FEMP-2609

EVOLUTION OF SAFETY BASIS DOCUMENTATION FOR THE FERNALD SITE

Author: Tulanda Brown
Contributors: Patricia Fisk, Sharon Kohler,
Fred Krach, and William Klein

March 2004

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Fluor Fernald, Inc.*
P.O. Box 538904
Cincinnati, Ohio 45253

*Fluor Fernald with the U.S. Department of Energy
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Abstract

The objective of the Department of Energy's (DOE) Fernald Closure Project (FCP), in suburban Cincinnati, Ohio, is to safely complete the environmental restoration of the Fernald site by 2006. Over 200 out of 220 total structures, at this DOE plant site which processed uranium ore concentrates into high-purity uranium metal products, have been safely demolished, including eight of the nine major production plants. Documented Safety Analyses (DSAs) for these facilities have gone through a process of simplification, from individual operating Safety Analysis Reports (SARs) to a single site-wide Authorization Basis containing nuclear facility Bases for Interim Operations (BIOs) to individual project Auditable Safety Records (ASRs). The final stage in DSA simplification consists of project-specific Integrated Health and Safety Plans (I-HASPs) and Nuclear Health and Safety Plans (N-HASPs) that address all aspects of safety, from the worker in the field to the safety basis requirements preserving the facility/activity hazard categorization. This paper addresses the evolution of Safety Basis Documentation (SBD), as DSAs, from production through site closure.

Introduction

The Fernald Closure Project (FCP) has implemented a logical evolution of graded safety basis documentation (SBD). The objective of this evolution has been to realign Fernald SBD to reflect the changes in hazards encountered as the site has moved from production toward final closure.

Project/site downgrading is a primary goal of nuclear site Decontamination and Demolition (D&D) and closure. Downgrading requires personnel to re-focus safety emphasis from protecting the public from high-level nuclear hazards to hands-on site worker hazards. Tailoring the SBD to the changing situation maintains rigor, discipline, and project efficiency.

SBD at the FCP has evolved as follows: during production, multiple Safety Analysis Reports (SARs) provided the safety bases for the nine production plants. When production ceased, a DOE-approved Implementation Plan (IP) for Safety Analysis Reports and Technical Safety Requirements was created as the safety basis for the entire site. This IP contained 12 Bases for Interim Operations (BIOs) that covered all nuclear facilities and related activities. Less-than-nuclear facilities/activities were covered by Safety Assessments.

Over time, as each nuclear facility was decontaminated in preparation for demolition, the facility BIO was downgraded to Radiological via an Auditable Safety Record (ASR). As closure activities became predominant, Integrated Health and Safety Plans (I-HASPs) were created to consolidate project-specific SBD for activities such as D&D, Wastewater Treatment, and Soils Remediation. Now that most nuclear materials have been shipped (except for silos), a site-wide Hazard Survey and Assessment document provides a mechanism for project-specific HASPs to also act as safety basis documents. For the three silos, Nuclear Health and Safety Plans (N-HASPs) were created to allow remediation facilities to be built and operated as Radiological facilities within the geographical boundaries of a Hazard Category 3 facility area.

The evolution of FCP DSAs reflects the course of environmental restoration of the site. As the facilities transitioned from operations to active shutdown (in which hazardous materials are sorted, packaged, and removed, and buildings are demolished), the hazards to the public, and particularly to the workers, changed. Safety documentation that previously addressed operational safety issues needed to focus on a different type of work and a different type of worker to ensure that appropriate hazards were addressed. A more integrated site-wide approach was needed to address both the oversight audience and the direct supervisory/worker audience. The solution was to combine the project-specific HASP with the project DSA(s), resulting in a document that addresses hazard categorization, Occupational Safety and Health Administration (OSHA) safety concerns, and implementation requirements.

Site Description and History

FCP Site Description

The FCP is located in southwestern Ohio, approximately twenty miles northwest of downtown Cincinnati near the communities of Miamitown and Ross, Ohio. The total site area is 1050 acres. FCP is owned by the DOE and is operated by Fluor Fernald, Inc. (Fluor Fernld).

The facility was built in the 1950s and called the Feed Materials Production Center (FMPC). It originally consisted of approximately 220 buildings, structures, and other facilities and 15 defined waste-disposal areas. The FMPC's mission was to process uranium ore concentrates into high-purity uranium metal products. A wide variety of chemical and metallurgical process steps supported manufacturing of uranium and thorium metal products for use at other DOE sites.

In July, 1989, after more than 36 years of production, operations at the site were suspended due to the reduced demand for uranium metal products as well as continuing problems in achieving full regulatory compliance. Much of the production-related equipment was placed in a standby state for restart. Management of the Fernald site was transferred from DOE Defense Programs (DP) to the Office of Environmental Restoration and Waste Management (EM) on October 1, 1990. The formal termination of the production mission took place in June, 1991, without the restart of production processes. In August, 1991, the site name was changed from the FMPC to the Fernald Environmental Management Project (FEMP) to signify the change in the site mission from uranium fabrication to environmental restoration. In 2003, the site name was changed again to the Fernald Closure Project (FCP) which addressed its closure mission.

Early History of FCP Safety Basis Documentation

During production operations, the Fernald Plant had individual SARs for each nuclear facility and a site-wide SAR, all written in DOE-5480.1B, and earlier formats. At that time, the Fernald site was being operated by the National Lead of Ohio, Inc. (NLO). In the early 1990s, after DOE Orders 5480.22 and .23 were made effective by the DOE, the new operating contractor, Westinghouse Environmental Management Co. (WEMCO), began the process of upgrading the SBD to these new orders.

When Fluor Fernald (then known as the Fernald Environmental Restoration Management Company [FERMCO]) submitted the IP in January, 1993, the safety documentation covering the Fernald nuclear facilities included the previously-described SARs and:

- 5480.23 SARs for Environmental Protection Agency (EPA) Operable Unit 4 (OU4) Silos 1, 2 and 3 (The silos contained uranium ore residues).
- 5480.23 SARs for Thorium Overpacking in Buildings 64/65, and liquid chemical neutralization processes in Plants 2/3 and 8.
- Safety Assessments and Auditable Safety Analyses for Safe Shutdown activities, Thorium Nitrate solidification in the Pilot Plant, and waste stabilization activities in Plant 6.

- Either project-specific health and safety plans (HASPs) or health and safety matrices.
- Radiation Work Permits and Hazardous Material Work Permits for all activities in the facilities.
- FEMP-2352, *FEMP Hazard Survey and Preliminary Hazard Categorization,* a site-wide hazard survey in support of the IP/BIOs.

Implementing Bases for Interim Operations (BIOs)

PL-3049, *Implementation Plan for Safety Analysis Reports and Technical Safety Requirements at the Fernald Environmental Management Project* (FEMP), was submitted for DOE approval in January, 1993. This Implementation Plan (IP), and its associated Bases for Interim Operations (BIOs), marked a change in approach to the Fernald nuclear safety basis. The key component was the IP, which provided: a summary of the history and status of activities at the FEMP; identification of facilities and their hazard classifications; identification of existing safety programs; an overview of waste disposal and site remediation plans; a summary of the structure and content of the BIOs; the rationale for the acceptability of operations based on the BIOs; and the rationale for concluding that upgrading the BIOs to SARs/TSRs was neither necessary nor cost-effective.

On December 17, 1996, the Assistant Secretary for Environmental Management, EM-1, issued a DOE Memorandum approving the IP. By doing so, the DOE accepted the Fluor Fernald recommendation that the BIOs serve as the DOE-approved safety basis for FEMP nuclear facilities. Therefore, the BIOs did not need to be upgraded to Safety Analysis Reports (SARs).

The IP contained a BIO for each of the site's 12 nuclear facilities. Those BIOs concluded that the facilities were safe to continue operations in support of the remediation mission. The basis for that affirmation was documented for each facility in its respective BIO. FIGURE 1 shows the relationship of the IP and the facility-specific BIOs, Safety Documentation, and Safety Program Summary Descriptions. Taken in their entirety, those documents were designed to adequately provide management with the basis to conclude that it was safe for these nuclear facilities to continue operation. The following nuclear facility BIOs were provided as appendices to PL-3049's IP:

- A: Plant 1 Area
- B: Plant 2/3 Area
- C: Plant 4 Area
- D: Plant 5 Area
- E: Plant 6 Area
- F: Plant 8 Area
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- H: Quonset Huts
- I: Thorium Warehouses
- J: Finished Products Warehouse
- K: Silos 1 and 2
- L: Silo 3

The BIOs relied on referenced documents to establish their unique basis for safe operation. Two types of documents referenced in the BIOs were Safety Documents and Safety Program Summary documents.

To streamline the process for maintaining, updating, and upgrading the BIOs as well to keep the BIOs brief, three Safety Documents were developed. They contained safety basis information common to most of the BIOs. Each Safety Document established the basis upon which the safety of the respective activities was established and allowed to continue in support of the site mission. Those activities were not facility-specific, and they could be conducted almost anywhere on site. They were located in the following appendices:

- M: Safety Documentation for Safe Shutdown Operations
- N: Safety Documentation for Material Storage, Handling, and Related Activities
- O: Safety Documentation for Nuclear Criticality Safety

Safety Program Summary descriptions were also referenced in the BIOs to provide assurance that the safety programs necessary for the safe operations described in the BIOs existed at the site. Those safety programs provided defense-in-depth for the nuclear facilities covered by the BIOs. The following Safety Program Descriptions were located in attachments to the IP:

1. Emergency Preparedness and Occurrence Reporting
2. Environmental Monitoring and Surveillance
3. Fire Protection
4. Occupational Safety and Health
5. Quality Assurance
6. Radiological Control
7. Training
8. Institutional Safety and Management
9. Testing, Surveillance, Inspection, and Maintenance
10. Conduct of Operations

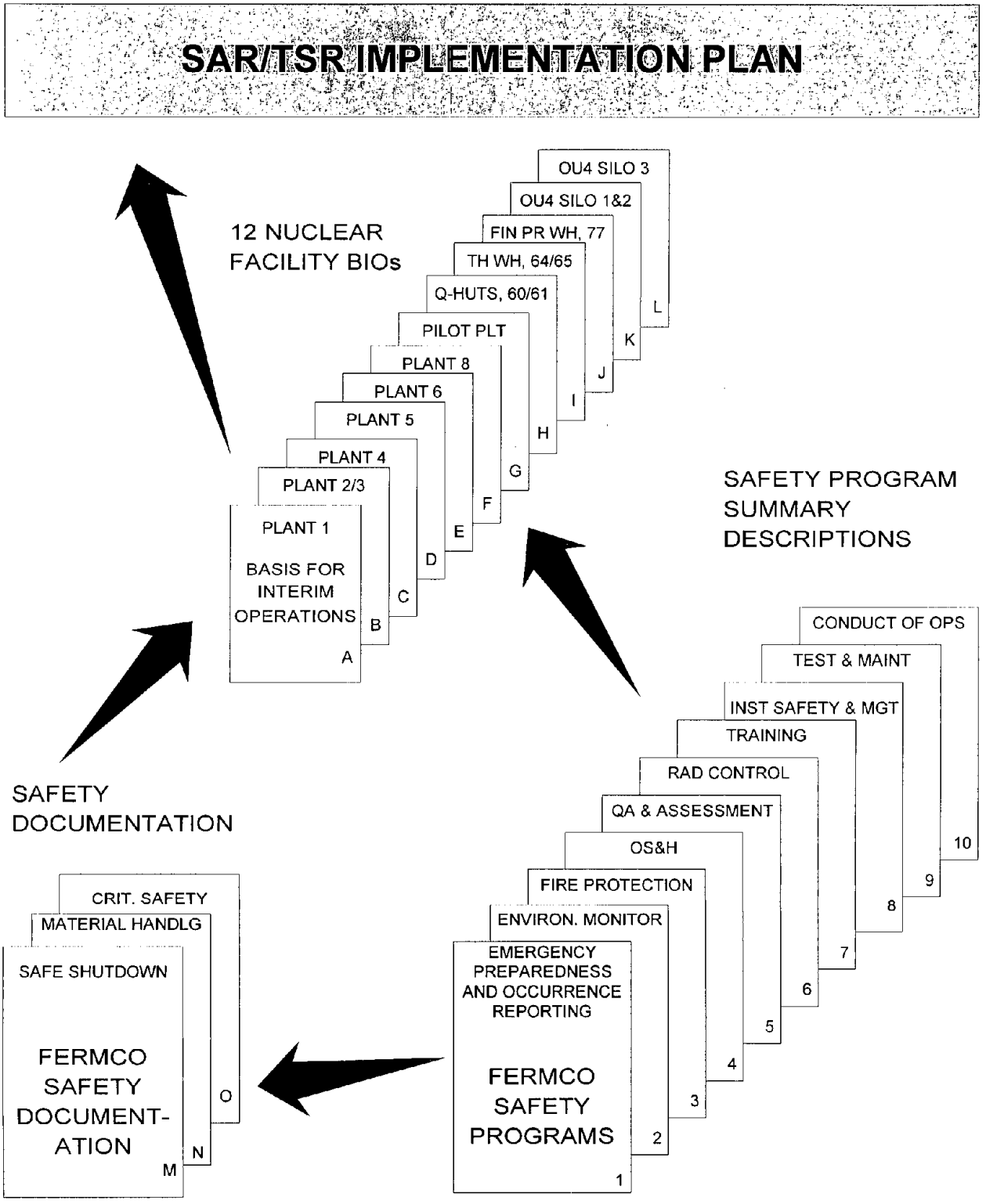

FIGURE 1. SAR/TSR Implementation Plan

Moving to Health and Safety Plans (I-HASPs and N-HASPs)

Beginning in 1999, FCP began streamlining the safety bases for the FCP closure process to bring SBD in line with the changing hazards faced by the workforce. Facilities were downgraded from Nuclear to RAD and Other Industrial Hazard (OIH). Obsolete safety assessments were inactivated. Innovative approaches to Documented Safety Analyses (DSAs) based on 10 CFR 830 safe harbor provisions were implemented.

As the FCP facilities transitioned from operations to active shutdown, the hazards to the public, and particularly to the workers, changed. Safety documentation that previously addressed operational safety issues needed to focus on a different type of work and a different type of worker to ensure that appropriate hazards were addressed. A more integrated site-wide approach was needed to address both the oversight audience and the direct supervisory/worker audience. The solution was to combine the project-specific HASP with the project DSA(s), resulting in a document that addresses hazard categorization, OSHA safety concerns, and implementation requirements. The final stage in DSA simplification consists of project-specific Integrated Health and Safety Plans (I-HASPs) for less than nuclear projects and Nuclear Health and Safety Plans (N-HASPs) for nuclear projects. These HASPs address all aspects of safety, from the worker in the field to the safety basis requirements preserving the facility/activity hazard categorization.

A large part of the effort to convert DSAs to I-HASPs or N-HASPs involved the Nuclear and System Safety (N&SS) group explaining to stakeholders the rationale of the conversion and obtaining their buy-in for it. This was no easy task considering the diversity of the projects in progress: facilities shutdown, aquifer restoration, waste pit remediation, on-site disposal, nuclear materials disposition, and remediation of silos containing uranium ore residues. After obtaining buy-in from the DOE and individual project managers, a plan was generated for implementing an I-HASP or N-HASP for each major project. Site procedures were revised to allow for this new type of documentation. FIGURE 1 shows the safety basis documents for the FCP closure process before I-HASPs and N-HASPs replaced other SBDs. FIGURE 2 shows the safety bases after replacement. Figure 2 shows that the site-wide BIOs are no longer needed because the nuclear facilities they covered have all been downgraded or have new, more current, safety basis documentation. These remaining safety basis documents are discussed below.

Remaining site-wide closure activities deal with hazardous materials that contain both radiological and chemical hazards. The closure process at the FCP includes:

- demolition of former production facilities.
- removal of building foundations and impacted soils by excavation subcontractors.
- construction, filling, and closing of the On-Site Disposal Facility (OSDF).
- silos waste retrieval, treatment, shipping and facility decontamination and demolition (D&D).
- restoration of the aquifer.
- removal of uranium contamination from site run-off and processes water.
- loading and transporting above-OSDF-WAC materials by truck and rail for off-site disposal.

- remediation of the waste pits area, Waste Pits Project (WPP) activities, and D&D of WPP facilities upon completion of the project.
- waste management activities.

The major closure activities listed above, and the one remaining nuclear facility (the silos) and their remediation, are covered by the safety basis generated by the documentation listed below.

- 60400-PL-0011, *Facilities Decontamination And Demolition (D&D) Projects Integrated Health And Safety Plan (I-HASP)*
- 20100-HS-0002, *Soil & Disposal Facility Project (SDFP) Integrated Health and Safety Plan*
- SA 2000-1027, *FEMP Deactivated Facility Auditable Safety Record*
- Shaw Group, Inc. Project No. 773481, *Waste Pits Project Remedial Action Health and Safety Plan*
- 40430-PL-0010, *Silo 3 Retrieval and Disposition Nuclear Health and Safety Plan* (DOE approved)
- 40710-PL-0015, Rev 0, *Radon Control System Nuclear Health and Safety Plan* (DOE approved)
- 40710-PL-0015, Rev 1, *Accelerated Waste Retrieval (AWR) Nuclear Health and Safety Plan* (under DOE review)
- 40710-PL-0015, Rev 2, *Silos 1 & 2 Retrieval and Disposition Nuclear Health and Safety Plan* (in progress)
- 5000-HS-0001, *Wastewater Treatment Operations (WTO) Integrated Health and Safety Plan*
- PL-2352, *FCP Hazard Survey and Assessment*

Other projects with lower-risk amounts of hazardous materials have project-specific SBD.

The recently updated *Hazard Survey and Assessment,* listed above, summarizes all of the major safety basis documentation at the FCP.

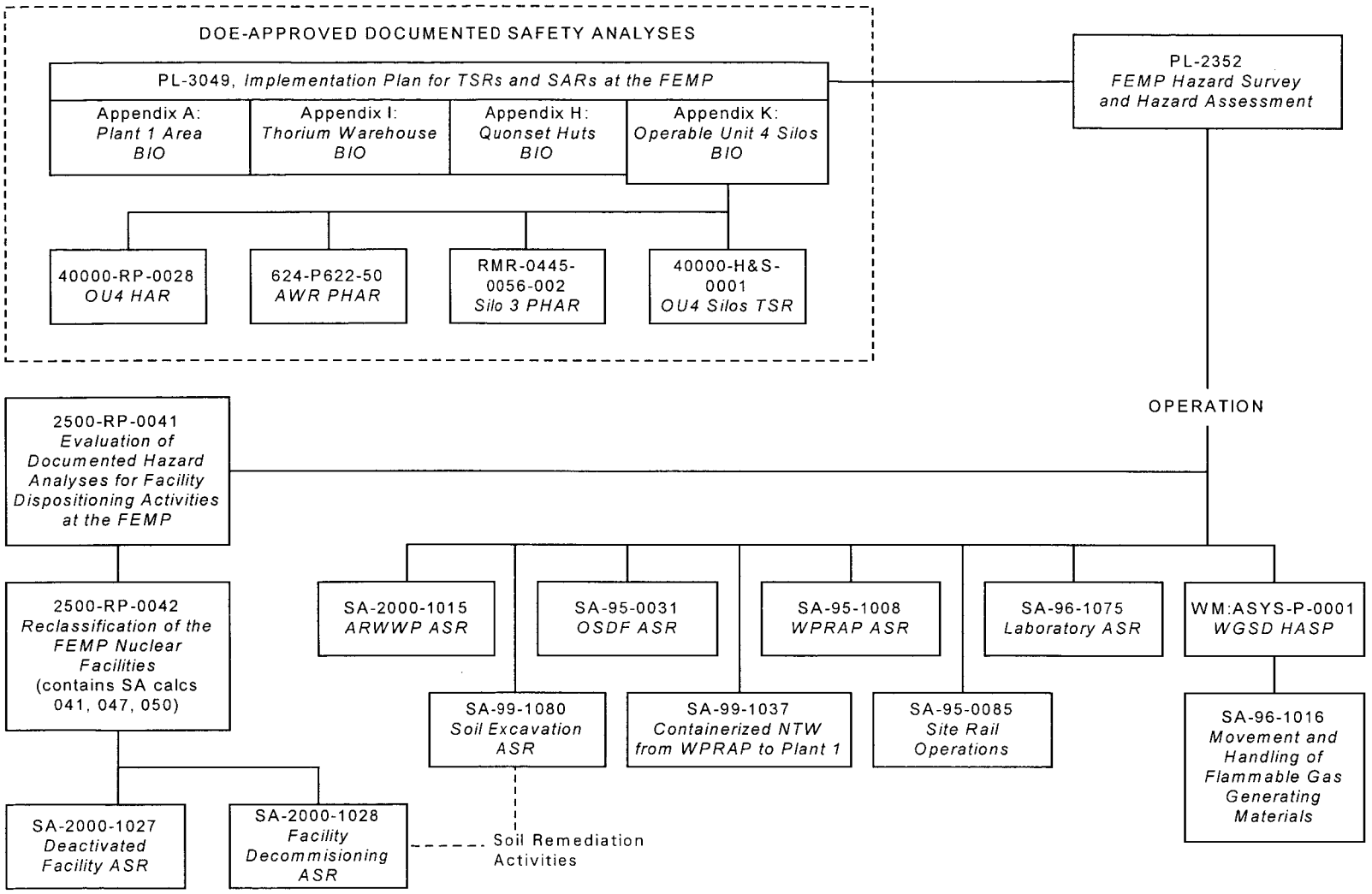

FIGURE 2. FCP Safety Bases Before I-HASPs and N-HASPs Replaced Other Types of SBD

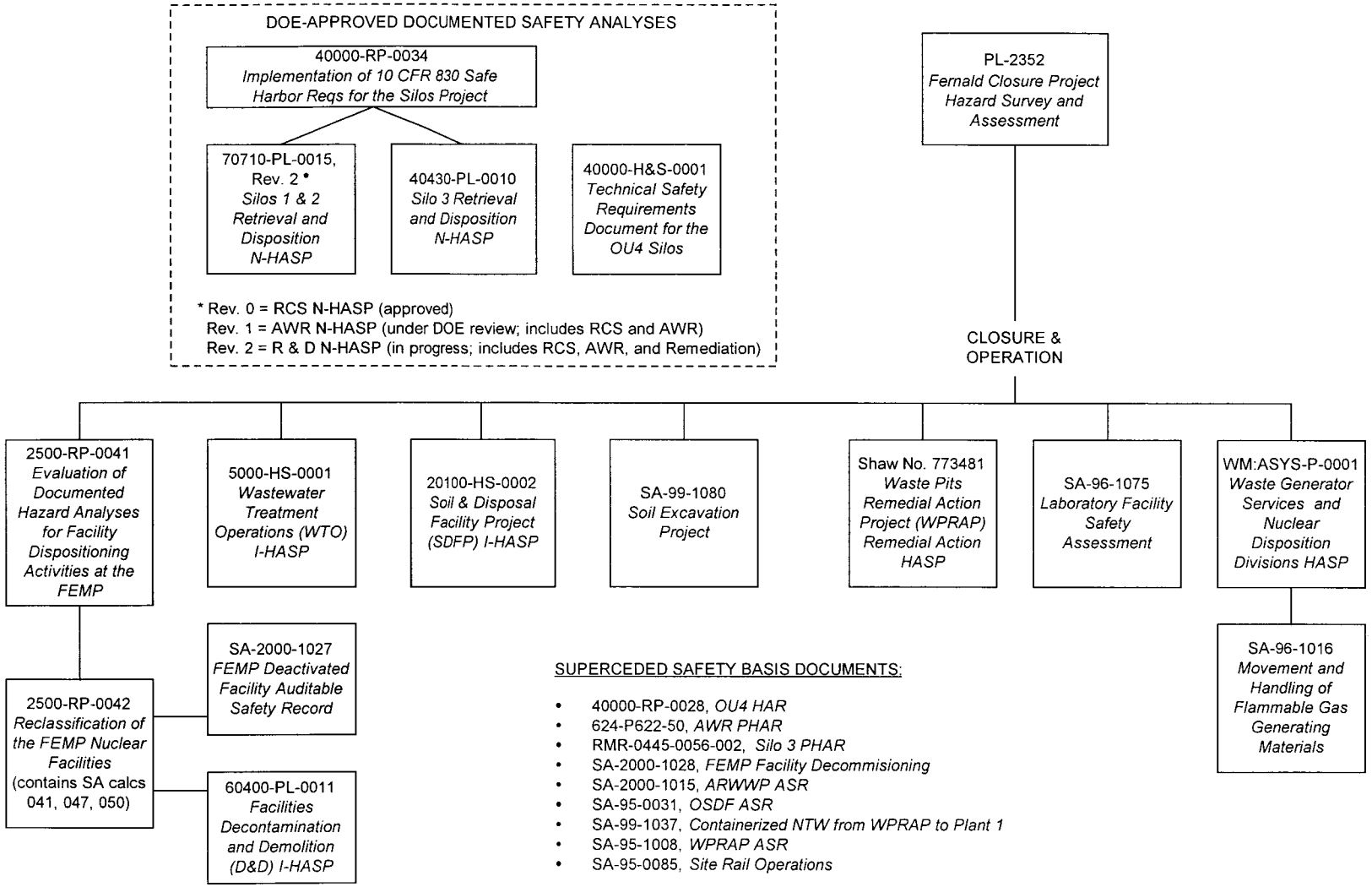

FIGURE 3. FCP Safety Bases After I-HASPs and N-HASPs Replaced Other Types of SBD

As can be seen from FIGURES 2 and 3, the I-HASPs and N-HASPs have become the primary types of SBD for most FCP projects as the site draws near final closure. I-HASPs have replaced less-than-nuclear hazard-categorized SBDs. N-HASPs have replaced, and are in the process of replacing, the SBDs for the one remaining nuclear facility, the silos.

Management of SBD Change

To maintain project safety bases as DSAs evolved, the change control process also underwent corresponding changes (see TABLE 1). For changes to nuclear facilities, site staff employed DOE's Unreviewed Safety Question (USQ) process. As the majority of the site downgraded to less-than-nuclear facilities, an FCP-designed USQ-like process, the Safety Basis Document Review (SBDR), was put into place. Now, during the era of I-HASPs and N-HASPs, safety bases are maintained with Safety Basis Impact Screens (SBISs). If a change affects a nuclear facility and an SBIS is positive, further analysis is conducted that can lead to a USQ Determination and Safety Evaluation (USQD/SE). For a less-than-nuclear facility, a positive SBIS leads to an SBDR.

Table 1. Management Of Change (MOC) Evolution

Facility Classification	MOC Process	How Process Applied
Nuclear	Unreviewed Safety Question (USQ)	Used per 10 CRF 830, Subpart B, for changes outside the authorization basis
Radiological (RAD)	Safety Basis Document Review (SBDR)	Primarily used for Design Change Notices (DCNs) and operations procedure changes
RAD (Silos)	Safety Basis Impact Screen (SBIS)	Primarily used for procedure changes
Other Industrial Hazard (OIH)	Construction Change Traveler	Primarily used for demolition and excavation projects

For facilities/activities dealing with significant amounts of hazardous materials, these change control processes provided a method of assuring that changes in design, approved operation, maintenance activities, new operating procedures, and maintenance work instructions, are evaluated against the projects' safety bases. In addition, potential impacts on adjacent facilities, safety basis requirements [SBRs], and process requirements [PRs]) (that support SBRs) are also evaluated. Changes that do impact the safety basis document are incorporated into the document during its annual review and update.

For facilities/activities with hazardous materials significantly less than the hazard classification threshold (e.g., excavating areas of slightly contaminated soils), the predominant OSHA hazards are reviewed and screened by the field safety engineer. Changes to these OSHA hazards are then evaluated and documented as part of the project change package (called construction change Travelers) covered by broad project safety bases provided by the project's I-HASP. During development of the travelers, if hazards are encountered by the field safety personnel that are significant enough to potentially cause a change in hazard classification, or severely endanger personnel, they undergo the change control process outlined in the preceding paragraph.

Thus, changes have been, and continue to be, controlled to assure that the safety bases are effectively and efficiently maintained throughout the life of the projects.

Conclusion

This paper has shown how SBD (now called DSA) has evolved over the life of the uranium Feed Materials Production Center in Fernald, Ohio. As facility ownership shifted from the Atomic Energy Commision (AEC) to the Energy Research and Development Administration (ERDA) to DOE, and changes occurred in safety basis requirements, the SBD was adapted to support the evolving requirements.

SBD also evolved to adapt to the changing mission of the Fernald site, from construction to production, to D&D and finally to closure. A goal of the safety analysts at Fernald has been to support the site's principal objectives while striving to optimize safety for both nuclear and non-nuclear activities. We feel that the support of safety and production objectives, as described herein, have been optimized.

If the reader has any questions, feel free to contact the author of this paper, or any of the paper's contributors, via Fluor Fernald's main telephone number (513) 648-3000.

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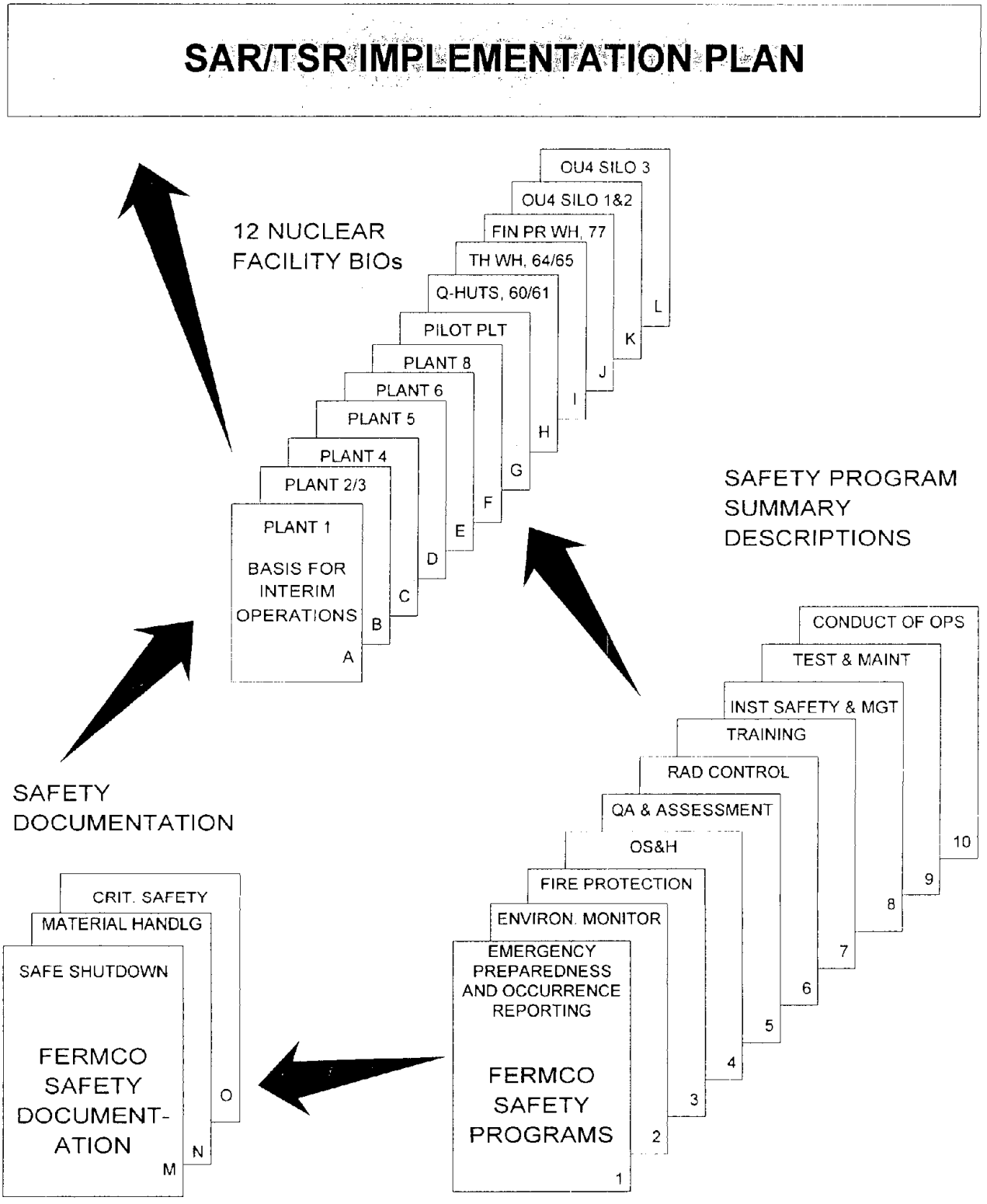

FIGURE 1. SAR/TSR Implementation Plan

Moving to Health and Safety Plans (I-HASPs and N-HASPs)

Beginning in 1999, FCP began streamlining the safety bases for the FCP closure process to bring SBD in line with the changing hazards faced by the workforce. Facilities were downgraded from Nuclear to RAD and Other Industrial Hazard (OIH). Obsolete safety assessments were inactivated. Innovative approaches to Documented Safety Analyses (DSAs) based on 10 CFR 830 safe harbor provisions were implemented.

As the FCP facilities transitioned from operations to active shutdown, the hazards to the public, and particularly to the workers, changed. Safety documentation that previously addressed operational safety issues needed to focus on a different type of work and a different type of worker to ensure that appropriate hazards were addressed. A more integrated site-wide approach was needed to address both the oversight audience and the direct supervisory/worker audience. The solution was to combine the project-specific HASP with the project DSA(s), resulting in a document that addresses hazard categorization, OSHA safety concerns, and implementation requirements. The final stage in DSA simplification consists of project-specific Integrated Health and Safety Plans (I-HASPs) for less than nuclear projects and Nuclear Health and Safety Plans (N-HASPs) for nuclear projects. These HASPs address all aspects of safety, from the worker in the field to the safety basis requirements preserving the facility/activity hazard categorization.

A large part of the effort to convert DSAs to I-HASPs or N-HASPs involved the Nuclear and System Safety (N&SS) group explaining to stakeholders the rationale of the conversion and obtaining their buy-in for it. This was no easy task considering the diversity of the projects in progress: facilities shutdown, aquifer restoration, waste pit remediation, on-site disposal, nuclear materials disposition, and remediation of silos containing uranium ore residues. After obtaining buy-in from the DOE and individual project managers, a plan was generated for implementing an I-HASP or N-HASP for each major project. Site procedures were revised to allow for this new type of documentation. FIGURE 1 shows the safety basis documents for the FCP closure process before I-HASPs and N-HASPs replaced other SBDs. FIGURE 2 shows the safety bases after replacement. Figure 2 shows that the site-wide BIOs are no longer needed because the nuclear facilities they covered have all been downgraded or have new, more current, safety basis documentation. These remaining safety basis documents are discussed below.

Remaining site-wide closure activities deal with hazardous materials that contain both radiological and chemical hazards. The closure process at the FCP includes:

- demolition of former production facilities.
- removal of building foundations and impacted soils by excavation subcontractors.
- construction, filling, and closing of the On-Site Disposal Facility (OSDF).
- silos waste retrieval, treatment, shipping and facility decontamination and demolition (D&D).
- restoration of the aquifer.
- removal of uranium contamination from site run-off and processes water.
- loading and transporting above-OSDF-WAC materials by truck and rail for off-site disposal.

- remediation of the waste pits area, Waste Pits Project (WPP) activities, and D&D of WPP facilities upon completion of the project.
- waste management activities.

The major closure activities listed above, and the one remaining nuclear facility (the silos) and their remediation, are covered by the safety basis generated by the documentation listed below.

- 60400-PL-0011, *Facilities Decontamination And Demolition (D&D) Projects Integrated Health And Safety Plan (I-HASP)*
- 20100-HS-0002, *Soil & Disposal Facility Project (SDFP) Integrated Health and Safety Plan*
- SA 2000-1027, *FEMP Deactivated Facility Auditable Safety Record*
- Shaw Group, Inc. Project No. 773481, *Waste Pits Project Remedial Action Health and Safety Plan*
- 40430-PL-0010, *Silo 3 Retrieval and Disposition Nuclear Health and Safety Plan* (DOE approved)
- 40710-PL-0015, Rev 0, *Radon Control System Nuclear Health and Safety Plan* (DOE approved)
- 40710-PL-0015, Rev 1, *Accelerated Waste Retrieval (AWR) Nuclear Health and Safety Plan* (under DOE review)
- 40710-PL-0015, Rev 2, *Silos 1 & 2 Retrieval and Disposition Nuclear Health and Safety Plan* (in progress)
- 5000-HS-0001, *Wastewater Treatment Operations (WTO) Integrated Health and Safety Plan*
- PL-2352, *FCP Hazard Survey and Assessment*

Other projects with lower-risk amounts of hazardous materials have project-specific SBD.

The recently updated *Hazard Survey and Assessment,* listed above, summarizes all of the major safety basis documentation at the FCP.

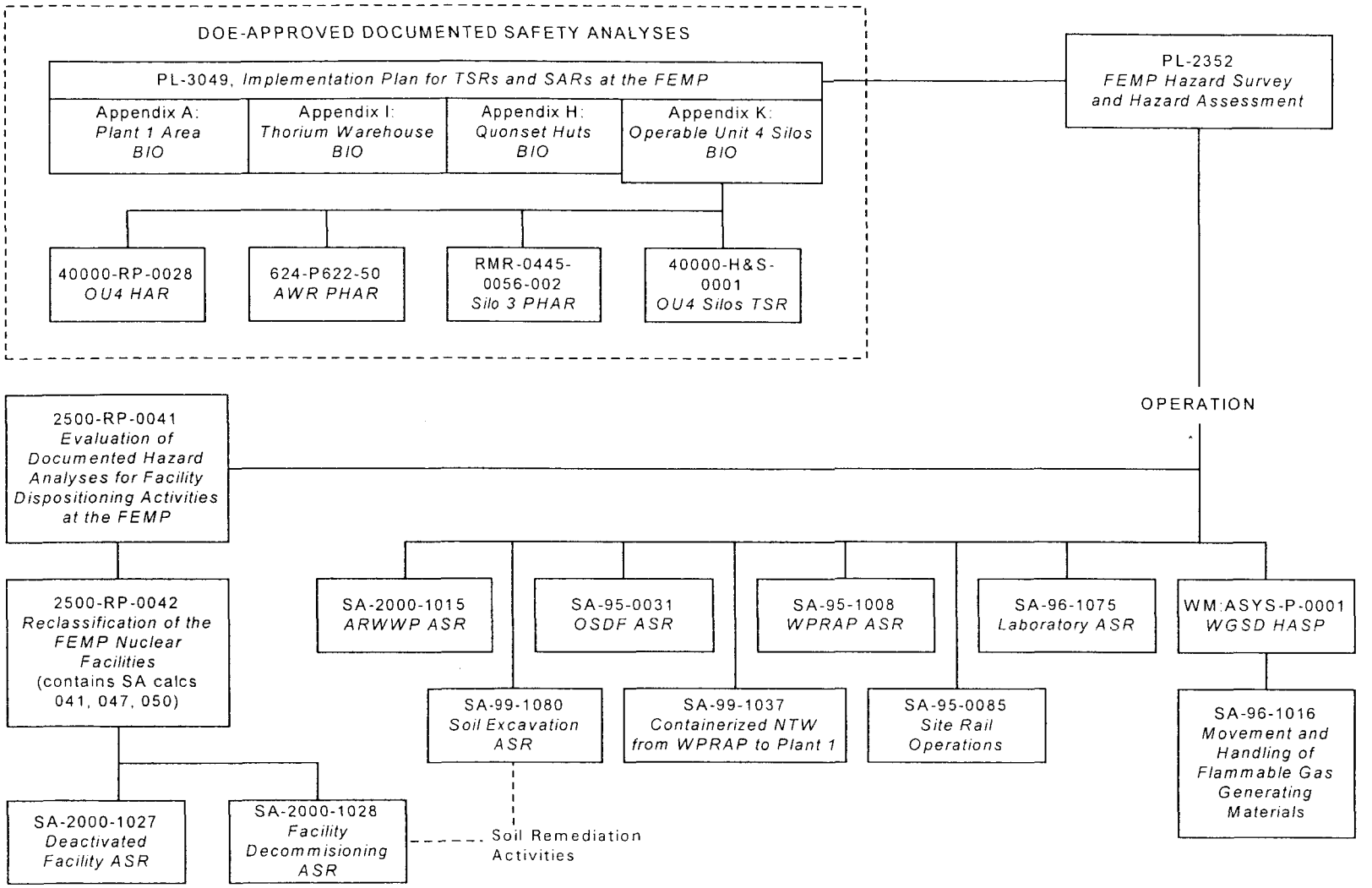

FIGURE 2. FCP Safety Bases Before I-HASPs and N-HASPs Replaced Other Types of SBD

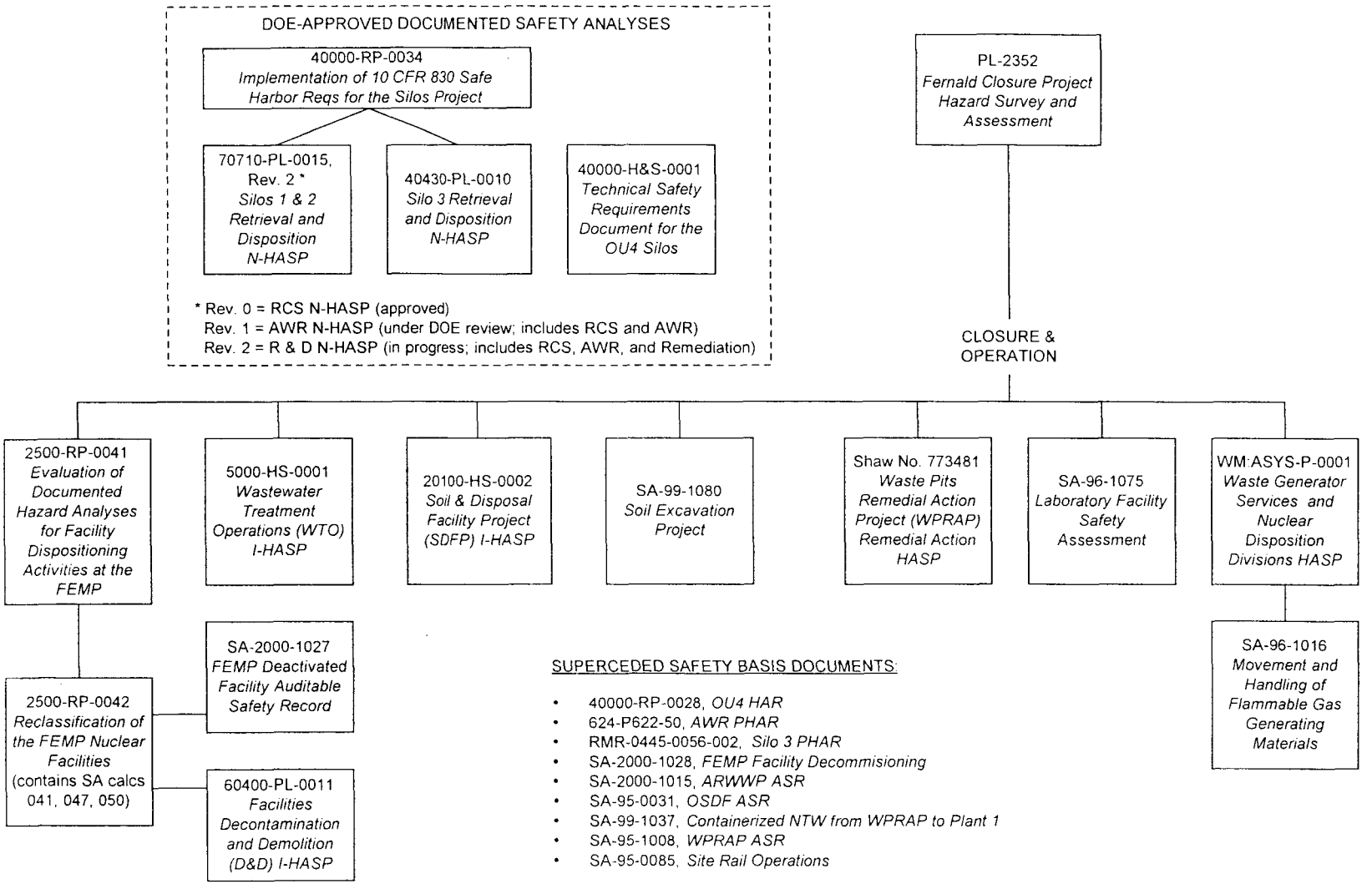

FIGURE 3. FCP Safety Bases After I-HASPs and N-HASPs Replaced Other Types of SBD

As can be seen from FIGURES 2 and 3, the I-HASPs and N-HASPs have become the primary types of SBD for most FCP projects as the site draws near final closure. I-HASPs have replaced less-than-nuclear hazard-categorized SBDs. N-HASPs have replaced, and are in the process of replacing, the SBDs for the one remaining nuclear facility, the silos.

Management of SBD Change

To maintain project safety bases as DSAs evolved, the change control process also underwent corresponding changes (see TABLE 1). For changes to nuclear facilities, site staff employed DOE's Unreviewed Safety Question (USQ) process. As the majority of the site downgraded to less-than-nuclear facilities, an FCP-designed USQ-like process, the Safety Basis Document Review (SBDR), was put into place. Now, during the era of I-HASPs and N-HASPs, safety bases are maintained with Safety Basis Impact Screens (SBISs). If a change affects a nuclear facility and an SBIS is positive, further analysis is conducted that can lead to a USQ Determination and Safety Evaluation (USQD/SE). For a less-than-nuclear facility, a positive SBIS leads to an SBDR.

Table 1. Management Of Change (MOC) Evolution

Facility Classification	MOC Process	How Process Applied
Nuclear	Unreviewed Safety Question (USQ)	Used per 10 CRF 830, Subpart B, for changes outside the authorization basis
Radiological (RAD)	Safety Basis Document Review (SBDR)	Primarily used for Design Change Notices (DCNs) and operations procedure changes
RAD (Silos)	Safety Basis Impact Screen (SBIS)	Primarily used for procedure changes
Other Industrial Hazard (OIH)	Construction Change Traveler	Primarily used for demolition and excavation projects

For facilities/activities dealing with significant amounts of hazardous materials, these change control processes provided a method of assuring that changes in design, approved operation, maintenance activities, new operating procedures, and maintenance work instructions, are evaluated against the projects' safety bases. In addition, potential impacts on adjacent facilities, safety basis requirements [SBRs], and process requirements [PRs]) (that support SBRs) are also evaluated. Changes that do impact the safety basis document are incorporated into the document during its annual review and update.

For facilities/activities with hazardous materials significantly less than the hazard classification threshold (e.g., excavating areas of slightly contaminated soils), the predominant OSHA hazards are reviewed and screened by the field safety engineer. Changes to these OSHA hazards are then evaluated and documented as part of the project change package (called construction change Travelers) covered by broad project safety bases provided by the project's I-HASP. During development of the travelers, if hazards are encountered by the field safety personnel that are significant enough to potentially cause a change in hazard classification, or severely endanger personnel, they undergo the change control process outlined in the preceding paragraph.

Thus, changes have been, and continue to be, controlled to assure that the safety bases are effectively and efficiently maintained throughout the life of the projects.

Conclusion

This paper has shown how SBD (now called DSA) has evolved over the life of the uranium Feed Materials Production Center in Fernald, Ohio. As facility ownership shifted from the Atomic Energy Commision (AEC) to the Energy Research and Development Administration (ERDA) to DOE, and changes occurred in safety basis requirements, the SBD was adapted to support the evolving requirements.

SBD also evolved to adapt to the changing mission of the Fernald site, from construction to production, to D&D and finally to closure. A goal of the safety analysts at Fernald has been to support the site's principal objectives while striving to optimize safety for both nuclear and non-nuclear activities. We feel that the support of safety and production objectives, as described herein, have been optimized.

If the reader has any questions, feel free to contact the author of this paper, or any of the paper's contributors, via Fluor Fernald's main telephone number (513) 648-3000.