



Request for Partial Exemption from 10 CFR 50.62(c)(1) Risk-Informed Process for Evaluations (RIPE) Pre-Submittal Meeting

Palo Verde Nuclear Generating Station (PVNGS)

September 1, 2021

Agenda

- Introduction
- Issue Description
- Design Features
- RIPE Screening Results
- Risk Insights
- Schedule



Issue Description

- 10 CFR 50.12 partial exemption from 10 CFR 50.62(c)(1) using RIPE process to remove the Diverse Auxiliary Feedwater Actuation System (DAFAS) from the PVNGS licensing basis
 - ... must have equipment *from sensor output to final actuation device, that is diverse from the reactor trip system, **to automatically initiate the auxiliary (or emergency) feedwater system** and initiate a turbine trip under conditions indicative of an ATWS...*
- Diverse turbine trip and diverse scram system are unaffected by this request
- DAFAS not credited in UFSAR Chapter 6 and 15 safety analyses
- DAFAS is a Modicon Programmable Logic Controller (PLC 984-685) based system
 - Obsolete and not supported by the vendor
- DAFAS is a unique, proprietary design
 - Spare parts are not readily available
 - Maintenance requires significant engineering resources to reverse engineer components
 - Frequent fiber optic communication problems affecting system availability



Design Features

- Reactor Protection System (RPS)
 - 4 channels with 15 Trip parameters
 - Core Protection Calculator, Steam Generator (SG) Low Level, and High Pressurizer Pressure Trips provide sufficient protection from an ATWS event
- Engineered Safety Features Actuation System (ESFAS)
 - Provides AFAS-1 and AFAS-2 on receipt of Low SG level signal
- Supplementary Protection System (SPS)
 - 4-channel safety related Diverse Scram System
 - Trips on high pressurizer pressure
 - Opens Reactor Trip Circuit Breakers and Motor Generator set load output contactors
 - Exceeds 10 CFR 50.62 requirements
- Diverse Turbine Trip
 - Trip on control element drive mechanism power bus undervoltage (SPS trip interrupts power to this bus)



RIPE Screening Results

- Applicable guidance documents:
 - NEI 21-01, *Industry Guidance to Support Implementation of NRC's Risk-Informed Process for Evaluations*, April 2021
 - NRC Guidelines for Characterizing the Safety Impact of Issues, June 2021
 - TSG-DORL-2021-01 – NRR Temporary Staff Guidance, *Risk-Informed Process for Evaluations*, January 2021
- PVNGS has implemented Risk-Informed Completion Times [ML19085A525] and 10 CFR 50.69 [ML18243A280]
 - APS qualifies to use the RIPE process
- Issue screened in as adverse, but minimal impact on safety



Risk Insights

A plant specific risk assessment was conducted

- DAFAS screened out from PVNGS PRA model
 - DAFAS function is to actuate Auxiliary Feedwater if ESFAS fails
 - ESFAS Auxiliary Feedwater Actuation Signal is a two out-of-four channel actuation system
 - DAFAS determined to have minimal benefit ensuring Auxiliary Feedwater actuated
- Bounding surrogates used for the relative change in risk
- No risk management actions are required to offset the risk



Risk Insights

The PRA model used reflected the following:

- Fully compliant internal events, flooding, fire and seismic PRA models
- All Other External Hazards listed in RG 1.200, Revision 3, screened out
- Addressed all NRC license conditions from the 10 CFR 50.69 and RICT License Amendments
- No open finding level Facts and Observations (F&Os)
- No newly developed methods
- No additional key assumptions or sources of uncertainty
- PRA model fully compliant with NRC RG 1.200, Revision 3



Risk Insights

Case	CDF	LERF
PVNGS Baseline	$5.5 \times 10^{-5}/\text{year}$	$9.5 \times 10^{-6}/\text{year}$
PVNGS DAFAS Sensitivity	$5.5 \times 10^{-5}/\text{year}$	$9.5 \times 10^{-6}/\text{year}$
Increase in Risk between Baseline & DAFAS Sensitivity	$3.2 \times 10^{-9}/\text{year}$	$5.9 \times 10^{-11}/\text{year}$
NEI 21-01 Acceptance Guideline	$1.0 \times 10^{-7}/\text{year}$	$1.0 \times 10^{-8}/\text{year}$
NRC RG 1.174 Acceptance Guideline	$1.0 \times 10^{-4}/\text{year}$	$1.0 \times 10^{-5}/\text{year}$

Therefore, removing DAFAS from the licensing basis is not risk-significant and has a minimal impact on safety.



Schedule

- Completed a challenge board with NEI on June 24, 2021
- Pre-submittal meeting on September 1, 2021
- Integrated Decision-Making Panel planned for September
 - NRC requested to observe
- Planned submittal early October 2021
- Discuss NRC approval schedule

