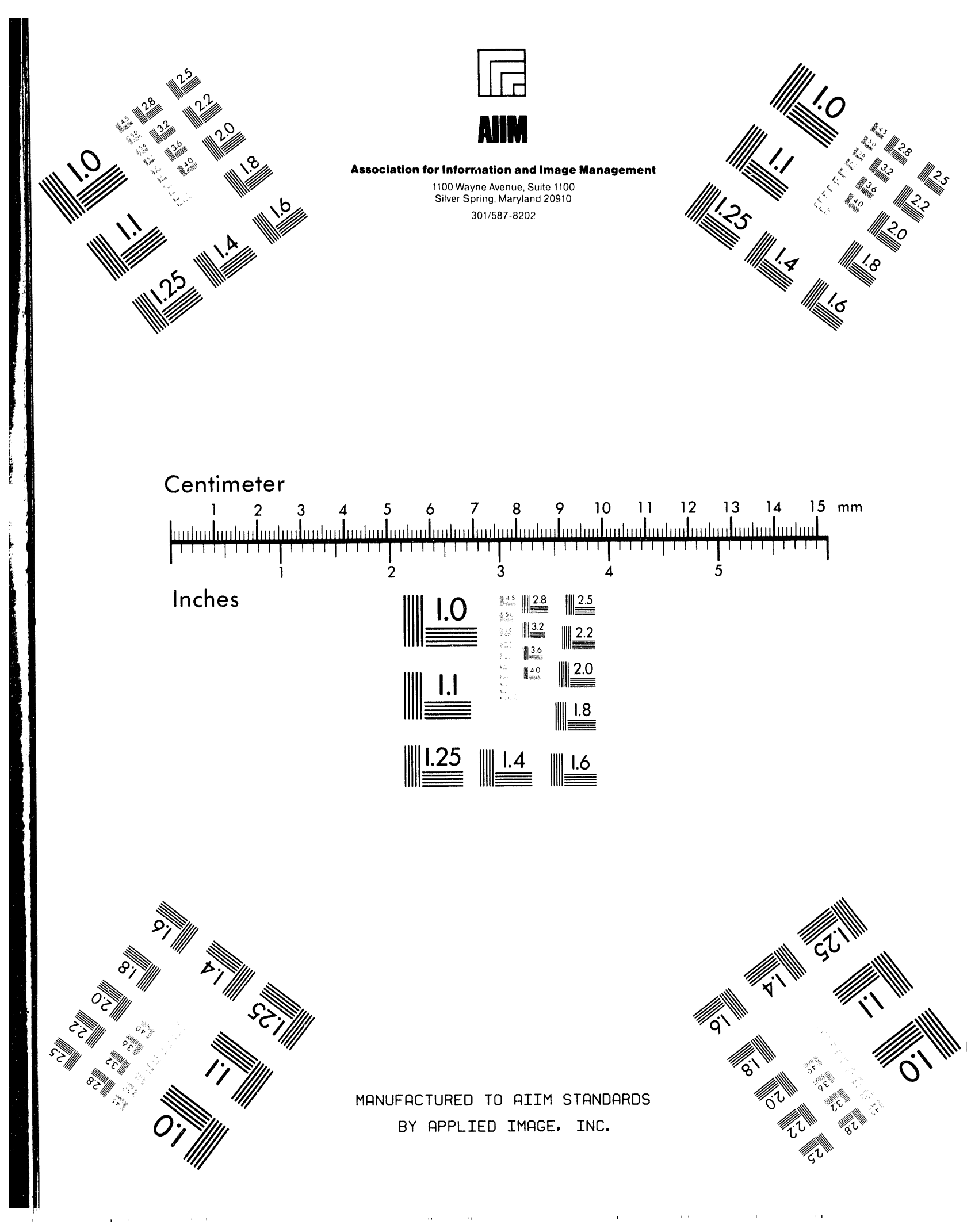
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Signature of EDT Originator Date	Authorized Representative for Receiving Organization Date	Cognizant/Project Engineer's Manager Date 1/20/94	Ltr. No. [] Approved [] Approved w/comments [] Disapproved w/comments

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7. Abstract

A Hazard Analysis (HA) identifies potentially hazardous conditions in a facility and the associated potential accident scenarios. The HA is the foundation of the accident analysis. The significant event scenarios identified by this HA will be further evaluated in a subsequent accident analysis.

10. RELEASE STAMP

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HAZARD ANALYSIS FOR 300 AkEA N REACTOR FUEL FABRICATION AND STORAGE FACILITY

WESTINGHOUSE HANFORD COMPANY

JANUARY 1994

For the U.S. Department of Energy
Contract DE-AC06-87RL10930

DISCLAIMER

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HAZARD ANALYSIS FOR 300 AREA N REACTOR FUEL FABRICATION AND STORAGE FACILITY

1.0 INTRODUCTION AND GENERAL DESCRIPTION

This hazard analysis (HA) has been prepared for the 300 Area N Reactor Fuel Fabrication and Storage Facility (Facility), in compliance with the requirements of Westinghouse Hanford Company (Westinghouse Hanford) controlled manual WHC-CM-4-46, *Nonreactor Facility Safety Analysis Manual*, and to the direction of WHC-IP-0690, *Safety Analysis and Regulation Desk Instructions*, (WHC 1992). An HA identifies potentially hazardous conditions in a facility and the associated potential accident scenarios. Unlike the Facility hazard classification documented in WHC-SD-NR-HC-004, *Hazard Classification for 300 Area N Reactor Fuel Fabrication and Storage Facility*, (Huang 1993), which is based on unmitigated consequences, credit is taken in an HA for administrative controls or engineered safety features planned or in place. The HA is the foundation for the accident analysis. The significant event scenarios identified by this HA will be further evaluated in a subsequent accident analysis.

1.1 INTRODUCTION

The mission of the Facility has changed from fuel production to standby status, which includes storage of fuel. The Facility is undergoing transition activities required for permanent closure as outlined in WHC-SP-0793, *N Reactor Fuel Fabrication Facility Shutdown Program Plan*, (Gimera 1992). Consequently, the safety analysis process has been initiated to evaluate the impact to the safety basis for the current Facility configuration and planned transition activities. The analysis process is conducted in three main steps: (1) the hazards analysis in which potentially hazardous conditions and associated potential accident scenarios are identified, (2) the accident analysis in which selected accident scenarios are analyzed for their consequences and frequency of occurrence, and (3) the risk acceptance in which postulated consequences and frequency are evaluated relative to established guidelines. The first step, hazard analysis, is presented in this document. Succeeding analyses will be prepared in accordance with WHC-CM-4-46.

1.2 GENERAL FACILITY DESCRIPTION

The Facility, consisting of fuel fabrication buildings, laboratories, a concretion facility (mixing uranium fines and sludge with masonry cement), uranium and Zircaloy-2 fines incinerator, uranium Special Nuclear Material (SNM) storage buildings, and offices is located in the northeast corner of the 300 Area on the Hanford Site. A Facility layout is shown in Figure 1.

Fuel fabrication and incinerator operations have been completely shutdown. The Facility is now used to store uranium billets, assembled and partially assembled fuel rods and scrap, and is also used for office space, see Table 1.

Figure 1. Facility Layout.

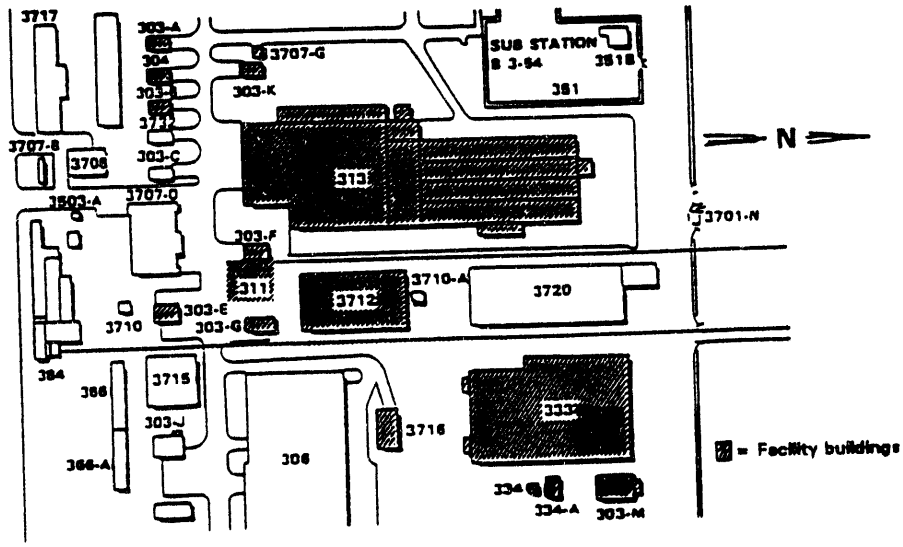

Table 1. N Reactor Fuel Fabrication and Storage Facility Building Identification and Function.

BUILDING	FUNCTION	MTU*
303-A	Green Fuel Storage**	122
303-B	Uranium Billet Storage	289
303-E	Green Fuel Storage**	52
303-F/311-Tank Farm	Pump House/Outside Chemical Storage and Transfer System	NONE
303-G	Uranium Billet Storage	250
303-K/3707-G	Mixed/Radioactive Solid Waste Storage/Change House and Pad	< 1
303-M	Uranium Oxide Facility (Shutdown)	NONE
304	Waste Concretion	NONE
313	Manufacturing Support & Fuel Packaging	257
333	Manufacturing (Shutdown) & Fuel Packaging	NONE
334 and Tank Farm	Process Sewer Monitoring	NONE
334-A	Waste Acid Storage (Shutdown)	NONE
3712	Finished Fuel & Billet Storage	1122
3716	Unfinished Uranium Fuel Storage	137
	TOTAL	2229

* MTU - metric ton uranium
** Green Fuel - Unirradiated, potentially surface contaminated with activation and fission products.

2.0 HAZARD ANALYSIS PROCESS

The HA is a form-driven (Appendix A) method used to characterize the hazards and potential accidents associated with a facility operation or activity. The techniques used are intended to systematically review the facility configuration with respect to the planned activities. The basic elements are: the hazard description; causes; major effects to the workers, public, property, and environment; and any corrective or preventive measures. These basic elements are identified as column headers in the form. The HA process included the formation of a team of knowledgeable Westinghouse Hanford individuals from the Facility and the safety analysis organizations. The team prepared a set of tables documenting their analysis of the hazards associated with the Facility and activities examined.

The HA team consisted of the following individuals:

J. R. Brehm, Facility Operations Safety Support, Safety Analysis & Engineering (SA&E), Team Leader
T. L. Deobald, Facility Operations Safety Support, SA&E
R. G. Gant, Environmental Safety, Operations Assurance
D. J. Johnson, Restoration and Remediation Safety Analysis, SA&E
J. A. Remaize, Manager, Fuel Supply, N Reactor Plant
J. J. Schumacher, Fuel Supply, N Reactor Plant
M. V. Shultz, Risk Assessment Technology, SA&E
E. A. Weakley, Fuel Supply, N Reactor Plant
E. M. Woodruff, Safety Technical Support, Operations Assurance

Results of the analysis include a list (Appendix A) of the hazards associated with a specific activity or facility/equipment, associated consequences, and the probability of the hazardous event occurring. Information is included for both mitigated and unmitigated events which can be used by facility personnel in the decision making process for prioritizing hardware or administrative upgrades.

2.1 HAZARDS IDENTIFICATION

The first step in the analysis process was to identify the hazards associated with the Facility. Since fuel production operations have ceased, emphasis was placed on the current status of the Facility systems, including residual materials from fuels production, the shutdown and closure activities scheduled prior to turnover to the decommissioning organization, and the short-term management and storage of nuclear material. The objective was to identify and document hazards and energy sources including potential failures, upsets, and unknowns, that could cause a hazardous condition.

Facility personnel provided drawings and a walk-down of the buildings to pass on a general knowledge of past Facility operations, present Facility equipment status, and identification and location of known and suspected hazardous materials and conditions. The approach included identification of potential hazards as identified in the shutdown plan (Gimera 1992). This

information was reviewed, over the course of several meetings, to ensure its correctness, including potential shutdown activities changes not yet noted in the shutdown plan (Gimera 1992).

The HA tables (Appendix A) were generated to ensure a thorough analysis of all the hazards and energies that could be encountered within the shutdown configuration of the Facility or during a specific shutdown activity.

The major headings for the "Hazard/Energy Source" column are as follows:

I. SHUTDOWN TASKS
   A. Sampling and characterization
   B. Stabilization/decontamination
      1. Equipment
      2. Building
   C. Sample and remove HEPA filters
   D. Ducts
   E. Building stacks no longer required
   F. Transformers
   G. Decontaminate and/or stabilize catch basins, trenches, dikes, and drains
   H. Tanks
   I. Inspection/work in confined spaces

II. CHEMISTRY
   A. Fire
   B. Bottled compressed gas

III. POTENTIAL/KINETIC ENERGY
   A. Helicopter or plane crash
   B. Transport vehicle
   C. Forklift
   D. Packaging/repackaging billets, fuel and fuel pieces
   E. Equipment
   F. Roof

IV. NATURAL OCCURRENCES
   A. Flood
   B. Seismic event
   C. Wind
   D. Volcanic activity
   E. Lightning

V. RADIATION
   A. Accidental exposure
   B. Releases locally, onsite, offsite
   C. Criticality

The HA tables are organized into a general section and the building-specific sections. The general section identifies hazards and energy sources common to all buildings; whereas, an individual building section list hazards associated with the particular building. Hazards were identified by breaking down the activity, building, or equipment into components to be analyzed. A summary of building location, description, and status is located at the beginning of each building section.

2.2 POTENTIAL ACCIDENT AND SEQUENCE

The "Potential Accident and Sequence" column identifies the series of events, promulgated by an undesirable or unplanned incident, that could provide an undesirable result or consequence.

2.3 TARGET/POTENTIAL CONSEQUENCES

The "Target/Potential Consequences" column identifies the undesired effect of the imposition of a hazard on people, property, or the environment. The descriptions state in qualitative terms, the impacts to the health and safety of workers, members of the public, and the environment (e.g., injury to operating staff; releases from the facility or during an activity; impact on other systems, structures, components, or nearby facilities; equipment damage only; cleanup required; etc.).

2.4 MITIGATING FEATURES

The "Mitigating Barriers" column lists the engineered safety features or administrative controls that could prevent or reduce the probability of an undesired occurrence. This column identifies and documents any engineered features (providing a safety function) and/or administrative controls for which credit may be taken to detect, prevent, reduce the frequency of, control, and/or mitigate the stated consequences. Items for which credit is taken may need to be included in the technical safety requirements (TSR), formerly known as operational safety requirements, if they are necessary to detect, prevent, control and/or mitigate potential hazards.

An engineered feature or barrier is an intrinsic character of the equipment or facility design that prevents or significantly reduces the effect of the event of interest. While, an administrative control includes the practice of using approved procedures, qualified personnel, routine surveillance and maintenance, as well as other practices; such as, ALARA, fire watches, and good housekeeping.

Probability and severity categories were determined for both the unmitigated and mitigated case of each event. Unmitigated is defined as without the benefit of engineered or administrative barriers; whereas, mitigated implies the use of engineered and/or administrative barriers to reduce the severity of a consequence. The probability of an accident, is represented by a number expressing the likelihood of the occurrence of a certain event, and is assigned one of the four Probability Category (PC) levels shown in Table 2.

Table 2. Probability Category Description.

PROBABILITY CATEGORY	CATEGORY DESCRIPTION	FREQUENCY RANGE
Anticipated	An abnormal event that is expected to occur once or more during the lifetime of the facility (e.g., small radioactive materials spills, small fires).	10^{-2} to 1
Unlikely	Individually, the condition is not expected to occur during plant lifetime, but collectively, events in this category may occur several times.	10^{-4} to 10^{-2}
Extremely Unlikely	Extremely low probability conditions that are not expected during the plant lifetime but that represent extreme or limiting cases of faults identified as possible. This category includes design basis accidents.	10^{-6} to 10^{-4}
Incredible	Accident for which no credible scenario can be identified.	$< 10^{-6}$

WHC-CM-4-46, Appendix B, REV 0.

The severity of an accident, is represented by the resulting consequences to the public, workers, or environment, and is assigned one of the four Severity Category (SC) levels as shown in Table 3.

Table 3. Qualitative Accident Severity Levels.

SEVERITY CATEGORY	CONSEQUENCES TO THE PUBLIC, WORKERS, OR ENVIRONMENT
Category I	May cause deaths onsite or loss of the facility/operation, major injuries or illness offsite, radiation exposure to offsite individuals in excess of annual limits, or severe impact on the environment.
Category II	May cause severe injuries or severe occupational illness onsite, exposure to onsite individuals in excess of annual limits, major damage to a facility/operation, minor illness or injury offsite, exposure to offsite individuals to radiation below annual limits, or major impact on the environment.
Category III	May cause minor injury or minor occupational illness onsite, or exposure of onsite individuals to radiation below annual limits, negligible impact offsite, or minor impact on the environment.
Category IV	Will not result in injury, occupational illness, or exposure onsite or offsite, or result in a significant impact on the environment.

WHC-CM-4-46, Appendix B, REV 0.

As an example, a "berm" is an engineered feature that is a severity mitigator (passive). A fire sprinkler system is also a severity mitigator (active). An administrative feature usually reduces the probability and sometimes the severity. If the system functions after the event it would be a severity mitigator; whereas, if the system averts an event it would more likely be a probability mitigator than a severity mitigator.

The HA team qualitatively estimated the probability and severity categories for the various events based on the specific values provided in WHC-CM-4-46, to facilitate a ranking of the events which in turn will identify those that bound the Facility.

3.0 RESULTS

The results of the HA process are displayed in the tables shown in Appendix A.

4.0 SELECTION CRITERIA

The criteria for selecting HA items for further analysis were based on both consequence and probability. Consequence and probability together define the risk and it is the risk that has to be determined (in the accident analysis) as acceptable or unacceptable. In this way, a safety envelope is defined for the Facility where acceptable risks are those within the safety envelope. At this point the HA process is intended to provide a gross selection for further analysis.

The scenarios that are not credible or do not have a significant consequence were eliminated from further consideration. Those that have an annual probability of less than 10^{-6} per year are "not credible" and were dropped from further review. Those events with programmatic impact only (e.g., physical damage to systems and structures, unplanned shutdown, etc.) or with no significant safety consequences were also dropped from further review. The engineered safety features and administrative controls used to make these conclusions are identified and documented in the tables (see Appendix A).

The remaining event sequences (i.e., the credible scenarios) were segregated according to the frequency range (i.e., anticipated, unlikely, or extremely unlikely). Within each category, common types of events were grouped. From each of these groups, the sequences of events that were expected to result in the most significant consequences were identified. These remaining events are the ones placed on the "short list" as identified in section 5.0, below.

5.0 RECOMMENDATIONS

Associated with the selection process, was a grouping of similar accidents to assure that the accident scenarios selected for further analysis are those required to fully "bound" the Facility. As a result, a hazard may be dropped from further analysis because it is "bound" (or within the risk criteria envelope) by another hazard of the same type having greater severity and/or probability. Events not eliminated at this point are assumed to be credible accident scenarios that may have significant radiological or toxicological consequences. Therefore, these remaining accident scenarios must be further evaluated to provide a more accurate estimate of their severity and probability and to identify any mitigating features, if required, to ensure that the resulting risk is acceptable (within WHC-CM-4-46 established risk guidelines).

The accident scenarios identified in Table 4 require further analyses which should be documented in an accident safety analysis in accordance with the guidelines of WHC-CM-4-46 and WHC-CM-6-32, *Safety Analysis and Engineering Work Procedures*.

6.0 REFERENCES

WHC-CM-4-46, *Nonreactor Facility Safety Analysis Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-6-32, *Safety Analysis and Engineering Work Procedures*, Westinghouse Hanford Company, Richland, Washington.

WHC, 1992, *Safety Analysis and Regulation Desk Instructions*, WHC-IP-0690, Westinghouse Hanford Company, Richland, Washington.

Gimera, R. J. 1992, *N Reactor Fuel Fabrication Facility Shutdown Program Plan*, WHC-SP-0793, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

Huang, C. H. 1993, *Hazard Classification for 300 Area N Reactor Fuel Fabrication and Storage Facility*, WHC-SD-NR-HC-004, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

Table 4. Facility SAR Accident Scenarios.

ACCIDENT SCENARIO	U[a] SOURCE TERM	Be[b] SOURCE TERM	ONSITE DOSE rem[c] U mg/m3c Be µg/m3c	SITE BOUNDARY DOSE rem[c] U mg/m3c Be µg/m3c	PROBABILITY[d]
Hazard Class Accident	1122 Metric Tons (MT)	0.1264 MT	12.2[e] 6.5[e] 2.91[e]	0.78[e] 0.43[e] 0.19[e]	Inc
Fines Drum Fire[f]	2.1E-1 MT, (460 lb) OSR Limit	--	9.2E-3 -- --	0.58E-3 -- --	Unl
Concreted Fines Drum Fire[f]	1.4E-2 MT (31.5 lbs) Sludge, U and Oxides (Weakley)	--	<0.632E-3 -- --	<3.96E-5 -- --	Unl
Unidentified/ Invisible Fines Fire[f]	1.8E-3 MT (4 lbs) (Weakley/ Deobald)	--	<7.90E-5 -- --	<5.0E-6 -- --	Ant
HEPA Filter Fire[f]	1.8E-3 MT 9,2'x2'HEPAs, 4 lb/HEPA (Weakley/ Deobald)	8.1E-7 MT	<7.9E-5 <4.2E-5 <1.7E-5	<5.0E-6 <2.8E-6 <1.2E-6	Ext Unl
			ONSITE CRITERIA[e]	OFFSITE CRITERIA[e]	
Radiological[e] U Toxicological[e] Be Toxicological[e] } M=Moderate, L=Low			5 < x ≤ 25,M 0.6< x ≤ 30,M x ≤ 25,L	0.5 < x ≤ 5,M NA < x ≤ 0.6,M NA < x ≤ 25,M	

a Uranium
b Beryllium
c Radiological (rem), U Toxicological (mg/m^3), Be Toxicological ($\mu g/m^3$)
d Ant, Anticipated
Unl, Unlikely
Ext Unl, Extremely Unlikely
Inc, Incredible
e WHC-SD-NR-HC-004, "Hazard Classification for 300 Area N Reactor Fuel Fabrication and Storage Facility".
f 100% Oxidation of Uranium

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APPENDIX A

FACILITY HAZARD ANALYSIS TABLES

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GENERAL

Buildings: Located in the northeast corner of the 300 area, the buildings are: 313, 333, 303A, 303B, 303E, 303F, 303G, 303K/3707G, 303M, 304, 334, 334A, 3712, 3716, the Outside Storage and Transfer System including the 311 Tank Farm and the 303F pump house.

Applicability: The following data applies to all buildings as applicable for that building. Items pertaining to a particular building will be found under Building Hazards Analysis.

Notes: Throughout this Hazards Analysis under Administrative Barriers - following approved procedures is a requirement and includes the use of all required personal protective equipment, (PPEs), such as breathing apparatus, safety shoes, hard hat and other tools, equipment, devises and permits required by the procedure.

Approved procedures include any of the procedures required to get the task done safely whether existing or written for the specific task. They will be written and approval received prior to starting the task.

Qualified workers are trained for the specific activity being addressed.

A radiation work permit (RWP) and a hazardous work permit (HWP) are two of the commonly required permits.

HAZARD/ENERGY SOURCE		POTENTIAL ACCIDENT AND SEQUENCE	TARGET/ POTENTIAL CONSEQUENCES	Unmitigated		MITIGATING BARRIERS		Mitigated	
				PC*	SC*	ENGINEERED	ADMINISTRATIVE	PC*	SC*
I.	SHUTDOWN TASKS								
A.	Sampling and Characterization (all potentially contaminated equipment, trenches, basins, exhaust ducts, HEPA filters, surfaces, walls, floors, and ceilings).	Mistakes in taking and handling samples releases contamination.	Personnel (worker). Radiological/ Toxicological contamination could occur.	Ant	III	Tools and equipment for taking samples designed to protect workers and environment.	Approved sampling, handling, and disposal procedures following ALARA rules.	Ant	III
B.	Stabilization/ Decontamination (general activities).	Failure to follow procedures and/or wear protective clothing may cause contamination of worker, clothing, equipment, and other surfaces.	Cleanup spreads contamination to new surfaces.	Ant	III	Tools, equipment, and clothing designed to protect worker.	Stabilization activities in accordance with approved procedures using ALARA rules. Coordinated protective clothing shutdown tasks to prevent increasing hazards.	Ant	III
1.	Equipment.								

* PC - Probability Category, SC - Severity Category

HAZARD/ENERGY SOURCE		POTENTIAL ACCIDENT AND SEQUENCE	TARGET/ POTENTIAL CONSEQUENCES	Unmitigated		MITIGATING BARRIERS		Mitigated	
				PC*	SC*	ENGINEERED	ADMINISTRATIVE	PC*	SC*
a.	Remove pyrophoric materials or equipment contaminated with pyrophoric material.	U, Zr, fines not properly handled can be a potential fire hazard.	Radiological/ Toxicological release could affect worker and nearby personnel. Ignition of other combustible materials.	Ant	III	Fines once removed, placed in drums, covered with water, and sealed with a lid in accordance with approved procedures. Tools for removing fines designed to protect workers. Equipment removed for disposal.	Approved fines cleanup or removal procedures using ALARA guidelines. Qualified workers. Approved procedures for filling drums and storing chips.	Ant	III
b.	Remove flammable and/or potentially contaminated/toxic oils or liquids.	Spill or fire could occur during removal.	Radiological/ Toxicological release could affect worker and local area.	Ant	III	Tools for removing oil designed to protect workers and prevent spills. Oils have high flash points to 470° F.	Approved cleanup procedures using ALARA guidelines. Qualified workers as required by HRP.	Ant	III
2.	Building.								
a.	Remove special nuclear materials.	(See Package/Repackage & Forklift/Transport).							
b.	Remove all stored chemicals.	Mishandling or dropping chemicals could cause injury or toxic release.	Worker and local area could be affected by toxic release. Workers could be injured.	Ant	III	Specialized equipment and clothing designed to protect workers and environment.	Approved procedures for handling chemicals using ALARA guidelines. Qualified workers.	Unl	III
c.	Remove furniture, tools, and combustible materials.	Mishandling could cause injury or personnel contamination.	Workers could be injured or become contaminated.	Ant	III	Equipment design. Hand trucks, forklifts, and specialized handling equipment to protect workers.	Equipment verified not contaminated before handling. Approved safety procedures. Qualified workers.	Ant	III
d.	Drain and deactivate sprinkler/fire alarm system.								
(1)	Sprinklers left active in unoccupied building.	Sprinklers and headers could freeze if heat turned off.	Property damage could occur. Contamination could be spread to building or environment.	Ant	III	Water to sprinkler system turned off and system drained.	Coordinate sprinkler deactivation with other shutdown tasks.	Unl	IV
(2)	Sprinklers drained.	Water from draining sprinklers contacts and spreads contamination.	Contamination could be spread to building or environment.	Ant	III		Approved procedures for draining sprinklers using ALARA guidelines.	Unl	III

* PC - Probability Category, SC - Severity Category

	HAZARD/ENERGY SOURCE	POTENTIAL ACCIDENT AND SEQUENCE	TARGET/ POTENTIAL CONSEQUENCES	Unmitigated		MITIGATING BARRIERS		Mitigated	
				PC*	SC*	ENGINEERED	ADMINISTRATIVE	PC*	SC*
(3)	Sprinklers drained and/or fire alarm system disconnected.	Fire could endanger nearby building.	Workers and firemen could be injured.	Unl	II	Fire systems added where required.	Fire suppression system deactivation review by fire protection personnel.	Ext	IV
e.	Deactivate criticality alarm system.	Deactivation requires separate analysis and documentation.							
f.	Unused circuits and equipment left energized (the intent is to deactivate the equipment).								
(1)	If power left on.	Power equipment could be started accidently.	Personnel injury could result.	Ant	II	Shutdown equipment locked and/or breakers racked, fuses removed from all unused circuits.	Verify power off before cleaning or moving equipment and before sealing building. Lock and tag procedures.	Unl	III
(2)	If power left on.	Shock could be received while cleaning powered equipment.	Personnel injury could result.	Ant	II	Shutdown equipment locked and/or breakers racked, fuses removed from all unused circuits.	Verify power off before cleaning or moving equipment and before sealing building. Lock and tag procedures.	Unl	III
(3)	If power left on.	Wiring insulation in unoccupied building can be damaged by rodents or deteriorate with time. Fire is caused by shorting of exposed wire.	Property damage would occur.	Unl	II	Shutdown equipment locked and/or breakers racked, fuses removed from all unused circuits.	Lock and tag procedures.	Ext	III
g.	Seal all openings and doors to prevent unauthorized entry or wildlife intrusion.	Industrial accident could occur. Spread of contamination by wildlife.	Surveillance personnel could be injured. Spread of contamination to local area.	Ant	III	Shutdown equipment is locked and/or breakers racked and removed from all unused circuits.	Approved procedures for surveillances.	Unl	IV
h.	Confined spaces.	Entering could cause industrial accident and/or personnel contamination.	Oxygen deprivation and toxic fumes or personnel injury could occur. Radiological/ Toxilogical contamination could occur locally.	Ant	II	Entryways secured. Equipment and clothing designed to protect workers will be used.	Approved posting and entry permits, approved industrial safety procedures.	Unl	II

* PC - Probability Category, SC - Severity Category

HAZARD/ENERGY SOURCE		POTENTIAL ACCIDENT AND SEQUENCE	TARGET/ POTENTIAL CONSEQUENCES	Unmitigated		MITIGATING BARRIERS		Mitigated	
				PC*	SC*	ENGINEERED	ADMINISTRATIVE	PC*	SC*
C.	Sample and remove HEPA filters. Possible contamination - U, U_3O_8, Zr, Be, DOP.	Filter breaks during removal spreading contamination or catches fire.	Radiological/ Toxicological release could affect workers and local area.	Ant	II	Temporary physical barrier prevents spread of contamination and protects workers. Equipment and clothing designed to protect workers will be used.	Approved sampling and bagout procedures following ALARA rules. Personnel protective equipment. Monitored for radiation levels during removal and sampling of filters.	Unl	III
D.	Ductwork. Possible contamination - U, U_3O_8, Zr, Be.								
1.	Weakened or damaged supports break, dropping section of duct.	Contents could be spread throughout building.	Radiological/ Toxicological release could occur locally, onsite and offsite.	Unl	II	Duct ends sealed.	Verify ends sealed.	Ext	III
2.	Cleaning duct loosens contamination.	Worker could be contaminated and contents could be spread throughout building. Fire could occur in ducts.	Radiological/ Toxicological release could occur locally.	Ant	II	Duct ends sealed. Clothing designed to protect worker. Tools designed to protect worker.	Approved cleanup procedures using ALARA rules. Qualified workers. Protective clothing.	Unl	III
E.	Remove stacks. Possible contamination - U_3O_8, Zr, Be. Roof contaminated by pigeon droppings, that can be infectious.	Stack could collapse or be dropped, falling through roof or dropping on other buildings or passers by.	Personnel injury, property damage could occur. If stack and/or roof are contaminated, radiological/ toxicological/ biological release could occur locally, onsite and offsite.	Unl	II	Cranes, hoists, rigging used as required.	Approved procedures for removing stacks, operating cranes, and hoists. Barricades to divert foot and vehicular traffic around removal area. Qualified operators to operate cranes and hoists. Verified roof safe to work on. Personal protective clothing.	Ext	II
		Movement of stack during removal could release surface contamination.		Ant	III			Ant	III
	Stack not removed.	Stack collapse or falling through roof because of deteriation and/or natural forces.		Unl	II			Unl	II

* PC - Probability Category, SC - Severity Category

	HAZARD/ENERGY SOURCE	POTENTIAL ACCIDENT AND SEQUENCE	TARGET/ POTENTIAL CONSEQUENCES	Unmitigated		MITIGATING BARRIERS		Mitigated	
				PC*	SC*	ENGINEERED	ADMINISTRATIVE	PC*	SC*
F.	Transformers.	Removing PCBs could result in spill.	Toxicological release could affect workers and local area	Unl	II	Some transformers in the buildings are dry type.	Approved procedures for removing PCBs using equipment specified. Oil transformers identified to have PCB levels below regulatory requirements.	Unl	III
G.	Decontaminate and/or stabilize catch basins, trenches, dikes and drains.	Release to process sewer could occur. Catch basins, trenches, drains, and sewers are connected to the process sewer and to the river via ground water.	Radiological/ Toxicological release could occur locally, onsite and offsite via process sewer and river. Release could exceed environmental regulations.	Ant	III	Berms, dikes, weirs, and plugs.	Approved sampling, absorbing, vacuuming, and plugging procedures. Approved procedures using ALARA rules. Protective clothing.	Ant	III
H.	Tanks. Sulfuric acid H_2SO_4, nitric acid (2) - HNO_3, sodium hydroxide, NaOH, neutralized chemical waste containing non-recoverable uranium.	Pumping out and flushing tank causes spill. Tanks spill goes to process sewer.	Toxicological release could occur locally, onsite and offsite.	Ant	II	Berms.	Pump out into tank car or truck. Approved tank flushing procedure using ALARA rules. Qualified workers. Approved waste disposal procedures using ALARA rules.	Ant	III
II.	CHEMISTRY								
A.	Fire.								
1.	Range.	Sparks from nearby range fire could set fires.	No releases expected.	Ext	III	Building in a paved area. Concrete slab or metal roof covered with felt, tar and gravel. Nearby Hanford Fire Department.	Fire watches.	Ext	III

* PC - Probability Category, SC - Severity Category

HAZARD/ENERGY SOURCE		POTENTIAL ACCIDENT AND SEQUENCE	TARGET/ POTENTIAL CONSEQUENCES	Unmitigated		MITIGATING BARRIERS		Mitigated	
				PC*	SC*	ENGINEERED	ADMINISTRATIVE	PC*	SC*
2.	Building. See also previous items on buildings.	Fire in building could impact fuel pieces, U billets, toxic chemicals, oils. Roof leaks during rain causing electrical shorts and fire.	Radiological/ Toxicological release could occur locally, onsite & offsite.	Ant	II	Building, combustibles removed. Centralized steam power plant removes open flame from (most) buildings. Active sprinkler and fire detection systems where required.	Building free of trash and flammable material in protective storage cabinets. No smoking allowed in buildings. Hot work (torch cutting welding, grinding, etc.) approved permits.	Ext	III
3.	Rags soaked with oil possibly contaminated.	Spontaneous combustion could start fire.	Radiological/ Toxicological release could occur locally.	Ant	II	Fire resistant containers.	Oil soaked rags in fire resistent containers.	Ant	III
B.	Bottled compressed gas. Argon, acetylene, oxygen, propane.								
1.	Bottle dropped and/or gas regulator impacted causing gas release or leak.	Bottle becomes a missile and/or released gas overcomes personnel.	Personnel injuries and property damage could occur.	Unl	II	Bottled gas stored in racks outside buildings.	Bottled compressed gas codes. Maintenance of bottles and regulators in good condition with labels visible. Approved handling devices.	Ext	III
		Fire and/or explosion occurs.	Fire could impact billets and fuel assemblies. Radiological/ Toxicological release could occur locally, onsite and offsite.						
C.	Propane storage tank (propane supply to 306 W PNL Building).	Filling tank could release gas and overcome personnel.	Personnel injuries could occur.	--	--	NOTE: Responsibility of offsite vendor.		--	--
		Line breaks fire occurs.	Fire could impact facility storage building. Radiological release could occur locally, onsite and offsite.	Unl	II	Building material and building separation provides some shielding from fire.		Unl	II
		Overheat tank, fireball occurs.							
III.	POTENTIAL/KINETIC ENERGY								

* PC - Probability Category, SC - Severity Category

HAZARD/ENERGY SOURCE		POTENTIAL ACCIDENT AND SEQUENCE	TARGET/ POTENTIAL CONSEQUENCES	Unmitigated		MITIGATING BARRIERS		Mitigated	
				PC*	SC*	ENGINEERED	ADMINISTRATIVE	PC*	SC*
A.	Helicopter/or plane crash.	Fire could impact billets or fuel assemblies. Personnel could be affected.	Radiological/ Toxicological release could occur onsite and offsite. Personnel injuries could occur.	Ext	I		Air navigation charts request pilots to fly above 2400 feet ANSL.	Ext	I
B.	Transport vehicle.	Accident could cause fire impacting uranium billets or fuel assemblies.	Radiological/ Toxicological release could occur locally, onsite and offsite.	Unl	II		Qualified drivers.	Ext	III
C.	Forklift.	Propane or electric forklifts are used.							
1.	Accident.	Forklift impacts stationary object or other vehicle causing propane release or vapor explosion, resulting fire impacts billets or fuel assemblies.	Radiological/ Toxicological release could occur locally, onsite and offsite.	Unl	II	Equipment designed NEFA requirements.	Qualified forklift operators. Approved procedures using ALARA and criticality prevention rules. Fuel storage housekeeping rules.	Ext	III
2.	Accident.	Persons, furniture, doors or other vehicles/objects could be struck by forklift.	Personnel injury and/or property damage could occur.	Ant	II		Qualified forklift operators. Approved procedures using ALARA and criticality prevention rules.	Unl	III
3.	Dropping or impacting billets/fuel assemblies from forklift.	Boxes could break spilling billets/fuel assemblies.	Radiological/ Toxicological contamination could occur locally.	Unl	III		Qualified forklift operators. Approved procedures using ALARA and criticality prevention rules.	Unl	III
D.	Packaging/ Repackaging billets, fuel and fuel pieces.	Billets are dropped while handling spreading contamination.	Radiological/ Toxicological contamination could be spread on floor and impacted objects. Worker injury could occur.	Unl	III	Certified lifting devices.	Qualified operators. Approved procedures using ALARA and criticality prevention rules.	Unl	III
E.	Equipment.	See building in question.							

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HAZARD/ENERGY SOURCE		POTENTIAL ACCIDENT AND SEQUENCE	TARGET/ POTENTIAL CONSEQUENCES	Unmitigated		MITIGATING BARRIERS		Mitigated	
				PC*	SC*	ENGINEERED	ADMINISTRATIVE	PC*	SC*
F.	Roof.	Roof collapse could cause injury, property damage, rearrange fuel.	Radiological/ toxicological release could occur locally onsite and offsite.	Unl	III		Roof integrity to be determined by engineering study.	Unl	III
IV.	NATURAL OCCURRENCES								
A.	Flood.								
1.	High Water.								
a.	Affects billets and fuel assemblies.	Flooding of the buildings could change billet and/or fuel geometry.	Criticality could occur.	Ext	I	The elevation of the floors of the Fuel Fabrication buildings are from 386.2 ft to 391.6 ft above mean sea level (MSL). The probable maximum flood is 383 ft MSL. UNI-1240 pg. 5-8.	Criticality limits calculated on the basis that water is present as a moderator. UNI-1240 pg. 5-20.	Inc	I
b.	Affects contamination.	Surface contamination flushed by flooding to surrounding area and process sewer, then process sewer goes to ground water, then to the river. Affected buildings have flood relief ports.	Radiological/ Toxicological releases locally, onsite/offsite could occur.	Ext	III	The elevation of the floors of the fuel fabrication buildings are from 386.2 ft to 391.6 ft above mean sea level (MSL). The probable maximum flood is 383 ft MSL. UNI-1240 pg. 5-8.		Ext	III
2.	Heavy rain (flash flood).	The 25 year-24 hour rainfall event could flood the site. Some drains go directly to process sewers.	Radiological/ Toxicological release could occur locally, onsite and offsite.	Ext	III	Natural slope of the area.		Ext	III
B.	Seismic event.	Earthquake could cause change in fuel geometry, building damage, or injury.	Criticality could occur. Radiological/ Toxicological release could occur locally, onsite and offsite. Lost time injury could occur.	Inc	I			Inc	I

* PC - Probability Category, SC - Severity Category

HAZARD/ENERGY SOURCE		POTENTIAL ACCIDENT AND SEQUENCE	TARGET/ POTENTIAL CONSEQUENCES	Unmitigated		MITIGATING BARRIERS		Mitigated	
				PC*	SC*	ENGINEERED	ADMINISTRATIVE	PC*	SC*
C.	Wind.								
1.	Missiles.	Missile could penetrate buildings.	Property damage, injury could occur.	Unl	II	The concrete buildings design strength is great enough to withstand missile. Metal walled buildings would slow or stop missiles.	Missile free area storage procedures.	Ext	III
2.	Pressure.	Wind pressure could collapse building.	Radiological/ Toxicological release could occur locally, onsite and offsite.	Unl	II			Unl	II
D.	Volcanic activity.	Ash buildup on roof causes collapse.	Radiological/ Toxicological release could occur locally.	Unl	II		Emergency ash removal procedures.	Unl	III
E.	Lightning.	Building struck by lightning, fire started.	Some damage could occur. No release expected.	Unl	III	Lightning protection. Active sprinkler systems.		Unl	III
V.	RADIATION								
A.	Accidental exposure.	Billets and fuel elements are radioactive.	Persons working in and around building could be exposed.	Ant	III		Qualified workers using ALARA procedures.	Ant	III
B.	Releases locally, onsite - offsite.	See above and specific building.							

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HAZARD/ENERGY SOURCE		POTENTIAL ACCIDENT AND SEQUENCE	TARGET/ POTENTIAL CONSEQUENCES	Unmitigated		MITIGATING BARRIERS		Mitigated	
				PC*	SC*	ENGINEERED	ADMINISTRATIVE	PC*	SC*
C.	Criticality. See possible causes above and under specific building.	Billets and/or fuel are flooded or rearranged.	Criticality could occur. Radiological release could occur locally, onsite and offsite.	Ext	1	Quantity and critical geometry were considered when calculating critical mass, allowable height, width & length of a stack of fissile material. Physical shape of U billets and fuel assemblies and their boxes are a natural barrier to formation of a critical geometry. UNI-1240 pg. 5-20. Wall flood ports (303-A, 303-B, 303-E, 303-G).	Criticality Prevention Specifications. Criticality calculations are based on the uranium being fully moderated by water. Uranium is stored and transported under double contingency criteria such that two failures could not cause a criticality. Uranium is stored in stacks of < 50% of a water moderated critical mass with a specified maximum stack height & minimum spacing between UNI-1240 pg. 5-20.	Ext	1

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BUILDING 313 - MANUFACTURING SUPPORT AND FUEL STORAGE

Building Description: The total building area is 7079 m^2 (76,200 ft^2). There are two types of construction: (1) steel frame with exterior and interior walls of concrete blocks on grade with a precast concrete slab roof with built-up tar and gravel surface, (2) steel frame with double metal insulated panel exterior wall, light weight metal interior partitions, foundations and floors of concrete or steel decking covering a concrete basement, and a roof of insulated metal covered with tar paper covered with tar and gravel surface. The truck loading dock at the north end is at building floor level. Ventilation throughout is provided by forced air equipment in combination with steam heat or evaporation cooling. The building is equipped with an electrical fire detection system and fully covered with an automatic fire alarm sprinkler (wet) system. The building is equipped with process water, steam and drains and trenches that go to process sewer.

Status: The majority of the major fuel fabrication equipment has been removed. Present usage is limited to: 1) neutralization of cleaning solution from spill and decontamination activities, 2) office space, 3) storage, 4) uranium packaging and repackaging, shipping and receiving, and 4) the Hanford Metal Working Facility in the north end which is in standby condition. An RWP is required for entry to surface contaminated areas.

HAZARD/ENERGY SOURCE		POTENTIAL ACCIDENT AND SEQUENCE	TARGET/ POTENTIAL CONSEQUENCES	Unmitigated		MITIGATING BARRIERS		Mitigated	
				PC*	SC*	ENGINEERED	ADMINISTRATIVE	PC*	SC*
I.	SHUTDOWN TASKS	See General HA Sections I A. through I H. as they apply.							
II.	CHEMISTRY	See General HA Sections II A. through II C. as they apply.							
III.	POTENTIAL/KINETIC ENERGY	See General HA Sections III A. through III F. as they apply.							
A.	Equipment.								
1.	North end - redone 1987.	Industrial and office type accidents could occur.	Personnel injury could occur.	Ant	III			Ant	III
a.	Offices, classrooms, and storage.	Cleanup or other activity releases wall or floor fixed contamination.	Personnel contamination could occur.	Ant	III	Contamination covered by paint or tile.	Approved clean-up procedures using ALARA practices. Qualified workers.	Ant	III
b.	Metalworking facility (in use for experimental purposes)	TBD	TBD	TBD	TBD	TBD	Review procedures for each group of experiments.	TBD	TBD
(1)	Sutton press - hydraulic oil.	Spill and/or fire could occur while removing oil.	Toxicological release could occur locally.	Ext	III	Hydraulic oil flash point 470°F. Lube oil flash point 410°F. Sprinkler and fire detection system.	No smoking allowed in building. Approved clean-up procedures using ALARA practices. Qualified workers.	Ext	III
(2)	Draw bench - lube oil.	Spill and/or fire could occur while removing oil.	Toxicological release could occur locally.	Ext	III	Lube oil flash point 410°F.		Ext	III

* PC - Probability Category, SC - Severity Category

BUILDING 313 - MANUFACTURING SUPPORT AND FUEL STORAGE

HAZARD/ENERGY SOURCE		POTENTIAL ACCIDENT AND SEQUENCE	TARGET/ POTENTIAL CONSEQUENCES	Unmitigated		MITIGATING BARRIERS		Mitigated	
				PC*	SC*	ENGINEERED	ADMINISTRATIVE	PC*	SC*
c.	North mezzanine area - electrical equipment.	Industrial accidents could occur.	Personnel injury could occur.	Ant	III	Electrical equipment is enclosed in NEMA panels.	Qualified workers for operating electrical equipment.	Ant	IV
2.	South end.								
a.	Southwest central area - wall and floor contaminated.	Tiles could come loose.	Contamination of personnel could occur.	Ant	III	Wall and floor contamination painted or tiled over.	Approved clean-up procedures following ALARA practices.	Ant	III
b.	Engineering development laboratory (EDL) (chemicals, contaminated sinks have been removed).	See General HA Section I B.2.							
c.	HEPA filters & ductwork, potential for Be, U & DOP contamination.	See General HA Sections I C. and I D.							
d.	Tool crib and offices - (formerly used for U fuel element processing) contamination on walls & floors .	Peeling tiles could release contamination.	Local radiological & toxicological contamination could occur.	Ant	III	Contamination painted or tiled over.	Approved cleanup procedures using ALARA practices and criticality prevention specifications.	Ant	III
e.	East wall - small chemical inventory. Oxidizers, sulfamic acid.	Fire could impact toxic chemicals. Flooding from sprinklers could cause release to process sewer.	Toxicological release could occur locally, onsite and offsite. Release to process sewer.	Ant	III	Tools, clothing, and equipment designed to protect workers.	Approved cleanup procedures using ALARA practices. Qualified workers.	Unl	III
f.	Drains and sewers - contaminated.	Flooding could cause release to process sewer.	Release to process sewer and eventually river possible.	Ant	III	Some sewers are plugged.	Approved cleanup procedures using ALARA practices. Qualified workers.	Ant	III
3.	Mezzanine.	Industrial accidents could occur.	Personnel injury could occur.	Unl	IV	Previously stored billets removed from under mezzanine.		Unl	IV

* PC - Probability Category, SC - Severity Category

BUILDING 313 - MANUFACTURING SUPPORT AND FUEL STORAGE

HAZARD/ENERGY SOURCE		POTENTIAL ACCIDENT AND SEQUENCE	TARGET/ POTENTIAL CONSEQUENCES	Unmitigated		MITIGATING BARRIERS		Mitigated	
				PC*	SC*	ENGINEERED	ADMINISTRATIVE	PC*	SC*
4.	Hot lab - equipment contaminated with pyrophoric materials, U fines.	Cleanup could cause uranium fires, contamination spread. Worker could be injured by operation of equipment.	Radiological/ Toxicological release could occur locally. Contamination could be spread to other surfaces.	Ant	III	Active sprinkler and fire alarm system. Tools and equipment for removing fines designed to protect workers. Machine shutdown. Circuit breakers locked open or removed.	Approved cleanup procedures using ALARA practices. Qualified workers. Verify power is off, locked, and tagged.	Ant	III
a.	Lathe - internal contamination, U fines.								
b.	Electro discharge machine (EDM) - contaminated oil, surface contamination U_3O_8.								
c.	Band saw - contaminated with U, Zr.								
d.	Ducts with HEPA filters contaminated with Be, U, and DOP.	See General HA Sections I C. and I D.							
5.	Extreme south end.								
a.	Waste acid treatment system (WATS) - contaminated with U salts. In use.	Cleanup could cause contamination spread.	Radiological/ Toxicological release could occur locally.	Ant	III	Bermed area.	In use. Approved cleanup procedures using ALARA practices. Qualified workers.	Ant	III
b.	Centrifuge, filter press - internal and surface contamination.	Cleanup could cause releases of contamination, spills to process sewer.	Radiological/ Toxicological release/contamination could occur.	Ant	III	Bermed area.	Approved cleanup procedures using ALARA practices. Qualified workers.	Ant	III
B.	Roof - contaminated with pigeon droppings, 13% of roof on south end can not be walked on.	Roof collapse could cause injury, property damage.	Radiological/ Toxicological release could occur locally.	Ant	II	Fencing and locked doors and gates.	South end roof limited access, hardhat area, offices emptied and closed. To be repaired or torn down. Approved cleanup procedures using ALARA practices.	Ant	III
IV.	NATURAL OCCURRENCES	See General HA Sections IV A. through IV E.							
V.	RADIATION	See General HA Sections V A. through V C.							

* PC - Probability Category, SC - Severity Category

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BUILDING 333 - FUEL MANUFACTURING

Building Description: The structure, 91.4 m by 42.7 m (300 ft by 140 ft), is steel frame with exterior insulated steel siding. The foundation and ground floor are concrete. The roof is insulated metal panel covered with felt, tar, and gravel. A mezzanine along the east side accommodates some electrical distribution equipment and a group of fifteen offices. A central mezzanine housed ventilation equipment for the chemical bay and a small mezzanine on the southwest corner accommodates a class room. A mezzanine on the northwest corner of the building includes eleven offices. A mezzanine on the north side includes 6 offices. Air conditioning of the building is accomplished with steam heat and evaporative cooling forced-air equipment. The building is equipped with three automatic fire alarm wet-pipe sprinkler systems. Floor trenches throughout the main building discharge to the process sewer.

Status: Some of the offices are in use. Currently the processing areas and equipment are being decontaminated of hazardous materials for final shutdown. There is no storage of nuclear materials. The facility may potentially be used for uranium packaging and repackaging, shipping and receiving. An RWP is required for entry to surface contaminated areas.

HAZARD/ENERGY SOURCE		POTENTIAL ACCIDENT AND SEQUENCE	TARGET/ POTENTIAL CONSEQUENCES	Unmitigated		MITIGATING BARRIERS		Mitigated	
				PC*	SC*	ENGINEERED	ADMINISTRATIVE	PC*	SC*
I.	SHUTDOWN TASKS	See General HA Sections I A. through I H. as they apply.							
II.	CHEMISTRY	See General HA Sections II A. through II C. as they apply.							
III.	POTENTIAL/KINETIC ENERGY	See General HA Sections III A. through III F. as they apply.							
A.	Equipment.								
1.	Autoradiography lab.	Industrial accidents could occur while cleaning or on walk through.	Personnel injury could occur.	Unl	IV	Chemicals removed.	Shutdown. All chemicals removed and equipment cleaned.	Unl	IV
2.	Autoclave area.								
a.	Sump trench contaminated with U_3O_8, $KMnO_4$, EDTA, NaOH.	See General HA Section I G.							
3.	Support welders - no contamination	Industrial accidents could occur.	Personnel injury could occur.	Unl	IV	Circuit breaker locked open and/or removed.		Unl	IV
4.	Final inspection & assembly area White Room small bench press	Industrial accidents could occur.	Personnel injury could occur.	Unl	IV	Circuit breaker locked open and/or removed.		Unl	IV
a.	Trench contamination, in SE corner Th, Zr, photographic chemicals.	See General HA Section I G.							
b.	End welder-possible beryllium and thorium contamination.	Cleanup could spread contamination. Shock or injury could occur.	Toxicological release could occur locally. Personnel injury could occur.	Ant	III	Circuit breaker locked open or removed. Weld chamber removed.	Shutdown. Approved cleanup procedures using ALARA practices.	Ant	III
5.	Temp storage-shipping.	Industrial accidents could occur.	Personnel injury could occur.	Unl	III	Empty, no cleanup needed.		Unl	IV
6.	End test room.	Industrial accidents could occur.	Personnel injury could occur.	Unl	III	Equipment removed. No cleanup needed.		Unl	IV

* PC - Probability Category, SC - Severity Category

BUILDING 333 - FUEL MANUFACTURING

HAZARD/ENERGY SOURCE		POTENTIAL ACCIDENT AND SEQUENCE	TARGET/ POTENTIAL CONSEQUENCES	Unmitigated		MITIGATING BARRIERS		Mitigated	
				PC*	SC*	ENGINEERED	ADMINISTRATIVE	PC*	SC*
a.	Main building sump contamination.	See General HA Section I G.							
7.	Chemical bay - surface contamination area.	Cleanup could spread contamination.	Radiological/ Toxicological contamination could occur locally.	Ant	III	Tools, clothing, equipment designed to protect workers.	Approved cleanup procedures using ALARA practices. Qualified workers. Tools and/or equipment specified in procedures.	Ant	III
a.	Trenches - contamination NHO_3, H_2SO_4, HF, Cu, Zr in solution.	See General HA Section I G.							
8.	Component cleaning area. Residual chemicals.	Cleanup could cause personnel contamination.	Toxicological release could occur locally.	Ant	III		Approved cleanup procedures using ALARA practices.	Ant	III
9.	Abrasive cleaning area - beryllium, Zircaloy-2 and aluminum oxide.	Cleanup could cause personnel contamination.	Toxicological release could occur locally.	Ant	III	Tools for removing contamination designed to protect workers.	Approved cleanup procedures using ALARA practices.	Ant	III
10.	End cap braze area - beryllium contamination.	Cleanup could cause personnel contamination. Oil removed could result in a spill or fire.	Toxicological release could occur locally.	Ant	III		Approved cleanup procedures using ALARA practices.	Ant	III
11.	Extrusion system - possible U contamination.						Shutdown.		
a.	Press hydraulic fluid.	Cleanup/removal could cause spill, personnel contamination or fire. Shock or injury could occur.	Toxicological contamination could occur locally.	Ant	III	High flash point oils - 405°F.	Approved cleanup procedures using ALARA practices.	Ant	III
b.	Runout table and loader.	Cleanup could cause personnel contamination.	Radiological/ Toxicological contamination could occur locally.	Ant	III	Tools for removing contamination designed to protect workers.	Approved cleanup procedures using ALARA practices.	Ant	III
c.	Tooling furnace.	Cleanup could cause personnel contamination.	Toxicological contamination could occur locally.	Ant	III	Tools for removing contamination designed to protect workers.	Approved cleanup procedures using ALARA practices.	Ant	III
d.	Billet furnaces.	Cleanup could cause industrial accident.	Toxicological contamination could occur locally.	Unl	III	Tools for removing contamination designed to protect workers.	Approved cleanup procedures using ALARA practices.	Unl	III

* PC - Probability Category, SC - Severity Category

BUILDING 333 - FUEL MANUFACTURING

HAZARD/ENERGY SOURCE		POTENTIAL ACCIDENT AND SEQUENCE	TARGET/ POTENTIAL CONSEQUENCES	Unmitigated		MITIGATING BARRIERS		Mitigated	
				PC*	SC*	ENGINEERED	ADMINISTRATIVE	PC*	SC*
e.	Die furnace - press hydraulic fluid	Oil spill or fire could occur.	Toxicological contamination could occur locally.	Unl	III	Tools for removing fluid designed to protect workers.	Approved cleanup procedures using ALARA practices.	Unl	III
f.	Container preheater.					Container preheater removed.			
g.	Container storage.	Cleanup couid cause industrial accident.	Toxicological contamination could occur locally.	Unl	III		Approved cleanup procedures using ALARA practices.	Unl	III
h.	Degreaser. 1,1,1-trichloroethane.	Cleanup could cause personnel contamination.	Toxicological contamination could occur locally.	Ant	III	Nonflammable solvent.	Solvent removed. Approved cleanup procedures using ALARA practices.	Unl	III
i.	Billet lube-oil - nonflammable graphite to sewer.	Cleanup could cause personnel contamination. Graphite washed to process sewer.	Toxicological contamination could occur locally.	Ant	III	Nonflammable lubricant.	Approved cleanup or isolation procedures using ALARA practices.	Ant	III
j.	Cut-up area and associated sewer/trench. Surface contaminated area. Desanno, Everite, and Peel test saw, Heald and Simplex counter- bore machines and exhaust scrubber (pyrophoric fines to be cleaned).	Removal of fines could result in a uranium/Zircaloy-2 fire. Cleanup could cause personnel contamination. Removal of hydraulic oil could potentially result in a spill or fire.	Radiological/ Toxicological release or contamination could occur locally.	Ant	III	Tools for removing fines designed to protect workers.	Approved clean-up procedures using ALARA practices.	Ant	III
k.	Compactor	Industrial accidents could occur.	Personnel injury could occur.	Ant	III		Approved operating procedures.	Ant	III
		Operations could cause personnel contamination or releases. (Breach of sealed container being compacted.)	Radiological/ Toxicological release or contamination could occur locally.	Ant	III	Operations conducted inside building. Equipment & clothing designed to protect workers will be used. HEPA filters used.	Approved operating procedures. HEPA filter checked yearly on PM standards.	Ant	III
12.	Hot lab - contaminated with pyrophoric materials, U fines.	Removal of fines could result in a uranium/Zircaloy-2 fire. Cleanup could cause personnel contamination.	Radiological/ Toxicological release or contamination could occur locally.	Ant	III	Tools and equipment for removing fines designed to protect workers.	Approved clean-up procedures using ALARA practices.	Ant	III

* PC - Probability Category, SC - Severity Category

BUILDING 333 - FUEL MANUFACTURING

	HAZARD/ENERGY SOURCE	POTENTIAL ACCIDENT AND SEQUENCE	TARGET/ POTENTIAL CONSEQUENCES	Unmitigated		MITIGATING BARRIERS		Mitigated	
				PC*	SC*	ENGINEERED	ADMINISTRATIVE	PC*	SC*
13.	Billet/can assembly welding area.	Cleanup could cause personnel contamination.	Radiological/ Toxicological contamination could occur locally.	Ant	III		Cleanup procedures using ALARA practices.	Ant	III
14.	Evacuation system and sump.	Industrial accidents could occur. Removal of hydraulic oil could potentially result in a spill or fire.	Personnel injury could occur.	Unl	III			Unl	III
15.	Step-cut saw, beryllium contaminated.	Cleanup could cause releases. Removal of fines could result in a fire. Removal of hydraulic oil could potentially result in a spill or fire.	Toxicological contamination could occur locally.	Ant	III	Tools for removing fines designed to protect workers.	Cleanup procedures using ALARA practices.	Ant	III
16.	Beta heat treatment furnace and straightener. (residual salt), hydraulic fluid.	Cleanup could cause personnel contamination. Removal of hydraulic oil could potentially result in a spill or fire.	Toxicological contamination could occur locally.	Ant	III	Oil flash Point 465 °F.	Cleanup procedures using ALARA practices.	Ant	III
17.	Grit blast bag house not in use.	Industrial accidents could occur.	Personnel injury could occur.	Unl	IV		Clean Area.	Unl	IV
18.	Nondestructive testing (NDE).	Industrial accidents could occur.	Personnel injury could occur.	Unl	IV		Clean Area.	Unl	IV
19.	Exhaust duct systems.								
a.	Chemical bay (inactive) fume, exhaust, and scrubber-HNO_3, H_2SO_4, HF, Cu, Zr, U, U_3O_8 contamination in ducts and stack.	See General HA Sections I C. and I D.				No identified ignition source.			
(1)	Decontaminate duct and scrubber. Ducts have a drain to process sewer.	See General HA Sections I C. and I D.							

* PC - Probability Category, SC - Severity Category

BUILDING 333 - FUEL MANUFACTURING

HAZARD/ENERGY SOURCE		POTENTIAL ACCIDENT AND SEQUENCE	TARGET/ POTENTIAL CONSEQUENCES	Unmitigated PC*	Unmitigated SC*	MITIGATING BARRIERS ENGINEERED	MITIGATING BARRIERS ADMINISTRATIVE	Mitigated PC*	Mitigated SC*
(2)	Stack - fiber glass reinforced resin with PVC liner, 60 inch throat, only 333 stack not sealed. Radiological contamination.	See General HA Sections I C., I D. and I E.							
b.	U saw, machining exhaust water scrubber; U, U_3O_8, and Zr contamination in ducts, scrubber and stack. Stack blocked.	See General HA Sections I C. and I D.				Stack sealed.			
c.	Be brazing & welding exhaust. Be, U, U_3O_8, DOP and Zr contamination in ducts and HEPA filter.	See General HA Sections I C. and I D.				Stack sealed.			
20.	Trenches, drains and sumps.								
a.	North of rework area.								
(1)	Two electrical trenches beneath DeSanno saw contaminated.	See General HA Section I G.				No drains.			
(2)	Sump to process sewer.	See General HA Section I G.							
(3)	Below floor holding tank with pump (never used).	See General HA Section I G.				Inlet to tank plugged.			
b.	Sump with pump south of can and billet welding press.	See General HA Section I G.				West side of chemical bay flows to berm.			
c.	SE corner of final area inspection sump to process sewer. Thorium, beryllium, Zircaloy-2, X-ray film developing chemical contamination - east side of building.	See General HA Section I G.							
d.	South end of autoclave area. Sump to process sewer. U_3O_8, EDTA, $KMnO_4$, NaOH contamination - east side of building.	See General HA Section I G.							

* PC - Probability Category, SC - Severity Category

BUILDING 333 - FUEL MANUFACTURING

HAZARD/ENERGY SOURCE		POTENTIAL ACCIDENT AND SEQUENCE	TARGET/ POTENTIAL CONSEQUENCES	Unmitigated		MITIGATING BARRIERS		Mitigated	
				PC*	SC*	ENGINEERED	ADMINISTRATIVE	PC*	SC*
e.	End Test room, main sump, east side of building.	See General HA Section I G.							
f.	Chem bay trenches run through east side of building to front of 334-A, and 334 buildings. HNO_3, H_2SO_4, HF, Cu, Zr, in solution, U, and other chemical contamination.	See General HA Section I G.							
g.	Container storage area inactive sump in pit does not go to process sewer.	See General HA Section I G.							
h.	Trench NE corner of building. PVC piping in trench, U fines cigarette butts, polishing compounds goes to process sewer and test room sump.	See General HA Section I G.							
21.	Tank pad (curbed) outside west side of 333 building.	Identified as 311 Tank Farm and addressed in the Outside Chemical Storage and Transfer System HA.							
B.	Roof.	See General HA Section III F.							
C.	Missile.	(See Wind) See General HA Section IV C.							
IV.	NATURAL OCCURRENCES	See General HA Sections IV A. through IV E.							
V.	RADIATION	See General HA Sections V A. and V C.							

* PC - Probability Category, SC - Severity Category

BUILDINGS 303-A - FINISHED FUEL STORAGE, 303-B - URANIUM BILLET STORAGE, 303-E - FINISHED FUEL STORAGE, 303-G - URANIUM BILLET STORAGE

Building Description: The structures are single story, 120.4 m^2 (1296 ft^2), 8.2m by 14.6 m (27 ft by 48 ft), concrete block and cement construction, munitions bunker type building, three doors, no windows. Roofs are 46 cm (18 in.) precast concrete slabs covered with felt, tar, and gravel. There are four 25 cm (10 in.) diameter holes in the walls at floor level for water drainage. Building are unheated. The buildings are equipped with an automatic fire alarm sprinkler (dry) systems with freeze protection in the valve rooms. Fire detection system.

Status: The buildings are used for fuel storage - "Green Fuel" in 303-A and 303-E, unirradiated fuel elements (wrapped in plastic) taken from N Reactor contaminated with fission and activation products, and U Billets in 303-B and 303-G. The billets and fuel stored in wooden boxes. Buildings are kept locked and sealed. RWP required for entry.

HAZARD/ENERGY SOURCE		POTENTIAL ACCIDENT AND SEQUENCE	TARGET/ POTENTIAL CONSEQUENCES	Unmitigated		MITIGATING BARRIERS		Mitigated	
				PC*	SC*	ENGINEERED	ADMINISTRATIVE	PC*	SC*
I.	SHUTDOWN TASKS	See General HA Sections I A. through I H. as they apply.							
II.	CHEMISTRY	See General HA Sections II A. through II C. as they apply.							
III.	POTENTIAL/KINETIC ENERGY	See General HA Sections III A. through III F. as they apply.							
IV.	NATURAL OCCURRENCES	See General HA Sections IV A. through IV E.							
V.	RADIATION	See General HA Sections V A. through V C.							
A.	Radiological exposure, 303-A and 303-E.	Accidental fire system operation or other introduction of water rinses reactor fission and activation products to the environment.	Surrounding environment and personnel.	Unl	III		Removal of activation and fission products.	Ext	III

* PC - Probability Category, SC - Severity Category

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BUILDING 304 - CONCRETION FACILITY

Building Description: The building is single story, 7.9 m by 14.6 m (26 ft by 48 ft) with a 3.7 m by 4.9 m (12 ft by 16 ft) addition (change room), steel frame with corrugated steel siding and roof with concrete foundation and floor, uninsulated and unheated, building with 6.1 m by 8.2 m (20 ft by 27 ft) fenced concrete pad. There is a heat detection fire alarm system.

Status: Surface-contaminated area. This facility will be used for embedding remaining uranium and beryllium-contaminated-Zircaloy-2 chips and fines in concrete. The chips and fines embedded in concrete are not exposed to air thereby virtually eliminating the potential for ignition during normal handling, storage, and shipment. There is no water to the building and drains have been blanked off. The building is kept locked. RWP is required for entry.

HAZARD/ENERGY SOURCE		POTENTIAL ACCIDENT AND SEQUENCE	TARGET/ POTENTIAL CONSEQUENCES	Unmitigated		MITIGATING BARRIERS		Mitigated	
				PC*	SC*	ENGINEERED	ADMINISTRATIVE	PC*	SC*
I.	SHUTDOWN TASKS	See General HA Sections I A. through I H. as they apply.							
II.	CHEMISTRY	See General HA Sections II A. through II C. as they apply.							
III.	POTENTIAL/KINETIC ENERGY	See General HA Sections III A. through III F. as they apply.							
A.	Equipment.								
1.	Ducts - contaminated with uranium.	Failure to follow cleanup procedures could cause release.	Radiological/ Toxicological release could occur locally, onsite and offsite.	Ant	III	Capped ends.	Approved sampling procedures following ALARA practices. Approved cleanup procedures using ALARA practices.	Ant	III
2.	Cyclone separator.	Cleanup could cause contamination spread or spill.	Radiological/ Toxicological release could occur locally, onsite and offsite.	Ant	III		Approved cleanup procedures using ALARA practices. Qualified workers.	Unl	III
3.	Contaminated drain, sump.	See General HA Section I G.				Drain plugged.			
4.	Forklift.	Collision could cause fines drum (being moved from 303-K) to tip and spill water and fines. Contamination would result. Fire could occur.	Radiological release could occur locally.	Ant	III		Qualified forklift operators. Approved cleanup procedures using ALARA practices.	Ant	III
B.	Roof.	See General HA Section III F.							
C.	Concretion process.								
1.	Fines - drum dries out.	Fines may ignite spontaneously if allowed to remain out of water more than 3½ hours.	Radiological release could occur locally, onsite and offsite.	Ant	III		Water filled drum until ready to concrete. Surveillance procedure.	Ant	III

* PC - Probability Category, SC - Severity Category

BUILDING 304 - CONCRETION FACILITY

	HAZARD/ENERGY SOURCE	POTENTIAL ACCIDENT AND SEQUENCE	TARGET/ POTENTIAL CONSEQUENCES	Unmitigated		MITIGATING BARRIERS		Mitigated	
				PC*	SC*	ENGINEERED	ADMINISTRATIVE	PC*	SC*
2.	Mixing drum 30 gal with welded in baffles. Add: 3 bags masonry cement, 60 lbs. water/coolant, 31.5 lb max of fines and sludge.	Drum spilled while adding ingredients, possible for fines fire.	Radiological/ Toxicological contamination and/or release could occur locally.	Ant	III		Approved filling procedures for adding masonry cement, water/coolant fines, and sludge. Approved cleanup procedures for spill using ALARA practices.	Unl	III
3.	Cover drum with non-bung lid.	Industrial accident could occur.	Personnel injury could occur.	Ant	IV			Ant	IV
4.	Drum is placed in drum rotator.	Lid comes off during rotation.	Radiological/ Toxicological contamination and/or release could occur locally.	Unl	III		Lid fastened tightly before rotating. Rotation speed limit.	Ext	III
5.	Non-bung lid is removed after 16 hours.	Removal of lid could release contamination.	Radiological/ Toxicological contamination could occur locally.	Unl	III		Sixteen hour interval for partial setting of cement.	Unl	IV
6.	Fill "6" void space with water adsorbent material after 7 days curing time.	Industrial accidents could occur.	Personnel injury could occur. Radiological/toxicol ogical contamination could occur locally.	Ant	IV		Approved procedures.	Ant	IV
7.	Install drum lid with Nucfil filter in bung hole.	Industrial accidents could occur.	Personnel injury could occur.	Ant	IV		Approved procedures.	Ant	IV
8.	Overpack in 55 gal drum filling void space with water adsorbent material, then install drum lid with Nucfil filter.	Industrial accidents could occur.	Personnel injury could occur.	Ant	IV		Approved procedures. Guard hands against pinching.	Ant	IV
9.	Final weighing, identifying, and installation of ID stickers.	Industrial accidents could occur.	Personnel injury could occur.	Ant	IV		Follow approved procedures.	Ant	IV

* PC - Probability Category, SC - Severity Category

BUILDING 304 - CONCRETION FACILITY

HAZARD/ENERGY SOURCE		POTENTIAL ACCIDENT AND SEQUENCE	TARGET/ POTENTIAL CONSEQUENCES	Unmitigated		MITIGATING BARRIERS		Mitigated	
				PC*	SC*	ENGINEERED	ADMINISTRATIVE	PC*	SC*
10.	Spontaneous ignition of chips and fines during curing of concrete.	Exothermic heat associated with curing contained in concrete results in spontaneous ignition of fines, swelling of mixture, and drum failure.	Contamination of local environment.	Ant	III	Designed and tested concrete mixture. Masonry cement.	Drum chips and fines limits.	Ext	III
IV.	NATURAL OCCURRENCES	See General HA Sections IV A. through IV E.							
V.	RADIATION	See General HA Sections V A. and V C.							

* PC - Probability Category, SC - Severity Category

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BUILDING 3712 - FINISHED FUEL AND BILLET STORAGE

Building Description: The 3712 Building is a one story steel frame structure, 27.4 m by 32.9 m (90 ft by 108 ft), with metal panel siding and roof, with a concrete floor and foundation. It is equipped with an automatic fire alarm and sprinkler (dry) system with freeze protection in the valve room. Steam heated forced air system inactive. There are no floor drains. The building floor is as at or above grade and the structure is supported approximately 8 in. above the floor on a concrete curb. Water accumulation would naturally be retained by this curb; however there are two 5 m (16 ft) wide roll up doors, with 11 cm (4.5 in.) high flaps at the bottom for drainage and two 2 m (8 ft) and two 1 m (3 ft) doors.

Status: The building is used for storage of uranium billets and finished fuel in wooden boxes, uranium scrap and standards, and unfinished fuel pieces. The building is kept locked. RWP required for entry.

HAZARD/ENERGY SOURCE		POTENTIAL ACCIDENT AND SEQUENCE	TARGET/ POTENTIAL CONSEQUENCES	Unmitigated		MITIGATING BARRIERS		Mitigated	
				PC*	SC*	ENGINEERED	ADMINISTRATIVE	PC*	SC*
I.	SHUTDOWN TASKS	See General HA Sections I A. through I H. as they apply.							
II.	CHEMISTRY	See General HA Sections II A. through II C. as they apply.							
III.	POTENTIAL/KINETIC ENERGY	See General HA Sections III A. through III F. as they apply.							
IV.	NATURAL OCCURRENCES	See General HA Sections IV A. through IV E.							
V.	RADIATION	See General HA Sections V A. through V C.							

* PC - Probability Category, SC - Severity Category

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BUILDING 3716 - IN PROCESS FUEL STORAGE

Building Description: The structure is a single story 12.2 m by 24.4 m(40 ft by 80 ft) aluminum frame building with corrugated aluminum siding and roof. The building is equipped with an automatic alarm and sprinklers (dry) system with freeze protection in the valve room. It has a floor trench to process sewer.

Status: The building is used for storage of unfinished fuel pieces capped with plastic caps, in wooden boxes. Building is kept locked. An RWP is required for entry.

HAZARD/ENERGY SOURCE		POTENTIAL ACCIDENT AND SEQUENCE	TARGET/ POTENTIAL CONSEQUENCES	Unmitigated		MITIGATING BARRIERS		Mitigated	
				PC*	SC*	ENGINEERED	ADMINISTRATIVE	PC*	SC*
I.	SHUTDOWN TASKS	See General HA Sections I A. through I. H. as they apply.							
II.	CHEMISTRY	See General HA Section II A. through II C. as they apply.							
III.	POTENTIAL/KINETIC ENERGY	See General HA Sections III A. through III F. as they apply.							
IV.	NATURAL OCCURRENCES	See General HA Sections IV A. through IV E.							
V.	RADIATION	See General HA Sections V A. through V C.							

* PC - Probability Category, SC - Severity Category

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BUILDING 303-K - MIXED RADIOACTIVE SOLID WASTE STORAGE, 3707-G - CHANGE HOUSE AND PAD

Building Description: The 303-K Building is of concrete block and cement construction with concrete foundation and floor, munitions bunker type building, four doors, no windows. Roofs are precast concrete covered with felt, tar, and gravel. The 3707-G change room is a metal Butler building with concrete foundation and floor. There is no fire protection system.

Status: North Room - storage of covered 30 gal drums containing uranium and beryllium-contaminated-Zircaloy-2 chips and fines covered with water and other liquid waste. South Room - storage of solid nuclear materials (UO_2 and ThO_2) controlled by Westinghouse Hanford Safeguards and Security. Outside fenced concrete pad - storage of low level and mixed wastes awaiting disposition. The RCRA closure plan has been submitted to Washington State Department of Ecology for comment. All drains are blanked-off. There is no steam, water, or fire protection for the building. Building and pad are secured/locked. An RWP is required for entry.

HAZARD/ENERGY SOURCE		POTENTIAL ACCIDENT AND SEQUENCE	TARGET/ POTENTIAL CONSEQUENCES	Unmitigated		MITIGATING BARRIERS		Mitigated	
				PC*	SC*	ENGINEERED	ADMINISTRATIVE	PC*	SC*
I.	SHUTDOWN TASKS	See General HA Sections I A. through I H. as they apply.							
II.	CHEMISTRY								
A.	Fire.	Also, see General HA Sections II A.1, II A.3., II B. and II C., as it applies.							
1.	North room.								
a.	Covered 30 gal drums - < 7.5" U & Zr chips & fines covered with water.	Water in fines drums could evaporate starting fire in drums.	Radiological/ Toxicological release could occur onsite & offsite.	Unl	III	Fines covered with water to prevent fires. Drums lidded to reduce evaporation. Oxides unlikely to be carried out of drum during fire.	Spacing maintained to prevent spread of fire. Water level in drums checked routinely through surveillance procedure.	Unl	III
		Hydrogen accumulation in six inch air space in drums and potential for undefined hydrogen ignition and explosion.	Radiological/ Toxicological release could occur onsite & offsite, personnel injury, and facility damage.	Unl	III		Drums vented periodically.	Ext	III
b.	Two drums of oil contaminated with uranium.	Oil could catch fire or spill.	Radiological/ Toxicological release or contamination could occur locally, onsite and offsite.	Unl	III	Trench drains plugged.		Unl	III
III.	POTENTIAL/KINETIC ENERGY	See General HA Section III A. through III D. as they apply.							
A.	Equipment.								

* PC - Probability Category, SC - Severity Category

BUILDING 303-K - MIXED RADIOACTIVE SOLID WASTE STORAGE, 3707-G - CHANGE HOUSE AND PAD

HAZARD/ENERGY SOURCE		POTENTIAL ACCIDENT AND SEQUENCE	TARGET/ POTENTIAL CONSEQUENCES	Unmitigated		MITIGATING BARRIERS		Mitigated	
				PC*	SC*	ENGINEERED	ADMINISTRATIVE	PC*	SC*
1.	On outside pad - mixed waste degreaser solvents perchloroethylene, 1,1,1 trichloroethane in 30 gal drums some in overpack, misc & U contamination.	Spillage could occur.	Toxicological releases could occur. RCRA/CERCLA violation could occur.	Unl	III	Solvents absorbed in Nochar making spill unlikely.		Ext	III
2.	Trench and sump.	None.	None.	Ext	III	Cleaned out.		Ext	III
3.	Drains.	None.	None.	Ext	III	Blocked.		Ext	III
4.	Exhaust duct and HEPA filters.	See General HA Sections I C. and I D.							
B.	Roof.								
1.	303-K.	See General HA Section III F.							
2.	3707-G.	Roof collapse.	Personnel injury could occur.	Unl	III			Unl	III
IV.	NATURAL OCCURRENCES	See General HA Sections IV A. through IV E.							
V.	RADIATION	See General HA Sections V A. through V C.							

* PC - Probability Category, SC - Severity Category

BUILDING 303-M - URANIUM OXIDE FACILITY

Building Description: The facility consists of 1) an Operations Room with 2 calcinators, a chip chopper, and material handling equipment 100.8 m^2 (1085 ft^2), and 2) an Equipment Room with 2 bag houses, HEPA filter banks and exhaust system 98 m^2 (1085 ft^2), and a change/monitor room 29 m^2 (312 ft^2). This is a precast concrete structure with concrete foundation and floor. The roof is precast concrete slab covered with felt, tar, and gravel. The change/monitor room has an automatic fire alarm sprinkler (wet) system.

Status: Shutdown. The operating area inside of the building is surface contaminated. Water (including the fire alarm system), steam, electricity, and air have been turned off. The west side bermed-storage-pad drain has been blanked-off to prevent precipitation from entering the process sewer. Building and pad are locked. Management approval is required before entering. An RWP is required for entry.

HAZARD/ENERGY SOURCE		POTENTIAL ACCIDENT AND SEQUENCE	TARGET/ POTENTIAL CONSEQUENCES	Unmitigated		MITIGATING BARRIERS		Mitigated	
				PC*	SC*	ENGINEERED	ADMINISTRATIVE	PC*	SC*
I.	SHUTDOWN TASKS	See General HA Sections I A. through I H. as they apply.							
II.	CHEMISTRY	See General HA Sections II A. through II C. as they apply.							
III.	POTENTIAL/KINETIC ENERGY	See General HA Sections III A. through III F. as they apply.							
A.	Equipment.								
1.	Bag house. HEPA filters U_3O_8 and DOP contaminated.	Filter break or fire.	Radiological/ Toxicological release could occur locally, onsite and offsite.	Ant	II	See HEPA filter removal, General HA.	See HEPA filter removal, General HA.	Unl	III
2.	Chipper. U, Zircaloy-2 contamination.	Clean up could cause personnel contamination, fire.	Radiological/ Toxicological release could occur locally.	Ant	III		Approved cleanup procedures using ALARA practices. Qualified workers.	Unl	III
3.	Oxide burner. U oxides.	Clean up could cause personnel contamination.	Radiological/ Toxicological contamination could occur locally.	Ant	III		Approved cleanup procedures using ALARA practices. Qualified workers.	Unl	III
B.	Roof.	Roof collapse could cause injury.	Minor release could occur locally.	Ant	III	New roof.		Unl	III
IV.	NATURAL OCCURRENCES	See General HA Sections IV A. through IV E.							
V.	RADIATION	See General HA Sections V A. and V B.							

* PC - Probability Category, SC - Severity Category

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BUILDING 334 - PROCESS SEWER MONITORING

Building Description: The steel frame structure has double insulated steel walls. Foundation and floor are concrete. The roof is insulated metal panel covered with felt, tar paper, and tar. The building is heated by a electric heater. There is no automatic fire alarm system. It contains instrumentation for measuring the level in three chemical storage tanks (the instrumentation is out of service) and the chart recorders and pH monitors for 313, 333, 3720 [Battelle Pacific Northwest Laboratories (PNL)] process sewers. It is also used for minor storage.

Status: Active, process sewer monitor operating.

HAZARD/ENERGY SOURCE		POTENTIAL ACCIDENT AND SEQUENCE	TARGET/ POTENTIAL CONSEQUENCES	Unmitigated		MITIGATING BARRIERS		Mitigated	
				PC*	SC*	ENGINEERED	ADMINISTRATIVE	PC*	SC*
I	SHUTDOWN TASKS	See General HA Sections I A. through I G.							
II.	CHEMISTRY								
A.	Fire.	Also see General HA Sections II A.1 & II A.3.							
III.	POTENTIAL/KINETIC ENERGY	See General HA Sections III A. through III D.							
A.	Equipment.								
1.	Instruments.	Flushing, sampling instruments. pH probes could cause spill.	Minor Radiological/ Toxicological release or contamination could occur locally and to process sewer.	Ant	III		Approved cleanup procedures using ALARA guidelines.	Unl	III
2.	Roof.	See General HA Section III F.							
IV.	NATURAL OCCURRENCES	See General HA Sections IV A. through IV E.							
V.	RADIATION	See General HA Sections V A. through V C.							

* PC - Probability Category, SC - Severity Category

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BUILDING 334-A - WASTE ACID STORAGE

Building Description: The structure is steel frame with double insulated steel walls. Foundation and floor are concrete. The roof is insulated metal panel covered with felt, tar paper, and tar. Contains a 3 m (10 ft) deep pit for waste acid tanks and settling tank.

Status: The waste acid collection and storage system is shutdown. There are potentially very low-level surface contaminated areas.

HAZARD/ENERGY SOURCE		POTENTIAL ACCIDENT AND SEQUENCE	TARGET/ POTENTIAL CONSEQUENCES	Unmitigated		MITIGATING BARRIERS		Mitigated	
				PC*	SC*	ENGINEERED	ADMINISTRATIVE	PC*	SC*
I	SHUTDOWN TASKS	See General HA Sections I A., B., D., and F.							
II.	CHEMISTRY	See General HA Section II.							
III.	POTENTIAL/KINETIC ENERGY	See General HA Section III.							
A.	Equipment.								
1.	Waste acid tanks (2) (empty and cleaned).	Puncture and minor residual release.	Toxicological release could occur locally, onsite and offsite.	Ant	IV	Sealed bermed area. Tanks emptied.		Ant	IV
2.	Process sewer active. Process sewer effluent presently goes to river via ground water.	Spill goes to river via process sewer and ground water.	Toxicological release could occur locally, onsite and offsite.	Ant	IV	Sewer drain plugged.		Ant	IV
IV.	NATURAL OCCURRENCES	See General HA Sections IV A. through IV E.							
V.	RADIATION	N/A							

* PC - Probability Category, SC - Severity Category

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303-F - PUMPHOUSE, 311 - OUTSIDE CHEMICAL STORAGE AND TRANSFER SYSTEM

Facility Description: The 303-F Pump House is a concrete block structure with concrete foundation and floor. The roof is precast concrete slab with tar and gravel surface. The steam to the building has been turned off. There is water to the safety shower and eye wash station. There is no fire alarm sprinkler system. The chemical storage and transfer system consists of tanks with catch basins to collect and divert spills to the process sewer, transfer piping in a concrete trench, the 311 tank farm, 303-F pump house, and process sewer lines.

Status: Tank 50 contains moratorium waste from surface contaminated areas. System will be used during cleanup of acid and caustic waste systems. Other tanks in the building are empty.

HAZARD/ENERGY SOURCE		POTENTIAL ACCIDENT AND SEQUENCE	TARGET/ POTENTIAL CONSEQUENCES	Unmitigated		MITIGATING BARRIERS		Mitigated	
				PC*	SC*	ENGINEERED	ADMINISTRATIVE	PC*	SC*
I	SHUTDOWN TASKS	See General HA Sections I A. through I G. as applicable.							
II.	CHEMISTRY	See General HA Section II A.1 N/A							
III.	POTENTIAL/KINETIC ENERGY	See General HA Sections III A. through III D. N/A							
A.	Equipment tanks by location.								
1.	South of 334 Building and east of 333 Building. 6,000 gallon tanks with catch basins.								
a.	Sulfuric acid H_2SO_4, emptied and cleaned.	Puncture causes spill and minor residual release.	Toxicological release could go to process sewer.	Unl	III	Tank cleaned out.		Ext	IV
b.	Nitric acid (2) - HNO_3, emptied and cleaned.	Puncture causes spill and minor residual release.	Toxicological release could go to process sewer.	Unl	III	Tank cleaned out.		Ext	IV
c.	Waste acid tank removed.	None.							
2.	Tank pad (curbed) outside west side of Building 333.								
a.	Two uranium bearing acid tanks (empty and flushed).	Puncture causes spill and minor residual release.	Radiological/ Toxicological release could occur locally, onsite and offsite.	Unl	III	Bermed area, drain valved off.	Drain valve closed and locked.	Unl	III
b.	Waste oil tank empty but not flushed. Uncontaminated.	Fumes could explode.	Personnel could be injured. Property damage could occur.	Unl	II	Bermed area, drain valved off.	Approved cleanup procedures using ALARA rules. Qualified workers.	Unl	III
3.	311 Tank Farm between 303-F and 303-G.					Bermed area.			

* PC - Probability Category, SC - Severity Category

303-F - PUMPHOUSE, 311 - OUTSIDE CHEMICAL STORAGE AND TRANSFER SYSTEM

HAZARD/ENERGY SOURCE		POTENTIAL ACCIDENT AND SEQUENCE	TARGET/ POTENTIAL CONSEQUENCES	Unmitigated		MITIGATING BARRIERS		Mitigated	
				PC*	SC*	ENGINEERED	ADMINISTRATIVE	PC*	SC*
a.	Two 10,000 gallon Sodium Hydroxide NaOH tanks in a catch basin to pipe trench (empty with heel awaiting cleanout).	Puncture causes spill.	Toxicological release could go to process sewer.	Unl	III	Tanks contain heel below normal drain lines.		Ext	III
b.	Concrete dike with impervious bottom 10,000 gallon capacity.	Failure while retaining liquids causes spill.	Toxicological release could occur locally, onsite and offsite.	Ext	III			Ext	III
(1)	Nitric acid 4,000 gallon (empty and flushed).	Puncture causes spill and potential minor residual release.	Toxicological release could go to process sewer. RCRA/CERCLA violation could occur.	Unl	III	Tank empty. Drain to sewer, valved off.	Tank empty.	Ext	III
(2)	Neutralized chemical waste containing non-recoverable uranium (Tank 50 in use, Tank 40 contaminated heel).	Puncture causes spill. Sampling and cleanup could cause release to sewer.	Radiological/ Toxicological release could occur locally, onsite and offsite.	Ext	III	Tank 40 empty. Drain to sewer, valved off.	Approved emptying and cleanup procedures using ALARA rules. Qualified workers.	Ext	III
B.	303-F pump house/ transfer lines.								
1.	Pump fails to stop when tank full. Overflow alarm not working.	Tank overflow causes spill.	Toxicological release could go to process sewer.	Unl	III	Bermed area.	Approved procedures.	Unl	III
C.	Pipe trench concrete channel with concrete lift slab covers. Trench east of railroad tracks go to process sewer.	Release to process sewer could occur during cleanout or inadvertent spills, fire system activation.	Toxicological release could go to process sewer.	Unl	III	Trench west of railroad tracks to bermed area.	Approved procedures using ALARA rules.	Unl	III
IV.	NATURAL OCCURRENCES	See General HA section as applicable.							
V.	RADIATION	N/A							

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