Best Practice # 200

Facility: Multiple

Best Practice Title: Incidental Welding: Welding Activities Not Covered by a Code or a Standard

Point of Contact: Gary Cannell, Welding Director, FLUOR (509-392-5897); gary.cannell@fluor.com) representing the EFCOG Engineering Practices Welding Task Team

Brief Description of Best Practice:

This practice addresses welding activities that are typically referred to as "Incidental Welding", "non-code welding", or other. Incidental welds can be defined as those that present very low to no risk to safety, cost and / or schedule, in the event the weld should "fail" or not perform its intended function. This does not mean that incidental welds are not to be of sound and suitable quality (for the application), but merely that controls associated with more "critical" or code welding activities are not required for these welds. This approach follows the DOE O 414.1D "graded approach".

> **Note:** Welding and welding activities that are governed by one or more codes and/or standards shall be performed in accordance with the Site Welding Program and are not considered incidental welds.

The drivers for this practice are found in DOE O 414.1D, *Quality Assurance* which requires using a graded approach for the development of the Site or Project Quality Assurance Program.

Recommended Practice:

The best practice identifies the following five (5) steps and activities generally associated with performing Incidental Welding activities.

Step 1: Incidental Welding Determination – Is it "incidental" or not

1) Incidental Welding typically are welds that are NOT governed by a code or standard and present very little risk to safety, cost, schedule, and/or consequence of failure. Examples of some Incidental Welding activities are provided in Attachment 1.
2) The determination that a welding activity falls under the scope of Incidental Welding is made by the Site Welding Program Authority (WPA) or persons designated by him.
    a) The responsible supervision requesting approval shall review the welding activities and application with the WPA.

3) Attachment 2 provides an example of a process flow or “decision tree” diagram to help in determining Incidental Welding status.

Step 2: Welding Supervision and Oversight

1) Welding supervision / oversight should be performed by an individual with at least one of the following (experience / expertise):
   a) Individual with current or former welding qualifications, welding foreman / supervisor or those with welding supervision experience.
   b) AWS Certified Welding Inspector or equivalent certification.
   c) Others with requisite expertise as a result of their experience.
2) Supervision shall have a basic understanding and knowledge of the application, to include:
   a) Base and filler materials.
   b) Welding process and equipment.
   c) Details of the weld joint – fillet, partial penetration, length, size, etc.

Step 3: Welders and Procedures

1) Welders shall have demonstrated suitable skill and ability to deposit sound weld metal (for the application) – to the satisfaction of the responsible supervision.
2) Welding should be performed in accordance with a procedure, instruction, plan or other suitable document that conveys the necessary, basic information regarding the welding application – see Step 2: 2), above.

Step 4: Process, Equipment and Filler Material

1) Supervision shall ensure:
   a) The welding process is suitable for the application.
   b) The welding and related equipment has been properly maintained and is capable of producing sound weld metal.
   c) The filler material is appropriate for making the weld.

   Note: Filler material for Incidental Welding shall be issued, controlled and returned in accordance with the Site Welding Program requirements.

Step 5: Weld Review

1) Welding supervision shall ensure:
   a) The welds are sound and of sufficient quality to support the application.
   b) The welds meet the specified size, configuration, shape, etc.
   c) That work package, instruction, documentation, etc. required for the welding is properly completed and filled out.

d) That excess filler material, and stubs, are returned or dispositioned in accordance with the Site Welding Program.

Why the Best Practice was used: The welding task team discussed inconsistencies across projects and sites relative to incidental welding which has led to increased costs or schedule impacts at some sites, and inadequate welds at other sites on occasion. The Team recognized that developing and implementing this best practice would lead to more consistent, compliant incidental welds across the DOE Complex.

What problems/issues associated with not using the Best Practice: The problem with not using or applying this practice is one of cost and schedule. Incidental Welding applications do not justify the costly and time-consuming controls / practices associated with "critical" or code welding applications. Implementing Incidental Welding practices follows the requirements outlined in the DOE O 414.1D, *Quality Assurance.*

An example of where unnecessary impact to cost and schedule with not using an Incidental Welding approach is as follows:

> At one of the sites, Security requires that all access covers such as manholes, sewers, storm drains and culverts be welded shut to prevent unauthorized personnel from entering the facility. Performing these welds in accordance with a Site Welding Program (or code welding) would require multiple procedure qualifications and welder certifications, and all of the attendant controls associated with code welding activities.

Bottom line: Failure to implement a graded approach (Incidental Welding) to welding activities results in inefficient use of DOE resources and funding and can negatively impact the departments overall mission.

How the success of the Best Practice was measured: Incidental Welding practices are not uncommon and have been successfully applied throughout the Complex. The metric or measure by which success is determined is the avoidance of unnecessary costs and resources.

Description of process experience using the Best Practice: Incidental Welding practices, when properly managed, fulfill the goals and objectives of a graded approach. This practice can be misused and when not properly managed, can lead to poor weld quality and ultimately impact weldment performance.

The practice steps identified above are basic recommendations that should be considered when implementing an Incidental Welding approach. Each site will have some unique circumstances that may require "tailoring". It is important that the approach be established and coordinated with the Site Welding Program and approved by the WPA. This best practice falls under Integrated Safety Management System steps to develop controls and perform work.

Attachment 1: Examples of Welds that may be Incidental

Type of Weld	Examples of Welds
Code Welds	• Welds covered in the applicable governing codes and standards
Incidental Welds *Incidental welds may be defined as those that present very lot to no risk to safety, cost and / or schedule in the event the weld should "fail" or not perform its intended function.*	• Auto body repairs, exhaust pipe welding • Soft soldering (under 840° F) • Tooling/fixturing for in-shop fabrication • Simple brackets for in-shop fabrication • Repair of surface cracks in carbon steel plate such as loader buckets • Restoring hard-facing weld metal overlay to shear jaws used in D&D activities • Gates, fencing etc. • Insulation clips, thermocouple wire connections • Gutters and downspouts • Equipment hard surfacing or buildup(e.g., buckets and blades) • Guardrails, handrails and kick pates for platforms less than 30 "

Attachment 2: Decision Tree