

# Immediate Procedure Change (IPC) Form

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Procedure Title:	Welding, Burning, and Hot Wo	ork		
Change description:				
Improved direction evaluation criteria		rments shall be used and a	additional C	S&H hazard
Page 5 (5.3.2) Page 6 (5.7.1 and 5.7 Page 19 (6.4.15) Page 22 (8.1 Definition Page 29 (Appendix D	ns "O") )	Didital	llusioned by DETER	onal pages as necessary)
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# Level 2 Administrative Procedure

Revision	Record of Issue/Revision	Affected Pages
9	Minor Revision: update form with correct Step numbers from document.	30

Previous Record of Issue/Revision information is available from the history files.

TITLE:

# Welding, Burning, and Hot Work

FBP-FP-PRO-00072

REV. NO. 9

Page 2 of 31

# **CONTENTS**

1.0	PURP	OSE	4
2.0	SCOP	E AND APPLICABILITY	4
3.0	GENE	ERAL INFORMATION	5
4.0	USE I	REFERENCES	5
5.0	RESP 5.1	ONSIBILITIESFacility Manager (FM)	
	5.2	Authority Having Jurisdiction (AHJ)	5
	5.3	Occupational Safety and Health (OS&H) Personnel	5
	5.4	Fire Protection Manager/Permit Authorizing Individual (PAI)	6
	5.5	Issuing Authority (IA)	6
	5.6	Supervisor	6
	5.7	Procurement	6
	5.8	Fire Protection Engineer (FPE)	6
	5.9	Fire Protection (FP) Services	7
	5.10	Fire Watch	7
	5.11	Hot Work Qualified Worker	7
6.0	ACTI 6.1	ONS	
	6.2	Fixed Weld Shops	9
	6.3	Welding/Burning/HWP (Non-fixed weld shops)	10
	6.4	Welding/Burning/Hot Work Operations	14
	6.5	Prohibited Welding/Burning/Hot Work Operations	19
	6.6	Special FP Requirements	
	6.7	Closeout/Completion of Non-Fixed Shop Permit Activity	20
7.0	RECO 7.1	PRDS	
	7.2	Requirements	21
8.0	DEFII 8.1	NITIONS/ACRONYMSDefinitions	
	8.2	Acronyms	23
9.0	SOUF	CE REFERENCES	23
Apper	ndix A	REGULATORY REQUIREMENTS FLOW DOWN	25
Apper	ndix B	SUPPLEMENTAL INFORMATION FOR A FIXED WELD SHOP	26

		FBP-FP-PRO-00072
TITLE:	Welding, Burning, and Hot Work	REV. NO. 9
	g/	Page 3 of 31
Appendix C	SUPPLEMENTAL INFORMATION FOR A FIR	RE WATCH27
Appendix D	SUPPLEMENTAL INFORMATION FOR PER-	
Attachment A	WELDING/BURNING/HOT WORK PERMIT.	30
Attachment B	FIXED WELD SHOP PERMIT	31

.

		FBP-FP-PRO-00072
TITLE:	Welding, Burning, and Hot Work	REV. NO. 9
		Page 4 of 31

#### 1.0 PURPOSE

- 1.1 This procedure provides instructions and implements applicable requirements to ensure all cutting, welding, and other hot work is conducted by way of a permit system/process and is accomplished in a manner that is consistent with industry fire prevention practices.
- **1.2** This document implements applicable regulatory requirements. They are listed in Appendix A, *Regulatory Requirements Flow Down*.

#### 2.0 SCOPE AND APPLICABILITY

- 2.1 This Level 2 procedure provides a consistent approach to hot work and applies to all Fluor-BWXT Portsmouth LLC (FBP) self-performed work, whether by FBP employees or contract labor resource personnel. The procedure also serves as a guide to FBP subcontractor operations at the Portsmouth Gaseous Diffusion Plant and can be used directly by FBP subcontractors or as a minimum standard for FBP subcontractors to prepare their own Hot Work Procedure.
- **2.2** Local implementing procedures used by FBP subcontractor personnel must meet or exceed the requirements outlined in this FBP procedure.
- 2.3 The requirements and instructions contained in this procedure apply to hot work conducted in the following FBP locations:
  - Areas not designed or approved for hot work
  - Areas approved for such purposes (i.e., fixed weld shops)
- 2.4 The requirements and instructions contained in this procedure apply to the following hot work processes:
  - Welding and allied processes
  - Heat treating
  - Grinding
  - Thawing pipe by electrical resistance or open flame
  - Powder-driven fasteners
  - Hot riveting
  - Torch-applied roofing, in conjunction with the requirements of NFPA 241, Standard for Safeguarding Construction, Alteration, and Demolition Operations
  - Similar applications producing or using a spark, flame, or heat

		FBP-FP-PRO-00072
TITLE:	Welding, Burning, and Hot Work	REV. NO. 9
	,	Page 5 of 31

## **Exceptions:**

This procedure does not apply to the following:

- Cooking operations
- Electric Soldering Iron
- Laboratory analytical instruments (e.g., Bunsen burners, flash point analyzers, spectrometers)

#### 3.0 GENERAL INFORMATION

- 3.1 A completed and approved FBP-FP-PRO-00072-F01, Welding/Burning/Hot Work Permit, may be referred to in this procedure as "Hot Work Permit (HWP)."
- **3.2** Training is required as a prerequisite to issuing permits. Contact FBP Training for specific requirements.

#### 4.0 USE REFERENCES

- A. FBP-BS-PRO-00062, Records Management Process
- **B.** FBP-FP-PRO-00046, Shift Turnover-Salary
- C. FBP-FP-PRO-00026, Alarm Room Response

#### 5.0 RESPONSIBILITIES

#### 5.1 Facility Manager (FM)

- **5.1.1** Is authorized to issue permits for the FM's facilities.
- **5.1.2** Designates in writing other personnel authorized to issue permits in the FM's facilities.

# 5.2 Authority Having Jurisdiction (AHJ)

- **5.2.1** Issues and approves HWPs when needed.
- **5.2.2** Issues requirements for special fire protection (FP) requirements for special operations.
- **5.2.3** Ensures requirements for special FP are submitted in writing to the FM.

# 5.3 Occupational Safety and Health (OS&H) Personnel

- **5.3.1** Evaluates requests for special FP that affect employee safety requirements.
- **5.3.2** Performs hazard analysis to determine appropriate controls for incorporation into the JHA including the PPE requirements in Appendix D. PLG 12/07/22

COLUMN TO		FBP-FP-PRO-00072
TITLE:	Welding, Burning, and Hot Work	REV. NO. 9
		Page 6 of 31

# 5.4 Fire Protection Manager/Permit Authorizing Individual (PAI)

- **5.4.1** Supervises the hot work program.
- **5.4.2** Provides technical support for personnel designated with Issuing Authority (IA) for HWPs.
- **5.4.3** Coordinates with Fire Services personnel for special requirements in support of hot work activities.
- **5.4.4** Notifies the FBP Fire Protection Engineer (FPE) for special assessments of HWPs.

#### 5.5 Issuing Authority (IA)

#### NOTE

The IA is the FM or Authorized Representative.

- **5.5.1** Issues and approves HWPs according to this procedure.
- **5.5.2** Modifies the HWP when conditions change in a facility that may impact the bounding limitations.

### 5.6 Supervisor

- 5.6.1 Monitors hot work activities and ensures the requirements of HWPs and this procedure are executed by the workers under his/her cognizance.
- **5.6.2** Accepts and signs the HWP.
- **5.6.3** Ensures HWPs are kept in the hot work areas or in work packages.
- 5.6.4 Ensures all subcontract and vendor personnel who perform hot work are trained according to this procedure or have submitted a subcontractor hot work program procedure as approved by the FBP PAI or designee.

#### 5.7 Procurement

5.7.1 Ensures all purchase requests for hot work personal protective clothing are approved by OS&H.

#### \*1 see below

#### 5.8 Fire Protection Engineer (FPE)

- **5.8.1** Ensures the review of special situations at the request of the HWP issuing authority.
- **5.8.2** Ensures FP evaluations are performed for each welding/burning/hot work operation, when required.
- \*1 5.7.2 Ensures when procuring NFPA 2112/2113 PPE a certificate of compliance is provided by the vendor/supplier. PLG 12/07/22

		FBP-FP-PRO-00072
TITLE:	Welding, Burning, and Hot Work	REV. NO. 9
	Welding, Burning, and Hot Work	Page 7 of 31

- **5.8.3** Inspects Fixed Weld Shops and issues permits upon request, if approved.
- **5.8.4** Ensures annual inspections of designated, approved fixed weld shops are performed and fixed weld shop permits are issued/reissued upon request.
- **5.8.5** Maintains a listing of approved fixed weld shops.
- **5.8.6** Ensures the review and approval of procedures for welding, burning, and/or hot work applications.

#### 5.9 Fire Protection (FP) Services

- **5.9.1** Ensures fire training facilities are made available for the fire watch training program.
- **5.9.2** Provides Fire Watch Program hands-on training and conducts performance evaluations of trainees.

#### 5.10 Fire Watch

- **5.10.1** Observes ongoing hot work and ensures fire prevention measures outlined in this procedure and reflected on the permit remain in place during hot work activity.
- **5.10.2** Facilitates further fire prevention measures, if needed, as a result of observing hot work activity.

# 5.11 Hot Work Qualified Worker

- **5.11.1** Ensures permit approval has been obtained before starting hot work operations.
- **5.11.2** Ensures use of Flame Resistant (FR) Personal Protective Equipment (PPE), as described in Appendix C, *Supplemental Information for Personal Flame Resistant Clothing*, or as approved by Industrial Safety, before starting hot work operations.
- 5.11.3 Inspects all equipment prior to use to ensure safe operating condition.
- **5.11.4** Stops hot work operations if unsafe conditions develop and notifies management and the area Supervisor for reassessment of the situation.

TITLE:		FBP-FP-PRO-00072
IIILE:	Welding, Burning, and Hot Work	REV. NO. 9
	-	Page 8 of 31

#### 6.0 ACTIONS

# 6.1 HWP Processing

#### IA

- **6.1.1** Issue HWP per Subsection 6.3 of this procedure.
- 6.1.2 Re-Issue HWP when requested per Step 6.1.5E.

#### Supervisor

- **6.1.3** Ensure HWP is available at the work site.
- **6.1.4** Upon completion of work, maintain the HWP with the work package.
- **6.1.5 IF** the hot work operation exceeds the 24-hour expiration period, **THEN** the Supervisor may extend the HWP an additional 24 hours after performing the following actions:
  - **A.** Review the HWP to ensure changes in work, work location, FP, and other provisions have **not** occurred.
  - B. Review the precautions listed on the permit to ensure no changes have occurred.
  - C. Obtain concurrence of the FM that no changes have occurred in protection, as identified on the HWP, and perform the following actions:
    - 1) Record the HWP start date, expiration date, and time.
    - 2) Sign in the designated space.
    - 3) Instruct the Fire Watch to sign in the designated space at the bottom of the HWP and verify the signing.
  - **D.** Extend the HWP, as outlined above, providing that no protection changes have occurred, up to a maximum of five 24-hour time periods.

#### NOTE

A new HWP is required for further extensions beyond the five-extension maximum.

**E. IF** a new HWP is required for a hot work operation having five 24-hour extensions, **THEN** request IA issue a new HWP for the hot work operation.

#### IA

F. IF required, THEN issue a new HWP for the hot work operation.

THE P	¥	FBP-FP-PRO-00072
TITLE:	Welding, Burning, and Hot Work	REV. NO. 9
	6,	Page 9 of 31

### 6.2 Fixed Weld Shops

#### **FPE**

- **6.2.1** Upon request, survey a specific operation before initiation of hot work to determine specific FP measures.
- 6.2.2 Review proposed fixed weld shops for conformance with the following standards and as specified in Appendix B, Supplemental Information for a Fixed Weld Shop:
  - **A.** Location of Fixed Weld Shop must be in noncombustible/fire resistive structure **OR** FP-approved alternative location.

#### NOTE

If limited soldering/brazing operations are adequately protected and performed on table tops or workbenches only within specifically identified boundaries defined on the HWP, the AHJ or designee may deviate from the 35-foot requirement described in Step 6.2.2B.

**B.** Shop boundary must be constructed to prevent spark and slag migration outside the approved area, **OR** the immediate space surrounding the defined welding/burning/hot work area must be kept clear of all combustibles for a minimum distance of 35 feet.

#### NOTE

A one-day gas supply is defined as the required amount in use and connected to an approved manifold. For special determinations, contact FP for guidance.

**C.** Unconnected gas cylinders located in the shops must be limited to a one-day supply.

#### NOTE

For installed equipment containing known or previously unknown deposit(s) of Uranyl Fluoride (UO<sub>2</sub>F<sub>2</sub>), and deposit(s) > safe mass opened to atmosphere, the fire extinguisher must be a portable Carbon Dioxide (CO<sub>2</sub>) and/or dry chemical type extinguisher.

- **D.** Fully charged fire extinguisher of appropriate size and type must be available at the fixed weld shop.
- **E. IF** sprinkler protection is available within the building, **THEN** it must be provided over the fixed weld shop.
- **F.** Welding/burning/hot work operations must not be permitted while sprinkler protection is impaired, unless approved by FP.

TITLE: Welding, Burning, and Hot Work		FBP-FP-PRO-00072
	Welding, Burning, and Hot Work	REV. NO. 9
	Page 10 of 31	

G. For installed equipment containing known or previously unknown deposit(s) of UO<sub>2</sub>F<sub>2</sub>, and deposit(s) > safe mass opened to atmosphere, ensure a person is to be stationed to valve off the sprinkler system, if inadvertently actuated, any time equipment opening(s) (containing such deposit[s]) remain uncovered.

NCSA-PLANT079

- **6.2.3 IF** the FP review of the proposed fixed weld shop conducted in Step 6.2.2 determines conformance with the requirements specified, **THEN** issue an FBP-FP-PRO-00072-F02, *Fixed Weld Shop Permit*, to authorize the fixed weld shop.
- **6.2.4** Sign FBP-FP-PRO-00072-F02, indicate the approved duration date, and post within the shop.
- 6.2.5 Re-inspect the shop annually or more frequently, whenever conditions change, and reissue/revise/rescind the authorization permit, as appropriate.

#### Supervisor

- 6.2.6 Prior to initiating hot work operations, ensure fixed weld shops display a current, approved, and numbered fixed weld shop permit (FBP-FP-PRO-00072-F02).
- 6.2.7 Ensure hot work qualified workers are aware of special conditions related to the fixed weld shop as stated on the posted fixed weld shop permit (FBP-FP-PRO-00072-F02).
- **6.2.8** Ensure FR PPE as described in Appendix D, or as required by Industrial Safety, is in use by all qualified workers prior to initiating hot work operations.
- **6.2.9** Request a new shop inspection by the FPE upon any changes to the conditions of the fixed weld shop.

#### 6.3 Welding/Burning/HWP (Non-fixed weld shops)

# IA (FM or Authorized Representative)

#### NOTE

Any precaution that is marked "NO" on FBP-FP-PRO-00072-F01, *Welding/Burning/Hot Work Permit*, must be evaluated by a SME of the appropriate support group (i.e., FPE, Radiation Protection, OS&H, etc.) to determine how to meet the precaution safely.

- 6.3.1 Obtain an FBP-FP-PRO-00072-F01 or each welding/burning/hot work operation performed outside an approved fixed weld shop.
- 6.3.2 Inspect the area where the proposed hot work operation is to be performed **before** issuing an HWP, to ensure compliance with the provisions of this procedure.

TITLE:		FBP-FP-PRO-00072
	Welding, Burning, and Hot Work	REV. NO. 9
		Page 11 of 31

- **6.3.3 IF** location of work is in an area protected by fixed sprinkler system(s), **THEN** ensure the sprinkler system(s) are in service. **IF** the fixed protection is inoperable/out of service **THEN** obtain approval from FP before initiating hot work.
- **6.3.4 IF** location of work is in an area equipped with smoke detection devices or is monitored by a smoke detection system, **THEN** ensure the device(s) or system(s) have been placed out of service by contacting FP.

If IA is uncertain if Flammable/Combustible material is present within piping, vessels, or containers, IA must request the piping, vessels, or container be evaluated by a SME of the appropriate support group (e.g., FPE, Radiation Protection, Engineering, OS&H) to determine if additional requirements are needed.

- **6.3.5 IF** the work is being performed on piping, vessels, or containers that have or may have been exposed to any flammable gases or may contain any flammable/combustible material, **THEN** ensure the system is thoroughly cleaned and/or purged or otherwise rendered acceptable to an FPE.
- **6.3.6** Complete the top portion of FBP-FP-PRO-00072-F01, as follows:
  - **A.** Record Service Manager's name or group the permit is being issued to.
  - **B.** Describe briefly the work to be performed.
  - **C.** Identify work location by listing the building or area identification number, floor of a building, and/or column number.

#### NOTE

**N/A** indicates the precaution is not applicable to the type equipment, status of the equipment, equipment not present or the work being performed.

**D.** Mark the appropriate box indicated on FBP-FP-PRO-00072-F01 as "YES", "NO", or "N/A" for precautions to be taken.

#### NOTE

Any precaution that is marked "NO" on FBP-FP-PRO-00072-F01 must be evaluated by a SME of the appropriate support group (i.e., FPE, Radiation Protection, OS&H, etc.) to determine how to meet the precaution safely.

**E. IF** any box is marked "NO," **THEN** obtain additional evaluation(s) before initiating hot work. Document additional evaluation results in writing and attach to FBP-FP-PRO-00072-F01.

TITLE:		FBP-FP-PRO-00072
	Welding, Burning, and Hot Work	REV. NO. 9
	<i></i>	Page 12 of 31

**6.3.7** IF installed equipment contains UO<sub>2</sub>F<sub>2</sub> deposit(s) > safe mass opened to atmosphere, **THEN** make arrangements with FP to station a person to valve off the sprinkler system, if inadvertently actuated, anytime equipment opening(s) containing such deposit(s) remain uncovered.

NCSA PLANT079

- **6.3.8** Verify the above precautions (Steps 6.3.2 through 6.3.7) have been reviewed and appropriate actions taken by signing in the space designated "Issuing Authority" on FBP-FP-PRO-00072-F01.
- **6.3.9** Issue the HWP **before** the start of the welding/burning/hot work operation.
- **6.3.10 IF** the HWP is lost or damaged, **THEN** issue a new HWP.

#### Supervisor

**6.3.11** Ensure HWP is available at the work site.

#### NOTE

**N/A** indicates the precaution is not applicable to the type equipment, status of the equipment, equipment not present, or the work being performed.

- 6.3.12 Prior to initiating welding/burning/hot work operations, ensure the following precautions have been taken and fill out all boxes, in the Supervisor's Section, on FBP-FP-PRO-00072-F01 marked "YES", "NO", or "N/A":
  - **A.** Contact OS&H to evaluate chemical hazards produced by welding/burning/hot work operations, such as fumes generated from metals, protective coatings, paints, and cleaners.
  - **B. IF** outside a building or structure, **THEN** use caution in performing hot work around dry grass, leaves, and other combustible material, and consider wetting down area with water.
  - **C.** Prevent the by-products of hot work activity (flames, sparks, heat, etc.) from impacting or igniting combustible materials within 35 feet of hot work operations by utilizing one or more of the following methods or techniques:

#### NOTE

Portions of methods/techniques in Step 6.4.4G items 1 through 4, in conjunction with additional Fire Watch may be acceptable pending FPE approval.

- 1) Move hot work activity 35 feet away from combustible materials.
- 2) Move combustible materials 35 feet away from hot work activity.

TITLE:		FBP-FP-PRO-00072
	Welding, Burning, and Hot Work	REV. NO. 9
		Page 13 of 31

- 3) Protect combustible materials with noncombustible shields, covers, screens, or building features within 35 feet of hot work activity.
- 4) Contain hot work activity by utilizing non-combustible shields, covers, screens, or building features such that the by-products of the hot work activity (flames, sparks, heat, etc.) do not propagate beyond the containment area, impacting or igniting adjacent combustible materials or associated welding/cutting equipment (i.e., hoses, compressed gas cylinders, regulator, etc.).
- 5) Contact FPE for specific direction if field conditions are such that the above methods/techniques are not practical or possible to follow.

Welding/burning, and/or hot work operations pertaining to, or associated with, contaminated material require the same FP measures as identified for basic welding, burning, and/or hot work operations, as identified in this procedure.

- **6.3.13** Contact Radiation Protection to determine the presence of radioactive contamination in areas where welding, burning and/or hot work is planned, and to prescribe radiological controls, if required.
- **6.3.14** Upon completion of work, maintain the HWP with the work package.
- **6.3.15** IF the hot work operation exceeds the 24-hour expiration period, **THEN** the Supervisor may extend the HWP an additional 24 hours after performing the following actions:
  - **A.** Review the HWP to ensure changes in work, work location, FP, and other provisions have **not** occurred.
  - **B.** Review the precautions listed on the permit to ensure no changes have occurred.
  - C. Obtain concurrence of the FM that no changes have occurred in protection, as identified on the HWP, and perform the following actions:
    - 1) Record the HWP start date, expiration date, and time.
    - 2) Sign in the designated space.
    - 3) Instruct the Fire Watch to sign in the designated space at the bottom of the HWP and verify the signing.
  - **D.** Extend the HWP, as outlined above, providing that no protection changes have occurred, up to a maximum of five 24-hour time periods.

TITLE: Welding, Burning, an		FBP-FP-PRO-00072
	Welding, Burning, and Hot Work	REV. NO. 9
	B,	Page 14 of 31

**E. IF** further extensions are desired after a maximum of five 24-hour time period extensions has elapsed, **THEN** request the IA issue a new HWP for the hot work operation in accordance to Steps 6.3.1 through 6.3.9.

#### 6.4 Welding/Burning/Hot Work Operations

### **FP Services**

**6.4.1** Coordinate scheduling of servicing and maintenance requirements for FP facilities, equipment, and extinguishers.

#### **Supervisor**

#### NOTE

Welding/burning, and/or hot work operations pertaining to, or associated with, contaminated material require the same FP measures as identified for basic welding, burning, and/or hot work operations, as identified in this procedure.

- **6.4.2** Contact Radiation Protection to determine the presence of radioactive contamination in areas where welding, burning, and/or hot work is planned, and to prescribe radiological controls, if required.
- 6.4.3 Have the atmosphere tested and note the reading in %Lower Explosive Limit (LEL) on FBP-FP-PRO-00072-F01 in the space provided; **IF** testing is not needed, **THEN** check "N/A" on FBP-FP-PRO-00072-F01.
- 6.4.4 Prior to initiating welding/burning/hot work operations, ensure the following precautions have been taken and ALL boxes, in the Supervisor's Section, on FBP-FP-PRO-00072-F01 are marked with "YES", "NO", or "N/A":
  - **A. IF** any box is marked "NO," **THEN** obtain additional evaluation(s) before initiating hot work. Document additional evaluation results in writing and attach to FBP-FP-PRO-00072-F01.
  - **B.** Identify the nearest firefighting equipment, phone, and/or fire alarm.
  - C. IF installed equipment containing UO<sub>2</sub>F<sub>2</sub> deposit(s) > safe mass opened to atmosphere, THEN equip the fire watch with portable CO<sub>2</sub> and/or dry chemical fire suppression equipment only.

#### NOTE

Welding/burning, and/or hot work operations are not permitted in areas containing flammable vapors above recommended LEL concentrations.

**D. IF** flammable vapors have been present or are suspected, **THEN** test the atmosphere for flammable vapors.

TITLE:		FBP-FP-PRO-00072
	Welding, Burning, and Hot Work	REV. NO. 9
		Page 15 of 31

- **E.** Contact OS&H to evaluate chemical hazards produced by welding/burning/hot work operations, such as fumes generated from metals, protective coatings, paints, and cleaners.
- **F. IF** outside a building or structure, **THEN** use caution in performing hot work around dry grass, leaves, and other combustible material; consider wetting down area with water.
- **G.** Prevent the by-products of hot work activity (flames, sparks, heat, etc.) from impacting or igniting combustible materials within 35 feet of hot work operations by utilizing one or more of the following methods or techniques:

Portions of methods/techniques in Step 6.4.4G, items 1 through 4, in conjunction with additional Fire Watch may be acceptable pending FPE approval.

- 1) Move hot work activity 35 feet away from combustible materials.
- 2) Move combustible materials 35 feet away from hot work activity.
- 3) Protect combustible materials with noncombustible shields, covers, screens, or building features within 35 feet of hot work activity.
- 4) Contain hot work activity by utilizing non-combustible shields, covers, screens, or building features such that the by-products of the hot work activity (flames, sparks, heat, etc.) do not propagate beyond the containment area, impacting or igniting adjacent combustible materials or associated welding/cutting equipment (e.g., hoses, compressed gas cylinders, regulator).
- 5) Contact FPE for specific direction if field conditions are such that the above methods/techniques are not practical or possible to follow.
- **H.** Prevent by-products of the hot work activity (flames, sparks, heat, etc.) from migrating through openings (penetrations, cracks, holes, ducts, etc.) in walls or floors within a radius of 35 feet of the hot work activity by utilizing one or more of the following methods:

#### NOTE

Portions of methods/techniques in Step 6.4.4H, items 1 through 3, in conjunction with additional Fire Watch, may be acceptable, pending FPE approval.

1) Move hot work 35 feet away from combustible materials.

TITLE:		FBP-FP-PRO-00072
	Welding, Burning, and Hot Work	REV. NO. 9
	8,	Page 16 of 31

- 2) Protect openings with non-combustible shields, covers, screens, or building features within 35 feet of hot work activity.
- 3) Contain hot work activity by utilizing non-combustible shields, covers, screens, or building features such that the by-products of the hot work activity (sparks, etc.) do not propagate beyond the containment area or migrate through openings.
- 4) Contact FPE for specific direction if field conditions are such that the above methods/techniques are not practical or possible to follow.

Welding, burning, and/or hot work operations are not permitted within 35 feet of any flammable liquid without special FP approvals.

Tools used to perform hot work operation that utilize flammable liquid by design, (i.e., Petrogen Torch) are permitted within 35 feet of the hot work, provided the flammable liquid is contained in the approved safety container designed for that tool.

- **I.** Remove flammable liquids from within a 35 foot radius of the hot work operation.
- J. IF, in special cases, flammable liquids cannot be removed beyond 35 feet, THEN contact FPE for guidance or FP to provide special FP.
- **K.** Protect and properly place compressed gas cylinders for maximum protection.
- L. Limit compressed flammable gas to be used to the cylinder(s) connected to the regulator and gauges.
- **M.** Notify Fire Services at the alarm desk by calling extension 5909 prior to initiating hot work activities. (Cell phone call: 740-897-5909)

mym c	FBP-FP-PRO-00072
TITLE: Welding, Burning, and Hot Work	k REV. NO. 9
	Page 17 of 31

If more than one person is assigned as Fire Watch to the job (e.g., a job with multiple levels that must be watched simultaneously), then all who are assigned the responsibility are required to continue the Fire Watch for a minimum of 60 minutes (or longer if directed in the HWP) after completion of the hot work operation.

If one person is assigned as Fire Watch to the job and transfer of responsibility occurs, then only the fire watch that has current responsibility is required to continue the Fire Watch for a minimum of 60 minutes (or longer if directed in the HWP) after completion of the hot work operation, or until Fire Watch responsibility is transferred to another.

The Supervisor or designee must receive a positive confirmation (i.e., via Fire Watch's signature on the HWP) from every individual assigned as Fire Watch to ensure his/her understanding and acceptance of fire watch duties.

- N. Assign and schedule Fire Watch to continue for a minimum of 60 minutes (or longer, if directed in the HWP) after completion of the hot work operation.
  - 1) Ensure all individuals assigned to Fire Watch sign in the space provided on FBP-FP-PRO-00072-F01 prior to commencing Fire Watch and when transferring fire watch responsibility to a replacement.
  - 2) IF fire watch duties are transferred, THEN ensure a signature record is maintained on FBP-FP-PRO-00072-F01.
- O. IF welding/hot work is performed in close proximity to a sprinkler head, THEN a wet rag, welding cover material, welder's glove, or other item(s) that offers similar protection must be laid over the sprinkler head immediately prior to the hot work activity and must be removed immediately following the completion of the hot work activity.
- P. Ensure the HWP has been signed, verifying the area has been inspected with all precautions implemented.
  - 1) Ensure each affected Supervisor verifies no changes or discrepancies have occurred.
  - 2) IF changes have occurred or discrepancies exist which were not present when the permit was issued, THEN IA must issue a new HWP covering the changes and/or correcting the discrepancies.

TITLE:		FBP-FP-PRO-00072
	Welding, Burning, and Hot Work	REV. NO. 9
		Page 18 of 31

#### IA

3) IF changes have occurred or discrepancies exist which were not present when the permit was originally issued, **THEN** issue a new HWP to cover the changes and/or discrepancies.

#### **Fire Services**

- **6.4.5** Receive notification from the Supervisor of hot work activities outside of a fixed weld shop, if applicable, and record information on FBP-FP-PRO-00026-F01, *Fire Station Journal*.
- **6.4.6** Use shift changeover procedure FBP-FP-PRO-00046, *Shift Turnover-Salary*, when reviewing outstanding permits.

#### Fire Watch

#### NOTE

More than one Fire Watch may be necessary to watch the area and the person performing hot work. For example, welding on a catwalk may require a Fire Watch with the person performing the hot work and one below to cover the area.

One fire watch **must** be in sight of the person performing hot work at all times when the hot work activity/ignition source is in progress/underway.

Appendix C, Supplemental Information for a Fire Watch, can be referenced as needed.

- 6.4.7 Locate nearest phone and fire alarm box, or use other method for requesting emergency assistance; ensure a suitably rated Fire Watch fire extinguisher is readily accessible prior to commencement of hot work operations.
- 6.4.8 Maintain a position from the hot work activity/workers performing hot work such that immediate emergency actions can be taken to prevent and/or extinguish fires involving materials and/or personnel.
- **6.4.9** Take immediate emergency actions to prevent and/or extinguish fires involving materials and/or personnel.
- **6.4.10** Continue Fire Watch for a minimum of 60 minutes (or longer, if directed in the HWP) after completion of the hot work operation.

# **Hot Work Qualified Worker**

- **6.4.11** Ensure Permit approval has been obtained before starting hot work operations.
- 6.4.12 Ensure use of FR PPE, as described in Appendix D, Supplemental Information for Personal Flame Resistant Clothing, or as required by Industrial Safety, before starting hot work operations.

		FBP-FP-PRO-00072
TITLE:	Welding, Burning, and Hot Work	REV. NO. 9
	G,	Page 19 of 31

- **6.4.13** Inspect all equipment prior to use to ensure safe operating condition.
- **6.4.14** Ensure Fire Watch Personnel are present and prepared.

# Procurement -

6.4.15 Ensure all Hot Work Qualified Workers' PPE includes an NFPA 2112 and NFPA 2113 certificate of compliance provided by the vendor/supplier.

PLG 12/07/22

R9.1

# 6.5 Prohibited Welding/Burning/Hot Work Operations

#### Supervisor

- **6.5.1** Ensure welding/burning/hot work operations are **not** performed:
  - In explosive atmospheres (e.g., mixtures of flammable gases, vapor, liquids, or dusts with air).
  - In explosive atmospheres that may develop inside un-cleaned or improperly
    prepared drums, tanks, or other containers or equipment that previously
    contained such materials, or where such materials may develop in areas with
    an accumulation of combustible dusts.
  - Where explosive chemicals, compounds, liquids, or similar materials are stored.
  - Where an oxygen-enriched atmosphere may be encountered.
  - In any area outside an approved fixed weld shop without an approved HWP.
  - In sprinkler-protected buildings where such protection is inoperable/out of service (e.g., no water flow capability at individual sprinkler system), and FP approved precautions have not been taken.
- 6.5.2 Contact FP to confirm if sprinkler protection is inoperable/out of service.

#### 6.6 Special FP Requirements

#### IA

**6.6.1 WHEN** situations develop requiring special FP, **THEN** contact FPE for evaluation and the AHJ or designee for special approval considerations.

#### OS&H

**6.6.2** Evaluate requests for special FP that affect worker safety requirements.

WALL D	FBP-FP-PRO-00072
TITLE: Welding, Burning, and Hot Work	REV. NO. 9
, staning, staning, and not work	Page 20 of 31

#### **AHJ**

- **6.6.3** Review all special FP requests.
  - **A.** Approve a special FP requirement for a special operation as long as it is determined that appropriate FP measures are employed.
  - **B.** Submit approval (or designate a qualified individual) for special FP in writing to the FM.

### 6.7 Closeout/Completion of Non-Fixed Shop Permit Activity

#### Supervisor

- 6.7.1 Ensure any covers, materials, etc., installed on sprinkler heads to support the performance of this procedure have been removed from the sprinkler heads.
- **6.7.2** Ensure any FP system taken out of service is put back into service by notifying FP.
- 6.7.3 Ensure good housekeeping practice has been followed for the location/area where the welding, burning, and/or hot work activity was performed.
- 6.7.4 Ensure FBP-FP-PRO-00072-F01 is signed off/closed out properly and is maintained in the work package, and any FPE evaluations/special guidance is attached.
- 6.7.5 IF a person was stationed to valve off the sprinkler system, according to Step 6.3.7, **THEN** ensure the person remains in place until the installed equipment containing UO<sub>2</sub>F<sub>2</sub> deposit(s) > safe mass has had all openings properly covered.

NCSA-PLANT079

**6.7.6** Notify Fire Services at the alarm desk by calling extension 5909 and advising the completion of hot work activities. (Cell phone call: 740-897-5909.)

# Fire Watch

- **6.7.7 WHEN** hot work has been completed, **THEN** ensure removal of protective covers from the sprinkler heads immediately following the termination of the heat/ignition source.
- 6.7.8 Complete sections of FBP-FP-PRO-00072-F01dedicated to the Fire Watch's responsibility and return to Supervisor, **OR** inform Supervisor that Hot Work evolution is completed and ready for inspection prior to HWP removal.

#### 7.0 RECORDS

#### 7.1 Records Generated

**A.** FBP-FP-PRO-00072- F02, Fixed Weld Shop Permit

	FBP-FP-PRO-00072
TITLE: Welding, Burning, and Hot Work	REV. NO. 9
g, <b>g</b> ,	Page 21 of 31

- B. FBP-FP-PRO-00072-F01, Welding/Burning/Hot Work Permit
- C. FBP-FP-PRO-00026-F01, Fire Station Journal
- **D.** Records listing approved fixed weld shops are maintained by FP

## 7.2 Requirements

Records generated or received as a result of performing this procedure shall be managed according to FBP-BS-PRO-00062, *Records Management Process*.

#### 8.0 **DEFINITIONS/ACRONYMS**

#### 8.1 Definitions

- **A. Approved** Acceptable to the fire protection Authority Having Jurisdiction (AHJ).
- **B. Authority Having Jurisdiction (AHJ)** An experienced Fire Protection professional designated to resolve FP issues for FBP.
- **C. Combustible Liquid** Liquid containing a flash point at or above 100°F. Combustible liquids are subdivided as follows:

#### NOTE

When a combustible liquid is heated for use to within 30°F of its flash point, then it must be handled according to the requirements for the next lower class of liquids.

- 1) Class II liquids include those having flash points at or above 100°F and below 140°F (e.g., kerosene, fuel oils No. 1-D and No.2-D, Naphtha, mineral spirits).
- 2) Class IIIA liquids include those having flash points at or above 140°F and below 200°F (e.g., asphalt, fuel oils No. 4-5-6, brake fluid).
- 3) Class IIIB liquids include those having flash points at or above 200°F.
- **D. Explosive Atmosphere** A condition of the atmosphere when the concentration of flammable gases/vapors is in the range between the lower explosive limit (LEL) and the Upper Explosive Limit.
- **E. Fire Watch** A designated individual trained in fire prevention and suppression who observes welding/burning/hot work operations. This individual is required to receive periodic training in the fire-watch training program administered by the plant training organization (see Appendix C, *Supplemental Information for a Fire Watch*).

		FBP-FP-PRO-00072
TITLE:	Welding, Burning, and Hot Work	REV. NO. 9
	<i>5,</i>	Page 22 of 31

- **F. Fixed Weld Shop** A maintenance or construction area or shop defined and segregated from non-weld areas by easily identified boundaries and approved by an authorized FP representative.
- **G. Flammable Liquids** Liquids containing a flash point below 100°F. Class I liquids are subdivided as follows:
  - 1) Class IA includes those having a flash point below 73°F and having a boiling point below 100 degrees F (e.g., Pentane).
  - 2) Class IB includes those having flash points below 73°F and having a boiling point at or above 100°F (e.g., Naphtha, benzene, denatured alcohol, gasoline, crude petroleum, toluene).
  - 3) Class IC includes those having flash points at or above 73°F and below 100°F.
- **H. "Fully Charged"** Applies to stored pressure portable fire extinguisher which contain an expellant gas such as nitrogen. Fully charged means there is sufficient pressure to expel contents.
- I. Hot Work Qualified Worker The person performing the Hot Work.
- J. Inoperable When used in the context of sprinkler system operation, indicates a condition of no water flow capability at an individual sprinkler system where work is being performed and/or a condition in which the fire water system is supplying less than 4000 gpm capacity for 4 hours.
- **K. Issuing Authority (IA)** Facility Manager or authorized representative with operating jurisdiction over the equipment or facilities where the work covered by the permit is being performed (this title applies to the responsible person initiating HWPs, as identified in this procedure).
- L. Listed/Labeled Equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization, acceptable to the AHJ, indicating compliance with appropriate quality standards or performance in a specified manner.
- M. Lower Explosive Limit (LEL) The minimum concentration of a flammable gas or vapor in air (usually expressed in percent by volume at sea level), which will ignite if an ignition source is present.
- N. Permit Authorizing Individual (PAI) Fire Protection Manager or authorized representative with oversite of the hot work procedure and HWP process.

  \*2 see below
- **O. Readily** As used in this procedure, a portable extinguisher that is easily acquired for prompt use in case of fire.
- **P. Supervisor** The person responsible for supervising employees performing construction, maintenance, modification, test, and/or inspection work.
- \*2 Short-Duration Thermal Exposure from Fire A period of egress from or accidental exposure to thermal events, including but not limited to, vapor cloud fires, jet flames, running liquid fires (pool fires or liquid fires), solids fires (fires of solid materials or dust fires), or warehouse fires.

TITLE:		FBP-FP-PRO-00072	
	Welding, Burning, and Hot Work	REV. NO. 9	
	8,	Page 23 of 31	

- **Q.** Time Period Extension The designated 24-hour period identified for extending the coverage of an issued HWP for completing a specific hot work operation.
- **R. Welding/Burning/Hot Work** Refers to all methods of welding; arc and torch cutting; open-flame brazing, burning, and soldering; other portable torch open-flame operations; and other spark-producing operations (e.g., grinding).
- S. Welding/Burning/Hot Work Permit (HWP) A form (FBP-FP-PRO-00072-F01) that provides an authorization from the Issuing Authority to perform Welding, Burning, and/or Hot Work outside a fixed weld shop. This permit specifies special fire safety precautions to be followed.

### 8.2 Acronyms

- A. CO<sub>2</sub> Carbon Dioxide
- **B. FR** Flame Resistant
- C. FPE Fire Protection Engineer
- **D. FP** Fire Protection
- E. OS&H Occupational Safety and Health
- F.  $UO_2F_2$  Uranyl Fluoride

#### 9.0 SOURCE REFERENCES

- **A.** Title 10 CFR 851, Worker Safety and Health Program
- **B.** Title 29 CFR 1910, Occupational Safety and Health Standards
- C. Title 29 CFR 1926, Safety and Health Regulations for Construction
- **D.** ANSI/ASC Z49.1, Safety in Welding, Cutting, and Allied
- E. DOE Order 420.1C, Change 1, Facility Safety
- **F.** Environmental, Safety & Health Safety and Health Bulletin #DOE/EH-0196 Issue no 97-3 dated July 1997
- **G.** NCSA-PLANT079, Opening Equipment Containing Greater Than a Safe Mass of Uranium-Bearing Material
- H. NFPA 10, Standard for Portable Fire Extinguishers
- I. NFPA 25, Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems
- J. NFPA 51B, Standard for Fire Prevention During Welding, Cutting and Other Hot Work

TITLE:		FBP-FP-PRO-00072
	Welding, Burning, and Hot Work	REV. NO. 9
	6,	Page 24 of 31

- K. NFPA 55, Compressed Gases and Cryogenic Fluids Code
- L. NFPA 241, Safeguarding Construction, Alteration, and Demolition Operations
- M. NFPA 2112, Standard on Flame-Resistant Garments for Protection of Industrial Personnel Against Flash Fire
- N. NFPA 2113, Standard on Selection, Care, Use, and Maintenance of Flame-Resistant Garments for Protection of Industrial Personnel Against Flash Fire
- O. OSHA 29 Code of Federal Regulations (CFR) 1910.252, Welding, Cutting, and Brazing
- P. OSHA Title 29 CFR 1926, Subpart J, Welding and Cutting

TITLE:
Welding, Burning, and Hot Work

FBP-FP-PRO-00072

REV. NO. 9

Page 25 of 31

# Appendix A REGULATORY REQUIREMENTS FLOW DOWN

- 1. Title 10 CFR 851, Worker Safety and Health Program
- 2. Title 29 CFR 1910, Occupational Safety and Health Standards
- 3. Title 29 CFR 1926, Safety and Health Regulations for Construction
- 4. DOE Order 420.1C, Change 1, Facility Safety
- 5. NFPA 10, Standard for Portable Fire Extinguishers
- 6. NFPA 25, Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems
- 7. NFPA 51B, Standard for Fire Prevention During Welding, Cutting and Other Hot Work
- 8. NFPA 55, Compressed Gases and Cryogenic Fluids Code
- 9. L. NFPA 241, Safeguarding Construction, Alteration, and Demolition Operations
- 10. NFPA 2112, Standard on Flame-Resistant Garments for Protection of Industrial Personnel Against Flash Fire
- 11. NFPA 2113, Standard on Selection, Care, Use, and Maintenance of Flame-Resistant Garments for Protection of Industrial Personnel Against Flash Fire
- 12. OSHA 29 Code of Federal Regulations (CFR) 1910.252, Welding, Cutting, and Brazing
- 13. OSHA Title 29 CFR 1926, Subpart J, Welding and Cutting

TITLE:
Welding, Burning, and Hot Work

FBP-FP-PRO-00072

REV. NO. 9

Page 26 of 31

# Appendix B SUPPLEMENTAL INFORMATION FOR A FIXED WELD SHOP

#### NOTE

**WHEN** a combustible liquid is heated for use to within 30°F of its flash point, **THEN** it must be handled according to the requirements for the next lower class of liquids.

- 1. Fixed Weld Shop shall be located in noncombustible/fire resistive structures unless otherwise approved by the FP.
- 2. The identified shop boundary shall be constructed to prevent spark and slag migration outside of the approved area; or the immediate space surrounding the defined welding/burning/hot work area shall be kept clear of all combustibles for a minimum distance of 35 feet, or combustibles shall be protected from sparks and slag.

#### Exceptions:

- The AHJ or designee may deviate from the 35-foot requirement for limited soldering/brazing operations performed on table tops or workbenches by specifically identifying boundaries.
- Such approved activities are limited to the confines of the identified area.
- This and other such special considerations by the AHJ or designee may be enacted provided the surrounding area is adequately protected and shall be stated on the permit.
- 3. Unconnected gas cylinders located in the shops shall be limited to a 1-day supply.
  - A 1-day supply is defined as the required amount in use and connected to an approved manifold.
     For special determinations, contact FP for guidance.
- 4. Fully charged fire extinguisher of appropriate size and type shall be available at the fixed weld shop.
  - For equipment containing known or previously unknown deposit of UO<sub>2</sub>F<sub>2</sub> deposit > safe mass opened to atmosphere, the fire extinguisher shall be a portable CO<sub>2</sub> and/or dry chemical type extinguisher.
- 5. If sprinkler protection is available within the building, it shall be provided over the fixed weld shop. Welding/burning/hot work operations shall not be permitted while sprinkler protection is impaired unless approved by FP.
  - For installed equipment containing known or previously unknown deposit UO<sub>2</sub>F<sub>2</sub> deposit > safe mass opened to atmosphere, a person shall be stationed to valve off the sprinkler system, if inadvertently actuated, anytime equipment opening(s) (containing such deposit) remain uncovered.
- 6. FBP-FP-PRO-00072-F02, *Fixed Weld Shop Permit*, authorizing the fixed weld shop shall be issued by the FP representative after review of the proposed shop for conformance to Items 1 through 5.
- 7. The authorization permit shall be posted within the shop and shall be reissued annually after a special inspection by an FP representative. The signature of the FP representative shall be required on the posted permit with the approved duration date.
- 8. The shop Supervisor shall request a new shop inspection upon any changes to the condition of the fixed weld shop.
- 9. The shop Supervisor and person performing the hot work shall ensure the personal protective equipment described in Appendix C, Supplemental Information for Personal Flame Resistant Clothing, is in use.

		FBP-FP-PRO-00072
TITLE:	Welding, Burning, and Hot Work	REV. NO. 9
		Page 27 of 31

# Appendix C SUPPLEMENTAL INFORMATION FOR A FIRE WATCH Page 1 of 2

- 1. A dedicated full-time fire watch is required for welding/burning/hot work operations performed outside of approved fixed weld shop and as designated in construction subcontracts.
- 2. Fire watch is a dedicated task associated with all hot work operations excluding an approved fixed weld shop. However, in special circumstances the person assigned this task can perform air sampling operations of the hot work area. If this additional activity or similar activity is required it must be approved by the FP with special instructions.
- 3. The fire watch must have appropriate, fully charged fire extinguishing equipment readily available and be trained annually. This equipment shall be in addition to existing fire protection equipment at the welding/hot work site.
  - NOTE: Use only extinguishers marked FIREWATCH EXTINGUISHER. When working outside a fixed weld shop, extinguishers that are tagged FIRE WATCH EXTINGUISHER are to be used. Obtain a Fire Watch Extinguisher from Fire Services or from an established Fire Watch Extinguisher bank and return them at the completion of the job to the bank or to Fire Services before the due date.
- 4. Fire watches are required to be familiar with facilities and procedures for sounding an alarm in the event of a fire.
- 5. Fire watches shall review and sign FBP-FP-PRO-00072-F01, *Welding/Burning/Hot Work Permit*, prior to commencing fire watch.
- 6. A fire watch is maintained for at least one hour after completion of welding/hot work operations to detect and extinguish smoldering fires. All fires are to be reported to FPS.
- 7. Lists of current trained fire watches are maintained by the plant training group.
- 8. Routine facility inspections by the FP, Engineering, and/or OS&H include verification that all individuals observed performing fire watch are authorized for that function.
- 9. A fire watch may be required under specific circumstances in approved fixed weld shops at the discretion of the Supervisor, but should not normally be required.
- 10. For installed equipment containing known or previously unknown deposit of UO<sub>2</sub>F<sub>2</sub> deposit > safe mass opened to atmosphere, a fire watch, equipped with portable CO<sub>2</sub> and/or dry chemical fire suppression equipment, shall be established during cutting/welding.

	FBP-FP-PRO-00072
TITLE: Welding, Burning, and Hot Work	REV. NO. 9
6,	Page 28 of 31

# Appendix C SUPPLEMENTAL INFORMATION FOR A FIRE WATCH Page 2 of 2

- 11. FP may require its personnel to stand by during high-hazard operations.
- 12. Fire watches receive "hands on" training with portable fire extinguishers during their initial training.
- 13. Fire watches attend an annual refresher on the use of fire extinguishers.
- 14. The fire watch shall ensure personal protective equipment worn by the person performing hot work is the flame resistant (FR) type described in Appendix D. If FR protective equipment is required for the fire watch, it will be noted on the Hot Work Permit.
- 15. All personnel working under the Hot Work Permit shall be briefed to its requirements.

		FBP-FP-PRO-00072
TITLE: Welding, Burning	and Hot Work	REV. NO. 9
, , , , , , , , , , , , , , , , , , , ,	,	Page 29 of 31

# Appendix D SUPPLEMENTAL INFORMATION FOR PERSONAL FLAME RESISTANT CLOTHING

Flame resistant (FR) clothing for persons performing hot work and fire watches shall be appropriate for the hazards associated with the work. OS&H shall be contacted to assist with the hazards assessment and for approval when less than the standard requirements for full body coverage is evaluated for specific types of hot work. Specific PPE for the work to be performed will be outlined in the Job Hazard Analysis (JHA) or the work package.

#### \*3 see below

Standard requirements for FR outer garments shall include the following:

• Full body coverage to include coveralls, jackets/pants, or equivalent.

Additional outer garments may include FR leather protectors, hoods, etc.

Anti-Contamination clothing worn during hot work performed under a radiological work permit shall be FR.

Leather mid-to-high top safety shoes.

Incidental segments of non-natural fabric, e.g., elastic in waistband may be permitted on the under garments. If gloves are needed for hot work, the outer gloves shall be FR.

Any gloves worn under the FR gloves (e.g., for radiological control purposes) shall be assessed for burn hazards, and use or limitation of use shall be addressed on applicable work permits.

Any equipment worn over FR garments shall be fire resistant or assessed for burn hazards, and use or limitation of use shall be addressed on applicable work permits. This includes:

• Fall protection equipment, respiratory protective equipment, personal monitoring/sampling equipment, tool belts/pouches, security media, tape, and any other equipment or material worn.

An assessment of the hazards and approval by OS&H is required if less than full body coverage as described above is to be used.

If less than full body coverage is required for specific hot work, clothing worn under any FR outer garments shall be all natural fabric (e.g., cotton).

For example, if FR lab coats are used in lieu of FR coveralls, cotton coveralls or other natural fabric clothing shall be worn under the lab coat.

\*3 When the hot work hazard involves potential from short-duration thermal exposure from fire, only NFPA 2112 FR compliant outer garments shall be worn. PLG 12/07/22

TITLE:

Welding, Burning, and Hot Work

FBP-FP-PRO-00072
REV. NO. 9
Page 30 of 31

# Attachment A WELDING/BURNING/HOT WORK PERMIT



#### WELDING/BURNING/HOT WORK PERMIT

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no change he Supervi perations s	es have occurred, t isor and designate are provided for up	he Supervisor notifi d fire watcher(s) sig to 5 time periods b	PERMIT EFI 24 hour time period provi es the IA of the permit ex in the permit for each app efore a new permit issuan extensions may be permit	tension and enters sta roved 24 hour time pa ice is required. This is	isted above have been re at (date/time) and expirati alod extension. Time per sonly effective providing r	on (date/time) lod extensions 10 changes af	for the	new tim ding/but	e period ning/hot	work
	Start Date/Time	Expiration Date/Time	*Signature of Super	rvisor or designee	Signature(s) of Fire \ & Transfer of Respon		eded\			
1*	Date/ Hille	Date/Title			G. Harister of Kespor	iorbinty (if the	Journal of			
vtencion										
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2 <sup>nd</sup> extension 3 <sup>nd</sup> extension 4 <sup>th</sup>										

TITLE:
Welding, Burning, and Hot Work

REV. NO. 9

Page 31 of 31

# Attachment B FIXED WELD SHOP PERMIT



#### FIXED WELD SHOP PERMIT

#### FIXED WELD SHOP PERMIT NUMBER

(Fire Protection Issued Number)
Use Black Ink Only

DURATION: FROM TO
LOCATION:
PROTECTED BY SPRINKLER SYSTEM NO.
THIS FIXED WELD SHOP COMPLIES WITH ALL APPLICABLE FIRE PROTECTION REGULATIONS. CHANGES IN THE CONFIGURATION AND/OR OCCUPANCY OF THE FIXED WELD SHOP SHALL VOID THIS PERMIT. OPERATIONS MUST BE SUSPENDED, ONCE A PERMIT IS VOID, UNTIL A VALID PERMIT IS ISSUED. THE RESPONSIBLE SUPERVISOR OF THE FIXED WELD SHOP IS RESPONSIBLE FOR REQUESTING A VALID PERMIT BEFORE THE CURRENTLY ISSUED PERMIT IS VOID OR EXPIRES. RETURN ALL VOID OR EXPIRED PERMITS TO THE FIRE PROTECTION REPRESENTATIVE.
(PRINT/SIGN NAME) PHONE
FIRE PROTECTION REPRESENTATIVE:
(PRINT/SIGN NAME) PHONE
(FRINTIGION NAME)