

rods. The analysis considered only a temperature differential of 210⁰F. 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_y (yield strength). The bolt's yield strength at 300⁰F 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 erroneously as being 21.9 at 300⁰F, and 20.8 at 400⁰F. The correct values are 31.9 at 300⁰F and 30.8 at 400⁰F. 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 $[\pi (1.5)^2 / 4] (.3)(31.9) = 16.9$ kips. This is less

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TABLE I-13.1
YIELD STRENGTH VALUES, S_y , FOR FERRITIC STEELS FOR CLASS 1, 2, 3, AND
MC LINEAR TYPE COMPONENT SUPPORTS

Nominal Composition	P. No.	Gr. No.	Product Form	Spec. No.	Type or Grade	Class	Notes	Min. Yield Strength	Min. Ult. Tensile Strength	Stress Intensity, ksi (Multiply by 1,000 to Obtain psi), For Metal Temperatures, F, Not to Exceed									
										100	200	300	400	500	600	650	700	750	
Carbon Steels																			
...	1	1	Rod and Bar	SA-306	50	...	...	25	60	25.0	22.7	22.2	21.4	20.2	18.5	18.2	18.0	...
...	1	1	Rod and Bar	SA-306	65	...	...	27.5	65	27.5	25.0	24.4	23.6	22.2	20.4	20.0	19.8	...
...	1	1	Rod and Bar	SA-306	60	...	...	30	60	30.0	27.3	26.8	25.7	24.2	22.2	21.8	21.6	...
...	1	1	Pipe	SA-53	A	...	...	30	48	30.0	27.3	26.8	25.7	24.2	22.2	21.8	21.6	...
...	1	1	Pipe	SA-53	B	...	...	30	60	35.0	31.8	31.0	30.0	28.3	25.9	25.4	25.2	...
...	1	1	Plate, Bar and Shapes	SA-36	...	...	...	36	58	36.0	32.8	21.9	20.8	29.1	26.6	26.1	25.9	...
Low-Alloy Steels																			
C-½ Mo	3	1	Casting	SA-217	WC1	...	...	35	65	35.0	33.0	31.7	31.1	30.2	29.4	29.0	28.4	...
C-½ Mo	3	1	Casting	SA-352	LC1	...	...	35	65	35.0	33.0	31.7	31.1	30.2	29.4	29.0	28.4	...
3% Ni	9B	1	Casting	SA-352	LC3	...	...	40	65	40.0	...	...	...	...	...	...	...	...
...	...	...	Forging	SA-592	A,E,F	...	(1)	90	105	90.0	86.2	83.8	81.1	80.5	78.6	77.4	75.9	...
2% Cr-1 Mo	...	...	Plate	SA-542	...	1	...	85	105	85.0	82.5	80.7	78.6	77.4	76.2	75.5	74.6	...
2% Cr-1 Mo	...	...	Plate	SA-542	...	2	...	100	115	100.0	97.1	95.0	92.6	91.0	89.6	89.0	87.8	...
...	...	...	Plate	SA-517	All	...	(1)	100	115	100.0	95.8	93.0	90.2	89.5	87.5	86.0	84.4	...
Ni-Cr-½ Mo	4	1	Casting	SA-217	WC4	...	...	40	70	40.0	37.7	36.2	35.6	34.5	33.6	33.1	32.5	...
Ni-Cr-1 Mo	4	1	Casting	SA-217	WC5	...	...	40	70	40.0	34.6	32.7	32.0	31.2	29.4	28.6	27.6	...
1% Cr-½ Mo	4	1	Casting	SA-217	WC6	...	...	40	70	40.0	34.6	32.7	32.0	31.2	29.4	28.6	27.6	...
2% Cr-1 Mo	5	1	Casting	SA-217	WC9	...	...	40	70	40.0	34.8	32.9	31.5	31.1	31.1	30.9	30.8	...

NOTE:

(1) Usual rules for welding this material can be added to Section III, this material is not for welded 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.

CASE EXHIBIT 760

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SUBCOMMITTEE ON NUCLEAR POWER

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS
United Engineering Center 345 East 47th Street New York, N.Y. 10017

TABLE I-13.1
YIELD STRENGTH VALUES S_y FOR FERRITIC STEELS AND COPPER ALLOYS FOR CLASS 1, 2, 3, AND
MC LINEAR TYPE COMPONENT SUPPORTS

Table I-13.1

SECTION III, DIVISION I—APPENDICES

Nominal Composition	P- No.	Gr. No.	Product Form [Note (6)]	Spec. No.	Type or Grade	Class	Notes	Min. Yield Strength, ksi	Min. Ult. Tensile Strength, ksi	Yield Strength Intensity, ksi, for Metal Temp., °F, Not Exceeding										
										100	200	300	400	500	600	700	750			
Carbon Steels										25	50	25.0	22.7	22.2	21.4	20.2	18.5	18.2	18.0	...
C	1	1	Rod, Bar	SA-675	50	...	...	25	50	25.0	22.7	22.2	21.4	20.2	18.5	18.2	18.0	...
C	1	1	Rod, Bar	SA-675	55	...	...	27.5	55	27.5	25.0	24.4	23.5	22.2	20.4	20.0	19.8	...
C	1	1	Rod, Bar	SA-675	60	...	...	30	60	30.0	27.3	26.6	25.7	24.2	22.2	21.8	21.6	...
C	1	1	Rod, Bar	SA-675	65	...	...	32.5	65	32.5	29.6	28.8	27.9	26.1	24.0	23.7	23.4	...
C	1	2	Rod, Bar	SA-675	70	...	...	35	70	35.0	31.9	31.0	30.0	28.3	25.9	25.6	25.2	...
C	1	1	Pipe	SA-53	A	...	...	30	40	30.0	27.3	26.6	25.7	24.2	22.2	21.8	21.6	...
C-Mn	1	1	Pipe	SA-53	B	...	...	35	60	35.0	31.8	31.0	30.0	28.3	25.9	25.4	25.2	...
C-Mn-Si	1	1	Pipe	SA-524	II	...	...	30	55	30.0	27.3	26.6	25.7	24.2	22.2	21.8	21.6	...
C-Mn-Si	1	1	Pipe	SA-524	I	...	...	35	60	35.0	31.9	31.0	30.0	28.3	25.9	25.4	25.2	...
C-Mn-Si	1	1	Plate, Bar, Shapes	SA-36	...	...	...	36	58	36.0	32.8	31.9	30.8	29.1	26.6	26.1	25.9	...
C-Mn-Si	1	1	Forg.	SA-727	...	...	...	36	60	36.0	32.8	31.9	30.8	29.1	26.6	26.1	25.9	...
Low Alloy Steels										35	65	35.0	32.3	30.7	29.5	28.4	27.4	27.0	26.4	...
C-1/2Mo	3	1	Casting	SA-217	WC1	...	...	35	65	35.0	32.3	30.7	29.5	28.4	27.4	27.0	26.4	...
C-1/2Mo	3	1	Casting	SA-352	LC1	...	...	35	65	35.0	32.3	30.7	29.5	28.4	27.4	27.0	26.4	...
3 1/2Ni	9B	1	Plate	SA-203	E	...	...	40	70	40.0	...	...	...	...	...	...	...	...
3 1/2Ni	9B	1	Casting	SA-352	LC3	...	...	40	65	40.0	...	...	...	...	...	...	...	...
...	...	...	Forg.	SA-592	A,E,F	...	(1)	90	105	90.0	86.2	83.6	81.1	80.5	78.6	77.4	75.9	...
2 1/4Cr-1Mo	...	...	Plate	SA-542	...	1	...	85	105	85.0	81.6	79.6	78.0	76.7	75.2	74.4	73.4	...
2 1/4Cr-1Mo	...	...	Plate	SA-542	...	2	...	100	115	100.0	96.0	93.7	91.8	90.2	88.5	87.5	86.4	...
...	...	...	Plate	SA-517	All	...	(1)	100	115	100.0	95.8	93.0	90.2	89.5	87.5	86.0	84.4	...
2Ni-Cr-Mo-V	...	...	Forg.	SA-723	1	1	(1)	100	115	100.0	96.0	93.5	92.0	90.5	89.0	87.7	86.0	...
2 3/4Ni-Cr-Mo-V	...	...	Forg.	SA-723	2	1	(1)	100	115	100.0	96.0	93.5	92.0	90.5	89.0	87.7	86.0	...
4Ni-Cr-Mo-V	...	...	Forg.	SA-723	3	1	(1)	100	115	100.0	96.0	93.5	92.0	90.5	89.0	87.7	86.0	...
2Ni-Cr-Mo-V	...	...	Forg.	SA-723	1	2	(1)	120	135	120.0	115.2	112.2	110.4	108.6	106.8	105.2	103.2	...
2 3/4Ni-Cr-Mo-V	...	...	Forg.	SA-723	2	2	(1)	120	135	120.0	115.2	112.2	110.4	108.6	106.8	105.2	103.2	...
4Ni-Cr-Mo-V	...	...	Forg.	SA-723	3	2	(1)	120	135	120.0	115.2	112.2	110.4	108.6	106.8	105.2	103.2	...
2Ni-Cr-Mo-V	...	...	Forg.	SA-723	1	3	(1)(2)	140	155	140.0	134.4	130.9	120.8	126.7	124.6	122.8	120.4	...
2 3/4Ni-Cr-Mo-V	...	...	Forg.	SA-723	2	3	(1)(2)	140	155	140.0	134.4	130.9	120.8	126.7	124.6	122.8	120.4	...
4Ni-Cr-Mo-V	...	...	Forg.	SA-723	3	3	(1)(2)	140	155	140.0	134.4	130.9	120.8	126.7	124.6	122.8	120.4	...
2Ni-Cr-Mo-V	...	...	Forg.	SA-723	1	4	(1)(3)	160	175	160.0	153.6	149.6	147.2	144.8	142.4	140.3	137.6	...
2 3/4Ni-Cr-Mo-V	...	...	Forg.	SA-723	2	4	(1)(3)	160	175	160.0	153.6	149.6	147.2	144.8	142.4	140.3	137.6	...
4Ni-Cr-Mo-V	...	...	Forg.	SA-723	3	4	(1)(3)	160	175	160.0	153.6	149.6	147.2	144.8	142.4	140.3	137.6	...