71-0708

Westinghouse

Westinghouse Electric Company
Nuclear Fuel
Columbia Fuel Site
P.O. Drawer R
Columbia, South Carolina 29250
USA

U. S. Nuclear Regulatory Commission
Attn: Capt. Robert A. Nelson, USN (Ret)
Chief
Spent Fuels Licensing Section Officer
Office of Nuclear Material Safety and Safeguards
Washington, DC 20555

Direct tel: 803-647-3552
Direct fax:
e-mail:
Your ref: 07100708/2005202
Our ref: UAM-NRC-06-002

January 6, 2006

SUBJECT: RESPONSE TO SAFETY INSPECTION REPORT: 07100708/2005202

Westinghouse Electric Company herein provides this response to Safety Inspection Report and Compliance Inspection Report # 07100708/2005202 dated December 7, 2005. Appendix A provides a response to the non-cited violation identified in the Inspection Report. References identified In Appendix A as Proprietary Class 2 were made available during the inspection but are not included in the response.

Should you have any questions or require additional information, please call the undersigned at (803) 647-3552 or Mr. Peter Vescovi at (803) 647-3671.

Sincerely,

WESTINGHOUSE ELECTRIC COMPANY

Norman A. Kent
Manager
Transport Licensing and Compliance

Attachments: Appendix A

cc: Mr. James Pearson, NRC Inspector

NMSS01

APPENDIX A

WESTINGHOUSE RESPONSE TO NOTICE OF VIOLATIONS

A.1 The following information is provided in response to Non-Cited Violation as reported in 07100708/2005202 failure to comply with requirements for procurement of maintenance services for the Patriot shipping package (USA.9292/AF-85).

A.1.a ACKNOWLEDGEMENT OF THE VIOLATION

The violation is correct as stated in the Safety Inspection Report and Compliance Inspection report 07100708/2005202. Westinghouse identified the noncompliance early in October 2005 and immediately stopped work at the vendor site. A meeting was convened that included representatives from Westinghouse quality assurance, supplier quality, transportation, shipping container licensing and compliance, and product engineering to ascertain the nature and extent the noncompliance and establish a plan of corrective actions.

A.1.b REASON FOR THE VIOLATION

The non-cited violation identifies maintenance being performed on the PATRIOT model package, Package Identification USA/9292/AF-85, licensed under NRC Docket 71-9292. The bill of material on the license drawing, Dwg. No. 10014E28, identifies the safety related components for the package. Maintenance work being performed for Westinghouse by the supplier included cutting and welding the inner container lid end cap. Both the inner container lid and end cap are designated as safety related components in the bill of material. The Westinghouse procedure for the control of purchased items and services (WEC 6.1) defines the responsibilities and identifies requirements for procurement of shipping packages subject to approval by the U.S. Department of Transportation (DOT) or U.S. Nuclear Regulatory Commission (NRC) for the transportation of radioactive material. WEC 6.1 defines specific responsibilities associated with procurement of items or services that includes identifying the item or service as safety-related.

Westinghouse initiated a purchase requisition that requested a vendor to provide services to chemically clean and paint PATRIOT inner containers, which included the cutting and welding the lid end caps. The requisition incorrectly identified the services to be "non-QA". This "non-QA" designation established a release strategy that did not include appropriate quality approvals for services that are safety-related. As a result Westinghouse issued a purchase order to the vendor that did not include appropriate quality requirements.

A.1.c CORRECTIVE ACTION TAKEN AND RESULTS ACHIEVED

When Westinghouse realized that the vendor providing the services was not a Qualified Supplier work was stopped and initiated a corrective action plan. The initial corrective action plan included qualifying the supplier, the process, the welders, and the work already completed.

After reviewing the vendor processes and Westinghouse quality requirements it was decided that rather than qualify the supplier Westinghouse would follow approved procedures for the dedication of commercial grade items that are intended for use in nuclear safety–related applications. Westinghouse issued a commercial dedication instruction (CDI) for maintenance performed on the Patriot inner container by the supplier. In accordance with the commercial dedication procedure Westinghouse is responsible for executing the CDI to dedicate packaging as a safety-related item. The dedication is based on special inspections and tests to verify critical characteristics identified by the responsible engineer. The critical characteristics include product identification verification, inner package skin integrity, inner package structural weld integrity, channel weld integrity, lid end repair weld integrity, surface finish, lid/base functionality, dimensional stability, and process verification.

Westinghouse worked generated a Manufacturing and Quality Plan (MAQP) for the refurbishment of the Patriot inner containers. The MAQP provides specific guidance for cleaning, acid stripping, welding, weld inspection, and powder coat painting services provided by the vendor. Westinghouse developed procedures with input from the vendor for the weld process, for welder qualification and specifically welding the lid end cap. A process routing was developed to documents the performance of required maintenance and inspections. The process routing identified inspection hold points during the maintenance.

Westinghouse procured the services of a qualified supplier to qualify the welders and the welding process. This vendor certified that test specimens were prepared, joined and examined in accordance with the requirements of American National Standard, AWS D9.1M/D9.1:2000, Sheet Metal Welding Code (ASW D9.1). Furthermore they provided procedure qualification test record (ASW D9.1, Annex E) and welding procedure specifications (ASW D9.1, Annex D) to certify the welding process used to repair the lid end cap. Welder and welding operator qualification test records (ASW D9.1, Annex F) were also provided by QIS for each of the welders who performed the welding.

Magnetic particle testing (MT) was used for nondestructive examination of all welding that was performed on the inner containers prior to issuing the CDI. The MT was completed on December 01, 2005. MT was performed using dry powder per ASW D9.1 to detect surface discontinuities in the sheet metal welds of the lid end cap. All welds inspected were found to be acceptable. No defects were found at the time of the inspection.

A.1.d ACTIONS TO PREVENT RECURRENCE

Westinghouse initiated a corrective actions process (CAPS) issue report (05286–C003) on October 13, 2005. The CAPS program formally ascertains the cause of the problem through an apparent cause analysis, and also requires short and long term corrective actions as well as actions to prevent recurrence. A project team has already been established to assess the current practices for procuring services and components for shipping containers. The CAPS process and project team's review may result in revisions to procedures or training to ensure that the quality requirements associated with procuring services or items for shipping packages are correctly identified.

A.1.e DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED

First note that no shipments have been made with packages that did comply with the Certificate of Compliance (CoC). Compliance was achieved with regard to t he maintenance activities November 15, 2005 when the Commercial Dedication Instruction was issued. Full compliance for the Patriot shipping packages will be achieved when the revised CoC is issued, and the anticipated date is prior to January 23, 2006.

References

1. U.S. NRC Safety Inspection Report and Compliance Inspection, Report 07100708/2005202
2. Commercial Dedication Instruction CDI-3219 (Proprietary Class 2)
3. Weld Wire Analysis
4. Procedure TR-219 Refurbish Patriot BWR Shipping Package, Rev. 2 (Proprietary Class 2)
5. AWS D9.1M/D9.1:2000 , Annex E - Procedure Qualification Test Record (PQR), Annex D - Welder Procedure Specification (WPS), Annex F - Welder and Welding Operator Qualification Test Records
6. Magnetic Particle Inspection Report
7. BWR/Patriot Inner Shipping Box, Refurbishment Manufacturing & Quality Plan (MAQP)
8. Patriot BWR Inner Box Routing
9. Weld Process and Welder Qualification, BWRWELD001
10. Weld Procedure for BWR Inner Box, ENDWELD001

NRC FORM 591S PART 1
(8-2002)
10 CFR 2.201

U.S. NUCLEAR REGULATORY COMMISSION

SAFETY INSPECTION REPORT AND COMPLIANCE INSPECTION

1. LICENSEE/CERTIFICATE HOLDER	2. NRC/REGIONAL OFFICE
Westinghouse Electric Company, LLC P. O. Drawer R Columbia, SC 29250 REPORT 07100708/2005202	Spent Fuel Project Office M/S O-13-D-13 Washington, DC 20555-0001

3. LICENSEE/CERTIFICATE NUMBER(S)	4. INSPECTION LOCATION	5. DATE(S) OF INSPECTION
71-0708	Columbia, SC	October 31 - December 7, 2005

The inspection was an examination of the activities conducted under your license as they relate to radiation safety and to compliance with the Nuclear Regulatory Commission (NRC) rules and regulations and the conditions of your license or Certificate of Compliance (CoC). The inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations by the inspector. The inspection findings are as follows:

☐ 1. Based on the inspection findings, no violations or nonconformances were identified.

☐ 2. Previous violation(s) or nonconformance(s) closed.

☒ 3. The violation(s), specifically described to you by the inspector as non-cited violations, are not being cited because they were self-identified, non-repetitive, and corrective action was or is being taken, and the remaining criteria in the NRC Enforcement Policy, NUREG-1600, to exercise discretion, were satisfied.

1 Non-Cited Violation(s) was/were discussed involving the following requirement(s) and Corrective Action(s):

On June 10, 2005, Westinghouse issued Purchase Order 4500168745 to Chem-Strip of Alamance, Inc., of Burlington, NC, to provide services to chemically clean and paint BWR/Patriot inner shipping containers. This process involved cutting and welding of the end of each container lid. The lid is designated on Drawing 10014E28 as a safety-related component of the Patriot container. The Westinghouse requisition for this work did not identify the work as safety-related and there was no QA review and approval of the requisition.

☐ 4. During this inspection certain of your activities, as described below and/or attached, were in violation or nonconformance of NRC requirements and are being cited. This form is a NOTICE OF VIOLATION OR NONCONFORMANCE, which may be subject to posting in accordance with 10 CFR 19.11.

(Violations, Nonconformances, and Corrective Actions)

STATEMENT OF CORRECTIVE ACTIONS

☐ I hereby state that, within 30 days, the actions described by me to the inspector will be taken to correct the violations identified. This statement of corrective actions is made in accordance with the requirements of 10 CFR 2.201 (corrective steps already taken, corrective steps which will be taken, date when full compliance will be achieved). I understand that no further written response to NRC will be required, unless specifically requested; **OR**

☒ Written Response requested in 30 days ☒ YES ☐ NO

TITLE	PRINTED NAME	SIGNATURE	DATE
LICENSEE	Norman Kent	Norman Kent	12/7/05
NRC INSPECTOR	James Pearson	James Pearson	12/7/05

SAFETY INSPECTION REPORT AND COMPLIANCE INSPECTION

1. LICENSEE/CERTIFICATE HOLDER	2. NRC/REGIONAL OFFICE
Westinghouse Electric Company REPORT NUMBER(S) 07100708/2005202	**Spent Fuel Project Office, M/S O-13-D-13** **Washington, DC 20555-0001**

3. LICENSE/CERTIFICATE NUMBER	4. INSPECTION LOCATION	5. DATE(S) OF INSPECTION
71-0708	Columbia, SC	October 31- December 7, 2005

(Continued)

Westinghouse created Issue Report # 05-286-C003, submitted 10/13/05, identifying that (1) the PO was issued without the required QC approval, (2) the vendor was not on the approved supplier list, (3) the vendor's welding had not been done under a Westinghouse program, and (4) an inspection program had not been established for the vendor welding.

Q. C. Deviation or Notification (QCDN) No. 65309, dated 10/17/05, identified the defective condition as: The ends of the BWR Inner Box were welded back in place and painted without the weld being inspected. The requirement was cited as: Welds on safety-related parts are to be inspected to PS-WELD10, Rev. 01. The QCDN identified 19 units in the condition, and instructed that the completed boxes be inspected for weld defects. The QCDN appeared to indicate the welds had subsequently been inspected by Westinghouse, but the NRC inspector was informed that some of the welds had been painted over at the time of the inspection.

The above Issue Report and QCDN document that Westinghouse had identified deviations and initiated corrective actions prior to the start of the NRC inspection. However, the team noted that the refurbishment activities were ongoing at the time of the inspection and the team considered that the actions that had been taken did not appear to be adequate to resolve the issue for either the completed units or the ongoing work. Westinghouse acknowledged during discussions with the team that additional actions would be necessary.

The purchase order to Chem-Strip specified that welding was to meet Westinghouse Electric Co. Specification PS-WELD10 - Shielded Metal Arc Welding of Carbon Steel. No other welding procedure was provided to Chem-Strip. The inspector was informed that Chem-Strip was performing MIG welding. PS-WELD10 states that the weld joint design shall be shown on drawing and designated by AWS weld symbols. Most of the welding performed to replace the end of the container lid was on newly created joints not shown on licensing or fabrication drawings.

Westinghouse had copies of certificates of welding qualification for three Chem-Strip employees. Neither Chem-Strip nor the three issuers of the certificates were approved suppliers for Westinghouse. No test reports, welding records, or other objective evidence accompanied any of the certificates which were dated 1990, 1992, and 1996. While such documentation may be obtainable, it did not appear that Westinghouse had reviewed or validated any such information.

Westinghouse issued a letter stating that two Chem-Strip employees had been trained on the verification of container rework welds per PS-WELD10 and container drawings on October 27, 2005. The letter certified the individuals to perform weld inspections per the specification and drawing. There was no further documentation on the details of the training or the weld attributes to be inspected. PS-WELD10 is a general welding specification and the drawings do not show the weld joint design. The sign-off on the inspection sheet used by Chem-Strip only states "Inspected Welds." Also, there was no further documentation attesting to the qualification of the inspector, such as a written or practical examination, or the results of an eye examination normally required for a visual inspector.

M 591S PART 3 U.S. NUCLEAR REGULATORY COMMISSION

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Docket File Information

SAFETY INSPECTION REPORT AND COMPLIANCE INSPECTION

1. LICENSEE/CERTIFICATE HOLDER	2. NRC/REGIONAL OFFICE
Westinghouse Electric Company REPORT NUMBER(S) 07100708/2005202	**Spent Fuel Project Office, M/S 0-13-D-13** **Washington, DC 20555-0001**

3. LICENSEE/CERTIFICATE NUMBER(S)	4. INSPECTION LOCATION	5. DATE(S) OF INSPECTION
71-0708	Columbia, SC	October 31- December 7, 2005

6. INSPECTION PROCEDURES USED	7. INSPECTION FOCUS AREAS
86001	Quality Assurance Program Implementation and NRC Inspection Followup

SUPPLEMENTAL INSPECTION INFORMATION

3. LICENSEE CONTACT	4. TELEPHONE NUMBER
Norman Kent	803-647-3552

PROGRAM SCOPE

10 CFR 71.105(b) states, in part, the certificate holder shall provide control over activities affecting quality of the identified materials and components to an extent consistent with their importance to safety, and as necessary to assure conformance to the approved design of each individual package used for the shipment of radioactive material.

Contrary to the above, cutting and welding was performed on important-to-safety components of Patriot shipping containers at Carolina Chem-Strip:

(1) without adequate procedures for welding,
(2) without adequate documentation of welder qualifications, and
(3) without adequate provisions for inspection and documentation of completed welds.

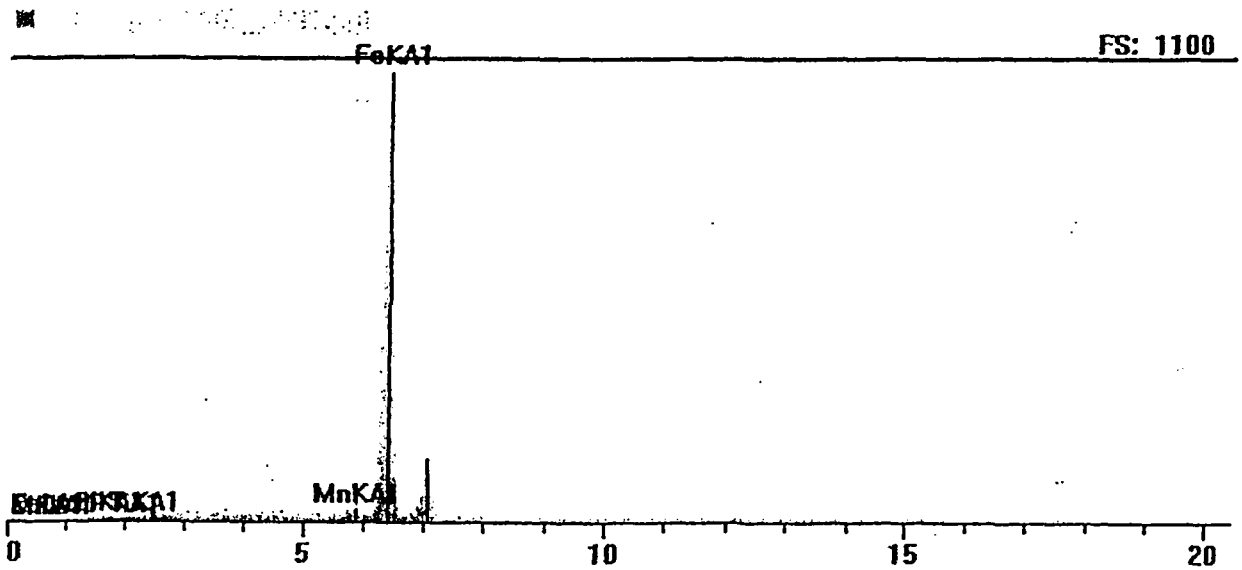
PRINCETON GAMMA-TECH

Princeton Gamma-Tech, Inc.

Spectrum Report
Monday, November 14, 2005

Set ID:
File: C:\Program Files\PGT\Data\Sample_1907_S001.pgt
Collected: November 14, 2005 14:31:23

Live Time:	43.39	Count Rate:	1557	Dead Time:	29.49 %
Beam Voltage:	20.00	Beam Current:	2.00	Takeoff Angle:	33.01



Element	Line	keV	KRatio	Wt%	At%	ChiSquare
Mn	KA1	5.898	0.0134	1.28	1.29	2.64
Si	KA1	1.740	0.0010	0.16	0.32	1.44
P	KA1	2.013	0.0007	0.09	0.17	1.44
S	KA1	2.307	0.0008	0.09	0.16	1.44
Fe	KA1	6.403	0.9833	98.37	98.05	2.64
C	KA1	0.277	0.0000	0.00	0.00	0.00
Total				**100.00**	**100.00**	**2.23**

Element	Line	Gross	BKG	Overlap	Net
		(cps)	(cps)	(cps)	(cps)
Mn	KA1	23.738	15.994	0.000	10.607
Si	KA1	7.444	5.785	0.001	1.830
P	KA1	7.951	7.006	0.006	1.114
S	KA1	9.150	7.882	0.005	1.298
Fe	KA1	714.681	15.672	0.954	696.301

Element	Line	Det Eff	Z Corr	A Corr	F Corr	Tot Corr	Modes
Mn	KA1	0.995	1.019	1.005	0.928	0.950	Elmnt.
Si	KA1	0.906	0.864	1.942	0.998	1.675	Elmnt.
P	KA1	0.882	0.898	1.614	0.996	1.444	Elmnt.
S	KA1	0.916	0.880	1.400	0.992	1.222	Elmnt.
Fe	KA1	0.996	1.000	1.000	1.000	1.000	Elmnt.
C	KA1	0.193	0.746	6.273	0.999	4.678	Elmnt.

Typical Wire Analysis

Type	Spoolarc Wires	AWS Classification	Typica C	Mn	Si	P	S
C-Mn	65	ER70S-2	0.06	1.09	0.53	0.009	0.00
	29S	ER70S-3	0.08	1.03	0.50	0.013	0.01
	82	ER70S-3	0.08	1.20	0.60	0.009	0.00
	85	ER70S-4	0.10	1.20	0.70	0.009	0.01
	86	ER70S-6	0.08	1.50	0.86	0.011	0.01
	87HP	ER70S-7	0.09	1.65	0.60	0.012	0.01
Mn-Mo	83	ER80S-D2 / ER90S-D2	0.09	1.83	0.60	0.011	0.01
Hign Strength	95	ER100S-1	0.06	1.62	0.32	0.005	0.00
	120	ER120S-1	0.07	1.60	0.32	0.005	0.00
Special Purpose	140	None	0.11	1.60	0.35	0.014	0.00

ESAB is the world's leading manufacturer of TIG welders, MIG or wire welders, stick welders, flux cored welders, multiprocess welder mutlioperator systems, automated welding systems, submerged arc welders, welding equipment, welding guns and accessories, oxyf welding tips and nozzles, stainless steel welding wire, flux cored welding wire, mig welding wire, welding consumables, and welder tr & Repair, Farm and Ranch, Construction, Motorsports, Hobbyist and Fabrication markets.

NWSUM6035445

E

Spoolarc 86

AWS Class ER70S-6

Code and Specification Data: AWS A5.18, ASME SFA 5.18
Military - MIL 70S-6, MIL-E-23765/1
ABS - ER70S-6
Lloyds - 3SA, 3YSA
CWB-CSA W48.4-M, ER40S-6

Description:
Spoolarc 86 contains higher levels of manganese and silicon than the other standard grades of MIG wire. This wire features excellent tolerance of rust and scale, produces the highest deposit strength of all the carbon steel MIG wires.

Spoolarc 86 is used for butt and fillet welding of sheet and plate of a variety of thickness. Applications include general carbon steel fabrication.

Typical Mechanical Properties

	As Welded	
	75% Ar/25% CO_2	CO_2
Yield Strength, psi (MPa)	72,000 (497)	68,000 (469)
Tensile Strength, psi (MPa)	86,000 (593)	81,600 (563)
% Elongation in 2" (51 mm)	27	30

Typical Charpy V-Notch Impact Properties

	As Welded	
Testing Temperature	75% Ar/25% CO_2 ft-lbs(J)	CO_2 ft-lbs(J)
-20°F (-18°C)	67 (91)	31 (42)

Typical Undiluted Weld Metal Analysis (%)

Gas	C	Mn	Si	P	S	Cu
75% Ar/25% CO_2	0.07	1.19	0.62	0.012	0.011	—

CO_2	0.08	1.03	0.51	0.011	0.012	0.26

Typical Undiluted Weld Metal Analysis

Typical Wire Analysis

Recommended Welding Parameters

Deposition and Efficiency Data for Welding Wires

Standard Diameters and Packages

- .023"(0.6 mm) x 12 & 33# (5.4 & 15kg) spl
- .030"(0.8 mm) x 12, 33 & 44# (5.4, 15 & 20 kg) spl
- .035"(0.9 mm) x 12, 33, 44 & 60# (5.4, 15, 20 & 27 kg) spl, 65# (29 kg 700 & 1000#(318 & 454 kg) reel, & 500 & 900#(227 & 408 kg)Marath
- .045"(1.2 mm) x 12, 33, 44 & 60# (5.4, 15, 20 & 27 kg) spl, 65# (29 kg 300, 700 & 1000#(136, 318 & 454 kg) reel, & 500#(227 kg)Marathon
- .052"(1.4 mm) x 500#(227 kg)Marathon Pac
- 1/16"(1.6 mm) x 33, 44 & 60#(15, 20 & 27 kg)spl, 65#(29 kg)coil & 7 (318 kg)reel

Packaging Specifications

Bulk Packaging

Annex E

Procedure Qualification Test Record (PQR)

(This Annex is not a part of AWS D9.1M/D9.1:2000, *Sheet Metal Welding Code*, but is included for information purposes only.)

PQR Number FNDWELD 001
WPS Number BWRWELD 001

VARIABLES

Base metal Carbon Steel A-36
Metal thickness 12 GA
Coating NONE
Joint preparation CLEAN EDGES
Backing N/A
Position of welding G-3 VERTICAL
Welding process MIG
Manual, semiautomatic, or automatic MANUAL
*Filler metal spec. A5.18
*Filler metal class. ER70S-6
Filler metal F. No. F6
Electrical char. ac V dcep dcen
Mode of transfer SHORT CIRCUIT
Shielding gas/combination 75% AR / 25% CO_2
Gas flow L/min (CFH) 40 CFH
Welder's name MICHAEL EDWARDS
Welder's ID no. 84
*See Definitions

Weld in butt joint visual exam results (see 3.4.1 or 8.4.1) Terry E Hodges
Fusion ACC
Penetration ACC
Reinforcement ACC
Porosity ACC
Undercut ACC
Cracks ACC

AWS QC 1 TERRY HODGES 81051541 CWI

Fillet weld visual exam results (see 3.4.2, or 8.4.2)
Fusion
Effective throat
Convexity
Porosity
Undercut
Cracks

JOINING PROCEDURE

Filler Metal Size	Welding Power		Speed of Travel	Joint Detail
	Current Range	Voltage Range		
0.035	170 AMP	23 V	4.5 FT/MIN	GA 1

We, the undersigned, certify that the statements in this record are correct and that the test specimens were prepared, joined, and examined in accordance with the requirements of AWS D9.1M/D9.1, *Sheet Metal Welding Code*.

Manufacturer or Contractor Carolina Chem-Strip
Authorized by
Date November 15, 2005

Annex D

Welding Procedure Specification (WPS)

(This Annex is not a part of AWS D9.1M/D9.1:2000, *Sheet Metal Welding Code*, but is included for information purposes only.)

WPS Number BWR WELD 001 Supported by PQR No.(s) END WELD 001
WPS Rev. No. 01 WPS Rev. Date 11-8-2005

VARIABLES

Base metal Carbon Steel A36
Metal thickness 16 GA
Coating type NONE
Joint preparation FREE OF RUST
Backing material N/A
Position of welding G3 VERTICAL
Welding process MIG
Manual, semiautomatic, or automatic MANUAL
*Filler metal spec. A5.18
*Filler metal class/weld metal grade ER 70S-6
Filler metal F. Number F6
Electrical characteristics ac ✓ dcep dcen
Mode of transfer SHORT CIRCUIT
Shielding gas/combination 75% AR / 25% CO_2
Gas flow L/min [CFH] 40 CFH
*See Definitions

JOINTING PROCEDURE

Filler Metal Size	Welding Power		Speed of Travel	Joint Detail
	Current Range	Voltage Range		
0.035	115-145 AMP	21-25 V	4.5 FEET/MIN	GA1

We, the undersigned, certify that the statements in this record are correct and that the test specimens were prepared, joined, and examined in accordance with the requirements of AWS D9.1M/D9.1, *Sheet Metal Welding Code*.

ACCEPTABLE
Terry Hedges

AWS QC 1 TERRY HEDGES 81051541 CWI

Manufacturer or Contractor Carolina Chem-Strip
Authorized by Stephen P. Peterson
Date November 15, 2005

AWS D9.1M/D9.1:2000

Annex F

Welder and Welding Operator Qualification Test Record

(This Annex is not a part of AWS D9.1M/D9.1:2000, *Sheet Metal Welding Code*, bu is included for information purposes only.)

Name Michael Edwards
I.D. no. 84
Date of Welding Test 11-3-05
Date of Knowledge Test 11/9/05
☑ Oral ☐ Written ☒ Passed ☐ Failed

QUALIFICATION TEST PERFORMED

WPS number BIORWELD 001
Square groove (butt joint) 1, 2, 3 VERTICAL
Fillet N/A
Weld test G3 VERTICAL
Braze weld test N/A

ESSENTIAL VARIABLES QUALIFIED BY TEST

Types of base metal CS A-36
Coating material on sheet ☐ yes ☒ no
Backing material N/A
Filler metal F number E6
Method of application
☑ manual ☐ semi-auto ☐ auto

Welding process MIG
Mode of transfer (GMAW) SHORT CIRCUIT
Welding current
☐ ac ☑ dcep ☐ dcen
Shielding gas used 75% AR / 25% CO_2
Position welded
☐ flat ☐ horz. ☑ vert ☐ overhead

VISUAL INSPECTION RESULTS

Square Groove (Butt Joint) Weld	Acceptance Criteria: Weld Yes	Weld No	Braze Weld Yes	Braze Weld No
Joint Fusion (metallic bond)	ACC			
Required joint penetration	ACC		N/A	N/A
Face reinforcement	ACC			
More than one pore or inclusion over 0.25t	ACC			
Undercut exceeding 0.15t	ACC		N/A	N/A
Cracks	ACC			

Fillet Weld	Acceptance Criteria: Weld Yes	Weld No	Braze Weld Yes	Braze Weld No
Joint Fusion (metallic bond)				
Required minimum effective throat				
Required maximum convexity				
Pore or inclusion over 0.25t				
Undercut exceeding 0.15t, or 0.25t			N/A	N/A
Cracks				

Thickness range qualified .0375 – 12.5
Position qualified 1, 2, 3G & 1, 2, 3F
Types of joints qualified GMA SQUARE BUTT

Inspection performed by QUALITY INSP SVCS
Name of Inspector TERRY E. HEDGES
Signature Terry E. Hedges
Date 11/15/05

AWS QC1 TERRY HEDGES 81051541 CWI

Annex F

Welder and Welding Operator Qualification Test Record

(This Annex is not a part of AWS D9.1M/D9.1:2000, *Sheet Metal Welding Code*, but is included for information purposes only.)

Name Terry McCRARY
I.D. no. 82
Date of Welding Test 11-8-05
Date of Knowledge Test
☒ Oral ☐ Written ☒ Passed ☐ Failed

QUALIFICATION TEST PERFORMED

WPS number BWR WELD001
Square groove (butt joint) G3 VERTICAL
Fillet N/A
Weld test G3 VERTICAL
Braze weld test N/A

ESSENTIAL VARIABLES QUALIFIED BY TEST

Types of base metal CS-A-36
Coating material on sheet ☐ yes ☒ no
Backing material N/A
Filler metal F number F6
Method of application
☒ manual ☐ semi-auto ☐ auto

Welding process MIG
Mode of transfer (GMAW) SHORT CIRCUIT
Welding current
☐ ac ☒ dcep ☐ dcen
Shielding gas used 75% AR/25% CO_2
Position welded
☐ flat ☐ horz ☒ vert ☐ overhead

VISUAL INSPECTION RESULTS

Square Groove (Butt Joint) Weld	Acceptance Criteria: Weld Yes	Weld No	Braze Weld Yes	Braze Weld No
Joint Fusion (metallic bond)	ACC			
Required joint penetration	ACC		N/A	N/A
Face reinforcement	ACC			
More than one pore or inclusion over 0.25t	ACC			
Undercut exceeding 0.15t	ACC		N/A	N/A
Cracks	ACC			

Fillet Weld	Acceptance Criteria: Weld Yes	Weld No	Braze Weld Yes	Braze Weld No
Joint Fusion (metallic bond)				
Required minimum effective throat				
Required maximum convexity				
Pore or inclusion over 0.25t				
Undercut exceeding 0.15t, or 0.25t			N/A	N/A
Cracks				

Thickness range qualified .0325 – .125
Position qualified 1,2,3G & 1,2,3F
Types of joints qualified Groove
SQUARE Butt

Inspection performed by Quality Insp. Svcs
Name of Inspector TERRY E. HEDGES
Signature Terry E. Hedges
Date 11/15/05

AWS QC1 TERRY HEDGES 8105154

Annex F

Welder and Welding Operator Qualification Test Record

(This Annex is not a part of AWS D9.1M/D9.1:2000, *Sheet Metal Welding Code*, but is included for information purposes only.)

Name Steve Smith
I.D. no. 85
Date of Welding Test 11-04-05
Date of Knowledge Test 11-9-05
☒ Oral ☐ Written ☒ Passed ☐ Failed

QUALIFICATION TEST PERFORMED

WPS number BWPWELD001
Square groove (butt joint) GE G3 VERTICAL
Fillet N/A
Weld test G3 VERTICAL
Braze weld test N/A

ESSENTIAL VARIABLES QUALIFIED BY TEST

Types of base metal A.C.S. A-36
Coating material on sheet ☐ yes ☒ no
Backing material N/A
Filler metal F number F6
Method of application
☒ manual ☐ semi-auto ☐ auto

Welding process MIG
Mode of transfer (GMAW) SHORT CIRCUIT
Welding current
☐ ac ☒ dcep ☐ dcen
Shielding gas used 75% AR / 25% CO_2
Position welded
☐ flat ☐ horz ☒ vert ☐ overhead

VISUAL INSPECTION RESULTS

Square Groove (Butt Joint) Weld	Acceptance Criteria			
	Weld		Braze Weld	
	Yes	No	Yes	No
Joint Fusion (metallic bond)	ACC			
Required joint penetration	ACC		N/A	N/A
Face reinforcement	ACC			
More than one pore or inclusion over 0.25t	ACC			
Undercut exceeding 0.15t	ACC		N/A	N/A
Cracks	ACC			

Fillet Weld	Acceptance Criteria			
	Weld		Braze Weld	
	Yes	No	Yes	No
Joint Fusion (metallic bond)				
Required minimum effective throat				
Required maximum convexity				
Pore or inclusion over 0.25t				
Undercut exceeding 0.15t, or 0.25t			N/A	N/A
Cracks				

Thickness range qualified .03125" – .125"
Position qualified 1, 2, 3G, 4, 1, 2, 3F
Types of joints qualified GA1 SQUARE BUTT

Inspection performed by QUALITY INSP. SVCS
Name of Inspector TERRY E. HEDGES
Signature Terry E. Hedges
Date 11/15/05

AWS QC 1 TERRY HEDGES 01051542 CWI

AWS D9.1M/D9.1:2000

Annex F

Welder and Welding Operator Qualification Test Record

(This Annex is not a part of AWS D9.1M/D9.1:2000, *Sheet Metal Welding Code*, but is included for information purposes only.)

Name LEE SMITH
I.D. no. 86
Date of Welding Test 11-2-05
Date of Knowledge Test 11/9/05
☒ Oral . ☐ Written ☒ Passed ☐ Failed

QUALIFICATION TEST PERFORMED

WPS number BWR WELD 001
Square groove (butt joint) G3 Vertical
Fillet N/A
Weld test G3 Vertical
Braze weld test N/A

ESSENTIAL VARIABLES QUALIFIED BY TEST

Types of base metal CS A-36
Coating material on sheet ☐ yes ☒ no
Backing material N/A
Filler metal F number F6
Method of application
☒ manual ☐ semi-auto ☐ auto

Welding process MIG
Mode of transfer (GMAW) SHORT CIRCUIT
Welding current
☐ ac ☒ dcep ☐ dcen
Shielding gas used 75% AR / 25% CO_2
Position welded
☐ flat ☐ horz ☒ vert ☐ overhead

VISUAL INSPECTION RESULTS

Square Groove (Butt Joint) Weld	Acceptance Criteria: Weld Yes	Weld No	Braze Weld Yes	Braze Weld No
Joint Fusion (metallic bond)		✓		
Required joint penetration		✓	N/A	N/A
Face reinforcement	ALL			
More than one pore or inclusion over 0.25t	ALL			
Undercut exceeding 0.15t	ALL	-	N/A	N/A
Cracks	ALL			

Fillet Weld	Acceptance Criteria: Weld Yes	Weld No	Braze Weld Yes	Braze Weld No
Joint Fusion (metallic bond)				
Required minimum effective throat				
Required maximum convexity				
Pore or inclusion over 0.25t				
Undercut exceeding 0.15t, or 0.25t			N/A	N/A
Cracks				

Thickness range qualified ALL
Position qualified
Types of joints qualified

Inspection performed by QUALITY INSP. SVC
Name of Inspector TERRY E. HEDGES
Signature Terry E. Hedges
Date

AWS QC1 TERRY HEDGES 01051541 CWI

Quality Inspection Services, Inc
2004 Edison Avenue
Jacksonville, FL 32204
(904) 359-0747

Corporate Headquarters
37 Franklin Street Suite 400
Buffalo, NY 14202
(716) 853-2611

Buffalo, NY, East Syracuse, NY, Mechanicville, NY, Richmond, WA, Rocky Hill, CT, Garnerville, NY Amherst, NY Warren, PA, Jacksonville, FL

MAGNETIC PARTICLE INSPECTION

☐ Nuclear ☒ Non-Nuclear

To: Robert Pollard — Date: 12-19-05

Inspection Project: BWR PATRIOT INNER BOX

QISI Job Number: 05-70-0778 — P.O. / Release Number: 4500181547

QISI Procedure: NDE MT-01 — Acceptance Standards: AWS D 9.1 SHEET METAL CODE

LOCATION

System: FUEL ASSEMBLY TRANSPORT — Area: TRANSPORTATION

COMPONENT

X	Weld	☐	Castings	☐	Machined Parts	☐	Machinery	☐	Pipe	☐	Structural

☐ Other:

☐	Non-Weld	☐	Bar	☐	Casting	☐	Machined Parts	☐	Pipe	X	Plate

☐ Other:

MATERIAL

Type of Base Metal	Type of Filler Material	Size(s)	No. of Pieces	Weld		
16ga. c/s		40" of Linear weld per lid.	34 Lid's	☐	As Welded	x Smooth & Powder coated

MODE

☐ Initial ☐ Repair X Final

INSPECTION METHOD

☐	Wet	X	Dry	X	Yoke	☐	Prod	X	Continuous
☐	Coil	☐	Head	☐	AC	X	DC		

Spacing: 1.5 INCHES — Amperage(s): 4

MT Equipment / Model / Serial Number: DA 400 PARKER PROBE SN 11052

Inspection Medium / Color: RED RP6 p/h BATCH 1252A

Reference Summary: Digital pic's included x See Attachment

Inspection Results: All welds inspected were found to be acceptable. No relevant indications were found at time of Inspection.

Copy To: Stephen D. Palmer, Jr.

Requested By: Robert Pollard

Quality Inspection Services, Inc.

☐

Reported By (Technician): Roger A. Miller

12-19-05

☐ Customer Specifications

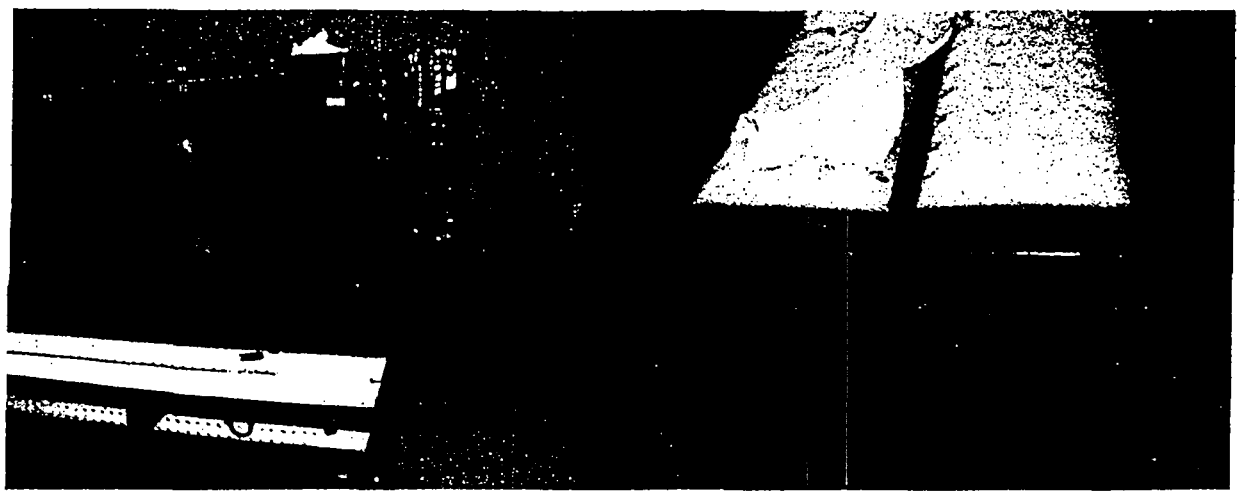
QISI Supervisor: Terry Hedges

Quality Inspection Services, Inc
2004 Edison Avenue
Jacksonville, FL 32204
(904) 359-0747

Corporate Headquarters
37 Franklin Street Suite 400
Buffalo, NY 14202
(716) 853-2611

ATTACHMENT 1

Serial #'s	Location of Inspection
169	TOP END
011	TOP END
148	TOP END
122	TOP END
013	TOP END



QUALITY INSPECTION SERVICES, INC.

37 Franklin Street • Cathedral Park Tower • Suite 400 • Buffalo, New York 14202 • 716-853-2611 • Fax 716-853-2619
Visit us at: www.qisi.com • E-mail: buffalo@qisi.com

Buffalo, NY	Long Island, NY	East Syracuse, NY	Albany, NY	Hartford, CT	Jacksonville, FL	Warren, PA	Pittsburgh, PA	Hanford, V
716-686-3710	631-585-3150	315-431-4291	518-899-3230	860-257-0377	904-359-0747	814-726-1988	412-461-1502	509-373-86

THIS IS NOT AN INVOICE

WORK ORDER

Customer: Westinghouse QIS WO # 05-70-0778 QIS Job # 05-14316

Contact: [illegible] Jr. Customer PO # 4500181547

Location: Columbia, SC Customer Job #

Work Description: [illegible] Inspection of Welds on [illegible] Containers

Work Instructions: MT Top ends of [illegible]

NDE Methods/Techniques: MT Acceptance Criteria: AWS D9.1

Inspector(s) Engineer(s): Roger Miller Start Date: 11-19-05 End Date: 12-19-05

Time Expended:	Shift	Hours	For Office Use Only Rate	Extension			For Office Use Only Rate	Extension
Regular:	1st	4 [illegible]			Work Hours:	2		
Premium		4			Travel Hours:	10		
Total:		12			Total Miles			

MATERIAL CONSUMABLES/EQUIPMENT

Radiographic Film Qty	Size	For Office Use Only Rate	Extension

Material/Consumables Description	Qty	Unit	For Office Use Only Rate	Extension
Magnetic Particle 8A Red	2oz	lbs		
Liquid Penetrant				
Leak Detector (Snoop)				
Gas / Air / Helium				
Acid/Tyvac Suits				
Concrete Cylinders				

Equipment Qty	Description	Period	For Office Use O Rate	Extens
	Breathing Air			
	Confined Space Entry			
	Magnetic Flux Extrusion			
	Troxler Nuclear Density			
	Ultrasonic Thickness			
	Ultrasonic Shear Wave			
	Positive Material ID			
	Coating Thickness			
	Skidmore Bolt Torque			
	Video Borescope			
	Portable Hardness Tester			
	Varian Helium Leak Detector			

Total Amount Due

Comments:

Prepared By: Roger A. Miller Date: 12-19-05

Customer Authorization: [illegible signature] Date: 12-19-05

WHITE — QIS COPY YELLOW — CUSTOMER COPY

Chem-Strip of Alamance, Inc
BWR/Patriot Inner Shipping Box
Refurbishment Manufacturing & Quality Plan (MAQP)

Scope:

This MAQP applies to the cleaning, acid striping, welding, weld inspection, and powder coat painting services provided to Westinghouse Electric Co. in Columbia, South Carolina.

I. Process Flow

1. Receive > Clean (via oven bake) > Remove lid top end > Acid Strip / Neutralize > Replace top lid > Inspect Weld > Powder Coat Paint > Inspect > Ship

II. Process Operations:

1.0 Receive BWR Inner Boxes from Westinghouse

1.1 Unload the boxes from the truck using a forklift.

1.2 Record the serial numbers of the boxes received.

1.3 Initiate for each box:

A. Container Refurbishment Process sheet
B. Process Routing
C. Record serial numbers

1.4 Prepare three (3) metal tags with the serial number for each box.

1.5 Attach the tags to each box as indicated on the Tag Location Sketch.

NOTE:

Any non-conforming box or box section should be tagged. This tag should have the box serial number, the nature of the non-conformity, date, and operator initials. This box is to be set aside until a disposition is made by an Westinghouse engineer. The non-conformity is to be noted in the comment section of the process routing – Patriot BWR Inner Box Routing.

2.0 Bake off Paint, Rust, etc.

2.1 Remove the lid from the main body.

2.2 Measure the lid with a commercial grade measuring tape.

- Measure the overall width at the mid-span
- Measure the overall length at the mid-span

2.3 Place the box lids and main bodies on carrier for transport to oven (4 total boxes per carrier).

2.4 Place the carrier with the boxes in the oven.

2.5 Close the oven doors.

2.6 Heat the oven to approximately 820° F.

2.7 Bake the boxes for approximately 3-4 hours.

2.8 Turn the heat off and allow the boxes to cool to approximately 400° F.

2.9 Remove the carrier from the oven.

2.10 Rinse the ash residue form the boxes with tap water.

3.0 Remove End of Lid

3.1 Cut the end off the "top" end of the lid. (The "top" end the end with removable end section.)

3.2 Stamp the box serial number on the inside of the piece removed from the end. Hold this end piece for reattachment later in this process.

4.0 Chemically Strip Box

4.1 Place the box sections on the chemical bath carrier with the open ends down.

4.2 Place the carrier with the boxes in the chemical bath to remove the remainder of the paint, rust, etc. (Approximate time – 1 hour or until the boxes are clean to bare metal.)

4.3 Rinse the boxes.

4.4 Place the boxes in a neutralizing solution.

4.5 Rinse and dry the boxes.

5.0 Paint Inside the Cavities in the Lid and the Main Body

5.1 Paint the interior cavities of the lid and main body with an epoxy paint. Use a wand to get paint along the entire length of the box and around all sections of the support angles.

6.0 Weld on the Lid End and Weld Repair

WARNING:

Always wear the proper Personal Safety Equipment for a welding operation. Failure to comply may result in personnel injury.

NOTE:

The lid end had been stamped with the inner box serial number when the end was removed. The number was stamped on the inside of the end.

6.1 Match the inner box lid end to the lid by the serial number.

6.2 Remove any rust or residue on the edges to be welded.

6.3 Position the lid end on the lid (the side stamped with the serial number is to the inside). The lid has been placed on the longitudinal edge with the width of the end in the vertical direction.

NOTE:

Only welders qualified and certified may weld on the box.

Only qualified and designated weld inspectors may do the weld inspection.

6.4 Tack-weld the lid end to the lid per Weld Procedure ENDWELD001.

6.5 Inspect the tack-welds for cracks. Any defective welds are to be removed and rewelded per Weld Procedure ENDWELD001.

6.6 Weld from the top to the bottom down each vertical side per Weld Procedure ENDWELD001.

6.7 Turn the lid 90° (a quarter turn about the longitudinal axis).

6.8 Weld from the top to the bottom down each vertical side to complete the weld per Weld Procedure ENDWELD001.

6.9 Inspect the final weld per Weld Procedure ENDWELD001 for the following:

- Complete fusion
- A maximum of 3.2 mm (1/8 inch) reinforcement
- No more than one visible pore or inclusion in any 25 mm (1 inch) of the weld. The size of any pore or inclusion shall not exceed 0.25t, where t is the base metal thickness.
- No undercutting exceeding 0.15t.
- No cracks

6.10 Repair any defects in the welds per Weld Procedure ENDWELD001.

6.11 Grind the weld until the weld is level with the lid surface.

6.12 Inspect the ground weld per Weld Procedure ENDWELD001 for the following:

- Complete fusion
- No more than one visible pore or inclusion in any 25 mm (1 inch) of the weld. The size of any pore or inclusion shall not exceed 0.25t, where t is the base metal thickness.
- No undercutting exceeding 0.15t.
- No cracks

6.13 Complete the welding Documentation of Repairs.

6.14 Welding Repairs

A. Identify the areas for weld repair. Mark these areas on the welding routing.
B. Prepare the area to be welded.
C. Weld the defective area per Weld Procedure ENDWELD001.
D. Inspect the weld per Weld Procedure ENDWELD001 for the following:
   - Complete fusion
   - A maximum of 3.2 mm (1/8 inch) reinforcement
   - No more than one visible pore or inclusion in any 25 mm (1 inch) of the weld. The size of any pore or inclusion shall not exceed 0.25t, where t is the base metal thickness.
   - No undercutting exceeding 0.15t.
   - No cracks
E. Grind and reweld as necessary per Weld Procedure ENDWELD001.

F. Complete the welding Documentation of Repairs.

6.15 Perform the straightening/alignment of bolt holes to assure box closure.

7.0 Powder Coat the BWR Inner Box

7.1 Wash the box with iron phosphate.

7.2 Rinse the box with tap water.

7.3 Place the box in a drying oven until dry.

7.4 Remove from oven and powder coat the boxes with RAL5002 Blue.

7.5 Place the powder coated box in an oven.

7.6 Heat the oven to approximately 375° F.

7.7 Bake the powder coat on for about 20 minutes.

7.8 Remove from oven and allow the box to cool.

8.0 Prepare for Return Shipment

8.1 Measure the lid with a commercial grade measuring tape.

- Measure the overall width at the mid-span
- Measure the overall length at the mid-span
- Compare the measurements with the measurements taken before the baking oven
  - If the measurements are within 1/16" of the initial measurements, then the box is acceptable.
  - If the measurements are greater than 1/16" of the initial measurements, then an engineering disposition would be needed for acceptance of the box.

8.2 Reassemble the BWR inner box.

8.3 Place packing foam between the box sections (lid, removable end, and main body) in place of gasket material during the reassemble.

8.4 Secure the sections together with nuts and bolts at least hand tight.

8.5 Inspect the box visually to assure that the box is ready for return shipment.

8.6 Prepare paperwork for Westinghouse review.

WESTINGHOUSE NUCLEAR FUEL SUPPLIER SUBMITTAL FORM

FORM NO.:	SCMF-500-1

SUPPLIER Section: Purchase Order No. (For Ref Only): _____

From: Chem-Strip of Alamance, Inc. Date: 11/16/05

_____ Phone: _____

_____ Fax: _____

1. The following items are forwarded for Westinghouse review and approval.

	Document No	Rev	Title	Applicable P/N
A.	MAQP		BWR/Patriot Inner Shipping Container Refurbishment	
B.				
C.				
D.				

2. Comments/Reason For Submittal: (e.g., New, Revision, explanation)	
A.	
B.	
C.	
D.	

WESTINGHOUSE Section: **Docket No.** 2051 **Date:** 11/16/05

1. Please review and return to Supplier Performance Technician within 5 working days.

Reviewer Comments:	

Reviewer:	Name	Signature	Approval:	Conditional Approval:	Disapproval:
PD Eng:	B. Hempy				
PA/QC Eng	T. Brown				
FBM/PE:	R. Lincoln				
PPT/MATERIALS	A. ARWOOD	[signature] 11/18/05	X		

2. **Supplier Performance Engineer** - Evaluate Reviewer forms/comments. R. Maurer

A. Notify supplier of any corrections needed and request applicable documents be resubmitted.	Initial:	Date:
B. Obtain corrected submittal/verify corrections, if applicable.	Initial:	Date:
C. SPE Final Approval - Signature: [signature]		Date: 11/23/05

To Supplier: SPE Final Approval above indicates submitted items are approved for use.

WESTINGHOUSE NUCLEAR FUEL SUPPLIER SUBMITTAL FORM

FORM NO.:	SCMF-500-1

SUPPLIER Section: Purchase Order No. (For Ref Only): _____

From: Chem-Strip of Alamance, Inc. Date: 11/14/05

_____ Phone: _____

_____ Fax: _____

1. The following items are forwarded for Westinghouse review and approval.

	Document No	Rev	Title	Applicable P/N
A.	MAQP		BWR/Patriot Inner Shipping Container Refurbishment	
B.				
C.				
D.				

2. Comments/Reason For Submittal: (e.g., New, Revision, explanation)

A.	
B.	
C.	
D.	

WESTINGHOUSE Section: **Docket No.** 2051 **Date:** 11/14/05

1. Please review and return to Supplier Performance Technician within 5 working days.

Reviewer Comments:	

Reviewer:	Name	Signature	Approval:	Conditional Approval:	Disapproval:
PD Eng:	B. Hempy	B. E. Hempy 11/14/05	✓		
PA/QC Eng	T. Brown				
FBM/PE:	R. Lincoln				
Other:	B. Stone				

2. **Supplier Performance Engineer** - Evaluate Reviewer forms/comments. R. Maurer

A. Notify supplier of any corrections needed and request applicable documents be resubmitted.	Initial:	Date:
B. Obtain corrected submittal/verify corrections, if applicable	Initial	Date
C. SPE Final Approval - Signature:		Date:

To Supplier: SPE Final Approval above indicates submitted items are approved for use.

WESTINGHOUSE NUCLEAR FUEL SUPPLIER SUBMITTAL FORM

FORM NO.:	SCMF-500-1

SUPPLIER Section: Purchase Order No. (For Ref Only): _____

From: Chem-Strip of Alamance, Inc. Date: 11/14/05

Phone: _____

Fax: _____

1. The following items are forwarded for Westinghouse review and approval.

	Document No	Rev	Title	Applicable P/N
A.	MAQP		BWR/Patriot Inner Shipping Container Refurbishment	
B.				
C.				
D.				

2. Comments/Reason For Submittal: (e.g., New, Revision, explanation)	
A.	
B.	
C.	
D.	

WESTINGHOUSE Section: **Docket No. 2051** **Date: 11/14/05**

1. Please review and return to Supplier Performance Technician within 5 working days.

Reviewer Comments:	

Reviewer:	Name	Signature	Approval:	Conditional Approval:	Disapproval:
PD Eng:	B. Hempy				
PA/QC Eng	~~T. Brown~~	Timothy D. Brown 11/14/05 ✓			
FBM/PE:	R. Lincoln				
Other:	B. Stone				

2. **Supplier Performance Engineer** - Evaluate Reviewer forms/comments. R. Maurer

A. Notify supplier of any corrections needed and request applicable documents be resubmitted.	Initial:	Date:
B. Obtain corrected submittal/verify corrections, if applicable.	Initial:	Date:
C. SPE Final Approval - Signature:		Date:

To Supplier: SPE Final Approval above indicates submitted items are approved for use.

WESTINGHOUSE NUCLEAR FUEL SUPPLIER SUBMITTAL FORM

FORM NO.:	SCMF-500-1

SUPPLIER Section: Purchase Order No. (For Ref Only): _____

From: Chem-Strip of Alamance, Inc. Date: 11/14/05

_____ Phone: _____

_____ Fax: _____

1. The following items are forwarded for Westinghouse review and approval.

	Document No	Rev	Title	Applicable P/N
A.	MAQP		BWR/Patriot Inner Shipping Container Refurbishment	
B.				
C.				
D.				

2. Comments/Reason For Submittal: (e.g., New, Revision, explanation)

A.	
B.	
C.	
D.	

WESTINGHOUSE Section: **Docket No.** 2051 **Date:** 11/14/05

1. Please review and return to Supplier Performance Technician within 5 working days.

Reviewer Comments:	

Reviewer:	Name	Signature	Approval:	Conditional Approval:	Disapproval:
PD Eng:	B. Hempy				
PA/QC Eng	T. Brown				
FBM/PE:	R. Lincoln	R Lincoln 16 Nov 05	✓		
Other:	B. Stone				

2. **Supplier Performance Engineer** - Evaluate Reviewer forms/comments. R. Maurer

A. Notify supplier of any corrections needed and request applicable documents be resubmitted.	Initial:	Date:
B. Obtain corrected submittal/verify corrections, if applicable.	Initial:	Date:
C. SPE Final Approval - Signature:		Date:

To Supplier: SPE Final Approval above indicates submitted items are approved for use.

Carolina Chem-Strip of Alamance, Inc.
Process Routing
Patriot BWR Inner Box Routing Rev. 1

Box Serial Number_____

NOTE:

Any non-conforming box or box section should be tagged. This tag should have the box serial number, the nature of the non-conformity, date, and operator initials. This box is to be set aside until a disposition is made by an Westinghouse engineer. The non-conformity is to be noted in the comment section of this routing.

Step	Area	Description	Date Completed	Initials	Inspector Date / Initials	Independent Rep Date / Initials	Comments
1	Receive	Unload boxes from truck. Place in designated area.					
2		Record serial number above (CDI Step H.1)					
3		Initiate Process Routing for each box.					
4		Prepare three (3) metal tags with the serial number for each box.					
5		Attach the tags to each corresponding box as specified on the Tag Location Sketch.					
6	Oven Bake	Remove the box lid.					
7		Measure lid overall length at mid-span _____ Measure lid overall width at mid-span _____ Tape Serial Number _____					

Step	Area	Description	Date Completed	Initials	Inspector Date / Initials	Independent Rep Date / Initials	Comments
8		Place box lid and bottom on carrier for transport to oven (4 sets per carrier)					
9		Place in oven. Heat oven to a minimum of 800°F and bake for a minimum of 3 hours. Time in: Time out:					
10		After baking, allow oven to cool until the boxes are safe to handle before removing. Remove from oven.					
11		Rinse ash residue from box with tap water.					
12		Move box to Fab Shop					
13	**Fab Shop**	Cut end off of lid ("top" end)					
14		Stamp the box serial number on the inside of the removed lid end. Hold for future replacement.					
15		Move box to chemical bath.					
16	**Chem Bath**	Dip box in chemical bath to remove paint, rust, etc for a minimum of 90 minutes.					
17		Rinse completely with tap water and allow to dry.					
18		Visually inspect inner package and verify that gross rust, paint and other debris is removed.					
19		Epoxy paint the inside of the lid and the main box with ERP-420/ERP-520 Epoxy, or engineering approved equal (CDI Step H.6). The painting is to be done with a wand. Use the paint manufacturer's technical sheet times for proper drying.					

Step	Area	Description	Date Completed	Initials	Inspector Date / Initials	Independent Rep Date / Initials	Comments
20		Move box to Fab-Shop					
21	Fab-Shop	Visually inspect entire inner package for pitted steel and indicate any pitting locations on Documentation of Repairs (CDI Step H.2) Identify and document any weld repairs required on the Documentation of Repairs' Welds Sketch (CDI Step H.2).					
22		Perform any straightening / alignment of bolt holes (cold working) to assure box closure.					
23		Visually inspect entire inner package for cracked welds (including lifting lugs, bolt lugs and channel) noting location of cracked welds on Documentation of Repairs (CDI Step H.3).					
24		Repair welds (ENDWELD001) and note repair on Documentation of Repairs (CDI Steps H.3 and H.4).					
25		Replace the lid end and weld in place (ENDWELD001) (CDI Step H.5).					
26	HOLD PT.	Visually inspect the weld on the lid end (ENDWELD001). Document the results (CDI Step H.5). Visually inspect any additional new welds and/or weld repairs (ENDWELD001). Document the results. Review Documentation of Repairs document.					
27		Reassemble the box.					

Step	Area	Description	Date Completed	Initials	Inspector Date / Initials	Independent Rep Date / Initials	Comments
28		Move the box to Powder Coating					
29	Powder Coating	Disassemble box.					
30	HOLD PT.	Visually verify that the box is free of rust and other debris.					
31		Wash the box with iron phosphate. Completely rinse the box with tap water. Place box in drying oven for a minimum of 60 minutes at 375°F.					
32		After drying, remove from oven. Powder coat box with RAL5002 Blue (CDI Step H.6).					
33		Place powder coated box in oven. Bake at 375°F for a minimum of 20 minutes (CDI Step H.6).					
34		Remove box from oven. Allow box to cool naturally.					
35		Visually verify that the finished paint surface is free of gross debris, runs and drips (CDI Step H.6).					
36		Reassemble box with foam packing (in lieu of gaskets) between lid, removable end, and main body.					
37		Insert bolts and secure (at least hand tight) with nuts.					
38		Verify the lid mates with the package base. Full insertion of lug bolts is acceptable (CDI Step H.7).					

Step	Area	Description	Date Completed	Initials	Inspector Date / Initials	Independent Rep Date / Initials	Comments
39		Measure lid overall length at mid-span _____ Measure lid overall width at mid-span _____ Tape Serial Number _____ Compare with measurements in step 7. If the measurements are within 1/16", the box is acceptable. (CDI Step H.8)					
40		Visually inspect for shipment.					
41	**Ship**	Prepare all documents for final review. Assemble packet per box.					
42		Contact Westinghouse for pick-up. Transmit documentation for shipment.					

Approved By:

Stephen D. Palmer, Jr. 11-23-2005

Jeffrey K. Eaves 11-23-05

Harry D. Hinson 11/30/05

Weld Process and Welder Qualification

I. Start-up:

1.1 N/A

II. Normal Operation:

1.0 Welding Procedure Specification

1.1 Qualification of welders is to be to AWS D9.1M/D9.1:2000 **Sheet Metal Welding Code**

1.2 The weld parameters are as follows:

A. Variables

Base Metal	Carbon Steel A36
Metal Thickness	16 GA
Coating Type	None
Joint Preparation	Clean edges free of rust
Backing Material	N/A
Position of Welding	G3 – Vertical
Welding Process	MIG
Manual, Semiautomatic, or Automatic	Manual
Filler Metal Specification	A5.18
Filler Metal Class/Weld Metal Grade	ER70S-6
Filler Metal F Number	F6
Electrical Characteristics	DCEP
Mode of Transfer	Short Circuit
Shielding Gas/Combination	75% AR / 25% CO_2

Gas Flow L/min (CFH)	40 CFH

B. Joining Settings

Filler Metal Size	0.035 inch
Welding Power - Current Range	115 – 145 AMP
Welding Power – Voltage Range	21 – 25 Volts
Wire – Speed of Travel	4.5 Feet / minute
Joint Detail	GA1

2.0 Qualification Welds

WARNING:

Always wear the proper Personal Safety Equipment for a welding operation. Failure to comply may result in personnel injury.

2.1 Weld a Butt Joint for all tests in the vertical or G3 position.

2.2 Prepare two pieces of the metal type and thickness as would be in production as follows:

- Obtain the metal type – Carbon steel (A36)
- Obtain the metal thickness 16GA – The qualification would cover the thickness from 0.5t to 2t where t is the thickness of the test piece. A 12 GA piece would be acceptable.
- Cut two pieces for each test 75 mm (3") by 150 mm (6")
- Secure the pieces in the vertical position (G3) with two longitudinal edges butted up.

2.3 Set-up the weld equipment

- Use a manual DCEP MIG welder
- Use as a shielding gas 75% Argon/25% CO_2
- Use short circuit mode of metal transfer
- Use the proper wire for the material and type of weld
- Set weld current and voltage

2.4 Weld the test coupon

3.0 Weld Qualification

3.1 Inspect the weld visually without aid of magnification. (Prescription eyeglasses for vision correction are acceptable.)

3.2 Accept the welds (except for the first and last 13 mm (0.5 inch) as follows:

- Complete fusion
- Complete joint penetration
- A maximum of 3.2 mm (1/8 inch) face reinforcement and 3.2 mm (1/8) root reinforcement
- No more than one visible pore or inclusion in any 25 mm (1 inch) of the weld. The size of any pore or inclusion shall not exceed 0.25t, where t is the base metal thickness.
- No undercutting exceeding 0.15t.
- No cracks

Approved By:

Process Engineer _____ 11-15-2005

Product Assurance _____ 11-15-05

Weld Engineer _____

Weld Procedure for BWR Inner Box

I. Start-up:

1.1 Assemble equipment for the weld process

- MIG welder
- Shielding gas – 75% Argon / 25% CO_2
- Filler wire for the material (carbon steel)
- Set the weld current for the material and type of weld (see table below).

1.2 The weld parameters are as follows:

A. Variables

Base Metal	Carbon Steel A36
Metal Thickness	16 GA
Coating Type	None
Joint Preparation	Clean edges free of rust
Backing Material	N/A
Position of Welding	Any positions but overhead
Welding Process	MIG
Manual, Semiautomatic, or Automatic	Manual
Filler Metal Specification	A5.18
Filler Metal Class/Weld Metal Grade	ER70S-6
Filler Metal F Number	F6
Electrical Characteristics	DCEP
Mode of Transfer	Short Circuit
Shielding Gas/Combination	75% AR / 25% CO_2

Gas Flow L/min (CFH)	40 CFH

B. Joining Settings

Filler Metal Size	0.035 inch
Welding Power - Current Range	115 – 145 AMP
Welding Power – Voltage Range	16 - 21 Volts
Wire – Speed of Travel	4.5 Feet / minute
Joint Detail	GA1, Square Butt Weld
Pre-Heating	Not Required when the ambient temperature is ≥ 50° F

II. Normal Operation:

1.0 Welding Procedure for Lid Ends

WARNING:

Always wear the proper Personal Safety Equipment for a welding operation. Failure to comply may result in personnel injury.

NOTE:

The lid end had been stamped with the inner box serial number when the end was removed. The number was stamped on the inside of the end.

1.1 Match the inner box lid end to the lid by the serial number.

1.2 Remove any rust or residue on the edges to be welded.

1.3 Position the lid end on the lid (the side stamped with the serial number is to the inside). The lid has been placed on the longitudinal edge with the width of the end in the vertical direction. The gap to be welded between the lid and the lid end is to be 0.06 inches or less.

NOTE:

Only welders qualified and certified may weld on the box.

Only qualified and designated weld inspectors may do the weld inspection.

All welding is to be done at 50°F or higher ambient air temperature.

1.4 Tack-weld the lid end to the lid.

1.5 Inspect the tack-welds for cracks. Any defective welds are to be removed and rewelded using the same procedure and requirements.

1.6 Weld from the top to the bottom down each vertical side.

1.7 Turn the lid 90° (a quarter turn about the longitudinal axis).

1.8 Weld from the top to the bottom down each vertical side to complete the weld.

1.9 Inspect the final weld for the following:

- Complete fusion
- A maximum of 3.2 mm (1/8 inch) reinforcement
- No more than one visible pore or inclusion in any 25 mm (1 inch) of the weld. The size of any pore or inclusion shall not exceed 0.25t, where t is the base metal thickness.
- No undercutting exceeding 0.15t.
- No cracks

1.10 Repair any defects in the welds using the same procedure and requirements.

NOTE:

The structural welds in the BWR Patriot inner box are at the corners of the main box.

1.11 Grind the weld until the weld is level with the lid surface (for non-structural welds only). Remove all weld spatter.

1.12 Inspect the ground weld for the following:

- Complete fusion

- No more than one visible pore or inclusion in any 25 mm (1 inch) of the weld. The size of any pore or inclusion shall not exceed 0.25t, where t is the base metal thickness.
- No undercutting exceeding 0.15t.
- No cracks

1.13 Complete the welding routing.

2.0 Welding Procedure for Repairs

2.1 Identify the areas for weld repair. Mark these areas on the welding routing.

2.2 Prepare the area to be welded by remove any rust or residue on the edges to be welded.

2.3 Weld the defective area.

2.4 Inspect the weld for the following:

- Complete fusion
- A maximum of 3.2 mm (1/8 inch) reinforcement
- No more than one visible pore or inclusion in any 25 mm (1 inch) of the weld. The size of any pore or inclusion shall not exceed 0.25t, where t is the base metal thickness.
- No undercutting exceeding 0.15t.
- No cracks

2.5 Grind and reweld as necessary (using the same requirements and procedure).

2.6 Complete the welding routing.

Approved By:

Process Engineer 12-07-05

Product Assurance 12-7-05

Weld Engineer 12/9/05