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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

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B. Paul Cotter, Jr., Chairman
Administrative Judge
Atomic Safety and Licensing
Board Panel
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dr. Richard F. Cole
Administrative Judge
Atomic Safety and Licensing
Board Panel
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Mr. Gustave A. Linenberger
Administrative Judge
Atomic Safety and Licensing
Board Panel
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

In the Matter of
GULF STATES UTILITIES CO., et al.
(River Bend Station, Units 1 & 2)
Docket Nos. 50-458 and 50-459-OL

Dear Administrative Judges:

Enclosed are Staff's responses to Applicant's Proposed Findings of Fact and Conclusions of Law for Contentions 1 and 2 in the above-captioned proceeding. As requested by the Board, Staff has indicated whether it (1) admits, (2) denies, (3) is unable to admit or deny, or (4) is neutral regarding each finding.

Sincerely,

Lee Scott Dewey

Lee Scott Dewey
Counsel for NRC Staff

Enclosure: As stated

cc w/encl: Service List

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

In the Matter of	)	
	)	
Gulf States Utilities Company, et al.	)	Docket No. 50-458
	)	
	)	
(River Bend Station)	)	

APPLICANTS' PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW RELATED TO CONTENTION 1 (ASIATIC CLAMS (CORBICULA))

Findings of Fact

1. The Asiatic clam is a type of small shellfish introduced to the northwest corner of the Unites States during the late 19th century, Conner, et al., ff. Tr. _____ at 2, ¶5.

Staff agrees.

2. Most American experts believe that a single highly-variable species of the Asiatic clam is present in the United States, and that its most appropriate technical name is Corbicula fluminea, Conner, et al., ff. Tr. _____ at 2-3, ¶5.

Staff agrees.

3. Corbicula is now known to inhabit 35 of the contiguous United States, Conner, et al., ff. Tr. _____ at 3, ¶6.

Staff agrees.

4. In the early 1960's, the Asiatic clam was noticed in the lower Mississippi River in the State of Louisiana, Conner, et al., ff. Tr. _____ at 3, ¶6.

Staff agrees.

5. Asiatic clams are robust, thick-shelled bivalve mollusks that are roughly triangular when viewed from the side (i.e., their least outside dimension is only slightly smaller than the greatest). They are quite variable in color; usually they appear coppery, greenish-yellow, or brownish-yellow, and tend to become darker with age. The primary mode of feeding for Corbicula is by filtration, Conner, et al., ff. Tr. _____ at 3-4, ¶8.

Staff agrees.

6. Because Corbicula are capable of surviving only in low to moderate salinities (up to 22 parts per thousand), the species is generally considered to be freshwater form, Conner, et al., ff. Tr. _____ at 4, ¶9.

Staff disagrees in part. The adult clam could survive high salinities by closing its shell in estuarine environments.

7. In freshwater, Asiatic clams are able to adapt to a wide variety of natural and manmade environments, although they seem to be more successful in moving water than in quiet water, Conner, et al., ff. Tr. _____ at 4, ¶9.

Staff agrees.

8. Corbicula are typically "infaunal" or burrowing in habit. Although reported from many types of substrates, they appear to prefer sands and gravels in streams, Conner, et al., ff. Tr. _____ at 4, ¶10.

Staff agrees.

9. Physical barriers such as drainage divides, saltwater, and an intolerance of low winter temperatures all limit the natural spread of Corbicula in North America. An absolute lower thermal limit for Corbicula fluminea is 2° C (36° F), Conner, et al., ff. Tr. _____ at 4, ¶11.

Staff agrees.

10. Most Corbicula grow to about 25-35 mm (1.0-1.3 inches) shell lengths (SL), Conner, et al., ff. Tr. _____ at 4, ¶12.

Staff agrees.

11. Sexual maturity is achieved at 7.5 mm SL (3/8 inch) in some individuals, although about 10 mm SL (7/16 inch) appears to be the more typical size at initial maturity, Conner, et al., Conner, et al., ff. Tr. _____ at 4, ¶12.

Staff agrees.

12. Growth of Corbuicula during early life is fairly rapid, and most Corbicula (especially in southern U.S. populations) seem to reach a size at which sexual maturity is anatomically possible during their first calendar year of life, Conner, et al., ff. Tr. _____ at 4-5, ¶12.

Staff agrees.

13. Occasional individuals may live up to four years, but the normal life span of Asiatic clams in southern rivers is about two years, Conner, et al., ff. Tr. _____ at 5, ¶12.

Staff agrees.

14. Corbicula fluminea is monoecious (hermaphroditic). Whether or not Corbicula actually engage in self-fertilization (and, if so, to what degree) has been the subject of debate, but the capability to do so has been amply demonstrated, Conner, et al., ff. Tr. _____ at 5, ¶13.

Staff agrees.

15. Once fertilized, the developing embryos and early larval stages are incubated (brooded) inside special pouches in the adult clam's inner gill, Conner, et al., ff. Tr. _____ at 5, ¶14.

Staff agrees.

16. Development and growth proceed inside the parent until the young clams are about 0.2 mm SL (0.008 inch) and have acquired their bivalved shell and a muscular organ known as the "foot." Corbicula larvae at this stage are technically known as pediveligers, Conner, et al., 5, ¶14.

Staff agrees.

17. "Spawning" in Asiatic clams consists of the parent clam exhaling the pediveligers via a breathing tube (siphon), Conner, et al., ff. Tr. _____ at 6, ¶14.

Staff is nuetral.

18. By virtue of its foot, a pediveliger is capable of crawling, and presumably burrowing, as are the older individuals. It is unlikely that this larvae is capable of intrinsically-directed locomotion when not in contact with a surface, Conner, et al., ff. Tr. _____ at 6, ¶15.

Staff agrees.

19. When subjected to turbulence, pediveligers can be carried great distances by currents before settling out on substrates, Conner, et al., ff. Tr. _____ at 6, ¶15.

Staff agrees.

20. The drifting of pediveligers, and of juveniles up to 5 mm SL (3/16 inch) given sufficient turbulence, is generally accepted to be the basis for the extensive and rapid downstream dispersal of Corbicula populations in rivers and is also the primary mechanism whereby Asiatic clams gain access to industrial cooling and service water systems, Conner, et al., ff. Tr. _____ at 6, ¶15.

Staff agrees.

21. The young clams are considered "juveniles" from about 0.5 mm SL (0.02 inch) until attainment of sexual maturity, Conner, et al., ff. Tr. _____ at 6, ¶16.

Staff is nuetral.

22. Juvenile Corbicula can produce "byssal threads," or holdfast organs. The byssal thread, muscular foot, and ability to burrow in substrates all enable young Corbicula to rapidly assume a benthonic existence, even in moving water, Conner, et al., ff. Tr. _____ at 6-7, ¶16.

Staff agrees.

23. Reproduction of Corbicula in the U.S. appears to be closely related to temperature, with spawning essentially limited to those periods when the water is over 16° C (60° F), Conner, et al., ff. Tr. _____ at 7, ¶17.

Staff agrees.

24. For most Gulf coastal streams, the Asiatic clam has a breeding season of 9-10 months, Conner, et al., ff. Tr. _____ at 7, ¶17.

Staff is unable to agree or disagree.

25. In the lower Mississippi River, however, temperatures ordinarily remain below 16° C from November through March, Conner, et al., ff. Tr. _____ at 7, ¶17.

Staff agrees.

26. Although some reproduction occurs throughout the period encompassing appropriate temperatures, many U.S. populations of Corbicula exhibit a bimodal pattern of spawning. There are two pronounced peaks of larval release (late spring/early summer and late summer/early autumn), Conner, et al., ff. Tr. _____ at 7, ¶17.

Staff agrees in part. In some situations and in some environments there may be a continuous level of larval production throughout the summer.

27. During spawning peaks, an individual clam may release several hundred pediveligers per day, Conner, et al., ff. Tr. _____ at 7, ¶17.

Staff is nuetral.

28. Corbicula (living and/or dead shells) cause problems by obstructing water flow. Flow is impeded by the clogging of orifices and/or by increased friction on surfaces that would ideally be smooth, Conner, et al., ff. Tr. _____ at 7, ¶18.

Staff agrees.

29. Attachment of clams to surfaces, or the passive accumulation of living Corbicula and/or their shell debris, can interfere with heat-transfer processes, Conner, et al., ff. Tr. _____ at 7, ¶18.

Staff disagrees in part since there is no proof that clams attach to pipes.

30. Historical data for Corbicula in the river near the site exist from Louisiana State University (LSU) studies performed for Gulf States Utilities Company (GSU). Twelve years of data exist for substrate-associated juveniles and adults. Eleven years of data exist on drifting juveniles in these same areas, Conner, et al., ff. Tr. _____ at 7-8, ¶19.

Staff agrees.

31. Benthic (substrate-associated) Asiatic clams have been encountered somewhat less frequently, and in generally lower numbers per unit area, in the late-1970's and early-1980's than during the baseline studies of the early- and mid-1970's, Conner, et al., ff. Tr. _____ at 8, ¶19.

Staff agrees.

32. Sampling of drifting larvae and early juveniles has suggested that, in some years at least, there are two peaks of abundance (early and late summer). This presumably reflects a bimodal spawning pattern such as has been observed in other streams of the southern U.S., Conner, et al., ff. Tr. _____ at 8, ¶19.

Staff agrees.

33. Adult and larger juvenile clams appear to be more abundant along the west side of the river, Conner, et al., ff. Tr. _____ at 8, ¶19.

Staff agrees.

34. Based on observations taken since 1980, the substrate in the immediate vicinity of the proposed intake (and of the intake embayment in general) has so far been colonized by extremely low numbers of Corbicula, Conner, et al., ff. Tr. _____ at 8, ¶20.

Staff agrees.

35. Routine monthly Petersen grab samples have yielded density estimates ranging from 0-5 per square meter with an overall mean of 1 per square meter at this location, Conner, et al., ff. Tr. _____ at 8, ¶20.

Staff agrees.

36. Two years of samples of microzooplankton exist which include Corbicula larvae. Preliminary indications are that, relative to the river channel, densities of drifting larvae in the intake embayment are quite low, Conner, et al., ff. Tr. _____ at 8, ¶20.

Staff agrees.

37. Big Cajun, a power plant directly across the river, has had no fouling problems, Conner, et al., ff. Tr. _____ at 9, ¶21.

Staff agrees.

38. Crown-Zellerbach, a paper mill located on the east shore two miles downstream of the River Bend Station intake, generates its own electricity, Conner, et al., ff. Tr. _____ at 9, ¶22.

Staff is nuetral.

39. Crown-Zellerbach circulates more river water through its plant than does River Bend Station, with makeup water suction taken from a position in the river nearer the bottom where Corbicula would be more likely to be found, Conner, et al., ff. Tr. _____ at 9, ¶22.

Staff agrees.

40. In 17 years, Crown-Zellerbach has never observed a single clam in any internal plumbing at their facility, Conner, et al., ff. Tr. _____ at 9, ¶22.

Staff agrees.

41. If Crown-Zellerbach entrains pediveligers, their clarifiers (very much like those at River Bend Station) and/or continuous low-level chlorination must be entirely effective, Conner, et al., ff. Tr. _____ at 9, ¶22.

Staff is unable to agree or disagree.

42. Considering the River Bend Station intake design and clarification equipment, the only possible means by which Corbicula could enter River Bend Station would be by entrainment of pediveligers, Conner, et al., ff. Tr. _____ at 9-10, ¶23.

Staff disagrees with this finding since Corbicula could also be brought into the River Bend Station by birds or man.

43. Adult clams could not pass through the intake screens or clarifiers, Conner, et al., ff. Tr. ___ at 10, ¶23.

Staff agrees.

44. There are three systems at River Bend Station that could potentially be affected by Asiatic Clams, inasmuch as they use water from the river, the Cooling Tower Makeup Water System, the Circulating Water System, and the Normal Service Water System, Conner, et al., ff. Tr. _____ at 10, ¶24.

Staff denies since the Standby Service Water System should also be included in this list.

45. The Cooling Tower Makeup Water System could potentially act as a physical pathway for Corbicula to the Circulating Water System and to the Normal Service Water System, Conner, et al., ff. Tr. _____ at 10, ¶24.

Staff only agrees in part since, as pointed out in our response to 46, there are four systems.

46. Of the three systems that could potentially be affected by the Asiatic clam, there are safety-related components only within the Normal Service Water System, Conner, et al., ff. Tr. _____ at 10, ¶24.

Staff agrees.

47. Asiatic clam infestation is a safety concern only in the Normal Service Water System, Conner, et al., ff. Tr. _____ at 10, ¶24.

Staff disagrees since Corbicula are also a safety concern in the Standby Service Water System.

48. The Normal Service Water System provides cooling water to remove heat from turbine and reactor plant auxiliary systems and components during all modes of normal plant operation, Conner, et al., ff. Tr. _____ at 12, ¶29.

Staff agrees.

49. During a loss of the Normal Service Water System, the Standby Service Water System goes into operation supplying safety-related components which normally use normal service water, Conner, et al., ff. Tr. _____ at 12, ¶29.

Staff agrees.

50. The Normal Service Water System consists of three 50% pumps which take suction from the circulating water flume. Design flow for the Normal Service Water System is approximately 51,000 gpm, Conner, et al., ff. Tr. _____ at 12, ¶29.

Staff disagrees. Applicant's FSAR at § 9.2.1.2 states that the systems' designed flow rate is approximately 31,500 gpm for each 50% capacity pump, yielding a design flow rate of approximately 63,200. Staff notes that Applicant's ER states that 50,900 gpm is the required normal flow rate of service water.

51. The Normal Service Water pumps discharge into a common header where the system is continuously chlorinated to prevent biofouling, Conner, et al., ff. Tr. _____ at 12, ¶29.

Staff agrees that the pumps discharge into a common header, but it has not been established that the system will be continuously chlorinated.

52. Outside of the turbine building, the common header branches into two headers, one to the turbine and radwaste buildings, the other to the auxiliary, diesel generator, control, and reactor buildings. The second branch supplies all safety-related components of the system as well as certain non-safety systems which would be isolated during SSW operation if required, Conner, et al., ff. Tr. _____ at 12, ¶29.

Staff agrees.

53. Automatic isolation of the Normal Service Water System supply and return headers allows standby service water to supply the auxiliary, control, diesel generator, and reactor buildings, Conner, et al., ff. Tr. _____ at 12, ¶29.

Staff agrees.

54. The Standby Service Water System consists of the standby service water cooling tower and four 50% capacity pumps, Conner, et al., ff. Tr. _____ at 12-13, ¶30.

Staff agrees.

55. The Standby Service Water pumps take suction from the standby cooling tower and supply well water from the basin to all safety-related service water components as well as some non-safety related components which are isolated, if required, Conner, et al., ff. Tr. _____ at 13, ¶30.

Staff disagrees. The Standby Service Water System will have some normal service water in it after the well water is added to the system.

56. During functional testing of the Standby Service Water System, there may be a potential for water from the Normal Service Water System to enter the Standby Service Water System. Chlorination of the Standby Service Water System would be used to prevent the survival of any Corbicula which may be present, Conner, et al., ff. Tr. _____ at 13, ¶30.

Staff agrees with the first sentence but there is insufficient information available at present to agree or disagree with the second sentence.

57. The Cooling Tower Makeup Water System is designed to supply approximately 14,000 gpm of clarified water to the circulating water flume, Conner, et al., ff. Tr. _____ at 10, ¶25.

Staff disagrees. Although Applicant's ER states there are 13,780 gpm, its FSAR (at § 9.2.11.2) states that there is 16,000 gpm.

58. Mississippi River water enters the Cooling Tower Makeup Water System through one of two conical-shaped wedgewire screen units which are constructed to screen all material greater than 1.5 X .75 inches, Conner, et al., ff. Tr. _____ at 10, ¶26.

Staff does not have sufficient information at this time to agree or disagree.

59. One 36 inch diameter intake line for each screen unit conveys water to the makeup pumphouse. In the pumphouse, the intake lines join at a common header to two makeup water pumps, Conner, et al., ff. Tr. _____ at 10, ¶26.

Staff is nuetral.

60. A makeup water pump supplies the raw river water to a clarifier which is sized to handle makeup water flow. The clarifier is a Graver solids-contact type treatment unit. Raw water is mixed with a polyelectrolyte and a recirculated floc and enters the clarifier unit, Conner, et al., ff. Tr. ____ at 11, ¶27.

Staff is nuetral.

61. The water is retained in the clarifier to permit the chemical and colloidal process to proceed to completion so that by the time the water passes into the outer settling zone, floc particles have formed and separated cleanly. The clear water rises and is uniformly collected over a substantial portion of the surface. Water from the clarifier is supplied to the flume from which the circulating water and service water pumps take suction, Conner, et al., ff. Tr. _____ at 11, ¶27.

Staff is nuetral.

62. The design specification for the clarifier is that average suspended solids shall not exceed 10 ppm, Conner, et al., ff. Tr. _____ at 11, ¶27.

Staff is nuetral.

63. Any adult clams which reach the clarifier will be trapped within the clarifier along with suspended solids and transferred back to the Mississippi River. The clarifier will also be effective in removing most, if not all, larvae, Conner, et al., ff. Tr. _____ at 11, ¶27.

Staff is unable to answer due to lack of documented evidence.

64. The Circulating Water System dissipates heat from the main condenser and provides the necessary heat sink for the Normal Service Water System, Conner, et al., ff. Tr. _____ at 11, ¶28.

Staff denies. The normal cooling towers, and not the Circulating Water System, is the Heat Sink for the Normal Service Water System.

65. The Circulating Water System consists of four multicell cooling towers, four 25% capacity circulating water pumps, and associated piping. Design flow for the Circulating Water System is approximately 510,000 gpm, Conner, et al., ff. Tr. _____ at 11, ¶28.

Staff agrees.

66. The water chemistry for the Circulating Water System is controlled in order to minimize biofouling by the injection of sodium hypochlorite solution periodically into the discharge of the circulating water pumps downstream of the blowdown header to the Mississippi River, Conner, et al., ff. Tr. _____ at 11, ¶28.

Staff agrees.

67. Blowdown from the Circulating Water System is approximately 2,200 gpm, Conner, et al., ff. Tr. _____ at 12, ¶28.

Staff agrees.

68. GSU's program of detection includes sampling for Corbicula in the intake embayment and in the river near the site, Conner, et al., ff. Tr. _____ at 13, ¶31.

Staff agrees.

69. Sampling for larger juveniles and adults will be continued monthly in the intake embayment, Conner, et al., ff. Tr. _____ at 13, ¶31.

Staff agrees.

70. Sampling for planktonic early life stages using plankton nets will be conducted semimonthly (April through October) or monthly (November through March) in the river channel near the embayment, Conner, et al., ff. Tr. _____ at 13, ¶31.

Staff agrees.

71. Sampling for planktonic early life stages will also be conducted semimonthly (April through October) or monthly (November through March) in the clarifier influent line to determine the quantities entrained in the makeup water, Conner, et al., ff. Tr. _____ at 13, ¶32.

Staff agrees.

72. Most of the sampling effort will be devoted to weekly (April through October) or monthly (November through March) samples of the clarifier discharge using plankton nets, Conner, et al., ff. Tr. _____ at 13-14, ¶32.

Staff agrees.

73. Sampling for larger juveniles and adults will be conducted monthly in various exposed portions of the Circulating Water System such as the cooling tower basins, Conner, et al., ff. Tr. _____ at 14, ¶33.

Staff agrees.

74. Tne sampling programs will begin upon start-up of the cooling tower makeup water system (initial introduction of river water into the plant is estimated to be in February 1985) and will continue through two complete clam reproductive seasons beyond commercial operation. At the end of this period there will be data reflecting: 1) ambient densities of larvae in the river; 2) numbers of larvae entrained by the plant intake water; and 3) numbers of larvae introduced into the plant service and circulating water systems (i.e., clarifier performance), Conner, et al., ff. Tr. _____ at 14, ¶34.

Staff agrees.

75. If, from clarifier discharge and cooling tower basin sampling, service water component performance trending, and maintenance inspections, minimal or no Corbicula infestation of the plant is indicated, an appropriate reduction in intensity of the detection program will be made, Conner, et al., ff. Tr. _____ at 14, ¶35.

Staff agrees.

76. Even under a reduced program, monitoring of clam populations in the river, and semimonthly or monthly sampling of the clarifier discharge will be maintained, Conner, et al., ff. Tr. _____ at 14, ¶36.

Staff agrees.

77. If the sampling program indicates that clams have been introduced into the Service and Circulating Service Water Systems, emphasis in monitoring will immediately shift to address: (a) the adequacy of the chlorination program and modifications to it, as appropriate; (b) the ecology of the clams in the plant (i.e., spatio-temporal distribution, growth, and reproduction); and (c) the relationship(s) between the numbers of clams observed and biofouling problems, Conner, et al., ff. Tr. _____ at 14-15, ¶37.

Staff agrees.

78. In addition to monitoring and sampling for Corbicula, GSU will utilize instrumentation to detect the deterioration of flow (possible blockage by clams) across heat exchangers in the Normal Service Water System, Conner, et al., ff. Tr. _____ at 15, ¶38.

Staff agrees.

79. The listing of the safety-related systems normally served by the Normal Service Water System, identified in Attachment 1, is correct and the instrumentation, parameters and frequency to be used for each is adequate, Conner, et al., ff. Tr. _____ at 15, ¶38.

Staff disagrees. The safety related systems list is not complete.

80. Operators will monitor the permanent instrumentation daily and will record the readings on their Daily Operating Log. If it is determined that a particular reading has exceeded its prescribed limits, that reading will be brought to the attention of the Shift Supervisor, Conner, et al., ff. Tr. _____ at 15, ¶38.

Staff agrees.

81. The Technical Staff group will review the Daily Operating Logs on a periodic basis and perform trending to detect component fouling on a monthly basis for those components listed in Attachment 1, Conner, et al., ff. Tr. _____ at 15-16, ¶39.

Staff agrees.

82. Using the trending program, it will be possible to predict when any particular component will exceed its desired performance capabilities, Conner, et al., ff. Tr. _____ at 16, ¶39.

Staff is unable to agree or disagree.

83. Upon receipt of an excessive instrument reading or indication from the trending program of a component's degraded heat exchange capability, the component will be removed from service, opened, and visually inspected for evidence of Corbicula fouling, Conner, et al., ff. Tr. ___ at 16, ¶39.

Staff agrees.

84. The tubesheets and water box dividers of the safety-related heat exchangers within the service water system are generally not of copper-nickel material composition. The exceptions, the RHR heat exchangers and the emergency diesel generator coolers, do not rely on differential pressure across the inlet and outlet water boxes for determining fouling, Conner, et al., ff. Tr. _____ at 16, ¶40.

Staff agrees.

85. The trending program utilizes a heat balance calculation to determine heat exchanger efficiency for these components, precluding a false indication of cooling water flow through the heat exchanger tubes upon flow blockage by Corbicula, Conner, et al., ff. Tr. _____ at 16, ¶40.

Staff denies in part since the heat balance calculation will only be utilized for two types of River Bend heat exchanges and not others.

86. If evidence of fouling is noted, the system will be flushed and the clams and clam debris will be removed prior to putting the component back in service, Conner, et al., ff. Tr. _____ at 17, ¶42.

Staff agrees.

87. If any component is found to contain adult clams large enough to foul heat exchangers, the performance testing of all other components served by the service water system and listed in Attachment 1 will be conducted within seven days, Conner, et al., ff. Tr. _____ at 17, ¶42.

Staff agrees.

88. If performance parameters exceed their prescribed limits, the component(s) will be opened for inspection. Additionally, the trending frequency will be increased, Conner, et al., ff. Tr. _____ at 17, ¶42.

Staff agrees.

89. Most adult clams will be excluded from entrainment in the makeup water by wedge wire screens mounted on each suction pipeline, Conner, et al., ff. Tr. _____ at 17, ¶43.

Staff agrees.

90. The clarifier for the removal of suspended matter from the makeup water is expected to remove a majority, if not all, of the Corbicula, Conner, et al., ff. Tr. _____ at 17, ¶43.

Staff does not have sufficient information to agree or disagree.

91. The continuous chlorination at the normal service water pump discharge header will serve as yet another level of prevention of infestation by Corbicula, Conner, et al., ff. Tr. _____ at 17, ¶43.

Staff disagrees since it has not been established that the system will be continuously chlorinated throughout the year.

92. Operating experience will determine the appropriate chlorine feed rates. A total residual chlorine concentration of 0.6 to 0.8 ppm is initially targeted, Conner, et al., ff. Tr. _____ at 17, ¶43.

Staff agrees.

93. The residual chlorine concentration will be measured by instrumentation at the outlet of the service water system prior to mixing with the condenser circulating water flow to the cooling towers, Conner, et al., ff. Tr. _____ at 17, ¶43.

Staff agrees.

94. The monthly rotation of normally-operating redundant safety-related components into service will ensure that the contained water will be periodically exchanged with freshly chlorinated water. Operation of intermittent flow systems in this manner will prevent Corbicula from surviving and growing to fouling size, Conner, et al., ff. Tr. _____ at 17-18, ¶44.

Staff agrees.

95. To avoid fouling problems following initial introduction of river water or following outages, the Normal Service Water System will be operated such that adequate chlorine levels are maintained continuously during these periods, Conner, et al., ff. Tr. _____ at 18, ¶45.

Staff agrees.

96. The monthly rotation of normally-operating redundant safety-related components into service will further assure that the plant will not be started (or restarted) with existing fouling unknown to the operators, Conner, et al., ff. Tr. _____ at 18, ¶45.

Staff denies. There could be fouling even with redundant systems which would be unknown to the operators.

Conclusions of Law

1. These detection and prevention programs and the facility's design provide reasonable assurance that GSU will be effective in controlling biofouling problems by Corbicula.

Staff agrees that, with the inclusion of technical specifications, the Corbicula problem will be controlled.

2. The issuance of an operating license to the Applicants will not be inimical to the common defense and security or to the health and safety of the public.

Staff agrees.

3. Pursuant to 10 C.F.R. §2.760a and 10 C.F.R. §50.57, the Director of Nuclear Reactor Regulation should be authorized to issue to the Applicants, upon making requisite findings with respect to matters not embraced in the Initial Decision, a license authorizing operation of River Bend Station.

Staff agrees.

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OFFICE OF SECRETARY
DOCKETING & SERVICE
BRANCH

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

In the Matter of	)	
	)	
Gulf States Utilities Company, et al.	)	Docket No. 50-458
	)	
	)	
(River Bend Station)	)	

APPLICANTS' PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW RELATED TO CONTENTION 2 (OLD RIVER CONTROL STRUCTURE)

Findings of Fact

1. The Old River Control Project ("Project") functions to control and regulate the amount of water diverted from the Mississippi River into the Atchafalaya River, thereby maintaining the stability of both river systems, Fairless, ff. Tr. _____ at _____.

Staff agrees

2. Without the Project, the Mississippi River would change its course to that of the Atchafalaya River, Fairless, ff. Tr. _____ at _____.

Staff agrees.

3. The Old River Control Project is located on the right descending bank of the Mississippi River, about 50 air miles northwest of Baton Rouge, Louisiana, Fairless, ff. Tr. _____ at _____.

Staff agrees.

4. The principal features of the project are: three mechanically operated control structures, designated as the low sill control structure; the overbank control structure; an auxiliary control structure (currently under construction); an inflow channel from the Mississippi River to the low sill structure; an outflow channel from the low sill structure to the Red River; a lock for navigation; forebay and tailbay channels for the lock; an earthen dam closing Old River; enlargement and extension of main line Mississippi River levees; and bank stabilization as required, Fairless, ff. Tr. _____ at _____.

Staff agrees.

5. The low sill structure is located at about Mississippi River Mile 315 above the head of passes (AHP). The low sill structure is a controlled spillway having a gross width of 566 feet between training walls and consisting principally of gated openings, a stilling basin, training walls, and abutments, Fairless, ff. Tr. _____ at _____.

Staff agrees.

6. The spillway section is composed of 11 gate openings each 44 feet wide, Fairless, ff. Tr. _____ at _____.

Staff agrees.

7. The low sill structure is operated on a continuous basis at all river stages, Fairless, ff. Tr. _____ at _____.

Staff agrees.

8. Flows through the low sill structure are controlled by means of adjustable vertical steel gates, Fairless, ff. Tr. _____ at _____.

Staff agrees.

9. At high water stages, the overbank control structure is operated together with the low sill structure to control flows, Fairless, ff. Tr. _____ at _____.

Staff agrees.

10. Upon completion of the auxiliary control structure, flow regulation will be accomplished by the combined operation of the low sill structure, the overbank structure, and the auxiliary structure, as appropriate, Fairless, ff. Tr. _____ at _____.

Staff agrees.

11. The Project is operated so as to maintain the flow distribution between the Mississippi and Atchafalaya Rivers in approximately the same proportions as occurred naturally (via lower Old River) in 1950, Fairless, ff. Tr. _____ at _____.

Staff agrees.

12. The 1950 flow distribution consisted of about 30% of the total latitude flow (combined flow in the Red River and in the Mississippi River above the control structures) passing down the Atchafalaya River on an annual basis and the remainder down the lower Mississippi River, Fairless, ff. Tr. _____ at _____.

Staff agrees.

13. To date, maintenance of this 70/30 annual distribution is, in fact, effective in maintaining a stable relationship between the two rivers, Fairless, ff. Tr. _____ at _____.

Staff agrees.

14. The current Federal Project for flood control and navigation along the lower Mississippi River has been under development for over 50 years and provides a reliable navigation system, a high degree of flood protection, and a dependable supply of fresh water, Fairless, ff. Tr. _____ at _____.

Staff agrees.

15. The Old River Control Project, by maintaining a stable relationship between the Mississippi and Atchafalaya Rivers, is an essential element of this plan, Fairless, ff. Tr. _____ at _____.

Staff agrees.

16. Failure of the Old River Control Project, resulting in a change in the course of the Mississippi River would have disastrous economic, social, and environmental effects on southern Louisiana and the entire nation, Fairless, ff. Tr. _____ at _____.

Staff agrees.

17. Were the Old River Control Project to fail and the Mississippi River to change its course, the abundant supply of fresh water in the lower Mississippi River, which New Orleans and other cities use for drinking water and on which billions of dollars of industrial development are dependent, would be reduced or eliminated, Fairless, ff. Tr. _____ at _____.

Staff agrees.

18. Were the Old River Control Project to fail and the Mississippi River to change its course, the flood protection system along the Atchafalaya River would not be able to accept the change in course without massive flooding and a long and costly redesign and reconstruction of the system, Fairless, ff. Tr. _____ at _____.

Staff agrees.

19. Were the Old River Control Project to fail and the Mississippi River to change its course, the continued existence of historic towns along the banks of the Atchafalaya River, such as Kortz Springs, Berwick, and Morgan City, would be threatened, Fairless, ff. Tr. _____ at _____.

Staff agrees.

20. Were the Old River Control Project to fail and the Mississippi River to change its course, vast adverse environmental impacts would occur both in the Atchafalaya Basin, America's largest river swamp, and in the coastal bays and marshes adjacent to the present outlets of the Atchafalaya and Mississippi Rivers, Fairless, ff. Tr. _____ at _____.

Staff agrees.

21. Were the Old River Control Project to fail and the Mississippi River to change its course, the tremendous volume of shallow draft navigation between the upper Mississippi River and the ports of Baton Rouge and New Orleans would be seriously disrupted, Fairless, ff. Tr. _____ at _____.

Staff agrees.

22. Erosion (scour) of the inflow and outflow channel bed and banks has occurred in a number of years since the Project was put in operation. Considerable bank stabilization has been placed to repair damages and prevent continued erosion, Fairless, ff. Tr. _____ at _____.

Staff agrees.

23. During the flood of 1973, scour occurred immediately in front of the low sill structure and brought about the collapse of one of the concrete inflow training walls, the loss of about one-half of a concrete approach slab in front of the structure, and the formation of a large void underneath the gated portion of the structure, Fairless, ff. Tr. _____ at _____.

Staff agrees.

24. To repair the 1973 scour damage, emergency repairs were required during 1973 and 1974, consisting of: filling the scour hole in front of the structure with riprap; construction of a riprap training dike to replace the concrete inflow training wall which was destroyed by the scour damage; and filling the void underneath the structure with cement grout. These repairs were successful in stabilizing conditions and preventing further damage, Fairless, ff. Tr. _____ at _____.

Staff agrees.

25. From 1975 to the present time, a comprehensive rehabilitation plan of the entire Old River Complex has been carried out by the Corps of Engineers, Fairless, ff. Tr. _____ at _____.

Staff agrees.

26. Work completed to date as part of this rehabilitation plan includes modification of the gates of the low sill structure to improve flow conditions through the structure; additional scour protection in both the inflow and outflow channels of the low sill structure; replacement piezometers at the low sill structure; repair of the stilling basin of the low sill structure; and modification of the overbank control structure, Fairless, ff. Tr. _____ at _____.

Staff agrees.

27. The repair and rehabilitation of the low sill structure enabled dependable control to be reestablished over the distribution of flow by 1977 and has provided a high degree of confidence in the ability of the project to meet normal day-to-day operating requirements, including major floods, Fairless, ff. Tr. _____ at _____.

Staff agrees.

28. Construction of an auxiliary structure will insure that the differential head does not exceed the safe limit, Fairless, ff. Tr. _____ at _____.

Staff agrees.

29. The Project demonstrated its effectiveness and reliability during the floods of 1979 and 1983, Fairless, ff. Tr. _____ at _____.

Staff agrees.

30. The auxiliary structure, the final element in the rehabilitation program, is now under construction and is scheduled for completion in the fall of 1986, Fairless, ff. Tr. _____ at _____.

Staff agrees.

31. With completion of the auxiliary structure, the ability of the Old River project to safely and reliably perform its authorized function under all conditions, including possible emergencies, will be fully restored, Fairless, ff. Tr. _____ at _____.

Staff agrees.

32. The auxiliary structure is designed to operate together with the low sill structure, reducing both hydraulic and structural stress at the low sill structure and providing needed operational flexibility, Fairless, ff. Tr. _____ at _____.

Staff agrees.

33. The picketboat operation, including the radar and TV system, is conducted on a 24 hour per day basis, Fairless, ff. Tr. _____ at _____.

Staff agrees.

34. Following the scour damage in 1973, strict control was placed on the allowable differential head at the low sill structure and a comprehensive daily surveillance program for the low sill structure and its adjacent channels was established, Fairless, ff. Tr. _____ at _____.

Staff agrees.

35. As part of the surveillance program, technicians at the low sill structure monitor various indicators of structural integrity, Fairless, ff. Tr. _____ at _____.

Staff agrees.

36. Hydrographic and topographic surveys of the channel bottoms are performed daily as is monitoring of foundation pressures, Fairless, ff. Tr. _____ at _____.

Staff agrees.

37. Alignments and vibrations are periodically observed and recorded, Fairless, ff. Tr. _____ at _____.

Staff agrees.

38. The stilling basin of the low sill structure is inspected annually, water levels permitting, Fairless, ff. Tr. _____ at _____.

Staff agrees.

39. "Failure" of the Old River Project is defined as a situation wherein the project is damaged to the point that it is unable to operate. The definition does not require that failure be of a sudden and massive nature, Fairless, ff. Tr. _____ at _____.

Staff agrees.

40. Studies of the low sill structure have identified three possible failure modes: (1) failure of the stilling basin of the structure, (2) failure of the main (gated portion) structure, and (3) failure of the levee system, adjacent to the structure, Fairless, ff. Tr. _____ at _____.

Staff agrees.

41. While the levee system adjacent to the Old River Control Structure could fail, the likelihood of such failure is not greater at the Old River Control Structure than at any other point in the system, Fairless, ff. Tr. _____ at _____.

Staff agrees.

42. Failure of a levee would not produce the catastrophic consequences that failure of the low sill structure would, Fairless, ff. Tr. _____ at _____.

Staff agrees.

43. Under the most adverse circumstances, one of these failures could occur suddenly. Even if this were to occur, however, there would not be a sudden shifting of the Mississippi River to a new channel. Rather, the Mississippi River would begin to gradually shift to a new channel. If this gradual movement was not altered by emergency construction, the change in course would take years to complete, Fairless, ff. Tr. _____ at _____.

Staff agrees.

44. The Corps has prepared a contingency plan for implementation in the event of incipient failure at the low sill structure, Fairless, ff. Tr. _____ at _____.

Staff agrees,

45. The contingency plan provides for construction of a riprap dam across the inflow channel leading to the low sill structure, providing either a partial or complete closure as the situation may require, Fairless, ff. Tr. _____ at _____.

Staff agrees.

46. It is estimated that about 2½ months would be required to construct the first stage (partial closure) of the riprap dam and about 4 to 5 additional months would be required to complete the full closure dam, Fairless, ff. Tr. ____ at _____.

Staff agrees.

47. Full restoration and/or replacement of the low sill structure would require several years, Fairless, ff. Tr. _____ at _____.

Staff agrees.

48. During this period of construction the flow in the Mississippi River might be decreased, Fairless, ff. Tr. _____ at _____.

Staff agrees.

49. Based upon River Bend Station's river water requirements, it is not expected that this possible decrease in flow would be sufficient to affect adversely the plant's cooling water requirements, Fairless, ff. Tr. _____ at _____; Cahill, et al., Tr. _____ at 2, ¶2 and at 3, ¶6.

Staff agrees.

50. A failure of the low sill structure would set in motion processes which, if not altered by emergency construction, would, over a period of years, result in a change of course of the Mississippi River to the Atchafalaya River, Fairless, ff. Tr. _____ at _____.

Staff agrees.

51. Were the low sill structure to fail and the Mississippi River to change its course, flows in the Mississippi River downstream of Old River would decrease with time and eventually the lower Mississippi would receive little or no flow during low water periods and significant flows only during high water periods, Fairless, ff. Tr. _____ at _____.

Staff agrees.

52. Were the low sill structure to fail and the Mississippi River to change its course, the rate at which this reduction would occur is greatly dependent upon the hydrologic conditions occurring from year to year and cannot be foretold but it would likely take at least several years, Fairless, ff. Tr. _____ at _____.

Staff agrees.

53. Were the Old River Control Project to fail and the Mississippi River to change its course, salt water intrusion would increase as flows in the lower Mississippi River decreased and at the extreme condition, where little or no flow was entering the river, salinity levels at River Bend Station would approach those of seawater, Fairless, ff. Tr. _____ at _____.

Staff agrees.

54. Were the Old River Control Project to fail and the Mississippi River to change its course, sedimentation would occur in the channel below Old River, but it is likely that sufficient water would remain available at the River Bend Station for its operation, Fairless, ff. Tr. _____ at _____; Cahill, et al., Tr. _____ at 2, ¶2 and at 3, ¶6.

Staff agrees.

55. With the auxiliary structure completed and in operation, and assuming an appropriate maintenance program, the probability of a failure of the Old River Project is almost nil, Fairless, ff. Tr. _____ at _____.

Staff agrees.

56. Assuming a hypothetical failure, salt water could eventually intrude into the area of the River Bend Station. Because it is not possible to predict the yearly flow regime or the time necessary for complete diversion, it is not possible to predict how long the salt line would require to reach the River Bend Station, Fairless, ff. Tr. _____ at _____; Cahill, et al., Tr. _____ at 2-3, ¶4.

Staff agrees.

57. Were there to be any extended saltwater intrusion into the vicinity near River Bend Station, GSU would shut down the facility, if operational conditions required, until a safety and environmental evaluation demonstrated that the plant could be restarted and an economic evaluation would be conducted to determine whether this course was warranted, Cahill, et al., ff. Tr. _____ at 3, ¶5.

Staff agrees.

58. There exist alternative means by which River Bend Station could be operated in the hypothetical event of reduced freshwater flow in the Mississippi River channel or of the presence of the salt line near River Bend Station, Cahill, et al., ff. Tr. _____ at 3, ¶6.

Staff agrees.

59. A viable alternative should the Old River Control Project fail, salt water be present near the River Bend site, and operational conditions require would be to extend the makeup water pipeline from its present point of suction in the Mississippi River channel westward approximately 25 miles to the Atchafalaya River channel, Cahill, et al., ff. Tr. _____ at 4, ¶8(a).

Staff agrees.

60. A viable alternative should the Old River Control Project fail, salt water be present near the River Bend site, and operational conditions require would be to extend the makeup water pipeline northwestward approximately 30 miles to the Mississippi River above the point of the Old River Control Project. This alternative would avoid a Mississippi River Channel crossing, Cahill, et al., ff. Tr. _____ at 4, ¶8(b).

Staff agrees.

61. A viable alternative should the Old River Control Project fail, salt water be present near the River Bend site, and operational conditions require would be to install a reverse osmosis system to treat saline water for use as cooling tower makeup, Cahill, et al., ff. Tr. _____ at 4, ¶8(c).

Staff agrees.

62. A viable alternative should the Old River Control Project fail, salt water be present near the River Bend site, and operational conditions require would be to replace, where necessary, the components and piping systems carrying river water with materials compatible with salt water. These systems include the makeup water system, circulating water system, and the service water system, Cahill, et al., ff. Tr. _____ at 4-5, ¶8(d).

Staff agrees.

63. A viable alternative should the Old River Control Project fail, salt water be present near the River Bend site, and operational conditions require would be to separate the service water system, which provides cooling to safety-related components, from the circulating water system. A cooling tower would be added for heat dissipation from this system and makeup water would be supplied from groundwater wells. The circulating water system (condenser) could be modified using saltwater-compatible materials. Water would be supplied from the river channel as makeup, Cahill, et al., ff. Tr. _____ at 5, ¶8(e).

Staff agrees.

64. Considering the present investment in the facility, there are available alternatives should the Old River Control Structure fail, Cahill, et al., ff. Tr. _____ at 5, ¶9.

Staff agrees.

65. Before proceeding with any alternative, a detailed feasibility and cost analysis would be conducted after consultation with governmental authorities, Cahill, et al., ff. Tr. _____ at 5, ¶9.

Staff agrees.

66. An environmental assessment of the selected changes would be submitted to the NRC, Cahill, et al., ff. Tr. _____ at 5, ¶9.

Staff opposes in part since this finding should make clear that there would be no changes made prior to the submission of such changes to the NRC.

67. In the event the Old River Control Structure were to fail, several of the available alternatives may be amenable to joint action by users of Mississippi River water. For such alternatives, the pro rata share of cost for River Bend Station would be expected to be less than discussed above, Cahill, et al., ff. Tr. _____ at 5-6, ¶10.

Staff is unable to agree or disagree.

68. The probability of failure of the Old River Control Structure is not sufficiently high that the consequences of operating the River Bend Station following such failure must be considered, Cahill, et al., ff. Tr. _____ at 6, ¶11.

Staff agrees.

69. Applicants have considered the public health, safety, and environmental impacts of further facility operation under altered river flow and salinity conditions in the event of failure, Cahill, et al., ff. Tr. _____ at 2-6, ¶¶3-11.

Staff agrees.

Conclusions of Law

1. The probability of failure of the Old River Control Structure is not sufficiently high that the consequences of operating the River Bend Station following such failure must be considered.

2. Applicants have considered the public health, safety, and environmental impacts of further facility operation under altered river flow and salinity conditions in the event of failu. .

Staff agrees with Conclusions of Law 1 & 2.

3. Alternative means do exist whereby River Bend Station could be operated under altered river flow and salinity conditions in the hypothetical event of a failure of the Old River Control Structure.

Staff agrees.

4. The issuance of an operating license to the Applicants will not be inimical to the common defense and security or to the health and safety of the public.

Staff agrees.

5. Pursuant to 10 C.F.R. §2.760a and 10 C.F.R. §50.57, the Director of Nuclear Reactor Regulation should be authorized to issue to the Applicants, upon making requisite findings with respect to matters not embraced in the Initial Decision, a license authorizing operation of River Bend Station.

Staff agrees.