Southern Nuclear Operating Company

ND-21-0392

Enclosure 3

Vogtle Electric Generating Plant (VEGP) Unit 3

CB&I Procedure Qualification Record 14163

(VEGP 3-ALT-16)

(This Enclosure consists of 8 pages, including this cover page)

PROCEDURE QUALIFICATION RECORD
To A.S.M.E. Section IX
ESSENTIAL VARIABLES

PQR No. 14163
Process SMAW Manual [X] Machine [ ] Auto. [ ] Semiauto. [ ]
Material specification SA738 Gr. B to SA516 Gr. 60/70

ASME P No.	1, Gp. 3 To ASME P No. 1, Gp. 1/2	**Flux or Atmosphere**	
Thickness(if pipe, dia and wall thick)	1.125"	Flux trade name	N/A
Filler metal group no. F	4	Inert gas composition	N/A
Weld metal analysis no. A	1	Flow rate	N/A
ASME specification no. SFA	5.1	Preheat temperature range	151°F - 278°F(IPT)
AWS specification no. A	5.1	Postweld heat treatment	None
		Plate edge preparation	Oxy Fuel burned

WELDING PROCEDURE

Single or multiple pass: Multiple Single or multiple arc: Single Position: 2G

Mode of transfer for GMAW: Spray [ ] Globular [ ] Pulsating [ ] Short Circuit [ ]

Filler Metal for GTAW or PAW	N/A	Filler metal diameter	N/A
Electrode	E7018	Electrode diameter	3/32"
Type of backing	None	Welding current	Direct Current / Electrode Positive

Consult WELDING VARIABLES for joint dimensions and welding current settings. (Reverse Polarity)

TEST RESULTS

Reduced Section Tensile Results

Specimen No.	Dimensions, in.		Area in ²	Ultimate Total Load Kips	Ultimate Unit Stress		Character of Failure and Location
	Width	Thickness			ksi	MPa	
P23403 1	0.749	1.020	0.764	59	77.2	532.3	Ductile Weld Metal
P23403 2	0.752	0.992	0.746	57.7	77.3	533.0	Ductile Weld Metal
---	---	---	---	---	---	---	---
---	---	---	---	---	---	---	---

Guided Bend Test

Type	Result	Type	Result
4 Transverse Side Bends	4 OK	-----	-----

Welder's name: Scott L. Kirman Welder's symbol: SLK
Welder's name: --- Welder's symbol: ---
Who by virtue of these tests meets welder performance requirements.

Work Order (Orig. WPS) No. P23403 Rev. 1

We certify that the statements in this record are correct and that the test weld was prepared, welded and tested in accordance with the requirements of Section IX of the ASME code.

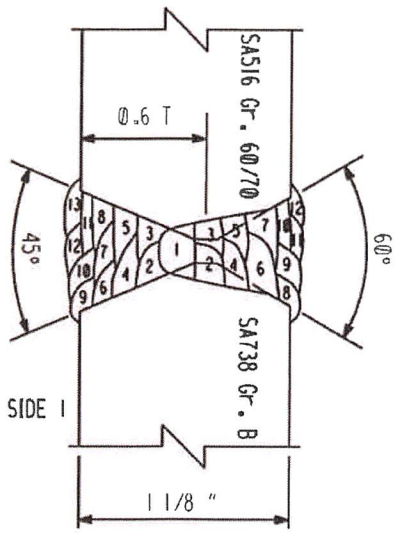
Signed CB&I

By Patrick Houghton Date May 13, 2021

Remarks:

Excalibur 7018 MR (E7018) by Lincoln (Lot No. 1443Z)
SA738 Gr. B heat treatment: Quenched & Tempered
SA516 Gr. 60/70 heat treatment: Normalized
This PQR is qualified using a material which is dual certified as SA516 Gr. 60 (P1,Gp.1) and SA516 Gr. 70 (P-1, Gp.2)

PROCEDURE QUALIFICATION RECORD
To A.S.M.E. Section IX
ESSENTIAL VARIABLES



Scale 1:1

Land: 1/8"
Gap: 1/8"
Technique: Stringer

Position 2G

Side	Pass	Electrode			Amps	Volts	Travel Speed		Heat Input		Remarks
		Type	Size in	Size mm			in/min	cm/min	KJ/in	KJ/cm	
1	1	E7018	3/32	2.4	102	24.2	3.4	8.6	43.8	17.2	
1	2	E7018	3/32	2.4	101	22.6	7.6	19.2	18.1	7.1	
1	3	E7018	3/32	2.4	101	22.8	6.4	16.3	21.6	8.5	
1	4	E7018	3/32	2.4	101	22.7	5.8	14.8	23.7	9.3	
1	5	E7018	3/32	2.4	101	23	5.6	14.1	25.1	9.9	
1	6	E7018	3/32	2.4	101	22.3	8.1	20.5	16.8	6.6	
1	7	E7018	3/32	2.4	101	22.6	10.4	26.5	13.1	5.2	
1	8	E7018	3/32	2.4	101	24.2	8.1	20.5	18.2	7.2	
1	9	E7018	3/32	2.4	101	23.6	7.6	19.2	18.9	7.4	
1	10	E7018	3/32	2.4	101	23.7	6.4	16.3	22.4	8.8	
1	11	E7018	3/32	2.4	101	23	8.1	20.5	17.3	6.8	
1	12	E7018	3/32	2.4	101	23.9	10.4	26.5	13.9	5.5	
1	13	E7018	3/32	2.4	102	22.1	8.1	20.5	16.8	6.6	

W/O No. P23403
Qualification No. 14163
Date: May 13, 2021

By: Patrick Houghton

PROCEDURE QUALIFICATION RECORD
To A.S.M.E. Section IX
ESSENTIAL VARIABLES

Side	Pass	Electrode			Amps	Volts	Travel Speed		Heat Input		Remarks
		Type	Size in	Size mm			in/min	cm/min	KJ/in	KJ/mm	
2	1	E7018	3/32	2.4	102	21.1	4.6	11.8	27.9	1.1	
2	2	E7018	3/32	2.4	101	23.9	8.1	20.5	18.0	0.7	
2	3	E7018	3/32	2.4	101	22.6	5.4	13.8	25.2	1.0	
2	4	E7018	3/32	2.4	101	22.2	7.1	18.1	18.8	0.7	
2	5	E7018	3/32	2.4	101	21.4	4.9	12.5	26.5	1.0	
2	6	E7018	3/32	2.4	101	22.6	6.1	15.5	22.5	0.9	
2	7	E7018	3/32	2.4	101	23.3	5.1	13.0	27.7	1.1	
2	8	E7018	3/32	2.4	101	23.1	5.3	13.5	26.3	1.0	
2	9	E7018	3/32	2.4	102	22.8	6.8	17.2	20.7	0.8	
2	10	E7018	3/32	2.4	101	22.2	8.1	20.5	16.7	0.7	
2	11	E7018	3/32	2.4	99	25.3	10.0	25.4	15.0	0.6	
2	12	E7018	3/32	2.4	101	22.3	8.9	22.7	15.1	0.6	

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PROCEDURE QUALIFICATION RECORD
IMPACT TEST REPORT
Type of Notch: Vee

Spec. No.	Spec. Orient	Spec. Size	Notch Location	Side	Depth	Test Temp Deg F	Energy		Lateral Expansion		Percent Shear
							Ft-Lb	J	Mils	mm	
A1	---	FULL	WM	1	3/8"	-30	99.5	135	69	1.753	70
A2	---	FULL	WM	1	3/8"	-30	107.63	146	61	1.549	60
A3	---	FULL	WM	1	3/8"	-30	99.64	135	65	1.651	65
SA738 Gr. B											
B1	Long.	FULL	HAZ	1	1/4T	-30	145.97	198	81	2.057	75
B2	Long.	FULL	HAZ	1	1/4T	-30	111.77	152	68	1.727	70
B3	Long.	FULL	HAZ	1	1/4T	-30	117.17	159	67	1.702	70
SA516 Gr. 60/70											
C1	Long.	FULL	HAZ	1	1/4T	-30	42.62	58	34	0.864	35
C2	Long.	FULL	HAZ	1	1/4T	-30	128.7	175	72	1.829	75
C3	Long.	FULL	HAZ	1	1/4T	-30	90.04	122	61	1.549	65

Remarks:

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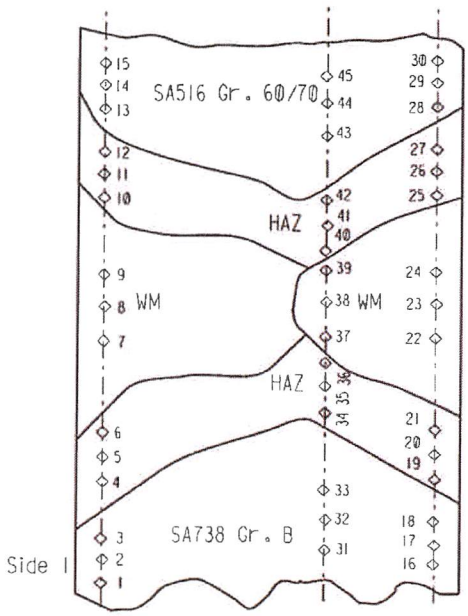
PROCEDURE QUALIFICATION RECORD
VICKERS HARDNESS REPORT
(10 Kg. LOAD)

POSITION 2G

Side 1		Side 2		Root	
1. BM	208	16. BM	209	31. BM	239
2. BM	205	17. BM	225	32. BM	240
3. BM	202	18. BM	207	33. BM	237
4. HAZ	216	19. HAZ	221	34. HAZ	229
5. HAZ	256	20. HAZ	220	35. HAZ	238
6. HAZ	306	21. HAZ	298	36. HAZ	328
7. WM	225	22. WM	237	37. WM	234
8. WM	196	23. WM	232	38. WM	239
9. WM	224	24. WM	236	39. WM	225
10. HAZ	328	25. HAZ	258	40. HAZ	409
11. HAZ	208	26. HAZ	209	41. HAZ	212
12. HAZ	178	27. HAZ	199	42. HAZ	177
13. BM	162	28. BM	160	43. BM	161
14. BM	159	29. BM	160	44. BM	154
15. BM	161	30. BM	160	45. BM	160



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PROCEDURE QUALIFICATION RECORD
BRINELL SURFACE HARDNESS REPORT
(3000 kg LOAD 10mm INDENTER)

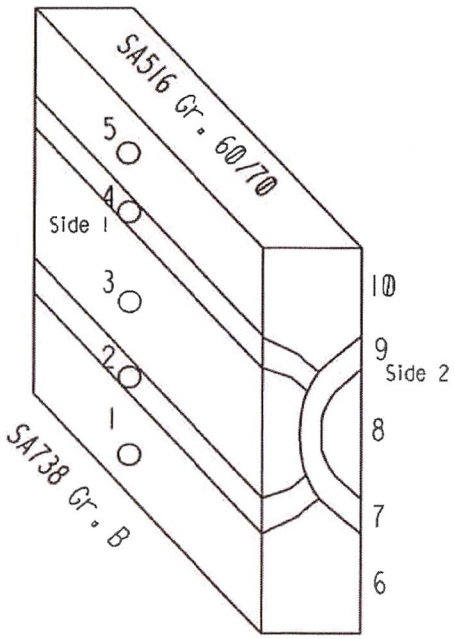
POSITION 2G

Side 1

1.	BM	201
2.	HAZ	213
3.	WM	208
4.	HAZ	194
5.	BM	158

Side 2

6.	BM	227
7.	HAZ	228
8.	WM	220
9.	HAZ	199
10.	BM	156



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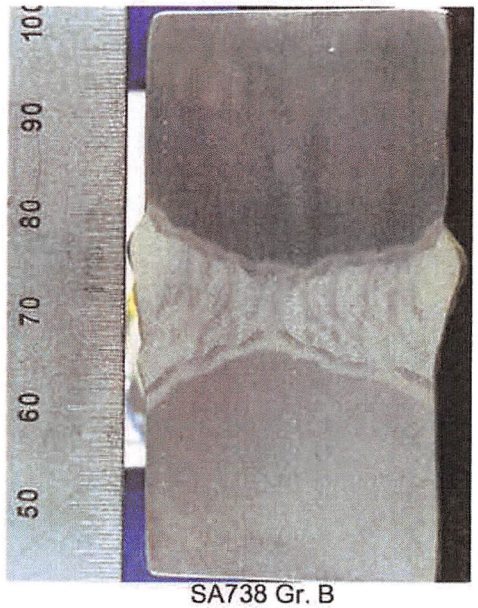
PROCEDURE QUALIFICATION RECORD
METALLOGRAPHY REPORT
Macrophotograph

SA516 Gr. 60/70



SA738 Gr. B

HAZ minimum width: 1.1mm
HAZ maximum width: 3.0mm

Scale Increment: 0.5mm

Etchant: 5% Nital
Finish: 1 micron
Photomacrograph: Cross-section of an SMAW weld seam.

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Form Number: CMS-830-15-FM-16008