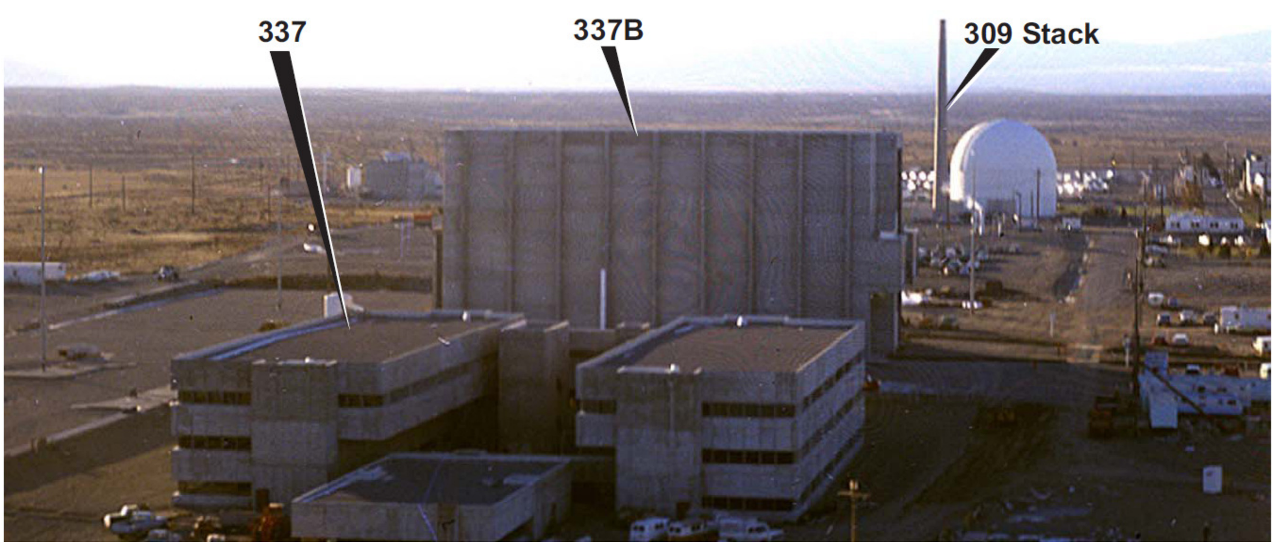
Best Practice Form

Best Practice Title:	Explosive Demolition of Buildings 337, 337B and the 309 Stack at the Hanford's 300 Area		
DOE Site:	300 Area, Hanford Site	**Facility Name:**	Bldgs. 337, 337B and the 309 Stack
Contact Name:	Bob Smith (D4/ISS Director, Washington Closure Hanford) Daniel Beckworth (WCH, Subcontract Engineer) Thomas Kisenwether (WCH, 300 Area Subcontracts Manager)	**Contact Phone:**	Daniel Beckworth (706) 833-0342
Contact Email:	drbeckwo@wch-rcc.com bdsmith@wch-rcc.com	**Interview Date:**	11/11/2010
Interviewed by:	Leonel Lagos, Peggy Shoffner, Lee Brady	**Transcribed by:**	Heidi Henderson and Leydi Velez

Brief Description of Best Practice: (Provide a short, "abstract-like" description of the best practice)



On October 9, 2010, Buildings 337, 337B, and the 309 Exhaust Stack located in the 300 Area at the Hanford Site, were safely razed by explosive demolition. The 337 facility and adjacent buildings were built in the early 1970s to support the Fast Flux Test Facility and the Liquid Metal Fast Breeder Reactor Program at Hanford. The 309 Exhaust Stack was utilized at the Plutonium Recycle Test Reactor (PRTR) during the 1960's to support development of the plutonium fuel cycle. The proper application of the demolition technique combined with qualified and experienced management, subcontractors and proactive communication with all parties involved contributed to the success of this project.

Summary:

Buildings 337 and 337B were two adjacent facilities built in the early 1970s to support the Fast Flux Test Facility and the Liquid Metal Fast Breeder Reactor Program at Hanford. The 337 Building was an office complex and the 337B Building was a high bay facility used at the 300 area the activities carried out at the Pacific Northwest National Laboratory (PNNL). The 337B Building was decommissioned in the late 1990s and the 337 Building was later vacated in the mid-2000s due to its deteriorating condition.

These buildings were architecturally unique in that they exhibited characteristics of an architectural style called Brutalism (large scale buildings with exposed concrete, piping, ductwork and mechanical systems). The 337 Building was a three-story office complex with two identical office wings (50 feet tall, 165 feet long and 50 feet wide). The building's total square footage was 54,118 feet and was constructed with reinforced cast in place concrete columns ranging from 2 to 3 feet thick and precast concrete panels ranging from 8 to 12 inches thick. The 337B Building had a very unique design: 95 feet tall with a foot print of 176 feet long by 76 feet wide and with a 20-foot deep basement which also contained caissons up to 30-feet deep. It was constructed with reinforced concrete columns that were up to 4 foot thick and slabs that were 12 inches thick. Two large bridge cranes were located at the top of the structure. The 337B Building totaled 23,250 square feet.

The 309 Exhaust Stack was constructed in the 1960s and was 12 feet in diameter at the base, 100 feet tall and 10 feet diameter at the top. The stack was constructed utilizing reinforced cast in place concrete 12' thick at the base and 6" thick at the top. The 309 stack was contaminated with fixed low level radiological contamination.

The Washington Closure Hanford (WCH) subcontracted Controlled Demolition, Inc. (CDI), Cavanagh Services Group, and Clauss Construction to successfully implode both buildings on October 9, 2010. Prior to the demolition, two small test blasts were performed to ensure the structures would behave as predicted. The first test blast used approximately 3½ pounds of dynamite on an external concrete panel at the 337B high bay. A second test blast with 1½ pounds of explosive tested an internal column on the first floor of a 337 office wing. The purpose of the test blasts was to verify the explosive loading density and minimize flying debris.

Why the best practice was used: (Briefly describe the issue/improvement opportunity the best practice was developed to address)

Industrial safety was the main criteria for choosing explosive demolition over conventional demolition due to the height of the structures and the concrete construction techniques (cast in place and per cast) utilized for the construction of the 337B Building. The explosive demolition also rubblized some building debris, allowed for easy access to complete size reduction of the debris and ensured that all parts of the building were dismantled. Conventional demolition techniques for this building would have included large excavators and high reach excavators for extended periods exposing personnel to industrial hazards which include; unstable building conditions at the end of a working day, flying debris, equipment maintenance hazards, and extended exposures to heavy equipment. Finally, explosives did not require the use of or the costs associated with special heavy machinery such as high reach excavators.

What problems/issues were associated with the best practice and any lessons learned derived as a result: (Briefly describe the problems/issues experienced with the initial deployment of the best practice that, if avoided, would make the deployment of this best practice easier the" next time".)

As for the demolition itself, there were no issues associated with this technique due to the subcontractor selection/qualification, engineering, work planning, and coordination performed prior to the demolition.

Some of the lessons learned derived from the proper management of the explosive demolition were:

1. Selecting managers and subcontractors with the right background and experience in explosive demolition contributed to the successful completion of this project.

2. Maintain proactive communication with stakeholders, including onsite entities and off site entities such as Federal Aviation Administration (FAA) local businesses, and the local community to keep everyone well informed of the plan and schedule.

3. Designate a specific Radiological Control Technician (RCT) and supervisor to help with the flow of the project and work packages and keep everyone on the same page, without the need to retrain new people. In the middle stages of the project, the coordination between the contractor's RCTs and WCH project directors disrupted the flow of the project because WCH had not designated an RCT supervisor. Once resolved, the project was able to move forward on schedule.

4. Development of a good working relationship between the contractor and subcontractor through the utilization of a Subcontract Technical Representative and Construction Subcontract Engineer to facilitate the interfaces between stakeholders, management, site work force and subcontractor personnel.

5. Utilized a Project Start-up Review (PSR) Process to verify that the implosion was ready to be performed. The PSR identified key items for the implosion to take place and included prerequisites that needed authorization to continue with the project. The PSR process involves senior management from development of the PSR checklist through the completion and approval of the PSR checklist items. A copy of the PSR has been enclosed as Appendix A.

6. Development of a detailed step-by-step process checklist to guide the "day of" implosion activities. This checklist was jointly developed by the explosive demolition expert and the contractor. The checklist incorporated site access control activities, explosive arming and detonation, instrumentation set up and data gathering, and site and building safety/stability inspections post implosion. A copy of the process checklist has been enclosed as Appendix B.

7. Work planning activities instrumental in identifying hazards, utilization of hazard controls and providing guidance for the work force to safely perform the demolition preparation activities and the final implosion.

How the success of the Best Practice was measured: (What data/operating experience is available to document how successful the best practice has been?)

The success of the project was measured in terms of safety of the personnel and timely completion of the project. At the end, the facilities came down exactly as planned and there were no safety issues, for example, with dust control limits, flying debris, heavy equipment incidents, or uncontrolled releases.

The Project did not perform a detailed cost savings analysis of conventional versus explosive demolition for this project. Explosive demolition was chosen for safety reasons. No first aid, recordable, or lost time incidents occurred. There were no releases and the final debris pile was stable and ready for final debris processing and disposal.

What are the benefits of the best practice: (Briefly describe the benefits derived from implementing the best practice.)

- Safety – Use of explosives significantly reduces worker exposure to conventional building demolition hazards. The explosives ensured that all parts of the building were dismantled; in turn, there were no unstable debris located within the demolition area that would pose a threat to the workers involved in the clean-up process.
- Easy Access - By using the explosive demolition, the building collapsed into its own footprint which provided easier access on-site during size reduction and the clean-up process.
- Cost Effective - Using explosives did not require the use or the costs associated with special heavy machinery for the demolition, increased equipment maintenance, equipment operation and repair labor itself.

Alternative solutions considered: (Other solutions to the issue/improvement opportunity considered prior to implementing the best practice?)

Conventional demolition was considered; however, given the height and construction of the facilities, explosive demolition proved to be the safest and most cost effective approach.

Additional Information	
Source Links:	http://www.washingtonclosure.com/documents/E1010034_1.pdf
Pictures:	    
Videos:	Videos of the 337B High Bay and adjacent Office Buildings Demolition http://www.youtube.com/watch?v=1r_WsqIcZIA&feature=related http://www.youtube.com/watch?v=zDdXdeFtmnc
Documents:	The following documents are enclosed below: 1. Appendix A: Project Startup Review Checklist 2. Appendix B: Process Checklist for 337 Facilities and the 309 Stack Implosion
Comments:	