
The Process, Methods and Tool Used To Integrate Safety During Design of a Category 2 Nuclear Facility

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B&W Y-12

August 26, 2009

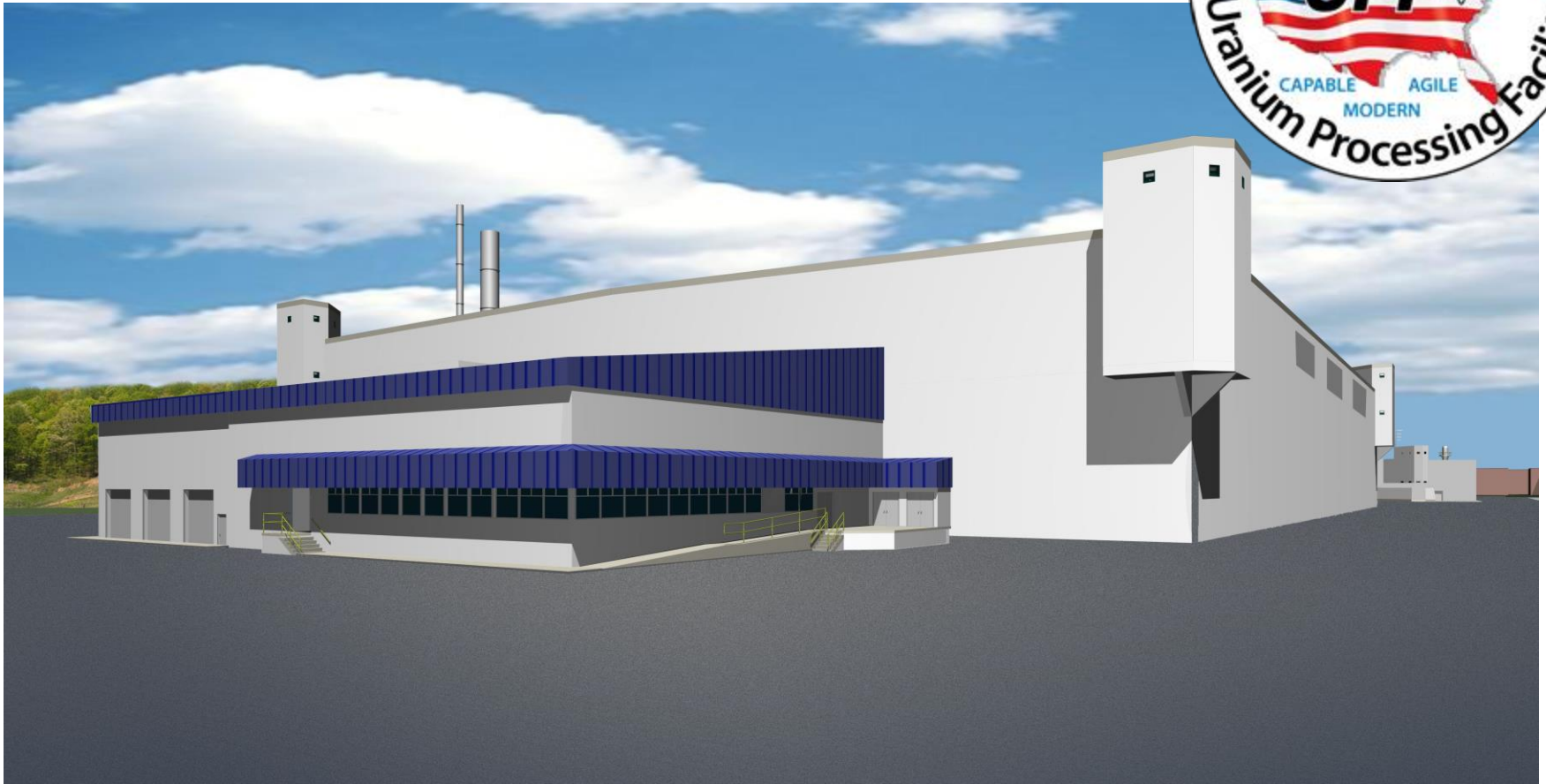
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What is UPF?

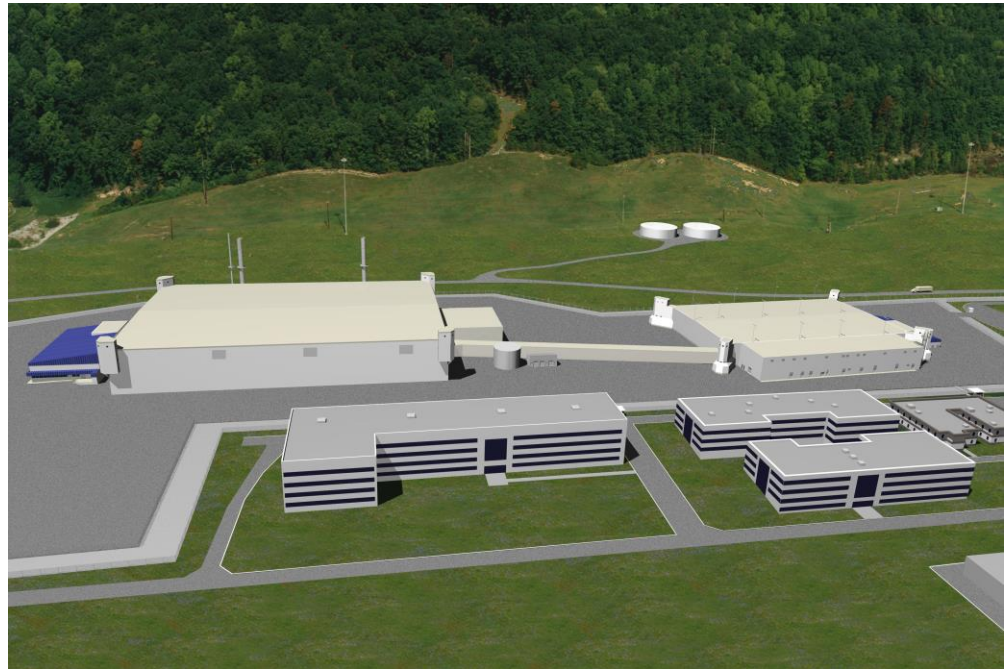


The Nation's Uranium Processing Facility

UPF Mission

Ensure the Nuclear Weapons Complex has and maintains secure, safe, and efficient enriched uranium processing to meet the mission of the U.S. Department of Energy's National Nuclear Security Administration

- Consolidate operations
- Reduce overall plant footprint
- Dramatically improve the security posture
- Reduce overall plant operating cost by leveraging new technologies
- Provide efficient engineered facilities and processes
- Improve worker safety and health
- Incorporate sustainable design concepts



UPF's Role in Y-12 Transformation

- Insert video clip Transformation4a.wmv

B&W Y-12 Objectives and Strategies 2006


Strategic Objective 1

- Ensure the safety, health, and protection of workers, the public, and the environment.

Strategies to Achieve

This Objective

- Fully integrate safety into the design of new equipment and facilities.

Objectives and Strategies	
	STRATEGIC OBJECTIVE 1 ENSURE THE SAFETY, HEALTH, AND PROTECTION OF WORKERS, THE PUBLIC, AND THE ENVIRONMENT.
STRATEGIES TO ACHIEVE THIS OBJECTIVE <ul style="list-style-type: none">• Achieve a goal of Target Zero (zero occupational injuries/illnesses) by implementing a human performance-based, integrated safety improvement plan.• Achieve site Environmental Management System targets and objectives to reduce low-level waste storage areas, unneeded materials, and chemicals.• Establish an employee wellness program to improve employee behaviors and health and to enhance productivity.• Fully integrate safety into the design of new equipment and facilities.	<i>The nature of our work demands actions that far exceed those of most private or commercial enterprises. In our nuclear business, we work with hazardous, high-consequence materials in facilities that demand the highest code of operational conduct. As we work to achieve our vision, we will ensure the safety and health of every worker, the public, and the environment.</i>
KEY SUCCESS INDICATORS <ul style="list-style-type: none">• Full implementation of the integrated safety improvement plan.• Implementation of an employee wellness program.• Achievement of the best safety record among NWC sites by 2008.• Recognized excellence in environmental compliance and waste management.	

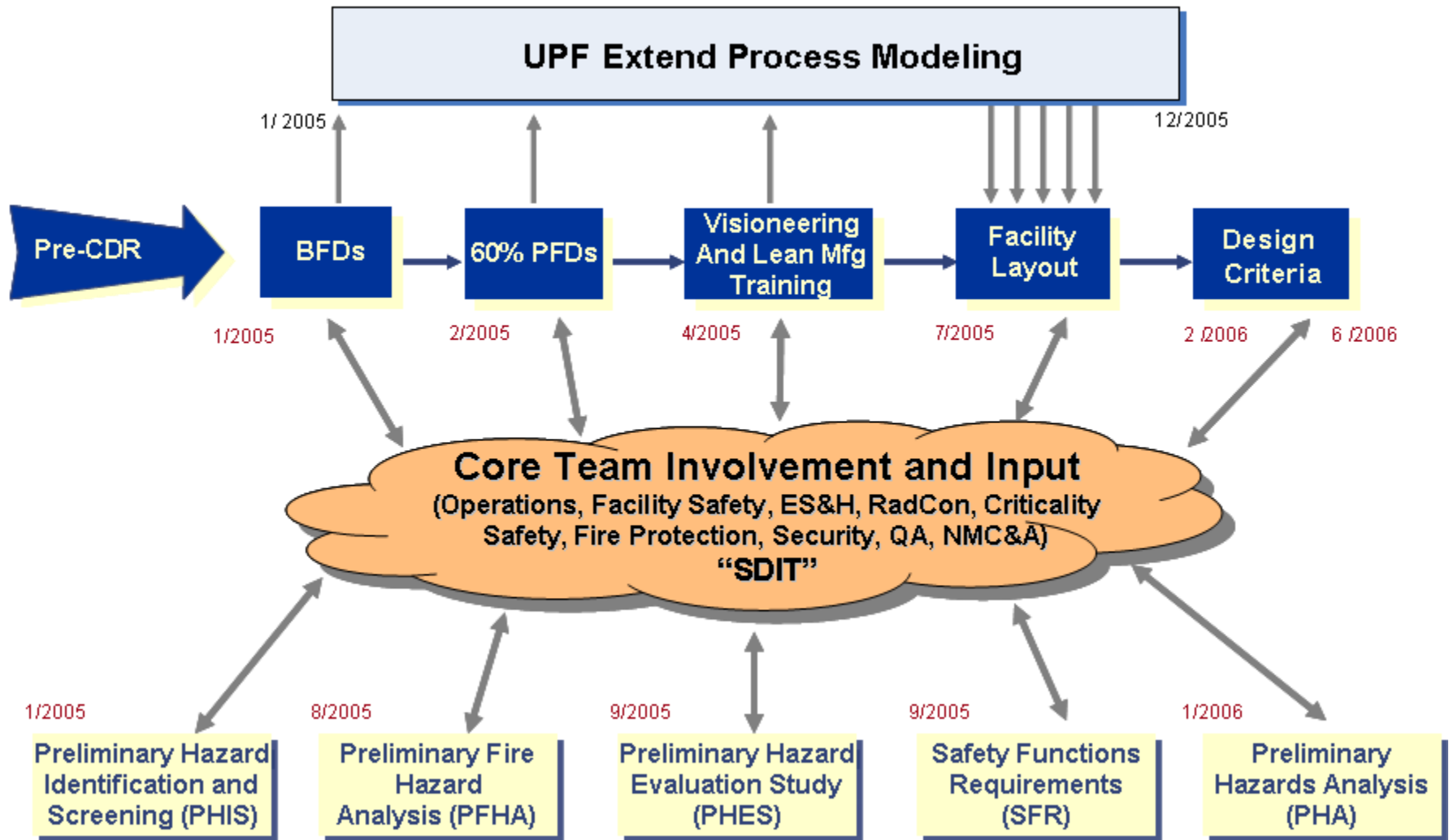
UPF Implementation of DOE-STD-1189



Everyone need to be on board to be successful!

UPF Pre-DOE-STD-1189

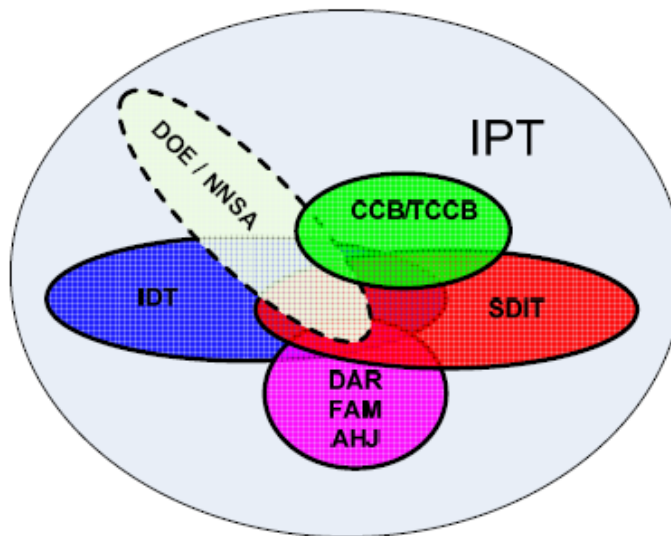
UPF has integrated safety and security into design



UPF SDIT Objectives

- Facilitate the integration of safety into the design and the implementation of the SDS
- Ensure collaboration and consensus between design and safety
- Capture, manage, and develop solutions to concerns and requirement conflicts
- Achieve consensus on a low composite design solution that meets requirements and criteria
- Elevate requirement conflicts and concerns that are unable to be resolved to the DAR, affected FAMs, and/or AHJs
- Trend design solutions that result in a change to the baseline
- Ensure design integration tools are used consistently

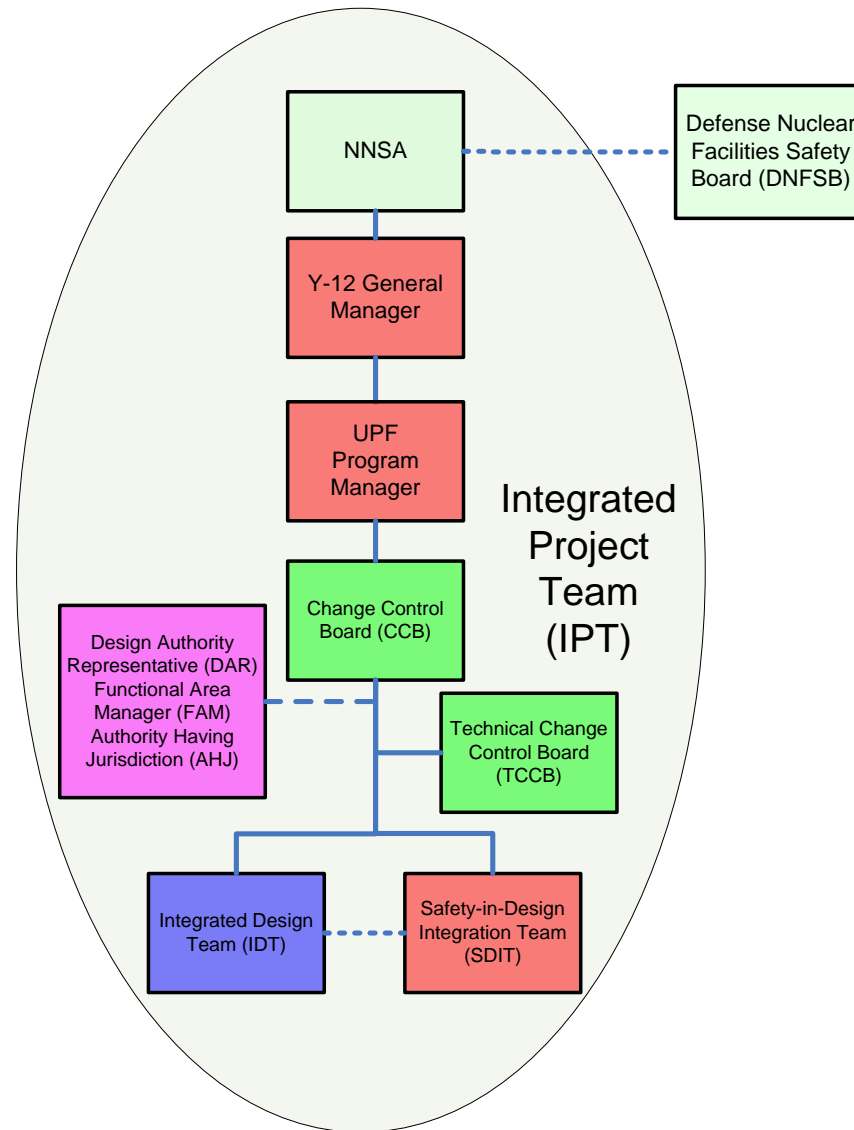
UPF SDIT Composition



CCB/TCCB – Change Control Board/Technical Change Control Board
 IDT – Integrated Design Team
 IPT – Integrated Project Team
 FAM – Functional Area Manager
 AHJ – Authority Having Jurisdiction
 SDIT – Safety-In-Design Integration Team
 DAR – Design Authority Representative
 DOE – Department of Energy
 NNSA – National Nuclear Security Administration

Core Team	Other Subject Matter Experts (as needed)
<ul style="list-style-type: none"> • SDIT Project Engineer • ES&H, including Safety, Industrial Hygiene, Radiological Control, Environmental Compliance, Waste Operations) • Safety Analysis Engineering, including Facility Safety and Criticality Safety • Fire Protection • Operations • Safeguards and Security, including NMC&A • Emergency Preparedness and Emergency Response • Design Engineering, including a qualified engineer/designer designated by each discipline • Quality Assurance • Nuclear Operations and Startup 	<ul style="list-style-type: none"> • Construction Safety • Construction • Procurement • Occupational Medicine • Legal • Technology Development • Technical specialists • Project Controls • Maintenance • UPF Start-Up • Y-12 Readiness • Human Performance Improvement • Project Management

SDIT Reporting Relationships On UPF



Ongoing SDIT Collaborations

- Monthly SDIT Meetings
- Facility Coordination
- Casting/rolling/forming Design Review
- Machining Design Review
- Analytical Services & Product Certification
- PC/SDC Ratings for Support Structures and Outbuildings
- Equipment and Design Detail Standardization
- 9212 Lessons Learned
- Ad hoc meetings
- Issue Specific SDIT Meetings

DOE-STD-1189 Implementation Difficulties

- 1189 could be interpreted as requiring the SDIT to be a separate, stand-alone and somewhat duplicate organization
 - *“The SDIT is expected to be a dynamic organization that will be made up of a limited core team comprising safety, design, and operations personnel, as well as SMEs, who will come together for short or extended periods of time to accomplish a task.”* Section 2.2
- The SDIT prepares the following documents (Table 2-1):
 - Safety Design Strategy (SDS)
 - Risk & Opportunity Assessment
 - Conceptual Safety Design Report (CSDR)
 - Preliminary Safety Design Report (PSDR)
 - Preliminary Documented Safety Analysis (PDSA)
 - Documented Safety Analysis (DSA)
 - Technical Safety Requirements (TSR)

UPF Implementation of DOE-STD-1189

- The UPF SDIT functions more as a matrixed, problem solving organization that also establishes design criteria.
 - All disciplines on the project have supporting organizations at the site level. Creating another organization with the same disciplines would be redundant.
- The UPF SDIT does not in, and of itself, prepare documents.
 - *“The appropriate SMEs, which are members of the SDIT, will prepare safety documents within their discipline. These documents are then reviewed by the SDIT and approved by the SDIT Project Engineer.”* UPF Integrated Management Plan

UPF Documentation Differences

- The UPF project had already passed the point where a Conceptual Safety Design Report (CSDR) would have been required prior to the issuance of DOE-STD-1189-2008. The UPF project elected not to prepare a CSDR as the required information had already been included in the Preliminary Hazards Analysis and the SDS.
- The UPF project has elected not to prepare a Risk and Opportunity Analysis as the required information will be included in the *Uranium Processing Facility Risk and Opportunity Management (R&OM) Plan* (RA-PJ-801768-A001), which was initially issued prior to the issuance of DOE-STD-1189-2008.

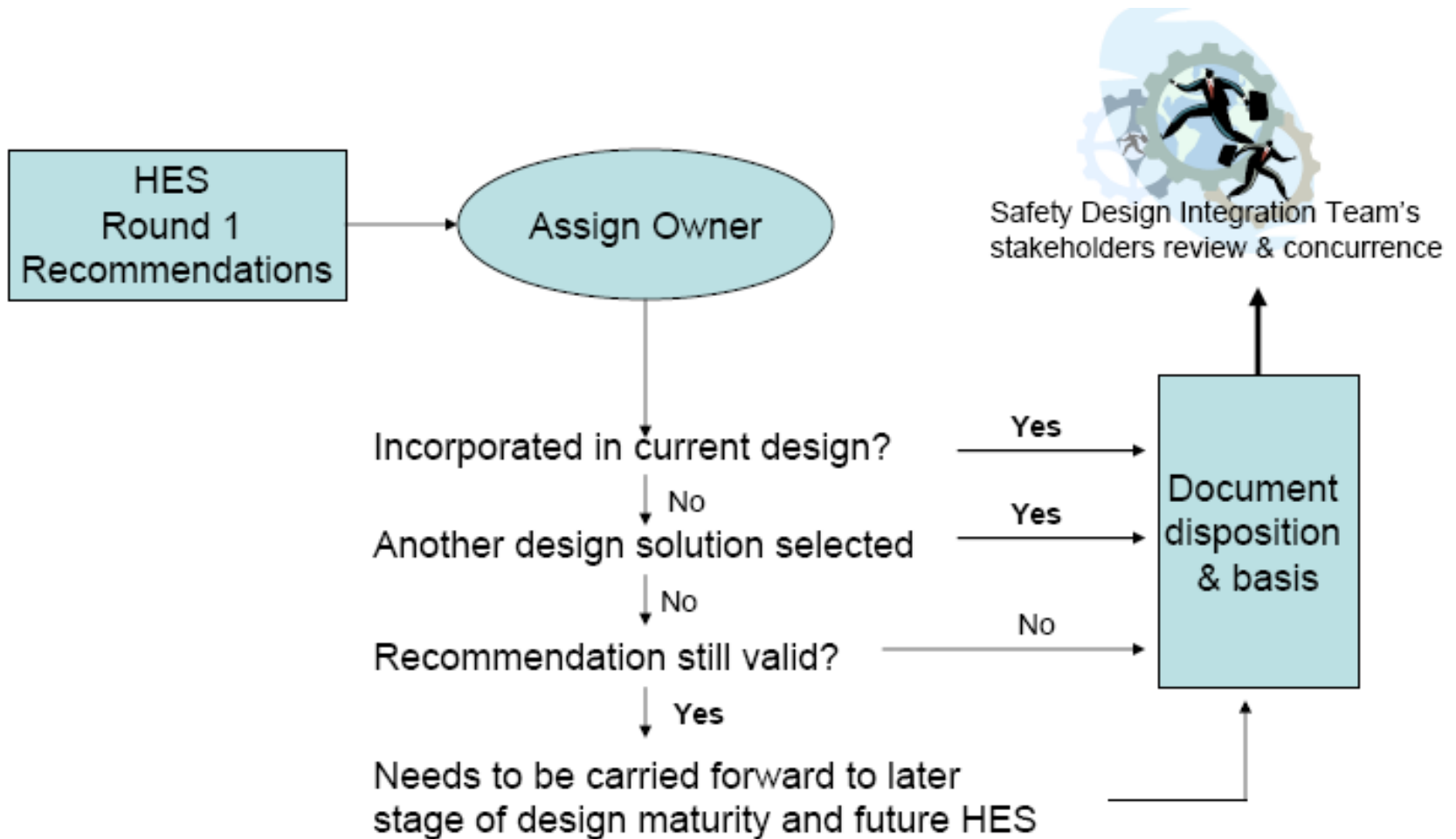
Optional Documents

- UPF has elected to follow Appendix B (Chemical Hazard Evaluation) and Appendix C (Facility Worker Hazard Evaluation).
 - Evaluations are integrated
 - Nuclear and high hazard chemicals are evaluated by Facility Safety
 - Remaining chemical hazards are evaluated by Industrial Safety
 - Industrial Safety utilizes the Hazards Analysis that was done for Facility Safety
 - Saves approximately \$1.5M in Engineering cost avoidance

Additional UPF SDIT Functions

- Ergonomic Evaluations
- Design for Construction Safety
 - Course #3, August 2009
- Technical Change Control Board (TCCB)
- Disposition of Hazard Evaluation Recommendations
- Equipment and Design Details Standardization

Disposition of HES Recommendations



Additional Information

Project Timeline



2018
CD-4 Start
of Operations

March 2010
CD-2
June 2010
CD-3B
August 2010
CD-3A
May 2011
CD-3C

December 2004
CD-0 Approved
July 2007
CD-1 Approved



Major Cost Benefits

- Payback within 5 years
- \$205 million/year cost savings over operating life of UPF project
- Up to \$700 million total cost avoidance through 2030 (capital improvements)

