



3.0 SIGNIFICANCE DETERMINATION

3.1 Purpose

This section provides several possible ways to determine the depth and amount of effort that should be used for reviewing and/or evaluating a particular OR.

3.2 Scope

This guidance is designed to be used by a facility and/or site to select a process (methodology) from several local options in order to determine the significance of an occurrence.

3.3 Guidance

The criteria in DOE Manual 232.1-1 define what is to be reported. The criteria, by their very nature, cannot always relate the significance of a particular occurrence. For example, improper maintenance of Safety Class SSCs could range from a simple clerical error to rendering the equipment inoperable. It is important to have this reported promptly in either case. However, a simple clerical error would not warrant the same depth of an evaluation (in general) as the case in which the equipment was broken.

A process (methodology) is needed to determine the significance of the occurrence during the evaluation phase so that resources can be effectively allocated. There are several methodologies available that can be used. It is important that a consistent methodology be applied.

A significance determination can be used in many different ways to add to the overall occurrence reporting process, for example:

- Trending. In the evaluation process one can determine what actually happened and if it was significant. This is an added dimension to the trending of just the number of Off Normal and Unusual Occurrences because it gives the importance of the occurrences and allows early identification of problems or adverse trends.
- Root Cause Analysis. A significance determination can be used to determine if a more formal and/or detailed root cause analysis is warranted. Most sites have a limited number of individuals who are qualified to complete the more detailed root cause analyses. It is important to have a plan to ensure that these individuals' skills are used effectively (i.e., required to perform a detailed root cause analysis for only the most significant occurrences).
- Potential Significance. Many times it is useful to look at an occurrence to determine if it is a precursor to a much more significant event. The methodology used for significance determination can also be used to determine the potential for a similar occurrence, but assumes a different operating condition or an additional single failure.





3.4 Possible Methodology for Significance Determination

There are many methodologies to help determine the significance of an occurrence. Some are more formal than others, but they all are dependent on knowledgeable people making informed judgments.

If a site or contractor chooses to use a significance determination process, only one methodology should be used. In addition, the methodology should be documented in a controlled procedure and the determination analysis documented.

Two possible methodologies are suggested:

- Significance Categories Matrix - Table 3-1. A matrix is developed where examples are used to determine the significance (i.e., actual and potential) of an occurrence. These examples are broken down (rows) into logical areas such as personal safety, releases, etc. The significance (columns) are predefined judgments that cover the complete range from a significant (major release) to a minor occurrence. The first example matrix, Table 3-1, was developed by the Westinghouse Savannah River Company and has been successfully used for several years.
- Priority Planning Grid (PPG) - Table 3-2. This is a matrix that is derived from a risk-based, structured, evaluation process that combines undesired consequences with probabilities to determine risk. The second example matrix, Table 3-2 (PPG), lists attributes in rows, such as compliance, worker safety, public safety, and consequences in columns, such as violation of law, violation of order, injury, or exposure. Once the attribute is combined with the consequence, a probability range is established. The result is a numerical risk value that is used to determine the level of causal analysis required, the need for lessons-learned evaluation, and requirements for verification and closeout of corrective actions. The PPG is currently in use by the Westinghouse Hanford Company.



Table 3-1 - Significance Categories Matrix (sheet 1 of 3)

SIGNIFICANCE CATEGORIES							
Definitions	A	B	C	D	E	F	G
Actual	Very Serious Consequences	Serious Consequences	Significant Consequences	Conditionally Significant Consequences	Minor Consequences	Slight Consequences	Low Significance
Potential	Very Serious Hazard Potential	Serious Hazard Potential	Significant Hazard Potential	Hazard Potential	Significantly Reduced Safety Margin - Safety System Degradation	Reduced Safety Margin	Process Efficiency
SAFETY							
I. Personnel Safety							
1. Injuries	≥5 Fatalities	Fatality	≥5 LWCs	LWC	RWC	MTC	-
II. Health Protection							
1. Occupational Exposure							
a. Individual Dose, rem(a)	100	25	5	1.8(b)	0.6	0.3(c)	-
b. Extremity, Skin Organ, rem	1000	250	50(d)	1.5	5	2.5	-
c. Workplace Control ALI(c)	20	5	1	-	0.1	-	-
d. Chemical Exposure	≥5 Fatalities	Fatality	IDLH(f)	PEL(g)/TLV(h) /STEL(i)/C(j)	-	-	-
III. Environment							
1. Environment	-	Significant Offsite Consequences	NOV with Fine Sig. Onsite Consequences	Notice of Deficiency	Permit Exception	-	-
2. Public Exposure							
a. Individual Dose, rem(a)	1.0	0.5	0.1	0.025	0.01	0.002	-



Table 3-1 - Significance Categories Matrix (sheet 2 of 3)

SIGNIFICANCE CATEGORIES							
Definitions	A	B	C	D	E	F	G
Actual	Very Serious Consequences	Serious Consequences	Significant Consequences	Conditionally Significant Consequences	Minor Consequences	Slight Consequences	Low Significance
Potential	Very Serious Hazard Potential	Serious Hazard Potential	Significant Hazard Potential	Hazard Potential	Significantly Reduced Safety Margin, Safety System Degradation	Reduced Safety Margin	Process Efficiency
b. Population Dose, Person-rem	500	100	50	10	2	-	-
c. Thyroid Dose, rem	15	1.5	0.3	0.1	-	-	-
d. Chemical Exposure	Fatality	EEG(k)	-	-	-	-	-
IV. Limit							
Nuclear Safety	Event with Fatality	Event	OSR/Tech. Spec. (DOE Auth. Start-up)	Other OSR/Tech. Spec Tech. Std.	NSC	-	-
Other	-	-	OSR (DOE Auth. for Restart)	Other OSR/Tech. Std.	Significant Operation Limit	-	-
V. Emergency Preparedness							
1. Failure to respond properly to:	-	General Emergency	Site Emergency	Alert	Unusual Event	-	-
VI. SNM Accountability							
1. Accountability	-	-	Missing Item	Alarm Limit	-	-	-
NON-SAFETY							
VII. Productivity/Equipment							
1. Equip/Inst. Damage	>\$75 MM	>\$50 MM	>\$5 MM	>\$1 MM	>\$250 M	>\$100 M	-



Table 3-1 - Significance Categories Matrix (sheet 3 of 3)

SIGNIFICANCE CATEGORIES							
Definitions	A	B	C	D	E	F	G
Actual	Very Serious Consequences	Serious Consequences	Significant Consequences	Conditionally Significant Consequences	Minor Consequences	Slight Consequences	Low Significance
Potential	Very Serious Hazard Potential	Serious Hazard Potential	Significant Hazard Potential	Hazard Potential	Significantly Reduced Safety Margin, Safety System Degradation	Reduced Safety Margin	Process Efficiency
2. Downtime /Lost Prod.	>1 yr.	> 6 mo.	>3 mo.	>1 mo.	>2 wks.	>3 days	-
(a) External Dose plus Committed Effective Dose Equivalent							
(b) External Dose Greater than SRS Goal: or Intakes Resulting in >100 mrem Effective Dose Equivalent in the First Year							
(c) Tritium bioassay result >20uCi/l							
(d) Limit for dose to eyes = 15 rem							
(e) Annual Limit of Intake							
(f) Imminent Danger to Life and Health							
(g) Permissible Exposure Limit							
(h) Threshold Limit Value							
(i) Short Term Exposure Limit							
(j) Ceiling (Concentration)							
(k) Emergency Exposure Guide							



Table 3-2 - Priority Planning Grid Matrix (sheet 1 of 3)

GRADED APPROACH TO CORRECTIVE ACTION							
Priority Planning Grid Value	Priority Actions	Action to Correct Specific Conditions	Corrective Action 1,4				
			Root Cause Analysis		Lessons Learned	Close-Out	Follow-Up
			Minimum Training Requirements 2	Procedure Documentation Requirements	Evaluate if Conditions Exist Elsewhere	Verification That Action was Acceptably Completed, By:	Verification of Effectiveness Corrective Actions
PPG > 25	Immediate Action; Consider Stop Work and Stabilization of Operations/ Activity. Notify RL Program .	Yes	At Least One Person in a Group Must Have Had a Week of Formal Training in Root Cause Analysis	Formal Proc. Supported by Detailed Documentation of Methodology, Analysis, and Results	Review Within Level 2 Org. and Across WHC SiteWide Activities in Applicable Locations	DOE-RL	Yes, on Sampling Basis by Cognizant Organization and by the Applicable Oversight Organization During Audits and Surveillances
< 25 & > 11	Prompt Action; Evaluate Acceptability of Continuing Works Activity	Yes	At Least One Person Must Have Had One-Day Orientation Course in Root Cause Analysis Techs.	Formal Proc. and Documentation of Conclusions	Review by Other Groups Within the Same Level 2 Organization where Applicable Activities are Involved	Applicable 5 Oversight Organization	None Required - Data Should be Used to Direct Oversight Activity Planning
< 11 & > 6	Routine Action and Response	Yes	No Formal Training Req'd. Will Normally be Accomplished Using Simple Methodology	If Required by Governing Document, or at Discretion of Cognizant Manager	None Required	Responsible Organization Manager or Oversight Organization as Applicable	None Required
PPG < 6	Routine Action and Response	Yes	N/A	Not Required	None Required	Responsible Organization Manager	None Required

1. Action to correct underlying cause and prevent recurrence
 2. Accident investigator (AI) must be involved if required by DOE order
 3. Some governing documents, e.g., DOE Order 5000.2a {mrp 5.14} for off-normal occurrences, may require a degree of evaluation to determine cause and define corrective action
 4. Trending is required for all conditions including those with PPG < 6
 5. For DOE- initiated items, final close-out will be by the initiating organization or its representative



Table 3-2 - Priority Planning Grid Matrix (sheet 2 of 3)

Rank	1	2	3	4	5	6	7	8
Attribute	Base Score, Compliance Consequences (Score Only One)							
A. Federal and state laws, compliance with agreements and regulations enforceable with fines or criminal penalties.				* Willful violation of federal or state law: no action to report or correct the problem (50)	* Several instances of noncompliance that indicate major deficiency or lack of a compliance program * TPA milestone not met	* Isolated compliance or single noncompliance: no evidence of failure of compliance program	* Administrative noncompliance	** Evidence of noncompliance but no clear finding
B. DOE Orders, SENs, other requirements mandated by DOE, applicable CFRs, and implementing requirements for laws and regulations.				* Willful management disregard or direction to staff to disregard ESSQ requirements, policies, or procedures	* OSR/tech spec violation * Unreviewed safety question * Major loss of configuration control in nuclear facility * No or significantly deficient oversight program * Widespread failure of lack of one or more ESSQ programs	* One significant finding or several related noncompliances indicating a major deficiency or lack of part of a compliance program * Lack of attention to corrective action * Safety class equipment can't perform adequately * Technical analysis can't support conclusions needed for a compliance document	* Administrative noncompliance with requirement * QA documentation missing, but no evidence of technical errors * Isolated noncompliance but no evidence of failure in part(s) of ESSQ program	* Isolated failure to follow compliance oriented procedure * Evidence of noncompliance with requirements but no clear finding
C. Best management practice.							* Significant deviation from good practice that is recognized as an industry standard	* Minor deviation with or slow implementation of good practices * Failure to implement internal requirement



Table 3-2 - Priority Planning Grid Matrix (sheet 2 of 3, cont.)

Additional Potential Consequences (Score each applicable attribute)								
D. Public safety.	* Single loss of public life or permanent disability related to site operations		* Multiple offsite exposures greater than 100 rem or greatly in excess of IDLH	* Offsite exposure near limits * Moderate injuries	* Low-level radiation or chemical exposure	* Minor injury	* Public inconvenience	
E. Worker safety.		* Single loss of life to worker onsite (1500) * Permanent disability resulting in significantly degraded lifestyle		* Onsite exposures of 100rem or greatly in excess of IDLH * Injury with greater than 70 days of lost time	* Worker exposure above DOE limit * Injury with 7 to 70 days of lost time	* Exposures that exceed contractor limits and/or injuries that result in inpatient hospitalization	* Minor injury requiring first aid * Exposure will be below limits * Removable skin contamination	



Table 3-2 - Priority Planning Grid Matrix (sheet 3 of 3)

Rank	1	2	3	4	5	6	7	8
Attribute	Base Score, Compliance Consequences (Score Only One)							
F. Environmental protection.		* Major environmental damage beyond site boundary with >\$100M cleanup cost and long recovery time	* Major onsite environmental damage with cleanup cost >\$100M * Offsite damage with cleanup cost >\$25M	* Environmental damage with cleanup costs >\$1M	* Environmental damage with cleanup costs on order of \$250,000	* Releases to environment that exceeds regulatory limits	* Reportable release to environment with very minor or no impact	
G. DOE mission impact.				* Vital program interruption >6 months (50)	* Vital program interruption of 1 to 6 months		* Failure to meet DOE-HQ milestone	* Failure to meet internal milestone or award fee goal
H. Cost impact.				* Equipment or facility damage >\$25M (40) * Increased operating costs >\$5M/yr (40)	* Equipment or facility damage from \$5M to \$25M * Increased operating cost from \$1M to \$5M/yr	* Equipment or facility damage from \$1M to \$5M * Increased operating costs from \$200,000 to \$1M/yr		* Equipment or facility damage much less than \$1M * Increased operating costs much less than \$200,000
I. External reaction.				* Congressional hearings (40)	* Public demonstrations * National headlines * High level DOE-HQ or state official conducts formal investigation	* Public writes to Congress * Regional front page news * GAO asked to investigation * High-level DOE-HQ or state official demands action	* Special interest groups show interest * Press calls for interview * Regulator involved in corrective action	* Press release issued: little or no public interest * DOE-HQ calls with questions



Table 3-2 - Priority Planning Grid Matrix (sheet 3 of 3, cont.)

Probability (frequency of happening)	Relative Risk Values							
	High (1.0) (occurs within 2 years)	3000	1000	300	100	25	10	5
Medium (.1) (likely to occur with facility lifetime)	300	100	30	10	2.5	1	.5	.1
Low (.01) (possible to occur with facility lifetime)	30	10	3	1	.25	.1	.05	.01
Very Low (.0001) (highly unlikely to occur)	.3	.1	.03	.01	.0025	.001	.0005	.0001