

# **Hanford Site Welding Program Successfully Providing a Single Site Function for Use by Multiple Contractors**

**Prepared for the U.S. Department of Energy  
Assistant Secretary for Environmental Management**

Contractor for the U.S. Department of Energy  
under Contract DE-AC06-08RL14788



**CH2MHILL**  
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Date Published  
November 2009

To Be Presented at  
WM 2010 Conference

Waste Management Symposia, Inc.  
Phoenix, Arizona

March 7-11, 2010

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*J. D. Aardsle* 11/19/2009  
Release Approval Date

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**HANFORD SITE WELDING PROGRAM  
SUCCESSFULLY PROVIDING A SINGLE SITE FUNCTION FOR USE BY MULTIPLE  
CONTRACTORS - 10042**

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**ABSTRACT**

The Department of Energy, Richland Operations (DOE-RL) recently restructured its Hanford work scope, awarding two new contracts over the past several months for a total of three contracts to manage the sites' cleanup efforts. DOE-RL met with key contractor personnel prior to and during contract transition to ensure site welding activities had appropriate oversight and maintained code compliance. The transition also provided an opportunity to establish a single site-wide function that would provide welding and materials engineering services to the Hanford site contractors: CH2M HILL Plateau Remediation Company (CHPRC); Mission Support Alliance (MSA); Washington River Protection Solutions (WRPS); and Washington Closure Hanford (WCH).

Over the years, multiple and separate welding programs (amongst the several contractors) existed at the Hanford site leading to inefficiencies resulting from duplication of administrative efforts, maintenance of welding procedures, welder performance certifications, etc. The new, single program eliminates these inefficiencies.

The new program, co-managed by two of the sites' new contractors, the CHPRC ("owner" of the program and responsible for construction welding services) and the MSA (provides maintenance welding services), provides more than just the traditional construction and maintenance welding services. Also provided, are welding engineering, specialty welding development/qualification for the closure of radioactive materials containers and materials evaluation/failure analysis. The following describes the new Hanford site welding program.

**INTRODUCTION**

The Department of Energy, Richland Operations (DOE-RL) recently restructured its Hanford work scope, awarding two new contracts over the past several months for a total of three contracts to manage the sites' cleanup efforts. DOE-RL met with key contractor personnel prior to and during contract transition to ensure site welding activities had appropriate oversight and maintained code compliance. The transition also provided an opportunity to establish a single site-wide function that would provide welding and materials engineering services to the Hanford site contractors: CH2M HILL Plateau Remediation Company (CHPRC); Mission Support Alliance (MSA); Washington River Protection Solutions (WRPS); and Washington Closure Hanford (WCH).

Over the years, multiple and separate welding programs (amongst the several contractors) existed at the Hanford site, leading to inefficiencies resulting from duplication of administrative efforts, maintenance of welding procedures, welder performance certifications, etc. The new, single program, co-managed by two of the sites' new contractors, the CHPRC and the MSA, eliminates these inefficiencies. In addition, it is expected that overall welding activities will be better controlled and more consistent across the site.

## **BACKGROUND**

Prior to the recent series of contract transitions noted above, Fluor Hanford managed what was known as the Project Hanford Management Contract (PHMC). The PHMC included work scope now contracted to CHPRC and MSA. Fluor Hanford maintained two separate welding programs, one for maintenance activities (HAMTC union craft) and the other for construction (Building Trades craft). This arrangement was part of the prior contracting legacy and worked well, but incurred some of the inefficiencies noted above.

The change in contractors provided an opportunity to combine the two programs and realize improved efficiencies; however, this created some uncertainty regarding which of the two new contractors would be responsible for the new program. The work scope of the two contractors can be summarized as follows: The CHPRC is responsible for cleanup and remediation activities for the plants and facilities associated with the "central plateau" region of the site and the MSA provides infrastructure and site services to the entire site.

In discussion with DOE-RL, it seemed reasonable to assign the program to the CHPRC to 1) support the "high-end" welding applications (e.g., welding development for SNF packaging, materials evaluation, etc. and 2) the CHPRC has the construction scope and craft. However, given that the MSA mission is to provide site-wide services, and the fact that the maintenance craft belong to the MSA, one could argue that the program should reside with the MSA. An agreement was eventually reached that would give program management to the CHPRC, construction welding activities to the CHPRC and maintenance welding activities to the MSA. The organization structure and responsibilities for the new Hanford Site Welding Program are as follows:

## **HANFORD SITE WELDING PROGRAM AND MANUAL**

CHPRC Engineering is designated as the owner and technical authority for the program. As such, Engineering is responsible for:

- Preparation and maintenance of the Hanford Welding Manual along with control of the site legacy Procedure Qualification Records (PQR). These PQRs total to more than 250 and date back many years. Multiple contractors contributed to the establishment of these records, but at any given time, just one contractor can be responsible for the PQRs, in accordance with the ASME code rules which prohibit sharing of PQRs between contractors.
- Preparation/qualification of welding procedure specifications (WPS), training, testing and qualification of Welders and Welding Operators, along with the maintenance of the welding certifications.
- Welding development/qualification for specialty welding applications such as radioactive materials container closure.
- Welding engineering, weld failure and materials investigation/evaluation.
- Subcontracted welding documentation review and approval.

CHPRC Construction Services is responsible for:

- Providing the craft, supervision, tools, equipment and shop facilities required to perform welding activities.
- Providing services and facilities for the procurement, storage and disbursal of filler material.
- Performing maintenance and calibration of welding equipment.

MSA Facility Support is responsible for:

- Providing the craft, supervision, tools, equipment and shop facilities required to perform welding activities.
- Providing services and facilities for the procurement, storage and disbursal of filler material.
- Performing maintenance and calibration of welding equipment.

#### Hanford Site Welding Manual

As noted above, prior to the new program, Construction and Maintenance maintained separate programs, including welding manuals. In preparation for the combined program, a new manual was prepared consisting of general welding specifications (GWS) and welding procedure specifications (WPS). GWSs include rules/requirements for the control of filler material, qualification of Welders and general welding requirements, etc. WPSs cover standard welding, brazing and bonding procedures.

As the site continues its cleanup mission, the need for many and varied WPSs has diminished. The prior manuals contained better than 50 WPSs each; the new manual has just over 20.

#### **PROGRAM ROLLOUT**

The new program closely resembles the prior Maintenance program in terms of control and responsibilities, along with format and presentation of procedures. This cannot be said for the Construction program and thus presented some significant change to the way Construction craft and supervision would perform welding activities.

In an effort to ensure a smooth transition to the new program, several training sessions were prepared and conducted prior to rollout. One of the areas of most concern was the control of filler material. The new program provides specific rules and requirements for the procurement, receiving, issuing and return of filler material. Several new "rod room" attendants were selected and trained in their duties. In addition to filler material control, emphasis was placed on the maintenance of Welder certifications; to ensure qualifications would not lapse.

The new welding manual is a virtual manual (for the most part) in which revision control is web-based; this too was new to Construction. However, because some of the welding stations are quite remote to offices (computers), a limited number of hard copies were prepared and distributed to these sites and controlled in a more classic manner.

To help ensure welding activities are consistently performed across the Hanford Site and in accordance with program requirements, a Site Welding Committee was established. The committee is chaired by CHPRC Engineering and includes key welding, quality and inspection personnel from both the CHPRC and MSA organizations. In addition, representatives from the WCH and WRPS contractors attend the

monthly meetings. The real benefit of the meetings is that they provide a forum for communication of program changes, issues, lessons learned, etc., amongst the many site entities involved in welding activities.

## **FUTURE ACTIVITIES**

As the Site continues with its cleanup mission, no significant changes/challenges are expected to impact the Hanford Site Welding Program. Routine activities, along with some normal welding and materials issues can be anticipated, but otherwise, there are no plans for major construction programs or projects involving welding.

This however, is not the case for "specialty welding" activities where projects involving the development and qualification of closure-welding processes, for radioactive materials packages, will be carried out. Over the past 8 years, the Engineering and Maintenance organizations conducted several closure-welding development efforts in support of Special Nuclear Materials (SNM) and Spent Nuclear Fuels (SNF) packaging campaigns. Welding for these applications was performed under semi-remote operations, i.e., the weld joint was accessible for equipment setup and repair, but the welding (for ALARA reasons) was performed remote to the work via cameras and video console. Upcoming packaging work will be performed under fully remote operations.

CHPRC Engineering and DOE-RL, with assistance from the Pacific Northwest National Laboratory (PNNL), are pursuing the development/commercialization of an emerging joining technology, Friction Stir Welding (FSW), for the upcoming packaging activities. Current fusion joining technologies are not well suited for fully remote operations and may present significant risk to packaging cost and schedule. FSW technology however, has been demonstrated in other industries (aerospace and marine) to produce near flaw-free welds on a consistent basis and is judged capable of providing the needed performance for fully-remote closure-welding applications [1].

## **CONCLUSION**

The new Hanford Site Welding program has been in place for several months now and appears to be functioning well, and as designed. The transition for some to new procedures, roles and responsibilities has not been without challenge. The "team" has demonstrated however, that they understand the value of the new, combined program and each of the members has been willing to work together to make the program a success.

## **REFERENCES**

- [1] G. R. Cannell, G. J. Grant, G. E. Hill, "Code Acceptance of a New Joining Technology for Storage Containments", Proceedings from the 17<sup>th</sup> International Conference on Nuclear Engineering (ICONE17), Brussels, Belgium, 7/12/09.