



need for the TFE, internal approval by senior managers, and regional approval through the Electric Reliability Organization (“ERO”).<sup>3</sup>

Order No. 706 also required that NERC submit an annual report to the Commission that provides a wide-area analysis of the use of TFEs and their effect on Bulk-Power System reliability.

The Commission stated:

The annual report must address, at a minimum, the frequency of the use of such provisions, the circumstances or justifications that prompt their use, the interim mitigation measures used to address vulnerabilities, and efforts to eliminate future reliance on the exception. . . [T]he report should contain aggregated data with sufficient detail for the Commission to understand the frequency with which specific provisions are being invoked as well as high level data regarding mitigation and remediation plans over time and by region . . . .<sup>4</sup>

In October 2009, NERC filed amendments to its ROP to implement the Commission’s directive in Order No. 706, proposing Section 412 (Requests for Technical Feasibility Exceptions to NERC Critical Infrastructure Protection Reliability Standards) and Appendix 4D (Procedure for Requesting and Receiving Technical Feasibility Exceptions to NERC Critical Infrastructure Protection Reliability Standards). On January 21, 2010, the Commission approved NERC’s amended ROP.<sup>5</sup>

On April 8, 2013, NERC filed revisions to Appendix 4D of the ROP to streamline the TFE approval process reflecting NERC, Regional Entity and industry experience processing TFE requests since the inception of the program. On September 3, 2013, FERC approved the proposed

---

<sup>3</sup> *Id.* at P 222.

<sup>4</sup> *Id.* at P 220.

<sup>5</sup> *North American Electric Reliability Corp.*, 130 FERC ¶ 61,050 (2010), *order on compliance*, 133 FERC ¶ 61,008 (2010) (“October 1 Order”), *order on reh’g*, 133 FERC ¶ 61,209 (2010), *order on compliance*, 135 FERC ¶ 61,026 (2011) (“April 12 Order”). The Commission requested further information and clarification regarding certain aspects of the TFE process. On April 21, 2010, NERC submitted its compliance filing in response to the January 21 Order. On October 1, 2010, the Commission issued an order accepting NERC’s April 2010 filing as partially compliant and directing further changes to the TFE Procedure. October 1 Order, 133 FERC ¶ 61,008. On December 23, 2010, NERC submitted a compliance filing in response to the Commission’s October 1 Order, which the Commission subsequently accepted.

revisions and directed limited revisions to Appendix 4D, including modifications to: (1) specify a time frame for reporting Material Changes to TFEs upon identification and discovery; and (2) require the annual TFE report to include information on Material Change Reports and TFE expiration dates.<sup>6</sup> NERC submitted a compliance filing consistent with the directives from the September 2013 Order, which the Commission approved on January 30, 2014.<sup>7</sup> Sections 11.2.4 and 13 of Appendix 4D set forth the requirements for the annual TFE report, as modified in accordance with the September 2013 Order. The 2016 Annual Report includes the information required by the September 2013 Order.

## **II. NOTICES AND COMMUNICATIONS**

Notices and communications with respect to this filing may be addressed to:

Shamai Elstein  
Senior Counsel  
North American Electric Reliability  
Corporation  
1325 G St., N.W., Suite 600  
Washington, D.C. 20005  
202-400-3000  
shamai.elstein@nerc.net

Tom Hofstetter, CISA, CISSP  
Senior CIP Compliance Auditor  
North American Electric Reliability Corporation  
3353 Peachtree Road NE, Suite 600 – North Tower  
Atlanta, G.A. 30326  
404-446-2574  
tom.hofstetter@nerc.net

## **III. 2016 ANNUAL REPORT**

In accordance with Appendix 4D of the ROP, NERC prepared the 2016 Annual Report in consultation with the Regional Entities. The Regional Entities provided regular reports to NERC regarding the types of Covered Assets for which the Regional Entities have approved TFEs.<sup>8</sup> In

---

<sup>6</sup> *North American Electric Reliability Corp.*, 144 FERC ¶ 61,180 (2013) (“September 2013 Order”).

<sup>7</sup> *North American Electric Reliability Corp.*, Docket No. RR13-3-001 (Jan. 30, 2014) (unpublished delegated letter order).

<sup>8</sup> During the reporting period for the 2016 Annual Report, a Covered Asset was defined in Appendix 2 of the ROP as a Cyber Asset or Critical Cyber Asset that is subject to a TFE. On January 21, 2016, the Commission issued a letter order in Docket No. RR16-2-000 approving revisions to the ROP, including modifications to Appendices 2 and 4D, to ensure that the procedures for TFEs in the ROP were consistent with version 5 of the CIP Reliability Standards. *See North American Electric Reliability Corp.*, Docket No. RR16-2-000 (Jan. 21, 2016) (unpublished delegated letter order). The effective date of version 5 CIP Reliability Standards was extended to July 1, 2016, *see*

addition, each Regional Entity provided information on the 10 elements identified in Section 13 of Appendix 4D to be included in the 2016 Annual Report. NERC compiled and analyzed the TFE data provided by the Regional Entities in preparation for the 2016 Annual Report.

During the reporting period for the 2016 Annual Report (July 1, 2015 through June 30, 2016), version 3 of the CIP Reliability Standards were still in effect. Accordingly, the 2016 Annual Report only includes data on TFEs submitted, approved, and rejected under the version 3 CIP Reliability Standards. The new and modified CIP Reliability Standards approved in Order Nos. 791 and 822, commonly referred to as version 5 of the CIP Reliability Standards, became effective on July 1, 2016. TFE data for version 5 of the CIP Reliability Standards will be included the Annual Report to be submitted in September 2017.

**a. Elements Required by Appendix 4D, Section 13.1**

The following is a summary of the TFE data reported by each Regional Entity for the 10 elements identified in Section 13.1 of Appendix 4D:<sup>9</sup>

1. *The frequency of use of the TFE Request process, disaggregated by Regional Entity and in the aggregate for the United States and for the jurisdictions of other Applicable Governmental Authorities, including (A) the numbers of TFE Requests that have been submitted and approved/disapproved during the preceding year and cumulatively since the effective date of this Appendix, (B) the numbers of unique Covered Assets for which TFEs have been approved, (C) the numbers of approved TFEs that are still in effect as of on or about the date of the Annual Report; (D) the numbers of approved TFEs that reached their TFE Expiration Dates or were terminated during the preceding year; and (E) the numbers of approved TFEs that are scheduled to reach their TFE Expiration Dates during the ensuing year.*

---

*Order Granting Extension of Time*, 154 FERC ¶ 61,137 (2016). Appendix 2 of the ROP now defines the term Covered Asset as “any BES Cyber Asset, BES Cyber System, Protected Cyber Asset, Electronic Access Control or Monitoring System, or Physical Access Control System that is subject to” a TFE.

<sup>9</sup> Unless stated otherwise, a table or reference to “2016” refers to the reporting period for this report: July 1, 2015 – June 30, 2016.

a. Frequency of use of the TFE Request process

Table 1 provides an industry-wide view of the U.S. entities with registrations to which the CIP Reliability Standards apply. Column 1 reflects the number of entities with registrations to which the CIP reliability standards apply, as defined by CIP-002-3. The subsequent columns further clarify how many entities have claimed Critical Cyber Assets (CCAs), the number of entities with CCAs that have requested TFEs (since the beginning of the TFE program), and the number of entities with active TFEs. The right column was added to this table to highlight the change in applicability with version 5 of the CIP Reliability Standards, which became enforceable immediately after the period covered by this report.

U.S. Entities only	Table 1: Frequency of Use (as of 6/30/16)				v5 CIP applicable entities (by registration)
	CIP v3 applicable entities (by registration)	Entities claiming CCAs	Entities with TFEs	Entities with active TFEs as of 6/30/2016	
FRCC	38	9	9	7	46
MRO	77	20	20	18	92
NPCC	190	42	42	39	214
RF	200	67	67	41	228
SERC	163	26	26	25	192
SPP-RE	102	17	17	17	114
TX RE	181	30	30	24	197
WECC	313	57	57	48	347
<b>Totals</b>	<b>1264</b>	<b>268</b>	<b>268</b>	<b>219</b>	<b>1430</b>

b. TFE Requests that have been Submitted and Approved/Disapproved

During the 2016 reporting period there were 90% fewer new TFE submitted and approved than in the previous year under version 3 of the CIP Reliability Standards. The decrease in submission is, in large part, a result of the transition to version 5 of the CIP Reliability Standards on July 1, 2016.<sup>10</sup> Table 2 summarizes the overall activity that pertained to the TFE program during this reporting period. Table 2 shows the breakdown per region and also includes other data

<sup>10</sup> As noted above, information regarding the submission and approval of TFEs under version 5 of the CIP Reliability Standards will be provided in next year's annual report.

pertaining to TFE requests that were received during the 2016 reporting period. The large number of terminated TFEs in the chart is also a result of the transition to version 5 of the CIP Reliability Standards, either because the entity no longer required a TFE or a TFE is no longer available under the new version of the standards.

U.S. Entities only	Table 2: V3 TFE activity during report period ending 6/30/16						
	New TFE Requests Approved	New TFE Requests Disapproved	Material Change Requests Approved	Material Change Requests Disapproved	Material Change Requests Pending	TFEs Terminated	Totals
FRCC			2		11	71	84
MRO			1		3	6	10
NPCC	16		67		5	62	150
RF					2	35	37
SERC	14		39		2	38	93
SPP-RE			13			44	57
TX RE	1		1			31	33
WECC	2		9			546	557
Totals	33	0	132	0	23	833	1021

Table 3 depicts the applicable standards and requirements for new and amended TFE requests that were submitted during the reporting period under version 3 of the CIP Reliability Standards.

U.S. Entities only	Table 3: Number and Types of TFE Requests Submitted, 7/1/15- 6/30/16																		
	FRCC		MRO		NPCC		RF		SERC		SPP-RE		TXE		WECC		Totals		
	New	Changes	New	Changes	New	Changes	New	Changes	New	Changes	New	Changes	New	Changes	New	Changes	New	Changes	
CIP-005 R2.4																	0	0	
CIP-005 R3.1																	0	0	
CIP-005 R3.2									1		1						0	2	
CIP-006 R1.1									1								0	1	
CIP-007 R2.3		4		1		1		1		1			1	1	2		1	11	
CIP-007 R3		1													2		0	3	
CIP-007 R4		3			6	39			4	10		5			1		10	58	
CIP-007 R5.3		2			5	11		1		2		1		1			5	18	
CIP-007 R5.3.1						1			1	3		1					1	5	
CIP-007 R5.3.2		1		1	1	10			4	8		3			1		5	24	
CIP-007 R5.3.3				1	1	4			2	6				1	2		4	13	
CIP-007 R6					3	4			3	6		1			1		6	12	
CIP-007 R6.3		2		1		2			1	2		1					1	8	
Totals	0	13	0	4	16	72	0	2	15	40	0	13	0	2	2	9	33	155	

Table 4 provides the cumulative total of TFE requests submitted since the program's inception, including the 2016 reporting period.<sup>11</sup>

<sup>11</sup> Figures in this table may differ from those contained in prior reports due to incomplete data that was unknowingly considered at that time. This report clarifies and corrects any prior information. Table 5 also does not

U.S. Entities only	Table 4: TFE Requests Submitted, cumulative (through 6/30/16)																	
	FRCC		MRO		NPCC		RF		SERC		SPP-RE		TX RE		WECC		Totals	
	New	Changes	New	Changes	New	Changes	New	Changes	New	Changes	New	Changes	New	Changes	New	Changes	New	Changes
CIP-005 R2.4	2	0	6	11	2	0	12	38	1	0	3	3	8	0	31	21	65	73
CIP-005 R3.1	4	1	0	0	0	0	16	22	1	0	1	1	0	0	28	10	50	34
CIP-005 R3.2	6	1	10	7	14	0	19	8	20	2	15	16	49	8	69	21	202	63
CIP-006 R1.1	11	4	10	4	4	0	43	26	7	4	1	1	9	3	15	6	100	48
CIP-007 R2.3	45	38	29	26	20	4	89	152	12	14	13	30	47	28	191	88	446	380
CIP-007 R3	23	10	25	21	25	3	70	75	4	3	23	13	11	5	51	18	232	148
CIP-007 R4	125	63	140	105	249	116	627	605	72	130	155	174	218	100	846	543	2432	1836
CIP-007 R5.3	66	56	50	45	104	29	304	291	53	53	54	65	65	46	191	71	887	656
CIP-007 R5.3.1	17	9	14	2	24	3	69	50	5	19	18	13	48	12	144	28	339	136
CIP-007 R5.3.2	68	37	41	39	69	32	263	305	20	66	50	68	72	35	220	75	803	657
CIP-007 R5.3.3	38	23	48	30	31	16	135	184	22	19	27	28	51	11	182	54	534	365
CIP-007 R6	47	25	42	21	59	17	174	177	53	43	32	43	74	31	312	147	793	504
CIP-007 R6.3	43	24	18	17	35	6	77	74	21	18	16	17	46	11	168	45	424	212
<b>Total</b>	<b>495</b>	<b>291</b>	<b>433</b>	<b>328</b>	<b>636</b>	<b>226</b>	<b>1898</b>	<b>2007</b>	<b>291</b>	<b>371</b>	<b>408</b>	<b>472</b>	<b>698</b>	<b>290</b>	<b>2448</b>	<b>1127</b>	<b>7307</b>	<b>5112</b>
	<b>786</b>		<b>761</b>		<b>862</b>		<b>3905</b>		<b>662</b>		<b>880</b>		<b>988</b>		<b>3575</b>		<b>12,419</b>	

Table 5 illustrates the cumulative submissions of new TFE requests for each reporting period, per region under version 3 of the CIP Reliability Standards. Some submissions listed in Table 5 may seem to indicate a disparity when compared to the data listed in Table 4; however, Table 5 includes submissions that were later revised, sometimes more than once, so a “single” TFE is likely to have had multiple instances of activity.

U.S. Entities only	Table 5: New TFE Requests (by report period)							
	6/30/2010	6/30/2011	6/30/2012	6/30/2013	6/30/2014	6/30/2015	6/30/2016	Total
FRCC	260	77	86	47	40	1	0	511
MRO	278	30	72	38	13	18	0	449
NPCC	241	50	166	69	70	56	16	652
RF	993	155	311	247	129	116	0	1951
SERC	37	22	65	89	37	23	14	273
SPP-RE	205	18	61	71	56	28	0	439
TX RE	516	27	76	69	43	30	1	761
WECC	1132	385	485	287	191	70	2	2550
<b>Totals</b>	<b>3662</b>	<b>764</b>	<b>1322</b>	<b>917</b>	<b>579</b>	<b>342</b>	<b>33</b>	<b>7586</b>

c. Number of Unique Covered Assets for which TFEs have been Approved

Tables 6 and 7 provide information regarding the Covered Assets for which the ERO has approved TFEs under version 3 of the CIP Reliability Standards. Many assets are subject to

include any submission related to TFEs under version 5 of the CIP Reliability Standards. Those will be included in the report submitted in September 2017.

multiple TFEs; so the quantities listed here may not align clearly when compared to the quantity of TFE requests.

U.S. Entities only	Table 6 : Assets for which TFEs Requested - report period ending 6/30/16				
	Network Data Communications	Relay	Workstation/ Server	Other	Total
FRCC	4	84	290	3	381
MRO	0	0	0	835	835
NPCC	376	0	404	107	887
RF	0	0	0	3206	3,206
SERC	593	0	490	5	1,088
SPP-RE	0	0	0	1425	1,425
TX RE	0	0	0	236	236
WECC	0	0	0	130	130
<b>Totals</b>	<b>973</b>	<b>84</b>	<b>1,184</b>	<b>5,947</b>	<b>8,188</b>

U.S. Entities only	Table 7 : Assets for which TFEs Requested - cumulative				
	Network Data Communications	Relay	Workstation/ Server	Other	Total
FRCC	3,593	84	3,665	6,556	13,898
MRO	11,434	18,749	4,629	25,498	60,310
NPCC	2,355	2,489	1,542	13,379	19,765
RF	68,876	76,348	33,565	87,972	266,761
SERC	9,937	5,911	6,295	8,296	30,439
SPP-RE	6,551	4,874	2,568	21,043	35,036
TX RE	18,402	6,112	4,591	20,537	49,642
WECC	24,474	29,109	8,645	56,158	118,386
<b>Totals</b>	<b>145,622</b>	<b>143,676</b>	<b>65,500</b>	<b>239,439</b>	<b>594,237</b>

Table 8 reflects the same data as Table 6, with assets grouped by requirement.

U.S. Entities only	Table 8: Assets Covered by TFEs, by Requirement - reporting period ending 6/30/16				
	Network Data Communications	Relay	Workstation/ Server	Other	Total
CIP-005 R2.4	0	0	0	0	0
CIP-005 R3.1	0	0	0	0	0
CIP-005 R3.2	103	0	0	0	103
CIP-006 R1.1	0	0	0	3	3
CIP-007 R2.3	4	28	62	2095	2,189
CIP-007 R3	0	0	1	31	32
CIP-007 R4	855	28	102	53	1,038
CIP-007 R5.3	56	0	65	120	241
CIP-007 R5.3.1	75	0	0	0	75
CIP-007 R5.3.2	289	0	803	183	1,275
CIP-007 R5.3.3	353	0	94	1146	1,593
CIP-007 R6	335	0	0	132	467
CIP-007 R6.3	328	28	57	759	1,172
<b>Total</b>	<b>2,398</b>	<b>84</b>	<b>1,184</b>	<b>4,522</b>	<b>8,188</b>

Table 9 provides several examples of devices that are not clearly assigned to the more common categories and listed as “Other” in Tables 6-8.

Table 9: Examples of Asset Types categorized as "Other"		
Access Control Controllers	Engine vibration monitoring devices	Management interface for Enterprise Service Bus
Adapter (to convert serial data streams to/from attached devices into TCP/IP traffic)	Environmental monitoring systems and devices	Network appliance to improve traffic performance & appliance utilization
Annunciator	Firewall	Network attached storage appliance
Appliance and Thin Client	Frequency Appliances	Network wiring within ESP but outside PSP
Application Interface	Hardware administrative interface for blade chassis	Phasor Data Concentrator (PDC)
Backup Concentrators	Hypervisor, also called virtual machine manager (VMM)	Programmable Logic Controller (PLC)
Badge Reader controllers	Input/Output (I/O) devices	Remote Access Controller
Blade Chassis Components	Infrastructure for managing real-time data and events	Remote power controller for server rack
Camera	Integrated Lights Out (ILO) Management Console	Satellite Clock
Centralized Storage Appliance	Intrusion Detection and Protection System (IDP)	SCADA Application
Communications media	Intrusion Detection System (IDS)	Security Event Management Console
Communications Processors		Serial to network interface
Control Panels		Storage Area Network (SAN) switch
Data Controller / Data Logger		

d. Numbers of Approved TFEs still in effect as of the 2016 Annual Report

Last year’s Annual Report showed that over 4,300 TFEs under version 3 of the CIP Reliability Standards were active, and most remained “officially” in effect until version 5 of the CIP Reliability Standards took effect on July 1, 2016. At the time data for this report was being collected and analyzed, information regarding the total number of TFE in effect following the effective date of version 5 of the CIP Reliability Standards was incomplete. The annual report due in September 2017 will provide a precise number of existing TFEs under version 5.

e. Number of TFEs that Expired or Terminated During the Reporting Period

Table 10 provides the numbers of TFEs that expired or terminated during this and previous reporting periods. During the 2016 reporting period, no TFEs were terminated due to a material misrepresentation by the Responsible Entity as to the facts relied upon by the Regional Entity in approving the TFE.

U.S. Entities only	Table 10: Terminated TFEs, by report period						
	6/30/2011	6/30/2012	6/30/2013	6/30/2014	6/30/2015	6/30/2016	Total
FRCC	24	11	11	1	2	73	163
MRO	73	32	82	34	10	0	231
NPCC	37	85	28	19	9	88	391
RF	24	4	20	23	5	81	228
SERC	6	11	29	10	4	44	112
SPP-RE	63	18	5	7	6	50	149
TX RE	7	28	21	9	1	31	294
WECC	164	121	35	32	7	51	583
<b>Totals</b>	<b>398</b>	<b>310</b>	<b>231</b>	<b>135</b>	<b>44</b>	<b>418</b>	<b>2151</b>

f. Number of Approved TFEs Scheduled to Reach their Expiration Dates during the Ensuing Year

As version 5 of the CIP Reliability Standards became mandatory and enforceable, over 80% of the TFEs that were in effect for version 3 of the CIP Reliability Standards became obsolete and no longer accountable in the program. Table 11 depicts the TFEs that were administratively

terminated since there are no comparable requirements in the CIP version 5 standards that authorize TFEs.

U.S. Entities only	Table 11: TFEs Administratively Terminated after CIP Version 5								
	FRCC	MRO	NPCC	RF	SERC	SPP-RE	TxRE	WECC	Totals
CIP-005 R3.1				7	1			6	14
CIP-005 R3.2	3	3	2	10	17	5	17	21	78
CIP-006 R1.1	3	5	3	21	9		6	10	57
CIP-007 R3	7	8	3	24	6	9	5	31	93
CIP-007 R4	102	78	211	312	150	61	133	574	1,621
CIP-007 R5.3	53	23	81	140	82	38	32	113	562
CIP-007 R5.3.1	15	3	17	31	20	5	25	44	160
CIP-007 R5.3.2	54	17	54	132	65	19	50		391
CIP-007 R6	33	21	41	76	74	12	37		294
<b>Total</b>	<b>270</b>	<b>158</b>	<b>412</b>	<b>753</b>	<b>424</b>	<b>149</b>	<b>305</b>	<b>799</b>	<b>3,270</b>

2. *Categorization of the submitted and approved TFE Requests to date by broad categories such as the general nature of the TFE Request, the Applicable Requirements covered by submitted and approved TFE Requests, and the types of Covered Assets that are the subject of submitted and approved TFE Requests.*

NERC and the Regional Entities continue to categorize submitted and approved TFEs by Applicable Requirement and type of Covered Asset. The types of Covered Assets for which TFEs have been approved has remained generally consistent since the program’s inception. Tables 6-8, above, list the types of Covered Assets that are the subject of submitted and approved TFE requests, while Tables 2-4 identify the Applicable Requirements for which the ERO has approved or disapproved TFEs.

3. *Categorization of the circumstances or justifications on which the approved TFEs to date were submitted and approved, by broad categories such as the need to avoid replacing existing equipment with significant remaining useful lives, unavailability of suitable equipment to achieve Strict Compliance in a timely manner, or conflicts with other statutes and regulations applicable to the Responsible Entity.*

Below is a list of categories of the circumstances or justifications on which the approved TFEs to date were submitted and approved. In general, a TFE request tends to be based on one of the first three criteria that are mentioned below. To date, that pattern has not changed since the inception of the TFE program.

- Not technically possible
- Operationally infeasible

- Precluded by technical limitations
  - Adverse effect on bulk electric system reliability
  - Cannot achieve by compliance date
  - Excessive cost that exceeds reliability benefit
  - Conflicts with other statutory or regulatory requirement
  - Unacceptable safety risks
4. *Categorization of the compensating measures and mitigating measures implemented and maintained by Responsible Entities pursuant to approved TFEs, by broad categories of compensating measures and mitigating measures and by types of Covered Assets.*

As described in previous annual reports, Regional Entities find that Responsible Entities are employing multiple strategies to protect Covered Assets that are unable to meet applicable Reliability Standards. Typically, Responsible Entities apply more than one strategy to mitigate the risk posed by a TFE. The principal strategies employed include protecting devices with physical and logical security controls. A significant portion of compensating and mitigating measures involve firewalls, the use of Intrusion Detection and Intrusion Prevention systems, and strong access policies. With version 5 of the CIP Reliability Standards focused on a “system” approach, it is expected that such strategies will become the norm as personnel approach their environment with a macro view.

The compensating and mitigating measures used most often is an Electronic Security Perimeter (“ESP”). Other significant compensating and mitigating measures deployed include Physical Security Perimeter (“PSP”), Authentication, Intrusion Detection and Prevention (“IDS/IPS”), and System Status Monitoring. Table 13 provides information on the common compensating and mitigating measures reported by the Regional Entities. As described below, the use of these compensating and mitigating measures has resulted in adequate protection for the bulk electric system.

Table 13: Compensating and Mitigating Measures	
Electronic Security Perimeter (ESP)	Covered Assets asserted in the TFE are protected as they reside within a defined ESP and access to/from these assets is controlled via defined access points.
Physical Security Perimeter (PSP)	Covered Assets asserted in the TFE are protected as they reside within a defined PSP and access to these assets is controlled via defined access points.
Status Monitoring	Covered Assets are protected by implementation of System Status Monitoring of all cyber assets residing within a defined ESP. Detection and alerting of system state and condition provides early warning and proactive troubleshooting and corrective action.
Enhanced Authentication	Access to Covered Assets asserted in the TFE and all cyber assets that reside within a defined ESP are protected by multi-factor authentication services ( e.g. , SecurID, Biometrics).
Intrusion Detection and Prevention Systems	Covered Assets asserted in the TFE are protected by network or host based IDS/IPS services. Anomalous data traffic is detected and alerted on and/or prevented from affected Covered Assets.
Training	Covered Assets are protected by general cyber security training and awareness related to CIP-004 or augmented training is provided due to the lack of strict compliance.
Host-Based Malware Prevention	When Covered Assets asserted in a TFE cannot implement anti-virus or anti-malware tools, they are protected by all other cyber assets within a defined ESP having these security controls installed and managed. Propagation of viruses ( e.g. , Trojans) to Critical Cyber Assets (CCAs) is a low risk.
Physical Monitoring	When other mandatory controls cannot be implemented, Covered Assets and/or access to them are physically monitored by Responsible Entity staff.
Data Encryption	When other mandatory controls cannot be implemented, data is encrypted between cyber assets to protect data confidentiality.

- For each TFE Request that was rejected or disapproved, and for each TFE that was terminated, but for which, due to exceptional circumstances as determined by the Regional Entity, the TFE Termination Date was later than the latest date specified in Section 5.2.6, or 9.3, as applicable, a statement of the number of days the Responsible Entity was not subject to imposition of findings of violations of the Applicable Requirement or imposition of Penalties or sanctions pursuant to Section 5.3.

All eight Regional Entities reported that during the 2016 reporting period there were no instances of rejection, disapproval, or termination of TFE requests where the effective date was extended past the latest date specified in Section 5.2.6, or 9.3 of Appendix 4D, as applicable.

- A discussion, on an aggregated basis, of Compliance Audit results and findings concerning the implementation and maintenance of compensating measures and mitigating measures, and the implementation of steps and the conduct of research and analyses to achieve Strict

*Compliance with the Applicable Requirements, by Responsible Entities in accordance with approved TFEs.*

The TFE Procedure, in conjunction with the Compliance Monitoring and Enforcement Program (“CMEP”), is the framework that Regional Entities use to review and audit TFE requests. During a compliance audit, a Responsible Entity that has a TFE for a particular requirement is *not* evaluated against the applicable Reliability Standard for which a TFE was accepted and approved. Instead, the Responsible Entity is evaluated against the alternative compliance obligations assumed by the Responsible Entity (*i.e.*, compensating and mitigating measures).

All eight Regional Entities have conducted Compliance Audits where approved or terminated TFEs were in scope. Typically, an audit of a Registered Entity with TFEs will be managed according to the TFEs that need to be reviewed; *i.e.*, based on factors such as quantity, locations, etc. Reviews include interviewing subject matter experts specifically about TFEs, sampling evidence pertaining to a TFE’s mitigating and compensating measures, etc. As was indicated in previous annual reports, Regional Entities continue to report that Responsible Entities are managing and maintaining their TFEs within the procedural requirements of Appendix 4D. Regional Entities have also issued audit findings that identify TFEs to be processed consistent with the CMEP.

The risk-based emphasis on compliance is underway, and TFEs have already been useful tools for Regional Entity auditors to review when assessing the relative risks for the systems they support.

- 7. Assessments, by Regional Entity (and for more discrete areas within a Regional Entity, if appropriate) and in the aggregate for the United States and for the jurisdictions of other Applicable Governmental Authorities, of the Wide-Area impacts on the reliability of the*

*Bulk Electric System of approved TFEs in the aggregate, including the compensating measures and mitigating measures that have been implemented.*

The Regional Entity representatives who are designated “TFE Managers” continue to hold regular meetings to discuss various topics, including those pertaining to issues related to the impact of TFEs. The consensus from those discussions is that there have been no negative wide-area impacts on the reliability of the bulk electric system as a result of any TFEs. Any wide-area impact of approved TFEs on the reliability of the bulk electric system, in the aggregate, remains negligible.

The Regional Entities have reported similar experiences with the execution and management of the TFE process and the manner in which it impacted the reliability of the bulk electric system. Regional Entities reported that a large majority of Responsible Entities have implemented multiple compensating and mitigating measures for Covered Assets, and, in general, the mitigating and compensating measures of approved TFEs that were implemented in lieu of strict compliance with applicable CIP Reliability Standards accomplished the stated alternate compliance objective. As a result, the level of security for the bulk electric system achieved through the TFE process is comparable to strict compliance with the applicable Reliability Standards.

8. *Discussion of efforts to eliminate future reliance on TFEs.*

Although version 5 of the CIP Reliability Standards continue to allow the use of TFEs,<sup>12</sup> the transition to version 5 of the CIP Reliability Standards may have an impact on future reliance on TFEs. NERC and the Regional Entities are still evaluating the extent of that impact. Nevertheless, it is likely that the need for TFEs will remain for the foreseeable future. Regional

---

<sup>12</sup> Under version 5 of the CIP standards, the following requirements allow for TFE: CIP-005-5, Requirement R1, Part 1.4; CIP-005-5, Requirement R2, Parts 2.1, 2.2, and 2.3; CIP-006-6, Requirement R1, Part 1.3; CIP-007-6, Requirement R1, Part 1.1; CIP-007-6, Requirement R4, Part 4.3; CIP-007-6, Requirement R5, Parts 5.1, 5.6, and 5.7; CIP-010-2, Requirement R1, Part 1.5; and CIP-010-2, Requirement R3, Part 3.2.

Entities have noted the difficulty in providing flexibility for future technology and security changes when developing a standard, thereby making it difficult to eliminate the TFE.

The ERO continues to voice support for requirements in the standards to use products that have been independently certified as offering adequate and appropriate security measures. Applying enhanced security features often requires that properly operating equipment be replaced with a more modern, secure models. There is more anecdotal evidence of vendors and manufacturers offering improved security features, perhaps in response to industry concerns about implementation of the CIP version 5 reliability standards, but there are many potentially insecure systems and devices throughout the industry that continue performing well from an operational perspective, so decisions about replacing them is likely to remain financially-based as well as reliability-based.

9. *Data and information regarding Material Change Reports, including the number of Material Change Reports filed annually and information regarding the types of circumstances or events that led to Material Changes, as well as any additional information NERC believes would be useful.*

As Responsible Entities update their systems, replace equipment, and add assets to inventory, requests to modify existing TFEs have become more common. The update to the TFE procedure in Appendix 4D streamlined that process, moving from a formal approval process to the submission of a “Material Change Report” (“MCR”). An MCR does not require approval by the respective Regional Entity, but information from an MCR is available to the Regional Entity and is helpful for subsequent compliance activities (e.g., audits, spot checks, self-certifications, etc.). Tables 3 and 4 above include data about active TFEs that were amended or changed during the reporting period and cumulatively. A substantial majority of the changes that are noted pertain to asset count changes and administrative updates.

10. *Additional information about TFEs and their TFE Expiration Dates, including the number of TFEs by expiration year and CIP Standard requirement, the percentage of currently approved TFEs without TFE Expiration Dates, and the number of new TFEs approved without expiration dates annually.*

In its September 2013 Order, the Commission directed NERC to provide additional information in the annual reports related to TFEs with and without expiration dates. As has been reported previously, most TFEs do not have expiration dates. With the advent of version 5 of the CIP reliability standards and as depicted in Table 11 above, NERC expects that most existing TFEs will be eliminated, and the prevalence of non-expiring TFEs at that time is yet to be determined.

#### **Consistency in Review, Approval and Disapproval of TFE Requests**

Appendix 4D requires that NERC and the Regional Entities collaborate to assure “consistency in the review, approval and disapproval of TFE Requests...”<sup>13</sup> Also, as noted above, Section 11.2.4 of the NERC Rules of Procedure requires that NERC submit with each Annual Report certain information concerning the manner in which Regional Entities have made determinations to approve or disapprove TFE requests.

NERC has received no reports of inconsistency either in assessing the accuracy or validity of TFEs submitted by Responsible Entities, or in the decisions approving or rejecting TFEs. NERC and the Regional Entities review TFE requests for consistency. Primary and alternate representatives from each Regional Entity, facilitated by NERC staff, meet regularly to discuss common issues. Those representatives also led the efforts at their respective Regional Entities for receiving, reviewing, and reporting TFE-related data.

---

<sup>13</sup> Section 11 of Appendix 4D of the NERC Rules of Procedure.

In addition to regularly scheduled conference calls and face-to-face meetings, the TFE Managers communicate regularly by email and in person at workshops and regular meetings with the goal of reaching consistency among the Regional Entities on pertinent issues.

#### IV. CONCLUSION

For the foregoing reasons, NERC respectfully requests that the Commission accept the 2016 Annual Report.

Respectfully submitted,

/s/ Shamai Elstein

Charles A. Berardesco  
Senior Vice President and General Counsel  
Shamai Elstein  
Senior Counsel  
North American Electric Reliability Corporation  
1325 G Street, N.W., Suite 600  
Washington, D.C. 20005  
202-400-3000  
charlie.berardesco@nerc.net  
shamai.elstein@nerc.net

*Attorneys for North American Electric Reliability  
Corporation*

September 28, 2016

**CERTIFICATE OF SERVICE**

I hereby certify that I have served a copy of the foregoing document upon all parties listed on the official service list compiled by the Secretary in this proceeding.

Dated at Washington, D.C. this 28<sup>th</sup> day of September, 2016.

/s/ Shamai Elstein  
Shamai Elstein

*Attorney for North American Electric Reliability  
Corporation*