THE NATION'S URANIUM PROCESSING FACILITY

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This document has been reviewed by a Y-12 DC/ RO and has been determined to be UNCLASSIFIED, not UCNI, and contains no CUI based upon current classification guidance. This review does not constitute a review for CUI outside of classification guidance and does not constitute clearance for Public Release.
Name: Steve Buffalo Date: 06/17/24

REVISION LOG

Revision 11

☒ Intent ☐ Non-Intent Implements PRMS Requirements: ☒ Yes ☐ No

- No forms have been edited as part of this revision
- Other changes include:
  - Updated references and acronyms
  - Editorial changes
- This revision is a total rewrite; due to the extent of changes, revision bars are not shown

Revision 10 ☒ Intent ☐ Non-Intent

- These changes are in response to Condition Report 25774-000-GCA-GAM-02998-15, *Revise procedure Y17-95-64-822 and UPF-CP-214 to clarify barricading requirements around active Excavations:*
  - Section 3.1, *General Requirements*: Added bullet to address use of a door as a barricade
  - Section 3.2, *Soft (Temporary) Barricades*: Changed barricade tape height to a range; added wording to open barricade access when no hazard exists or no work is ongoing
  - Changed “Discipline Superintendent” to Responsible Superintendent” throughout
  - Section 3.3.2, *Excavation Barricade Requirements*: Clarified excavation barricade construction methods, additional safety requirements for deeper excavations, and labeling/tagging requirements
  - Section 3.4, *Signs and Tags*: Emphasized excavation signage and tagging requirements; removal of signage when hazard no longer present and damaged sign replacement
- No forms have been edited as part of this revision
- An evaluation determination has been performed confirming that this Procedure does implement requirements tracked in the Programmatic Requirements Management System (PRMS). This document will be added to the PRMS in the future, which is tracked in CR 25774-000-GCA-GAM-03372
- Other changes include:
  - Updated references
  - Updated acronyms
  - Editorial changes

Previous revisions on record

CONTENTS

1.0 INTRODUCTION

1.1 Purpose

This Procedure describes the barricade and signage requirements for controlling (informing and/or restricting) entry into areas that contain safety hazards, abnormal conditions, or where work activities require restricted access.

1.2 Scope

This Procedure applies to all personnel (including subcontractors) who perform work at the Uranium Processing Facility (UPF) Project.

2.0 RESPONSIBILITIES

2.1 UPF Site Manager/Project Startup Manager

The Site Manager is responsible for ensuring the implementation of this Procedure by the UPF site personnel. The Project Startup Manager has the overall responsibility for the implementation of this Procedure as it pertains to systems that have been turned over to Startup.

2.2 UPF Environmental, Safety and Health Manager, Bechtel National, Inc.

The Environmental, Safety, and Health (ES&H) Manager, Bechtel National, Inc. (BNI) is responsible for interpreting this Procedure (intent and application) and the associated requirements.

2.3 UPF Environmental, Safety, and Health Representative, BNI

The ES&H Representative, BNI, is responsible for:

- Reviewing compliance with this Procedure through periodic field inspections
- Assisting site personnel to determine the appropriate protective measures for recognized hazards

2.4 UPF Discipline Superintendent/Test Lead/Subcontractor Technical Representative

The Discipline Superintendent/Test Lead/Subcontractor Technical Representative is responsible for:

- Understanding this Procedure and their individual responsibilities regarding implementation of this Procedure
- Pre-planning work activities to identify the appropriate barricade to use
- Communicating the identified hazards and controls to supervisors and/or work crews
- Ensuring the identified control measures are in place and maintained until the completion of the job task

2.5 UPF Responsible Supervisor

The Responsible Supervisor is responsible for:

- Understanding this Procedure and their individual responsibilities regarding implementation of this Procedure
- Pre-planning work activities to identify the appropriate barricade to use
- Communicating the identified hazards and controls to work crews and those in surrounding areas impacted by their work requiring a barricade
- Ensuring the barricades and signs are properly erected and maintained and they are removed when the hazard has been mitigated or the work activity is complete

2.6 UPF Personnel

Site personnel are responsible for:

- Understanding and complying with the requirements of this Procedure
- Pausing/stopping work when they are unsure of the requirements for a work task, or they witness an unsafe condition or behavior

3.0 REQUIREMENTS

3.1 General Requirements

Where a hazard is likely to be introduced from planned work or is identified in the workplace and cannot be immediately eliminated, the area around the hazard should be guarded by a barricade appropriate for the type of hazard.

Signs or tags must be used in conjunction with barricades to provide specific warnings and other essential information about the hazards and risks that exist beyond the barricade. Barricades, signs, and tags may incorporate the use of color to indicate severity of hazard or communicate other environmental, safety, or health information. Refer to **Appendix B, *Common Application for Barricades and Signs*,** for general guidelines and examples.

3.2 Barricade Types

A barricade is defined as a system or device designed to warn personnel about a hazard or restricted area. Barricades can be classified as protective (hard) or warning (soft), depending on the intended use and the hazard necessitating their use. Barricades completely enclose the hazard, are equipped with a designated entry and exit point (except for exclusion zones), and contain a sign or tag identifying the barricade owner and hazard being protected.

3.2.1 Protective Barricades

Protective barricades, also referred to as hard barricades, provide a physical barrier erected around a potential hazard to protect people and/or prevent entry into a specific area.

Protective barricades, which may include guardrail systems (i.e., permanent handrails, scaffold, and timber members) are used to prevent exposure to long-term hazards, significant hazards, or environmentally protected resources.

3.2.1.1 Guardrail Systems

When barricades are used for fall prevention, they must meet the specification of a guardrail system. Top rails shall be 42 inches plus-or-minus three inches (i.e., 39 to 45 inches) above the walking/working level. When conditions warrant, the height of the top edge may exceed the 45-inch height, provided the guardrail system meets all other criteria of this section.

Mid-rails, screens, mesh, intermediate vertical members, or equivalent intermediate structural members shall be installed between the top rail of the guardrail system and the walking/working surface according to the following guidelines:

- Mid-rails, when used, shall be installed at a height midway between the top rail and the walking/working surface (approximately 21 inches)
- Screens and mesh, when used, shall extend from the top rail to the walking/working level and along the entire opening between the top rail supports
- Intermediate members (such as balusters), when used between posts, shall not be more than 19 inches apart

Guardrail systems shall be capable of withstanding, without failure, a force of at least 200 pounds applied within two inches of the top edge, in any outward or downward direction, at any point along the top edge.

A toeboard, or equivalent mesh/debris netting, must be installed on guardrails for all elevated work surfaces where dropped objects can present a hazard to personnel working below.

Toeboards shall be a minimum of 3½ inches in vertical height from their top edge to the level of the walking/working surface. They shall have no more than ¼-inch clearance above the walking/working surface.

3.2.2 Warning Barricades

Warning barricades, also referred to as soft barricades, are used to provide temporary warning of hazards or denote restricted access and are erected to alert personnel that they be nearing a hazard. Warning barricades may include plastic chain, flagging, rope, fabric, and plastic mesh netting. They do not provide the same level of physical protection as protective barricades. Where hazards are expected to exist for more than 24 hours (e.g., excavations), a protective barricade should be erected.

Danger (red) warning barricades are erected around imminent danger activities (i.e., dropped object prevention, pressure testing activities, respiratory protection required areas).

Caution (yellow) warning barricades can be erected around activities that pose minor to moderate safety risk (i.e., wet/slippery surfaces, tripping hazards).

3.3 Barricade Management

Barricades must be erected as directed by the supervisor responsible for the work. Personnel initiating work necessitating a barricade are responsible for erecting it, unless such duties are assigned to a specific project group or subcontractor. Personnel working inside a barricade are responsible for maintaining it. Barricades must be erected and tagged prior to starting work and removed as soon as the work is complete.

3.4 Barricade Construction

Barricades must be complete, continuous, and uninterrupted for the location being protected. Permanent or substantial structures that prevent entry may be used as part of the barricade.

Barricade size must be appropriate for the workspace, and large enough to provide protection to personnel from the hazardous task being performed and should not occupy more area than is needed to accomplish the work task. Over-barricading for convenience (e.g., large-scale space acquisition by trades to keep other trades from accessing non-work areas) should not occur.

Barricades should be erected in a manner that will allow other personnel and work groups to carry out their work. However, barricades must be kept separate and cannot share a side with barricades used by other work groups.

Coordination between work crews must occur where Simultaneous Operations (SIMOPS) will exist (i.e., when the execution of two or more tasks by two or more work crews at the same location at the same time will occur). SIMOPs includes situations where crews are working adjacent to or above or below one another. Shared barricading for elevated work is permitted only for a few isolated instances. Refer to **Appendix C, *Elevated Work Sharing Barricading***, for process details for elevated work shared barricading between two work groups.

Barricade boundaries must be an adequate distance away from hazards to assure that employees outside the barricade are not affected by the hazard.

Tags and/or signs must be used to provide personnel outside of barricades with important safety information.

The expectations for preventing dropped objects on the UPF Project by controlling tools, materials, and equipment brought to or used at height are outlined in UPF-CP-203, *Dropped Object Prevention*. When working at elevated work locations where objects may fall, lower levels must be barricaded with a red (danger) barricade unless overhead protection is established. For overhead work and dropped object protection, barricades should extend outward 1 foot (0.3 m) for every 2 feet (0.6 m) of height above the ground or floor surface, where practicable. If this distance is not feasible because of site conditions or restrictions, alternative measures shall be implemented and documented on the Field Level Hazard Assessment (FLHA) Card, in accordance with Y17-95-64-823, *UPF Field Level Hazard Assessment/Job Hazard Analysis Program (FLHA/JHA) Process,* and in conjunction with the barricade (e.g., Overhead Safety Watch, safety netting/physical barrier). The Discipline Superintendent must approve the alternative measures on the FLHA card prior to implementation.

3.5 Access Requirements

Barricades should have at least one designated access point (e.g., entry/egress gate). Access points should be opened only for the purpose of moving authorized personnel and equipment into or out of the barricade. Entry to barricades should be thought the access point(s). Personnel should not climb over or duck under barricades.

Red (danger) barricades must be erected around hazards that pose immediate danger to life and health. Only personnel working to eliminate a hazard, typically members of the work crew, may be inside a red barricaded area while the work activity is ongoing or when the hazard exists. Entry by other personnel not involved in the work task is prohibited.

Yellow (caution) barricades can be erected around hazards that pose a minor or moderate safety risk. Personnel may enter yellow barricaded areas, providing they have a legitimate reason to enter, have recognized the hazard, and receive verbal approval from a member of the work crew responsible for the barricade. The barricade owner should require personnel making entry to read and sign the FLHA verifying their understanding of the identified hazards and agreement to follow safe work practices.

3.6 Radiography Barricading

The radiographer must determine by calculation, and a calibrated radiation survey meter, the areas around a radiation source (i.e., radiography area) that would be unsafe for unauthorized personnel to enter and establish a barricade defining the radiography area. Radiation levels in safe areas (i.e., areas outside of the radiography area), must not exceed the value specified in the radiographer's Operating and Emergency Procedure.

The radiography area must be clear of unauthorized personnel prior to each exposure and under constant visual surveillance during each exposure. Bypassing a radiography barricade, and entry to a radiography area, by unauthorized personnel is the equivalent of bypassing a red (danger) barricade.

3.7 Exclusion Zones

Exclusion zones can be for safety, health, or environmental reasons. They most commonly involve locations posing immediate danger to life and health, a significant need for environmental protection, or investigation of a significant incident. They differ from other red barricade areas in that no personnel can access an exclusion zone unless the hazard or condition has been completely removed or otherwise made safe, and at least one side of the exclusion zone barricade has been removed or lowered to the walking surface. Tags and/or signs must clearly indicate that the barricade is established as an exclusion zone.

3.8 Signs and Tags

Signs should be printed on material suitable to the environment (e.g., plastic or metal), or protected in a way to prevent damage and fading.

Signs should be removed when the hazard is no longer present, and replaced when significantly damaged or illegible. Signs should include a description of the hazard(s) and instructions, as applicable.

Signs should be provided to help enforce proper use of personal protective clothing and equipment and provide specific instructions appropriate to tasks or conditions.

Prohibition signs can be displayed for restricting access or entry, no smoking areas, no parking, and any other unauthorized acts.

Tags should include a description of the hazard(s) and instructions, as applicable. Contact information for the Responsible Supervisor should be included on the tag.

4.0 RECORDS

None

5.0 REFERENCES

5.1 Source References

10 CFR 851, *Worker Safety and Health Program*

29 CFR 1926, Subpart G, *Signs, Signals, and Barricades*

29 CFR 1926 Subpart M, *Fall Protection*

ML-CM-801768-A019, *UPF Hazard Tree*

ML-SU-801768-A001, *UPF Startup Hazard Tree*

NS&E CP 2HC-E0S0-00214-000, *Barricades and Signs*

UPF-CP-108, *UPF Event Management and Investigation*

UPF-CP-200, *UPF General Safe Work Practices*

UPF-CP-211, *Fire Prevention and Protection*

UPF-CP-227, *UPF Safety Watches*

UPF-CP-229, *Vehicle Safety Management*

UPF-CP-312, *Hearing Conservation Program*

UPF-CP-318, *Respirator Use and Issuance*

UPF-MANUAL-CM-001, *Uranium Processing Facility Construction Electrical Safety Manual*

UPF-MANUAL-SH-A001, *UPF Elevated Work Manual*

Y17-95-64-801, *UPF Energy Isolation Management (EIM) – Lockout/Tagout (LOTO)*

Y17-95-64-806, *UPF Pressure Testing of Piping, Tubing, and Components*

Y17-95-64-822, *UPF Site Excavation and Backfill*

Y17-95-64-837, *UPF Housekeeping*

Y17-95-64-855, *UPF Structural Steel Erection*

Y17-95-64-871, *UPF Construction Hoisting and Rigging Work Operations*

Y17-95-64-872, *UPF Crane Use and Operation*

Y17-95-64-877, *UPF Hot Work Permit*

Y72-95-003, *Silica Exposure Control Procedure for the Construction of the Uranium Processing Facility Project*

Y73-95-802, *Confined Space Entry Program*

Y73-95-803, *Hexavalent Chromium Procedure*

Y75-100, *Y-12 Site Radiological Control Program*

5.2 Interfacing References

UPF-CP-203, *Dropped Object Prevention*

Y17-95-64-823, *UPF Field Level Hazard Assessment/Job Hazard Analysis Program (FLHA/JHA) Process*

5.3 Forms

None

6.0 SUPPLEMENTAL INFORMATION

Appendix A, *Acronyms and Definitions*

Appendix B, *Common Application of Barricades and Signs*

Appendix C, *Elevated Work Sharing Barricading*

APPENDIX A
Acronyms and Definitions

Acronyms

BNI - Bechtel National, Inc. 4
ES&H - Environmental, Safety, and Health 4
FLHA - Field Level Hazard Assessment 7
SIMOPS - Simultaneous Operations 7
STR - Subcontractor Technical Representative 14
UPF - Uranium Processing Facility 4

Definitions

Barricade	A system designed to warn of a hazard and physically identify the hazard's parameters.
Signs	A posting bearing information, advisory, or a warning of hazards, which is temporarily or permanently affixed or placed at locations where the hazards exist.
Tags	Temporary postings, usually attached to a piece of equipment or part of a structure (e.g., scaffolding), to warn or inform workers of a condition or requirement. Tags are also used in conjunction with barricades to provide specific warnings and/or other essential information about the hazard(s) that exist beyond the barricade.

APPENDIX B
Common Application of Barricades and Signs

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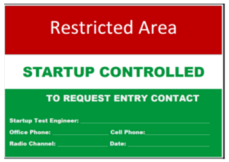
NOTE: *Signs/tags can be used independent of a barricade; however, if a barricade or delineation of an area is required, the following guidelines may be used.*

Warning Header	Description	Barricade/ Delineation	Applications
	**DANGER** Is used for a condition or process that has the potential to cause a serious or life threating injury or illness.	**RED OR RED/BLACK** Webbed Barricade Tape Rope Plastic Chain	Examples include High Voltage, Hexavalent Chromium, Permit Required Confined Space, Abrasive Blasting, Crane Counterweight Swing Radius, Pneumatic Pressure Testing, Overhead Work, and Respiratory Protection Required.
	**CAUTION** Is used only to warn against physical hazards or to caution against changing conditions.	**YELLOW OR YELLOW/BLACK** Webbed Barricade Tape Rope Plastic Chain	Examples include Noise Conditions, Non-Permit Confined Space, Low Clearance Areas, Open Excavations, and Wet/Slippery Surfaces.
	**NOTICE** Provides information or safety requirements.		Examples include Personal Protective Equipment free zones, No Dark Lenses Beyond this Point.
	**RESTRICTED AREA STARTUP CONTROLLED** Established for the general exclusion of personnel for the protection of Startup Controlled systems or components Startup operation/testing process.	**GREEN** Rope Barricade Tape Plastic Chain	Examples include Areas, Systems, or Components controlled by Startup
	**RADIOLOGICAL** Used ONLY where radiological hazards are or may be present.	**MAGENTA AND YELLOW** Rope Barricade Tape	Examples include Radiation Areas and High Radiation Areas typically associated with radiography (non-destructive examination) work.

APPENDIX B
Common Application of Barricades and Signs
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ADDITIONAL SIGNS/SPECIFICATIONS		
Exit Signs	Red letters, no less than 6 inches high, on a white field, and the principal stroke of the letters shall be at least 3/4 of an inch in width.	
Traffic and Road Signs	Provide information to operators of motor vehicles including, but not limited to, Department of Transportation signage required on public roads. Also including traffic control devices (e.g., signs, signals, markings, and barricades) for protection of workers that must conform to Part 6 of the Manual on Uniform Traffic Control Devices.	Speed Limit, Pedestrian Crossing, Stop, Curve, One Way, Two Way, Work Crew Ahead, Flaggers Ahead, and Do Not Enter.
Fire Signs	Provide information on the location of firefighting equipment.	Fire Extinguisher
Prohibition Signs	Provide information on prohibited actions.	No Smoking and No Parking
Emergency Signs	Typically includes white lettering on a green background with the appropriate symbols. Provide information on the location of emergency equipment.	Eyewash Station, Automated External Defibrillators, and Emergency Rescue Equipment.

APPENDIX C
Elevated Work Sharing Barricading

Before implementing an elevated work shared barricade with another work group, the Responsible Superintendent(s)/Subcontractor Technical Representative(s) (STRs) will ensure the following requirements are met:

- Affected personnel from both work groups participate on a joint FLHA card to identify the dropped object hazards and the controls that will be employed
- An Overhead Safety Watch (hereinafter referred to as “Watch”) is designated and noted on the FLHA card
- The Watch will be positioned outside of the barricaded area and must be in a position to observe the coexisting activities
- The Watch will have no other duties assigned that would interfere with their ability to perform their duties
- Communication between personnel conducting the coexisting work activities will be maintained by the Watch
- Prior to moving or changing work location, personnel will communicate their intentions with the Watch to ensure the coexisting work activities are not impacted
- Multiple Watches may be required to adequately oversee the work activities; communication between multiple Watches and the elevated work groups must be maintained
- If at any point during the elevated work activities, the Watch is unable to maintain observation and/or communication with the work groups, activities shall be paused; the Watch will be repositioned and/or the coexisting work activities reevaluated

NOTE: *A 1-foot, horizontal separation distance for every 2 feet of vertical work location shall be maintained between work groups within the shared barricade. When the 1 to 2 ratio cannot be maintained between the two work activities, the uppermost elevated work will be directed to pause and secure the work until the appropriate distance can be re-established within the confines of the shared barricade.*