

PRELIMINARY

Energy Industries of Ohio

Contract # S005242-F

Modular Coil Winding Forms

C-3 Documentation Package

**Part 1 – Metal Tek International
Casting Data Package**

11/16/2005

C-3 Documentation Package

List of Documents 11-16-2005

Doc #	Description	# Pages
1	MTR for weighted average of chemistry – 3 ladles replaced by product analysis	1
2	MTR from Wisconsin Centrifugal	1
3	MTR for C-3 Shim dated 9/24/05	1
5	MTR for Lincoln lot # 3018926 78309	1
6	Westmoreland Tensile test report @ -320°F dated 6-30-05	1
7	St Louis Test Lab dated 6-24-05 – incl. tensile test results @ room temp & Charpy V Notch (CVN) at 77°K & 293°K	3
8	Westmoreland CVN of Lincoln weld material @ -320°F dated 8/23/2005	1
9	Westmoreland tensile test report of Lincoln weld material @ -320°F dated 8/23/2005 – failed – See CA 1379	2
10	St Louis Test Lab dated 8-8-05 tensile test results @ & Charpy V Notch (CVN) @293°K of Lincoln weld material lot # 3018926 78309	3
11	Westmoreland CVN of Lincoln weld material @ -320°F dated 9/13/2005	1
12	Westmoreland tensile test report of Lincoln weld material @ -320°F dated 9/13/2005	1
13	Westmoreland shim tensile tests @ -320°F	1
14	St Louis Testing Labs CVN shim material @ 77°K & 293°K + mechanical test results at RT dated 6-13-05	3
15	Weld map	10
16		
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31	CA 1323 – CA for sulfur & phosphorus readings dated 7/26/05 + addendum dated 8/17/05 – 9/8/05 & 9/30/05	10
32	CA 1379 Failed weld test	2
33	CA 1403 – Lack of fusion in weld repairs	1
34		
35		
36		
11/16/05		



Carondelet Division

8600 Commercial Blvd. - Pevely, MO 63070 USA
Phone: 636-479-4499 - Fax: 636-479-3399

Material Test Report

ENERGY INDUSTRIES OF OHIO

Purchase Order Number PPPL-FP-LTS-2

Cert Number S75920-2

Pattern Number MCWF-C3

Pour Date 6/10/2005

CAF Metal Designation CF8MNMnMod

Material Spec CF8MNMnMOD

Weighted average of 3 heats - 29716(40%),29717(21%),29720(39%) Total Weight 32016 lbs.

Revised 10/26/05

Element	Min	Actual	Max
C	0.04	0.04	0.07
MN	2.3	2.5	2.8
SI	0.0	0.4	0.7
CR	18.0	18.2	18.5
NI	13.0	13.3	13.5
MO	2.1	2.3	2.5
P*	0.0	0.023	0.035
S*	0.0	0.013	0.025
N	0.24	0.25	0.28

*P & S taken from cast on bar, zones 1,2,&3 and analyzed by wet chemistries, ASTM E1019-03 for sulfur and Colormetric for phosphorous.

PRODUCT ANALYSIS

Results of spectrometer analysis of cast on test bar after spectrometer preventive maintenance performed and at Wisconsin Centrifugal.

***Not analyzed on spectrograph.

Element	CAF after PM	WC Analysis
C	***	0.06
MN	1.6	1.6
SI	0.6	0.6
CR	18.1	18.3
NI	13.5	13.7
MO	2.4	2.4
P	0.023	0.029
S	0.011	0.009
N	***	0.24

Charles A. Ruud
Quality Assurance Manager

Superior Quality Engineered Metal Products

www.MetalTekInt.Com



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Material Test Report

ENERGY INDUSTRIES OF OHIO

Purchase Order Number PPPL-FP-LTS-2

Pattern Number MCWF-C3

CAF Metal Designation CF8MNMnMod

Material Spec CF8MNMnMOD

Analysis performed by Wisconsin Centrifugal

Cert Number S75920-2

Pour Date 6/10/2005

Revised 11/3/05

Element	Min	Actual	Max
C	0.04	0.06	0.07
MN*	2.3	1.6	2.8
SI	0.0	0.6	0.7
CR	18.0	18.3	18.5
NI*	13.0	13.7	13.5
MO	2.1	2.4	2.5
P	0.0	0.029	0.035
S	0.0	0.009	0.025
N	0.24	0.24	0.28

* See Corrective Action Number 1323.

Respectfully Submitted,
Charles A. Ruud
Quality Assurance Manager

Superior Quality Engineered Metal Products

www.MetalTekInt.Com

Carondelet Division

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Phone: 636-479-4499 - Fax: 636-479-3399

Material Test Report

ENERGY INDUSTRIES OF OHIO

Purchase Order Number PPPL-FP-LTS-2 Heat Number 29198 Pour Date 4/28/2005
Pattern Number SE-141-073 COIL C SHIM (-3 thru -6 Parts) Cert Number S73220-2 and
SE-141-033 COIL A SHIM (-1 thru -6 Parts) Cert Number S76220-1
CAF Metal Designation CF8MNMnMod
Material Spec CF8MNMN MOD

Revised 9/24/05

Element	Min	Actual	Max
C	0.040	0.070	0.070
CR	18.000	18.100	18.500
MN	2.300	2.970	2.800
MO	2.100	2.450	2.500
N	0.240	0.255	0.280
NI	13.000	13.120	13.500
P*	0.000	0.013	0.035
S*	0.000	0.010	0.025
SI	0.000	0.700	0.700

MN & SI previously reported on CA 1308 and were accepted.

*P & S taken from test from heat parts were poured from and analyzed by wet chemistry, ASTM E1019-03 for sulfur and Gravimetric for phosphorous.

This report covers the eleven castings poured from heat 29198. Only parts listed above however will be shipped for this order. Each casting has a unique number stamped in the part adjacent to the pattern number to differentiate the part and subsequent reporting that will be traced to the casting.

Specification limits have been updated to latest specification.

Respectfully Submitted,
Charles A. Ruud
Quality Assurance Manager

Superior Quality Engineered Metal Products

www.MetalTekInt.Com

.045

ER316 MNN F
**LINCOLN®
ELECTRIC**

PRODUCT CONFORMANCE REPORT

Product	LNM 4455	Size(s) mm	1,2
Class.	EN 12072-99: G 20 16 3 Mn L	Lot/Batch	3018926/78309
		Item No.	692129
Customer	CK SUPPLY Contact Ernie Simpson Eureka (MISSOURI) 63025 UNITED STATES	Quantity	450,0 KG
		Customer ref.	P.O.: SL 057549
		LSW Order No.	SD424496

Chemical analysis (%)										EN10204 3.1B
C	Si	Mn	P	S	Cr	Ni	Mo	Cu	N	
0,02	0,4	7,3	0,019	0,001	20,1	16,3	2,9	0,1	0,200	

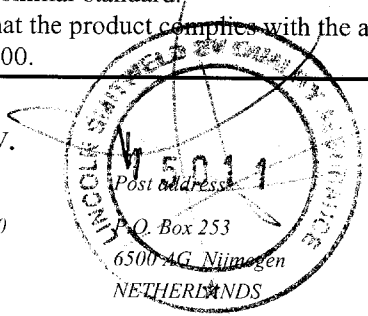
Mechanical tests, all weld metal	EN10204
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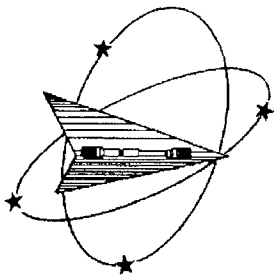
Additional information	EN10204
Other tests	

Remarks

The product identified above has been manufactured, tested and supplied in compliance with a Quality Assurance Programme that fulfils the requirements of EN 29000/ ISO 9000/BS 5750 or similar standard.
We herewith certify that the product complies with the above-mentioned standards.
Certified ISO 9001:2000.

Company	Issued by	Function	Date	Cert.No.
Lincoln Smitweld B.V.	P. van Etteger	QS Manager	10/02/2005	3018926/7830
Registered Office	Telephone:	Fax:		
Nieuwe Dukenburgseweg 20	31 24 3522911	31 24 3522200		
6534 AD NIJMEGEN				





Westmoreland Mechanical Testing & Research, Inc.

P.O. Box 388

Westmoreland Drive

Youngstown, Pa. 15696-0388 U.S.A.

Telephone: 724-537-3131

Fax: 724-537-3151

Website: www.wmtr.com

WMT&R is a technical leader in the material testing industry.



621-01 & 621-02



June 30, 2005

CERTIFICATION

Section 1 of 1

WMT&R Report No. 5-29805

Req. No. 5404

MetalTek International
The Carondelet Division
8600 Commercial Blvd.
I-55 Industrial Park
Pevely, MO 63070-1528

Attention: Rick Suria

Subject: All processes, performed upon the material as received, were conducted at WMT&R, Inc. in accordance with the WMT&R Quality Assurance Manual, Rev. 9, dated 4/1/2000.

The following tests were performed on this order: TENSILE

TENSILE RESULTS: ASTM E21-03a

C-3 Coil CR

SOAK TIME: 5 Minutes

SPEED OF TESTING: 0.0030 in./in./min., 0.0500 in./min./in.


MATERIAL: Metaltek CF8MNm


DISPOSITION: Report

Sample	TestLog Number	Temp. °F	UTS ksi	0.2% YS ksi	Elong %	RA %	Modulus Msi	Ult. Load lbf	0.2% YLD. lbf	Orig. Dia. (in.)	Final Dia. (in.)	4D Orig GL (in.)	4D Final GL (in.)	Orig. Area (sq. in.)	Machine Number	AIUR
Z1	C07850	-320	161.7	102.2	45	33	27.0	32600	20611	0.5067	0.4145	2.00	2.89	0.20164697	M9	R
Z2	C07851	-320	164.4	94.9	60	63	24.1	33080	19100	0.5062	0.3096	2.00	3.20	0.20124920	M9	R
Z3	C07852	-320	163.3	94.2	62	56	23.7	32870	18970	0.5063	0.3361	2.00	3.23	0.20132872	M9	R

AIUR: A=ACCEPTABLE, U=UNACCEPTABLE, R=REPORT

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 Roy E. Stamm
 Technical Services Manager / Tensile Supervisor


 Matt Wojton
 Tensile Supervisor

June 30, 2005

Testing Specialists for Aerospace, Automotive, and Material Testing Fields
Locations in Youngstown, PA U.S.A. ~ Tel. (724) 537-3131 and
Banbury U.K. ~ Tel. +44 (0) 1295 261211

2810 Clark Avenue • St. Louis, MO 63103-2574 • (314) 531-8080 • FAX (314) 531-8085
 Chemical, Metallurgical, Mechanical, Nondestructive, Environmental Testing, Analyses and Field Service.

METALTEK INTERNATIONAL
 8600 Commercial Blvd.
 Pevely, MO 63070

June 24, 2005
 Lab No. 05P-1885
 P.O. No. 12516
 Page 1 of 3

Attention: Chuck Ruud

REPORT OF CHARPY IMPACT TEST

MATERIAL (SAMPLE ID): C3 Coil- Alloy CF8 MNMNMOD, Z1,Z2,Z3
SPECIFICATION: ASTM A 370-03a
SPECIMEN TYPE: "A" Vee Notch
SPECIMEN SIZE: 10 mm x 10 mm
TEMPERATURE OF TEST: 73°F
REQUIREMENTS: 50 ft/ lb

BASE METAL	FOOT LBS.	LATERAL EXPANSION	% SHEAR
Z1-7	193	0.121	100
Z1-8	165	0.100	100
Z1-9	113	0.079	100
Average	157	0.100	100
SAMPLE ID	FOOT LBS.	LATERAL EXPANSION	% SHEAR
Z2-7	144	0.098	100
Z2-8	142	0.070	100
Z2-9	138	0.081	100
Average	141	0.083	100
SAMPLE ID	FOOT LBS.	LATERAL EXPANSION	% SHEAR
Z3-7	132	0.089	100
Z3-8	160	0.098	100
Z3-9	230	0.062	100
Average	174	0.083	100

identification of tested specimen provided by client.


 Karl Schmitz, Director
 Materials Testing



Certificate No. 0397-01
 Certificate No. 0397-02

AN OFFICIAL COPY OF TEST REPORT WILL BE PROVIDED BY THIS LABORATORY ON REQUEST.
 NOT OFFICIAL WITHOUT THE RAISED SEAL OF ST. LOUIS TESTING LABORATORIES, INC.
 SEE REVERSE FOR CONDITIONS.



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June 24, 2005
 Lab No. 05P-1885
 P.O. No. 12516
 Page 2 of 3

Attention: Chuck Ruud

REPORT OF CHARPY IMPACT TEST

MATERIAL (SAMPLE ID): C3 Coil- Alloy CF8 MNMNMOD, Z1,Z2,Z3
SPECIFICATION: ASTM A 370-03a
SPECIMEN TYPE: "A" Vee Notch
SPECIMEN SIZE: 10 mm x 10 mm
TEMPERATURE OF TEST: 77°K
REQUIREMENTS: 35 ft/ lb

BASE METAL	FOOT LBS.	LATERAL EXPANSION	% SHEAR
Z1-7	110	0.086	100
Z1-8	68	0.041	100
Z1-9	104	0.068	90
Average	94	0.065	97
BASE METAL	FOOT LBS.	LATERAL EXPANSION	% SHEAR
Z2-7	92	0.059	90
Z2-8	85	0.052	100
Z2-9	94	0.056	100
Average	90	0.056	97
BASE METAL	FOOT LBS.	LATERAL EXPANSION	% SHEAR
Z3-7	99	0.067	100
Z3-8	148	0.087	100
Z3-9	99	0.076	100
Average	115	0.077	100

Identification of tested specimen provided by client.


 Karl Schmitz, Director
 Materials Testing



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 Pevely, MO 63070

June 24, 2005
 Lab No. 05P-1885
 P.O. No. 12516
 Page 3 of 3

Attention: CHUCK RUUD

REPORT OF MECHANICAL TESTS

SAMPLE ID: C3 COIL- ALLOY CF8MNMNMOD, Z1, Z2, Z3

Sample ID	Original Area Sq. Inches	Reduced Area Sq. Inches	Reduction in Area %	Modules of Elasticity	Yield Strength PSI	Tensile Strength PSI	Elongation (2.0" Gage Length)	
							in.	%
Z1	0.1963	0.1257	36.0	22.6	37800	83300	0.95	47.5
Z2	0.1963	0.1257	36.0	21.2	42700	83300	0.10	55.0
Z3	0.1924	0.1257	34.7	21.0	34300	81500	0.1	55.0

Round, reduced section tensiles

Yield taken at .2% offset

Tested in accordance with ASTM A 370-03a

Identification of tested specimens provided by the client.


 Karl Schmitz, Director
 Materials Testing

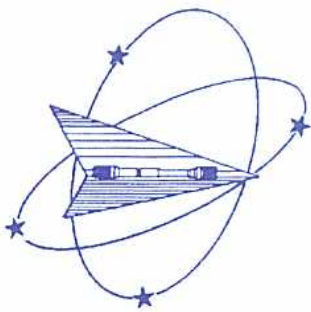
KS/tlv



Certificate No. 0397-01
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Westmoreland Mechanical Testing & Research, Inc.

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Youngstown, Pa. 15696-0388 U.S.A.

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Website: www.wmtr.com

WMT&R is a technical leader in the material testing industry.



621-01 & 621-02

August 23, 2005

CERTIFICATION

WMT&R Report No. 5-32228

Requisition No. 4335

MetalTek International
The Carondelet Division
8600 Commercial Blvd.
I-55 Industrial Park
Pevely, MO 63070-1528

Attention: Jim Galaske

Subject: All processes, performed upon the material as received, were conducted at WMT&R, Inc. in accordance with the WMT&R Quality Assurance Manual, Rev. 9, dated 4/1/2000.

The following tests were performed on this order: IMPACT and TENSILE

IMPACT RESULTS: ASTM E23-02

No Requirements

MATERIAL: Lincoln LNM4455

SAMPLE TYPE: Charpy V-Notch

DISPOSITION: Report

Reference	Lot No. Batch No. Specimen ID	TestLog Number	Sample Size	Temp. °F	Energy ft-lbs	Mils Lat Exp	% Shear Fracture	AUUR
Lincoln LNM4455	3018926 78309 CVN-1	C26832	Standard	-320	33	17	20	Report
Lincoln LNM4455	3018926 78309 CVN-2	C26833	Standard	-320	36	22	25	Report
Lincoln LNM4455	3018926 78309 CVN-3	C26834	Standard	-320	40	18	40	Report
Lincoln LNM4455	3017006 72262 CVN-1	C26835	Standard	-320	55	26	30	Report
Lincoln LNM4455	3017006 72262 CVN-2	C26836	Standard	-320	53	34	30	Report
Lincoln LNM4455	3017006 72262 CVN-3	C26837	Standard	-320	51	34	30	Report

AUUR: A=ACCEPTABLE, U=UNACCEPTABLE, R=REPORT

Roy E. Starr/Matt Wojton
____ Technical Services Manager/____ Tensile Supervisor

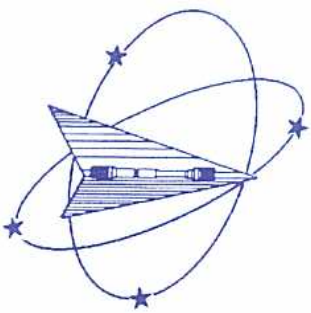
August 23, 2005

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621-01 & 621-02



August 23, 2005

CERTIFICATION

MetalTek International

WMT&R Report No. 5-32228

TENSILE RESULTS: ASTM E21-03a

Requirements: UTS ksi (Min 95\Max ---) 0.2% YS ksi (Min 72\Max ---) 4D Elong. % (Min 32\Max ---) Modulus Msi (Min 21\Max ---)

SOAK TIME: 5 Minutes

SPEED OF TESTING: 0.0030 in./in./min., 0.0500 in./min./in.

MATERIAL: Metrude B316NF

DISPOSITION: Acceptable

Reference	Lot No. Batch No. Specimen ID	TestLog Number	Temp. °F	UTS ksi	0.2% YS ksi	Elong %	RA %	Modulus Msi	Ult. Load lbf	0.2% YLD. lbf	Orig. Dia. (in.)	Final Dia. (in.)	4D Orig GL (in.)	4D Final GL (in.)	Orig. Area (sq. in.)	Machine Number	AUUR
Metrude B316NF	W021735 T1	C26831	-320	166.6	102.1	38	31	24.3	16070	9842	0.3504	0.2912	1.40	1.93	0.09643131	M9	A

AUUR: A=ACCEPTABLE, U=UNACCEPTABLE, R=REPORT

TENSILE RESULTS: ASTM E21-03a

Requirements: UTS ksi (Min 95\Max ---) 0.2% YS ksi (Min 72\Max ---) 4D Elong. % (Min 32\Max ---) Modulus Msi (Min 21\Max ---)

SOAK TIME: 5 Minutes

SPEED OF TESTING: 0.0030 in./in./min., 0.0500 in./min./in.

MATERIAL: Lincoln LNM4455

DISPOSITION: Unacceptable

Reference	Lot No. Batch No. Specimen ID	TestLog Number	Temp. °F	UTS ksi	0.2% YS ksi	Elong %	RA %	Modulus Msi	Codes	Ult. Load lbf	0.2% YLD. lbf
Lincoln LNM4455	3018926 78309 T1	C26829	-320	157.5	114.3	16	18	23.3	H	15210	11030

AUUR: A=ACCEPTABLE, U=UNACCEPTABLE, R=REPORT

DISPOSITION: Unacceptable

Reference	Lot No. Batch No. Specimen ID	TestLog Number	Orig. Dia. (in.)	Final Dia. (in.)	4D Orig GL (in.)	4D Final GL (in.)	Orig. Area (sq. in.)	Machine Number	AUUR
Lincoln LNM4455	3018926 78309 T1	C26829	0.3506	0.3168	1.40	1.63	0.09654142	M9	U

AUUR: A=ACCEPTABLE, U=UNACCEPTABLE, R=REPORT

Requirements provided by MetalTek International

H - Failed outside gage length.

Matthew Wojton
Roy E. Starr (Matt Wojton)
Technical Services Manager Tensile Supervisor

8-23-05
August 23, 2005

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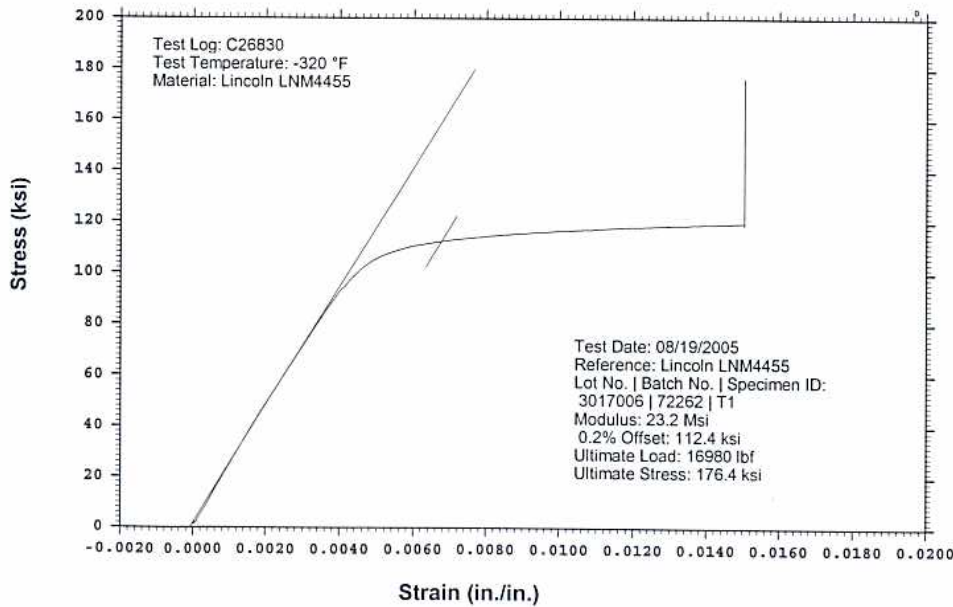
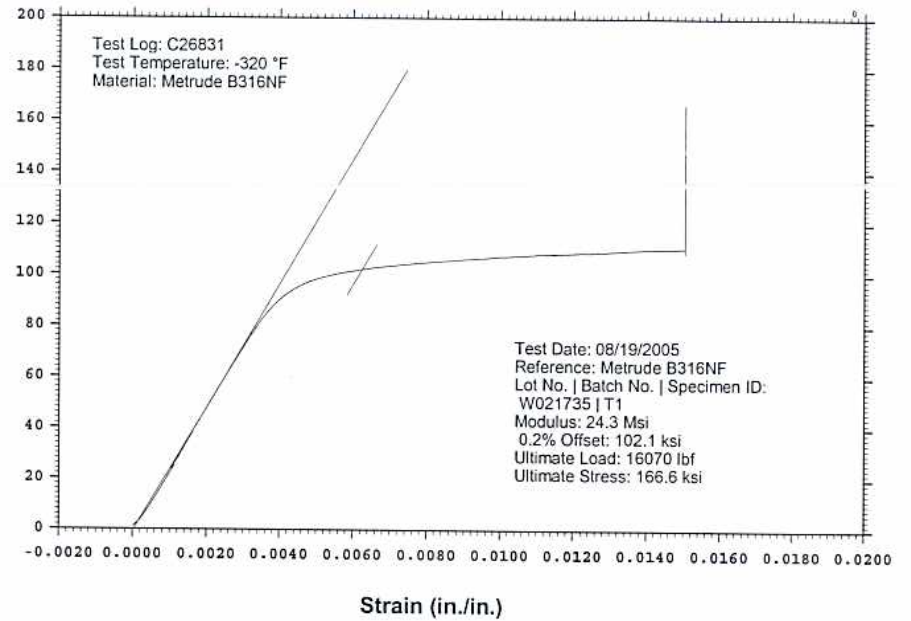
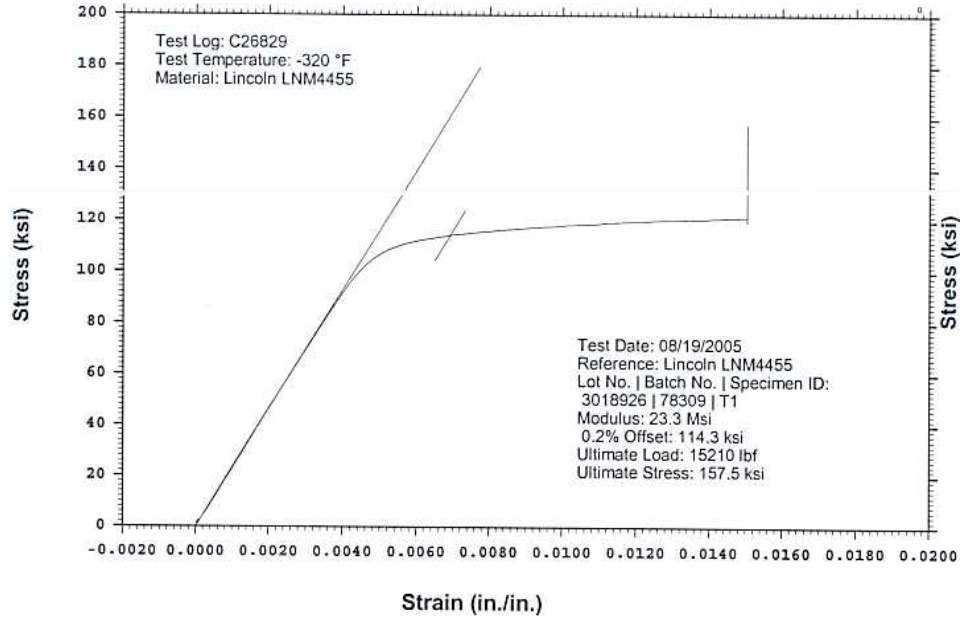
WESTMORELAND MECHANICAL TESTING & RESEARCH, Inc

Stress vs. Strain

Phone: (724)537-3131

Customer: MetalTek International
WMT&R Report: 5-32228

Requisition No.: 4335



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METALTEK INTERNATIONAL
 8600 Commercial Blvd.
 Pevely, MO 63070

August 8, 2005
 Lab No. 05P-2334
 P.O. No. 21324
 Page 1 of 3

Attention: CHUCK RUUD

REPORT OF MECHANICAL TESTS

SAMPLE ID: 1) STOCK# LNM 4455, LINCOLN LOT 3018926/78309
 2) STOCK# LNM 4455, LINCOLN LOT 3017006/72262
 3) STOCK# LNM 4455, LINCOLN LOT 3012668/82743
 4) STOCK# B316NF METRODE, W021735

Sample ID	Original Area Sq. Inches	Reduced Area Sq. Inches	Reduction in Area %	Modules of Elasticity	Yield Strength PSI	Tensile Strength PSI	Elongation (2.0" Gage Length)	
							in.	%
1	0.1385	0.0897	54.3	24.5 Msi	56900	93900	0.84	42.0
2	0.1886	0.0935	50.4	24.9 Msi	54900	92100	0.85	42.5
3	0.1909	0.0951	50.2	22.6 Msi	57400	93700	0.83	41.5
4	0.1901	0.0962	49.4	23.0 Msi	54800	88200	0.75	37.5


Round, reduced section all weld tensiles

Yield taken at .2% offset

Tested in accordance with ASTM A 370-03a

Identification of tested specimens provided by the client.

KS/tlv


 Karl Schmitz, Director
 Materials Testing



Certificate No. 0397-01
 Certificate No. 0397-02

AN OFFICIAL COPY OF TEST REPORT WILL BE PROVIDED BY THIS LABORATORY ON REQUEST.
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 SEE REVERSE FOR CONDITIONS.



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METALTEK INTERNATIONAL
 8600 Commercial Blvd.
 Pevely, MO 63070

August 8, 2005
 Lab No. 05P-2334
 P.O. No. 21324
 Page 2 of 3

Attention: Chuck Ruud

REPORT OF CHARPY IMPACT TEST

MATERIAL (SAMPLE ID): STOCK# LNM 4455, LINCOLN LOT 3018926/78309
 STOCK# LNM 4455, LINCOLN LOT 3017006/72262

SPECIFICATION: ASTM A 370-03a

SPECIMEN TYPE: "A" Vee Notch


SPECIMEN SIZE: 10 mm x 10 mm (All Weld)

TEMPERATURE OF TEST: 293°K

REQUIREMENTS:

ALL WELD	FOOT LBS.	LATERAL EXPANSION	% SHEAR
78309-7	97	0.074	50
78309-8	96	0.076	50
78309-9	108	0.075	50
Average	100	0.075	50
ALL WELD	FOOT LBS.	LATERAL EXPANSION	% SHEAR
72262-7	126	0.098	50
72262-8	102	0.080	50
72262-9	123	0.087	50
Average	117	0.088	50

Identification of tested specimen provided by client.


 Karl Schmitz, Director
 Materials Testing

KS/tlv



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Chemical, Metallurgical, Mechanical, Nondestructive, Environmental Testing, Analyses and Field Service.

METALTEK INTERNATIONAL
 8600 Commercial Blvd.
 Pevely, MO 63070

August 8, 2005
 Lab No. 05P-2334
 P.O. No. 21324
 Page 3 of 3

Attention: Chuck Ruud

AUG 10 2005

REPORT OF CHARPY IMPACT TEST

MATERIAL (SAMPLE ID): STOCK# LNM 4455, LINCOLN LOT 3012668/82743
 STOCK# B316NF METRODE, W021735

SPECIFICATION: ASTM A 370-03a

SPECIMEN TYPE: "A" Vee Notch

SPECIMEN SIZE: 10 mm x 10 mm (All Weld)

TEMPERATURE OF TEST: 293°K

REQUIREMENTS:

ALL WELD	FOOT LBS.	LATERAL EXPANSION	% SHEAR
82743-7	100	0.082	50
82743-8	99	0.076	50
82743-9	94	0.072	50
Average	98	0.077	50
ALL WELD	FOOT LBS.	LATERAL EXPANSION	% SHEAR
W021735-7	102	0.101	50
W021735-8	88	0.073	50
W021735-9	88	0.080	50
Average	93	0.085	50

Identification of tested specimen provided by client.

KS/tlv

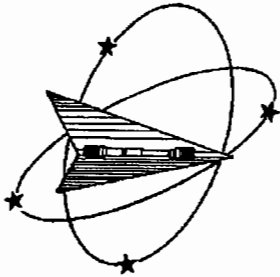

 Karl Schmitz, Director
 Materials Testing



Certificate No. 0397-01
 Certificate No. 0397-02

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Westmoreland Mechanical Testing & Research, Inc.

P.O. Box 388

Westmoreland Drive

Youngstown, Pa. 15696-0388 U.S.A.

Telephone: 724-537-3131 Fax: 724-537-3151

Website: www.wmtr.com

WMT&R is a technical leader in the material testing industry.



621-01 & 621-02

September 13, 2005

CERTIFICATION

MetalTek International
The Carondelet Division
8600 Commercial Blvd.
I-55 Industrial Park
Pevely, MO 63070-1528

WMT&R Report No. 5-34328

P.O. No. 19386 Rel No.18

Requisition No. 4934

Attention: Jim Galaske

Subject: All processes, performed upon the material as received, were conducted at WMT&R, Inc. in accordance with the WMT&R Quality Assurance Manual, Rev. 9, dated 4/1/2000.
The following tests were performed on this order: IMPACT and TENSILE

IMPACT RESULTS: ASTM E23-02

REQUIREMENTS: Energy (Min 35\Max --)

MATERIAL: Lincoln LNM4455

SAMPLE TYPE: Charpy V-Notch

DISPOSITION: Acceptable

Reference	Lot No. Batch No. Specimen ID	Test Log Number	Sample Size	Temp. °F	Energy ft-lbs	Mils Lat Exp	% Shear Fracture	AIUR
Lincoln LNM4455	3018926 78309 Cvm-1	C43939	Standard	-320	56	18	40	Acceptable
Lincoln LNM4455	3018926 78309 Cvm-2	C43940	Standard	-320	52	18	40	Acceptable
Lincoln LNM4455	3018926 78309 Cvm-3	C43941	Standard	-320	53	12	40	Acceptable

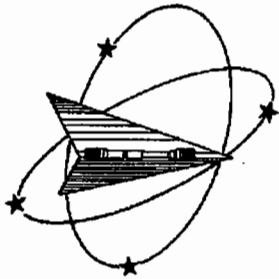
Requirements supplied by MetalTek International.

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Roy E. Star (Matt Wagoner)
Technical Services Manager / Tensile Supervisor

9-13-05
September 13, 2005

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Website: www.wmtr.com

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821-01 & 821-02

September 13, 2005

CERTIFICATION

MetalTek International
The Carondelet Division
8600 Commercial Blvd.
I-55 Industrial Park
Pevely, MO 63070-1528

WMT&R Report No. 5-34328
P.O. No. 19386 Rel No.18
Requisition No. 4934

Attention: Jim Galaske

Subject: All processes, performed upon the material as received, were conducted at WMT&R, Inc. in accordance with the WMT&R Quality Assurance Manual, Rev. 9, dated 4/1/2000.

The following tests were performed on this order: IMPACT and TENSILE

TENSILE RESULTS: ASTM E21-03a

Requirements: UTS ksi (Min 95\Max —) 0.2% YS ksi (Min 72\Max —) 4D Elong. % (Min 32\Max —) Modulus Msi (Min 21\Max —)

SOAK TIME: 5 Minutes

SPEED OF TESTING: 0.0030 in./in./min., 0.0500 in./min./in.

MATERIAL: 316 S/S

DISPOSITION: Acceptable

Reference	Lot No. Batch No. Specimen ID	TestLog Number	Temp. °F	UTS ksi	0.2% YS ksi	Elong %	RA %	Modulus Msi	Ult. Load lbf	0.2% YLD. lbf
Lincoln LNM4455	3018926 78309 Tensile	C43938	-320	182.1	128.2	34	24	27.0	17560	12360

AUUR: A=ACCEPTABLE, U=UNACCEPTABLE, R=REPORT

DISPOSITION: Acceptable

Reference	Lot No. Batch No. Specimen ID	TestLog Number	Orig. Dia. (in.)	Final Dia. (in.)	4D Orig GL (in.)	4D Final GL (in.)	Orig. Area (sq. in.)	Machine Number	AUUR
Lincoln LNM4455	3018926 78309 Tensile	C43938	0.3504	0.3048	1.40	1.87	0.09643131	M9	A

AUUR: A=ACCEPTABLE, U=UNACCEPTABLE, R=REPORT

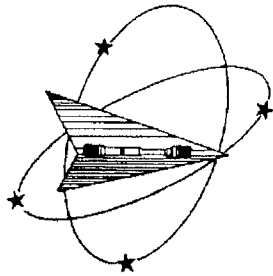
Requirements supplied by MetalTek International.

Matthew Wojton
Roy E. Starr
Technical Services Manager

9-13-05
September 13, 2005

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Website: www.wmtr.com

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621-01 & 621-02



June 20, 2005

CERTIFICATION

Section 1 of 1

WMT&R Report No. 5-29403

Req. No. 5394

MetalTek International
The Carondelet Division
8600 Commercial Blvd.
I-55 Industrial Park
Pevely, MO 63070-1528

Attention: Rick Suria

Subject: All processes, performed upon the material as received, were conducted at WMT&R, Inc. in accordance with the WMT&R Quality Assurance Manual, Rev. 9, dated 4/1/2000.

The following tests were performed on this order: TENSILE

TENSILE RESULTS: ASTM E21-03a

SOAK TIME: 5 Minutes

SPEED OF TESTING: 0.0030 in./in./min., 0.0500 in./min./in.


MATERIAL: Metaltek CF8MNMnMOD

DISPOSITION: Report

Sample	TestLog Number	Temp. °F	UTS ksi	0.2% YS ksi	Elong %	RA %	Modulus Msi	Ult. Load lbf	0.2% YLD. lbf	Orig. Dia. (in.)	Final Dia. (in.)	4D Orig GL (in.)	4D Final GL (in.)	Orig. Area (sq. in.)	Machine Number	AIUR
29198 (1)	C03696	-320	166.1	96.0	57	62	28.6	33330	19260	0.5054	0.3103	2.00	3.14	0.20061359	M9	R
29198 (2)	C03697	-320	161.4	96.8	38	33	28.8	32390	19430	0.5055	0.4130	2.00	2.75	0.20069299	M9	R
29198 (3)	C03698	-320	165.0	92.6	62	62	27.6	33100	18581	0.5054	0.3109	2.00	3.23	0.20061359	M9	R

AIUR: A=ACCEPTABLE, U=UNACCEPTABLE, R=REPORT

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Roy E. Starr, Matt Wojton
Technical Services Manager Tensile Supervisor

6-20-05

June 20, 2005

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METALTEK INTERNATIONAL
 8600 Commercial Blvd.
 Pevely, MO 63070

June 13, 2005
 Lab No. 05P-1739
 P.O. No. 12516
 Page 1 of 3

Attention: Chuck Ruud

REPORT OF CHARPY IMPACT TEST

MATERIAL (SAMPLE ID): HT # 29198
SPECIFICATION: ASTM A 370-03a
SPECIMEN TYPE: "A" Vee Notch
SPECIMEN SIZE: 10 mm x 10 mm
TEMPERATURE OF TEST: 293° K / 68° F
REQUIREMENTS: 50 ft. / lb

BASE METAL	FOOT LBS.	LATERAL EXPANSION	% SHEAR
1-7	132	0.085	100
1-8	176	0.084	100
1-9	152	0.082	100
Average	153	0.084	100
BASE METAL	FOOT LBS.	LATERAL EXPANSION	% SHEAR
2-7	160	0.112	100
2-8	144	0.107	100
2-9	140	0.069	100
Average	148	0.096	100
BASE METAL	FOOT LBS.	LATERAL EXPANSION	% SHEAR
3-7	176	0.110	100
3-8	124	0.087	100
3-9	144	0.107	100
Average	148	0.101	100

Identification of tested specimen provided by client.

[Signature]
 Karl Schmitz, Director
 Materials Testing



Certificate No. 0397-01
 Certificate No. 0397-02

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June 13, 2005
 Lab No. 05p-1739
 P.O. No. 12516
 Page 2 of 3

Attention: Chuck Ruud

REPORT OF CHARPY IMPACT TEST

MATERIAL (SAMPLE ID): HT # 29198
SPECIFICATION: ASTM A 370-03a
SPECIMEN TYPE: "A" Vee Notch
SPECIMEN SIZE: 10 mm x 10 mm
TEMPERATURE OF TEST: 77° K / -321° F
REQUIREMENTS: 35 ft / lb

BASE METAL	FOOT LBS.	LATERAL EXPANSION	% SHEAR
4-7	84	0.055	50
4-8	83	0.035	50
4-9	76	0.058	50
Average	81	0.049	50
BASE METAL	FOOT LBS.	LATERAL EXPANSION	% SHEAR
5-7	82	0.059	50
5-8	82	0.040	50
5-9	98	0.075	80
Average	87	0.058	60
BASE METAL	FOOT LBS.	LATERAL EXPANSION	% SHEAR
6-7	82	0.050	50
6-8	93	0.052	50
6-9	94	0.051	50
Average	90	0.051	50

Identification of tested specimen provided by client.

Karl Schmitz, Director
 Materials Testing



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June 13, 2005
Lab No. 05P-1739
P.O. No. 12516
Page 3 of 3

Attention: **CHUCK RUUD**

REPORT OF MECHANICAL TESTS

SAMPLE ID: 3 EA., 29198

Sample ID	Original Area Sq. inches	Reduced Area Sq. inches	Reduction in Area %	Modules of Elasticity	Yield Strength PSI	Tensile Strength PSI	Elongation (2.0" Gage Length)	
							in.	%
29298-1	0.1817	0.0855	52.9	21.2 Msi	40600	91900	1.00	50.0
29198-2	0.1825	0.0962	47.3	20.9 Msi	42700	88500	1.00	50.0
29198-3	0.1840	0.1170	36.4	21.1 Msi	39500	88300	0.97	48.5

Round, reduced section room temperature tensiles

Yield taken at .2% offset

Tested in accordance with ASTM A 370-03a

Identification of tested specimens provided by the client.

KS/tiv

Karl Schmitz, Director
Materials Testing



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C-3 Coil Weld Map – Metal Tek

Map of all major welds exceeding 20% of wall, over 1 inch or over 10² inches

Defect Number	Drawing View	Length (inches)	Width (inches)	Depth (inches)
1	Right	19	1 1/8	1/2
2	Right	7	4 1/2	1/2
3	Right	15 1/2	3 1/2	3
4	Right	19 1/2	6 1/2	3/4
5	Right	5	2 1/2	1 1/2
6	Front	9	5	1
7	Right	4 1/2	4	1
8	Back	30	12	1
9	Back	6 1/2	5	3/4
10	Front	7 3/4	3	1/4
11	Font	6	4	3/4
12	Front	4 3/4	2 3/4	1 1/2
13	Front	9 1/2	6	Thru
14	Front	26	7	3/4
15	Right	13	4 1/2	3/4
16	Right	13	7	Thru
17	Right	7	4 1/2	3
18	Right	9	5	3/4
19	Right	12	6	2
20	Right	6	3	Thru
21	Right	6 1/2	5 3/4	3/4
22	Right	8	2	3
23	Front	6	2 1/2	1
24	Front	9	2	3/4
25	Front	8	2	3/4
26	Front	12	2	3/4
27	Front	5	4 1/2	1/4
28	Bottom	4	3	1 1/8
29	Bottom	7	2	Thru
30	Bottom	8	2 1/2	3/4
31	Bottom	10 1/2	4	3/4
32	Bottom	6 1/2	3 1/2	2
33	Back	8	2	2
34	Back	4	2 1/2	Thru
35	Back	12	4	Thru

C-3 Coil Weld Map – Metal Tek

Map of all major welds exceeding 20% of wall, over 1 inch or over 10² inches

Defect Number	Drawing View	Length (inches)	Width (inches)	Depth (inches)
36	Back	9	2	¾
37	Back	8	5	¾
38	Back	4	4	¼
39	Back	18	1 ½	¼
40	Back	6	4 ½	¼
41	Back	6	1	Thru
42	Back	13	4 ½	¾
43	Back	7	5	1
44	Back	11 ½	3 ¾	¾
45	Back	13	4	Thru
46	Back	8 ½	8 1/8	Thru
47	Back	6	2 ½	1 ½
48	Back	6	3	¾
49	Top	8 ½	2	¾
50	Top	15	3	Thru
51	Top	7	2	2
52	Top	7	2	1
53	Top	3	2	3
54	Left	4	4	3
55	Left	14	10	3
56	Left	4	4	2 ¾
57	Left	6	1 ¾	1
58	Left	14	2	½
59	Left	2	2	1 ¼
60	Left	6 ½	3 ¾	1
61	Left	29	9	1
62	Left	26	10	1 ½
63	Left	19	6	¾
64	Left	18	11	¾
65	Left	10	6	¾
66	Left	4 ½	2 ½	2 ¾
67	Left	10	4	3 ½
68	Left	12	4 ¼	4
6	Left	3 ¾	2	1 ¼
70	Left	19 ½	8	4
71	Front	5 ¼	4 ¾	Thru
72	Right	2	2	1

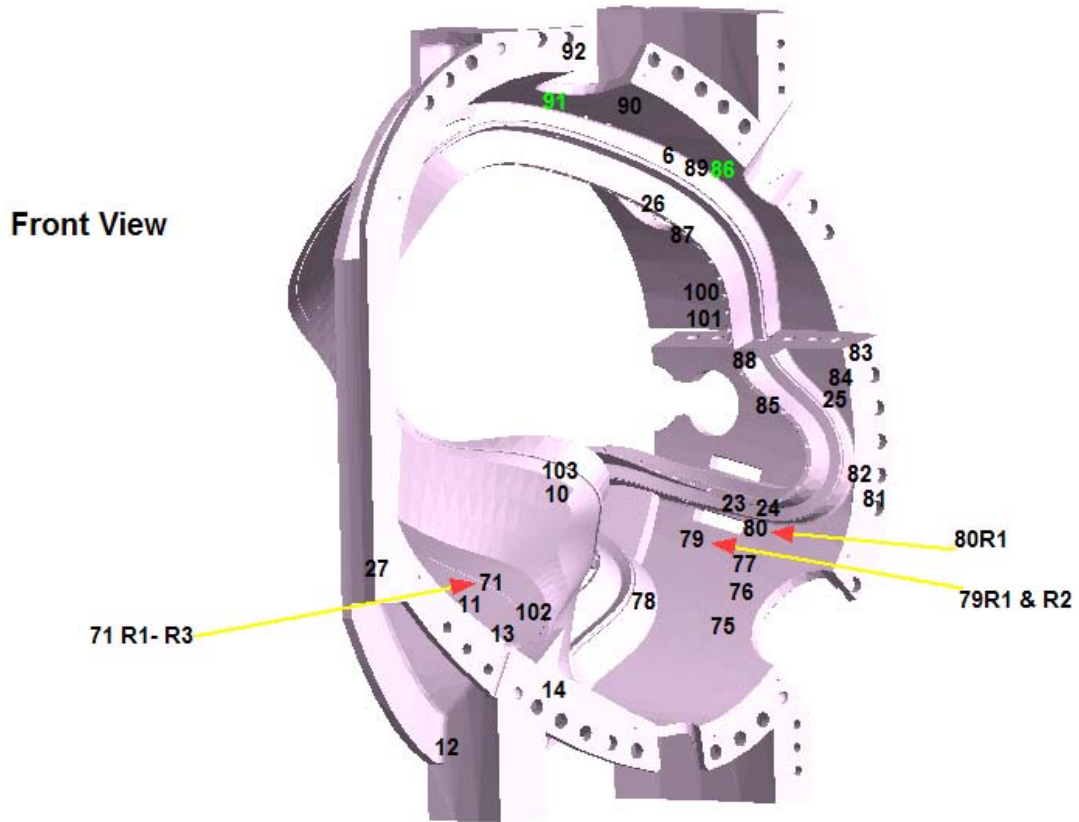
C-3 Coil Weld Map – Metal Tek

Map of all major welds exceeding 20% of wall, over 1 inch or over 10² inches

Defect Number	Drawing View	Length (inches)	Width (inches)	Depth (inches)
73	Right	6 ¼	5	4
74	Right	10 ½	2 ½	1 ¼
75	Front	8 ½	3 ¾	Thru
76	Front	9	5	Thru
77	Front	12 ¼	11	Thru
78	Front	5	3 ½	¼
79	Front	5 ¾	2 ½	¾
80	Front	5	5	1 ½
81	Front	3	3	1 ¼
82	Front	8	2 ½	1
83	Front	3	2	1
84	Front	9	2	1
85	Front	10 ¼	3	1
86	Front	6	4	Thru
87	Front	4	2 ½	1
88	Front	10	2 ½	1 ½
89	Front	3	2	1
90	Front	6 ½	5	Thru
91	Front	4	2	1
92	Front	3	3	1 ½
93	Top	8	4	¾
94	Top	3	1 ½	1
95	Right	5	4	¾
96	Right	12	4	¾
97	Bottom	5	3 ¾	¾
98	Bottom	4 ½	4	¾
99	Back	11 ½	4	3 ½
100	Front	8	4	½
101	Front	9	7	2
102	Front	8	4 ½	½
103	Front	11	3 ½	¾
104	Left	3	3	1
105	Back	6	4 ½	1
79R1	Front	6	5	1
71R1	Front	7	6	3
71R2	Front	5	4 ¼	2 ½
79R2	Front	9	5	1

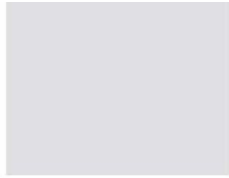
C-3 Coil Weld Map – Metal Tek

Map of all major welds exceeding 20% of wall, over 1 inch or over 10² inches

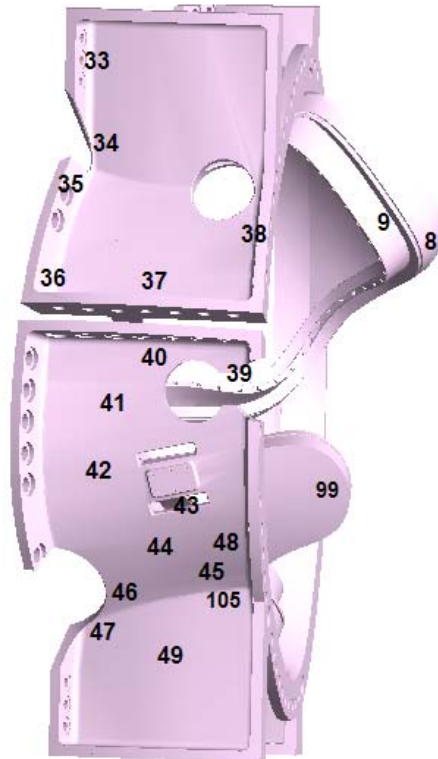


C-3 Coil Weld Map – Metal Tek

Map of all major welds exceeding 20% of wall, over 1 inch or over 10² inches

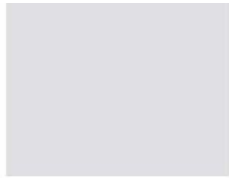


Back View

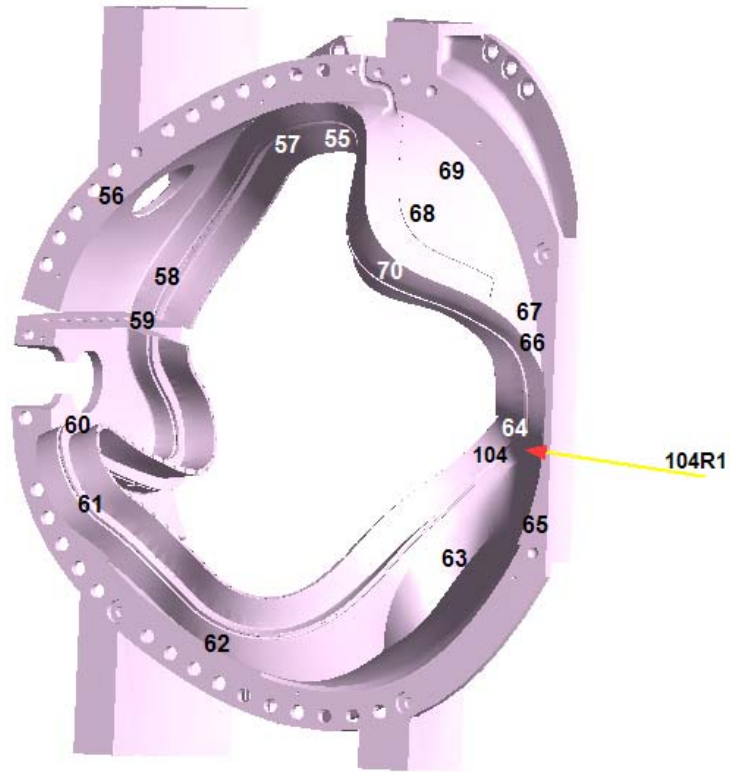


C-3 Coil Weld Map – Metal Tek

Map of all major welds exceeding 20% of wall, over 1 inch or over 10² inches

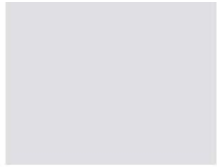


Left View

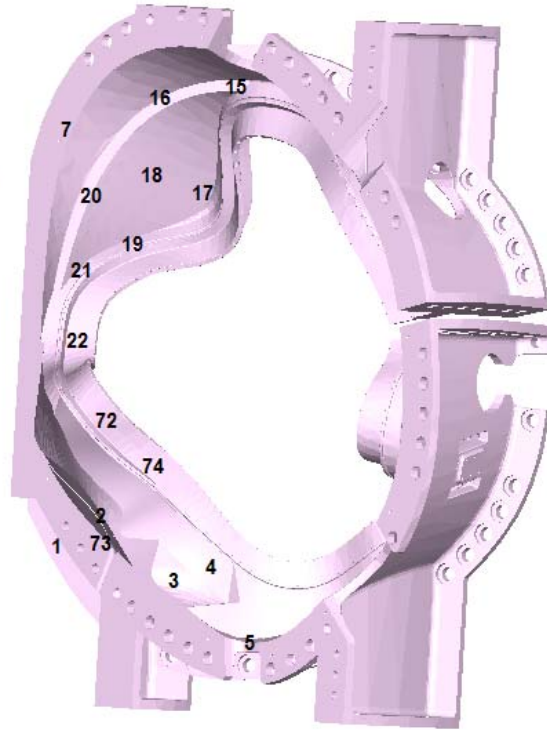


C-3 Coil Weld Map – Metal Tek

Map of all major welds exceeding 20% of wall, over 1 inch or over 10² inches



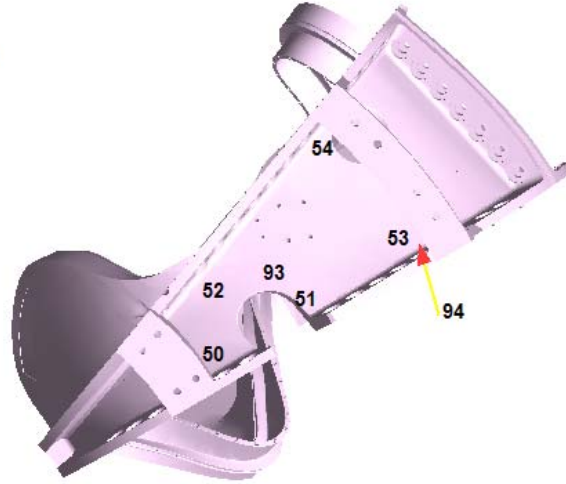
Right View



C-3 Coil Weld Map – Metal Tek

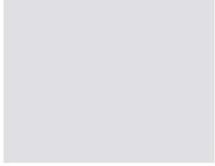
Map of all major welds exceeding 20% of wall, over 1 inch or over 10² inches

Top View

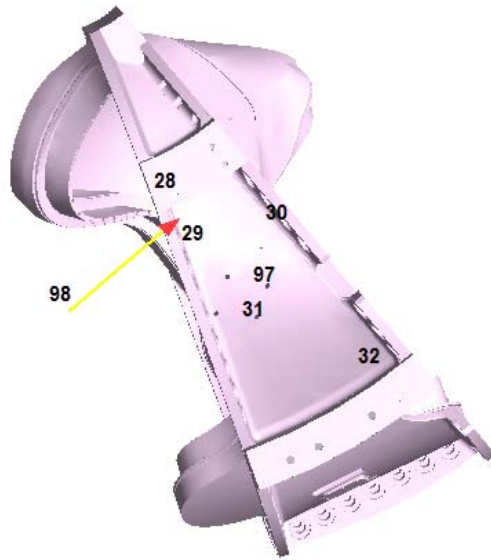


C-3 Coil Weld Map – Metal Tek

Map of all major welds exceeding 20% of wall, over 1 inch or over 10² inches



Bottom View





Corrective Action 1323
Carondelet Division - CA / PA / RGA Database
Corrective Action Type NCR
Date 7/27/2005
CA Originator C. Ruud
Applies to: Coil castings C-1, C-2, C-3, C-4 and A-1 and C 1 shim and four C coil and six A coil shims

Description of Defect / Non-Conformance

Phosphorus levels in material produced to date exceed specification limits. Both phosphorus and sulfur readings reported erroneously in certifications.

Certification reports have shown phosphorus and sulfur levels in the <.01% range. Independent laboratory data confirmed phosphorus in the .018 to .033% range and sulfur in the .005 to .022% range. Actual levels of some tests are above those in PPPL Specification NCSX-CSPEC-141-03-07 Rev 7.

Nonconformance was first suspected as a result of analysis of zoned attached test specimens volunteered by MetalTek International as response to PPPL questions on weighted average chemical analysis and quality of blending in the gating system. Nonconformance was verified on the bars used in the study and has been extended to evaluation of previously poured products.

Root Cause

Specification limits were set below the levels achievable through use of available raw materials. Spectrometer did not properly calibrate for phosphorus and sulfur at levels of specification due to equipment malfunction.

The chemical specification of EIO heats uses alloy CF8MNMn-Mod which incorporates a type standard calibration with a certified reference material (CRM) BS180. This enables the operator of the spectrometer to match the elemental concentrations of this alloy with corrective factors. These factors are determined by analyzing the CRM and having them compared with the calibration curves for each element. The phosphorus and sulfur content have very low measured intensities due to low concentrations. Intermittent failure of the spectrometer intensity measuring card caused higher intensity readings for phosphorus and sulfur. Subsequent checks with the CRM resulted in low corrective factors that were not detected. This in turn resulted in low reported concentrations for the EIO samples. All the major elements, which are measured on other intensity cards, have been closely monitored and matched very well with the CRM and thus were reported correctly.

Corrective Action

Modification to specification for phosphorus and sulfur will be requested. Limits will be set based on process capability and consistent with other stainless steel grades. Replacement of deficient card in spectrometer will be made upon delivery.



Addendum to CA1323 8-17-05

Historical:

The proto type coil was poured on February 24, 2004. The chemistry specification at that time permitted a maximum of 0.04% for sulfur and phosphorus. The reported values for these elements were 0.01 and 0.02% respectively.

Prior to pouring the C-1 coil casting the specification was revised. MT failed to incorporate the revisions into our system. The contract review procedure did not detect the changes to the specification. Therefore normal change procedures were not implemented. This was reported in corrective action 1308 on June 13, 2005. The error was recognized when the material poured to cast C and A coil shims did not meet the revised specification.

An investigation was begun immediately to determine compliance of the C-1 and C-2 coils. It was determined that both the C-1 and C-2 met the revised chemistry, except for sulfur and phosphorus. To verify the analysis MT analyzed samples from the cast on bars taken from the coils. By this time the optical card had malfunctioned. This fact, in combination with the human error (believing that the type standard was also in the 0.002% range) led MT to believe that the sulfur and phosphorus were actually in the 0.002% range. As a result MT believed the coils to be compliant and no action was taken.

Current Activities:

Samples from A-1, C-4 and C-5 have been sent to Wisconsin Centrifugal, our parent company for independent analysis of all reported elements.

Repair to the spectrometer is scheduled for this week. In the mean time we continue our surveillance of the suspect elements during melt and chemistry analysis.

C. Ruud

A handwritten signature in black ink, appearing to read "C. Ruud", written over a white background.

CC: Jim Galaske, Barry Craig, Joe Edwards, E.J. Kubick



Addendum to CA1323 9-8-05

This is to supplement and report our progress on this corrective action.

As previously committed, samples from A-1, C-4 and C-5 were sent to Wisconsin Centrifugal, our parent company, for independent analysis of all reported elements. The results indicated a discrepancy in the level of manganese in the results of the analyses performed by the two labs. Consistently, the Pevely lab measured Mn about 0.4 to 0.5% higher than WC measured. To confirm this information we sent three samples to an outside laboratory for wet chemistry analysis. The results correlated well with the results achieved at Wisconsin Centrifugal. See attached report.

In follow-up, samples from C-1, C-2 and C-3 were also sent for verification, with similar outcome. We then located and tested a sample from a test heat #21424 of CF8MNMNMOD made in January 2004. Testing indicated similar results.

It can be stated that, for at least the period of time comprising the Prototype and the Production to the repair of the Spectrometer, that our analysis of Manganese levels has been higher than the level actually present in the alloy. Typically, this deviation is on the order of 0.4-0.5%.

The spectrometer received the preventive maintenance on August 29, 2005. The report was submitted on September 2, 2005. The repair made to the optical card was determined to have rectified the previously reported issue with P and S reporting. No other mechanical or software problem that would affect Mn was determined at the time of the preventative maintenance.

In follow up to the Manganese discrepancy, the same samples were analyzed on the Pevely spectrometer. The levels reported after PM now correlate with the results from WC and the independent laboratory. Further investigation indicates that the BS180 standard used for type standardization may be sufficiently outside the range of Mn and inducing error. No other root cause has been determined, but the investigation continues.

In consideration of the erroneous Mn and other elemental readings, the following actions are proposed:

- Create a type standard that closely matches the Mn in CF8MNMNMOD. (In process)
- Request a revision to the chemistry range for Mn. (propose widening of Manganese since it has been proven to be effective at much lower concentrations than previously thought).
- Have each heat of CF8MNMNMOD verified independently for balance of program.

A handwritten signature in black ink, appearing to be "C. Ruud".

C. Ruud

CC: Jim Galaske, Barry Craig, Joe Edwards, E.J. Kubick

Chemistry Check with WISCO

Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S
CAF	C-5,I-1	Button #1	0.05	0.3	2.6	18.1	13.4	2.4	0.26	0.023	0.011
CAF	C-5,I-1	Button #2	0.05	0.4	2.6	18.0	13.4	2.6	0.26	0.026	0.013
WC	C-5,I-1	Button #2	0.02	0.3	2.2	18.2	13.5	2.4	0.25	0.025	0.010
STL Wet	C-5,I-1	Button #1			2.2						
CAF	C-5,I-1	Button #1	*	0.3	2.3	18.3	13.4	2.4	*	0.029	0.012 re-run after PM

Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S
CAF	C-5,I-3	Button #1	0.05	0.4	2.2	17.9	13.4	2.5	0.24	0.033	0.012
CAF	C-5,I-3	Button #2	0.05	0.4	2.2	17.9	13.2	2.4	0.24	0.033	0.012
WC	C-5,I-3	Button #2	0.05	0.4	1.8	18.2	13.4	2.5	0.23	0.034	0.018
STL Wet	C-5,I-3	Button #1			1.8						
CAF	C-5,I-3	Button #1	*	0.4	1.8	18.3	13.3	2.5	*	0.034	0.012 re-run after PM

Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S
CAF	C-5,I-6	Button #1	0.05	0.3	2.4	18.1	13.2	2.4	0.25	0.030	0.012
CAF	C-5,I-6	Button #2	0.05	0.3	2.4	18.1	13.2	2.4	0.25	0.029	0.011
WC	C-5,I-6	Button #2	0.04	0.3	2	18.3	13.3	2.4	0.24	0.031	0.018
STL Wet	C-5,I-6	Button #1			1.9						
CAF	C-5,I-6	Button #1	*	0.3	2.0	18.4	13.3	2.4	*	0.033	0.012 re-run after PM

Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S
CAF	A-1	Reported	0.04	0.4	2.4	18.2	13.3	2.4	0.26	*	*
CAF	A-1	Cast on sample	*	0.5	2.1	18.0	13.4	2.4	*	0.034	0.009
WC	A-1	Cast on sample	0.06	0.6	1.6	18.1	13.7	2.4	0.25	0.027	0.009
CAF	A-1	Cast on sample	*	0.6	1.6	18.2	13.5	2.4	*	0.028	0.009 re-run after PM

Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S
CAF	C-4	Reported	0.04	0.4	2.5	18.2	13.2	2.2	0.26	.030**	.014**
CAF	C-4	Cast on sample	*	0.6	1.9	17.9	13.5	2.3	*	0.037	0.013
WC	C-4	Cast on sample	0.04	0.6	1.5	17.8	13.6	2.4	0.25	0.030	0.012
CAF	C-4	Cast on sample	*	0.6	1.4	18.2	13.6	2.4	*	0.031	0.009 re-run after PM

Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S
CAF	C-1	Reported	0.06	0.5	2.7	18.1	13.1	2.2	0.27	0.018**	0.014**
CAF	C-1	Cast on sample	*	0.7	2.2	18.1	13.1	2.2	*	0.021	0.010
WC	C-1	Cast on sample	0.06	0.7	1.8	18.3	13.4	2.4	0.24	0.021	0.014
CAF	C-1	Cast on sample	*	0.7	1.9	18.3	13.2	2.4	*	0.024	0.013 re-run after PM

Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S
CAF	C-2	Reported	0.06	0.5	2.8	18.0	13.2	2.3	0.26	0.023**	0.018**
CAF	C-2	Cast on sample	*	0.8	2.2	18.1	13.4	2.2	*	0.030	0.012
WC	C-2	Cast on sample	0.07	0.9	1.6	18.2	13.7	2.2	0.23	0.023	0.014
CAF	C-2	Cast on sample	*	0.8	1.6	18.2	13.5	2.3	*	0.024	0.012 re-run after PM

Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S
CAF	C-3	Reported	0.04	0.4	2.5	18.2	13.3	2.3	0.25	0.023**	0.013**
CAF	C-3	Cast on sample	*	0.6	1.9	18.0	13.3	2.4	*	0.027	0.010
WC	C-3	Cast on sample	0.06	0.6	1.6	18.3	13.7	2.4	0.24	0.029	0.009
CAF	C-3	Cast on sample	*	0.6	1.6	18.1	13.5	2.4	*	0.028	0.011 re-run after PM

Test Heat poured 1/14/04

Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S
CAF		24424 Button	0.05	0.4	2.8	18.1	12.9	2.2	0.27	0.020	0.010
CAF		24424 Keel bar	*	0.4	2.2	18.2	13.2	2.2	*	0.018	0.010 re-run after PM

* not analyzed by spectrometer.

** analyzed by wet chemistry.

For C-5 C and N were analyzed at CAF and at WC by Leco Analyzer, P+S analyzed on spectrometer.



Addendum to CA1323 9-30-05

This is to supplement and report our progress on this corrective action.

We have discussed the variation in reading the Mn levels with the service technician and the spectrometer manufacturer. No new information has been obtained to explain the differences in reading Mn levels.

The chemistry for the shims poured from heat 29198 has been analyzed and is added to the spreadsheet attached. It shows similar readings for Mn.

The chemistry for the C-6 coil is also added to the spreadsheet. We aimed for higher Mn at the furnace to assure the higher Mn levels. The results indicate the effort was successful.

Update as to action steps:

Create a type standard that closely matches the Mn in CF8MNMNMOD.

Completed at WC and has been sent to another laboratory.

Request a revision to the chemistry range for Mn. (propose widening of Manganese since it has been proven to be effective at much lower concentrations than previously thought).

Pending.

Have each heat of CF8MNMNMOD verified independently for balance of program.

Complete for all coils to date.

A handwritten signature in black ink, appearing to read "C. Ruud".

C. Ruud

CC: Jim Galaske, Barry Craig, Joe Edwards, E.J. Kubick

Chemistry Check with WISCO			Revised 9-30-05			Information in blue added 9-30-05						
Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S	
Heat #29198 for 5 C and 6 A shims												
CAF	29198	Reported 9/24/05	0.07	0.7	2.97	18.1	13.12	2.45	0.255	0.013**	0.01**	
CAF	29198	Separate Test bar	*	0.8	2.7	18.2	13.2	2.4	*	0.025	0.011	re-run after PM
Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S	
CAF	C-6,I-1	Button #1	0.04	0.3	2.5	18.2	13.5	2.4	0.25	0.028	0.010	run after PM
CAF	C-6,I-1	Button #2	*	0.2	2.4	18.1	13.6	2.4	*	0.03	0.012	run after PM
WC	C-6,I-1	Button #2	0.03	0.2	2.4	17.9	13.7	2.5	0.26	0.028	0.010	
Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S	
CAF	C-6,I-3	Button #1	0.04	0.4	2.4	18.2	13.4	2.3	0.25	0.034	0.011	run after PM
CAF	C-6,I-3	Button #2	*	0.4	2.4	18.2	13.7	2.3	*	0.033	0.012	run after PM
WC	C-6,I-3	Button #2	0.03	0.4	2.2	17.9	13.6	2.4	0.25	0.028	0.013	
Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S	
CAF	C-6,I-6	Button #1	0.04	0.4	2.6	18.3	13.4	2.4	0.26	0.031	0.010	run after PM
CAF	C-6,I-6	Button #2	*	0.4	2.5	18.2	13.7	2.4	*	0.031	0.013	run after PM
WC	C-6,I-6	Button #2	0.04	0.4	2.4	18.2	13.7	2.4	0.26	0.030	0.014	
Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S	
CAF	C-6,Z-3	Cast on sample	*	0.6	1.7	18.1	13.6	2.4	*	0.031	0.012	run after PM
WC	C-6,Z-3	Cast on sample	0.04	0.6	1.7	17.8	13.8	2.4	0.26	0.025	0.011	
Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S	
CAF	C-5,I-1	Button #1	0.05	0.3	2.6	18.1	13.4	2.4	0.26	0.023	0.011	
CAF	C-5,I-1	Button #2	0.05	0.4	2.6	18.0	13.4	2.6	0.26	0.025	0.013	
WC	C-5,I-1	Button #2	0.02	0.3	2.2	18.2	13.5	2.4	0.25	0.025	0.010	
STL Wet	C-5,I-1	Button #1			2.2							
CAF	C-5,I-1	Button #1	*	0.3	2.3	18.3	13.4	2.4	*	0.029	0.012	re-run after PM
Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S	
CAF	C-5,I-3	Button #1	0.05	0.4	2.2	17.9	13.4	2.5	0.24	0.033	0.012	
CAF	C-5,I-3	Button #2	0.05	0.4	2.2	17.9	13.2	2.4	0.24	0.033	0.012	
WC	C-5,I-3	Button #2	0.05	0.4	1.8	18.2	13.4	2.5	0.23	0.034	0.018	
STL Wet	C-5,I-3	Button #1			1.8							
CAF	C-5,I-3	Button #1	*	0.4	1.8	18.3	13.3	2.5	*	0.034	0.012	re-run after PM
Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S	
CAF	C-5,I-6	Button #1	0.05	0.3	2.4	18.1	13.2	2.4	0.25	0.030	0.012	
CAF	C-5,I-6	Button #2	0.05	0.3	2.4	18.1	13.2	2.4	0.25	0.029	0.011	
WC	C-5,I-6	Button #2	0.04	0.3	2	18.3	13.3	2.4	0.24	0.031	0.018	
STL Wet	C-5,I-6	Button #1			1.9							
CAF	C-5,I-6	Button #1	*	0.3	2.0	18.4	13.3	2.4	*	0.033	0.012	re-run after PM
Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S	
CAF	A-1	Reported	0.04	0.4	2.4	18.2	13.3	2.4	0.26	*	*	
CAF	A-1	Cast on sample	*	0.5	2.1	18.0	13.4	2.4	*	0.034	0.009	
WC	A-1	Cast on sample	0.06	0.6	1.6	18.1	13.7	2.4	0.25	0.027	0.009	
CAF	A-1	Cast on sample	*	0.6	1.6	18.2	13.5	2.4	*	0.028	0.009	re-run after PM
Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S	
CAF	C-4	Reported	0.04	0.4	2.5	18.2	13.2	2.2	0.26	0.030**	0.014**	
CAF	C-4	Cast on sample	*	0.6	1.9	17.9	13.5	2.3	*	0.037	0.013	
WC	C-4	Cast on sample	0.04	0.6	1.5	17.8	13.6	2.4	0.25	0.030	0.012	
CAF	C-4	Cast on sample	*	0.6	1.4	18.2	13.6	2.4	*	0.031	0.009	re-run after PM
Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S	
CAF	C-1	Reported	0.06	0.5	2.7	18.1	13.1	2.2	0.27	0.013**	0.014**	
CAF	C-1	Cast on sample	*	0.7	2.2	18.1	13.1	2.2	*	0.021	0.010	
WC	C-1	Cast on sample	0.06	0.7	1.8	18.3	13.4	2.4	0.24	0.021	0.014	
CAF	C-1	Cast on sample	*	0.7	1.9	18.3	13.2	2.4	*	0.024	0.013	re-run after PM
Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S	
CAF	C-2	Reported	0.06	0.5	2.8	18.0	13.2	2.3	0.26	0.023**	0.018**	
CAF	C-2	Cast on sample	*	0.8	2.2	18.1	13.4	2.2	*	0.030	0.012	
WC	C-2	Cast on sample	0.07	0.9	1.6	18.2	13.7	2.2	0.23	0.023	0.014	
CAF	C-2	Cast on sample	*	0.8	1.6	18.2	13.5	2.3	*	0.024	0.012	re-run after PM

Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S	
CAF	C-3	Reported	0.04	0.4	2.5	18.2	13.3	2.3	0.25	0.023**	0.013**	
CAF	C-3	Cast on sample	*	0.6	1.9	18.0	13.3	2.4	*	0.027	0.010	
WC	C-3	Cast on sample	0.06	0.6	1.6	18.3	13.7	2.4	0.24	0.023	0.009	
CAF	C-3	Cast on sample	*	0.6	1.6	18.1	13.5	2.4	*	0.023	0.011	re-run after PM
Test Heat poured 1/14/04												
Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S	
CAF	24424	Reported	0.054	0.4	2.8	18.1	12.94	2.21	0.27	0.023	0.010	
CAF	24424	Keel bar	*	0.4	2.2	18.2	13.2	2.2	*	0.013	0.010	re-run after PM
* not analyzed by spectrometer.												
** analyzed by wet chemistry.												
For C-5 and C-6 - C and N were analyzed at CAF and at WC by Leco Analyzer, P+S analyzed on spectrometer.												

Subsequent immediate analysis of chemistry results, obtained by wet analysis, is attached and demonstrate top of specification for sulfur and over specification for phosphorus. The spectrometer manufacturer has performed an analysis to determine the cause of the malfunction and verified that the intensity card has an intermittent fault and must be replaced. The card has been ordered and scheduled for replacement on August 15, 2005.

Until the card is replaced we will be performing additional type standardizations to ensure accurate sulfur and phosphorus analysis. Additionally, for coils made until the card is replaced, an independent laboratory will perform a verification of the chemical analysis.

Verification of Corrective Action

Will be determined at a later date.

Preventive Action

In addition to spectrometer faults, we have identified that the specification ranges for sulfur and phosphorus is unattainable. Analysis and specifications for virgin charge materials predict sulfur at 0.040% maximum and phosphorus at 0.040% maximum. We have no way to remove phosphorus from the melt and do not intentionally add phosphorus. So, the confirmed coil analyses, along with analyses of virgin material heats, demonstrate sulfur in the range of 0.010% to 0.022% and phosphorus in the range of 0.018% to 0.033%. These results are consistent with our charge material analysis. We will request a deviation for phosphorus in the subject parts and also request a permanent specification change to 0.040% maximum for both phosphorus and sulfur, to allow us to provide non-discrepant material. This change will not affect, in any way, the physical properties or material performance because all coils and test material exhibited sulfur and phosphorus within the new ranges despite inaccurate reporting. Other actions: Specifications have been added to the BS 180 standard and the type standard will be measured against the criteria.

Estimated Completion Date

August 15, 2005

Actual Completion Date TBD

Signed: C. Ruud



CC: Jim Galaske, Barry Craig, Joe Edwards, E.J. Kubick

Guide to St Louis Testing Report Dated 7-26-05

Sample name	Sample origin
A1Z1	Cast on bar A-1 coil, zone 1
A1Z2	Cast on bar A-1 coil, zone 2
A1Z3	Cast on bar A-1 coil, zone 3
C1	Cast on bar C-1 coil
C2Z1	Cast on bar C-2 coil, zone 1
C2Z2	Cast on bar C-2 coil, zone 2
C2Z3	Cast on bar C-2 coil, zone 3
C3Z1	Cast on bar C-3 coil, zone 1
C3Z2	Cast on bar C-3 coil, zone 2
C3Z3	Cast on bar C-3 coil, zone 3
F1	Final analysis button from ladle for C-4 coil
F2	Final analysis button from ladle for C-4 coil
F3	Final analysis button from ladle for C-4 coil
P1	Preliminary analysis button from ladle for C-4 coil

Testing is underway of the heat used to pour the four C coil and six A coil shims.



Attachment to
CA 1323

Chemical, Metallurgical, Mechanical, Nondestructive, Environmental Testing, Analyses and Field Service.

July 26, 2005
Lab No. 05C-0608
Invoice No. 59891
P.O. No. 21324
Page 1 of 1

METALTEK INTERNATIONAL
8600 Commercial Blvd.
Pevely, MO 63070

Attention: Chuck Ruud

REPORT OF CHEMICAL ANALYSIS

SAMPLE ID: A1 Z1, A1 Z2, A1 Z3, C1, C2 Z1, C2 Z2, C2 Z3,
C3 Z1, C3 Z2, C3 Z3, F1, F2, F3, P1

RESULTS: %

ANALYTE	A1Z1	A1Z2	A1Z3
Sulfur	.013	.005	.010
Phosphorus	.025	.023	.018

ANALYTE	C1	C2Z1	C2Z2	C2Z3
Sulfur	.014	.022	.018	.015
Phosphorus	.018	.024	.021	.025

ANALYTE	C3Z1	C3Z2	C3Z3
Sulfur	.013	.014	.012
Phosphorus	.024	.025	.021

ANALYTE	F1	F2	F3	P1
Sulfur	.014	.015	.012	.010
Phosphorus	.029	.033	.028	.030

Sulfur Test Method: ASTM E1019-03

Phosphorous Test Method: Colormetric

Identification of tested specimen provided by the client.

Robin E. Sinn
Laboratory Director

RES/nmc





Corrective Action 1379
Carondelet Division - CA / PA / RGA Database
Corrective Action Type NCR
Date 8/31/2005
CA Originator C. Ruud
Applies to: Weld Material Lincoln 3018926-78309

Description of Defect / Non-Conformance

Material failed elongation and one of three Charpy impact tests at -320 F. The average of the specimens exceeds the minimum. See S8 of ASTM A 703/A 703M.

Root Cause

The sample of the weld contained defects not detected.

Corrective Action

Retest material already at Lab.
If needed, make a new weld plate after reviewing process with welder and weld another sample.

Verification of Corrective Action

Retest results. If new plates are needed, the new plate will be x-rayed prior to testing.

Estimated Completion Date

9-2-05

Actual Completion Date TBD

Signed: C. Ruud

A handwritten signature in black ink, appearing to be "C. Ruud".

CC: R. Suria, Barry Craig, Joe Edwards, E.J. Kubick

Nonconformance Report: CA1379

Project Disposition:


Since the re-test meets requirements, this NCR can now be considered closed.

Approvals:

Phil
Heitzenroeder

Digitally signed by Phil Heitzenroeder
DN: CN = Phil Heitzenroeder, C = US,
O = PPPL, OU = Mech. Eng. Division
Reason: I am approving this document
Date: 2005.11.07 10:09:53 -0500

Procurement Technical Representative

 11/7/05

Responsible Line Manager:



Corrective Action 1403
Carondelet Division - CA / PA / RGA Database
Corrective Action Type NCR
Date 9-30-05
CA Originator C. Ruud
Applies to: C-3 Coil

Description of Defect / Non-Conformance

Lack of fusion and porosity in weld repairs were observed during radiography of the R-2 through R-7 x-ray confirmation shots.

Root Cause

Porosity and lack of fusion was caused by leaks in the lines feeding gas to the welding booths and leaks from the leads on one welding machine. Some repair loops resulted from the original defects not fully being removed during excavation.

Corrective Action

Took all welders off the main lines and supplied with bottled gas. Inspect all lines from the bulk tanks to the weld booth. Replaced defective lead. Reviewed proper excavation techniques with the welders. The start up procedure for welders has been revised to include a flow check. If flow is not adequate, welding will not be performed until repairs are complete and re test indicate proper flow.

Verification of Corrective Action

Re x-ray the defective welds.

Estimated Completion Date

9/16/05 for repairs, other actions 10/21/05.

Actual Completion Date

9/16/05 for bottle gas, repairs and RT. 10/4/05 for leads.

Signed: C. Ruud

A handwritten signature in black ink, appearing to be "C. Ruud", written over a horizontal line.

CC: R Suria, B. Craig, J. Edwards, E.J. Kubick