MISTRAS Asset Protection Solutions | Services Division

Radiography Examination Report

3985 Teal CT. | Benicia, CA. 94510 | P: (707) 746-5870; F: (707) 746-8664
www.mistrasgroup.com

Client: TVI / CHEVRON CUSA
Contact: RALPH WORSHAM
Location: RLOP T/A 2014
Part/Item No: EWO DX200-E1
Description: LINE B-251262 C&D
Date: 10-22-11 Page: 1 of 1
Mistras Job No: 107327 NDE Req.# 144
Purchase Order: 342644

Code/Specification		Acceptance Criteria		Procedure	Technique
ASME Sec V		ASME B31.3 NFS		100-RT-001 Rev. 5	☐ SWE/SWV ☒ DWE/SWV ☐ DWE/DWV
Material Type: 5CR	Base Mat'l Thickness: .258	Weld Joint Type: BUTT WELD	Weld Thickness: .383	Weld Reinforcement: .125	Radiation Source: ☒ Ir 192 ☐ Co 60 ☐ SE 75 ☐ X-Ray
Location Markers: ☐ Source-Side ☒ Film-Side		IQI Type & ID: B WIRE	IQI Material	IQI Location: ☐ Source-Side ☒ Film-Side	Focal Spot Size: .146 / Curies/mA-kV: 63
Quality Level: 6 WIRE	Shim Material: N/A	Shim Thickness: N/A	Source-Film Distance: 5.813	Min. Source-Object Distance: 5.430	Max. Source Side of Object-Film Distance: .383
Exposure Time: 8 SEC	Film Mfr. & Type: DIGITAL	Film Technique: ☒ Single-Load ☐ Multi-Load	Screen Type: Pb	Screen Thickness: Front: .010 Back: .010	No. of Film & Size: 6 4.5 X 10
Film Viewing: ☒ Single ☐ Composite	Film Processing: DIGITAL ☒ Automatic ☐ Manual: Time (min):		Developer Temperature: N/A	Comments:	

Tested Item(s):

ID/Weld No.	View	Original or Repair	Geometric Unsharpness	Accept	Reject	Porosity	Slag/ Inclusions	Lack of Fusion	Incomplete Penetration	Crack	Root Concavity	Root Convexity	Tungsten	Undercut	Weld Contour	Film Artifact	Comments	IQI Density	Weld Density
weld # 1149	0-1	0	<.020	✓															
WS DPM	1-2	0	<.020	✓															
	2-0	0	<.020	✓															
weld # 1150	0-1	0	<.020	✓															
WS DPM	1-2	0	<.020	✓															
	2-0	0	<.020	✓															

0418-006-007

Technician, Level & Date: EDDIE BOUVER 10-22-11
Customer's Signature (if applicable):
Reviewed By (if applicable): MAY LaGrande 10-23-11

CERTIFICATION OF INSPECTION, RADIOGRAPHY [WELDS]

100-RTFORM-001 | REV 1

MISTRAS GROUP INC.

Inspection Report, Radiography (Welds

Division:	590	Client:	JVI	Date:	10-22-2011	Page:	of
Address:	Mistras,	Address:	ON FILE	Job Number:	104329		
	3985 TEAL CT			Purchase Order:	342644		
	BENICIA, CA 94510	Contact:	Ralph W.	Reference Number:	NDE REQUEST 134		
		Location:	Chevron Richmond	Part/Item Number:	F-1550 FURNACE TUBES		

Code/Specification: ASME SEC V		Acceptance Criteria: B31.3 Normal		Procedure: 100-RT-001 REV 6	Technique: ☐ SWE/SWV ☒ DWE/SWV ☐ DWE/DWV
Material Type: 5CR	Base Mat'l Thickness: .375	Weld Reinforcement: .125	Weld Thickness: .500	Weld Joint Type: BW	Radiation Source: ☒ Ir 192 ☐ Co 60 ☐ X-Ray
Location Markers: ☐ Source-Side ☒ Film-Side		IQI Type & ID: B-Wire	IQI Material: S/S	IQI Location: ☐ Source-Side ☒ Film-Side	Focal Spot Size: .146 / Curies/mA-kV: 89
Quality Level: 2-2T	Shim Material: N/A	Shim Thickness: N/A	Source-Film Distance: 5.938	Min. Source-Object Distance: 5.063	Max. Source Side of Object-Film Distance: 5.688
Exposure Time: 22 Seconds	Film Type: AGFA D4	No. of Film & Size: 4.5 X 10"	Film Technique: ☒ Single-Load ☐ Multi-Load	Screen Type: Pb	Screen Thickness Front: .010 Back: .010
Film Viewing: ☒ Single ☐ Composite		Film Processing: ☐ Automatic ☒ Manual: Time (min):		Developer Temp: 70 C	Comments:

Inspection Item(s):

ID/Weld No.	View	Original or Repair	Geometric Unsharpness	Accept	Reject	Porosity	Slag/ Inclusions	Lack of Fusion	Incomplete Penetration	Crack	Root Concavity	Root Convexity	Tungsten	Undercut	Weld Contour	Film Artifact	Comments	IQI Density	Weld Density
1167	0-6	O	.014	✓		✓											B-251262-01 A & B BM- 3.80		3.26
	6-12	O	.014	✓		✓											W.S.- DPM BM- 3.44		2.99
	12-0	O	.014	✓		✓											BM- 3.48		3.22
1148	0-6	O	.014		X	✓		X									B-251262-02 BM- 3.46		3.20
	6-12	O	.014		X	✓		X									W.S.-DPM BM- 3.50		3.14
	12-0	O	.014	✓							✓						BM- 3.47		3.38

04-18-006-001

Technician, Level & Date: B. Robertson II 10-22-11

Customer's Signature (if applicable)

Reviewed By (Sign & Date)

100-FORM-011W Rev 1 (03/12/200

CUSA-EPA-0007063

MISTRAS Asset Protection Solutions | Services Division

Radiography Examination Report

195 Clarksville Road | Princeton Junction, NJ 08550 | P: (609) 716-4000; F: (609) 716-4145 www.mistrasgroup.com

Client: JVI
Location: RLOP T/A
Date: 10-22-11 Page: 1 of 1
Part/Item No: 5" Butt weld
Mistras Job No:
Contact: Royce Smith
Description: B-251262-01 A&B
Purchase Order: 342644

Code/Specification: ASME Sec V		Acceptance Criteria: B313		Procedure: 100-RT-001	Technique: ☐ SWE/SWV ☑ DWE/SWV ☐ DWE/DWV
Material Type	Base Mat'l Thickness: .375	Weld Joint Type: Butt weld	Weld Thickness: .5	Weld Reinforcement: .125	Radiation Source: ☑ Ir 192 ☐ Co 60 ☐ SE 75 ☐ X-Ray
Location Markers: ☐ Source-Side ☑ Film-Side		IQI Type & ID: B-Wire	IQI Material: N/A	IQI Location: ☐ Source-Side ☑ Film-Side	Focal Spot Size: 146 / Curies/mA-kV: 65
Quality Level: .010	Shim Material: N/A	Shim Thickness: N/A	Source-Film Distance: 5.5"	Min. Source-Object Distance: Contact	Max. Source Side of Object-Film Distance: 5.5"
Exposure Time: 40 sec	Film Mfr. & Type: AGFA D4	Film Technique: ☑ Single-Load ☐ Multi-Load	Screen Type: Pb	Screen Thickness: Front: .010 Back: .010	No. of Film & Size: 3-4.5"x10"
Film Viewing: ☑ Single ☐ Composite	Film Processing: ☐ Automatic ☑ Manual: Time (min): 5 min		Developer Temperature: 68°	Comments: ~~B2110-E1~~ CB Reg # 141 DX-200-E1	

Tested Item(s):

ID/Weld No.	View	Original or Repair	Geometric Unsharpness	Accept	Reject	Porosity	Slag/Inclusions	Lack of Fusion	Incomplete Penetration	Crack	Root Concavity	Root Convexity	Tungsten	Undercut	Weld Contour	Film Artifact	Comments	IQI Density	Weld Density
W-1131	0-1	↓		✓													JVI Job #104329		2.40
ID-BHH	1-2	↓		✓										✓					3.27
	2-0	↓		✓															3.05

0418-006-007

Technician, Level & Date: Eddie Bouvier [signature] 10-22-11	Customer's Signature (if applicable): [signature]	Reviewed By (if applicable):

MISTRAS Asset Protection Solutions | Services Division

Radiography Examination Report

195 Clarksville Road | Princeton Junction, NJ 08550 | P: (609) 716-4000; F: (609) 716-4145 www.mistrasgroup.com

Client:	JVI	Location:	RLOP T/A	Date:	10-22-11 Page: 1 of 1
		Part/Item No:	4" Butt weld	Mistras Job No:	
Contact:	Royce Smith	Description:	B-251262-02 C&D	Purchase Order:	342644

Code/Specification: ASME Sec V		Acceptance Criteria: B313		Procedure: 100-RT-001	Technique: ☐ SWE/SWV ☑ DWE/SWV ☐ DWE/DWV
Material Type	Base Mat'l Thickness: .337	Weld Joint Type: Butt Weld	Weld Thickness: .462	Weld Reinforcement: .125	Radiation Source: ☑ Ir 192 ☐ Co 60 ☐ SE 75 ☐ X-Ray
Location Markers: ☐ Source-Side ☑ Film-Side		IQI Type & ID: B-Wire	IQI Material: N/A	IQI Location: ☐ Source-Side ☑ Film-Side	Focal Spot Size: .146 Curies/mA-kV: 65 ci
Quality Level: .010	Shim Material: N/A	Shim Thickness: N/A	Source-Film Distance: 4.5"	Min. Source-Object Distance: Contact	Max. Source Side of Object-Film Distance: 4.5"
Exposure Time: 25 sec	Film Mfr. & Type: AGFA D4	Film Technique: ☑ Single-Load ☐ Multi-Load	Screen Type: Pb	Screen Thickness: Front: .010 Back: .010	No. of Film & Size: 3-4.5" x 10"
Film Viewing: ☑ Single ☐ Composite	Film Processing: ☐ Automatic ☑ Manual: Time (min): 5 min		Developer Temperature: 68°	Comments: ~~DZ110-E1~~ CB Req # 141 DX-200-E1	

Tested Item(s):

ID/Weld No.	View	Original or Repair	Geometric Unsharpness	Accept	Reject	Porosity	Slag/Inclusions	Lack of Fusion	Incomplete Penetration	Crack	Root Concavity	Root Convexity	Tungsten	Undercut	Weld Contour	Film Artifact	Comments	IQI Density	Weld Density
W-1152	0-1	0		✓													JVI Job # 104329	2.63	
ID-DPM	1-2	↓		✓														2.44	
	2-0	↓		✓		✓												2.73	

0418-006-007

Technician, Level & Date: Eddie Bouvier [signature] 10-22-11	Customer's Signature (if applicable): [signature]	Reviewed By (if applicable)

MISTRAS Asset Protection Solutions | Services Division

Radiography Examination Report

3985 Teal CT. | Benicia, CA. 94510 | P: (707) 746-5870; F: (707) 746-8664 www.mistrasgroup.com

Client: IVI
Location: CHEVRON RICHMOND CA
Date: 10-23-11
Page: of
Part/Item No: F1550
Mistras Job No: 104329
Contact: R. WORSHAM
Description: 5" BUTTWELDS
Purchase Order: WO# 324644

Code/Specification: ASME SEC V		Acceptance Criteria: B31.3		Procedure: 100-RT-001 REV 5	Technique: ☐ SWE/SWV ☐ DWE/SWV ☒ DWE/DWV
Material Type: 5 CR	Base Mat'l Thickness: .258"	Weld Joint Type: SINGLE V	Weld Thickness: .383"	Weld Reinforcement: 125	Radiation Source: ☒ Ir 192 ☐ Co 60 ☐ SE 75 ☐ X-Ray
Location Markers: ☐ Source-Side ☒ Film-Side		IQI Type & ID: ASTM 1-B	IQI Material: SS	IQI Location: ☐ Source-Side ☒ Film-Side	Focal Spot Size: .146 / Curies/mA-kV: 89
Quality Level: .010"	Shim Material: N/A	Shim Thickness: N/A	Source-Film Distance: 5.5"	Min. Source-Object Distance: CONTACT	Max. Source Side of Object-Film Distance: 5.5"
Exposure Time: 22 SEC	Film Mfr. & Type	Film Technique: ☐ Single-Load ☐ Multi-Load	Screen Type	Screen Thickness: Front: .010" Back: .010"	No. of Film & Size: 9 4.5X10
Film Viewing: ☒ Single ☐ Composite	Film Processing: ☐ Automatic ☒ Manual: Time (min): 5		Developer Temperature: 68"	Comments: B-251262-02 C&D	

Tested Item(s):

ID/Weld No.	View	Original or Repair	Geometric Unsharpness	Accept	Reject	Porosity	Slag/ Inclusions	Lack of Fusion	Incomplete Penetration	Crack	Root Concavity	Root Convexity	Tungsten	Undercut	Weld Contour	Film Artifact	Comments	IQI Density	Weld Density
W 1144	0-6	0		✓					✓										
WS BHH	6-12	0		✓	✓	✓			✓								→ REPAIR 3-9" RC		
	12-0	0		✓															
W 1153	0-6	0		✓		✓													
WS DPM	6-12	0		✓													→ Rep. 3-9 RC		
	12-0	0		✓															
W 1160	0-6	0		✓															
WS DPM	6-12	0		✓															
	12-0	0		✓															

0 1 8 1 0 0 0 1 0 0 1

Technician, Level & Date	Customer's Signature (if applicable)	Reviewed By (if applicable)
CARL CAMPBELL 10-23-11	R. Ch	

MISTRAS Services Division
Asset Protection Solutions

Radiography Examination Report

3985 Teal CT. | Benicia, CA. 94510 | P: (707) 746-5870; F: (707) 746-8664 www.mistrasgroup.com

Client: JVI
Contact: R. WORSHAM
Location: CHEVRON RICHMOND CA
Part/Item No: FISSO
Description: 4" BUTTWELDS
Date: 10-23-11 Page: of
Mistras Job No: 104329
Purchase Order: WO# 324644

Code/Specification: ASME SEC V		Acceptance Criteria: B31.3		Procedure: 100-RT-001 REV5	Technique: ☐ SWE/SWV ☒ DWE/SWV ☐ DWE/DWV
Material Type: SCR	Base Mat'l Thickness: .237	Weld Joint Type: SINGLE V	Weld Thickness: .362"	Weld Reinforcement: .125"	Radiation Source: ☒ Ir 192 ☐ Co 60 ☐ SE 75 ☐ X-Ray
Location Markers: ☐ Source-Side ☒ Film-Side		IQI Type & ID: ASTM 1-B	IQI Material: SS	IQI Location: ☐ Source-Side ☒ Film-Side	Focal Spot Size: .146" / Curies/mA-kV: 89
Quality Level: .008	Shim Material: N/A	Shim Thickness: N/A	Source-Film Distance: 4.5"	Min. Source-Object Distance: CONTACT	Max. Source Side of Object-Film Distance: 4.5"
Exposure Time: 10 SEC	Film Mfr. & Type: AGFA D4	Film Technique: ☒ Single-Load ☐ Multi-Load	Screen Type: PB	Screen Thickness: Front: .010 Back: .010	No. of Film & Size: 4.5X10
Film Viewing: ☒ Single ☐ Composite	Film Processing: ☐ Automatic ☒ Manual: Time (min): 5		Developer Temperature: 68°	Comments: R-25126-01 A&B	

Tested Item(s):

ID/Weld No.	View	Original or Repair	Geometric Unsharpness	Accept	Reject	Porosity	Slag/ Inclusions	Lack of Fusion	Incomplete Penetration	Crack	Root Concavity	Root Convexity	Tungsten	Undercut	Weld Contour	Film Artifact	Comments	IQI Density	Weld Density
W 1135	0-5	0		✓															
WSDPM	5-10	0		✓															
	16-0	0		✓															

Technician, Level & Date: 10-23-11
Customer's Signature (if applicable):
Reviewed By (if applicable):

MISTRAS GROUP INC.

Inspection Report, Radiography (Welds)

Division:	590	Client:	JVI	Date:	10-24-2011	Page:	of
Address:	Mistras.	Address:	ON FILE	Job Number:	104329		
	3985 TEAL CT			Purchase Order:	342644		
	BENICIA, CA 94510	Contact:	Ralph W.	Reference Number:	NDE REQUEST 149		
		Location:	Chevron Richmond	Part/Item Number:	F-1550 FURNACE TUBES		

Code/Specification: ASME SEC V		Acceptance Criteria: B31.3 Normal		Procedure: 100-RT-001 REV 6		Technique: ☐ SWE/SWV ☒ DWE/SWV ☐ DWE/DWV
Material Type: 5CR	Base Mat'l Thickness: .375	Weld Reinforcement: .125	Weld Thickness: .500	Weld Joint Type: BW		Radiation Source: ☒ Ir 192 ☐ Co 60 ☐ X-Ray
Location Markers: ☐ Source-Side ☒ Film-Side		IQI Type & ID: B-Wire	IQI Material: S/S	IQI Location: ☐ Source-Side ☒ Film-Side		Focal Spot Size: .146 / Curies/mA-kV: 89
Quality Level: 2-2T	Shim Material: N/A	Shim Thickness: N/A	Source-Film Distance: 5.938	Min. Source-Object Distance: 5.063		Max. Source Side of Object-Film Distance: 5.688
Exposure Time: 17 Seconds	Film Type: AGFA D4	No. of Film & Size: 4.5 X 10"	Film Technique: ☒ Single-Load ☐ Multi-Load		Screen Type: Pb	Screen Thickness Front: .010 Back: .010
Film Viewing: ☒ Single ☐ Composite		Film Processing: ☐ Automatic ☒ Manual: Time (min):		Developer Temp: 70 C	Comments:	

Inspection Item(s):

ID/Weld No.	View	Original or Repair	Geometric Unsharpness	Accept	Reject	Porosity	Slag/ Inclusions	Lack of Fusion	Incomplete Penetration	Crack	Root Concavity	Root Convexity	Tungsten	Undercut	Weld Contour	Film Artifact	Comments	IQI Density	Weld Density
1133	0-6	O	.014	✓													B-251262-01 A & B		
	6-12	O	.014	✓													W.S.-BHH		
	12-0	O	.014	✓															
1134	0-6	O	.014	✓													B-251262-01 A & B		
	6-12	O	.014	✓													W.S.-BXX		
	12-0	O	.014	✓							/								

0418-006-007

Technician, Level & Date: L. CAMPBELL II 10-24-11

Customer's Signature (if applicable)

Reviewed By (Sign & Date)

100-FORM-011W Rev 1 (03/12/200

CUSA-EPA-0007068

MISTRAS Asset Protection Solutions | Services Division

REQ# 199

Radiography Examination Report

3985 Teal CT. | Benicia, CA. 94510 | P: (707) 746-5870; F: (707) 746-8664

www.mistrasgroup.com

Client: JVI

Contact: R. WORSHAM

Location: CHEVRON RICHMOND CA

Part/Item No: F1550

Description: 4" BUTTWELDS

Date: 10-28-11 Page: of

Mistras Job No: JVI JH 104329

Purchase Order: NO# 342644

Code/Specification: ASME SECT V		Acceptance Criteria: B31.3		Procedure: 100-RT-001 REV 5	Technique: ☐ SWE/SWV ☐ DWE/SWV ☒ DWE/DWV
Material Type: 5 CR	Base Mat'l Thickness: 237	Weld Joint Type: BUTTWELD	Weld Thickness: .362	Weld Reinforcement: .125"	Radiation Source: ☒ Ir 192 ☐ Co 60 ☐ SE 75 ☐ X-Ray
Location Markers: ☐ Source-Side ☒ Film-Side		IQI Type & ID: ASTM 1-B	IQI Material: SS	IQI Location: ☐ Source-Side ☒ Film-Side	Focal Spot Size: .196 / Curies/mA-kV: 87
Quality Level: .010	Shim Material: N/A	Shim Thickness: N/A	Source-Film Distance: 4"	Min. Source-Object Distance: CONTACT	Max. Source Side of Object-Film Distance: 4"
Exposure Time: 7 SEC	Film Mfr. & Type: AGFA D4	Film Technique: ☒ Single-Load ☐ Multi-Load	Screen Type: PB	Screen Thickness: Front: .010 Back: .010	No. of Film & Size: (9) 4.5X10
Film Viewing: ☒ Single ☐ Composite	Film Processing: ☐ Automatic ☒ Manual: Time (min): 5		Developer Temperature: 72°	Comments: B-25126-01 A&B	

Tested Item(s):

ID/Weld No.	View	Original or Repair	Geometric Unsharpness	Accept	Reject	Porosity	Slag/ Inclusions	Lack of Fusion	Incomplete Penetration	Crack	Root Concavity	Root Convexity	Tungsten	Undercut	Weld Contour	Film Artifact	Comments	IQI Density	Weld Density
W1140	0-5	0		✓															
	5-10	0		✓															
	10-0	0		✓															
W1142	0-5	0		✓															
	5-10	0		✓															
	10-0	0		✓															
W1141	0-5	0		✓															
	5-10	0			X						X						@ 9 ✓		
	10-0	0		✓															

0418-006-007

Technician, Level & Date: LARRY AMPBELL 10-28-11

Customer's Signature (if applicable):

Reviewed By (if applicable):

CERTIFICATION OF INSPECTION, RADIOGRAPHY [WELDS]

100-RTFORM-001 | REV 1

CUSA-EPA-0007069

MISTRAS Services Division
Asset Protection Solutions

Radiography Examination Report

3985 Teal CT. | Benicia, CA. 94510 | P: (707) 746-5870; F: (707) 746-8664
www.mistrasgroup.com

Client: TVI
Contact: R MURSHANT
Location: CHEVRON RICHMOND
Part/Item No: F1550
Description: 5" BUTT WELDS
Date: 10-28-11
Page: of
Mistras Job No: TVI 104225
Purchase Order: WO# 592649

Code/Specification		Acceptance Criteria		Procedure	Technique
ASME Sec V		B31.3		100-RT-001 REV5	☐ SWE/SWV ☐ DWE/SWV ☒ DWE/DWV
Material Type: SCR	Base Mat'l Thickness: .258"	Weld Joint Type: Butt	Weld Thickness: .283	Weld Reinforcement: .125	Radiation Source: ☒ Ir 192 ☐ Co 60 ☐ SE 75 ☐ X-Ray
Location Markers: ☐ Source Side ☒ Film-Side		IQI Type & ID: ASTM 1-8	IQI Material: SS	IQI Location: ☐ Source-Side ☒ Film-Side	Focal Spot Size: .146 / Curies/mA-kV: 87
Quality Level: 010	Shim Material: N/A	Shim Thickness: N/A	Source-Film Distance: 5"	Min. Source-Object Distance: CONTACT	Max. Source Side of Object-Film Distance: 5"
Exposure Time: 12 SEC	Film Mfr. & Type: AGFA D4	Film Technique: ☒ Single-Load ☐ Multi-Load	Screen Type: Pb	Screen Thickness: Front: 010 Back: 010	No. of Film & Size: 16 4.5x10
Film Viewing: ☒ Single ☐ Composite	Film Processing: ☐ Automatic ☒ Manual: Time (min): 5		Developer Temperature: 72°	Comments: B-25126-01-A&B	

Tested Item(s):

ID/Weld No.	View	Original or Repair	Geometric Unsharpness	Accept	Reject	Porosity	Slag/ Inclusions	Lack of Fusion	Incomplete Penetration	Crack	Root Concavity	Root Convexity	Tungsten	Undercut	Weld Contour	Film Artifact	Comments	IQI Density	Weld Density
W 1168	0-6	0		✓															
	6-12	0		✓															
	12-0	0		✓															
W 1169	0-6	0		✓															
	6-12	0		✓															
	12-0	0		✓															

Technician, Level & Date	Customer's Signature (if applicable)	Reviewed By (if applicable)
[signature] II 10-28-11	[signature]	