

Administrative Procedure, Level 1 - Company Wide

CPCC-PRO-FP-40420

Fire Protection Analyses

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Program: Fire Protection Engineering

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Use Type: Administrative



USQ Facility	USQ Review	Screeners
105 KW Facility	Exclusion Reason: <i>N/A per B-20</i>	
324 Building	Exclusion Reason: <i>N/A per B-20</i>	
Below HazCat 3	Exclusion Reason: <i>N/A per B-20</i>	
Canister Storage Building/Interim Storage Area	Exclusion Reason: <i>N/A per B-20</i>	
Capsule Storage Area	Exclusion Reason: <i>N/A per B-20</i>	
D4ES-Central Plateau	Exclusion Reason: <i>N/A per B-20</i>	
Solid Waste Operations Complex	Exclusion Reason: <i>N/A per B-20</i>	
Transportation	Exclusion Reason: <i>N/A per B-20</i>	
Waste Encapsulation Storage Facility	Exclusion Reason: <i>N/A per B-20</i>	
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Change Summary

Description of Change

This update adds a new section that provides guidance on fire protection design review for FPE's.

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Fire Protection Analyses**Published Date: 01/29/26****Effective Date: 01/29/26****1.0 INTRODUCTION****1.1 Purpose**

The purpose of this procedure is to describe the process for preparation, review, approval, and release of the different fire protection analyses, inspections, and assessments required by the Central Plateau Cleanup Company (CPCCo) Fire Protection Program (FPP).

This is an Integrated Safety Management System (ISMS) implementing document.

1.2 Scope

This procedure applies to fire protection documentation that is prepared and maintained by or for the CPCCo FPP staff. The following types of analyses, assessments, and inspections are included in the scope of this procedure:

- Fire Hazards Analysis (FHA)
- Facility Fire Protection Assessments (FFPA)
- Fire Protection Program Assessments
- Life Safety Analysis

The following activities are excluded from the scope of this procedure:

- The performance of inspections of Resource Conservation and Recovery Act (RCRA) storage areas for ignitable and reactive wastes is done under CPCC-PRO-EP-52900, *Performing Inspections of Storage Areas for Ignitable or Reactive Waste*.
- Periodic inspections of administrative facilities are performed under CPCC-PRO-PMT-52688, *Landlord Facilities Management*.
- Inspections of work areas are performed per CPCC-PRO-SH-40499, *Safety and Health Inspections*, at the periodicity specified in that procedure.

1.3 Applicability

This procedure is applicable to the preparation, review, approval, and release of fire protection analyses falling within the scope of this procedure. Previously prepared and released fire protection analyses do not require revision to comply with this procedure.

1.4 Implementation

This procedure revision is effective 90 days after publication.

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2.0 RESPONSIBILITIES

All responsibilities associated with this procedure are identified in the process steps.

FHAs, FHA Implementation Plans, FFPAs, FPP Assessments, Life Safety Analysis, and other technical fire protection analyses shall be performed under the direction of a Qualified Fire Protection Engineer (QFPE).

2.1 Fire Hazard Analysis (FHA) Development

Per DOE O 420.1C, Chg. 3, *Facility Safety*, FHAs, using a graded approach, must be conducted for the following cases:

1. All Hazard Category 1, 2, and 3 nuclear facilities and major modifications thereto,
2. Facilities that represent unique fire safety risks,
3. New facilities or modifications to existing facilities with value greater than \$177 million (in 2018 dollars), and
4. When directed by the responsible DOE authority.
5. The term “graded approach” identified by this DOE Order, means a qualitatively scaled use of FHA elements, based upon a combination of size, value, complexity, and potential hazards associated with a subject facility. It does not reference the definition contained in CPCC-PRO-QA-54798, *Graded Approach Management Plan*, or implements the requirements of CPCC-MP-QA-599, *Quality Assurance Program*.
6. An FHA shall be completed for:
 - Significant new facilities (new facilities that have a combined building and content replacement value of \$29.5M or more),
 - A new moderate hazard non-nuclear facility (facility where hazards present considerable potential onsite impacts to people or the environment, but at most only minor offsite impacts),
 - New high hazard non-nuclear facility (facilities where hazards have a potential for onsite and offsite impacts to large numbers of persons or for major impacts to the environment),
 - Existing and new nuclear facilities, and other facilities as defined by DOE O 420.1C, Chg. 3.

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- *High—hazards with a potential for onsite and offsite impacts to large numbers of persons [10 or more] or for major impacts to the environment*
- *Moderate—hazards which present considerable potential for onsite impacts to people or the environment, but at most only minor offsite impacts*

- a. Each required facility must have its own FHA. Facility modifications will not have a standalone FHA document; but the changes must be reflected in the facility FHA document.
- b. For new facility design, a preliminary FHA shall be completed during Title I (conceptual design) and revised during Title II (definitive design) of the project design process. The preliminary FHA developed during the design process shall address to the maximum extent possible the elements required by the final FHA.
- c. The scope of an FHA shall include facilities that directly support the parent facility, such as filter plenum buildings, generators, tanks, etc. The scope shall also include proximal facilities which pose exposure risks to the parent facility, regardless of the support role, unless specifically included in a separate FHA or an FHA for another major facility. Regardless, the exposure fire potential of the proximal facility shall be considered for the parent building within the FHA.
- d. The FHA shall include an assessment of the risk from fire and related hazards (wildland fire, direct flame impingement, hot gases, smoke mitigation, firefighting water damage, fire exposure to structural members, etc.) in relationship to existing or proposed fire safety features to ensure that the facility can be safely controlled and stabilized during and after a fire. The level of detail necessary in the FHA is directly related to the complexity of the facility and the potential risk to the public, worker, and the environment.
- e. The focus of the FHA shall be the individual fire areas that comprise the facility unless analytical deterministic modeling methods can demonstrate a lesser or greater fire potential. A fire area is defined as a location bounded by fire-rated construction having a minimum fire resistance rating commensurate with the analyzed fire duration and intensity but not less than 2 hours.
- f. Fire models developed by the National Institute of Standards and Technology (NIST) or fire models acceptable by the U.S. Department of Energy (DOE) authority having jurisdiction (AHJ) that utilize deterministic fire behavioral methods may be used in the development of the FHA. The model must have undergone a formal software quality assurance program in accordance with DOE requirements.
- g. The FHA shall not preclude the assumption of a fire occurring when an energy source and a combustible source are present. Average combustible loading as a means to characterize the fire severity shall not be considered an acceptable technique.
- h. The FHA must be performed under the direction of a QFPE. The final and preliminary FHA shall contain but not be limited to, the following elements:

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- Description of operations
- Description of construction
- Protection of essential safety class and safety significant equipment
- Fire protection features
- Description of fire hazards
- Life safety considerations
- Critical process equipment
- High value property
- Damage potential: When determining fire loss, the estimated damage to the facility and contents typically includes:
 - Replacement cost, less salvage value unless scheduled for demolition
 - Cost of decontamination and cleanup, including restoration of other areas that received water, smoke, or radiological/chemical contamination damage
 - Indirect costs of fire extinguishment (such as arranged fire department equipment)
 - Costs associated with temporary or permanent relocation to alternate facilities of equipment, operations, or personnel
- Fire Department response
- Recovery potential
- Potential for a toxic, biological and/or radiation incident due to a fire
- Emergency planning
- Security considerations related to fire protection
- Natural hazards (earthquake, flood, wind) impact on fire safety
- Exposure fire potential, including the potential for fire spread between fire areas
- Reference the fire department needs assessment baseline document
- Deficiencies or "recommendations" that are required to be corrected to meet fire protection objectives
- Risk of fire and related hazards (direct flame impingement, hot gases, smoke mitigation, firefighting water damage, etc.) – see DOE-STD-1066-2016, *Fire Protection*, Appendix B
- Description, basis, and recommended controls for key assumptions
- Description of alternate approach to program design, or operational methods described in DOE-STD-1066-2016 demonstrating an equivalent level of safety

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- i. The FHA shall include an inventory assessment of all safety class (SC) and safety significant (SS) structures, systems, and components (SSC) and all credible fire-related failure modes, including inadvertent operation or failure of fire suppression systems, shall be analyzed to determine whether a fire or fire suppression system could prevent a SC or SS SSC from performing its credited safety function.
- j. The FHA shall consider fire propagation and the potential for fire induced radiological dispersal through the facility air distribution system. Consideration shall include normal operating modes as well as alternate modes, such as system failure, that may result from the fire.
- k. If the FHA will be used to replace an FFPA, then the following additional areas shall be addressed in the FHA:
 - Water Runoff
 - Fire Barrier Integrity
 - Fire Safety Training
 - Inspection/Testing/Maintenance Reports
 - Adequacy of the Facility Self Appraisals
 - Administrative Controls
 - Status of Previous Findings
- l. The FHA shall arrive at a conclusion that either the facility meets the fire protection objectives or identify the implementation actions that are required in order for the facility to meet the objectives. The FHA shall be documented and show the thought process and assumptions required to arrive at the conclusion.
- m. The results of an FHA may determine that implementation of recommendations or corrective actions to address deficiencies are required in order for the facility to demonstrate that the fire protection objectives of DOE O 420.1C, Chg. 3, and life safety are met.
- n. The current facility FHA shall be provided concurrently with the Documented Safety Analysis (DSA) as part of the set of key supporting documents when the DSA is submitted for DOE approval.
- o. Credit taken for fire department response in an FHA and nuclear safety documentation shall be concurred by the Hanford Fire Department (HFD) and be documented in the pre-incident plan.

NOTE: *When an FHA is scheduled in the same year as an FFPA, the FHA may substitute per Section 2.1, item m.*

- p. All FHAs shall be reviewed at least every three (3) years and/or revised as follows:
 - When changes to the annual DSA updates impact the contents of the FHA
 - When a modification to an associated facility poses a significant new fire safety risk
 - When the three (3)-year review identifies the need for changes

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- q. A peer review by a QFPE shall be required for all FHAs and shall be performed and documented on a *CPCCo Engineering Review Checklist* (Site Form A-6004-797).
- r. Implementation plans for FHAs. The results of an FHA may determine that implementation of "recommendations" or corrective actions to address deficiencies are required for the facility to demonstrate that the fire protection objectives of DOE O 420.1C, Chg. 3, and life safety are met. Following the approval of the FHA, the contractor shall issue an FHA implementation plan within 60 days. The FHA implementation plan shall describe findings, recommendations, and deficiencies requiring action, and include implementation strategies, funding, corrective actions, and schedules for each item recommended or determined to be deficient by the FHA. The recommendations and corrective actions in the implementation plan shall be developed by a QFPE and input into the Integrated Contractor Assurance System (iCAS). The FHA implementation plan shall be submitted to the DOE Contracting Officer Representative for information only.

2.2 Facility Fire Protection Assessment (FFPA) Development

FFPAs shall be performed in accordance with the following:

1. Assessments shall be made annually for facilities valued (combined building and content replacement cost) in excess of \$118 million (in 2018 dollars) or in non-nuclear facilities considered to be a high hazard facility.
2. Assessments shall be made at least every three (3) years for the following facilities:
 - a. Facilities having a value of \$5.9 million to \$118 million (in 2018 dollars)
 - b. Non-nuclear facilities considered to be moderate hazard facilities
 - c. Category 2 or 3 nuclear facilities
3. Assessments shall be made at least every five (5) years for facilities valued between \$1.2 million and \$5.9 million (in 2018 dollars).
4. Facilities having a property value less than \$1.2 million (in 2018 dollars) shall not require an FFPA that contains the required nature and scope elements of DOE-STD-1066-2016, *Fire Protection*, unless significant impacts from programmatic interruption, hazardous materials, or radioactive materials are involved. If such assessments are required, they shall be performed at least every three (3) years.
 - Programmatic/Mission Interruption – Loss of the facility or Use of the facility that would have negative impact on the project/mission.
 - Hazardous Material Involvement – A facility where Hazardous Materials are used in the process or are stored in quantity above the “permit required amount.”
 - Radioactive Materials Involvement – A facility where radioactive materials are processed or stored in quantity above the “permit required amount.”

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5. A one-time assessment should be made for buildings becoming "Vacant" Buildings - Buildings that are "Cold and Dark" status or otherwise meet criteria for vacant, per National Fire Protection Association (NFPA) 1.

NOTE: *The assessments may be performed using the CPCCo Facility Fire Protection Assessment - Short Form (Site Form A-6008-436), CPCCo Facility Fire Protection Assessment - Long Form (Site Form A-6008-437), or an equivalent form.*

6. Maximum Possible Fire Loss (MPFL) values described in the assessments shall utilize the property valuation and loss estimation guidelines found in DOE O 231.1B Admin Chg. 1 (latest revision).
7. As part of the FFPA process, the cognizant Fire Protection Engineer (FPE)/Deputy Fire Marshal (DFM) shall review the following and address results within the report:
 - Construction, Occupancy, Protection, and Exposure (C.O.P.E) details shall be reviews for accuracy and consistency with the FHA and field conditions.
 - Occupancy permits shall be reviewed for each CPCCo facility by the cognizant CPCCo FPE/DFM as part of that facility's recurrent FHA and FFPA to ensure that occupancy classifications, hazardous material storage quantities, and hazardous conditions and limitations are correctly identified, and controlled. Occupancy life safety information and instructions shall also be verified as correct.
 - Open iCAS items applicable to the facility for fire protection shall be reviewed for status toward completion.
 - The status of fire protection system inspection, testing, and maintenance. The history for the period from the last FFPA to the current report and trending results from fire system impairments shall be evaluated.
 - The reports associated with facility fire prevention and life safety inspections, fire protection surveillances, and passive fire protection feature inspections and tests shall be reviewed.
 - Equivalencies and Exemptions applicable to the facility shall be reviewed for both continuing applicability and implementation through facility-specific procedures or administrative controls.
 - FHA-required administrative controls from the FFHA shall be reviewed to confirm that facility-specific procedures fully cover requirements, and the controls are fully implemented.
 - The status of previous findings and recommendations shall be reviewed.
8. New findings and recommendations shall be reviewed with facility management and their response included.
9. The FFPA shall identify the compensatory measures that must be implemented (if any) until recommendations are corrected/resolved.

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The principal objective of a FPP Assessment shall include identification of significant fire program deficiencies that would prevent the achievement of DOE's fire safety policy objectives.

1. FPP Assessments shall be made every three (3) years.
2. FPP Assessments should be performed under the supervision of a QFPE.
3. The FPP Assessment shall include assessment of the following as a minimum:
 - Comprehensiveness of the program
 - Procedures for engineering design and review
 - Procedures for inspection, testing, and maintenance of installed fire protection systems and features
 - Fire protection engineering staff (number, qualifications, training)
 - Emergency services organizations including Baseline Needs Assessments
 - Management support
 - Exemptions and documented equivalencies
 - Conformance with applicable Orders, codes, and standards
 - Adequacy of facility appraisal reports

The contractor shall provide FPE support to DOE, if requested, in performing tri-annual FPP Assessments of other site contractors.

2.4 Pre-Incident Plans

CPCCo shall provide facility assistance to the HFD in the development of pre-incident plans.

2.5 Fire Protection Deactivation Analysis

For fire protection deactivation analysis, see CPCC-PRO-FP-54134, *Fire Protection in D4 Facilities and Facilities Under Construction*, Section 3.6, "Deactivation of Fire Systems," and HFD-PRO-FS-60742, *Deactivation of Facilities Fire Protection Features*.

2.6 Fire Protection Design Analysis

Per DOE-STD-1066, *Fire Protection*, a Fire Protection Design Analysis (FPDA) is an engineering analysis for non-nuclear facilities during or preceding the preliminary design to establish fire protection design criteria, including applicable national codes and consensus standards. Updated during the design process, the FPDA provides a comprehensive design review that ensures the fire protection requirements are incorporated into the design.

The FPDA may be used at the early stages of project design development for both nuclear and non-nuclear facilities to establish fire protection Functional and Operating Requirements (F&OR).

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For nuclear facilities, key elements of the FPDA shall be incorporated into a formal FHA, Transitional FHA, or Preliminary or Project FHA by end of the Conceptual Design Phase.

Individual system-specific FPDA's may be used to establish design bases for active and passive fire protection to support design and specification development efforts at key points during the project design and construction award process.

Similarly, FPDA's may be used to establish the bases when the scope of a project is limited to either new, renovated, or replacement active or passive fire protection.

For non-nuclear facilities, key elements of FPDA's may be incorporated into relevant FFPA's when the project acceptance testing has been satisfactorily completed.

Per DOE-STD-1066, section 7.1.2 Documented Fire Protection Design Review and Analysis:

“7.1.2.1 An FPDA should be performed to ensure that FPP requirements are documented and incorporated into plans and specifications for new buildings and significant modifications to existing buildings (See Section 4.1.1 of this Standard).

7.1.2.2 For Hazard Category 1, 2, and 3 nuclear facilities, new facilities that represent a unique fire safety risk, facilities valued over \$167 million (in 2016 dollars), or when directed by the responsible DOE authority, the FPDA should be documented in a Preliminary/Project FHA that will be converted or incorporated into the facility FHA after project completion.

7.1.2.3 The FPDA and Preliminary/Project FHA should be of sufficient detail to identify applicable design criteria for meeting the fire safety objectives. The Preliminary/Project FHA should be used to justify design decisions, where required, when one or more solution is available, when multiple protection approaches are necessary, or where prescriptive requirements do not adequately address the situation encountered.”

2.7 Miscellaneous Analysis

Fire protection engineering analyses may be performed on any specific risk when requested or when deemed necessary. Miscellaneous analyses may address multiple topics such as:

- Use of a specific combustible or toxic material
- Use of unique interior or exterior finishes
- Application of hazardous or combustible finishes
- Effectiveness of a specific fire protection system application
- Risks associated with unique equipment or machinery
- Code intent analysis or technical positions

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The format for miscellaneous analysis should include, as a minimum:

- Purpose or Objective
- Governing or required documents
- Description of the system or item in study
- Analysis
- Conclusions
- Recommendations

Miscellaneous analysis shall be documented as a Calculation, defined in CPCC-STD-EN-40259, *Engineering Calculations*.

A peer review by a QFPE shall be required for all fire protection engineering analyses and shall be performed and documented on a *CPCCo Engineering Review Checklist* (Site Form A-6004-797).

2.8 Ignitable and Reactive Waste Inspections

Ignitable and reactive waste site inspections shall be performed at least annually as required by Washington Administrative Code (WAC)-173-303-395, *Dangerous Waste Regulations*, for applicable treatment, storage, and/or disposal (TSD) units and 90-day accumulation areas. The inspection shall be documented on Site Form A-6009-0033, *Annual Ignitable/Reactive Waste Storage Area Inspection* by the Facility Operator (as inspector) in the presence of the cognizant FPE/DFM (professional familiar with the International Fire Code).

Inspections for TSD units are required for areas which the Part A Permit Application allows for the management of ignitable and reactive waste at the storage area.

Inspections for 90-day accumulation areas are required for all “active” areas.

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3.0 PROCESS

FHAs, FHA Implementation Plans, FFPAs, FPP Assessment, life safety analysis, ignitable/reactive waste inspections, and other technical fire protection analyses/evaluations shall be performed under the direction of a qualified FPE.

This section describes the process for preparation, review, approval, and release of fire protection analyses.

The physical condition of facilities in surveillance and maintenance phase of their life cycle may preclude access to the entire facility as determined by the work planning process. In such cases, the inspection shall be carried out per the task analysis of the work document and the associated work steps for revisions to the FHAs and performance of the periodic FFPAs.

3.1 Fire Hazards Analysis (FHA)

Actionee	Step	Action
Responsible Manager	1.	DIRECT the preparation or revision of an FHA for facilities meeting the criteria requiring an FHA per DOE O 420.1C, Chg. 3.
FPE and Nuclear Safety Analyst	2.	For nuclear facilities, jointly IDENTIFY the fire related hazards <u>AND</u> EVALUATE postulated scenarios to ensure the accident analyses for fire and explosion events are consistent in both the FHA and nuclear safety documentation. (See Appendix A for FPE roles in this process.)
	3.	OBTAIN <u>AND</u> REVIEW previous FHA, FFPA, fire protection-related iCAS items, Hanford Fire Marshal (HFM) Permits, any facility change/modification descriptions, life safety analyses, and deactivation analyses.
	4.	REVIEW FFPA, FHA, fire protection-related iCAS item status, HFM Permits, fire systems inspection, testing, and maintenance status, and related facility changes or interim analyses with FM/BM, Design Authority (DA), and Safety Engineer (SE).

Examples of this review:

- Verify fire protection features in FFPA/FHA is in alignment with the drawing(s), items receiving inspection, testing, and maintenance, and labeling in the field.
 - Verify that a common boundary for two FFPAs/FHAs contain consistent description of that boundary, description, classification, and controls match OR explained in each FHA why they do not need to match. Common wall between B Plant and WESF is a good example.
5. DEVELOP OR UPDATE FHA to reflect accuracy changes, analyses, and iCAS item status.

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Actionee	Step	Action
FPE and Nuclear Safety Analyst	6.	CONDUCT field walkdown <u>AND</u> NOTE deficiencies.
	7.	PERFORM <u>AND/OR</u> REVIEW existing fire models and assumption for completeness, accuracy, and appropriateness of conclusions.

NOTE: Appendix C, "Fire Hazards Analysis Preparation Critical Path," provides a guide to organizing the FHA process from data gathering through final approval.

FPE or FHA Author	8.	PREPARE <u>OR</u> REVISE the facility FHA per the requirements of DOE O 420.1C, Chg. 3.
	9.	LIST <u>AND</u> CATEGORIZE findings and recommendations in the FHA in an orderly manner to address non-compliant conditions, opportunities for improvement, and good practices that should be maintained. Findings and recommendations should specifically address: <ul style="list-style-type: none"> • NFPA 101, <i>Life Safety Code</i>, non-compliances for new and existing facilities • Property protection and fire prevention non-compliances with requirements taken from NFPA codes and standards and the DOE FPP • Property protection and fire prevention with the requirements of DOE O 420.1C, Chg. 3 • Recognition and recommendation to retain good fire prevention practices that have been implemented by a facility
	10.	<u>IF</u> revising an existing FHA, <u>THEN</u> PROVIDE closure status of previous findings and recommendations.
	11.	OBTAIN peer review by QFPE.
Independent QFPE	12.	PERFORM <u>AND</u> DOCUMENT independent peer review of the new or revised FHA using the <i>CPCCo Engineering Review Checklist</i> (Site Form A-6004-797).
FPE or FHA Author	13.	RESOLVE review comments <u>AND</u> UPDATE to final FHA status.
	14.	ATTACH the completed Site Form A-6004-797 to the FHA document.

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Actionee	Step	Action
FPE or FHA Author	15.	PROCESS the new or revised FHA for review, approval, and release as a supporting document or engineering text document (as applicable) in accordance with CPCC-PRO-EN-440, <i>Engineering Documentation Preparation and Control</i> .
	16.	PROVIDE a copy of the FHA to the Nuclear Safety Analyst for review to determine if an unreviewed safety question (USQ) review is required.
	17.	SUBMIT the completed FHA to a QFPE for approval.
	18.	SUBMIT the final document to the FPP Manager for review and comment.
	19.	RECONCILE any comments by the FPP Manager.
	20.	PROVIDE Nuclear Safety the opportunity to review and comment on any changes made by the FPE or FPP Manager to ensure they do not contradict the USQ.
	21.	PLACE an electronic copy of the completed FHA in the CPCCo-FPE folder, FPE section, Fire Hazards Analysis, in the subfolder.
FPE	22.	<u>IF</u> requested, <u>THEN</u> PROVIDE an informational copy of new and revised FHAs to DOE Fire Protection Engineering subject matter expert (SME). For facilities operating under a DSA, the FHA should be submitted when the facility DSA, including the final or preliminary safety analysis, is submitted to DOE for approval.
FPE & Facility Management	23.	Following approval of the new or revised FHA, ENSURE the FHA Implementation Plan (or the revision of the current plan) is generated to address open findings and recommendations resulting from the FHA. The FHA Implementation Plan shall address the following for each finding and recommendation described in the FHA and requiring action: <ul style="list-style-type: none"> • Description of each finding and recommendation • Planned corrective action • Implementation strategy or strategies • Source of funding • Schedule for completion

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Actionee	Step	Action
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NOTE:

- *The facility and their associated business services organization shall be involved in the development of this criteria for coordination with strategic planning and budget requests for the facility.*
- *If during the preparation of an FHA implementation plan it is determined that an FHA recommendation, finding, observation etc., should be changed in any way, the FHA must be revised before the FHA implementation plan is issued.*

FPE	24. ENSURE the new or revised FHA Implementation Plan is processed for review, approval, and release as a supporting document or engineering text document (as applicable) in accordance with CPCC-PRO-EN-440.
	25. During the FHA Implementation Plan review and approval process, ENSURE the new or revised plan is transmitted to the DOE Fire Protection Engineering SME.
	26. Formally TRANSMIT the new or revised FHA Implementation Plan to DOE Office Contracting Officer Representative for information only.
Responsible Manager	27. ENTER <u>AND</u> TRACK the resolution and completion of FHA Implementation Plan findings, recommendations, and deficiencies in accordance with CPCC-PRO-QA-052, <i>Issues Management</i> .

3.2 Transitional Fire Hazards Analysis (TFHA)

Transitional facilities are those that have been placed in a safe-shutdown condition and abandoned or are undergoing decontamination and decommissioning (D&D) work leading to demolition or abandonment. TFHA's follow identical processes and formations to standard FHA's. Transitional facility planning should include the impact that such a transition has on the effectiveness of existing fire protection features and activities. Moreover, a fire at a shutdown facility can significantly increase the cost of the transition process. Increased costs may be incurred by the destruction of vital equipment required for transitional activities. Other impacts include a delay in transition commitments, undermining of public confidence, and an increase in the final cost of cleanup.

- DOE-STD-1066-2016, Appendix B, Section B.6, *Transitional Fire Hazard Analysis* provides guidance on TFHA development and provides a list of topics that should be addressed in B.6.4:
 - Facility construction, including interior finish;
 - Fire protection features, their status, and plans for deactivation;
 - Potential need to restore system to service for D&D;
 - Facility hazards;
 - The removal of combustibles, including flammable or combustible liquids;
 - Periodic monitoring;
 - Appropriate signage showing the status of facility and fire protection systems;

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- Securing the facility from unauthorized entry;
 - Requirements for performance of transitional activities;
 - Maintaining worker safety;
 - Fire department notifications and firefighting strategies; and,
 - Other pertinent information, as necessary.
- DOE-STD-1066-2016, Appendix E, *Transitional Facilities*, provides additional considerations and fire safety principles.
 - Transitional facilities are governed by the requirements contained in 10 CFR Part 851, *Worker Safety and Health Program*, (including 29 CFR Part 1926, *Safety and Health Regulations for Construction*) and the provisions of the NFPA Standard 241, *Safeguarding Construction, Alteration and Demolition Operations*. (See also FM Global Loss Prevention Data Sheet 1-0, *Safeguards During Construction*, and Chapter 8 of NFPA 801, *Standard for Fire Protection for Facilities Handling Radioactive Materials*.)
 - Appendix B of this procedure, “Criteria for Loss Estimation”, section 2.0, *Considerations Unique to S&M, Cold and Dark, Transitional, and D-4 Facilities*, provides specific guidance in evaluating D-4 facility loss potential.
 - CPCC-PRO-FP-54134, *Fire Protection in D-4 Facilities and Facilities Under Construction*, addresses fire hazard mitigation and associated administrative controls needed for successful bounding of fire risk.
 - CPCC-PRO-FP-40422, *Fire Marshal Permit Interfaces*, identifies fire marshal permits that may be needed to maintain administrative controls needed to support the TFHA. Appendix C, *Construction and D-4 Activities*, provides additional guidance.

3.3 Fire Protection Design Analysis (FPDA)

DOE-STD-1066-2016, defines FPDA as an engineering analysis for non-nuclear facilities during or preceding the preliminary design to establish fire protection design criteria, including applicable national codes and consensus standards. Updated during the design process, the FPDA provides a comprehensive design review that ensures the fire protection requirements are incorporated into the design. The FPDA should be considered the most distilled form of graded approach FHA, as it only analyzes design criteria and does no analysis of operations or accidents. For projects requiring a PFHA, the PFHA takes the place of the FPDA. A standalone FPDA should only be considered when:

- The facility is Below Hazard Category 3 (BHC3), and
- The construction/modification is above the minimum threshold requiring automatic fire protection, but below threshold requiring an FHA.

An FPDA should have a level of detail based on the complexity of the facility and potential risks, and include the following elements as recommended by DOE-STD-1066-2016, Section B.5:

- Building Code Requirements
- Fire Separation
- Life Safety
- NFPA Codes and Standards relating to specific processes to be part of the project

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- Code Compliance with identified applicable codes and standards

3.4 Facility Fire Protection Assessments (FFPA)

Actionee	Step	Action
Fire Protection Manager	1.	ENSURE a revised list of facilities requiring FFPAs is generated annually documenting all building changes (additions, deletions, changes in value).
	2.	DOCUMENT the revised list by updating the iCAS schedule.
Responsible Manager	3.	DIRECT the preparation of an FFPA for facilities meeting the criteria requiring an FFPA per DOE O 420.1C, Chg. 3.
QFPE	4.	ENSURE FFPAs are performed in accordance with the requirements in DOE O 420.1C, Chg. 3.

NOTE:

- *Areas within facilities that are not accessible due to hazardous conditions such as radiological, biological, and physical or any similar condition shall not be accessed for the purpose of performing assessments. The assessment shall include an evaluation of any work activities or changes in the area in comparison to the last known assessment to determine if hazards have increased. The evaluation shall be included in the assessment and noted due to inaccessible conditions.*
- *The FFPA(s) must clearly delineate the buildings or structures which are included, and which are not included. Particular detail should be given to those areas which consist of numerous building(s) or structure(s) (as a group called complexes) some of which are not being considered as part of the assessment.*

- QFPE
- OBTAIN AND REVIEW previous FHA, FFPA, fire protection-related iCAS items, HFM Permits, any facility change/modification descriptions, life safety analyses, and deactivation analyses.
 - REVIEW FFPA, FHA, fire protection-related iCAS item status, HFM Permits, fire systems inspection, testing, and maintenance status, and related facility changes or interim analyses with FM/BM, DA, and SE.
 - Examples of this review:
 - Verify fire protection features in FFPA/FHA is in alignment with the drawing(s), items receiving inspection, testing, and maintenance, and labeling in the field.
 - Verify that a common boundary for two FFPAs/FHAs contain consistent description of that boundary, description, classification, and controls match OR explained in each FHA why they do not need to match. Common wall between B Plant and WESF is a good example.

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Actionee	Step	Action
QFPE	8.	UPDATE FFPA to reflect accuracy changes, analyses, and iCAS item status.
	9.	CONDUCT field walkdown <u>AND</u> NOTE deficiencies.
	10.	USE CPCCo Facility Fire Protection Assessment - Short Form (Site Form A-6008-436), CPCCo Facility Fire Protection Assessment - Long Form (Site Form A-6008-437), or an equivalent form to complete the FFPA.
	11.	UPDATE Construction, Occupancy, Protection, and Exposures (C.O.P.E.) description for both narrative and IBC/NFPA classifications.
	12.	IDENTIFY AND DISCUSS condition issues, obsolescence, or deterioration.
	13.	ENSURE findings, recommendations, and deficiencies are documented <u>AND</u> IDENTIFY any resulting compensatory measures in the body of the FFPA.
	14.	PROVIDE a conclusion concerning adequacy of conditions in each section of the FFPA report. Provide supporting narrative for all ratings less than adequate or satisfactory.
	15.	BRIEF the Responsible Manager on the results of the FFPA. <ul style="list-style-type: none"> a. INCLUDE the need for facility/project implementation of compensatory measures and any findings, recommendations, and deficiencies discovered by the FFPA.
	16.	OBTAIN peer review by QFPE using the CPCCo Engineering Review Checklist (Site Form A-6004-797).
	17.	RESOLVE review comments <u>AND</u> UPDATE to final FFPA status.
	18.	OBTAIN review from Responsible Manager, USQ, and Fire Protection Manager.
	19.	ENTER the FFPA into the iCAS system by following the steps of CPCC-PRO-QA-40090, Self-Assessment. <ul style="list-style-type: none"> a. ATTACH FFPA Long Form or Short Form as supporting documents.

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<i>Actionee</i>	<i>Step</i>	<i>Action</i>
QFPE		b. COMPLETE the iCAS Performance Objectives and Lines of Inquiry. c. ENTER any findings/OFIs into the issues section. 20. PLACE an electronic copy of the completed FFPA in the CPCCo-FPE folder, FPE section, Facility Fire Protection Assessment, in the subfolder of the location of the assessment. 21. TRACK the resolution and completion of FFPA findings, recommendations, and deficiencies in accordance with CPCC-PRO-QA-052.
Responsible Manager		22. IMPLEMENT compensatory measures, if required.

3.5 Fire Protection Program Assessments

<i>Actionee</i>	<i>Step</i>	<i>Action</i>
FPP Manager		1. ENSURE the performance of a FPP Assessment as required by DOE O 420.1C, Chg. 3. 2. SCHEDULE the FPP Assessment in iCAS. 3. ENSURE a qualified FPE is assigned to the assessment team. 4. ENSURE personnel assigned to lead, perform, or conduct FPP Assessment activities are trained in accordance with CPCC-PRO-QA-246, <i>Management Assessment</i> . 5. ASSIST in planning the FPP Assessment.
Assessment Team Lead		6. PLAN <u>AND</u> LEAD the performance of the FPP Assessment in accordance with CPCC-PRO-QA-246. 7. EVALUATE FPP Assessment data <u>AND</u> PREPARE preliminary results in accordance with CPCC-PRO-QA-246. 8. DOCUMENT findings, opportunities for improvement, and noteworthy practices in the body of the FPP Assessment. 9. BRIEF the FPP Manager on the preliminary results of the Fire Protection Program Assessment.

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Actionee	Step	Action
Assessment Team Lead	10.	REPORT the FPP Assessment as a Surveillance. a. PREPARE the report <u>AND FOLLOW</u> the submittal requirements contained in CPCC-PRO-QA-246.
	11.	ENTER <u>AND TRACK</u> the resolution and completion of FPP Assessment findings and opportunities for improvement in accordance with CPCC-PRO-QA-052.
FPP Manager	12.	APPROVE the completed FPP Assessment.
	13.	MONITOR the completion of FPP Assessment findings, recommendations, or opportunities for improvement.

3.6 Life Safety Analysis

Actionee	Step	Action
QFPE	1.	<u>IF</u> determined necessary, <u>THEN</u> PREPARE a written Life Safety Analysis (LSA) to document the adequacy of the life safety features of structures prior to undergoing deactivation, decontamination, decommissioning, demolition (D4) or construction.
	2.	For transitional (undergoing alteration, demolition, or varying degrees of deconstruction) or vacant facilities, REFER to CPCC-PRO-FP-54134, <i>Fire Protection in D4 Facilities and Facilities Under Construction</i> , Section 3.7, "Facility Transition," for life safety controls.
	3.	WALK DOWN the D4 or construction site with the appropriate project supervising authority. It is appropriate to include a representative of the Hanford Fire Chief on the walkdown if provisions for technical rescue are of concern.
	4.	INCLUDE the following in the LSA: <ul style="list-style-type: none"> • DESCRIBE the scope of work, work area, structure, physical boundaries, and methodology used to accomplish the work. • DISCUSS <u>AND</u> DOCUMENT observations made during the walkdown. • DISCUSS the elimination of hazards and hazardous (including flammable and combustible) material from the area to the maximum extent possible.

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Actionee	Step	Action
QFPE		<ul style="list-style-type: none"> DISCUSS the implementation of the general principles of NFPA 101. Discuss specific provisions required for life safety (e.g., lighting, signage, means of egress, etc.). DISCUSS the application of requirements taken from NFPA 241, <i>Standard for Safeguarding Construction, Alteration, and Demolition Operations</i>, regarding life safety for the type of work performed (e.g., underground operations, construction, demolition, etc.). ESTABLISH compensatory measures, if necessary, to ensure an acceptable level of life safety <u>AND IDENTIFY</u> HFM permitting requirements.
DFM	5.	PROVIDE technical review and sign as reviewer on the completed LSA.
QFPE	6.	DOCUMENT the completed LSA in retrievable form. An appropriate level of documentation may be in the form of a numbered CPCCo Internal Memorandum from the FPE to the responsible Manager.
	7.	ENTER the LSA findings, recommendations, and deficiencies in accordance with CPCC-PRO-QA-052.
Responsible Manager	8.	MAINTAIN worksite scope and conditions in accordance with the description contained in the LSA for the duration of the work activity and implement compensatory measures prescribed by the LSA or HFM Permit(s).
	9.	TRACK the resolution and completion of LSA findings, recommendations, and deficiencies in accordance with CPCC-PRO-QA-052.

3.7 Interpretations/Clarification Requests

NOTE: *Approved interpretation/clarification requests (ICR) are located on the Hanford Fire Protection Forum shared drive.*

The HFMI's Office shall provide routine interpretations of fire protection and building codes or standards with input from the responsible FPE.

Routine Interpretations shall not be used as a mechanism for granting a departure from a mandated code, DOE requirement, or standard. Furthermore, an interpretation shall not be used when the approval of a fire safety exemption or equivalency is mandated by DOE requirements or the DOE AHJ.

ICRs shall be performed in accordance with CPCC-PRO-FP-40424, *Equivalencies, Exemptions, and Interpretation/Clarification Requests (ICRs)*.

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CPCCo shall provide facility assistance to the HFD in the development of pre-incident plans.

3.9 Ignitable and Reactive Waste Inspections

Ignitable and Reactive Waste site inspections shall be performed annually as required by WAC-173-303-395 for applicable TSD units and 90-day accumulation areas by the Facility Operator (as Inspector) in the presence of the cognizant FPE/DFM (as (professional familiar with the International Fire Code).

Inspections for TSD units are required for areas which the Part A Permit Application allows for the management of ignitable and reactive waste at the storage area.

Inspections for 90-day accumulation areas are required for all “active” areas.

WAC inspections shall be performed in accordance with CPCC-PRO-EP-52900, using *Site Form A-6009-0033, Annual Ignitable/Reactive Waste Storage Area Inspection*.

3.10 Annual Fire Protection Program Summary

By February 15 of every year, provide input as required to the HFD for reporting of CPCCo's recurring FPP costs in accordance with the requirements of DOE O 231.1B, Admin Change 1. CPCCo's input shall consist of Fire Protection Engineering costs. If directed by the HFD, provide this input directly to DOE.

3.11 Miscellaneous Analysis

Fire protection engineering analyses may be performed on any specific risk when requested or when deemed necessary.

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The following forms are used as tools for information gathering and are not records to this procedure.

A-6004-797, *CPCCo Engineering Review Checklist*
A-6008-436, *CPCCo Facility Fire Protection Assessment - Short Form*
A-6008-437, *CPCCo Facility Fire Protection Assessment - Long Form*

5.0 RECORD IDENTIFICATION

None

6.0 SOURCES**6.1 Requirements**

10 CFR 851, *Worker Safety and Health Program*
CPCC-PRO-EN-440, *Engineering Documentation Preparation and Control*
CPCC-PRO-IRM-8310, *Document Control Processes*
CPCC-PRO-QA-052, *Issues Management*
CPCC-PRO-QA-246, *Management Assessment*
CPCC-PRO-QA-40090, *Self Assessment*
CPCC-STD-EN-40259, *Engineering Calculations*
CPCC-STD-FP-40404, *Fire Protection Program*
DOE O 231.1B Admin Chg. 1, *Environment, Safety and Health Reporting* (latest version)
DOE O 420.1C, Chg. 3, *Facility Safety*
DOE-STD-1066-2016, *Fire Protection*
NFPA 101, *Life Safety Code*
NFPA 241, *Standard for Safeguarding Construction, Alteration, and Demolition Operations*
WAC-173-303-395, *Dangerous Waste Regulations*

6.2 References

CPCC-PRO-EP-52900, *Performing Inspections of Storage Areas for Ignitable or Reactive Waste*
CPCC-PRO-FP-40424, *Equivalencies, Exemptions, and Interpretation/Clarification Requests (ICRs)*
CPCC-PRO-FP-54134, *Fire Protection in D4 Facilities and Facilities Under Construction*
CPCC-PRO-PMT-52688, *Landlord Facilities Management*
CPCC-PRO-SH-40499, *Safety and Health Inspections*
HFD-PRO-FS-60742, *Deactivation of Facilities Fire Protection Features*

6.3 Bases

CPCC-PRO-MN-19304, *Periodic Maintenance Process*

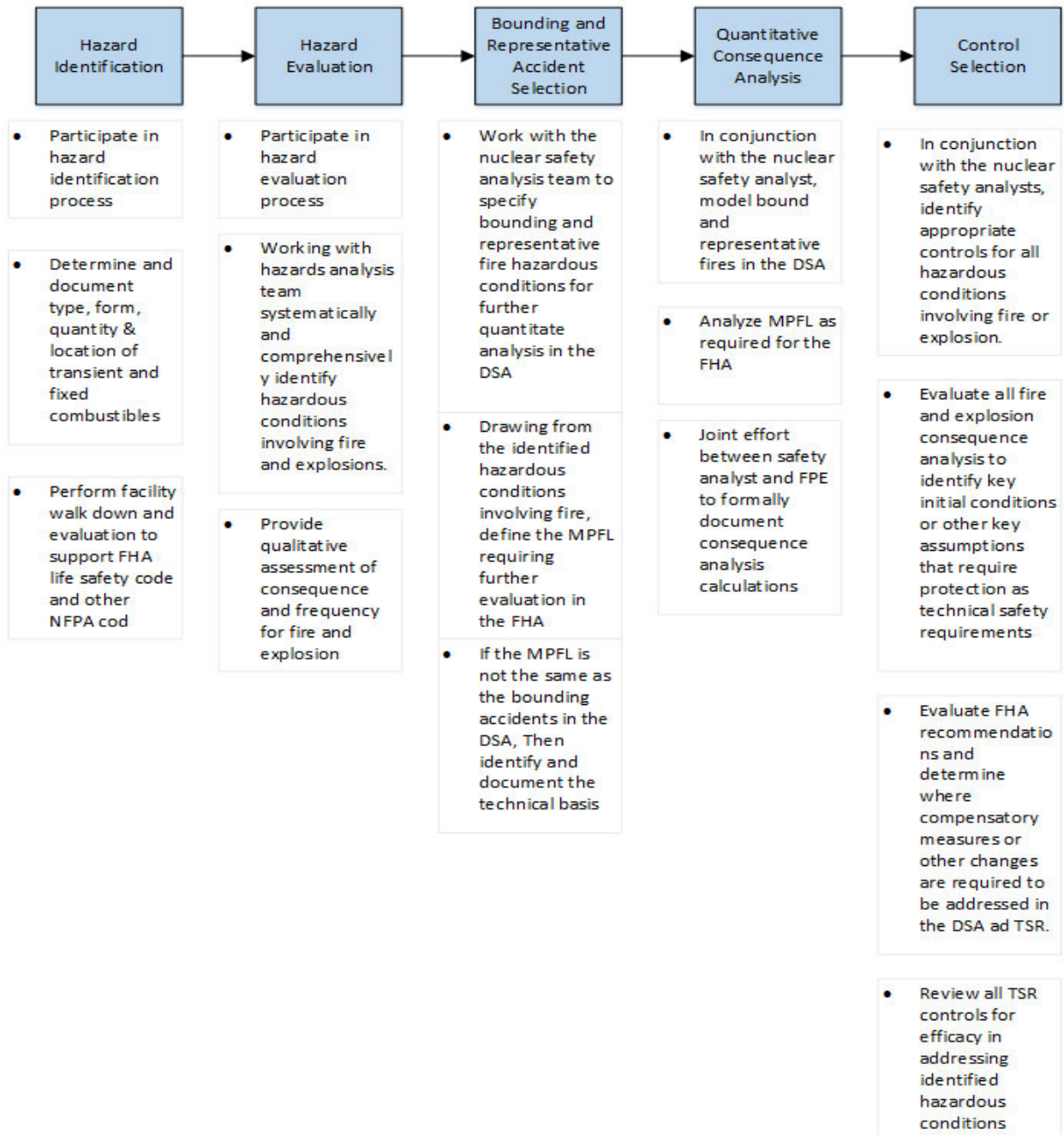
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Appendix A - FHA DSA Integration

Fire Protection Engineer Roles to Integrate the FHA and DSA



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Appendix B - Criteria for Loss Estimation

1.0 LOSS ANALYSIS

Loss analysis is required to be performed within FHA's and FFPA's by DOE-STD-1066-2016. It is part of a Highly Protected Risk (HPR) approach that translates hazards and exposures encountered by the FPE from the fire assessment process for comparison with an established set of DOE-centric tolerances or threshold limits. Loss estimates are performed:

- As part of the "HPR" Risk Control Model –
 - A communication between the "Risk Control Engineer" & the "Underwriter"
 - A tool that translates hazards and exposures into risks for comparison to an established set of risk tolerance or thresholds
- To create a "quasi-quantitative" template to compare cost of unmitigated and mitigated exposures to physical protection (existing & recommended)

Loss analysis is a risk management tool. It sets a bounding upper limit on fire exposure from a building or activity. It compares the mitigated versus unmitigated exposure results to arrive at a cost vs benefit for proposed risk control. Through loss estimation it is possible to gauge risk position for a building or activity in a "snapshot in time". A detailed loss estimate can strategically inform on-going maintenance or project priorities vs the risk appetite of the customer or stakeholder and supports the basis for administrative controls, compensatory measures, & equivalencies. Finally, it demonstrates the effectiveness or impacts from an alternative approach to a prescriptive code.

Two concepts are employed to establish a "Quasi-Quantitative" comparison based upon cost of unmitigated versus mitigated exposures (via existing and recommended physical protection):

- Maximum Possible Fire Loss (MPFL): The worst-case fire that could occur, constrained only by fire resistive construction and the arrangement/quantity of combustible fuels present. The extent to which protection is credited for this evaluation is based upon the "as found" condition of the feature at the time of the assessment. The total value of property (excluding land value) within a fire area, unless a FHA demonstrates a lesser (or greater) loss potential with all fire protection equipment out of service and no response from the Fire Department except for salvage operations. This assumes the failure of both automatic fire suppression systems and manual fire-fighting efforts, but credits passive fire protection (e.g., fire walls, doors, dampers, and rated floor separations) having a fire resistance of 2 hours or more.

MPFL is not necessarily equal to Amount Subject to Loss (fire area)

- When there is a lack of continuity of combustibles by:
 - clear space separation
 - physical barrier separation

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- When there is a substantial degree of robust subdivision:
 - Does not necessarily require rated construction.
 - Even non-combustible or fire resistive construction that is not smoke tight may be of some mitigative effect.
- When supported and verified removal of combustibles to at least a limited combustible (A.L.A.R.A.) level has taken place.

Maximum Credible Fire Loss (MCFL) - MCFL is not a required loss scenario but is nonetheless useful in comparing an unmitigated fire to one that involves active fire protection. This may be particularly important for proposed new construction and/or operations as well as any analysis involving the potential removal of fire protection from existing facilities.) The worst-case fire that could occur constrained by both fire resistive construction and automatic fire protection. The total value of property within a fire area unless a FHA demonstrates a lesser (or greater) loss potential. When performing the MCFL analysis, system and equipment design features that function to reduce the probability and consequences of a fire can be considered in reducing the estimated loss. It is assumed that:

- All installed fire protection systems function as designed.
- The effect of emergency response is omitted except for post-fire actions such as salvage work, shutting down water systems, and restoring operation.
- The extent to which protection is credited for this evaluation is based upon the “as found” condition of the feature at the time of the assessment.
- Special fire-resistant materials, such as FM Approved Less Hazardous Industrial Fluids, may be considered as limiting the MCFL when utilized in accordance with the approval conditions and in equipment arranged with applicable safeguards and safety interlocks.
- Portions of buildings or operations, such as attics and crawl spaces, and certain utility areas; that meet NFPA definition for non-combustible or limited combustible may also be credited when supported by analysis by the cognizant FPE.

The extent to which quantitative fuel package limits, spatial separation between fuel packages, and non-combustibility are credited for MCFL or MPFL purposes is based upon the engineering judgement of the FPE with respect to such issues as:

- Formality of Administrative Controls (procedural or within permits) and their historical effectiveness in implementation
- Operator fuel package size and spacing limitation recognition and control training
- Formality and effectiveness of routinely scheduled surveillances and program oversight.
- Formality, effectiveness, and timeliness of corrective action

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However, there are administrative controls that cannot be credited in either MPFL or MCFL analysis including that are nonetheless critical to effective risk control:

- Transition to temporary construction power and disconnecting house power (and associated utilities)
- Transient combustible controls (e.g., hot work, introduction and management of combustible, flammable, hazardous materials, and waste).
- Controls on use of FR and non-FR materials
- Routine self-inspections for fire prevention and housekeeping
- Transient combustible controls (e.g., hot work, introduction and management of combustible, flammable, hazardous materials and waste).
- Controls on use of FR and non-FR materials
- Routine self-inspections for fire prevention and housekeeping

Fire Protection System - Any system designed to detect, extinguish, and limit the extent of fire damage or enhance life safety. Where redundant fire protection systems are required, any two of the following will satisfy that requirement. These include:

- Automatic suppression systems, such as fire sprinklers, foam, clean agent (gaseous), explosion suppression, or other specialized extinguishing systems plus appropriate detection and alarms. An adequate supply, storage, and distribution system is an essential element.
- Automatic fire detection, occupant warning, manual fire alarm, and fire alarm reporting systems combined with properly equipped and adequately trained fire departments or brigades.
- Fire barrier systems or combinations of physical separation and barriers for outdoor locations.
- Other systems, such as alternate process control systems or gaseous inerting and oxygen limiting atmospheres, as approved by the AHJ.

Limited Supply Suppression System - A system installed in accordance with the applicable NFPA Standards and having a limited quantity of suppression agent. These systems typically include carbon dioxide, dry chemical, other gaseous agent, or water.

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NOTE: *The extent to which such systems are credited for MCFL or PROBABLE MAXIMUM LOSS (PML) purposes is based upon the engineering judgement of the FPE with respect to such issues as:*

- *Potential to deplete effective fire suppression agent concentrations.*
- *Room or compartment integrity to contain agent for the duration of the suppression activity.*
- *Ability of the system to provide reliable shut-down of ignition sources or processes.*
- *Projected duration of the design basis fire event and/or potential of the fire to re-kindle.*

Property - All Government-owned or leased structures and contents for which the Department has responsibility, including:

- All DOE land, structures, and contents.
- All leased locations.
- All other government property on DOE land or in DOE structures.
- Other personnel and property that occupy DOE land or are in DOE structures

Noncombustible - A material that in the form in which it is used and under the conditions anticipated will not ignite, burn, support combustion, or release flammable vapors when subjected to fire or heat, as defined by fire protection industry standards on the basis of large-scale fire tests performed by a nationally recognized testing laboratory. (NFPA 1, 2018, Section 3.3.59)

Design Basis Fire - A fire that is the most severe design basis accident of this type. In postulating such a fire, failure of automatic and manual fire suppression provisions shall be assumed except for those SC items or systems that are specifically designed to remain available (structurally or functionally) through the event. The DSA design basis fire scenario should be discussed in the FHA, per DOE-STD-1066-2016, Appendix B, Section B.2.3. This scenario is intended to be "reasonable and plausible", per Footnote 87:

- The scenario should be a reasonably conservative evaluation of potential consequences from the worst-case fire.
- Be based upon facility, process, and hazard descriptions, supported by the DSA, and physically plausible.
- Consider unplanned hazards or activities that have a real potential of being introduced into the facility.
- Do not assume the presence of hazards not expected to be introduced into the facility simply to ensure a bounding analysis (e.g., excessive transient combustible, flammable gases, explosives, etc.).

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- Consider items whose failure may increase beyond established MPFL.

Fire Loss - Items considered in a DOE loss analysis include:

- Damage or loss of facilities, inventories, and associated equipment as a result of a fire or a fire suppression system actuation.
- All estimated or actual costs to restore DOE property to a reasonable approximation of pre-accident conditions. If an accident involves property that has been lost, completely destroyed, or contaminated to a degree precluding economically justifiable recovery, estimates shall be based on cost for actual replacement and installation of comparable equipment, devices, or materials (including nuclear materials) as well as clean-up and disposal cost for the damaged facility. Such costs should include credit for any salvage value associated with the loss.
- In the case of unused, obsolete, or excess building space, equipment, or materials that are not going to be replaced, the cost estimate of the market value at time of accident shall be used.
- Estimated costs for restoring to a reasonable degree to pre-accident condition, without improvement, all partially lost or damaged DOE property. Include replacement cost for all DOE-owned supplies and costs for decontamination operations where applicable.
- Estimated costs for reprocessing and reclaiming partially destroyed and damaged materials. Where applicable, costs for damage resulting from firefighting (e.g., water and smoke damage) should be included.
- All post-incident cleanup expenses both inside and outside the facility (e.g., cleanup of hazardous materials or radioactive contamination resulting from fires, or fire suppression system actuation).
- All costs for recharging fire suppression systems (gaseous, chemical and foam agents) and decontamination or replacement of fire department equipment.
- Costs for damage caused by DOE operations to privately-owned property.
- Costs for restoration of land and land improvements (sidewalks, roads, etc.) that were damaged as a result of an accident.
- Costs for outside specialists or organizations hired to mitigate losses and costs for non-standard labor hours (i.e., above the amount normally worked by the employee) for onsite personnel to restore the property to pre-accident condition.
- Any lost revenue experienced as a result of the accident. Examples include income-producing processes, such as power generating and transmission facilities or timber sales, whose loss would cause a reduction in payments to the Federal Government.
- Estimated damage losses to Government or private wetlands, grasslands, and forests as a result of a wild-land fire originating on DOE lands. Restoration costs should also be included along with actual costs to suppress the event.
- Labor hours expended by investigative and/or administrative personnel as a result of the incident.

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- Labor cost for personnel evacuated during a fire including any stand-down costs associated with investigations, employee relocations, or restoration activities.

Items Excluded from DOE Losses

Items excluded from DOE loss estimates:

- Expenses resulting solely from loss of the use or occupancy of facilities affected by the fire, including lost production and research time, unless it becomes necessary to obtain special facilities (e.g., temporary structures) to maintain the facilities' use or occupancy.
- All post-accident expenses paid by non-DOE sources (e.g., expenses covered by private insurance).
- Expenses to bring property to modern standards.
- Normal wear.
- Damage to privately owned property caused by other than DOE operations.
- Labor hours for onsite firefighters during their normal work shifts.

When applied to existing facility conditions MPFL and MCFL comparisons provide an “as-is” measure of the effectiveness of fire protection at a particular point in time (including both adequacy and reliability). It also provides a method of screening acceptable risk, based upon DOE-established monetary limits.

If extended to recommended improvements in protection, MPFL and MCFL comparisons are useful in demonstrating the effectiveness of a recommended physical protection improvement, especially when further compared with the costs associated with that improvement. For example, the HPR industry rough comparison of the “one tenth rule” can be applied where the MPFL is compared to the MCFL to show the reduced loss that would occur. If the cost is less than one tenth of the MPFL without the improvement, the recommended level of protection is deemed a reasonable and prudent consideration. There are other considerations that may factor into the eventual protection improvement process, but it at least serves as a starting point for risk consideration by both contractor and DOE management.

MPFL and MCFL analysis is most applicable to operating facilities where the building and contents have replacement value. Administrative controls, fire department response, and other manual methods of fire suppression are not credited in either analysis, being considered insufficiently reliable.

In summary, the following elements make up a fire loss within the DOE system:

The dollar cost of restoring damaged property to its pre-fire condition. In determining loss, the estimated damage to the facility and contents shall include:

- Replacement cost, less salvage value.
- The cost of decontamination and cleanup.
- The loss of production or program continuity.

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- The auxiliary costs of fire extinguishment (including the indirect costs of fire extinguishment such as damaged fire department equipment); and
- Consequent effects on related areas.

Losses will exclude:

- Property that is scheduled for demolition.
- Property that is decommissioned and not carried on books as a value and where there is no loss potential or threat to the public.

2.0 CONSIDERATIONS UNIQUE TO S&M, COLD & DARK, TRANSITIONAL, & D4 FACILITIES

However, facilities that are surplus, vacant (in either surveillance and maintenance mode, or cold and dark status), undergoing transition, or extended decommissioning/decontamination/demolition frequently do not have property or programmatic values. In fact, they represent DOE infrastructure liabilities. The negative exposure to the DOE is further exacerbated when radiological, biological, or chemical contamination is present, which may be readily spread by the effects of fire. Even in operating facilities that have radiological material at risk (MAR), contamination dispersion factors may overshadow conventional property considerations from direct fire damage.

Fire is recognized to be a leading factor leading to airborne contamination spread. As a result, the damage directly from fire may be a fraction of the total loss when decontamination and stabilization is factored. Even when the goal is not full restoration to the “pre-fire” condition, decontamination costs may continue for an extended period. In fact, environmental factors during clean-up efforts may further continue contamination spread over a wider area well after the direct fire has been extinguished. The fire-related radiological events parallel more conventional chemical-related environmental losses in industrial facilities.

Unique conditions include:

- Little or no automatic or manual fire protection
- Little or no fixed fire alarm or early warning detection
- Compromised passive fire protection
- Normally unattended or unattended for long periods
- Limited Project Knowledge of Interior Conditions and Legacy Systems
- Legacy Waste
- Varying degrees of legacy vs construction grade utility services
- Restricted ingress and egress
- Limited pre-incident plans
- Introduction of new (transient) materials, conditions, activities

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- Negligible Code precedent for vacant buildings & buildings with protracted deconstruction

1.1 Fire Scenarios

D&D (including S&M) activities generate contaminated waste. Typically, the waste packages are limited to incidental low-level waste associated with contamination control of S&M activities. However, as D&D progresses, conditions will require risk-reduction activities leading to characterizing, packaging, and staging of waste from deactivated process components. D&D work is expected to generate waste packages staged for transport and disposal.

Typically, two fire scenarios are developed to address the D&D of a building. The first scenario involves a fire outdoors on a material waste pad and the second scenario involves a fire within the structural confines of the building.

1. **Waste Pad MPFL:** The waste pad is usually located at least 60 ft. from the building walls to reduce mutual exposure. Packaged material is expected to be removed from the and placed on the waste pad to await interim or final disposition.
 - a. There are normally two fire scenarios to consider for this type of MPFL evaluation:
 - A TRU waste container subject to a fire with lid loss, ejection of contents, and unconfined burning; and
 - A waste container subject to a fire with lid loss and confined burning.

Outdoors on the waste pad the fire may be assumed to be the result of ignition of fuel spilled from a fossil-fuel powered vehicle. A 6 MW (20.5×10^6 BTU/hr) fire on the TRU waste pad is equivalent to a diesel pool fire approximately 2 m (6 ft 8 in.) in diameter, engulfing a non-combustible container containing waste is typically used for DOE scenarios. The quantity of fuel needed for a 30-minute fire in this case is 0.3 m³ (80 gal) of diesel fuel. The fire is postulated to occur at any point between the building and the waste pad. The waste pad fire scenario assumes that the fire burns with enough energy to result in releasing the contents of the non-combustible container to the environment, including combustion of the contents of the container.

2. **Building Interior MPFL.** Within the building the fire is assumed to occur in an area of highest combustible fuel loading and/or MAR and involve ordinary combustible material. Assumptions concerning fuel loading (both qualitative and quantitative if further fire modeling is to be used) should be explained in the narrative. An appendix covering flashover and venting may be used to cover this evaluation, which should support key conclusions concerning the feasibility of flash-over events. This also helps support administrative controls to reduce, eliminate, or limit combustible materials.

A fire involving only the mixed ordinary combustibles within a waste container is expected to be on the order of 200 kW based on single drum fire testing, containing a mixture of plastic, paper, rubber, and cotton. This testing is documented in WHC-SD-WM-TRP-233, *Analytical and Experimental Evaluation of Solid Waste Drum Fire Performance*.

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1. MPFL fire loss estimates are addressed in the sections which follow.
2. The MPFL fire events should be fully described within an appendix which describes, evaluates, and provides the basis for cleanup cost estimates (if any).
3. Two MPFL fire events are normally addressed by the FHA. These MPFL events are analogous to the two DBF events described above (i.e., a building MPFL and a TRU waste pad MPFL with two cases).
4. The MPFL building fire event should take into account the building structure serving to some extent as a confinement barrier during the fire. This is because a normal fire event within a noncombustible S&M/D&D building does not significantly challenge the structure based on the construction of the building and large areas involved within the structure.
5. Accordingly, a building may be assumed to be a “leaky” compartment. The assumption of a “leaky” compartment leads to the qualitative conclusion that 15 percent of the bounding MAR inventory is vented to the environment and 85 percent is assumed to be deposited on surfaces throughout the building.
6. Appropriate airborne release fractions (ARFs), as found in DOE-HDBK-3010, *Airborne Release Fractions/Rates and Respirable Fractions for Nonreactor Nuclear Facilities* are considered for all MPFL fire events.

Analogous Historical Losses: While it is possible to develop plausible contamination dispersion models using recognized Gaussian plume algorithms, applying unitized monetary costs is highly speculative. This is due to the wide variety of circumstances impacting decontamination choices, as well as the conditions evolving subsequent to the primary fire event. This is further exacerbated by the lack of reproducible and comparable historic decontamination cost data. In the absence of these reproducible cost estimating tools, it is necessary to refer to the historical record for comparable events. One such event that may be employed at the Hanford Site is a radiological contamination airborne release event at the Plutonium Finishing Plant PFP.

A spread of radiological contamination occurred during demolition of the Plutonium Reclamation Facility (PRF) in December, 2017 resulting in significant cost and schedule impacts.

- Contamination discovered outside posted radiological boundaries on December 15-19
- Seven personal vehicles contaminated.
- 29 government vehicles contaminated.

The response involved:

- Expanded work control area to restrict access to only authorized personnel.
- PFP workforce relocated outside expanded work control zone.
- Bioassay evaluations performed for hundreds of personnel.

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- Mobilization of personnel, supplies and equipment to maintain the PFP work control zone in a safe configuration.
- Personnel performed extensive radiological surveys, decontamination of equipment.
- Application of fixative across several acres of contaminated surfaces

Long-term actions included:

- Implementation of additional radiological monitoring (e.g., added additional CAMs, fixed-head air samplers, “cookie sheets” for monitoring contamination migration)
- Placement of soils and materials to prevent contamination migration.
- Reconfigured boundaries, canister transfer areas, load-out areas, waste storage areas to accommodate the larger work control zone.
- Reconfigured equipment in the PFP work control zone to support stabilization activities (water systems, foggers, etc.)
- Revision of work plan to reduce future risk of contamination spread.

The December 2017 contamination spread at PFP resulted in cost impacts in excess of \$125 million and delayed completion of the PFP project by approximately 18 months. Numerous Lessons Learned were identified as a result of this event. Most are in the area of Conduct of Operations and Radiological Control. Relevant to Fire Protection, this event clearly demonstrates the significant cost and schedule impacts associated with a release of radiological contamination, even one with negligible dose consequences to personnel.

While S&M, Cold and Dark, Transitional, and D4 Facilities do not readily lend themselves to the MPFL and MCFL concepts of conventional operating facilities, effective loss analysis may be approach in a more qualitative manner.

1. As with all MPFL and MCFL considerations, begin with a narrative description of the fire, its growth and spread and its eventual extinguishment.
2. Next describe the progression of smoke development, spread, deposition within the building, and method of excursion from the building. Factor biological, chemical, and radiological contaminants borne by the products of combustion. Extended discussion may be necessary to describe impacts upon exhaust ventilation systems, filter breaching and blockages. Contamination release models should be referenced to establish the initial plume form the fire event. Note for the reader that the extent of further contamination spread is indeterminate, but likely to significantly exceed the initial deposition area.
3. Similarly, describe liquid and fire suppression water run-ff, areas of spread, collection and containment features, and impact to both internal and external areas.
4. Describe potential impacts to surrounding operations or functions, such as relocation of offices, loss of facilities adjacent due to contamination, damage to vehicles and equipment, and likely boundary control impacts to adjoining facilities or operations.

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5. Account for the impact of fire to any property which retains value, as well as any programmatic interruption that may occur, using the MPFL and MCFL limitations previously described.
6. Systematically describe the decontamination processes likely to be employed, based upon previous incidents. Distinguish between decontamination actions and interim controls used to expedite resumption of operations, factoring time impacts to previous project functions.
7. When attempting to arrive at a quasi-quantitative monetary result, the December 2017 PFP incident may be used for comparison. It should be pointed out in the course of the comparison narrative that the results in the PFP incident would have been significantly larger if the release had developed with an ensuring fire. The baseline \$125 million rough order of magnitude for the PFP loss can be adjusted by qualitatively discussing factors, such as degree of openness or physical separation/compartimentation, amount of combustible fuels present, resilience of the exhaust ventilation system, and proximity to public or private lands.
8. Narrative descriptions of internal fires involving radiological MAR and similar external fires involving open waste containers are available for reference in existing DSA's and FHA's.

4.0 PROBABLE MAXIMUM LOSS (PML), AN OPTIONAL METHOD OF DESCRIBING LOSS EXPOSURES FOR RADIOLOGICAL EXPOSURES

While not required by DOE Orders, PML is a way of expressing managed risk as a snapshot in time that when compared to MPFL provides a practical measure of performance. PML is the fire loss likely to occur based upon conditions encountered at the time of the inspection or assessment, including the effectiveness of administrative controls intended to mitigate fire severity and/or frequency.

Despite the limitations of cost estimates contributing to the overall MPFL, the narrative provides qualitative support to the degree and magnitude of fire risk. Fundamentals, such as combustible fuel loading separation and degrees of compartmentation can be taken into account in the MPFL while PML provides a practical comparison of the impacts of administrative control upon primary loss factors. Combined they are supported by preceding sections of the report and in turn reinforce the validity of recommended improvements or corrective actions. While justifying an MPFL in a DOE report/FHA/FFPA consider using a PML description.

How to Employ the MPFL vs PML concept in a Report

1. Provide a narrative description of the bounding scenario:
 - a. Choose a point of origin that produces the greatest fire development. If needed, explain other alternate initiating scenarios and why this was selected over them.
 - b. Develop a progression of fire development through extinguishment.
 - c. Explain both contributing and mitigating factors that influence the fire progression and outcome (Remember to use only those factors allowed by the MPFL definition)

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- d. Account for flame spread, smoke spread, contamination. Describe mitigating factors that limit or expand.
 - e. Discuss debris removal, cleanup, stabilization activities.
 - f. Describe temporary relocation or other additional expenses that may practicably be expected from the event.
 - g. Describe the expected status of restoration and impacts upon Projects moving forward for the facility.
2. Provide a break-down of direct property losses. (A table containing the relevant portions of the DOE Loss Elements list would be a preferred way of breaking down the information).
 3. Describe discrepancies in Sunflower Valuation for the facility, if any.
 4. Develop the PML
 - a. Provide a definition of PML.
 - b. Describe each instance in which an administrative control or long-term as-found discrepancy impacts the loss scenario and to what extent.
 - c. Re-summarize the loss scenario under PML conditions.
 - d. In the case of long-term discrepancies, describe the effect of proactive correction of conditions on the PML if completed. Identify which issues, if corrected would improve MPFL, MCFL, or PML conditions and why.
 - e. Be consistent with your conclusions developed about the effectiveness of administrative controls from previous sections of the report.
 - f. Is the current MPFL monetary loss under the DOE threshold. If not explain why.

5.0 CONCLUSION

Loss analysis is performed to present a deterministic risk case. This may be expressed as a worst-case, unmitigated condition (MPFL), mitigated worst case (MCFL), or normal loss expectancy with effective administrative controls and precautions in place (PML). Loss analyses compare a current condition (snapshot in time) versus an alternate and presumably improved proposed configuration. This is a particularly effective method in establishing risk versus reward when examining recommended improvements, such as additional physical protection for damage mitigation or implementation of formal administrative controls design to prevent a loss.

The narrative scenario is the single most effective tool in loss analysis in guiding the reader toward a better appreciation of the net effect of conditions and hazards. It should provide a plausible description of how a fire may originate, grow, and eventually be suppressed. Beyond the direct fire, impacts from heat, products of combustion, firefighting, and chemical or radiological contamination water run-off are described. These must be expressed in terms of

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both direct and indirect impacts to operations and surroundings. The loss analysis is complete when the scenario has described potential events through the point of facility restoration or stabilization and resumption of normal operations.

Fire and dispersion modeling may be useful in augmenting the understanding of the basic physics of fire and contamination spread but is not the exclusive methodology in determining or presenting loss impacts to others. Modeling employs algorithms that were once derived to simulate observed fire behavior. This informational process approaches real world conditions, but only if very specific conditions are input. Modeling performs best when the problem is retrospective (i.e., the fire has already occurred and all of the information concerning the facility is available). The modeling approach becomes less effective when used in more speculative condition (i.e., conditions of fuel package, arrangement, source of ignition is not known.) Since the spread of fire itself varies widely, based upon these factors, fire models are limited to a single set, rather than range of conditions.

Instead, comparisons with similar actual fire losses often provides sufficient basis to establish reasonable and compelling arguments. Comparison and analogy are often more effective in conveying risk to the reader than complex numerical simulations. Based upon the fundamental loss control principle of FM Global that, "What has happened can happen", the FPE can utilize previous losses. Through a qualitative comparison of conditions and basic understanding of fire behavior a risk condition can be effectively expressed.

In the specific case of DOE, radiologically contaminated facilities that are no longer in active operations, there existing analogous property loss incidents that may serve as a foundation for such qualitative analysis. The PFP loss incident is one such illustrative source.

Loss analysis utilizes monetary comparisons that provide a rough order of magnitude of potential cost. While it may be possible to develop a detailed itemized list, based upon the DOE categorization of loss, such efforts may be highly speculative, particularly when dealing with contamination dispersion and resultant clean-up efforts. Obtaining information on actual fire losses and comparing them to the risks, exposures and fire protection features of a subject facility can be an effective method to develop monetary loss estimates. The purpose in this exercise is not to develop a scientific theory concerning potential fire loss, but to provide an indication and comparison of severity from which an informed management decision regarding risk undertaking versus mitigation can be made.

This guide is not intended as an exhaustive primer on loss analysis but is intended to provide a starting point in the development effort. The FPE is encouraged to obtain, review, and apply large loss information from a variety of sources. Since loss analysis is scenario driven, such narratives should be peer reviewed.

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Appendix C - Fire Hazards Analysis Preparation Critical Path

The following is a desk guide to be used by Fire Protection Engineers in the preparation of FHAs. It follows the basic outline of the current FHA template. It is to be used as a reference and not a substitute for the more detailed instructions of CPCC-PRO-FP-40420.

- NOTE:**
1. *Items indicated in **Blue** are critical milestones in the FHA development process.*
 2. *Items indicated in **Red** are instructions to perform field evaluation tasks as part of the development or verification process.*
 3. *Items indicated in **Purple** provide guidance regarding narrative to be provided within specific chapters of the FHA.*
 4. *Items indicated as (standard) refer to pre-established and approved narrative for a specific session.*
 5. *It is intended that the following outline be used as both an FHA development critical path plan and as a quality assurance checklist to verify all critical elements are included before formal submittal to stakeholders and approving parties.*
 6. *Frequent informal communication with stakeholders concerning technical approaches is encouraged throughout the development process to improve factual accuracy and eventual concurrence with the final document.*

FIRE HAZARDS ANALYSIS PREPARATION

- **Template Preparation**
- **Obtain Up-to-Date FHA Template from Technical Writer**
- **Obtain Latest Approved Revision of FHA in Word**
- **Obtain Latest Version of FFPA in Word**
- **With Assistance and Direction from Technical Writer, block move applicable sections of FHA to appropriate Chapters of Template**
- **Cross-Check FHA text with FPP Assessments updates to narrative descriptions and resolve discrepancies within the FHA Template**
- **Identify narrative conflicts requiring field confirmation or further Operations Inquiry**

1.0 INTRODUCTION (STANDARD)

- **Make Stakeholder Contact**
- **Design Authority/Systems Engineer**
- **Operations Management**
- **Nuclear Safety Analyst**

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Appendix C - (Cont.)**1.1 Purpose (standard) Approach (standard)**

Insert Facility Specific Information

1.3 Facility Overview**1.3.1 Facility**

Insert General Facility description.

1.3.2 Limitations (standard)**2.0 CONTROL FOR CRITICAL FHA ASSUMPTIONS (STANDARD)****2.1 Critical Assumptions and Controls**

- Identify critical assumptions and verify their description in FHA Template
- Identify controls and verify their description in FHA Template
- Verify for each control that there is a corresponding procedure in effect that adequately bounds its implementation
- Remove TSR references from the FHA
- Update applicable Chapter and Critical Assumptions and Controls
- Make recommendations/update as needed

2.1.1 Operations Controls (standard)**2.1.2 Combustible Material Controls (standard)****2.1.3 Insert Other Controls**

Ensure controls are FHA driven and procedures are implementing controls.

3.0 DOE ORDERS AND INDUSTRY CODES AND STANDARDS (STANDARD)**3.1 DOE Directives (standard)****3.2 Mandatory Codes and Standards Applicable to Facility (standard)**

Insert codes and standards that specifically apply to facility.

3.3 Alternate Approaches: Variances, Exemptions, and Equivalencies**Status of Equivalencies and Exemptions**

- Identify Equivalencies and Exemptions applicable to the buildings and operations within the scope of this FHA
- Verify that the basis for each Equivalency or Exemption remains valid

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- Verify that control requirements are:
 - Formally addressed in appropriate facility procedures as needed
 - Actively implemented as applicable
 - Revise and update references to Equivalencies and Exemptions and recommendations as needed in the FHA Template

List and describe each equivalency and exemption that applies.

3.3.1 Emergency response Time (standard)

4.0 MISSION AND ASSOCIATED HAZARDS

Operations/Functional Status and Mission

- Coordinate with Operations Management to review and verify Operations/Functional Status and Mission, as well as individual building occupancy descriptions to verify factual accuracy
- Update description in FHA Template for factual accuracy
- Update and discuss changes in Operational or Functional and Mission status since the last FHA in the FHA Template

4.1 Mission Description (standard)

Insert Facility Mission Description.

4.2 Inherent Hazards

Decontamination and Demolition Status

- As applicable, review status of D&D operations and controls
 - Coordinate with Operations Management to review and verify
- Review D&D process follows applicable CPCCo Fire Protection Procedures
- Update and discuss changes in status since the last FHA in the FHA Template
- Make recommendations/update as needed

Insert description of inherent hazards of facility.

5.0 OCCUPANCY CLASSIFICATION AND BUILDING CODE CONSTRUCTION REQUIREMENTS

Status of Fire Marshal Permits

- Review Status of Fire Marshal Occupancy Permits

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- Verify an Occupancy Permit is available and up to date for each required building within the scope of the FHA
- Update Occupancy Precautions and Hazard Controls for each Permit as needed
- Review Status of Fire Marshal Special Occupancy Permits (e.g., flammable/combustible liquids, designated hot work area, etc.)
 - Verify an applicable permit is available and up to date for each required building within the scope of the FHA
 - Update Occupancy Precautions and Hazard Controls for each Permit as needed
- Review status of Fire Marshal Permits for work packages or temporary conditions
 - Verify that appropriate precautions and controls are identified
 - Verify that active work packages have applicable Fire Marshal Permits assigned
- Conduct field observations to confirm that terms of Fire Marshal Permits are being adhered to
- Make recommendations for improvement as needed and discuss with applicable Operations and/or Maintenance Management
- Revise and update references to permits and recommendations as needed in the FHA Template

5.1 Facility Overview

Insert Description of the overall facility.

5.1.1 Facility

List and describe each building.

5.2 Building Occupancy Classification

Occupancy Verification

- Determine factual accuracy of physical description
- Verify Code of Record
- Determine if Radiological Hazard Class considerations are in accordance with DOE O 420.1C, Chg. 3 criteria
- Verify supporting explanatory narrative is complete
- Review occupancy/operations limitations for occupancy group, hazardous materials, flammable/combustible liquids, storage types, containers, etc. is discussed and controls identified in applicable Chapter of FHA Template
- Conduct field verification of fire prevention, occupancy arrangement, and operations

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5.2.1 List each building, provide occupancy group and include basic drawings

5.3 Building Construction Types**Construction**

- Verify Code of Record
- Determine factual accuracy of physical description
- Verify that classification of construction type per IBC is correct
- Verify description of arrangement of passive fire protection features and associated inspection, testing, and maintenance
- Conduct field verification of passive fire protection features and their condition

5.3.1 List and describe each building

Provide IBC and NFPA Construction Type

6.0 CRITICAL PROCESS EQUIPMENT

Define the critical process equipment or state that none exists.

7.0 HIGH-VALUE PROPERTY (STANDARD)

Define the high-valued property or state that none exists.

8.0 FIRE HAZARDS**8.1 Facility**

Describe the fire hazards for each building.

9.0 OPERATIONS**9.1 Facility**

Describe operations and processes for each building.

10.0 POTENTIAL FOR A TOXIC, BIOLOGICAL, AND/OR RADIOLOGICAL INCIDENT DUE TO FIRE**10.1 Criticality, Radioactive Materials, and Contamination****Review Design Safety Analysis**

- Verify FHA description matches current FHA and resolve differences with Nuclear Safety

Describe radiological hazards in the facility.

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10.2 Hazardous Materials

Review hazardous materials inventory with Operations and designated Chemical Safety Coordinator

- Verify FHA description with applicable Fire Marshal Permits and CITS
- Review Ignitable Waste areas and surveillance results

Describe hazardous materials and hazardous waste hazards in the facility.

10.3 Biological Hazards

Describe biological hazards in the facility.

11.0 NATURAL HAZARDS THAT MAY HAVE AN IMPACT ON FIRE SAFETY (STANDARD)

11.1 Earthquake (standard)

Describe any facility-specific seismic information if known.

11.2 Flood (standard)

Describe any facility-specific flood information if known.

11.3 Wind (standard)

11.3.1 Tornadoes (standard)

11.4 Lightning (standard)

Describe any facility-specific lightning protection information if known and include lightning analysis.

For further guidance on performing a Lightning Risk Assessment, see CPCC-STD-FP-54128, *Fire Protection System Design*, Appendix C.

11.5 Wildland Fire (standard)

Describe the wildland exposures to the facility, as well as vegetation clear space and other protection measures used to control wildland exposures.

12.0 DAMAGE POTENTIAL (STANDARD)**Fire Modeling Calculations**

- Identify Fire Model Calculations within current FHA and/or FHA Appendices and Set out as separate stand-alone Engineering Calculations per CPCCo Engineering Procedures
- Arrange Sr. QFPE peer review of all calculations for accuracy and applicability to FHA

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- Process and document peer review of Engineering Calculation documents, per CPCCo Engineering standards
- Sr. QFPE determine which Fire Model Calculations are directly applicable and bounding for FHA MPFL conditions
- Add applicable Fire Model Engineering Calculation references to appropriate sections of FHA Template to support MPFL determinations as needed and to Reference Bibliography

Remove DSA Fire Scenarios

- Meet with the Nuclear Safety Analyst to jointly identify/verify fire related hazards and evaluate postulated scenarios to ensure the accident analysis for fire and explosion events are consistent with both the FHA and DSA, per CPCC-PRO-FP-40420, Appendix A)
- Determine reference connections to DSA and associated engineering documents
- Remove DSA details in FHA Template
- Provide reference to appropriate DSA and Engineering Documents as needed in FHA Template

12.1 Analysis of Potential Fire Scenarios

12.1.1 Facility

Insert description of individual facility fire scenarios.

12.2 Analysis of Worst-Case Automatic Fire Protection System Malfunction

Describe an analyzed condition where the automatic fire protection system could malfunction.

12.3 Failure of Safety System Impact on Function

Describe any failures of Safety Systems due to fire.

12.4 Radiological Dispersal Potential within Facility

Describe the potential for the spread of contamination.

12.5 Off-Site Impact

Describe any offsite impacts due to contamination.

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NOTE: *Maximum Possible Fire Loss and Maximum Credible Fire Loss Update.*

- *Review Sunflower Database Values and ensure update is reasonable*
- *Review factual accuracy of each scenario*
- *Verify that the conditions discussed are bounding*
- *Verify that MPFL C.O.P.E. definitions are reflected in the chapter*
- *Ensure that narrative fully describes MPFL scenarios*
- *Validate and Update building contents, debris removal, clean-up, and decontamination values as applicable*
- *Verify that contamination modeling conforms to established DOE-RL standards*
- *Verify that applicable fire models (if needed) are correctly referenced*
- *Update FHA Template Narratives*

12.6 Maximum Potential Fire Loss (MPFL)

Describe the MPFL based upon credited fire walls.

12.7 Recovery Potential

Describe recovery potential.

13.0 FIRE PROTECTION FEATURES**Fire Protection and Fire Alarm**

- *Verify the design basis parameters of fire protection and alarm systems*
- *Conduct field verification of fire protection and alarm system configurations*
- *Ensure that areas where additional fire protection is recommended is addressed*

Fire Protection Inspection, Testing, and Maintenance

- *Determine the status of scheduled Inspection and Testing*
- *Determine inspection, testing, and maintenance backlogs*
- *Update FHA template for status/condition of fire protection and make recommendations/update as needed.*

Status of Deactivation Analyses

- *Identify completed and approved deactivation analyses and requests*
 - *Verify status of implementation*

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- Verify conditions of approval are actively fulfilled at the facility level
 - Identify deactivation analyses in-process
 - Update FHA Template to reflect status and progress
- 13.1 Special Fire Protection Features
- Describe special fire protection features (e.g., clean agent, special hazards protection, pre-engineered fire suppression, smoke/fire detection [other than fire alarms and automatic sprinkler systems]).
- 13.2 Safety Class (SC) Fire Protection Systems
- Review and confirm with Nuclear Safety Analyst identified SC fire protection systems and describe.
- 13.3 Safety Significant (SS) Fire Protection Features
- Review and confirm with Nuclear Safety Analyst identified SS fire protection systems and describe.
- 13.4 Water Supply and Distribution System
- Describe.
- 13.4.1 Fire Hydrants
- Describe and provide hydrant flow information.
- 13.5 Fire Suppression
- Verify design basis of each building fire suppression system against:
- Available record drawings
 - FHA design basis description
 - Hydraulic placard data at the system riser
- Verify sprinkler demand vs water supply analysis adequacy for each system.
- Determine adequacy of protection versus most demanding prevailing occupancies/ commodities in each protected area and make recommendations as needed for improvement.
- Describe each fire suppression system, design basis parameters, adequacy of protection and discuss deficiencies.

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Describe arrangement, access, maintenance, and adequacy of fire extinguishers provided for the facility and discuss deficiencies.

13.7 Protective Signaling Systems

Describe arrangement, maintenance, and adequacy of fire alarm and related signaling systems.

14.0 FIRE PROTECTION OF VITAL SAFETY SYSTEMS THAT HAVE A SAFETY FUNCTION DURING OR FOLLOWING A FIRE

Describe those fire protection systems credited by the DSA that are intended to protect vital safety systems (if any) during or after a fire (e.g., DSA credited HEPA Filter systems, etc.).

15.0 LIFE SAFETY ANALYSIS**Life Safety**

- Determine factual accuracy of physical description
- Determine if Radiological Hazard Class considerations are in accordance with DOE O 420.1C, Chg. 3 criteria
- Conduct field verification of means of egress, emergency lighting, route signs, etc.
- Verify supporting explanatory narrative is complete

16.0 EMERGENCY PLANNING**16.1 Facility Fire Training (standard)**

Review facility-specific fire safety training procedures and determine completeness and adequacy.

Describe any facility-specific fire safety training and discuss adequacy.

16.1.1 Pre-incident Plans (standard)

- Review Pre-Fire Plan for factual accuracy and update status
- Update and discuss changes in status since the last FHA in the FHA Template
- Make recommendations/update as needed

Identify HFD Pre-incident Plan

17.0 FIRE DEPARTMENT RESPONSE (STANDARD)

Provide facility-specific details.

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17.1 Mutual Aid (standard)

17.2 Baseline Needs Assessment (standard)

17.3 Apparatus Access to Facility

Verify fire department access to facility and fire hydrants and make recommendations as needed for improvement.

Describe fire department access to the facility and adequacy.

18.0 SAFEGUARDS AND SECURITY CONSIDERATIONS RELATED TO FIRE PROTECTION

Describe if applicable.

19.0 ELECTRICAL SYSTEMS

Describe general primary and secondary power systems available within the facility.

20.0 EXPOSURE FIRE POTENTIAL AND THE POTENTIAL FOR FIRE SPREAD BETWEEN TWO FIRE AREAS

Evaluate building and storage clear space separations as well as other physical fire separations credited with reducing the potential for fire spread between two fire areas.

Review and confirm the condition of credited fire separations, doors, dampers, and penetrations.

Describe mutual exposure fire conditions and the adequacy of clear space separation and physical barriers to limit spread between two or more fire areas.

21.0 EFFECT OF SIGNIFICANT FIRE SAFETY DEFICIENCIES ON FIRE RISK

Review the FFPAs, Corrective Action Database, and any other forms of information to determine if Deficiencies exist.

22.0 ENVIRONMENTAL IMPACTS FOR A FIRE

22.1 Suppression System Discharge and Run-off Considerations

Describe.

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23.0 CONCLUSION (STANDARD)

Status of Findings/Recommendations

- Identify Open FHA findings and recommendations
 - Verify that an associated iCAS item is assigned
 - Confirm status of Actionees
 - Update status as needed
- Identify Open FFPA findings and recommendations
 - Verify that an associated iCAS item is assigned
 - Confirm status of Actionees
 - Update status as needed
- Identify Open findings and recommendations from previous surveillances or observations
 - Verify that an associated iCAS item is assigned
 - Confirm status of Actionees
 - Update status as needed
- Review action history of closed iCAS items for previously identified FHA or FFPA findings and recommendations
 - Perform field verification of satisfactory closure as needed
 - Revise and Update status of Findings/Recommendations Chapter of FHA Template

23.1 Closure Status of Previous Findings and Recommendations

State any that apply.

List and categorize findings and recommendations in the FHA in an orderly manner to address non-compliant conditions, opportunities for improvement, and good practices that should be maintained. Findings and recommendations should specifically address:

- NFPA 101, *Life Safety Code*, non-compliances for new and existing facilities
- Property protection and fire prevention non-compliances with requirements taken from NFPA Codes and Standards and the U.S. DOE FPP
- Property protection and fire prevention with the requirements of DOE O 420.1C, Chg. 3, *Facility Safety*
- Recognition and recommendation to retain good fire prevention practices that have been implemented by a facility

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23.2 Findings

Describe using numbered indices, and CRS – describe both the finding conditions (e.g., what, where, why) and provide a separate recommendation for improvement (with alternatives, if applicable) for each.

23.2.1 Previous Open

23.2.2 New

23.3 Opportunities for Improvement

Describe using numbered indices, and CRS – describe both the finding conditions (e.g., what, where, why) and provide a separate recommendation for improvement (with alternatives, if applicable) for each.

23.3.1 Previous Open

23.3.2 New

24.0 REFERENCES (STANDARD)

Update as needed to include all facility-specific references used.

Appendix A – *FHA DSA Integration*

Attachment – Site Form A-6004-786, *Record of Revision (ROR)*

Independent Peer Review

1. Perform and document independent peer review of the new or revised FHA using the *CPCCo Engineering Review Checklist* (Site Form A-6004-797).
2. Reconcile any open comments within the FHA document.
3. Attach the completed Site Form A-6004-797 to the final peer-reviewed FHA document.

CPCCo Stakeholder Review

1. Submit the peer-reviewed FHA document to the FPP Manager for review and comment.
2. Provide a copy of the peer-reviewed FHA document to the Nuclear Safety Analyst for review and to determine if a USQ review is required and include.
3. Provide a copy of the peer-reviewed FHA document to Operations Management for review.
4. Verify that comments from the FPP Manager, Nuclear Safety, and Operations Management are formally submitted on Site Form A-6004-835, *Record of Comment (RCR)*, and adequately documented.

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5. Formally address each open comment on the appropriate RCR form and track-changes in the peer-reviewed FHA document.
6. Meet directly with the FPP Manager, Nuclear Safety, and Operations Management to present proposed resolutions and reach concurrence with each comment.
7. Revise (using track-changes) the peer-reviewed FHA document and RCR resolution for each comment as appropriate.
8. Confirm concurrence and closure of all comments on the RCR forms.
9. Obtain signed concurrence from each originating commenter on the applicable RCR form.

DOE Submittal with DSA

1. Provide an informational copy of new or revised stakeholder-concurred FHA to DOE, if requested. For facilities operating under a DSA, the FHA shall be submitted when the facility DSA, including the final or interim safety analysis, is submitted to DOE for approval. When submitted to DOE, provide an RCR form.

Implementation Plan

1. Following approval of the new or revised FHA, ensure the FHA Implementation Plan, (or the revision of the current plan) is generated, to address open findings and recommendations resulting from the FHA. The FHA Implementation Plan shall address the following for each finding and recommendation described in the FHA and requiring action:
 - Description of each finding and recommendation
 - Planned corrective action
 - Implementation strategy or strategies
 - Source of funding
 - Schedule for completion

NOTE: *If during the preparation of an FHA implementation plan, it is determined that an FHA recommendation, finding, observation etc., should be changed in any way, the FHA must be revised before the FHA implementation plan is issued.*

2. ENSURE the new or revised FHA Implementation Plan is processed for review, approval, and release as a supporting document or engineering text document (as applicable) in accordance with CPCC-PRO-EN-440.
3. Enter and track the resolution and completion of FHA Implementation Plan findings, recommendations, and deficiencies in accordance with CPCC-PRO-QA-052, *Issues Management*.
4. Formally TRANSMIT the new or revised FHA Implementation Plan to DOE Office Contracting Officer Representative for information only.

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Appendix D - Short Form, Facility Fire Protection Assessment Short Form and Guide

CPCCO FACILITY FIRE PROTECTION ASSESSMENT – SHORT FORM			
Facility:	Area:	Date Inspected:	Date of Report:
Fire Protection Engineer:		Recommended Re-occurrence Frequency:	
Multiple Facility Assessment: [] Yes [] No		Responsible Organization:	
REPLACEMENT COST VALUES			
Building Value:	Contents Value:	Total Value:	
Concur with Sunflower Evaluation: [] Yes [] No			
PURPOSE			
<p>The purpose of the assessment is to identify and correct fire protection deficiencies and communicate any lessons learned in compliance with the U.S. Department of Energy (DOE) Order (O) 420.1C, Change 3, Facility Safety.</p> <p>This assessment will establish fire risk conditions, determine extent of compliance with fire prevention and life safety administrative controls, and identify fire protection deficiencies or opportunities for improvement.</p>			
SCOPE*			
<p>This Facility Fire Protection Assessment (FFPA) includes current activity at the time of inspection for the facility .</p> <p>This FFPA is a summary of conditions encountered at the time of inspection and a review of the status of findings or recommendations from the previous assessment, applicable administrative controls, site specific fire and life safety procedures and fire marshal permits.</p>			
APPROACH			
<p>This FFPA was performed in accordance with the requirements DOE O 420.1C; DOE-STD-1066-2016, Fire Protection; CPCC-STD-FP-40404, Fire Protection Program; and CPCC-PRO-FP-40420, Fire Protection Analyses.</p>			
PERFORMANCE OBJECTIVE			
<p>Fire protection for the facility meets the requirements of DOE O 420.1. C.</p>			
FACILITY DESCRIPTION			

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DISCUSSION OF RESULTS			
Below are the Lines of Inquiry (LOI). The LOIs are objectives set in place to ensure the overall Purpose and Performance Objective of the assessment is met.			
LOI #1: Is the construction adequate?			
Construction			
The facility/structure identification and NFPA 704 signage	[] Satisfactory	[] Deficient	[] N/A
Comments			
LOI #2: Is the Occupancy properly arranged, maintained, and administratively controlled?			
Occupancy			
Housekeeping, storage arrangement, operations, special hazards	[] Satisfactory	[] Deficient	[] N/A
Trash cans emptied, trash removed on a regular basis	[] Satisfactory	[] Deficient	[] N/A
Flammable/combustible liquids and hazardous chemicals maintained in approved metal cabinets, labeled quantity limits per Fire Marshal Permit	[] Satisfactory	[] Deficient	[] N/A
Oil soaked rags, absorbent pads removed and placed in enclosed trash receptacles	[] Satisfactory	[] Deficient	[] N/A
Combustible material stored at least 36 in. from a heating appliance or electrical lights	[] Satisfactory	[] Deficient	[] N/A
Compressed gas containers, cylinders, and tanks secured in place to prevent falling when stored.	[] Satisfactory	[] Deficient	[] N/A
Compressed gas cylinder regulators removed and valves closed with protection caps Secured in place when stored	[] Satisfactory	[] Deficient	[] N/A
Outside dumpsters located away from building walls in accordance with CPCC-STD-RP-54133, Control of Combustible Materials, Section 3.2, 1. "General Conditions," part K, 4	[] Satisfactory	[] Deficient	[] N/A
Racks, shelves, and cabinets are secure from tipping during earthquakes	[] Satisfactory	[] Deficient	[] N/A
Designated Hot Work Areas have Fire Marshal Permits and precautions/conditions maintained	[] Satisfactory	[] Deficient	[] N/A
Non-Designated Hot Work controlled by Hot Work Permits	[] Satisfactory	[] Deficient	[] N/A
Areas controlled by Fire Marshal Occupancy Permits; Areas inspected and precautions/compensatory agreements maintained	[] Satisfactory	[] Deficient	[] N/A

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Storage arranged at least 24 in. from ceiling in non-sprinklered areas	<input type="checkbox"/> Satisfactory	<input type="checkbox"/> Deficient	<input type="checkbox"/> N/A
Permit properly addresses chemical inventory above permit threshold	<input type="checkbox"/> Satisfactory	<input type="checkbox"/> Deficient	<input type="checkbox"/> N/A
Comments			
LOI #3: Is the life safety adequate?			
Means of egress	<input type="checkbox"/> Satisfactory	<input type="checkbox"/> Deficient	<input type="checkbox"/> N/A
Adequate lighting in corridors	<input type="checkbox"/> Satisfactory	<input type="checkbox"/> Deficient	<input type="checkbox"/> N/A
EXIT signs readily visible, illumination operable, battery OK	<input type="checkbox"/> Satisfactory	<input type="checkbox"/> Deficient	<input type="checkbox"/> N/A
Exit doors not blocked and open easily	<input type="checkbox"/> Satisfactory	<input type="checkbox"/> Deficient	<input type="checkbox"/> N/A
Adequate corridor clearance	<input type="checkbox"/> Satisfactory	<input type="checkbox"/> Deficient	<input type="checkbox"/> N/A
Emergency light properly directed along egress path	<input type="checkbox"/> Satisfactory	<input type="checkbox"/> Deficient	<input type="checkbox"/> N/A
Stairwells free of storage and doors kept closed	<input type="checkbox"/> Satisfactory	<input type="checkbox"/> Deficient	<input type="checkbox"/> N/A
No biological agents/radioactive materials/hazardous chemicals stored in corridors	<input type="checkbox"/> Satisfactory	<input type="checkbox"/> Deficient	<input type="checkbox"/> N/A
Essential cabinets or equipment not obstructing corridor	<input type="checkbox"/> Satisfactory	<input type="checkbox"/> Deficient	<input type="checkbox"/> N/A
Emergency escape procedures and emergency route assignments are written and posted	<input type="checkbox"/> Satisfactory	<input type="checkbox"/> Deficient	<input type="checkbox"/> N/A
Fire doors not wedged or blocked open, especially stairwells	<input type="checkbox"/> Satisfactory	<input type="checkbox"/> Deficient	<input type="checkbox"/> N/A
Comments			
LOI #4: Is the fire protection adequate?			
Fire Protection			
Fire Protection of Safety class and Safety Significant Systems and Equipment	<input type="checkbox"/> Satisfactory	<input type="checkbox"/> Deficient	<input type="checkbox"/> N/A
Fire Protection of Mission-Critical process and equipment or programs	<input type="checkbox"/> Satisfactory	<input type="checkbox"/> Deficient	<input type="checkbox"/> N/A
High value property protection	<input type="checkbox"/> Satisfactory	<input type="checkbox"/> Deficient	<input type="checkbox"/> N/A

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Fire suppression systems and equipment arrangement and condition	<input type="checkbox"/>	Satisfactory	<input type="checkbox"/>	Deficient	<input type="checkbox"/>	N/A
Fire detection and alarm systems and equipment arrangement and condition	<input type="checkbox"/>	Satisfactory	<input type="checkbox"/>	Deficient	<input type="checkbox"/>	N/A
Fire barrier arrangement and condition <i>(including opening protectives)</i>	<input type="checkbox"/>	Satisfactory	<input type="checkbox"/>	Deficient	<input type="checkbox"/>	N/A
Water Supply	<input type="checkbox"/>	Satisfactory	<input type="checkbox"/>	Deficient	<input type="checkbox"/>	N/A
All hydrants, fire lanes, Fire Department Connections (FDC) and control valves clear, visible and unobstructed	<input type="checkbox"/>	Satisfactory	<input type="checkbox"/>	Deficient	<input type="checkbox"/>	N/A
Fire alarm pull stations visible and accessible	<input type="checkbox"/>	Satisfactory	<input type="checkbox"/>	Deficient	<input type="checkbox"/>	N/A
Fire extinguishers visible, accessible, pin and seal in place, pressure adequate, current year's tag, tag initialed monthly	<input type="checkbox"/>	Satisfactory	<input type="checkbox"/>	Deficient	<input type="checkbox"/>	N/A
Comments						
LOI #5: Are the exposures adequate? <i>(Other buildings, structures, yard storage, and wildland areas)</i>						
Exposures						
Exposures from other structures <i>(NFPA 80A)</i>	<input type="checkbox"/>	Satisfactory	<input type="checkbox"/>	Deficient	<input type="checkbox"/>	N/A
Exposures from wildfire <i>(NFPA 1141)</i>	<input type="checkbox"/>	Satisfactory	<input type="checkbox"/>	Deficient	<input type="checkbox"/>	N/A
Rated fire barrier and opening protection	<input type="checkbox"/>	Satisfactory	<input type="checkbox"/>	Deficient	<input type="checkbox"/>	N/A
Comments						
LOI #6: Is the loss potential acceptable?						
The maximum possible fire loss is? \$	<input type="checkbox"/>	Satisfactory	<input type="checkbox"/>	Deficient	<input type="checkbox"/>	N/A
Comments						
LOI #7: Is the fire prevention acceptable?						
Compliance with codes, standards, procedures, and requirement documents	<input type="checkbox"/>	Satisfactory	<input type="checkbox"/>	Deficient	<input type="checkbox"/>	N/A
Inspection, Testing, and Maintenance reports	<input type="checkbox"/>	Satisfactory	<input type="checkbox"/>	Deficient	<input type="checkbox"/>	N/A
Administrative controls	<input type="checkbox"/>	Satisfactory	<input type="checkbox"/>	Deficient	<input type="checkbox"/>	N/A
Completeness of Fire Hazard Analysis and implementation plan	<input type="checkbox"/>	Satisfactory	<input type="checkbox"/>	Deficient	<input type="checkbox"/>	N/A

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Facility fire prevention planning documents (A-6007-767, A-6007-366, or equivalent)	<input type="checkbox"/>	Satisfactory	<input type="checkbox"/>
	<input type="checkbox"/>	Deficient	<input type="checkbox"/>
	<input type="checkbox"/>	N/A	
Compliance with applicable Hanford Fire Marshal Permits	<input type="checkbox"/>	Satisfactory	<input type="checkbox"/>
	<input type="checkbox"/>	Deficient	<input type="checkbox"/>
	<input type="checkbox"/>	N/A	
Applicability and compliance of equivalencies and exemptions	<input type="checkbox"/>	Satisfactory	<input type="checkbox"/>
	<input type="checkbox"/>	Deficient	<input type="checkbox"/>
	<input type="checkbox"/>	N/A	
Comments			
LOI #8: Are the electrical fire hazards adequate?			
A working space of no less than 30 in. wide (<i>or width of equipment</i>), 36 in. deep and 78 in. high provided in front of electrical service equipment. No storage within this workspace?	<input type="checkbox"/>	Satisfactory	<input type="checkbox"/>
	<input type="checkbox"/>	Deficient	<input type="checkbox"/>
	<input type="checkbox"/>	N/A	
All active electrical boxes properly covered	<input type="checkbox"/>	Satisfactory	<input type="checkbox"/>
	<input type="checkbox"/>	Deficient	<input type="checkbox"/>
	<input type="checkbox"/>	N/A	
Extension cords not used in place of permanent (<i>normally 90 day timeframe</i>) wiring, Except where designated by approved engineering drawings	<input type="checkbox"/>	Satisfactory	<input type="checkbox"/>
	<input type="checkbox"/>	Deficient	<input type="checkbox"/>
	<input type="checkbox"/>	N/A	
Power strips directly connected to permanent installed receptacles. No “daisy chaining.”	<input type="checkbox"/>	Satisfactory	<input type="checkbox"/>
	<input type="checkbox"/>	Deficient	<input type="checkbox"/>
	<input type="checkbox"/>	N/A	
Power strips not used to supply electricity to heating devices or as an extension cord	<input type="checkbox"/>	Satisfactory	<input type="checkbox"/>
	<input type="checkbox"/>	Deficient	<input type="checkbox"/>
	<input type="checkbox"/>	N/A	
Cords arranged to prevent tripping hazards	<input type="checkbox"/>	Satisfactory	<input type="checkbox"/>
	<input type="checkbox"/>	Deficient	<input type="checkbox"/>
	<input type="checkbox"/>	N/A	
Power strips’ cords shall not extend through walls, ceilings, floors, under doors or floor coverings, nor subject to environmental or physical damage	<input type="checkbox"/>	Satisfactory	<input type="checkbox"/>
	<input type="checkbox"/>	Deficient	<input type="checkbox"/>
	<input type="checkbox"/>	N/A	
Portable space heaters approved for use, have tip-over protection, and automatic temperature shut-offs	<input type="checkbox"/>	Satisfactory	<input type="checkbox"/>
	<input type="checkbox"/>	Deficient	<input type="checkbox"/>
	<input type="checkbox"/>	N/A	
Wiring and cords on fans and heaters not frayed or damaged	<input type="checkbox"/>	Satisfactory	<input type="checkbox"/>
	<input type="checkbox"/>	Deficient	<input type="checkbox"/>
	<input type="checkbox"/>	N/A	
Comments			
LOI #9: Is the impact from natural hazards to the facility’s fire safety acceptable?			
Natural hazards to the facility’s fire safety	<input type="checkbox"/>	Satisfactory	<input type="checkbox"/>
	<input type="checkbox"/>	Deficient	<input type="checkbox"/>
	<input type="checkbox"/>	N/A	
Comments			
LOI #10: Is the potential for toxic, biological, and/or radiological incident due to fire acceptable?			
Potential for toxic, biological, and/or radiological incident due to fire	<input type="checkbox"/>	Satisfactory	<input type="checkbox"/>
	<input type="checkbox"/>	Deficient	<input type="checkbox"/>
	<input type="checkbox"/>	N/A	
Comments			

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LOI #11: Is the emergency response adequate?			
Water run-off	<input type="checkbox"/> Satisfactory	<input type="checkbox"/> Deficient	<input type="checkbox"/> N/A
Emergency response capability and fire apparatus accessibility	<input type="checkbox"/> Satisfactory	<input type="checkbox"/> Deficient	<input type="checkbox"/> N/A
Comments			
LOI #12: Are all issues reported?			
Status of Previous Issues and Tracking			
New Issues			
Have all findings been discussed with the facility management	<input type="checkbox"/> Satisfactory	<input type="checkbox"/> Deficient	<input type="checkbox"/> N/A
CONCLUSION			
The performance objective was <input type="checkbox"/> met/ <input type="checkbox"/> partially met/ <input type="checkbox"/> not met. The following issue(s) was/were created:			
Summary:			
Fire prevention is trending	<input type="checkbox"/> Improving	<input type="checkbox"/> Stable	<input type="checkbox"/> Declining
Fire protection is trending	<input type="checkbox"/> Improving	<input type="checkbox"/> Stable	<input type="checkbox"/> Declining
This assessment identified and initiated corrective actions for fire protection deficiencies and communicates lessons learned by creating issues in iCAS. The fire protection of facility is satisfactory/deficient.			

* These sections will be copy and pasted into iCAS

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APPROVALS

Originator

Print First and Last Name

Signature / Date

Peer Evaluation

Print First and Last Name

Signature / Date

Unreviewed Safety Question Evaluator

USQ Required?: [] USQ #: _____ [] GCX [] N/A [] No

Print First and Last Name

Signature / Date

Facility Manager

Print First and Last Name

Signature / Date

Other (If Applicable)

Print First and Last Name

Signature / Date

Fire Protection Program Manager

Print First and Last Name

Signature / Date

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Appendix E - Narrative Guidance for Short Form - Facilities Fire Protection Assessments

1.0 INTRODUCTION

This guide is intended to provide direction for the development and review of short form - Facilities Fire Protection Assessments (sf-FFPA), with particular attention to narrative content. This guidance is to be applied with engineering judgement and an understanding of stakeholder readers, as well as a sufficient level of technical rigor to support critical ratings and conclusions. All narrative shall follow the quality writing style provided by CPCC-GD-NS-52731, *Nuclear Safety Style Guide*.

2.0 APPLICATION

The sf-FFPA provides a graduated approach to conveying technical information regarding hazards, protection, and administrative controls to clearly describe fire risk conditions for small to moderate sized facilities where overall size, values, operational or process complexity, and hazards are deemed to be low. The selection of the sf-FFPA is somewhat subjective but is generally applied upon agreement between the Fire Protection Engineering author and the Lead FPE. The critical elements of an FFPA, per DOE-STD-1066, 2016, *Fire Protection Standard*, are contained within the report template. However, due to the relative simplicity of the facility being assessed critical conclusions are reduced to checklist elements and limited to a brief descriptive narrative.

The sf-FFPA **is not** a report by exception (i.e., narrative is not intended to be omitted strictly on the basis that, in the opinion of the FPE, the arrangement or condition was adequate). Instead, the intent is to strike a balance between information that supports the FPE's conclusions, and the relative complexity of factors or conditions encountered. Basic background C.O.P.E. information should be provided. In addition, any area of the template where there is a rating of less than satisfactory needs to have additional descriptive information to adequately illustrate the conditions and support the basis of any resultant issue or recommendation. Finally, the FPE is encouraged to describe any unique conditions that may be other than that which would be expected for a typical facility of similar type or size.

3.0 GENERAL INSTRUCTIONS

The following broadly applies to all portions of the sf-FFPA:

1. Provide entries for all sections of the report. Do not leave blank area; these will be considered omissions rendering the report incomplete. Where there are exceptions or deviations impeding completion of a section for any reason, the FPE should provide an explanation.
2. Use of photographs and sketches is encouraged and can readily be imported into the report template. However, the FPE is responsible to ensure that pictures are of sufficient quality to readily convey the intended condition or arrangement involved. Any photograph or sketch should have at least accompanying captions, if not a descriptive narrative to aid the stakeholder-reader in comprehension.

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3. Use of other supporting information, by reference, is a useful tool in demonstrating satisfactory support of a condition, recommendation, or conclusion. However, such references must be fully referenced by applicable document number, title, date, and source.
4. After each passive or active fire system description, provide a list of drawings and specifications for each. For active fire systems, these will include post-acceptance test record drawings for each system. For passive fire protection, it will include general arrangement and supporting drawings of fire walls, through penetrations, and firestopping protectives, doors, and dampers. Evaluate the extent that this information is up-to-date and complete, time permitting. If such an evaluation cannot be completed in the allotted time for the FFPA or partial or incomplete information is available, make a recommendation (and enter into iCAS) that the assigned DA complete a fire protection system drawing review and perform a resource search for accurate fire protection system information. Update the FFPA, based upon the revised results.
5. While it is not necessary to repeat the complete narrative of an issue, finding, or recommendation; the FPE should at least provide the item number and an illustrative title in the applicable comments section of the report. This provides a ready cross-reference for the stakeholder-reader between supporting information, a conclusion, or an issue itself.
6. Issues newly identified will have identification provided as follows: Year-Fac #- FFPA- Type of Issue – 00X Short Issue Title (in bold). Refer to CPCC-PRO-QA-40090, Self Assessment, for the types of issues. Once entered into iCAS, the issue will be assigned a new number. Where applicable within the report, refer to the new and existing issues by their numbers and title.
7. Issues, recommendations, and findings should contain within the description:
 - a. A brief title
 - b. What the issue or concern is
 - c. Why it is a concern or hazard and potential risk
 - d. Where the discrepancy or adverse condition is located
 - e. How to correct the issue
8. If any item is marked deficient, an explanation shall be provided in the corresponding comments.
9. Use of code or standard references should state for the first time used the complete code or standard number and title (in italics). Thereafter, it may be referenced by code or standard number, only.

3.1 Header

This section of the report is largely self-explanatory.

1. On the first line, fill in the Facility Name, Hanford Area, Date of Inspection, and date report was completed.
2. On the second line, complete the section for FPE.

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3. Fill in the Recommended Reoccurrence Frequency (RRF) with the FPE's recommended time between assessments based on the valuation guide provided on CPCC-PRO-FP-40420, Section 2.2 (e.g., 5 years for a low cost, non-dynamic facility).
4. Mark whether the FFPA is a part of a multiple facility assessment, as identified in iCAS (only one facility per form).
5. Fill in the "Responsible Organization" as shown in PopFon (e.g., IAES).

To find in PopFon:

- a. Click "Building Contact Information."
- b. Search facility number.
- c. Click on the building manager's name.
- d. The "Owning Organization" will be under "Dept Abbr."

NOTE: *This will not work for ALL facilities. Contact the responsible manager for verification.*

6. Fill in the "Replacement Cost Values" from Sunflower using the linked [instructions](#).
7. Purpose, Scope, and Approach. These sections of the report are consistent descriptions of the FFPA activity and need no further action on the part of the FPE. However, any limitations or assumptions specific to the actual inspection should be discussed in the "Approach" section of the form.
8. Fill in the facilities being assessed in the "Scope" fill in section.
9. Fill in "Facility Description" with a general description of activities performed within the building starting with title associated with the building number in H-Maps, [HGIS Web Site](#) (e.g., is it operating, pump house, offices, etc.?).

LOI #1 Provide a "Yes" or "No" response supported by the narrative below:

3.2 Construction

1. In the space provided, give a brief description of construction, beginning with a material description of the exterior walls, roof, floor/foundation, and interior wall construction. (For example: Building ___ is a ___ ft x ___ ft ___ ft high corrugated metal on steel frame one-story structure having a standing seam roof, slab-on-grade foundation, and gypsum board on wood frame interior walls.)
2. Next, classify the building in accordance with the least construction type per NFPA 220 and IBC (e.g., IBC Type II-B, NFPA 220 Type II (0,0,0)).
3. Describe the degree of subdivision. (For example: The building is moderately subdivided by perimeter offices and a central open high bay maintenance shop.)

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4. If there are rated fire separations describe each. (For example: A 2-hour rated fire wall extended from floor-through-roof and divides the building in roughly have in the north-south direction. The wall, doors, through penetrations, and opening protectives are in good condition.)
5. Describe heating and/or air conditioning provided. (For example: Heating is provided by ceiling mounted unit air heaters, which are adequately maintained.)
6. Note any facility deficiencies, such as loose flashing, broken windows, missing or damaged ceiling tiles, evidence of rainwater or liquid damage, etc.
7. Finally, provide a statement concerning the overall condition of the building. (For example: The overall condition of the building is "fair," due to the evidence of roof leakage on the walls and floor. (See photographs #1 and 2) Issue 2021-2520W- FFPA- Opportunity for Improvement - 001, **Leaking Roof.**)
8. Mark applicable "Satisfactory," "Deficient," or "N/A" responses to the checklist items below the narrative.
9. Describe any deficient conditions in the comments.

LOI #2 Provide a "Yes" or "No" response supported by the narrative below:

3.3 Occupancy

1. Provide a brief description of the occupancy, sufficient to support the IBC and NFPA 101 occupancy group classification. (For example: Building 2740W is used as a general office for administrative and support functions. There are two conference rooms under 400 sq. ft. each, constituting an "incidental use.")
2. Provide the applicable occupancy group, per NFPA 101 and the IBC. (For example: This facility is considered to be an IBC Group B, NFPA 101 "Business" group.)
3. Identify the radiological hazard category for the facility.
4. If applicable, describe any "Special Hazards," such as flammable and combustible liquids above the permit threshold.
5. List any applicable occupancy, flammable/hazardous chemical, or other HFM Permits and describe is they are current, properly arranged, and being complied with.
6. Identify any combustible controls and whether they are being satisfactorily complied with.
7. Mark applicable "Satisfactory," "Deficient," or "N/A" responses to the checklist items below the narrative.
8. Describe any deficient conditions in the comments.

LOI #3 Provide a "Yes" or "No" response supported by the narrative below:

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1. Mark applicable "Satisfactory," "Deficient," or "N/A" responses to the checklist items.
2. Describe any deficient conditions in the comments.

LOI #4 Provide a "Yes" or "No" response supported by the narrative below:

3.5 Fire Protection

1. Describe automatic sprinkler protection, if any. (For example: Building 402 is protected by a wet pipe sprinkler system throughout, consisting of a hydraulically designed arrangement with a minimum density of 0.20 gpm/sq.ft. over 1500 sq.ft. (NFPA 13, Ordinary Hazard Group 2) with a 250-gpm hose stream allowance. Low temperature ½" orifice sprinklers are used throughout. The base of riser demand is ____ gpm at ____ psi, including hose streams. The system is adequately designed for the occupancy hazards and is adequately maintained in accordance with NFPA 25.)
2. Describe special hazards protection, if any. (For example: Building 2727W sodium storage is protected by argon gas blanket gas system, supported by an oxygen sampling gas detection arrangement for the tank interstitial space. The system provides total flooding at ____ cu. ft. with a continuous flow or 3 cu. ft. per hours to manage system leaks. The system is adequately designed for the sodium hazards and is adequately maintained in accordance with NFPA ____.)
3. Describe the fire alarm and detection system. (For example: A Pyrotronic fire alarm control panel is located at the front entrance to Building 2740W. In duct smoke detectors for HVAC shutdown, valve tamper supervisory switches, sprinkler water flow alarms, and manual pull stations located at each exit door are provided. The system is obsolete and is being supported by refurbished parts by Fire Systems Maintenance. The system continues to be provisionally operable with the used parts. However, the replacement schedule should be revised to prioritize replacement of the FACU within the next three years. Issue 2021-2740W-FFPA- Opportunity for Improvement - 001, **Fire alarm Panel and RFAR Replacement Priority**.)
4. Reference the description of water supplies. (For example: Water supplies are on the 200W Area Raw Water System (See HNF-13136-FHA Rev 16, *PPF Fire Hazards Analysis*). The water supply is adequate for the demand.)

Water supply and hydrant information is available from a variety of sources, including DMCS, FHAs, and the Fire Department. For major complexes (e.g., Central Waster Complex and Wrap, T Plant, etc.) a central sprinkler system demand and water supply test analysis document is available. The FPE is cautioned to first obtain a copy of the applicable underground fire main drawing serving the subject facility and to physically confirm the arrangement of hydrant and valves within the immediate vicinity of the building.

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For fire hydrant evaluation, provide the following:

- Indicate the presence or absence of fire hydrants within 300 ft. of the subject building. Reference the appropriate drawing number covering the underground main arrangement.
 - For conditions where hydrants are provided, the following narrative elements should be addressed:
 - “There are ___ hydrants provided within 300 ft. of the building on the ___ side and ___ side. (See Drawing # _____ for reference). On _____, a fire test was performed using hydrant _____ for flow and hydrant (or Riser) _____ for pressure, resulting in a static pressure of ___, a residual pressure of ___ at a flow of _____ gpm. Based upon the information available, the water supply is adequate/inadequate for the demand.”
 - For conditions where hydrants are not provided and otherwise not warranted, the following narrative may be modified as needed to fit conditions:
 - “Hydrant protection was not provided for Building _____. Adequate clear space separation to the wildland is provided and exposure separation from other buildings or yard storage on site is acceptable, based upon NFPA 80A. Based upon these factors the MFPL is less than \$2 million. Neither automatic sprinkler protection nor fire alarms are required (or provided) for this building. The building is remote from any established water supply distribution system and the cost to provide such support, including a fire hydrant within 300 ft. of the building, would exceed the MPFL. (Optional favorable information: The building is used for support storage and is not routinely occupied (when occupied, it is by 5 or less personnel) Hazardous chemical storage is below the NFPA 30 and 400 limits for a non-sprinklered combination storage and shop occupancy. Given these factors, a fire originating in the building would be expected to stay within the clear space boundary and not spread to the wildland beyond. Manual firefighting is expected to consist of a defensive posture, using small hose streams fed by on-board apparatus tanks, supplemented by tenders.
 - A courtesy copy of this FFPA has been transmitted to HFD Operations and the Fire Marshal review to confirm that adequate resources and tactical guidance is available through the applicable Pre-Incident Plan.”
5. Mark applicable “Satisfactory,” “Deficient,” or “N/A” responses to the checklist items below the narrative.
6. Describe any deficient conditions in the comments.

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LOI #5 Provide a “Yes” or “No” response supported by the narrative below:

3.6 Exposures

1. Describe exposures within 150 ft. to/from the building. (For example: Building 324 is located within the 300 Area. To the north is open gravel parking lot for 150 ft. Vehicles are arranged more than 10 ft. from the exterior walls in established stalls. To the south is seasonal dry vegetation from the wildland that is separated by 40 ft. of combustible-free clear space. To the east is Building 325, located 90 ft. away within intervening clear space. To the west is a 10 MVA oil-filled service transformer, located 15 ft. It is separated by 2-hour rated exposure walls and diking surround the transformer. Overall, exposures are considered moderate (oil-filled transformer), but adequately protection by a combination of spatial separation and rated exposure walls.)
2. Mark applicable “Satisfactory,” “Deficient,” or “N/A” responses to the checklist items below the narrative.
3. Describe any deficient conditions in the comments.

LOI #6 Provide a “Yes” or “No” response supported by the narrative below:

3.7 Loss Potential

1. Provide a loss scenario narrative, copy the applicable scenario illustrative of conditions from the FHAs, or appropriately reference the scenario for the FHA.
2. Describe discrepancies in Sunflower Valuation for the facility, if any.
3. Mark applicable “Satisfactory,” “Deficient,” or “N/A” responses to the checklist items below the narrative.
4. Describe any deficient conditions in the comments.

LOI #7 Provide a “Yes” or “No” response supported by the narrative below:

3.8 Electrical Hazards

1. Mark applicable “Satisfactory,” “Deficient,” or “N/A” responses to the checklist items.
2. Describe any deficient conditions in the comments.

LOI #8 Provide a “Yes” or “No” response supported by the narrative below:

3.9 Fire Prevention

1. Mark applicable “Satisfactory,” “Deficient,” or “N/A” responses to the checklist items.
2. Describe any deficient conditions in the comments.

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LOI #9 Provide a “Yes” or “No” response supported by the narrative below:

3.10 Natural hazards to the facility’s fire safety

1. Mark applicable “Satisfactory,” “Deficient,” or “N/A” responses to the checklist items.
2. Consider exposures from natural hazards to the facility and the degree to which they may impact fire safety and loss potential. When adequately discussed within a bounding FHA, make reference to the section of that report in the comments.
3. Describe any deficient conditions in the comments.

LOI #10 Provide a “Yes” or “No” response supported by the narrative below:

3.11 Potential for toxic, biological, and/or radiological incident due to fire

1. Mark applicable “Satisfactory,” “Deficient,” or “N/A” responses to the checklist items.
2. Consider conditions in which a fire may result in increased damage from dispersed toxic, biological, and low radiological hazards. Where adequately discussed in a bounding FHA, make reference to the section of that report in the comments.
3. Describe any deficient conditions in the comments.

LOI #11 Provide a “Yes” or “No” response supported by the narrative below.

3.12 Emergency Response

The CPCCo Fire Protection Organization is not responsible for the selection of locations or content of HFD Pre-Incident Plans. However, DOE-STD-1066 does include criteria to address the presence or absence of such plans within FFPA’s. Contact for Pre-Incident Plan information is available from the HFM’s Office, via Rick Justice, DFM, with a copy of the request to Paul Ellis.

The HFD is responsible for managing its area risk control strategy with concurrence from DOE RL. Not all facilities will have an associated Pre-Incident Plan. Pre-Incident Plan information should be placed within the “Comments” section.

Where Pre-Incident Plans exist:

Report the title of the Pre-Incident Plan, date of last update, and provide a brief evaluation of the factual information provided, consistent with the available FFPA data (e.g., “The Pre-Incident Plan _____, was prepared for Building ____ and was last updated _____. Basic facility information is consistent with conditions encountered during this FFPA.”). Do not evaluate operational tactics since this is the responsibility of the Hanford Fire Chief. Where discrepancies between the FFPA and a Pre-Incident Plan exist, it is sufficient to submit a courtesy copy of the completed FFPA to the HFM, along with a cover note explaining the discrepancy. Submissions of this kind should be documented in the FFPA and do not require creation of an iCAS item.

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Appendix E - (Cont.)**Where Pre-Incident Plans do not exist:**

Report, "There are no current pre-incident plans for this facility. HFD has evaluated all the existing pre-incident plans and now only maintains those that present an increased fire/life safety risk."

1. Mark applicable "Satisfactory," "Deficient," or "N/A" responses to the checklist items.
2. Describe any deficient conditions in the comments.

LOI #12 Provide a "Yes" or "No" response supported by the narrative below:

3.13 Issues and Findings

1. Status of Previous Issues: List each issue by number and title and individually address:
 - a. If applicable, state the corrective action number the issue is/was being tracked under.
 - b. Describe the degree to which the issue has been addressed to date.
 - c. Identify whether conditions are deteriorating, improving, or stable.
 - d. Describe initiatives, completed work, and anticipated work associated with each issue or finding
 - e. Finally, identify whether the issue is complete and closed, continues to be open, or is modified.
2. New Issues as a result of this assessment. List each issue by number and title and individually address:
 - a. Describe the degree to which the issue has been addressed to date.
 - b. Describe responsible management's response to the issue, recommendations, and any alternatives.
 - c. Finally, identify any anticipated action and timeframes.
3. Mark applicable "Satisfactory," "Deficient," or "N/A" responses to the checklist items below the narrative.

4.0 CONCLUSION

1. Check the necessary box to have the sentence read whether the objective was met/partially met/not met.
2. Describe at least one positive or favorable condition associated with the assessment. (For example: Management interest in loss prevention is good as demonstrated by the recent fire and evacuation drill conducted in April of this year.)

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3. Describe the top three discrepancies and their impact upon overall fire safety.

5.0 SUMMARY

1. Describe any other significant adverse conditions leading to performance objectives not being met or only partially met.
2. Check the appropriate box to state whether the fire prevention and protection are improving, stable, or declining.
3. Delete the necessary text in the last sentence to state whether the fire protection is satisfactory or not.

NOTE: *If this is a Multiple Facility FFPA, then continue to the mf-FFPA Guide.
Do not go to Approvals.*

6.0 APPROVALS

1. Sign and date as the “Originator” and forward assessment to the necessary faculty in order of the signature blocks.

NOTE: *The Peer Reviewer needs to fill out a Peer Review Checklist located in the [Blank Forms](#) folder.*

*“Other (If Applicable)” is intended for DAs or other necessary faculty to review the assessment. If no other reviews are necessary, fill in the blank spot with “NA.”
DO NOT LEAVE A BLANK SIGNATURE SPOT.*

2. Save the Word document in the corresponding folder by area and project inside of  [CHPRC-FPE\FPE\Facility Fire Protection Assessments.](#)

Name the Word documents as Facility Number FFPA Year (e.g., 481 FFPA 2021).

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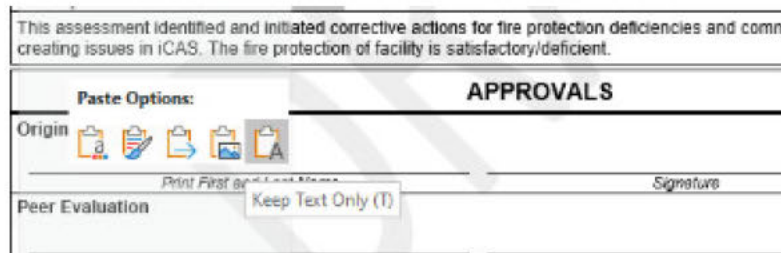
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7.0 FORMATTING HELP

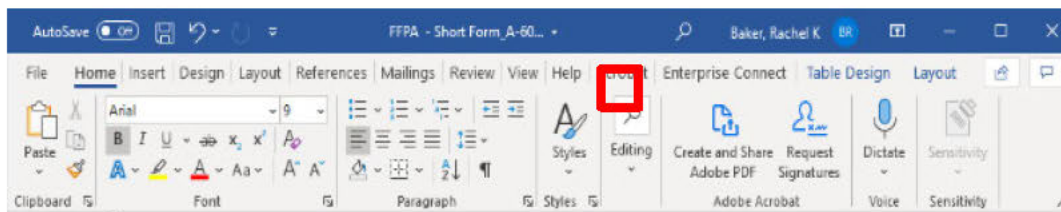
- Photos, bullet points, and more can be pasted into the form. When doing so, use the right click Keep text only paste as shown below.



This assessment identified and initiated corrective actions for fire protection deficiencies and commencing issues in iCAS. The fire protection of facility is satisfactory/deficient.

Paste Options:		APPROVALS	
Origin			
	<i>Print First and Last Name</i>		<i>Signature</i>
Peer Evaluation	Keep Text Only (T)		

- To keep tabbing aligned, use the button below when all text needing to move is highlighted.



- Grey box font automatically populates as Courier New size 9.

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Appendix F - Long Form, Facility Fire Protection Assessment Long Form and Guide

CPCCO FACILITY FIRE PROTECTION ASSESSMENT – LONG FORM

Facility:	Area:	Date Inspected:	Date of Report:
Fire Protection Engineer:		Recommended Re-occurrence Frequency:	
Multiple Facility Assessment: [] Yes [] No		Responsible Organization:	
REPLACEMENT COST VALUES			
Building Value:	Contents Value:	Total Value:	
Concur with Sunflower Evaluation: [] Yes [] No			
PURPOSE			
<p>The purpose of the assessment is to identify and correct fire protection deficiencies and communicate any lessons learned in compliance with the U.S. Department of Energy (DOE) Order (O) 420.1C, Change 3, Facility Safety.</p> <p>This assessment will establish fire risk conditions, determine extent of compliance with fire prevention and life safety administrative controls, and identify fire protection deficiencies or opportunities for improvement.</p>			
SCOPE*			
<p>This facility Fire Protection Assessment (FFPA) includes current activity for the facility at the time of inspection for the facility</p> <p>. This FFPA is a summary of conditions encountered at the time of inspection and a review of the status of findings or recommendations from the previous assessment, applicable administrative controls, site specific fire and life safety procedures and fire marshal permits.</p>			
APPROACH			
<p>This FFPA was performed in accordance with the requirements of DOE O 420.1C; DOE-STD-1066-2016, Fire Protection; CPCC-STD-FP-40404, Fire Protection Program; and CPCC-PRO-FP-40420, Fire Protection Analyses.</p>			
PERFORMANCE OBJECTIVE			
<p>Fire protection for the facility meets the requirements of DOE O 420.1.C.</p>			
FACILITY DESCRIPTION			

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CPCCO FACILITY FIRE PROTECTION ASSESSMENT – LONG FORM

DISCUSSION OF RESULTS

Below are the Lines of Inquiry (LOI). The LOIs are objectives set in place to ensure the overall Purpose and Performance Objective of the assessment is met.

LOI #1: Is the construction adequate?

General Construction Description

Degree of Separation/Compartmentation

Physical Condition

Facility/Structure Identification and NFPA 704 Signage

Conclusion

LOI #2: Is the Occupancy properly arranged, maintained, and administratively controlled?

General Occupancy Description

Operations

Process

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Common Hazards

Storage Arrangement

Special Hazards

Hanford Fire Marshal Permits

Conclusion

LOI #3: Is the life safety adequate?

Occupancy Group Determination

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Means of Egress

Emergency Lighting and Way Finding

Rated fire/smoke separation for corridors, stairs, and Life Safety Compartments

Conclusion

LOI #4: Is the fire protection adequate?

Water supplies and distribution

Special Hazards Fire Suppression

Manual Fire Suppression and Extinguishers

Fire Detection and Alarm Systems and Equipment

Temporary Protection and Compensatory Measures

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Fire and Explosion Hazards

Safety Class and Safety Significant Systems

Mission Critical Processes, Equipment, or Programs

High Value Property

Conclusion

LOI #5: Are the exposures adequate? (Other buildings, structures, yard storage, and wildland areas)

Exposures

Exposures from other structures (*NFPA 80A*)

Exposures from wildfire (*NSPA 1141*)

Conclusion

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LOI #6: Is the loss potential acceptable?

Maximum Possible Fire Loss

A maximum possible fire loss (MPFL) is the value of property, excluding land, within a fire area, unless a fire hazard analysis (FHA) demonstrates otherwise. This assumes the failure of both automatic fire suppression systems and manual firefighting efforts.

Conclusion

LOI #7: Is the fire prevention acceptable?

Compliance with codes, standards, procedures, and requirement documents

Inspection, Testing, and Maintenance reports

Administrative controls

Completeness of Fire Analysis and implementation plan

Facility fire prevention planning documents

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Fire Safety training

Compliance with applicable Hanford Fire Marshal Permits

Conclusion

LOI #8: Are the electrical fire hazards adequate?

Electrical Cords and Power Strips

Portable Space Heaters

Electrical Service Equipment and Boxes

Conclusion

LOI #9: Is the impact from hazards to the facility's fire safety acceptable?

Conclusion

LOI #10: Is the potential for toxic, biological, and/or radiological incident due to fire acceptable?

Conclusion

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CPCCO FACILITY FIRE PROTECTION ASSESSMENT – LONG FORM

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CPCCO FACILITY FIRE PROTECTION ASSESSMENT – LONG FORM

LOI #11: Is the emergency response adequate?

Pre-Incident Plan

HFD Apparatus Accessibility

Water Run-Off

Conclusion

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CPCCO FACILITY FIRE PROTECTION ASSESSMENT – LONG FORM

LOI #12: Are all issues reported?

Status of Previous Issues and Tracking

New Issues

Conclusion

CONCLUSION

The performance objective was [] met/ [] partially met/ [] not met. The following issue(s) was/were created:

Summary:

Fire prevention is trending [] Improving [] Stable [] Declining

Fire protection is trending [] Improving [] Stable [] Declining

This assessment identified and initiated corrective actions for fire protection deficiencies and communicates lessons learned by creating issues in iCAS. The fire protection of facility is satisfactory/deficient.

*These sections will be copy and pasted into iCAS.

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APPROVALS

Originator

Print First and Last Name

Signature / Date

Peer Evaluation

Print First and Last Name

Signature / Date

Unreviewed Safety Question Evaluator

USQ Required?: USQ #: _____

GCX

N/A

No

Print First and Last Name

Signature / Date

Facility Manager

Print First and Last Name

Signature / Date

Other (If Applicable)

Print First and Last Name

Signature / Date

Fire Protection Program Manager

Print First and Last Name

Signature / Date

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Appendix G - Narrative Guidance for Long Form - Facilities Fire Protection Assessments

1.0 INTRODUCTION

This guide is intended to provide direction for the development and review of long form - Facilities Fire Protection Assessments (If-FFPAs), with particular attention to narrative content. This guidance is to be applied with engineering judgement and an understanding of stakeholder readers, as well as a sufficient level of technical rigor to support critical ratings and conclusions. All narratives shall follow the quality writing style provided by CPCC-GD-NS-52731, *Nuclear Safety Style Guide*.

2.0 APPLICATION

The If-FFPA provides an expanded format to enable more detailed descriptions of construction, operations, hazards, protection, and administrative controls to clearly describe fire risk conditions for moderate to large facilities. The selection of the If-FFPA is somewhat subjective but is generally applied to the main facilities associated with a FHA, high valued buildings or complexes, where high hazard exposures may be encountered, or upon agreement between the Fire Protection Engineering author and the Lead FPE. The critical elements of an FFPA, per DOE-STD-1066, 2016, *Fire Protection Standard*, are contained within the report template.

The If-FFPA **is not** a report by exception (i.e., narrative is not intended to be omitted strictly on the basis that, in the opinion of the FPE, the arrangement or condition was adequate). Instead, the intent is to strike a balance between information that supports the FPE's conclusions and the relative complexity of factors or conditions encountered. Similarly, the FFPA is not intended to repeat verbatim the information provided in the associated FHA. Instead, it is an evaluation of conditions and application of controls in a moment in time as encountered by the Fire Protection Engineering author.

Basic background C.O.P.E. information should be provided. In addition, any area of the template where there is a rating of less than satisfactory needs to have additional descriptive information to adequately illustrate the conditions and support the basis of any resultant issues or recommendation. Where, information has changed, is incomplete, or is factually inaccurate within an FHA, the FFPA should make note and provide sufficient detail to provide an accurate and factually supportive addition within the FFPA to relevant conclusions. Beyond the basic C.O.P.E. information required to support the FFPA, other descriptive information within the FHA may merely be included by reference. Other studies or analyses that are performed outside of an FHA or previous FFPA may either be addressed by reference, partial incorporation of relevant text, or in whole at the discretion of the Fire Protection Engineering author.

Finally, the FPE is encouraged to describe any unique conditions that may be other than that which would be expected for a typical facility of similar type or size. This includes any limitations, assumptions, or omissions.

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Appendix G - (Cont.)**3.0 GENERAL INSTRUCTIONS**

The following broadly applies to all portions of the If-FFPA:

1. Provide entries for all sections of the report. Do not leave blank area; these will be considered omissions rendering the report incomplete. Where there are exceptions or deviations impeding completion of a section for any reason, the FPE should provide an explanation.
2. Use of photographs and sketches is encouraged and can readily be imported into the report template. However, the FPE is responsible to ensure that pictures are of sufficient quality to readily convey the intended condition or arrangement involved. Any photograph or sketch should have at least accompanying captions, if not a descriptive narrative to aid the stakeholder-reader in comprehension.
3. Use of other supporting information, by reference, is a useful tool in demonstrating satisfactory support of a condition, recommendation, or conclusion. However, such references must be fully referenced by applicable document number, title, date, and source.
4. While it is not necessary that a If-FFPA exactly follow the checklist items for each LOI in the sf-FFPA, this template can be a useful tool for reminding the Fire Protection Engineering author, both during the field inspection and as part of the report writing process.
5. While it is not necessary to repeat the complete narrative of an issue, finding, or recommendation; the FPE should at least provide the item number and an illustrative title in the applicable comments section of the report. This provides a ready cross-reference for the stakeholder-reader between supporting information, a conclusion, or an issue itself.
6. After each passive or active fire system description, provide a list of drawings and specifications for each. For active fire systems, these will include post-acceptance test record drawings for each system. For passive fire protection, it will include general arrangement and supporting drawings of fire walls, through penetrations, and firestopping protectives, doors, and dampers. Evaluate the extent that this information is up-to-date and complete, time permitting. If such an evaluation cannot be completed in the allotted time for the FFPA or partial or incomplete information is available, make a recommendation (and enter into iCAS) that the assigned DA complete a fire protection system drawing review and perform a resource search for accurate fire protection system information. Update the FFPA, based upon the revised results.
7. Issues newly identified will have identification provided as follows: Year-Fac #- FFPA-Type of Issue – 00X Short Issue Title (in bold). Refer to CPCC-PRO-QA-40090, Self Assessment, for the types of issues. Once entered into iCAS, the issue will be assigned a new number. Where applicable within the report, refer to the new and existing issues by their numbers and title.

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8. Issues, recommendations, and findings should contain within the description:
 - a. A brief title
 - b. What the issue or concern is
 - c. Why it is a concern or hazard and potential risk
 - d. Where the discrepancy or adverse condition is located
 - e. How to correct the issue
9. If any item is considered deficient, an explanation shall be provided in the conclusion section.
10. Use of code or standard references should state for the first time used the complete code or standard number and title (in italics). Thereafter, it may be referenced by code or standard number, only.

3.1 Header

This section of the report is largely self-explanatory.

1. On the first line, fill in the Facility Name, Hanford Area, Date of Inspection, and date report was completed.
2. On the second line, complete the section for FPE.
3. Fill in the RRF with the FPE's recommended time between assessments based on the valuation guide provided on CPCC-PRO-FP-40420, Section 2.2 (e.g., 5 years for a low cost, non-dynamic facility).
4. Mark whether the FFPA is a part of a multiple facility assessment, as identified in iCAS (only one facility per form).
5. Fill in the "Responsible Organization" as shown in PopFon (e.g., IAES).

To find in PopFon:

- a. Click "Building Contact Information."
 - b. Search facility number.
 - c. Click on the building manager's name.
 - d. The "Owning Organization" will be under "Dept Abbr."
6. **NOTE:** This will not work for ALL facilities. Contact the responsible manager for verification.
 7. Fill in the "Replacement Cost Values" from Sunflower using the linked [instructions](#).
 8. Purpose, Scope, and Approach. These sections of the report are consistent descriptions of the FFPA activity and need no further action on the part of the FPE. However, any limitations or assumptions specific to the actual inspection should be discussed in the "Approach" section of the form.

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9. Fill in the facilities being assessed in the "Scope" fill in section.
10. Fill in "Facility Description" with a general description of activities performed within the building starting with title associated with the building number in H-Maps, [HGIS Web Site](#) (e.g., is it operating, pump house, offices, etc.?).

LOI #1 Provide a "Yes" or "No" response supported by the narrative below:

3.2 General Construction Description

1. In the space provided, give a brief description of construction, beginning with a material description of the exterior walls, roof, floor/foundation, and interior wall construction. (For example: Building ___ is a ___ ft x ___ ft ___ high corrugated metal on steel frame one story structure having a standing seam roof, slab-on-grade foundation, and gypsum board on wood frame interior walls.)
2. Next, classify the building in accordance with the least construction type per NFPA 220 and IBC (e.g., IBC Type II-B, NFPA 220 Type II (0,0,0)).
3. Describe heating and/or air conditioning provided (e.g., heating is provided by ceiling mounted unit air heaters, which are adequately maintained).
4. Describe any deficient conditions in the conclusion.

3.3 Degree of Separation/Compartmentation

1. Describe the degree of subdivision. (For example: The building is moderately subdivided by perimeter offices and a central open high bay maintenance shop.)
2. If there are rated fire separations describe each. (For example, A 2-hour rated fire wall extended from floor-through-roof and divides the building in roughly have in the north-south direction. The wall, doors, through penetrations, and opening protectives are in good condition.)
3. Describe any deficient conditions in the conclusion.

3.4 Physical Condition

1. Note any facility deficiencies, such as loose flashing, broken windows, missing or damaged ceiling tiles, evidence of rainwater or liquid damage, etc.
2. Finally, provide a statement concerning the overall condition of the building. (For example: The overall condition of the building is "fair," due to the evidence of roof leakage on the walls and floor. (See photographs #1 and 2) Issue 2021-2520W- FFP- Opportunity for Improvement - 001, **Leaking Roof.**)
3. Describe any deficient conditions in the conclusion.

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Appendix G - (Cont.)**3.5 Facility/Structure Identification and NFPA 704 Signage**

1. Verify that a hazard diamond is properly posted in accordance with NFPA 704 when flammable and combustible liquids, gases, or hazardous chemicals exceed the MAQ. (See also CPCC-PRO-40422, *Fire Marshal Permit Interfaces*, chemical permit instructions, and CPCC-STD-FP-54137, *Control of Flammable and Combustible Liquids*, NFPA 704 diamond.)
2. In the Facility Identification section, provide a definitive statement whether the facility identification is satisfactory along with any NFPA 704 signage.
3. Describe any deficient conditions in the conclusion.

4.0 CONCLUSION

1. Clearly state whether the type of construction meets the minimum occupancy requirement.

LOI #2 Provide a “Yes” or “No” response supported by the narrative below:

5.0 GENERAL OCCUPANCY DESCRIPTION

1. Provide a brief description of the occupancy, sufficient to support the IBC and NFPA 101 occupancy group classification. (For example: Building 2740W is used as a general office for administrative and support functions. There are two conference rooms under 400 sq. ft. each, constituting an “incidental use.”)
2. Provide the applicable occupancy group, per NFPA 101 and the IBC. (For example: This facility is considered to be an IBC Group B, NFPA 101 “Business” group.)
3. Identify the radiological hazard category for the facility.
4. Describe any deficient conditions in the conclusion.

NOTE: *Succeeding subheadings are to be used as applicable. If a particular heading does not apply to the facility being evaluated, so state.*

6.0 OPERATIONS

1. Provide a description of the day-to-day operations that occur in and around the facility.
2. Also, provide a description of less frequent operations that occur in and around the facility.
3. Describe any deficient conditions in the conclusion.

7.0 PROCESS

1. Provide a description of any processes performed within the building. The use of flowcharts and reference to associated process and instrument diagrams is encouraged.

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2. The narrative description should flow in a stepwise fashion from beginning to end of the process.
3. Process hazards should be described within the description. However, prevent duplication in succeeding sections of the report, such as "Special Hazards."
4. Describe any deficient conditions in the conclusion.

8.0 COMMON HAZARDS

1. Identify and describe and general hazards in the facility (e.g., transient combustible, housekeeping, and low pile storage).
2. Describe any deficient conditions in the conclusion.

9.0 STORAGE ARRANGEMENT

1. For Class I – IV and plastics commodities:
 - a. Describe the locations of the storage.
 - b. Describe storage height, whether rack or pile storage.
 - c. Describe aisle spacing, intervals, and width.
 - d. Describe types of materials and NFPA 13 commodity classification.
2. If applicable, describe the location and condition of flammable and combustible liquids storage and use.
 - a. Describe the locations of the storage.
 - b. Describe storage height, whether rack or pile storage, use of flammable liquids storage cabinets.
 - c. Describe materials and provide supporting NFPA 30 classifications.
 - d. Presence and adequacy of sprinkler protection.
 - e. Identify permits applicable to the hazard and adequacy of implementation of controls.
3. If applicable, describe the location and condition of hazardous chemicals storage and use.
 - a. Describe the locations of the storage
 - b. Describe storage height, whether rack or pile storage, use of storage cabinets
 - c. Describe materials and provide supporting NFPA 400 classifications
 - d. Presence and adequacy of sprinkler protection.

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4. If applicable, describe the location and condition of compressed gases storage and use.
 - a. Describe the locations of the storage.
 - b. Describe storage height, whether rack or pile storage, use of storage cabinets.
 - c. Describe materials and provide supporting NFPA 30 classifications.
 - d. Presence and adequacy of sprinkler protection.
5. Describe any deficient conditions in the conclusion.

10.0 SPECIAL HAZARDS

1. If applicable, describe any "Special Hazards," such as flammable and combustible liquids or hazardous chemicals above the permit threshold, open and closed loop systems with hydraulics, paint spray operations and spray booths, compressed gas cylinder storage and use, etc.).

11.0 HANFORD FIRE MARSHAL PERMITS

1. List any applicable occupancy, flammable/hazardous chemical, or other HFM Permits and describe is they are current, properly arranged, and being complied with.
2. List any designated hot work areas and their applicable permits.
3. Describe any deficient conditions and the adequacy of implementation of administrative controls in the conclusion.

LOI #3 Provide a "Yes" or "No" response supported by the narrative below:

12.0 OCCUPANCY GROUP DETERMINATION

1. Restate the determined NFPA 101, life safety occupancy group from LOI#2.
2. In the case of mixed occupancies, identify the location area, and arrangement of each occupancy.
3. Describe the manner in which mixed occupancies were approached from a configuration and compliance standpoint (e.g., most stringent requirements form each, application of incidental use provisions, physical fire or smoke separations, etc.).

13.0 MEANS OF EGRESS

1. Summarize the means of egress limitations applicable to the occupancy group or groups, including maximum travel distance to an exit, common path of travel, maximum length of dead-end corridors, corridor minimum width, number of required exits, etc.
2. Describe if the means of egress and stairwells are free of any obstructions.

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3. Describe whether the means of egress has any hazardous change in elevations, or tripping hazards.
4. Comment whether the emergency escape procedures and emergency route assignments are written and posted.
5. Describe compensatory measures and administrative controls for accountability, compensation for physical limitations, adjustments to surveillance and maintenance, cold and dark, or D4-related activities.
6. Describe any deficient conditions in the conclusion.

14.0 EMERGENCY LIGHTING

1. Describe if emergency lighting is provided, adequately arranged, and maintained.
2. Describe the use and arrangement of wayfinding, the exit signs, and whether they are adequately visible and operational.
3. Describe any deficient conditions in the conclusion.

15.0 RATED FIRE/SMOKE SEPARATION FOR CORRIDORS, STAIRS, AND LIFE SAFETY COMPARTMENTS

1. If applicable, describe the location and conditions of all fire/smoke doors and barriers.
2. If applicable, review and describe the inspection, testing, and maintenance reports of the doors and barriers.
3. Describe any deficient conditions in the conclusion.

LOI #4 Provide a “Yes” or “No” response supported by the narrative below:

16.0 WATER SUPPLY AND DISTRIBUTION

Water supply and hydrant information is available from a variety of sources, including DMCS, FHAs, and the Fire Department. For major complexes (e.g., Central Waster Complex and Wrap, T Plant, etc.) a central sprinkler system demand and water supply test analysis document is available. The FPE is cautioned to first obtain a copy of the applicable underground fire main drawing serving the subject facility and to physically confirm the arrangement of hydrant and valves within the immediate vicinity of the building.

For fire hydrant evaluation, provide the following:

- Indicate the presence or absence of fire hydrants within 300 ft. of the subject building. Reference the appropriate drawing number covering the underground main arrangement.
- For conditions where hydrants are provided, the following narrative elements should be addressed:

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- “There are ___ hydrants provided within 300 ft. of the building on the ___ side and ___ side. (See Drawing # _____ for reference). On _____, a fire test was performed using hydrant ___ for flow and hydrant (or Riser) ___ for pressure, resulting in a static pressure of ___, a residual pressure of ___ at a flow of _____ gpm. Based upon the information available, the water supply is adequate/inadequate for the demand.”
- For conditions where hydrants are not provided and otherwise not warranted, the following narrative may be modified as needed to fit conditions:
 - “Hydrant protection was not provided for Building _____. Adequate clear space separation to the wildland is provided and exposure separation from other buildings or yard storage on site is acceptable, based upon NFPA 80A. Based upon these factors the MFPL is less than \$2 million. Neither automatic sprinkler protection nor fire alarms are required (or provided) for this building. The building is remote from any established water supply distribution system and the cost to provide such support, including a fire hydrant within 300 ft. of the building, would exceed the MPFL. (Optional favorable information: The building is used for support storage and is not routinely occupied (when occupied, it is by 5 or less personnel) Hazardous chemical storage is below the NFPA 30 and 400 limits for a non-sprinklered combination storage and shop occupancy. Given these factors, a fire originating in the building would be expected to stay within the clear space boundary and not spread to the wildland beyond. Manual firefighting is expected to consist of a defensive posture, using small hose streams fed by on-board apparatus tanks, supplemented by tenders.
 - A courtesy copy of this FFPA has been transmitted to HFD Operations and the Fire Marshal review to confirm that adequate resources and tactical guidance is available through the applicable Pre-Incident Plan.”
- 4. Reference the description of water supplies. (For example: Water supplies are on the 200W Area Raw Water System (See HNF-13136-FHA Rev 16, *PPF Fire Hazards Analysis*). The water supply is adequate for the demand.)
- 5. Describe the quantity and location of the nearby fire hydrants. Is the quantity adequate for the facility hazards and size? What is the quality of the mains? Has there been any recent issues with the water supply?
- 6. Discuss recent water supply testing results, impairments to protection and results of inspection, testing, and maintenance activities.
- 7. Describe any deficient conditions in the conclusion.

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Appendix G - (Cont.)**17.0 SPECIAL HAZARD FIRE SUPPRESSION**

1. Describe special hazards protection, if any. (For example: Building 2727W sodium storage is protected by argon gas blanket gas system, supported by an oxygen sampling gas detection arrangement for the tank interstitial space. The system provides total flooding at ___ cu. ft. with a continuous flow or 3 cu. ft. per hours to manage system leaks. The system is adequately designed for the sodium hazards and is adequately maintained in accordance with NFPA ____.)
2. Describe any deficient conditions in the conclusion.

18.0 MANUAL FIRE SUPPRESSION AND EXTINGUISHERS

1. If applicable, describe the manual fire suppression system.
2. If applicable, check the fire extinguishers inspection tag for up-to-date inspections and comment on the results.
3. Describe any deficient conditions in the conclusion.

19.0 FIRE DETECTION AND ALARM SYSTEMS AND EQUIPMENT

1. Describe the fire alarm and detection system. (For example: A Pyrotronic fire alarm control panel is located at the front entrance to Building 2740W. In duct smoke detectors for HVAC shutdown, valve tamper supervisory switches, sprinkler water flow alarms, and manual pull stations located at each exit door are provided. The system is obsolete and is being supported by refurbished parts by Fire Systems Maintenance. The system continues to be provisionally operable with the used parts. However, the replacement schedule should be revised to prioritize replacement of the FACU within the next three years. Issue 2021-2740W- FPPA- Opportunity for Improvement - 001, **Fire alarm Panel and RFAR Replacement Priority.**)
2. Describe any deficient conditions in the conclusion.

20.0 TEMPORARY PROTECTION AND COMPENSATORY MEASURES

1. If applicable, list the location and type of temporary protection being utilized in the facility.
2. If applicable, list any specific compensatory measures that are being practiced inside of the facility.
3. If applicable, describe if the temporary protection and compensatory measures are meeting their intended use.
4. Describe any deficient conditions in the conclusion.

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Appendix G - (Cont.)**21.0 FIRE AND EXPLOSION HAZARDS**

1. If applicable, describe any fuel tanks, compressed gas, or other explosion hazards.
2. Describe both physical protection and administrative controls associated with fire and explosion hazards.
3. Discuss potential losses from explosion hazards.
4. Describe any deficient conditions in the conclusion.

22.0 SAFETY CLASS AND SAFETY SIGNIFICANT SYSTEMS AND EQUIPMENT

1. If applicable, list out and describe any safety significant systems in the facility.
2. If applicable, describe the outcome if the safety significant system would go out due to a fire.
3. Describe any deficient conditions in the conclusion.

23.0 MISSION-CRITICAL PROCESS AND EQUIPMENT OR PROGRAMS

4. If applicable, list out and describe any Mission-Critical systems in the facility.
5. If applicable, describe the outcome if the Mission-Critical system would go out due to a fire.
6. Describe any deficient conditions in the conclusion.

24.0 HIGH VALUE PROPERTY

1. If applicable, list and describe any high value property inside of the fire area (e.g., equipment, vehicles, etc.).
2. If applicable, describe the fire risk to the high value property.
3. Describe any deficient conditions in the conclusion.

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LOI #5 Provide a “Yes” or “No” response supported by the narrative below:

25.0 EXPOSURES

1. Describe exposures within 150 ft. to/from the building. (For example: Building 324 is located within the 300 Area. To the north is open gravel parking lot for 150 ft. Vehicles are arranged more than 10 ft. from the exterior walls in established stalls. To the south is seasonal dry vegetation from the wildland that is separated by 40 ft. of combustible-free clear space. To the east is Building 325, located 90 ft. away within intervening clear space. To the west is a 10 MVA oil-filled service transformer, located 15 ft. It is separated by 2-hour rated exposure walls and diking surround the transformer. Overall, exposures are considered moderate (oil-filled transformer), but adequately protection by a combination of spatial separation and rated exposure walls.)
2. Describe any deficient conditions in the conclusion.

26.0 EXPOSURES FROM OTHER STRUCTURES (NFPA 80A)

1. Refer to NFPA 80A. Describe the sufficiency of space between the facility and other structures nearby.
2. Describe any deficient conditions in the conclusion.

27.0 EXPOSURES FROM WILDFIRE (NFPA 1141)

1. Refer to NFPA 1141, Describe distance between the facility and wildland.
2. Describe the type of wildland and its vegetation.
3. Describe any deficient conditions in the conclusion.

LOI #6 Provide a “Yes” or “No” response supported by the narrative below:

28.0 LOSS POTENTIAL

1. Provide a loss scenario narrative, copy the applicable scenario illustrative of conditions from the FHAs or appropriately reference the scenario for the FHA, if factually accurate. Otherwise, propose a corrected or revised version of the applicable loss scenario.
2. Describe discrepancies in Sunflower Valuation for the facility, if any.
3. Describe any deficient conditions in the conclusion.

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LOI #7 Provide a “Yes” or “No” response supported by the narrative below:

29.0 COMPLIANCE WITH CODES, STANDARDS, PROCEDURES, AND REQUIREMENT DOCUMENTS

1. Review the Fire Protection codes and standards applicable to the facility.
2. Describe any deficient conditions in the conclusion, limiting repetition from previous sections.

30.0 INSPECTION, TESTING, AND MAINTENANCE REPORTS

1. Review related inspection, testing, and maintenance reports for both active and passive fire systems in the facility. Describe the results from the inspection, testing, and maintenance reports.
2. Describe any deficient conditions in the conclusion.

31.0 ADMINISTRATIVE CONTROLS

1. If applicable, state whether the facility is following any administrative controls related to fire protection.
2. If applicable, describe if the administrative controls are being followed sufficiently and are meeting the intended purpose.
3. Describe any deficient conditions in the conclusion.

32.0 COMPLETENESS OF FIRE HAZARD ANALYSIS AND IMPLEMENTATION PLAN

1. If applicable, review the FHA and implementation plan. Then, make comments towards completeness, need for updates, and status of the implementation plan.
2. Describe any deficient conditions in the conclusion.

33.0 FACILITY FIRE PREVENTION PLANNING DOCUMENTS

1. If applicable, review any facility fire prevention planning documents. Then make comment to sufficiency and implementation.
2. Describe any deficient conditions in the conclusion.

34.0 FIRE SAFETY TRAINING

1. If applicable, describe any life safety training the facility and its personal partake in, including fire alarm drills, exit path awareness, and emergency response notification.
2. Describe any deficient conditions in the conclusion.

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Appendix G - (Cont.)**35.0 COMPLIANCE WITH APPLICABLE HANFORD FIRE MARSHAL PERMITS**

1. Review the applicable HFM Permits associated with the facility. Make comments to whether the facility is following the compensatory measures stated in the permits.
2. If applicable, make comment to any scenario that is occurring at the facility that needs a new HFM Permit.
3. Describe any deficient conditions in the conclusion.

LOI #8 Provide a “Yes” or “No” response supported by the narrative below:

36.0 ELECTRICAL CORDS AND POWER STRIPS

1. If applicable, describe the use of electrical cords and power strips. Are they causing a tripping hazard? Are they located in areas high with combustibles? Are power strips connected to permanently installed receptacles?
2. Describe any deficient conditions in the conclusion.

37.0 PORTABLE SPACE HEATERS

1. If applicable, describe the quantity and locations of portable space heaters in the facility. Are they permitted? Are they located in areas with combustibles or flammables? Are they being properly maintained to their corresponding permit?
2. Describe any deficient conditions in the conclusion.

38.0 ELECTRICAL SERVICE EQUIPMENT AND BOXES

1. If applicable, describe the quantity and locations of the electrical service equipment and boxes. Are they being maintained and inspected properly? Are all electrical boxes properly covered?
2. Describe any deficient conditions in the conclusion.

LOI #9 Provide a “Yes” or “No” response supported by the narrative below:

39.0 IS THE IMPACT FROM NATURAL HAZARDS TO THE FACILITY’S FIRE SAFETY ACCEPTABLE?

1. Briefly describe exposures from natural hazards to the facility and the degree to which they may impact fire safety and loss potential. When adequately discussed within a bounding FHA, make reference to the section of that report.
2. Describe any deficient conditions in the conclusion.

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LOI #10 Provide a “Yes” or “No” response supported by the narrative below:

40.0 POTENTIAL FOR TOXIC, BIOLOGICAL, AND/OR RADIOLOGICAL INCIDENT DUE TO FIRE

1. Describe conditions in which a fire may result in increased damage from dispersed toxic, biological, and low radiological hazards. Where adequately discussed in a bounding FHA, make reference to the section of that report.
2. Describe any deficient conditions in the conclusion.

LOI #11 Provide a “Yes” or “No” response supported by the narrative below.

41.0 PRE-INCIDENT PLAN**41.1 EMERGENCY RESPONSE**

The CPCCo Fire Protection Organization is not responsible for the selection of locations or content of HFD Pre-Incident Plans. However, DOE-STD-1066 does include criteria to address the presence or absence of such plans within FFPA's. Contact for Pre-Incident Plan information is available from the HFM's Office, via Rick Justice, DFM, with a copy of the request to Paul Ellis.

The HFD is responsible for managing its area risk control strategy with concurrence from DOE RL. Not all facilities will have an associated Pre-Incident Plan. Pre-Incident Plan information should be placed within the “Comments” section.

Where Pre-Incident Plans exist:

Report the title of the Pre-Incident Plan, date of last update, and provide a brief evaluation of the factual information provided, consistent with the available FFPA data (e.g., “The Pre-Incident Plan _____, was prepared for Building ____ and was last updated _____. Basic facility information is consistent with conditions encountered during this FFPA.”). Do not evaluate operational tactics since this is the responsibility of the Hanford Fire Chief. Where discrepancies between the FFPA and a Pre-Incident Plan exist, it is sufficient to submit a courtesy copy of the completed FFPA to the HFM, along with a cover note explaining the discrepancy. Submissions of this kind should be documented in the FFPA and do not require creation of an iCAS item.

Where Pre-Incident Plans do not exist:

Report, “There are no current pre-incident plans for this facility. HFD has evaluated all the existing pre-incident plans and now only maintains those that present an increased fire/life safety risk.”

1. Request the pre-incident plan from the HFM's Office. Review the report for accuracy and adequacy for the current state of the facility.
2. Describe any deficient conditions in the conclusion.

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Appendix G - (Cont.)**42.0 HFD APPARATUS ACCESSIBILITY**

1. Describe the conditions of access for the HFD. Is the accessibility adequate for the hazard?
2. Describe any deficient conditions in the conclusion.

43.0 WATER RUN-OFF

1. Describe where the water would go in the case of a fire fight. Are there any catch basins for the water?
2. Describe the degree of susceptibility to water damage of any facilities, storage, or operations.
3. Describe administrative controls, physical protection, or formal plans and the degree of their effectiveness.
4. Describe any deficient conditions in the conclusion.

LOI #12 Provide a “Yes” or “No” response supported by the narrative below:

44.0 STATUS OF PREVIOUS ISSUES AND TRACKING

1. Status of Previous Issues. List each issue by number and title and individually address:
 - a. If applicable, state the corrective action number the issue is/was being tracked under.
 - b. Describe the degree to which the issue has been addressed to date.
 - c. Identify whether conditions are deteriorating, improving, or stable.
 - d. Describe initiatives, completed work, and anticipated work associated with each issue or finding.
 - e. Finally, identify whether the issue is complete and closed, continues to be open, or is modified.

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45.0 NEW ISSUES

1. New issues as a result of this assessment. List each finding by number and title and individually address:
 - a. Describe the degree to which the issue has been addressed to date.
 - b. Describe responsible management's response to the issue, recommendations, and any alternatives.
 - c. Finally, identify any anticipated action and timeframes.

46.0 CONCLUSION

1. Check the necessary box to have the sentence read whether the objective was met/partially met/not met.
2. Describe at least one positive or favorable condition associated with the assessment. (For example: Management interest in loss prevention is good as demonstrated by the recent fire and evacuation drill conducted in April of this year.)
3. Describe the top three discrepancies and their impact upon overall fire safety.

47.0 SUMMARY

1. Describe any other significant adverse conditions leading to performance objectives not being met or only partially met.
2. Check the appropriate box to state whether the fire prevention and protection are improving, stable, or declining.
3. Delete the necessary text in the last sentence to state whether the fire protection is satisfactory or not.

**NOTE: If this is a Multiple Facility FFPA, then continue to the mf-FFPA Guide.
Do not go to Approvals.**

48.0 APPROVALS

1. Sign and date as the "Originator" and forward assessment to the necessary faculty in order of the signature blocks.

NOTE:

- *The Peer Reviewer needs to fill out a Peer Review Checklist located in the [Blank Forms](#) folder.*
- *"Other (If Applicable)" is intended for DAs or other necessary faculty to review the assessment. If no other reviews are necessary, fill in the blank spot with "NA."*

DO NOT LEAVE A BLANK SIGNATURE SPOT.

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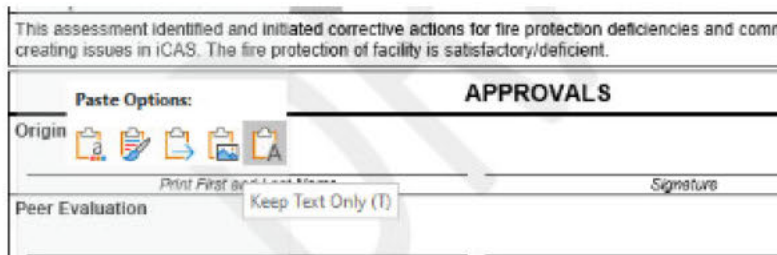
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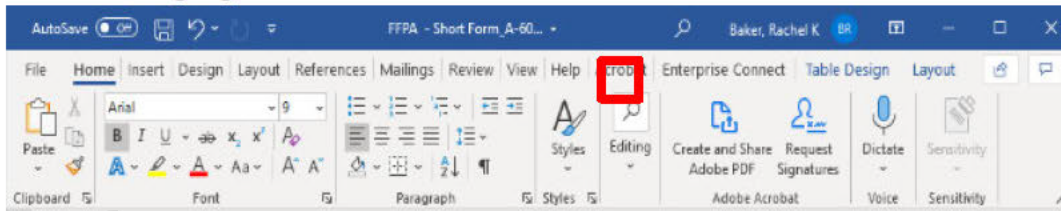
- 2. Save the Word document in the corresponding folder by area and project inside of [REDACTED] [CHPRC-FPE\FPE\Facility Fire Protection Assessments.](#)
Name the Word documents as Facility Number FFPA Year (e.g., 481 FFPA 2021).

49.0 FORMATTING HELP

- Photos, bullet points, and more can be pasted into the form. When doing so, use the right click Keep text only paste as shown below.



- To keep tabbing aligned, use the button below when all text needing to move is highlighted.



- Grey box font automatically populates as Courier New size 9

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Appendix H - Multi-Facility, Facility Fire Protection Assessment Form and Guide

CPCCO FACILITY FIRE PROTECTION ASSESSMENT – MULTIPLE FACILITY			
Facility Complex:	Area:	Date Inspected:	Date of Report:
Facilities:		Recommended Re-occurrence Frequency:	
Fire Protection Engineer:		Responsible Organization:	
SCOPE*			
This Facility Fire Protection Assessment (FFPA) includes current activity at the time of inspection for the facility .			
COMPLEX DESCRIPTION			
COMPLEX EXPOSURES			
COMPLEX CONSTRUCTION			
COMPLEX OCCUPANCY			
COMPLEX PROTECTION			
LOI SUMMARY			
LOI #1: Is the construction adequate?	<input type="checkbox"/> Satisfactory	<input type="checkbox"/> Deficient	<input type="checkbox"/> N/A
LOI #2: Is the Occupancy properly arranged, maintained, and administratively controlled?	<input type="checkbox"/> Satisfactory	<input type="checkbox"/> Deficient	<input type="checkbox"/> N/A
LOI #3: Is the life safety adequate?	<input type="checkbox"/> Satisfactory	<input type="checkbox"/> Deficient	<input type="checkbox"/> N/A
LOI #4: Is the fire protection adequate?	<input type="checkbox"/> Satisfactory	<input type="checkbox"/> Deficient	<input type="checkbox"/> N/A
LOI #5: Are the exposures adequate?	<input type="checkbox"/> Satisfactory	<input type="checkbox"/> Deficient	<input type="checkbox"/> N/A
LOI #6: Is the loss potential acceptable?	<input type="checkbox"/> Satisfactory	<input type="checkbox"/> Deficient	<input type="checkbox"/> N/A

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Appendix H - Multi-Facility, Facility Fire Protection Assessment Form and Guide

CPCCO FACILITY FIRE PROTECTION ASSESSMENT – MULTIPLE FACILITY			
LOI #7: Is the fire prevention acceptable?	<input type="checkbox"/> Satisfactory	<input type="checkbox"/> Deficient	<input type="checkbox"/> N/A
LOI #8: Are the electrical fire hazards adequate?	<input type="checkbox"/> Satisfactory	<input type="checkbox"/> Deficient	<input type="checkbox"/> N/A
LOI #9: Is the impact from natural hazards to the facility's fire safety acceptable?	<input type="checkbox"/> Satisfactory	<input type="checkbox"/> Deficient	<input type="checkbox"/> N/A
LOI #10: Is the potential for toxic, biological, and/or radiological incident due to fire acceptable?	<input type="checkbox"/> Satisfactory	<input type="checkbox"/> Deficient	<input type="checkbox"/> N/A
LOI #11: Is the emergency response adequate?	<input type="checkbox"/> Satisfactory	<input type="checkbox"/> Deficient	<input type="checkbox"/> N/A
LOI #12: Are all findings reported?	<input type="checkbox"/> Satisfactory	<input type="checkbox"/> Deficient	<input type="checkbox"/> N/A
COMMENTS			
CONCLUSION			
The performance objective was <input type="checkbox"/> met/ <input type="checkbox"/> partially met/ <input type="checkbox"/> not met. The following issue(s) was/were created:			
Summary:			
Fire prevention is trending	<input type="checkbox"/> Improving	<input type="checkbox"/> Stable	<input type="checkbox"/> Declining
Fire protection is trending	<input type="checkbox"/> Improving	<input type="checkbox"/> Stable	<input type="checkbox"/> Declining
This assessment identified and initiated corrective actions for fire protection deficiencies and communicates lessons learned by creating issues in iCAS. The fire protection of facility is satisfactory/deficient.			

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APPROVALS	
Originator	
_____	_____
<i>Print First and Last Name</i>	<i>Signature / Date</i>
Peer Evaluation	
_____	_____
<i>Print First and Last Name</i>	<i>Signature / Date</i>
Unreviewed Safety Question Evaluator	
USQ Required?: [<input type="checkbox"/>] USQ #: _____ [<input type="checkbox"/>] GCX [<input type="checkbox"/>] N/A [<input type="checkbox"/>] No	
_____	_____
<i>Print First and Last Name</i>	<i>Signature / Date</i>
Facility Manager	
_____	_____
<i>Print First and Last Name</i>	<i>Signature / Date</i>
Other (If Applicable)	
_____	_____
<i>Print First and Last Name</i>	<i>Signature / Date</i>
Fire Protection Program Manager	
_____	_____
<i>Print First and Last Name</i>	<i>Signature / Date</i>

1.0 NARRATIVE GUIDANCE FOR MULTIPLE FACILITY FORM - FACILITIES FIRE PROTECTION ASSESSMENTS

1.1 To Start

1. Start by using the If-FFPA and sf-FFPA located at the link below to complete the assessments on each facility individually.

[\CHPRC-FPE\FPE\Facility Fire Protection Assessments\Instructions](#)

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NOTE: *The large facility will be a long form and the supporting facilities will be short forms (e.g., T Plant Canyon is long form, all other facilities are short form).*

Do not get approval signatures yet!

2. Create a folder under the appropriate project from the link below titled "Project FFPA Year" (e.g., TPLANT FFPA 2021).

[\CHPRC-FPE\FPE\Facility Fire Protection Assessments](#)

3. Save all Word documents of the single facility forms in the new folder.
4. Open Word document "Multiple Facility FFPA Cover Sheet" located in the below folder.

[\CHPRC-FPE\FPE\Facility Fire Protection Assessments\Instructions\Blank Forms](#)

5. Continue with the below narrative guide.

2.0 INTRODUCTION

This guide is intended to provide direction for the development and review of the multiple facility form - Facilities Fire Protection Assessments (mf-FFPAs), with particular attention to narrative content. This guidance is to be applied with engineering judgement and an understanding of stakeholder readers, as well as a sufficient level of technical rigor to support critical ratings and conclusions. All narrative shall follow the quality writing style provided by CPCC-GD-NS-52731, *Nuclear Safety Style Guide*.

3.0 APPLICATION

The mf-FFPA provides a cover and summary of conditions where grouping related buildings in proximity to each other better covers hazards and operations that are in common. It is intended that individual buildings be addressed separately through short form (sf) or long form (lf) FFPAs. Common features, trends, discrepancies, and conditions are then covered in the mf-FFPA. The selection of the mf-FFPA can be a useful tool where there are shared features or a common theme to multiple structures (e.g., individual trenches with supporting buildings at the Low-Level Burial grounds or North Balance of Plant support buildings at PUREX). The multi-facility approach is generally applied upon agreement between the Fire Protection Engineering author and the Lead FPE depending on the grouping of facilities. The critical elements of an FFPA, per DOE-STD-1066, 2016, *Fire Protection Standard*, are contained within the sf- or lf-FFPAs with common conditions broadly described in the mf-FFPA as a kind of summary.

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The mf-FFPA **is not** a standalone report. Instead, it relies upon individual sf- or lf-FFPAs to provide sufficient detail to support conclusions concerning hazards, conditions, and protection features. Basic background C.O.P.E. information should be provided within each specific building report. However, common trends should be provided in the mf-FFPA for each LOI category. In addition, any common trend, noteworthy practices, or significant discrepancies should be discussed. Finally, the FPE is encouraged to describe any unique conditions, assumptions, or limitations that may be other than that which would be expected for a typical facility of similar type or size.

4.0 GENERAL INSTRUCTIONS

The following broadly applies to all portions of the mf-FFPA:

1. Provide entries for all sections of the report. Do not leave blank area; these will be considered omissions rendering the report incomplete. Where there are exceptions or deviations impeding completion of a section for any reason, the FPE should provide an explanation.
2. Use of general arrangement photographs and sketches for the overall area of concern is encouraged and can readily be imported into the report template. However, the FPE is responsible to ensure that pictures are of sufficient quality to readily convey the intended condition or arrangement involved. Any photograph or sketch should have at least accompanying captions, if not a descriptive narrative to aid the stakeholder-reader in comprehension. Drawings or photographs specific to a building or structure should be placed within the individual sf- or lf-FFPA for that unit.
3. Use of other supporting information, by reference, is a useful tool in demonstrating satisfactory support of a condition, recommendation, or conclusion. However, such references must be fully reference by applicable document number, title, date, and source.
4. While it is not necessary to repeat the complete narrative of an issue, finding, or recommendation; the FPE should at least provide the item number and an illustrative title in the applicable comments section of the report. This provides a ready cross-reference for the stakeholder-reader between supporting information, a conclusion, or an issue itself.
5. If any item is marked deficient, an explanation shall be provided in the comments.
6. Use of code or standard references should state for the first time used the complete code or standard number and title (in italics). Thereafter, it may be referenced by code or standard number, only.

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5.0 HEADER

This section of the report is largely self-explanatory.

1. On the first line, fill in the Facility Complex Name, Hanford Area, Date of Inspection, and Date Report was completed.
2. On the second line, list of the facilities included in the Multiple FFPA.
3. Fill in the RRF with the FPE's recommended time between assessments based on the valuation guide provided on CPCC-PRO-FP-40420, Section 2.2 (e.g., 5 years for a low cost, non-dynamic facility).
4. On the third line, complete the section for FPE.
5. Fill in the "Responsible Organization" as shown in PopFon (e.g., IAES).

To find in PopFon:

- a. Click "Building Contact Information."
- b. Search facility number.
- c. Click on the building manager's name.
- d. The "Owning Organization" will be under "Dept Abbr."

NOTE: *This will not work for ALL facilities. Contact the responsible manager for verification.*

6. Fill in the facilities being assessed in the "Scope" fill in section.

6.0 COMPLEX DESCRIPTION

1. Fill in with a general description of activities performed within the complex starting with title associated Project name. If able, include a complex map image. (For example: The T Plant Complex is located in the Hanford Site 200 West Area. The Complex consists of three primary operations buildings (221-T, 271-T, and 2706-T Complex) and numerous smaller support buildings. Buildings 210-T, 221-T, 271-T, 291-T, and 292-T were built during the Manhattan Project, between 1943 and 1944. The 2706-T Building was built in 1959 and has been modified several times. The 2706-TA and 2706-TB Buildings were built in 1998. Other smaller buildings and structures were added as needed. Most T Plant buildings and structures are shown in Figure 1, T Plant Site Plan.)

7.0 COMPLEX EXPOSURES

1. Include a description of any exposures to/from complex. This includes total complex exposures such as wild land areas, yard storage, Conex boxes, fencing, barricades, and power lines.
2. This includes parking areas, storage areas, and lighting.

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1. Include a description of any structures or construction common to the complex (no IBC or NFPA type classification is required here). Comments such as whether the buildings are aged or new; combustible or fire resistive or non-combustible construction; in good/fair or poor condition.

9.0 COMPLEX OCCUPANCY

1. Provide a brief description of the total complex occupancy and processes. (For example: The T plant complex occupies industrial and business facilities. This complex is considered a Hazard Category 2 facility. Outside of the facilities with individual FFPAs, there is a break area 40 ft. east of 221T which includes large shade trees and a bench. There is also a 100-car parking lot east of 221T, with no parking closer than 30 ft. from any building.)

10.0 COMPLEX PROTECTION

1. Provide any overall complex protection. Identify areas sprinklered and/or fire alarmed versus those that are unprotected.

11.0 LOI SUMMARY

1. Mark applicable "Satisfactory," "Deficient," or "N/A" responses to the checklist items. If one LOI is marked deficient in the supporting FFPAs, then the multiple facility LOI shall be marked deficient as well.

12.0 COMMENTS

1. If any subjects from above are marked deficient, describe "why" here.

13.0 CONCLUSION

1. Check the necessary box to have the sentence read whether the objective was met/partially met/not met.
2. Describe at least one positive or favorable condition associated with the multiple facility assessment. (For example: Management interest in loss prevention is good as demonstrated by the recent fire and evacuation drill conducted in April of this year.)
3. Describe the top three discrepancies and their impact upon overall fire safety.

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14.0 SUMMARY

1. Describe any other significant adverse conditions leading to performance objectives not being met or only partially met.
2. Check the appropriate box to state whether the fire prevention and protection are improving, stable, or declining.
3. Delete the necessary text in the last sentence to state whether the fire protection is satisfactory or not.

15.0 APPROVALS

1. Open Word document "Multiple Facility FFPA Approval Sheet" from the folder below [\CHPRC-FPE\FPE\Facility Fire Protection Assessments\Instructions\Blank Forms.](#)
2. Sign and date as the "Originator" and forward assessment to the necessary faculty in order of the signature blocks.

NOTE:

- *The Peer Reviewer needs to fill out a Peer Review Checklist located in the [Blank Forms](#) folder.*
- *"Other (If Applicable)" is intended for DAs or other necessary faculty to review the assessment. If no other reviews are necessary, fill in the blank spot with "NA." DO NOT LEAVE A BLANK SIGNATURE SPOT.*

3. Save the Approval Sheet in the folder from step 2 named "Project FFPA year Approval Sheet" (e.g., TPLANT FFPA 2021 Approval Sheet).

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16.0 FORMATTING HELP

Combining Files in Adobe

These instructions will only work if Adobe Acrobat DC is installed on your computer.

1. Open the folder you created in step 2.
2. Highlight all of the FFPAs, Cover Sheet, and Approval Sheet.
3. Right Click and select “Combine files in Acrobat.”
4. Click and drag the files to the appropriate order of Cover Sheet, Long form, Short forms in any order, Approval Sheet.
5. Once in the correct order, click combine.

NOTE: *This will take a minute to combine.*

6. Then click on “Organize Pages” on the right tool bar as shown below:



7. Click and delete all of the approval pages besides the last approval page by clicking the trash can icon as shown below:



8. Once all of the extra approval pages are deleted, select close in the top right corner.
9. On the last “Approvals” sections, sign and date as the “Originator” and forward assessment to the necessary faculty in order of the signature blocks.

NOTE: *“Other (If Applicable)” is intended for DAs or other necessary faculty to review the assessment. If no other reviews are necessary, fill in the blank spot with “NA.”*

DO NOT LEAVE A BLANK SIGNATURE SPOT.