

50-289

NRC DISTRIBUTION FOR PART 50 DOCKET MATERIAL

FILE NUMBER

TO: Mr. R. Reid

FROM:

Met. Ed. Co.
Reading, Pa. 19603
J.G. Herbein

DATE OF DOCUMENT

9-21-77

DATE RECEIVED

9-23-77

☒ LETTER
☒ ORIGINAL
☐ COPY☐ NOTORIZED
☒ UNCLASSIFIED

PROP

INPUT FORM

NUMBER OF COPIES RECEIVED

1 Signed

DESCRIPTION

Ltr trans the following: 2P

ENCLOSURE

Reviews of the metallurgical properties
of the DH-P-1A/B shafts as documented by
record by Met. Ed & Babcock & trans 5 Attchmts.
(8P)

1492 030

PLANT NAME: Three Mile Island Unit 1

DHL 9-23-77

1 CY ENCL Rec'd *

SAFETY

FOR ACTION/INFORMATION

BRANCH CHIEF: (7)

Reid

INTERNAL DISTRIBUTION

REG FILE

NRC PDR

I & E (2)

OELD

HANAUER

CHECK

STELLO

EISENHUT

SHAO

BAER

BUTLER

GRIMES

J. COLLINS

EXTERNAL DISTRIBUTION

LPDR: Harrisburg, PA.

TIC

NSIC

16 CYS ACRS SENT CATEGORY B

CONTROL NUMBER

772660165

7910800 627 P



METROPOLITAN EDISON COMPANY

POST OFFICE BOX 542 READING, PENNSYLVANIA 19603

TELEPHONE 215 - 929-3601

September 21, 1977
GQL 1289

Director of Nuclear Reactor Regulation
Attn: R. W. Reid, Chief
Operating Reactors Branch No. 4
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Sir:

Three Mile Island Nuclear Station, Unit 1 (TMI-1)
Docket No. 50-289
Operating License No. DPR-50
Decay Heat Pump Shafts
Metallurgical Properties Preliminary Report

23
1492 031

This letter is in response to Paragraph No. 3 of Metropolitan Edison Company, GQL 1234, September 8, 1977. Both Met-Ed and Babcock and Wilcox have reviewed, to the extent possible, the metallurgical properties of the DH-P-1A/B shafts as documented by record. Results of these reviews are as follows:

1. On January 21, 1969, Worthington Corporation added PT #930679-1 to their Bill of Material for the TMI-1 Decay Heat Pumps. This addition specified Worthington Material M4273 (17-4 PH, Condition A). See Attachment No. 1.
2. On February 12, 1969, Worthington issued Purchase Order No. WP453200-H to U. S. Steel Supply Div. This Purchase Order specified 17-4 PH (M4273) Condition A Material. See Attachment No. 2.
3. U. S. Steel Supply's Material Test Report, February 13, 1969, specifies 17-4 PH Condition A material. Review of the chemical properties indicated the material to be acceptable. However, review of the mechanical properties indicated that the material may have been heat treated. Therefore, Worthington may have received the material in other than Condition A. Worthington has stated that they always heat treat per their drawing requirements to the H1150 condition, and that material has been released for manufacture and heat treatment upon verification and approval of chemistry only. See Attachment No. 3. Additionally, this material test report, due to poor copying, is confusing in that it appears to show a tensile strength of 179,000 psi, a yield strength of 190,000 psi, and a 17-4 PH Condition H. Our copy indicates a tensile strength of 199,000 psi, a yield strength of 190,000 psi, and a 17-4 PH Condition A. At some point during the distribution of copies, a copy was inked-in causing the errors in the above values.

772660/65

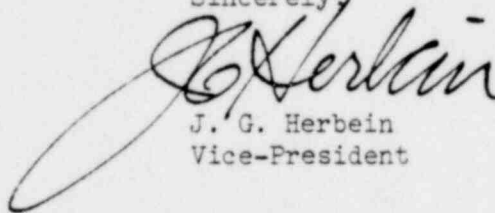
4. Review of Worthington's procedure indicates that fabrication and heat treatment is per their drawing requirements. Drawing No. RX-130679C specifies H1150 shop heat treatment before machining. See Attachment No. 4.

Based upon review thus far, it is both Met-Ed's and B&W's contention that the material used for fabrication of the TMI-1, DH-P-1A/B shafts was in fact 17-4 PH properly heat treated to H1150. Although material test reports are not available to document the heat treatment for the DH-P-1A/B shafts, there is no reason to assume that Worthington would have deviated from their normal procedure such that the 17-4 PH material was not H1150 heat treated. It should be noted, the B&W Specification CS-3-30/NSS-5/0369, required record retention for five years only, and the records have been subsequently destroyed.

Review of the material certifications for the spare shafts is being performed, and results of this review will be included in the final report to be submitted by October 5, 1977. To date, we have on hand Ultrasonic Test Reports, material test reports for pre heat treatment, and certification of H1150 heat treatment for two of the three spare shafts.

Also attached, please find the Vibration Test Data of September 5, 1977, per telecon of September 16, 1977, between your G. B. Zwetzig and our R. J. Stevens.

Sincerely,



J. G. Herbein
Vice-President

JGH:RJS:dkf

- Attachment
- (1) Worthington Corporation Bill of Material, 1/27/69
 - (2) Worthington Corporation Purchase Order WP453200-H, 2/12/69
 - (3) U. S. Steel Supply Material Test Report, 2/13/69
 - (4) Worthington Corporation Drawing No. RX-130679C
 - (5) DH-P-1A/B Vibration Test Data, 9/5/77

1492 032

CW
APPROVED

PME

DLE
COMP.

12/13/68

4/14/69

4/28/69

5/1/69

B. J. P. O. 612012

8 HN 194 REFINERY PUMP

TWO

1621418

1621419 W.P.C. P453200

9

8 HN 194 REFINERY PUMP				UNITS REQD.	CP. NO.	S/H	TO	ORDER NO.	P.L. OR LINE NO.	PATTERN NO. CUT NO. OR P.L. REF.	PG.	OF	
RTG	PART NO.	NO. REQD.	NO. ONE UNIT	CLASS AND DESCRIPTION			MATERIAL	DRAWING NO.					
	26318	16	8	SCR DRIVE NO 10 X 1/4			STL	ET 35				0	
	25871	8	4	SCR CAP HH 3/4-10 X 1 3/4			SAE2	ET 7				501	
00	AG930679	2	1	SFT 3 1/4 O X 34 5/8 See 4140 4140			M4270	RX130679		29074			
00	36592 -60	2	1	IMP KEY 1/2 SQ X 3 3/4 20Cb-3 S			M4171	RX130679		36592			
00	36568 -64	2	1	CPLG KEY 1/2 SQ X 4 4140			M-258	RX130679		36668			
				THE FOLLOWING CONSTITUTES SEAL PIPING PER RY155360 ASSEMBLE ACCORDINGLY									
P	PURCH	2	1	1/2 PIPE 8 FT 0 IN			316 STM	RY155360	1	(3)			
P	PURCH	2	1	CYCLONE SEPARATOR (316 ST ST) BORZ WALKER MODEL 10043				RY155360	2	(4)			
P	PURCH	6	3	ASHCROFT 1379-3 PRESS GAUGE 4 1/2 DIAL 0-200 LB 1/2				RY155360	3	(5)			
P	PURCH	6	3	1/2 GLOBE VALVE			316 STM	RY155360	4	(6)			
P	PURCH	6	3	1/2 X 2 NIPPLE			316 STM	RY155360	5	(7)			
P	PURCH	4	2	1/2-90 DEG STREET ELBOW			316 STM	RY155360	6	(8)			
P	PURCH	4	2	1/2 X 4 NIPPLE			316 STM	RY155360	7	(9)			

1492 033

1492 033

ATTACHMENT (1)

ORDER NO. P453200

W21472

WASHINGTON CORPORATION BILL OF MATERIAL

APPROVED

S CH

DUE
COMP.

1/27/69

DATE OF

FOUNDER

MATERIAL

EVALUATE

4/14/59

4/20/60

5/14/60

S PIN 194

T-0

1621418

1621419

P453200

2A

OR

UNITS REQ'D.

GP. NO.

S/N

TO

ORDER NO.

PG.

OF

QTY	PART NO.	NO. REQD.	NO. ONE UNIT	CLASS AND DESCRIPTION	MATERIAL	DRAWING NO.	REF. OR LINE NO.	PATTERN NO. CUT NO. OR PUR. REF.
				YELLOW JOURNAL				
				CANCEL				
C	AG930679	2	1	SET 3 1/4 X 34 5/8 <i>Worthite</i>	M4270	RX130679		29074
				FURNISH INSTEAD				
AX	930679-1	2	1	SET 3 1/8 X 34 5/8 <i>17 1/2 Ph</i>	M4273	RX130679A		(15)

POOR ORIGINAL

1492 034

ORDER NO.

P453200

PURCHASE ORDER

NO. WP453200 -H

WORTHINGTON CORPORATION

401 WORTHINGTON AVENUE
HARRISON, N.J. 07029
TEL. NO. CODE 201-484-1234DATE 2/12/69
PAGE 1 OF 1TO U.S. Steel Supply Div
P.O. Box 479
Newark, N.J. 07101SHIP TO: Worthington Corporation
Harrison, N.J. 07029

FOR OUR USE ONLY	
COMMODITY NO. <u>01-569</u>	ACCOUNT NO.
VENDOR'S NO. <u>0186-3497</u>	
STORES CLASS	
END USE <u>A 4N 1 Q11</u>	
DELIVER TO	
REQUISITIONED BY <u>C.W.</u>	
BUYER <u>G. Doty/h</u>	

SHIP VIA UNLESS INSTRUCTED OTHERWISE, SHIP
FAST WAY - INSURED CARRIER, DO NOT
INCLUDE DATED, PLST. MARK WP453200 -H

ITEM	QUANTITY	DESCRIPTION OF MATERIAL	LIST PRICE EACH AND DISCOUNT	TOTAL NET PRICE
15	2	BAR OF HOT ROLLED 17-4PH (OUR M4273) IN CONDITION "A", 3 1/2" D, X 35" LG. 141#	\$130.44/ert plus 4.77 cutting charge	\$188.69

POOR ORIGINAL

NEW JERSEY SALES AND USE TAX REG. NO. 22-182630 ☐ APPLICABLE ☒ NOT APPLICABLETERMS OF
PAYMENT

1/2% 10 days, 30 days net

VENDOR QUOTATION REFERENCE

price phone
2/6/69

F.O.B. POINT

delivered

EXPEDITOR

DATE
REQUIRED

SIGNATURE REQUIRED

AS REQUIRED

PROU. DATE

RATING

ALLOTMENT

WT. 3 60

"CERTIFIED UNDER

1492 035

ATTACHMENT (2)

EXTRA COPY FOR ORIGINATING DEPT

TEST REPORT



U. S. STEEL SUPPLY
Division of United States Steel Corporation

CUST. ORDER NO. 11045320 OUR ORDER NO. NEW 1748 DATE 2/12/69

P453 200

81321 LW

DECAY HT. REMOVAL

Washington Corp
Harrison, N.J.

SEP 26 '69 D.C.L.

Description & Specification:

2 1/2" x 12" T 17 1/4" x 16" d H
5 1/4" x 13" d

Item	Heat	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	V	Ti	B	Tu	Co
1	42434	.34	.28	.017	.014	.62	.33	.43	.572					.01	.27
2															
3															

MECHANICAL PROPERTIES

	SLAB	TENSILE STRENGTH PSI	YIELD-ENL- OFFSET PT	ELONG.		PER CENT RED. AREA	HARDNESS	BEND TEST	HOMO.	G/S
				%	IN.					
1		177000	172000	150		530	415			
1										
2										
2										
3										
3										

POOR ORIGINAL

END QUENCH HARDENABILITY—16th Inches Rc

	1	2	3	4	5	6	7	8	9	10	12	14	16	18	20	24	28	32
1																		
2																		
3																		

SPECIAL TESTS

CORROSION

MACRO

HARDENABILITY
SPECIAL

DECARB

OTHER

1492 036

ATTACHMENT (3)

WE HEREBY CERTIFY THAT THE ABOVE DATA IS
AS CONTAINED IN OUR RECORDS

United States Steel Supply

000046

NOTES:
IT'S MUST BE
TYPIC WITHIN .002" T.I.R.
CORNERS SLIGHTLY
FLATTEN THIS SHAFT.

1492 037

POOR ORIGINAL

21-05	1.111
21-06	8.3166
21-07	
21-08	
21-09	1.23.62
21-10	2.14.64

31 40 1 5

FOR SHAFT WITH TAPERED COUPLING END SEE RX-144066

8-HN-194 REFINERY PUMP
SHAFT

<div>cf - Coarse - 1000 ✓ rf - Rough - 500 ✓ f - Regular - 125 ✓ sf - Smooth - 32 ✓ ff - Fine - 16 ✓</div>	FOUNDRT APPROVAL	WEIGHT	WORTHINGTON CORPORATION HARRISON, NEW JERSEY			
	Machining tolerances:		ORDER	P-434778	DATE	2-21-61
	Finished fractional dimensions where no limits given $\pm 1/64"$		SCALE	6	INS = 1 FOOT	
	" decimal " " " " " $\pm .005"$		DRAWN	F.B.	CHECKED	F.B.
Where closer tolerances required limits are specified.		APPROVED	Corbo	RX-130679 C		
f	h	j	k			

AMREKE

ATTACHMENT (4)

2. BREAK ALL SHADES
3. DO NOT TOLD ST

9

10

ALT. DATES ADDED PT. # 930679-1 TO MAT. LIST	ADD P/N 93067902	ADDED 1/16 R. @ (5-4) 8 (5-K) 9-6-77 15.8 25.2651	C
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17 X 22
DEFIANCE NO. 81

a

b

c

d

POOR ORIGINAL

1492 038

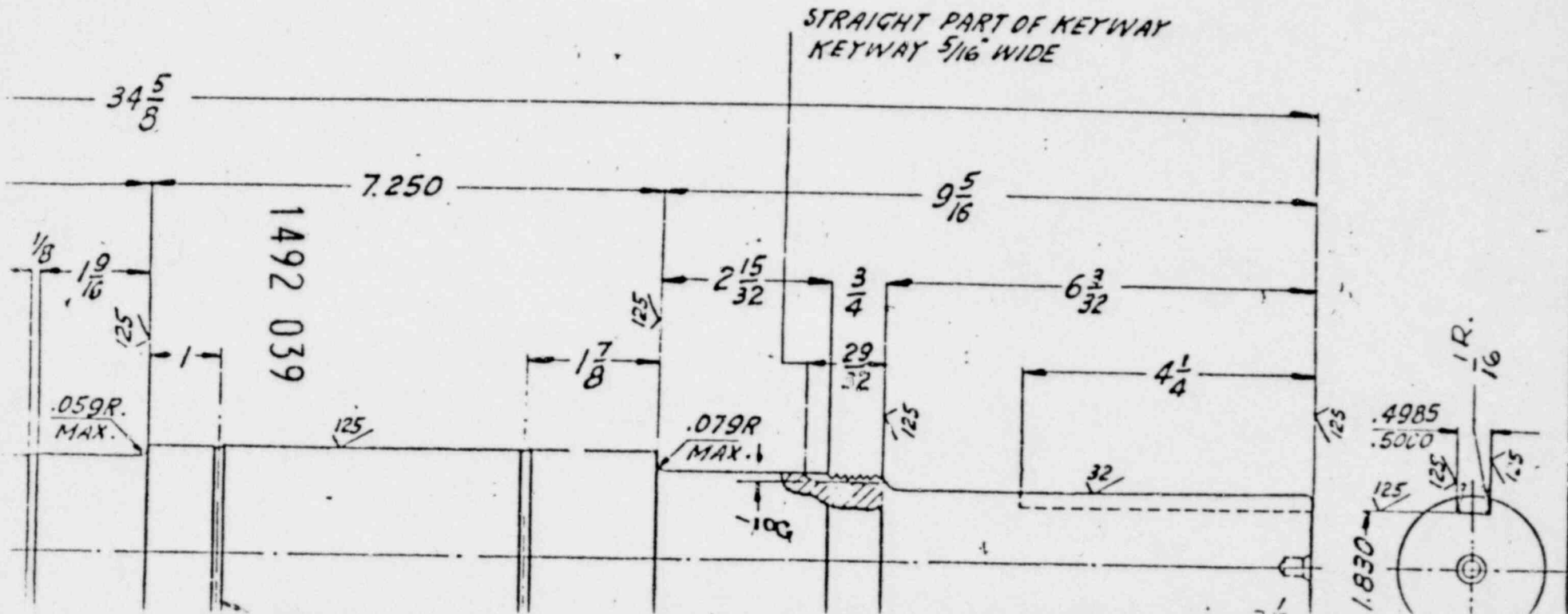
FROM - DWG No. RX 13069-C.

HEAT TREAT SHAFT TO 250-302 BRINELL

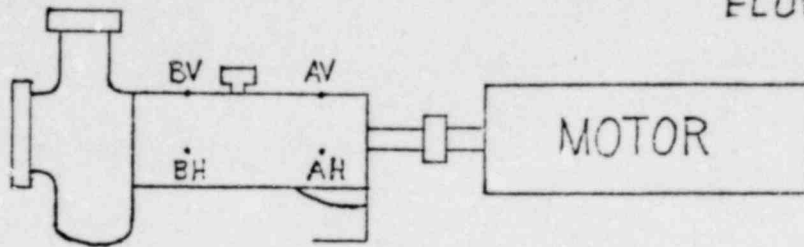
PART NO.	NO. OF PIECES	NAME OF PART	MAT.	PART NO. OR CUT FROM PT.
930679	1	SHAFT 3 1/8" D. x 34 5/8	M-4258	37220
36668-60	1	IMPR KEY 1/2" SQ x 3 3/4"	- 4 -	
36668-64	1	COUPL. KEY 1/2" SQ x 4	- 4 -	
13477	1	SKF. BEARING # 5214	ST.	LINE BRG.
14553	2	SKF. BEARING # 7313 BGM.	ST.	THRUST BRG.
16278	1	SKF. # N13 LOCKNUT	ST.	ET-54
16279	1	SKF. # W-13 LOCKWASHER	ST.	ET. 54
38952	1	WONDROFF KEY # 5	ST.	SK-78830
930679-01	1	SHAFT 3 1/8" D. x 34 5/8	M-4273 17-4 PM	PURCHASE
930679-02	1	" " " "	M-4270	02907400

* PURCHASED BAR WILL BE RECEIVED IN
CONDITION-A, SHOP TO HEAT TREAT TO
H-1150 BEFORE MACHINING

POOR ORIGINAL



DATA TAKEN: 9/5/77
 TAKEN BY: G. M. STANOT
 INST. MODEL: 330
 CAL. DUE DATE: 3-14-78
 FLOW: 20 GPM



DHP-1A

CPM		900	1800	3600	18,000
AV	DISPLACEMENT - MILS		.2		
BV			.1		
AH			.4		
BH			.32		

DHP-1B

CPM		900	1800	3600	18,000
AV	DISPLACEMENT - MILS		.5		
BV			.8		
AH			.4		
BH			.5		