ORGANIZATION: BRAND INDUSTRIAL SERVICES, INCORPORATED
PARK RIDGE, ILLINOIS

REPORT NO.: 99901020/87-01	INSPECTION DATES: 01/20-23/87	INSPECTION ON-SITE HOURS: 71

CORRESPONDENCE ADDRESS: Brand Industrial Services, Incorporated
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NUCLEAR INDUSTRY ACTIVITY: Brand Industrial Services, Incorporated (BISCO) has been in the nuclear plant fire protection business for 18 years and has provided materials and/or installed fire penetration seals in over 50 domestic nuclear power plants.

ASSIGNED INSPECTOR: For James C. Stone 5/14/87
J. J. Petrosino, Program Development and Reactive Inspection Section (PDRIS) Date

OTHER INSPECTORS: T. L. Tinkel, Brookhaven National Laboratory
J. M. Ulie, Reactor Inspector, RIII

APPROVED BY: James C. Stone 5/14/87
J. C. Stone, Chief, PDRIS, Vendor Inspection Branch Date

INSPECTION BASES AND SCOPE:

A. BASES: 10 CFR Part 21 and Appendix B to 10 CFR Part 50.

B. SCOPE: 1) Obtain generic technical and testing information regarding silcone foam and silcone elastomer fire barrier penetration seals.
2) Evaluate BISCO's QA program implementation.

PLANT SITE APPLICABILITY: Arkansas 1 & 2 (50-313/368); Callaway (50-483); Clinton (50-461); Comanche Peak 1 & 2 (50-445/446); (continued on next page)

PLANT SITE APPLICABILITY: (continued) Cook 1 & 2 (50-315/316); Cooper Station (50-298); Crystal River (50-302); Davis-Besse (50-346); Diablo Canyon (50-275/323); Dresden 2 & 3 (50-237/249); Enrico Fermi (50-341); Fort St. Vrain (50-267); Ginna (50-244); Hatch (50-321); Hope Creek (50-354); LaSalle 1 & 2 (50-373/374); Limerick 1 & 2 (50-352/353); Maine Yankee (50-309); McGuire 1 & 2 (50-369/370); Millstone 1, 2, & 3 (50-245/336/423); Nine Mile Point 1 & 2 (50-369/370); Oyster Creek 1 (50-219); Palo Verde 1, 2, & 3 (50-528/529/530); Peach Bottom 2 & 3 (50-277/278); Perry (50-440); Pilgrim (50-293); Quad Cities 1 & 2 (50-254/265); Rancho Seco (50-312); Robinson (50-261); Salem (50-272); San Onofre 1, 2, & 3 (50-206/361/362); Seabrook (50-443); Shoreham (50-322); St. Lucie 1 & 2 (50-335/389); Summer (50-395); Susquehanna 1 & 2 (50-387/389); Three Mile Island 1 & 2 (50-289/320); Trojan (50-344); Turkey Point 3 & 4 (50-250/251); Vermont Yankee (50-271); Vogtle 1 & 2 (50-424/425); Washington Nuclear (50-397); Waterford 3 (50-382); Watts Bar (50-391); Wolf Creek (50-482); and Zion (50-295/304).

A. VIOLATIONS:

Contrary to Section 21.21, "Notification," of 10 CFR Part 21, BISCO failed to establish a written procedure to implement the regulations of 10 CFR Part 21 as imposed by Section 206 of the Energy Reorganization Act of 1974.

B. NONCONFORMANCES:

None.

C. UNRESOLVED ITEMS:

None.

D. STATUS OF PREVIOUS INSPECTION FINDINGS:

1. Section D.3 of BISCO report No. 99901020/85-01, mentions a 1976 test that was conducted and accepted by American Nuclear Insurers (ANI) for various BISCO fire barrier penetration design configurations. ANI later withdrew its acceptance of the test in a August 20, 1985 ANI letter transmitted to BISCO and several nuclear generating stations (NGS). This issue was reviewed during this NRC inspection. Discussed below are the background and conclusions of this review.

   Discussion - The technical basis for the ANI acceptance of BISCO's October, 1976 9-inch silcone foam (SF) fire penetration seal testing was not fully documented and did not substantiate that the generic

ASTM-E119 and USNRC requirements had been met. Specifically, a review of the test reports and discussions with ANI and BISCO personnel determined that:

a. Although no specific mention was made of the 9-inch SF penetration test failing the required hose stream test, statements within the report indicate that it did fail. Therefore, ANI should not have accepted the particular configuration;

b. ANI and BISCO have stated that a successful hose stream test was conducted on a second 9-inch SF specimen, as allowed by ASTM E-119, but according to ANI, "was never formally documented," in 1976 when it was performed;

c. ANI discovered the lack of objective evidence of the hose stream test in 1985, contacted BISCO and attempted a make-up test that failed; ANI subsequently notified ten NGS facilities of their acceptance withdrawal. The letter stated that the failed test was acceptable to the ANI for "insurance purposes only," but also stated their 2-1/2 hour rating acceptance may not be acceptable where a strict 3-hour rating is required; and

d. Current industry practice allows fire barrier installer to utilize other installers tested design configurations to substantiate their installations. This practice creates the possibility that there are additional NRC licensees that utilized the failed October 1976 BISCO/ANI design configuration for their installed 9-inch SF installations, and are not aware of the problem, since ANI may or may not be their insurance agency.

A related concern is the design parameters of other BISCO test reports. A review of three penetration seal test reports that BISCO stated would substantiate their recinded 1976 test acceptance by ANI, were found to be very restrictive in their parameters; however, BISCO's statement in their ANI follow-up letter could imply that the NRC licensee's recinded penetration seals were adequate and no additional review was required. The test report numbers are:

BISCO Report No. 3001-03-B, dated May 19, 1980
BISCO Report No. 748-134, dated May 14, 1984
BISCO Report No. 748-183(3), dated August 9, 1985

In letters dated August 20, 1985 to various NGS facilities, and in another letter dated August 20, 1985 to BISCO, ANI advised of its withdrawal of three previously accepted BISCO fire barrier penetration seal design configurations. The ANI letter indicated that the subject designs involved penetrations for cable and pipe sealed with 9-inches of BISCO SF-20. ANI indicated that its acceptance, which was previously issued based on 1976 testing, was being withdrawn because a review indicated available evidence was insufficient to support the 2-hour and 3-hour ratings for these particular designs. BISCO and ANI stated that only one design was of a concern. The particular design configuration identified by ANI and BISCO is for cable tray penetrations filled with 9-inches of SF with no permanant dams installed. These are typically wall penetrations and are 3-hour rated. The ANI review was performed following a request by Rancho Seco personnel in 1984 or 1985 for ANI to provide them additional documentation of ANI's 1976 technical basis for its subsequent acceptance of SF penetration seals at their plant.

The original test of this cable tray configuration was one of a number of configurations tested at the same time for BISCO by ANI at the Portland Cement Association (PCA) Laboratories in Skokie, Illinois. This particular test is discussed in a BISCO report dated October 1976. The test report is referred to as PCA-76 for most applications. The test specimen passed the 3-hour fire endurance test of ASTM-E119 and its unexposed surface did not exceed the allowable ASTM-E119 temperatures. However, "flame through" occurred at 3-hours 1-minute and PCA-76 does not mention whether or not the hose stream test was performed, but references in other report sections indicate that it failed the required hose stream test. Both BISCO and ANI have stated that a hose stream test was performed on a second 9-inch SF specimen as allowed by ASTM-E119, and passed. ANI additionally states that the test was performed on the second specimen but that "no formal documentation was ever generated for the test."

Following the Rancho Seco request for additional test documentation to ANI, BISCO and ANI conducted a more severe fire endurance test for a make-up test. This test failed after 2-hours and 35 minutes and was the basis for ANI's August 20, 1985 letter. The test was more severe because the total cross sectional area of the cable was greater than the 1976 tests and additionally all of the cables had jackets of PVC which are more combustible than the original test cable jackets. The test was conducted at PCA on August 6, 1985.

BISCO and ANI witnessed the test. The results are presented in BISCO Test Report 748-183 (Specimen 2), dated August 6, 1985. The test assembly was subjected to the ASTM E-119 standard 3-hour fire endurance test and developed a burn through after 2-hours and 35 minutes. This was a failure and consequently no hose stream test was performed.

Therefore, as a result of no formal documentation to show that the 1976 hose stream test was performed, and the subsequent August 6, 1985 fire test failure, ANI issued their August 20, 1985 letter to ten nuclear plants that BISCO stated were affected, see list below. The August 20, 1985 ANI letter states, in part:

a. "Since 1975, American Nuclear Insurers has reviewed and accepted for property insurance purposes only, over 200 fire stop systems...."

b. "We recently found insufficient evidence to support the ANI acceptance of testing form issued to BISCO for test data, various (1976)...."

c. "In an effort to verify the proper rating of this system, we conducted a fire test of a sample of the subject system at an independent test laboratory. The sample withstood the fire exposure prescribed in ASTM E-119 for a duration of 2-hours, 35 minutes...."

d. "This fire stop system presents a substantial barrier to the passage of fire between fire areas and except for some unanticipated fire loading hazard, all existing systems are considered by ANI to be acceptable for property insurance purposes for the separation of areas...."

e. "However, this system may not be adequate where there is a strict requirement for a 3-hour rated barrier for other than insurance purposes...." and

f. "If it is necessary to upgrade this fire stop system for a 3-hour fire rating, the following suggested methods may be adequate:" a) "Apply a ANI/MAERP accepted damming board to the bottom side of vertical (floor) seals and on both sides of horizontal (wall) seals;" or b) "Apply a protective coating over the foam that has been fire tested in accordance with the ANI/MAERP fire test standard for penetration seals...."

ANI transmitted their August 20, 1985 letters to the following NGS facilities:

NAME	SEAL INSTALLED IN FLOORS	INSTALLATION FLOOR DAMS LEFT BY BISCO	SEAL INSTALLED IN WALLS
*VC Summer	Yes	Yes	Yes
Rancho Seco	Yes	Yes	Yes
Davis Besse	Yes	Yes	Yes
*Susquehanna	Yes	Yes	Yes
Hanford	Yes	Yes	Yes
Shoreham	Yes	Yes	Yes
*Comanche Peak	Yes	Yes	Yes
*Clinton	Yes	Yes	Yes
*Palo Verde	Yes	No	Yes
Trojan	Yes	Yes	Yes

*Plants receiving BISCO's followup letter after the ANI August 20, 1985 letter, as stated by BISCO.

Note: No wall dams were left in place for the above plants.

Subsequent to ANI issuing its August 20, 1985 acceptance withdrawal letters, BISCO issued a followup form letter. BISCO stated that to the best of their knowledge only four of the plants noted above responded to the ANI letter. BISCO's form letter states, in part:

a. "Recently you received correspondence from ANI reciding their acceptance of fire testing conducted on two cable tray blockout designs by BISCO."

b. "The reason behind this action had to do with the large scale fire test that was conducted and because of its size requiring separate hose stream tests that were originally submitted to ANI and received their certified acceptance."

c. "Subsequent to the test, BISCO experienced a fire at their facilities...and apparently during this time the subject hose stream test was either destroyed or lost. This was brought to light when ANI, unable to locate their file copy, requested a replacement from BISCO."

d. "ANI requested BISCO to conduct a new test to their present standards, which experienced a burn-through at 2-hours and 35 minutes. However, ANI has stated they will accept all fire barriers of this BISCO design..." and;

e. "BISCO has testing documentation that substantiates the fire seal design that failed the ANI fire test standards, does meet and surpass the test standards of ASTM-E119 and the NRC."

In summary, it is perceived that some NRC licensees may be relying on ANI for overall acceptance; though ANI is looking at the fire barriers only in regard to insurance purposes and not NRC licensing requirements.

2. NRC previously reviewed a 6-inch SF fire barrier issue regarding the Salem Unit 1 NGS facility. NRC report 99901020/85-01 concluded that the test data satisfactorily supported, as required by ASTM-E119, the installed subject seals at Salem; however, the previous NRC report did not address the required ASTM-E119 hose stream tests.

Discussion - It was revealed that an NRC fire protection staff review had approved a Salem deviation request to its Appendix A to the NRC Branch Technical Position 9.5-1 guidelines. The deviation acceptance by the NRC exempted Salem from having to perform a hose stream test following its fire endurance test. Therefore, the Salem Unit 1 NGS facility appears to have an adequate technical basis for its installed 6-inch SF seals and are acceptable according to the NRC criteria.

However, similar to issue 1. above, if these two test reports, SEMCO PR-55 (6/76) and PSE&G (AISCO 6/76), were adopted by use for seal qualifications at another facility, the potential would exist for an unqualified basis. Specifically:

a. The ASTM-E119 required hose stream test would have to be performed or exempted by the NRC;

b. The 6-inch SF seal as built configurations must have the damming boards installed on both sides as shown in the tested configurations.

E. OTHER FINDINGS OR COMMENTS:

1. 10 CFR Part 21

Observations determined that BISCO did not have the required procedure posted that they adopted pursuant to the provisions of 10 CFR Part 21. Discussions were conducted with BISCO concerning their requirements under 10 CFR Part 21 and it was revealed that they had not established the required procedure.

Within three weeks after the inspection was completed, BISCO provided the inspector with a copy of their 10 CFR Part 21 procedure that was generated in compliance with the regulations.

2. Facility Tour

BISCO provided the NRC inspectors a tour of their warehouse facilities. During the tour, it was noticed that some of BISCO's M&TE devices were not currently valid regarding calibration due dates. However, a review of their QA manual determined that the specific devices were not required to be calibrated for use by their QC personnel. It was noted to the QA manager that the area's that we noted as needing calibraton control appeared to be an important link in the BISCO process control; however, BISCO stated that the final verification was performed by QC.

3. V.C. Summer Nuclear Plant Facility

The South Carolina Electric and Gas Company's (SCEG) V.C. Summer nuclear plant facility was visited on February 25-27, 1987 as a result of this inspection. Some of the information obtained during this inspection, in conjunction with previous NRC information, indicated that the potential exists for a nuclear plant to have penetration seal test reports and documentation that will not substantiate the validity of the particular plants installed penetration seal configurations. Therefore, the NRC performed a follow-up inspection at the SCEG facility.

It was determined, from a review of test report documentation, in-plant installed penetration seal dimensional measurements of blockouts, and cable tray/conduit sizes that some design parameter values in installed penetration seals exceed the values or range of values validated by the test report being cited to qualify these particular installed penetration seal design configurations.

SCEG is taking corrective action and performing a review of their fire protection system. This effort is being coordinated through the NRC Region II office.

F. PERSONS CONTACTED:

BISCO:

*Clayton Brown, President
*Thomas Gilmore, Vice-President
*Frank Barta, QA Manager
Delores Lott, QC Supervisor
Gary Fedor, Development Engineer

USNRC:

D. Kubicki, NRR/PBPE
L. Whitney, IE/OPRB
J. Wermiel, NRR/PBPE

*Attended Exit Meeting

ANI:

P. Giaccaglia, Senior Staff Engineer
W. Holmes, Director/Technical Review
J. Carney, Vice President/ Technical Review

PCA:

R. Hall, Engineer

ASTM:

R. Sansone, Staff Engineer

G. DOCUMENTS EXAMINED:

1. ANI letter, August 20, 1985 - withdrawal of previous acceptance.
2. BISCO QA Manual - certain sections.
3. BISCO Procedure, dated February 5, 1987 - 10 CFR Part 21 Procedure.
4. BISCO letter, dated September 16, 1985 - to TUGCO, following the ANI August 20, 1985 letter.
5. BISCO letter, dated November 13, 1984 - BISCO response to TUGCO letter No. CPPA-41,594.
6. ANI Bulletin, February 1983 - Fire stop systems, QA sign off.
7. NRC Appendix A - to Branch Technical Position 9.5-1, dated August 23, 1976.
8. NRC Standard Review Plan - 9.5-1, dated July 1981.
9. NRC Generic letter - 86-10, dated April 25, 1986.
10. BISCO Test Report - "Fire Endurance Test in BISCO Penetration Seal Systems in a Concrete Floor using BISCO Systems SF-20 and SF-150L Silicone Polymers," dated October 1976 (PCA-76).
11. BISCO Test Report #748-183-(Specimen 2 and 3), "3-hour Fire Test of Two Cable Tray Seal Configuration," dated August 6, 1985 and August 9, 1985, respectively.
12. BISCO Test for Public Service Electric and Gas Company (PSE&G) - undated, regarding six inch SF-20 seals at Salem (1976).
13. SEMCO Test Report - "SEMCO PR 855 RTV Silicone Foam Sealant in Concrete Floor," dated June 28, 1976.
14. BISCO Test Report #748-134, dated May 14, 1984. Overall size 2.5' x 2.5' that was divided in half. One side with SF-20 and the other with SE-Foam, both sides having one cable tray and one conduit.
15. BISCO Test Report #3001-003, dated May 19, 1980. Overall size 2.5' x 2.5', wall, with 9" of SF-20 and no dam.

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RPrevatte, RII
JUlie, RIII
JTaylor, BNL

May 22, 1987

OFC	:VIB:DRIS	:SC/VIB:DRIS	:ABC/VIB:DRIS	:	:	:
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