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FCOP SDP DEVELOPMENT

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Proposed Path Forward

- Existing NRC experience with the Reactor Oversight Program is positive.
- Use the framework and selected elements to help develop a Fuel Cycle Oversight Program.

SDP Differences

Part 50 facilities use CDF for the SDP Metric

Part 70.61 gives goals in terms of:

- no criticalities
- low worker exposure
- low public exposure
- low chemical exposure

Other CFR parts cover MC&A, Radiation Protection, EP, and Security requirements

- Some Criteria may be the same as ROP

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External Input

- The effort is not only an internal process
- The NRC will use industry insights to help develop the process
- The Licensee ISAs may be used as inputs for our quantitative tools and analyses.

Proposed FCOP SDP Flow Path

- Determine if a performance deficiency exists. If so, continue -
- Answer the minor questions. If > minor then -
- Go to Step 1. High Level Screen for Green.
- Go to Step 2. Risk Analyst determines significance. If > Green then -
- Conduct a Regulatory Conference to allow Licensee to provide public input.
- Perform action required by the Action Matrix

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The SDP can be:

- Deterministic (i.e. use same criteria as violations, or some other metrics)
- Qualitative (evaluate significance relative to some other standard or example
- Quantitative (use ISAs or some other numerical way to rank), or
- Management uses blended input to decide

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Action Matrix

- The SDP output, when combined with outputs from the Performance Indicators (if available) feed an Action Matrix to decide if the licensee needs additional oversight.
- If the licensee meets the performance goals, only the baseline inspection program provides regulatory oversight. (Inspections to respond to significant events can still happen)

Development Plan

- Use existing process flows as a starting point to develop FCOP SDP
- Port over, with modifications, current deterministic SDPs, where applicable
- Develop numerical thresholds for the more Risk Informed Cornerstone's SDPs
- Develop the criteria for minor findings
- Develop site specific Step 1 tools
- Develop Step 2 guidance for more Risk Informed Cornerstone's SDPs
- Produce final SDP guidance documents

The SDP is Risk Informed

- Risk equals Probability times Consequence
- What is the consequence of interest for the Cornerstone of Criticality Safety?

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Consequence

- The consequence is a negative impact on the worker or the public.
- In Criticality Safety the event that causes the consequence is a Criticality
- One metric could be to use the changes in probability of a criticality to measure change in risk.

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PROB = IEF * PFE * HRA * DUR

IEF	likelihood of upset event	per hour
PFE	probability of failure of mitigating equipment	per demand
HRA	probability of failure of human actions that could mitigate the event	per demand
DUR	duration of the deficiency	hour
PROB	total probability of the sequence	unitless

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Risk Metric

- The Risk Metric could be the change in probability
- Duration of finding will impact the result (frequency times duration equals probability)
- Where the same finding impacts multiple risk sequences, the individual results are added for the total risk of the finding.
- There are order of magnitude change between the levels of significance that are entered into the Action Matrix

SDP Significance

- Colors are an order of magnitude tool with values about a factor of 10 apart

RED	1E-(X)
YELLOW	1E-(X+1)
WHITE	1E-(X+2)
GREEN	

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Δ Probability

- The SDP output is based on change in value of whole sequence, not just value of control that is lost.
- If additional controls are available, are maintained as if they were an IROFS, and are declared prior to the finding, they can decrease the change in risk credited in the SDP.
- Shorter exposure times can result in reduced change in probability.

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An example of how existing processes use risk concepts

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CONSEQUENCE SEVERITY CATEGORIES BASED ON 10 CFR 70.61

	Workers	**Offsite Public**	**Environment**
High Consequences	Dose >1 Sv (100 rem) chemical exposure.. endanger the life	Dose>.25 Sv (25 rem) 30 mg sol U intake chemical exposure.. irreversible or serious long lasting health effects	
Intermediate Consequences	.25 Sv<Dose≤ 1 Sv chemical exposure.. irreversible or serious long lasting health effects	.05 Sv<Dose≤ .25 Sv chemical exposure.. mild or transient health effects	radioactive release >5000 x Table 2 App B 10 CFR 20
Less than Intermediate Consequences	accidents of lesser radiological and chemical exposures to workers than those above in this column	accidents of lesser radiological and chemical exposures to the public than those above in this column	radioactive releases producing effects less than those specified above in this column

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10 CFR 70.61 Risk Matrix

	Highly Unlikely	Unlikely	More than Unlikely
High Consequence	OK	NOT OK	NOT OK
Intermediate Consequence	OK	OK	NOT OK
Less than Intermediate	OK	OK	OK

A similar approach could be used for the SDP process

Risk Thresholds

- Need to develop Risk Informed Thresholds for the SDP Process
- Consistent between Crit, Chem
- Thresholds may be derived with input from:

  Concepts in 10CFR70.61

  Likelihood definitions from ISAs

  Draft Revised Enforcement Policy Supplements

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The proposed Fuel Cycle Enforcement Supplement uses similar concepts incorporating risk insights.