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June 1, 2017

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Division of Decommissioning, Uranium Recovery, and Waste Programs
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
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SUBJECT: Transmittal of U.S. Department of Energy West Valley Demonstration Project (DOE-WVDP) Vitrification Facility (VF) Decommissioning & Demolition (D&D) Plan, Revision (Rev.) 4, May 9, 2017

REFERENCES:

1) Letter (369807), B. C. Bower to M. R. Meyer, "U.S. Department of Energy West Valley Demonstration Project (DOE-WVDP) Responses to the U.S. Nuclear Regulatory Commission (NRC) Comments on DOE-WVDP Vitrification Facility Decommissioning & Demolition Plan, WVDP-575, Rev. 3, dated July 6, 2016," dated January 30, 2017

2) Letter (368973), M. R. Meyer to B. C. Bower, "U.S. Nuclear Regulatory Comments on U.S. Department of Energy West Valley Demonstration Project Vitrification Facility Decommissioning & Demolition Plan, WVDP-575, Rev. 3, dated July 6, 2016 (Docket No. POOM-0032)," dated September 12, 2016

3) Letter (368093), B. C. Bower to M. R. Meyer, "Transmittal of U.S. Department of Energy (DOE) West Valley Demonstration Project (WVDP) Vitrification Facility (VF) Decommissioning & Demolition (D&D) Plan, WVDP-575, Rev. 3," dated July 13, 2016

4) Phase 1 Decommissioning Plan for the West Valley Demonstration Project, Revision 2, December 2009

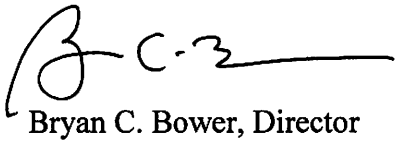
Dear Mr. Meyer:

This letter transmits to the U.S. Nuclear Regulatory Commission (NRC) *WVDP-575 – WVDP Vitrification Facility (VF) Decommissioning & Demolition (D&D) Plan, Rev. 4, May 9, 2017*. WVDP-575, Rev. 4 incorporates the NRC's September 12, 2016, technical comments from its review of WVDP-575 Rev. 3, which was submitted for NRC review on July 13, 2016. DOE responses to the NRC technical comments were transmitted to the NRC on January 30, 2017.

WVDP-575 was prepared to fulfill, in part, commitments made in the *Phase 1 Decommissioning Plan for the WVDP, Revision 2, December 2009* (Phase 1 DP), to provide NRC decommissioning work plans for the demolition of major WVDP facilities such as the Main Plant Process Building and the VF. It should be noted that WVDP-575 describes the tasks and approaches to deactivate, decommission, and demolish the above grade portion of the WVDP VF, which is consistent with the terms of DOE Contract No. DE-EM0001529 with CH2M HILL BWXT West Valley, LLC to remove the VF to the 100 foot plant reference elevation, plus or minus 3 feet.

Please let us know if NRC needs any additional information regarding this document. Please refer any questions about this submittal to Moira Maloney of my staff at 716-942-4255.

Sincerely,



Bryan C. Bower, Director
West Valley Demonstration Project

Enclosures:
1. WVDP-575 – WVDP VF D&D Plan, Rev. 4, May 9, 2017
2. One CD (Containing electronic file of the report identified above)

cc: J. K. Grimes, DOE-EMCBC, Office of the Director, w/o enc.
M. N. Maloney, DOE-WVDP, AC-DOE, w/o enc.
A. Snyder, NRC, w/enc.
P. J. Bembia, NYSERDA, AC-NYS, w/enc.

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West Valley Demonstration Project

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WVDP VITRIFICATION FACILITY (VF) DECOMMISSIONING & DEMOLITION (D&D) PLAN

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Acronyms

ACM	Asbestos-Containing Materials
AERMOD	American Meteorological Society/Environmental Protection Agency Regulatory Model Improvement Committee's Dispersion Model
ALARA	As Low As Reasonably Achievable
ANSI	American National Standards Institute
BSFR	Bulk Survey for Release
CAP-88	Clean Air Act Assessment Package – 1988
CFMT	Concentrator Feed Makeup Tank
CFR	Code of Federal Regulations
CHBWV	CH2M HILL BWXT West Valley, LLC
CMR	Crane Maintenance Room
CSBD	Cut, Shear, Break, Drop
CSRF	Contact Size Reduction Facility
D&D	Decommissioning & Demolition
DOD	U.S. Department of Defense
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
DP	Decommissioning Plan
DSA	Documented Safety Analysis
EDR	Equipment Decontamination Room
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
HEME	High-Efficiency Mist Eliminator
HEPA	High-Efficiency Particulate Air
HWMU	Hazardous Waste Management Unit
HVAC	Heating Ventilation and Air Conditioning
IM	Intermodal
ISMS	Integrated Safety Management System
IWCP	Integrated Work Control Program
IWP	Industrial Work Permit
IWTS	Integrated Waste Tracking System
LLW	Low-Level Waste
MEOSI	Maximally Exposed Off-Site Individual
MFHT	Melter Feed Hold Tank
MLLW	Mixed Low-Level Waste
MPPB	Main Plant Process Building
NESHAP	National Emission Standards for Hazardous Air Pollutants
NNSS	Nevada National Security Site
NRC	U.S. Nuclear Regulatory Commission
NYCRR	New York State Official Compilation of Codes, Rules, and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOL	New York State Department of Labor
OSHA	Occupational Safety and Health Administration
PBS	Polymeric Barrier System
PCB	Polychlorinated Biphenyl
rad-NESHAP	National Emission Standards for Hazardous Air Pollutants (for Radionuclides)
RCRA	Resource Conservation and Recovery Act
RM	Responsible Manager
ROD	Record of Decision
RPP	Radiation Protection Program
RWP	Radiological Work Permit
SBS	Submerged Bed Scrubber
SOP	Standard Operating Procedure
SPDES	State Pollutant Discharge Elimination System
SPRU	Separations Process Research Unit

STR	Subcontractor Technical Representative
TSI	Thermal System Insulation
TSCA	Toxic Substance Control Act
TSD	Treatment Storage or Disposal
TSRs	Technical Safety Requirements
TSDFs	Treatment Storage & Disposal Facilities
TRU	Transuranic
VC	Vitrification Cell
VF	Vitrification Facility
VTS	Vitrification Treatment System
WAC	Waste Acceptance Criteria
WCS	Waste Control Specialists
WIP	Work Instruction Package
WVDP	West Valley Demonstration Project

1.0 INTRODUCTION

1.1 Background

In December 2009 the U.S. Department of Energy (DOE) submitted Revision 2 of the Phase 1 Decommissioning Plan (DP) for the West Valley Demonstration Project (WVDP) for U.S. Nuclear Regulatory Commission (NRC) information. The DOE prepared the DP pursuant to its statutory obligations under the *WVDP Act of 1980*, Public Law 96-368, and to satisfy a commitment in the 1981 Memorandum of Understanding between DOE and NRC. The proposed action in the Phase 1 DP is based on the preferred alternative (Phased Decisionmaking) in the *Environmental Impact Statement for Decommissioning and/or Long-Term Stewardship at the West Valley Demonstration Project and Western New York Nuclear Service Center* (EIS). Under the preferred alternative, decommissioning will be accomplished in two phases. Phase 1 decommissioning actions include removal of certain WVDP facilities including the Main Plant Process Building (MPPB) and the Vitrification Facility (VF). The Phase 2 decision, to be made within 10 years of the EIS Record of Decision (ROD), involves decommissioning or long-term management decisions for remaining WVDP facilities.

Under the WVDP Act, the NRC's responsibilities include prescribing requirements for decontamination and decommissioning of project facilities, providing informal review and consultation to DOE on activities related to the project, and monitoring project activities for the purpose of assuring public health and safety.

The organization and content of the Phase 1 DP prepared by DOE were based on NRC guidance in Volume 1 of NUREG-1757, *Consolidated Decommissioning Guidance, Decommissioning Process for Materials Licensees* and agreements made between NRC and DOE on the applicability of this guidance to the DP during a May 2008 meeting. Prior to DOE developing the Phase 1 DP, NRC agreed that certain DOE regulations, orders, and technical standards are adequate to define, control, and establish safe work activities at the site, and that DOE did not need to provide these details in the Phase 1 DP. In this respect, NRC considered areas such as project management and organization, the health and safety program, the environmental monitoring and control program, and the radioactive waste management program adequate under DOE's responsibility and authority.

The DP contains a general overview of Phase 1 decommissioning activities including a summary of remediation and demolition technologies. In the Phase 1 DP, DOE generally avoided being prescriptive in methods to be used to give the decommissioning contractor(s) flexibility. The DP stated that it would be supplemented by more detailed work plans for demolition of major facilities such as the MPPB and VF.

In June 2011, DOE awarded the Phase 1 Decommissioning and Facility Disposition Contract to CH2M HILL BWXT West Valley, LLC (CHBWV). Under this contract, CHBWV, and its subcontractors, will deactivate and prepare the VF for demolition, demolish the building to grade level (i.e., nominal 100 ±3 ft, plant reference elevation), and stabilize the remaining at-grade and below grade structures.

In 2012 the WVDP established an ambient air monitoring network and sampling program providing continuous environmental air sampling during all site activities for surveillance and regulatory compliance. Sixteen air monitoring stations encircling the WVDP are located near the closest off-

site receptor in each compass sector and one background location located about 18 miles from the site. In 2015, the U.S. Environmental Protection Agency (EPA) approved the use of "ambient environmental measurements" pursuant to 40 CFR 61.93(b)(5) for estimating off-site dose from airborne emissions and to demonstrate compliance with 40 CFR 61, Subpart H. As the predominant source of WVDP air emissions transitions from point sources (e.g., MPPB stack) to diffuse sources (i.e., releases from building demolition), the use of ambient air monitoring samplers becomes a more appropriate method of demonstrating compliance with National Emission Standards for Hazardous Air Pollutants for radionuclides (rad-NESHAP) requirements.

In January 2016, the WVDP submitted to EPA a request for approval for alternative methodology, pursuant to 40 CFR Part 61.96(b), for radionuclide source-term calculations for air emissions from WVDP demolition activities. The WVDP believes the proposed alternative calculation is more appropriate for the estimation of radionuclide emissions from demolition activities, as demolition activities were not considered when the regulations (Appendix D to 40CFR Part 61) were originally promulgated. The EPA approved the use of the alternative methodology to support VF demolition on May 3, 2016, with conditions to be implemented during demolition activities. The WVDP will continue to coordinate with EPA and perform calculations to support WVDP facility demolitions in accordance with rad-NESHAP requirements.

The VF is also identified as a Resource Conservation and Recovery Act (RCRA) Interim Status Hazardous Waste Management Unit (HWMU) with closure of the facility to be performed in accordance with WVDP-153, *Resource Conservation and Recovery Act Hazardous Waste Closure Plan for the High-Level Waste Vitrification Facility.* The RCRA closure plan was prepared to meet the requirements of the state and federal hazardous waste regulations, specifically Title 6 of the New York State Official Compilation of Codes, Rules, and Regulations (6 NYCRR) §373-3, *Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities.* The closure plan was submitted to the New York State Department of Environmental Conservation (NYSDEC) in March 2016. Closure certification and required documentation will be prepared at completion of closure activities and submitted to NYSDEC.

1.2 Purpose

The purpose of this Decommissioning and Demolition (D&D) plan is to provide information on the tasks and approaches for deactivating (i.e., prepare for demolition), decommissioning, and demolishing the VF. The WVDP Phase 1 DP presented a general summary of remediation and demolition technologies with more detailed information to be included in decommissioning work plans such as this. The types of information to be provided were summarized in the Phase 1 DP checklist, based on NUREG-1757, Volume 1, Appendix D.

1.3 Scope

This D&D Plan provides a summary of tasks and techniques to decommission and demolish the VF structure, systems, and components and stabilize the grade-level and below grade-level portions of the structure. These activities will be performed by CHWBV and its subcontractor(s), according to the terms and scope of the Phase 1 Decommissioning and Facility Disposition Contract between CHBWV and DOE.

As noted above, the WVDP Phase 1 DP indicated that it would be supplemented with more detailed plans for demolition of major facilities such as the VF and MPPB. Consistent with NUREG-1757, the Phase 1 DP checklist summarizes the types of additional information to be provided which include: (plan sections providing the information are shown in parentheses)

- a summary of the deactivation and demolition tasks and the order in which they occur and a description of remediation techniques for contaminated structures, systems, and equipment (Sections 5.0 and 6.0);
- a summary of equipment being removed or decontaminated and decontamination approach(es) (Sections 5.0 and 6.0);
- commitment to conduct decommissioning activities in accordance with written, approved procedures (Sections 4.1 and 5.7); and
- a summary of unique safety or remediation issues associated with the facility and systems (Sections 5.2-5.4 and 6.0).

In addition to these primary topics, this D&D Plan presents a description of the VF, summary of characterization information and an overview of the management approach. Also included is information regarding work planning and work controls, radiological control measures, and waste management activities that are integrated by CHBWV to safely and compliantly demolish the VF.

This document is not intended as a comprehensive procedure for implementing VF D&D. This D&D Plan will be supplemented by specific Work Instruction Packages (WIP's) and CHBWV work procedures, Industrial Work Permits (IWPs), Radiological Work Permits (RWPs), and waste management procedures, as applicable. The WVDP work control process is described in more detail in Sections 4.1 and 5.7.

The specific D&D approaches, techniques, work sequencing and schedule are based on currently available information and planning and lessons learned from demolition of the WVDP 01-14 Building. Demolition of the 01-14 Building was conducted as a proof of concept for safe and compliant open air demolition of a radiological building.

As the final steps are taken and equipment is removed to prepare the VF for demolition and facility demolition begins, it may become necessary to make adjustments to the approaches or sequencing outlined in this plan. Such potential adjustments will be documented through the work control process and associated documents.

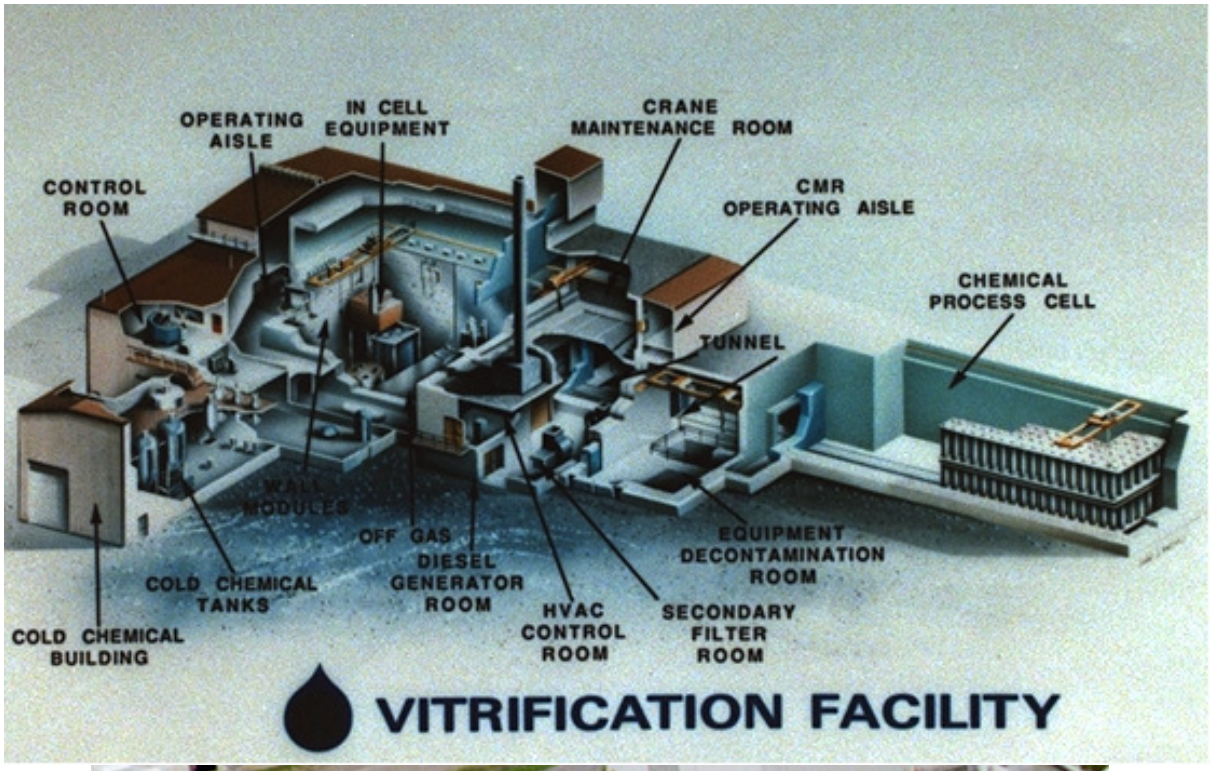
2.0 FACILITY DESCRIPTION

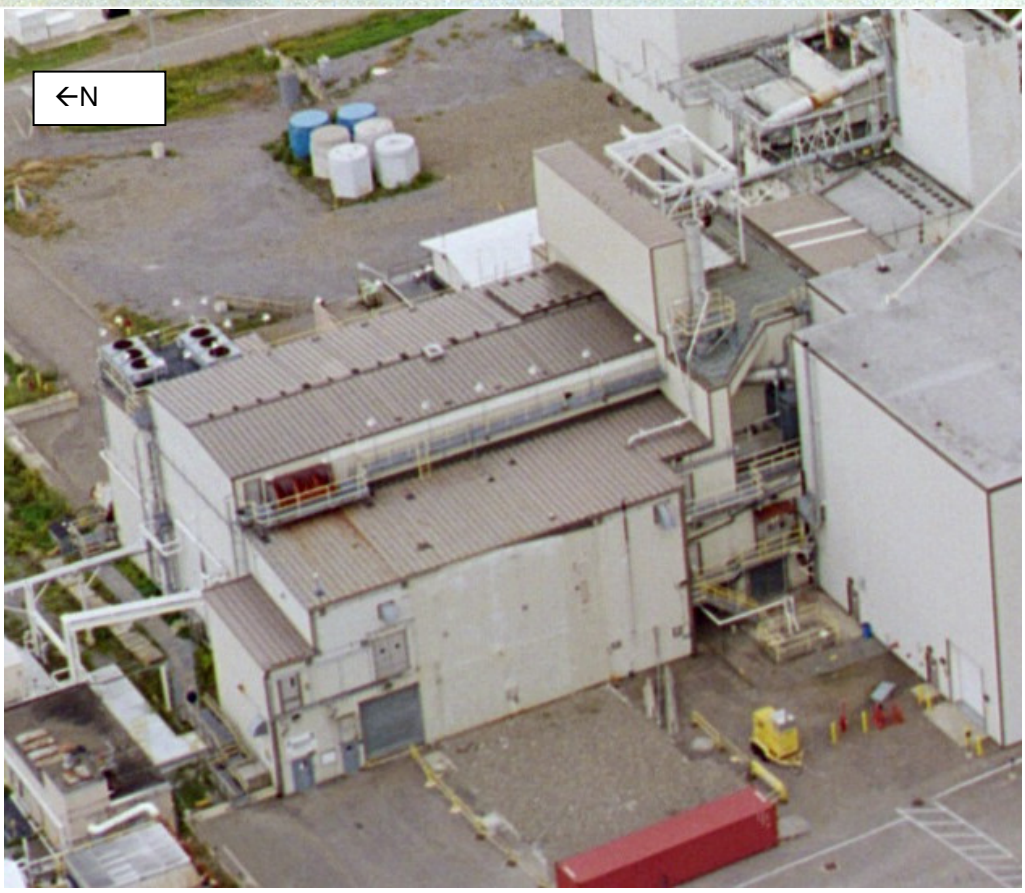
The VF is located adjacent to the northwest end of the MPPB on the north plateau (Figure 1). The VF is a structural steel, reinforced concrete, and metal-sided building approximately 145 feet (ft) (44.2 meters [m]) long by 91 ft (27.7 m) wide by 50 ft (15.2 m) high, which rests on a reinforced concrete mat footing approximately 5 ft (1.5 m) thick. The crane house extends an additional 26 ft (8 m) above the building roof. Two views of different sections through the VF are shown on the drawings in Attachment A. The facility consists of the following work and support areas:

Vitrification Cell (VC)

The VC is a reinforced concrete cell that has dimensions of 65 ft long (19.8 m) by 34 ft wide (10.4 m) by 42 ft high (12.8 m), with the floor, walls, and roof varying from 2 to 4 ft (0.6 to 1.2 m) thick with a 3/8-inch-

Figure 1
Vitrification Facility Illustration and Overhead Photograph





thick (0.95-centimeter [cm]) stainless steel liner up to 22 ft (6.7 m) above the cell floor. The walls of the cell are approximately 48 inches thick, except for parts of the upper walls on three sides, which are 34 inches thick. The VC contains six leaded-glass viewing windows. The vitrification process equipment consisted primarily of the Concentrator Feed Makeup Tank (CFMT), the Melter Feed Hold Tank (MFHT), the Melter, and the Submerged Bed Scrubber (SBS), which have all been removed.

The Vitrification Treatment System (VTS) vessels (CFMT, MFHT, Melter, and SBS) were located in a pit inside the VC. This pit is lined with a ⅛-inch-thick (0.32-cm) stainless steel for containment of spills. The pit is 34 ft (10.4 m) wide, 25 ft (7.6 m) in a north-to-south direction, and 14 ft (4.3 m) deep. The pit floor slopes north to a channel, which leads to a sump nearly centered on the floor along the north wall. The high-level waste lines enter below grade, nearly center on the west pit wall. The CFMT was located in the southwest corner of the pit. The MFHT was in the northwest corner of the pit. The Melter, CFMT, MFHT, and SBS were removed from the VC in 2004. On the north wall, approximately 15 ft (4.6 m) above grade, the sample table, associated viewing window, and manipulators were used to take samples from both the CFMT and MFHT.

The apron area is serviced by an extension of the tracks from the Chemical Process Cell (otherwise referred to as the High-Level Waste Interim Storage Facility) on which canisters were brought in and removed from the VC. This path also provided access for replacement equipment through the Equipment Decontamination Room (EDR). The VTS's off-gas equipment, including the SBS, was located on the west portion of the apron. Vessel service stub walls penetrate into the cell, which provided services to these tanks.

The service wall adjacent to the pit provided services to the CFMT, the SBS, and the vessel vent condenser. The off-gas stub wall, located about midway south of the apron, provided services to the high-efficiency particulate air (HEPA) filters, the high-efficiency mist eliminators (HEMEs), preheaters, and post-heater. The primary cell ventilation HEPA filters for the VC were located adjacent to the south wall and were remotely replaceable. The maintenance station, canister lid welding station, and canister decontamination station were located along the east wall of the cell. These units were also removed from the VC in 2004.

Transfer Tunnel

The transfer tunnel connects the VC to the EDR and acts as an airlock between the VC and the EDR. Drains in the floor are directed to the south sump in the VC. A ceiling hatch provides access to the Crane Maintenance Room (CMR) above (see Figure 1). The transfer tunnel has been used to transfer containerized waste and spent equipment. The transfer tunnel is a reinforced concrete structure that is approximately 16 ft (5 m) wide by 32 ft (10 m) long by 22 ft (6.7 m) high. The tunnel walls are constructed of four foot thick reinforced concrete, and the floor and walls are lined with stainless steel.

Crane Maintenance Room (CMR)

The CMR is located above the transfer tunnel and is fitted with heavy-duty hoists and large hatches in the floor and ceiling for equipment removal. The CMR is a reinforced concrete structure with 2-ft-thick (0.6-m) walls, roof, and floor. The CMR floor has a 3/8-inch (1-cm) stainless steel liner over the floor and coverage up the walls to 18 inches (46 cm) above the floor.

3.0 CHARACTERIZATION SUMMARY

Characterization is an ongoing process with the obtained information used to guide the deactivation activities in preparation for demolition, including work planning and worker protection, and to support waste management and disposition. Characterization data will be utilized to help determine the engineering controls, work sequencing, personal protective equipment, demolition techniques and equipment needed to execute deactivation and demolition activities. Ultimately, characterization data will be used to insure that the appropriate decontamination levels are achieved for safe and compliant open air demolition, taking into account demolition approaches and engineering controls and site specific environmental conditions.

3.1 Radiological Characterization

The December 2009 revision of the DP presented the amount of residual radioactivity estimated to be present in the VF at the beginning of WVDP Phase 1 decommissioning activities in 2011. Essentially all of the radioactivity was estimated to exist in the VC. The estimated total was approximately 1,900 curies (Ci) with the largest contributions from cesium-137 (Cs-137) and strontium-90 (Sr-90). The total estimate also included 14 Ci of americium-241 (Am-241) and about 2.5 Ci of alpha plutonium (Pu-238, 239, 240).

The guiding WVDP document for hazard characterization for demolitions is WVDP-446, *Facility Demolition Hazard Characterization Planning*. Samples to assess surface contamination levels and radiation dose surveys are performed in accordance with WVDP-477, *CHBWV Documented Radiation Protection Program and Implementation for Title 10, Code of Federal Regulations, Part 835, as Amended May 2011.* Characterization efforts will quantify residual contamination and radiological activity that is present, focusing on Cs-137, Sr-90, Pu-239/240, and Am-241, although not excluding other isotopes that may be present in measurable quantities. Data collected are utilized for dose modeling to support demolition sequencing and limits (example = maximum number of square feet in a given area that can be removed or demolished in a given time period). Characterization data will also be used to model potential dose to onsite workers (i.e., using AERMOD, air dispersion modeling system) and the public (i.e. the maximally exposed off-site individual [MEOSI] using CAP-88 dose modeling software).

Equipment removal and decontamination activities have removed a significant quantity of radioactivity from the VF. Also, a layer of grout will be placed in the VC pit and on the floor prior to demolition. Information on residual radioactivity levels of these surfaces will be collected prior to grouting, but this radioactivity is not included in the dose modeling to support open air demolition since the surfaces will not be disturbed during this demolition.

Radiological surveys have been performed to collect information on radioactivity levels on various VF surfaces. Table 1 shows survey results for the VC walls.

Table 1
Vitrification Cell Radiological Survey Results

Vitrification Cell Location	Alpha Survey Data (dpm/100 cm^2)	Beta Survey Data (dpm/100 cm^2)
North Wall*	2.26E+05	2.75E+07
South Wall	7.07E+04	8.62E+06
East Wall	3.37E+04	4.11E+06
West Wall	1.12E+05	1.37E+07
* The North Wall data is also used to represent the ceiling		

Based on available data and dose modeling, it is currently estimated that approximately 0.7 Ci of radioactivity will be present in the VF prior to demolition, not including radioactivity residing on the cell surfaces below the added grout layer (Table 2).

Table 2
Vitrification Facility - Current Radioactivity Levels

Vitrification Facility Area	Alpha (Ci)	Beta (Ci)	Total
Vitrification Cell	5.47E-03	6.79E-01	6.84E-01
Vitrification Facility Crane Room	1.48E-06	1.84E-04	1.85E-04
Vitrification Facility Tunnels	9.47E-06	1.17E-03	1.18E-03
Vitrification Facility Operating Aisles	1.06E-05	1.32E-03	1.33E-03
Vitrification Facility Secondary Filter Room	1.12E-08	1.39E-06	1.40E-06
Totals	5.49E-03	6.82E-01	6.87E-01

Based on available information, the residual levels of radioactivity in the VF prior to demolition are estimated to be approximately 1.42E+07 disintegrations per minute (dpm)/100 square centimeters (cm^2) for total Beta isotopes and 1.16E+05 dpm/100 cm^2 for total Alpha isotopes with an isotopic breakdown as shown on Table 3.

Table 3
Vitrification Facility - Activity Levels Prior to Demolition

ISOTOPE	RADIOACTIVITY (dpm/100 cm^2)
Cesium-137 (Cs-137)	1.27E+07
Curium-243 (Cm-243)	9.49E+01
Curium-244 (Cm-244)	2.39E+03
Neptunium-237 (Np-237)	7.58E+00
Strontium/Yttrium-90 (Sr/Y-90)	1.54E+06
Americium-241 (Am-241)	7.12E+04
Plutonium-238 (Pu-238)	2.11E+04
Plutonium-239 (Pu-239)	1.17E+04
Plutonium-240 (Pu-240)	8.90E+03
Plutonium-241 (Pu-241)	1.97E+05
Uranium-232 (U-232)	5.08E+02
Uranium-233 (U-233)	1.82E+02
Uranium-234 (U-234)	8.61E+01
Uranium-235 (U-235)	2.69E+01
Uranium-238 (U-238)	1.73E+02

Radiological surveys will continue to be performed and documented in support of pre-demolition and demolition activities. Radiation and radiological contamination surveys are performed in accordance with WVDP radiological control procedure RC-RPO-104, *Performing Radiation and Contamination Surveys*. This procedure contains general guidelines for performing pre-demolition radiological surveys where the collected data is used for demolition calculations using air dispersion modeling.

3.2 Hazardous and Other Materials

As mentioned previously, the VF is a RCRA HWMU since it was used to treat and manage mixed waste (i.e., a solid waste that contains a hazardous waste component that is subject to RCRA and a radioactive component subject to the Atomic Energy Act). Wastes managed in the VF were characteristically hazardous due to the presence of various metals and some were corrosive (12<pH<2). Residual materials that were vacuumed off the VF floors during deactivation activities were also characterized as mixed wastes in accordance with the WVDP waste management program. As noted in WVDP-153, some spills to the floor of the facility have occurred over time, with most being mineral oil-based hydraulic oil from in-cell equipment. Spilled liquid was contained by the cells' stainless steel floor liners and sumps or the VF operating aisles, then cleaned up and collected for proper management. The general approach was to use wipes and absorbent pads to absorb as much of the spilled material and oil as possible from the floor and sump and operating aisles. As mentioned above, the floor surface will be covered with grout to provide a protective barrier during the upcoming phase of building demolition.

As part of deactivation in preparation for demolition, potential hazardous materials are being identified and plans developed to remove the materials either prior to or during demolition. Materials being removed prior to demolition include lead counterweights and shielding not integral with the VF structure, electrical lamps, ballasts and switches, petroleum based oils from cranes,

and mineral oil from shield windows. It has been confirmed that lighting ballasts in the VF are free of polychlorinated biphenyls (PCBs), and paints applied in the VF are characterized as PCB-free based on the timeframe of construction. Any material packaged as mixed or hazardous wastes will be removed from the VF prior to demolition. Evaluation for the presence of asbestos containing materials (ACM) is underway and as a result, a small quantity of ACM was identified in roof repair materials. A pre-demolition ACM survey will be performed and any additional ACM will be documented and dispositioned in accordance with New York State Department of Labor (NYSDOL) requirements.

In some instances the locations or types of hazardous materials may not be able to be removed before demolition. In these instances, the work documents will include steps to identify/mark, remove, and segregate the hazardous materials during the demolition operations. Examples include leaded glass shield windows, lead materials in the shield window frames, lead in shield doors and shield plugs, and ACM in roof repair materials.

4.0 MANAGEMENT APPROACH

Using the guiding principles of the Integrated Safety Management System (ISMS), all work will be completed under the Integrated Work Control Program (IWCP). ISMS is built directly into the entire D&D planning and working phases through a team concept with continuous improvement including worker feedback and management self-assessments. The IWCP implements the ISMS core functions and guiding principles for planning the work at the activity level by: defining the scope of work; identifying, analyzing, and controlling associated hazards; performing the work safely within controls; and conducting a feedback and improvement process. Essential to the successful utilization of the IWCP and strongly supported by CHBWV management is worker input. Augmenting this work planning approach is a step back/stop work policy that is in effect whenever workers or support personnel are uncertain or concerned about an activity, thus ensuring workers and line management's total control of the work evolution. The Work Control process for identifying, planning, scheduling, authorizing, performance, and closeout of work activities at the WVDP is defined in WVDP-485, *Work Control*.

Senior management assigns work planning and control program roles and responsibilities and a Subcontractor Technical Representative (STR) to ensure requirements are flowed down to the subcontractor(s). Senior management also performs independent review of high hazard/complex work during the work package approval process in accordance with EMD-002, *Hazard Review Board*.
Line management is responsible for the protection of employees, the public, and the environment. Line management includes CHBWV and subcontractor employees managing or supervising employees performing work. CHBWV's program and implementing documents define clear and unambiguous lines of authority and responsibility for ensuring environmental, safety, and health requirements are established and maintained at all organizational levels and become an integral but visible part of the WVDP's work planning and execution process.

4.1 WVDP Work Planning and Implementation

The WVDP has a robust work planning and control program. Complex or high hazard work that is only performed once or a limited number of times requires the preparation of a WIP. High hazard or complex work activities involve tasks that require detailed work instructions and accompanying hazard analysis to be performed safely and correctly. WIPs are developed per EP-5-002, *Administration of Work Instruction Packages*, and hazard analysis is performed per WV-921, *Hazards Identification and Analysis*.

Each WIP will contain a thorough hazard analysis, all relevant design engineering documents, and tailored instructions for safely executing the scope within the safety basis of the facility. Tailoring includes the development of explicit and approved Documented Safety Analysis (DSA) step-out controls as hazards are reduced and deactivation activities remove safety systems. Hazard controls will be tailored for various facility conditions allowing a graded approach to address personnel and environmental safety concerns for specific activities.

More routine and repetitive operations and maintenance activities may be described in Standard Operating Procedures (SOPs). SOPs may be used for various levels of risk and complexity and the level of detailed instruction will vary based on the complexity. Hazard analysis is performed in accordance with WV-921 and hazard mitigations are included directly in the SOP or in permits required by the SOP (e.g., IWPs and RWPs). SOPs are developed, issued and maintained in accordance with DCIP-100, *Controlled Document Preparation and Revision Process* and DCIP-101, *Controlled Document Review, Approval, and Emergent Change Process*.

In order to fully embed the ISMS processes and expectations, work will commence at a controlled, deliberate pace. Work controls will also be reinforced by Human Performance tools. VF deactivation and demolition work will be planned to allow personnel to gain familiarity with the facility and gain confidence in the processes being used. This approach affords line management the opportunity to mentor and monitor the personnel in a less hazardous environment where the likeliness of personnel injury or environmental upsets is minimized.

5.0 PRE-DEMOLITION ACTIVITIES

5.1 Post-Vitrification Campaign Activities

The vitrification operation was conducted between July 1996 and September 2002. Initial dismantlement of expended materials and equipment inside the VC began in late 2003 and was completed in July 2005. The Melter, CFMT, MFHT, the turntable, off-gas treatment equipment, the canister welding station, and the canister decontamination station were removed and packaged as low-level waste (LLW) pending their disposal off-site. Process jumpers and utility lines were cut back to the walls of the cell and these smaller pieces of equipment were packaged and staged in WVDP waste management container storage areas for disposal off site. In addition, the SBS, HEME, and condenser unit were moved into appropriate mixed waste storage areas pending their disposal off site. The WVDP then continued to use the VC for mixed waste and radiological waste container repackaging, size reduction, and storage, consistent with its status as a RCRA containment building. Wall penetrations were sealed and documented as part of the certification for use as a containment building.

5.2 Deactivation Activities Completed

In 2013, the WVDP determined that VF operation as a containment building or container storage unit for management of high-activity radioactive and mixed waste was no longer required. Planning then began for decontamination of the VC in preparation for facility demolition. Cleanup and decontamination activities performed since then have included the removal of all waste, miscellaneous equipment, materials, and debris from the VC and remote mechanical scraping and vacuuming of the floor. Having removed as much of the contaminated materials as possible, it was determined that additional decontamination was needed to further reduce the radiological source term in this highly radioactive cell.

High pressure/high temperature water spray of the VC walls and floor was employed July through September of 2014. Plant Utility water was heated to 221° Fahrenheit (F). However, travel through approximately 100 ft. (30.5 m) of hose reduced the temperature of the water at the spray head so that a combination of steam and water exited the spray head under pressure. To achieve a better decontamination factor, washing with aqueous solutions containing Simple Green® and other approved cleaning agents (e.g., Radiacwash™) was also performed. Wash liquids were kept to the minimum amount practicable to achieve the desired decontamination factor in support of open air demolition. Wash water was transferred to and accumulated in the VC pit and enhanced evaporation was employed to reduce the volume of liquids to allow for an evaluation to determine if it was necessary to remove any remaining residues for radiological source term reduction. It is not anticipated that any additional residues will be removed however, as necessary, residues could subsequently be removed, characterized, containerized, and disposed to reduce radiological source term in preparation for demolition using remote means and tooling. As used here, "residues" do not refer to materials that are introduced to facilitate preparation for demolition such as strippable coating, foaming, fixatives, grout or other means to prevent or minimize the spread of contamination or otherwise support preparation for demolition. Overspray of these materials is not considered residue.

During washing of the VC floor, operators observed floor blemishes/deformations in the stainless steel primary liner. The blemishes/deformations were filled in by accumulated grime. Remote tooling applied compressed air at 90 psi (6.3 kg/cm^2) to the blemishes to clean the areas and to determine whether a breach in the primary liner had occurred. For four of the five blemishes, engineers determined that a breach in the liner had not occurred. A definitive determination as to whether the primary barrier was breached could not be made for the fifth blemish. This blemish is less than 5 in (<13 cm) long by 0.5 in (1.3 cm) wide. It was concluded that further attempts to determine whether it was just grime in this blemish or whether there was a potential breach in the liner at this location would not be productive.

It was also concluded that if wash water had migrated through the primary stainless steel barrier, it would have been a minimal amount of water. Also, the sections of the stainless steel liner are joined by welds to imbedded angular steel plates that section the floor into approximately 6 ft (1.8 m) squares. These imbedded steel plates would impede migration of liquids containing any materials within the square. Furthermore, the 4.5 ft (1.4 m) thick reinforced concrete, underlying the stainless steel liner would prevent any migration to subsurface soils. However, because a potential breach of the primary barrier was discovered during washing of the floor, the following actions were implemented to prevent further potential for leaks through the primary stainless steel liner:

- the floor blemishes/deformations were covered by a thick coat of Bartlett Nuclear, Inc. Polymeric Barrier System (PBS) or approved equivalent;
- steps will be taken in an effort to prevent wash water from other VC decontamination activities from flowing over the blemish/deformation areas;
- if new blemishes are identified, work will stop and the project engineer will determine further actions (e.g., discontinued rinsing of wash waters over the blemish area, use of PBS to seal the blemish, and/or other actions as deemed appropriate to prevent any potential leaks in the primary barrier), and;
- before demolition of the above ground portions of the VF, the stainless steel liner and concrete slab will be covered with a thick coat of fixative and/or grout to protect the surface features pending completion of demolition.

The following VF deactivation activities have also been performed to prepare for demolition:

- air gapped the vitrification off-gas piping and grouted the bulkhead;
- air gapped the tank farm waste transfer piping and grouted the lines;
- removed components containing hazardous constituents from the VF operating aisles (e.g., circuit boards, lamps, batteries);
- dispositioned out of service piping systems in the operating aisles and at the cell walls;
- performed radiological surveys of VC and penetrations, and sealed penetrations, and;
- removed debris from the CMR.

5.3 Deactivation Activities Remaining

In addition to the completed actions described above, the following deactivation activities will be completed prior to the start of VF demolition. These activities are planned for completion during 2016:

- decontamination and removal of the Brokk®;
- decontamination of the removable floor sections from the VC pit;
- cleanup and removal of remaining materials and debris in the CMR;
- decontaminate, survey, and apply fixative in the CMR;
- additional rinsing of the floor and lower portion of the walls, as needed;
- add grout to the VC pit and apply fixative to other surfaces in the VC;
- decontaminate, survey, and drain oils from cranes;
- perform radiological surveys of remaining in-cell items, as necessary;
- remove master slave manipulators and seal the associated wall penetrations;
- drain mineral oil from shield windows;
- perform pre-demolition ACM survey and disposition any identified ACM (or remove during demolition);
- shutdown ventilation and isolate (i.e., air gapping) utilities;
- loadout any remaining wastes and remove transfer cart, or ready cart for removal during demolition, and;
- remove filters in the facility including secondary filter room.

Grout will be added to the VC pit and VC to further reduce dose and create a working surface across the VC and VC pit to allow for completion of final deactivation activities. The purpose of the grout is also to provide a level of protection to the VC liner and slab to preclude damage during VF demolition, to minimize equipment contamination, and to minimize the potential for water migration into, or accumulation on remaining contaminated surfaces prior to their subsequent removal.

5.4 Dispositioning “Stand-Alone” Items

After completing the VF deactivation activities, several items will remain within the VF to be processed and dispositioned as part of the open air demolition. These “stand-alone” items include:

- four cooling units near the ceiling;
- removable floor sections;
- lifting tongs;
- lift beam;

- two overhead cranes;
- an in-cell robotic arm;
- three in-cell filter housings (filters removed);
- two work tables;
- the crane recovery system;
- shield doors; and
- remaining filter housings outside the VC (filters removed).

5.5 Structural Analysis

An engineering survey is being performed and documented by a structural engineer to evaluate the structural condition of the VF in accordance with ANSI International (ANSI), formerly American National Standards Institute, American National Standard for Construction and Demolition Operations - Safety Requirements for Demolition Operations (ANSI A10.6); and 29 CFR Part 1926.850 - Safety and Health Regulations for Construction, Subpart T - Demolition. The engineering survey will include a visual survey of the building, and a structural assessment to evaluate the possibility of a premature collapse of portions of the building during demolition and steps to be taken to prevent any such occurrence. In addition, any adjacent structure where employees may be exposed shall also be similarly checked.

As described below, a demolition readiness checklist will be prepared prior to demolition. This checklist will include an engineering section where completion of the engineering survey described above will be documented prior to initiating VF demolition. A New York State-licensed structural Professional Engineer is also part of the work planning and sequence development process. This individual will assess the demolition WIP(s) to ensure the demolition sequencing, means, and methods will not cause a premature collapse during demolition and will prevent damage to any adjacent structures.

5.6 Demolition Readiness Checklist

A demolition readiness checklist will be developed to ensure pre-demolition activities are completed and accepted as complete prior to starting VF demolition. Attachment B is an example of a checklist used for other WVDP demolition activities, and a similar checklist will be completed for the VF. The checklist will be reviewed by personnel from various departments whose signatures will indicate that they concur that all items and required actions, for their area of expertise, required to make the facility ready for demolition have been identified and addressed. Organizations reviewing the checklist will include: Regulatory Strategy & Engineering, Industrial Safety, Nuclear Safety, Radiological Controls, Quality Assurance, and Waste Operations.

Topical areas addressed by the checklist will include:

- Regulatory Notifications/Requirements
- Training Requirements
- Engineering Evaluation
- Utilities
- Hazardous Materials
- Other Hazards (e.g., radiological, biological, physical, etc.)

Once the checklist is reviewed and signed off by the necessary departments, the Facility Manager will approve it, indicating that the VF is ready for demolition.

5.7 Preparation of Work Documents

As described in Section 4.1, WVDP work planning follows a well-established and controlled process which insures that: 1) The work scope is well defined; 2) Hazards are identified and controlled; 3) Work is performed safely and within controls; and 4) Feedback is provided and lessons learned are shared. The work documents (i.e., WIPs) governing VF demolition activities will be prepared, reviewed, and approved according to this process as further described below.

As part of work planning and execution, the planning/work team, including workers and subject matter experts, performs walk downs using SOP 00-46, *Work Instruction Walkdowns, Pre-Job and Daily Briefings, and Post-Job Feedback/ Lessons Learned* to better identify and analyze specific hazards and possible human performance issues. Other items accomplished during the walk downs also include:

- identify the specific tasks and associated steps necessary to accomplish the work;
- verify the equipment, components, locations, etc. described in the requested work are correct and accurate;
- identify the applicable and affected documents (e.g., procedures, drawings, specifications, vendor manuals, training materials, etc.), and the latest versions/revisions, and;
- determine that the work activity is clearly and adequately bounded/limited (e.g., physical boundaries such as equipment/components to which work activity is limited, specific work environment to which work is confined; conditions under which work can be performed; and organizations responsible for the various tasks, etc.).

Facility Assessments are an essential prerequisite to a safe and successful D&D process. An integrated group of personnel composed of safety, industrial hygiene, radiological controls, engineering, D&D management, workers, environmental and regulatory compliance, nuclear safety, waste operations, and quality assurance will be involved in the WIP development.

As part of the planning process, hazard assessments will be conducted to document existing conditions in and around the facility. Hazard assessments are performed by qualified individuals to document current facility conditions from a safety, radiological, engineering, utility, and demolition standpoint. An example of the hazards analysis form that is prepared is included in Attachment C. Pre-demolition surveys are conducted as part of the hazard assessments process on all structures decommissioned in accordance with Occupational Safety and Health Administration (OSHA) guidelines (1926.850) following WVDP-446, *Facility Demolition Hazard Characterization Planning*.

Prior to issuance of a WIP, the work review group coordinator performs a Work Control management review of the WIP and ensures that: 1) the WIP was developed following the processes in EP-5-002; and 2) all Hazard Control Specialists identified by the hazard analysis process were required to review and approve the WIP.

The Responsible Manager (RM) and Operations Manager also approve the WIP, and a final interactive meeting for high hazard or complex work is held when deemed necessary by the RM. The final interactive WIP review meeting is a face-to-face review of the draft WIP with planning team members, which allows the reviewers to improve the final product based on the shared

discussions. Work Control reviews the WIP for completeness, insuring that all necessary signatures are present. The work package is then issued for implementation along with supporting documents such as an IWP, to identify hazards and establish worker health and safety controls, and a RWP to establish radiological controls. If it is necessary to make a Field Change to a WIP, the steps identified in EP-5-002 are followed, including obtaining signatures from all departments and work groups affected by the change.

6.0 VITRIFICATION FACILITY DEMOLITION

This section provides an overall description of how the open air demolition approach and techniques will be executed to ensure the VF is safely and compliantly demolished. The overall approach is to perform characterization, decontamination, and source term reduction to a degree that supports conventional, uncontained, open air demolition. Techniques which utilize mechanical, hydraulic, or remote equipment, to the greatest extent possible, will be implemented to perform D&D activities in a manner which minimizes worker exposure to radiological, mechanical, and chemical hazards. Lessons learned from the 2013 demolition of the 01-14 Building at the WVDP, the Separations Process Research Unit (SPRU) D&D activities at Knolls Atomic Power Laboratory, and other DOE facilities will be factored into the planning for the VF demolition.
The following general performance criteria will be incorporated into the work scope for the VF D&D as specified by DOE:

- demolition of the VF will be performed in accordance with all applicable Federal, State and DOE Environmental, Safety and Health Requirements, Laws and Regulations;
- demolition will be consistent with the Phase 1 Decommissioning Plan for the WVDP, and the NRC Technical Evaluation Report;
- during the decommissioning and demolition work, CHBWV will minimize the generation of difficult to dispose of waste streams such as transuranic (TRU) waste and mixed low-level waste (MLLW);
- measures will be implemented to control the spread of contamination;
- an Ambient Air Monitoring Program approved by EPA will be operational to support the unconfined, open air decommissioning and demolition work, and;
- measures will be implemented to prevent the migration of water into, or out of all remaining penetrations, surfaces, and structures and the accumulation of water in below grade structures.

6.1 General Decommissioning Approach and Technologies

The VF demolition WIP will identify the final, approved, specific sequence of demolition activities, including detailed means and methods and controlled demolition techniques consistent with the final approved calculation for open air demolition. The demolition WIP will also include a radiological monitoring plan to identify methods for monitoring the perimeter of the work area and personnel working within the area, environmental controls to mitigate potential releases, waste management practices, and safety and health processes to ensure worker safety. These items are discussed further below.

Some of the techniques and approaches to be used include development of detailed demolition drawings/sketches identifying the specific sequence of events, continuous air monitoring, control and disposition of wastewater, use of suppressants on demolition debris to prevent dispersion of particulates and/or contamination, timely loading of debris to prevent accumulation, and restricting access to the area to prevent unauthorized entry during demolition activities. Suppression of airborne contamination during demolition will be through the application of fixatives to contaminated

building surfaces and the use of water spraying/misting equipment with surfactant (stand-alone or equipment mounted) to suppress dust during demolition. Run-off water will be controlled and dispositioned appropriately in accordance with WVDP procedures (e.g., treated and discharged through the site's State Pollutant Discharge Elimination System [SPDES] permitted system).

The VC floor will be grouted with approximately one to three feet of grout both to minimize employee exposure to external radiation, protect the surfaces from damage during demolition, minimize equipment contamination, and deter water intrusion. Items such as in-cell filters, cell debris, piping, and miscellaneous equipment with high levels of radioactivity will already have been removed from the building or stabilized during deactivation. Remaining piping sections and wall penetrations containing piping that were stabilized will be removed and segregated during demolition. Sufficient coat(s) of contamination fixatives will be applied to allow open air demolition. As described in Section 6.4, continuous monitoring will be performed near the demolition area to monitor worker safety. If necessary, additional fixatives can be applied during the demolition work process. Demolition will primarily be performed using heavy equipment, with two to four pieces of complimentary heavy equipment typically used as described in Section 6.2.

The demolition techniques will be performed by competent persons who are familiar with the building design and construction, demolition operations, equipment functions, and potential hazards. These individuals will perform what is generally described as a "Cut, Shear, Break, Drop" (CSBD) approach starting at the top of the building and working in a downward manner. The CSBD approach can generally be described as cutting or shearing followed by breaking and dropping the building pieces to the ground within the controlled/regulated work area (drop zone). The building structure and components are sized into small manageable pieces through the use of hydraulic excavators (or other manual equipment) and appropriately sized attachments. Then, utilizing the equipment, the pieces are dropped to the ground within the controlled/regulated work area.

One important aspect to be maintained throughout demolition that no undermining and no cutting or shearing of lower level/floors will occur that could jeopardize the structural integrity of the building. The overall demolition approach is to start at the top floor level of the building to remove upper structures, roofs, walls and floors in a limited or general area, then work in a downward manner as each floor or area is completed. The individuals directing operation of the equipment (e.g., Demolition Superintendents, Foreman and craft work crew) are primarily responsible for determining, from the WIP, which pieces are cut, broken or snipped as well as the general direction and sequencing of the demolition, such as either working from north to south, east to west, or any other direction as needed to address site specific concerns. The demolition activities will also be supported by a licensed structural professional engineer throughout the process.

Explanation of the following terms is provided to help describe the demolition process:

Cut - To cut apart using a combination of means and methods. Cutting typically involves the use of manually operated thermal torches, burning bars, cutoff saws, or pneumatic and hydraulically operated equipment to cut through steel, concrete, wood and other building materials.

Shear - To snip, saw, or otherwise tear apart (similar to a scissors) with the use of a hydraulically operated, mechanical device attached to a track excavator, crane, or other equipment. Shears (or similar devices) are typically capable of cutting through steel, metals, concrete, wood and typical building materials.

Break - To break apart building components with a combination of devices such as hydraulically operated hammers, pulverizers, grapples, buckets with thumbs, or other types of material processors generally attached to track mounted hydraulic excavators, cranes or other carriers. Typically, once a building component is "Cut" or "Sheared", the piece may need to be further broken apart from the structure before being dropped to the ground.

Drop - Once the various types of building materials and structural components are cut, sheared, or broken apart from the building, they are then dropped to the ground under controlled conditions into the controlled/regulated work zone.

As the building demolition progresses, debris will be sized and loaded in appropriate containers for transportation to the designated waste disposal facility. Demolition debris will be packaged and transported in accordance with the waste management approach described in Section 7.0. The various sized excavators will perform the shearing and debris segregation/load out operations. The majority of debris will be loaded into intermodals (IM's) or other specified containers.

6.2 Equipment to be Utilized and Available

A primary processing excavator configured with a rotating shear or hydraulic breaker attachment along with a secondary processing excavator with a concrete pulverizer and handling attachment(s) will be the typical equipment utilized. Additional methods such as a concrete crusher on an excavator may also be used to fracture the thickest reinforced concrete walls of the VF.

Attachment D contains pictures and additional information regarding typical D&D equipment items. The following types of equipment (or equivalents) will be utilized as necessary:

- large excavator (such as CAT 374D, 160-220K class) with standard arm and combination shear for cutting steel and/or concrete crusher jaw and hydraulic hammer for breaking concrete and masonry
- medium excavator (such as CAT 345D, 90 to 110K Class) with bucket and thumb, able to use 11,000 ft lb hammer, and or shear/concrete breaker High Reach Arm (30' extension = total height to +/- 60')
- small excavator (such as CAT 320D, 40 to 50K Class) with standard arm and concrete pulverizing head for crushing concrete, segregating rebar, and breaking masonry, bucket and thumb, and 3-4k lb hammer,
- Aerial platforms (varies) to facilitate cutting and dust control
- Dust suppression equipment
- Front end loader(s)
- Skid steer(s)
- Crane(s)
- Waste Containers
- Forklifts
- Diamond Wire Saw (available if needed)
- Concrete Saw
- Oxy-Propane or gasoline cutting torch,
- Ambient air sampling equipment.

Heavy equipment end effectors (attachments, such as shears, grapples, buckets, thumbs, hammers, etc.) will become contaminated during the course of VC demolition. At the completion of the VF D&D work, the equipment may require decontamination and bagging in order to be reused during later demolition of the MPPB.

6.3 Demolition Approach and Sequence

The overarching demolition approach and planned sequencing for the VF is to perform the demolition in a stepwise manner from the known radiologically "cleanest" areas (the perimeter aisles) to those areas more impacted by prior processes (the VC) and from top to bottom. This will minimize the potential for cross-contamination of facility areas, minimize migration of contamination, and reduce the time and resources associated with decontaminating equipment and materials from one area to another. This conceptual sequencing approach was successfully implemented during D&D of the WVDP 01-14 Building.

The Figure 2 A/B illustrations, further described below, show the planned sequencing approach for VF demolition using the methods and equipment described in the previous sections. There may be some overlap between areas as demolition activities are being completed in one area and beginning in the next. As final steps are taken to prepare the VF for demolition and demolition gets underway, it may become necessary to make adjustments to the approaches or sequencing described below due to differing conditions. Such potential adjustments will be documented and authorized through the work control system and associated documents. Factors influencing the work process may include: activities and occupancy in adjacent nearby facilities, other surrounding site activities, radiological monitoring and controls, ventilation controls and requirements, or other project related factors.

Figure 2A - Vitrification Facility Overview and Demolition Sequencing

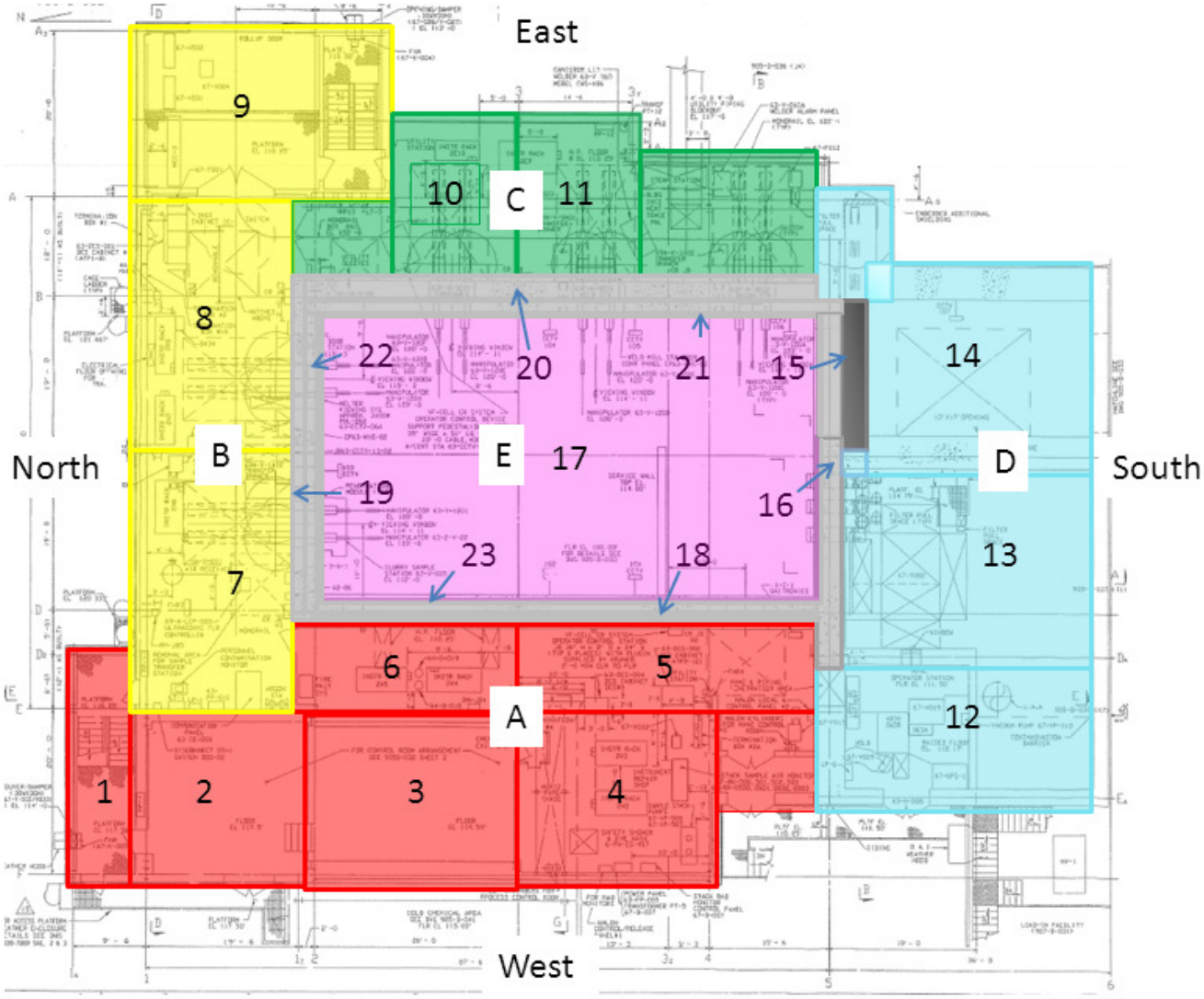


Figure 2B - Vitrification Facility Overview and Demolition Sequencing

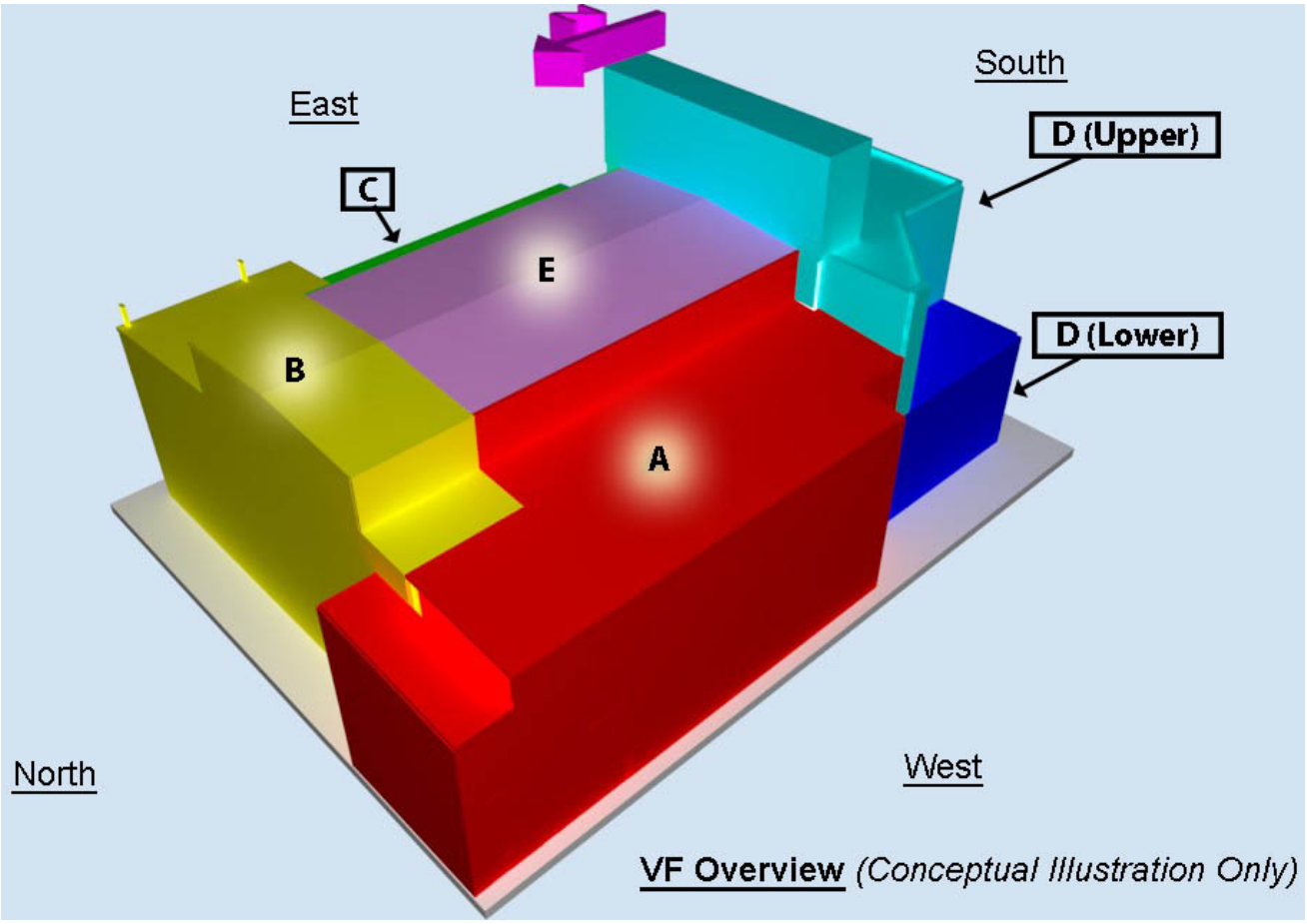


Figure 2 A/B Notes:

- Color coding represents basic phasing areas and sequencing
- Phase A = Red (West Aisle)
- Phase B = Yellow (North Aisle)
- Phase C = Green (East Aisle)
- Phase D = Blue = Lower; Teal = Upper (South Aisle)
- Phase E = Pink & Gray (VC Area)
- The numbers on Figure 2A represent general discrete "areas" of the building within each sequencing phase/area for reference purposes. They are not meant to establish a defined numerical sequence.

NOTE *References to building elevations throughout this section refer to nominal "plant elevations" with ground level = 100 ± 3 ft, nominal plant reference elevation.*

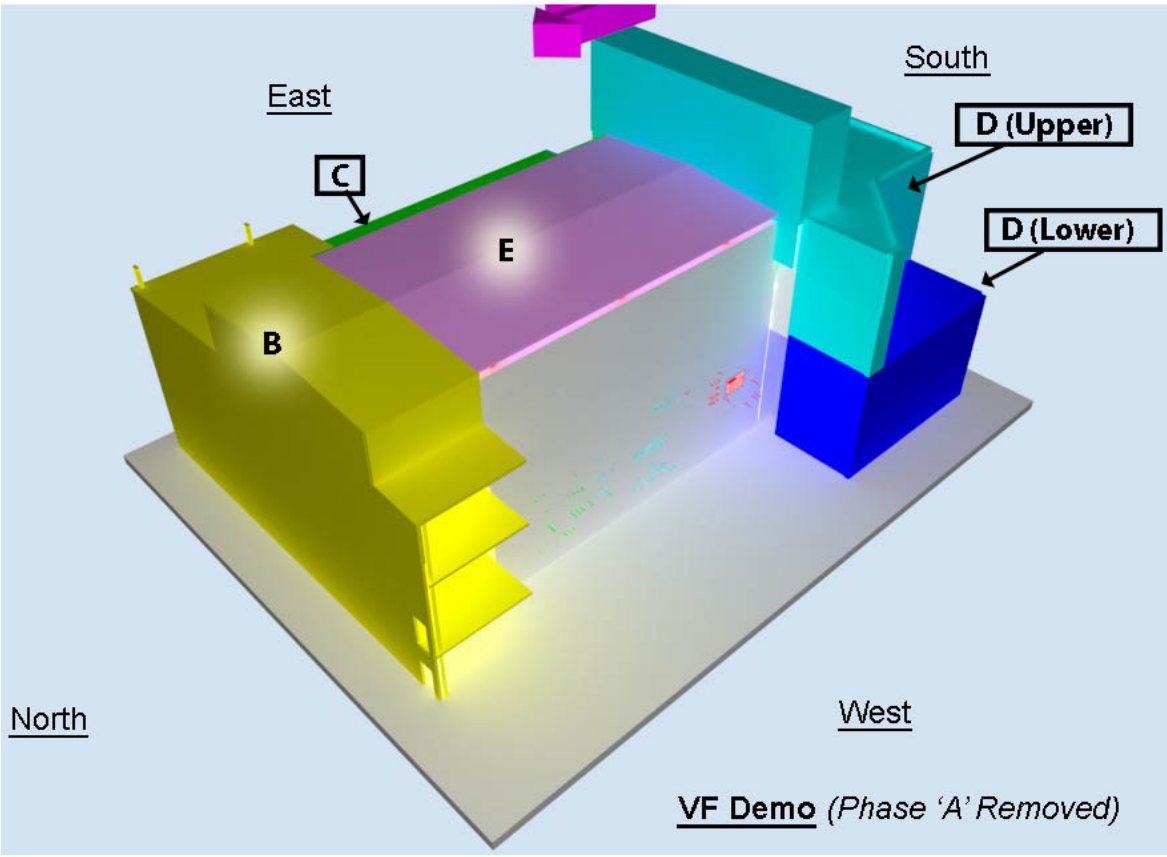
Phase A (West Aisle Area)

1. Remove, size (reduce), and disposition upper and lower exterior northwest stairs.
2. Remove, size, and disposition the Control Room roof, northern portion of the Control Room, and the West Truck Lock from top to bottom. Shear wall girts and lower to ground. Shear piping, conduit, switchgear, and access platforms located inside the rooms. Shear roof beams and lower roofing materials to ground. The at-grade concrete floor will remain in place. (This approach will be used for the Operating Aisles around the perimeter of the VF.)

3. Remove, size, and disposition the Control Room Ventilation Room roof, air handling units, and floor. Remove, size, and disposition the southern portion of the Control Room, equipment, and floor and the Locker Room Area.
4. Remove, size, and disposition the roof, floor, platform and west entrance of the Upper West Operating Aisle. Remove, size, and disposition the space containing instrument racks, the floor, the platform, and entrance into the Middle West Operating Aisle. Remove, size, and disposition the off-gas heater controls, steam and condensate tank, cooling water holding tank, and other equipment in the Steam Condensate Pump Room and the Radiation Monitoring Room in the Lower West Operating Aisle equipment room.
5. Remove, size, and disposition the roof, instrument racks, other equipment and floor slab of the southern portion of the Upper West Operating Aisle. Remove, size, and disposition the southern portion of the Middle West Operating Aisle. Remove, size, and disposition the cooling water heat exchanger and remaining equipment from the southern portion of the Lower West Operating Aisle.
6. Remove, size, and disposition the roof, instrument racks, equipment, and floor slab from the northern portion of the Upper West Operating Aisle. Remove, size, and disposition instrument racks, equipment, and floor slab from the northern portion of the Middle West Operating Aisle. Remove, size, and disposition the discharge pumps and remaining equipment from the northern portion of the Lower West Operating Aisle.

Figure 3
Viewing the Outer West Side of the Vitrification Facility
(Phase A - West Aisle Area)

Figure 4
Phase A Portion of Vitrification Facility Removed

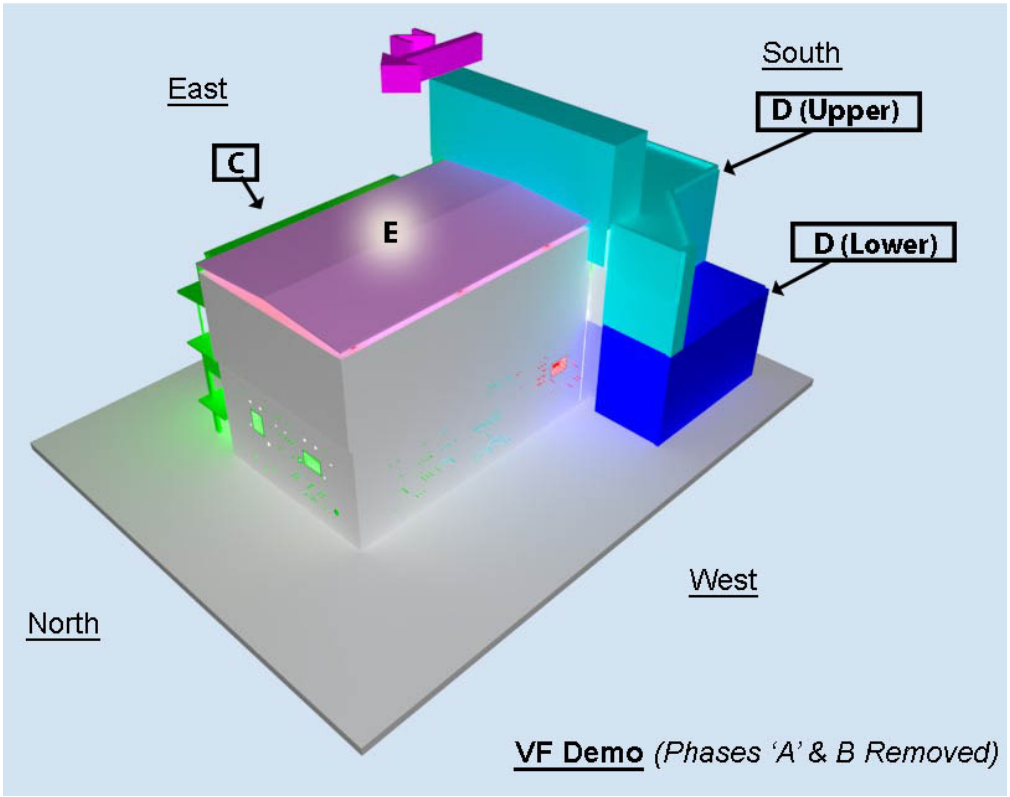


Phase B (North Aisle Area)

7. Remove, size, and disposition the roof, Heating Ventilation and Air Conditioning (HVAC) system, and floor slab from the western portion of the Upper North Operating Aisle. Remove, size, and disposition instrument racks, ductwork, equipment, and the floor slab from the western portion of the Middle North Operating Aisle. Remove, size, and disposition the sample transfer cell, sample transfer system, and transformers from the western portion of the Lower North Operating Aisle.
8. Remove, size, and disposition the remainder of the Main HVAC unit, ductwork, and equipment from the eastern portion of the Upper North Operating Aisle. Remove, size, and disposition the instrument racks, ductwork, and equipment from the eastern portion of the Middle North Operating Aisle (110'). Remove, size, and disposition the melter power controllers, transformers, and equipment from the eastern portion of the Lower North Operating Aisle (100').
9. Remove, size, and disposition the chillers, condenser units, platform, east stairs and roof from the Chiller Equipment Room (125.5'). Remove, size, and disposition the electrical gear, east stairs, platform, and remaining equipment from the East Truck Lock (110'). Remove outer shield plates from previously foamed sample station and then inner portion. Remove, size, and disposition the northeast stairs (100').

Figure 5
Viewing the Outer North Side of the Vitrification Facility
(Phase B - North Aisle Area)

Figure 6
Phases A & B Portions of Vitrification Facility Removed

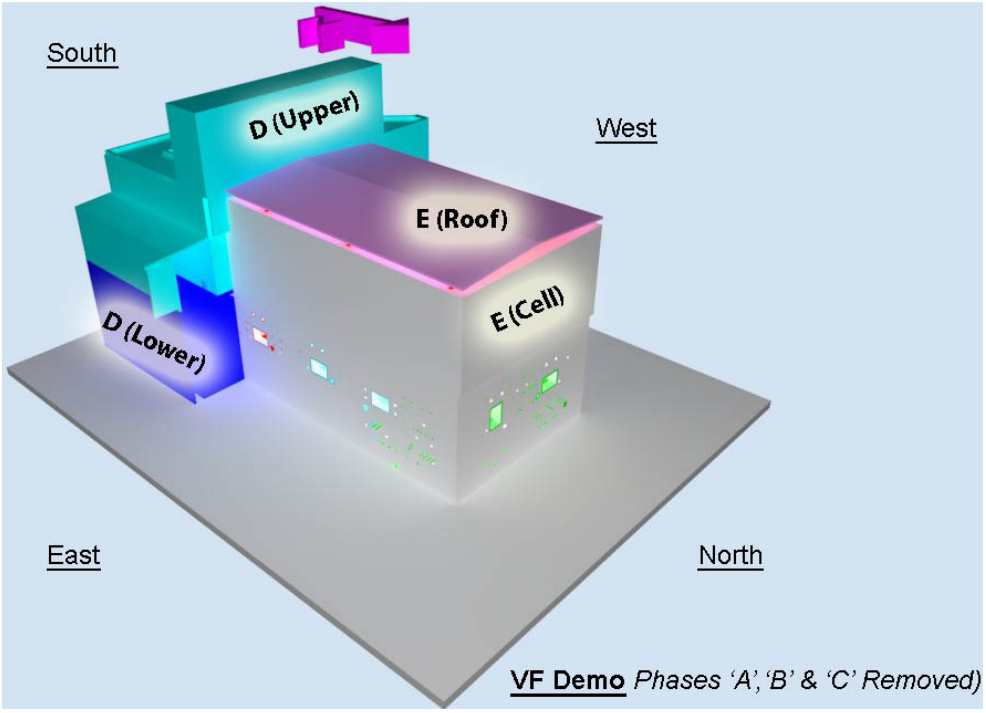


Phase C (East Aisle Area)

10. Remove, size, and disposition the roof, instrument rack, ductwork, equipment, and floor slab from the northern portion of the Upper East Operating Aisle (125'). Remove, size, and disposition instrument rack, ductwork, equipment, and floor slab from the northern portion of the Middle East Operating Aisle (110'). Remove, size, and disposition remaining equipment from the Lower East Operating Aisle (100').
11. Remove, size, and disposition roof, instrument racks, air dryer, ductwork, and equipment from the southern portion of the Upper East Operating Aisle (125'). Remove, size, and disposition the instrument rack, steam station, and equipment from the southern portion of the Middle East Operating Aisle (110'). Remove, size, and disposition the transformers and remaining equipment from the southern portion of the Lower East Operating Aisle (100').

Figure 7
Viewing the Outer East Side of the Vitrification Facility
(Phase C - East Aisle Area)

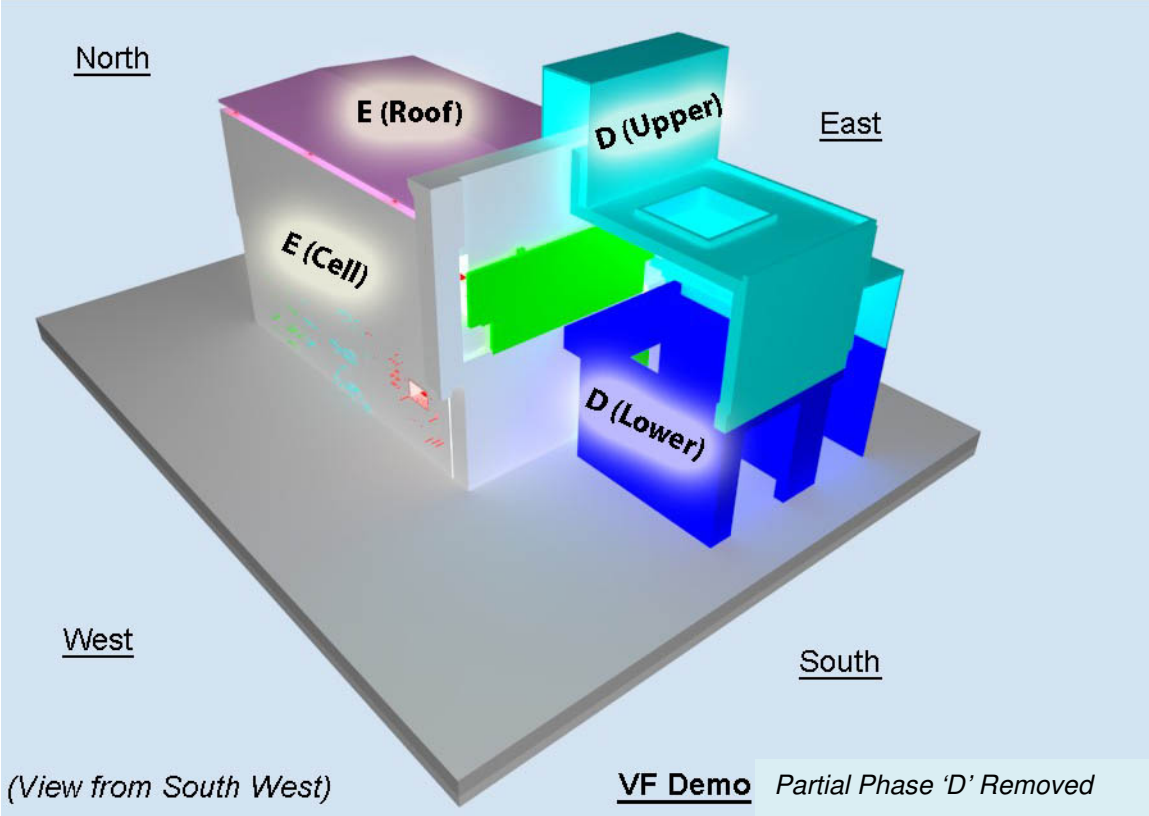
Figure 8
Phases A, B, & C Portions of Vitrification Facility Removed



Phase D (South Aisle Area)

12. Remove, size, and disposition the rail (141'), roof, platform (131'), ductwork, stack, and floor (124'). Remove, size, and disposition the HVAC Operator Station electrical switchgear and floor slab (112'). Remove the west and north walls and equipment from the Diesel Generator Room.
13. Remove, size, and disposition the roof, crane rails, cranes (125' and 141') and platform (131') and floor of the Crane Maintenance Room (124'). Remove, size, and disposition the west and north concrete walls of the Secondary Filter Room (100'). Remove, size, and disposition fans, ductwork, and equipment. Remove metal roof over VC, leave concrete roof.

Figure 9
Phases A, B, C, & Part of D Portions of Vitrification Facility Removed



Phase E (VC Area)

NOTE *The numbers on Figure 2A represent general discrete "areas" of the building within each sequencing phase/area for reference purposes. They are not meant to establish a defined numerical sequence.*

17. Remove and disposition filter housings. Remove, size and disposition, using shears, three removable floor sections.
    i. Cut/pull Vit Crane(s) off rails from CMR onto grouted floor. Size and disposition cranes.
    ii. Remove the ceiling mounted cooler units from within the VC. Lower the units in a controlled manner and size reduce and package per radiological survey results at the time of packaging.
    iii. Hammer/shear the roof into manageable sections (no larger than approximately 10 ft x 10 ft) and control drop to ground level.
    iv. Hammer southernmost precut roof strip into 12 ft x 6 ft sections and control drop to ground level. Segregate and disposition concrete and rebar.

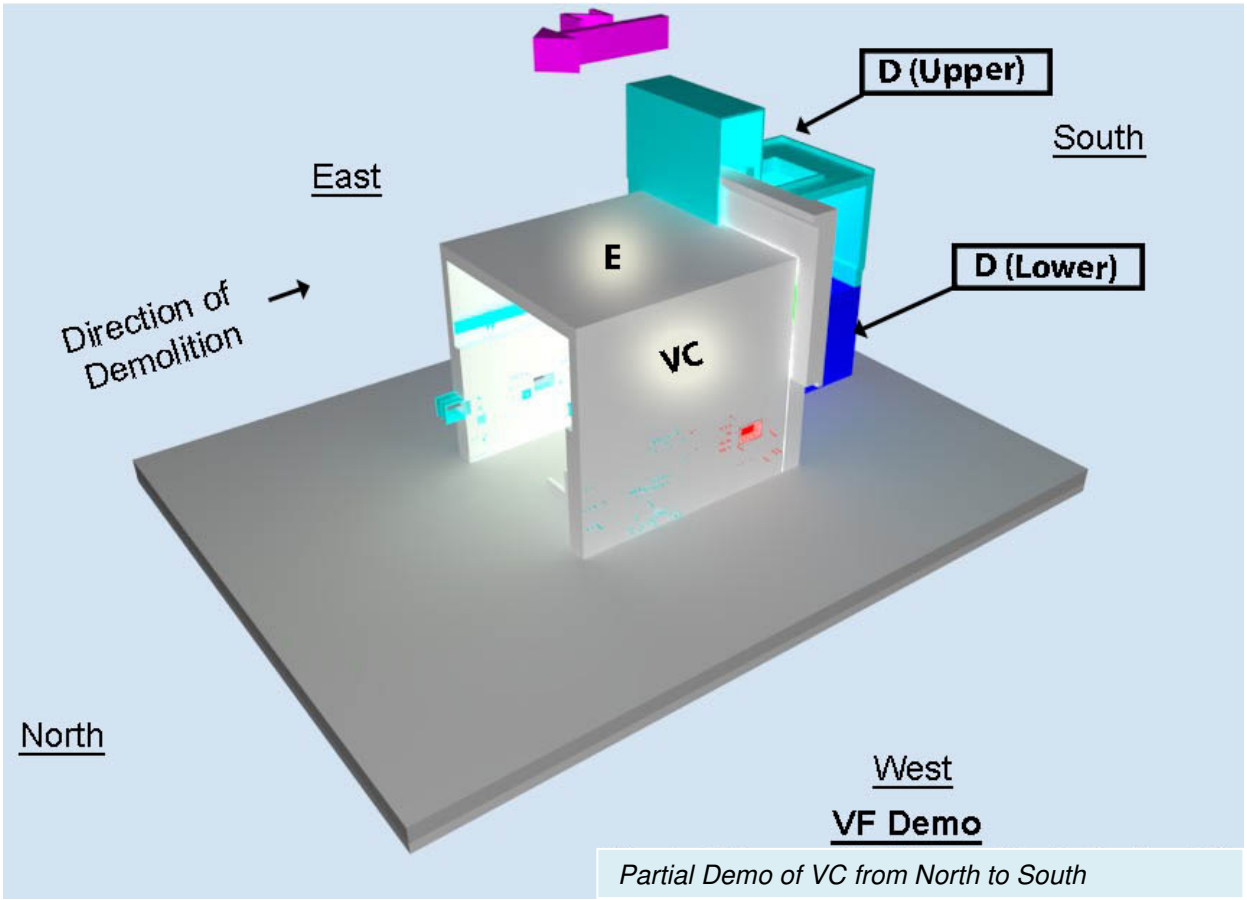
18-20. Hammer approximately three feet of exterior concrete VC wall approximately to the 101' level on east, west, and north walls proceeding six feet from south to north. Avoid breaching cell penetrations. (Penetrations will be foamed, grouted, or otherwise sealed during deactivation). Segregate and disposition rebar and concrete rubble.

21-23. Hammer remainder of east, west, and north concrete walls in approximately six foot sections down to approximately the 101' level. Utilize shears to remove rebar/wall supports. Working from top to bottom - size reduce and push stainless steel liner in on itself. Disposition cell liner. If liner does not shear at the appropriate level utilize assistance from torch.

14. Hammer west and east walls and the tunnel shield door pocket walls of the tunnel to elevation 124'. Hammer west and east tunnel walls and the tunnel shield door pocket walls of the tunnel to elevation 100'. Segregate and disposition debris.
15. Remove Tunnel Shield Door and size into manageable pieces using a hot torch cutting system.
16. Hammer northern wall of Secondary Filter Room.

Following demolition and debris removal, gravel placed over the grouted floor of the VC, as needed, for "cushioning" during demolition would be graded to promote drainage. If necessary, additional material would be placed over a portion of the area to support future equipment passage. This material may need to be removed to satisfy contract requirements.

Figure 10
Phases A, B, C, Parts of D & E (Vitrification Cell) Removed



6.4 Radiation Protection and Radiological Controls

It is the policy of DOE to conduct its radiological operations in a manner that ensures the health and safety of all its employees, contractors, and the general public. In achieving this objective, the DOE will ensure that radiation exposures to its workers and the public and releases of radioactivity to the environment are maintained below regulatory limits and deliberate efforts are taken to further reduce exposures and releases as low as reasonably achievable. The DOE is committed to implementing high quality radiological control programs that consistently reflect this policy.

CHBWV utilizes the Radiation Protection Program (RPP), as defined in WVDP-477, to implement the requirements of 10 CFR 835 *Occupational Radiation Protection* at the WVDP. The RPP implements the necessary programmatic requirements to ensure that radiological operations are performed in a manner to protect the health and safety of all employees, contractors and the general public. Specific sections are included covering area monitoring and radiological controls. All radiological activities performed by CHBWV and other WVDP site contractors, under DOE contract, will meet the requirements of this RPP. The RPP was developed following the guidance provided by DOE G 441.1-1C *Radiation Protection Programs Guide*, Section 3.0, Radiation Protection Programs. The requirements of the RPP are implemented through specific statements contained in the *WVDP Radiological Controls Manual* (WVDP-010), and enhanced by WVDP procedures.

The RPP provides for the following:

- ensuring that a compliant radiation protection program is established and maintained;
- ensuring personnel responsible for performing radiological work are appropriately trained;
- ensuring the technical competence of personnel responsible for implementing and overseeing the Radiation Protection Program;
- ensuring that radiological control personnel are an integral part of the D&D operations;
- ensuring line management's involvement and accountability for radiological performance;
- ensuring that radiological measurements, analyses, worker monitoring results and estimates of public exposures are accurately and appropriately made in accordance with the site's environmental monitoring program;
- ensuring that radiological operations are conducted in a manner that controls the spread of radioactive materials and minimizes the risk to the work force and the general public and that a process is utilized that seeks exposure levels As Low As Reasonably Achievable (ALARA), and;
- ensuring that the ALARA process is incorporated into facility design and modifications, and during D&D operations.

As described previously, open air demolition of the above grade portions of the VF building, including the VC, will be performed in a controlled step-by-step process proceeding from uncontaminated portions of the building, inward towards the VC. To minimize the potential for airborne releases during demolition and to stay within regulatory limits, application of strippable coatings, fixatives, and/or other processes will be employed prior to demolition of the building. Guidance for the use of these materials to control radioactive contamination during D&D activities is provided in radiological control procedure RC-RPO-110, *Usage guides for Fixatives and Decontamination Agents.* Methods will be taken to prevent the release of radioactive and hazardous constituent contaminants following demolition of the above grade structures.

The following monitoring approaches, described in more detail later in this section, will be implemented to insure protection of the workers, the public, and the environment. Monitoring during demolition of the building includes air monitoring in the vicinity of the demolition actions for radiological releases to protect worker health and safety. This monitoring will also serve as an indication of potential airborne hazardous constituent releases. Should releases be detected above preset levels, work will be stopped and additional controls will be evaluated and implemented, as necessary. Ambient air monitoring stations located around the perimeter of the WVDP will monitor for airborne radioactivity and confirm protection of the public.

6.4.1 ALARA

As low as reasonably achievable (ALARA) is a philosophy of striving for excellence in the practice of health physics and is an important aspect of radiation-safety regulations. The National Council on Radiation Protection and Measurements has stated "ALARA is simply the continuation of good radiation-protection programs and practices which traditionally have been effective in keeping the average and individual exposures for monitored workers well below the limits" (NCRP 1993). The application of ALARA clearly includes the consideration of economic and social factors, and thus will inherently be different for different sources or facilities. From 10 CFR 20.1003:

ALARA means making every reasonable effort to maintain exposures to radiation as far below the dose limits in this part as is practical consistent with the purpose for which the licensed activity *is undertaken, taking into account the state of technology, the economics of improvements in relation to state of technology, the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to utilization of nuclear energy and licensed materials in the public interest.*

The 10 CFR 20.1103 standard for ALARA is similar to that in DOE-STD-1098-2008:

10 CFR 835 requires DOE activities to develop and implement plans and measures to maintain occupational *radiation exposures as low as is reasonably achievable (ALARA) [see 10 CFR 835.101 and 835.1001]. As applied to occupational radiation exposure, the ALARA process does not require that exposures to radiological hazards be minimized without further consideration, but that such exposures be optimized, taking into account both the benefits arising out of the activity and the detriments arising from the resultant radiation exposures and the controls to be implemented.*

The ALARA concept is founded on the professional judgment of radiation-safety managers and personnel and is not, therefore, able to be used as a measure as to whether or not a particular radiation-safety program is adequate in comparison with other programs. Additionally, the ALARA concept does not provide a numerical limit below which the ALARA concept is achieved; ALARA makes every reasonable effort to maintain exposure as far below regulatory limits as possible.

Quantitative ALARA analyses include societal, technological, economic, and public policy considerations. In addition, these ALARA analyses consider NRC and DOE guidance for performing the following ALARA assessments:

- Identification of possible radiation protection systems, such as alternative operating methods or controls, that is reasonably achievable. The options range from the most rudimentary (base case) to the most technologically sophisticated systems.
- Quantification of exposures and doses to workers and the public in the vicinity of the work through air monitoring and dosimetry.
- Quantification of the economic factors, including the costs of purchasing, installing, operating, and maintaining the radiological equipment, and the potential health effects associated with the exposure of people and any other direct or indirect cost resulting from exposures to radiation during investigations and/or remediation.
- Identification and estimation of other health and non-health detriments and benefits, such as equipment loss and accidents.
- Evaluation of process alternatives using a quantitative cost-benefit analysis, when possible (NUREG-1530, 10 CFR 50 Appendix I, REG GUIDE 8.37).
- Implementation of the ALARA principles and monitoring of the results.

The following specific factors were used in performing a quantitative ALARA analysis:

- Dose to workers, the public, and the environment before and during work processes using AERMOD.
- Residual dose to the local population (CAP-88 Modeling).
- Applicable alternative processes (treatments, operating methods, or controls) for site investigations or remediation.
- Costs for each alternative evaluated compared to standards listed in NUREG-1530 and/or REG Guide 8.37.
- Societal and environmental (positive and negative) impacts associated with alternatives.

6.4.2 Demolition Support Monitoring

Real time air monitoring will be performed near the demolition site to monitor worker safety and maintain proper radiological control of the work area. The worker safety monitoring goal is to maintain safe levels at the demolition area boundary and demonstrate success of the engineered controls. The air monitoring program, as implemented, is designed to reduce the internal dose to the radiation workers and is part of the overall ALARA program. Air samples will be taken as necessary to detect and evaluate the level of airborne radioactivity at the work locations. Real-time air monitoring will be performed as necessary to detect and provide warning of airborne radioactivity concentrations that warrant immediate action.

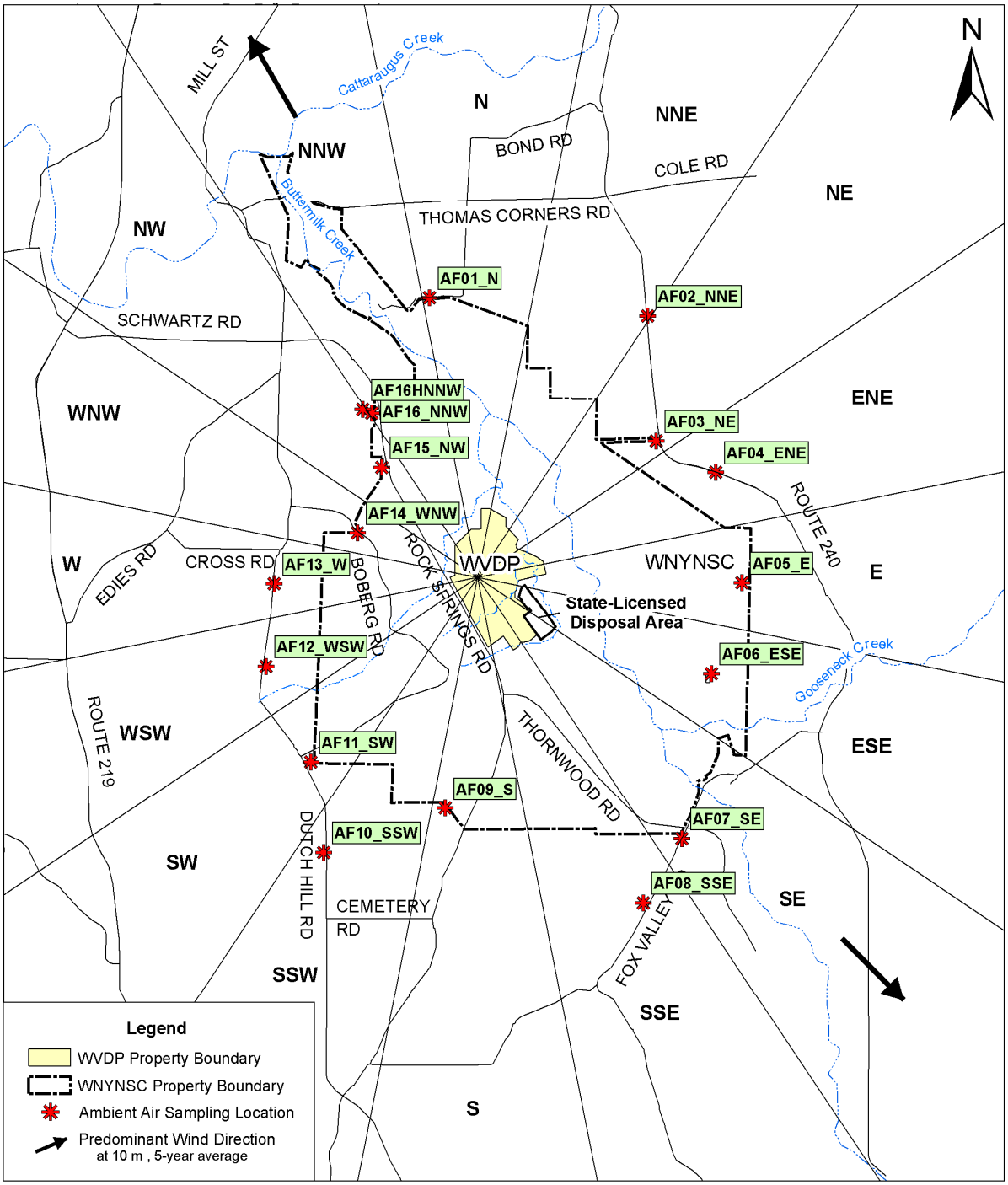
Monitoring of demolition activities will include the steps outlined below which were successfully implemented during demolition of the WVDP 01-14 Building. That demolition, completed in 2013, did not result in detection of any WVDP radionuclide contaminants above background and demonstrated the feasibility of compliant open air demolition. Worker breathing zones and perimeter area airborne radioactivity levels will be monitored per RWP specifications.

- Low volume air samplers and real time air monitors will be located at the perimeter of the demolition site. A breathing zone air sampler will be located in the cab of the excavator(s).
- Dust monitoring will be performed by health and safety personnel.
- Real time air monitoring will be utilized during demolition and packaging activities.
- At the end of each shift, air sample filters will be counted for gross alpha and gross beta activity levels.
- Prior to starting a new shift, air sample results from the previous day will be evaluated.
- Frequent contamination surveys (approximately every 30 minutes) at perimeter locations will be performed during demolition.
- Final counting of air sample filters for gross alpha and gross beta seven days after collection to allow for decay of normally occurring radioactive material such as radon and associated decay products with short half-lives.

6.4.3 Ambient Monitoring Program

As indicated in Section 1.1, the WVDP implemented and EPA approved an ambient air environmental measurements system to estimate off-site dose from airborne emissions and demonstrate compliance with rad-NESHAP requirements from site operations, including facility demolition. The ambient air sampling program provides continuous environmental air sampling for surveillance and regulatory compliance. The location of the 16 low-volume samplers is shown on Figure 11. In addition, a high-volume sampler is co-located in the sector most often identified as the critical receptor (NNW) to allow data comparison with the low-volume sampler. Filter samples from the ambient air monitoring locations are collected biweekly for gross alpha and gross beta screening and charcoal cartridges are collected monthly for iodine-129 screening analysis. Samples collected on a biweekly or monthly basis are also composited quarterly and analyzed for radioisotopes known to have been managed on the site. Samples of ambient air will include naturally occurring radioisotopes such as radon decay products which will be detected in the gross radioactivity analyses. Results from more than three years of monitoring have been generally similar across the 16 locations and consistent with background levels.

Figure 11
Ambient Air Monitoring Locations



The ambient air monitoring data were used to estimate the dose from airborne releases for NESHAP compliance for the first time in the 2014 evaluation. The estimated dose to the off-site critical receptor from airborne emissions at the WVDP in 2014 was <0.52 millirem (mrem) which is well below the 10-mrem limit established by EPA and mandated by DOE Order 458.1, *Radiation Protection of the Public and the Environment*.

6.4.4 Air Dispersion Modeling

Air dispersion modeling using the CAP-88 and AERMOD programs is being performed to show that residual radiation levels within the VF are low enough to perform open air demolition while insuring potential doses to the workers and the public remain well below established standards. As indicated in Section 3.1, radiation and radiological contamination surveys, including pre-demolition surveys, are performed in accordance with established radiological control procedures with guidelines for collecting data used for demolition calculations using air dispersion modeling. Such radiological engineering calculations are documented consistent with radiological control procedure RC-ALAR-9, *Documentation of Radiological Engineering Calculations.* This procedure indicates that all calculations should receive a peer review, and that computer software used in computations should be independently validated and verified. Results produced by software that is developed for a single application and single user (e.g., excel spreadsheet, mathcad worksheet, etc.) will be checked as part of the peer review process.

The WVDP submitted a request for approval to EPA to utilize alternative methodology for radionuclide source-term calculations for air emissions from WVDP demolition activities as permitted by 40 CFR Part 61.96(b). This request was submitted in January 2016, and following EPA review and approval, calculations will be performed to estimate radiological emissions and demonstrate compliance with rad-NESHAP requirements. Results from these calculations will also be used to establish worker protection limits to maintain airborne concentrations below acceptable criteria at an established perimeter from the active demolition zone. Maintaining this worker protection limit will also be protective of the public.

Radiological surveys will also be performed and documented following final preparations for demolition including final grout placement and fixative application to walls and other surfaces. Air dispersion modeling using these survey results will be performed to confirm and document that open air demolition of the VF can safely commence. These calculations and documentation will undergo internal review by CHBWV and also by DOE-WVDP.

6.5 Access Control and Security

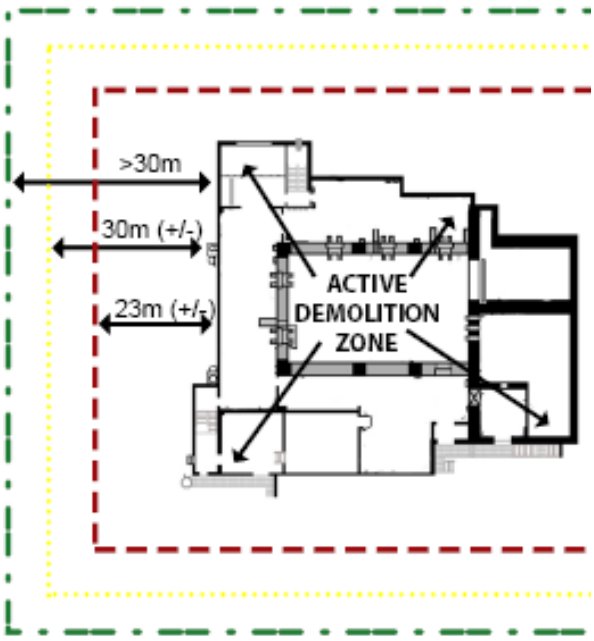
The approximately 152 acres (61 hectares) that comprise the WVDP are enclosed by an 8-ft-high (2.4-m) security fence with 3-strand barbed wire. The entire perimeter is patrolled on a random schedule by Safeguards and Security personnel. Other security measures, including entry badge systems, intrusion alarms, and video surveillance, limit the potential for unauthorized entry to the WVDP.

Surveillance of the VC operations, including decontamination and waste removal activities performed with remote tooling, is accomplished through windows and remote cameras. Access for equipment and waste removal and for remote decontamination activities is through the doors and hatches of adjoining rooms of the VF and the MPPB. Access to VF areas is controlled administratively through postings and via access-badge restrictions.
Only authorized and appropriately trained and badged personnel, including contractor personnel, are granted access to these areas.

The following boundaries will be established around the active demolition zone:

1. Demolition Buffer - A boundary set up approximately 23 meters from the active demolition zone where physical demolition activities are occurring.
2. Monitoring Boundary - A perimeter established about 30 meters from the active demolition zone. This is where monitoring is performed to insure worker protection levels are achieved.
3. Demolition Boundary - A perimeter fence line at a distance greater than 30 meters from the demolition zone to keep unauthorized persons away from the demolition activities and supporting functions.

Figure 12
Boundaries During VF Demolition



Key:

Demolition Buffer: Approximately 23 m (75 ft)+/- from Active Demolition Zone; Where Physical Demolition Occurs

Monitoring Boundary: 30 m (100 ft) +/- From Active Demolition Zone; Where Perimeter Monitoring And Sampling Occurs

Demolition Boundary: >30 m (100 ft) +/- From Active Demolition Zone. A fence line around the entire demolition work zone to keep away unauthorized persons.

7.0 WASTE MANAGEMENT

The WVDP maintains a comprehensive waste management program which includes the following programs, policies and procedures:

Document No.	Document Name
WVNS-DSA-001	*Documented Safety Analysis for Waste Processing and Support Activities*
WVDP-107	*WVDP Waste Analysis Plan*
WVDP-112	*Transportation Safety Document*
WVDP-446	*Facility Demolition Hazard Characterization Planning*
WVDP-508	*WVDP Hazardous Waste Contingency Plan and Emergency Procedures*
WVDP-568	*Radioactive Waste Management Basis (RWMB) for the Lag Storage System*
WM-210	*Waste Stream Characterization*
WM-230	*Determining Radioactivity in a Waste Package*
WM-250	*Waste Container Characterizations*
WM-310	*Conducting Waste Certification Activities*
WM-340	*Off-Site Shipment Preparation*
SOP 009-12	*Municipal Waste Management and Recyclable Materials*
SOP 300-07	*Waste Generation, Packaging and On-Site Transportation*
SOP 300-26	*Off-Site Transportation of Waste and Hazardous Material*
SOP 300-32	*Container Handling and Inspection*

(*Note that these documents are not listed again in Section 9.0, References*)

7.1 Waste Identification and Characterization

The waste generated from the VF D&D operations will be evaluated for RCRA and radiological characterization prior to packaging and shipment for offsite disposal. Preliminary waste profiles and characterization will be performed prior to demolition, with final surveying and confirmation performed prior to shipping the waste from the WVDP.

RCRA Characterization

RCRA Characterization of the demolition debris will be conducted in accordance with WM-210, *Waste Stream Characterization*. The characterization will be applied to the overall facility structure prior to demolition using historical data and process knowledge. The characterization will be documented in accordance with SOP 300-07, *Waste Generation, Packaging and On-Site Transportation.* Mixed wastes to be removed and segregated for disposal during demolition include the six leaded glass shield windows from the VC, lead materials in the window frames, and lead from shield doors and shield plugs.

Radiological Characterization

Radiological Characterization of the demolition debris will also be conducted in accordance with WM-210, *Waste Stream Characterization* for the demolition waste streams and to establish the isotopic scaling factors for the waste. Characterization of the IM containers or other containers of demolition debris will be performed in accordance with WM-250, *Waste Container Characterizations* and WM-230, *Determining Radioactivity in a Waste Package*.

7.2 Waste Minimization and Mitigation Strategies

The overall WVDP waste management program proactively provides for waste mitigation and minimization strategies. The overall goal during demolition is to sort and segregate the waste streams by utilizing proven demolition techniques to prevent the comingling of uncontaminated building debris with LLW contaminated debris and other environmental contaminants. Where feasible, prior decontamination and deactivation activities will further reduce the waste types and quantities as low as reasonably achievable prior to the start of D&D activities. In this manner, the overall waste quantities and types are minimized and the overall cost and expense for transportation and disposal is mitigated.

7.3 Disposal Pathways

The WVDP has identified the following facilities for off-site disposal of LLW demolition debris and waste from the VF D&D operations:

7.3.1 Nevada National Security Site, Nye County Nevada

The Nevada National Security Site (NNSS) is a DOE owned disposal facility authorized to accept the following waste: DOE LLW, DOE MLLW, DOE hazardous and non-hazardous waste, non-radioactive classified waste, and U.S. Department of Defense (DOD) classified waste.

7.3.2 Energy Solutions, Clive, Utah

Energy Solutions is permitted, licensed and authorized to receive, treat and dispose of Class A mixed and non-mixed wastes, byproduct material, special nuclear material based on concentration limits, PCB radioactive waste, and PCB mixed waste.

7.3.3 Energy Solutions, Bear Creek, Tennessee

The Bear Creek Tennessee facility provides an opportunity for Bulk Survey for Release (BSFR) disposal pathway. BSFR is a licensed process approved by the Regulatory Agencies (NRC, or Agreement State) that allows for the bulk survey and release of materials with extremely low levels of radioactive contamination in specific industrial waste landfills. This option is available to the WVDP under various DOE contracts.

7.3.4 Waste Control Specialists, LLC (WCS), Andrews County, Texas

WCS is a full service radioactive waste disposal facility which can accept Class A, B and C LLW for land disposal, and mixed LLW for both treatment and/or disposal. WCS also has an exempt cell for very low-level waste (one-tenth of the Class A limits).

7.4 Packaging, Transportation and Disposal

All D&D building debris will be compliantly packaged into containers suitable for the type of debris generated, and meeting the U.S. Department of Transportation (DOT) regulations as well as the Waste Acceptance Criteria (WAC) for each specific facility. Most waste will be placed into IM

containers. A small amount of soil, stone, and/or small sized debris will often be placed on the bottom of the IM's prior to loading in the building rubble.

Demolition activities will be conducted in a manner to facilitate the size reduction and subsequent loading of debris directly into final containers for transportation and disposal. In this manner, double handling of waste debris and containers is eliminated and there is no need for reopening waste containers prior to shipping them off-site.

Transportation to the disposal facilities will be via licensed, certified, insured, and DOT compliant trucks operated by properly licensed and trained drivers. The waste from the VF will be shipped via a combination of trucks and/or railcars.

7.5 Summary of Estimated Waste Quantities

Based on preliminary deactivation and decontamination activities which have already occurred in the VF, and available characterization data, the following table represents an initial estimate of waste quantities and type from VF demolition. The quantities are broken down by general areas of the VF and are subject to further revision as additional characterization and deactivation activities continue. The quantities will be updated prior to the start of demolition.

Table 4
Estimated Waste Quantities from Vitrification Facility Demolition

Ref #	VF Area	Tons	Containers*	Waste Type**
1	VC Walls & Ceiling	3,600	240	2
2	Secondary Filter Room/Diesel Generator and Tunnel Walls	1,000	67	2
3	Crane Maintenance Room	1,400	94	2
4	Remaining Aisles & General Area	700	47	1
5	Subtotal Entire VF	6,700	448*	

* Container size assumed to be 25 cu yd carrying 15 tons/container
** Type 1 Waste is low activity waste with potential for release or BSFR and Type 2 Waste is LLW.

7.6 Record Keeping and Disposal Records

Waste Operations will track the transportation and dispositioning of the VF demolition waste in the Integrated Waste Tracking System (IWTS) or similar inventory tracking system. A record will be kept of each container (IM or special package), and the transportation vehicle and final disposition/disposal of that container. The weight of the waste along with waste profile and disposal facility will also be included.

8.0 SCHEDULE

Attachment E includes a VF demolition schedule. This is a high level schedule showing planned time frames and sequencing for the demolition activities. The actual dates when activities are performed may change based on integration of this work with, and the timing of, other ongoing WVDP Phase 1 decommissioning activities. The dates and durations may also be adjusted based on the completion of characterization and deactivation activities and conditions encountered once demolition begins. Should

circumstances warrant a change, updates to the schedule are documented through the WVDP change control process. Given the nature of this work, some adjustments to the schedule are likely to occur. However, this plan is not anticipated to be revised only to update the schedule.

9.0 REFERENCES

ANSI International. 2006. *American National Standard for Construction and Demolition Operations - Safety Requirements for Demolition Operations*. ANSI A10.6.

CHBWV. March 2016. *Resource Conservation and Recovery Act Hazardous Waste Closure Plan for the High-Level Waste Vitrification Facility.* WVDP-153, Rev. 11 (or latest revision).

_____. September 2012. *Facility Demolition Hazard Characterization Planning*. WVDP-446. Rev. 3 (or latest revision).

_____. February 2012. *CHBWV Documented Radiation Protection Program and Implementation for Title 10, Code of Federal Regulations, Part 835, as Amended May 2011*. WVDP-477. Rev. 7 (or latest revision).

_____. May 2016. *Performing Radiation and Contamination Surveys.* RC-RPO-104 . Rev. 11 (or latest revision).

_____. January 2016. *Work Control*. WVDP-485. Rev. 14 (or latest revision).

_____. October 2015. CHBWV Executive Management Directive. *Hazard Review Board*. EMD-002. Rev. 2 (or latest revision).

_____. April 2016. *Administration of Work Instruction Packages*. EP-5-002. Rev. 40 (or latest revision).

_____. January 2016. *Hazards Identification and Analysis*. WV-921. Rev. 28 (or latest revision).

_____. May 2014. *Controlled Document Preparation and Revision Process*. DCIP-100. Rev. 10 (or latest revision).

_____. October 2013. *Controlled Document Review, Approval, and Emergent Change Process*. DCIP-101. Rev. 13 (or latest revision).

_____. March 2015. *Work Instruction Walkdowns, Pre-Job and Daily Briefings, and Post-Job Feedback/ Lessons Learned*. SOP 000-46. Rev. 14 (or latest revision).

_____. August 2015. *WVDP Radiological Controls Manual*. WVDP-010. Rev. 37 (or latest revision).

_____. December 2012. *Usage guides for Fixatives and Decontamination Agents.* RC-RPO-110. Rev. 0 (or latest revision).

_____. January 2012. *Documentation of Radiological Engineering Calculations.* RC-ALAR-9. Rev. 4 (or latest revision).

NYSDEC. Official Compilation of Codes, Rules and Regulations, Title 6, Subpart 373-3, *Interim Status Standards for Owners and/or Operators of Hazardous Waste Facilities*.

Occupational Safety and Health Administration. 2012. *Safety and Health Regulations for Construction*. 29 CFR Part 1926, Subpart T - *Demolition.*

U.S. Congress. October 1980. *An Act to Authorize the Department of Energy to Carry Out a High-Level Liquid Nuclear Waste Management Demonstration Project at the Western New York Service Center in West Valley, New York.* Public Law 96-368 [S. 2443]. Congressional Record, Vol. 126. (Also known as the WVDP Act)

_____. 1954. *Atomic Energy Act of 1954*. 42 USC §2011 *et seq.*

U.S. DOE. December 2009. P*hase 1 Decommissioning Plan for the West Valley Demonstration Project*. Rev. 2.

_____. January 2010. *Final Environmental Impact Statement for Decommissioning and/or Long-Term Stewardship at the WVDP and the WNYNSC*, DOE/EIS-0226.

_____. April 14, 2010. *Record of Decision: Final Environmental Impact Statement for Decommissioning and/or Long-Term Stewardship at the West Valley Demonstration Project and Western New York Nuclear Service Center.* DOE/EIS-0226.

_____. January 25, 2016. Letter from B.C. Bower to O. Povetko. *Request for Approval for Alternative Methodology for Radionuclide Source Term Calculations for Air Emissions from Demolition Activities at the West Valley Demonstration Project*.

_____. July 8, 2011 (Change 1). *Radiation Protection Programs Guide.* DOE G 441.1-1C.

_____. January 15, 2013 (Admin. Change 3). *Radiation Protection of the Public and the Environment.* DOE O 458.1.

_____. May 2011 (amended). *Occupational Radiation Protection.* 10 CFR 835.

_____. 1981. *West Valley Demonstration Project Memorandum of Understanding Between the U.S. Department of Energy and the U.S. Nuclear Regulatory Commission*.

U.S. EPA. July 14, 2015. Letter from J. Filippelli to B.C. Bower. *Request for Final Approval of Environmental Measurements for NESHAP Compliance at the U.S. Department of Energy (DOE) West Valley Demonstration Project (WVDP).*

_____. August 3, 2015. Office of Air Quality Planning and Standards Air Quality Assessment Division. *AERMOD Implementation Guide.*

_____. December 15, 1989 (including update of September 9, 2002). *National Emission Standards for Hazardous Air Pollutants: Standards for Radionuclides.* 40 CFR 61, Subpart H. *National Emission Standards for Emissions of Radionuclides Other Than Radon from Department of Energy Facilities.*

U.S. NRC. September 2006. *Consolidated Decommissioning Guidance, Decommissioning Process for Materials Licensees*. NUREG-1757, Volume 1, Revision 2.

_____. June 2, 2008. *Report of May 19, 2008 Meeting with U.S. Department of Energy to Discuss the West Valley Demonstration Project Phase 1 Decommissioning Plan.*

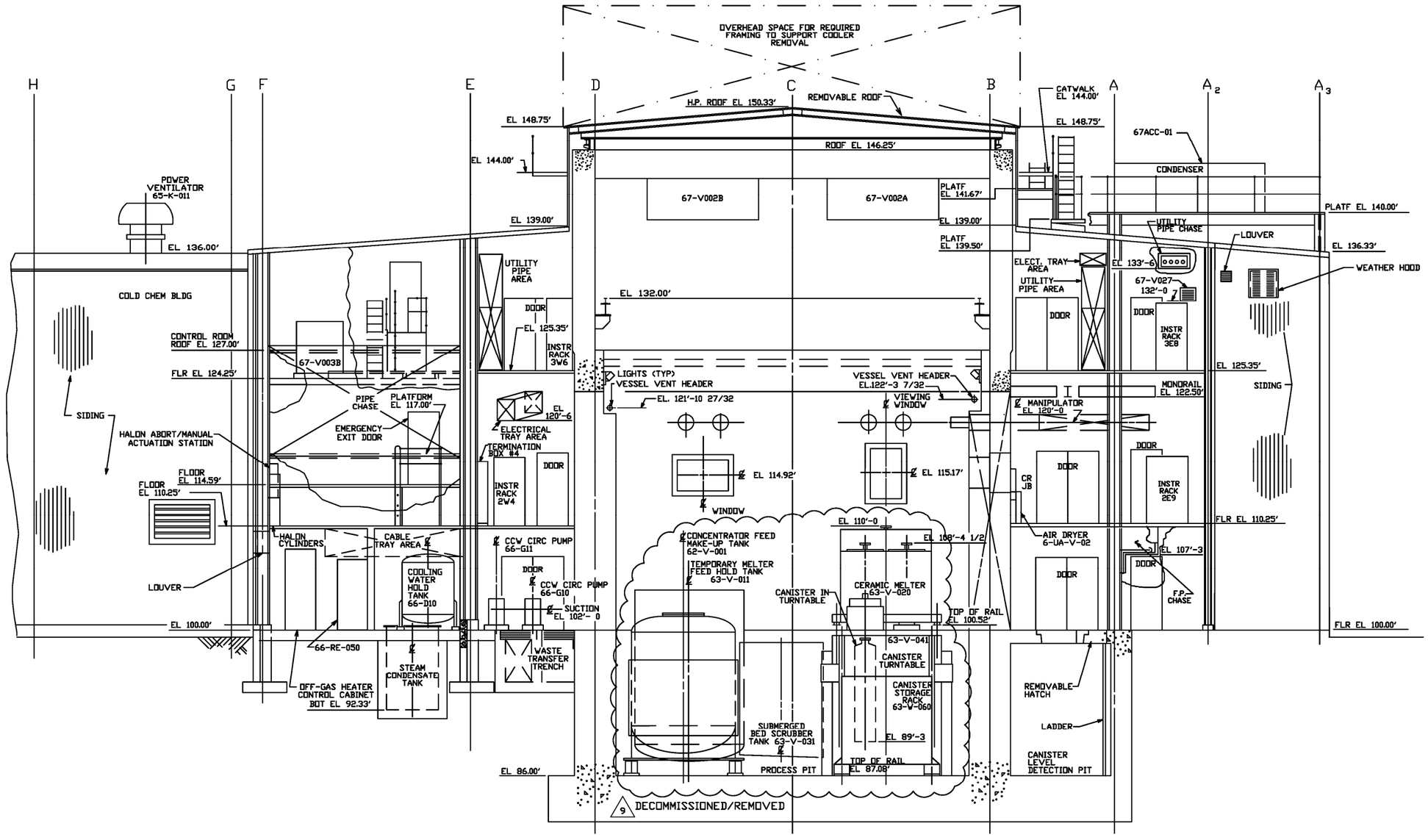
_____. February 25, 2010. *U.S. Nuclear Regulatory Commission Technical Evaluation Report on the U.S. Department of Energy Phase 1 Decommissioning Plan for the West Valley Demonstration Project.*

Trinity Engineering Associates, Inc. and U.S. Environmental Protection Agency Office of Radiation and Indoor Air. February 2013. *CAP88-PC Version 3.0 User Guide*.

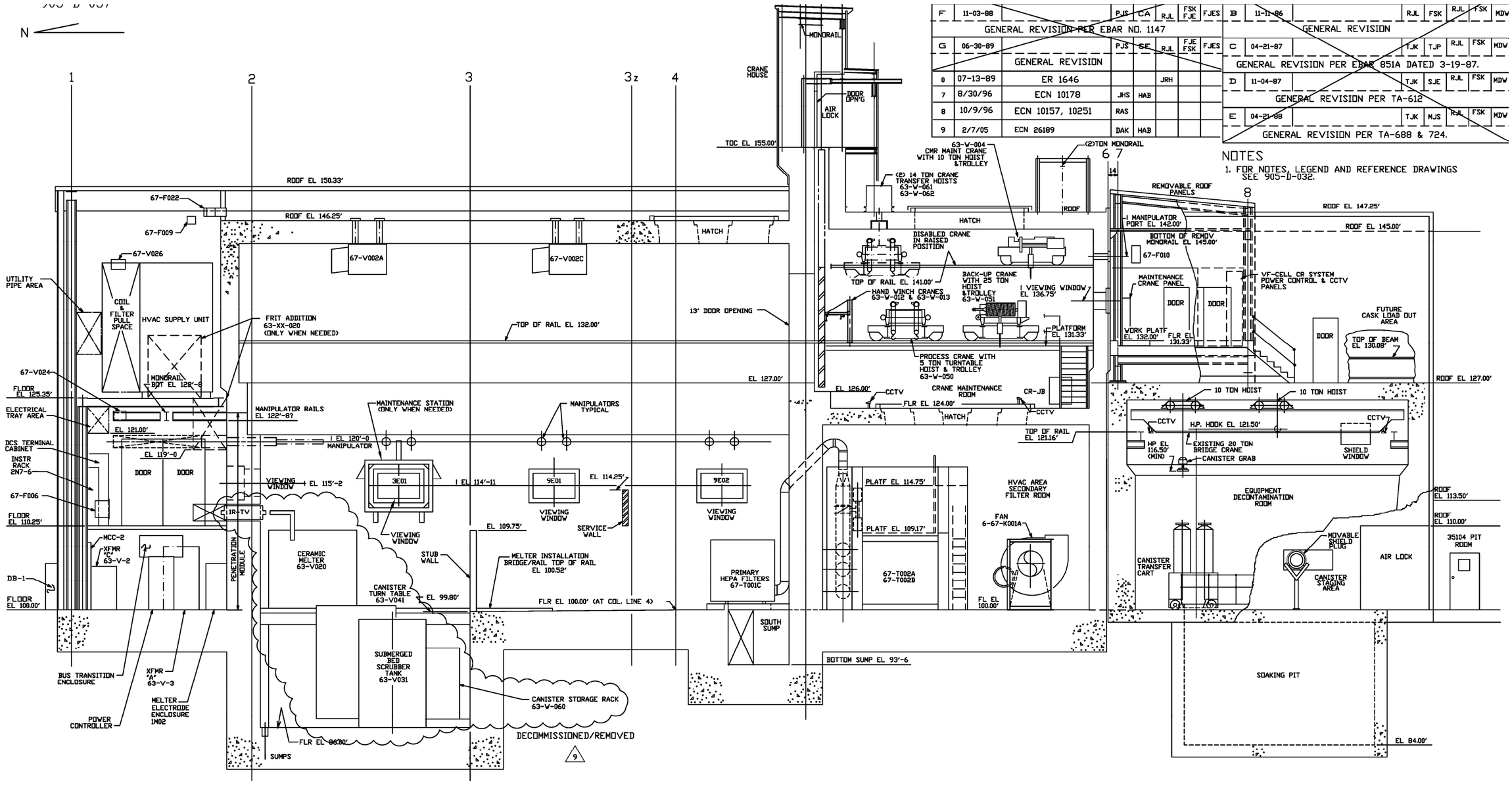
_____. February 2015. *CAP88-PC Version 4.0 online training, http://www.epa.gov/radiation/assessment/CAP88/training.html #Course 1 and 2.*

ATTACHMENTS

Attachment A
Vitrification Facility Section Facing North



Attachment A
Vitrification Facility Section Facing East



F	11-03-88	GENERAL REVISION PER EBAR NO. 1147	PJS	CA	RJL	FSK FJE FJES
G	06-30-89	GENERAL REVISION	PJS	SE	RJL	FJE FSK FJES
0	07-13-89	ER 1646			JRH	
7	8/30/96	ECN 10178	JHS	HAB		
8	10/9/96	ECN 10157, 10251	RAS			
9	2/7/05	ECN 26189	DAK	HAB		

B	11-11-86	GENERAL REVISION			RJL	FSK RJL FSK MDW
C	04-21-87	GENERAL REVISION PER EBAR 851A DATED 3-19-87.	TJK	TJP	RJL	FSK MDW
D	11-04-87	GENERAL REVISION PER TA-612	TJK	SJE	RJL	FSK MDW
E	04-21-88	GENERAL REVISION PER TA-688 & 724.	TJK	MJS	RJL	FSK MDW

NOTES
1. FOR NOTES, LEGEND AND REFERENCE DRAWINGS SEE 905-D-032.

Attachment B
WVDP Demolition Readiness Checklist Form

Demolition Readiness Checklist for: _____

	- Items with a in the left side column require action to be completed before the facility is ready for demolition. - Subject matter expert (SME) to sign the right column when the action requirement(s) have been satisfied.	Completion Signature

Demolition Readiness Checklist Reviewers

Signatures below signify that the Demolition Readiness Checklist has been reviewed by the parties indicated, and they concur with the stated disposition for each item as it applies to their area of expertise. **Their signature DOES NOT signify the building is ready for demolition, only that all items and actions required to make the facility ready for demolition have been identified.**

Department/Position	Name	Date	Signature
Professional Engineer			
(Primary) System Engineer			
(Electrical) System Engineer			
(Site Piping) System Engineer			
(Structural) System Engineer			
(Ventilation) System Engineer			
Asbestos Program Manager			
Emergency Management			
Fire Protection Specialist			
Nuclear and Criticality Safety			
Property Management			
Quality Assurance			
Radiological Engineering			
Regulatory Strategy			
Safety			
Security			
Subcontract Technical Representative (STR)			
Training			
Waste Planning & Disposition (WPD)			

Part I – Building Information

Building/Area Name								
Hazard Category								
Year Building Built								
Facility Mgr.								
Cognizant System Design Manager								
System Engineer								
System Number								
Building/Area Dimensions	Width		Length		Height		Total Square Feet	
Structure Type:								
Foundation Type:								
Demolition Work Instruction Package (WIP) Number & Title								
End State Vision Statement How facility will be left at end of project. (Physical alterations and surveillance & maintenance following demolition)								
Facility Areas Omitted from Demolition								

Action items identified have been verified as completed by the appropriate SMEs and Part X Pre-Demolition Walkdown items have been addressed.

Signature in this box indicates that the _____ is ready for Demolition.

Facility Manager (Signature) _____ (Date) _____

Demolition Readiness Checklist for:_____

- Items with a in the left side column require action to be completed before the facility is ready for demolition.
- Subject matter expert (SME) to sign the right column when the action requirement(s) have been satisfied.

Completion Signature

Part II – WVDP Policies & Procedures Compliance Documentation

Participate in an integrated facility walkdown inspection and explain pre-demolition actions required. Additional facility-specific lines of inquiry may be added as necessary. Reference the associated completion documentation for "Yes" determinations. Signatures below indicate that actions have been completed or added to Part X for Subcontract Technical Representative (STR) verification.

Asbestos Program — Asbestos Program Manager

___ Yes ___ No Certified Asbestos Inspector Survey Required? (Possible source: insulation, floor, roof, caulk, mastic)
___ Yes ___ No Asbestos Abatement Required?
___ Yes ___ No Asbestos Site Inventory Update Required?
Explain:

Emergency Management — Emergency Management

___ Yes ___ No Emergency Management Implementing Procedure Modifications Required?
___ Yes ___ No Relocation of Emergency Equipment Required (e.g., all-page speakers, assembly area, SCBAs, etc.)?
Explain:

System Engineer — System Engineer

___ Yes ___ No Prototype, Mockup and/or Proof of Application Test Required?
___ Yes ___ No Design/Engineering Drawings Required?
___ Yes ___ No Standard Operating Procedure (SOP) Modification/Cancellation Required?
___ Yes ___ No Engineering Change Notice (ECN) Required?
___ Yes ___ No System Description Modification or Cancellation?
___ Yes ___ No Preventative Maintenance Card Modification or Cancellation?
___ Yes ___ No Warehouse Stock/Spare Part Review Required?
___ Yes ___ No Hoisting & Rigging Lift Plans Required?
___ Yes ___ No Detailed Section Cut Plans Required?
Explain:

Facility Disposition — Facility Disposition

___ Yes ___ No Demolition Plan Required (Hazard Category 3)?
___ Yes ___ No Risk Management Plan Required?
___ Yes ___ No Hazard Review Board (HRB) Approval Required?
___ Yes ___ No Subcontract Purchase Order/Change Order Required?
Explain:

Facility Manager - Infrastructure — Facility Manager

___ Yes ___ No WVDP-183, Freeze Protection Program Modification Required?
___ Yes ___ No Outdoor Lighting, Speakers or Lightning Protection Required?
___ Yes ___ No Off-shift Demolition Monitoring Activities Defined?
___ Yes ___ No Surveillance & Maintenance (S&M) Plan Required per WVDP-546 (e.g., inspections, surveys)?
Explain:

Fire Protection — Fire Protection Specialist

___ Yes ___ No Transitional Fire Hazard Analysis (FHA) or Facility Fire Assessment (FFA) Required?
___ Yes ___ No Adjacent Facility Access/Egress Points Affected by Demolition?
___ Yes ___ No Combustible Loading Surveillance Schedule Required?
___ Yes ___ No Temporary Fire Protection Equipment Required?
___ Yes ___ No Fire Protection Review of Demolition Documents Required (i.e., Field Changes, WIPs)?
___ Yes ___ No Compensatory Measures in Place?
Explain:

Nuclear & Criticality Safety — Nuclear & Criticality Safety

___ Yes ___ No Is a USQD Required? If yes, USQD No.:_____
___ Yes ___ No Facility Categorization Downgrade Required? (WVDP-227) _____
___ Yes ___ No Postings Required to Preclude Addition of Rad Inventory?
___ Yes ___ No Nuclear Safety Review of Documents Required (SOPs, WIPs, ECNs, Approval Requests, etc.)?
Explain:

Property Management — Property Management

___ Yes ___ No Have associated facility Warehouse stock items and spare parts been excessed?
___ Yes ___ No Has government furnished property within this structure been removed, excessed or dispositioned?
Explain:

Radiation Protection — Radiological Engineering

___ Yes ___ No Have contaminated materials that could create a building demolition issue been addressed?
___ Yes ___ No Have dismantlement activities that require fixatives, shielding or temporary ventilation been identified?
___ Yes ___ No Have potential airborne releases modeled for remaining contaminants yielded acceptable levels?
___ Yes ___ No Have in-situ nondestructive assay (NDA) methods been established for residual nuclear material?
___ Yes ___ No Have radiological monitoring and surveying protocols been established for each demolition phase?
___ Yes ___ No ALARA Committee Approval Required?
Explain:

Demolition Readiness Checklist for:_____

- Items with a in the left side column require action to be completed before the facility is ready for demolition.
- Subject matter expert (SME) to sign the right column when the action requirement(s) have been satisfied.

Completion Signature

Part II – WVDP Policies & Procedures Compliance Documentation

Participate in an integrated facility walkdown inspection and explain pre-demolition actions required. Additional facility-specific lines of inquiry may be added as necessary. Reference the associated completion documentation for "Yes" determinations. Signatures below indicate that actions have been completed or added to Part X for Subcontract Technical Representative (STR) verification.

Regulatory Strategy — Regulatory Strategy

___ Yes ___ No RCRA Closure Plan Required?
___ Yes ___ No SPDES Closure Plan Required?
___ Yes ___ No Storm Water Pollution Prevention Plan (SWPPP) Required?
___ Yes ___ No Regulatory Agency Permits Modification Required (NEPA/NESHAPS)?
___ Yes ___ No Environmental Assessments Modification Required?
___ Yes ___ No Effluent Monitoring Controls Required?
___ Yes ___ No Portable Ventilation Unit (PVU) Required?
___ Yes ___ No Are there rodents, animals or migratory birds that may be disturbed during dismantlement/demolition?
___ Yes ___ No Asbestos Variance Required?
___ Yes ___ No Are there any backflow preventers that have been taken out of service? (CCHD Notification Required)
___ Yes ___ No EPA 10 day Notification for ACM Removal (if more than 260 LF or 160 SF of ACM to be abated)?
___ Yes ___ No EPA 10 day Demolition Notification?
___ Yes ___ No NYSDOL 10 day ACM Removal Notification (if more than 260 LF or 160 SF of ACM to be abated)?
___ Yes ___ No NYSDOL Pre-Demolition Survey Report Submittal for Buildings erected before 1974?

Notification Date: **Earliest Demolition Date:**

Explain:

Safety — Safety

___ Yes ___ No Special or Additional Health and Safety Plan (HASP) Required?
___ Yes ___ No New/Revised Safety & Health Implementing Procedures (SHIP) Required?
___ Yes ___ No Baseline Sampling/Monitoring for Dismantlement/Demolition Activities Required?
___ Yes ___ No New or Updated Job Safety Analysis (JSA) Required?
___ Yes ___ No Confined Space Rescue Plan Required?
___ Yes ___ No Fall Protection Evaluation Required?

Explain:

Security — Security

___ Yes ___ No Demolition Traffic Detour Routes Required
___ Yes ___ No Emergency Vehicle Access Points Required
___ Yes ___ No Security Cameras Required

Explain:

Subcontract Technical Representative — STR

___ Yes ___ No Subcontract Approval Requests (e.g. lift plans, training certifications, etc.) Required?

Explain:

Waste Planning & Disposition — WPD

___ Yes ___ No Sample Analysis Plan (SAP) Required?
___ Yes ___ No Appendix B - Per SOP 300-07 Required?
___ Yes ___ No Waste Stream Profiles Approved by Disposal Facility?
___ Yes ___ No Transportation Permits Required?
___ Yes ___ No Specialty Waste Containers Procured?
___ Yes ___ No Are an Adequate Number of Waste Containers Ready (e.g., inspected, cribbing & shielding installed)?
___ Yes ___ No Required Samples Collected and Results Obtained?

Explain?

Part III – Training

Ensure training is aligned with the work activities and responsibilities. Reference completion documentation for items marked Yes.

Training — Training

___ Yes ___ No Do Personnel Training Requirements Need to be Established for Subcontract and CHWBV Personnel?
___ Yes ___ No Do Personnel Performing the Work Require Training on the Processes, Methods or Procedures?
___ Yes ___ No Have Qualifications, Including Heavy Equipment, Been Reviewed as Current and Adequate?

Explain:

Part IV –Quality Assurance

Ensure completion of Action Items. Ensure remaining work scope items (if any) are adequately addressed within this document.

Quality Assurance — Quality Assurance

___ Yes ___ No Parts I through III Completion Signatures Obtained or Remaining Work Scope Items Identified ?
___ Yes ___ No Part VII Utility End Point Actions Completed?

Explain:

Demolition Readiness Checklist for:_____	
- Items with a in the left side column require action to be completed before the facility is ready for demolition. - Subject matter expert (SME) to sign the right column when the action requirement(s) have been satisfied.	Completion Signature

Part V – Property Management

Identify major facility equipment and materials by location below and document disposition.

	Description	QTY	Reuse	Excess	Property Management: Waste	Property Management: Abandon
Location:						

Part VI – Engineering Evaluation

	List reference documentation (e.g. calculations, sketches) or mitigating actions for items marked Yes below.	Professional Engineer
	Do any component(s) of the building/structure display signs of weakness, deterioration or failure which may cause inadvertent collapse during dismantlement or demolition? ___ Yes ___ No ___ Questionable (further investigation required) Explain:	
	Have there been any structural modifications to this facility/building that would affect structural integrity? ___ Yes ___ No ___ Questionable (further investigation required) Explain:	
	Does the building contain any pre-stressed construction? ___ Yes ___ No ___ Questionable (further investigation required) Explain:	
	Does the building contain any post-stressed construction? ___ Yes ___ No ___ Questionable (further investigation required) Explain:	
	Will adjacent facilities/buildings be impacted structurally by demolition activities? ___ Yes ___ No ___ Questionable (further investigation required) Explain:	
	Are there any common structural members or interferences between adjacent facilities/buildings? ___ Yes ___ No ___ Questionable (further investigation required) Explain:	
	By what method is the structure anchored to the foundation? Explain:	
	Will the de-coupling of the super-structure from the foundation cause any structural instability? ___ Yes ___ No ___ Questionable (further investigation required) Explain:	
	Are there items (below grade projections, wells, trenches, etc.) around the facility that need protection or monitoring during demolition? ___ Yes ___ No ___ Questionable (further investigation required) Explain:	
	Are there below grade utilities that need protection against outrigger loading? ___ Yes ___ No ___ Questionable (further investigation required) Explain:	
	Are there any overhead obstructions (guy wires, power lines, communication cables, and building overhangs) that require relocation or signage to prevent inadvertent contact? ___ Yes ___ No ___ Questionable (further investigation required) Explain:	
	Have dust suppression needs been calculated and water collection systems designed, installed and tested for adequacy? ___ Yes ___ No ___ Questionable (further investigation required) Explain:	

Demolition Readiness Checklist for:_____	
- Items with a in the left side column require action to be completed before the facility is ready for demolition. - Subject matter expert (SME) to sign the right column when the action requirement(s) have been satisfied.	Completion Signature

Part VII - Utilities

Check applicable utilities, the desired End Point (I- Isolated; R – Re-routed; N/A – Not Applicable) and remaining work scope or implementing work document(s) (e.g., isolate, air-gap, grout, cap, re-route, etc.) and status below.

	Utility Type	End Point	Work Document	Description	Status	System Engineer
	Natural Gas					
	Electrical					
	Potable Water					
	Utility Water					
	Fire Water					
	Demin Water					
	Waste Water					
	Cooling Water					
	Vacuum Air					
	Fuel Oil					
	Steam					
	Steam Condensate					
	Utility Air					
	Breathing Air					
	Instrument Air					
	Ventilation					
	Chemical					
	Data					
	Communication					
	Storm Sewer Inlets					
	Sanitary Sewer					
	Fire Detection					
	Fire Suppression					
	Floor Drains					
	Sumps					
	Sampling Wells					
	Other					

Part VIII – Hazardous Materials

Have any of the following hazardous substances been used, stored, handled or are part of the structural surfaces or materials of the facility/building? Identify those hazardous materials that may exist or could have existed, locations (real and suspect) of the equipment or surface containing the hazardous material and the proposed method of abatement or mitigation.	WPO
Lead: ___ Yes ___ No (Possible sources: paint or other protective coating, lead acid batteries, shielding, solder, joint packing, lead flashing) Include any supporting documentation which eliminates or confirms the suspect materials. Explain:	
Batteries: ___ Yes ___ No Explain:	
Mercury (Possible sources: switch gears, thermostats, flourescent light bulbs, floats, detectors, elec. relays, inst. controls) Explain:	

Demolition Readiness Checklist for:_____	
- Items with a in the left side column require action to be completed before the facility is ready for demolition. - Subject matter expert (SME) to sign the right column when the action requirement(s) have been satisfied.	Completion Signature

Part VIII – Hazardous Materials

Have any of the following hazardous substances been used, stored, handled or are part of the structural surfaces or materials of the facility/building? Identify those hazardous materials that may exist or could have existed, locations (real and suspect) of the equipment or surface containing the hazardous material and the proposed method of abatement or mitigation.	WPO
Asbestos or ACM ___ Yes ___ No (Possible sources: insulation, flooring, roofing, caulk, mastic) Explain:	
Heavy Metals (In Hazardous Form) Check any that apply: ___ Yes ___ No Aluminum (Possible sources: building materials, electrical components) ___ Yes ___ No Arsenic (Possible sources: chemical and hazardous wastes) ___ Yes ___ No Cadmium (Possible sources: batteries, cadmium vapor lamps, paints, motor oils) ___ Yes ___ No Copper (Possible sources: electrical and plumbing equipment and supplies) ___ Yes ___ No Nickel (Possible sources: stainless steel, combustion fuel oils) Explain:	
PCB's ___ Yes ___ No (Possible sources: light ballasts, transformers, capacitors, heat transfer equipment) Explain:	
Refrigeration/Cooling Units ___ Yes ___ No Explain:	
Oil/Petroleum Based Lubricants ___ Yes ___ No (Possible sources: drums/cans, door closers, gear boxes, HVAC equip., shield windows) Explain:	
Glycol ___ Yes ___ No (anti-freeze) Explain:	
Tritium ___ Yes ___ No (exit signs) Explain:	
Glass/Shield Windows: Is there glass or other surfaces/materials in the area that may shatter or fragment? ___ Yes ___ No Explain:	
Biological Organisms: Are there molds, mildews, algae's, animal feces or other biologically hazardous materials? ___ Yes ___ No ___ Questionable (further investigation required) Explain:	
Toxic Chemicals or Corrosive Materials: ___ Yes ___ No If any, have the lines been flushed and purged? ___ Yes ___ No Is there any supporting documentation which confirms the absence of chemical residuals? ___ Yes ___ No Explain:	
Pressurized Vessels/Cylinders ___ Yes ___ No (e.g., aerosols, gas cylinders) Explain:	
Expired or Excess Chemicals ___ Yes ___ No Explain:	

Part IX – Waste Planning

List bulk contaminated items (i.e., tanks, vessels & equipment), status and actions (e.g., size reduction) to prepare for disposition.	WPO

	Number	Description	Status (flushed, empty)	Actions Required (fix, foam)

Demolition Readiness Checklist for:_____		
	- Items with a in the left side column require action to be completed before the facility is ready for demolition. - Subject matter expert (SME) to sign the right column when the action requirement(s) have been satisfied.	Completion Signature

Part X – Pre-Demolition Walkdown

	Conduct demolition area walkdown confirming the following conditions.	STR
	Are high visibility markers in place?	
	Have radiologically contaminated components requiring special handling been marked (pink) per SOP 00-30?	
	Is the demolition boundary clearly established (signs, ropes and postings in place)?	
	Have temporary utilities (e.g., electric, water) been run or portable equipment (e.g., air compressors, generators) staged?	
	Are all isolations, temporary modifications and re-routes properly installed and protected from potential damage?	
	Has infrastructure within the demolition area been protected with plates, jersey barriers, etc.?	
	Have signs, surfaces or other displays showing the WVDP name or other logo been removed or obliterated?	
	Has a size reduction area been established?	
	Have the waste container staging and loading areas been established?	

Attachment C

ACTIVITY HAZARDS ANALYSIS

Training TR791B is required to complete this form.

Project/Document ID:	Rev.	FC#	Originator:	Date:

NOTE: *The hazards identified should be specific to the job tasks. Identifying generic hazards that are already addressed by other programs dilute the effectiveness of this analysis.*

Performing an Activity Hazards Analysis (AHA) shall identify (1) the hazards applicable to the specific tasks and (2) the applicable Hazards Controls Specialists (HCSs)/Subject Matter Experts (SMEs) to be included in the work planning process. Mitigations for the identified hazards are captured in the procedure or work instruction, applicable permits, or the pre-job brief.

For revisions/FC: Perform the following:

1) Screening of a change to a previously approved activity needs to address the impact of the change on the original Activity Hazards Analysis (AHA). If the hazards of the work change, indicate in the Rev/FC/Other column on the original AHA the number of the revision, field change, or other change that is being made. The HCSs affected by newly identified hazards or an increase in already identified hazards must approve the change.
2) If a hazard is eliminated by the change, indicate in the Rev/FC/Other column on the original AHA the number of the revision, field change, or other change. In the left hand column of the original AHA change the Yes to a No. In this, NO review for the hazard eliminated is required.

Hazard Control Specialists (HCSs) /Subject Matter Experts (SMEs)

CSE - Criticality Safety Engineer
EM - Emergency Management
FM - Facility Manager
FSS - Fire Safety Specialist
NS - Nuclear Safety
PSOS – Plant Systems Ops Supervisor
RS - Regulatory Strategy
RC - Radiological Controls
Safety
Security
WPD - Waste Planning & Disposition

NOTE: *Work Group Supervisor participation in ALL hazard analysis is REQUIRED.*

#	YES	NO	Potentially Hazardous Situation or Hazard	HCS/ SME	Rev./ FC/ Other
1.			**RADIOLOGICAL SAFETY**		
a.			Will the work activity be performed inside a Radiological Controlled area such as: Radiological Buffer Area; Radioactive Material Area; Radiation Area; High Radiation Area; Very High Radiation Area; Contamination Area; High Contamination Area; or Airborne Radioactivity Area?	RC	
b.			Could the activity involve the transfer, pumping, or draining of potentially radioactive or radioactively contaminated liquids (including storm water)?	RC, RS	
c.			Could the activity involve the breaching of systems containing potentially radioactive or radioactively contaminated liquids (including storm water)?	RC, RS	
d.			Could the work activity involve demolition or work activities on a component, system, or equipment that has the potential for internal contamination?	RC	
e.			Could the work activity involve handling, movement or transportation of radioactive material or waste?	RC, WPD	
f.			Could the activity involve welding, grinding, cutting, surface preparation, abrasive blasting, scabbling, chipping, or other treatment on or near a surface in a manner that contamination could be uncovered or become airborne?	RC, RS, Safety	
g.			Could the work be conducted on, or affect, equipment containing radiation/contamination detectors?	RC	
h.			Could the work require the use of fixatives?	RC	
i.			Will the work activity interfere with the use of the Personnel Decontamination Room?	RC	

#	YES	NO	Potentially Hazardous Situation or Hazard	HCS/ SME	Rev./ FC/ Other
2.			**INDUSTRIAL HYGIENE AND SAFETY – GENERAL SAFETY**		
a.			Could the work activity create or occur in an area with inadequate lighting?	Safety	
b.			Could the work activity increase the potential for slips, trips, and fall injuries or be performed in an area with a higher than average potential for slips, trips, and falls?	Safety	
c.			Could the activity involve work on rotating machinery or near unguarded operating equipment that could pose a pinching or crushing problem?	Safety	
d.			Could the worker be exposed to the danger of being struck by, or making harmful contact with an object (e.g., overhead obstructions, falling objects, areas where workers could be caught or struck by moving equipment)?	Safety	
e.			Could the worker sustain pinches, punctures, cuts, lacerations or other similar injuries from working with portable equipment (e.g., drills, nibbler saws, metal saws, hand tools) or be exposed to sharp or pointed edges?	Safety	
f.			Could the work activity include the manual lifting of heavy objects. (nominally 50 lbs. or 1/3 body weight, whichever is less)?	Safety	
g.			Could the work activity have ergonomic hazards present (e.g., repetitive motion, excessive manual force, awkward or static postures, contact stress on body, vibration, work system not accommodating employee physical shape)?	Safety	
h.			Could the work activity involve a suspected confined space (Permitted or Non-Permitted) or potentially create a confined space?	Safety	
i.			Are additional resources required to remove an injured or incapacitated worker from the work space?	Safety, Rescue SME, EM	
j.			Could the work activity include initially accessing areas closed for long periods?	Safety	
k.			Is the work area posted as a high noise area (greater than 85 dBs) or could the work activities produce high noise levels?	Safety	
l.			Is the work activity likely to result in inhalation of, or eye or skin exposure to: ➢ Dust, mists, or ashes resulting from surface preparation, including grinding, abrasive blasting, scabbling, chipping or other demolition activities ➢ Fumes, vapors, mists, gases (includes painting or working with heavy metals, e.g., lead, mercury, cadmium, hexavalent chromium) ➢ Nuisance dust (e.g., from sweeping)?	Safety	
m.			Could the activity expose workers to an extreme temperature environment or expose workers to conditions that prevent the body from maintaining proper body temperature (e.g., hot weather, outside work in the cold, wearing of PPE)?	Safety	
n.			Will the work activity expose or have the potential to expose workers to blood-borne and/or other potentially infectious materials, biohazards, agents, pathogens, or toxins, including: ➢ Potentially infectious materials such as: raw sewage; birds or animal waste. ➢ Potential to disturb areas contaminated with rodent or bird feces or urine?	Safety	
o.			Could hazards from the proposed work be reasonably expected to expose employees in adjacent work areas?	Safety	
p.			Could the work cause flying dust and debris which could cause injury?	Safety	

#	YES	NO	Potentially Hazardous Situation or Hazard	HCS/ SME	Rev./ FC/ Other
2.			**INDUSTRIAL HYGIENE AND SAFETY – GENERAL SAFETY**		
q.			Could the work involve heavy equipment vehicle operations or transportation of heavy loads (e.g., supporting demolition activities)?	Safety	
r.			Could the work involve Hoisting and Rigging operations?	Safety, H&R SME	
s.			Could the work involve the temporary or permanent routing of utilities (e.g., electricity, air, gas, steam, water, gasoline, fuel oil) that may become damaged as a result of exposure to personnel or vehicular traffic or that may become covered in some manner by material (e.g., snow, water, sand, dirt, gravel, mud, boxes, containers)?	Safety, PSOS	
t.			Could the work involve conditions where the unexpected energization or startup of machines or equipment or the release of stored energy could cause injury or death to personnel?	Safety, PSOS	
u.			Could the work activity be performed on a system, equipment or component that stores energy (such as springs, batteries, capacitors, hydraulic accumulators, pressurized gas cylinders, compressors, etc.)?	Safety	
v.			Could the work activity involve breaching a system known or suspected to contain hazardous materials (e.g., mercury, acids, natural gas) or energy sources (e.g., steam, electricity)?	Safety	
w.			Will the work be required to be performed as a Remote Worker?	Safety	

#	YES	NO	Potentially Hazardous Situation or Hazard	HCS/ SME	Rev./ FC/ Other
3.			**EXCAVATION, SUBSURFACE PENETRATION**		
a.			Could the work activity involve digging, drilling, pile driving; or cutting into walls, floors, or ceilings; removal of soil, or other surface penetration activities regardless of depth; where a potential for damaging underlying cables or piping exists)? ➢ Includes: Hand (Non-intrusive) and Mechanical (Intrusive) methods	Safety, RC	
b.			Could the work activity have the potential to cause engulfment?	Safety	

#	YES	NO	Potentially Hazardous Situation or Hazard	HCS/ SME	Rev./ FC/ Other
4.			**FIRE SAFETY**		
a.			Could the work activity involve heat producing operations (e.g., cutting, welding, flame soldering, grinding, or plasma arc cutting) or otherwise produce sparks or flames outside an approved welding area?	Safety, FSS	
b.			Could the work activity be located where a heat source greater than 100°C will be used, produced, or located in close proximity to the work. (e.g., steam lines or muffler)?	Safety, FSS	

#	YES	NO	Potentially Hazardous Situation or Hazard	HCS/ SME	Rev./ FC/ Other
4.			**FIRE SAFETY**		
c.			Could the work impair or disable a fire alarm or protective system or potentially cause inadvertent activation of a fire alarm or protective system? This includes but is not limited to: ➢ Fire Suppression Systems (water or dry) ➢ Fire Detection or Alarm Systems, includes site Keltron system ➢ Fire Doors or Barriers ➢ Fire Dampers or Fire/Ventilation interface components	FSS, FM, PSOS, Security EM	
d.			Could the work impact means of egress (e.g., blocked hallways, stairs removed for repairs) or block or obstruct access to safety equipment?	Safety, FSS, PSOS, Security EM	
e.			Could the work activity result in an increase to existing combustible loading above the limits established in SHIP-228?	FSS	
f.			Could the work involve erecting a containment tent or entering a containment area?	FSS	

#	YES	NO	Potentially Hazardous Situation or Hazard	HCS/ SME	Rev./ FC/ Other
5.			**CHEMICAL SAFETY** **NOTE:** *Obtain and review Safety Data Sheets for all chemicals involved.*		
a.			Could the work involve exposure to uncharacterized or unknown chemical hazards (e.g., potential container mislabeling; abandoned pipes/equipment; accessing closed/sealed drums, vaults, tanks, cells) that could pose an inhalation, ingestion, injection hazard or IDLH condition?	Safety, RS	
b.			Could the work involve handling of corrosive, toxic, caustic, carcinogenic (e.g., PCBs), cryogenic, flammable, combustible, explosive or reactive chemicals or could pose an inhalation, ingestion, injection hazard or an IDLH condition?	Safety, RS	
c.			Could the work activity involve breaking the boundary to a system containing corrosive, toxic, caustic, carcinogenic (e.g., PCBs), cryogenic, flammable, combustible, explosive or reactive chemical liquids or gases with the potential for uncontrolled release or that could result in oxygen displacement?	Safety, RS	

#	YES	NO	Potentially Hazardous Situation or Hazard	HCS/ SME	Rev./ FC/ Other
6.			**FALL PROTECTION**		
a.			Could the work activity be performed from elevated heights or elevated work platforms where fall hazards exist? Includes: ➢ Aerial Lifts, Man-lifts, Scissor Lifts, etc. ➢ Scaffolds (including erection, alteration, and dismantlement)(Ensure properly tagged per SHIP-219) ➢ Ladders (from a ladder or mobile ladder stand at a height above 6 feet for construction or demolition work or a height above 4 feet for general operational or maintenance work) ➢ Roof tops	Safety	

#	YES	NO	Potentially Hazardous Situation or Hazard	HCS/ SME	Rev./ FC/ Other
7.			**ELECTRICAL SAFETY**		
a.			Could the work involve electrical work activities? ➢ Electrical LOTO Isolation ➢ Zero Energy Verification ➢ Air-gapping ➢ Electrical D&D (removal of wires and components) ➢ Electrical troubleshooting and repair ➢ Where the potential for Arc Flash or Electrical Shock exists Performance of any of these items requires walk down of the specific activities to be performed and for D&D, work specific marking of isolated/inactive systems that are to be removed.	Safety, PSOS	
b.			Could the work activity involve replacement or work on batteries including removing/replacing intercell connections, where the potential for Arc Flash or Electrical Shock exists? (Excludes small appliance/flashlight batteries)	Safety	
c.			Could the work activity encounter electrical overhead hazards?	Safety	
d.			Could the work activity use hand or electrical powered portable tools or equipment. (Includes temporary power cords and equipment, portable generators, etc.)?	Safety	
e.			Could the work activities have the potential to generate static electrical discharges?	Safety	

#	YES	NO	Potentially Hazardous Situation or Hazard	HCS/ SME	Rev./ FC/ Other
8.			**CONSTRUCTION, RE-MODELING, OR DEMOLITION SAFETY**		
a.			Will the work activities perform construction, re-modeling or demolition activities of building or structures?	Safety, RS	
b.			Does the work have the potential for contaminating the breathing air system or potable water system?	Safety, PSO	

#	YES	NO	Potentially Hazardous Situation or Hazard	HCS/ SME	Rev./ FC/ Other
9.			**REGULATORY STRATEGY AND ENVIRONMENTAL COMPLIANCE, WASTE MINIMIZATION AND POLLUTION PREVENTION**		
a.			Could the work activity disturb, break up, dislodge, asbestos-containing (ACM) or suspect material (PACM) (such as thermal insulation; gaskets; valve packing; wall, floor, or ceiling material; roofing; insulated wiring; transite siding)?	Safety, RS, WPD	
b.			Could the work require the disturbance of bird nests or involve animal or insect control?	Safety, RS	
c.			Could the work result in changes to the site storm water drainage system (e.g., pathways/ patterns) removal of established vegetative ground cover or exposure of soil to rain/snowfall, or placement of quarried materials (soil, stone)?	RS	
d.			Will the work activity involve performing activities with the potential for any airborne releases (e.g., smoke, fumes, gases, exhaust, dust, mercury, radioactive material) into the environment?	Safety, RS, RC	

#	YES	NO	Potentially Hazardous Situation or Hazard	HCS/ SME	Rev./ FC/ Other
9.			REGULATORY STRATEGY AND ENVIRONMENTAL COMPLIANCE, WASTE MINIMIZATION AND POLLUTION PREVENTION		
e.			Could the work activity involve operating, sampling, constructing, or modifying wells?	RS	
f.			Could the work involve changes to the site wastewater or potable water systems?	RS	
g.			Could the work activity potentially result in any liquid releases (e.g., water, petroleum products, mercury, chemicals, etc.) into the environment?	RS, RC	
h.			Could the work disable, be performed in close proximity to, or affect access to, any environmental monitoring equipment (e.g., air monitors, groundwater wells)?	RS	
i.			Could the work involve PCB items in use (e.g., transformers, capacitors, and voltage regulators), PCB wastes, Lead, or the removal or abandonment of pipes that distribute natural gas?	Safety, RS, WPD	
j.			Could the work potentially affect wetlands or the associated 100 foot buffer area (click on Wetland Delineation Map), the flow of creeks or streams, or lake discharges?	RS	
k.			Could the work activity involve waste generation, treatment, storage, or management of any waste (e.g., industrial waste, hazardous waste, mixed waste, radiological waste) or involve the on-site or off-site transportation of any waste?	RS, WPD	
l.			Could the work involve management of Environmental Media (e.g., surface soil, subsurface soil, streambed sediment, groundwater, vegetation, and fauna)?	RS, WPD	

#	YES	NO	Potentially Hazardous Situation or Hazard	HCS/ SME	Rev./ FC/ Other
10.			NUCLEAR AND CRITICALITY SAFETY		
a.			Could the work activity involve moving, handling, processing, staging/storage, or transporting TRU or TRU mixed waste?	RC, NS, WPD	
b.			Could the work activity involve or potentially affect equipment or contamination containing greater than 1 gram of fissile material (i.e., U-233, U-235, Pu-239, Pu-241) (e.g., vacuum collection, HEPA filter)?	RC, CSE	
c.			Could the work or design activity involve collection, staging or storage of fissile material in a container other than described in PSR-6. (e.g., drum liners, 30-gallon drums, 5-gallon pails)?	RC, CSE, WPD	
d.			Could the work or design activity involve generation, collection, transfer or storage of liquids containing > 1 gram of fissile material (e.g., tank liquids) or involve liquid decontamination in areas containing > 1 gram of fissile materials (e.g., tank liquids, LWC, GPC, PMC).	RC, CSE, WPD	

#	YES	NO	Potentially Hazardous Situation or Hazard	HCS/ SME	Rev./ FC/ Other
11.			FACILITY OPERATIONS		
a.			Is the work performed on or could the work potentially impact ventilation systems or air effluent monitoring systems?	FM, RC, PSOS	
b.			Could the work affect any air supply, including instrument or utility air, or fresh air intake?	FM, PSOS	

#	YES	NO	Potentially Hazardous Situation or Hazard	HCS/ SME	Rev./ FC/ Other
11.			**FACILITY OPERATIONS**		
c.			Could the work activity restrict access to other equipment for an extensive period of time?	FM, PSOS	

#	YES	NO	Potentially Hazardous Situation or Hazard	HCS/ SME	Rev./ FC/ Other
12.			**SITE SECURITY**		
a.			Could the work involve disabling of SECURITY alarms?	FM, EM, Security PSOS	
b.			Could the work involve working in secured areas?	FM, Security PSOS	
c.			Could the work involve firearms or other specialized security equipment?	Security	

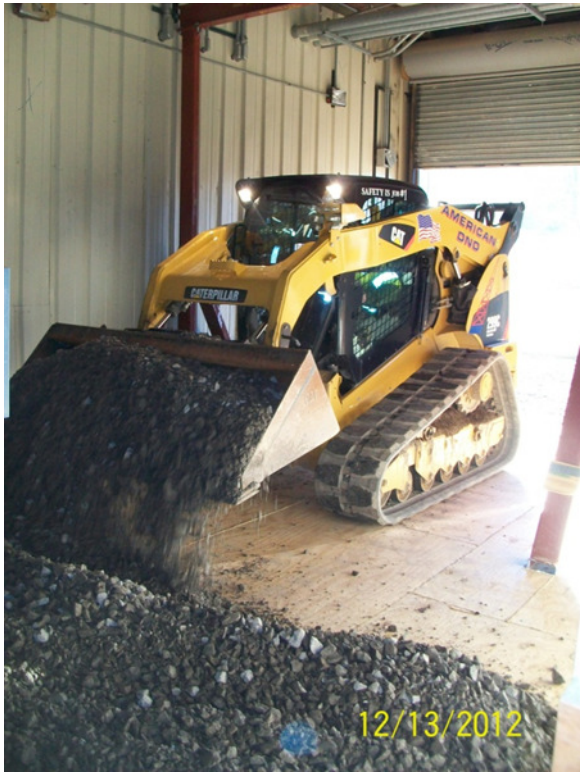
#	YES	NO	Potentially Hazardous Situation or Hazard	HCS/ SME	Rev./ FC/ Other
13.			**EMERGENCY PREPAREDNESS**		
a.			Could the work disable or impair ability to hear the 812 all-page system, the 222 plant-page system, or the sheltering alarm?	FM, EM, PSOS	
b.			Could the work disable the Meteorological Tower or instrumentation?	RS, EM, PSOS	
c.			Could the work block or render inaccessible any emergency access or emergency relocation routes or assembly areas?	EM, FSS, PSOS, Security	
d.			Could the work affect the ability to respond to an emergency at an adjacent facility?	EM, PSOS, Safety, Security	
e.			Could the work involve maintenance on, temporary or permanent relocation of, or disablement of emergency response equipment?	FM, EM, Security PSOS	
f.			Could the work require the development of new or a change to existing emergency management postings, signs, instructions, or response actions (e.g., relocation route postings, assembly area maps, or ventilation or sheltering instructions)?	FM, EM, PSOS	
g.			Could the work directly or indirectly affect the operability of the Emergency Operations Center's (EOC), the Technical Support Center's (TSC), or Consequence Assessment Area's (CAA) facility or equipment?	EM, PSOS	
h.			Could the work require personnel in work zone to respond to an alternate designated assembly area?	EM, PSOS	

#	YES	NO	Potentially Hazardous Situation or Hazard	HCS/ SME	Rev./ FC/ Other
14.			OTHER HAZARDS *List any hazards not already identified on the Hazard Screen that may be encountered during the work evolution. Consider both normal operations and process upset conditions.*		
a.					
b.					
c.					
d.					

Attachment D
Typical Types of Demolition Equipment

This section includes pictures of typical types of demolition equipment as identified earlier in this plan.
Many of the pictures are directly from the prior 01-14 Building demolition work completed by CHBWV in early 2013 at the WVDP.

Work Area Air Sampling Station



Placing stone over Slab BEFORE 01-14 Demo with Skid Steer

11,000 ft lb Hydraulic Hammer (01-14 Demo)

1 - Demo with 200,000 lb Class Excavator with Shear (01-14 Demo)

2 - 200,000 lb Class Excavator = Start of Demo at Top of Bldg (01-14 Demo)

3 - 200,000 lb Class Excavator with Hyd Hammer (01-14 Demo)

4 - 40,000 lb Class Excavator with Concrete Pulverizer

Selective Dismantling of Rad-component DURING 01-14 Demo

Hammer & Pulverizer Size Reducing Concrete Rubble (01-14 Rubble Pile)

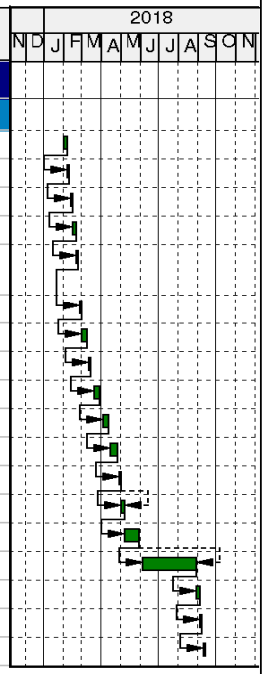
Processing and Size Reducing Concrete Rubble at 01-14

Sorting & Segregating Waste Piles at 01-14

Attachment E
Vitrification Facility Demolition Schedule

Vitrification Facility Demolition

#	Activity ID	Activity Name	Original Duration	Start	Finish
1	**Vitrification Facility Building Demolition**				
2	**Vitrification Facility Building Demolition**				
3	10602302010B-FS010	VF Demo: Area #1: Stairs	2	01-Feb-18*	05-Feb-18
4	10602302010B-FS020	VF Demo: Area #2: Control Room (N) & W Truck Lock	3	06-Feb-18	08-Feb-18
5	10602302010B-FS030	VF Demo: Area #3: Control Room (Middle)	2	12-Feb-18	13-Feb-18
6	10602302010B-FS040	VF Demo: Area #4: Control Room(s) and Operating Aisle	3	14-Feb-18	19-Feb-18
7	10602302010B-FS-050	VF Demo: Area #5: Upper & Lower W. Operating Aisle & Instrument Racks (south end)	3	20-Feb-18	22-Feb-18
8	10602302010B-FS060	VF Demo: Area #6: Upper & Lower W. Operating Aisle & Instrument Racks (north end)	3	26-Feb-18	28-Feb-18
9	10602302010C-FS010	VF Demo: Area #7: N. Operating Aisle (West Side)	5	01-Mar-18	08-Mar-18
10	10602302010C-FS020	VF Demo: Area #8: N. Operating Aisle (Middle)	4	12-Mar-18	15-Mar-18
11	10602302010C-FS030	VF Demo: Area #9: N. Operating Aisle & Truck Lock & NE Stairs	7	19-Mar-18	28-Mar-18
12	10602302MS1-FS010	VF Demo: Area #10: E. Operating Aisle (North End)	8	02-Apr-18	12-Apr-18
13	10602302MS1-FS020	VF Demo: Area #11: E. Operating Aisle (South End)	8	16-Apr-18	26-Apr-18
14	10602101140K-FS010	VF Demo: Area #12: Switch Gear & Generator Walls	2	30-Apr-18	01-May-18
15	10602101140K-FS020	VF Demo: Area #13: Crane Maintenance Room (upper)	3	02-May-18	07-May-18
16	10602302010E-FS010	VF Demo: Area #17: VC Roof	14	08-May-18	31-May-18
17	10602302010E-FS020	VF Demo: Area #18-24: VF Walls and Liner	50	04-Jun-18	29-Aug-18
18	10602101140K-FS030	VF Demo: Area #14: VF Tunnel to EDR (lower)	2	30-Aug-18	04-Sep-18
19	10602101140K-FS040	VF Demo: Area #15: Tunnel Shield Door (upper & lower)	2	05-Sep-18	06-Sep-18
20	10602101140K-FS050	VF Demo: Area #16: Secondary Filter Room & Diesel Generator (lower)	3	10-Sep-18	12-Sep-18



WVDP RECORD OF REVISION

Rev. No.	Description of Changes	Revision On Page(s)	Dated
0	Original Issue	All	09/10/15
1	General Revision- Major changes throughout document to address DOE comments. These revisions affect Facility Disposition, Regulatory Strategy & Chief Engineer, and Waste Operations.	All	03/29/16
2	Major revisions as noted below to address DOE comments Added sentence to indicate EPA approval of alternative methodology. Revised last sentence of Section 5.3 for clarification. Revised paragraph before Figure 10 for clarification. These revisions affect Facility Disposition and Regulatory Strategy & Chief Engineer.	 Page 7 Page 17 Page 32	06/22/16
3	Major Revision Added sentence to page 32 to address DOE comment. These revisions affect Facility Disposition and Regulatory Strategy & Chief Engineer.	 Page 32	07/06/16
4	Major Revision Corrected CFR reference to 40 CFR 61 Added Section 6.4.1 ALARA Updated Attachment C, Demolition Readiness Checklist Updated Attachment D, Activity Hazard Analysis These revisions affect Facility Disposition and Regulatory Strategy & Chief Engineer.	 7 34,35 49-55 56-63	05/09/17