Southern Nuclear

Hatch Risk-Informed One-Time Technical Specification Completion Time Extension

June 10, 2020

Agenda Items

1. Introductions
2. Meeting Kick-off
3. Purpose HNP EDG Risk Informed One-Time Completion Time Extension
4. Overview of HNP Electrical System
5. Deterministic and Defense in Depth Aspects
6. HNP PRA
7. Proposed License Amendment Request Content

Purpose HNP EDG Risk Informed One-Time Completion Time Extension

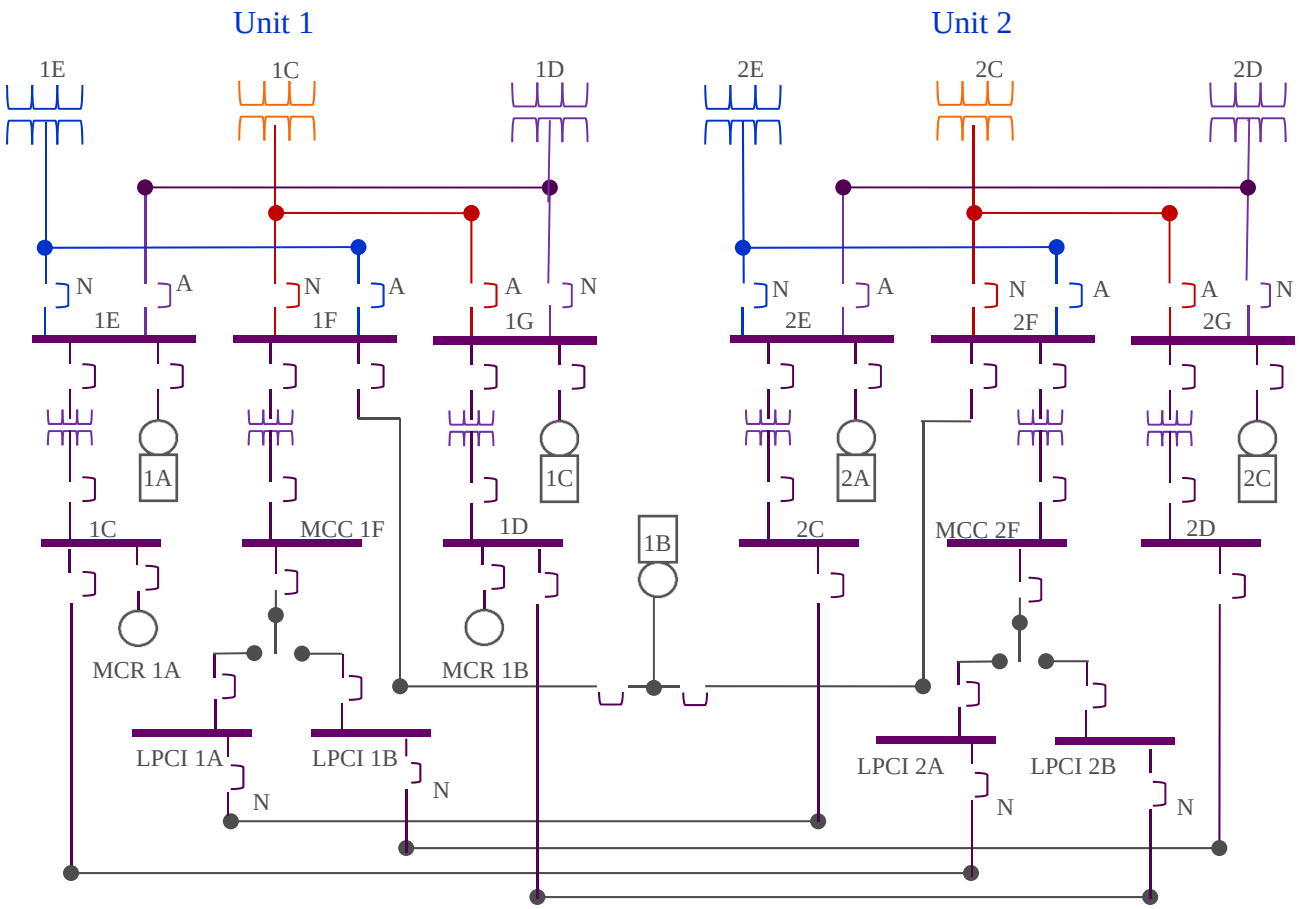
Purpose

- HNP Technical Specifications (TS) currently allow up to 14 days allowable outage time (AOT) for a single EDG.
- Fall and Spring upcoming EDG outages include cylinder liner replacements and a full teardown of each HNP Unit 1 EDG and the swing EDG.
- The current schedules show greater than 75% of the AOT being used to complete the work.
- COVID-19 impacts such as social distancing requirements further increase the chance of exceeding the AOT.
- To be proactive SNC proposes an expedited LAR to support a risk-informed one-time EDG Completion Time extension for both Unit 1 EDGs and the swing EDG instead of processing a risk-informed emergency TS change during an EDG outage.

Proposal

- SNC proposes a one-time allowance for each Unit 1 EDG and the swing EDG to extend the AOT.
  - Will allow for margin to account for unforeseen EDG material degradations/repairs.
  - Risk impact of requested change will be evaluated and shown to meet the risk metrics of RG 1.174 and RG 1.177.
  - Will require existing maintenance restrictions to be met and will require swing EDG inhibited from aligning to Unit 2 (for 1A & 1C outages) during extended AOT.

Overview of HNP Electrical System



Simplified HNP Electrical System

HNP Electrical Offsite Power System Overview

- With the recent installation of an additional startup auxiliary transfer (SAT) on each unit, the HNP offsite circuit design is robust and highly reliable.
- Offsite power is supplied to the station from the 230kV ring bus by five electrically and physically separate feeds through startup auxiliary transformers (SATs) 1C and 2C (via a common switchyard feed), 1D, 1E, 2D, and 2E, to the respective unit 4.16 kV ESF buses E, F, and G.
- Each SAT provides the normal source of power to its respective ESF bus. If any 4.16 kV ESF bus loses power, an automatic transfer occurs from the normal offsite power source to its alternate offsite power source.

HNP Electrical Offsite Power System Overview

- By design, no single SAT can supply more than two ESF buses simultaneously.
- The SATs are sized to accommodate the simultaneous starting of all required ESF loads on receipt of an accident signal without the need for load sequencing.
- Only one SAT per unit is required to supply two ESF buses, which are sufficient to provide the required safety functions and support shutdown and cooldown to cold conditions.

HNP Electrical Onsite Emergency Power System Overview

- Each HNP unit is designed with three ESF buses (E, F, and G). The E and G buses contain most of the divisional equipment and the F (or swing) bus contains some divisional equipment from both electrical divisions (e.g., an RHR pump from each RHR loop).
  - Emergency power is supplied by independent EDGs with the E and G buses supplied by a unit EDG and the swing EDG can be selected to either F bus on either unit. The swing EDG cannot supply both F buses simultaneously.
  - Any two of three ESF buses per unit can fully provide the required safety functions and support shutdown and cooldown to cold conditions and remain in cold shutdown conditions for 30 days.

HNP Unit 1 and 2 Loads

4160 V 2E

2A PSW Pump
2A RHR Pump
2A Core Spray Pump
2A RHRSW Pump
2A Drywell Chiller Motor
600 V xfrm 2C
  2A SGT

4160 V 2F

2C PSW Pump
2D PSW Pump
2C RHR Pump
2D RHR Pump
2C RHRSW Pump

4160 V 2G

2B PSW Pump
2B RHR Pump
2B Core Spray Pump
2B RHRSW Pump
2D RHRSW Pump
2B Drywell Chiller Motor
600 V xfrm 2D
  2B SGT

4160 V 1E

1A PSW Pump
1A RHR Pump
1A Core Spray Pump
1A RHRSW Pump
600 V xfrm 1C
  1A SGT
  A MCR Chiller
  A MCREV

4160 V 1F

1C PSW Pump
1D PSW Pump
1C RHR Pump
1D RHR Pump
1C RHRSW Pump

4160 V 1G

1B PSW Pump
1B RHR Pump
1B Core Spray Pump
1B RHRSW Pump
1D RHRSW Pump
600 V xfrm 1D
  1B SGT
  B MCR Chiller
  B MCREV

Deterministic and Defense in Depth Aspects

Reliable Offsite Sources

- Since each ESF bus is supplied by its respective SAT and each SAT has an independent line to the ring bus, except SAT 1C and 2C, which share a common feeder line, it is highly unlikely that a full loss of all offsite power will occur during an extended EDG outage.
  - A single feeder line failure will result in loss of no more than one ESF bus per unit thereby relying on the start of one EDG per unit.
  - Any two ESF buses per unit are adequate to support shutdown and cooldown of each unit.
  - During the EDG extended outage, loss of power to a single offsite feeder line concurrent with an additional EDG failure will not result in loss of more than one ESF bus per unit; two ESF buses per unit will remain available to support unit shutdown and cooldown.

Three Onsite EDG Sources

- A typical standard plant electrical system design arrangement consists of two ESF buses with one EDG supplying each bus. With one EDG in an extended outage, an additional EDG failure would result in a loss of both AC electrical power divisions in the event of a full loss of offsite power.
- The HNP electrical power design is such that a single ESF bus provides a portion of at least one electrical power division. Any combination of two ESF buses is adequate to provide the plant safety functions. Two buses provide power to either one electrical power division or a portion of both divisions that is at least equivalent to one division.
- In the highly unlikely event of a full loss of the Georgia grid system during an extended EDG outage with an additional EDG failure, at least one ESF bus per unit will continue to be available to support shutdown and cooldown of each unit.
  - In this highly unlikely scenario, at least one RHR pump and one RHRSW pump per unit would be available to cooldown its respective unit to cold conditions, although it would not meet the cooldown time period specified in RG 1.139.

Defense in Depth Aspects

- SNC is not planning to acquire and temporarily install an alternate AC source.
- To minimize the likelihood of a full loss of offsite power to a unit, SNC plans to:
  - protect all six SATs and maintain in service and aligned to their respective ESF buses for the duration of the extended EDG outage.
  - ESF bus automatic transfer capability from the normal to the alternate circuit will be maintained for each ESF bus on both units.
- No maintenance or testing will be scheduled in the HNP 500 kV or 230kV switchyard that could affect the stability of the of the feeder lines to the HNP SATs.
- No maintenance or testing will be scheduled that could affect the availability of the FLEX DGs.
- All remaining HNP EDGs will be protected, available, and maintained OPERABLE for the duration of the extended EDG outage; testing of the remaining EDGs will be limited to that only required by Technical Specifications.

Defense in Depth Aspects

- No maintenance will be scheduled on any equipment needed to support shutdown and cooldown of both HNP units in the event of a full loss of offsite power.
- Both HPCI and RCIC will be protected, available, and maintained OPERABLE for the duration of the extended EDG outage.

HNP PRA

RG 1.177, Principle 4

When the proposed licensing basis changes result in an increase in risk, the increases should be small and consistent with the intent of the Commission's policy statement on safety goals for the operations of nuclear power plants.

Hatch PRA Acceptability

- Hatch has PRA models for Internal Events, Internal Flooding, Internal Fires, and Seismic.
- All Hatch PRA models used for this request reflect the current as-built as-operated plant and have been peer reviewed and all F&Os are closed.
- Screening evaluation for other hazards will be reviewed to confirm that no assumptions about diesels impact the screening.
- The PRA models contain a high level of detail for the safety related electrical power supplies, including common cause groupings and human reliability events.

PRA Analysis

- The PRA analysis will demonstrate compliance with RG 1.177.
- Metrics to be used will be total CDF and LERF, and ICCDP/ILERP as discussed for one-time changes in RG 1.177 section 2.4
- It is expected that the results will fall in the range requiring compensatory actions such as prohibited maintenance and additional controls in fire areas.
- Existing restrictions associated with the 14 day LCO will be the starting point for any additional risk management actions.
- Each diesel assessed separately, impacts to both Unit 1 and Unit 2 to be assessed, due to LPCI MCC cross-ties.

Risk Management Actions

- Existing set of risk management actions exist. Additional actions would depend on PRA results analysis.
- Additional actions would most likely be needed to address fire risk.
- Existing on-line configuration risk management program would be updated to use same base model as LAR risk submittal prior to first diesel outage.
- On-line configuration risk process uses all hazards except seismic and uses integrated risk for risk management actions.
- Seismic model is present in on-line model but is turned off for quantification time improvements and low contribution to risk. If contribution to diesel risk is high, will be turned on.

Monitoring Actions

- Diesel unavailability is tracked for maintenance rule target and MSPI impact.
- Additional diesel unavailability time resulting from extended time will be evaluated against the existing targets for MR and planned unavailability for MSPI.

Conclusions

- Risk Impact evaluations will follow RG 1.177 guidance.
- Risk increases will be within acceptable limits
- Risk management actions will be taken.
- Diesel unavailability will remain below maintenance rule and MSPI targets.

License Amendment Request Content

License Amendment Request Content

Enclosure 1:

1. Summary Description
2. Detailed Description
   - System Design and Operation
   - Current TS Requirements
   - Reason for Proposed Change
   - Description of Change
3. Technical Evaluation
   - Applicability of Proposed Change
   - Deterministic Aspects and Defense in Depth Measures
   - Risk Informed Summary including risk metrics
4. Regulatory Evaluation
   - BTP 8-8 Draft Discussion
   - RG 1.177 and 1.174
   - RG 1.138
5. Environmental Considerations
6. References

License Amendment Request Content (continued)

Attachments

1. HNP Unit 1 and Unit 2 Technical Specifications Marked-Up Pages
2. HNP Unit 1 and Unit 2 Technical Specifications Clean-Typed Pages
3. HNP Unit 1 and Unit 2 Technical Specifications Bases Marked-Up Pages (Information Only)
4. HNP PRA Acceptability Report