

Guidance on Use of Site Risk Analyses to Determine Environmental Liability Contingency

Introduction

Every year, EM is required to estimate the future costs of its cleanup mission as part of the Department's Annual Financial Report. For this liability estimate, EM uses the approved Life-Cycle Cost estimate as its starting point. EM then adds contingency to capture all known potential impacts to our projects and activities.

In past years, the annual environmental liability estimate has calculated contingency at the PBS level through the use of an uncertainty model: the assignment of integer-value scores to three types of uncertainty (project definition, innovation, and complexity) to determine the amount of contingency needed to reflect the state of each site's PBSs. For FY 2011, EM plans to use risk analyses based upon the site's Monte Carlo calculations for estimating contingency costs.

Objectives

The reasons for moving to site-generated contingency estimates to support the FY 2011 environmental liability are:

1. It provides a more realistic representation of contingency.
2. It is consistent with DOE and EM guidance.
3. It provides a more comprehensive listing of risks (threats and opportunities) that are specifically identified and assigned to each site.
4. It ensures that contingency estimates are based on risks within the site's control and approved scope. Those risks that should be managed by the EM Program would be assigned to EM-HQ.
5. It ensures that risk-based analyses cover the phases of each project/activity over their life-cycle.
6. It provides traceability between the calculated contingency and the cost profile components in IPABS.

Use of Site Risk Management Documentation

Contingency estimates should be based upon calculations performed on all projects/activities throughout their life-cycle. DOE guidance and EM policy recommends the use of probabilistic risk analyses to estimate the required contingency, consistent with each sites' RMPs, which detail the process to identify risks and estimate the required contingency. Each site must produce one or more RMPs, developed with a clear delineation between the risks associated with the current contractor performance period and the risks associated with the remaining life-cycle. Each site maintains, and periodically updates, risk management documentation consisting of RMPs, Risk Registers, and risk analyses. The Risk Registers identify and assign all key risk factors applicable to a project or activity. These risks are used as "inputs" to estimate contingency costs. The stochastic risk analyses result in estimates of contingency during each of the project's or activity's life-cycle phases. This year's environmental liability will be based upon contingency estimates derived from the site's risk documentation.

Updating IPABS to Reflect High Confidence Life-Cycle Cost Estimates

During FY 2010, EM and the sites established capital projects and operating activities under each PBS for all applicable Base programs which are reflected in EM's corporate data warehouse – IPABS. The sites allocated costs among specific categories to all projects and activities. During the contract period, detailed cost profiles for each key category were established, reviewed, and placed under change control. During the out-years, costs were estimated collectively. The categories of life-cycle costs in IPABS include:

Approved 50 Percent Confidence	Approved 80 Percent Confidence
Performance Measurement Baseline Other Direct Costs Award Fee Management Reserve Funded Contingency	Unfunded Contingency

These cost categories form the life-cycle cost profiles at the median (50 percent) and high (80 percent) confidence levels, which are maintained under change control for the contractor performance period and configuration control for the out-years.

To determine the environmental liability for the current fiscal year, EM begins with the approved life-cycle cost profiles from IPABS cost categories comprising the approved 50 percent Confidence estimate. For capital projects, IPABS generally captures the contingency estimates in the “Funded Contingency” profile, at 80 percent confidence. No further contingency is necessary for the environmental liability estimate.

For operating projects, IPABS generally captures the contingency in the “Unfunded Contingency” profile. Since operating activities provide the largest contribution to the liability cost estimate, additional contingency may need to be added. This additional contingency is the increment between the median and high estimates, determined from risk analyses.

Any contingency added to EM's cost estimate for the FY 2011 environmental liability will be captured in a separate IPABS cost profile, in order to avoid potential impact to the approved cost baseline. The Environmental Liability Contingency profile will initially contain the existing Unfunded Contingency estimate values from the Cost Module in IPABS.

Figure 1 displays example IPABS cost profiles for further clarification of the information to be used for the FY 2011 environmental liability estimate. The data in the Figure is intended for illustrative purposes.

Figure 1. Example Cost Profiles in IPABS (Illustrative only). Costs in Constant 2010 Million Dollars.

Site: Paducah		PBS: PA-0040		Sub-PBS: PA-0040.O1		Type: Operations	
Cost Profile	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017 ...	End Project
PMB	62.2						
ODC	6.0						
Fee	4.0						
MR	1.5						
Funded C	0.0						
Appr. 50%	73.7	80.9	109.0	155.4	182.6	176.7	41.9
Unfunded C	10.0	2.0	2.0	2.0	2.0	3.6	2.1
Appr. 80%	83.7	82.9	111.0	157.4	184.6	180.3	44.0
Site: Richland		PBS: RL-0012		Sub-PBS: RL-0012.O1		Type: Operations	
PMB	4.9	4.9					
ODC	0.0	0.0					
Fee	0.3	0.4					
MR	0.4	0.3					
Funded C	0.0	0.0					
Appr. 50%	5.6	5.6	7.2	5.1	4.9	5.3	5.7
Unfunded C	0.0	0.0	0.04	0.01	0.001	-0.02	5.5
Appr. 80%	5.6	5.6	7.24	5.11	4.901	5.28	11.2
Site: Savannah River		PBS: SR-0014C		SubPBS: SR-0014C.O1.1		Type: Operations	
PMB	642.1	632.2	621.1	562.4	502.1	460.1	0.0
ODC	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fee	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Funded C	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Appr. 50%	642.1	632.3	621.1	562.4	502.1	460.1	0.0
Unfunded C	0.0	0.0	0.0	0.0	203.5	198.2	147.8
Appr. 80%	642.1	632.3	621.1	562.4	705.6	658.3	147.8
Site: Richland		PBS: RL-0041		SubPBS: RL-0041.C1		Type: Capital	
PMB	189.6	54.3	0.0	0.0	0.0	0.0	0.0
ODC	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fee	4.7	28.2	0.0	0.0	0.0	0.0	0.0
MR	44.6	74.2	0.0	0.0	0.0	0.0	0.0
Funded C	0.0	79.8	273.4	158.5	60.0	15.4	0.0
Appr. 50%	238.8	236.5	273.4	158.5	60.0	15.4	0.0
Unfunded C	0.0	0.0	0.0	4.9	52.4	50.1	7.2
Appr. 80%	238.8	236.5	273.4	163.4	112.4	65.5	7.2
Site: River Protection		PBS: ORP-0060		SubPBS: 01-D-16A		Type: Line Item Capital	
PMB	51.9	40.6	41.0	42.3	61.6	57.5	0.0
ODC	1.6	1.6	1.5	1.5	1.4	1.4	0.0
Fee	2.4	2.3	2.3	8.6	2.1	2.1	0.1
MR	4.3	3.5	2.4	3.0	10.3	7.7	0.0
Funded C	0.0	0.0	8.9	4.3	3.4	8.6	35.9
Appr. 50%	60.2	48.0	56.1	59.7	78.9	77.2	36.0
Unfunded C	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Appr. 80%	60.2	48.0	56.1	59.7	78.9	77.2	36.0

Abbreviation Key: PMB=Performance Measurement Baseline; ODC=Other Direct Costs; Fee=Contractor Award Fee; MR=Contractor Management Reserve; C=Contingency; Appr. 50%=Total Approved 50% Confidence

The environmental liability estimate also includes costs associated with pending CRs and environmental liability estimates. IPABS will use the Unfunded Contingency profile associated

with all pending CRs as part of the liability estimate. In addition, the costs associated with an environmental liability adjustment are expected to be conservative to account for contingency costs within the adjustment estimate.

Guidance on Risk Registers

It is preferable that project risks be managed strictly within each project's or activity's existing scope. However, there will be cases where risks extend beyond the standard risk management conventions. The following guidance, applicable to the most common of these risks, applies to each site's Risk Registers.

1. Risks must be appropriately assigned to HQ, site Federal, and site contractors. Risks assigned to EM-HQ will not be evaluated as part of the site's risk analyses. EM-HQ will calculate contingency from programmatic risks and report estimated contingency costs from these risks separately.
 - a. Programmatic Risks are risks that are common to a number of sites and are beyond the ability of a site to control. Although these risks may require individual mitigation or handling strategies for each site independently, they will be managed at the Program level. The cost and schedule impacts of programmatic risks should not be included in a project's contingency estimates for the environmental liability. Such risks include:
 - Closure of Waste Isolation Pilot Plant;
 - Availability of a national repository for SNF and HLW;
 - Changes in funding levels; and
 - Unknown-unknowns.

Certain EM-HQ risks affecting sites, which are outside of the approved scope of a project or activity, would not be calculated by EM-HQ unless the risk is more likely than not to be realized.

- b. Risks Outside of Current Approved Scope are the result of the highly uncertain nature of EM cleanup projects and activities. There is always the possibility for scope to grow due to unknown and unplanned events. These risks arise from significant increases to the scope of a project, rather than the realization of risks from the conduct of approved work scope. In these cases, sites should include new scope risks as part of their risk analyses, if the likelihood of such new scope is more likely than not (i.e. greater than 50 percent chance of occurring). These risks should not be used in the development of a project or activity contingency, but rather addressed separately through an environmental liability adjustment. Examples of these risks include:
 - Site mission changes;
 - Reprogramming;
 - Regulatory or NEPA changes; and
 - DOE and EM directives.

- c. Interdependent Risks are risks that can be shared between two different sites or between a site and EM-HQ. Only that portion of the risk within the site's control should be evaluated.
 - Cross-project risks that involve interrelationships between different projects at the same site, and
 - Co-dependent project risks are generated when intermediate deliverables interlock in such a way that if both projects are not successfully completed, neither can be successfully completed.
2. Risks must be identified for all phases of a project's or activity's remaining life-cycle. It is expected that near-term risks will be more comprehensive and definable than out-year risks.
3. Regulatory risks should be assigned to EM-HQ if they involve DOE or other Federal agency policy deliberations. As Risk Registers are reviewed and/or updated, EM-HQ and the sites should discuss assignment of some or all of these regulatory risks to EM-HQ.
4. Risks for similar activities conducted at different sites should be consistent to the greatest extent possible.

Guidance on Risk Analyses

For the next RMP and related risk documentation updates, each site will revise its risk documentation to reflect this guidance, applicable to Risk Registers and risk analyses. At a minimum, the following guidance shall be applied in updating stochastic risk analysis documentation.

1. Ensure clear delineation of contingency (contractor and DOE) at both 50 percent and 80 percent confidence levels. Risk analyses must capture all contingency costs, whether or not the site assigns Management Reserve (MR) to future contractors in the out-years, or combines MR and contingency in the timeframe beyond the current contract performance baseline.
2. Ensure risks are estimated over the full life-cycle of each project and activity.
3. Ensure consistency of risk analyses for ARRA and Base, and operations and capital cleanup/asset projects.

To limit the need for IPABS Cost CRs, the IPABS Environmental Liability Module will be updated to accept these risk-based contingency costs separately. These contingency estimates will then be used for the environmental liability estimate. Modifications to IPABS are currently under development and testing. Additional guidance detailing the process for entering these additional contingency costs into IPABS will be provided separately, once the required modifications to IPABS are completed.

Risk analyses must be consistent with the sites' Risk Registers and must consider the following guidance:

1. Cost estimates for sub-PBS projects and activities must sum correctly to the PBS level of detail.
2. Estimates must capture contingency costs, assigned both to contractors and to site Federal managers. Only those risks within the scope and control of the site or its contractors should be considered in the analyses.
3. Estimates must cover all activities for the remainder of the life-cycle of the project.

4. Non-project PBS activities (e.g. safeguards and security) would include contingency estimates as necessary for those risks within the site's control. Future risks, such as a change in the design basis threat, should limit contingency estimates to what is more likely than not to occur and not anticipate worst-case scenarios.
5. For IPABS use, costs must be annualized or time phased to allow for correctly de-escalating contingency estimates. IPABS currently requires MR and contingency values to be entered in current year dollars. Cost estimates must be able to be captured and/or converted into constant year dollars.
6. Estimates for long-term stewardship costs may use either uncertainty-based calculated contingency or risk-based analyses. LTS activities primarily involve monitoring to ensure effective cleanup costs, but typically extend to times well into the future, making estimates unreliable.

Key Activities and Schedule

The risk-based contingency estimates will be used to report the life-cycle cost estimates for EM's environmental liability in the third and fourth fiscal quarters. This is when DOE provides its current estimates for independent review. On March 22, 2011, EM-HQ met with the CFO and the independent auditors to inform them of the intent to change over from the uncertainty score approach.

The initial request from this guidance is to ask the sites to provide EM-HQ with electronic copies of its current risk documentation. EM-HQ will coordinate with all sites to provide clarification to this guidance, to identify if changes are needed to sites' risk management documentation, and to determine an appropriate schedule needed to update risk registers/risk analyses and update additional contingency cost profiles in IPABS.

Beginning in March 20, 2011, and throughout the environmental liability process, EM-HQ will assemble staff from EM-10, EM-50, EM-60, and other offices as needed, to assess the adequacy of each site's risk management documentation and to ensure risk-based contingency estimates are captured in the Environmental Liability Module in IPABS. Coordination among EM Small Sites will be provided by the EM-Consolidated Business Center and among NNSA Sites by the NNSA Service Center. The Environmental Liability Contingency cost profile in the IPABS Environmental Liability Module will be initially populated with each project's and activity's Unfunded Contingency estimates.

Third Quarter Draft Estimate (end June): Before the end of the third quarter reporting period, sites should complete updates to their Risk Registers and begin risk analyses to reflect project-owned risks. In addition, sites should update the Additional Contingency profile in IPABS, as necessary, to implement the above guidance.

Fourth Quarter Final Estimate (end September): Before the end of the fourth quarter, sites should have finalized or be near final in updating their Risk Management documents. Most notably, updated risk analyses should be completed. Any necessary updates to the Additional Contingency profile in IPABS should be completed for incorporation into the final environmental liability cost estimate.