DRAFT

Attachment 5

Appendix K

Maintenance Risk Assessment and Risk Management Significance Determination Process

1. Objective

To determine the significance of inspection findings related to licensee assessment and management of the risk associated with performing maintenance activities under all plant operating or shutdown conditions in accordance with Baseline Inspection Procedure (IP) 71111.13, "Maintenance Risk Assessment and Emergent Work Control."

2. Basis

The NRC requirements in this area are set forth in paragraph (a)(4) of 10 CFR 50.65, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," effective November 28, 2000.

3. General Guidance

Once an inspection finding satisfies the Inspection Manual Chapter (IMC 0612) minimum threshold process, the finding can then be evaluated using the following tables and flowcharts. The input to the (a)(4) SDP is an inspection finding that has some significance due to the licensee's underestimate of plant risk from ongoing or completed maintenance activities and/or the licensee's ineffective implementation of risk management actions (RMAs). This SDP utilizes a logic chart that will allow individual inspection findings to be categorized into one of four levels in the safety significance color scheme:

GREEN - Very Low Safety Significance
WHITE - Low to Moderate Safety Significance
YELLOW - Substantial Safety Significance
RED - High Safety Significance

The assumptions and defined terms used in this SDP are discussed in Attachment 1.

4. Specific Guidance

The significance characterization of the two types of licensee performance deficiency in meeting the Maintenance Rule (a)(4) requirements can be determined by using the graded approach of matching the performance colors to the risk deficits for maintenance configurations that were not assessed, in whole or in part. That is, the safety significance (in terms of color) of the applicable risk deficit, i.e., the magnitude of the licensee's underestimate (or lack of estimate) of the maintenance risk, is determined by means of this SDP.

The risk deficits for each performance color are established in increasing order of magnitude to reflect the amount by which the risk increases from the plant's baseline (or zero maintenance) risk were not adequately assessed by the licensee. The metrics for evaluating the magnitude of the error in the licensee's inadequate risk assessment of the temporary risk increases due to maintenance activities/configurations are the incremental core damage probability deficit (ICDPD) and the incremental large early release probability deficit (ILERPD). The mathematical formulations for these metrics are defined in attachment 1.

When the inspector has identified that the licensee has performed an inadequate risk assessment (or none at all), the actual maintenance risk (configuration-specific CDF) must first be adequately or accurately assessed. This value may be obtained in several ways including having the licensee perform the omitted maintenance risk assessment or re-perform it, correcting those errors and/or omissions that rendered its original risk assessment inadequate. The inspector may consult with the regional senior reactor analyst(s) or the headquarters risk analyst(s) to independently determine an accurate maintenance risk value. The actual or corrected maintenance risk value (CDF) may then be compared to the baseline (or zero-maintenance) CDF as appropriate and the actual ICDF determined.

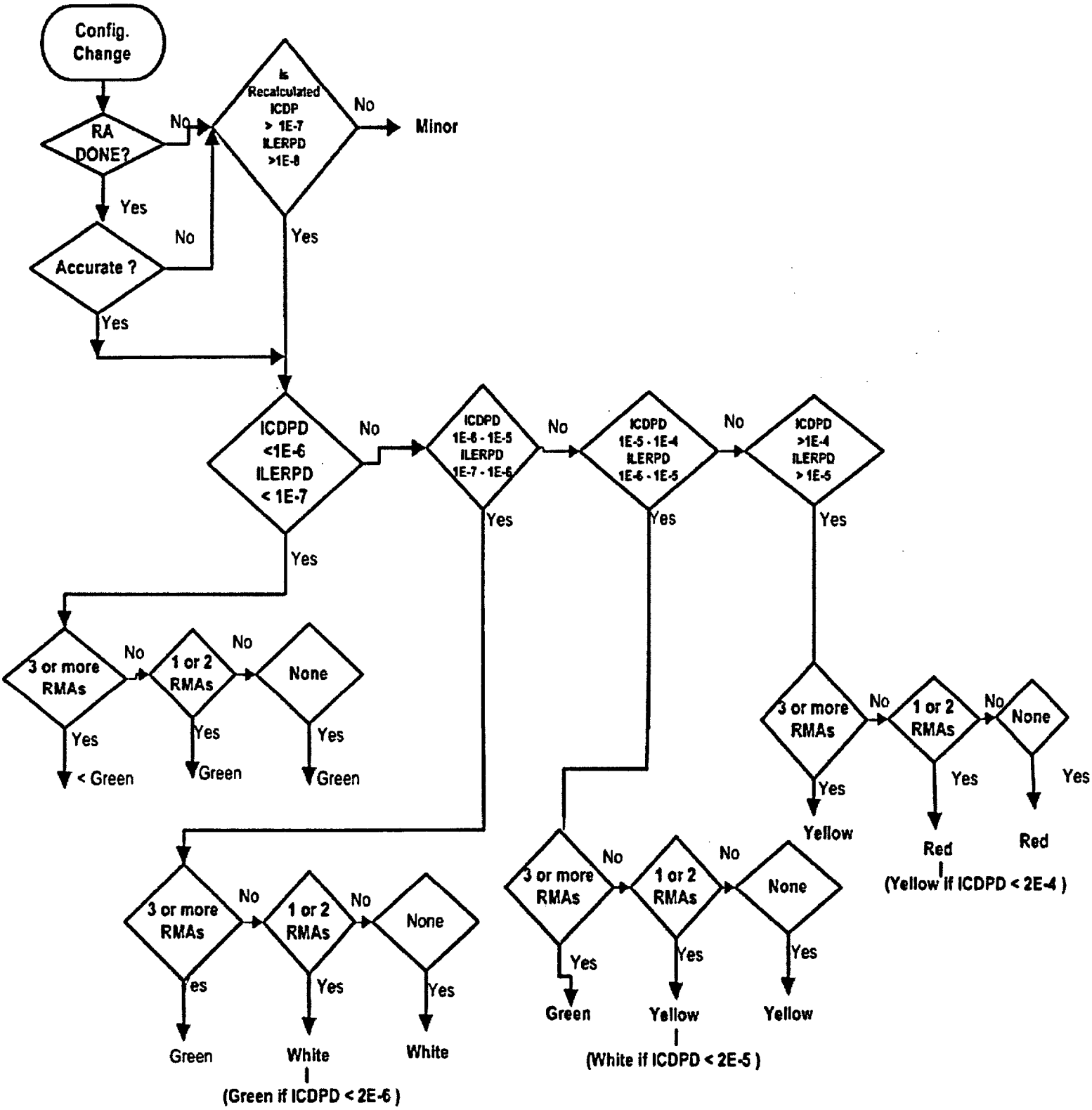
Then the original flawed risk assessment value is subtracted from the actual/correct ICDF to obtain the risk deficit or ICDFD. The ICDFD is converted into ICDPD, or the entering argument for Table 1, as shown in the definition of ICDPD. Note that ICDPD is equal to ICDP when there was no risk assessment at all. The safety significance of the licensee's underestimate (or lack of estimate) of the risk is then determined by entering Table 1 with the value of ICDPD as determined above and finding the matching color. The color of the ILERPD, if applicable, is determined in a similar fashion.

Table 1

Risk Results		SDP Colors for Licensee Performance Deficiency
Incremental Core Damage Probability Deficit (ICDPD)	Incremental Large Early Release Probability Deficit (ILERPD)	Failure to Perform an Adequate Risk Assessment (without any mitigation for risk management)
< 1E-6	< 1E-7	GREEN
1E-6 ~ 1E-5	1E-7 ~ 1E-6	WHITE
1E-5 ~ 1E-4	1E-6 ~ 1E-5	YELLOW
> 1E-4	> 1E-5	RED

Flowchart 1

Quantitative Significance Determination



As discussed in NUMARC 93-01, Section 11.3, "Assessment of Risk Resulting from Performance of Maintenance Activities," and in Appendix A of IP 71111.13, "Maintenance Risk Assessment and Emergent Work Control," the categories of appropriate RMAs that can be taken to control risk of a maintenance activity include the following:

1. Increased risk awareness and control
2. Reducing duration of maintenance activity
3. Minimizing magnitude of risk increase
4. Establishing other compensatory measures to provide alternate success paths for maintaining the safety function of the out-of-service SSC (e.g., using diverse means of accomplishing the intended safety function).

Since the benefits of these risk management actions are generally not readily quantifiable, the approach chosen for quantitatively determining the significance of failure to manage risk is to assign some numerical credit to the effectiveness of these actions in reducing the risk impact of the assessed configuration (See flow chart 1). Therefore, the simple screening rule used in this SDP is to assign a credit of 50-percent reduction in risk to the correctly calculated risk if one or two categories of the risk management actions were effectively implemented to control risk. If three or more categories of the risk management actions were effectively implemented by the licensee, an order-of-magnitude reduction in risk can be credited against the actual maintenance risk. This approach allows the significance of failure to manage risk to be expeditiously determined without using quantitative approaches that may require intensive resources. Thus, effectively implemented risk management actions serve to mitigate the severity of the maintenance risk deficit and can reduce its resultant safety/risk significance and possibly color, depending on the amount of mitigation.

The process of managing risk involves using the results of a risk assessment in the licensee's decision-making for appropriate risk management actions to control the overall risk impact of an assessed maintenance configuration. However, licensees use a variety of methods for categorizing risk significance and managing the risk according to the category. In Regulatory Guide 1.182, the NRC endorsed the risk management action levels or categories/bands prescribed in the revised Section 11 of NUMARC 93-01, Revision 2, and subsequently incorporated in Revision 3 of NUMARC 93-01. These risk bands are defined in terms of ICDP, making them readily comparable to the risk levels used in determining the significance of the risk deficits. For licensees that have adopted this guidance, normal work controls are allowed by site procedures for ICDPs less than 1E-6. For ICDPs of 1E-6 and greater, risk management actions are prescribed. As also provided in Section 11, voluntary entry into elevated maintenance risk configurations above 1E-5 is prohibited. Site procedures will then prohibit this either entirely or allow it with fairly rigorous restrictions that typically include the plant manager's written permission along with extensive risk management actions. Site procedures may further define specific detailed risk management actions or plans for routinely allowable risk categories as well. It should be noted that when evaluating the adequacy of licensee's RMAs, the inspector should consider only those actions that could have actual risk implications such as working around the clock, installation of backup equipment, and minimizing duration for effective implementation of RMAs. Other

administrative actions such as management signatures, briefing, and having certain engineers available should be considered as having negligible risk contributions and should not be considered for the effective implementation of RMAs. For more information, see the example provided in Attachment 2.

Many licensees have adopted a four-color-designated risk band scheme (or a variation of it) developed in conjunction with the Electric Power Research Institute for use with its ORAM/Sentinel risk assessment tool (software). These bands, typically: green (normal work controls), yellow (minimal risk management actions, including heightened awareness measures), orange (extensive risk management actions and special authorizations), and red (not voluntarily entered), are defined in terms of multiples of the plant's baseline or zero-maintenance CDF (typical values are green=up to 2 or 3 x base CDF, yellow=up to 10 x, orange - up to 20x, and red above 20xCDF). Site procedures will then prescribe the minimum risk management plan or actions for each band with varying specificity. Since these licensees may not compute corresponding ICDPs or place time limits on the work designed not to exceed certain ICDP levels, the licensee's risk levels may need to be converted in order to determine the significance of inadequately assessed risk.

If the risk is inadequately assessed (or not assessed at all), this is the performance deficiency that is processed through this SDP. The resultant failure to take risk management actions (due to lack of risk recognition) merely provides no mitigation of the risk deficits.

When the risk is adequately assessed, absent gross omissions, the licensee will normally only be expected to effectively implement those risk management actions prescribed for the assessed risk by site procedures. Under certain circumstances, specific compensatory measures may also be prescribed by license conditions, technical specifications, notices of enforcement discretion (NOEDs) and/or special commitments as applicable. In this case, the performance deficiency to be processed through this SDP would be the failure to implement one or more risk management actions either prescribed by any of the sets of requirements cited above or any that may be deemed necessary by the inspector on the basis of some objective and widely accepted standard(s). Examples are given in IP 71111.13.

If some RMAs were effectively implemented and the risk assessment was adequately performed, the significance of inadequate implementation of RMAs is determined by adjusting the performance color to a lower significance commensurate with the credit for reduction to the risk estimate of the assessed maintenance configuration. For example, the White characterization of the licensee performance deficiency can be adjusted to Green if three or more categories of the RMAs as discussed in NUMARC 93-01, Section 11.3, were effectively implemented by the licensee. If one or two categories of the RMAs were implemented to control risk, the White characterization can be adjusted to Green only when the assessed risk of the maintenance configuration is below 2 times lower of the risk limit (i.e., ICDP < 2E-6) that are defined for the White performance color. When the assessed risk of the maintenance configuration is above the above risk limits and one or two categories of the risk management actions were implemented to control risk, the credit of 50-percent reduction in risk may not be sufficient to adjust the

performance color to a lower significance and therefore, the significance characterization should remain as initially determined.

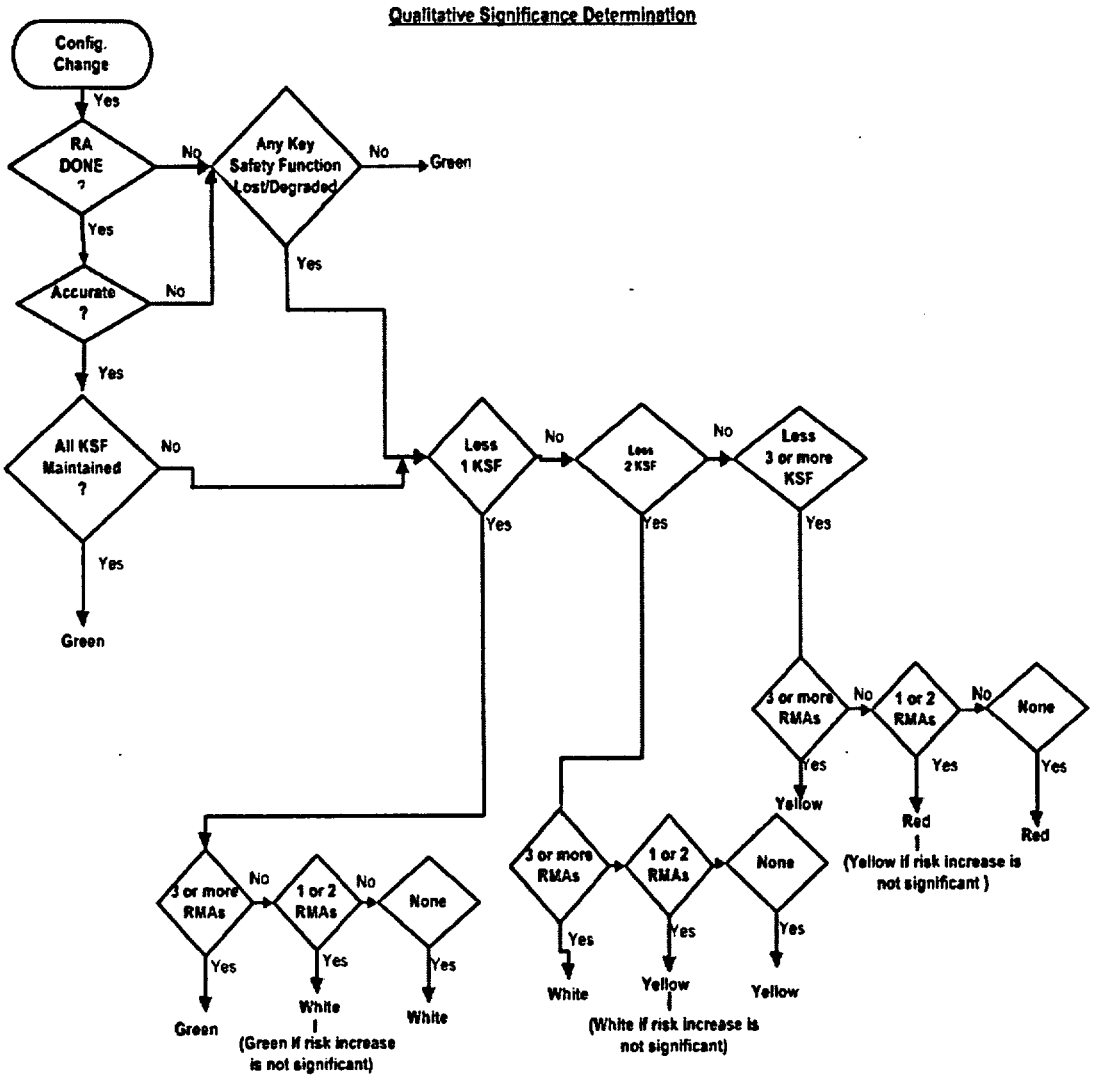
Qualitative Risk Assessment

Use Table 2 and Flowchart 2 for qualitative significance determination of (a)(4) performance deficiencies.

Table 2

Defense-In-Depth Results	SDP Colors for Licensee Performance Deficiency
Key Safety Functions (KSF) Maintained (shutdown or operations)	Failure to Perform an Adequate Risk Assessment (without any mitigation for risk management)
All	GREEN
missing 1	WHITE
missing 2	YELLOW
missing 3 or more	RED

Flowchart 2


Qualitative Significance Determination
Config. Change
Yes
RA DONE ?
No
Any Key Safety Function Lost/Degraded
No
Green
Yes
Yes
Accurate ?
No
Yes
All KSF Maintained ?
No
Yes
Green
Less 1 KSF
No
Less 2 KSF
No
Less 3 or more KSF
Yes
Yes
Yes
3 or more RMAs
No
1 or 2 RMAs
No
None
Yes
Yes
Yes
Yellow
Red
Red
(Yellow if risk increase is not significant)
3 or more RMAs
No
1 or 2 RMAs
No
None
Yes
Yes
Yes
Green
White
White
(Green if risk increase is not significant)
3 or more RMAs
1 or 2 RMAs
None
Yes
Yes
Yes
White
Yellow
Yellow
(White if risk increase is not significant)

The performance of qualitative risk assessments and the management of risks of shutdown configurations generally involve preserving defense in depth, the integrity of barriers to the release of radioactivity and assuring that key safety functions (KSF) are maintained. As discussed in Section 4 of NUMARC 91-06, shutdown key safety functions are decay heat removal, inventory control, power availability, reactivity control, and primary or secondary containment operability. Because of the special considerations of shutdown risk assessments, guidance is provided below with respect to the definition of each key safety function:

a. Decay heat removal. Availability of the decay heat removal (DHR) system or equivalent or some alternate means is required during shutdown conditions to remove decay heat from the reactor coolant system (RCS) inventory.

b, Inventory control. Adequate control measures to prevent loss of reactor coolant inventory during reduced inventory operations at shutdown conditions with the objective of keeping the core covered and preserving sufficient inventory to enable decay heat removal.

c. Power availability. Availability of electrical power is required during shutdown conditions to maintain cooling to the reactor core and spent fuel pool, to transfer decay heat to the heat sink, to achieve containment closure when needed, and to support other important functions.

d. Reactivity control. Capability of maintaining adequate shutdown margin in the RCS and spent fuel pool.

e. Primary or secondary containment operability. Capability to achieve containment closure in sufficient time to mitigate potential fission product release.

For power operation, key plant safety functions are those that ensure (a) the capability to maintain integrity of the RCS pressure boundary, (b) the capability to shut down the reactor and maintain it in a safe shutdown condition, and (c) the capability to prevent or mitigate the consequences of accidents that could result in offsite release of radioactivity in excess of 10 CFR Part 100 guidelines. Examples of at-power key safety functions are (1) containment integrity (isolation, pressure and temperature control), (2) RCS inventory control, (3) RCS heat removal, and (4) reactivity control.

Table 2 is used for evaluating the significance of inadequately assessing maintenance activities/configurations qualitatively. The defense-in-depth limits for each performance color are established in terms of increasing number of lost/degraded key safety functions. This is intended to reflect the risk of maintaining less than the required number of key safety functions when the risk was not adequately assessed or managed. The process for determining significance of a licensee performance deficiency in meeting the (a)(4) requirements follows the same general process described above for significance determination of performance issues related to quantitative risk assessments. For example, the significance of failure to perform an adequate risk assessment would be characterized as a White performance deficiency when one key safety function was lost or significantly degraded due to the maintenance activity and its

loss or degradation was not mitigated or compensated for through risk management actions. If two key safety functions were not maintained, the significance of failure to perform an adequate risk assessment would be characterized as a Yellow performance deficiency, etc.

When none of the categories of appropriate risk management actions are implemented even though a risk assessment was adequately performed, the significance of the licensee performance deficiency is determined by matching the performance colors shown in Table 2 to the defense-in-depth limits for an assessed maintenance configuration. If some risk management actions were implemented and the shutdown risk assessment was adequately performed, the significance of inadequate implementation of risk management actions is determined by adjusting the performance color to a lower significance commensurate with the credit for reduction to the risk of maintaining less than the required number of key safety functions for the assessed maintenance configuration. For example, the White characterization of the licensee performance deficiency can be adjusted to Green if three or more categories of appropriate risk management actions were effectively implemented by the licensee. If only one or two categories of risk management actions were implemented, then the White characterization can be adjusted to Green only when the loss of one key safety function does not significantly increase the risk of the assessed maintenance configuration. When the risk of the assessed maintenance configuration is significantly increased by the loss of one key safety function and one or two categories of the risk management actions were implemented to control risk, the credit for reduction in risk may not be sufficient to adjust the performance color to a lower significance and therefore, the significance characterization should remain as initially determined.

ATTACHMENT 1
ADDITIONAL GUIDANCE

The following assumptions and defined terms regarding licensee risk assessments and risk management actions are necessary to understand and efficiently utilize this (a)(4) SDP evaluation tool.

Risk Assessments and Risk Management Actions. The intent of paragraph (a)(4) is to have licensees appropriately assess the risks of proposed maintenance activities that will (1) directly, or may inadvertently, result in equipment being taken out of service; (2) involve temporary alterations or modifications that could impact SSC operation or performance; and (3) be affected by other maintenance activities, plant conditions or evolutions, and/or (4) be affected by external events, internal flooding, or containment integrity. Paragraph (a)(4) then requires management of the resultant risk which is done using insights from the assessment. Therefore, licensee risk assessments should properly determine the risk impact of planned maintenance configurations to allow effective implementation of risk management actions that would limit any potential risk increase when maintenance activities are actually being performed. Although the level of complexity in an assessment would be expected to differ from plant to plant, as well as from configuration to configuration within a given plant, it is expected that licensee risk assessments would provide insights for identifying risk-significant activities and minimizing their durations. In general, two types of licensee performance deficiencies in meeting (a)(4) requirements can be defined:

A. Failure to Perform an Adequate Risk Assessment. The failure to perform an adequate risk assessment prior to the conduct of maintenance activities includes the following deficiencies when they result in underestimating the risk:

1. Failure to perform a risk assessment for maintenance configuration changes.

2. Failure to update a risk assessment for changes in the assessed plant conditions (e.g., changes in maintenance activities or emergent conditions).

3. Risk assessment was incomplete, may not have included all affected/involved structures, systems, or components (SSCs) within the scope of SSCs required for (a)(4) assessments, or may not have considered (or adequately considered) all plant relevant plant conditions or evolutions, external events, internal flooding, and/or containment integrity.

4. Failure to consider maintenance activities which may increase the likelihood of an initiating event that would result in risk-significant configurations.

5. Improper use of the risk assessment tool or process, i.e., beyond its capabilities or limitations, under plant conditions for which it was neither designed nor in accordance with site procedures.

6. Deficient risk-informed evaluation process for limiting the scope of SSCs to be included in (a)(4) risk assessments as identified by NRC inspection in accordance with IP 62709.

7. Flawed risk assessment tool or process as identified by NRC inspection in accordance with IP 62709.

Underestimating or not estimating the risk of maintenance activities may not significantly increase the expected overall plant risk, in terms of core damage frequency (CDF) or large early release frequency (LERF). However, underestimating the risk may result in lack of risk awareness that could preclude risk management actions and allow a high-risk configuration to persist, unrecognized and compensated for. Allowing a high-risk configuration with an unassessed CDF increase to persist longer than necessary or desirable does increase the exposure time and hence the incremental (integrated) core damage probability (ICDP) and/or the incremental large early release probability (ILERP) as defined below. Finally, unawareness of unassessed or inadequately assessed risk may allow actions or events to occur that could directly increase risk; or hamper recovery from accidents or transients.

B. Failure to Manage Risk. Failure to manage the risk impacts of proposed maintenance activities means a failure to implement, in whole or in part, the key elements of the licensee's risk management program. However, this deficiency does not result in an additional risk increase to the assessed risk of the maintenance configuration in terms of CDF or LERF, unless an event actually occurs that result in additional risk impacts. Measures to minimize the duration of a risky maintenance activity/configuration are a principal risk management action. Nevertheless, failure to implement such measures when they are possible and practicable, does allow ICDP and/or ILERP to increase further as long as the elevated risk condition persists. Appropriate and suitable risk management actions can only reduce the risk incurred from a given configuration change.

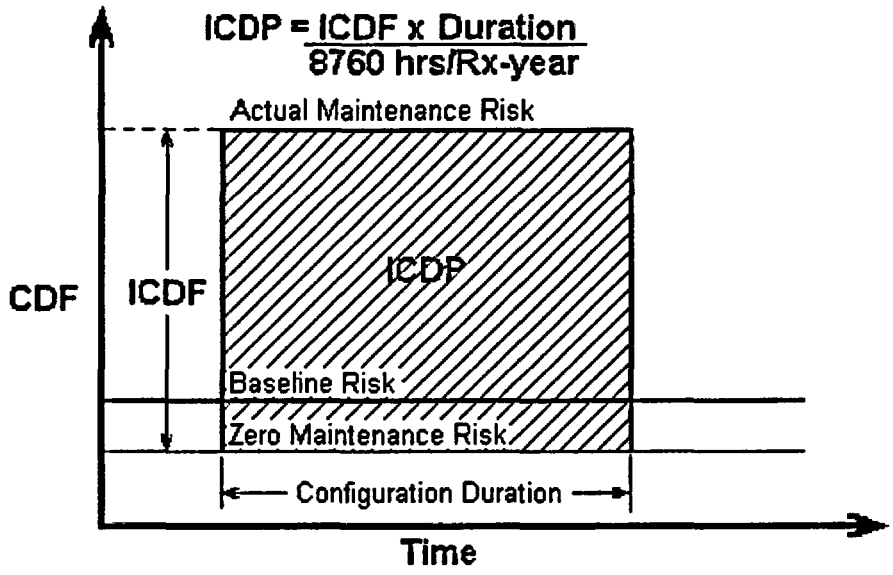


Figure 1 - Relationship of ICDF to ICDP

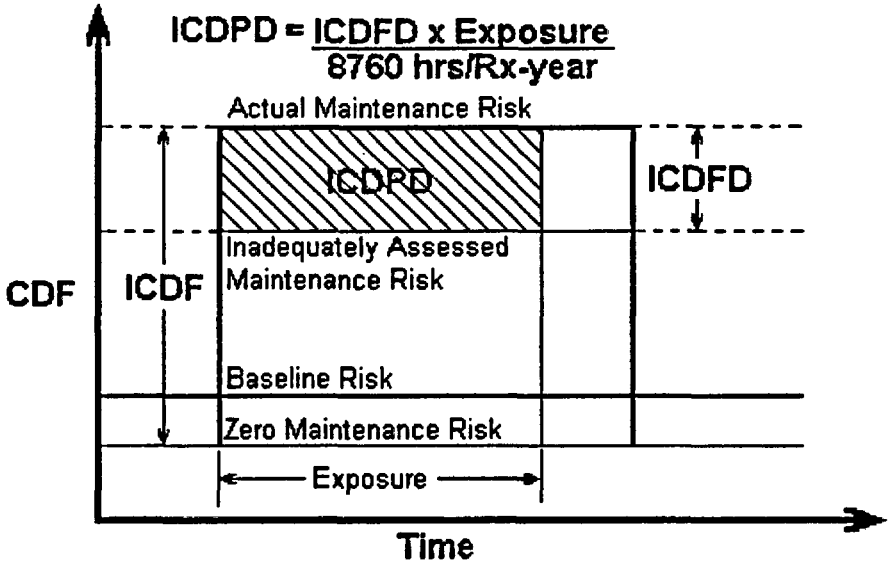


Figure 2 - Relationship of ICDFD to ICDPD

Definitions:

Incremental Core Damage Frequency (ICDF). The ICDF is the difference between the actual (adequately/accurately assessed) maintenance risk (configuration-specific CDF) and the baseline (or zero-maintenance) CDF. The configuration-specific CDF or ICDF is the annualized risk estimate with the out-of-service or otherwise affected SSCs considered unavailable. The term, "Incremental Core Damage Frequency," is also equivalently referred to as delta CDF, or change in CDF.

Incremental Core Damage Probability (ICDP). The ICDP is the product of incremental CDF and the annual fraction of the duration of the configuration, i.e., ICDP = ICDF x (duration in hours)/(8760 hours per reactor year). Note that ICDP is sometimes expressed as the integrated or integral ICDP, i.e., the delta CDF or ICDF integrated over the time of its duration which increases as the elevated-risk configuration persists. Figure 1 is a graphical representation of this concept.

Incremental Core Damage Frequency Deficit (ICDFD). The ICDFD is that portion of the ICDF defined as the difference between the actual maintenance-configuration-specific CDF (called $ICDF_{actual}$ for purposes of this definition) and the maintenance-related ICDF as originally and inadequately assessed by the licensee ($ICDF_{assessed}$). Therefore, the ICDFD = $ICDF_{actual}$ - $ICDF_{assessed}$. Note that if the licensee has failed to assess maintenance risk entirely when required, i.e., there is no licensee risk assessment, then the ICDFD will be equal to the entire value of the ICDF. The safety significance of the ICDFD, i.e., the magnitude of the licensee's underestimate (or lack of estimate) of the risk, is determined by means of this SDP.

Incremental Core Damage Probability Deficit (ICDPD). The ICDPD is the product of the ICDFD and the Exposure (i.e., the annual fraction of the duration of the unassessed or inadequately assessed configuration or that portion of the annual fraction of the duration of the maintenance configuration during which its risk remained unassessed or inadequately assessed). ICDPD = ICDFD x (exposure in hours) ÷ (8760 hours per reactor-year). Note that similar to ICDFD, ICDPD equals ICDP when there was no risk assessment at all instead of a flawed risk assessment. Note also that Exposure equals Duration if the risk remained unassessed or inadequately assessed for the entire duration of the configuration. The safety significance of the ICDPD, i.e., the magnitude of the licensee's underestimate (or lack of estimate) of the risk (in terms of ICDP), may also be determined by means of this SDP. Figure 2 is a graphical representation of this concept.

Incremental Large Early Release Frequency (ILERF). The ILERF is the difference between the actual, adequately determined maintenance activity/configuration-specific LERF and the plant's baseline or zero-maintenance LERF, if determinable. Note that LERF and ILERF are determinable only if the plant has a Level-II probabilistic risk analysis/probabilistic safety assessment (PRA/PSA) and a risk tool or process capable of quantitatively assessing Level-II risk beyond a qualitative assessment of the impact of containment integrity. If calculated, ILERF may also be referred to as the delta-LERF or LERF difference.

Incremental Large Early Release Frequency Deficit (ILERFD). The ILERFD is used to evaluate the significance of a finding under the following conditions: (1) There is an impact

on containment integrity from or concurrent with the maintenance activity, (2) this impact is/was not qualitatively assessed, and (3) the impact is/was quantitatively assessed, but not adequately. Then the ILERFD is meaningful and is that portion of the ILERF defined as the difference between the actual maintenance-configuration-specific LERF (called $ILERF_{actual}$ for purposes of this definition) and the maintenance-related ILERF as originally and inadequately assessed by the licensee ($ILERF_{assessed}$). Therefore, the ILERFD = $ILERF_{actual}$ - $ILERF_{assessed}$. Note that if the licensee has failed to assess maintenance risk entirely when required, i.e., there is no licensee risk assessment, and there is an impact on containment integrity from or concurrent with the maintenance activity, and with no risk assessment, this impact is neither qualitatively nor quantitatively assessed, then the ILERFD, will be equal to the entire value of the ILERF. The safety significance of the licensee's underestimate (or lack of estimate) of the Level-II risk, i.e., ILERFD, may also be determined by means of this SDP if appropriate.

Incremental Large Early Release Probability (ILERP). The ILERP is the product of the incremental large early release frequency (ILERF) and the annual fraction of the duration of the configuration. ILERP = (ILERF x duration in hours)/(8760 hours per reactor year)

Incremental Large Early Release Probability Deficit (ILERPD). The ILERPD is the product of the ILERFD with the annual fraction of the duration of the unassessed or inadequately assessed configuration or that portion of the annual fraction of the duration of the maintenance configuration during which its risk (in terms of ILERF or ILERP) remained unassessed or inadequately assessed.

NOTE: Although an adequate maintenance risk assessment is expected to include the impact of containment integrity, at least qualitatively, there is no regulatory requirement for a quantitative risk assessment using a Level-II PRA. Paragraph (a)(4) of 10 CFR 50.65 neither prohibits nor explicitly discourages incurring maintenance risk. It only requires that the risk of maintenance activities be assessed (which can be done qualitatively, quantitatively, or, as is often the case, in a blended fashion) and managed.

Loss of function. This is the condition in which an SSC becomes incapable of performing its intended purpose. This can mean a complete functional failure or impaired or degraded performance or condition such that the affected structure, system or component (SSC) is incapable of meeting its functional success criteria. Functional success criteria include having the required trains, adequate speed, flow, pressure, load, startup time, mission time, etc. These are defined or assumed in the design and/or licensing bases (i.e., UFSAR or license conditions or technical specifications and/or their bases). For the purposes of determining risk/safety significance, the functional success criteria of particular interest would be those assumed in the plant's probabilistic risk assessment (PRA) and/or the licensee's risk assessment tool.

Zero Maintenance CDF(Risk). The CDF estimate of plant baseline configuration where all SSCs considered available.

Baseline CDF(Risk). The CDF from a PRA considering normal preventive maintenance and typically industry wide historical reliability data (normal operating condition).

Note that inadequate risk assessment or risk management for work not yet started is not an (a)(4) violation, but it still represents a licensee performance deficiency and may be indicative of deficiencies in previous risk assessments, risk management actions and/or in the licensee's (a)(4) program. This SDP is not suited for determining the significance of this type of performance deficiency. This issue will be screened to Green in accordance with Reactor SDP phase 1 screening.

ATTACHMENT 2
EXAMPLE OF (A)(4) FINDING

The following example is provided for illustrating the use of subject SDP for inspection findings that involve failure to perform an adequate risk assessment and failure to manage risk. This example does not represent risk assessments of actual configurations.

During the period January 14 -16, 2003, plant "X" was operating at 75% power with Division 1 partial outage in which the residual heat removal (RHR) heat exchanger "A", ESW "A" 4.16 kV switchgear breaker, and Division 1 emergency diesel generator (EDG) had already been assessed for risk and removed from service. The licensee's risk assessment indicated that the ICDP was 1 E- 5. The inspectors reviewed work orders, control room log, and risk assessments for the maintenance activities performed during the above period. The inspector noted that the licensee failed to consider the following maintenance work activities for the above risk assessment: (1) maintenance on switchyard breakers and relays by the offsite group and (2) routine maintenance on train "B" Class 1E Battery system. In addition, during this time the licensee's contractors were working near the switchyard with cranes and other heavy equipment which had the potential for causing a loss-of-offsite power. Also, the licensee's Division 1 partial outage was extended for additional 18 hours (from the original schedule) due to the unavailability of parts and other documentation issues. The licensee reassessed the risk and the corresponding ICDP was 8.2 E-5.

A review of the licensee's risk management actions (RMAs) indicated the following deficiencies :

a. RMAs did not contain actions to provide increased risk awareness and control such as coordinating switchyard and other yard work activities that could affect availability of offsite power source; obtaining management review and approval of the proposed maintenance work; coordinating work activities with those assigned to offsite organizations; and requiring risk assessments prior to conducting maintenance activities and applicable risk management guidance.

b. RMAs did not contain actions to reduce duration of maintenance activity such as verifying and pre-staging parts, materials, tools and other equipment; to encourage performing maintenance work during back shifts as well as day shift; and to establish contingency plans to restore out-of-service equipment (or functions) rapidly if needed.

c. RMAs did not contain actions to reduce the magnitude of a risk increase such as minimizing work that could affect the frequency of initiating events which are mitigated by out-of-service SSCs; to establish alternate success paths to for performance of the safety function of the out-of-service SSC; to minimize work that could affect redundant systems; to develop administrative controls to ensure that backup equipment is protected; to establish other compensatory measures; and to re-prioritize and/or reschedule maintenance activities.

d. RMAs did not establish risk thresholds so that risk significant configurations are not normally entered voluntarily.

The risk deficit (ICDPD) can be calculated as corrected ICDP - original flawed ICDP = 8.2 E-5 - 1 E-5 = 7.2 E-5.

In order to determine the significance, using Table 1 determine the SDP color. For ICDPD = 7.2 E-5, the SDP color is Yellow.

Then using flow chart-1, follow the decision block for ICDPD for 1E-5-1E-4. In accordance with the flow chart, determine how many categories of RMAs are taken for the above configuration.

The categories of appropriate RMAs in accordance with SDP guidance in section 4 are:

a. Increased risk awareness and control
b. Reducing duration of maintenance activity
c. Minimizing magnitude of risk increase
d. Establishing other compensatory measures to provide alternate success paths for maintaining the safety function of the out-of-service SSC (e.g., using diverse means of accomplishing the intended safety function).

Based on the deficiencies identified in all 4 RMA categories, as discussed above, no credit is given for risk management actions. Therefore, the final significance color is Yellow.