



Entergy Nuclear Operations, Inc.
Palisades Nuclear Plant
27780 Blue Star Memorial Highway
Covert, MI 49043-9530
Tel 269 764 2000

PNP 2015-063

Anthony J. Vitale
Site Vice President

August 14, 2015

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

SUBJECT: Supplemental Information for the Response to the First Request for Additional Information Regarding the License Amendment Request to Implement 10 CFR 50.61a (TAC No. MF4528)

Palisades Nuclear Plant
Docket No. 50-255
Renewed Facility Operating License No. DPR-20

- REFERENCES:
1. Entergy Nuclear Operations, Inc. letter PNP 2014-049, *License Amendment Request to Implement 10 CFR 50.61a, "Alternate Fracture Toughness Requirements for Protection Against Pressurized Thermal Shock Events,"* dated July 29, 2014 (ADAMS Accession Package No. ML14211A520).
 2. NRC letter, *Palisades Nuclear Plant – Request for Additional Information Regarding the License Amendment Request to Implement 10 CFR 50.61a (TAC No. MF4528)*, dated January 20, 2015 (ADAMS Accession No. ML15016A184).
 3. Entergy Nuclear Operations, Inc. letter PNP 2015-004, *Response to Request for Additional Information Regarding the License Amendment Request to Implement 10 CFR 50.61a (TAC No. MF4528)*, dated February 13, 2015 (ADAMS Accession No. ML15050A259).
 4. NRC letter, *Palisades Nuclear Plant – Request for Additional Information Regarding the License Amendment Request to Implement 10 CFR 50.61a (TAC No. MF4528)*, dated March 19, 2015 (ADAMS Accession No. ML15072A254).

PROPRIETARY

Attachment 2 contains confidential information submitted under 10 CFR 2.390. Withhold from public disclosure. When separated from Attachment 2, the remainder of the submittal may be decontrolled.

5. Entergy Nuclear Operations, Inc. letter PNP 2015-023, *Response to Second Request for Additional Information Regarding the License Amendment Request to Implement 10 CFR 50.61a (TAC No. MF4528)*, dated April 1, 2015 (ADAMS Accession No. ML15091A468).

Dear Sir or Madam:

In Reference 1, Entergy Nuclear Operations, Inc. (ENO) submitted a license amendment request for the Palisades Nuclear Plant renewed facility operating license pursuant to 10 CFR 50.61a(c) and 10 CFR 50.90. The proposed amendment would authorize the implementation of 10 CFR 50.61a, "Alternate fracture toughness requirements for protection against pressurized thermal shock events," in lieu of 10 CFR 50.61, "Fracture toughness requirements for protection against pressurized thermal shock events."

In Reference 2, ENO received a request for additional information (RAI) concerning the license amendment request. The ENO response to RAI 2a included proprietary reactor vessel materials certification reports in Attachment 3 (Reference 3).

This submittal provides a non-proprietary version of the reactor vessel materials certification reports that were provided in Attachment 3 of Reference 3 in response to RAI 2a.

In Reference 4, ENO received a second RAI, and responded to the RAI in Reference 5. References 4 and 5 are listed for completeness of docketed correspondence.

Attachment 1 provides the Westinghouse proprietary authorization affidavit supporting the proprietary nature of Attachment 2. The affidavit sets forth the basis on which the information may be withheld from public disclosure by the NRC and addresses the specific considerations listed in paragraph (b) of 10 CFR 2.390, Public inspections, exemptions, requests for withholding. Accordingly, it is respectfully requested that the information which is proprietary to Westinghouse be withheld from public disclosure in accordance with 10 CFR 2.390. This attachment supersedes the affidavit documentation in Attachment 2 of Reference 3.

Attachment 2 provides proprietary reactor vessel materials certification reports that support the response to RAI 2a. This attachment supersedes Attachment 3 of Reference 3.

Attachment 3 provides the non-proprietary version of the reactor vessel materials certification reports that supplement the response to RAI 2a.

This submittal makes no new commitments and no revisions to existing commitments.

In accordance with 10 CFR 50.91(b), a copy of this application, with the attachment, is being provided to the designated State of Michigan official.

I declare under penalty of perjury that the foregoing is true and correct. Executed on August 14, 2015.

Sincerely,

A handwritten signature in black ink, appearing to read 'AJV/jse', written in a cursive style.

AJV/jse

Attachment 1: Westinghouse Affidavit Documentation

Attachment 2: Palisades Reactor Vessel Materials Certification Reports for Response to Request for Additional Information 2a (Proprietary Version)

Attachment 3: Palisades Reactor Vessel Materials Certification Reports for Response to Request for Additional Information 2a (Non-Proprietary Version)

cc: Administrator, Region III, USNRC
Project Manager, Palisades, USNRC
Resident Inspector, Palisades, USNRC
State of Michigan

PNP 2015-063

Attachment 1

Westinghouse Affidavit Documentation

7 Pages Follow



Westinghouse Electric Company
1000 Westinghouse Drive
Cranberry Township, Pennsylvania 16066
USA

U.S. Nuclear Regulatory Commission
Document Control Desk
11555 Rockville Pike
Rockville, MD 20852

Direct tel: (412) 374-4643
Direct fax: (724) 940-8560
e-mail: greshaja@westinghouse.com

CAW-15-4252

August 5, 2015

**APPLICATION FOR WITHHOLDING PROPRIETARY
INFORMATION FROM PUBLIC DISCLOSURE**


Subject: CPAL-15-13, Attachment 1, "Palisades Reactor Vessel Material Certification Reports"
(Proprietary)

The proprietary information for which withholding is being requested in the above-referenced document is further identified in Affidavit CAW-15-4252 signed by the owner of the proprietary information, Westinghouse Electric Company LLC. The Affidavit, which accompanies this letter, sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in paragraph (b)(4) of 10 CFR Section 2.390 of the Commission's regulations.

The Material Certification Reports contained in the subject document were originally classified as C-E Proprietary, considered equivalent to Westinghouse Proprietary Class 2.

Accordingly, this letter authorizes the utilization of the accompanying Affidavit by Entergy Nuclear Operations, Inc.

Correspondence with respect to the proprietary aspects of the application for withholding or the Westinghouse Affidavit should reference CAW-15-4252, and should be addressed to James A. Gresham, Manager, Regulatory Compliance, Westinghouse Electric Company, 1000 Westinghouse Drive, Building 3 Suite 310, Cranberry Township, Pennsylvania 16066.


James A. Gresham, Manager
Regulatory Compliance

Enclosures

August 5, 2015

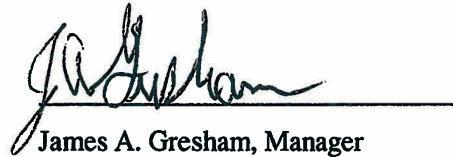
AFFIDAVIT

COMMONWEALTH OF PENNSYLVANIA:

ss

COUNTY OF BUTLER:

I, James A. Gresham, am authorized to execute this Affidavit on behalf of Westinghouse Electric Company LLC (Westinghouse), and that the averments of fact set forth in this Affidavit are true and correct to the best of my knowledge, information, and belief.

A handwritten signature in black ink, appearing to read "JA Gresham", is written over a horizontal line.

James A. Gresham, Manager

Regulatory Compliance

- (1) I am Manager, Regulatory Compliance, Westinghouse Electric Company LLC (Westinghouse), and as such, I have been specifically delegated the function of reviewing the proprietary information sought to be withheld from public disclosure in connection with nuclear power plant licensing and rule making proceedings, and am authorized to apply for its withholding on behalf of Westinghouse.
- (2) I am making this Affidavit in conformance with the provisions of 10 CFR Section 2.390 of the Commission's regulations and in conjunction with the Westinghouse Application for Withholding Proprietary Information from Public Disclosure accompanying this Affidavit.
- (3) I have personal knowledge of the criteria and procedures utilized by Westinghouse in designating information as a trade secret, privileged or as confidential commercial or financial information.
- (4) Pursuant to the provisions of paragraph (b)(4) of Section 2.390 of the Commission's regulations, the following is furnished for consideration by the Commission in determining whether the information sought to be withheld from public disclosure should be withheld.
 - (i) The information sought to be withheld from public disclosure is owned and has been held in confidence by Westinghouse.
 - (ii) The information is of a type customarily held in confidence by Westinghouse and not customarily disclosed to the public. Westinghouse has a rational basis for determining the types of information customarily held in confidence by it and, in that connection, utilizes a system to determine when and whether to hold certain types of information in confidence. The application of that system and the substance of that system constitute Westinghouse policy and provide the rational basis required.

Under that system, information is held in confidence if it falls in one or more of several types, the release of which might result in the loss of an existing or potential competitive advantage, as follows:

- (a) The information reveals the distinguishing aspects of a process (or component, structure, tool, method, etc.) where prevention of its use by any of

Westinghouse's competitors without license from Westinghouse constitutes a competitive economic advantage over other companies.

- (b) It consists of supporting data, including test data, relative to a process (or component, structure, tool, method, etc.), the application of which data secures a competitive economic advantage, e.g., by optimization or improved marketability.
 - (c) Its use by a competitor would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing a similar product.
 - (d) It reveals cost or price information, production capacities, budget levels, or commercial strategies of Westinghouse, its customers or suppliers.
 - (e) It reveals aspects of past, present, or future Westinghouse or customer funded development plans and programs of potential commercial value to Westinghouse.
 - (f) It contains patentable ideas, for which patent protection may be desirable.
- (iii) There are sound policy reasons behind the Westinghouse system which include the following:
- (a) The use of such information by Westinghouse gives Westinghouse a competitive advantage over its competitors. It is, therefore, withheld from disclosure to protect the Westinghouse competitive position.
 - (b) It is information that is marketable in many ways. The extent to which such information is available to competitors diminishes the Westinghouse ability to sell products and services involving the use of the information.
 - (c) Use by our competitor would put Westinghouse at a competitive disadvantage by reducing his expenditure of resources at our expense.

- (d) Each component of proprietary information pertinent to a particular competitive advantage is potentially as valuable as the total competitive advantage. If competitors acquire components of proprietary information, any one component may be the key to the entire puzzle, thereby depriving Westinghouse of a competitive advantage.
 - (e) Unrestricted disclosure would jeopardize the position of prominence of Westinghouse in the world market, and thereby give a market advantage to the competition of those countries.
 - (f) The Westinghouse capacity to invest corporate assets in research and development depends upon the success in obtaining and maintaining a competitive advantage.
- (iv) The information is being transmitted to the Commission in confidence and, under the provisions of 10 CFR Section 2.390, it is to be received in confidence by the Commission.
- (v) The information sought to be protected is not available in public sources or available information has not been previously employed in the same original manner or method to the best of our knowledge and belief.
- (vi) The proprietary information sought to be withheld in this submittal is that contained in CPAL-15-13, Attachment 1, "Palisades Reactor Vessel Material Certification Reports" (Proprietary), for submittal to the Commission, being transmitted by Entergy Nuclear Operations, Inc. letter and Application for Withholding Proprietary Information from Public Disclosure, to the Document Control Desk. The proprietary information as submitted by Westinghouse is that associated with NRC letter PALISADES NUCLEAR PLANT-REQUEST FOR ADDITIONAL INFORMATION REGARDING THE LICENSE AMENDMENT REQUEST TO IMPLEMENT 10 CFR 50.61a (TAC NO. MF4528), and may be used only for that purpose.

- (a) This information is part of that which will enable Westinghouse to:
 - (i) Perform reactor vessel integrity evaluations to support license renewal.
 - (ii) Document the specific properties of the reactor vessel beltline materials.
- (b) Further this information has substantial commercial value as follows:
 - (i) Westinghouse plans to use the information to perform evaluations that demonstrate compliance with NRC requirements for vessel integrity.
 - (ii) The information requested to be withheld represents a valuable resource for Palisades in demonstrating the material properties of its reactor vessel components.

Public disclosure of this proprietary information is likely to cause substantial harm to the competitive position of Westinghouse because it would enhance the ability of competitors to provide similar analyses and licensing defense services for Palisades without commensurate expenses. Also, public disclosure of the information would enable others to use the information to meet NRC requirements for licensing documentation without purchasing the right to use the information.

In order for competitors of Westinghouse to duplicate this information, similar technical programs would have to be performed and a significant manpower effort, having the requisite talent and experience, would have to be expended.

Further the deponent sayeth not.

PROPRIETARY INFORMATION NOTICE

Transmitted herewith are the proprietary and non-proprietary documents furnished to the NRC in connection with NRC letter PALISADES NUCLEAR PLANT -REQUEST FOR ADDITIONAL INFORMATION REGARDING THE LICENSE AMENDMENT REQUEST TO IMPLEMENT 10 CFR 50.61a (TAC NO. MF4528), and may be used only for that purpose.

In order to conform to the requirements of 10 CFR 2.390 of the Commission's regulations concerning the protection of proprietary information so submitted to the NRC, the information which is proprietary in the proprietary versions is contained within brackets, and where the proprietary information has been deleted in the non-proprietary versions, only the brackets remain (the information that was contained within the brackets in the proprietary versions having been deleted). The justification for claiming the information so designated as proprietary is indicated in both versions by means of lower case letters (a) through (f) located as a superscript immediately following the brackets enclosing each item of information being identified as proprietary or in the margin opposite such information. These lower case letters refer to the types of information Westinghouse customarily holds in confidence identified in Sections (4)(ii)(a) through (4)(ii)(f) of the Affidavit accompanying this transmittal pursuant to 10 CFR 2.390(b)(1).

COPYRIGHT NOTICE

The reports transmitted herewith each bear a Westinghouse copyright notice. The NRC is permitted to make the number of copies of the information contained in these reports which are necessary for its internal use in connection with generic and plant-specific reviews and approvals as well as the issuance, denial, amendment, transfer, renewal, modification, suspension, revocation, or violation of a license, permit, order, or regulation subject to the requirements of 10 CFR 2.390 regarding restrictions on public disclosure to the extent such information has been identified as proprietary by Westinghouse, copyright protection notwithstanding. With respect to the non-proprietary versions of these reports, the NRC is permitted to make the number of copies beyond those necessary for its internal use which are necessary in order to have one copy available for public viewing in the appropriate docket files in the public document room in Washington, DC and in local public document rooms as may be required by NRC regulations if the number of copies submitted is insufficient for this purpose. Copies made by the NRC must include the copyright notice in all instances and the proprietary notice if the original was identified as proprietary.

PNP 2015-063

Attachment 3

**Palisades Reactor Vessel Materials Certification Reports for
Response to Request for Additional Information 2a
(Non-Proprietary Version)**

14 Pages Follow

J. W. Rogers

COMBUSTION ENGINEERING, INC.

RVG-000 0001304

METALLURGICAL RESEARCH AND DEVELOPMENT DEPT

Revised Copy

MATERIALS CERTIFICATION REPORT

MATERIAL SPECIFICATION P3F 12(a)CONTRACT NO. 2966-AVENDOR Lukens Steel CompanyJOB NO. T-51051HEAT NO. C-1279-2CODE NO. D-3802-1

MATERIAL DESCRIPTION []

a.c.e

MILL CHEMICAL ANALYSIS

TYPE	C	Mn	P	S	Si	Ni	Cr	Mo	Cb	Cu	a.c.e

MECHANICAL TESTS

TEST NO.	GAUGE	TEST TEMPERATURE °F	YIELD STRENGTH, KSI	ULTIMATE TENSILE STRENGTH, KSI	ELONG. IN 2" %	REDUCTION OF AREA %	a.c.e

IMPACT AND/OR FRACTURE TESTS

TYPE	TEMP. °F	VALUES			TEMP. °F	VALUES	NDT
CVN		Ft. Lbs	% Shear	Mils			
				Lat. Exp			
	-40	7.0	a.c.e	8			
	-40	9.0		9			
	-40	9.0		10			a.c.e
	+10	22.0		21			
	+10	27.0		24			
	+10	17.0		18			
	+40	25.0		24			
	+40	65.0		54			
	+40	46.0		40			
	+110	95.0		72			
	+110	95.0		75			
	+110	110.0		85			
	+160	115.0		88			
	+160	117.0		86			
	+160	115.0		80			

a.c.e

Form E-2120

cc: Mr. R. E. Lorentz, Jr.
 S. R. Lewis
 P. Webb (2)
 J. Brasfield

2-89

We hereby certify that the foregoing data is a true copy of the data furnished us by the producing mill, or data resulting from tests performed in the Combustion Metallurgical Laboratory.

COMBUSTION ENGINEERING, INC.

BY William C. RiggsDATE March 25 1968

J. W. Rogers

COMBUSTION ENGINEERING, INC.

RVG-0000001307

Revised Copy

METALLURGICAL RESEARCH AND DEVELOPMENT DEPT

MATERIALS CERTIFICATION REPORT

MATERIAL SPECIFICATION P3F12(a)CONTRACT NO. 2966-AVENDOR Lukens Steel CompanyJOB NO. T-51051HEAT NO. C-1308-2CODE NO. D-3802-2

MATERIAL DESCRIPTION []

a.c.e

MILL CHEMICAL ANALYSIS

TYPE	C	Mn	P	S	Si	Ni	Cr	Mo	Cb	Cu	a.c.e

MECHANICAL TESTS

TEST NO.	GAUGE	TEST TEMPERATURE °F	YIELD STRENGTH, KSI	ULTIMATE TENSILE STRENGTH, KSI	ELONG. IN 2" %	REDUCTION OF AREA %	a.c.e

IMPACT AND/OR FRACTURE TESTS

TYPE	TEMP. °F	VALUES			TEMP. °F	VALUES			NDT
CVN		Ft. Lbs	% Shear	Mils		Drop Weight Tests			
				a.c.e Lat.	Exp.				
	-40	10.0		10					
	-40	9.0		11					
	-40	9.0		10					
	+10	18.0		20					
	+10	24.0		23					
	+10	30.0		29					
	+40	34.0		32					
	+40	43.0		39					
	+40	40.0		37					
	+110	85.0		71					
	+110	63.0		55					
	+110	82.0		67					
	+160	120.0		90					
	+160	117.0		79					
	+160	102.0		84					

a.c.e

Form E-2120

cc: R. E. Lorentz, Jr.
S. R. Lewis
P. Webb (2)
J. Brasfield

2-90

We hereby certify that the foregoing data is a true copy of the data furnished us by the producing mill, or data resulting from tests performed in the Combustion Metallurgical Laboratory.

COMBUSTION ENGINEERING, INC.

BY

William C. Riggs

DATE

March 26, 1968

J. W. Rogers

COMBUSTION ENGINEERING, INC.

Revised Copy

METALLURGICAL RESEARCH AND DEVELOPMENT, DEPT

RVG-0000001308

MATERIALS CERTIFICATION REPORT

MATERIAL SPECIFICATION P3F12 (a)

CONTRACT NO. 2966-A

VENDOR Lukens Steel Company

JOB NO. T-51051

HEAT NO. C-1281-1

CODE NO. D-3802-3

MATERIAL DESCRIPTION

a.c.e

MILL CHEMICAL ANALYSIS

TYPE	C	Mn	P	S	Si	Ni	Cr	Mo	Cb	Cu	a.c.e

MECHANICAL TESTS

TEST NO.	GAUGE	TEST TEMPERATURE °F	YIELD STRENGTH, KSI	ULTIMATE TENSILE STRENGTH, KSI	ELONG. IN 2" %	REDUCTION OF AREA %	a.c.e

IMPACT AND/OR FRACTURE TESTS

TYPE	TEMP. °F	VALUES	TEMP. °F	VALUES	NDT
CVN		Ft. Lbs % Shear Mils		Drop Weight Tests	
		a.c.e at Exp.			
	-40	7.0		8	
	-40	10.0		10	
	-40	12.0		11	
	+10	21.0		21	
	+10	36.5		32	
	+10	37.0		32	
	+40	48.0		40	
	+40	40.0		35	
	+40	47.0		39	
	+110	79.0		65	
	+110	83.0		64	
	+110	72.0		61	
	+160	86.0		71	
	+160	94.0		79	
	+160	93.0		79	

Form E-2120

cc: R. E. Lorentz, Jr.
S. R. Lewis
P. Webb. (2)
J. Brasfield

2-91

We hereby certify that the foregoing data is a true copy of the data furnished us by the producing mill, or data resulting from tests performed in the Combustion Metallurgical Laboratory.

COMBUSTION ENGINEERING, INC.

BY

William C. Riggs

March 26, 1968

DATE

[

]

METALLURGICAL RESEARCH AND DEVELOPMENT DEPT

RVG-0000001313

MATERIALS CERTIFICATION REPORT

MATERIAL SPECIFICATION P3F12 (a)

CONTRACT NO. 2966-A

VENDOR Lukens Steel Company

JOB NO. T-51057

HEAT NO. A-0313-2

CODE NO. D-3803-2

MATERIAL DESCRIPTION

a,c,e

MILL CHEMICAL ANALYSIS											
TYPE	C	Mn	P	S	Si	NI	Cr	Mo	Cb	Cu	
Check	.19	1.35	.011	.026	.27	.50		.49			

MECHANICAL TESTS						
TEST NO.	GAUGE	TEST TEMPERATURE °F	YIELD STRENGTH, KSI	ULTIMATE TENSILE STRENGTH, KSI	ELONG. IN 2" %	REDUCTION OF AREA %

IMPACT AND/OR FRACTURE TESTS							
TYPE	TEMP. °F	VALUES			TEMP. °F	VALUES	NDT
CVN		Ft. Lbs	% Shear	Mils			
			a.c.e	Lat.	Exp.		a.c.e

Form E-2120

cc: R. E. Lorentz, Jr.
S. R. Lewis
P. Webb (2)
J. Brasfield

Q-87

We hereby certify that the foregoing data is a true copy of the data furnished us by the producing mill, or data resulting from tests performed in the Combustion Metallurgical Laboratory.

COMBUSTION ENGINEERING, INC.

BY William C. Ring

DATE March 25, 1968

J. W. Rogers

COMBUSTION ENGINEERING, INC.

RVG-000 000-1320

METALLURGICAL RESEARCH AND DEVELOPMENT DEPT

MATERIALS CERTIFICATION REPORT

MATERIAL SPECIFICATION P3F12(a) SA-302-B Mod.CONTRACT NO. 2966AVENDOR Lukens Steel Co.JOB NO. T-51406HEAT NO. C-1308-1CODE NO. D-3804-1MATERIAL DESCRIPTION []

a.c.e

MILL CHEMICAL ANALYSIS

TYPE	C	Mn	P	S	Si	Ni	Cr	Mo	Cb	Cu
Check	.23	1.22	.017	.024	.24	.45		.47		

MECHANICAL TESTS

TEST NO.	GAUGE	TEST TEMPERATURE °F	YIELD STRENGTH, KSI	ULTIMATE TENSILE STRENGTH, KSI	ELONG. IN 2" %	REDUCTION OF AREA a.c.e

IMPACT AND/OR FRACTURE TESTS

TYPE	TEMP. °F	VALUES			Mils	TEMP. °F	VALUES			Mils	NDT
		Ft./Lb.	% Shear	Lat. Exp.			Ft./Lb.	% Shear	Lat. Exp.		
YH-4			a.c.e								a.c.e
						+160	110.0	100			a.c.e
						+160	108.0	100			
						+160	110.0	100			
											a.c.e
	+110	114.0	100	a.c.e							-30
											a.c.e

We hereby certify that the foregoing data is a true copy of the data furnished us by the producing mill, or data resulting from tests performed in the Combustion Metallurgical Laboratory.

COMBUSTION ENGINEERING, INC.

cc: R. E. Lorentz, Jr.

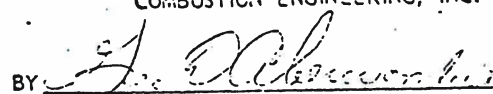
C. R. Pandelis

S. R. Lewis

J. Brasfield

FIVE-BR Coulter

BY


DATE January 11, 1967

J. W. Rogers

COMBUSTION ENGINEERING, INC.

0000

METALLURGICAL RESEARCH AND DEVELOPMENT DEPT

0000

MATERIALS CERTIFICATION REPORT

RVG-000 0001323

MATERIAL SPECIFICATION P3F12(a) SA-302-B Mod.CONTRACT NO. 2966AVENDOR Lukens Steel Co.JOB NO. T-51406HEAT NO. C-1308-3CODE NO. D-3804-2MATERIAL DESCRIPTION

a.c.e

MILL CHEMICAL ANALYSIS

TYPE	C	Mn	P	S	Si	Ni	Cr	Mo	Cb	Cu
Check	.23	1.25	.018	.022	.24	.50		.50		

MECHANICAL TESTS

TEST NO.	GAUGE	TEST TEMPERATURE °F	YIELD STRENGTH, KSI	ULTIMATE TENSILE STRENGTH, KSI	ELONG. IN 2" %	REDUCTION OF AREA a.c.e

IMPACT AND/OR FRACTURE TESTS

TYPE	TEMP. °F	VALUES			Mils	TEMP. °F	VALUES			Mils	NDT
		Ft./Lb.	% Shear	Lat.Exp.			Ft./Lb.	% Shear	Lat.Exp.		
ZH-4			a.c.e	a.c.e							
						+160	119.0	100			a.c.e
						+160	115.0	100			a.c.e
						+160	117.0	100			a.c.e
											-40
	+110	115.0	100								
	+100	117.0	100								a.c.e

We hereby certify that the foregoing data is a true copy of the data furnished us by the producing mill, or data resulting from tests performed in the Combustion Metallurgical Laboratory.

COMBUSTION ENGINEERING, INC.

cc: R. E. Lorentz, Jr.

C. R. Pandelis

S. R. Lewis

J. Brasfield

Form E-Bi: Goulter

BY A. P. ChittendenDATE January 11, 1967

J. W. Rogers

COMBUSTION ENGINEERING, INC.

KVG-000 0001314

6893

METALLURGICAL RESEARCH AND DEVELOPMENT DEPT

MATERIALS CERTIFICATION REPORT

MATERIAL SPECIFICATION P3F12(a) SA-302-B Mod.CONTRACT NO. 2966AVENDOR Lukens Steel Co.JOB NO. T-51406HEAT NO. B-5294-2CODE NO. D-3804-3MATERIAL DESCRIPTION []

a.c.e

MILL CHEMICAL ANALYSIS

TYPE	C	Mn	P	S	Si	Ni	Cr	Mo	Cb	Cu
Check	.22	1.27	.010	.020	.25	.54		.48		

MECHANICAL TESTS

TEST NO.	GAUGE	TEST TEMPERATURE °F	YIELD STRENGTH, KSI	ULTIMATE TENSILE STRENGTH, KSI	ELONG. IN 2" %	REDUCTION OF AREA % a.c.e

IMPACT AND/OR FRACTURE TESTS

TYPE	TEMP. °F	VALUES			Mils	TEMP. °F	VALUES			Mils	NDT
		Ft./Lb.	% Shear	Lat. Exp.			Ft./Lb.	% Shear	Lat. Exp.		
AI-4			a.c.e	a.c.e		+110	119.0	100		a.c.e	
						+160	115.0	100			
						+160	108.0	100			
						+160	108.0	100			
	+110	113.0	100								a.c.e
	+110	114.0	100								-30

a.c.e

We hereby certify that the foregoing data is a true copy of the data furnished us by the producing mill, or data resulting from tests performed in the Combustion Metallurgical Laboratory.

COMBUSTION ENGINEERING, INC.

cc: R. E. Lorentz, Jr.

C. R. Pandelis

S. R. Lewis

J. Brasfield

Form E-B: Goulter

BY

A. O. Ch...

DATE

January 11, 1967

