UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
WISCONSIN ELECTRIC POWER COMPANY	)	Docket Nos. 50-266
	)	50-301
(Point Beach Nuclear Plant,	)	(Repair to Steam Generator Tubes)
Units 1 and 2)	)	

STATEMENT OF MATERIAL FACTS AS TO WHICH
THERE IS NO GENUINE ISSUE TO BE HEARD

The following is a statement of those material facts as to which there is no genuine issue in this proceeding.

Contention 1

1. Degradation of steam generator tubes is not synonymous with failure or rupture of the tubes but only means that the tubes have had a measurable reduction in wall thickness from that of the originally installed tube.

2. Degradation is defined in the Licensee's Technical Specifications (T.S.) for Point Beach Units 1 and 2 as "service induced cracking wastage, wear, or genenal tube corrosion occurring on either inside or outside of a tube."

3. The Licensee's T.S. define a degraded tube as "a tub hat contains imperfections cause by degradation greater than 20% of the nominal tube wall thickness".

4. The General Design Criteria notably 14, "Reactor Coolant Pressure Boundary," and 31, "Fracture Prevention of Reactor Coolant Pressure

Boundary," require that the reactor coolant pressure boundary have an extremely low probability of abnormal leakage, of rapidly propagating failure and of gross rupture.

5. Regulatory Guide 1.83 provides an acceptable method for implementing these criteria.

6. NUREG-0651, states that "Recent studies have shown that as few as ten tubes would need to have ruptured during a LOCA (assuming a leakage rate of 130 gal/min per ruptured tube) before the cladding temperature would be significantly affected."

7. 1300 gal/min total in-leakage would be required (130 gal/min per tube x 10 tubes) to significantly affect cladding temperature.

8. A guillotine rupture of a tube at a location 1/2 inch below the top of the tubesheet would yield a calculated in-leakage of 9.2 gal/min per tube assuming a secondary-to-primary differential pressure of 800 psid following a LOCA.

9. The leakage calculated for similar conditions at a location in the tubesheet where the crevice gap is .008 inches was only 5.5 gal/min per tube.

10. If a leak occurred in a sleeved tube following a LOCA at the location of the mechanical joint the in-leakage would be likewise constrained and of a similar magnitude as that stated above.

11. Because the small narrow crevice between the tube and tubesheet limits in-leakage during postulated LOCA conditions (assuming a circumferential crack of a steam generator tube), the narrow annulus region between the sleeve and tube in the vicinity of the mechanical joint similarly

limits the in-leakage per tube which would result from a circumferential crack near or at the location of the joint during postulated LOCA conditions.

12. The resulting in-leakage to be 12.5 gal/min per tube even if no expansion of the sleeve occurred during installation.

13. At least 100 tubes would have to simultaneously fail in the above manner during a LOCA to be of concern.

14. Tube collapse is a more likely mechanism for tube failure during a LOCA than tube rupture due to the direction of the resulting differential pressure forces.

15. The resulting in-leakage during a LOCA from tube collapse has been calculated to be much less than would be experienced during a tube rupture due to the smaller cross-sectional area available as a leakage path from tube collapse compared with a tube rupture.

16. Tube collapse does not have as high a potential to produce multiple tube failures as tube rupture because tube collapse will not cause tube-whip interaction of the affected tube with adjacent tubes as might a tube rupture in the free-standing region of the steam generator.

17. A sleeved tube will be less likely to experience tube failure along its sleeved length than an unsleeved tube due to the added support the sleeve lends to the tube.

Contention 2(a) and (c)

18. The NRC Staff's Safety Evaluation concludes that the Westinghouse Standard Technical Specifications for reactor coolant iodine activity should be adopted for Point Beach Unit 2 as they have for Point Beach Unit 1.

19. The Licensee has acknowledged to the Staff that they would accept this as a requirement, and the Standard Technical Specifications for iodine activity will be adopted for Unit 2 as they have been for Unit 1 upon assurance of the sleeving license amendment.

20. The Staff is unaware of any pressurized water reactor (PWR) which has ever violated the Westinghouse Standard Technical Specifications (STS) for iodine coolant activity, and most PWR's operate well below the STS limits.

21. The failure of a safety valve is not linked to sleeving steam generator tubes.

22. Sleeved steam generator tubes are not more likely to rupture during normal operation than unsleeved steam generator tubes.

23. A procedural error on the part of the Ginna operators contributed to the leakage experienced on the steam generator safety valve.

24. The power operated generator relief valve, which is isolable, was isolated prior to the affected steam generator pressure reaching the lift setpoint for the spring-loaded safety valves.

25. This unnecessarily challenged the spring-load safety valves, which are not isolable, five times.

26. The performance of the spring-loaded code safety valve which lifted five times was not unexpected or unsatisfactory given the exposure to the steam-water mixture and the state of the art of the valve.

27. The valve did close fully after leaking for about 50 minutes.

28. Should a tube rupture event occur, the correct procedure to relieve steam generator pressure would be to cycle the power operated

steam generator relief valve as necessary to relieve pressure rather than challenge the non-isolable spring-loaded steam generator code safety valves.

29. The power operated relief valve can be isolated if the valve fails to seat fully.

Contention 3(a)-(e)

30. The sleeves have been designed to replace defective portions of tubing as the primary pressure boundary and to meet applicable ASME Code and Regulatory requirements.

31. An extensive test verification program has been conducted to confirm acceptable structural strength, metallurgical properties, corrosion resistence, leak tightness, and inservice inspectability.

32. Post-installation process verification checks, baseline eddy current inspection, and system hydrostatic tests which will be performed prior to resuming power operation provide added assurance regarding the integrity of the sleeved tube assemblies.

33. Periodic inservice inspections, hydrostatic pressure tests, and tight limits on allowable primary to secondary leakage will be performed to ensure that tube integrity is maintained at acceptable levels throughout the life of the facility.

34. The sleeves will be periodically inspected during service using the eddy current test method.

35. The inspectability of the sleeves between the sleeve joints is comparable to that for an unsleeved tube.

36. At the sleeve joints, various structural discontinuities will produce background signals which will make flaw detection more difficult.

37. Laboratory tests indicate that flaws will generally be detectable before they are sufficiently large to cause a rupture.

38. Eddy current test sensitivity to small volume defects such as intergranular attack (IGA) and tight stress corrosion cracks (SCC) is significantly reduced relative to larger volume flaws, and this applies to both sleeved and non-sleeved tubes.

39. Corrosion testing has shown that the thermal treatment given to the Inconel sleeves is effective in reducing the probability of this type of corrosion developing on the sleeves.

40. The small, controlled amount of cold work associated with fabrication of the sleeve joints is not sufficient to cause a significant increase in the potential for stress corrosion cracking at the joints.

41. Even should IGA or SCC type defects occur during service, and even should some of these flaws escape detection by eddy current testing, the likely consequence would be a small leak based on operating experience.

42. The stringent Technical Specification limit on allowable primary to secondary leakage ensures that the plant will be shut down for appropriate corrective action before degradation could potentially rupture a tube during normal operating and postulated accident conditions.

43. Even if the sleeve or tube were to become completely severed at the location of the joint, the sleeve tube would be constrained against a double ended failure by the sleeve itself, and the resulting leakage

would be severely limited by the narrow annulus gap between the sleeve and tube.

44. The resulting leakage would be limited to approximately 5% of the rate which would be expected from an unobstructed leak path of a double ended break.

45. For postulated LOCA conditions, this would correspond to 12.5 gallons per minute leakage from the secondary to the primary side.

46. This is a very small amount of leakage compared to that which is necessary (1300 gallons per minute) to potentially cause critical overheating of the fuel during a LOCA.

47. The advent of AVT chemistry has resulted in a significant reduction in solids in the secondary water.

48. AVT does not increase the propensity for concentration of impurities in the tube/tube sleeve crevice.

49. Installation of a tube sleeve will result in significantly reduced heat transfer at the sleeve location and a concurrent decrease in heat flux.

50. Reduced heat flux in the areas of a tube sleeve will reduce boiling, which will act to minimize concentration of impurities.

51. Because concentrated impurities are necessary to cause corrosion, the installation of a sleeve and the resultant decreased heat flux will in fact reduce corrosion.

52. reduced boiling will further act to minimize impurity concentrations which result in scaling.

53. Surface desposits of conductive impurities or scaling which may occur with time is not expected to cause any significant degradation of eddy current detection capabilities.

54. Multifrequency eddy current techniques can be adapted as necessary to minimize background noise as a result of those impurities.

55. Sleeved tubes will also be adequately inspectable above the location of the sleeves.

56. The length of tubing above the sleeves can be inspected from the cold leg side using probes which are of the same diameter as those normally used to inspect unsleeved tubes.

57. For tubes with the smallest radius U-bends (tubes in row 1 through approximately row 5), it would be necessary to decrease the probe diameter somewhat to permit the probe to pass through the U-bends.

58. Use of appropriate centering devices to minimize probe wobble effects should permit these small radius U-bend tubes to be inspected above the sleeves without excessive loss of sensitivity.

59. Eddy current test inspection of the sleeves in conjunction with stringent limits on allowable primary to secondary leakage will provide reasonable assurance that the occurrance of degradation will be detected and appropriate corrective action taken before the integrity of the sleeved tubes has become sufficiently degraded to create the potential for rupture or unacceptable leakage during normal and postulated accident conditions.

60. Concentration of impurities, if any, which may or may not preferentially accumulate in the annulus between the original tube and the sleeve will not affect the concentration of corrodents or corrosion products in the free standing region of the steam generator.

61. Sleeving will not introduce corrodents or impurities into the secondary side of the steam generator in any greater quantity or concentration than presently exists.

62. The Licensee's reported efforts at sludge lancing and crevice flushing indicate that the level of solid impurities and corrosion products is not increasing as a result of switching to all-volatile chemistry treatment because the residual amount of solids obtained by these methods is not increasing.

63. The failure of hydraulic equipment at San Onofre 1 which resulted in a number of sleeves not being inserted all the way into the tubesheet is not related to tubes becoming under or over expanded.

64. This condition was identified and corrected at San Onofre 1 by their quality assurance check prior to startup.

65. Failure of equipment at San Onofre 1 cannot be implied to be the fault of transient workers.

66. The use of drugs or alcohol by workers at one job site does not necessarily imply that drugs and alcohol will be used by workers at some other site.

67. Westinghouse and the Licensee have provided a description of the training programs for the transient workers and the description of their duties with respect to equipment installation of remote and semi-remote equipment.

68. The workers will be trained and supervised by Westinghouse personnel.

69. The workers will be pre-screened by Westinghouse prior to hiring.

70. The NRC Staff is requiring an acceptable post-process sampling plan to verify the correct installation of the sleeves and proper joint formation.

71. Regardless of how many transient workers are used, each will receive the same training, including the use of full scale rehersal mockups prior to performance of duties.

72. Each worker will be under direct supervision of Westinghouse personnel.

73. The workers will be monitored by closed-circuit TV while performing their duties.

74. The joint fabrication procedures and tooling incorporate a highly controlled and automated process to achieve the specified amount of expansion.

75. The resulting joint expansions will be verified by measuring the inner diameter of the joints in accordance with a process sampling plan.

76. This will involve a 10% sample of the joints, with additional samples to be taken if under or over-expanded joints are found.

77. All joints will be eddy current inspected to verify that the expansion joints have been formed.

78. The likely consequence of a joint not receiving the full specified expansion would be a small leak.

79. If Technical Specification limits on primary to secondary leakage are exceeded, the plant will be shut down for appropriate corrective action.

80. Even if no credit is taken for the expansion joint, the maximum leakage which could result would be limited to a small fraction of the maximum leakage which could occur for a double ended rupture of a unsleeved tube due to the narrow annular gap between the sleeve and tube.

81. For postulated LOCA conditions, the resulting leakage would only be a small fraction of the amount of leakage which we expect could potentially result in critical overheating of the fuel.

82. It is very unlikely that any sleeves will be accepted for service with unexpanded joints based upon the Staff's review of how the joints are expanded and the post-process verification checks (including eddy current inspection of all joints) which will be performed prior to resuming power operation.

83. The sleeves are expanded against the tubes to provide a leak limiting seal.

84. Deformation of the sleeves relative to the tubes caused by differential pressure loadings are very small relative to the deformations induced by the specified joint expansion process.

85. Depressurization of the primary side during a LOCA will have little effect on the leakage characteristics of the joint as compared to the amount of deformation achieved during the expansion.

86. The sleeved tube assemblies will be subjected to a 1900 psid primary to secondary hydrostatic pressure test following installation of the sleeves.

87. This test pressure is considerably in excess of the approximately 1300 psid normal operating differential pressure across the tubes.

88. The steam generators will be subjected to an 800 psid secondary to primary (reverse pressure) test.

89. This latter test is close to the pressure which would be expected to occur during a LOCA.

90. Both the primary side and secondary side hydro tests will be repeated during subsequent inservice inspections of the steam generators.

91. These tests will identify abnormal leakage which occur as a result of an underexpanded joint.

92. Joint fabrication procedures and tooling, equipment cutoff settings, and post-process diameter measurements are expected to minimize any potential for overexpanding the joints, and thus to minimize any potential for stress corrosion cracking at the joints.

93. Assuming that stress corrosion cracks do occur as a result of the joints being overexpanded, the cracks will be identified either during inservice inspection or as a result of leaks during service.

94. The stringent Technical Specification limit on allowable primary to secondary leakages ensures that the plant will be shutdown for the appropriate corrective action before degradation could potentially rupture a tube during normal operating or postulated accident conditions.

Contention 4

95. The Licensee has previously submitted by letter to all parties its notice that it does not intend to sleeve tubes which have previously been plugged with explosive plugs.

96. Explosive plugs have shown some small indications of leakage (a few drops per minute) and have required further repair (usually seal welding).

97. The maximum force that could be exerted on an explosive plug during a LOCA would be the same as the secondary-to-primary differential pressure, approximately 800 psid, assuming a large through wall defect of the explosively plugged tube.

98. A drilling operation is required for removal of explosive plugs due to the large forces used initially in expanding the explosive plug (several KSI).

99. The maximum force an explosive plug will see during a LOCA is much less than used in installing the plug and should not be enough to cause it to rock loose.

Contention 5

100. The sleeving repair effort will take place on the primary side of the steam generators.

101. No sleeving repair work will take place on the secondary side of the steam generators.

102. Tubes cannot be damaged on the secondary side by loose parts left as a result of the sleeving process.

103. Were loose parts to be introduced into the Point Beach steam generators at some future date from some other repair or inspection effort, the presence of sleeves in some tubes would make it less likely that these tubes rather than unsleeved tubes would leak because of loose-part damage.

104. The sleeves will provide added support to the original tube along the sleeved portion.

105. Loose parts would preferentially locate at or near the top of the tubesheet due to gravitional forces.

106. The sleeves extend above the top of the tubesheet for several inches.

Respectfully submitted,

Richard G. Bachmann
Counsel for NRC Staff

Dated at Bethesda, Maryland
this 16th day of August, 1981