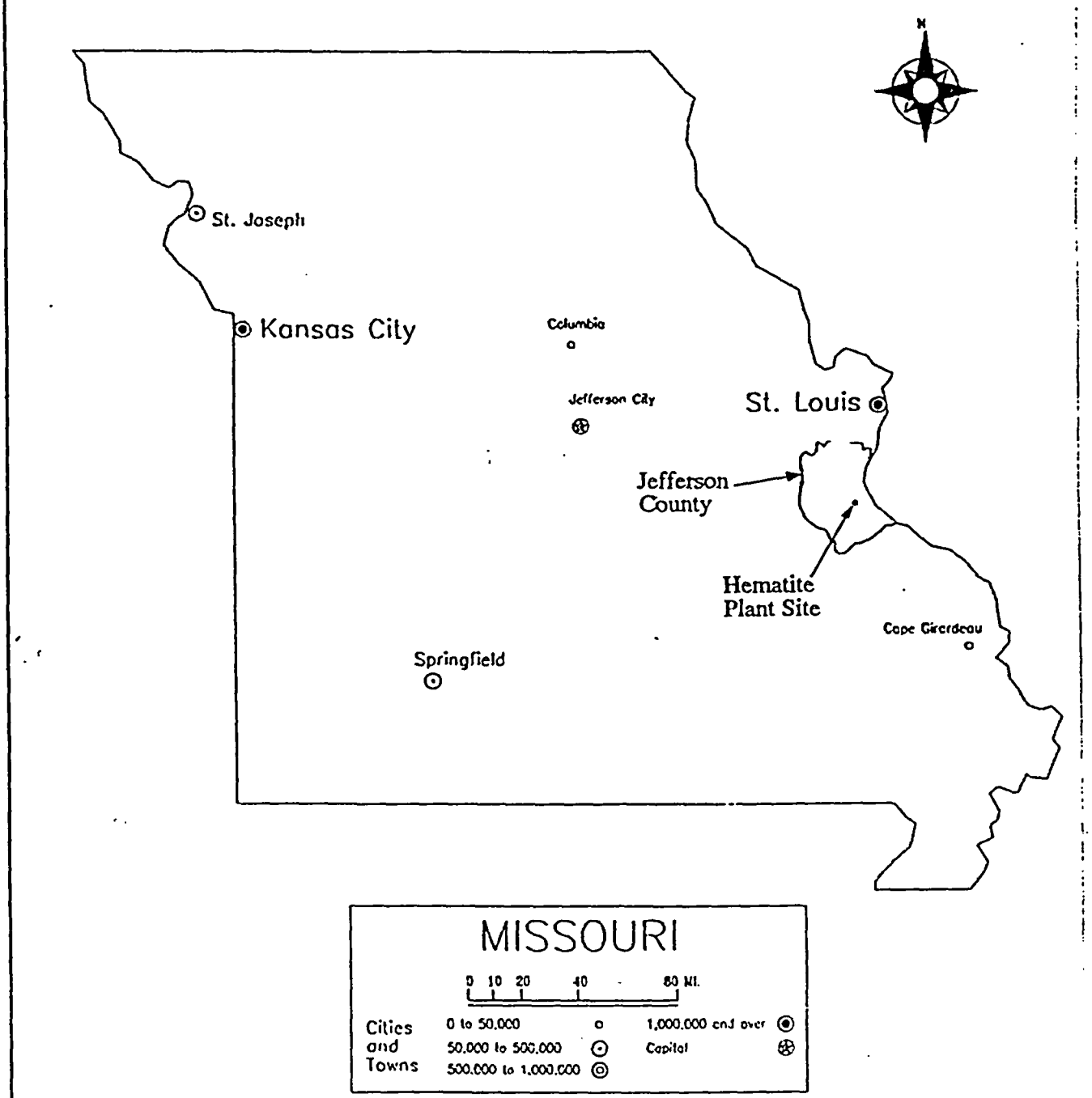


FIGURE 1-1. HEMATITE PLANT SITE LOCATION WITHIN THE STATE OF MISSOURI

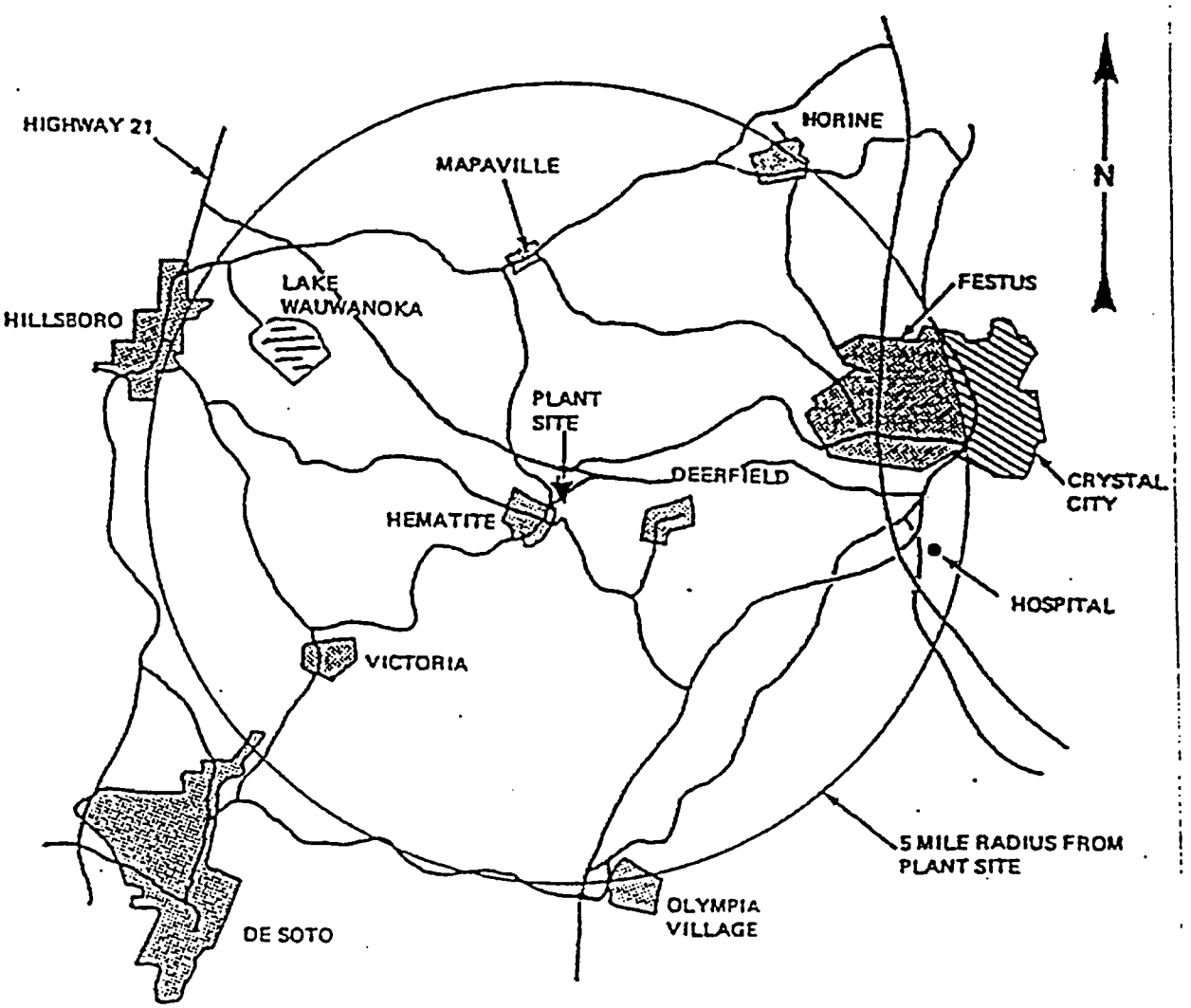


FIGURE 1-2. AREA WITHIN 5 MILE RADIUS OF PLANT SITE

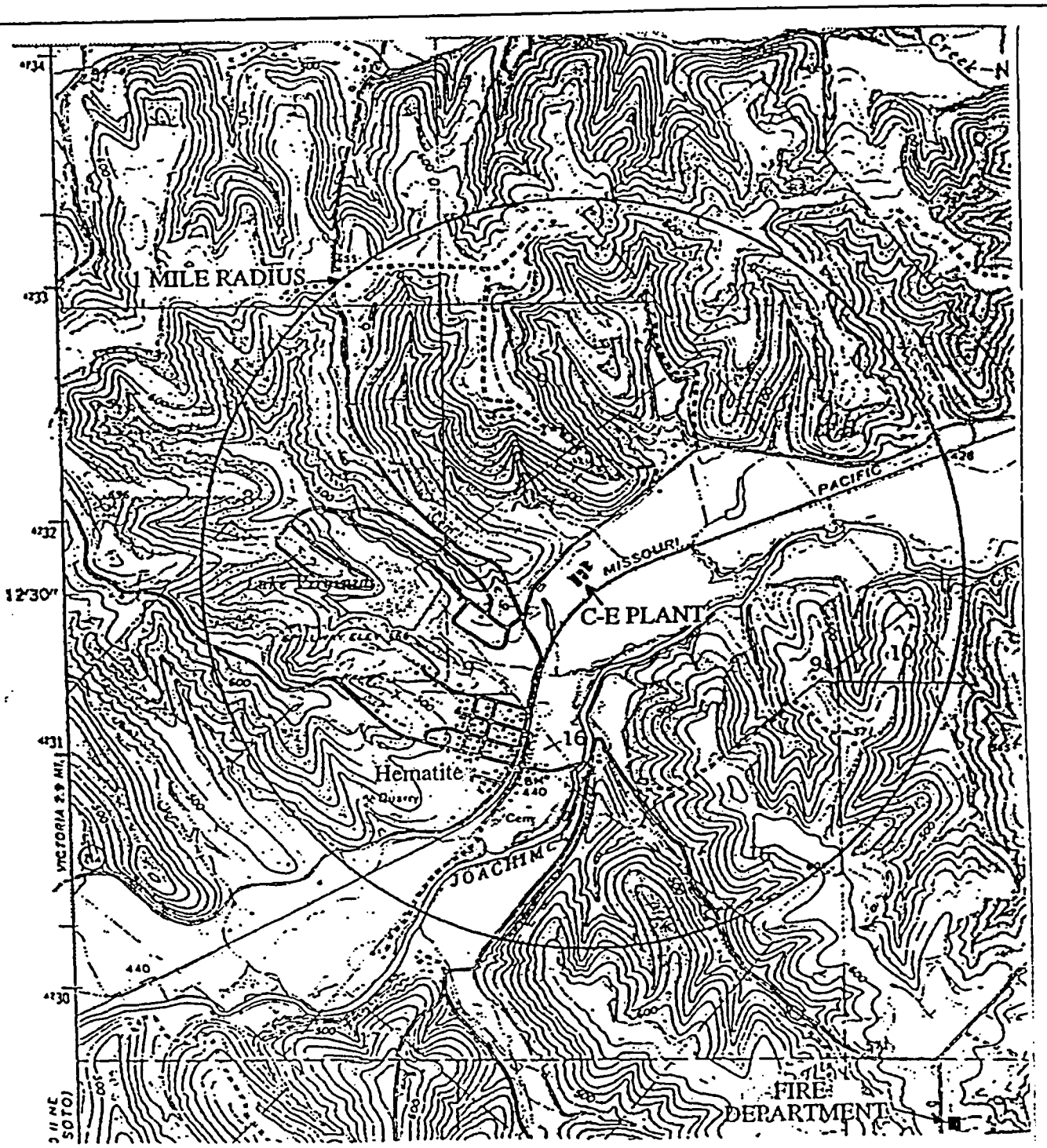


FIGURE 1-3. AREA WITHIN 1 MILE RADIUS OF C-E PLANT SITE

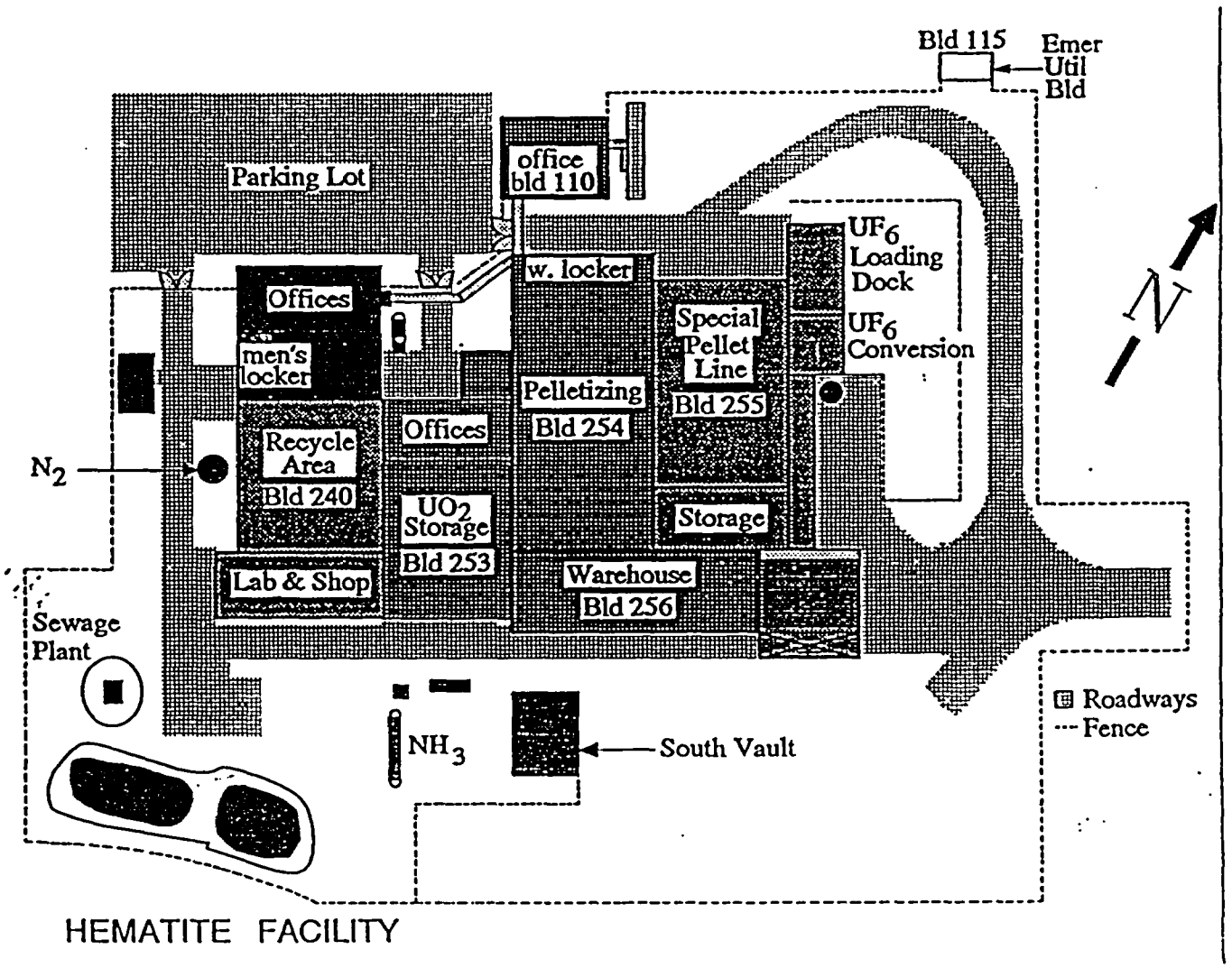


FIGURE 1-4. LOCATION AND IDENTIFICATION OF BUILDINGS AND FACILITIES ON COMBUSTION ENGINEERING'S HEMATITE PLANT SITE

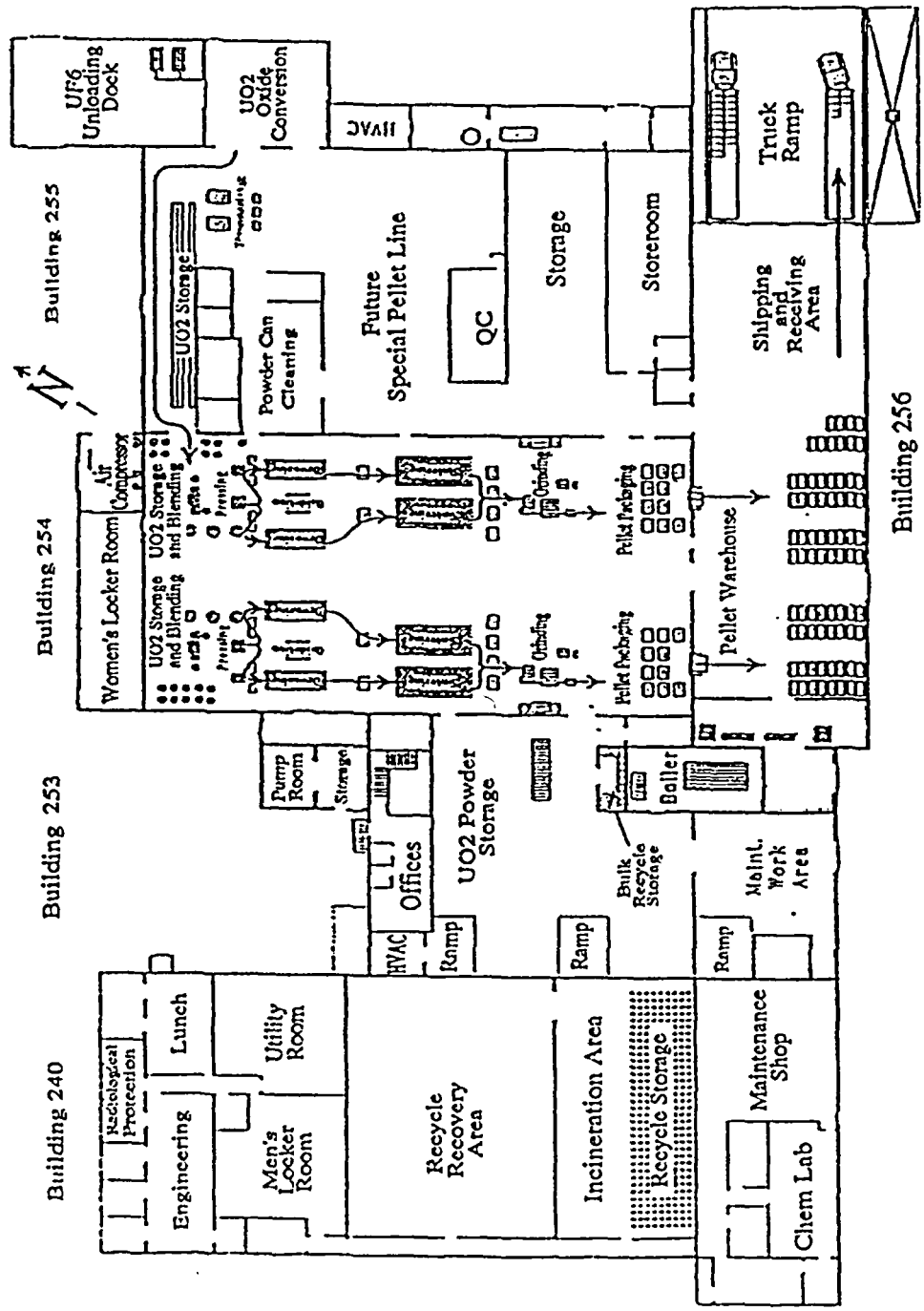


FIGURE 1-5. HEMATITE BUILDING AND EQUIPMENT LAYOUT

2.0 TYPES OF ACCIDENTS

Possession limits and authorized activities for nuclear fuel are listed in License SNM-33.

A number of postulated accidents are described for the licensed areas. These include spills of radioactive materials, weather-related incidents, bomb threats, fires, explosions, criticality, personnel injuries, loss of plant services and chemical spills. Accidents are classified into general categories based on their increasing potential to affect the site.

2.1 Description of Postulated Accidents

2.1.1 Detected Spills of Uranium-Bearing Materials

A detected spill of uranium-bearing materials is defined as one which occurs and is immediately reported. This type of accident may involve contaminated waste water, uranium powder or uranium pellets. The cause of this type of accident would likely be human error or mechanical malfunction.

The detected spill within the work area is normally handled quickly by site personnel. The primary considerations would be detection of the spill, containment, and cleanup. In all cases, the contaminated material would be removed by personnel using plant practices and the area returned to an acceptable condition. Spills of uranium bearing materials postulated to occur in handling operations would release relatively small amounts of uranium to the working area and would not result in a significant release of uranium to the environment. No significant release to the environment would occur because of the filtered ventilation systems, the physical properties of the material, and the dilution factors involved. This category of postulated accident is determined to have a very small potential for employee injury or impact to the environment. Another category of detectable spill

would be process line leak inside the manufacturing buildings. This type of spill would also be quickly detected by the operators and the necessary corrective actions taken to isolate the leaking section. Spilled material would then be cleaned up and retained for reprocessing. Some operational downtime might be required to make repairs or to replace damaged equipment or components. No release in detectable quantities outside the buildings would occur.

2.1.2 Undetected (Initially) Spill of Uranium-Bearing Material

Undetected spills of uranium-bearing materials could occur in any of the facilities licensed for authorized activities under SNM-33.

An SNM spill remaining undetected in the Hematite facility is unlikely since the facility normally operates on a multi-shift basis. A spill would not remain undetected with plant operators and technicians in the facility. Shutdown periods do occur for holidays and at other times and can result in periods when plant personnel are not present. During such periods a spill would be noted as an abnormal condition when security personnel inspect the facility. These security inspections are conducted periodically each shift.

2.1.3 UF_6 Release

2.1.3.1 Minor UF_6 Cylinder Leak

Uranium hexafluoride cylinders arrive by truck in their protective shipping containers. The shipping container is opened and the cylinder is transferred by a stationary crane to the weighing area on the Oxide Building dock. It is then moved to a vaporization chamber or into the outside storage area. All customary handling precautions are observed, and a drop of more than twelve feet is not possible. During

testing, a 30-foot drop was required to cause even a hairline crack in a cylinder. UF_6 is a solid at ambient temperature (melts at 132°F), and therefore would leak out of a crack very slowly. Also, UF_6 reacts with atmospheric moisture to form UO_2F_2, a non-volatile solid. Thus, a slow leak in a UF_6 cylinder is self-sealing.

A leak occurring within a steam-heated UF_6 vaporization chamber would be exhausted through the wet-scrubber prior to release to the atmosphere. No significant environmental effect would be caused by a minor UF_6 leak in the open or in a vaporization chamber.

2.1.3.2 Major UF_6 Cylinder Release

Uranium Hexafluoride (UF_6) is received at the Hematite site in standard 30-inch diameter cylinders, having a capacity of 5,000 pounds. In the case of a massive cylinder failure, the UF_6 would vaporize over a period of time, forming UO_2F_2 and HF upon contact with moisture in the atmosphere.

An incident resulting in a massive release of UF_6 is considered to be the bounding accident case for the release of uranium or fluoride. This accident would involve the release of UF_6 as might occur from valve or line failure of a heated cylinder being emptied. Assuming that a full cylinder of UF_6 (2500 Kg) at unloading temperatures started to leak and that no additional heat was supplied after cylinder failure, it is estimated that about 22 percent of the material

would be released before the UF_6 could be considered to be cool enough to solidify and have a vapor pressure low enough so that the release stops. Such a release was estimated to last for 15 minutes and result in a release of 23.8% of the UF_6. It was assumed the uranium released would react with water in the air and form UO_2F_2 of a respirable particle size.

The results of the dose assessment for the accidental massive UF_6 release are shown in Table 2-1.

It should also be noted there is another element of conservatism in that the postulated release would be visible as a white cloud. Hydrogen fluoride is very irritating to the lungs and mucous membranes. Thus, the natural reaction is to hold one's breath and run from the cloud. The actual maximum dose commitments are likely to be at least a factor of 100 lower than those calculated, as it is extremely unlikely that any individual would be exposed to the cloud for any length of time.

2.1.4 Outside Material Spills

The worst postulated situation would be a spill of a radioactive liquid which could enter the storm drains. Such an incident would be the release of the entire contents of the laundry water holding tank, with all this solution entering the storm drains. The solution would be diluted with uncontaminated water flowing in the same line to the site pond. Additional dilution by mixing with water in the site pond would occur prior to release to the site creek. The concentration at this point would be significantly below MPC. (This solution is normally released to the sanitary waste treatment plant after filtering and sampling.) In the case of a chemical spill that entered the storm drain, adequate dilution would also be achieved.

2.1.5 External Events Such as Severe Weather or Bomb Threats

Externally induced events such as weather related incidents, civil disturbances, earthquakes, forest fires, bomb threats and other related events are potential situations which could cause damage to the facility or personnel injury and must be considered as a postulated accident. The weather related events are overviewed below.

2.1.5.1 Flooding

Floods which might occur at the site will produce different flood levels depending on the flow rate of Joachim Creek. While the historical records (maximum observed level of 431 feet msl) as well as the analysis by U.S. Corps of Engineers (100 year flood level at 434.7 feet msl) show that while a site flood is not likely it is still considered remotely possible. If a flood of larger magnitude (greater than 435 feet msl) were to occur, water at the plant site would rise but there is not expected to be any

significant water velocity associated with the flooding. The reason for the minimal water velocity is that the railroad track, which is located between Joachim Creek and the plant, would serve to isolate the plant area from the main stream flow. Water would enter and exit this isolated area via a culvert 900 feet south of the plant boundary and a second one about 1200 feet northeast of the plant, both of which pass under the railroad tracks. This postulated flood would be expected to result in only minimal water velocities (less than 0.1 ft/sec). These velocities are not expected to be able to tip material storage canisters within the buildings or transport any spilled material. Experimental results for a water-sand system show that for particles of UO_2 size, water velocities of greater than 0.6 ft/sec are required to move the material. Given the increased density of UO_2 relative to sand (a factor of about 4), it does not seem likely that a credible flood would spill or transport spilled UO_2 particles.

2.1.5.2 Wind Damage

The average wind speed for the area, as recorded by the St. Louis U.S. Weather Bureau, is about 9.5 miles per hour. Elevated wind speeds often occur as storm fronts move through the area, particularly in the spring and summer. However, no wind damage has been experienced in the thirty year history of the plant.

The probability of a tornado striking the Hematite plant is extremely low.

The U.S. Department of Commerce reports a mean annual frequency of about eight tornadoes in the 34 year period of 1919 - 1950. The probability of a tornado striking a particular location is computed as 7.51 x 10^{-4} per year and the recurrence interval as 1,331 years (Union Electric Company, Callaway Plant PSAR).

A tornado could cause considerable dispersement of contaminated items and require a major cleanup effort. Extensive dispersement of nuclear material would not be expected offsite, since nearly all uranium on the site is contained in UF_6 cylinders, sealed metal cans, pellet trays, or vessels with sound structural characteristics. Therefore, very little uranium would become airborne.

2.1.5.3 Earthquakes

The east-central Missouri general area is relatively active seismically and also contains a portion of the New Madrid Fault that caused the "great earthquakes" of 1811 and 1812. There were three quakes of Epicentral Intensity XII Modified Mercalli scale (M.M.) which took place on December 6, 1811 and January 23 and February 7, 1812, near New Madrid. During recent years, there have been two quakes recorded in the New Madrid area. In 1962 a quake measuring V (M.M.) was recorded and one with a magnitude of 4.5 was recorded in 1963. A quake reported as "the strongest in years" occurred near Caruthersville, Missouri, 150 miles southeast of Hematite, on December 3, 1980.

Only a small amount of nuclear material would be released offsite as the result of an earthquake. Because of the form and containment discussed above, there would be very little becoming airborne. The maximum release would probably be less than the routine annual release. (Additional information concerning Missouri seismic activity may be found in the Union Electric Company Callaway Plant PSAR.)

Thus, the plant could sustain very severe damage from either a tornado or an earthquake without causing a radiological impact in excess of applicable limits to offsite individuals. The major concern would be cleanup activities, largely limited to the plant and its immediate environs onsite.

2.1.6 Minor Fire Involving Uranium-Bearing Materials

A minor fire involving uranium-bearing materials, such as contaminated waste, can be postulated to occur in the facility. A minor fire inside the Hematite facility involving uranium-bearing materials could release airborne uranium contamination inside the building. However, a significant release of uranium contamination to the environment is unlikely due to the HEPA filtration system in the building, the presence of smoke detectors in selected HEPA filter banks, the size of the fuel fabrication building, the availability of portable fire extinguishing equipment and the training of personnel in fire protection. Airborne uranium released within the building as a result of a fire would be cleaned up and the source of the problem corrected as discussed in Section 2.1.1.

A fire or explosion which could cause radioactive material to spread beyond the confines of the area in which it occurs would require a substantial driving force, such as large amounts of flammable solvents, flammable wastes, explosive liquids or gases, or other chemical which support fires and/or explosions. Materials of this nature are used in small quantities and are closely monitored and stored in a controlled manner. In addition, there is portable fire fighting equipment which would mitigate conditions leading to a large fire or an explosion.

2.1.7 Major Fire or Explosion

A major fire or explosion that would destroy the entire facility including the building ventilation exhaust filtration systems, could release significant amounts or uranium oxide in the form of powder or fragments into the atmosphere. However, this type of major postulated accident is considered very remote due to the extensive engineered safeguards in the facility to control fire and explosion. The primary explosion hazard within the plant is hydrogen, which is used as a reducing atmosphere in several processes. For example, a hydrogen explosion could occur in a furnace due to the presence of oxygen during furnace startup as a result of incomplete air purge. Prevention measures include flow monitoring, detailed procedures and personnel training, emergency cutoffs, and availability of fire fighting equipment.

Engineered safeguards are also incorporated to minimize the probability of explosion through the use of noncombustible and fire resistant materials, control of solvent and flammable liquid inventories, control of combustible materials, fire resistant filters, infrared furnace pilot light monitors, zonal heat rise heat detectors, and through the use of approved containers for

combustible waste. Procedures are followed for design review of plant and equipment changes for fire and explosion hazards, routine inspections and audits are conducted to check for fire hazards. These combined safeguards for both the prevention and control of fires and explosion makes the probability of a major explosion or fire remote.

For evaluation purposes, the following postulated situation was analyzed.

Sintering and Dewaxing Furnace

An explosion in the sintering furnace is considered remote. Furthermore, significant damage to the furnace is remote since the entrance and exit doors are designed to relieve pressure in the event of an explosion. A worst case explosion, however, has been postulated. For purposes of this analysis, it is assumed that all precautionary steps fail and an explosion occurs in the furnace. The Fuel Manufacturing building integrity is maintained in this evaluation. It is assumed that the furnace contains a maximum of 280 kilograms of uranium oxide in the form of pellets. It is assumed that all of this uranium oxide is blown into the Pellet Shop. With a ventilation filter design efficiency greater than 99.9 percent in the Pellet Shop, the calculated release from the building to the external environment is 280 grams of uranium oxide (573 microcuries, if enriched to the maximum 5.0 wt% U-235). This is an extremely conservative estimate of the UO_2 reaching the external atmosphere, since most of the UO_2 ejected from the furnace would be in the form of pellets or large pellet fragments. The dose to the nearest resident, which is about 290 meters from the Pellet Shop, was calculated assuming that the atmospheric stability condition was conservatively chosen to be Pasquill Type F and the wind speed was one meter per second. The doses were

calculated assuming a breathing rate of $2.66 \times 10^{-4} m^3$ per second. The doses were calculated using the ICRP-30 Table 2.1, "Dose to Body Burden Factors for Class Y material." The dose levels which would be received by the nearest resident outside are shown on Table 2-1.

2.1.8 Criticality

As discussed in License SNM-33, the total amount of uranium onsite is greater than the minimum mass needed to achieve criticality. Therefore, a criticality event, even though remote, has been evaluated as a postulated accident.

In the history of the fuel fabrication industry, there has never been a criticality accident associated with fuel preparation or fabrication. The few criticality accidents that have occurred involved wet chemical processing in highly enriched scrap recovery operations. It should be noted that much larger quantities of the low enriched uranium handled at the Hematite plant would be required for a criticality accident than have been involved in these accidents with highly enriched uranium.

Criticality incidents that have occurred have had no significant environmental impact. Radiation injuries were limited to the individuals directly involved and fission products were mostly confined to the processing building in which the event happened. Based on this accident experience, it can be stated that significant environmental impact from a criticality accident is highly improbable.

Criticality alarm systems provide the necessary warning of a criticality condition. Criticality alarm monitoring systems are installed in several locations throughout the facility in accordance with applicable regulatory requirements.

Postulated Criticality Accident: Moderated Uranium Oxide--Unencapsulated Criticality Event

Unencapsulated enriched uranium, such as powder or pellets or fuel sludge, could potentially be accumulated in sufficient quantities for a criticality accident following the addition of moderator. Accidents of this nature have occurred at facilities handling uranium solutions but never at a facility similar to the Hematite facility. From 10^{15} to 10^{17} fissions could occur from a single burst criticality with fission products subsequently released. Following are the resulting doses to the environment for an unencapsulated criticality event.

Cloud Dose

The whole body doses were calculated assuming a criticality accident that produced 10^{18} fissions. This is equivalent to the release of about 32 megawatt-seconds, which is a much larger excursion than could be expected in any system at the Hematite facility. To attain an excursion of this magnitude, a very rapid increase in reactivity would be required. The fission product isotopic release and the average energy used in this analysis were taken from Regulatory Guide 3.34, dated July 1979. The distance to the nearest resident is 290 meters. The atmospheric conditions assumed for the dose calculations were very conservatively chosen to be Pasquill Type F with a wind speed of one meter per second.

The gamma and beta dose was calculated assuming a semi-infinite cloud surrounding the individual with a radioisotopic concentration equivalent to the center of the plume. Since the Pasquill Type F atmospheric stability condition produces a very small plume, the gamma dose is over-estimated as a result of the semi-infinite cloud assumption. The gamma cloud doses for finite clouds were corrected using NUREG-0857.

In the calculation of the cloud gamma and beta dose, credit was taken for the delay time between the time of criticality and the arrival of the cloud to the nearest resident. The delay time is 10.8 minutes. This delay is composed of two components. One is the delay in the Hematite facility and the other is the transit time from the building to the nearest site boundary. The delay time for the facility buildings is about six minutes. This is the delay for the building complex which has a volume of 871,700 cubic feet and a ventilation rate of 145,000 cubic feet per minute. The delay after release is 4.8 minutes based on the transit time of the cloud moving at one meter per second for 290 meters. A factor of 3 was taken for the wake effect of the building. This is based on the external areas of the building at 500 square meters.

Prompt Gamma and Neutron Dose

The prompt gamma and neutron dose was calculated for the nearest residence using the method shown in Regulatory Guide 3.34 dated July 1979. 10^{18} Fissions were assumed for the criticality accident. Attenuation by the buildings has not been included in the analysis. The resulting whole body dose due to the prompt neutron and gamma and the cloud dose is shown in Table 2-1. Also shown in Table 2-1 is the skin dose from the cloud.

Thyroid Dose

Doses to the thyroid from the inhalation of radioactive iodine were calculated for the nearest resident to the Hematite facility. The result is shown in Table 2-1. The source used assumes 50% release from the fuel, 50% plate-out in the building, and 75% removal by the filters. The same atmospheric conditions were used to calculate the concentration of iodine as used in the whole body dose calculations. It was assumed that a breathing rate of 2.66×10^{-4} cubic meters per second is characteristic of the active portion of the normal work day. The thyroid dose per iodine curie

inhaled was taken from Table II in TID-14844. The thyroid dose to the nearest resident is shown in Table 2-1. The dose would be less for a person inside the house.

Conclusions

The doses shown in Table 2-1 were calculated using extremely conservative assumptions. Even using these conservative assumptions, the resulting doses at the nearest residency are well below the limits.

2.1.9 Personnel Emergencies

This class involves accidents and occurrences on-site in which emergency treatment of one or more individuals is required. It includes those situations that have no potential for escalation to more severe emergency conditions. There may be no effect on the facility, and immediate operator action to alter facility status is not necessarily required. A Personnel Emergency does not activate the entire emergency organization, but may activate teams such as the first aid team. It may also require specialized local services such as ambulance and medical. Emergencies in this class can reasonably be expected to occur during the life of the plant.

Recognition of this class of emergency is primarily a judgement matter for facility supervisory or management personnel.

Examples of personnel emergencies are:

Injuries requiring first aid treatment by trained plant personnel only.

Injuries requiring transportation to offsite medical facilities for treatment.

Actual or possible internal exposure to radioactive materials requiring health physics evaluation and follow-up.

External contamination requiring decontamination and assessment by Nuclear and Industrial Safety (Health Physics).

2.1.10 Loss of Plant Services

Incidents involving the loss of one or more plant services at the Hematite facility may result in a disruption of normal plant operation and may require termination of normal production activities. Backup systems are available to provide certain services. In addition, temporary services are also available and can be installed, if needed, to replace certain equipment in a safe standby condition. The following describes two events: loss of facility power and loss of facility water supply.

Facility Power Outage - C-E receives electric power from the Union Electric Company (UE), and backup power is provided for critical services automatically by means of an onsite emergency generator. Complete power outages are infrequent and voltage fluctuations which would affect motors and circuit breakers rarely occur.

Services on the emergency generator system include the nuclear criticality sensors and alarms, telephones, one air compressor, Oxide Building emergency lights, emergency alarm system, site computer network, well pump, and control panel and instrument power. Ventilation air systems are also on emergency power and would continue operating during a power outage.

In the unlikely event that UE power suffered an outage and the emergency generators failed to pick up their loads, all ventilation systems and instrumentation would stop operating. Ventilation systems are being retrofit with backflow prevention dampers to prevent airborne material escaping from process containment and hoods. Process valves used in the oxide conversion system are air-operated and spring-loaded to fail in the safe position. All processes would shut down with no loss of material containment. Thus, there would be no impact due to power outage.

Loss of Water Supply - Water is supplied to the Hematite facility by an onsite well. Water from this well is pumped to a 200,000 gallon water tower. Additionally, a fire booster pump is available to elevate the water pressure from the water tower in the event of a fire. Loss of power would not result in loss in availability of the site water supply.

2.1.11 Chemical Spills

Potential accidents involving chemical spills include a pipeline leak, a spill within the fenced manufacturing area, and partial or complete emptying of a storage tank.

A leak or spill outside the manufacturing buildings would again be quickly located by operators and corrective action taken. A small quantity of material could enter the storm drains and be carried to the site pond through the storm sewers. Dilution by industrial waste water and pond water before discharge into Joachim Creek would make the environmental effects of such an occurrence negligible. Accidents concerning bulk storage tanks are discussed below.

Anhydrous Ammonia - Anhydrous ammonia is stored in a 10,000 gallon tank equipped with dual pressure relief valves. The exposure of this tank to an intense fire would result in bleeding of overpressure through the relief valves. The release would cease as the fire was extinguished.

A leak or rupture of the ammonia tank could also result in a chemical release., In this event, fire hoses would be utilized to neutralize the ammonia.

As a result of these postulated events, ammonia vapors could reach high concentrations in the vicinity of the tank, but would be rapidly dispersed. It is expected that concentrations at the nearest site boundary would be less than 500 ppm and have no permanent effect on personnel or the environs.

Liquid Nitrogen - Liquid nitrogen in stored in a 1,000 gallon tank equipped with pressure relief valves. Liquid nitrogen is nontoxic and non-flammable and rapidly evaporates and dissipates upon exposure to the atmosphere.

Liquid Propane - Liquid propane is stored in a standard residential-type 300 gallon tank outside of the tile barn. It is used to provide heat to the Emergency Operations Center when required. The chance of a significant leak occurring is extremely low. Liquid propane is readily volatilized to a gas upon exposure to the atmosphere. Propane is highly flammable and would present a fire hazard should a large leak occur. The fire, however, would be restricted to the immediate vicinity of the tank and no significant environmental effect would be caused.

Acids - Nitric and Hydrochloric acids are stored in standard, approved shipping containers.

2.1.12 Spills of Radioactive Materials During Shipment

Transportation of radioactive materials takes place both to and from the Hematite plant site. The uranium shipped to the Hematite site is principally UF_6 in Model 30B shipping containers. Shipments from the Hematite site are principally UO_2 pellets. Fuel shipments from the Hematite site are made using exclusive use trucks. All such radioactive material shipments are regulated by the U.S. Department of Transportation and the Nuclear Regulatory Commission, and are in full accordance with state and federal regulations governing the safe shipment of hazardous materials.

Shipments to the Hematite Site - The majority of radioactive material shipped to the Hematite site will consist of uranium hexafluoride (UF_6). Some discrepant uranium oxide (UO_2) pellets are also received for recycle.

The low enriched UF_6 is received in Model 30B cylinders 30 inches in diameter. These cylinders are contained in Model OR-30 protective shipping packages. Approximately 45 shipments are received annually.

Discrepant UO_2 pellets are normally received in Type "A" (UNC-2901) steel shipping containers that meet all DOT specifications and NRC regulations.

Shipments, on receipt, are completely surveyed for damage and radioactive contamination. The truck is surveyed before it is allowed to leave the plant site.

Shipments From the Hematite Site - Radioactive material shipped from the Hematite plant site largely consists of finished UO_2 fuel pellets, and is shipped in specially designed and tested shipping containers. All shipments are made in Model UNC-2901 shipping

containers, but other approved models may be used. These containers are shipped in exclusive use trucks.

In addition to product shipment, small quantities of radioactive materials are also shipped in the form of contaminated solid wastes. Several truckloads of waste materials are removed from the Hematite site and shipped to a processing facility or a licensed burial site each year. These shipments are made using steel drums or metal boxes on exclusive use trucks.

All containers and the transport vehicles are surveyed for proper loading, absence of defects that could affect container integrity, and for radioactive contamination before off-plant shipment.

Environmental Impact of Shipments - All shipment of radioactive material to and from the C-E Hematite plant site are made in accordance with the stringent regulations of the DOT and NRC. These regulations specify container integrity under severe conditions. The containers are designed, manufactured and maintained to provide containment of their contents and remain subcritical when subjected to accident conditions.

In addition to the stringent performance standards for shipping containers, C-E imposes administrative control over the exclusive use truck transport vehicles. The number, type, and contents of the containers loaded on each truck will be controlled to ensure that all vehicles will remain nuclear-safe under normal transport and severe accident conditions.

No transportation accident resulting in a criticality has ever occurred. In addition, container performance standards and vehicle loading controls are provided to ensure that a vehicle will remain nuclear-safe even during hypothetical accident

conditions. For this reason it is extremely unlikely that a nuclear criticality could result from shipments to or from the Hematite site. Should a shipping package be breached, the impact on the environment would be low as the nuclear materials are in solid, insoluble form and not readily dispersible. Due to the low specific activity and low radiation levels of the uranium involved, the radiological impact on the environment from a transportation accident would not be significant.

2.2 Detection of Emergency Conditions

The detection of emergency conditions resulting from an accident is accomplished through automatic or manual methods as discussed below:

2.2.1 Major emergencies, originating from onsite causes such as a significant fire or criticality, would most likely be alarmed. Criticality monitors are strategically placed throughout the facility. For fire detection, smoke detectors or heat sensors are located in the maintenance and laboratory areas. Smoke detectors are also located in selected ventilation ducts. Sprinklers are automatically activated in the warehouse, storeroom, and laundry facility. Less significant emergencies such as local airborne releases, solid or liquid radioactive spills, chemical spills, small fires or other minor emergencies would be identified by normal monitoring programs and/or the operating staff. Emergencies originating offsite would be identified by the staff either by observation or notification by Federal, State or Local authorities.

The site workforce would be notified of emergency conditions as necessary by use of the site telephone systems, site alarms, or their supervisor. Selected members of the site emergency response organization are notified by pagers. Personnel in the immediate vicinity of the emergency would initially be advised of the

situation by seeing or hearing the event or by their Supervisor, Radiation Protection personnel, or Security Control personnel. The Emergency Director would take the responsibility for direction and management of the emergency response team when mobilized. In areas unaffected by the emergency, the onsite staff would be informed as required by their supervisor or security organizations as directed by the Emergency Director.

2.2.2 The detection of criticality and/or accidental release of radioactive materials is accomplished by use of monitoring procedures and alarming devices. Release of radioactive or other hazardous materials is often the result of, or associated with, a fire or explosion. Thus, when either of these occur in the vicinity of an area containing radioactive or hazardous materials, radiological and/or environmental monitoring is initiated as required in the Emergency Plan Implementing Procedures (EPIP's).

2.2.2.1 Primary reliance for determining the occurrence of a criticality event is placed on the criticality alarm systems. A criticality alarm is initiated when a radiation field of greater than ten mr/hr is measured by the system detectors. The systems meet the requirements of 10 CFR 70.24(a)(1), Regulatory Guide 8.12, "Criticality Accident Alarm System," Revision 2, October 1988. Criticality monitors are located throughout the facility buildings. Each of the systems activates an audible alarm which serves as an evacuation alarm. When the alarm is sounded, evacuation of personnel takes place and applicable EPIP's are implemented. In the event of a general power failure within the facility, the criticality monitors are automatically switched to the emergency power system which supplies emergency lights and

alarms. This electrical system arrangement keeps the criticality monitoring system operative. The criticality monitoring system is periodically tested as described in the license (SNM-33).

2.2.2.2 Fires are detected in areas containing SNM primarily by staff observation and the security force. Heat rise sensors and smoke detectors are installed in selected locations throughout the facility and will automatically initiate the emergency alarm. During plant working hours fires would be discovered by the normal plant staff. There are inspections in the Hematite facility on back shifts by security personnel.

2.2.2.3 Detection of explosions in the Hematite facility would primarily be by observation of the staff or security force. An explosion is most likely to be initiated by actions associated with the manufacturing or chemical analysis effort: therefore, it would most likely occur when the plant staff is present. If this were the case, the explosion would be reported to supervision and applicable Emergency Plan Implementing Procedures (EPIP's) would be implemented.

Explosions that might occur during non-working hours would be reported by security personnel. This would result in notifications to management and implementation of applicable EPIP's.

2.2.2.4 Surface and airborne uranium contamination are monitored in the Hematite facility by the Radiation Protection staff, and, in the case of airborne

involved in the emergency. Such safety related equipment includes the following:

- criticality detection system
- high efficiency filter ventilation system
- heat/smoke detectors
- respiratory protection equipment
- fire fighting equipment
- building integrity

The operation of the emergency alarm systems is restored as soon as possible.

9.2.4 Implementation of the restoration tasks will be conducted in accordance with the following basic criteria:

- Approval of all repair/replacement procedures utilized for restoration of safety related equipment and the repair of the plant production equipment.
- Resumption of 10CFR Part 20 requirements for Protection against Radiation exposure.
- Development of repair programs which meet ALARA objectives.
- Compliance with Nuclear Fuel Facility License (SNM-33) requirements.

9.3 Resumption of Operations

Corrective actions for each type of incident included in this plan are discussed in Sections 4.0, 5.0, 6.0, and the EPIP's. Normal operations will resume after the conditions specified in the above noted sections have been complied with. Deficiencies identified in the investigation of the incident shall be resolved prior to resumption of operations.

10.0 EMERGENCY PLANNING AND COMMUNITY RIGHT-TO-KNOW ACT

Conformance with the Community Right-To-Know Act is addressed in this section. This Emergency Plan and EPIP's deal with emergencies originating at the Hematite Facility. Listing and reporting of hazardous chemicals (Sections 311, 312 and 313 of the Community Right-To-Know Act), are included in this plan. The Emergency Plan and EPIP's for the licensed facility include the specific steps required to assure integration with Federal, State, and local emergency plans.

10.1 Emergency Planning (Sections 301 through 303 of the Community Right-To-Know Act

10.1.1 Preparation

Sections 4.2 (Local Offsite Assistance to Facility) and 4.4 (Coordination with Participating Government Agencies) of this Emergency Plan address interaction with State and local agencies. Section 4.4 specifically addresses the Emergency Planning and Community Right-To-Know Act. These sections deal with setting up interaction with state and local agencies that are expected to provide support. The medical aspects of these plans are addressed in Section 5.6

The Site Emergency Plan and the local emergency planning committee's plans have been coordinated to assure that:

(1) adequate onsite and offsite emergency response support is available,

(2) a site coordinator has been designated,

(3) emergency notification procedures have been established,

(4) methods for determining the occurrence of a release and its probable affected area have been established, and

(5) inventory and description of emergency equipment and facilities, and people responsible for the use and allocation have been identified.

10.1.2 Maintenance of Capability

Section 7.0 (Maintenance of Emergency Preparedness Capability) addresses implementation and maintenance of the emergency plans and EPIP's. It also outlines training of emergency responders and performance of drills and exercises to ensure workability of the plan.

10.1.3 Review and Updating

Section 7.5 (Review and Updating of the Plan and Procedures) addresses annual reviews and updates of this Emergency Plan. Those parts of the plan which address interaction with State and local plans and procedures are reviewed and revised as required.

10.1.4 Equipment

Section 7.6 (maintenance and Inventory of Emergency Equipment, Instrumentation and Supplies) describes the plans for assessing that adequate equipment and instruments are available and operable to address any postulated emergency.

10.1.5 Evacuation

Sections 3.2.3 (Site Area Emergency), 3.3 (Information to be Communicated), 5.3 (Corrective Action), 5.4 (Onsite Protective Action), and 6.1 (Control Point)

deal with notification and interaction with State and local officials and the necessary actions to be taken.

10.2 Emergency Notification (Section 304 of Community Right-To-Know Act)

Section 3.3 (Information to be Communicated) and Section 4.4 (Coordination with Participating government Agencies) in this plan discuss circumstances under which notification of offsite agencies are made, the agencies to be contacted, updating of the notification, and information to be communicated.

Emergency notifications in conformance with Community Right-To-Know requirements are specified in the EPIP's.

Enclosure II to
ML-92-024

COMMENTS FROM OFFSITE RESPONSE AGENCIES ON THE COMBUSTION ENGINEERING HEMATITE NUCLEAR FUEL MANUFACTURING FACILITY EMERGENCY PLAN

County of JEFFERSON State of Missouri

EMERGENCY MANAGEMENT AGENCY
JEFFERSON COUNTY COURTHOUSE
HILLSBORO, MO. 63050
(314) 789-5381 / 789-3391

ELIZABETH FAULKENBERRY
Presiding Commissioner

CHARLES BECKER
Director

FRED BAUMAN
Coordinator

MARCH 12, 1992

MR. HOWELL ESKRIDGE
AAB COMBUSTION ENGINEERING
P.O. BOX 107 - HWY. P
HEMATITE, MO. 63047

Dear Mr. Eskridge;

As per our conversation of Thursday, March 12, 1992, in regard to your Hematite Facility Emergency Plan, I'd like to make the following recommendations.

1. On the Classification System, Page 3-2, i.e., Unusual Events, Alert and Site Area Emergency. I recommend that the Fire District become more familiar with the terms, and the meaning of the terms, so as to prevent undue alarm when they are informed. With the NRC, an unusual event is a very minor thing, while with the Fire Departments, an unusual event is most likely a serious event.

2. The last sentence of the first paragraph, Page 4-2, I recommend that a couple of words be inserted. "----------in their support response actions of Radioactive Materials at the Licensed Facility.----------"

3. On Page 4-13, if you could clarify the Fire Marshall and Fire Brigade as the Plant Fire Marshall and Plant Fire Brigade, it would eliminate local confusion. The term Fire Marshall is accepted as meaning the "State Fire Marshall" to Fire Personnel and dispatchers.

4. Perhaps for expediency, you could identify the title or name of the individual who would be assigned to the Command Post, with whom the Incident Commander could and would consult with, during an Incident if they are called to the scene. This would facilitate the proper response.

Again Howell, these are suggestions from where I see it. If they are contrary to the NRC rules and regulations, I will stand corrected.

It was good to talk to you again, and if there is anything this office, or the L.E.P.C. can do, please do not hesitate to call.

Sincerely;

FRED

CC: Chief Bob Hipes Jr. - Hematite Fire Department

William Johnson - S.E.M.A. RADEF Office

JOACHIM-PLATTIN TOWNSHIPS AMBULANCE DISTRICT

Office: 937-2224
Emergency: 937-3666

David McFarland
Administrator

619 Collins Dr.
Post Office Box 124
FESTUS, MISSOURI 63028

Mr. H.E. Eskridge
Manager, Nuclear Licensing,
Safety, and Accountability
ABB Combustion Engineering Inc.
1000 Prospect Hill Rd.
Post Office Box 500
Windsor, Conn. 06095-0500

2-28-92

Dear Mr. Eskridge:

We have reviewed the Emergency Plan for the Hematite Plant and find it to be very comprehensive and practical. This plan also closely parallels our own emergency plan which has been in effect for many years and, according to Missouri ambulance licensure regulations, must be adhered to.

Please accept this letter as a pledge of our full cooperation in the event that you may need our assistance at the Hematite facility.

Respectfully yours,

David McFarland

Administrator

Kenneth W. Boyer

Disaster Coordinator

NORMAN P. KNOWLTON, JR., M.D.
QUEENY TOWER BUILDING, SUITE 3102
4989 BARNES HOSPITAL PLAZA
ST. LOUIS, MISSOURI 63110

PHONE 361-7000

April 2, 1992

Combustion Engineering, Inc.
P.O. Box 107
Highway P
Hematite, Missouri 63047

Attn: H. E. Eskridge

Dear Mr. Eskridge:

I have reviewed the Hematite Facility Emergency Plan and found it very satisfactory.

Sincerely,

Norman P. Knowlton, Jr., M.D.

NPK/gms

BILL M. SEEK, Chief Executive Officer

Telephone: 314-933-1000

Jefferson Memorial Hospital

P.O. Box 350
Crystal City, Missouri 63019-0350

February 20, 1992

Mr. H.E. Eskridge
Manager, Nuclear Licensing, Safety and Accountability
ABB Combustion Engineering Nuclear Power
Hematite MO 63047

Subject: Review of Hematite Facility Emergency Plan

Thank you for your submittal of the Hematite Nuclear Fuel Facility Emergency Plan under your cover letter dated January 31, 1992.

We have completed our review of the plan, and confirming our conversation of February 18, 1992, subparagraphs 5.6.2, 5.6.3, 6.3.1, and 6.3.2 on pages 5-9, 5-10, 6-1, and 6-2 respectively are consistent with our facility's procedures.

Very Truly Yours,

Tom Rawson

Tom Rawson
Safety Director

aw/TR

contamination, by portable lapel air samplers and fixed air sampling systems. Handling of spills was previously described in Section 2.1.1 (Detected Spills of Uranium-Bearing Material), and Section 2.1.2 (Undetected Spills of Uranium-Bearing Material).

2.2.2.5 Release of airborne radioactive material to the environment could occur as the result of an accident during operations or in conjunction with other emergencies such as fire, explosion or criticality. Ventilation requirements in the Hematite facility are discussed in the license (SNM-33). The exhaust is monitored whenever operations are in process. Stacks in production areas used for exhausting radioactive effluents are equipped with sampling systems.

2.2.2.6 In the Hematite facility, chemical reagents such as acids (HNO_3, HCL, etc.), bases, and chemical cleaning materials are frequently used. Spills of these materials could disrupt the operation in the immediate areas and cause local evacuation and/or personal injury, but do not pose a threat to other personnel outside of the immediate area. Small spills will be dealt with by supervisors, trained staff, and the personnel normally working with these materials. For larger spills, the immediate area would be evacuated and applicable EPIP's implemented.

2.2.2.7 Adjacent to Building 240 is a 10,000 gallon tank containing anhydrous ammonia which is used in the manufacturing process. Anhydrous ammonia fumes are toxic in sufficient quantities. Anhydrous ammonia is volatile and lighter than air: therefore, any spills would be expected to dissipate

quickly. It also has a distinctive odor which is easily identifiable below about 50 ppm. If a spill or small leak were to occur, it would be quickly identified by the staff in the immediate area. Applicable EPIP's would be implemented.

Spills that could occur during non-working hours when the operating staff are not present would be detected by security personnel during their inspection tours.

TABLE 2-1

ACCIDENT DOSES - NEAREST RESIDENT (REM)

ACCIDENT	WHOLE BODY	SKIN	THYROID	LUNG	BONE	EFFECTIVE
Criticality	2.9×10^{-1}	1.3×10^{-3}	2.2×10^{-1}	--	--	3.0×10^{-1}
UO_2 Release	--	---	--	1.58×10^{-1}	6.0×10^{-4}	1.9×10^{-2}
UF_6 Release	--	---	--	2.5×10^{-1}	8.5	5.8×10^{-1}

3.0 CLASSIFICATION AND NOTIFICATION OF ACCIDENTS

The Hematite NFM facility is limited by license (SNM-33) to the manufacture of fuel pellets containing uranium enriched to a maximum of 5% U-235, by weight. These pellets are subsequently used in the manufacture of fuel assemblies for light water reactors. Thus, the only source of radioactivity encountered in the NFM facilities is uranium. Uranium is a relatively benign material that could only develop into a significant hazard if ingested, inhaled or if accidentally made critical; the net result of the latter being the release of radioactive fission products and direct radiation. Care must be exercised to assure it does not become airborne and/or ingested in quantities which could result in exceeding specific limits. Uranium powder particles do not become airborne without relatively strong air circulation due to the high density of the particles. An accidental criticality of low enrichment uranium in powder or pellet form requires the presence of the right mixture of a hydrogenous moderator and uranium as well as a postulated mode of dispersing the uranium in the hydrogenous medium to achieve the critical H/U ratio. This combination of factors is not expected to occur because of the engineered safety features in the NFM facility and the physical state of the materials in the manufacturing process.

Section 2.1 of this plan evaluates the consequence of the types of credible accidents. In the cases examined, the probability of a major accident is extremely low and the consequences relatively minor. This low probability is derived from the fact that: (1) process equipment is designed to incorporate permanently installed engineered safeguards; (2) administrative control of production processes is maintained; (3) the double contingency principle is adhered to in the design of the equipment and processes; and (4) safety factors are included in facility limits. A classification system has been employed which covers the entire spectrum of possible emergency situations regardless of the probability of their occurrence.

This section of the plan describes how the spectrum of postulated accidents is encompassed within the emergency characterization classes. Each class defined is associated with a particular set of immediate actions which must be taken to handle the situation. It should be noted that various classes of accidents require a graded scale of responses which form the basis for the accident classification scheme. For example, a small problem such as a localized fire may increase in severity and therefore move up from one classification of accident to another.

3.1 Classification System

NRC regulations classify possible accidents in a fuel fabrication facility as: UNUSUAL EVENT, ALERT, or SITE AREA EMERGENCY. The classification of GENERAL EMERGENCY is not part of this plan as there is no accident scenario postulated which meets GENERAL EMERGENCY conditions.

3.1.1 UNUSUAL EVENT

This event classification involves any accident or emergency condition in which the release of radioactive or hazardous material is not imminent or expected. However, non-routine actions or activities could be required by site personnel to handle and resolve the abnormal condition. It includes those conditions that are relatively minor in nature and not expected to escalate into a more serious event. Generally, there will not be any long-lasting effect on the facility or personnel. This type of event would not be expected to activate the entire emergency organization, but may activate special teams such as first aid, maintenance or repair. It may also require additional local services such as ambulance and medical. Emergencies in this class could happen on a rather frequent basis but pose little or no threat to other Hematite site personnel or offsite individuals.

In Section 2.0 of this plan, a number of incidents were described which fall into the UNUSUAL EVENT category (reprinted below). These events are ones which are identified by the plant staff and resolved locally.

3.1.1.1 Detected Spills of Uranium-Bearing Materials - These are identified by the plant staff or during contamination surveys and cleaned up by plant staff and Radiation Protection personnel. No assistance is required from offsite personnel.

3.1.1.2 Undetected (Initially) Spills or Uranium-Bearing Materials - This is similar to 3.1.1.1 but differs only in the time delay in discovering that a spill has occurred.

3.1.1.3 Minor Fire Involving Uranium-Bearing Materials - For this event, it is assumed the fire is found by the plant staff, Radiation Protection or Security and is extinguished without activation of the emergency alarm. The primary consequence involves dealing with potential airborne and surface contamination. These would be handled using normal Radiation Protection procedures.

3.1.1.4 Minor Chemical Spills - Hazardous Materials - This event would be a localized problem which would be handled by normal plant spill procedures and would not result in activation of either the emergency or nuclear alarms. Offsite personnel support would not be required, but notification may be made.

3.1.1.5 Personnel Emergency

Personnel emergencies involve accidents and occurrences on-site in which emergency treatment of one or more individuals is required. These emergencies involve situations that have no potential to escalate to more severe emergency conditions. A personnel emergency is generally a judgement matter for facility supervisory or management personnel.

3.1.1.6 Loss of Plant Services -

For this event it is assumed that one or more required plant services is lost due to an unscheduled problem. These services include electric, water, natural gas, hydrogen and nitrogen. Loss of the aforementioned could result in the shutdown of the production activities and temporary loss of automatic alarm systems. If it is determined that the situation impacts facility safety, appropriate actions per the EPIP's are initiated.

3.1.1.7 External UNUSUAL EVENT

This classification involves specific conditions which are influenced from sources external to the plant which could create a potential hazard to the facility and/or the employees. The situation may not have caused any damage to the facility or harm to personnel, but does require a change in the facility operating status. This may be a situation in which there is available time to take precautionary and constructive steps to prevent an accident or emergency and to mitigate any resulting consequences should it occur. An external UNUSUAL EVENT situation may be the

result of either man-made or natural phenomena, and can reasonably be expected to occur, but on an infrequent basis.

UNUSUAL EVENT conditions imply an orderly transition to a state of readiness by the facility personnel and possibly by off-site emergency support organizations. The possible cessation of certain non-essential routine functions and implementing of certain precautionary actions for a specific situation may be required. Examples of external UNUSUAL EVENTS that may pose a safety issue are:

- Bomb Threats
- Civil Disturbances
- Tornado Warning or Sighting
- Earthquakes
- Forest Fire
- Nearby Toxic or Noxious Gas Release

The Emergency Director is responsible for classifying and declaring the UNUSUAL EVENT condition, although other employees are responsible to report non-routine incidents or occurrences.

3.1.2 ALERT

An ALERT is defined as an incident that has led or could lead to a release of radioactive or other hazardous material. The release is not expected to impact offsite areas, however, and should not require a response by any offsite agency to protect the general public located close to the C-E plant site. An ALERT requires the mobilization of the Emergency Response Organization, either on ALERT status or full mobilization, but does not indicate an

expectation of off-site consequences. However, an alert requires off-site response organization support in response to onsite conditions such as fire, personnel injury, police assistance, etc.

In Section 2.0 of this plan, a number of accidents were described. Several could fall, or be reclassified, into the ALERT category. They are summarized below:

3.1.2.1 Fires or explosions involving uranium-bearing materials that have led or could lead to a release of radioactive material beyond the area in which they occur.

3.1.2.2 Potential Criticality

3.1.2.3 Significant Anhydrous Ammonia Spill

3.1.2.4 Minor UF_6 Release

3.1.3 SITE AREA EMERGENCY

A SITE AREA EMERGENCY is defined as a situation that has led or could lead to a release of radioactive material or other hazardous material from the C-E Hematite site and may result in responses by offsite organizations. Incidents that could lead to conditions of a SITE AREA EMERGENCY are:

3.1.3.1 Criticality
A criticality event resulting in the release of radioactive materials to the environment beyond the Hematite site boundaries.

3.1.3.2 Major Fire/Explosion

Major fire and explosions which would breach affected facility and result in release of uranium into the atmosphere of the areas surrounding the Hematite facility.

3.1.3.3 Breach of Anhydrous Ammonia Tank

A major breach of the anhydrous ammonia tank associated with sufficient heat to result in rapid vaporization of a major portion of the stored ammonia. This would need to occur under adverse meteorological conditions, such that an undispersed cloud of ammonia gas would cover areas outside of the site boundaries. This might require action of offsite agencies to notify the general public.

3.1.3.4 Major UF_6 Release

A major UF_6 release can be postulated in the event of a valve or line failure of a heated cylinder being unloaded.

3.2 Notification and Coordination

It is the responsibility of the Emergency Director to classify potential or actual emergencies based on assessment of the information received. Recognition that an event has ceased to be a normal operational problem and is potentially an UNUSUAL EVENT or ALERT is primarily a judgement matter. The Emergency director will implement the requirements of EPIP's to assess, classify and respond to an emergency. Notification of offsite organizations of a condition that has been classified in an emergency category is accomplished in accordance with the EPIP's.

3.2.1 UNUSUAL EVENT

Once an UNUSUAL EVENT, or higher classification, has been declared by the Emergency Director, he is responsible to implement the appropriate EPIP and direct the emergency response. Additionally, he will monitor the event conditions to determine if a higher classification must be declared.

Upon successful resolution of emergency conditions and other issues related to the event, the Emergency Director then determines when the event can be terminated. Finally, he assures that emergency equipment has been secured and safety-related equipment is returned to normal operating conditions.

3.2.2 ALERT

It is the responsibility of the Emergency Director, based on input from the functional organization, to determine when an ALERT situation exists. A major fire, explosion or criticality condition, as discussed in Section 3.1, may lead to an ALERT condition. Appropriate EPIP's involved with an ALERT such as evacuation of the affected areas and notification of the security and emergency personnel are implemented. After the conditions associated with the ALERT have been evaluated and/or resolved, the Emergency Director may reclassify the incident to a higher or lower category based on additional information received.

3.2.3 SITE AREA EMERGENCY

It is the responsibility of the Emergency Director to declare that a Site Area Emergency condition exists. This may be an upgrade from a lower classification or through an initial classification based on the severity of the problem as described in Section 3.1. A confirmed criticality event or a fire or explosion which breaches the integrity of the building, causing an actual radioactive or hazardous material release, will be positive

evidence to consider an immediate declaration of a SITE AREA EMERGENCY.

Catastrophic failure of the anhydrous ammonia tank with a large airborne release of ammonia would also cause declaration of a SITE AREA EMERGENCY. Responses to a SITE AREA EMERGENCY are controlled by the EPIP's and emergency response forces are directed by the Emergency Director.

3.2.3.1 Offsite Communications

If a SITE AREA EMERGENCY is declared, the emergency response organization through the Emergency Director is responsible for coordinating offsite communications (state, local and federal). These communications are in accordance with the appropriate EPIP's. Discussion in section 3.3 describes the information for any contact of offsite organizations in response to this type of classification.

3.2.3.2 Reclassification of a SITE AREA EMERGENCY

The Emergency Director maintains cognizance of the progress of an event or emergency based on information provided by the response team. This progress is evaluated in light of the appropriate EPIP's and event classification (described in Section 3.1) to determine when reclassification of the event must occur. When it is determined that there is no longer a hazardous condition affecting the site boundary and emergency conditions are in control, the emergency can be reclassified.

3.3 Information to be Communicated

The overall responsibility for directing activities in response to emergencies/events rests with the Emergency Director. By focusing this responsibility on the Emergency Director, responses to emergency situations will be performed in a consistent and accurate manner. The requirements to notify state, local and federal officials (NRC) of the event and its status is based on NRC, state and local directives with guidance provided in the EPIP's. Notification and followup information are provided to appropriate state, local and NRC representatives as specified in the EPIP's. This process is controlled by the Emergency Director. The most recent update of the event status is made available to interested parties through communications with the Emergency Control Center (ECC). Throughout the event, all affected agencies will be provided updates regarding changes in the event status, as they occur, until the event has been terminated.

Information to be communicated includes type of materials potentially affecting off-site areas, toxicity, quantity, time, duration, release medium, known health risks and precautions, if applicable. An onsite point of contact is also identified. Followup reports updating the initial information transmitted are provided.

4.0 RESPONSIBILITIES

The formal organization of C-E Hematite contains support groups which, in addition to normal functions during routine operations, can provide support to any or all facilities at Hematite during an emergency.

4.1 Normal Facility Organization

The Hematite Nuclear Fuel (HMF) Manufacturing Facility organization structure chart is shown as Figure 4-1, and key positions described in the license (SNM-33).

4.2 Onsite Emergency Response Organization

The Hematite Site Emergency Response Organization is shown functionally on Figure 4-2. Each response and support organization is identified. During normal working hours, functional response groups reside onsite with the exception of Police, Fire, and Ambulance support. Each working shift has initial response emergency personnel assigned by name to implement required functions until relieved by higher authority. These functions include Emergency Director, Re-Entry Team, and Survey Team. Notification and mobilization of response personnel are described below for working shifts and non-working facility times.

4.2.1 Direction and Coordination

The Emergency Director is designated as the individual with the overall responsibility for implementing applicable EPIP's and directing the emergency response organization. For emergencies involving the licensed facilities (SNM-33), the Production Superintendent is designated as the Emergency Director. He reports to the Hematite Plant Manager, who will provide support during a plant emergency. The VP of Nuclear Fuel, Windsor, Ct. based, may also provide upper-level management support during the emergency. During the Production Superintendent's absence, designated alternates (Production Supervisors) serve as the Emergency Director until termination of the emergency or until

relieved by the primary Emergency Director. The Emergency Director is responsible for classifying the emergency situation, implementing applicable EPIP's, notifying offsite organizations, and directing the necessary resources to control the situation. He will terminate the emergency when the abnormal condition is resolved. The Emergency Director is responsible and has the authority to direct outside supporting agencies, e.g., fire department, in responding to events involving radioactive materials at the licensed facilities.

The reclassification of an event and authorization for rescue personnel to receive emergency radiation exposures for lifesaving purposes and mitigating further damage or hazardous material releases, are the responsibility of the Emergency Director.

4.2.2 Plant Staff Emergency Assignments

The Emergency director mobilizes the support groups necessary to resolve the emergency condition. Additional resourses are available from other groups to help resolve the emergency in a safe and timely manner.

4.2.2.1 Plant Systems Operations

If the emergency involves manufacturing activities performed in the Hematite facility, designated plant staff would be mobilized to operate emergency equipment and secure existing plant apparatus. Designated managers and supervisors would also direct the recovery and repair activities including outside resources as required. Plant personnel can be utilized from operating shifts. The following describes specific responsibilities for plant emergency response functions.

Fact Finding Committee

Members to serve on this committee will be selected by the Director depending on the nature of the emergency. The Chairman of the committee shall be an individual who is not a member of the immediate response teams.

a. Communicate with the Emergency Director and others to obtain facts for determining the cause and effect of the emergency.

b. Interview personnel who witnessed the incident or those who can contribute information leading to cause and effect.

c. Review and examine all evidences (photographs, recoverable materials, etc.) that may be considered pertinent and informative for evaluation purposes.

d. Keep records and prepare a written report for the Plant Manager.

Radiological and Safety Advisor (Manager, Nuclear Licensing, Safety and Accountability, Alternate: Health Physics Supervisor).

a. Accumulate and evaluate known data to determine the extent of the emergency.

b. Establish a liaison between the Director and a direct source of available information.

c. Establish policies with Emergency Director regarding the emergency plan of action for controlling the incident.

d. Collect and disseminate information pertaining to the emergency to outside agencies.

e. Maintain a close liaison with the Emergency director and the Plant Manager regarding emergency activity progress.

f. Inform and consult with the Fact Finding Committee.

News Media Contact (Plant Manager - Alternate: designated appointee).

a. Serve as the news media contact.

b. Review public releases and notices and obtain approval of Windsor Public Relations or their designate for such releases.

Supervisors

a. Ensure proper implementation of the Emergency Plan in his areas.

b. Ensure personnel under supervision are familiar with the location and use of emergency equipment.

c. Ensure personnel familiarization with the Emergency Plan and procedures.

d. Account for their personnel during an emergency, including visitors and contractor personnel in their areas.

Nuclear Licensing, Safety and Accountability

a. Assess and delineate an emergency radiation or toxic fume, vapor or mist condition, including radiological survey monitoring.

b. Provide personnel monitoring, decontamination, recovery accident dosimetry for analysis and collect health physics or industrial hygiene samples for analysis.

c. Conduct environmental monitoring.

d. Assist with first aid and emergency rescue.

e. Procure, store and issue protective clothing and equipment for recovery operations.

f. Prepare necessary records and reports.

Site Security Office (Administration and Production Control Manager, Alternate: Shift Security Guard).

a. Direct and coordinate Security Guard activities.

b. Restrict access to the site to authorized personnel and outside supporting services.

c. Coordinate activities with state and local police.

Plant Fire Coordinator (NLS&A Technician, Alternate: Shift Supervisor)

a. Coordinate the fire-fighting activities of site fire brigades with local fire departments.

b. Assure that both onsite and offsite personnel have been trained in fire-fighting techniques involving radioactive materials, including precautions to be taken in criticality control areas.

Security Guards

a. Provide traffic control and communication with outside supporting services.

b. Understand Special Guard Orders for all emergency occurrences, which includes maintaining plant security and access control.

Maintenance

a. Maintain or discontinue as necessary utility services during the emergency.

b. Provide, fabricate or modify equipment needed for recovery operations.

c. Provide equipment and personnel for recovery and salvage operations.

d. Obtain special assistance as necessary.

4.2.2.2 Fire Control

The Hematite and Festus Fire Departments provide primary support for fire-fighting at the Hematite Nuclear Fuel Manufacturing Facility. The fire department would report to the site and follow directions from the Emergency Director for fire situations in the facility complex involving radioactive materials. The Emergency Director would assign a trained person to accompany fire department personnel for any entries into the facility. Methods and equipment to be used by fire fighting personnel for controlling or extinguishing fires in controlled access areas will be approved by the Emergency Director. If the fire involves radioactive material, NLS&A technicians will provide monitoring as necessary to protect fire department personnel.

4.2.2.3 Personnel Accountability

Personnel evacuated from the Hematite facility proceed to the evacuation center for accountability and decontamination purposes. Personnel lists and personal observations are utilized to ensure that personnel are accounted for. The responsibility for

personnel accountability rests with each Supervisor/Manager. Each individual associated with their group, including visitors, is accounted for and the results are reported to the Emergency Director.

4.2.2.4 Rescue Operations

Rescue operations for injured or missing personnel are performed by plant personnel under the direction of the Emergency Director. As the need arises, offsite rescue personnel accompany plant personnel in rescue operations to locate and remove injured personnel.

4.2.2.5 First Aid

The Hematite facility has assigned First Aiders who are trained in basic first aid and practices. Jefferson Memorial Hospital and Barnes Hospital have agreed to accept victims of accidents having injuries possibly complicated by radioactive contamination. Both hospitals have procedures for handling patients who are contaminated with radioactive materials. Joachim-Plattin Ambulance District has agreed to transport victims of accidents having injuries possibly complicated by radioactive contamination.

4.2.2.6 Communications

The site communication system provides for communications between all support groups involved with emergency operations and with off-site organizations.

4.2.2.7 Radiological Survey and Assessment

Radiation Protection personnel provide shift coverage during plant operations. During an emergency, trained

personnel are responsible for performing facility re-entry, radiological assessments, equipment and personnel decontamination efforts and support for all subsequent recovery operations. These personnel have the responsibility to make accurate radiation measurements and report hazards during an emergency. They also determine the final disposition of material and equipment contaminated during the emergency.

4.2.2.8 Decontamination of Personnel

Trained staff monitor personnel that have potentially been exposed to radioactive contamination or hazardous materials. They also provide direction for decontamination activities, monitor personnel after decontamination efforts are complete, and provide clearance for their unconditional release.

4.2.2.9 Plant Security and Access Control

The Hematite Site Security organization provides continuous coverage of the site. Security Control also provides site traffic control during an emergency. The Jefferson County Sheriff Department has agreed to provide assistance to C-E Hematite in an emergency. This assistance includes coordination with other civil authorities as necessary, traffic control, and control of civil disturbances.

4.2.2.10 Repair and Damage Control

Site Maintenance provides support for utilities (Electricity, gas, water) and other services (heating, air conditioning, ventilation) serving each building. This group also assists with recovery and restoration activities utilizing existing onsite capabilities and resources.

4.2.2.11 Facility and Equipment Decontamination

Contaminated areas and equipment are decontaminated in accordance with accepted procedures based on amount of contamination and the area/equipment affected. Decontamination operations are the responsibilities of the plant staff.

4.2.2.12 Post-Event Assessment

Post-event assessment is the responsibility of the Vice President, Nuclear Fuel, who will assure the direction, procedures and resources necessary to properly evaluate the effectiveness of emergency responses. In response to this evaluation, actions will be taken to correct identified deficiencies.

4.2.2.13 Record Keeping

Records and pertinent documentation generated from the emergency are directed to the Vice President, Nuclear Fuel. The documentation is assembled for further evaluation during post-event review by management and offsite organizations, if required.

4.3 Local Off-Site Assistance to Facility

If there is an emergency, it will be necessary to notify certain local individuals or organizations. The current listing (and corresponding telephone numbers) of those individuals or organizations requiring notification is provided in the EPIP's.

Each organization is provided with updated facility information if changes have been made to the facility that could impact their effectiveness. Agreements have been made with each of the local off-site response groups identifying responsibilities during an emergency. Each organization is invited to participate in biennial emergency drills.

4.3.1 Medical Assistance

As the situation warrants, the Emergency Director will have one or more of the following notified:

- Site First Aid Response Team
- Joachim - Plattin District Ambulance Service (Festus)
- Jefferson Memorial Hospital (Crystal City)
- Barnes Hospital (St. Louis)

4.3.2 Fire Fighting Assistance

The site emergency fire brigade is advised of a fire by the emergency alarm system sounding off over the entire site. If necessary, outside fire fighting support from the Town of Hematite can be requested by the Emergency Director or his alternate. If additional help is needed, the Hematite Fire Department would request help from the Festus Fire Department.

4.3.3 Police Assistance

If police assistance is required, support will be requested from the local Sheriff's office in Hillsboro, or from the Highway Patrol located in Creve Coeur, by site security. Notification is made by telephone.

4.4 Coordination with Participating Government Agencies

As previously stated, analysis of the postulated C-E Hematite accident spectrum shows that there is no credible accident with significant offsite consequences. A list of cognizant government agencies and current telephone numbers is maintained in the EPIP's, however, and they will be contacted should an emergency arise involving a consideration within their jurisdiction. The contact would normally be in the form of notification although a request for emergency assistance would be made as needed.

These agencies include:

U.S. Nuclear Regulatory Commission, Operations Center, Washington, D.C.

U.S. Nuclear Regulatory Commission, Region III, Glen Ellyn, Illinois

Missouri State Emergency Management Agency - Jefferson City

Missouri Division of Health, Bureau of Radiological Health - Jefferson City

Missouri Department of Natural Resources - Jefferson City. St. Louis

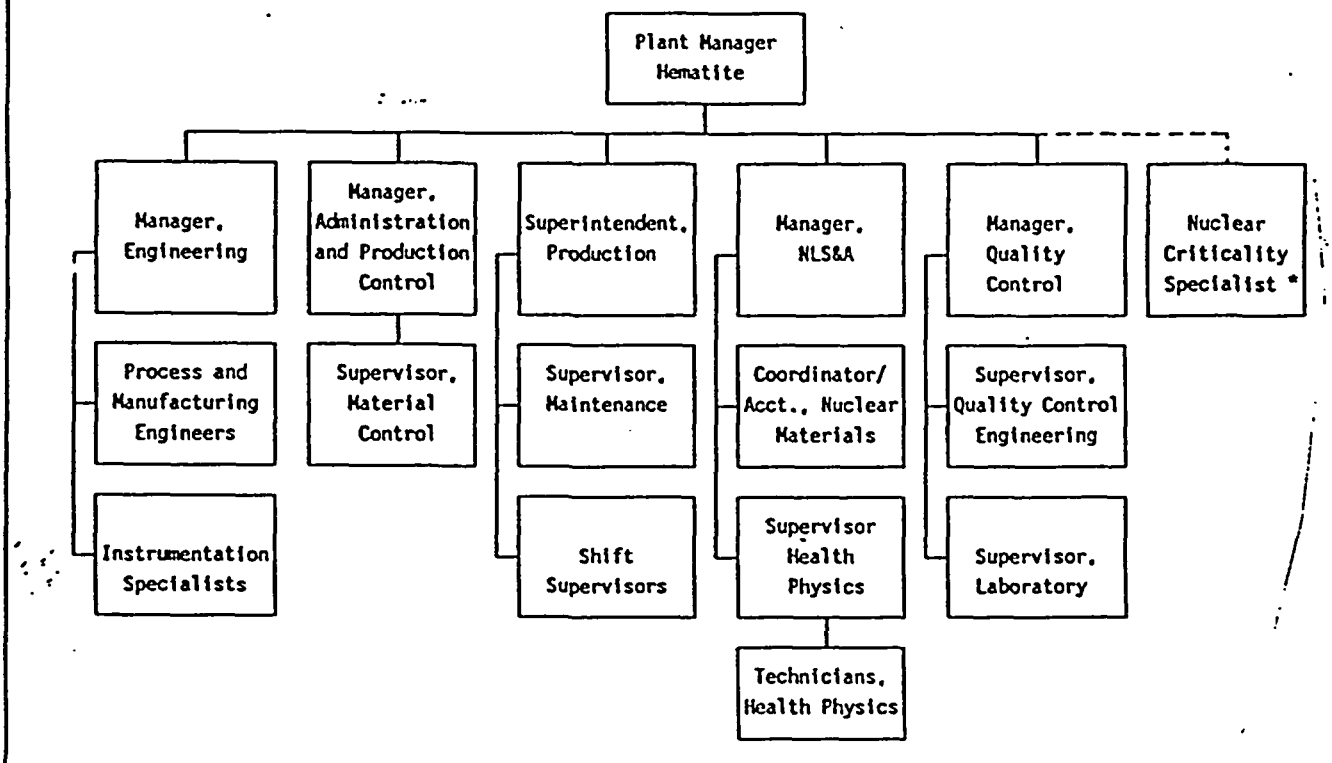
Missouri Highway Patrol - Creve Coeur

U.S. Federal Bureau of Investigation - St. Louis

U.S. Department of Energy Radiological Assistance Team - Oak Ridge

The above agencies are listed, with their phone numbers, in the Emergency Procedures manual.

The EPIP's address the notification of Local and State Civil Preparedness Organizations. These same EPIP's also include notification of Federal Agencies, e.g., the NRC.



*Windsor Based Support Position

FIGURE 4-1. HEMATITE PLANT ORGANIZATION CHART

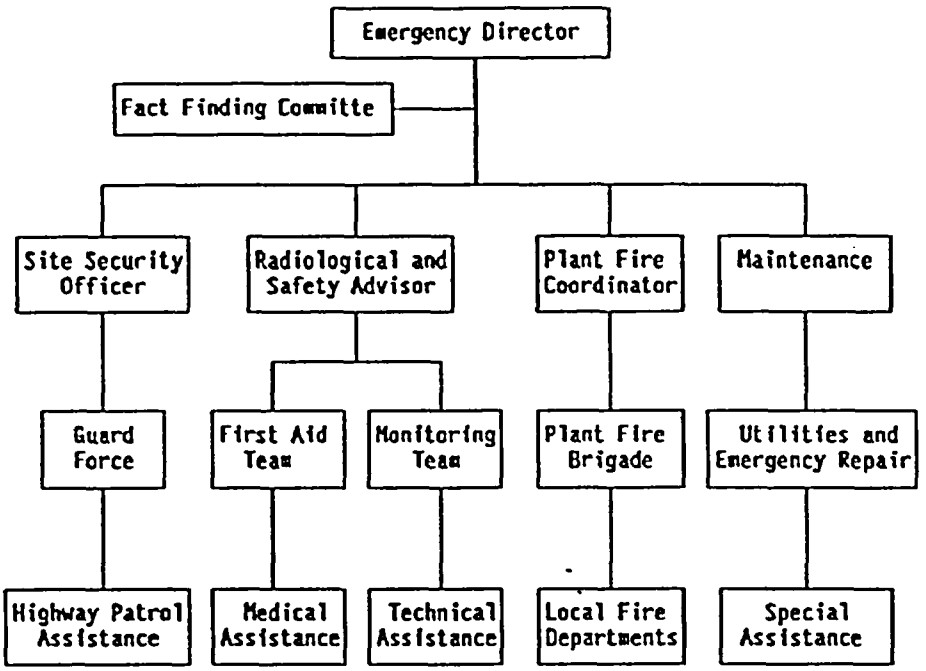


FIGURE 4-2. HEMATITE EMERGENCY ORGANIZATION CHART

5.0 EMERGENCY RESPONSE MEASURES

Emergency Plan Implementing Procedures (EPIP) have been developed for responding to postulated emergencies. These pre-established procedures ensure that the proper complement of support services are available for response to abnormal conditions. The EPIP's direct the rapid mobilization of the required forces to assess, manage and control abnormal conditions. This programmed response ensures that personnel exposure is kept as low as possible for site personnel and minimized for the general public. A further discussion of the emergency response program is contained in the following subsections.

5.1 Activation of Emergency Response Organization

During day shift operations, the emergency response team is located on-site and is quickly notified by site telephone or telephone pager. During back shift emergencies response team members are part of the back shift operations and are immediately available. Additional C-E personnel are called to support the required site activities as directed by the Emergency Director. During non-working shifts and when the facilities are secured, Site Security Control personnel monitor the Hematite site facility. If an emergency situation occurs, the emergency response organization is mobilized and the Emergency Director assesses the condition and implements the respective EPIP's. This may include notification of offsite organizations. The State of Missouri Emergency Management Agency is staffed at all times for alerting purposes and would respond to provide resources above and beyond local response groups in accordance with the nature and severity of the emergency.

Notification of emergency situations may come from various sources; personnel observations, fire sensing systems, criticality alarms, stack radiation monitors, process monitors, etc. Response actions to each alerting mechanism are specified in the respective EPIP's. Situations may be of a minor nature and normal on-site personnel can quickly resolve the abnormal event. These conditions are generally anticipated in a normal industrial environment and are handled in a routine manner. Reporting of these events occurs through the Operations Shift

Supervisor to the Plant Manager. The emergency responders are provided a pager device which, when activated, identifies a call-back telephone number. Authentication for a request for emergency support services is through call-back procedures.

5.2 Emergency Assessment Actions

Guidance for the initial assessment and classification of potential emergency situations is provided in the EPIP's. The Emergency Director performs a continuous assessment of the emergency situation and reclassifies the emergency as conditions change. The established responses to the three (3) classifications of emergencies are described below:

5.2.1 UNUSUAL EVENT

Most postulated emergencies at the Hematite facility, other than anticipated operational occurrences, would fall into this category due to the type of work being performed. Emergencies in this classification generally would not affect other areas outside the specific facility where the incident occurs. The resolution of the UNUSUAL EVENT is performed by plant personnel using standard operating procedures in most cases.

5.2.2 ALERT

Confirmation that a major fire, explosion, a potential criticality, or a major spill of a hazardous material had taken place would be the basis for the Emergency director to consider an immediate declaration of an ALERT. The emergency response team would be activated and the applicable EPIP's implemented. Personnel located in other site buildings potentially affected by the emergency would be notified of the condition by plant emergency or criticality alarms or the site telephone system.

5.2.3 SITE AREA EMERGENCY

A SITE AREA EMERGENCY involves a release of contaminated or hazardous material that could affect offsite residents. Conditions which might require this degree of offsite response would include a criticality event, a major breach of building integrity, or a large scale ammonia leak. For these postulated conditions, monitoring of offsite downwind locations, if required, would be performed by offsite agencies. The Emergency Director would evaluate the situation and decide if a SITE AREA EMERGENCY classification is required.

The required response actions to a SITE AREA EMERGENCY are indicated in the respective EPIP's. The Emergency Director can request other resources as needed to resolve the SITE AREA EMERGENCY. Support personnel from Production, Operations, Health Physics, Maintenance, Security, and Engineering are available to support recovery or repair as required.

A projected evacuation of offsite personnel is highly improbable as harmful doses from the site are not expected to occur. Offsite response is controlled and coordinated by the Emergency Director. These organizations provide notification and direction to affected individuals.

The GENERAL EMERGENCY category is not addressed as there is no postulated emergency in the Nuclear Fuel Facilities which would require this level of response.

5.3 Corrective Actions

The Hematite facility is equipped with continuous monitoring equipment to detect the occurrence of a criticality event. These warning systems provide assurance that criticality events would be detected and corrective actions taken.

In the event of a fire in an area involving uranium materials, trained plant personnel and offsite support (when called upon) respond under the direction of the Emergency Director to extinguish the fire using measures appropriate to the situation.

A fire occurring in the warehouse, storeroom, or laundry areas of the facility would automatically activate the fire sprinkler system. Fire hoses are also available in the warehouse and storeroom areas.

Fires external to the facility buildings can be extinguished using fire hoses connected to fire hydrants located around the perimeter of the facility. A fire booster pump is available to maintain water pressure to the hydrants from the 200,000 gallon storage tank.

In the event of a fire, it is expected that personnel in the immediate area would report the abnormal conditions, activate necessary alarms and initiate emergency actions, if possible.

Emergencies classified as external events would normally be preceded by a warning, such as severe weather. Preparatory actions may be taken to secure plant equipment, place the facility in a safe shutdown condition and provide for the safety of all affected personnel. Equipment used in the licensed facilities can generally be secured within two hours with most equipment requiring only the termination of electrical power. This is sufficient for most emergencies in this event category. For events such as bomb threats, equipment can be quickly de-powered or left unatterded for short periods of time.

5.4 Onsite Protective Actions

5.4.1 Personnel Evacuation and Accountability

In response to a criticality alarm, personnel working in the licensed areas are required to evacuate the affected facility and

report to the Tile Barn emergency assembly area as quickly as possible. Designated emergency personnel report to their emergency response station as soon as possible. In some situations, evacuation would occur on a verbal command or a manual activation of the nuclear alarm. The emergency assembly area is within five minutes walking distance from any of the work areas. The emergency assembly area is sheltered and contains facilities to accommodate evacuees.

In response to an Emergency Alarm, personnel working in the affected area are required to evacuate the area immediately and report to the emergency assembly area.

Preplanned evacuation routes are posted in all licensed facilities and personnel are periodically trained on emergency evacuation. Evacuation drills are conducted periodically in accordance with the license commitments.

Personnel accountability is performed using the appropriate EPIP's. The accountability status is reported to the Emergency director as quickly as possible to determine the need for search and rescue operations.

Personnel contaminated because of the incident would be monitored by trained personnel at the staging area and decontaminated to the extent required for their immediate safety. Personnel requiring medical treatment would be handled in accordance with the EPIP for treating contaminated, injured personnel. The travel route and emergency assembly area would be monitored for radioactive contamination and cleaned, as necessary.

5.4.2 Use of Protective Equipment and Supplies

Protective equipment and supplies dedicated for emergency use are stored at the Emergency Assembly Area/Emergency Control Center (Tile Barn). The inventory at this location includes protective clothing, personnel respiratory protection equipment, radiation exposure monitoring equipment, and emergency medical supplies. The emergency equipment locations are detailed in the EPIP's. These supplies are available for use by rescue and recovery personnel for entry into contaminated areas or for use by emergency personnel in treating or transporting injured personnel.

As the situation requires and when notified, emergency response teams report to the Emergency Control Center (ECC). Protective equipment is issued to trained personnel based on the nature and extent of the emergency.

Trained site emergency response personnel are listed in the EPIP and by Plant Manager memorandum. The list is used to ensure that only trained personnel have been issued emergency equipment. In the event that offsite responders require emergency equipment to assist onsite, verification of their training is requested from supervisory personnel before issuance of safety equipment.

Two-way radios are utilized by emergency personnel for communications during performance of their emergency function.

5.4.3 Contamination Control Measures

During an UNUSUAL EVENT situation there could be a limited spread of contamination within the facility building. During a more extreme emergency condition (ALERT or SITE AREA EMERGENCY),

normally unrestricted areas on site could become contaminated and require isolation and access control.

Emergency contamination control measures are aimed at preventing the spread of radioactive contamination beyond controlled areas of the licensed facilities. This could be accomplished by establishing a perimeter to identify the contaminated zone with a controlled entrance/exit and designated areas for personnel to put on or remove all protective clothing.

5.5 Exposure Control in Radiological Emergencies

5.5.1 Emergency Radiation Exposure Control Program

The EPIP's provide instructions that are to be used in emergency situations when occupational radiation exposure standards in 10CFR20 cannot be reasonably implemented. Emergency radiation exposure is only authorized in the extreme conditions when life saving measures are required and tasks related to emergency assessment or immediate mitigating actions must be performed.

Emergency radiation exposures can only be authorized by the Emergency Director. The need for emergency exposure and authorization is based on immediate needs to rescue personnel and upon recommendations by senior radiological/environmental assessment personnel. Emergency exposure related tasks are only authorized when there is no other acceptable means of accomplishing the required action. The specific task to be accomplished within the emergency area is identified, personal risks evaluated, and conditions likely to be encountered are considered in the authorization process. Persons who are authorized emergency exposure will be made aware of the emergency

related task they may be requested to perform, and they will be volunteers.

5.5.1.1 Exposure Guidelines

Emergency radiation exposure of up to 25 REM whole body dose can be authorized for personnel rescue and life saving related tasks. Emergency radiation exposure of up to 12.5 REM whole body dose can be authorized for emergency workers involved in emergency work tasks.

The EPIP's require that radiation exposure records are maintained for each individual exposed or potentially exposed to radiation as a result of emergency related actions (either emergency response or as a result of being in the area when the emergency condition began). Radiation exposure accumulated during an emergency is added to the individual's permanent occupational exposure records.

5.5.1.2 Monitoring

In the event of a radiological emergency, personnel directly involved with coping with the emergency will be included in a bioassay program: urinalysis, fecal analysis, in-vivo measurements, as appropriate: in order to evaluate possible internal exposure.

Personnel entering a contaminated area for response actions are issued exposure monitoring devices.

The EPIP's require maintenance of exposure records during the emergency condition such that exposures each individual may receive become part of the

individual's permanent record. These recorded exposure values are taken from film badges if worn or from values based on indium foil activation. In addition, bioassay results (accomplished after the emergency) would also be noted in the individual's permanent record.

5.5.2 Decontamination of Personnel and Equipment

The EPIP's provide instruction for personnel and equipment decontamination.

Personnel skin contamination is removed using standard washing techniques as directed by medical and Radiological Protection personnel. Locker rooms are equipped with dedicated personnel decontamination showers. Additionally, a hose is located at the Tile Barn for use during emergency conditions.

Equipment decontamination is straight forward, either the contamination is removed to meet the license (SNM-33) release limits or the equipment is retained as radioactively contaminated. It is expected that most emergency equipment can be quickly surveyed, decontaminated if required, and released. Equipment that cannot be decontaminated and released is retained and properly disposed of as radioactive waste.

Materials identified as radioactive waste generated during or following an emergency will be processed for disposal utilizing standard procedures and approved containers.

5.6 Medical Transportation

5.6.1 Transportation of injured, contaminated personnel would be per the EPIP's. Transportation of noncontaminated injured personnel will be arranged in accordance with the site Emergency Plan.

The ambulance service dispatched for transportation of injured personnel may send a representative to facilitate emergency communications and rescue vehicle coordination for multiple victim situations. This person will report to the ECC or to a location designated by the Emergency Director.

5.6.2 Injured personnel who are radiologically contaminated will be transported to Jefferson Memorial and/or Barnes Hospitals for emergency hospital care. Injured personnel who are not contaminated will be transported according to local medical services protocol.

5.6.3 Trained personnel will accompany the first radiologically contaminated person to the hospital and remain at the hospital. These trained personnel assist in minimizing the spread of radiological contamination, assist with patient decontamination, and survey/release of the ambulance.

Additionally, assistance is provided for the decontamination of hospital equipment following the treatment of site personnel.

6.0 EMERGENCY RESPONSE EQUIPMENT AND FACILITIES

This section identifies, describes briefly, and gives locations of items to be maintained for emergency use at C-E Hematite.

6.1 Control Point

Emergency Control Center is located within the Tile Barn west of the fenced manufacturing area. This direction is normally upwind from the manufacturing area. Although an alternate offsite location is not considered necessary, emergency equipment is portable and can easily be moved to an alternate location.

6.2 Communications Equipment

Onsite Communications

Communications during an emergency may be by the following methods:

- Normal plant telephone system and telephone pagers
- Separate emergency telephone line in Emergency Control Center
- Two-way radios (battery operated)
- Bull Horn
- Voice and hand signals (effective in many cases due to small size of plant)

All the above communication methods may be used at the Emergency Control Center.

6.3 First Aid and Medical Facilities

6.3.1 The Hematite facility is supported by trained first aid responders. First aid equipment is available in the ECC. Additional first aid stations are located throughout the site. The first aid responder at the emergency scene will direct less severely injured personnel to a first aid station or to the ECC. Seriously injured personnel are transported to a local hospital.

Injured personnel that require treatment at an off-site medical facility and are contaminated are transported directly to either Jefferson Memorial or Barnes Hospital.

6.3.2 The ECC is equipped as an emergency supply station and has equipment including mass casualty first aid kits, oxygen delivery systems, stretchers, blankets, and patient immobilization equipment. Procedures have been established to distribute patients to area hospitals in the event of multiple casualty incidents.

6.4 Offsite Communications and Emergency Monitoring Equipment

The following monitoring systems are used to initiate emergency measures as well as those used for continuing assessment:

6.4.1 Onsite Systems and Equipment

Wind speed and direction - Remote readout is in the HP office.

Criticality monitors and alarms - Criticality monitors are installed in various areas of plant manufacturing and storage areas so that all Special Nuclear Material located in or about the facility is observed by a detector.

The radiation intensity is shown on a meter mounted on the front panel of the monitor. There is an alarm which serves as a local and general audible criticality evacuation alarm. A visual alarm for the above units is also located near the HP office and at the guard station.

An externally mounted light and control panel buzzer serve as a power failure indicator.

Loss of power indicators are also provided at the readout location for each detector. These monitors are connected to the emergency power system.

Emergency equipment stations are located throughout the Hematite Facility. figure 6-1 shows the locations of these stations. The EPIP's identify the specific equipment located at each station.

Portable monitors - Air samplers, radiation survey instrumentation, and radiation dosimeters are located in the HP office and/or Emergency Control Center.

Process control monitors are the same as normally found in any chemical plant - temperature, pressure, flow rate, etc. Only the UF_6 leak detectors are related to a potential emergency situation.

6.4.2 Facilities and Equipment for Offsite Monitoring

Portable, battery-operated air samplers
Fixed air samplers outside of fenced manufacturing area
Portable radiation survey instruments
Containers, etc., for sampling soil, water and vegetation
Proportional counter for alpha and beta analyses of samples - located in Health Physics Office
Standard industrial hygiene equipment for measuring ammonia concentrations

6.5 Emergency Monitoring

The emergency assembly area in the tile barn, located west of the fenced manufacturing area, is of adequate size to accommodate the entire plant staff. It is not in the prevailing wind direction and the distance and construction provide sufficient shielding in the event of a criticality accident.

Located in the emergency control and assembly area are emergency equipment supplies, including:

- Radiation Survey Instruments
- Respirators
- Protective Clothing
- First Aid Supplies
- Two-Way Radios (located at Tile Barn [ECC])
- Decontamination Supplies
- Environmental Sampling Supplies

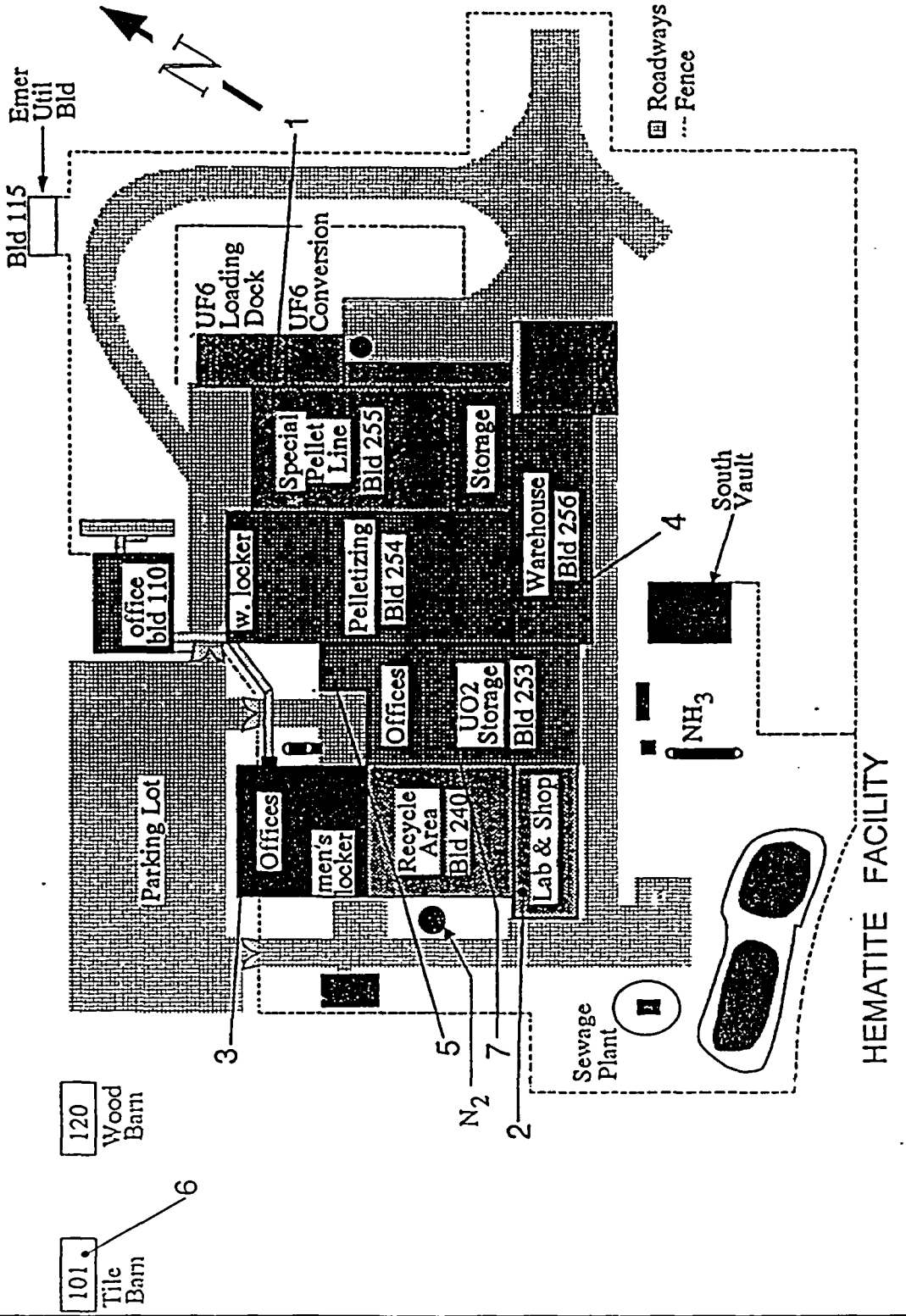


FIGURE 6-1. EMERGENCY EQUIPMENT STATIONS

7.0 MAINTAINING EMERGENCY PREPAREDNESS CAPABILITY

7.1 Written Emergency Plan Procedures

The responsibility for the maintenance, revision and control of the EPIP's is assigned to the Nuclear Licensing, Safety & Accountability (NLS&A) Manager. Further discussion on the maintenance program implemented to maintain the required level of readiness is contained below:

7.1.1 Document Control maintains a master list of personnel who are assigned controlled copies of EPIP's. Document Control also maintains a master list of personnel on distribution for the Emergency Plan. Revisions to the Plan or EPIP's are sent to each holder of the documents.

7.1.2 The EPIP's contain a description of the responses required to implement the particular emergency procedure. The Emergency Director has the ultimate authority to implement the steps required to control and resolve the stated emergency. However, it is expected that he will delegate certain aspects of the implementation phase of the response, keeping the primary direction responsibilities under his control.

7.1.3 The Emergency Plan and EPIP's are reviewed and revised as required based on a review schedule (see Section 7.5) under the direction of the NLS&A Manager. Additionally, whenever conditions have changed, the NLS&A Manager can authorize a review of the program and implementing procedures. Revised sections are approved as specified in internal administrative procedures and provided to all holders of controlled copies of the Emergency Plan and EPIP's.

7.2 Training

The purpose of the training program is to inform and instruct all employees in the policy and programs of the company as they relate to nuclear criticality, safety, health physics and industrial safety, emergency procedures, and proper and safe performance of their assignments.

The indoctrination of new employees in the safety aspects of the facility is conducted by, or under supervision of specialists in the various topics. The indoctrination topics include, but are not limited to:

a. Fundamentals of nuclear criticality safety and controls.
b. Fundamentals of the health physics program and controls.
c. Emergency alarms and actions required.
d. A review of the facility operations.
e. On the job training, under direct line supervision and/or by experienced personnel.

After determining by testing that a new employee has attained sufficient knowledge in the above topics, adequate performance is monitored by the supervisor and NLS&A prior to permitting work without close supervision.

The training and personnel safety program is continued with on-the-job training supplemented by regularly scheduled meetings conducted by line supervision and specialists in the subject covered. Personnel protective equipment, industrial safety and accident prevention, emergency procedures and other safety topics are included. Production supervisors receive a formal course in radiation safety, criticality control, and emergency plans and procedures. Sufficient knowledge to enable them to carry out their training functions is determined by testing.

All operating personnel receive a re-training course in criticality control, radiation safety and emergency procedures on an biennial basis. Selected personnel are provided specialized training in fire fighting annually, and

first aid every three years. All training is documented. The remainder of emergency team members receive training at least annually in connection with drills and exercises. The NLS&A Manager evaluates effectiveness of training, documentation, and revises the training program as appropriate.

Training of off-site response personnel is limited to those areas that are unique to the Nuclear Fuel Manufacturing Facility. This includes potential radiological and chemical hazards, facility familiarization and limitations/restrictions for responding to emergencies. This training is directed at the supervisory level, e.g., Fire Chief, assistance Chief, etc., and offered to all support forces.

7.3 Drills and Exercises

Biennial site emergency exercises and annual site emergency evacuation drills are conducted to provide training and test promptness of response, familiarity with duties, adequacy of procedures, emergency equipment and the overall effectiveness of the emergency plan. Participation by offsite agencies will be requested during the biennial exercise to test, as a minimum, the communication links and notification procedures.

7.4 Critiques

All drills and exercises are documented and critiqued by the NLS&A Manager to evaluate the effectiveness of the plan and to correct weak areas through feedback with emphasis on practical training. The NLS&A Manager revises drills and exercises, if necessary, to increase their effectiveness.

7.5 Review and Updating Plans and Procedures

At least once per year the Emergency Plan and EPIP's are reviewed and revised accordingly. Annual reviews of the Emergency Plan and support procedures are performed by representatives assigned by the NLS&A Manager. Specific sections of the plan or individual EPIP's may be updated at any time as required.

Letters of agreement with offsite agencies are reviewed as part of the annual review of the Emergency Plan and EPIP's. Contact is maintained with these support organizations to facilitate agreement letter revisions.

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

Both the emergency and nuclear alarm systems are tested weekly to insure their proper operation. Testing is documented.

Nuclear Licensing, Safety and Accountability, is responsible for routine inspection and testing of all equipment and supplies at all emergency stations and other reserve equipment, and for maintenance and servicing, or obtaining servicing, for all emergency equipment. NLS&A also procures, or initiates procurement, of all supplies of emergency equipment and other miscellaneous supplies necessary to cope with foreseeable emergency situations. Inspections and testing are documented.

The minimum frequency for inspections and testing of all equipment and supplies is quarterly.

7.7 Verification of Telephone Numbers

Telephone numbers used to activate the EPIP's, request offsite assistance, and notify offsite agencies of emergency situations are checked and updated quarterly. The telephone numbers are identified in the appropriate EPIP. If changes to telephone numbers occur, revisions to the applicable EPIP are performed and the new numbers verified.

8.0 RECORDS AND REPORTS

8.1 Records of Incidents

Notifications of emergency conditions are recorded in the security log. The types of documents and reports typically generated during an emergency are identified in Table 8-1. The Emergency Director ensures that applicable EPIP's are completed and required reports are assembled by the functional team. Emergency response documentation is transmitted to the NLS&A Manager. He assembles and reviews this documentation to ensure completeness of the document package. He then develops a summary of the incident.

The summary includes a chronology of the incident, actions taken, responses to the situation and conditions for termination of the emergency. It includes assessments of the causes, personnel and equipment involved, extent of injury and damage (on-site and off-site) resulting from the incident, locations of contamination with the final decontamination survey results, the adequacy of the emergency response team, and the corrective actions required to preclude recurrence of the emergency. Additionally, the summary identifies the on-site and off-site support assistance requested and received, deficiencies in the Emergency Response actions are reviewed and corrective actions offered. The summary report is reviewed by management, as required. In those situations for which causes and deficiencies are not readily identified, the Vice President, Nuclear Fuel, appoints an investigative team to conduct an in-depth evaluation of the situation to develop required corrective actions. The findings of the investigative team are reported to the Vice President for inclusion into the incident summary report. The summary report is released to the Emergency Response Organization, as appropriate.

Records and reports are maintained by the NLS&A Manager. Records that are unique to a radiological contingency that is not covered by a license condition or an existing NRC regulation are retained until the license is terminated.

8.2 Records of Preparedness Assurance

8.2.1 The training program for emergency response preparedness provides various levels of training for the on-site and off-site emergency response personnel. The initial emergency training sessions and review programs are documented by attendance rosters for particular training areas.

Non-emergency personnel (employees) are trained as part of the General Employee Training (GET) program with documentation as part of that program.

8.2.2 Drills and exercises conducted to test capabilities and procedures are documented in a manner similar to that for an actual event. However, the drill objectives, scenarios and results are also included.

8.2.3 Emergency equipment and supplies utilized and maintained by HFM facility are described in Chapter 6.0. Records of inventories, maintenance, calibration, and testing are maintained by the HP Supervisor.

8.2.4 Letters of agreement for support by off-site emergency response organizations are maintained. Off-site agencies maintain their own emergency equipment and supplies. Unique equipment required for response at the Hematite facility is provided on-site as required. Equipment provided by off-site responders which cannot be released because of contamination is replaced by C-E.

8.2.5 Changes to the Emergency Plan and/or EPIP's are coordinated through the Manager, NLS&A, for review and incorporation into the Site Emergency Plan. Off-site support organizations are notified of changes by the Manager, NLS&A. The effect of the changes on existing support agreements are evaluated and the support agreements updated, if required.

TABLE 8-1

EMERGENCY RESPONSE SUPPORT DOCUMENTATION

The following is a typical list of documentation that may be developed and retained during an emergency:

1. Copies of Daily Status Logs
2. EPIP -- Reference Checklists
3. Radiation Protection Surveys
4. Personnel Exposure Data
5. Replacement Emergency Material and Equipment Lists
6. Security Control Reports
7. Off-Site Response Service Reports
8. News Articles
9. Assessment Reports and Surveys
10. Repair Procedures
11. Summary Report

9.0 RECOVERY

9.1 Re-Entry

Re-entry into the affected area will be in accordance with sections 5.0 and 6.0 of this plan.

9.2 Plant Restoration

9.2.1 The Emergency Director will assign such personnel as necessary to restore or have restored all equipment and/or services to a safe operating condition upon termination of the emergency. Any spills will be cleaned up and no excessive radiation levels will be present when operations are restarted. Radiation levels will not exceed normal operating levels as specified in the SNM-33 license. Each member of the emergency organization will assure that safety related equipment, within his area of responsibility, is restored to normal as soon as practicable following an incident.

9.2.2 As a minimum, the restoration plan will include the following considerations:

- Determination of the capabilities of the facility to contain radioactive contamination.
- Development and implementation of actions required to terminate releases of radioactive contamination or other hazardous materials.
- Restoration of safety related equipment.
- Repair and/or replacement of facility equipment/material for resumption of normal plant operations.

9.2.3 The restoration program will include steps needed to restore normal operation of safety related equipment that may have been