

Assessment of the Oak Ridge National Laboratory Safety Related Permitting Processes



Assessment Plan

**Oak Ridge Office
Assistant Manager for Science
Integrated Assessment Program**

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Approved By:

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Acronyms

| | |
|--------|---|
| ACTS | Assessment and Commitment Tracking System |
| AMS | Assistant Manager for Science |
| CSE | Confined Space Entry |
| DOE | Department of Energy |
| ES&H | Environment, Safety, and Health |
| FDD | Facilities Development Division |
| HFIR | High Flux Isotope Reactor |
| IAP | Integrated Assessment Program |
| LOI | Lines of Inquiry |
| LO/TO | Lockout/Tagout |
| Ex/Pen | Excavation/Penetration |
| NFPA | National Fire Protection Association |
| ORNL | Oak Ridge National Laboratory |
| ORO | DOE Oak Ridge Office |
| ORPS | Occurrence Reporting and Processing System |
| OSHA | Occupational Safety and Health Administration |
| PPE | Personal Protective Equipment |
| PRCS | Permit Required Confined Space |
| SBMS | Standards Based Management System |
| SNS | Spallation Neutron Source |

**Assessment Plan
Assessment of the
Oak Ridge National Laboratory
Safety Related Permitting Processes**

1.0 INTRODUCTION

1.1 Objective

In support of the Department of Energy (DOE) Assistant Manager for Science (AMS) Integrated Assessment Program (IAP), an assessment will be conducted during April 2 - 5, 2007, of the UT-Battelle safety related permitting processes including excavation/penetration, lockout/tagout, confined space entry, and hot work.

The objective of this assessment is to verify that UT-Battelle has established effective work control processes that clearly identify when safety related permits are required, assure comprehensive pre-job review by line management and/or the permitting authority, establishes appropriate hazard controls for safe work conduct, and includes worker involvement and feedback.

5.2 Background

Requirements for excavation/penetration, confined space entry, hot work, and hazardous energy lockout/tagout (LO/TO) are contained in the OSHA regulations. The specific sections(s) of the regulations that contain these requirements and their general scope are shown in Table 1.

**Table 1:
Occupational Safety and Health Administration (OSHA)
Regulations Pertaining to Safety-Related Permitting**

| Assessment Area | OSHA Regulations | General Scope |
|----------------------------|------------------|---|
| Excavation/ Penetration | 1926.651(b) | The estimated location of utility installations, such as sewer, telephone, fuel, electric, water lines, or any other underground installations that reasonably may be expected to be encountered during excavation work, shall be determined prior to opening an excavation. |
| Excavation/ Penetration | 1926.416(a)(3) | Before work is begun the employer shall ascertain by inquiry or direct observation, or by instruments, whether any part of an energized electric power circuit, exposed or concealed, is so located that the performance of the work may bring any person, tool, or machine into physical or electrical contact with the electric power circuit. The employer shall post and maintain proper warning signs where such a circuit exists. The employer shall advise employees of the location of such lines, the hazards involved, and the protective measures to be taken. |

Assessment Plan (Example 1)

| Assessment Area | OSHA Regulations | General Scope |
|------------------------|--------------------|---|
| Confined Space Entry | 1910.146 | This section contains requirements for practices and procedures to protect employees in general industry from the hazards of entry into permit-required confined spaces. |
| Hot Work | 1910.252(a)(2)(iv) | Before cutting or welding is permitted, the area shall be inspected by the individual responsible for authorizing cutting and welding operations. He shall designate precautions to be followed in granting authorization to proceed preferably in the form of a written permit. |
| Hazardous Energy LO/TO | 1910.147 | This standard covers the servicing and maintenance of machines and equipment in which the unexpected energization or start up of the machines or equipment, or release of stored energy could cause injury to employees. This standard establishes minimum performance requirements for the control of such hazardous Energy. |

UT-Battelle implements the OSHA requirements through their Standards Based Management System (SBMS) and/or organization specific procedures. Requirements for confined space entry and LO/TO are included in procedures located in the SBMS Worker Safety and Health Management System. Requirements for Ex/Pen and hot work are included in the procedures located in the SBMS Engineering Management System. SBMS procedures are to be used by all UT-Battelle programs unless a specific exclusion or variance is granted. The SBMS Ex/Pen subject acknowledges exclusions for the High Flux Isotope Reactor (HFIR) and the Spallation Neutron Source (SNS). Both of these facilities utilize their own site-specific Ex/Pen process instead of the SBMS process.

UT-Battelle performance in the safety relating permitting area has been covered by several internal, ORO, and DOE Headquarters assessments over the recent past. Specific assessment coverage and a summary of results from key assessments conducted since FY 2004 are included in Table 2.

**Table 2:
OSHA Regulations Pertaining to Safety-Related Permitting**

| Assessment | Date | Relevant Assessment Scope | Results |
|---|--------|--|--|
| ORNL Site Office Work Permit Review | 4/2004 | Ex/Pen, Confined Spaces, LO/TO, Hot Work, RWPs | No issues were noted with Confined Space permits or radiological work permits. Minor issues were noted related to Hot Work Permits. These included: (1) legibility of F&O issued permits, (2) lack of modification of a subcontractor HW permit when conditions changed and inadequate control of combustibles in the vicinity of welding for same subcontractor. Five of seven Ex/Pen permits reviewed had major issues. These issues include inadequate designation of required work control practices on the permit, incomplete permit entries, failure to issue permit revisions when major changes to SBMS were made, performing excavations without first physically marking utility locations as required, lack of adequate configuration control for “as-found” utility locations, and inadequate functionality of underground utility survey equipment (not capable of locating non-ferrous utilities). |
| DOE Headquarters Office of Independent Oversight and Performance Assurance (OA-40) Inspection of Environment, Safety, and Health (ES&H) | 7/2004 | Ex/Pen | OA-40 acknowledged that several improvements have been made to the Ex/Pen program. However, they also identified a number of weaknesses including: (1) lack of clear responsibilities for identifying and marking underground utilities at construction sites, (2) permits at construction sites typically did not address underground piping and wiring that had been installed by the construction subcontractor, even if such utilities were known to be present, (3) some of the permit exclusions specified by SBMS were not well supported with technical bases or performance data, (4) the permit form requires a signature to confirm that underground utilities have been surveyed and marked, but neither the form nor process instructions includes provisions for confirming multiple markings that may occur over an extended period of time (without such updates on permits, excavators may mistakenly interpret the absence of ground markings to mean that a requested survey was done and no utilities were found when, in fact, no survey was performed), (5) available survey instrumentation is not being used to its full potential to enhance safety, and instrument use is not governed by a written ORNL procedure, (6) depth information was not being recorded on the permit or ground markings (this information is needed by excavators to assure compliance with the two-foot hand-digging requirement), and (7) the location of proposed excavations was not precisely identified on some permit requests causing the locating |

Assessment Plan (Example 1)

| Assessment | Date | Relevant Assessment Scope | Results |
|--|----------|---------------------------|---|
| | | | contractor to survey an unnecessarily large area (surveys could be more efficient and thorough if the location of proposed excavations were marked). |
| UT-Battelle Independent assessment, IO-2007-03, "Engineering Management System Effectiveness Evaluation" | 11/2006 | Ex/Pen | The assessment noted a strength in that there has been a substantial decrease in the number of reportable occurrences relating to Ex/Pen since the 2001-2003 timeframe. Weaknesses were noted in the following areas: (1) permit reviewers and approvers sometimes have an incomplete understanding of the ex/pen process, (2) Atlas drawings do not consistently reflect accuracy with respect to "as-built" conditions due to problems in configuration management, (3) the current Ex/Pen form is time consuming and confusing and needs improvement to ensure all necessary information is captured, (4) the Ex/Pen procedure is unclear as to when signatures and/or data elements are required or not required, (5) there is no signature sequencing on the Ex/Pen form, (6) numerous discrepancies were noted relating to lack of required permit signatures, (7) permits are not being returned to the Permit Coordinator (located in FDD) as required within 60 days of completion of the work (this is needed to ensure that "as-built" and new discovery information is added to drawings, and (8) copies completed location survey forms are not being included with the Ex/Pen permit. |
| UT-Battelle FY 2005 Annual Confined Space Assessments (ACTS No. 7015) | 8/2005 a | Confined Space Entry | There has been a significant decrease in a number of permits issued due to clarification in space classification. Weaknesses include: (1) Entry Supervisors are not forwarding copies of cancelled (completed) permits to the UT-Battelle Confined Space Program Manager, and (2) some Entry Supervisors were using an older of the permit. |
| UT-Battelle FY 2006 Annual Confined Space Assessments (ACTS No. 8749) | 9/2006 | Confined Space Entry | Weaknesses noted included: (1) Review of cancelled (completed) permits indicated that most were missing some of the required information; however, all were complete with respect to pre-entry air monitoring and (2) discussions with several staff members who use the current permit system find it to be confusing and cumbersome. |

Assessment Plan (Example 1)

| Assessment | Date | Relevant Assessment Scope | Results |
|--|---------|---------------------------|--|
| UT-Battelle FY 2005 Lockout/Tagout Assessment | 10/2005 | LO/TO | One improper LO/TO was observed relating to a ORNL subcontractor. |
| UT-Battelle FY 2005 Lockout/Tagout Assessment | 11/2006 | LO/TO | <p>A noteworthy practice was noted at the Steam Plant where personnel have developed lockout “templates” for working on pieces of equipment or processes that require numerous points of isolation. Weaknesses were noted with respect to a few instances of lack of attention to detail in meeting some of the procedural requirements.</p> <ul style="list-style-type: none"> • FMD, 5600 – even though they were properly identified, standard non-colored Masterlock brand locks were being used for LO purposes • FMD, 5600 – a few “extension tags” (for single source LO) were found to be missing either a date or the additional information required to extend the lockout condition past a single shift • Research Reactors Division, HFIR – a “loaner lock” was found on one lockbox (adjacent to the Control Room) that did not have the proper level of I.D. to identify which employee was working under its protection • SNS, Klystron Gallery – at one location two locks were noted on one circuit, with a combination of one lock having a personal I.D. but no tag, while the other had a generic I.D. with a tag; but the tag was not supplied with the required added information nor was it dated • SNS, Klystron Gallery – at another location a tag was noted to have been re-used, however it was lined through to the point where the date was not clear. Note: This condition was a bit different from the “blurred” appearance of some tags that have an erasable feature to accommodate a tags re-use. Regardless of the extent or amount of an individual tags re-use, it must be legible. |
| UT-Battelle Welding, Burning, and Hot Work | 8/2005 | Hot Work | No issues noted. |

Assessment Plan (Example 1)

| Assessment | Date | Relevant Assessment Scope | Results |
|--|--------|---------------------------|--|
| Assessment | | | |
| UT-Battelle Welding, Burning, and Hot Work Assessment | 9/2006 | Hot Work | Weaknesses noted included: (1) while most designated hot work areas were acceptable, some were noted to have housekeeping issues that presented potential combustible control problems, (2) there was a general perception that a hot work permit could be used generically for similar hot work activities throughout the year, (3) observations of improper use of fire retardant clothing, and (5) lack of requirements for training of those who develop hot work permits. |
| DOE AMS IAP Assessment of ORNL Fire Protection Program | 6/2006 | Hot Work | Weaknesses noted included: (1) lack of training requirements for hot work permit authorizing individuals, and (2) a majority of ORNL Designated Hot Work Areas have not been approved by UT-Battelle Fire Protection Engineering, as required. |
| DOE AMS IAP Assessment of Energized Electrical Work | | LO/TO | The SNS lockout/tagout program and work practices do not meet all of the applicable OSHA and NFPA 70E requirements: (1) LO/TO not being adequately controlled to restrict its use to only protecting workers from equipment energy hazards, (2) re-use of tags by marking through past information and overwriting current information (this creates potentially illegible identification and contact information as the tags are designed for one-time use), and (3) SNS issued a revised LO/TO procedure without providing concurrent training on the changes. |

As noted in the FY 2006, UT-Battelle assessment of Ex/Pen, there have been repetitive occurrences relating to Ex/Pen over the past several years. Specifically, for the past five years there have been 10 ex/pen related Occurrence Reporting and Processing System (ORPS) reported occurrences from January 2002 to the present. A review of ORPS for ORNL occurrences related to lockout/tagout, hot work, and confined spaces yield the following results for the period January 2002 to the present:

- Lockout/Tagout: One occurrence at HFIR in October 2006 where a single source LO/TO was used instead of a permitted LO/TO as required
- Hot Work: One occurrence at the Radiochemical Engineering Development Center in June 2004 where there was a small gauze fire in a glove box (inadequate combustible control during encapsulation of I-131 in an ampoule.
- Confined Space Entry: No occurrences in this area during January 2002 to present.

Based on review of assessment results and the frequency of occurrence in the various safety related permit areas, it is clear that the excavation/penetration area has been more problematic at ORNL as compared to the other areas. For this reason, the scope of the current assessment will place more emphasis on the Ex/Pen area.

2.0 SCOPE

This assessment will include the planning and implementation activities associated for energized electrical work. Specific scope elements with include:

- (1) Work planning and preparation process, e.g., flash hazard analysis, the preparation of work plans and maintenance requests, pre-job briefings.
- (2) Work authorization process including review and approval of work plans, maintenance requests, and/or energized electrical work permits. This scope area also includes a review of the duties and responsibilities of the ORNL Authority Having Jurisdiction.
- (3) Work procedures.
- (4) Work implementation including zero energy checks, use of personal protective equipment, establishment of boundaries (limited, restricted, prohibited), use of hot sticks, use of test meters.
- (5) Personnel qualification and training.
- (6) Electrical safety oversight.
- (7) Operational Experience and Lessons Learned.

The assessment will include all UT-Battelle and subcontractor work at all ORNL facilities.

The assessment scope is further detailed in the assessments Lines of Inquiry (LOIs) contained in Appendix I.

3.0 PERFORMANCE CRITERIA

Performance criteria are defined as the requirements, documents, and standards that are applicable to the activity and scope being assessed: For the objectives and scope of the current assessment, these performance criteria include:

- UT-Battelle Contract, Appendix E, Baseline List of Required Compliance Documents, List B - List of Applicable Directives
- SBMS Engineering Management System and associated procedures
- SBMS Worker Safety and Health Management System and associated procedures
- 29 CFR 1926
- 29 CFR 1910

4.0 ASSESSMENT APPROACH AND LOGISTICS

The assessment will be conducted in accordance with the AMS IAP procedure, OSOP 453 *Integrated Assessment Program*, Revision 1 and ORO M 220, *Oak Ridge Office Assessment Program*. The following sections contain specific details on the schedule and logistics, lines of inquiry, assessment conduct, and assessment results reporting.

4.1 Schedule and Logistics

The assessment will consist of document review, personnel interviews and field observations based on the established Lines of Inquiry. The assessment will be conducted from April 2-5, 2007, and will consist of the following members:

| Team Member | Organization |
|-----------------------------|---|
| David Carden (Team Lead) | AMS Technical Support and Oversight Division |
| Tyrone Harris | ORO Assistant Manager for ES&H |
| John Pearson | ORO Assistant Manager for ES&H |
| Larry Perkins | ORO Assistant Manager for Nuclear Fuel Services |
| Doug Paul (for SNS only) | AMS Facility Representative |

The opening meeting will be held on Monday, April 2, 2007, at 8:30 a.m. At the opening meeting, the objectives and scope of the assessment as well as assessment logistics will be discussed. The opening meeting will also be used to establish points of contact for the assessment and to develop interview schedules. Daily briefings will be held as needed to advise management of team findings and observations.

The exit brief is tentatively scheduled for Friday, April 5, 2007, at 3:00 p.m. At this closeout, a list of draft issues (observations, findings, and proficiencies) will be provided to UT-Battelle. By May 7, 2007, a draft report will be provided to UT-Battelle for factual accuracy review; comments from this review will be required to be provided to the assessment team by May 14, 2007. The assessment team will submit a final report for DOE management review by May 21, 2007

Issues noted during the conduct of the assessment will be categorized as either proficiencies, findings, or observations. Proficiencies are positive practices for which the contractor is to be commended. Findings represent lack of adherence to a requirement. Findings will be categorized further as either Priority 1, 2 or 3. Priority 1 findings represent an imminent danger to worker safety or the environment or a breakdown in the implementation of a safety management system. Priority 2 findings represent deviations from requirements that do not meet the definition of Priority 1. Observations, also referred to as Priority 3 issues, represent isolated, minor (quick-fix) deviations from best practices, internal procedures, or non-mandatory standards.

4.3 Assessment Conduct

The assessment will be a performance based assessment in that requirements implementation will be verified to be in place in the facility procedures as well as adequately implemented in practice. Assessment approaches will include:

- Review of procedures, documents, and records.
- Interviews with line management, operations, and operations support staff.
- Inspection of current work practices.

Each team member must keep a records of the documents reviewed, interviews conducted, and work practices inspected/work observed for their specific areas of review.

5.0 **FINAL REPORT**

The results from the assessment will be published in a final report, following a factual accuracy review by the contractor and DOE line management. The assessment team will submit a final report for DOE management review by May 21, 2007.

The report will include the following contents:

- Title Page
- Introduction
- Purpose
- Review Scope
- Review Criteria
- Results, including a summary of findings, observations, and proficiencies.
- Conclusion including a team statement as to the overall adequacy of program implementation.
- Appendices:
 - Listing of Lines of Inquiry
 - Documents reviewed, interviews conducted, work practices observed
 - Proficiencies and Findings

AMS managers will conduct the review of the final report and any comments will be addressed prior to issuance to UT-Battelle.

**APPENDIX I
LINES OF INQUIRY**

| Line of Inquiry | Status (A/U/ P) | Comment |
|---|-----------------------|---------|
| <i>Excavation/Penetration permits are prepared, issued, used, and controlled in a manner that ensure reliable/current information on subsurface features, protects the worker from unnecessary hazards, and assures that new as-built information is incorporated into the information system for future use.</i> | | |
| PERMIT DEVELOPMENT | | |
| Procedures clearly state when an Ex/Pen permit is required and when it is not. | | |
| Exclusions to excavation permits are defined and represent cases of low safety risk. | | |
| Exclusions to penetration permits are defined and represent cases of low safety risk. | | |
| Prior to submittal of permit for review and approval, the permit owner conducts an onsite inspection of the work area to identify any special site conditions that workers need to be aware of; these conditions are documented on the Ex/Pen form. | | |
| The permit owner completes the excavation or penetration permit regarding the description of work in sufficient detail so that Permit Reviewers and Approvers have a clear understanding of the nature of the work. | | |
| A unique and trackable permit number is assigned to each Ex/Pen permit. | | |
| Contractor engineering staff with necessary technical expertise and resources are assigned to review and approve Ex/Pen permits. | | |
| Engineering staff review the proposed work and identify subsurface utilities and obstructions that may be in the work area. | | |
| Drawings used by permit reviewers are maintained under a rigorous configuration management program such that they have the most current and accurate information available. | | |

Assessment Plan (Example 1)

| Line of Inquiry | Status (A/U/ P) | Comment |
|--|-----------------------|---------|
| Engineering reviewers attach relevant drawings to the permit that will assist the permit owner in locating utilities and obstructions. | | |
| When the review is complete, the permit is returned to the permit owner who, in turn, will add any special requirements related to excavated soil management. | | |
| Procedures define who must approve each permit; review of completed permits indicates that permits are being approved as required. | | |
| Prior to work, utilities are located by survey and are physically marked by FMD for ORNL managed utilities and/or using Tennessee One Call for non-ORNL utilities managed by Qwest, Bell South, Duke Energy, or Tennessee Natural Gas. | | |
| Survey maps are included in the permit package. | | |
| Required hazard controls for the excavation work are included in the permit. | | |
| All permit entries locations are filled in, or otherwise marked as N/A. | | |
| Depth of the subsurface feature is clearly denoted in the permit. | | |
| SURVEY INSTRUMENT ATION USE, CALIBRATION, MAINTENANCE | | |
| Survey instrumentation is in good working order and is able to locate both ferrous and non-ferrous interferences. | | |
| Survey instrument use procedures are in place. | | |
| Survey instrumentation has a current calibration that is traceable to a national standard. | | |
| Survey instrument calibration and functionality is checked before and after each use. | | |
| Survey instruments are stored in a manner that protects them from damage and calibration drift. | | |
| PRE-EXCAVATION ACTIVITIES | | |
| The permit owner goes to the excavation site and physically verifies that markings are present for utilities that have been surveyed. | | |
| If surveys noted in the permit cannot be surveyed and marked, this fact is noted in the permit. | | |

Assessment Plan (Example 1)

| Line of Inquiry | Status (A/U/ P) | Comment |
|---|-----------------------|---------|
| The permit owner meets with the entity that will perform the work and reviews the permit in detail to ensure that the entity understands the contents of the permit and work requirements, understands the results of the field locate/marketing effort (including utilities/structures that were marked, and those that could not be located/located), understands utilities re-marking requirements, understands the obligation to ensure that as-built information is developed as part of the job. | | |
| The person that will be performing the work signs the permit, acknowledging receipt of the permit and understanding of permit information and requirements. | | |
| The permit owner (or designee) verifies that the entity performing the work has incorporated the excavation or penetration permit into the appropriate work control process for the work (e.g., maintenance work package or construction AHA), and that the mechanisms are in place to ensure the permit information and special work requirements are flowed down through all management/supervision and/or subteir subcontractor levels to the person(s) performing the excavation or penetration work. | | |
| EXCAVATION OPERATIONS | | |
| The Ex/Pen permit is posted, or is readily available, near the work area so that personnel performing the work have easy, direct access to the permit package and drawings showing underground utilities. | | |
| For permits that are in use over and extended period, the permit is UPDATED when additional information is obtained relating to subsurface features. | | |
| Tennessee One Call markings are not considered as valid after 15 days of Locate Ticket date. | | |
| Ex/Pen work is suspended if the entity performing the work cannot discern where the subsurface utilities or structures are present. Before restarting, the permit owner arranges for | | |

Assessment Plan (Example 1)

| Line of Inquiry | Status (A/U/ P) | Comment |
|--|-----------------------|---------|
| re-marking and then verifies that it has been done. | | |
| As-built configuration information is obtained/developed during the field excavation and is documented on the permit or associated record. | | |
| POST-WORK PROCESSING | | |
| The permit owner (or designee) returns the permit to Facilities Development Division (FDD) Permit Coordinator within 60 days of completion of work, ensuring that updated as-built information on the permit and associated drawings are provided. | | |
| The FDD Permit Coordinator notes the date that the permit was returned in the permit log and reviews the returned/closed-out permit to determine if it contains an appropriate level of useable-quality as-built information. | | |
| The FDD Design Manager reviews the as-built information provided with the permit as appropriate. If the Design Manager believes the as-built information is deficient, the Design Manager may contact the permit owner and/or the Design Authority for the work to determine if additional action is necessary. A Nonconformance Report may be generated if the lack of information is considered vital to maintaining configuration management of critical Laboratory infrastructure. | | |
| TRAINING PROGRAMS | | |
| Training programs are in place for: Permit Owners Permit Reviewers Permit Approvers Field Surveyors | | |
| Training is documented and there is a positive mechanism to prevent untrained employees from engaging in permit generation, review, and approval. | | |

| Line of Inquiry | Status (A/U/ P) | Comment |
|---|-----------------------|---------|
| ASSESSMENTS AND OVERSIGHT | | |
| During execution of excavation or penetration work, the permit owner (or designee) periodically monitors the excavation/penetration work to ensure the entity performing the work complies with all permit requirements. | | |
| The Ex/Pen process is included in routine self and independent assessments. | | |
| Management System Maturity evaluations have been performed, documented, and tracked in ACTS as required by SBMS. | | |
| <i>Permit Required Confined Spaces (PRCSs) are appropriately identified, posted, and controlled and any required entry is planned and implemented in a manner that protects the entrant and support staff</i> | | |
| IDENTIFICATION AND POSTING OF PRCSs | | |
| The contractor procedure clearly defines the process for making a decision on whether a space is a PRCS and this process conforms to the OSHA definition of a PRCS. | | |
| The contractor has completed evaluations of the workplace and has determined if any spaces are PRCSs. | | |
| PRCSs are posted with signs such as 'DANGER--PERMIT-REQUIRED CONFINED SPACE, DO NOT ENTER' | | |
| The contractor maintains an inventory of the locations of PRCSs. | | |
| When there are changes in the use or configuration of a non-permit confined space that might increase the hazards to entrants, the employer shall reevaluate that space and, if necessary, reclassify it as a permit-required confined space. | | |
| PRE-ENTRY AIR MONITORING | | |
| Before an employee enters the space, the internal atmosphere is tested, with a calibrated direct-reading instrument for oxygen content, for flammable gases and vapors, and for potential toxic air contaminants, in that order. | | |

Assessment Plan (Example 1)

| Line of Inquiry | Status (A/U/ P) | Comment |
|---|-----------------------|---------|
| Employees who enter a PRCS the space are provided an opportunity to observe the pre-entry testing. | | |
| Testing equipment is appropriate for its intended use and is capable of measuring reliability at the decision limits. | | |
| Instrument calibration current? (at least annual) | | |
| Instruments checked to verify operability before and after each use. | | |
| Pre-and post-survey calibration log maintained. | | |
| PRE-ENTRY HAZARD EVALUATION | | |
| For each PRCS entry, the contractor will evaluate the conditions and hazards that the entrant will be exposed to. | | |
| Hazard controls will established to mitigate any know or potential hazards including, but not limited to, forced ventilation, lighting, LO/TO, and Personal Protective Equipment (PPE). | | |
| Engineering controls will be used in lieu of PPE whenever feasible. | | |

| Line of Inquiry | Status (A/U/ P) | Comment |
|--|-----------------------|---------|
| PERMIT CONTENT AND ISSUANCE | | |
| <p>Permits are issued that contain the following information:</p> <ol style="list-style-type: none"> (1) Permit space to be entered; (2) Purpose of the entry; (3) Date and the authorized duration of the entry permit; (4) Authorized entrants within the permit space, by name or by other means; (5) Acceptable entry conditions; (6) Personnel, by name, currently serving as attendants; (7) Individual, by name, currently serving as entry supervisor; (8) Hazards of the permit space to be entered; (9) Measures used to isolate the permit space and to eliminate or control permit space hazards before entry; (10) Results of initial and periodic air tests accompanied by the names or initials of the testers and when the tests were performed; (11) Rescue and emergency services that can be summoned and the means (such as the equipment to use and the numbers to call) for summoning those services; (12) Communication procedures used by authorized entrants and attendants to maintain contact during the entry; (13) Equipment, such as personal protective equipment, testing equipment, communications equipment, alarm systems, and rescue equipment, to be provided; | | |

Assessment Plan (Example 1)

| Line of Inquiry | Status (A/U/ P) | Comment |
|--|-----------------------|---------|
| <p>(14) Any other information whose inclusion is necessary, given the circumstances of the particular confined space, in order to ensure employee safety; and</p> <p>(15) Any additional permits, such as for hot work, that have been issued to authorize work in the permit space.</p> | | |
| <p>Entry supervisor who authorizes entry signs the completed permit after verifying that all appropriate information has been completed on the Permit, all tests specified by the Permit have been conducted, all personnel are trained, entry conditions are acceptable, and all procedures and equipment specified by the permit are in place before signing the Permit.</p> | | |
| ENTRY TO PRCS | | |
| <p>The completed permit is made available at the time of entry to all authorized entrants or their authorized representatives, by posting it at the entry portal or by any other equally effective means, so that the entrants can confirm that pre-</p> | | |

Assessment Plan (Example 1)

| Line of Inquiry | Status (A/U/ P) | Comment |
|--|-----------------------|---------|
| entry preparations have been completed. | | |
| At least one attendant is provided outside the permit space into which entry is authorized for the duration of entry operations. | | |
| The attendant controls the entry into the PRCS by remaining at the work site and keeps an accurate accounting of entrants in the PRCS on the Confined Space Entry Log. | | |
| The attendant maintains communication with the entrant(s) and performs no other duties that might interfere with their ability to observe and protect the entrant(s). Note: The attendant never enters the confined space. | | |
| <p>The entry supervisor periodically verifies that entry operations remain consistent with terms of the CSE Permit and that acceptable entry conditions are maintained:</p> <ul style="list-style-type: none"> • during the entry at intervals dictated by the hazards and operations performed within the space; and • whenever responsibility for a permit space entry is transferred to another entry supervisor. | | |
| PERMIT CANCELLATION | | |
| The entry supervisor cancels the CSE Permit at the completion of the job, the end of the work shift, or if a change in the work conditions or methods or acceptable entry conditions occurs. | | |
| The entry supervisor performs a review of the cancelled permit and conducts/documents a post-entry debriefing with entrants and attendants. | | |
| Upon completion of review of the CSE Permit and post-entry debriefing, the entry supervisor forwards a copy of the terminated CSE Permit to the Confined Space Program Manager | | |
| Complex Facility/Facility Operations Manager, or his or her designee, maintains the canceled Confined Space Entry Permits for at least one year. | | |

Assessment Plan (Example 1)

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| TRAINING PROGRAM | | |
| Training is provided so that entrants, attendants, entry supervisors, and air testing staff acquire the understanding, knowledge, and skills necessary for the safe performance of the duties that they are assigned. | | |
| Training is documented and there is a positive mechanism to prevent untrained employees from engaging in PRCS activities. | | |
| EMERGENCY RESPONSE | | |
| To facilitate non-entry rescue, retrieval systems or methods are used whenever an authorized entrant enters a permit space, unless the retrieval equipment would increase the overall risk of entry or would not contribute to the rescue of the entrant. | | |
| Rescue and emergency services are provided that provide timely response. | | |
| Rescue and emergency response staff are trained in assigned rescue duties as well as first aid and Cardiopulmonary Resuscitation. | | |
| Drills involving confined space rescue are done at least once every 12 months. | | |
| ASSESSMENTS AND OVERSIGHT | | |
| The Confined Space program is included in routine self and independent assessments. | | |
| Management System Maturity evaluations have been performed, documented, and tracked in ACTS as required by SBMS. | | |
| The PRCS program is reviewed at least once annually using canceled permits. | | |
| <i>Lockout/Tagout Permitting</i> | | |
| LO/TO NEED EVALUATION | | |
| The contractor procedure clearly defines the process for making a decision on which LO/TO method to use and whether a LO/TO permit is required | | |

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| PERMIT REQUIRED LO/TO PROCESS (PROCESS BASED ON SBMS and MAY VARY AT SNS AND HFIR) | | |
| The Permit Issuing Authority (PAI) and all who will be involved in LO/TO conduct a pre-job walk-down and review of available drawings to evaluate and identify the requirements for component alignment list and any special instructions to ensure adequate protection for employees. | | |
| The PAI initiates the LO/TO permit, performs or directs shutdown, and then authorizes energy isolation. | | |
| Authorized employees place each energy isolation device in the required position following the sequence as indicated in the LO/TO permit. | | |
| Service/maintenance staff perform verification of isolation for each energy isolation device and ensures that all stored energy has been released. | | |
| The Issuing Authority and service supervisor ensures through field verification that verification of isolation has been performed, and that all stored energy has been released. | | |
| The authorized employee locks the energy isolation device(s) using system lock(s) with an attached "DANGER-DO NOT OPERATE" tag to each energy isolation device. If the energy isolating device is not capable of being locked, a tag shall be located as close as possible to the device in a position that will be immediately obvious to anyone attempting to operate the device. NOTE: For work in nuclear facilities, independent verification of the process is required and documented along with the permit. | | |
| Authorized employee placing the locks and/or tags complete their section of the LO/TO permit and then place the lockout key(s) and "DANGER-DO NOT OPERATE" tag tear-off tab(s) in the lockbox. | | |
| Each service/maintenance supervisor locks the lockbox using their personal lock. | | |
| The PAI retains the original LO/TO permit and posts a copy (marked "COPY") of the permit on | | |

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| or near the lockbox and provides the supervisor(s) with a copy (marked "COPY") of the permit upon request. An up-to-date copy (marked "COPY") is maintained at or near the lockbox. | | |
| Each service/maintenance employee overlocks the lockbox with their personal lock. | | |
| <p>Prior to the start of work, each service employee verifies safe energy conditions at the point of service or maintenance.</p> <p>Note: Such verification may include visual inspection techniques, e.g., visually verifying safety blocks are in place or the absence of a fluid in a pipe or vessel. Other methods may include a deliberate attempt to start up a machine or equipment, or by testing the machine/equipment with an appropriate test instrument, e.g., a voltmeter or combustible gas/oxygen indicator.</p> <p>Upon verifying safe energy conditions exist at the point of service or maintenance, service employee(s) begin work.</p> | | |
| LO/TO is removed in accordance with approved procedures. | | |
| TRAINING | | |
| Line managers ensure staff involved in service/maintenance activities of equipment and machinery (which could result in the unexpected release of stored energy) are trained in the proper application and use of lockout/tagout. | | |
| Authorized employees are trained in the recognition of applicable hazardous energy sources, types(s) and magnitude of energy present in the workplace, and the methods and means necessary for energy isolation and control. | | |
| Training is conducted in the limitations of tags where a tagout-only system is used for a means of energy control. | | |
| Training is provided to employees whose work activities are, or place them in, an area where lockout/tagout may be performed. These employees shall be instructed about the procedure, | | |

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| with specific emphasis on the prohibition of any attempt to restart or reenergize equipment or systems that are under control of lockout/tagout. | | |
| Line manager ensures that retraining is provided for all authorized and affected employees whenever the following occur: <ul style="list-style-type: none"> • There is a change in job assignments, a change in machines, equipment, or processes that present a new hazard, or • There is a change in the energy control procedures. | | |
| Additional retraining shall be conducted when a periodic inspection of lockout/tagout activities or the energy control procedures reveal deviations from, or inadequacies in, the employees knowledge or use of these procedures. | | |
| The line manager ensures that a record of the employee training is kept up to date and contains the employee's name, badge number, and date the training occurred. | | |
| ASSESSMENT AND OVERSIGHT | | |
| The LO/TO program is included in routine self and independent assessments. | | |
| Management System Maturity evaluations have been performed, documented, and tracked in ACTS as required by SBMS. | | |
| A periodic inspection/review of the LO/TO program is performed at least an annual basis. | | |
| <i>Hot Work Permitting</i> | | |
| HAZARDS EVALUATION | | |
| As part of the work control process, the employee who has a need for hot work evaluates the proposed hot work and determines where and how it will be done, what potential hazards are present, what type of permit it required (Designated Area or single use Hot Work Permit), and what potential controls are needed. | | |

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| DEVELOPMENT OF SINGLE USE HOT WORK PERMIT | | |
| <p>The Complex Facility Manager or their designee initiates the Welding/Burning/Hot Work Permit and ensure that all required permit information is listed included, e.g.:</p> <ul style="list-style-type: none"> • Description of hot work • Required combustible controls • Required PPE • Fire watch requirements • Fire protection equipment requirements <p><u>NOTE:</u> Fire watches are required when any of the following conditions exist:</p> <ul style="list-style-type: none"> • Hot work is conducted in a facility where the building is constructed of combustible material. • Combustible material is closer than 35 ft (10.7 m) to the point of operations. • Combustible material is more than 35 ft (10.7 m) away, but could be easily ignited by sparks. • Wall or floor openings within a 35-ft (10.7 m) radius expose combustible materials in adjacent areas, including concealed spaces in walls or floors. • Combustible materials are adjacent to the opposite side of metal partitions, walls, ceilings, or roofs and could be ignited by conduction or radiation. • Hot work is conducted in areas where the employee must wear multiple layers of clothing and respiratory protection. | | |
| <p>The Permit Authorizing Individual (PAI) authorizing the hot work operation physically inspects the area, verifies the conditions, and identifies controls before the hot work operator reviews the permit.</p> | | |
| <p>Hot work operators and fire watch review the permit and the associated work area, confirm the conditions, and implement the identified controls</p> | | |

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| noted on the permit. | | |
| All permit blanks are completed or mark N/A. | | |
| All required permit signatures are obtained. | | |
| Procedures define when approval by Fire Protection Engineering or ES&H staff is required. | | |
| Hot work permits are for well define discrete tasks and are not written to generically cover a range of operations over a long period of time. | | |
| DESIGNATED HOT WORK AREAS | | |
| Designated hot work areas are established where a constant type of work can be consistently performed in a controlled area (e.g. welding shops). | | |
| Designated hot work areas are noncombustible or fire-resistive construction, essentially free of combustible contents, and suitably segregated from adjacent areas. | | |
| Designated hot work areas are approved by Fire Protection Engineering. | | |
| Written documentation is available for each Designated Hot Work Area that defines what type of work is allowed in area and what controls are required during work. | | |
| Documentation of Designated Hot Work Area approval is available. | | |
| TRAINING | | |
| Training requirements for Fire Watchers are defined. | | |
| Training requirements for PAIs are defined. | | |
| Staff who are required to serve as Fire Watchers are trained. | | |
| Staff who serve as PAIs are trained | | |
| Training records are complete. | | |

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| ASSESSMENTS AND OVERSIGHT | | |
| The Hot Work program is included in routine self and independent assessments. | | |
| Management System Maturity evaluations have been performed, documented, and tracked in ACTS as required by SBMS. | | |