FAQ Number **06-0022 R1**

Plant:	Arkansas Nuclear One - ANO	Submittal Date:	August 21, 2007
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☒ 805 TF ☐ FPWG ☐ RATF ☐ RIRWG ☐ BWROG ☐ PWROG

Subject:

Interpretation of guidance? Yes

Proposed new guidance not in NEI 04-02? Yes

Details:

NEI 04-02 guidance needing interpretation (include section, paragraph, and line numbers as applicable):

Appendix D, Section D.3.4 – After paragraph 2 that begins, "The range of heat realease rate data for a given type of insulation ……"

Circumstances requiring guidance interpretation or new guidance:

Section 3.3.5.3 of NFPA 805 and Appendix A, Section 3.3.5.3 require that electric cable construction comply with a flame propagation test acceptable to the AHJ and that it be a type that has been tested using a recognized flame spread test such as IEEE 817 or IEEE 1202.

Several NRC documents include the requirements for flame propagation for existing or new electrical cables. In general those documents refer to IEEE 383-1974 and/or IEEE 1202-1991 as the NRC accepted standards for flame propagation. The standard flame propagation tests accepted by the US NRC are still basically the same. Among those documents are the following:

NUREG-0800 (Rev.4, Oct 2003) states that "*Electrical cables should meet flame test criteria of IEEE 383 or 1202, or be provided with alternative protection as allowed by the specific plant licensing and/or design basis (See Regulatory Guide 1.189*)".

Appendix A to Branch Technical Position (BTP) APCSB 9.5-1 states that "*electric cable constructions should, as a minimum, pass the flame test in the current IEEE 383*". It also states that "*for cable installation in operating plants and plants under construction that do not meet the IEEE 383 flame test requirements, all cables must be covered with an approved flame retardant coating and properly derated.*"

Reg Guide 1.189 (Rev 1, Mar 2007) states that "*Electric cable construction should pass the flame test in IEEE Standard 383, "IEEE Standard for Type Test of Class IE Electric Cables, Field Splices, and connections for Nuclear Power Generating Stations" (Ref. 109), or IEEE Standard 1202, "IEEE Standard for Flame Testing of Cables for use in Cable Trays in Industrial and Commercial Occupancies"(Ref. 110). (This does not imply that cables passing either test will not require additional fire protection.) For cable installations in operating plants and plants under construction before July 1, 1976, that do not meet the IEEE Standard 383 flame test requirements, all cables should be covered with an approved flame-retardant coating and properly derated or be protected by automatic suppression. Although cable coatings have been shown to reduce flame spread, coated cables are considered intervening combustibles when determining the protection requirements of Section III.G.2 of Appendix R to 10 CFR Part 50. Coated cables do not have higher damage thresholds and, therefore, are not equivalent to IEEE 383 or IEEE 1202 cables. In addition, coated cables can and do ignite in fires."*

In order to compare test results from some other industry recognized tests the utility should compare theoretical burner heat output, heat exposure time, and pass/fail criteria to determine the relative severity of the test standards. The method recognized is to examine the vertical flame propagation test in IEEE 383-1974 as a baseline to determine if testing conditions and/or passing criteria are comparable. Tests with lower burner heat outputs than IEEE 383-1974 are very difficult to compare due to the difference in test sample size.

Note: A flame propagation test procedure in one Standard could be included or referenced in another standard. That does not mean the two standards are the same; only that the standard uses the same testing procedure for flame propagation testing. A standard might have other sections which have nothing to do with flame propagation, like smoke and aging test procedures, materials of construction, or markings, among other procedures and requirements. For that reason data must be organized in terms of flame tests instead of individual standards.

As a matter of example the utility proposes utilization of the following methodology presented by the NRC for comparison realizing other test comparison by the individual utility:

METHODOLOGY FOR COMPARISON OF CABLE TESTS TO IEEE 383-1974 AND IEEE 1202-1991

Table 3 contains a list of cables examined by the NRC for use in this demonstration**.**

Table 3
Cable Standards Examined and Respective Flame Tests

Test Title (Test Type)	Standard Organization and Number	Standard Title
FT-6/Flame Travel Test (horizontal)	NFPA 262	Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling spaces (2007 Ed)
	CSA 22.2 No. 0.3	Test Methods for Electrical Wires and Cables (Jan2005)
Fire Test (Riser/vertical)	UL 1666	Test for Flame Propagation Height of Electrical and Optical Fiber Cables Installed Vertically in Shafts (4th Ed Nov2000 Revisions thru Jul2002)
FT-4/Vertical Flame Test (vertical)	UL 1581	Reference Standard for Electrical Wires, Cables and Flexible Cords (4th Ed Oct2001 Revisions thru Aug2006)
	UL 1685	Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Fiber Optical-Fiber Cables (2nd Ed Feb1997 Revisions thru Nov2000)
	UL 83	Thermoplastic-Insulated Wires and Cables (13th Ed Nov2003 Revisions thru Apr2006)
	UL 44	Thermo set-Insulated Wires and Cables (16th Ed Jul2005 Revisions thru Nov2005)
	CSA 22.2 No. 0.3	Test Methods for Electrical Wires and Cables (Jan2005)
	IEEE 1202-1991	IEEE Standard for Flame Testing of Cables for Use in Cable Tray in Industrial and Commercial Occupancies (1991)
Flame Test qualification (vertical)	IEEE 383-2003	IEEE Standard for Qualifying Class 1E Electric Cables and Field Splices for Nuclear Power Generating Stations (2003; Revision of IEEE 383-1974)
Vertical Cable Tray Flame Test (vertical)	ICEA T-29-520	Conducting Vertical Cable Tray Flame Tests with Theoretical Heat Input Rate of 210000 Btu/hr (Sep 1986)
Vertical Flame Spread (vertical)	IEC 60332-3-21	Tests on Electric Cables Under Fire Conditions Parts 3-21 to 23: Test for Vertical Flame Spread of Vertically-Mounted Bunched Wires or Cables: Category A (F/R), A&B (Oct2000)
	IEC 60332-3-22	
	IEC 60332-3-23	
Vertical Tray Flame Test (vertical)	UL 1581	See above
	UL 83	See Above
	UL 44	See Above
	UL 1685	See Above
Vertical Cable Tray Flame Test (vertical)	ICEA T-30-520	Guide for Conducting Vertical Cable Tray Flame Tests with Theoretical Heat Input of 70000 Btu/hr (Sep1986)
Flame Test (vertical)	IEEE 383-1974	IEEE Standard for Type Test of Class 1E Electric Cables, Field Splices, and Connections for Nuclear Power Generating Stations (1974)
Flame Test (vertical)	IEEE 817-1993	IEEE Standard Test Procedure for Flame-Retardant Coatings Applied to Insulated Cables in Cable Trays (1993)
Vertical Flame Spread (vertical)	IEC 60332-3-24	Tests on Electric Cables Under Fire Conditions Parts 3-21 thru 23: Test for Vertical Flame Spread of Vertically-Mounted Bunched Wires or Cables: Category C (Oct2000)
Vertical Flame Propagation (vertical)	IEC 60332-1-2	Test for Vertical Flame Propagation for a Single Insulated Wire or Cable – Procedure for 1 kW pre-mixed (2004-07)
Vertical Flame Propagation (vertical)	IEC 60332-1-3	Test for Vertical Flame Propagation for a Single Insulated Wire or Cable – Procedure for determination of flaming droplets/particles (2004-07)
VW-1 Vertical Wire flame Test (vertical)	UL 1581	See Above
	UL 83	See Above
	UL 44	See Above
	CSA 22.2 No. 0.3	See Above

FT-1 Vertical Flame Test (vertical)	UL 1581	See Above
	UL 83	See Above
	UL 44	See Above
	CSA 22.2 No. 0.3	See Above
Flame Test (vertical)	IPCEA S-61-402	Thermoplastic-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy (Oct1994)
FT-2 Horizontal Flame Test (horizontal)	UL 1581	See Above
	UL 83	See Above
	UL 44	See Above
	CSA 22.2 No. 0.3	See Above
Standard Test Method for flame Spread (vertical)	ASTM D5537-03	Standard Test Method for Heat Release, Flame Spread Smoke Obscuration, and Mass Loss Testing of Insulating Materials Contained in Electrical or Optical Fiber Cables When Burning in a Vertical Cable Tray Configuration (Ded2003)
Fire Propagation Test	FM 3972	Test Standard for Cable Fire Propagation (Mar1994)

Note: A reference hard copy of each standard reviewed should be available in the US NRC Technical Library and RES Fire Team

Test Ranking and Description

IEEE 383-1974 is the baseline test to which the other tests will be compared. It is a 20kW (70000 Btu/hr) heat exposure, vertical test considered the minimum requirement of the US NRC to pass flame propagation criteria. As in all the 20 kW tests discussed below, it has a 20 minute exposure time. This test requires cables to self extinguish before reaching the top of the tray (8ft.) to pass the test.

One of the most severe flame tests is the FT-6 Horizontal Flame Test included in the **NFPA 262** (issued by NFPA) and **CSA C22.2 No. 0.3** standards. It is a horizontal flame test used for cables in plenum applications. This test uses a burner heat output of 86 kW (294000 Btu/hr). This test has one of the lowest acceptable damage lengths the second highest heat output and uses high air flow in its chamber during testing to increase flame spread. This combination of variables makes it one of the most rigorous tests for a sample to pass. This is currently considered the most severe flame test.

The **UL 1666** Fire Riser Test is another of the more severe flame tests. It is a vertical test used for cables in riser shaft applications. It has the highest heat output of all the tests (154.5 kW (527500 Btu/hr)), second highest exposure time (30 minutes) and high air flow in its chamber during testing. This test has an acceptable cable damage length of 12 ft. Even though the damage criteria is less severe than the IEEE 383-1974 (12 ft. vs. 10 ft.), the higher exposed heat and time makes this test more severe.

The FT-4/Vertical Flame Test, included in Standards **IEEE 1202-1991**, CSA22.2 No. 0.3, **UL 1685**, and referenced in **UL 1581, UL 44, and UL 83**, is the most rigorous of the 20 kW (70000 Btu/hr) tests. The testing conditions and equipment in all of these standards are essentially the same. What makes this test the most difficult to pass of the 20 kW tests is its low acceptable damage length of 4.9 ft.

The IEEE 383-2003 Standard Flame Test qualification cites: "*Cable shall be flame retardant in accordance with the requirements of IEEE Std. 1202-1991 or NFPA 262-2002. Switchboard cables, coaxial, twinaxial, and triaxial cables shall as a minimum pass the **UL VW-1** flame test."* This citation is the only direction the IEEE 383-2003 standard gives on cable flame propagation testing. The IEEE organization superseded IEEE 383-1974 standard with IEEE 383-2003. Still, the US NRC standards on flame propagation tests are IEEE 383-1974 or IEEE 1202-1991 as cited on the NRC documents previously discussed.

The **ICEA T-29-520** (issued by ICEA) standard is essentially the same as the 20 kW (70000 Btu/hr) IEEE 383-1974 tests except with a burner heat output of 62 kW. In this test the distance acceptance criteria is the same as IEEE 383-1974: 8 ft. Cables tested using this test will meet or exceed performance of IEEE 383-1974 tested cables, and could have similar cable performance to tests like the FT-4/Vertical Flame Test.

The Vertical Flame Spread tests (**IEC 60332-3-21, IEC 60332-3-22 and IEC 60332-3-23** (issued by IEC) uses a burner of 20 kW (70000 Btu/hr) heat output. In those tests, the recommended acceptance length of damage is 10.2 ft. which is less rigorous than the 8 ft. of acceptable damage of the IEEE 383-1974 standard, but the heat exposure time is 40 minutes which is twice the exposure time in IEEE 383-1974. In order to compare the severity of these IEC tests with the IEEE 383-1974 test, the maximum average damage length (adl) per heat exposure time (het) can be calculated. Assuming most of the damage will occur during flame application times, an average adl/het of 0.4 ft of damage/minute (during the 20 minutes of flame application) for the IEEE 383-1974 test and an average adl/het of 0.255 ft. of damage/minutes (during the 40 minutes of flame application) for the IEC tests. If those two values are compared, it can be observed that any sample which has an average adl/het greater (during flame application) than the calculated should fail the test. In this case, the IEC test will be more rigorous than the IEEE 383-1974.

The Vertical Tray Flame Test (UL 1581, 1685, 83 and 44) and the Vertical Cable Tray Flame Test (**ICEA T-30-520** (issued by ICEA)) all use a burner with a 20 kW (70000 Btu/hr) heat output. Those two tests are very similar to the IEEE 383-1974. The three have the same acceptable damage length of 8 ft. and require cables to self extinguish before reaching the top of the tray. Also, the heat exposure time is 20 minutes. These tests have minor variations in procedure and equipment used. **IEEE 817-1993** Flame Test is mainly used to determine whether cables need to be coated or not. It does not have pass/fail criteria. If cable damage reaches the top of the tray, the cable is recommended to be coated.

The **IEC 60332-3-24** standard is very similar to IEEE 383-1974 but has less strict acceptance criteria. This test has the same burner heat output and exposure time as IEEE 383-1974 but has an acceptable damage length of 10.2 ft. making the test less severe.

Results of the Investigation of Specific Test Criteria From Test in Previous Sections:

Table 4 provides NRC comments on Flame Propagation Tests included in more than one standard examined by the NRC for purposes of clarification of the FAQ. It can be used as a demonstration of expectations of the NRC to allow crediting other specific testing methodologies employed by individual utilities.

Table 5 provides a summary of the testing methods that have been examined by the NRC in terms of testing conditions and acceptance criteria

Table 4
NRC comments on Selected Tests

Test Name (Test Type)	Cable Standard #	Comments
FT-6/Flame Travel Test (horizontal)	NFPA 262	This std includes procedure and requirements of the FT-6/Horizontal Flame Travel Test
	CSA 22.2 No. 0.3	The Std. refers (sends) user to use FT-6/Horizontal Flame Travel Test Procedure in NFPA 262 Std.
FT-4/Vertical Flame Test (vertical)	IEEE 1202-1991	These stds. Include procedure and requirements of the FT-4/Vertical Flame Test
	CSA 22.2 No. 0.3 sec 4.11.4 & App A	
	UL 1685 sec 12-19	
	UL 44 sec 5.14.6 & 8.14.6	These stds. Refer (send) user to use FT-4/IEEE 1202 Vertical Tray Flame Test procedure in UL 1685 or CSA 22.2 No. 0.3 Stds.
	UL 83 sec 5.12.5, 5.12.6.3 & 8.12.5	
	UL 1581 sec 1164	
Flame Test Qualification (vertical)	IEEE 383-2003	This std. refers (sends) user to use Flame Tests procedure of NFPA 262 (horizontal flame test) or IEEE 1202-1991 (vertical flame test) stds.
Vertical Flame Spread (vertical)	IEC 60332-3-21	These tests follow the same procedure and apparatus in IEC 60332-3-10 Std. but the requiremnts apply to different category cables A (F/R), B and C.
	IEC 60332-3-22	
	IEC 60332-3-23	
Vertical Tray Flame Test (vertical)	UL 1685 sec 4-11	These stds.include procedure and requirements of the Vertical Tray Flame Test (also called UL Flame Exposure)
	UL 44 sec 5.14.5 & 8.14.5	
	UL 83 sec 5.12.6.2 & 8.12.6.1	
	UL 1581 sec 1160	This Std. refers (send) user to use Vertical Tray Flame Test in UL 1685. std.
VW-1 Vertical Wire Flame Test (vertical)	UL 1581 sec 1080	This std. includes procedure and requirements of the VW-1 Vertical Wire Flame Test
	CSA 22.2 No. 0.3 sec 4.11.7 & App A & D	
	UL 44 sec 5.14.4 & 8.14.4	This Std. refers (sends) user to use VW-1 Vertical Wire Flame Test in UL 1581 or CSA 22.2 No. 0.3 stds.
	UL 83 sec 8.12.1 & 8.12.3	
FT-1 Vertical Flame Test (vertical)	UL 1581 sec 1060	This std. includes procedure and requirements of the FT-1 Vertical Flame Test
	CSA 22.2 No. 0.3 sec 4.11.1 & App A	
	UL 44 sec 5.14.3 & 8.14.3	This std. refers (sends) user to use FT-1 Vertical Flame Test in UL 1581 or CSA 22.2 No. 0.3 stds.
	UL 83 sec 8.12.2	
FT-2 Horizontal Flame Test (horizontal)	UL 1581 sec 1100	This std. includes procedure and requirements of the FT-2 Horizontal Flame Test
	CSA 22.2 No. 0.3 sec 4.11.2 & App A	
	UL 44 sec 5.14.1 & 8.14.1	This Std. refers (sends) user to use FT-2 Horizontal Flame Test in UL 1581 or CSA 22.2 No. 0.3 stds.
	UL 83 sec 8.12.3.2	

Table 5
Testing Conditions and Acceptance Criteria

Test Names(s) (Test Type)	Test Standard #	Acceptance Criteria		Test Exposure Conditions	
		Acceptable Damage Length	Other Acceptance Criteria	Burner Heat Output	Exposure time
FT-6/Flame Travel Test (horizontal)	NFPA 262 CSA 22.2 No. 0.3	5 ft.	Max temperature shall be 542°F	86 kW (294000 Btu/hr)	20 min
Fire Test (Riser/vertical)	UL 1666	12 ft.	Any TC shall not exceed 850° F	154.5 kW (527500 Btu/hr)	30 min
FT-4/Vertical Flame Test (vertical)	UL 1581 UL 1685 UL 83 UL 44 CSA 22.2 No. 0.3 IEEE 1202-1991	4.9 ft.	N/A	20 kW (70000 Btu/hr)	20 min
Flame test qualification (vertical)	IEEE 383-2003	Refers user to IEEE 1202-1991 or NFPA 262 flame propagation test procedure.			
Vertical Cable Tray Flame Test (vertical)	ICEA T-29-520	8 ft.	Cables that self extinguish pass the test; fail if the flame propagates to the total height of the tray (8 ft.)	62 kW (210000 Btu/hr)	20 min
Vertical Flame Spread (vertical)	IEC 60332-3-21 IEC 60332-3-22 IEC 60332-3-23	10.2 ft.	N/A	20 kW (70000 Btu/hr)	40 min
Vertical Tray Flame Test (vertical)	UL 1581 UL 83 UL 44 UL 1685	8 ft.	Requires cable to self extinguish before reaching top of the tray.	20 kW (70000 Btu/hr)	20 min
Vertical Cable Tray Flame Test (vertical)	ICEA T-30-520	8 ft.	Cable damage shall not extend to the top of the tray (8 ft.)	20 kW (70000 Btu/hr)	20 min
Flame test (vertical)	IEEE 383-1974	8 ft.	Cables that self extinguish pass the test; fail if the flame propagates to the total height of the tray (8 ft.)	20 kW (70000 Btu/hr)	20 min
Flame test (vertical)	IEEE 817-1993	N/A	When flame is removed the cable needs to self-extinguish. Uncoated cables that burn to the top of the tray are suitable for testing coatings.	20 kW (70000 Btu/hr)	20 min
Vertical Flame Spread (vertical)	IEC 60332-3-24	10.2 ft.	N/A	20 kW (70000 Btu/hr)	20 min
Vertical Flame Propagation (Vertical)	IEC 60332-1-2	N/A	Requires more than 50 mm (1.97 in.) of distance between the lower edge of the top support and the onset of charring and less than 540mm (21.26 in.) from the lower edge to the top support	1 kW (3400 Btu/hr)	1-8 min (depends on sample diameter)
Vertical Flame Propagation (Vertical)	IEC 60332-1-3	N/A	Requires that the filter paper does not ignite during the test.	1 kW (3400 Btu/hr)	1-8 min (depends on sample diameter)
VW-1 Vertical Wire Flame	UL 1581 UL 83	N/A	If sample burns for more than 60 sec the sample fails the	500 W (1700 Btu/hr)	75 sec (flame applied 5 times

Test (vertical)	UL 44 CSA 22.2 No. 0.3		test. If 25% or more of the cotton batting or indicator flag burns the cable fails test.		of 15 sec with time intervals of no more than 60 sec)
FT-1 Vertical Flame Test (vertical)	UL 1581 UL 83 UL 44 CSA 22.2 No. 0.3	N/A	If sample burns for more than 60 sec the sample fails the test. If 25% or more of the cotton batting or indicator flag burns the cable fails test.	500 W (1700 Btu/hr)	75 sec (flame applied 5 times of 15 sec with time intervals of no more than 60 sec)
Flame Test (vertical)	IPCEA S-61-402	N/A	If sample burns for more than 60 sec the sample fails the test. If 25% or more of the cotton batting or indicator flag burns the cable fails test.	500 W (1700 Btu/hr)	75 sec (flame applied 5 times for 15 sec with time intervals betweem applications)
FT-2 Horizontal Flame Test (horizontal)	UL 1581 UL 83 UL 44 CSA 22.2 No. 0.3	N/A	No flaming particles shall drop from the specimen causing the cotton under the specimen to ignite and the cable should self-extinguish.	500 W (1700 Btu/hr)	30 sec
Standard Test Method for Flame spread (vertical)	ASTM D5537-03	N/A	N/A	20 kW (70000 Btu/hr)	20 min
Fire Propagation Test (vertical)	FM 3972	N/A	Until cable self-extinguish	50 kW (175000 Btu/hr) *(heater output)	

Summary of the Results from the NRC Investigation

Tables 1 and 2 below provide a summary of the testing methods that are more severe than IEEE 1202-1991 (Table 1) or more severe than IEEE 383-1974 (Table 2).

The flame propagation tests in Table 1 also have more rigorous acceptance criteria than IEEE 383-1991. Cables tested by any of these methods should have similar or better flame propagation resistance than if tested by IEEE 383-1974 test method. Note that all test standards in Table 1 are also included in Table 2, since IEEE 1202-1991 is a more rigorous test method than IEEE 383-1974.

Conclusion

Electrical cables tested in accordance with, and meeting the flame propagation acceptance criteria of one or more of the Test Standards listed in Table 2 should be considered to perform equal to, or better than if they were tested to IEEE 383-1974. Low burner heat outputs tests are not recommended to be accepted due to the impractical nature of comparing these small scale screening test requirements (e.g. low thermal exposure, sample size, time exposure and acceptance criteria) to the US NRC minimum accepted test methods and acceptance criteria of larger scale IEEE 383-1974.

Detail contentious points if licensee and NRC have not reached consensus on the facts and circumstances:

None

Potentially relevant existing FAQ numbers:

None

Response Section:

Proposed resolution of FAQ and the basis for the proposal:

It is recommended that the NRC Methodology for cable test comparisons be used to evaluate the other flame tests as providing a degree of flame retardancy that was equivalent or superior to IEEE 383-1974, since many existing units may have other suitable tests named in design specifications.

If appropriate, provide proposed rewording of guidance for inclusion in the next Revision to NEI 04-02:

Appendix D, Section D.3.4 – After paragraph 2 that begins, “The range of heat realease rate data for a given type of insulation ……”, add a new paragraph that reads:

“The following tables provide a summary of the testing methods that are more severe than IEEE 1202-1991 (Table 1) or more severe than IEEE 383-1974 (Table 2).

Table 1

Test Name (Test Type)	Cable Standard #
FT-/Flame Travel Test (horizontal)	NFPA 262
	CSA 22.2 No. 0.3
Fire Test (Riser/vertical)	UL 1666
FT-4/Vertical Flame Test (vertical)	UL 1581
	UL 1685
	UL 83
	UL 44
	CSA22.2 No. 0/3
	IEEE 1202-1991
Flame test Qualification (vertical)	IEEE 383-2003

Table 2

Test Name (Test Type)	Cable Standard #
FT-6/Flame Travel Test (horizontal)	NFPA 262
	CSA 22.2 No. 0.3
Fire Test (Riser/vertical)	UL 1666
FT-4/Vertical Flame Test (vertical)	UL 1581
	UL 1685
	UL 83
	UL 44
	CSA 22.2 No. 0.3
	IEEE 1202-1991
Flame Test Qualification (vertical)	IEEE 383-2003
Vertical Cable Tray Flame Test (vertical)	ICEA T-29-520
Vertical Flame Spread (vertical)	IEC 60332-3-21
	IEC 60332-3-22
	IEC 60332-3-23
Vertical Tray Flame Test (Vertical)	UL 1581
	UL 1685
	UL 83
	UL 44
Vertical Cable Tray Flame Test (vertical)	ICEA T-30-520
Flame Test (Vertical)	IEEE 383-1974

Several NRC documents include the requirements for flame propagation for existing or new electrical cables. In general those documents refer to IEEE 383-1974 and/or IEEE 1202-1991 as the NRC accepted standards for flame propagation.

If cables have been purchased to different standards than those listed in Tables 1 and/or 2, the utility may prepare an equivalency evaluation in order to demonstrate that tested parameters of installed cables are equal to or exceed those specified by IEEE 383-1974 and IEEE 1202-1991 for flame propagation or spread."