ATTACHMENT

SUMMARY OF CHANGES TO DOCUMENT NO. XN-2

Page No.	Section No.	Change
0.3	Table of Contents	Update Table of Contents.
2.4	2.2.1	Changed ALARA Committee Report minimum frequency.
2.25	Figure 2.3-2	Modified approval requirements of Process Test Authorizations.
3.19	3.1.4.5(e)	Modified this section to require annual in-vivo examination of all employees routinely working in Contamination Control Areas.
3.20 thru 3.27	- - - -	Relocation of material, only.
3.28	3.2.2.2	Added new section, "Limits on Maximum Multiplication Factor" in order to define allowances for calculated and experimental uncertainties applicable to the maximum multiplication factor.
3.29	3.2.2.3	Changed section no. (previously 3.2.2.2); removed limits and constraints on the maximum k_{eff}, and added a reference to Section 3.2.2.2.
3.29	3.2.2.4	Changed section no. (previously 3.2.2.3).
3.30	3.2.2.5	Changed section no. (previously 3.2.2.4).
3.30	3.2.2.5.1	Changed section no. (previously 3.2.2.4 l); removed specific limits on reactivity, and added a reference to Section 3.2.2.2.
3.30	3.2.2.5.2	Changed section no.(previously 3.2.2.4.2); removed specific limits on reactivity, and added a reference to Section 3.2.2.2.
3.31	3.2.2.6	Changed section no.(previously 3.2.2.5); removed specific limits on reactivity, and added a reference to Section 3.2.2.2.
3.32	3.2.2.7	Changed section no. (previously 3.2.2.6).
3.32	3.2.2.7(A)	Changed no. of referenced section, and removed Section 3.2.2.7(A)(4).
3.33	3.2.2.7(C)	Removed specific limits on reactivity, and added a reference to Section 3.2.2.2.
3.34	3.2.2.7(E)	Removed reference to Surface Density Method.
3.34	3.2.2.7(E)(1)	Corrected Reference from (b) to (b').
3.34	3.2.2.7(E)(3)	Modified wording to clarify the spacing between the outermost tanks in an array and the adjacent walls in order to satisfy the requirement for use of the nominally reflected Solid Angle criteria.

Attachment (continued)

Page No.	Section No.	Change
3.34	3.2.2.7(E)(4)	Combined previous paragraphs (4) & (5) and modified wording to clarify the requirement that the nominally reflected Solid Angle criteria is limited to finite arrays of finite sized vessels; corrected Reference from (b) to (b').
3.34	3.2.2.7(E)(5)	Changed section no. (previously 3.2.2.6(E)(6)).
3.35	3.2.2.7	Removed paragraph on the Surface Density method.
3.36	3.2.2.8	Changed section no. (previously 3.2.2.7).
3.56	3.7.2.3	Added requirement for quarterly inspections and contamination surveys of accumulations of packages of uranium-contaminated solid waste stored outdoors for extended periods of time.
3.59	3.10	Corrected typo.
3.61	3.11	Removed duplication of Radiation Work Procedure requirement (this requirement is adequately covered in Section 3.1.1.3 and in the first paragraph of Section 3.11, page 3.60, as these sections were modified by Revision 1); modified description of how process and equipment, as well as Process Test Authorizations, are reviewed and approved, and included the requirement for specifing the authorized duration of the Test.
3.62	- - - -	Relocation of material only.

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e) Manager, Maintenance.

f) Manager, UO_2 Plant.

g) Manager, MO&SF Plant.

The ALARA Committee shall convene at least semi-annually. The ALARA Committee shall issue a formal report at least annually to the FMD Industrial Health & Safety Council reviewing employee exposures and effluent release data to determine: | 2

a) If there are any upward trends developing in personnel exposures for identifiable categories of workers or types of operations, effluents, or concentrations of effluents in environmental samples.

b) If exposures and effluents might be lowered under the concept of as low as reasonably achievable.

c) If equipment for effluent and exposure control is being properly used, maintained and inspected.

Their reports shall include review of other required audits and inspections performed during the past year and review of the data from the following areas: employee exposures, bioassay results, unusual occurrences, effluent releases, in-plant airborne radioactivity, and environmental monitoring.

2.3 Organizational Safety Responsibilities and Authorities

The President of Exxon Nuclear has the ultimate responsibility for ensuring that all Company operations at Richland, Washington are conducted safely and in full compliance with applicable Federal, State and local regulations, licenses and permits.

Section/Appendix/Attachment ID: Application - License Conditions

FIGURE 2.3-2 APPROVAL & RESPONSIBILITY MATRIX

A - Prepare/Primary Responsibility
B - Approve/Accept/Concur
C - Implement/Execute
D - Inspect/Audit

A primed letter (e.g., A') signifies that the respective individual is responsible for the respective function only as it relates to his area of responsibility.

	Vice President & Executive-In-Charge Fuels Manufacturing	Manager, Manufacturing	Plant Managers	Manager, Manuracturing Engineering	Manager, Facilities & Equipment Engineering (ELO)	Manager, Maintenance	Manager, Auxiliary Operations	Manager, Plant Security	Industrial Safety Component	Plant Criticality Safety Engineer	Supervisor, Radiological Safety	Health Physics Technicians	Manager, Fuel Development & Testing(ET	Manager, Logistics	Manager, Corporate Licensing & Compliance Department	Manager, Licensing & Compliance Operating Facilities	Health Physics Component	Criticality Safety Component	Nuclear Criticality Safety Specialist			Rev.
Position Responsibilities & Authorities	B	A'			A'								A'	A'	A'/B							
Position Professional Requirements		B'	A'	A'	A'	A'	A'						A'	A'	A'/B							
Radiation Protection Standards	B	B	B								C			B	B	B	A/C/D					
Radiation Safety Operating Procedures		B					B				A	C		B		B	D					
Radiation Work Procedures			B'/C'		B'/C'	B'/C'					A/D	D	B'/C'	B'/C'		B	D					
Nuclear Crit. Safety Bases & Criteria	B														B			B/C	A			
Nuclear Crit. Safety Standards	B	B	B							C/D					B	B		A/C/D	B			
Nuclear Crit. Safety Analyses										C								A/D				
Criticality Safety Specifications		B'	B'		B'					A/D			B'	B"		B		B/D				
Rad. & Crit. Safety Insp./Audit Programs							B'			A'/C	A'	C'				B'	A'/C	A'/C'				
Operating Procedures		B'	A'/C'		A'/C'								A'/C'	A'/C'								
Rad. Waste Treat. & Disposal Programs	B	A'	C'		A'/C'						D	D	A'/C'		B	B	D					
Environmental Surveillance Program	B														B	B/D	A/C					
Emergency Plan & Procedures	B	B	C'	C'	B'/C'	C'	A		C'		C'	C'	B'/C'	C'	B							
Access Controls		B'	A/C'		A'/C'			A'/C'			D	D	A'/C'	A'/C'	B	B						
Training Programs		B'	A'/C'		A'/C'	A'/C'	B'	A'/C'	A'/C'	A'/C'	A'	C'	A'/C'	A'/C'			D'	D'				
Process & Equipment Changes		B'	B'	A'/C'	A'/C'	C'/D'			B'/D'	B'/D'	B'/D'	D'	A'/C'			B	B'	B'				
Process Test Authorizations		B'	B'	A'/B'	B'		B			B'/D'	B'/D'	D'	B'			B	B'	B'				2
Incident Investigations & Reporting	A	B'	B'		B'								B'	B'	B	B						
Records			A'	A'	A'	A'	A'	A'	A'	A'	A'	A'	A'	A'		A'	A'	A'				

Amendment Application Date: April 1980

The following aspects of the bioassay program apply:

a) An in-vivo examination is performed on all new employees who have previously handled special nuclear material prior to allowing them to work in Contamination Control Areas.

b) A urine specimen from each employee scheduled for routine work in Contamination Control Areas is obtained and analyzed for uranium and/or plutonium, as appropriate, prior to allowing them to work in these Areas.

c) Employees working in uranium-Contamination Control Areas submit monthly urine specimens for routine uranium analysis.

d) Employees working in plutonium-Contamination Control Areas submit quarterly urine specimens for routine plutonium analysis.

e) Employees routinely working in Contamination Control Areas shall receive in-vivo examinations at least annually. 2

f) If the most recent quarterly average of the airborne uranium concentration for any work area exceeds 25% of the respective DAC, the frequency of sampling and the type of bioassay measurements for workers in that work area shall be modified to that given in Table 3 of Regulatory Guide 8.11, "Application of Bioassay for Uranium," June 1974.

Unusual occurrences with documented evaluation will not be included in calculating the quarterly average. However, diagnostic evaluations, as defined in Section C.2.b(4) of Regulatory Guide 8.11, shall be performed in accordance with criteria set forth in Figure 2 of the same Guide.

g) If an emplcyee may have been exposed to greater than 40 DAC-hours of plutonium in air in any consecutive 7-day period, or if routine urinalysis exhibits ≥ 0.2 dpm of Pu per 24-hour specimen, additional urinalysis shall be required within one working day following detection. If confirming urinalysis exhibits ≥ 0.2 dpm of Pu, then an in-vivo examination shall be performed within one week.

h) The following action guides and actions shall apply:

1) For transportable uranium compounds, an individual whose urine specimen exhibits a concentration in excess of 25 μg U/ℓ is required to submit another urine specimen on his first work day following the Company's receipt of the result, and at least weekly thereafter until a concentration of less than 25 μg U/ℓ is reached.

2) For nontransportable uranium and plutonium, should the future dose commitment to an individual's lung (based on in-vivo examinations) exceed 7.5 rem for the following 12 months, that individual will receive in-vivo examinations at least bi-monthly as long as he continues to work in Contamination Control Areas, and until that time when the future dose commitment to the lung for a subsequent 12-month period is less than 5 rem.

Any time that a dose evaluation is necessary, an investigation as to the possible source and cause shall be jointly conducted by the Radiological Safety Supervisor and the Health Physics Component of the Licensing & Compliance, Operating Facilities Section.

i) Individuals shall be restricted from work in Contamination Control Areas according to the following:

1) For transportable uranium compounds, any individual whose urine specimen exhibits a concentration in excess of 100 μg U/ℓ; such individuals shall not be allowed to work in Contamination Control Areas until subsequent urine specimens exhibit a concentration of less than 25 μg U/ℓ.

2) For nontransportable uranium and plutonium, any individual whose future dose commitment to the individual's lung (based on in-vivo examinations) exceeds 12 rem for a subsequent 12-month period; such individuals shall not be allowed to work in Contamination Control Areas until that time when his future dose commitment to the lung for a subsequent 12-month period is less than 7.5 rem.

3.1.5 Radiation Safety Instruments and Equipment

Sufficient radiation safety instruments, equipment and supplies are maintained readily available at the plant and, as appropriate, strategically located.

The general capabilities of radiation safety instruments used to make radiation protection measurements are described in Table 3.1-1.

The Manager, Maintenance, is responsible for the maintenance and calibration of radiation safety instruments and equipment. The following general requirements apply to all such equipment and instruments:

a) All radiation detection instruments are inspected, repaired when necessary, and calibrated at least semi-annually.

b) Instruments are calibrated following any maintenance on them before they are put back into routine service.

c) Each on-line radiation detection instrument is checked for proper operation by Health Physics Technicians daily (Monday through Friday). When daily checks are performed in a manner which qualifies as calibration, separate semi-annual calibrations are not required.

d) Portable survey instruments are source checked each time they are turned on for use.

e) AC-operated personnel contamination survey instruments are provided with individual check sources to allow personnel to source check the instruments at random.

f) Calibration sources are traceable to the National Bureau of Standards.

3.2 Nuclear Criticality Safety Controls

Nuclear criticality safety shall be assured through both administrative and technical practices. Administrative practices include establishing clearly the responsibilities for nuclear criticality safety, providing adequate and skilled personnel, preparing written standards and procedures, process analysis, materials and operational controls, operational and incident reviews, and emergency procedures. Technical practices include exercising control over the mass and distribution of significant Quantities of special nuclear materials and the mass, distribution, and nuclear properties of all other materials with which special nuclear materials are associated.

3.2.1 Administrative Practices

The responsibilities and authorities for nuclear criticality safety are as described in Section 2 of this Application. The professional requirements for criticality safety personnel are as described in Section 2.

3.2.1.1 Process Analyses (Critically Safe Determinations)

Before any operation with special nuclear material is begun or changed, it is determined that the entire process will be subcritical under both normal and credible abnormal conditions, and within the technical requirements specified in Section 3.2.2. Criticality safety analyses are performed on all applicable processes in accordance with Section 2.3.18, and all determinations of nuclear criticality safety are reviewed and approved by a second-party reviewer in accordance with the requirements specified therein.

Criticality safety analyses are performed and/or reviewed by Exxon Nuclear or contractor personnel who meet the professional requirements specified in Section 2.3.18.

Records of criticality safety analyses of processes shall be documented and retained in accordance with Section 2.3.18. Additionally, basic criteria, data, methods and references pertaining to nuclear criticality safety shall be documented and retained in Company files by the Criticality Safety Component of Licensing & Compliance, Operating Facilities.

Operations in which nuclear criticality safety is pertinent are governed by written procedures, and all persons participating in these operations are required to be familiar with the procedures. Each process step is described by a written Process Specification which, together with the respective Criticality Safety Specification, provides the basis for written Operating Procedures.

Criticality Safety Specifications are prepared in a standardized format containing the following information: work location, equipment description, special nuclear material description (element, isotope, enrichment, form, density), operation involved, control limits, moderator and reflector restrictions, spacing restrictions, criticality safety procedures, date, and approvals.

Criticality Safety Specifications are maintained up-to-date and reflect all approved process and/or equipment changes. Additionally, they shall be kept current by annual reviews, and updated as appropriate.

Criticality Safety Specifications are prepared by the Plant Criticality Safety Engineer based on limits established in criticality safety analyses provided by the Criticality Safety Component.

The Specifications are accepted and approved in accordance with Figure 2.3-2.

Copies of current Criticality Safety Specifications are maintained in the work or storage areas in which the respective specifications apply.

3.2.1.2 Criticality Safety Standards

Exxon Nuclear has established, and maintains, a system of written Criticality Safety Standards for processes, equipment and facilities involving special nuclear material. These Standards are prepared and maintained by the Criticality Safety Component of Licensing & Compliance, Operating Facilities, and are approved and accepted in accordance with Figure 2.3-2. These Standards shall be kept current by annual review, and updated as appropriate.

3.2.1.3 Fissile Content Verification

The fissile isotope content of all incoming special nuclear material is verified by laboratory analysis of a certified sample of each withdrawal lot furnished by the supplier or of a representative sample obtained by Company employees upon receipt of the material.

3.2.1.4 Special Nuclear Material Control

The movement of fissionable materials is controlled. The procedures section of Criticality Safety Specifications describes the materials control practices, including the following requirements:

a) Work stations procedurally controlled only on the basis of a safe mass of material are limited to one safe batch, where a safe batch is defined as no more than 0.45 of the minimum critical mass of the material in process.

b) No more than one safe batch may be moved at one time when introducing or removing material from a work station.

c) Individual safe batches are spaced a specified minimum distance apart.

d) A record is maintained of the special nuclear material inventory at each mass limited work station.

These requirements do not apply in systems controlled by geometry, moderation, or fixed neutron absorbers (see Section 3.2.2).

3.2.1.5 Labeling of Special Nuclear Material

Insofar as practical, all special nuclear material in the plant is identified with distinctive labels. When possible, the label is applied to the outer container of special nuclear material. When such labeling is not practical, as for fuel pellets outside of containers, each item is identified by permanent markings or distinctive shapes which identify the item according to identification coding posted in the immediate vicinity of unlabeled items.

a) Content

The label or sign shows, as appropriate, the type of material, form, enrichment, gross, tare and net weights, element or fissile isotope weight, fuel identification number, date, and initials of person preparing the label.

b) Segregation

Materials of different enrichment, physical and/or chemical form, and isotopic content are kept segregated until combination of different materials is required in the process.

3.2.1.6 Posting of Special Nuclear Material Locations

Each location where special nuclear material is handled, processed, transported or stored is identified by a distinctive symbol which will be observable from all approaches at a distance at least equal to the spacing requirement from other special nuclear material. For work locations separated from other areas by partitions, walls, etc., posting on the opposite side of the obstruction will indicate the spacing limit requirements for special nuclear material in that area.

In addition to the symbol, the location is posted with a sign showing limits specified in the respective Criticality Safety Specification, including type and form of material permitted, allowable quantity (containers, pieces, weight, or volume), restrictions on moderators, required spacing from other special nuclear material, and the applicable Criticality Safety Specification number.

3.2.1.7 Confirmation of Analysis Assumptions

Prior to operation with special nuclear material, each operation or process for which a criticality safety analysis has been performed, a member of the Criticality Safety Component of Licensing & Compliance, Operating Facilities shall inspect the respective facility and/or equipment and confirm that the assumed controls are in place and/or functional. The results of these inspections shall be appropriately documented.

3.2.2 Technical Practices

Wherever practicable, nuclear criticality safety will depend as little as possible upon decisions or actions of personnel, especially for routine activities. This normally means processing in geometrically favorable equipment insofar as practicable. The following general criteria form the bases for the Exxon Nuclear criticality safety controls and procedures.

3.2.2.1 Double Contingency Policy

Process and equipment designs and operating procedures incorporate sufficient factors of safety to require at least two unlikely, independent, and concurrent errors, accidents, equipment malfunctions, or changes in process conditions before a criticality accident is possible.

3.2.2.2 Limits on Maximum Multiplication Factors

The k_{eff} to be used as the permissible upper limit for single units or multi-unit arrays at the worst creditable accident condition is defined as follows:

a) Where reliable experimental data exists for closely similar systems and adequate calculational techniques exist for relatively small extrapolation of data, k_{eff} shall not exceed 0.95 at the 95 percent confidence level. 2

b) If limited experimental data exists for a similar system and relatively large but reasonable extrapolations are necessary, or where calculational methods compare less favorably with experimental data the k_{eff} of the system shall not exceed 0.90 at the 95 percent confidence level. 2

3.2.2.3 Geometry 2

Wherever practicable, reliance is placed on equipment designs which physically limit the dimensions of units containing special nuclear material.

Safe dimensions may be established by utilizing the following safety factors:

a) The k_{eff} of the unit may be established by using the guidelines given in section 3.2.2.2. 2

b) Critical dimensions multiplied by the applicable safety factors given in Tables 3.2-1 and 3.2-2.

Where applicable, dimensional limitations include an allowance for fabrication tolerance and/or potential dimensional changes from corrosion or mechanical distortion. Also, limiting values are based on the worst forseeable operating conditions and include appropriate allowances for uncertainties in the data and methods used to demonstrate safety.

3.2.2.4 Neutron Absorbers 2

Criticality safety may be assured through the use of fixed neutron absorbers, such as cadmium, boron, etc., provided that:

a) Neutron absorbers are designed and fabricated as an integral part of the equipment.

b) Inspections to verify the continued integrity of the equipment and neutron absorber structure are performed on established time frequencies sufficient to insure their affectiveness. Results of these inspections, and the basis for the inspection frequencies are recorded and audited.

c) Viable alternatives to the use of fixed neutron absorbers to assure criticality safety do not exist.

3.2.2.5 Concentration Control | 2

Reliance for primary criticality control may be placed on concentration controls in areas where geometry control is not practicable, and where the nature of the process and operations make violation of the concentration limit unlikely even after failure of any single control. Concentration control may be applied to both overmoderated and undermoderated accumulations of material as described below.

3.2.2.5.1 Concentration Control - Solutions | 2

The concentration of fissile material dispersed or dissolved in another medium may be limited to prevent criticality, provided that:

a) The permitted concentration of fissile material in solution shall be equal to or less than fifty percent of the minimum critical concentration in the vessel.

b) The k_{eff} of the system at the maximum allowable concentration shall be limited by using the guidelines given in section 3.2.2.2. | 2

c) For individual tanks (non-geometrically safe) using concentration control, the mass shall be limited such that k_{eff} is limited by the guidlines given in section 3.2.2.2 for the maximum uranium mass accumulated in the tank under the worst conditions attainable by inadvertent concentration of the fissile material. For large storage systems where concentration of the fissile material is not a credible condition, or where administrative practices are implemented to prevent concentration of the fissile material, the above requirement may be disregarded. 2

3.2.2.5.2 Concentration Control - Powders and Pellets 2

The concentration of hydrogenous material within the fissile material may be limited to a small percentage by weight of the fissile material (moderation control) to prevent criticality, provided that:

a) The permitted concentration of hydrogenous material shall be equal to or less than fifty percent of the critical concentration for the system in question; and

b) The maximum reactivity of the system full of the material in question, under the worst credible accident conditions, shall be limited by the guidelines given in section 3.2.2.2; and 2

c) Where practicable, the material shall be contained within a fireproof barrier or in a process area containing limited sources of hydrogenous material. In the absence of a fireproof barrier, special controls shall be used to prevent fires and to control the use of moderators in fire fighting in such process areas.

3.2.2.6 Multi-Unit Arrays 2

The spacing between units within an array is limited by mechanical means such that the following requirements are met.

a) The k_{eff} of the array under the maximum credible accident conditions shall be limited by the guidelines given section 3.2.2.2. 2

b) For multi-unit arrays where k_{eff} is not used as a basis, the number of units in the array shall not exceed 50 percent of the calculated critical number.

The mechanical design of equipment or storage arrays in which deformation or rearrangement could result in the loss of a contingency, shall be reviewed by a person competent in mechanical engineering.

3.2.2.7 Criticality Safety Parameters 2

A) Criticality Data

Critical parameters used to establish primary criticality safety limits shall be based on one or more of the following (see Section 3.2.2.8 for sources of data currently acceptable to Exxon Nuclear): 2

1) Criticality parameters obtained directly from experimental measurements.

2) Criticality parameters derived from experimental measurements.

3) Theoretical calculations using methods shown to be accurate by validation according to Regulatory Guide 3.14, "Validation of Calculational Methods for Nuclear Criticality Safety."

2

B) Enrichment Levels

Design isotopic compositions shall be established and appropriate criticality safety controls implemented to assure conformance with the respective fissile element composition prior to initiating respective activities.

Normally, equipment is designed to assure criticality safety by geometry control. Where batch control is utilized, enrichment level or other isotopic composition limits are clearly posted at the respective equipment or location.

C) Moderation

Critical parameters shall be based on optimum water moderation unless other than optimum moderation can be assured under both normal and credible abnormal conditions. If used in conjunction with other primary criticality safety parameters, the hydrogen-to-fissile atom ratio shall be maintained such that the resulting k_{eff} of the unit shall be limited by the guidelines given in section 3.2.2.2. 2

D) Reflection

Critical values shall be based on full water reflection unless less-than-full reflection can be assured under both normal and credible abnormal conditions. Consideration shall be given to other reflectors in the immediate vicinity which could result in a reactivity greater than that for a water-reflected system.

E) Neutron Interaction

Neutron interaction (exchange between individually subcritical units shall be considered. Consideration of the interaction between units or arrays of special nuclear material may be accomplished through the use of the Solid Angle method. 2

The Solid Angle method is applied according to the constraints in the "Nuclear Safety Guide." TID-7016, Rev. 2, except for the use of the nominally reflected solid angle acceptance criteria. The nominally reflected solid angle acceptance criteria is used to limit the allowable solid angle for arrangements of individually subcritical units provided that:

1) Boundary conditions for the spacing between concrete walls and the array are as stated in Table 1 of Reference (b'), except that a minimum separation of six (6) inches shall be required; 2

2) Concrete walls are $\leq$ seven (7) inches in thickness;

3) Separation distances given in Table 1 of Reference (b') are measured from the outermost vessel in the array to the closest wall; 2

4) The array shall be limited in both number and size of vessels to arrays that are reasonable extrapolations of the conditions assumed in Reference (b'); and 2

5) All vessels within the array shall be subcritical when fully reflected by water and shall have a minimum edge-to-edge separation of twelve (12) inches. 2

For arrays that violate any of the six (6) conditions stated above, additional analyses will be necessary to (1) demonstrate the safety of the particular array in question, or (2) demonstrate the continued acceptability of using the nominally reflected solid angle acceptance criteria. 2

The above methods will have been validated according to Regulatory Guide 3.14, "Validation of Calculational Methods for Nuclear Criticality Safety".

3.2.2.8 Sources of Criticality Data and Analytical Techniques |2

The sources of criticality data and analytical techniques currently used by Exxon Nuclear in performing criticality safety analyses are identified below:

a) Chalmers, J. H., Walker, G., and Pugh, J., "Handbook of Criticality Data," UKAEA Handbook AHSB (S), 1965.

b) H. C. Paxton, J. T. Thomas, D. Callihan, and E. B. Johnson, "Critical Dimensions of Systems Containing ^{235}U, ^{239}Pu, and ^{233}U," TID-7028, Division of Technical Information Extension, USAEC (1964).

c) Subcommittee 8 of the American Standards Association Sectional Committee N6 and Project 8 of the American Nuclear Society Standards Committee, "Nuclear Safety Guide," TID-7016, Rev. 2, Division of Technical Information Extension, USAEC (1978).

d) H. K. Clark, "Critical and Safe Masses and Dimensions of Lattices of U and UO_2 Rods in Water," DP-1014, Savannah River Laboratory (1966).

e) H. K. Clark, "Maximum Safe Limits for Slightly Enriched Uranium and Uranium Oxide," Criticality Control of Fissile Materials, pp. 35-49, International Atomic Energy Agency, Vienna (1966).

f) H. C. Paxton, "Criticality Control in Operations with Fissile Material," LA-3366, Los Alamos Scientific Laboratory (1972).

g) H. F. Henry, C. E. Newlon, and J. R. Knight, "Extensions of Neutron Interaction Criteria," K-1478, Union Carbide Corporation, Nuclear Division (1969).

h) C. E. Newlon, AEC Research and Development Report, "Minimum Critical Cylinder Diameters of Hydrogen Moderated U (4.9) Systems," K-1629, Union Carbide Corporation, ORGDP, March 15, 1965.

3.7.2.3 Packaged Fuel and Solid Radioactive Waste

Packaged fuel awaiting shipment is stored either in a warehouse or other designated area within the exclusion area. Fuel so stored is completely packaged for shipment in accordance with approvals issued pursuant to 10 CFR 71 and the outer containers are fixed with appropriate tamper-indicating seals and shipping labels. Fissile Class II and III packages (shipments) are isolated by at least twenty (20) feet from other fissile materials.

Uranium-contaminated solid waste awaiting treatment and/or shipment is stored either in a warehouse or other designated area within the exclusion area. Containers used for this purpose are DOT Specification containers, and they are adequately sealed and appropriately labeled prior to being stored. In the event that such containers of waste are stored outdoors for extended periods of time, their physical integrity shall be visually inspected and the accumulation shall be surveyed for external radioactive material contamination at least quarterly, and records of such inspections and surveys shall be maintained. 2

3.8 Fire Safety Practices

3.8.1 Fire Hazards

Since the basic fuel materials handled in the fuel processing buildings are oxide, they do not present a hazard from a combustible standpoint. Control of combustible materials is as described in this section.

3.8.2 Fire Prevention

Other than quantities required for normal use within the process buildings, supplies of combustible solvents, oils, and other flammable liquids are stored in metal buildings located outside

3.10 Training

In addition to normal on-the-job training, employees are instructed in radiation protection and criticality safety requirements and procedures, industrial safety, fire protection, and emergency procedures. The degree of training is commensurate with each employee's position in the Company (related to general and special responsibilities), and with the extent of the employee's contact with radioactive and fissionable materials. Employee instruction is provided by personnel knowledgeable in the various training topics.

Each employee is provided initial instruction adequate to allow him to safely start on-the-job training; they are provided the full instruction within two weeks after starting work. Prior to assignment to independent operation, each employee is required, by signiture, to indicate that he has been instructed in radiation protection, criticality safety and emergency requirements and procedures.

Employee awareness of and conformity to safety requirements and procedures, as well as the effectiveness of safety training programs, shall be evaluated at least monthly by the Radiological Safety Supervisor for radiation protection, and by the Plant Criticality Safety Engineer for criticality safety. These ENC staff members have the authority to require retraining of employees. These evaluations shall be documented, along with actions required by them. 2

3.10.1 Follow-up Training

When changes are made in radiation protection or criticality safety controls (procedures, specifications, etc.), or in emergency of Licensing & Compliance, Operating Facilities perform reviews of such proposed modifications. Also, such modifications are approved in accordance with Figure 2.3-2. If significant safety issues are involved, final approval by the Vice President & Executive-in-Charge, Fuels Manufacturing and by the Manager, Corporate Licensing & Compliance, is required. 2

New or appropriately revised written procedures and specifications are issued for the modified operation. 2

When temporary or special operations, which are not covered by existing operating procedures and which can affect radiation and/or criticality safety, are needed and warranted, written Process Test Authorizations are issued. Process Test Authorizations are reviewed by the Radiological Safety Supervisor and the Plant Criticality Safety Engineer of Auxiliary Operations, and by the Health Physics and Criticality Safety Components of Licensing & Compliance, Operating Facilities. Process Test Authorizations involving special nuclear material specify special control limits and procedures under which the non-routine work must be done, and specify the authorized duration of the Test. Process Test Authorizations are approved in accordance with Figure 2.3-2. 2 2

3.12 Periodic Inspections and Tests

In addition to the inspections and tests specified in other sections of this Application, the following periodic inspections and tests are conducted. These inspections and tests are performed in accordance with written procedures, and are properly documented.

3.12.1 Acceptance Tests

All new or modified facility and process equipment is subjected to acceptance testing prior to release for routine operation. Initial facility and process equipment testing is performed in accordance with approved acceptance test procedures.

3.12.2 Criticality Accident Alarm System

The neutron detectors of this system are removed from their normal locations at least annually for bench-testing and any needed maintenance. The mechanical and electrical components of the system are tested for proper operation quarterly.

3.12.3 Criticality Dosimeters

The criticality dosimeters described in Section 3.1.3.4 are inspected at least annually to assure the integrity of the foils.

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