



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

REGION IV
1600 EAST LAMAR BOULEVARD
ARLINGTON, TEXAS 76011-4511

July 14, 2021

Ms. Maria Lacal, Executive Vice President
and Chief Nuclear Officer
Arizona Public Service Company
P.O. Box 52034, MS 7602
Phoenix, AZ 85072-2034

SUBJECT: PALO VERDE NUCLEAR GENERATING STATION – DESIGN BASIS
ASSURANCE INSPECTION (PROGRAMS) INSPECTION REPORT
05000528/2021014 AND 05000529/2021014 AND 05000530/2021014

Dear Ms. M. Lacal:

On June 9, 2021, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Palo Verde Nuclear Generating Station and discussed the results of this inspection with you and other members of your staff. The results of this inspection are documented in the enclosed report.

No findings or violations of more than minor significance were identified during this inspection.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at <http://www.nrc.gov/reading-rm/adams.html> and at the NRC Public Document Room in accordance with Title 10 of the *Code of Federal Regulations* 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

David Proulx, Acting Branch Chief
Engineering Branch 1
Division of Reactor Safety

Docket Nos. 05000528 and 05000529 and 05000530
License Nos. NPF-41 and NPF-51 and NPF-74

Enclosure:
As stated

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PALO VERDE NUCLEAR GENERATING STATION – DESIGN BASIS ASSURANCE
 INSPECTION (PROGRAMS) INSPECTION REPORT 05000528/2021014 AND
 05000529/2021014 AND 05000530/2021014 – DATED JULY 14, 2021

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DATE	7/13/2021	7/13/2021	7/13/2021	7/14/2021	7/13/2021	7/14/2021

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**U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report**

Docket Numbers: 05000528, 05000529 and 05000530

License Numbers: NPF-41, NPF-51 and NPF-74

Report Numbers: 05000528/2021014, 05000529/2021014 and 05000530/2021014

Enterprise Identifier: I-2021-014-0000

Licensee: Arizona Public Service Company

Facility: Palo Verde Nuclear Generating Station

Location: Tonopah, AZ

Inspection Dates: May 10, 2021 to May 28, 2021

Inspectors: J. Braisted, Reactor Inspector
W. Cullum, Reactor Inspector
R. Kopriva, Senior Reactor Inspector

Approved By: David Proulx, Acting Branch Chief
Engineering Branch 1
Division of Reactor Safety

Enclosure

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee's performance by conducting a design basis assurance inspection (programs) inspection at Palo Verde Nuclear Generating Station, in accordance with the Reactor Oversight Process. The Reactor Oversight Process is the NRC's program for overseeing the safe operation of commercial nuclear power reactors. Refer to <https://www.nrc.gov/reactors/operating/oversight.html> for more information.

List of Findings and Violations

No findings or violations of more than minor significance were identified.

Additional Tracking Items

None.

INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at <http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html>. Samples were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards. Starting on March 20, 2020, in response to the National Emergency declared by the President of the United States on the public health risks of the coronavirus (COVID-19), inspectors were directed to begin telework. In addition, regional baseline inspections were evaluated to determine if all or a portion of the objectives and requirements stated in the IP could be performed remotely. If the inspections could be performed remotely, they were conducted per the applicable IP. In some cases, portions of an IP were completed remotely and on site. The inspections documented below met the objectives and requirements for completion of the IP.

REACTOR SAFETY

71111.21N.02 - Design-Basis Capability of Power-Operated Valves Under 10 CFR 50.55a Requirements

POV Review (IP Section 03) (12 Samples)

The inspectors:

- a. Determined whether the sampled POVs are being tested and maintained in accordance with NRC regulations along with the licensee's commitments and/or licensing bases.
- b. Determined whether the sampled POVs are capable of performing their design-basis functions.
- c. Determined whether testing of the sampled POVs is adequate to demonstrate the capability of the POVs to perform their safety functions under design-basis conditions.
- d. Evaluated maintenance activities including a walkdown of the sampled POVs (if accessible).

- (1) Unit 1 Motor-Driven Auxiliary Feedwater Pump to Steam Generator 1 Flow Control Valve 1JAFBHV0030
- (2) Unit 1 Nuclear Cooling Water Supply to Reactor Coolant Pump Cooler Outboard Containment Isolation Valve 1JNCAUV0402
- (3) Unit 1 Steam Generator 1 Steam Supply to Auxiliary Feed Pump Turbine Isolation Valve (Penetration 2) 1JSGAUV0134
- (4) Unit 2 Chemical Volume and Control System Letdown from Regenerative Heat Exchanger Outboard Containment Isolation Valve (Penetration 40) 2JCHBUV0523
- (5) Unit 2 Refueling Water Tank Outlet Isolation Valve 2JCHBHV0530
- (6) Unit 2 Safety Injection System Containment Sump to Safety Injection Pump Suction Inboard Containment Isolation Valve (Penetration 24) 2JSIBUV0675
- (7) Unit 3 Auxiliary Feedwater Turbine Driven Auxiliary Feedwater Pump to Steam Generator 1 Isolation Valve (Penetration 75) 3JAFUCV0036

- (8) Unit 3 Motor-Driven Auxiliary Feedwater Pump to Steam Generator 2 Isolation Valve 3JAFBUV0035
- (9) Unit 1 Main Steam, Steam Generator 2, Economizer Feedwater Downstream Isolation Valve (Penetration 10) 1JSGBUV0137
- (10) Unit 2 Chemical Volume and Control System Auxiliary Pressurizer Spray Valve 2JCHAHV0205
- (11) Unit 2 Auxiliary Feedwater Steam Generator 2 Steam Supply to Auxiliary Feed Pump Turbine Isolation Valve (Penetration 3) 2JSGAUV0138
- (12) Unit 3 Safety Injection Containment Spray Control Valve and Outboard Containment Isolation Valve (Penetration 21) 3JSIAUV0672

INSPECTION RESULTS

No findings were identified.

EXIT MEETINGS AND DEBRIEFS

The inspectors verified no proprietary information was retained or documented in this report.

- On June 9, 2021, the inspectors presented the Exit Meeting inspection results to Ms. M. Laca, Vice President / Chief Nuclear Officer and other members of the licensee staff.

DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.21N.02	Calculations	01-EC-MA-0221	AC Distribution	14
		01-EC-PK-0207	DC Battery Sizing and Minimum Voltage	9
		01-J-ZZI-0004	Controlled Motor Operator Database	33
		02-EC-MA-0221	AC Distribution	14
		02-J-ZZI-0006	Controlled - Air Operated Valve Setpoint Database	15
		03-EC-MA-0221	AC Distribution	12
		03-EC-PK-0207	DC Battery Sizing and Minimum Voltage	8
		03-J-ZZI-0004	Controlled Motor Operator Data Base	33
		13-JC-CH-0102	Air Operated Valve (AOV) Setting Calculation for Letdown to Regen HX Isolation Valves and Regenerative Heat Exchanger Outlet Isolation Valves	000
		13-JC-ZZ-0300	Motor Operated Valve Thrust and Torque Calculation for 13JAFBUIV0034 and 13JAFBUIV0035	1
		13-JC-ZZ-0301	Motor Operated Valve Thrust and Torque Calculation for 13JAFUIV0036 and 13JAFUIV0037	2
		13-JC-ZZ-0304	Motor Operated Valve Thrust and Torque Calculation for 13JCHBHV0530 and 13JCHBHV0531	1
		13-JC-ZZ-0306	Motor Operated Valve Thrust and Torque Calculation for 13JSGAUIV0134 and 13JSGAUIV0138	0
		13-JC-ZZ-0311	Motor Operated Valve Thrust and Torque Calculation for 13JSIBUIV0671 and 13JSIAUIV0672	3
		13-JC-ZZ-0400	Motor Operated Valve Thrust and Torque Calculation for 13JAFBHV0030 and 13JAFBHV0031	1
		13-JC-ZZ-0503	Motor Operated Valve Torque Calculation for 13JNCBUIV0401, 13JNCAUIV0402 and 13JNCBUIV0403	1
		13-JS-A41	Technical Study to Support G.L. 89-10 MOV Program	04/20/2007
		13-MC-AF-0401	AFW System - MOV Maximum Differential Pressure	5
		13-MC-AF-0800	Auxiliary Feedwater ESF Function Response Times	8
		13-MC-CH-0604	Maximum Differential Pressure Calculation for Chemical Volume Control System Air-Operated Valves (AOVs) 13JCHAUIV0506,	0

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			13JCHAUV0516, 13JCHBUV0505, 13JCHBUV0515, and 13JCHBUV0523	
		13-MC-CH-0604	Maximum Differential Pressure Calculation for Chemical Volume Control System Air-Operated Valves (AOVs) 13JCHAUV0506, 13JCHAUV0516, 13JCHBUV0505, 13JCHBUV0515, and 13JCHBUV0523.	0
		13-MC-CH-326	Stress Evaluation of Air-Operated Valves	1
		13-MC-NC-301	MOV Program Support - Valves UV-401, UV-402, and UV-403	4
		13-MC-SG-0811	Maximum Differential Pressure Across MOVs SG-134/138 and AF-54	3
		13-MC-SG-0811	Maximum Differential Pressure Across MOVs SG-134/138 and AF-54	3
		13-MC-XM-0500	MOV Bolt Torque Calculation	11
		13-MC-ZZ-0216	Air Operated Valve Bench Set Calculation	7
		13-MC-ZZ-0217	Gate Valve Open Thrust Required During Potential Pressure Locking Conditions	7
		13-MS-B007	Evaluation of Dynamic Performance Parameters for Generic Letter GL 89-10	11/12/2010
		13-MS-B075	Motor Operated Valve (MOV) Valve Factors	0
		13-MS-B076	Motor Operated Valve (MOV) Rate of Loading	0
		13-VTD-A391-0020	Anchor Darling FWIV and MSIV Accumulator Minimum and Maximum Nitrogen Precharge Pressures Based on Accumulator Temperature	1
		J601A-00246	CCI MOV Weak-Link and Thrust Analysis	3
		J605-00106	Stress Report for 10" NXL W/SMB0005-H1BC	5
		J605-00201	Engineering Analysis of Torque Requirements for Butterfly Valves	3
		M234A-00157	Stress Analysis End Load Calculations for Gate Valve	0
		N001-0701-00174	A Maximum Line/DP Cases for CVCS	3
		N001-2101-00094	Thrust, Torque and Limiting Component Report, Carbon Steel & Stainless Steel Motor Operated Gate & Globe	10

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			Valves	
		P221B-00609	Valve Data Sheets and Maximum Thrust Analysis for Anchor/Darling Valves	6
		P221B-00609	Valve Data Sheets and Maximum Thrust Analysis	6
		P221B-00657	Analysis of Retrofit Trim	3
		P221B-00657	Anchor Darling Analysis of Retrofit Trim (Weak link)	B
	Corrective Action Documents	Condition Report (CR)	21-02176, 16-04430, 17-04425, 18-07812, 18-17231, 19-05506, 20-08224, 20-14853, 21-02537, 20-04719, 21,03579, 18-03063, 18-05620, 16-16105, 19-06087	
	Corrective Action Documents Resulting from Inspection	Condition Report (CR)	21-06133, 21-06365, 21-06625	
	Drawings	01-M-AFP-001	Auxiliary-Feedwater System	45
		01-M-AFP-001	P & I Diagram, Auxiliary - Feedwater System	45
		01-M-NCP-003	Nuclear Cooling Water System	13
		01-M-SGP-001	P & I Diagram - Main Steam System	72
		01-N001-1104-00282	24 Inch Class 150 Wafer Valve Assembly SI-673, 675 V-CE-16690 30JN82	10
		01-N001-1104-00282	24" CLASS 150 WAFER VALVE ASSY SI-673,675 V-CE-16690 30JN82	10
		02-M-CHP-001	P & I Diagram - Chemical and Volume Control System	38
		02-M-SIP-001	P & I Diagram - Safety Injection & Shutdown Cooling System	55
		02-N001-1104-00274	24 inch Class 150 Wafer Valve Assembly SI-UV-673 and 675	8
		02-N001-1104-00274	24" CLASS 150 WAFER VLV ASSY. SI-UV-673 &675	8
03-M-AFP-001		P & I Diagram - Auxiliary-Feedwater System	31	
03-N001-1104-00275		24 Inch Class 150 Wafer Valve Assembly SI-UV-673 and 675	8	
08-E-CHB-029	RWT to Train Safety Injection System Valve 2J-CHA-HV-531	3		

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		13-10407-P221B-137	6 inch - 900 pound, Gate Valve, Pressure Seal-Butt Wied Ends, Double Packing- SMB-1 Motor Operator	N
		13-M234A-00047	Feed Water Isolation Valve With A/DV Hydraulic Actuator	16
		13-N001-1104-00006	2 BODY 60 ACTUATOR 667 DBQ DIAPHRAGM ACTUATED CONTROL VALVE	12
		M234A-00156	Flowserve Corporation Anchor Darling Hydraulic Manifold Assembly Exploded View	0
		P221B-00137	6 inch 900 pound Gate Valve Cast Stain Steel	M
		P221B-00137	6 Inch 900 Pound Gate Valve - Cast Stain Steel	N
	Engineering Changes	2005-00965	The Purpose of This EDC Is to Provide New Setpoint Limits for the MOV Actuator Open Torque Switch Bypass Limit Switch for MOV 1JAFBHV0030	10/10/2008
		2006-01122	Update Documents to Reflect the Rewiring of the Actuator to Disconnect the Torque Switch on Valve 1JNCAUV0402	03/08/2007
		2009-01216	Modify Duration of Close Torque Switch Bypass to Approximately 98% Of the Stroke for 1JSIAHV0698	12/17/2010
		2009-01225	Modify duration of close torque switch bypass to approximately 98% of the stroke for valves 1/2/3JAFBHV0034, 1/2/3JAFBHV0035, 1/2/3JAFBHV0036, 1/2/3JAFBHV0037, 1/2/3JSIAHV0698, 1/2/3JSIBHV0699, 1/2/3JCHNUV0501	3
		2011-00261	Modification to Prevent Pressure Locking of High Risk Unit 3 AF Motor Operated Valves (AF-35)	04/20/2012
		2011-00522	MOV Thrust, Torque, and Actuator Sizing Calculation 13-JC-ZZ-0201 was replaced with a series of calculations known as the MIDAS Calculations as defined in EDC 2011-00139, and 13-JC-ZZ-0201 is referenced in various AF, CT, and WC Calculations. ACTs 3637913, 3637878, and 3638195 track the impact to update the references associated with the AF, CT, and WC Calculations, respectively. This PO EDC implements the updates to these calculations.	2

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		2012-00390	The Purpose of This Paper Only Change Is to Address CRDR 4030986 and CRAI 4030988	06/15/2012
		2012-00390	In CRDR 4030986, the original intent of the pressure locking calculation, 13-MC-ZZ-0217, was to control the required opening force by limiting the peak cracking value for pressure locking susceptible valves	06/15/2012
		2017-00382	Update Calculation 13-JC-ZZ-0503 to Incorporate Voltages From 13-EC-MA-0221 per AI 09-00197-068 and EWR 17-04348-001	1
	Miscellaneous	13-J-083-080	Valve Data Sheet	0
		13-JN021-A043-1	A-C/D-C Motor Performance Curves	04/22/1991
		13-N001-2101-34-10	Project Specification for Solenoid Operated Valves	5
		13-VTD-L200-0020-1	Limatorque Maintenance Update on Nuclear Qualified Limit and Torque Switches	0
		13-VTD-P340-0003-1	Pratt Valves Application Procedure Forrust-Veto MP [PUB.# A-691 3].	0
		13-VTD-P340-O01 6-2	Pratt Valves Rubber Seat Butterfly Vales, Valve Shaft Packing Instructions.	2
		3-VTD-R165-0016-2	Lubrication of Anti-Friction Bearings in Reliance Electric Motors [PUS. # A-381 I-7].	2
		AF STM	System Training Manual, Volume 21, Auxiliary Feedwater System (AF)	7
		AF STM	System Training Manual, Volume 21, Auxiliary Feedwater System (AF)	7
		CH DBM	Chemical and Volume Control System Design Basis Manual	26
		CH STM	System Training Manual, Volume 41, Chemical and Volume Control System (CH)	7
		D2014-0017	Removal of EQ Equipment in Zone ME from the EQL	06/11/2014
EEQ-L200-001	Electrical Equipment Qualification Data File, Reliance Class H/RH & Class F Type LR AC Motors and Limatorque SB/SMB/SMC Series Valve Actuators	27		

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		EEQ-L200-001	Electrical Equipment Qualification Data File - Reliance Class H/RH & Class F Type LR AC Motors and Limitorque SB/SMB/SMC Series Valve Actuators	27
		EEQ-L200-002	Electrical Equipment Qualification Data File - Peerless Class RH 125 VDC Motor used on SB and SMB Actuators	18
		EEQ-L200-003	Electrical Equipment Qualification Data File - Class B, AC Reliance, Electric Apparatus or Paramount Motors used with SMB/SB or SMC-04 Valve Actuators	16
		EEQ-T020-002	Electrical Equipment Qualification Data File - Solenoid Operated Valve (SOV), 82EE-001 & 76HH Series with Soft Seats and 98F-002 with Hard Seats	15
		JN021-A00043-1	A-C and D-C Motor Performance Curves.	04/19/1991
		MIDAS-APS VER 2009.29 VVTR	MIDAS-APS Verification and Validation Plan Results	1
		NC DBM	Design Basis Manual, Nuclear Cooling Water System	21
		SG STM	System Training Manual, Volume 9, Main Steam System (SG)	3
		SI STM	System Training Manual, Volume 40, Safety Injection System (SI)	4
		VTD-A381-00004	Spare Parts Ordering Instructions for Anchor darling 2 1/2 Inch and Larger Valves	12/28/1992
		VTD-A391-00003	Vendor Document: Anchor/Darling Operation-Maintenance Instruction for 2 1/2" and Larger Nuclear Service Valves [PUB. # 4162-1].	8
		VTD-C600-0005	Vendor Document: Control Components Inc. Main Feedwater Bypass Valves Maintenance Manual	2
		VTD-F130-00017	Vendor Document: Fisher Instruction Manual For Design DBQ and DBAQ Control Valves [PUB. # 1799].	3
		VTD-F130-00070	Vender Document: Fisher Instruction Manual for Type 667 Diaphragm Actuator Sizes 30-76 & 87 [PUB. # 1203]	10
		VTD-F130-00073	Vendor Document: Fisher Instruction Manual for Type 667 Diaphragm Actuator Sizes 80 & 100 [PUB.# 1432]	03

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		VTD-L200-00003	instruction and Maintenance Manual for Limitorque Type SMB Valve Operators (PUB. #SMBI-82D).	4
		VTD-L200-0021	Maintenance Update on Hydraulic Lock of Limitorque Valve Actuators [PUB. # 88-2].	0
		VTD-L200-0036	Limitorque Technical Update Concerning Kalsi Engineering Document # 1707-C	0
		VTD-L200-0039	Limitorque Technical Update 92-02, Recommended Spring Pack Replacement for SMB Actuators	0
		VTD-P340-O005-1	Pratt Valves Bonded Seat Valves Application Procedure Chemglaze Z-306 [PUB. # A-6217].	0
		VTD-R165-0010	Vendor Document: Instruction Manual for Fractional Horsepower Duty Master A-C Motors	0
		VTD-R165-0016	Vendor Document: Lubrication of Anti-Friction Bearings in Reliance Electric Motors	2
	Procedures	39MT-9ZZ02	PM or EQ Inspection of the Limitorque SMB/SB/SMC Motor Operated Valve Actuators	34
		73DP-9XI01	Pump and Valve Inservice Testing Program	40
		73DP-9ZZ12	Motor Operated Valve (MOV) Program	20
		73DP-9ZZ13	Motor Operated Valve - Thrust and Torque Calculations	5
		73DP-9ZZ18	Motor Operated Valve - Post Test Evaluations	7
		73DP-9ZZ20	Air Operated Valve Program	14
		73DP-9ZZ20-01	Air Operated Valve Thrust and Torque Calculation	0
		73DP-9ZZ20-03	Air Operated Valves - Post Test Evaluations	1
		73DP-9ZZ23	Final JOG MOV Verification Program Implementation	2
		73ST-9AF02	Aux Feedpump AFA-P01 Trip and Throttle Valve	09/30/2020
		73ST-9X134-1	Steam Supply Valves Inservice Test (AFA-P01)	12/04/2012
		73ST-9XI16	Economizer FWIVs - Inservice Test	39
		73ST9XI411	Stroke Timing SGAUV134/134A/138/138A in Unit 1	04/06/2019
	Self-Assessments	20-16281-002	Power Operated Valve Self-Assessment	02/26/2021
		4608114	USA/STARS MOV Engineering Program Self-Assessment	03/06/2015
	Work Orders	Work Order (WO-)	5122472, 5152588, 5182251, 4289107, 5070140, 4718303, 3799194, 4731181, 3084385, 4434578, 4962760, 4965375, 2855334, 4789076, 4969579, 5152723, 2840636, 5161715, 5135177, 5059533,	

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			3588553, 3197094, 5151546, 4795821, 4965371, 5086895, 4732562, 4911657, 5139359, 5166757, 5197994, 4732939, 4877254, 5054804, 4866084, 4912257, 5087908, 4371624, 4965354, 3082998, 3799194, 4731181, 3289898, 3460729, 4538355, 3423339, 3989910, 4648818, 4965354, 4371624,	