Radiological Contingency Plan

U.S. Nuclear Regulatory Commission

DOCKET NO. 40-3392

Material License No. SUB-526

METROPOLIS WORKS

AlliedSignal Inc.

INTRODUCTION

This on-site Radiological Contingency Plan has been prepared in accordance with U.S. NRC Regulatory Guide 3.67, "Standard Format and Content for Emergency Plans for Fuel Cycle and Material Facilities," January 1992. This plan shall be a condition of Source Material License SUB-526.

Approved By: _____ Date: 3/17/99
M. L. Shepherd
Manager, Environmental/Regulatory Affairs

Approved By: _____ Date: 3/18/99
J. William Lessig
Plant Manager

Date: Nov., 1998

TABLE OF CONTENTS

Date: Nov., 1998

TABLE OF CONTENTS

Date: Nov., 1998

TABLE OF CONTENTS

TABLE OF CONTENTS

Date: Nov., 1998

1.0 General Description of the Plant/Licensed Activity

AlliedSignal operates a privately owned uranium hexafluoride conversion/ deconversion facility at Metropolis, Illinois. At this facility, natural uranium ore concentrates are chemically converted into high purity uranium hexafluoride (UF_6), and uranium tetrafluoride (UF_4) can be deconverted into uranium oxides. The UF_6 product from the facility is shipped to gaseous diffusion plants for enrichment of the U-235 isotope. Following enrichment, the uranium is converted into fuel for use in nuclear power reactors.

The Metropolis Plant was originally built at this location to supply UF_6 conversion for the U.S. Atomic Energy Commission under a five-year contract (1959-1964). Presently, however, the Metropolis facility supplies conversion services for the commercial nuclear power industry.

1.1 Licensed Activity Description

The Metropolis Plant is currently licensed to produce uranium hexafluoride by processing source material which is received as uranium ore concentrate, in accordance with Source Material License No. SUB-526. The maximum inventory of source material authorized by the license is one hundred and fifty million (150M) pounds of natural uranium.

The present plant is a multi-product chemical manufacturing facility producing sulfur hexafluoride, iodine and antimony pentafluoride, liquid fluorine, synthetic calcium fluoride, uranium oxides, and uranium hexafluoride. The production of uranium hexafluoride and uranium oxides are the only operations requiring licensing by USNRC pursuant to the provisions of 10 CFR 40. The production of uranium oxides from UF_4 has only been performed on an experimental basis. The licensed facility is designed to produce about 14,000 short tons per year of uranium as UF_6 from uranium concentrates. The plant feed usually assays about 80% uranium and the final UF_6 product contains less than 300 parts per million impurities. In the AlliedSignal process, the ore concentrates feed is carried through the successive steps of feed preparation, reduction, hydro-fluorination, fluorination and distillation. Chemical reactions are carried out in fluid bed reactors. A simplified flow chart of the manufacturing process is presented in Figure 1.1, page 1-12.

1.2 Site and Facility Description and Process Description

The AlliedSignal Metropolis Plant is located on approximately 1,000 acres of land in Massac County, at the southern tip of Illinois, along the North bank of the Ohio River. A general area map showing a five mile radius around the plant is depicted in Drawing No. MTW 2963. The site perimeter is formed by U.S. Highway 45 to the North, the Ohio River to the South, an

industrial coal handling plant to the West and privately owned land to the East. The company also owns approximately 80 acres of land northeast of U.S. 45 some of which is leased for farming operations. Plant operations are conducted in a double-fenced restricted area covering 54 acres in the North Central portion of the site.

Most of the uranium processing equipment is housed in a six-story structure called the Feed Materials Building (FMB) where essentially all of the steps in the UF_6 manufacturing process are conducted. Other areas and buildings in which operations are conducted involving the handling or processing of significant quantities of source material include the following:

a. Sampling Plant which receives and samples ore concentrates for uranium assay and impurities and moisture analyses.

b. The Sodium Removal and Uranium Recovery Facilities which are housed in buildings where high sodium content ore concentrates are treated to remove this impurity and where recycled materials are processed to recover contained uranium.

c. The KOH Muds facility where potassium diuranate solids generated in the fluorination scrubber system are separated from spent KOH liquors. The potassium diuranate is then processed through Sodium Removal, and the spent KOH liquors are regenerated at the Calcium Fluoride - Environmental Protection Facility (EPF).

d. The Calcining Facility where the incoming ore concentrates and recovered uranium are dried as the first step in ore preparation.

e. The Laboratory Building which houses facilities for conducting process control, product, and radiological control analyses.

f. The Cylinder Wash Building where UF_6 product cylinders are periodically washed and hydrostatically tested prior to reuse.

g. Outdoor pads for the storage of ore concentrates and other uranium-bearing materials in drums as well as UF_6 product cylinders.

Additional plant facilities which are involved directly in the UF_6 manufacturing process but do not involve the handling of any significant quantities of source material include a fluorine manufacturing facility, a fluoride waste treatment facility with five large settling ponds, a powerhouse, a reductor off-gas incinerator, and two small settling ponds to collect any uranium contained in pad run-off.

The Feed Materials Building is the processing area most likely to be the source of a major uranium hexafluoride release which could require activation of the Radiological Contingency Plan. The relationship of this processing area to other plant facilities, near-site facilities, and environmental monitoring stations is shown on Drawing No. MTW 4781.

There are approximately 500,000 people located within a 50-mile radius of the Metropolis Plant. Within a one-mile radius of the facility, the population is concentrated in the NNE and E sectors. About 200 people live within one (1) mile of this facility. The workforce on-site during day shift is approximately 280 people with approximately 40 employees on 2nd and 3rd shifts, respectively.

AlliedSignal has purchased most of the properties bordering the northeast side of U.S. Highway 45 to increase the "buffer zone" in the NNE sectors. In the event of a Site Area Emergency, the persons occupying the remaining residences near the plant in the NNE sectors will be subject to notification in accordance with established procedures, provided the prevailing wind is toward these sectors. See Security Officer/ERP page A-6.

A flow chart of the process used for the conversion of uranium ore concentrates into UF_6 is depicted in Figure 1.1, where the source of effluents and emissions from the various process steps are also shown. The UF_6 conversion and deconversion vessels important to safety were fabricated in accordance with ASME Codes. Special metals and alloys are used in UF_6 service to minimize the possibility of a UF_6 release. Performance criteria for these systems are discussed in Section 2. A description of each major processing area and confinement and control systems is as follows:

1.2.1 Sampling and Storage

The plant normally receives uranium ore concentrates in 55-gallon drums. Each drum of ore concentrate is weighed, sampled, and then stored on storage pads until accountability procedures and the uranium and impurity analyses are completed.

1.2.2 Pretreatment Facility

Some ore concentrates and all uranium compounds from the uranium recovery facility contain undesirable amounts of contaminants, principally sodium, that must be removed. The pretreatment consists of a one-stage partial digestion treatment using sulfuric acid and re-precipitation of dissolved uranium using ammonia. The uranium solids from this facility discharge into the ore calciner in the ore preparation section.

1.2.3 Ore Preparation

Incoming ore concentrates are charged into the system through a drum dumping station. The concentrates go directly to the ore preparation section via the calciner. Following the calcination, the ore concentrates are blended, agglomerated, dried, crushed, and sized to a uniform particle size. Dusts and fumes from this process are controlled by use of dust collectors.

1.2.4 Reduction

The sized uranium concentrates enter a fluidized bed reactor termed the reductor. In the reductor the mixed uranium oxides are reduced to the dioxide utilizing hydrogen, which is the reactant, and nitrogen as the fluidizing gases. Both hydrogen and nitrogen are obtained from the dissociation of ammonia. The reductor off-gas (principally hydrogen, nitrogen, water vapor and some hydrogen sulfide) is passed through filters to remove particulate uranium, and the residual gas is incinerated to burn the hydrogen and convert the hydrogen sulfide into sulfur dioxide.

1.2.5 Hydrofluorination

The uranium dioxide from the reductor is fed into two fluidized bed hydrofluorinators operated in series. A countercurrent flow of anhydrous HF fluidizing gas converts the uranium dioxide into uranium tetrafluoride (UF_4). The off-gas is filtered to remove particulate uranium and scrubbed with water and potassium hydroxide solutions to remove HF before being vented to the atmosphere. The HF scrubber liquors are neutralized, and treated to remove fluoride in the Environmental Protection Facility before being discharged with the main plant effluent.

1.2.6 Fluorination

The UF_4 is fed into a fluidized bed fluorinator that also contains an inert bed material. Elemental fluorine used as the fluidizing gas converts the UF_4 to UF_6 which is volatilized from the fluorinators. Residual uranium and nonvolatile uranium daughter products remain in the bed material which is recycled and reused until the buildup of contaminant levels prohibit further use. The bed material is then retired for radioactive decay and subsequent recovery of the uranium content. Gases from the fluorinator are passed through primary and secondary filters. After leaving the filters, the gases pass through primary cold traps where the bulk

of the UF_6 desublimes and is collected as a solid. When the fill level is reached, the primary cold traps are taken off line and heated to liquefy the UF_6. The UF_6 is then drained into the distillation feed tanks. The capacity of each primary cold trap is approximately 40,000 pounds liquid at 200°F, but 18,000 pounds is the normal in-plant limit. The gas stream exits the primary cold traps and is then passed through secondary and tertiary cold traps for recovery of any UF_6 not trapped in the primary system. When a secondary or tertiary trap is full, it is valved off and heated, and the UF_6 is vaporized back to the primary cold traps.

1.2.7 Distillation and Product Packaging

Crude UF_6 from the still feed tanks is gravity fed to a vaporizer through a control valve to maintain a constant weight in the vaporizer. The UF_6 from the vapor phase of the vaporizer is fed to the low boiler distillation column. The UF_6 which has been stripped of low boiling impurities is then fed through a flow control valve to the high boiler still. The UF_6 product comes off vapor phase from the high boiler column, is condensed, and flows as a liquid into the product cylinder.

Prior to filling each UF_6 product cylinder, the cylinder fill line (pigtail) is thoroughly inspected. New gaskets are installed, and the pigtail is leak-tested before flow to the cylinder is initiated. Cylinder overfilling is prevented by strict adherence to weight limitations. Two independent load cells are utilized at each cylinder fill spot to give continuous readings of the weight of UF_6 in the cylinder. A totalized weight from an orifice flow meter is also utilized to monitor the amount of UF_6 in the cylinder during the fill process. Additionally, operating experience indicates product distillation rate can reliably be used to confirm load cell readings. Refer to AlliedSignal's application for renewal of Source Material License (SUB-526), Section C-1.5.1 for a detailed packaging procedure.

After the product flow is shut off, the pigtail is thoroughly evacuated before breaking connections. The cylinder weight is then verified using a crane scale before the cylinder is moved to the cylinder buggy for a final weighing.

Plant personnel are always present when cylinder connections, leak testing, sampling, and disconnections are made. A UF_6 leak can be immediately recognized by the visible white vapor that occurs when it reacts with moisture in the air. A small leak may be terminated by "freezing off" the leak using pressurized CO_2.

Full product cylinders are moved within the process building by use of equipment specially designed to minimize the probability of damaging a hot product cylinder. Two persons are always in attendance during cylinder moving operations. Production personnel make a visual inspection of cables, lifting eyes, clevises, and strong backs. Proper operation of the cylinder crane is confirmed before each series of lifts involving a hot UF_6 cylinder. Cylinder movements are performed carefully and slowly while minimizing the vertical lift required to perform the job. In addition, the cylinder crane is inspected and serviced weekly as part of the plant preventative maintenance program.

After weighing, the filled cylinders are transported on specially designed cylinder buggies to the product cylinder cooling area. The full cylinders remain on these buggies for a minimum of four days to allow the liquid UF_6 to cool and solidify before they are located on storage cradles.

All UF_6 product cylinders and valves are manufactured and inspected in accordance with the provisions of ANSI N14.1.

1.2.8 Uranium Recovery

Different types of uranium-bearing liquors are processed in Wet Process/Uranium Recovery to recover as much uranium as possible. These include FMP and cylinder wash liquors, rainwater from certain storage pads, and Fluorination scrubber liquors. Regardless of the origin of the uranium-bearing liquors, the uranium is precipitated from solution by pH adjustment, separated from the solution using rotary drum vacuum filtration, and returned to the process via Ore Preparation. The liquors in each case are treated in the Environmental Protection Facility (EPF) to remove fluorides and then discharged into the plant effluent.

Fluorination scrubbing liquors, which contain potassium diuranate solids, may also be shipped to a mill for toll reprocessing.

1.2.9 Cylinder Wash Facility

Periodically, UF_6 product cylinders must be washed and pressure tested to assure integrity and to conform to DOT regulations. The cylinders are washed with sodium carbonate solution to leach the uranium from the residual solids. The leach liquors are then filtered to remove particulates and transferred to the uranium recovery facility. The remaining solids containing daughter

products of uranium, principally Th-234 and Pa-234, are disposed of at a low-level radioactive waste disposal facility.

1.2.10 Fluorine Production

Fluorine, which is one of the raw materials required for the UF_6 process, is produced on-site by electrolysis of hydrogen fluoride. A portion of this material is consumed in the UF_6 operation, and the remainder is used to produce other fluorine-based chemical products.

1.3 Waste Confinement and Effluent Controls

1.3.1 Gaseous Effluents

All areas in the UF_6 process that produce dusts, mists, or fumes containing uranium or other toxic materials are provided with dust collectors, scrubbers, or ventilation equipment to reduce employee and environmental exposures. Refer to the Source Material License SUB-526 for cold traps and off-gas cleanup.

The ventilation system used in the UF_6 process area consists of a series of fresh air intake units and a series of exhaust fans. The total air flow through the process building is sufficient to ensure a complete air changeout approximately once every five minutes.

The main control room has an emergency fresh air blower used to maintain positive pressure. The emergency blower and the heat and air conditioning systems are connected to a common fresh air ventilation duct located outside the UF_6 process building. An in-line damper is used to take in air from either the East or West side of the UF_6 process building.

There are approximately (52) individual stacks and exhaust fans associated with the operation of the UF_6 facility which could contain significant concentrations of uranium. These exits are sampled continuously at isokinetic flow conditions. Stack samples that could have a high loss potential are collected twice per 24 hours and are counted for alpha radioactivity. If the loss potential is small, the samples are collected once every 24 hours.

In addition to the analysis of air samples, operating personnel provide continuous surveillance of the operation of pollution control equipment. Analytical samples are routinely analyzed to insure that emissions are minimized. Other precautions are taken

as necessary to insure optimum performance of pollution control equipment.

Stack discharge alarms have not been found to be feasible for use in the large number of plant stacks which are continuously sampled for natural uranium. Operational and administrative controls are utilized to shut down equipment when the concentration of uranium in the exit stack exceeds the established administrative limit for that stack.

A release of UF_6 could occur when equipment containing this material is opened for inspection or maintenance activities. Normally two or more individuals are present during these activities. They would be able to detect a UF_6 leak immediately, and in most cases, stop the source of the leak at that time. Administrative controls, e.g., "The UF_6 Release Control Procedure", attached as Appendix "A", are utilized where the leak cannot be immediately contained.

Accidental spills of other hazardous chemicals such as hydrofluoric acid (HF), fluorine (F_2), or ammonia (NH_3) are not expected to have a significant impact on UF_6 operations because the UF_6 operations control room is maintained under a positive pressure and an auxiliary fresh air blower is also available to prevent entry of hazardous gases during an emergency. Additionally, minimal inventories (in process lines) are maintained in the Feed Materials Building. Bulk storage for these other hazardous chemicals is provided outdoors away from the Feed Materials Building.

1.3.2 Liquid Effluents

All liquid wastes from the facility are discharged through the main effluent via natural drainage into the Ohio River. The main plant effluent is continuously sampled, and the composite sample is analyzed daily for uranium. Suspended solids, pH, and fluoride are analyzed in accordance with the NPDES permit.

Wastewater that may contain uranium, except the HF water scrubber liquors and the uranium recovery leach liquors, is routed through settling ponds No. 3 and No. 4 which are used as uranium spill control ponds. These ponds receive spent ammonium sulfate solutions from the pretreatment facility and all other uranium-contaminated water that does not contain significant fluoride concentrations. As the effluent leaves the second uranium pond, a flow totalizer records the flow, and a flow proportional 24-hour

composite sample is collected. The pH and uranium content of the composite sample is analyzed daily. The effluent from the uranium settling ponds is then mixed with the remainder of the facility effluent before the plant outfall is sampled and discharged.

Administrative controls are utilized in conjunction with daily sampling to limit liquid effluent concentrations of uranium. The administrative investigation level is established at 10% of the NRC public dose limit, which is considered ALARA for materials facilities. In the event of a major spill which could significantly increase effluent water concentrations of uranium, additional controls, e.g., diking, neutralization, etc., are utilized to minimize the environmental impact.

1.3.3 Solid Materials

Radioactive solid wastes are generated from routine operation of the UF_6 facility. The routine wastes generated consist primarily of contaminated blotting paper, floor sweepings, cleaning rags, etc. Disposal of this contaminated trash is accomplished through a licensed radioactive waste disposal firm. The solid radioactive materials generated in the uranium recovery facility consist primarily of inorganic fluorides that contain residual natural uranium, natural thorium, and uranium daughter products. These materials are shipped to a licensed disposal site. As an alternative, solid wastes in the form of bed material and filter fines, may be shipped off-site for recovery of uranium and subsequent recycle.

1.3.4 Contaminated Equipment

Contaminated pieces of process equipment and piping being discarded are decontaminated when feasible. They are then compacted before disposal at a licensed site. Non-contaminated scrap metal is sold to various scrap metal dealers. Thorough radiation monitoring is done to assure that the residual radioactivity level is below applicable NRC guidelines.

1.4 Process Design and Construction

All major equipment is of standard chemical plant design and construction. Vessels critical to safe operation are constructed in accordance with ASME Codes. Process flow diagrams, and safety and control instrumentation used in the major process areas are depicted in Drawings MTW 2869, 3392, 3393, 3396, 3401, and 3010 "Appendix D".

The Feed Materials Building is the only location which contains significant quantities of liquid UF_6. Process vessels which may contain significant quantities of UF_6 are listed in Table 1.3, page 1-11.

The location of additional significant quantities of radioactive and non-radioactive materials is shown on Drawing MTW 4781 "Appendix D".

TABLE 1.3
TYPICAL QUANTITIES OF UF_6 IN FEED MATERIALS BUILDING

Basement Equipment	UF_6
UF[redacted]porizer	10,000 lbs.
UF_6 Vaporizer Flush Pot	100 lbs.
*High Boiler Still	1,000 lbs.
**Low Boiler Still	2,000 lbs.
High Boiler Pot	10,000 lbs.
Low Boiler Pot	10,000 lbs.
1st Floor	
UF_6 Cylinder Fill #1 }	
UF_6 Cylinder Fill #2 }	Normally one
UF_6 Cylinder Fill #3 }	station has 27,000 lbs.
Uf_6 Cylinder Fill #4 }	Other three are empty.
Sampling System	
Sample Cold Traps	100 lbs, 50 lbs. in one. Other empty.
2nd Floor	
"A" Fluorinator }	Normally two on
"B" Fluorinator }	line containing 20 lbs.
"C" Fluorinator }	
UF_6 Dump Tank	0 lbs.
6th Floor	
#1 Low Boiler Still Condenser }	Normally one is on
#2 Low Boiler Still Condenser }	line and contains
#3 Low Boiler Still Condenser }	200 lbs.
#[redacted] Boiler Still Condenser }	
A1 Primary Fluorination Filter	
A2 Primary Fluorination Filter	Normally, two sets of
A-3 Primary Fluorination Filter	filters on line containing
B1 Primary Fluorination Filter	approximately 75 lbs.
B2 Primary Fluorination Filter	
B3 Primary Fluorination Filter	
C1 Primary Fluorination Filter	
C2 Primary Fluorination Filter	
C3 Primary Fluorination Filter	
A1 Secondary Fluorination Filter	
A2 Secondary Fluorination Filter	
A3 Secondary Fluorination Filter	
B1 Secondary Fluorination Filter	
B2 Secondary Fluorination Filter	
B3 Secondary Fluorination Filter	
C1 Secondary Fluorination Filter	
C2 Secondary Fluorination Filter	
C3 Secondary Fluorination Filter	

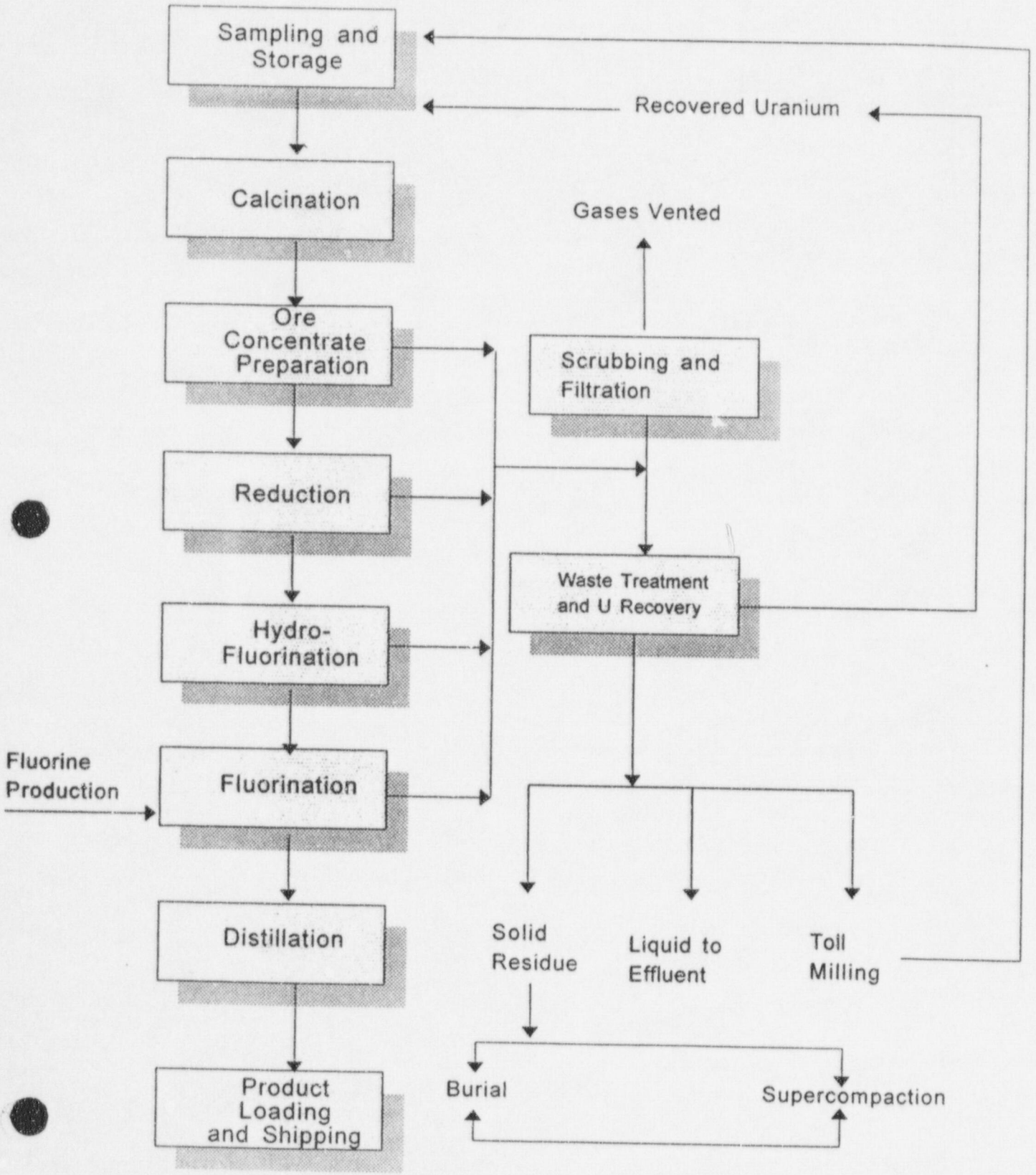
3rd Floor	
#1 Still Feed Tank	20,000 lbs.
#2 Still Feed Tank	20,000 lbs.
#3 Still Feed Tank	20,000 lbs.
4th Floor	
1A Primary Cold Trap	9,000 lbs.
2A Primary Cold Trap	9,000 lbs.
3A Primary Cold Trap	9,000 lbs.
4A Primary Cold Trap	9,000 lbs.
1B Primary Cold Trap	9,000 lbs.
2B Primary Cold Trap	9,000 lbs.
3B Primary Cold Trap	9,000 lbs.
4B Primary Cold Trap	9,000 lbs.
Alt. Primary Cold Trap	9,000 lbs.
Product Condenser	200 lbs.
5th Floor	
1A Secondary Cold Trap	1,700 lbs.
2A Secondary Cold Trap	1,700 lbs.
3A Secondary Cold Trap	1,700 lbs.
1B Secondary Cold Trap	1,700 lbs.
2B Secondary Cold Trap	1,700 lbs.
3B Secondary Cold Trap	1,700 lbs.
1A Tertiary Cold Trap	1200 lbs.
2A Tertiary Cold Trap	1200 lbs.
1B Tertiary Cold Trap	1200 lbs.
2B Tertiary Cold Trap	1200 lbs.
Sample Cold Trap	1000 lbs.
UF_6 Surge Tank	-0-

* Located on Floors Basement through 2nd.

** Located on Floors Basement through 5[redacted]

Figure 1.1

UF6 FACILITY FLOW CHART



Date: June 1996

2.0 ENGINEERED PROVISIONS FOR ABNORMAL OPERATIONS

2.1 Criteria for Accommodation of Abnormal Operations

2.1.1 Process Systems

The UF_6 distillation process is controlled primarily through use of process instrumentation located in the central control room. Essential temperature and pressure readings are continuously recorded. The quantity of UF_6 in critical process vessels is continuously monitored by weight recorders or weight indicators to prevent overfilling. Pressure and weight indicators are attached to alarms to alert the operator of an abnormal operating condition for critical equipment (the operator also records essential data on a log sheet approximately every two hours). Deviations from established operating conditions are expeditiously corrected. If the abnormal condition cannot be readily corrected, the unit is shut down until the abnormality has been corrected. The major process systems are electrically interlocked to assure the proper sequence of startup and shutdown of the process.

2.1.2 Alarm System and Release Prevention

The UF_6 distillation process is designed to provide containment of UF_6 and to insure safe operating conditions. Materials of construction for the process vessels and piping are selected to provide excellent resistance to corrosion. There are numerous places throughout the distillation system where double, and in some cases, triple block valves are used to assure isolation of process vessels in case of an emergency or abnormality. In most cases, welded construction is used rather than flanged or threaded connections to minimize the possibility of a UF_6 release. The process vessels were fabricated and are maintained in accordance with applicable engineering standards and codes. The process vessel relief system is a closed system. If a vessel should become overpressured due to an abnormal condition, the design provides an alternate storage vessel for containment of the UF_6 which might have otherwise escaped to the atmosphere. An emergency shutdown button will automatically close critical process control valves in the event of an emergency or abnormality.

Allied owned containers used to package UF_6 comply with the provisions of ANSI N14.1. The UF_6 cylinders are inspected for visible defects when received, prior to filling, after filling, and prior to shipment in accordance with the Quality Assurance Program and other plant operating procedures. Customer owned

containers used to package UF_6 at Metropolis Works must be leak free as determined by a pressure test and must pass the visual inspections mentioned previously.

The "process piping to cylinder valve" connectors used for filling the cylinders are routinely inspected and maintained locally. The connections are leak-tested each time one of the connections is re-established. The connector is evacuated and purged of UF_6 before each disconnect from the cylinder or process piping.

Each product UF_6 cylinder is filled, liquid phase, in one of four (4) fill positions. The UF_6 continuous sampling system is normally used to obtain a UF_6 sample between the high boiler column and the product take-off control valve. The following controls are utilized to minimize movement of hot cylinders and to minimize the potential of a cylinder overfill:

a. Two sets of load cells are used to monitor cylinder filling operations. The load cell weights are continuously indicated and recorded in the control room. A separate UF_6 product flow totalizer is utilized to measure the amount of UF_6 filled into a cylinder. A manual calculation is also performed of flow rate vs. time to determine, by a third method, when the cylinder has been filled to the plant administrative limit. Cylinder filling operations are not conducted unless at least two independent methods exist for determining the amount of UF_6 filled into the cylinder.

b. After filling, the cylinder is lifted approximately four inches using a crane, which is equipped with a built-in digital scale. The crane is remote control operated which allows operation from ground level rather than from an elevated crane cab. Thus, immediate escape is provided for the operator in the event of an accident. This weighing is used to verify the fill weights.

c. The cylinder is then lifted vertically about 8-10 feet above the fill position and moved horizontally about 50 feet and lowered onto a beam scale buggy for final product weight determination.

d. The weighed cylinder is then transferred to a mobile storage buggy using a vertical lift of about six feet and horizontal movement of approximately ten feet.

e. The mobile storage buggy is transported to a designated cooling area where the cylinder remains on the buggy for a minimum of four days for product solidification. The product cylinder is then transferred to the UF_6 cylinder storage area. Cylinders are not shipped unless the contents have been allowed to solidify for a minimum of four days prior to shipment.

The primary alarm system utilized to alert personnel to an accidental release of uranium hexafluoride is an evacuation siren located in the Feed Materials Building. This alarm is manually activated from the control room. The alarm is sounded as a result of visual observation of a significant release of UF_6. Plant personnel respond in accordance with an established plant procedure titled "The UF_6 Release Control Procedure", (attached as Appendix A). Equipment related to the source of the release is immediately shut down, the release is brought under control, and repairs are initiated promptly.

2.1.3 Support Systems

2.1.3.1 Structural Performance Vs. Site Environmental Factors

2.1.3.1.1 Severe Natural Phenomena

Vessels used in the UF_6 conversion and deconversion processes are fabricated in accordance with A.S.M.E. Codes. The entire processes are constructed using standard chemical plant design; however, special metals and alloys are used extensively in UF_6 and fluorine systems. Performance of these systems is more fully discussed later.

The plant site is located in the Central Mississippi Valley seismic region which produced the New Madrid earthquake of 1811-1812; however, the plant is not in the most active part of this seismic region. Seismologists are unable to predict the recurrence rates for destructive earthquakes because of their infrequent occurrences. Nevertheless, indications are that major earthquakes originating along the New Madrid fault zone are capable of causing substantial damage in the Metropolis area.

A severe earthquake or tornado which might impact directly upon the Feed Materials Building may cause

substantial property damage and could result in a significant release of source material. Seismic studies have been performed, and the implementation of study recommendations is in progress.

2.1.3.1.2 Confinement of Barriers and Systems

Process equipment associated with the production of UF_6 is provided with filters and scrubbers in series to prevent environmental release. Additionally, dust collectors and vacuum pumps are used, when feasible, to prevent leakage of material into workroom air. Adequate surge capacity is provided to allow material transfers prior to reaching alarm levels for fill capacity.

Uranium ore concentrates are normally stored on concrete pads that are diked and equipped with sump pumps, which provide recovery of uranium spills. Concentrates may also be stored on crushed stone pads if space is not available on the concrete pads. Additionally, a series of settling ponds is utilized for cleanup and containment of plant uranium spills. A comprehensive spill control program is utilized throughout the plant.

2.1.3.1.3 Access and Egress of Operating Personnel and Emergency Response Teams

The 59-acre plant operating area is surrounded by two six-foot cyclone fences with three strands of barbed wire at the top. Surveillance cameras are utilized by the security guards to monitor personnel at the entrance gates 24 hours a day. Entrance to the restricted area is made through the main gate, construction gate, or the Sampling Plant gate. Off-duty personnel entering the plant in response to an emergency would also enter and exit through these control points.

Clearance of plant aisles, roadways and stairwells are maintained during normal operations to allow emergency response personnel to respond in the event of an emergency. A control point is established to limit access by operating personnel, into an area where an actual emergency exists, e.g., UF_6 release, chemical spill, or fire.

2.1.3.1.4 Fire and Explosion Resistance and Suppression

Essentially all process areas are constructed of concrete and steel which pose a minimal fire hazard. Storage room areas which contain combustible or flammable materials are provided with sprinkler systems. Fire extinguishers are available throughout the plant, and a trained Emergency Response Team is available to utilize the fire fighting equipment maintained in the plant.

LPG may be used at any time as an alternative to the plant natural gas supply. The hazard associated with a release of LPG is a potential for fire and/or explosion. There are three LPG storage tanks at Metropolis Works with capacities of 30,000 gallons each. A day tank which has a capacity of 1,000 gallons is also in service when LPG is being consumed. The LPG storage area is flanked by two deluge spray nozzles capable of delivering 250 gallons of water per minute each at a pressure of 85 PSIG. Other possible hazards include asphyxiation and frost bite. The most likely cause of a release of LPG would be leaking equipment (e.g., valves, pumps, lines, etc.). Additional procedures to minimize fire incidents are outlined in the plant Emergency Response Plan, Section D. Refer to Drawing MTW-A4825 for the location of fire water lines.

2.1.3.1.5 Shielding

The extensive use of radiation shielding is not necessary in a plant processing natural uranium compounds due to the very low specific activity; however, personnel TLD dosimeters are worn by the employees to determine actual exposure.

2.1.4 Control Operations

The performance of equipment, piping and instrumentation to operate within designed specifications is determined by routine testing, inspection and calibration. Inspection schedules are established for specific pieces of equipment and instruments that are critical to the safety and quality of the operation. The inspection frequency is determined by operating experience,

company engineering and/or vendor specifications, or a combination of these. Established inspection programs exist for the UF_6 cylinder handling crane, the UF_6 cylinder handling fork truck, rupture discs, relief valves, critical vessels, UF_6 product cylinders. the UF_6 cylinder scales, UF_6 cylinder buggies and critical instrumentation.

The frequency of these inspections range from daily visual inspections by operating personnel to weekly, monthly, quarterly, semi-annual, annual, or two and three year intervals. The maintenance inspections are documented and results maintained for a minimum of one (1) year.

Non-destructive testing of equipment is routinely done on a scheduled basis. In addition, non-scheduled testing can be readily performed if deemed necessary. Non-destructive tests currently performed are:

a. Ultrasonic thickness testing of critical vessels and piping.

b. Vibration analysis of critical rotating equipment.

c. Eddy Current testing of heat exchanger "U" tube bundle tubes.

d. Stroboscope visual inspections of external rotating members of operating equipment.

e. Infrared inspections of electrical equipment and switch gear.

2.2 Demonstration of Engineered Provisions for Abnormal Operations

2.2.1 Process Systems

Process equipment which fails to perform properly will normally trigger an alarm. The malfunctioning equipment is shut down and repaired or replaced. Process instrumentation, alarms, and interlocks are checked and calibrated in accordance with the previous section. If the instrumentation is found to be defective, the Inoperative Instrument Procedure included in the unit's operating procedures manual should be followed. Additionally, an annual maintenance shutdown is taken during which major process equipment is inspected for defects which might result in an abnormal release of material.

2.2.2 Alarm Systems and Release Prevention Capability

The alarm system utilized to alert personnel to an accidental release of uranium hexafluoride (UF_6) is tested monthly. Gaseous alarm systems capable of detecting UF_6 below the visual threshold of 1 mg/m^3 are slower in response and less reliable than actual visual observation. The major strength of visual observation is that it allows an immediate response in shutting down the equipment, isolating the source of the release and thus, minimizing loss of material and area contamination.

2.2.3 Support Systems

Support systems consist of vacuum cleaners, dust collectors, cold trap vacuum system, vessel relief containment system, instrumentation, automatic shut-down circuits, remote operated control valves, and personal protective equipment.

Performance of the vacuum cleaners, dust collectors and cold trap vacuum systems is monitored by visual checks by operating personnel via pressure/vacuum gauges and routine internal inspections of dust collectors and vacuum cleaners. Cold trap vacuum systems are monitored via pressure/vacuum gauges. Redundant equipment provides a reliable source of vacuum. Relief valves, instrumentation, automatic shutdown circuits, pumps, blowers, and piping performance is monitored by procedures described previously.

2.2.4 Control Operations

The primary responsibility for auditing the routine safe operation of process equipment is delegated to the employee performing the job and his immediate supervisor. Plant Reliability personnel provide additional effective controls for assuring continued safe operation of process equipment. The primary function of this group is to: perform failure analyses of process equipment; plan and schedule performance testing of process vessels, equipment, and instrumentation; perform non-destructive testing of critical process equipment to detect any deterioration from normal safe operation.

In addition, the Quality Assurance Program has been developed to provide for verification of controls in the areas of design, procurement, operation, modification, and maintenance of the facility. The Quality Assurance Program provides that selected activities are verified as being correctly performed, that QA

functions are performed independent of the individual or group directly responsible for the performance of the activity and that the QA organization has sufficient authority and organization freedom to identify quality related problems; to initiate, recommend, or provide solutions; and to verify successful implementation of corrective actions. Verification may be via audit, investigation, or surveillance or by other means necessary to verify compliance with approved plant policies, programs, or procedures.

Quality Assurance personnel also perform investigations of significant events in order to determine the root cause and prevent future occurrence. Documentation of Quality Assurance activities is forwarded to responsible plant management for information and further action as deemed necessary.

3.0 Classes of Radiological Contingencies

3.1 Classification System

The UF_6 conversion/deconversion facility processes only natural uranium. Chemical toxicity of uranium to the kidney rather than radiation dose is limiting for exposure to soluble forms of natural uranium. For this reason, the EPA Protective Action Guideline exposure levels and criteria would not be appropriate for this type of facility.

The Metropolis Plant has been converting uranium into UF_6 since 1958 except for a four-year period from 1964 to 1968. These many years of operating experience indicate the potential for public exposure resulting from a spill of uranium oxide or uranium tetrafluoride (UF_4) is insignificant due to the large particle size and high density of the solid material processed in the reaction vessels. A spill of UF_6 is considered the only credible radiological event which might have an off-site impact. However, a number of other plant emergencies have been evaluated, and are included in the classification system provided in Section 3.2.

Uranium Hexafluoride (UF_6), when released to the atmosphere, reacts with the atmospheric moisture to form HF and particulate UO_2F_2. The corrosive properties of UF_6 and HF are such that exposure can result in skin burns and temporary lung impairment. The UO_2F_2 and HF which form quickly during a release, are readily visible as a white cloud. A concentration of 1 mg of UO_2F_2/m^3 of air is visible as a white haze, and the cloud from a large release may obscure vision. For this reason, the control of UF_6 releases is of primary concern and requires preplanning with respect to emergency procedures and equipment. The plant "UF_6 Release Control Procedure" has proven effective in mitigating the effects of a UF_6 release and is incorporated, as a basic resource, into this Radiological Contingency Plan. The UF_6 Release Control Procedure is provided in Appendix A.

The most reliable warning property of released UF_6 is visual observation of the white vapor due to HF and UO_2F_2 formation. Visual observation provides an immediate warning of a leak which may be observed by employees working in the operating area or detected through a series of TV monitors installed in critical liquid UF_6 transfer areas. Ionization-type industrial smoke detectors with control room alarms have also been installed for detecting UF_6 releases; however, they do not appear to provide more immediate detection than visual observation.

Computerized dispersion modeling has been utilized to determine the quantity of UF_6 released inside the process building which after exiting building vents, would result in a visible plume at the nearest fence line (230 meters). The Industrial Source Complex - short term (ISCST) model

calculations indicate a release of 120 pounds of UF_6 would be required to produce the visual threshold concentration of UO_2F_2 at the fence line. It was assumed the release occurred over a 30-minute period, under conditions of "D" stability, and average site wind speed of 3 meters/sec. It was estimated that approximately 1/3 of the actual released quantity would escape through building vents over the 30-minute period. The ISCST model provides for building downwash effects and volume source releases; however, particulate deposition of UO_2F_2 was not considered in the calculations once the plume exited the building. It should be noted that the plant has never experienced a UF_6 release larger than 100 pounds.

The visual threshold of UF_6 decomposition products provides an immediate warning which is utilized within the plant to trigger Administrative controls and evacuation procedures. This threshold is also utilized to declare a "Site Area Emergency". Use of this criteria is effective for members of the public since it is highly unlikely that an informed individual would remain in a cloud of material which he can actually see and smell.

The visual threshold may also be utilized during night time or other limited visibility conditions at the plant restricted area fence line because these outside areas are well lighted to permit employees to work there during the normal continuous operation of the plant. The Chief Control Officer is responsible for escalating or downgrading the category of the event declared in accordance with the criteria described in this plan. The Chief Officer is responsible for making telephone notification to appropriate off-site agencies. A "Site Area Emergency" will be reported to the USNRC Operations Center immediately after notification has been made to the local and state agencies (see Section B, Support Agencies, Emergency Response Plan). The NRC Operations Center will also be notified of an "Alert". Pages B-1 and B-2 ERP.

3.2 Classification of Emergencies

It is imperative that several factors be considered in emergency classification when that emergency is due to a UF_6 release. The primary consideration must be the level of threat that the situation imposes on the health and safety to both employees and the general public and the potential impact on property and the environment. Consideration must be given to the quantity of material released, the duration of that release, the dispersion characteristics of the resulting release cloud, and the potential impact of the release on people and the environment. For this reason, some evaluation and interpretation is required. The classification of emergencies is not necessarily progressive. For example, the release of a significant quantity of UF_6 might immediately be classified as an Alert, or, in very extreme cases, a Site Area Emergency depending upon the severity

of the situation. Guidelines for the classification of emergencies are as follows:

3.2.1 Plant Emergency

A plant emergency is defined as a minor incident or situation that deviates from normal operation and that could, under certain conditions, escalate to an Alert although this is not likely. Any release of UF_6 that cannot be stopped and mitigated almost immediately must be considered a Plant Emergency. A Plant Emergency would result in a haze or a release cloud that may or may not be visible outside the Feed Materials Building. A small wisp of material that can readily be contained using a vacuum hose would not be considered a Plant Emergency. The release of a very small quantity of material when the release is stopped immediately and the resulting "smoke" dissipates very quickly would not constitute a Plant Emergency either. These situations are most likely to occur when disconnecting a fitting or operating a valve when there is still some level of control over the operation being performed. An emergency occurs when the situation gets out of control for even a relatively short period of time. Typical events which fall within this classification are:

- Minor "Puff" of UF_6 or a UF_6 release that may be visible outside the Feed Materials Building but does not meet the criteria for an Alert. Vision would likely be impaired on at least one floor.
- Minor uranium powder spill
- Chemical solution spill
- Loss of primary electrical supply
- Minor fire
- Hazardous weather
- Minor toxic gas release
- Personal injury of plant employee

Response Actions

- Assess the magnitude of the incident.
- Initiate the UF_6 Release Control Procedure.

- Activate the UF_6 evacuation siren.
- Notify the appropriate on-site response organization, e.g., medical, Emergency Response Team, Health Physics, etc.
- Terminate the release.
- Perform appropriate decontamination.
- Dispatch health physics monitoring technicians if required.
- Perform maintenance on malfunctioning equipment as appropriate.

3.2.2 Alert

An alert is defined as a situation in which events may occur or have occurred that could lead to a release of UF_6 which is not expected to require assistance from off-site organizations to protect members of the general public. Once the release has been classified as a Plant Emergency, and the UF_6 Release Control Procedure has been activated, the following criteria may cause the situation to be upgraded to an Alert. Complete evacuation of the plant is not anticipated, however, the release cloud does have the potential to be visible at the fence line.

a. The release cloud becomes visible at the edge of an imaginary circle with a radius of approximately 150 feet from the location of the release and is of sufficient quantity to potentially reach the fence line that defines the restricted area. The boundaries of this circle are approximated by the north end of the ore calciner to the north, the tank farm to the east, the liquid fluorine unit to the south, and the forepersons' offices to the west. A very faint haze at the edge of this circle may not necessitate an upgrade if there is very little potential that this cloud will reach the fence line and the emergency situation is under control.

b. If the release is determined to be a significant quantity and the cloud outside the building is very dense, the event may be upgraded to an Alert even if the release cloud has not reached the edge of this imaginary circle.

c. If it is determined that the release cannot be stopped promptly, the emergency may be upgraded to an Alert even if other criteria for an Alert are not met.

Example of events that may be classified as an Alert are as follows:

- Upgrades from Plant Emergency Category.
- The release cloud is visible at the edge of the area mentioned above, but has not reached the fence line.
- Hazardous weather including earthquakes and tornadoes.
- Major fire or explosion.
- Major hazardous chemical release.
- Bomb threat.

Response Actions

- Stop or contain the UF_6 spill.
- Initiate the UF_6 Release Control Procedure.
- Activate the plant disaster siren.
- Escalate to "Site Area Emergency" if UF_6 cloud reaches the plant fence line.
- Perform Health Physics monitoring and bioassays as required.
- Perform appropriate decontamination.
- Activate the plant "Emergency Response Plan" for fires, explosions or chemical spills.
- Notify the Shift Supervisor, Decontamination Foreman, Health Physics Dept., and Emergency Response Team captain (for fires, explosions or chemical spills).
- Notify the NRC Operations Center within one hour of declaring an "Alert". Make notification to IDNS within two hours.

3.2.3 Site Area Emergency

A Site Area Emergency is a condition in which events are in progress, or have occurred that could lead to a significant release of UF_6 and may require a response by off-site response organizations to protect persons off-site. Protective actions may include evacuation of facility

areas and relocation of assembly areas. Typical events which fall in this classification are:

- Upgrades of events from the "Alert" category.
- A UF_6 release which is visible exiting building vents and is visible passing over the fence line.
- Natural disasters or civil disturbances which threaten the safety of operations and the plant is shut down to reduce the potential for a major UF_6 release.

Response Actions

- Initiate the UF_6 Release Control Procedure.
- Activate the plant disaster siren.
- Determine wind direction and alert nearest residents if required.
- Perform Health Physics radiation and environmental monitoring as appropriate.
- Perform appropriate decontamination.
- Activate the plant "Emergency Response Plan" for fires, explosions and chemical releases.
- Notify the local ESDA coordinator, and the Illinois Department of Nuclear Safety (IDNS) immediately.
- Notify the NRC Operations Center and NRC Region III within one hour of declaring a "Site Area Emergency".
- Notify AlliedSignal Headquarters.
- Notify the National Response Center if more than 440 pounds of UF_6 are released, or any other chemical release exceeds the reporting quantity.
- Conduct a meeting of RCP officers to investigate, document, and revise procedures to prevent a recurrence.

The UF_6 Release Control Procedure will only be activated in the event of a "Plant Emergency", an "Alert" or a "Site Area Emergency". In the event of a release of an EPA listed hazardous chemical to the environment, the plant

Emergency Response Plan would be activated. A list of hazardous chemicals used in the plant is provided in Table 1, Section B, Support Agencies, Emergency Response Plan. A listing of the MSDS sheets that have been sent to the Massac County Emergency Planning Commission, the Illinois Emergency Services and Disaster Agency, and the Massac County Fire Department is provided in Table 2, Section B, Support Agencies, Emergency Response Plan. In addition, MSDS sheets are maintained in the Health Physics Office and in selected areas throughout the plant. Monthly chemical effluent reports are maintained in the Environmental Supervisor's office.

The AlliedSignal, Metropolis Works facility complies with the EPA SARA Title III regulations also known as the "Emergency Planning and Community Right-To-Know Act of 1986." These regulations require submission of certain Material Safety Data Sheets (MSDS) to County and State Emergency Planning Agencies (SARA 311), the submission of a hazardous chemical inventory (SARA 312), and the annual emission of certain regulated chemicals (SARA 313). A hazardous chemicals inventory for the Metropolis plant is provided in Table 1 Section B, Support Agencies, Emergency Response Plan. The list contains the chemical by name, the typical quantity on site, and the primary locations of use and storage. Typical quantities will vary somewhat, depending on the production requirements.

3.3 Range of Postulated Accidents

A number of potential accident situations, ranging from trivial to very serious have been analyzed for events which could occur in the plant. A large UF_6 release is the only radiological event which has the potential to cause health hazards to the nearby population.

Postulated accidents for the release of other non-radioactive chemicals are provided in the "Application for Renewal of Source Materials License SUB-526", June 1995, Chapter 14, "Accident Analyses". Although a major chemical spill might have an impact on the nearby population, a condition cannot be hypothesized in which a major chemical spill would result in the release of UF_6. During such an event the UF_6 production operation could quickly be shut down, as occurs during a power outage, and employees evacuated from the affected production areas.

The currently installed engineered safeguards in the UF_6 cylinder filling and handling area are adequate to preclude a large uncontrolled release of UF_6 which might produce significant off-site consequences.

3.3.1 Maximum Credible UF_6 Release

The maximum credible UF_6 release which could occur in the plant is believed to result from a UF_6 "pigtail" failure. Presently installed engineered safeguards: automatic closure device on cylinder valve, and automatic closure devices on the UF_6 filling manifold would limit the UF_6 available for release to 290 pounds.

Computerized dispersion modeling has also been used to determine the potential impact of this maximum credible accident. Using the conservative assumption that 1/3 of the indoor release escapes the building vents, the calculated concentration at the nearest fence line would be 2.4 mg/m^3 of UO_2F_2 in air. This concentration is visible and would be declared a "Site Area Emergency". If a member of the public were present at the fence for the entire duration of the 30 minute release modeled, the intake of soluble uranium would be 1.1 milligrams. This intake is below the intake threshold of 8 mg of uranium which might produce some transient changes in urine - indicating some effect; and significantly below the 40 mg intake level which may be the beginning of permanent kidney damage.
Although a release of this magnitude might be visible at the nearest plant boundary, it would not be expected to produce measurable changes in the off-site environment.

3.3.2 Hypothetical UF_6 Release

Although the currently installed engineered safeguards in the UF_6 cylinder filling and handling area are believed to be adequate to preclude a large uncontrolled release of UF_6 which might occur from a cylinder failure, such an incident has been modeled to determine the hypothetical public health impact. The following assumptions were utilized with the ISCST dispersion model:

1. The entire contents of a liquid UF_6 cylinder are released over a 15 minute period, inside the process building.

2. Complete hydrolysis of UF_6 to release 6,140 lbs. HF and 18,256 lbs. of uranium (uranium concentration x 0.336 = HF concentration).

3. Approximately 1/3 of the release escapes the building through vents and exhaust fans resulting in a source term of 3067 gm/sec. as uranium.

4. Average site wind speed of 3 m/sec. and "D" stability category were assumed.

The distance to the nearest plant residence is 564 meters in a NNE direction. The modeling results indicate a peak center line concentration at this receptor of 190 mg/m^3 uranium. Dosage calculation assume an exposure period of 18 minutes for this receptor due to reduced concentrations from the front and tail of the plume as it passes. The maximum calculated intake for an outdoor receptor at this location is 68.4 mg of soluble natural uranium; however, an individual properly informed would immediately take cover inside his dwelling, close windows and doors, and shut down dwelling ventilation during the 18 minutes of plume passage. Protection factors provided by dwellings under these conditions have been estimated to range from 5-15, depending on age, type of construction, etc. Using a protection factor of 5, the resulting intake would be 13.7 mg of uranium. A uranium intake of this magnitude might produce some transient kidney changes. Some reference documents indicate that an intake of 40 mg is a reasonable estimate of the threshold at which permanent kidney damage might begin to occur.

The calculated outdoor concentration of HF in the plume is 63.8 mg/m^3. This level is considered dangerous. Above 26 mg/m^3, HF would cause irritation and possible health effects; however, sheltering inside a dwelling would reduce the exposure to about 13 mg/m^3 and result in an intake of 4.6 mg. This intake of HF would not expected to produce any long-term health effects since an industry worker could receive an intake of 20 mg from one eight hour shift at the threshold limit valve (TLV) of 2.5 mg/m^3.

4.0 Organization for Control of Radiological Contingencies

4.1 Normal Plant Organization

The normal plant organizational structure is depicted in Figure 1, Section A, Organization/Activation, Emergency Response Plan. Due to plant operations, supervisory personnel are on duty 24 hours per day, seven days per week. The Production Shift Supervisor on duty has the overall responsibility for implementing the UF_6 Release Control Procedure and The Radiological Contingency Plan.

4.2 Normal On-Site Emergency Organization

The normal on-site Radiological Contingency Organization is shown in Figure 2, Section A, Organization/Activation, Emergency Response Plan. The Radiological Contingency Plan used in conjunction with "The UF_6 Release Control Procedure" defines responsibilities for assuring prompt reaction and control for a major UF_6 release which could impact upon employee health or members of the public. Alternate personnel are provided for each area of responsibility to assure timely response during an emergency.

4.2.1 Direction and Coordination

The Plant Manager is the Chief Officer for Radiological Contingencies. His responsibilities include overall coordination of the plan. He is responsible for liaison with local, state and federal agencies and AlliedSignal Headquarters. He coordinates and reviews all releases of information to the public and news media. He is advised of controls implemented through the Chief Control Officer and apprised of support readiness through the Assistant Chief Officer.

4.2.2 Plant Staff Emergency Assignments

The duties and responsibilities of each officer in The Radiological Contingency Plan and the Emergency Response Plan are outlined in Section A, Organization/Activation, Emergency Response Plan.

4.3 Off-Site Assistance to Facility

The Chief Officer (Plant Manager) or his designee is responsible for reporting the following information to the off-site agencies and to the NRC:

1. Time of the UF_6 release and the meteorological conditions.
2. Release location and release classification.
3. Current facility status.
4. Brief description of personnel injuries and/or property damages.

5. Recommended protective actions.

The Plant Manager (Chief Officer), the Environmental/Regulatory Affairs Manager (Chief Officer Alternate), and the Capital/CLC Engineering Manager (Assistant Chief Officer) are the three people, in order of priority, who provide communications to the media and outside response organizations. Local media and response organizations have been informed that these persons are the primary communicators and that all communications they receive from plant personnel should be verified by a return call to the plant. This action is necessary to prevent emergency response to a "prank" call.

During a Site Area Emergency or drill, the Chief Officer or his designee will contact local officials by calling 9-1-1 to inform them that an emergency or drill is underway. Also, any time that plant radio communications are being used during a simulated emergency, the Communications Officer will announce over the radio, at regular intervals, that a test drill is underway. This prevents unnecessary alarm of members of the public who may intercept plant radio messages.

Press releases that result from local plant activities or conditions are drafted by the Plant Manager or his designee. They are faxed to the Marketing Communications Director in Morristown, NJ for final approval. The approved document is then faxed back to the Plant Manager for release to the local media and response organizations through regular mailing, fax transmission, or through a press conference, depending on the urgency of the message.

It is the responsibility of the Director of the Massac County Emergency Services & Disaster Agency (ESDA) to activate the county siren system. In his absence the Massac County Sheriff will be responsible for this action. The current telephone list of all off-site agencies is outlined in Section B, Support Agencies, Emergency Response Plan.

The plant also has a mutual aid agreement with Massac Memorial Hospital, approximately one mile from the plant, which provides rapid and efficient ambulance service and emergency medical treatment for injured plant personnel who cannot be properly treated in the plant dispensary. (See Section B, Support Agencies, Emergency Response Plan.) The plant physician is trained and aware of the potential chemical hazards and injury treatment required for exposures to UF_6. Hospital emergency treatment personnel have also been trained in the standard treatment procedures to be used on plant personnel.

4.4 Coordination with Participating Government Agencies

See Section B, Support Agencies, Emergency Response Plan for reporting emergencies.

5.0 RADIOLOGICAL CONTINGENCY MEASURES

5.1 Activation of the Radiological Contingency Response Organization

Radiological contingency response personnel are activated through use of a UF_6 release siren and a plant disaster siren. During off-shifts and weekends, a telephone call-in list is utilized to notify responsible officers of a radiological emergency. The alerting and call-in procedure is fully described in the Emergency Response Plan in Sections A and B. Appendix B includes emergency phone numbers and the Contingency Call List.

5.2 Assessment Actions

The assessment actions to be taken for each class of emergency are described in Section 3.2. In addition, should an actual event occur with off-site consequences, AlliedSignal's Corporate Engineering Department would be asked to perform dispersion calculations to identify the potential size of the off-site plume for a chemical or radiological release. These data could then be used by plant health physics and environmental personnel to determine potential radiological dose or chemical exposures to the off-site environment. Environmental samples (soil, vegetation, or human bioassays) would then be collected from the path of the plume to measure actual environmental impact and determine what remediation actions are necessary.

5.3 Mitigating Actions

Some of the mitigating actions required by this plan are identified in Section 3.0 and in "The UF_6 Release Control Procedure" attached as Appendix A.

In addition, the following actions would be used for the events described:

- Major Chemical Spill, or UF_6 Release:

  The plant Emergency Response Team would be activated to limit and control the size of the release, rescue injured personnel, and provide immediate first aid. Team response actions may include use of fire hose fog nozzles to knock down chemical or UF_6 fumes and diking or neutralization to prevent liquid releases to the environment. A complete description of training and response capabilities is provided in the plant "Emergency Response Plan".

- Fire:
  A major fire cannot be hypothesized in a radioactive materials usage area because most construction materials are nonflammable. However,

a fire could occur in office or storage areas which are generally some distance from chemical usage areas. These areas are provided with sprinkler systems, fire extinguishers, and fire hoses. The plant Emergency Response Team would be activated to control any major fire which might occur.

- Natural Disaster (wind, tornado, earthquake):

The plant shift supervisor is provided with a weather warning radio which provides a distinctive alarm to alert the supervisor. The supervisor then can monitor the weather warning to determine potential impact on plant operations. These weather warnings are issued from the Paducah, Kentucky National Weather Service (at Barkley Airport) approximately three (3) miles south of the plant. Direct radio communications to the Metropolis City Police are also available to obtain information on natural phenomena which might affect the plant.

The decision to shut down processes or the entire plant during a major emergency is the responsibility of the shift supervisor. This individual has the necessary information and authority to determine which processes should be shut down and appropriate response actions. Experience indicates the entire plant can be shut down immediately, as the result of a major power outage, with no release of hazardous materials. Systematic securing of all operating units and dispensing of standby power normally requires approximately three (3) hours. Since the flow of all raw materials can be stopped immediately, the major emphasis during an emergency shutdown is the provision of steam to vessels and lines containing UF_6. This prevents UF_6 blockage of lines, and minimizes the potential of a UF_6 release when the production process resumes operations. The entire plant will be shut down during a "Site Area Emergency"; however, the decision to shut down processes during lower class emergency events will be made by the shift supervisor during off-shifts and weekends or the Chief Officer during day shift. This decision will be based on the best information available at that time.

5.4 Protective Actions

5.4.1 Personnel Evacuation and Accountability

A radiological emergency which could require evacuation of the entire plant restricted area cannot be hypothesized. The maximum credible accident hypothesized could require evacuation of downwind portions of the site.

5.4.2 Use of Protective Equipment and Supplies

A comprehensive respirator fitting and training program is utilized in the plant. Basic procedures used in implementing and maintaining the program are contained in the Health Physics Procedures Manual. The location and utilization of special protective equipment used in controlling a UF_6 release are listed in the Emergency Response Plan, Section A, Organization/Activation.

5.4.3 Contamination Control Measures

The spread of UO_2F_2 contamination resulting from a UF_6 release inside the Feed Materials Building is controlled by shutting down the building exhaust ventilation and allowing the particulate UO_2F_2 to settle. Standard plant decontamination procedures are utilized to decontaminate the affected area of this water soluble contaminate.

Fire hose spray may be utilized to control the spread of HF vapors which may occur outside the process building in the event of a major UF_6 release. However, water should not be sprayed directly on liquid UF_6. Rather, CO_2 fire extinguishers should be used to freeze out small liquid UF_6 releases.

5.5 Exposure Control in Radiological Contingencies

The primary exposure of concern during a major UF_6 release is skin and lung burns from HF and inhalation of soluble UO_2F_2 which is chemically toxic to the kidney. Control of these exposures is provided by requiring appropriate protective equipment for potentially exposed employees in accordance with this contingency plan. The Radiation Officer is responsible for establishing and maintaining on-site and off-site radiation monitoring equipment during a major UF_6 release. The results obtained from air monitoring may be used in conjunction with bioassay measurements and respiratory protection to assess inhalation exposures. Personnel and equipment are easily decontaminated of UO_2F_2 using soap and water. All equipment, protective clothing, and routine work clothing are provided by and stored within the facility. The plant laundry provides all cleaning and decontamination of protective equipment and clothing following a UF_6 release.

5.6 Medical Transportation

Injured employees may be transported to the plant dispensary using plant vehicles. Treatment of HF injury is initiated immediately in the field or in the dispensary. The extent of injury is determined by the Registered Nurse during day shift or Health Physics Technician during off-shifts. If the HF

injury is more serious than can effectively be treated in the plant dispensary, an ambulance is called; and the patient is transported to a hospital for additional treatment by a physician. In certain cases, the ambulance may be directed to the on-site location of injured personnel.

5.7 Medical Treatment

Off-site medical treatment of injured employees has always been supplied by Massac Memorial Hospital which has a "linkage agreement" with Lourdes and Western Baptist hospitals in Paducah, Kentucky. Massac Memorial Hospital utilizes Emergency Medical Technicians (EMT-A) and Paramedics to operate the ambulance service. The distance to both Lourdes and Western Baptist Hospitals is approximately 12 miles. Emergency room personnel are knowledgeable of proper treatment for HF injuries. Training in the treatment of HF injuries is provided to employees of these hospitals by Metropolis Works' personnel and the plant physician.

Injured plant personnel who, due to the nature of the injury, cannot have their plant clothing removed, will be transported to the hospital wearing plant clothing. The plant Health Physicist or his designee will perform monitoring and decontamination activities on hospital facilities and equipment used to treat these employees. All contaminated clothing and used decontamination supplies will be returned to the plant site.

6.0 Equipment and Facilities

6.1 Control Point

The primary point utilized for emergency control is a telephone booth located outside the UF_6 processing building by the south distillation door. Alternate sites are provided near the Ore Storage Building and the Cylinder Wash Building. If none of these three locations is appropriate, the Chief Control Officer may designate another location as the control point.

6.2 Communications Equipment

An extensive telephone system is maintained within the plant. In addition, a public address system accessed by phone is used for announcing general and emergency messages. Speakers for this system are located in all buildings, storage, and yard areas. During a plant emergency, a 5.0-watt, 2-way radio system is also used for communications. The base and mobile stations have a range of 45 miles, and individual radios have a range of about two miles. A radio is assigned to each Contingency Plan Officer. Refer to the Emergency Response Plan, Section E, Communications for a listing of these assignments.

In the event of a "Site Area Emergency", the Communications Officer will establish a communications center in the Administration Building.

6.3 Facility for Assessment Teams

The plant conference room, located in the Administration Building will normally be used for performing post accident assessment. Other alternate meeting areas are also available.

6.4 On-Site Medical Facilities

The present on-site medical facility consists of a plant dispensary containing routine first-aid supplies appropriate for the hazards present in the plant. Life preservation equipment is available for use until ambulance service arrives on site. The dispensary furnishings include a tub and shower for burn treatment, examination tables, a counter with sink, a washroom, and an office for the plant Nurse. Oxygen administration equipment is also located in this area.

6.5 Emergency Equipment

6.5.1 Health Physics Survey Instruments

Instruments which are routinely used by the Health Physics Department and which are available for emergency monitoring are listed in the following table; a minimum of one of each type is available:

SURVEY INSTRUMENTS

Type	Use	Sensitivity	Range	Calibration Frequency
Geiger Counter	General Survey	Beta-Gamma >40 KeV	0-200 mr/hr	Quarterly *
Thin window Radiation Monitor	Surface Contamination	Alpha-Beta-Gamma	0 - 50,000 CPM	Quarterly *
Scintillation Alpha Counter	Surface Contamination Air Filters	Alpha	0.3 - 1000 CPM	Monthly *
Internal Proportional Counter	Air Filters Surface Contamination	Alpha-Beta	0.1-1000 CPM	Monthly *

* Or immediately prior to use.

In addition to the survey instruments, the Health Physics Department has high and low volume air samplers which may be used to take environmental air samples. An on-site meteorological station provides wind speed and direction data.

6.5.2 Emergency Equipment

6.5.2.1 Health Physics Transportation Kit

This kit, which is under the care of the H.P. Department, contains items that might be used off-site in the event of a chemical spill or other transportation incident. It would not normally be used for on-site emergencies.

6.5.2.2 UF_6 Cylinder Patch Kit

This kit is located in the south locker room and would be used by salaried personnel for an off-site transportation incident.

The kit contains tools and equipment that would aid in patching a UF_6 cylinder.

6.5.2.3 Protective Safety Equipment Cabinet

These cabinets are located on each floor of the Feed Materials Building next to the hoist well. The protective equipment in these safety cabinets is designated for "Emergency Use Only". The equipment could be used for radiological as well as non-radiological emergencies in the building.

6.5.2.4 UF_6 Emergency Release Cabinet

These wall mounted cabinets are located near the Distillation area on each floor of the Feed Materials Building and in the Control Room. These cabinets contain tools and equipment which might be required to prevent or stop a UF_6 release. These materials are designated for "Emergency Use Only".

6.5.2.5 Distillation Emergency Cabinet

This cabinet is located at the primary control point outside the south Distillation door of the Feed Materials Building and at the Ore Storage Building. This protective equipment is designated for "Emergency Use Only".

6.5.2.6 Control Room Safety Cabinet

This cabinet which contains personal protective equipment is located in the Feed Materials Building Control Room.

6.5.2.7 Hospital Kit

The Health Physics Supervisor, the Health Physics Specialist, and the Supervisor of Health Physics Technicians have monitoring kits which are stored at their personal residences. These kits may be used during off hours to perform monitoring of the hospital facilities into which injured employees have worn contaminated clothing.

6.5.2.8 Standby Electric Generator

This diesel powered generator is located in the Power House and is used to supply standby power to the following:

a. Boiler feed pumps

b. No. 1 and 2 boilers and control instrumentation

c. Power House lights

d. Ash Vacuum Cleaner

e. Electrical Alarm for Fire Pump

f. Disaster Siren

g. Health Physics Vacuum Pump

h. A-1 Nash Vacuum Pump

i. "A" Coke Box Blower

j. Control Room Blower (FM Building)

6.5.2.9 Additional Equipment

Additional emergency equipment which is available in the plant includes such items as an on-site fire water tank, encapsulating chemical suits, four fire hose houses, numerous air packs (SCBA), fire extinguishers, and chemical spill control boxes.

7.0 Maintenance of Radiological Contingency Preparedness Capability

7.1 Written Procedures

The Health Physics Supervisor is the plant coordinator for the Radiological Contingency Plan. He will assure that the plan contains provisions for protecting both on-site and off-site personnel. All procedures are reviewed and approved by the Health Physics Supervisor and Environmental/Regulatory Affairs Manager. The plan is also reviewed and approved by the Plant Manager before being sent to the local E.S.D.A. Coordinator and I.D.N.S. for comments. Comments received from these agencies are sent with the Plan to the Nuclear Regulatory Commission (NRC).

7.2 Training

The Radiological Contingency Officers will be retrained as necessary when the Plan is changed. The Health Physics staff is responsible for this training and for providing appropriate procedures and training for radiological monitoring. These procedures are provided in the plant "Health Physics Procedures Manual." "UF_6 Release Control Procedure" training is provided for hourly employees through the "B" Council Safety Meetings.

The Emergency Response Team will be trained in accordance with Section 'J' of the Emergency Response Plan.

Health Physics first-aid personnel are trained in multimedia first-aid or equivalent. These personnel receive training in plant first-aid procedures at least annually. In addition, written first-aid procedures are available for use during periods when the plant Nurse is not available.

A standing offer has been made to off-site support groups (hospitals, policy, fire departments, etc.) for initial training of new personnel and retraining of current personnel whenever these agencies request these services.

Medical, Occupational Health, and Environmental support and training is also provided by the Corporate Staff as needed.

7.3 Exercises (Drills and Tests)

Drills and tests will be conducted as follows:

7.3.1 Drills

The following drills are performed at the frequencies shown:

a. Site Area Emergency/Emergency Rescue - Annually

b. UF_6 Release Control Procedure - Quarterly

The objective and scenario for the annual site area emergency drill will be submitted for N.R.C. review at least sixty (60) days before the exercise. However, the plant must retain discretion in modifying the starting time and date of the scenario to accommodate abnormal weather, operating conditions, or other factors which could produce an ineffective exercise.

At least one independent outside observer who is familiar with the Radiological Contingency Plan will critique each drill. Non-participating observers from the community and off-site response organizations will be invited to observe and evaluate the Site Area Emergency drill. All observers will be given a copy of the objectives and scenario prior to the drill. Actions will be explained to the observers as the drill occurs. The observers will be able to critique the effectiveness of the drill by comparing the scenario and objectives to the actual drill proceedings. Critiques will be accepted from the observers for a period of seven (7) days following the drill. These critiques will be combined to form a composite analysis of the effectiveness of the exercise. Each area of deficiency will be addressed within one month following the exercise. The appropriate department manager will have the responsibility for correcting deficiencies. That manager must ensure that the deficiencies are corrected in a timely manner.

7.3.2 Equipment Tests

Equipment tests are performed in accordance with the following schedule:

Equipment	Frequency	Responsibility
Communication Radios on-site	-Quarterly	Safety Dept.
Communication with local off-site Agencies	-Quarterly	Mgr., Environmental/Regulatory Affairs

Equipment	Frequency	Responsibility
Release Sirens	-Monthly	Production Dept.
Control Rm. Emergency Blower	-Monthly	Production Dept.
FM Building Red Lights	-Monthly	Production Dept.

7.4 Review and Updating of The Plan and Procedures

The Radiological Contingency Plan will be reviewed annually by the Health Physics Supervisor. Procedure changes will be made as necessary.

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

Supplies	Inspection Frequency	Responsibility
Health Physics Transportation Kit	Annually*	HP
Hospital Kit	Quarterly	HP
UF_6 Cylinder Patch Kit	Monthly*	Safety
Protective Safety Equipment Cabinet by hoist well	Monthly*	Safety
UF_6 Emergency Release Cabinet (Tools and Material)	Annually*	Safety
Distillation Emergency Cabinet/Ore Storage	Monthly*	Safety
Control Room Safety Cabinet	Monthly*	Safety

*Or whenever the seal is broken.

When deficiencies cannot be corrected immediately, the appropriate manager will be notified and purchase of replacement equipment will be expedited.

8.0 Records and Reports

8.1 Records of Incidents

A Health Physics Incident Report will be completed for each class of radiological incident listed in the plan. Each incident report involving a significant employee health or environmental impact will be reviewed by the appropriate department manager. Additionally, in the event of a Site Area Emergency a formal investigation will be conducted, and a report will be prepared to document the incident. Records of incidents will be retained in accordance with 10 CFR 20 requirements.

8.2 Records of Preparedness Assurance

Written records which are required in accordance with this Radiological Contingency Plan will be retained until The Nuclear Regulatory Commission authorizes their disposition.

8.3 Reporting Arrangements

Reportable incidents, as defined in 10 CFR 20, will be reported directly to the NRC Operations Center and to Region III of The Nuclear Regulatory Commission. In the event of a Site Area Emergency, additional reports to state and local agencies will be made by the Chief Officer, who will also provide information to the news media as appropriate.

9.0 Recovery

9.1 Reentry

Reentry into the UF_6 building following a UF_6 release will be authorized by either the Operations Officer or the Chief Control Officer after the Health Physics personnel have determined there are no visible vapors present. The source of the release will be isolated or repaired before reentry is allowed. Respiratory protection will be worn as a precautionary measure until the air activity is less than 30% of DAC.

In the event of an outdoor UF_6 release, reentry into the potentially contaminated area will be permitted after the visible vapor cloud has passed and visibility has returned to normal.

Reentry into any area where a hazardous condition is still present will only be made to stop the release or to save human life. Personnel making this entry will enter in teams of two and will wear chemical suits and self-contained breathing apparatus (SCBA) while performing their assigned duties.

9.2 Plant Restoration

Each Radiological Contingency Officer will assure that safety related equipment within his area of responsibility is restored to normal as soon as practical following an incident.

Potentially contaminated articles of personal property (automobiles, motorcycles, etc.) will be surveyed for surface contamination if they were downwind of the release. Items found to be contaminated above the NRC Fuel Cycle Facility release limit will be decontaminated before allowing them to leave the site.

9.3 Resumption of Operations

Corrective actions for each type of incident are included in this plan. Investigation of each type of incident is documented through use of an "Incident Report". Normal operations are resumed following a "Site Area Emergency" when the Contingency Plan Officers have reviewed the incident and determined that employee or public safety would not be endangered by resuming operations.

APPENDIX "A"

RADIOLOGICAL CONTINGENCY PLAN

UF_6 RELEASE CONTROL PROCEDURE

The chemical and radiological toxicity of UF_6 make it imperative that any release be contained as soon as possible. The purpose of this procedure is to provide for prompt and safe evacuation of the Feed Materials Building and subsequent accounting of plant personnel. Control is most easily accomplished when each employee knows what is expected of him/her prior to an emergency. All unescorted visitors are given instructions prior to entering the restricted area in accordance with 10 CFR 19.12.

Many minor spills of UF_6 are readily contained using a vacuum hose and would not provide a significant exposure potential to employees working in other parts of the building. Employees involved in a minor release should notify the Feed Materials Building (FMB) Foreperson or Shift Supervisor as soon as possible. The Foreperson will evaluate the condition immediately. **If visibility is impaired on the floor, or the release should worsen, this procedure must be implemented. Although the primary objective is to control the release, if the UF_6 "smoke" is not contained in a localized area, this procedure must be used for the evacuation of the FMB, the warning of plant personnel that a UF_6 release emergency exists, and a head count of on-site personnel.** See Page 3-1, RCP.

Upon implementation of the UF_6 Release Control Procedure, it is imperative that all personnel on-site proceed to their designated assembly areas as soon as possible for personnel accounting. Caution should be exercised in selecting an evacuation route that will not lead into the release cloud.

This UF_6 Release Control Procedure defines responsibilities of plant personnel under two conditions: (1) weekdays, when a full complement of supervisory and hourly personnel are present, and (2) off-shifts, holidays, and weekends, when fewer people and only a few supervisors are immediately available. Responsibilities concerning visitors and contractor employees working in the Feed Materials Building are also defined in this procedure.

During off-shifts and weekends, on-duty supervisors must serve dual functions until relieved by the called-in emergency officers. It is imperative that called-in officers respond as promptly as possible. Special attention is required during these situations by supervisory personnel to assure that employees working overtime are accounted for during the emergency.

WEEKDAYS

RELEASE NOTIFICATION

The person observing the release shall notify the Feed Materials Building Foreperson, Shift Supervisor or personnel in the Control Room. If visibility is impaired on the floor, this procedure must be implemented immediately. If visibility is not impaired, the Foreperson will evaluate the condition and implement the procedure as needed. Instructions posted below the clock on the North wall of the Control Room shall be

followed. The operator should dial the plant emergency Public Address (PA) System number and announce the release three (3) consecutive times as follows:

"EVACUATE THE FEED MATERIALS BUILDING,
THERE HAS BEEN A UF_6 RELEASE."

After the announcement, the building evacuation alarm and the flashing red light system must be activated. The plant disaster siren is also activated for an Alert or a Site Area Emergency.

The announcement will be repeated again on the PA System after approximately three (3) minutes. For test drills, the words, "This is a Test Drill", should be added to the announcement.

BUILDING EVACUATION AND PERSONNEL ACCOUNTING

1. When the alarm is sounded, personnel in the Feed Materials Building are to put on their respirators and use the stairways to either leave the building or get to the Control Room. **DO NOT USE THE MAN LIFT.**

2. All plant personnel not directly involved with the UF_6 release are to report to areas specified on the Emergency Assembly and Notification chart in Appendix C so that they can be accounted for. Care should be exercised to avoid entering a release cloud.

3. All non-MTW personnel must report as they have been instructed either to the Guard at the main gate or the construction gate.

4. Emergency Response Team members shall report directly to the control point. The team leader will provide their census to the census taker at that location.

5. As the census is completed at the various assembly points, the results must be reported to the Chief Control Officer by phone at 6383 (or as announced).

RELEASE CONTROL

1. The Chief Control Officer will set up a control point at the phone booth South of the distillation door. He will assign personnel to close the distillation and hoistwell doors if necessary. If this control point is uninhabitable due to either environmental conditions or the close proximity of the release, the Chief Control Officer will relocate to either the Cylinder Wash Building or the Ore Storage Building. The phone extension at all three locations is 6383. All building re-entries will be at his discretion. He will direct the Control Room Officer to turn off the evacuation sirens/disaster alarm in order to facilitate in-plant communication. A UF_6 Safety Equipment cabinet is maintained near the distillation door and the Ore Storage Building to assure that each person entering the building is properly attired prior to entry.

2. The Control Room Officer (Phone 6290) and the Operations Officer will report to the Control Room or directly to the incident scene and direct the necessary actions to assure control. UF_6 Emergency Release Cabinets are maintained in the

Control Room and on each floor of the building near the distillation area. Any one may open the cabinet in the Control Room and prepare to distribute repair materials as required.

3. The Ore Prep/Green Salt Foreperson will assure that all items on the "Instructions For UF_6 Release Control" have been completed.

4. UF_6 Production Forepersons not directly involved in the release will report to the Control Room Officer.

5. All remaining Production Forepersons and the Production Engineers will report to the Chief Control Officer at the control point after they have been accounted for as part of their departmental census.

GENERAL DESCRIPTION OF SUPERVISORY RESPONSIBILITIES

Refer to the Emergency Response Plan, Section A Organization - Activation for additional information concerning officer responsibilities.

OFF-SHIFTS - WEEKENDS - HOLIDAYS

RELEASE NOTIFICATION

The person observing the release should notify the Feed Materials Foreperson, Shift Supervisor, or Control Room personnel. If visibility is impaired on the floor, this procedure must be implemented immediately. If visibility is not impaired, the Foreperson should evaluate the condition and implement the procedure as needed. The instructions posted below the clock on the North wall of the Control Room should be followed. Any employee may notify plant employees of the release by accessing the plant PA System and announcing the release three (3) consecutive times by stating:

"EVACUATE THE FEED MATERIALS BUILDING
THERE HAS BEEN A UF_6 RELEASE."

Following the announcement, the building evacuation alarm and the flashing red light system must be activated. The disaster siren must be activated for an Alert or a Site Area Emergency.

Repeat this announcement again over the plant PA System after approximately three (3) minutes. For a test drill, the words, "This is a test drill" should be added to the announcement.

The Feed Materials Building Foreperson will designate someone to immediately start phoning off-duty RCP officers to inform them of the release. A call-in list is posted in the Foreperson's Office in the UF_6 Control Room.

BUILDING EVACUATION AND PERSONNEL ACCOUNTING

Upon hearing the announcement or the siren, all personnel in the Feed Materials Building will put on their respirators and use the stairways to either exit the building or report to the Control Room. **DO NOT USE THE MAN LIFT**

Production Personnel: Shift personnel assigned to the Feed Materials Building and not directly involved in the UF_6 release will report to the FMB Control Room. All other Production personnel will report in the same manner as outlined for week days, **except the census count will be reported to the Fluorine Products Shift Foreperson (Phone 6333) who serves as the Chief Control Officer until relieved by that officer.**

Maintenance Personnel: Maintenance personnel not directly involved in the UF_6 release will report to the control point at the phone booth South of the distillation door. If this control point is uninhabitable due to either environmental conditions or close proximity of the release, they will relocate either to the Cylinder Wash Building or Ore Storage Building. The census count will be reported to the Fluorine Products Shift Foreperson (Phone 6333) by the Maintenance Foreperson.

Laboratory Personnel: Laboratory and Health Physics personnel will report their census to the Laboratory Shift Leader (Phone 6329) who will report the census to the Fluorine Products Shift Foreperson (Phone 6333).

RELEASE CONTROL

1. **Chief Officer and Operations Officer**

The Shift Supervisor will report to the UF_6 Control Room to act as Chief Officer and Operation's Officer until relieved by these designated officers. He will ascertain the safety of personnel and act to control the release.

2. **Chief Control Officer**

The Fluorine Products Shift Foreperson will act as Chief Control Officer until relieved by that officer. He or a designee will take and report the census from the South GF_2 plant. He will be responsible for coordinating all activities outside the Feed Materials Building.

3. **Maintenance Officer and Emergency Response Officer**

The Maintenance Shift Foreperson will act as the Maintenance Officer and Emergency Response Officer until relieved by these officers. The Maintenance Foreperson will decide where he should report. He may report to the release site, control room, or the control point. This will allow him to direct rescue operations or to assist in controlling the release.

4. **Control Room Officer**

The Feed Materials Building Foreperson will act as the Control Room Officer until relieved by that officer. He will advise people, record data, and relay information either to the Chief Control Officer or the Operations Officer.

5. **Radiation Officer**

The Health Physics Technician will act as the Radiation Officer until relieved by that officer. Upon hearing the release announcement, he will determine the wind direction. If the UF_6 release cloud is visible going over the North plant fence anywhere between the Sampling Plant and the LPG facility, the technician will instruct the Guard to implement the "Procedure for Alerting Residents of Plant Emergencies". He will notify the Chief Control Officer immediately if the release cloud is passing over the fence. This condition would constitute a Site Area Emergency.

Refer to the General Description of Supervisory Responsibilities in the Emergency Response Plan Section A Organization - Activation for additional information concerning officer responsibilities.

GENERAL INSTRUCTIONS FOR ALL PERSONNEL

All other Metropolis Works personnel will make themselves available to assist as directed by the Chief Control Officer. Help can be most effectively given if all areas and personnel are prepared. The following items provide information regarding preparation for response:

1. All personnel entering the building to help control the release will be properly attired in proper safety gear as prescribed by the Chief Control Officer. This attire will include chemical suits and SCBA as a minimum.

2. People entering the release area must do so as a team. All personnel will enter at the discretion of the Chief Control Officer. All personnel should either report to the control room or the control point after they leave the release site.

3. Safety equipment at all locations should be made ready to be moved to the Feed Materials Building. Do not move equipment into the area until directed to do so.

4. Stretchers, oxygen, and first-aid supplies should be made ready for use. Laboratory First-Aid personnel should report to the Dispensary or the Lab Library to standby for possible action.

5. CO_2 fire extinguishers should be readied for movement into the area as necessary. Fire hose fog nozzles may be useful to reduce downwind UF_6 vapors; however, water should not be sprayed directly on a liquid UF_6 leak.

6. All employees should refrain from using phones except for emergency communications during the period of the release. No report of any kind should be released to any outside agency, including the news media, unless it has been specifically cleared through the Chief Officer.

POST RELEASE INVESTIGATION

After the release has been contained, and the area safely secured, it will be the duty of the Chief Control Officer to appoint an investigation team to determine why the release occurred, how people responded, and how equipment functioned during the emergency. This team should also consider how to avoid similar releases in the future. A written report on the incident will be filed for future reference.

VISITORS AND NON-METROPOLIS WORKS EMPLOYEES

In order to assure the safety of non-Metropolis Works employees* who are required to enter the Feed Materials Building, the following procedure must be followed:

1. All visitors and non-Metropolis Works employees required to enter the Feed Materials Building will be instructed in radiation safety and evacuation procedures by the Health Physics Department before they enter the building if they are not accompanied by a plant employee.

2. Notification must be made to the Shift Supervisor of the visitor's name, time of entry, and time of exit from the building. See attached form on Page A-8 for the UF_6 Building Entry Log.

3. In the event of a UF_6 release or test drill, each non-MTW employee in the FMB will exit as rapidly as possible and then proceed directly to the nearest Guard Station.

4. For contractor crews working in the FMB, the Contractor Designated Representative (CDR) or his designee will be responsible for number 2 and number 3 above.

5. The AlliedSignal Designated Representative (ASDR) is responsible for informing the CDR about this procedure and his responsibilities.

6. All unescorted visitors will be instructed to return to the nearest Guard Station immediately when a plant emergency is announced. This information is issued in the "Visitor Health & Safety Instructions". These instructions also address items which are required in 10 CFR 19.12.

*Includes: Vendors, repairpersons, contractors, visitors, Morristown personnel, etc.

UF_6 Building Entry Log for Non-Metropolis Works Employees

Name	Firm Represented	Area of Building Where Working	Time In	Time Out

COMPANY PERSONNEL	TITLE	OFFICE PHONE	HOME PHONE

THIS PAGE IS INTENTIONALLY LEFT BLANK DUE TO THE CONFIDENTIAL NATURE OF COMPANY PERSONNEL NAMES, TITLES, OFFICE AND HOME PHONE NUMBERS.

Tier 1 Event: Requires an immediate (<2 hours) report by telephone communication to one of the following:

Company Personnel	Office	Home	Pager

If unable to reach one of the above personnel, contact one of the following:

Co. Personnel	Office	Home	Pager	Mobile Phone

PLANT PERSONNEL	TITLE	HOME PHONE

THIS PAGE IS INTENTIONALLY LEFT BLANK DUE TO THE CONFIDENTIAL NATURE OF COMPANY PERSONNEL NAMES, TITLES, OFFICE AND HOME PHONE NUMBERS.

FEDERAL REGULATORY AGENCIES

U.S.N.R.C. - OPERATIONS CENTER (24 HRS./DAY) ..... (301) 816-5100

U.S.N.R.C. – Lisle, IL ..... (630) 829-9500

O.S.H.A. - Fairview Hts., IL ..... (312) 353-2220

U.S.E.P.A. – Chicago, IL ..... (312) 886-3000

U.S. COAST GUARD – Paducah, KY ..... (502) 442-1621

STATE REGULATORY AGENCIES

ILLINOIS DEPARTMENT OF NUCLEAR SAFETY ..... (217) 785-9900

ILLINOIS E.P.A. - MARION, ILLINOIS ..... (618) 993-7200

EMERGENCY AGENCIES

E.S.D.A. - MASSAC COUNTY ..... (618) 524-2002

E.S.D.A. - MASSAC COUNTY (IF NO ANSWER AT 524-2002) ..... (618) 524-7120

E.S.D.A. COORDINATOR (O.D. TROUTMAN HOME PHONE) ..... (618) 524-2918

TESAC ..... (201) 455-2177

CHEMTREC ..... (800) 424-9300

ILLINOIS E.M.A. ..... (217) 782-7860

U.S.D.O.E. - RADIOLOGICAL ASSISTANCE ..... (312) 972-4800

NATIONAL RESPONSE CENTER ..... (800) 424-8802

HOSPITAL

MASSAC MEMORIAL - METROPOLIS, ILLINOIS ..... (618) 524-2176

LOURDES - PADUCAH, KENTUCKY ..... (502) 444-2150

WESTERN BAPTIST - PADUCAH, KENTUCKY ..... (502) 575-2180

PLANT DOCTOR

DR. BRADFORD MUTCHLER – PADUCAH, KY .....BEEPER NO. (502) 444-1001

(HOME) ..... (502) 575-3406

AMBULANCE SERVICE

MASSAC MEMORIAL, METROPOLIS, ILLINOIS .....911 or (618) 524-2176

CITY AND COUNTY EXECUTIVES

COUNTY COMMISSIONER CHAIRMAN – JIM MODGLIN .....(618) 524-4262

MAYOR, CITY OF METROPOLIS – BETH CLANAHAN (OFFICE) ..... (618) 524-4016

(HOME) ..... (618) 524-2045

LAW ENFORCEMENT

POLICE - CITY OF METROPOLIS	(618) 524-2310
SHERIFF - MASSAC COUNTY	(618) 524-2912
POLICE - STATE OF ILLINOIS	(618) 845-3740
District #22 Emergency Number	***(618) 845-3737***
POLICE - PADUCAH, KENTUCKY	(502) 444-8550
SHERIFF - McCRACKEN COUNTY	(502) 444-4719
FBI - CARBONDALE, ILLINOIS	(618) 529-5121
FBI - SPRINGFIELD, ILLINOIS	(217) 522-9675
U.S. SECRET SERVICE	(217) 492-4033

FIRE DEPARTMENTS

FIRE DEPARTMENT - MASSAC COUNTY	(618) 524-2912
FIRE DEPARTMENT - METROPOLIS NO. 1	(618) 524-2121
FIRE DEPARTMENT - METROPOLIS NO. 2	(618) 524-5313

NEWSPAPERS

METROPOLIS PLANET	(618) 524-2141
PADUCAH SUN	(502) 443-1771
GOLCONDA HERALD ENT	(618) 683-3531
VIENNA TIMES	(618) 658-4321

RADIO

WREZ - METROPOLIS, ILLINOIS	(618) 524-1055
WMOK - METROPOLIS, ILLINOIS	(618) 524-9209
WRIK - METROPOLIS, ILLINOIS	(618) 564-2171
WDXR - PADUCAH, KENTUCKY	(502) 443-1737
WDDJ AND WPAD	(502) 442-8231

TELEVISION

WPSD-TV, NBC, CHANNEL 6, PADUCAH, KENTUCKY	(502) 443-4021
WSIL-TV, ABC, CHANNEL 3, HARRISBURG, ILLINOIS	(618) 252-7447
KFVS-TV, CBS, CHANNEL 12, CAPE GIRARDEAU, MISSOURI	(573) 335-1212

CONTINGENCY CALL LIST

NAME		PHONE	CELL PHONE	SPEED DIAL	CONTACTED TIME	MESSAGE TIME

THIS PAGE IS INTENTIONALLY LEFT BLANK DUE TO THE CONFIDENTIAL NATURE OF COMPANY PERSONNEL NAMES, TITLES, OFFICE AND HOME PHONE NUMBERS.

EMERGENCY ASSEMBLY & NOTIFICATION

PERSONS ON SITE	ASSEMBLY AREA	NOTIFY:	NOTIFY:
Maintenance Personnel			
Emergency Response Team Members	Control Point	Maintenance Shift Foreperson	Chief Control Officer @ 6383
Maintenance Personnel (Non-ERT) Assigned to:			
Shift Foreperson	Control Point	GF2 / SF6 Maintenance Supervisor @ 6325	
Shop Foreperson	Shop - West Vehicle Door		
FMB Day Foreperson	# 4 Hose House		
GF2 Foreperson	Shop - Tool Crib Door		
F2 Products Foreperson	Shop - Band Saw Area		
Elec. / Inst. Foreperson	Instrument Shop		
Construction Day Foreperson	Shop - Fabrication Area		
Sampling Plant	Sampling Plant Lunchroom		
Lawn Janitors	Shop - Mobile Equipment Area		
Reliability / Engineering	Offices		
Production Personnel			
UF6 Production Personnel	FMB Control Room	FMB Foreperson	Chief Control Officer @ 6383
Yard Safety Laundry Safety Operator	Area Outside South SGF2 Control Rooms	*F2 Products Area Day Foreperson or Shift Foreperson @ 6333 * Also serves as Chief Control Officer on Off Shifts, Holidays, and Weekends.	
North Laundry Sodium Removal, "U" Recovery & KOH Muds	Work Area or Area Control Rooms		
SGF2	SGF2 Control Room		
NGF2	NGF2 Control Room		
F2 Products	SF6 Control Room		
Cylinder Wash Waste Handlers	CFx Control Room		
Sampling Plant	Sampling Plant Lunchroom		
EPF - CaF2	EPF Control Room		
Powerhouse	Powerhouse Control Room		
Production Engineers	Offices		
Other Personnel			
Administration	Admin. Lunch Room	Communications Officer	Chief Control Officer @ 6383
Capital Project Engineers	Offices	Lab Team Leader or Shift Leader @ 6329	
Health Physics	Health Physics Lab		
Laboratory	Lab Lunch Room		
Nurse	Dispensary		
Safety	Office		
Service and Stores	Stores Office		
Plant Security, Visitors & Other Non - MTW Personnel	Guard Station - Main or Construction as Instructed.	Guard	