

EFCOG BEST PRACTICES – ENVIRONMENTAL

Facility: Hanford Site, Richland, Washington

Best Practice Title: 360 Degree Photography Implements ALARA Principle

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Brief Description of Best Practice:

Fluor Hanford has developed a process for recording 360 degree photographs of contaminated buildings at the Hanford Site. The creation of virtual tours, using vendor available photographic hardware and software, provides a tool for conducting inspection, training, and planning activities while providing detailed records of hazardous facilities. The use of this tool results in time savings and the reduction of human exposure and miscellaneous wastes associated with entry into contaminated areas.

Digital cameras, in conjunction with photographic editing software, make possible 360 degree photos and allow a person to look all around and zoom in or out. Multiple 360 degree photos can be linked creating a virtual tour. Other information, such as sound files, flat photos, gamma camera photos and text can also be linked to the photos. Items are linked by creating a "hot spot". The user only needs to click a hot spot to view the attached media. Hazards, especially hidden hazards, known to operating personnel can be identified on the 360 degree photo using pop-up notes.

The 360 degree photographs are taken with an "off the shelf" camera with a 185 degree lens. Two back-to-back photos are taken to create the 360 degree photographs. The photos are enhanced using standard photo enhancing software and then merged into a 360 degree photograph using vendor software. An "image key" is used to save the photo in various formats.

Why the Best Practice was used:

The Hanford site has numerous contaminated facilities which require periodic entry for operational and/or maintenance purposes. Most of these facilities are in various stages of deactivation and/or decommissioning (D&D). Entry into some areas is difficult, requiring protective equipment and a cadre of support personnel. The 360 degree photos with linked information, provides an overall perspective and can satisfy information and assessment needs.

A virtual tour of a building or room can be used for facility documentation, informing management and others, work planning and orientation, training and historical documentation, thus minimizing the need to re-enter hazardous areas. Reducing entries decreases exposure, increases safety and efficiency, and minimizes waste.

What are the benefits of the Best Practice?

The 360 degree photography system is relatively inexpensive and can be used for (1) documenting historical and compliance information in buildings that are highly contaminated (2) communicating information to management and others, (3) planning new D &D approaches and

for pre-job hazards analysis and (4) employee orientation and training without having to enter hazardous areas. Reducing entries saves time, decreases exposure, increases safety and efficiency, and minimizes waste.

What problems/issues were associated with the Best Practice?

The problems associated with the deployment of 360 Degree photography is availability of photo software trained staff and it can be time and labor intensive.

How the success of the Best Practice was measured:

Efforts are being conducted to measure the amount of clothing waste and exposure reduction but have not been completed.

Description of process experience using the Best Practice:

The Critical Assembly Room at the 209-E facility is a radiological airborne contamination area. During a routine quarterly surveillance, 360 degree and flat detail photos were taken. Since it was anticipated that the inlet filters would have to be changed, detail photos of the filters were taken. The photos were used to plan the job and later to orient workers. The 360 degree photo was used to give an overall perspective of the work area and discussions were held about how work would proceed in the cramped area. A detailed photo of the filter assembly was used to identify how the filter was attached and what tools would be needed remove it. When the team entered to perform the work they were so well oriented, that the work was able to be completed quickly. A few days before the filter change out, DOE representatives were evaluating for the voluntary protection program. The planner explained how he was going to use the 360 degree photos and linked the photos to orient the workers and to conduct the pre-job. The use of the tool was identified as a "noteworthy practice" in DOE/EH-270.

In another instance, two representatives from a regulatory organization wanted to discuss and tour the cells at the 231-Z facility. The cells are a contamination area. The day of the planned tour was overcast which caused an increase of radon in the facility and an increased potential for contamination. After the status of the cells was discussed in the conference room, a virtual tour of the cells using the 360-Degree photography was provided. After taking the virtual tour, representatives of the oversight organization stated that they were satisfied by what they had seen.

The most realistic training occurs in the field and next in mockups to simulate field conditions. However, when neither in-field nor mock-up training is available, 360 degree photos can help students obtain a perspective of field conditions. Using linked files, they can gather information and then respond as if they were in the situation.

Web Publishing Information:

Please check the applicable boxes below for the Topical Area(s) to which the Best Practice relates:

- Acquisition Management
- Assessments

- Cyber Security
- Energy Efficiency
- Engineering
- Environmental
- Information Management
- Information Security
- Integrated Safety Management
- Maintenance
- Management
- Material Control and Accountability
- Nuclear Safety
- Performance Metrics
- Personnel Security
- Physical Security
- Price-Anderson Amendments Act
- Project Management
- Protective Force
- S&S Program Planning and Management
- Standards and Requirements
- Subcontractor Safety
- Other Environmental Management System (EMS)

Please check the applicable box below for the Core Function and Guiding Principle to which the Best Practice relates

- Principle 1: Line Management Responsibility for Safety
- Principle 2: Clear Roles and Responsibilities
- Principle 3: Competence Commensurate with Responsibilities
- Core Function 1: Define Scope of Work ; Principle 4: Balanced Priorities
- Core Function 2: Analysis of Hazards
- Core Function 3: Develop and Implement Hazard Controls; Principle 5: Identification of Safety Standards and Requirements; Principle 6: Hazard Controls Tailored to Work Being Performed
- Core Function 4: Perform Work Within Controls; Principle 7: Operations Authorization
- Core Function 5: Provide Feedback and Continuous Improvement