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Serial: RA-17-0053
December 20, 2017

U.S. Nuclear Regulatory Commission
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BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 AND 2
DOCKET NOS. 50-325, 50-324 / RENEWED LICENSE NOS. DPR-71 AND DPR-62

CATAWBA NUCLEAR STATION, UNIT NOS. 1 AND 2
DOCKET NOS. 50-413, 50-414 / RENEWED LICENSE NOS. NPF-35 AND NPF-52

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261 / RENEWED LICENSE NO. DPR-23

MCGUIRE NUCLEAR STATION, UNIT NOS. 1 AND 2
DOCKET NOS. 50-369, 50-370 / RENEWED LICENSE NOS. NPF-9 AND NPF-17

OCONEE NUCLEAR STATION, UNIT NOS. 1, 2 AND 3
DOCKET NOS. 50-269, 50-270, AND 50-287 / RENEWED LICENSE NOS. DPR-38, DPR-47,
AND DPR-55

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1
DOCKET NO. 50-400 / RENEWED LICENSE NO. NPF-63

**SUBJECT: ANCHOR DARLING DOUBLE DISC GATE VALVE INFORMATION AND
STATUS**

REFERENCES:

1. Letter from Greg Krueger (NEI) to Mr. John Lubinski, U.S. Nuclear Regulatory Commission, *Anchor Darling Double Disc Gate Valve Industry Resolution Plan Update (Project 689)*, dated August 4, 2017 (ADAMS Accession No. ML17220A363)
2. BWROG Topical Report TP-16-1-112 Rev.4, *Recommendations to Resolve Flowserve 10CFR Part21 Notification Affecting Anchor Darling Double Disc Gate Valve Wedge Pin Failures*, dated August 2017 (ADAMS Accession No. ML17243A137)
3. Letter from Joe Pollock (NEI) to Mr. Brian Holian, U.S. Nuclear Regulatory Commission, *NSIAC Concurrence on Anchor Darling Double Disc Gate Valve Industry Response Actions (Project 689)*, dated October 26, 2017 (ADAMS Accession No. ML17303A031)

Ladies and Gentlemen:

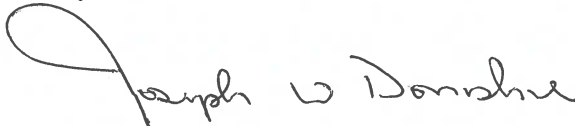
In Reference 1, the Nuclear Energy Institute (NEI) provided the NRC a resolution plan for the U.S. Nuclear Industry to address the known Anchor Darling Double Disk Gate Valve (AD DDGV) issues. Reference 3 indicated each utility will provide a listing of their Anchor Darling valve population with active safety functions along with relevant valve information, including the results of susceptibility evaluations, repair status, and a repair schedule for each susceptible valve not yet repaired. This letter serves to provide this information for Duke Energy including Brunswick, Catawba, Harris, McGuire, Oconee, and Robinson nuclear stations (all units) for any active safety function AD DDGV applicable to References 1 and 2. Note, a review has determined that Harris and McGuire stations do not have any active safety function AD DDGV applicable to References 1 and 2. Therefore, no data or commitments are provided for Harris and McGuire stations.

The Attachments to this letter contain the following information for each AD DDGV.

- Valve Unit and ID
- System and Valve Functional Description
- Valve Size
- Active Safety Function (open, close, both) and whether multiple design basis post-accident strokes are required (yes/no)
- Risk Significance (high, medium, low)
- The result of each valve's susceptibility evaluation (i.e. susceptible or not susceptible), and whether the evaluation is in general conformance with the BWROG guidance (Reference 2).
- Whether the susceptibility evaluation relied upon the presence of thread-friction.
 - For cases where thread-friction was relied upon, information is provided whether the coefficient of friction was above or below 0.10.
- Whether an initial stem-rotation check has been performed and the associated acceptance criteria (i.e. ≤ 10 degrees or ≤ 5 degrees).
- Whether existing diagnostic test data has been reviewed for the failure precursors described in Reference 2.
- The valve's repair status (i.e. repaired or not repaired).
- A committed repair schedule for each susceptible valve (except for four Brunswick valves as detailed in Attachment 1).

Should you have any questions concerning this letter, or require additional information, please contact Art Zaremba, Manager – Nuclear Fleet Licensing, at 980-373-2062.

Sincerely,



Joseph Donahue
Vice President – Nuclear Engineering

JBD

Attachments:

1. Brunswick Nuclear Plant AD DDGV Listing and Commitments
2. Catawba Nuclear Station AD DDGV Listing and Commitments
3. Oconee Nuclear Station AD DDGV Listing and Commitments
4. Robinson Nuclear Plant AD DDGV Listing and Commitments

cc: (all with Attachments unless otherwise noted)

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Attachment 1
RA-17-0053

Attachment 1

Brunswick Nuclear Plant AD DDGV Listing and Commitments

**TABLE 1:
BRUNSWICK NUCLEAR PLANT (BNP): ANCHOR DARLING DOUBLE DISC GATE VALVE LISTING (see Reference 3 of the cover letter)**

Plant Name	Unit	Valve ID	System	Valve Functional Description	Valve Size (inches)	Active Safety Function (Open, Close, Both)	Are multiple design basis post-accident strokes required? (Yes/No)	Expert Panel Risk Ranking (High, Medium, Low)	Result of susceptibility evaluation (susceptible or not susceptible)	Is the susceptibility evaluation in general conformance with TP16-1-112r4? (Yes/No)	Does the susceptibility evaluation rely on thread friction? If yes, was the COF greater than 0.10? (No), (Yes, >0.10), (Yes, ≤0.10)	Was an initial stem-rotation check performed? If yes, include rotation criteria (No), (Yes, ≤10 deg.), (Yes, ≤5 deg.)	Was the diagnostic test data reviewed for failure precursors described in TP16-1-112r4? (Yes/ No)	Valve repair status (repaired or not repaired)
BNP	1	1-B32-F031A	Reactor Recirc	Reactor Recirc Pump 1A Discharge Valve	24x28	Close	No	Low	Susceptible ⁽¹⁾⁽²⁾	Yes	Yes, >0.10	No	Yes	Not Repaired ⁽⁴⁾
BNP	1	1-B32-F031B	Reactor Recirc	Reactor Recirc Pump 1B Discharge Valve	24x28	Close	No	Low	Susceptible ⁽¹⁾⁽²⁾	Yes	Yes, >0.10	No	Yes	Not Repaired ⁽⁴⁾
BNP	1	1-B32-F032A	Reactor Recirc	Reactor Recirc Pump 1A Disch Bypass Vlv	4	Close	No	Low	Susceptible ⁽²⁾	Yes	No	No	Yes	Not Repaired
BNP	1	1-B32-F032B	Reactor Recirc	Reactor Recirc Pump 1B Disch Bypass Vlv	4	Close	No	Low	Susceptible ⁽²⁾	Yes	No	No	Yes	Not Repaired
BNP	1	1-E41-F002	HPCI	HPCI Turbine Steam Supply Inboard Isolation Valve	10	Both	No	Medium	Susceptible ⁽²⁾	Yes	No	No	Yes	Not Repaired
BNP	1	1-E41-F003	HPCI	HPCI Turbine Steam Supply Outboard Isolation Valve	10	Both	No	Medium	Susceptible ⁽²⁾	Yes	No	No	Yes	Not Repaired
BNP	1	1-E41-F006	HPCI	HPCI Injection Valve	14	Both	Yes	Medium	Susceptible ⁽²⁾	Yes	No	No	Yes	Not Repaired
BNP	1	1-E51-F008	RCIC	RCIC Steam Supply Line Outboard Isolation Vlv	3	Both	No	Medium	Susceptible ⁽¹⁾⁽²⁾	Yes	Yes, >0.10	No	Yes	Not Repaired
BNP	1	1-E51-F013	RCIC	RCIC Injection Valve	4	Both	Yes	Medium	Susceptible ⁽¹⁾⁽²⁾	Yes	Yes, >0.10	No	Yes	Not Repaired
BNP	1	1-G31-F001	Reactor Water Cleanup	RWCU Inlet Line Inboard Isolation Vlv	6	Close	No	Medium	Not Susceptible	Yes	see footnote ⁽³⁾	No ⁽³⁾	No ⁽³⁾	Repaired
BNP	1	1-G31-F004	Reactor Water Cleanup	RWCU Inlet Line Outboard Isolation Vlv	6	Close	No	Medium	Susceptible ⁽¹⁾⁽²⁾	Yes	Yes, >0.10	No	Yes	Not Repaired
BNP	2	2-B32-F031A	Reactor Recirc	Reactor Recirc Pump 2A Discharge Valve	24x28	Close	No	Low	Susceptible ⁽¹⁾	Yes	Yes, >0.10	Yes, ≤ 5 deg.	Yes	Not Repaired ⁽⁴⁾
BNP	2	2-B32-F031B	Reactor Recirc	Reactor Recirc Pump 2B Discharge Valve	24x28	Close	No	Low	Susceptible ⁽¹⁾	Yes	Yes, >0.10	Yes, ≤ 5 deg.	Yes	Not Repaired ⁽⁴⁾
BNP	2	2-B32-F032A	Reactor Recirc	Reactor Recirc Pump 2A Disch Bypass Vlv	4	Close	No	Low	Not Susceptible	Yes	No	Yes, ≤ 5 deg.	Yes	Not Repaired
BNP	2	2-B32-F032B	Reactor Recirc	Reactor Recirc Pump 2B Disch Bypass Vlv	4	Close	No	Low	Susceptible ⁽²⁾	Yes	No	No	Yes	Not Repaired
BNP	2	2-E41-F002	HPCI	HPCI Turbine Steam Supply Inboard Isolation Valve	10	Both	No	Medium	Susceptible ⁽²⁾	Yes	No	No	Yes	Not Repaired
BNP	2	2-E41-F003	HPCI	HPCI Turbine Steam Supply Outboard Isolation Valve	10	Both	No	Medium	Susceptible ⁽²⁾	Yes	No	No	Yes	Not Repaired
BNP	2	2-E41-F006	HPCI	HPCI Injection Valve	14	Both	Yes	Medium	Susceptible ⁽²⁾	Yes	No	No	Yes	Not Repaired

**TABLE 1:
BRUNSWICK NUCLEAR PLANT (BNP): ANCHOR DARLING DOUBLE DISC GATE VALVE LISTING (see Reference 3 of the cover letter)**

Plant Name	Unit	Valve ID	System	Valve Functional Description	Valve Size (inches)	Active Safety Function (Open, Close, Both)	Are multiple design basis post-accident strokes required? (Yes/No)	Expert Panel Risk Ranking (High, Medium, Low)	Result of susceptibility evaluation (susceptible or not susceptible)	Is the susceptibility evaluation in general conformance with TP16-1-112r4? (Yes/No)	Does the susceptibility evaluation rely on thread friction? If yes, was the COF greater than 0.10? (No), (Yes, >0.10), (Yes, ≤0.10)	Was an initial stem-rotation check performed? If yes, include rotation criteria (No), (Yes, ≤10 deg.), (Yes, ≤5 deg.)	Was the diagnostic test data reviewed for failure precursors described in TP16-1-112r4? (Yes/ No)	Valve repair status (repaired or not repaired)
BNP	2	2-E51-F013	RCIC	RCIC Injection Valve	4	Both	Yes	Medium	Susceptible ⁽¹⁾	Yes	Yes, >0.10	Yes, ≤ 5 deg.	Yes	Not Repaired
BNP	2	2-G31-F001	Reactor Water Cleanup	RWCU Inlet Line Inboard Isolation Vlv	6	Close	No	Medium	Susceptible ⁽¹⁾	Yes	Yes, >0.10	Yes, ≤ 5 deg.	Yes	Not Repaired
BNP	2	2-G31-F004	Reactor Water Cleanup	RWCU Inlet Line Outboard Isolation Vlv	6	Close	No	Medium	Susceptible ⁽¹⁾	Yes	Yes, >0.10	Yes, ≤ 5 deg.	Yes	Not Repaired

^(A) Applied Wedge Pin Torque must bound anticipated design basis operating torque requirements and current maximum total torque

⁽¹⁾ As a conservative action, Duke is considering MOVs "Susceptible" if their wedge-pin analysis relies on the presence of thread friction >0.10. See commitment table.

⁽²⁾ This valve is "Susceptible" because a stem-rotation check has not been performed. See commitment table.

⁽³⁾ Not applicable for repaired valves (i.e. a wedge-pin analysis, initial stem rotation check, and diagnostic review are not required for repaired valves).

⁽⁴⁾ Repair is not planned, an Engineering evaluation found that the safety function is not adversely affected by the Part 21 condition. Ongoing stem rotation checks and diagnostic testing will be performed at an increased frequency to provide additional confidence. See commitment table.

Additional information:

These valves have a safety function to close only, so the potential for separation of the stem to upper wedge connection on the BNP RCR discharge valves does not pose a nuclear safety concern. These valves do not have a disc retainer so if the wedge pin were to fracture there is a very low probability the loose parts from the fractured pin could prevent the valve from performing its safety function. Going forward these valves will be diagnostically tested every 4 years.

**TABLE 2:
BRUNSWICK NUCLEAR PLANT (BNP): ANCHOR DARLING DOUBLE DISC GATE VALVE COMMITMENTS**

The following table identifies commitments made in this document. (Any other actions discussed in the submittal represent intended or planned actions. They are described to the NRC for the NRC's information and are not regulatory commitments.)

COMMITMENT	COMMITTED DATE OR "OUTAGE"	COMMITMENT TYPE	
		ONE-TIME ACTION (Yes/No)	Programmatic (Yes/No)
<p>Perform stem rotation checks in accordance with TP16-1-112r4 (Reference 2) with contingency repairs on the following AD DDGV MOVs:</p> <p>Unit 1: <u>MOV Number</u> 1-B32-F032A 1-B32-F032B 1-E41-F002 1-E41-F003 1-E41-F006 1-E51-F008 1-E51-F013 1-G31-F004</p> <p>Unit 2: <u>MOV Number</u> 2-B32-F032B 2-E41-F002 2-E41-F003 2-E41-F006</p>	<p><u>Outage(Year)</u> B1R22 (2018) B1R22 (2018) B1R22 (2018)</p> <p><u>Outage(Year)</u> B2R24 (2019) B2R24 (2019)</p>	<p>Yes Yes Yes</p> <p>Yes Yes</p>	<p>No No No</p> <p>No No</p>
<p>Repair the following Anchor Darling double disc gate valves to resolve Flowserve's Part 21 dated 2/25/2013 including the updated Part 21 issued 7/11/2017.</p> <p>Unit 1 <u>MOV Number</u> 1-E51-F008 1-E51-F013</p> <p>Unit 2: <u>MOV Number</u> 2-E51-F013 2-G31-F001</p>	<p><u>Outage(Year)</u> B1R23 (2020) B1R23 (2020)</p> <p><u>Outage(Year)</u> B2R24 (2019) B2R25 (2021)</p>	<p>Yes Yes</p> <p>Yes Yes</p>	<p>No No</p> <p>No No</p>

COMMITMENT	COMMITTED DATE OR "OUTAGE"	COMMITMENT TYPE	
		ONE-TIME ACTION (Yes/No)	Programmatic (Yes/No)
<p>Repair / replace the following Anchor Darling double disc gate valves with a flex-wedge valve to resolve Flowserve's Part 21 dated 2/25/2013 including the updated Part 21 issued 7/11/2017.</p> <p>Unit 1 <u>MOV Number</u> 1-G31-F004</p> <p>Unit 2: <u>MOV Number</u> 2-G31-F004</p>	<p style="text-align: center;"><u>Outage(Year)</u> B1R24 (2022)^{See Note 1}</p> <p style="text-align: center;"><u>Outage(Year)</u> B2R26 (2023)^{See Note 1}</p>	<p>Yes</p> <p>Yes</p>	<p>No</p> <p>No</p>
<p><u>Note 1:</u> Replacement is currently scheduled per the station's long range plan by the date/outage shown. Per BWR owners group recommendation (TP16-1-112r4, Reference 2), 1-G31-F004 should be repaired by 2020 and the 2-G31-F004 should be repaired by 2021. As a part of the BNP station long range plan, these valves are currently scheduled to be replaced with a flex-wedge design. The risk of a consequential wedge pin fracture / stem disc separation occurring between the BWROG recommended repair date and the BNP long range plan replacement date is considered low for the following reasons:</p> <p>(1) These valves are limit seated valves so the risk of breaking the pin during normal operation is low. (2) The safety function of these valves is to close. Closing of the valves drives the stem into the wedge. These valves do not have a safety function to open. (3) These valves do have disc retainer, there is at least one occurrence in the industry where the wedge pin broke and the disc retainer became foreign material and prevented the associated valve from fully closing. The G31-F001 is the inboard RWCU suction isolation valve and the G31-F004 is the outboard RWCU suction isolation valve. These valves are primary containment isolation valves (PCIV). If one were to fail to fully close due to a the disc retainer the other PCIV would close and the PCIV function would remain intact.</p>			
<p>Perform diagnostic testing and stem rotation checks with contingency repairs each refueling outage on the following AD DDGV MOVs until they are repaired/replaced (i.e. method (c) in TP16-1-112r4, Reference 2):</p> <p>Unit 1 <u>MOV Number</u> 1-G31-F004</p> <p>Unit 2: <u>MOV Number</u> 2-G31-F004</p>	<p style="text-align: center;">Every outage beginning B1R23 (2020)</p> <p style="text-align: center;">Every outage beginning B2R24 (2019)</p>	<p>No</p> <p>No</p>	<p>Yes</p> <p>Yes</p>

COMMITMENT	COMMITTED DATE OR "OUTAGE"	COMMITMENT TYPE	
		ONE-TIME ACTION (Yes/No)	Programmatic (Yes/No)
Perform diagnostic testing and stem rotation checks with contingency repairs every other refueling outage on the following AD DDGV MOVs (i.e. method (c) in TP16-1-112r4, Reference 2): Unit 1 <u>MOV Number</u> 1-B32-F031A 1-B32-F031B Unit 2: <u>MOV Number</u> 2-B32-F031A 2-B32-F031B	Every other outage beginning B1R22 (2018) B1R22 (2018)	No No	Yes Yes
	Every other outage beginning B2R24 (2019) B2R24 (2019)	No No	Yes Yes

Attachment 2
RA-17-0053

Attachment 2

Catawba Nuclear Station AD DDGV Listing and Commitments

**TABLE 1:
CATAWBA NUCLEAR STATION (CNS): ANCHOR DARLING DOUBLE DISC GATE VALVE LISTING (see Reference 3 of the cover letter)**

Plant Name	Unit	Valve ID	System	Valve Functional Description	Valve Size (inches)	Active Safety Function (Open, Close, Both)	Are multiple design basis post-accident strokes required? (Yes/No)	Expert Panel Risk Ranking (High, Medium, Low)	Result of susceptibility evaluation (susceptible or not susceptible)	Is the susceptibility evaluation in general conformance with TP16-1-112r4? (Yes/No)	Does the susceptibility evaluation rely on thread friction? If yes, was the COF greater than 0.10? (No), (Yes, >0.10), (Yes, ≤0.10)	Was an initial stem-rotation check performed? If yes, include rotation criteria (No), (Yes, ≤10 deg.), (Yes, ≤5 deg.)	Was the diagnostic test data reviewed for failure precursors described in TP16-1-112r4? (Yes/ No)	Valve repair status (repaired or not repaired)
CNS	1	1BB008A	BB	S/G BLWDN CONT. ISOL. INSIDE VLV.	4.00	Close	No	Low	Not Susceptible	Yes	see footnote ⁽³⁾	No ⁽³⁾	No ⁽³⁾	Repaired
CNS	1	1BB010B	BB	S/G BLWDN CONT. ISOL. OUTSIDE VLV.	4.00	Close	No	Low	Not Susceptible	Yes	see footnote ⁽³⁾	No ⁽³⁾	No ⁽³⁾	Repaired
CNS	1	1BB019A	BB	S/G BLWDN CONT. ISOL. INSIDE VLV..	4.00	Close	No	Low	Not Susceptible	Yes	see footnote ⁽³⁾	No ⁽³⁾	No ⁽³⁾	Repaired
CNS	1	1BB021B	BB	S/G BLWDN CONT. ISOL. OUTSIDE VLV.	4.00	Close	No	Low	Not Susceptible	Yes	see footnote ⁽³⁾	No ⁽³⁾	No ⁽³⁾	Repaired
CNS	1	1BB056A	BB	S/G BLWDN CONT. ISOL. INSIDE VLV.	4.00	Close	No	Low	Not Susceptible	Yes	see footnote ⁽³⁾	No ⁽³⁾	No ⁽³⁾	Repaired
CNS	1	1BB057B	BB	S/G BLWDN CONT. ISOL. OUTSIDE VLV.	4.00	Close	No	Low	Not Susceptible	Yes	see footnote ⁽³⁾	No ⁽³⁾	No ⁽³⁾	Repaired
CNS	1	1BB060A	BB	S/G BLWDN CONT. ISOL. INSIDE VLV.	4.00	Close	No	Low	Not Susceptible	Yes	see footnote ⁽³⁾	No ⁽³⁾	No ⁽³⁾	Repaired
CNS	1	1BB061B	BB	S/G BLWDN CONT. ISOL. OUTSIDE VLV.	4.00	Close	No	Low	Not Susceptible	Yes	see footnote ⁽³⁾	No ⁽³⁾	No ⁽³⁾	Repaired
CNS	1	1CA038A	CA	TURBINE DRIVEN AUX FEEDWATER PMP TO S/G ISOL.	4.00	Close	No	Low	Not Susceptible	Yes	see footnote ⁽³⁾	No ⁽³⁾	No ⁽³⁾	Repaired
CNS	1	1CA042B	CA	MOTOR DRIVEN AUX FEEDWATER PMP B TO S/G ISOL.	4.00	Close	No	Low	Not Susceptible	Yes	see footnote ⁽³⁾	No ⁽³⁾	No ⁽³⁾	Repaired
CNS	1	1CA046B	CA	MOTOR DRIVEN AUX FEEDWATER PMP B TO S/G ISOL.	4.00	Close	No	Low	Not Susceptible	Yes	see footnote ⁽³⁾	No ⁽³⁾	No ⁽³⁾	Repaired
CNS	1	1CA050A	CA	TURBINE DRIVEN AUX FEEDWATER PMP TO S/G ISOL.	4.00	Close	No	Low	Not Susceptible	Yes	see footnote ⁽³⁾	No ⁽³⁾	No ⁽³⁾	Repaired
CNS	1	1CA054B	CA	TURBINE DRIVEN AUX FEEDWATER PMP TO S/G ISOL.	4.00	Close	No	Low	Not Susceptible	Yes	see footnote ⁽³⁾	No ⁽³⁾	No ⁽³⁾	Repaired
CNS	1	1CA058A	CA	MOTOR DRIVEN AUX FEEDWATER PMP A TO S/G ISOL.	4.00	Close	No	Low	Not Susceptible	Yes	see footnote ⁽³⁾	No ⁽³⁾	No ⁽³⁾	Repaired
CNS	1	1CA062A	CA	MOTOR DRIVEN AUX FEEDWATER PMP A TO S/G ISOL.	4.00	Close	No	Low	Susceptible ⁽²⁾	Yes	Yes, ≤0.10	No	Yes	Not Repaired
CNS	1	1CA066B	CA	TURBINE DRIVEN AUX FEEDWATER PMP TO S/G ISOL.	4.00	Close	No	Low	Not Susceptible	Yes	see footnote ⁽³⁾	No ⁽³⁾	No ⁽³⁾	Repaired
CNS	1	1SV025B	SV	S/G PORV BLOCK	6.00	Close	No	Low	Susceptible ⁽²⁾	Yes	No	No	Yes	Not Repaired

**TABLE 1:
CATAWBA NUCLEAR STATION (CNS): ANCHOR DARLING DOUBLE DISC GATE VALVE LISTING (see Reference 3 of the cover letter)**

Plant Name	Unit	Valve ID	System	Valve Functional Description	Valve Size (inches)	Active Safety Function (Open, Close, Both)	Are multiple design basis post-accident strokes required? (Yes/No)	Expert Panel Risk Ranking (High, Medium, Low)	Result of susceptibility evaluation (susceptible or not susceptible)	Is the susceptibility evaluation in general conformance with TP16-1-112r4? (Yes/No)	Does the susceptibility evaluation rely on thread friction? If yes, was the COF greater than 0.10? (No), (Yes, >0.10), (Yes, ≤0.10)	Was an initial stem-rotation check performed? If yes, include rotation criteria (No), (Yes, ≤10 deg.), (Yes, ≤5 deg.)	Was the diagnostic test data reviewed for failure precursors described in TP16-1-112r4? (Yes/ No)	Valve repair status (repaired or not repaired)
CNS	1	1SV026B	SV	S/G PORV BLOCK	6.00	Close	No	Low	Not Susceptible	Yes	see footnote ⁽³⁾	No ⁽³⁾	No ⁽³⁾	Repaired
CNS	1	1SV027A	SV	S/G PORV BLOCK	6.00	Close	No	Low	Susceptible ⁽²⁾	Yes	No	No	Yes	Not Repaired
CNS	1	1SV028A	SV	S/G PORV BLOCK	6.00	Close	No	Low	Not Susceptible	Yes	see footnote ⁽³⁾	No ⁽³⁾	No ⁽³⁾	Repaired
CNS	2	2BB008A	BB	S/G BLWDN CONT. ISOL. INSIDE VLV.	4.00	Close	No	Low	Not Susceptible	Yes	see footnote ⁽³⁾	No ⁽³⁾	No ⁽³⁾	Repaired
CNS	2	2BB010B	BB	S/G BLWDN CONT. ISOL. OUTSIDE VLV.	4.00	Close	No	Low	Not Susceptible	Yes	see footnote ⁽³⁾	No ⁽³⁾	No ⁽³⁾	Repaired
CNS	2	2BB019A	BB	S/G BLWDN CONT. ISOL. INSIDE VLV.	4.00	Close	No	Low	Not Susceptible	Yes	see footnote ⁽³⁾	No ⁽³⁾	No ⁽³⁾	Repaired
CNS	2	2BB021B	BB	S/G BLWDN CONT. ISOL. OUTSIDE VLV.	4.00	Close	No	Low	Not Susceptible	Yes	see footnote ⁽³⁾	No ⁽³⁾	No ⁽³⁾	Repaired
CNS	2	2BB056A	BB	S/G BLWDN CONT. ISOL. INSIDE VLV.	4.00	Close	No	Low	Not Susceptible	Yes	see footnote ⁽³⁾	No ⁽³⁾	No ⁽³⁾	Repaired
CNS	2	2BB057B	BB	S/G BLWDN CONT. ISOL. OUTSIDE VLV.	4.00	Close	No	Low	Not Susceptible	Yes	see footnote ⁽³⁾	No ⁽³⁾	No ⁽³⁾	Repaired
CNS	2	2BB060A	BB	S/G BLWDN CONT. ISOL. INSIDE VLV.	4.00	Close	No	Low	Susceptible ⁽²⁾	Yes	Yes, ≤0.10	No	Yes	Not Repaired
CNS	2	2BB061B	BB	S/G BLWDN CONT. ISOL. OUTSIDE VLV.	4.00	Close	No	Low	Not Susceptible	Yes	see footnote ⁽³⁾	No ⁽³⁾	No ⁽³⁾	Repaired
CNS	2	2CA038A	CA	TURBINE DRIVEN AUX FEEDWATER PMP TO S/G ISOL.	4.00	Close	No	Low	Susceptible ⁽²⁾	Yes	Yes, ≤0.10	No	Yes	Not Repaired
CNS	2	2CA042B	CA	MOTOR DRIVEN AUX FEEDWATER PMP B TO S/G ISOL.	4.00	Close	No	Low	Not Susceptible	Yes	see footnote ⁽³⁾	No ⁽³⁾	No ⁽³⁾	Repaired
CNS	2	2CA046B	CA	MOTOR DRIVEN AUX FEEDWATER PMP B TO S/G ISOL.	4.00	Close	No	Low	Not Susceptible	Yes	see footnote ⁽³⁾	No ⁽³⁾	No ⁽³⁾	Repaired
CNS	2	2CA050A	CA	TURBINE DRIVEN AUX FEEDWATER PMP TO S/G ISOL.	4.00	Close	No	Low	Not Susceptible	Yes	see footnote ⁽³⁾	No ⁽³⁾	No ⁽³⁾	Repaired
CNS	2	2CA054B	CA	TURBINE DRIVEN AUX FEEDWATER PMP TO S/G ISOL.	4.00	Close	No	Low	Not Susceptible	Yes	see footnote ⁽³⁾	No ⁽³⁾	No ⁽³⁾	Repaired
CNS	2	2CA058A	CA	MOTOR DRIVEN AUX FEEDWATER PMP A TO S/G ISOL.	4.00	Close	No	Low	Not Susceptible	Yes	see footnote ⁽³⁾	No ⁽³⁾	No ⁽³⁾	Repaired

**TABLE 1:
CATAWBA NUCLEAR STATION (CNS): ANCHOR DARLING DOUBLE DISC GATE VALVE LISTING (see Reference 3 of the cover letter)**

Plant Name	Unit	Valve ID	System	Valve Functional Description	Valve Size (inches)	Active Safety Function (Open, Close, Both)	Are multiple design basis post-accident strokes required? (Yes/No)	Expert Panel Risk Ranking (High, Medium, Low)	Result of susceptibility evaluation (susceptible or not susceptible)	Is the susceptibility evaluation in general conformance with TP16-1-112r4? (Yes/No)	Does the susceptibility evaluation rely on thread friction? If yes, was the COF greater than 0.10? (No), (Yes, >0.10), (Yes, ≤0.10)	Was an initial stem-rotation check performed? If yes, include rotation criteria (No), (Yes, ≤10 deg.), (Yes, ≤5 deg.)	Was the diagnostic test data reviewed for failure precursors described in TP16-1-112r4? (Yes/ No)	Valve repair status (repaired or not repaired)
CNS	2	2CA062A	CA	MOTOR DRIVEN AUX FEEDWATER PMP A TO S/G ISOL.	4.00	Close	No	Low	Not Susceptible	Yes	see footnote ⁽³⁾	No ⁽³⁾	No ⁽³⁾	Repaired
CNS	2	2CA066B	CA	TURBINE DRIVEN AUX FEEDWATER PMP TO S/G ISOL.	4.00	Close	No	Low	Not Susceptible	Yes	see footnote ⁽³⁾	No ⁽³⁾	No ⁽³⁾	Repaired
CNS	2	2SV025B	SV	S/G PORV BLOCK	6.00	Close	No	Low	Susceptible ⁽²⁾	Yes	No	No	Yes	Not Repaired
CNS	2	2SV026B	SV	S/G PORV BLOCK	6.00	Close	No	Low	Not Susceptible	Yes	see footnote ⁽³⁾	No ⁽³⁾	No ⁽³⁾	Repaired
CNS	2	2SV027A	SV	S/G PORV BLOCK	6.00	Close	No	Low	Susceptible ⁽²⁾	Yes	No	No	Yes	Not Repaired
CNS	2	2SV028A	SV	S/G PORV BLOCK	6.00	Close	No	Low	Not Susceptible	Yes	see footnote ⁽³⁾	No ⁽³⁾	No ⁽³⁾	Repaired

^(A) Applied Wedge Pin Torque must bound anticipated design basis operating torque requirements and current maximum total torque

⁽¹⁾ footnote 1 is not used in Attachment 2.

⁽²⁾ This valve is “susceptible” because a stem-rotation check has not been performed. These MOVs will be repaired per the commitment table.

⁽³⁾ Not applicable for repaired valves (i.e. a wedge-pin analysis, initial stem rotation check, and diagnostic review are not required for repaired valves).

**TABLE 2:
 CATAWBA NUCLEAR STATION (CNS): ANCHOR DARLING DOUBLE DISC GATE VALVE COMMITMENTS**

The following table identifies commitments made in this document. (Any other actions discussed in the submittal represent intended or planned actions. They are described to the NRC for the NRC's information and are not regulatory commitments.)

CATAWBA NUCLEAR STATION COMMITMENT	COMMITTED DATE OR "OUTAGE"	COMMITMENT TYPE	
		ONE-TIME ACTION (Yes/No)	Programmatic (Yes/No)
Repair the following Anchor Darling double disc gate valves to resolve Flowserve's Part 21 dated 2/25/2013 including the updated Part 21 issued 7/11/2017. Unit 1: <u>MOV Numbers</u> 1CA062A, 1SV025B, 1SV027A Unit 2: <u>MOV Number</u> 2BB060A, 2CA038A, 2SV025B, 2SV027A	 <u>Outage</u> C1R24 (Fall 2018)	 Yes	 No
	 <u>Outage</u> C2R22 (Spring 2018)	 Yes	 No

Attachment 3
RA-17-0053

Attachment 3

Oconee Nuclear Station AD DDGV Listing and Commitments

**TABLE 1:
OCONEE NUCLEAR STATION (ONS): ANCHOR DARLING DOUBLE DISC GATE VALVE LISTING (see Reference 3 of the cover letter)**

Plant Name	Unit	Valve ID	System	Valve Functional Description	Valve Size (inches)	Active Safety Function (Open, Close, Both)	Are multiple design basis post-accident strokes required? (Yes/No)	Expert Panel Risk Ranking (High, Medium, Low)	Result of susceptibility evaluation (susceptible or not susceptible)	Is the susceptibility evaluation in general conformance with TP16-1-112r4? (Yes/No)	Does the susceptibility evaluation rely on thread friction? If yes, was the COF greater than 0.10? (No), (Yes, >0.10), (Yes, ≤0.10)	Was an initial stem-rotation check performed? If yes, include rotation criteria (No), (Yes, ≤10 deg.), (Yes, ≤5 deg.)	Was the diagnostic test data reviewed for failure precursors described in TP16-1-112r4? (Yes/ No)	Valve repair status (repaired or not repaired)
ONS	1	1FDW-103	FDW	SG Shell Drain Block Valve	4.00	Close	No	Low	Not Susceptible	Yes	see footnote ⁽³⁾	No ⁽³⁾	No ⁽³⁾	Repaired
ONS	1	1FDW-104	FDW	SG Shell Drain Block Valve	4.00	Close	No	Low	Not Susceptible	Yes	see footnote ⁽³⁾	No ⁽³⁾	No ⁽³⁾	Repaired
ONS	1	1SF-97	SF	Spent Fuel Pool to RC Make Up System Block Inside Containment Isolation	3.00	Both	No	High	Not Susceptible	Yes	see footnote ⁽³⁾	No ⁽³⁾	No ⁽³⁾	Repaired
ONS	2	2FDW-103	FDW	SG Shell Drain Block Valve	4.00	Close	No	Low	Not Susceptible	Yes	see footnote ⁽³⁾	No ⁽³⁾	No ⁽³⁾	Repaired
ONS	2	2SF-97	SF	Spent Fuel Pool to RC Make Up System Block Inside Containment Isolation	3.00	Both	No	High	Not Susceptible	Yes	see footnote ⁽³⁾	No ⁽³⁾	No ⁽³⁾	Repaired
ONS	3	3FDW-103	FDW	SG Shell Drain Block Valve	4.00	Close	No	Low	Not Susceptible	Yes	see footnote ⁽³⁾	No ⁽³⁾	No ⁽³⁾	Repaired
ONS	3	3FDW-104	FDW	SG Shell Drain Block Valve	4.00	Close	No	Low	Not Susceptible	Yes	see footnote ⁽³⁾	No ⁽³⁾	No ⁽³⁾	Repaired
ONS	3	3SF-97	SF	Spent Fuel Pool to RC Make Up System Block Inside Containment Isolation	3.00	Both	No	High	Not Susceptible	Yes	see footnote ⁽³⁾	No ⁽³⁾	No ⁽³⁾	Repaired
⁽¹⁾ footnote 1 is not used in Attachment 3. ⁽²⁾ footnote 2 is not used in Attachment 3. ⁽³⁾ A wedge-pin analysis, stem rotation check, and diagnostic review are not required for repaired valves.														

No commitments are being made for Oconee Nuclear Station.

Attachment 4
RA-17-0053

Attachment 4

Robinson Nuclear Plant AD DDGV Listing and Commitments

**TABLE 1:
ROBINSON NUCLEAR PLANT (RNP): ANCHOR DARLING DOUBLE DISC GATE VALVE LISTING (see Reference 3 of the cover letter)**

Plant Name	Unit	Valve ID	System	Valve Functional Description	Valve Size (inches)	Active Safety Function (Open, Close, Both)	Are multiple design basis post-accident strokes required? (Yes/No)	Expert Panel Risk Ranking (High, Medium, Low)	Result of susceptibility evaluation (susceptible or not susceptible)	Is the susceptibility evaluation in general conformance with TP16-1-112r4? (Yes/No)	Does the susceptibility evaluation rely on thread friction? If yes, was the COF greater than 0.10? (No), (Yes, >0.10), (Yes, ≤0.10)	Was an initial stem-rotation check performed? If yes, include rotation criteria (No), (Yes, ≤10 deg.), (Yes, ≤5 deg.)	Was the diagnostic test data reviewed for failure precursors described in TP16-1-112r4? (Yes/ No)	Valve repair status (repaired or not repaired)
RNP	2	AFW-V2-14A	AFW	SDAFW PUMP FW DISCH TO SG	4	Both	Yes	Medium	Susceptible ⁽²⁾	Yes	No	No	Yes	Not Repaired
RNP	2	AFW-V2-14B	AFW	SDAFW PUMP FW DISCH TO SG	4	Both	Yes	Medium	Susceptible ⁽²⁾	Yes	No	No	Yes	Not Repaired
RNP	2	AFW-V2-14C	AFW	SDAFW PUMP FW DISCH TO SG	4	Both	Yes	Medium	Susceptible ⁽²⁾	Yes	No	No	Yes	Not Repaired
RNP	2	AFW-V2-16A	AFW	AFW HEADER DISCH TO SG	4	Both	Yes	Medium	Susceptible ⁽²⁾	Yes	No	No	Yes	Not Repaired
RNP	2	AFW-V2-16B	AFW	AFW HEADER DISCH TO SG	4	Both	Yes	Medium	Susceptible ⁽²⁾	Yes	No	No	Yes	Not Repaired
RNP	2	AFW-V2-16C	AFW	AFW HEADER DISCH TO SG	4	Both	Yes	Medium	Susceptible ⁽²⁾	Yes	No	No	Yes	Not Repaired
RNP	2	CC-716B	CC	COOLING WATER INLET	6	Close	No	Low	Not Susceptible	Yes	see footnote 3	No ⁽³⁾	Yes	Repaired ⁽⁴⁾
RNP	2	CC-730	CC	BEARING COOLING WATER OUTLET	6	Close	No	Low	Susceptible ⁽²⁾	Yes	No	No	Yes	Not Repaired
RNP	2	CVC-381	CVC	RCP SEAL WATER RETURN	3	Close	No	Low	Not Susceptible	Yes	see footnote 3	Yes, ≤10 deg.	No ⁽³⁾	Repaired ⁽⁴⁾
RNP	2	MS-V1-8A	MS	SG STM SUPPLY TO STM DRIVEN AFW PUMP	2	Both	Yes	Medium	Not Susceptible	Yes	see footnote 3	No ⁽³⁾	No ⁽³⁾	Repaired
RNP	2	MS-V1-8B	MS	SG STM SUPPLY TO STM DRIVEN AFW PUMP	2	Both	Yes	Medium	Not Susceptible	Yes	see footnote 3	No ⁽³⁾	No ⁽³⁾	Repaired
RNP	2	MS-V1-8C	MS	SG STM SUPPLY TO STM DRIVEN AFW PUMP	2	Both	Yes	Medium	Not Susceptible	Yes	see footnote 3	No ⁽³⁾	No ⁽³⁾	Repaired
RNP	2	RHR-752A	RHR	RHR PUMP SUCTION	14	Close	No	Low	Susceptible ⁽¹⁾	Yes	Yes, >0.10	Yes, ≤10 deg.	Yes	Not Repaired
RNP	2	RHR-752B	RHR	RHR PUMP SUCTION	14	Close	No	Low	Susceptible ⁽¹⁾	Yes	Yes, >0.10	Yes, ≤10 deg.	Yes	Not Repaired
RNP	2	SI-860A	SI	CV SUMP RECIRC SUCTION	14	Both	Yes	High	Susceptible ⁽¹⁾	Yes	Yes, >0.10	Yes, ≤10 deg.	Yes	Not Repaired
RNP	2	SI-860B	SI	CV SUMP RECIRC SUCTION	14	Both	Yes	High	Susceptible ⁽¹⁾	Yes	Yes, >0.10	Yes, ≤10 deg.	Yes	Not Repaired
RNP	2	SI-861A	SI	CV SUMP RECIRC SUCTION	14	Both	Yes	High	Susceptible ⁽¹⁾	Yes	Yes, >0.10	Yes, ≤10 deg.	Yes	Not Repaired
RNP	2	SI-861B	SI	CV SUMP RECIRC SUCTION	14	Both	Yes	High	Susceptible ⁽¹⁾	Yes	Yes, >0.10	Yes, ≤10 deg.	Yes	Not Repaired
RNP	2	SI-862A	SI	RHR LOOP RWST ISOL	14	Close	No	High	Susceptible ⁽¹⁾	Yes	Yes, >0.10	Yes, ≤10 deg.	Yes	Not Repaired

**TABLE 1:
ROBINSON NUCLEAR PLANT (RNP): ANCHOR DARLING DOUBLE DISC GATE VALVE LISTING (see Reference 3 of the cover letter)**

Plant Name	Unit	Valve ID	System	Valve Functional Description	Valve Size (inches)	Active Safety Function (Open, Close, Both)	Are multiple design basis post-accident strokes required? (Yes/No)	Expert Panel Risk Ranking (High, Medium, Low)	Result of susceptibility evaluation (susceptible or not susceptible)	Is the susceptibility evaluation in general conformance with TP16-1-112r4? (Yes/No)	Does the susceptibility evaluation rely on thread friction? If yes, was the COF greater than 0.10? (No), (Yes, >0.10), (Yes, ≤0.10)	Was an initial stem-rotation check performed? If yes, include rotation criteria (No), (Yes, ≤10 deg.), (Yes, ≤5 deg.)	Was the diagnostic test data reviewed for failure precursors described in TP16-1-112r4? (Yes/ No)	Valve repair status (repaired or not repaired)
RNP	2	SI-862B	SI	RHR LOOP RWST ISOL	14	Close	No	High	Susceptible ⁽¹⁾	Yes	Yes, >0.10	Yes, ≤10 deg.	Yes	Not Repaired
RNP	2	SI-864A	SI	RWST DISCHARGE	16	Close	No	High	Susceptible ⁽¹⁾	Yes	Yes, >0.10	Yes, ≤10 deg.	Yes	Not Repaired
RNP	2	SI-864B	SI	RWST DISCHARGE	16	Close	No	High	Susceptible ⁽¹⁾	Yes	Yes, >0.10	Yes, ≤10 deg.	Yes	Not Repaired
RNP	2	SI-869	SI	LOOPS "B" AND "C" HOT LEG INJECTION SHUTOFF	3	Both	Yes	Low	Susceptible ⁽¹⁾	Yes	Yes, >0.10	Yes, ≤10 deg.	Yes	Not Repaired
RNP	2	SI-878A	SI	SI PUMP DISCH HDR CROSS-CONN	4	Close	No	Medium	Susceptible ⁽²⁾	Yes	Yes, ≤0.10	No	No ⁽⁵⁾	Not Repaired
RNP	2	SI-878B	SI	SI PUMP DISCH HDR CROSS-CONN	4	Close	No	Medium	Susceptible ⁽¹⁾⁽²⁾	Yes	Yes, >0.10	No	No ⁽⁵⁾	Not Repaired

^(A) Applied Wedge Pin Torque must bound anticipated design basis operating torque requirements and current maximum total torque

⁽¹⁾ As a conservative action, Duke is considering MOVs "Susceptible" if their wedge-pin analysis relies on the presence of thread friction >0.10. See commitment table.

⁽²⁾ These valves are "Susceptible" because a stem-rotation check has not been performed. A wedge pin analysis has been performed. See commitment table.

⁽³⁾ Not applicable for repaired valves (i.e. a wedge-pin analysis, initial stem rotation check, and diagnostic review are not required for repaired valves).

⁽⁴⁾ The stem/wedge connection was torqued in 2013 to a known value (which is greater than the operating loads). The stem has an integral backseat. The pin and thread friction are not relied upon.

⁽⁵⁾ There is no test data to trend. These valves were not Program Valves prior to now.

COMMITMENT	COMMITTED DATE OR "OUTAGE"	COMMITMENT TYPE	
		ONE-TIME ACTION (Yes/No)	Programmatic (Yes/No)
Replace the following Anchor Darling double disc gate valves with a different valve design to resolve Flowserve's Part 21 dated 2/25/2013 including the updated Part 21 issued 7/11/2017. Unit 2: <u>MOV Number</u> AFW-V2-14A AFW-V2-14B AFW-V2-14C SI-869	<u>Outage(Year)</u> R2R31 (2018) R2R31 (2018) R2R31 (2018) R2R31 (2018)	Yes Yes Yes Yes	No No No No