

151 FERC ¶ 61,129  
UNITED STATES OF AMERICA  
FEDERAL ENERGY REGULATORY COMMISSION

Before Commissioners: Norman C. Bay, Chairman;  
Philip D. Moeller, Cheryl A. LaFleur,  
Tony Clark, and Colette D. Honorable.

North American Electric Reliability Corporation

Docket No. RD14-14-000

ORDER APPROVING RELIABILITY STANDARD

(Issued May 13, 2015)

1. On September 15, 2014, the North American Electric Reliability Corporation (NERC) submitted a petition seeking approval of a modified Protection and Control (PRC) Reliability Standard PRC-004-3 (Protection System Misoperation Identification and Correction), pursuant to section 215(d) of the Federal Power Act (FPA).<sup>1</sup> The modified Reliability Standard requires transmission owners, generator owners, and distribution providers to identify and correct causes of misoperations<sup>2</sup> of certain protection systems.<sup>3</sup> NERC also requests approval of two new defined terms to include in the NERC Glossary of Terms Used in NERC Reliability Standards (NERC Glossary). Finally, NERC requests approval of the implementation plan for Reliability Standard PRC-004-3, as well as approval of the associated Violation Risk Factors (VRFs) and Violation Severity Levels (VSLs).

2. As explained below, the Commission finds that revised Reliability Standard PRC-004-3, including the associated new Glossary terms and implementation plan, is just, reasonable, not unduly discriminatory or preferential and in the public interest. The Commission also approves the VSLs associated with the Reliability Standard, as

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<sup>1</sup> 16 U.S.C. § 824o(d) (2012).

<sup>2</sup> The NERC Glossary defines “Misoperation” as “[t]he failure of a Composite Protection System to operate as intended for protection purposes. ...”

<sup>3</sup> The NERC Glossary defines “Protection System” as “[p]rotective relays which respond to electrical quantities, communications systems necessary for correct operation of protective functions. ...”

proposed by NERC. The Commission, however, directs NERC to submit a compliance filing, within 60 days of the issuance of this order, to address certain concerns regarding the VRF designations for Requirements R1 through R6, as described below.

## **I. Background**

3. The Commission certified NERC as the Electric Reliability Organization (ERO), as defined in section 215 of the FPA, in July 2006.<sup>4</sup> In Order No. 693, the Commission approved 83 of 107 proposed Reliability Standards submitted by NERC, including approval of PRC-004-1 (Analysis and Mitigation of Transmission and Generation Protection System Misoperations).<sup>5</sup> In addition, the Commission directed that NERC (1) consider a commenter's suggestion regarding whether PRC-004-1 should apply to load serving entities and transmission operators; and (2) clarify what entity should develop the procedures for corrective action plans.<sup>6</sup>

4. Subsequently, NERC submitted, and the Commission approved, Reliability Standard PRC-004-2, which included modifications in response to the Commission's directives in Order No. 693.<sup>7</sup>

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<sup>4</sup> *North American Electric Reliability Corp.*, 116 FERC ¶ 61,062, *order on reh'g and compliance*, 117 FERC ¶ 61,126 (2006), *order on compliance*, 118 FERC ¶ 61,190, *order on reh'g* 119 FERC ¶ 61,046 (2007), *aff'd sub nom. Alcoa Inc. v. FERC*, 564 F.3d 1342 (D.C. Cir. 2009).

<sup>5</sup> *Mandatory Reliability Standards for the Bulk-Power System*, Order No. 693, FERC Stats. & Regs. ¶ 31,242 at P 1467, *order on reh'g*, Order No. 693-A, 120 FERC ¶ 61,053 (2007).

<sup>6</sup> Order No. 693, FERC Stats. & Regs. ¶ 31,242 at P 1469.

<sup>7</sup> *North American Electric Reliability Corp.*, 134 FERC ¶ 61,015 (2011). The Commission has also approved minor revisions to the standard, as well as an interpretation. *See Generator Requirements at the Transmission Interface*, Order No. 785, 144 FERC ¶ 61,221 (2012) (approving PRC-004-2.1a and clarifying that the requirements in PRC-004 extend not only to protection systems associated with the generating facility or station, but also to protection systems associated with the generator interconnection facilities); *North American Electric Reliability Corp.*, 136 FERC ¶ 61,208 (2011) (approving an interpretation for the term "transmission Protection System" as it appears in Requirements R1 and R3).

5. In Order No. 693, the Commission neither accepted nor remanded Reliability Standard PRC-003-1 (Regional Procedures for Analysis of Misoperations of Transmission and Generation Protection System). The Commission identified the standard as a “fill-in-the-blank” standard and noted that the associated regional procedures had not been submitted. Concluding that additional information was needed regarding the regional procedures, the Commission directed NERC to consider whether greater consistency can be achieved “on an Interconnection-wide basis” in Reliability Standard PRC-003-1.<sup>8</sup>

## II. NERC’s Petition

6. In its Petition, NERC explains that Reliability Standard PRC-004-3 was developed “as a means to address the reliability risks posed by misoperations.”<sup>9</sup> According to NERC, the modified Reliability Standard, which replaces Reliability Standards PRC-004-2.1a and PRC-003-1, requires transmission owners, generator owners, and distribution providers to identify and correct causes of misoperations of certain protection systems. Noting that nearly all major system failures that are not related to severe weather include misoperations as a contributing factor, NERC states that PRC-004-3, in concert with a Section 1600 Misoperations Data Request, provides the means to address protection system misoperations. Specifically, NERC states “reducing the risk to reliability from Protection System misoperations will require consistent collection of Misoperation information along with systematic analysis and correction of the underlying causes of preventable Misoperations. Proposed PRC-004-3, and the parallel Section 1600 Data Request provide means to accomplish this systematic analysis and correction.”<sup>10</sup>

7. Reliability Standard PRC-004-3, which applies to transmission owners, generator owners, and distribution providers, contains six requirements. Requirement R1 obligates an applicable entity “that owns a BES [bulk electric system] interrupting device that operated under [specified circumstances] shall, within 120 calendar days of the BES interrupting device operation, identify whether its Protection System component(s) caused a Misoperation.”<sup>11</sup> Pursuant to Requirement R2, an applicable entity must notify other protection system owners of a misoperation. Under Requirement R3, an entity that

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<sup>8</sup> Order No. 693, FERC Stats. & Regs. ¶ 31,242 at P 1461.

<sup>9</sup> NERC Petition at 9.

<sup>10</sup> *Id.*

<sup>11</sup> *Id.* at 15.

owns a portion of a composite protection system<sup>12</sup> and receives notice under Requirement R2 has the later of 60 calendar days from receipt of notification or 120 calendar days from the BES interrupting device operation to determine whether its protection system components caused a misoperation.

8. Requirement R4 requires an entity that owns a “BES interrupting device” to “perform investigative action(s)” to determine the cause or causes of an identified misoperation. NERC explains that an entity must perform at least one investigative action every two full calendar quarters until the investigation is complete. According to NERC, an investigation is considered complete when an entity identifies the cause of a misoperation or declares that no cause was determined.<sup>13</sup> Under Requirement R5, an applicable entity must, within 60 calendar days of identifying a cause of a misoperation, develop a corrective action plan to address the cause of the misoperation and to evaluate its applicability to the entity’s protection systems installed in other locations, or explain why corrective actions are beyond the entity’s control or would not improve bulk electric system reliability.<sup>14</sup> Finally, Requirement R6 requires entities to “implement” a corrective action plan developed under Requirement R5.

9. NERC explains that PRC-004-3 “eliminates the need for regional procedures by providing continent-wide parameters for investigating Protection System operations and identifying Misoperations,” thereby addressing the Commission’s concerns with consistency reflected in the Order No. 693 discussion of Reliability Standard PRC-003-1. In addition, NERC notes that proposed Reliability Standard PRC-004-3 applies to underfrequency load shedding “that is intended to trip one or more Bulk Electric System Elements” in order to close a reliability gap where misoperations of such relays were not previously addressed by a reliability standard.<sup>15</sup>

10. NERC states that the standard drafting team addressed the Commission’s directive to consider whether to include load serving entities and transmission operators in the applicability section for Reliability Standard PRC-004-3. According to NERC, the standard drafting team concluded that “the proper functional entities to include in the

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<sup>12</sup> NERC proposes to define a composite protection system as “[t]he total complement of Protection System(s) that function collectively to protect an Element. Backup protection provided by a different Element’s Protection System(s) is excluded.”

<sup>13</sup> NERC Petition at 20.

<sup>14</sup> *Id.* at 21.

<sup>15</sup> *Id.* at 10.

applicability [for Reliability Standard PRC-004-3] are the Transmission Owner, Generator Owner, and Distribution Provider who own the BES Protection Systems.”<sup>16</sup> NERC explains that owners of protection systems have the personnel with subject matter expertise, design and setting information, and disturbance data necessary to assess protection system misoperations and, therefore, it is appropriate for the owner to have “the responsibility to assure proper operation and implement corrective actions as needed.”<sup>17</sup>

11. NERC also requests approval of the proposed definitions of the terms “Composite Protection System” and “Misoperation.” Finally, NERC proposes an implementation plan that includes an effective date for the revised Reliability Standard and definitions that is the first day of the first calendar quarter that is twelve months after the date that the Commission approves the standard. Concurrent with the effective date, the implementation plan calls for the retirement of currently-effective Reliability Standard PRC-004-2.1a and “pending” standard PRC-003-1.<sup>18</sup>

### **III. Notice of Filing and Responsive Pleading**

12. Notice of NERC’s Petition was issued on September 18, 2014 and published on September 30, 2014 in the *Federal Register*, with comments, protests and motions to intervene due on or before October 20, 2014.<sup>19</sup> Dominion Resources Services, Inc. (Dominion) filed a timely motion to intervene.

### **IV. Discussion**

13. Pursuant to Rule 214 of the Commission's Rules of Practice and Procedure, 18 C.F.R. § 385.214 (2014), the timely motion to intervene filed by Dominion serves to make it a party to this proceeding.

#### **A. Reliability Standard PRC-004-3**

14. We approve Reliability Standard PRC-004-3 and find that the standard is just, reasonable, not unduly discriminatory or preferential, and in the public interest.

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<sup>16</sup> *Id.* at 24.

<sup>17</sup> *Id.*

<sup>18</sup> *Id.* at Ex. B.

<sup>19</sup> 79 Fed. Reg. 58,760 (2014).

Reliability Standard PRC-004-3 requires transmission owners, generator owners, and distribution providers to identify and correct causes of misoperations of certain protection systems. We agree with NERC that the modified Reliability Standard clarifies the process and establishes timeframes that registered entities must follow in analyzing and correcting protection system misoperations. In addition, the process in the revised Reliability Standard allows the entities to declare if the cause of the misoperation could not be identified, and the timeframes allow the entities to investigate and correct the causes of the misoperations within a reasonable period of time. These improvements to the Reliability Standard should benefit reliability by providing clear expectations on how applicable entities should investigate, communicate about and mitigate specified misoperations.

15. Further, we agree with NERC that Reliability Standard PRC-004-3 addresses an existing reliability gap by applying the standard to underfrequency load shedding that is intended to trip one or more bulk electric system elements. This improvement to the scope of the standard requires that the analysis of misoperations that may be associated with underfrequency load shedding facilities is performed. Finally, we determine that PRC-004-3 adequately addresses the relevant directives in Order No. 693 by providing a consistent, continent-wide approach to addressing misoperations. Likewise, as directed in Order No. 693, the NERC drafting team considered whether to expand the applicability of the standard and provided a reasonable explanation for the decision not to expand the applicability.

16. In addition, we approve: (1) NERC's implementation plan for Reliability Standard PRC-004-3, which includes retiring Reliability Standards PRC-004-2.1a and PRC-003-1 when PRC-004-3 becomes effective;<sup>20</sup> (2) the addition of the terms "Composite Protection System" and "Misoperation" to the NERC Glossary; and (3) the proposed VSLs designations for Reliability Standard PRC-004-3. Below, we discuss certain concerns with the assigned VRFs for PRC-004-3.

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<sup>20</sup> As noted above, the Commission in Order No. 693 did not approve proposed Reliability Standard PRC-003-1 but, rather, pended the standard based on the need for additional information. With our approval of PRC-004-3, Reliability Standard PRC-003-1 will be considered "retired" and no longer pending before the Commission.

## B. Violation Risk Factors

17. On May 18, 2007, the Commission established guidelines for determining whether to approve VRFs proposed by NERC.<sup>21</sup> We conclude that the “medium” VRFs assigned to Requirements R1 through R6 of PRC-004-3 are not consistent with the Commission’s guidelines. Nor are the VRF assignments in alignment with NERC’s definitions of high, medium and low VRF levels. Specifically, NERC has not adequately justified the proposed “medium” VRF designations considering : (1) the important reliability objectives of the underlying Reliability Standard; and (2) the “high” risk designations for the corresponding Requirements of the currently-effective standard PRC-004-2.1a. Accordingly, we direct NERC to revise the VRF designations to address our concerns discussed below.

18. NERC states that the six discrete requirements of proposed Reliability Standard PRC-004-3 “incorporate and enhance the intent of the requirements of PRC-004-2.1a and PRC-003-1.”<sup>22</sup> NERC states further that:

The requirements of the proposed PRC-004-3 do not map, one-to-one, with the Requirements of the two legacy standards, PRC-003-1 and PRC-004-2.1a. The new Requirements comingle various reliability attributes of the legacy standards with precise reliability objectives. In developing the new VRFs for the Requirements of PRC-004-3, the Standard Drafting Team carefully considered the NERC criteria for developing VRFs, as well as the FERC VRF guidelines. The VRFs of the FERC approved PRC-004-2.1a – Analysis and Mitigation of Transmission and Generation Protection System Misoperations (R1 & R2 – High VRF), PRC-004-WECC-1 – Protection System and Remedial Action Scheme Misoperation (R1 – Lower VRF), PRC-016-0.1 – Special Protection System Misoperation (R2 – Medium VRF), and PRC-022-1 – Under-Voltage Load Shedding Program Performance (R1 & R1.5 – Medium

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<sup>21</sup> See *North American Electric Reliability Corp.*, 119 FERC ¶ 61,145, *order on reh’g*, 120 FERC ¶ 61,145 (2007); *North American Electric Reliability Corp.*, 123 FERC ¶ 61,284, at PP 20-35, *order on reh’g & compliance*, 125 FERC ¶ 61,212 (2008); *North American Electric Reliability Corp.*, 135 FERC ¶ 61,166 (2011).

<sup>22</sup> NERC Petition, Ex. F (Analysis of Violation Risk Factors and Violation Severity Levels) at 4.

VRF), all influenced (citing FERC VRF Guideline 3) the drafting team's VRF decisions, as such, the VRFs for PRC-004-3 Requirements R1 through R6 are assigned a VRF of Medium.<sup>23</sup>

19. The Commission is not persuaded by NERC's explanation. Reliability Standard PRC-004-2.1a, Requirements R1 and R2, which apply to Protection Systems, are assigned a High VRF. In contrast, Reliability Standards PRC-016-0.1 and PRC-022-1 apply to Remedial Action Schemes and to Under-Voltage Load Shedding Program Performance and not Protection Systems. Regional Standard PRC-004-WECC-1, Requirement R1 applies to the analysis of both Remedial Action Schemes and Protection Systems, while all four provisions of Requirement R2, which require actions to protect the Bulk-Power System from a Protection System or Remedial Action Schemes misoperation, are assigned a High VRF. Thus, while it is true, as NERC claims, that there is not a one-to-one correlation between the currently-effective and proposed PRC-004 requirements, it is clear that the provisions of the currently-effective standards that pertain to protection system performance are assigned "high" VRF levels.

20. Moreover, Commission VRF Guideline 4 calls for consistency between the assignment of a particular VRF and NERC's definition of that VRF level.<sup>24</sup> The Commission-approved NERC VRF definition for "high" VRF states, in pertinent part, that a requirement should have a "high" VRF designation if a violation of the requirement "could place the bulk electric system at an unacceptable risk of instability, separation or cascading failures." NERC has designated protection system misoperations as one of the top priority reliability risks, noting that unnecessary trips resulting from misoperations can lead to cascading failures.<sup>25</sup> In contrast, the Commission-approved NERC VRF definition for "medium" provides that the violation of the underlying requirement could not result in, among other things, a cascading sequence of failures or place the bulk electric system at an unacceptable risk of, among other things, cascading failures. We are not persuaded by NERC's technical justification for lowering the subject VRF assignments to "medium," particularly in light of NERC's findings that misoperations

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<sup>23</sup> *Id.*, Ex. F at 5.

<sup>24</sup> See *North American Electric Reliability Corp.*, 119 FERC ¶ 61,145 at PP 28-31.

<sup>25</sup> See "ERO Top Priority Reliability Risks 2014-2017," January 16, 2014, <http://www.nerc.com/comm/RISC/Agenda%20Highlights%20and%20Minutes/ERO%20Top%20Priority%20Reliability%20Risks%202014.pdf> at 12; see also NERC "State of Reliability Report," May 2014 at Page 17.



can lead to cascading outages.<sup>26</sup> For the reasons stated above, we direct NERC to submit a compliance filing within 60 days of issuance of this order that revises the proposed “medium” VRF designations to “high.”

## V. Information Collection Statement

21. The information collection requirements contained in this order are subject to review by the Office of Management and Budget (OMB) under section 3507(d) of the Paperwork Reduction Act of 1995.<sup>27</sup> OMB’s regulations require approval of certain information collection requirements imposed by agency rules.<sup>28</sup> Upon approval of a collection of information, OMB will assign an OMB control number and expiration date. Respondents subject to the reporting requirements of this order will not be penalized for failing to respond to these collections of information unless the collections of information display a valid OMB control number. Under the Paperwork Reduction Act, the Commission solicits comments on the need for this information, whether the information will have practical utility, the accuracy of the burden estimates, ways to enhance the quality, utility, and clarity of the information to be collected or retained, and any suggested methods for minimizing respondents’ burden, including the use of automated information techniques. Comments are due within 60 days from publication in the Federal Register.

22. Public Reporting Burden: Reliability Standard PRC-004-3 requires each transmission owner, generator owner, and distribution provider to provide notification of BES interrupting devices that operated in accordance with the Requirement R2.<sup>29</sup> Our estimate below regarding the number of respondents is based on the NERC Compliance Registry as of January 30, 2015. According to the NERC Compliance Registry, NERC has registered in the United States 326 transmission owners (TO), 914 generator owners (GO), and 471 distribution providers (DP). However, under NERC’s compliance registration program, entities may be registered for multiple functions, so these numbers

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<sup>26</sup> *Id.*

<sup>27</sup> 44 U.S.C. 3507(d) (2012).

<sup>28</sup> 5 CFR 1320.11 (2014).

<sup>29</sup> Requirement R2 provides “Each Transmission Owner, Generator Owner, and Distribution Provider that owns a BES interrupting device that operated shall, within 120 calendar days of the BES interrupting device operation, provide notification as described in Parts 2.1 and 2.2.”

incorporate some double counting. The total number of unique entities that may be identified as a notification provider (e.g. applicable entity) in accordance with Reliability Standard PRC-004-3 will be approximately 659 entities registered in the United States as a transmission owner, generator owner, and/or distribution provider.

<b>FERC-725G<sup>1</sup><sup>30</sup></b>						
	<b>Number of Respondents (1)</b>	<b>Annual Number of Responses per Respondent (2)</b>	<b>Total Number of Responses (1)*(2)=(3)</b>	<b>Average Burden &amp; Cost Per Response<sup>31</sup> (4)</b>	<b>Total Annual Burden Hours &amp; Total Annual Cost (3)*(4)=(5)</b>	<b>Cost per Respondent (\$) (5)÷(1)</b>
Notifications to TO/GO/DP per Requirement R2	659	1	659	8 \$584	5,272 \$384,856	\$584
One-time review and adjustment of existing program	659	1	659	2 \$146	1,318 \$96,214	\$146
Evidence Retention	659	1	659	12 \$384	7,908 \$253,056	\$384
<b>TOTAL</b>					14,498 \$734,126	\$1,114

<sup>30</sup> FERC-725G is a currently pending request at OMB. Only one submittal can be pending OMB review under each control number, therefore, FERC-725G1 will be used for timely submittal.

<sup>31</sup> The estimates for cost per response are derived using the following formula: Average Burden Hours per Response \* \$n per Hour = Average Cost per Response. The \$73 hourly cost figure is the average of the salary plus benefits for a manager and an engineer (rounded to the nearest dollar); \$32/hour is the salary plus benefits for information and record clerks. The figures are taken from the Bureau of Labor Statistics at [http://bls.gov/oes/current/naics3\\_221000.htm](http://bls.gov/oes/current/naics3_221000.htm).

NERC states that “moving the periodic reporting of Misoperations from the standard (PRC-004-2.1) and into a separate data request pursuant to Section 1600 of NERC’s Rules of Procedure will permit NERC’s data analysis to continue separately from compliance with the standard and continue reporting, using a standardized template, for all entities subject to the data request.”<sup>32</sup> Therefore, registered entities will still conduct the collection. The burden associated with PRC-004-2.1 will be removed from FERC-725A (1902-0244) and added to FERC-725, as reflected in the table below.

<b>Documentation of Misoperations Analyses and Corrective Action Plans Per PRC-004-2.1</b>						
	<b>Number of Respondents (1)</b>	<b>Annual Number of Responses per Respondent (2)</b>	<b>Total Number of Responses (1)*(2)=(3)</b>	<b>Average Burden &amp; Cost Per Response<sup>33</sup> (4)</b>	<b>Total Annual Burden Hours &amp; Total Annual Cost (3)*(4)=(5)</b>	<b>Cost per Respondent (\$) (5)÷(1)</b>
FERC-725	659	1	659	96 \$7,008	63,264 \$4,618,272	\$7,008
FERC-725A	-659	-1	-659	-96 -\$7,008	-63,264 -\$4,618,272	-\$7,008
Total Net Change	0	0	0	0	0	0

Title: Certification of the Electric Reliability Organization and Procedures for the Establishment, Approval and Enforcement of Electric Reliability Standards; Mandatory Reliability Standards for the Bulk-Power System: Reliability Standard PRC-004-3

Action: Proposed revisions FERC-725; proposed new collection FERC-725G1  
OMB Control No: FERC-725 (1902-0269), FERC-725G1 (OMB Control No to be determined)

<sup>32</sup> NERC Petition at 23.

<sup>33</sup> The estimates for cost per response are derived using the following formula: Average Burden Hours per Response \* \$n per Hour = Average Cost per Response. The \$73 hourly cost figure is the average of the salary plus benefits for a manager and an engineer (rounded to the nearest dollar); \$32/hour is the salary plus benefits for information and record clerks. The figures are taken from the Bureau of Labor Statistics at [http://bls.gov/oes/current/naics3\\_221000.htm](http://bls.gov/oes/current/naics3_221000.htm).

Respondents: Businesses or other for-profit institutions; not-for-profit institutions.

Frequency of Responses: Occasional.

Necessity of the Information: Reliability Standard PRC-004-3 provides improvements over the currently-effective PRC-004-2.1a, including clearer requirements that establish what is required of the applicable entities and timeframes for the reliability objectives to be completed.

23. Interested persons may obtain information on the reporting requirements by contacting: Federal Energy Regulatory Commission, 888 First Street, NE, Washington, DC 20426 [Attention: Ellen Brown, Office of the Executive Director, e-mail: DataClearance@ferc.gov, Phone: (202) 502-8663, fax: (202) 273-0873].

## **VI. Effective Date**

24. This order will become effective upon issuance.

### The Commission orders:

(A) Reliability Standard PRC-004-3 is hereby approved as just, reasonable, not unduly discriminatory, and in the public interest, as discussed in the body of this order.

(B) The revisions to NERC's Glossary of Terms, the proposed implementation plan and the proposed Violation Severity Levels for Reliability Standard PRC-004-3 are hereby approved, as discussed in the body of this order.

(C) NERC is hereby directed to submit a compliance filing within 60 days of this order addressing the proposed Violation Risk Factors, as discussed in the body of this order.

By the Commission.

( S E A L )

Nathaniel J. Davis, Sr.,  
Deputy Secretary.

Document Content(s)

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