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VOLUME 1 - GENERAL WELDING STANDARDS

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RECORD OF REVISIONS

Rev	Date	Description	POC	RM
0	8/16/04	Initial issue.	Kelly Bingham, FWO-DECS	Gurinder Grewal, FWO-DO
1	10/27/06	Deleted redundant roles & responsibilities, added WPSs. Organization updates from LANS transition. ISD number changes based on new Conduct of Engineering IMP 341. Other administrative changes.	Kelly Bingham, <i>FM&E-DES</i>	Kirk Christensen, <i>CENG</i>

Contact the Welding Standards POC for upkeep, interpretation, and variance issues.

GWS 1-12	<u>Welding POC/Committee</u>
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GWS 1-12 USE, PREPARATION, & CONTROL OF LANL WELDING & BRAZING STANDARDS

1.0 PURPOSE AND SCOPE

- A. The purpose of this procedure is to establish the requirements and responsibilities for preparation, issue, control, and use of the LANL Welding Standards (ESM Chapter 13).
- B. These include the General Welding Standards (GWS), Welding Procedure Specifications (WPS), Welding Fabrication Procedures (WFP), Welding Technique Sheets (WQT), and Procedure Qualification Records (PQR).

2.0 REFERENCES

- 1. GWS 1-04 – Welding Procedure Qualification Tests and Records
- 2. GWS 1-05 - Welder Performance Qualification/Certification
- 3. GWS 1-07 - Materials Specifications

3.0 ACRONYMS AND DEFINITIONS

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Acronym / Term	Description
AWS	American Welding Society
FM&E	Facility Management & Engineering Division
GWS	General Welding Standards
IQMG	LANL Institutional Quality Management Group
LANL	Los Alamos National Laboratory
Pre-qualified Welding Procedures	A written welding procedure with the ranges taken from a set of pre-qualified variables as defined in the AWS codes. These procedures shall be written by the LANL WPA and can be authorized for use without further procedure qualification testing.
Procedure Qualification Records (PQR)	A document that records welding data, inspection and test results both mechanical and NDE from qualification test coupons welded to validate written Welding Procedure Specifications.
SSS	Support Services Subcontractor (e.g., KSL)
Standard Welding Procedure Specifications (SWPS)	A welding procedure prepared as an industry standard, such as AWS, and adopted for use by a manufacturer or contractor as permitted by the applicable fabrication or construction code.
WFP	Welding Fabrication Procedures: requirements for fit-up, extent of inspection and applicable weld acceptance criteria for specific codes and standards.
Welding Fabrication Procedures	Process procedures prepared and certified by LANL that contain the requirements for welding to the rules of a fabrication standard.
Welding Procedure Specifications	Procedures developed or adopted by LANL and contain the general requirements that control the variables to welding operations

Acronym / Term	Description
(WPS)	performed to the governing fabrication code. LANL welding procedures including welding procedure documents prepared by predecessor or contractor organizations.
Welding Qualification Technique Sheet (WQTS)	Contain the specific test requirements which will provide standardization for testing and are designed to provide best ranges for limits of qualifications.
Welding Technique Sheet (WTS)	Contain the specific requirements for welding various thicknesses of materials utilizing various welding processes. These WTS requirements apply to a limited number of specific welding operation or welding conditions (e. g, critical, costly) and are used in conjunction with the requirements of the WPS, WFP, and GWS.
WPA	LANL Welding Program Administrator
WQT	Welder Qualification Test

4.0 GENERAL

4.1 Responsibilities

A. The LANL WPA is responsible for the:

- approval of new, revised, and canceled LANL welding standards sections and procedures;
- preparation, issue, and control of the LANL welding standards, WTS, and welder performance qualification tests, and
- the acceptance of changes to welding procedure manual sections and welding procedures.

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5.0 PROCEDURE

5.1 Performance Qualification

A. Welder Performance Qualification Test requirements and methods are established in the GWS 1-05 - *Welder Performance Qualification and Certification*.

- Recommended Welder Qualification Technique Sheet (WQTS) (GWS 1-05 Sample, Attachment 16) numbers are listed by craft in the GWS.
- The recommended WQTS will qualify the welder to the material thickness/size ranges specified on the WQTS. Situations may develop where some of the WQTS are not required or another WQTS is desired; in such cases the LANL WPA will determine the WQT to be utilized.
- Questions on applicable WQTS may be directed to the LANL WPA.

B. When using a two-process WFP or WTS, the welder may be qualified to only one of the processes and weld with that portion of the WTS.

- For example, if the welder is qualified to the SMAW process only, a two-process WTS (GTAW and SMAW) may be used for welding within the limits of the SMAW portion only.

5.2 General Procedure

- A. Requests for new or revised WTS, manual sections, or GWS shall be submitted to the LANL WPA using GWS 1-02, Attachment 1.
- B. The LANL WPA shall prepare or revise the WTS, WFP, or manual sections based on the information contained on the request.
- C. Welding Fabrication Procedures and WTS for which a certified PQR is not available shall be qualified in accordance with GWS 1-04 - *Welding Procedure Qualification Tests and Records*.
- D. The LANL WPA shall include the assigned PQR number(s) and sign the approval block on the WFP or Welding Technique Sheet.
- E. The format and style of procedures and manual sections shall be in the general structure of this procedure.
- F. Procedures and manual sections shall be approved by the LANL WPA prior to issue.

5.3 Issue and Control

- A. The Welding Program is Chapter 13 of the LANL Engineering Standards Manual and the official copy will be maintained on the LANL internet.
- B. A signed copy will be maintained by the LANL Standards Program Manager.
- C. Approved WFP and WTS, and manual sections, changes, revisions, and cancellations shall be issued and controlled by the LANL Standards Program Manager.
- D. Only LANL WPA authorized changes, revisions, and cancellations may be made to individual WTS, WFP, manual sections, WTS, and PQR.
- E. The LANL Standards Program Manager shall maintain a history file containing issued welding procedures and manual sections and revisions, changes, and cancellations.
- F. An update notification shall be at the discretion of the LANL Standards Program Manager; however, as a minimum facility, program, SSS, or project managers and subcontractors should be on distribution for Welding Procedures governing their work and will be notified whenever an Administrative Procedure, Welding Procedure, or a Manual Section is issued, revised, changed, or canceled.

5.4 Action/Change Notices

- A. Actions or changes to welding procedures (WFP, WPS, and WTS) or manual sections that do not involve significant content, technical modification, or large amounts of new material may be accomplished through the issue of an Action/Change Notice (Attachment 1).
- B. Action/Change Notices shall not be used for modification of responsibility, authority, quality, or technical requirements.
- C. Action/Change Notices shall be numbered consecutively for each WFP and manual Section.
- D. Action/Change Notices to manual sections and procedures shall be identified by the words "Action/Change Notice No. X" and attached pages that have been changed.
- E. Instructions and a summary of the changes shall be issued with the Action/Change Notice.

- F. Action/Change Notices to procedures shall be identified by typing “Chg-X” after the revision number in the applicable index and on the document after the revision number. Instructions and a summary of the changes will be printed on the transmittal letter.
- G. Changes within a page shall be indicated by placing a change marker in the margin adjacent to those portions of the text which have been changed.
- H. Action/Change Notices shall be approved by the LANL WPA and shall be issued and controlled in accordance with Section 5.3.

5.5 Revisions

- A. Revisions to Welding Procedures (WFP, WPS, and WTS) or manual sections shall be made when three Action/Change Notices have been issued and warrant incorporation or when a change involves significant modifications to the procedure.
- B. Revisions will be prepared and handled in the same manner as initial issues. The sequence of revisions will be designated numerically for each procedure.
- C. Revisions within a page will be indicated by placing a revision marker in the margin adjacent to those portions of the text that have been revised. When the magnitude of the revision to Manual sections and WFP makes it impractical to use revision indicators, the revision indicators may be omitted and noted in the procedure’s record of revisions.
- D. Revisions and additions to the WFP, WTS, PQR, WQT, and WPSs including WPS 3-01 and attachments only require LANL WPA and Standards Manager (or CENG Office Director) approval (consistent with specifications at LANL). Revisions to Vol. 1 GWSs, 4.01, and 5.01 shall follow the entire ESM revision process (e.g., ESM Board meeting and RM approval).

5.6 Cancellations

- A. Cancellations to Welding Procedures or Manual sections will be communicated by e-mail.
- B. Cancellations of WPS, WTS, and PQR will be identified by typing “Canceled” in the revision column of the index.
- C. Cancellations to WPS, WFP, manual sections, WTS and PQR will be approved as required for revisions to the document.
- D. Cancellations will be issued and controlled in accordance with Section 5.3. Cancellation Notice will become effective upon issue.

5.7 Project Welding Procedures

- A. Project or Program-specific welding procedures (e.g., WPS, manual sections, WTS and PQR) may be developed for special or limited use welding applications.
- B. The preparation, qualification, review, approval, and revision of project welding procedures shall be as required for the corresponding WPS, WFP and PQR of this program.
- C. Distribution and control of project welding procedures shall be limited to the affected project.

5.8 Standard Welding Procedure Specifications (SWPS)

5.8.1 Application of American Welding Society (AWS) Codes

- A. Approved welding standards procedures (SWPS) may be used for LANL welding activities as permitted by the applicable fabrication code, engineering specification, or contract document.
- B. When applied, all requirements and limitations of the SWPS shall be met. A SWPS shall not be applied using conditions or variables outside the ranges established in the WPS.
- C. All related requirements for design, post weld heat treatment, quality control, inspection, examination, and testing shall be met in accordance with the applicable fabrication code, engineering specification, and contract documents.
- D. Welders and welding operators using SWPS shall be qualified in accordance with the Welder Performance Qualification section of this program.
- E. Use of a SWPS does not replace or substitute the responsibility for compliance with the fabrication code, engineering specification, and contract documents, or acceptability of the final product.
- F. Supplementary instructions or a WTS may be issued to adapt a SWPS for a specific design or welding application.
- G. Such instructions may, for example, consist of tighter fit-up tolerances, higher minimum preheat temperature, or any other instruction necessary to produce elements that meet the requirements of the fabrication documents.
- H. Any supplementary instruction shall not be less restrictive than provided in the SWPS.
- I. Supplementary welding procedure instructions shall be issued on a project-specific basis in accordance with paragraph 5.7.

5.8.2 Adoption for ASME Section IX Applications

- A. SWPS identified in ASME Section IX are acceptable for construction to ASME Boiler and Pressure Vessel Code Sections that invoke ASME Section IX.
- B. Any requirements of the construction code take precedence over ASME Section IX.
- C. SWPS shall be demonstrated and adopted for use prior to use in applications permitted by ASME Section IX.
- D. The LANL WPA shall review requested applications of SWPS and assure the following:
 - Demonstration testing of the SWPS is conducted in accordance with the Welding Procedure Qualification section of this program and ASME Section IX (see QW-510 and QW-520).
 - Required information is recorded on the SWPS, including identification of LANL as the responsible organization, the supporting demonstration record number, and applicable fabrication or construction code.
 - Upon acceptance, the LANL WPA shall sign and date the SWPS.
- E. SWPS shall be distributed for use in accordance with paragraph 5.7.

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- F. The LANL WPA shall assure production use of SWPS complies with the following:
- Applicable project fabrication documents, e.g. contract or specifications, are recorded on the SWPS.
 - Deviations from the specified welding conditions are not permitted.
 - SWPSs may not be revised or supplemented with PQR.
 - Only the welding process shown may be used. When a multiple process SWPS is selected the processes shown shall be used in the order and manner specified.
 - SWPS shall not be used to produce a weld joint with other procedures qualified by PQRs (i.e. procedures prepared and qualified by LANL or site contractors.)
 - SWPS are not permitted where impact testing is required by the fabrication or construction code.
 - Any supplemental instructions to the SWPS shall be within the limits of the SWPS.

5.8.3 Other Standard Welding Procedure Specifications

- A. Other standard welding procedure specifications (e.g., manufacturer instructions, welding schedules, international codes, etc.) may be applied as permitted by applicable specifications.
- B. The LANL Welding Program Administrator shall be contacted for application of welding procedure specifications not otherwise addressed in this section.

6.0 ATTACHMENTS

Attachment 1: Action/Change Notice Form