

# NUGEQ Comments on IP 37060

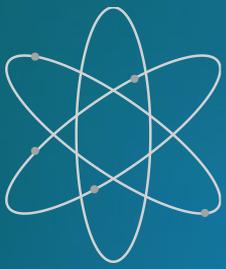


## **Presentation to NRC on Provisions in IP 37060 Regarding Consideration of Synergistic Effects in the Design of RISC-3 SSCs Web-Based Public Meeting February 22, 2022**

**Webinar Meeting Number: 227 914 477#**

**• William Horin, Winston & Strawn, LLP (Counsel to NUGEQ ([whorin@winston.com](mailto:whorin@winston.com)))**

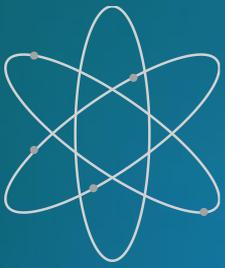
**• Ron Wise, NEQ Consulting (NUGEQ Technical Consultant ([ronwise@aol.com](mailto:ronwise@aol.com)))**



# NUGEQ Comments on IP 37060

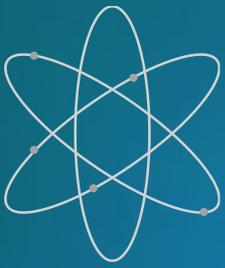
## INTRODUCTIONS:

- William Horin (NUGEQ Counsel)
- Ron Wise (NUGEQ Consultant)



# NUGEQ Observations

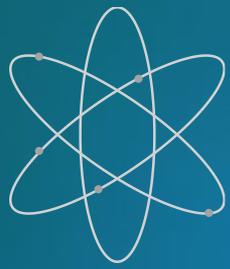
- The position in IP 37060 that licensees **must expressly** address environmental effects (such as aging and synergisms) in the design of RISC-3 equipment in order to satisfy the provisions of GDC-4 is an incorrect regulatory approach.
- It is incorrect for IP 37060 to single out synergistic effects for RISC-3 equipment as needing to be addressed differently from any other unquantified uncertainty or unanticipated aging mechanism.
- The feedback mechanism embodied in 50.69(d)(2), (e)(1), and (e)(3) is a fundamental element of an effective aging management process that accounts for any unanticipated aging mechanisms in a way that ensures RISC-3 equipment remain capable of performing their safety-related function(s) under design basis conditions throughout their service life.



# NUGEQ Comments on IP 37060

## PURPOSE OF MEETING:

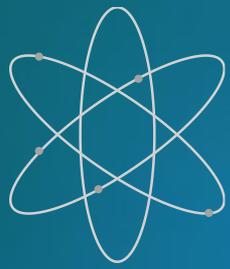
- Discuss NUGEQ's December 22, 2021 letter to the NRC (ML22005A127) concerning the need to re-examine the NRC position for licensees to independently consider/address synergistic effects in the design of RISC-3 equipment to satisfy the provisions of GDC-4 of 10 CFR 50 Appendix A.



# NUGEQ Comments on IP 37060

## DISCUSSION TOPICS:

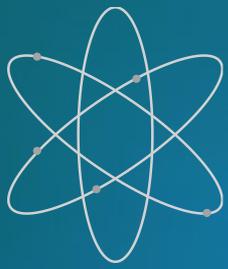
- Provisions in IP 37060 Expressed as Requirements Related to Synergistic Effects
- Summary of Concern
- Relevance of GDC-4 to Aging and Synergistic Effects
- Need for Flexibility in Alternate Treatment of RISC-3 SSCs
- Recommendations
- Example of an Approach that is Compliant with 50.69
- Closing Remarks



## Provisions in IP 37060 Expressed as Requirements Related to Synergistic Effects

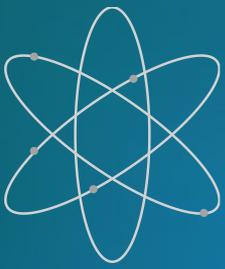
*“Therefore, a licensee implementing 10 CFR 50.69 **must consider** operating life (aging) and combinations of operating life parameters (**synergistic effects**) in the design of RISC-3 electrical equipment. This is particularly important if the equipment contains materials which are known to be susceptible to significant degradation due to thermal, radiation, and/or wear (cyclic) aging including any known synergistic effects that could impair the ability of the equipment to meet its design-basis function. See 69 FR 68008, 68013-68014.”*

*“To satisfy the provisions of GDC 4, the licensee **must address** environmental conditions such as temperature, pressure, humidity, chemical effects, radiation and submergence; and environmental effects such as aging and **synergisms**. See 69 FR 68008, 68040-68041.”*



# Summary of Concern

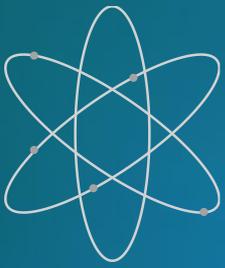
- Because Appendix A of IP 37060 presents as a requirement that licensees “must” address aging and synergistic effects in the design of RISC-3 SSCs in order to comply with the provisions of GDC-4 in accordance with the SOC for 50.69 [69 FR 68041], the inspection procedure does not allow any flexibility for licensees to address aging or synergistic effects outside of the design process, for example in the same manner used for other unquantified uncertainties or unanticipated aging mechanisms.



# Basis for Concern

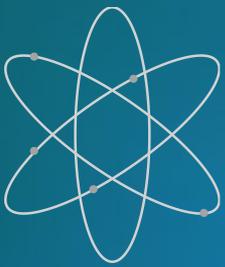
The incorporation of the Commission's response to comments in the SOC with respect to GDC-4/synergistic effects in Appendix A of IP 37060 as inspector guidance is a misapplication of the regulatory process. As noted in NUREG/BR-0053, Rev. 6, NRC Regulations Handbook, Preamble page 15.

- *Each rule the NRC prepares for publication in the Federal Register must begin with a preamble. At the NRC, the preamble is also known as the "Statement of Considerations." Although the preamble contains no regulatory text, it contains the information necessary for the user to understand the basis and purpose of the regulation. Each preamble must comply with the format requirements of 1 CFR 18.12. (Emphasis added)*



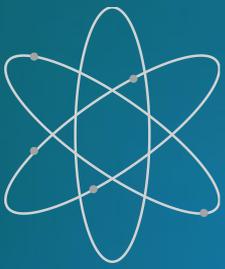
## Basis for Concern (continued)

- Therefore, for licensees subject to inspections under IP 37060, the existing regulatory position could result in undue enforcement to licensees who have implemented the § 50.69 categorization process because the guidance does not afford inspectors the option to consider that licensees could define alternative treatments that address aging effects (including synergisms) outside of the design process.



## Basis for Concern (continued)

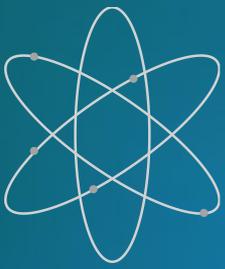
- The currently known synergistic effects related to environmental qualification under § 50.49 are all related to differences in the degree of degradation between natural aging and accelerated aging simulations in a qualification test program. These include:
  - Simultaneous vs. Sequential exposure
  - Test Sequence effects for Sequential exposure
  - Dose-rate effects



# Basis for Concern (continued)

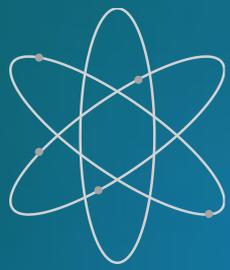
## **Inherent Inconsistencies with Treating Synergism in Design**

- RISC-3 and RISC-4 SSC are removed from the scope of the requirements of § 50.49 by § 50.69(b)(1)(iii).
- For SSCs categorized as RISC-3 or RISC-4, the Commission has concluded that for low safety significant SSCs, additional assurance, such as that provided by the detailed provisions in § 50.49 for testing, documentation files, and application of margins are not necessary. [Section III.4.2 of SOC for § 50.69]



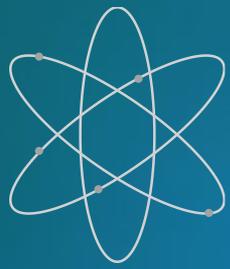
## Basis for Concern (continued)

- As currently worded, the expression in IP 37060 of a “requirement” to address synergistic effects for all important to safety equipment subject to GDC-4 could also have new licensing and enforcement implications for licensees who have not yet adopted or implemented § 50.69.



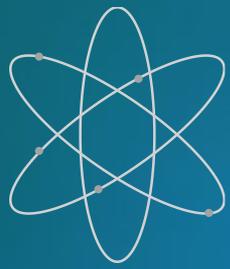
# Relevance of GDC-4 to Aging and Synergistic Effects

- GDC-4 encompasses the design basis for environmental and dynamic effects for Important to Safety SSCs.
- GDC-4 specifies that Important to Safety SSCs:
  - *shall be designed to accommodate the effects of and to be compatible with the environmental conditions associated with normal operation, maintenance, testing, and postulated accidents, including loss-of-coolant accidents.”*
- GDC-4 does not explicitly require consideration of “aging and synergisms” as design considerations as asserted in IP 37060.



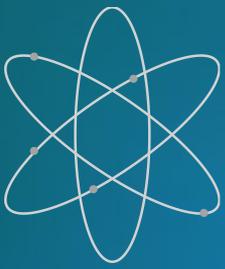
# Relevance of GDC-4 to Aging and Synergistic Effects

- It is recognized in accordance with § 50.69(d)(2) that aging effects do need to be considered to satisfy the high-level performance-based treatment requirements that the safety-related functional capability of RISC-3 equipment be maintained throughout its service life.
- Consistent with Acceptance Criteria 23 in Section 3.11 of NUREG-0800, a well supported maintenance/surveillance program, in conjunction with a good preventive maintenance program, provides confidence that the environmental design of RISC-3 SSCs is maintained throughout its service life.



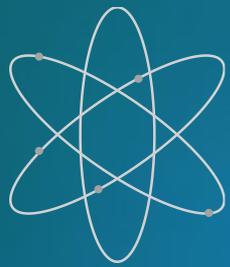
# Need for Flexibility in Alternative Treatment of RISC-3 SSCs

- As currently worded, IP 37060 presents as a requirement that aging effects and synergisms be addressed expressly in the design of RISC-3 SSCs.
- There is no acknowledgement in the IP that indicates to inspectors that such a position is NOT a requirement and there are approaches available to licensees, consistent with the provisions of § 50.69, that inherently address aging and synergisms outside of the design of RISC-3 SSCs.



# Recommendations

- Revise the guidance in Appendix A of IP 37060 prior to the upcoming round of 50.69 inspections scheduled to resume in 2022.
- Some suggested wording changes to address the appropriate flexibility in defining alternative treatments outside of environmental design are provided in “brackets” on the following slides.
- These wording changes conform to § 50.69 and:
  - Still account for the need to address aging
  - Still account for consideration of design basis service conditions.



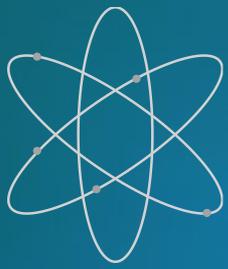
# Recommended Changes to Revise Guidance in Appendix A

*“Therefore, a licensee implementing 10 CFR 50.69 must consider operating life (aging)*

**[of RISC-3 SSCs including consideration of the applicable environmental and operational service conditions in defining the alternative treatments for RISC-3 SSCs that ensure with reasonable confidence that their design basis functionality is maintained throughout their service life.]**

*This is particularly important if the equipment contains materials which are known to be susceptible to*

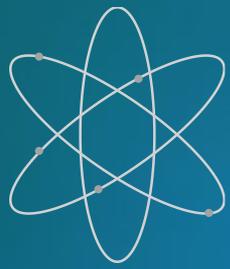
**[significant aging mechanisms (e.g., degradation due to thermal, radiation or cyclic/wear that could impair the ability of the equipment to perform its design basis function.)] ”**



# Recommended Changes to Revise Guidance in Appendix A

*“To satisfy the provisions of GDC 4, the licensee must address environmental conditions such as temperature, pressure, humidity, chemical effects, radiation and submergence.*

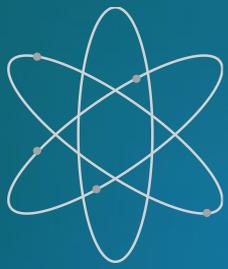
**[Aging effects from environmental and operational service conditions should be considered in defining treatments associated with ensuring that the design basis capability of RISC-3 SSCs is maintained throughout their service life.]”**



# Recommended Changes to Revise Guidance in Appendix A

These suggested changes to the IP:

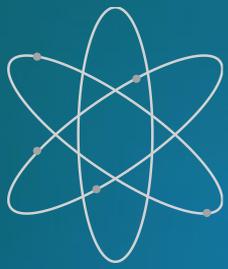
- Are consistent with the requirements of 10 CFR 50.69.
- Reflect an acknowledgement that the intent of 50.69 is to afford licensees the regulatory flexibility to establish alternative treatments that satisfies the high-level performance based requirements for RISC-3 SSCs (e.g., Sections III.3.2 and V.5.2 of the SOC for § 50.69)



# Example of a Compliant Approach

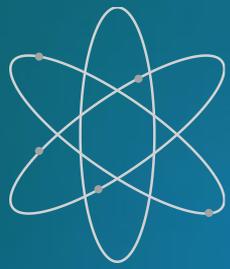
The approach described in the following example is consistent with:

- Section 3.11 of NUREG-0800 which highlights the approach of environmental design being supported by a maintenance / surveillance program; and
- Demonstrates how aging effects, that could prevent a RISC-3 SSC from performing its safety-related function, can be identified and addressed by the provisions in § 50.69.



# Example of a Compliant Approach

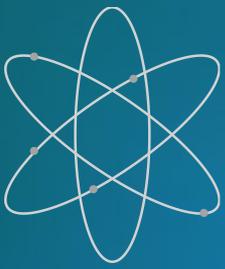
- The inspection, testing, and corrective action requirements for RISC-3 SSCs in § 50.69(d)(2), coupled with the feedback requirements in § 50.69(e)(1) and § 50.69(e)(3) can identify and address aging effects, including unanticipated aging mechanisms, that affect the reliability or functionality of RISC-3 equipment.
- Collectively, these mandatory RISC-3 treatment requirements from § 50.69(d)(2) and 50.69(e) can be relied upon to address aging effects and determine if changes to the alternative treatment is appropriate.
- The corrective action requirements provides the programmatic controls that ensures any changes from this feedback mechanism is appropriately taken to prevent recurrence.



# Example of a Compliant Approach

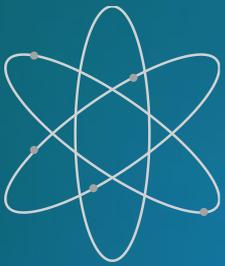
This approach is compliant with 10 CFR 50.69 and captures:

- 1) Aging effects of operating life parameters, including any synergistic effects, directly supports the requirement to ensure with reasonable confidence that RISC-3 equipment remains capable of performing their safety-related functions; and
- 2) Treats synergistic effects in the same manner as other unanticipated aging mechanisms and promotes flexibility in the approach; and
- 3) Ensures aging effects are accounted for in a manner independent from whether the reasonable confidence is based on a qualification type test or not; and
- 4) Is consistent with both the results of multiple NRC sponsored research efforts on synergistic effects and with the characterization of synergistic effects as an example of “unquantified uncertainties” from Section X.E1 of NUREG-2191 (SLR-GALL).



# Closing Remarks

- The guidance in Appendix A of IP 37060 should not limit the flexibility of a licensee to address environmental effects solely within the design of RISC-3 SSCs.
- Once the environmental design is established, the combination of the mandatory treatments imposed on RISC-3 SSCs in § 50.69(d)(2), (e)(1), and (e)(3) provide an effective and compliant feedback mechanism for aging management of any unanticipated aging mechanisms.



# End of Presentation

- Questions / Discussion