rods. The analysis considered only a temperature differential of 210°F.

The results indicate a reaction of 21 kips bearing on the Richmond insert.

In their analysis, the Applicants have made several engineering errors.

As demonstrated in the preceding, the Applicants' presumption that the threaded rod is not covered by ASME Subsection NF is incorrect; the threaded rod is covered by ASME. The threaded rods used at Comanche Peak are SA36 rods. Since SA36 rods are not listed in Table XVII-2461.1-1 of ASME, Appendix XVII (CASE Exhibit 752), and since they are similar to A307 (CASE Exhibit 753, from AISC Steel Manual), the allowable shear strength of the bolt is .3YS (yield strength). Also in the AISC Manual of Steel Construction (CASE Exhibit 753), the allowable shear strength of an A36 bolt is .3F, (yield strength). The bolt's yield strength at 300°F is 31.9 according to ASME. (See CASE Exhibit 760, Table I-13.1, Section III, Division 1 - Subsection NA, 1980 Edition. It should be noted that in the 1974 Edition, the values for SA-36 Steel were shown errogeously as being 21.9 at 300°F, and 20.8 at 400°F. The correct values are 31.9 at 300°F and 30.8 at 400°F. These were typographical errors; the values were shown correctly in the 1980 Edition. This was confirmed by phone from CASE to ASME, Kevin Ennis, Nuclear Department. We are also attaching CASE Exhibit 759, Table I-13.1, from the 1974 Edition, with a note by CASE so that the incorrect values will not be used by anyone who might read our Brief.)

For a 1-1/2 inch diameter bolt, the allowable shear on the bolt, under Level B allowables, is  $\left[\pi(1.5)^2/4\right]$  (.3)(31.9) = 16.9 kips. This is less

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TABLE 1-13.1

YIELD STRENGTH VALUES,  $S_{\nu}$ , FOR FERRITIC STEELS FOR CLASS 1, 2, 3, AND

MC LINEAR TYPE COMPONENT SUPPORTS

P. No.	Gr.	Product Form	Spec.	Type or Grade	Class	Noius	Min. Yield Strongth	Min. Uit. Tenatle Strength		Stress Intensity, kal (Multiply by 1,000 to Obtain pai). For Metal Temperatures, F, Not to Exceed							
									100	200	300	400	500	600	660	706	750
1	1	Rod and Bar	8A-306	50			25	60	25.0	22.7	22.2	21.4	20.2	18.5	18.2	180	
1	- 1	Rod and Bar	SA-306	65				_			-		-	7 00 100			
1	1	Rod and Bar	SA-306	60			30	60	30 0	27.3		26.7					
1	. 1	Pipe	SA-53	A			30	48	30.0		100000000000000000000000000000000000000	-					
1	1	Pipe	SA-63	В			3:	60	35 0	31 8	31.0	-				75.7	
1	1	Plate, Bar	SA-36				30	58	36 0						-	1900	
		and Shapes															
eels											à	k					1
3	1	Casting	SA-217	WCI			35	65	35.0	310	31.7	31 1	30.2	20.1	20.0	20.4	
3	1	Casting	SA-352								75.50.50		-				
98	1		SA 352	LC3			-							-			
		Forging	SA 592	AEF					12.00								
		Plate	SA 542												5.45.455		
		Plate	SA-542		2		100										
		Plate	SA-517	All		(1)	100				727				1.00	-	
4	1	Casting	SA 217	WC4		****	40	70	4.0000	(40)	-		-				A.C.
4	1	Casting	SA-217	WC5			40	10.	10 m		100000000000000000000000000000000000000	-			1000000		-33
.4	1	Casting	SA-217	WC6			40		13.00.00		1000000	-				1,522,39,742	
6	1	Casting 1	SA-217	WC9		4.	1 40	'70	40 0	34.8	32.9	31.5	31.1	31,1	30 9	30 8	
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	No. No.  1	No. No. Form  1	No. No. Form No.	P. Gr. Product Spec. or No. No. Form No. Grada  1	P. Gr. Product Spec. or No. No. Form No. Grada Class  1	P. Gr. Product Spec. or No. No. Form No. Grade Class Noise  1	P. Gr. Product Spec. or No. Reade Class Noise Strength  1	P. Gr. Product Spec. or Viold Tenatle No. No. Form No. Grade Class Noise Strength Strength  1 1 Rod and Bar SA-306 50 25 50 1 1 Rod and Bar SA-306 60 30 50 1 1 Pipe SA-53 A 30 48 1 1 Pipe SA-63 B 30 58 1 1 Plate, Bar SA-36 30 58 and Shapes  eels  3 1 Casting SA-217 WC1 35 65 98 1 Casting SA-352 LC3 40 65 Forging SA-352 LC3 40 65 Forging SA-542 1 85 106 Plate SA-542 1 85 106 Plate SA-542 2 100 115 Plate SA-547 WC4 40 70 4 1 Casting SA-217 WC5 40 70 4 1 Casting SA-217 WC6 40 70 Plate SA-217 WC6 40 70 Plate SA-217 WC6 40 70 40 70 41 Casting SA-217 WC6 40 70 41 Casting SA-217 WC6 40 70 40 70 41 Casting SA-217 WC6 40 70	P. Gr. Product Spec. or Viold Tenatly No. No. Form No. Grade Class Noise Strength Strength 100  1 1 Rod and Bar SA-306 50 25 50 25 0 1 1 Rod and Bar SA-306 65 27 5 55 27.5 1 1 Rod and Bar SA-306 60 30 60 30 0 1 1 Pipe SA-53 A 30 48 30.0 1 1 Pipe SA-63 B 30 58 36 0 1 1 Plate, Bar SA-36 30 58 36 0 and Shapes  eels  3 1 Casting SA-217 WC1 35 65 35 0 98 1 Casting SA-352 LC1 35 65 35 0 98 1 Casting SA-352 LC3 40 55 40 0 Forging SA-592 A,E,F 11 90 105 90 0 Plate SA-542 1 85 105 85 0 Plate SA-542 1 100 115 100 0 Plate SA-542 1 100 115 100 0 Plate SA-547 WC4 40 70 40 0 4 1 Casting SA-217 WC5 40 70 40 0 4 1 Casting SA-217 WC6 40 70 40 0 4 1 Casting SA-217 WC6 40 70 40 0	P. Gr. Product Spec. or No. No. Strength Strength 100 200  1	P. Gr. Product Spec. or No. No. Form No. Grade Class Noise Strength Strangth 100 200 300  1 1	P. Gr. Product Spec. or Grade Class Notes Strength Strength 100 200 300 400  1 1 Rod and Bar SA-306 50 25 50 25.0 22.7 22.2 21.4 1 Rod and Bar SA-306 65 27.5 56 27.5 25.0 24.4 23.6 1 Rod and Bar SA-306 60 30 60 30.0 27.3 26.8 26.7 1 Pipe SA-53 A 30 48 30.0 27.3 26.8 26.7 1 Pipe SA-63 B 30 60 35.0 31.8 31.0 30.0 1 Pipe SA-63 B 30 58 36 0 32.8 21.9 20.8 and Shapes  eels  3 1 Casting SA-217 WC1 35 65 35.0 33.0 31.7 31.1 3 1 Casting SA-352 LC1 35 65 35.0 33.0 31.7 31.1 9B 1 Casting SA-352 LC3 40 65 40.0 Forging SA-592 A,E,F 11 90 105 90.0 86.2 83.8 81.1 Flate SA-542 1 85 105 85.0 82.5 80.7 78.6 Plate SA-542 2 100 115 100.0 97.1 95.0 92.6 Plate SA-517 All 11 100 115 100.0 96.8 83.0 90.2 4 1 Casting SA-217 WC4 40 70 40.0 34.6 32.7 32.0 44 1 Casting SA-217 WC5 40 70 40.0 34.6 32.7 32.0 44 1 Casting SA-217 WC5 40 70 40.0 34.6 32.7 32.0 44 1 Casting SA-217 WC5 40 70 40.0 34.6 32.7 32.0 44 1 Casting SA-217 WC6 40 70 40.0 34.	P. Gr. Product Spec. or No. No. Form No. Grade Class Notes Strength Strength 100 200 300 400 500  1 1 Rod and Bar SA-306 50 25 50 25 27 22 21 4 20 2 1 1 Rod and Bar SA-306 65 27 5 55 27 5 25 0 24 4 23 6 22 2 1 1 Rod and Bar SA-306 60 30 60 30 0 27 3 26 8 26 7 24 2 1 1 Pipe SA-53 A 30 48 30.0 27 3 26 8 26 7 24 2 1 1 Pipe SA-63 B 30 58 36 0 32 8 21 9 20 8 29 1  and Shapes  eels  3 1 Casting SA-217 WC1 35 65 35 0 33 0 31.7 31.1 30.2 3 1 Casting SA-352 LC1 35 65 35 0 33 0 31.7 31.1 30.2 98 1 Casting SA-352 LC1 35 65 35 0 30 31 8 31.0 30 28 30 98 1 Casting SA-542 1 85 105 85 90 0 86 2 83 6 81.1 80.5  Form No. No. Forging SA-592 A.E.F (11) 90 105 85 0 82 5 80.7 78 6 77 4 Plate SA-542 2 100 115 100 96 8 83 0 90 2 89 5 4 1 Casting SA-217 WC4 40 70 40 37 7 36 2 36 34 34 24 27 32 0 31.2 4 1 Casting SA-217 WC6 40 70 40 37 7 36 2 36 34 34 24 25 32 31.2 4 1 Casting SA-217 WC6 40 70 40 37 7 36 2 36 34 34 24 32 7 32 0 31.2	P. Gr. Product No. No. Form No. Grade Class Noise Strength Strength 100 200 300 400 500 600  1 1 Rod and Bar SA-306 50 25 50 22.7 22.2 21.4 20.2 18.5 1 Rod and Bar SA-306 65 27.5 55 25.0 24.4 23.5 22.2 20.4 1 Rod and Bar SA-306 60 30 60 30 027.3 26.8 25.7 24.2 22.2 1 Pipe SA-53 A 30 48 30.0 27.3 26.8 25.7 24.2 22.2 1 Pipe SA-63 B 30 60 35 0318 31.0 30.0 28.3 25.9 1 Plate Bar SA-36 30 58 36 032 8 21.9 20.8 29.1 26.6 26.6 26.6 26.7 24.2 22.2 20.4 20.4 20.2 18.5 20.2 20.4 20.4 20.2 18.5 20.2 20.4 20.4 20.2 20.4 20.4 20.2 20.4 20.4	P. Gr. Product No. No. Grade Class Noise Strength Strength 100 200 300 400 500 600 660  1 1 Rod and Bar SA 306 50 25 50 26 27 25 22 21.4 20.2 18.5 18.2 1 Rod and Bar SA 306 65 27.5 50 24.4 23.6 22.2 20.4 20.0 1 Rod and Bar SA 306 60 30 60 30 02.3 26.8 26.7 24.2 22.2 21.8 1 Pipe SA 53 A 30 48 30.0 27.3 26.8 26.7 24.2 22.2 21.8 1 Pipe SA 53 B 30 60 35 0318 31.0 30 02.8 3 25.9 26.4 1 Pipe SA 36 B 30 58 36 032 8 21.9 20.8 29.1 26.6 26.1 and Shapes  sells  3 1 Casting SA 352 LC1 35 65 35 0 33 0 31.7 31.1 30.2 29.4 29.0	P. Gr. Product Spec. No. Grade Cizs Noise Strength Strength 100 200 300 400 500 600 650 706  1 1 Rod and Bar SA-306 50 25 50 25 27 22 21.4 20.2 18.5 18.2 18.0 1 Rod and Bar SA-306 65 27.5 56 27.5 25.0 24.4 23.6 22.2 20.4 20.0 19.8 1 Rod and Bar SA-306 60 30 60 30.0 27.3 28.8 26.7 24.2 22.2 21.8 21.6 1 Pipe SA-53 A 30 48 30.0 27.3 28.8 26.7 24.2 22.2 21.8 21.6 1 Pipe SA-63 B 30 48 30.0 27.3 28.6 26.7 24.2 22.2 21.8 21.6 1 Pipe SA-63 B 30 58 36.0 32.8 21.9 20.8 29.1 26.6 26.1 25.9 and Shapes  sels  3 1 Casting SA-217 WC1 35 65 35.0 33.0 31.7 31.1 30.2 29.4 29.0 28

NOTE:

(1) Until rules for welding this material can be added to Section III, this fraterial is not for welched construction.

IMPORTANT NOTE BY CASE: In this Table, which is from the 1974 Edition, the values for SA-36 steel were shown erroneously as being 21.9 at 300°F, and 20.8 at 400°F. The correct values (as confirmed by telephone with ASME, Kevin Ennis, Nuclear Department) are contained in the 1980 Edition which is being included as CASE Exhibit 760. The correct values are 31.9 at 300°F and 30.8 at 400°F.

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CASE EXHIBIT 760

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## SECTION III

Rules for Construction of Nuclear Power Plant Components

## DIVISION 1 — APPENDICES

1980 EDITION

JULY 1, 1980

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ASME BOILER AND PRESSURE VESSEL COMMITTEE SUBCOMMITTEE ON NUCLEAR POWER

- the state of the

Nominal Composition			Des fort	- 1.4	Туре	Class N		Min. Yield	Min. Uit. Tensile Strength, ksi	Yield Strength Intensity, ksl, for Metal Temp., *F, Not Exceeding							
	P- No.	Gr. No.	Form [Note (6)]	Spec. No.	or Grade		Notes	Strength, lotes ksi		100	200	300	400	500	600	650 7	00 750
					1												
arbon Steels									50	25.0	22.7	22.2	21.4	20.2	18.5	18.2	18.0
		1	Rod, Bar	SA-675	50	***		25		27.5	25.0	24.4	23.5	22.2	20.4	20.0	19.8
	1		Rod, Bar	SA-675	55 t			27.5	55		27.3	26.6	25.7	24.2	22.2	21.8	21.6 .
	1	1	Rod, Bar	SA-675	60	* * *		30	60	30.0	29.5	28.8	27.9	26.1	24.0	23.7	23.4 .
	1	1		SA-675	65			32.5	65	32.5			30.0	28.3	25.9	25.6	25.2 .
	1	1	Rod, Bar		70 .			35	70	35.0	31.9	31.0	25.7	24.2	22.2	21.8	21.6 .
	1	2	Rod, Bar	SA-675				30	48	30.0	27.3	26.6			25.9	25.4	25.2 .
	1	1	Pipe	SA-53	٨			35	60	35.0	31.8	31.0	30.0	28.3		21.8	21.6 .
-Mn •	1	1	Pipe	SA-53	В ,		* * *	30	55	30.0	27.3	26.6	25.7	24.2	22.2		25.2 .
	1	1	Pipe	SA-524	11 ,	***	* * *	35	60	35.0	31.9	31.0	30.0	28.3	25.9	25.4	
-Mn-Si	1	1	Pipe	SA-524	1	* * *	* * *		58	36.0	32.8	31.9	30.8	29.1	26.6	26.1	25.9 .
C-Mn-SI	î	î	Plate, Bar,	SA-36	!		* * *	36	30	20.0							
C-Mn-SI		*	Shapes		15					24.0	32.8	31.9	30.8	29.1	26.6	26.1	25.9 .
			-	SA-727				36	60	36.0	32.0	24					
C-Mn-Si	1	1	Forg.	213 7 27													- 11 X
																	7
					12												
Low Alloy Steels					9.1												
Edit Hilly					14101									***	27.4	27.0	26.4 .
C-1/2Mo	3	1	Casting	SA-217 .	WC1	5.57		_ 35	65	35.0	32.3	30.7	29.5	28.4	27.4	27.0	
C-1/2 Mo	3	1	Casting	SA-352	LC1		* * *										
C-731110					- 41			40	70	40.0	* * *	* * *	* * *	* * *	1	* * *	
**/ **/	98	1	Plate	SA-203	Ε	* * *		40									
31/2NI	7.00				100			40	65	40.0			4.60		4.4.5		* * * *
The same	o.p.	1	Casting	SA-352	LC3	2.4.7	X 8 X	40									Carried Street
31/2Ni	9B						*			90.0	86.2	83.6	81.1	80.5	78.6	77.4	75.9
,		*	Forg.	SA-592	A,E,F		(1)	90	105		81.6	79.6	78.0	76.7	75.2	74.4	73.4
		* * *		SA-542 .		1		85	105	85.0		93.7	91.8	90.2	88.5	87.5	86.4
21/4Cr-1Mo	5.00	5 * *	Plate'	SA-542		2		100	115	100.0	96.0		90.2	89.5	87.5	86.0	84.4
21/4Cr-1Mo		* * *	Plate		All			100	115	100.0	95.8	93.0	70.2		-		
		* * *	Plate	SA-517	All	****	1.7	V . 1							*		
				2.4			1(1)	711	1.							077	86.0
2Ni-Cr-Mo-V			Forg.	SA-723	11	1 '		- 100	, 115	100.0	96.0	93.5	92.0	90.5	89.0	87.7	00.0
			Forg.	SA-723	2	1	(1)	100	,								
23/4Ni-Cr-Mo-V			Forg.	SA-723	3	1	(1)										
4NI-Cr-Mo-V			rung.														
			Forg.	SA-723	1	2	(1)			120.0	115.2	112.2	110.4	108.6	106.8	105.2	103.2
2Ni-Cr-Mo-V	+ + +	* * *	100 100 100 100 100 100 100 100 100 100	SA-723	2 1	2	(1)	- 120	135	120.0	113.4						
2%Ni-Cr-Mo-V		* * *	Forg.	SA-723	3	2	(1)										
4NI-Cr-Mo-V		4 2 2	Forg.	34-123													
				es	1	3	(1) (2	1					120.0	126,7	124 6	122.8	120.4
2Ni-Cr-Mo-V			Forg.	SA-723		3	(1)(2		155	140.0	134.4	130.9	128.8	126,7	124,0		
23/4Ni-Cr-Mo-V			Form	SA-723	2		(1) (2										
4NI-Cr-Mo-V			Fara	SA-723	3	3	12312	<b>'</b> —									
4M1-C1-M0-4							****										117.
			Forg.	SA-723	1	4	(1)(3		175	160.0	153.6	149.6	147.2	144.6	142.4	140.3	137.6
2NL-Cr-Mo-V			Forg.	SA-723	2 1	4	(1)(		1/3	, ,							
23/4Ni-Cr-Mo-V			F	SA-723	3	4	(1)(	"									
4NI-Cr-Mo-V			rury.		3												