



UNITED STATES
 NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001
SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATING TO HYDROSTATIC TESTING OF OFFGAS RADIOACTIVE WASTE PIPING

PENNSYLVANIA POWER AND LIGHT COMPANY

ALLEGHENY ELECTRIC COOPERATIVE, INC.

SUSQUEHANNA STEAM ELECTRIC STATION, UNITS 1 AND 2

DOCKET NOS. 50-387 AND 50-388

1.0 INTRODUCTION

By letter dated April 18, 1991, Pennsylvania Power and Light Company (PP&L or the licensee) requested an exemption from the hydrostatic testing provisions in NRC Branch Technical Position (BTP) ETSB 11-1 for 6 welds in 2 sections of small diameter (2") piping in the Offgas System.

2.0 BACKGROUND

Susquehanna Steam Electric Station (SSES), Unit 1 was issued a full-power license on November 12, 1982. The low power (5%) license for Unit 2 was issued March 23, 1984. During construction of SSES, system quality group classifications as defined in NRC Regulatory Guide 1.26 were determined by PP&L for each water, steam, or radioactive waste system. These classifications are discussed in Section 3.2.2 of the Final Safety Analysis Report (FSAR). Section 3.2.2.1 states that "certain portions of the radwaste system meet the additional requirements of Quality Group D (Augmented) as defined in the NRC BTP ETSB 11-1, Revision 1, Parts IV and VI. Portions of the radwaste system meeting the requirements of Quality Group D (Augmented) may be determined from notes on the appropriate figures in Chapter 11." This commitment was made in a letter to the NRC from PP&L (who, at the time, was an applicant) dated March 16, 1981, forwarding an FSAR revision to address seismic qualifications of some radwaste subsystems.

BTP-ETSB 11-1, Revision 1, "Design Guidance for Radioactive Waste Management Systems Installed in Light-Water-Cooled Nuclear Power Plants," was issued in May 1976. It was subsequently superseded by Regulatory Guide (RG) 1.143, "Design Guidance for Radioactive Waste Management Systems, Structures, and Components Installed in Light-Water-Cooled Nuclear Power Plants," which was initially issued in July 1978. Revision 1 to RG 1.143 was issued October 1979, 16 months prior to the March 16, 1981, commitment letter from PP&L. The only area in which the commitment to BTP ETSB 11-1 was apparently a consideration in the staff's assessment of the SSES design was for the gaseous radwaste system. In Supplement No. 1 to NUREG-0776, the NRC staff's Safety Evaluation Report for SSES, Units 1 and 2, dated June 1981, in Section 11.2.2, "Gaseous Waste Management Systems," the staff referenced the March 16, 1981, letter from PP&L and stated that, "The letter provided a commitment by the applicants to modify Table 3.2-1 of the SSES FSAR to show compliance with BTP ETSB 11.1. We find this to be acceptable."

9306280187 930622
 PDR ADOCK 05000387
 P PDR



1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

From the above, it is evident that the quality group classification and quality assurance provision for the gaseous radwaste system at SSES were, at most, "Quality Group D (Augmented) as defined in Parts IV and VI of BTP ETSB 11-1, Revision 1.

BTP ETSB 11-1, Revision 1 (and RG 1.143) in Table 1 on Equipment Codes specifies that Radwaste piping and valves be designed and tested in accordance with ANSI B 31.1 (American National Code Pressure Piping, "Power Piping" sponsored by the ANSI and the American Society of Mechanical Engineers (ASME)). From discussion with the licensee's staff, Bechtel designed and constructed the offgas piping in accordance with the 1973 edition of the ANSI B 31.1 code.

Table 11.3-5 of the SSES FSAR lists the design pressure and temperature for the major items of equipment in the offgas systems. The design pressures range from 150 psig to 700 psig, even though the normal operating pressures are either slightly below or above atmospheric pressure, depending on location within the system. As listed in Table 11.3.5 of the FSAR, the design pressure for the 8" and 16" carbon steel delay piping is 300 psig. As stated in the licensee's submittal, the design pressure for the 2" diameter piping which is the subject of this evaluation is 700 psig. As noted above, most of the offgas system operates at about atmospheric pressure. The basis for the high design pressures is to withstand a possible hydrogen detonation. As discussed at length in the licensee's submittal, the Susquehanna Offgas System is designed with both isolation on high hydrogen concentration (well below the detonation point) and detonation proof piping rather than only one of these requirements as specified by ANSI/ANS-55.4-1979.

3.0 EVALUATION

During a review of the offgas system piping documentation in 1983 (prior to licensing of Unit 2), the licensee discovered that for two short (2') sections of 2" piping, there was no record that 6 welds had been hydrostatically tested. The two sections of piping are downstream of the offgas recombiner skid and upstream of the HEPA filters at the inlet to the water removal unit. The 2" piping is Schedule 160 carbon steel designed for 700 psig, even though the normal operating pressure is about atmospheric pressure. The apparent lack of hydro tests on the 6 welds was the result of changing 2 valves from ball valves to plug valves. Of the six welds in question, welds 9 thru 12 received a Liquid Penetrant Test in lieu of a hydro test and welds 13 and 14 received a Radiographic Examination in lieu of a hydro test. A nonconformance report (NCR) was written to address the lack of documentation of a hydro testing for the 6 welds. As stated in the licensee's letter of April 18, 1991, "The disposition of the NCR was to 'use as is' since the affected welds had received a liquid penetrant test or a radiographic examination in lieu of a hydrostatic test." The NCR also concluded that an exemption was required since the licensee had committed to BTP ETSB 11-1 and the latter specifies that "completed process systems shall be pressure tested to the maximum practicable extent at a minimum pressure of 75 psig." Hence, the licensee's letter requested an exemption from hydrostatically testing the six welds.

As discussed in our letter to the licensee of May 19, 1993, on the liquid radwaste piping, for Quality Group D piping, licensees can evaluate and disposition apparent discrepancies in accordance with 10 CFR 50.59. No exemption is necessary.

The licensee's disposition was to "use as is". The ANSI B 31.1 Code makes allowances to substitute 100% radiography, ultrasonic, liquid penetrant or magnetic particle examinations in lieu of hydrostatic tests and the NRC staff has also found this acceptable. The licensee concluded that the level of confidence in the integrity of the weld provided by the radiographic and liquid penetrant test is commensurate to the level of confidence that would be provided by the 75 psig minimum hydro pressure specified in BTP ETSB 11-1, especially if one considers that the 6 welds are sized to withstand 700 psig (Schedule 160 wall thickness) in piping that operates at essentially atmospheric pressure. We agree with the licensee's disposition of the NCR.

Principal Contributors: R. Clark
G. Johnson

Date: June 22, 1993