



MEMORANDUM

TO: EFCOG MEMBER
FROM: TOM STEVENS, CHAIR, EFCOG
SUBJECT: EFCOG CONTRACTOR ALERT – WELDING PROGRAM ISSUES
DATE: 01/06/05

One of our continuing challenges is to provide member companies with timely information on critical customer issues in both sufficient detail and also as an “actionable” product that brings value to our operations.

Attached for your review and action, as appropriate, is the first “EFCOG Contractor Alert.” We are piloting the Contractor Alert concept as a new initiative for 2005. This particular Alert addresses on-going issues with Welding Program implementation in the DOE complex. From an industry perspective, systemic failures in this particular program can result in significant impacts to projects and on-going operational issues

The Alert provides you with both background information on the issue and has as an attachment a “Key Program/Element Attribute Checklist” which can be used to baseline your individual programs.

Since this is a pilot process, later in the first quarter of 2005, we will send you a short survey to get your feedback on the value of continuing the process.

Sincerely,

A handwritten signature in blue ink that reads 'Thomas R. Stevens'.

Tom Stevens

EFCOG Contractor Alert

Welding Program Issues

Purpose

The purpose of this EFCOG Contractor Alert is to notify Department of Energy (DOE) Contractors, and Subcontractors, of potential welding program deficiencies that may exist in their current programs. The Energy Facility Contractors Group's Quality Engineering Task Group was requested to review recently identified welding program deficiencies at a DOE facility for applicability across the contractor community. The objective was to ensure that lessons learned are communicated in a timely manner such that they can be used to validate the acceptability of welding programs during Management Assessments, Independent Assessments, or, other welding program reviews. This activity is considered to be a critical aspect of both Integrated Safety Management (ISM) and associated Quality Assurance Program (QAP) feedback and improvement functions.

Background

During an audit of a contractor's welding program, it was identified that proper controls for welding consumables had not been established and adequate documentation of completed welding activities had not been maintained. As a result, the organization could not demonstrate that all completed welding activities were performed to the requirements of applicable codes and standards. Following identification of the audit finding, it was further determined that the subcontractor's welding inspection and welder qualification programs were lacking. Key deficiencies identified during the audit indicated that:

- Welding and brazing was suspected of being performed on Safety Class (SC), Safety Significant (SS) or Vital Safety Systems (VSS), Structures, Systems, and Components (SSC), by uncertified welders.
- Welding was being performed to unqualified welding processes or procedures.
- Welding was not being inspected in accordance with governing codes and consensus standards. And,
- Weld filler materials were not always being properly procured and were not traceable to a properly approved Welding Procedure Specification (WPS).

Each of these deficiencies is a key program, or implementation, gap versus recognized acceptable welding program requirements. National consensus codes and standards governing fabrication and welding/brazing, such as American Society of Mechanical Engineers (ASME), American National Standards Institute (ANSI), American Welding

Society (AWS), American Institute for Steel Construction (AISC), American Petroleum Institute (API), American Water Works Association (AWWA), require that:

- Properly approved welding and brazing procedure specifications be developed and used for all welding and brazing performed in accordance with each standard or code.
- Welders using properly approved welding and brazing procedures are qualified and certified to the appropriate standard or code prior to performing any welding or brazing process. And,
- Consumable materials used for welding/brazing be properly specified, acquired, stored, distributed, and maintained in accordance with applicable materials specifications and manufacturers' requirements.

Discussion

Welding programs are established to ensure appropriate controls are identified and maintained to ensure that welder qualification, welding, and weld inspection activities meet applicable codes and standards; and, that appropriate documentation is generated and maintained in order to demonstrate that these codes and standards have been met. 10CFR830, Subpart A, *Quality Assurance Requirements*, and DOE Order 414.1B, *Quality Assurance*, require selection of appropriate controls and a level of rigor that is commensurate with the risk and importance of the activity and mission (graded approach). Controls and rigor are based on factors that include risk to the environment, public and worker, cost, schedule, and function of equipment. Implementation of this grading process is vitally important when performing special processes such as welding, an activity whose adequacy relies heavily on having qualified processes, proper materials/consumables, and highly skilled welders and inspectors. Further, it is recognized throughout the industry that welds are difficult to inspect to confirm both quality and technical requirements after the work is completed.

Welding programs should be developed and tailored to fit site-specific contract and ISM/QAP needs. A welding program should always be based on recognized industry codes and standards utilized for welder qualification, welding and inspection for the specified applications on the site. When evaluating specific welding needs and applications, proper grading and tailoring during the design process ensures that the selected specifications are appropriate and correct for welding and inspection activities. When considering welding and inspection requirements, the designer must evaluate risk and factors that include radiological conditions, temperature, pressure, materials, and access requirements. The designer must also ensure the welding program is capable of accommodating changes brought about by new specifications. These changes can include different or more demanding welder qualifications, certification of welding consumables, handling and storage requirements, or, inspector training and certifications. Selection of the proper welding specifications (based on the application, base metals,

hazards, etc.) will ensure the proper grading is applied to welding activities. It is important that all personnel involved in the implementation of the welding process, including those initiating

the work documents, understand these processes. Additionally, it is also imperative to effectively flow down both technical welding requirements as well as Quality Assurance Program requirements in procurement documents when subcontracting welding activities. Codes and standards should be referenced to ensure the required welding quality is being implemented.

Recommendation

The EFCOG Quality Engineering Task Group recommends that DOE contractors, and subcontractors, perform a baseline assessment of their welding programs to determine if the proper controls and programs are established, and, to verify that welding activities are being properly performed. Attachment 1 to this Alert provides a “Key Welding Program Elements and Attributes Checklist” that can be used as part of the recommended assessment activity.

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Welding Program Key Element and Attribute Checklist

The following key welding program elements and attributes are recognized as essential in order to have implemented an effective welding program. They have been phased in the form of a question so that they can be incorporated into organization specific checklists, lines of inquiry or other assessment mechanisms.

- Are your work control processes for welding activities defined and effectively implemented to ensure adequate oversight and conformance with requirements?
- Are work documents established for welding activities (e.g., operating procedures, shop travelers, etc.), and, do they include safety and personal protective equipment (PPE) requirements, fire or entry permits, radiation work permits, and any activity-specific technical or special instructions?
- Are requirements for the purchase, control, storage, and issuance of weld filler material defined and being effectively implemented?
- Are welders trained and qualified/certified for the welding process being used?
- Are welders required to, and using, an approved Welding Procedure Specification that provides welding parameters, joint configuration, type of weld, filler material, etc., during the performance of welding activities?
- Have appropriate inspection, test, and acceptance criteria been incorporated into the work documents? Do work documents include requirements for material control and traceability, independent in-process inspection, hold points, weld maps, and program/technical oversight?
- Does the welding program provide for increased amounts of inspection and testing based on the importance, special nature, or complexity of the specific task? Do the inspection and testing requirements typically include items and activities such as nondestructive testing per American Society for Nondestructive Testing (ASNT), functional testing of major components to design parameters, and verifications of material certifications (e.g., Certified Material Test Reports, Certificates of Conformance, heat treat reports, destructive testing reports, etc.).
- Do work processes include requirements to validate and provide objective evidence that the item or activity meets the design requirements and the work is inspected and tested by certified personnel? Is objective evidence available to document independent program oversight, personnel qualifications, weld process approval, procurement, and material control?