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1.0 PURPOSE AND SCOPE

1.1 Purpose

The purpose of this Enterprise Risk and Opportunity Management Plan (EROMP) is to ensure that risk and opportunity (R&O) identification, assessment, and handling are incorporated into the management and decision-making strategies of Washington River Protection Solutions, LLC (WRPS) as they relate to Tank Operations Contractor (TOC) work scope defined in PBS-ORP-0014 managed by the U.S. Department of Energy (DOE) Office of River Protection (ORP). The EROMP supports the effective management and execution of TOC scope to minimize cost and schedule through the minimization of risk impacts and the maximization of opportunity benefits that are inherent in the TOC life-cycle scope, schedule, and cost baseline. This EROMP describes how and by whom the Enterprise Risk and Opportunity Management (EROM) Framework will be applied to the River Protection Mission and serves as an example of how the EROM Framework can be executed throughout WRPS. This document also establishes the hierarchy and methodology for managing R&Os at the lowest acceptable management levels consistent with the importance and value of those R&Os to the WRPS enterprise.

This EROMP builds upon the approach set forth in a companion document, EROM Framework, which provides information and guidance on the EROM process. The EROM Framework and this plan will be used together to communicate the WRPS EROM processes and objectives, and R&O information pertaining to “cross-cutting” decisions with ORP and other Hanford Site contractors, and pertaining to decisions within the WRPS management chain. TFC-PRJ-PC-C-13 describes the application of the EROM Framework process at both the River Protection Project (RPP) mission level and at the program and project levels.

Additional Risk & Opportunity Management Plans (ROMP) will be written as needed by various programs and projects being executed within WRPS to describe in more detail how the EROM Framework processes are applied to these endeavors.

1.2 Scope

The WRPS contract requires WRPS to capture R&Os associated with ORP’s mission technical baseline. The existing baseline undergoes frequent revision to change and adapt to changing conditions and assumptions. For the purpose of this plan the technical baseline selected for review and analysis is the Base Case as documented in the River Protection Project System Plan, ORP-11242.

This EROMP describes how the WRPS EROM process defined by the EROM Framework and the tools available to implement the process will be implemented for the RPP mission elements of the WRPS Enterprise (see Figure 1). The primary focus of this EROMP is upon the approach to analyze the RPP mission (level 0). This includes how risks or opportunities (R/O) will “roll up” from programs, projects, or other tasks to the enterprise level, reporting forms, and formats. Even though the basic EROM process is the same for both Mission and Programs/Projects, there are some differences in how the process will be implemented. Where differences exist, they will be documented throughout this EROMP.

This EROMP satisfies the requirement sources and uses a graded approach to follow the guidance listed below:
This EROMP does not address the process for identification and handling of environmental, safety, health, and quality risks and hazards at the work execution level. However, programmatic or project specific R&Os related to these areas may be captured and managed if they impact program or project goals/objectives.

This EROMP is considered a “living document” (to be updated as necessary), under configuration management control, with appropriate integration into WRPS strategic initiatives being executed. The process of managing mission R&O is iterative.

**Figure 1. WRPS Enterprise Risk and Opportunity Management Scope.**
2.0 **EROM PROCESS**

The EROM process is described in detail within the WRPS EROM Framework and the WRPS Risk and Opportunity Management Procedure. The Framework and procedure provide guidance and direction for the implementation of the EROM process throughout WRPS. The five steps of the EROM process summarized in Figure 2 and are defined and explored in greater detail within these documents.

**Figure 2. The Basic R&O Management Process.**

![Diagram](attachment:image.png)

This basic process is applicable at all levels of R&O management within the WRPS Enterprise, whether it be at the mission level or any level below (i.e., program, project, or other activity). The primary differences between the hierarchical levels at which R&Os will be managed is the change in focus and level of rigor with which the following five process steps are performed (e.g., process is applied using a graded approach):

1. **Plan** – This phase focuses on establishing a plan for what process will be used and how the process will be implemented for an enterprise. Examples of important elements that must be addressed in this step are: A) defining the process to be used, B) establishing assessable elements, C) defining evaluation criteria for the assess step that will follow, D)
2. Identify – Events and conditions that could have a negative impact (risks with consequences) or a positive impact (opportunities with benefits) on enterprise goals and objectives are identified during this step. Various techniques are used to capture clearly defined R/O statements that include three important elements: A) Context, B) ‘If…Then’ Statement, and C) Title.

3. Assess – R&Os are then evaluated and prioritized qualitatively against Likelihood and Consequence/Benefit criteria. Using predefined matrixes, R&Os are scored simply as High, Medium, or Low. Quantitative analysis may also be performed for those R&Os considered to be potentially and substantially impacting enterprise objectives. Where quantitative analysis is performed, the analysis of technical and programmatic R&Os forms the basis for management reserve (MR) and contingency recommendations. Quantitative analysis of R&Os is also part of managing R&O on line item projects. Understanding the cause of risk is key to selection of effective handling actions.

4. Handle – Strategies are then developed to minimize risk impacts and maximize opportunity benefits. An essential part of this step is the evaluation of any residual risk or opportunity using the same process performed during the Assess step described above. The potential cost, schedule, and performance impacts of handling strategies and residual risks are determined during this phase and provide a basis for cost and/or schedule baseline changes and residual risk-based cost and/or schedule contingency estimates.

5. Monitor/Control – This phase captures all of the elements (e.g., implementing handling strategies, tracking and trending, reporting) that must take place to ensure successful implementation of the process throughout the enterprise.

The following sections provide detail on how this process is applied at the mission level as it relates to the categorization and analysis of risks and opportunities within PBS-ORP-0014. WRPS programs and projects will apply the EROM Framework in a similar manner.

2.1 R&O Planning

The TOC mission, managed by WRPS under the purview of ORP, is a multi-year project to effect clean-up of the liquid waste within the Hanford Tank Farms and the ultimate disposal of low-level waste (LLW) on the Hanford site and the removal of high-level waste (HLW) to an alternate site as yet to be determined. To accomplish this mission the project baseline summary (PBS) can be divided into six functional areas that effectively represent the high level mission.
This functional breakdown can further be defined as the mission assessable elements allowing the entire mission to be efficiently assessed and to ensure a complete and holistic approach.

Figure 3 presents the Mission level assessable elements selected. High level functions represent “what” must be done to execute the mission and are sources of risk “assessable elements.” The assessable element structure shown also includes functions performed by programs and even major projects (architecture) to deliver the mission.

The Mission level assessable elements include several that are not within direct control of WRPS (e.g., ‘Red Borders/Fill’ elements that are primarily associated with Waste Treatment and Immobilization Plant (WTP)) that might impact the ability to execute the TOC contract. A Mission Integration organization has been formed to help manage the interface between the TOC and WTP, and drive down risk impacts and maximize opportunity benefits. Operation of the Mission Integration Risk Management Team is outlined in RPP-52149, “One System Risk Management Team (OSRMT) Charter.

Figure 3. WRPS Mission Level Assessable Elements.
Programs and projects can determine their assessable elements in a similar manner through consideration of the functions and architecture associated with them. Some typical categories of uncertainty are included in Attachment A.

Successful execution of the TOC mission will require the deployment of new facilities and processes, modifications of existing facilities and infrastructure, and system and equipment replacement and maintenance. In addition to ongoing facility operations, projects will be initiated and implemented throughout the TOC mission timeframe to ensure successful mission execution. R&Os associated with individual programs and projects are addressed through individual ROMPs as described in the EROM Framework and the WRPS Risk Management Procedure.

Figure 4 shows the assessable element translation into the RPP mission and WRPS programs and projects. At the mission level one can see the top level RPP mission functions. The program level shows the alignment of programs with sibling RPP mission functions/architecture. One can also see how the Mission Integration organization cross cuts RPP mission level functions to ensure integration of the TOC with WTP. The project level shows a snap shot in time of the alignment of projects with TOC programs and RPP mission functions/architecture. The diagram is not intended to convey a status regarding register development; this will be communicated in WRPS monthly status reports.

Figure 5 attempts to show conceptually how the Systems Engineering identified RPP mission assessable elements can be flowed to form the basis for the Tank Waste Disposition Integrated Flowsheet (TWDIF) and how the application of common performance related cause-effect analysis can be applied to result in an RPP Mission cause-effect diagram. Major branches of the
RPP mission cause-effect diagram form the basis for selected TOC programs and the associated sibling project risk source.

Cause-effect diagrams should be used by programs and major projects as a starting point to help them identify sources (cause) of R&Os. The cause-effect diagrams function as a “strawman” to facilitate integrated project and program team member R&O identification, characterization, and assessment workshops. They also support the identification of handling actions.

Mission level risks align with top level functions and the architecture to perform them, and are related to availability/delays, performance/throughput, and interface quantity and quality (composition). Figure 6 is intended to illustrate the concept of how project, program, and mission level risks are related. Mission level risks can be thought of as being similar in concept to top level schedule summary bars or hammocks. Similarly, program level risks appear as consequences (effects) from the perspective of project level risks, which are causal to the program level risks. Program level risks can also be thought of as similar to mid-level schedule hammocks covering a set of discrete project level risks. The relationship or linkage between the mission, program, and project level risks is captured through use of cause-effect diagraming and through coding applied within the various registers.

Mission level risks are intended to be high level and broad in nature presenting a “top down” view of RPP Mission level uncertainty. Mission level R&Os are analyzed using Monte Carlo techniques to determine the level of contingency that should be held by ORP to execute the mission successfully. Examination of risk at the mission level is also intended to help improve senior management focus and prioritize work in the near term.

The overall mission will be impacted by the realization of R&Os at the individual program and project level. As R&O assessments are conducted of the programs and projects, the program and project managers along with the risk management organization have the responsibility to note R&Os that if realized would result in impacts at the next higher level (see Figure 7) to ensure they are appropriately captured and characterized by taking into consideration the mission hotel load costs, as well as at the program level taking into consideration program hotel load costs, and at the project level taking into consideration project hotel load costs. Figure 7 also illustrates how a single project level risk event that impacts the project critical path, could also impact the associated program’s critical path and even the associated portion of the mission critical path resulting in higher impacts at these levels. Section 3.1 provides more information regarding the roles and responsibilities of program and project personnel.
Figure 4. Assessable Element Translation into RPP Mission and WRPS Program and Projects.
Figure 5. EROM RPP Mission Register Development Process

The RPP Mission Register is developed as a result of the application of cause-effect analysis to the TWDIF.

Systems Engineering synthesis (transformation of functions into architecture [facilities]) is applied to the RPP Mission assessable elements resulting in a function/architecture flow block diagram also known as the Tank Waste Disposition Integrated Flowsheet (TWDIF).

Common causes of failure associated with each TWDIF element are captured in the RPP Mission level cause-effect analysis diagram.
Mission level risks tend to be broad in scope much like a top level schedule summary bar or hammock. Mission level risks are categorized broadly enough to account for the span of associated program level risks.

Program level risks tend to be narrower in scope than mission level risks, but still function like a mid level schedule hammock. Program risks are categorized broadly enough to account for the span of associated project level risks.

Project level risks tend to be very specific to aspects of project performance associated with development of the design, procurement, construction, testing, startup and operations.
Figure 7. Risk Impact Level Ripple Effect Example.

**Mission Level**
Includes Multiple Programs

Typical Mission Level Hotel Load
= $30 to $100 million/month

**Program Level:**
Includes Multiple Projects

Typical Program level Hotel Load
= $10 to $20 million/month

**Project Level:**
Includes Multiple Project Phases
Made Up of Discrete Tasks

Typical Project Level Hotel Load
= $1 to $4 million/month

Time

Mission Critical Path

Program Critical Path

Project Critical Path

Baseline Task Duration
Task Completion Delay

Assumption: Task is on critical path at all levels.
Hotel loads are examples and vary with Program and Project.
Figure 8 shows how ROMPs will be developed and executed within WRPS.

**Figure 8. WRPS ROMP Integration Strategy.**

The top down analysis is periodically compared with the “bottoms up” approach taken by programs and projects as they assess their R&Os. The reconciliation of the top down and bottoms up process helps ensure completeness and that the likelihood and consequence values assigned at the mission level “bound” the lower level program and project level R&Os.

The following guidelines have been developed for use by project managers, program managers, and mission R&O SMEs to help them determine how and when R/Os from the project level may be “rolled up” to a program level by also including them on the program level register, and when program level risks may be “rolled up” to the mission level by also including them within the mission level register. Even though certain project level R/Os may be rolled up to an associated program level, the R/O does not disappear from the project level register where it needs to be continually managed in addition to any program efforts. The same logic applies to the rollup of program level R/Os to the mission level. As an R/O is rolled up, the scope of the higher level R/O may be broadened to encompass multiple lower level sibling R/Os of narrower scope. Changes in R/O impact levels are communicated to the next higher level to ensure consideration during R/O assessments.
R&O roll up guidelines (see Figure 9):

1. R&O impact level. Project level R&Os assessed as high should be considered for roll up to the program level. Similarly, program level R&Os assessed as high should be considered for roll up to the mission level. High risks can bust schedules and/or budgets.

2. R&O pervasiveness. R&Os that cut across or involve multiple projects should be considered for roll up to the program level. Similarly, R&Os that cut across or involve multiple programs should be considered for roll up to the mission level.

3. R&O importance. R&Os of high importance to project execution success should be considered for roll up to the program level. Similarly, R&Os of high importance to program execution success should be considered for roll up to the mission level.

4. R&O handling. Project R&Os that cannot be successfully managed or difficulty is encountered handling them (e.g., funding shortfalls prevent handling action implementation) should be considered for roll up to the program level. Similarly, program R&Os that cannot be successfully managed or difficulty is encountered handling them should be considered for roll up to the mission level.

5) Compliance. Project R&Os that may result in noncompliance with regulatory and other requirements should be considered for roll up to the program level. Similarly, program R&Os that may result in noncompliance with regulatory and other requirements should be considered for roll up to the mission level.

Figure 9. Risk and Opportunity Roll Up Guidelines.
2.2 R&O Identification

Identification is an organized approach for determining R&Os that may impact the PBS scope. R&Os are identified using any number of techniques described in the EROM Framework including:

- Use of mission, program, and project level R&O data
- Use of R&O checklists
- Reviews of process or functional flow charts
- Interviews with SMEs
- Team brainstorming workshops
- Performance of premortem workshops
- Application of causal analysis.

Proposed R&Os are reviewed against the assumptions and uncertainties documented within the RPP system plan by subject matter technical experts. R/Os will be developed with sufficient detail to allow an outside party to understand clearly the event or condition which would lead to realization of the R/O. This detail will include at a minimum:

- Context: One or more paragraphs that provide a backdrop for discussion, concisely denoting the ‘who, what, where, why, when and/or how’ (latent condition(s)) of the situation surrounding the R/O being considered. Including this information will help in defining a basis for the cause of the R/O; this basis information is very helpful in developing an appropriate handling strategy later in the process. However, it is also important to focus only on pertinent information (i.e., being concise is generally better).

- ‘If…Then’ Statement: A single sentence that captures the R/O event(s) and condition(s) and its impact on one or more specific enterprise objectives. This would result in a statement that reads: If R/O event(s) (actions(s)) and condition(s) occur, then the impact, describing significant attributes of performance, cost, schedule, etc.

- Title: A short title which describes the R/O in terms of a newspaper headline. While not normally considered to be a part of the statement, a short title (i.e., no complete sentences) that adequately describes the R/O is essential for quickly locating a specific R/O among many in an R&O register. In addition, a good title communicates the essence of the R/O to stakeholders who may only be looking at titles in their reviews.

2.3 R&O Assessment

Assessment of R&Os consists of determining the likelihood of occurrence and the consequences or benefit of the realization of the R/O. To aid in the understanding and ease of communication of R&O data to a wide variety of process participants and stakeholders, grading criteria sets have been developed that establish qualitative grading criteria for likelihood, consequences and benefits for both Mission level R&Os and Program/Project level R&Os. These criteria were developed based on guidance from the WRPS EROM Framework.

The current WRPS contract scope executes only a portion of the overall TOC mission. R&Os in the future are expected to change and continue to evolve as the mission becomes further defined. Recognizing that execution of the mission will take multiple future contract segments, WRPS has taken a detailed look at the execution of their TOC, and through consideration of RPP Mission
level risks along with the development of project and program level risk registers, identified a top level cross-cutting risk register to better understand risk exposure during the contract.

The process to determine R/O ownership and accountability for handling actions is discussed in Section 3.4.

Table 1 presents the established likelihood assessment criteria for all WRPS R&Os whether they are Mission level, Program level, or Project level.

Table 1. Likelihood Assessment Criteria (All R&Os).

<table>
<thead>
<tr>
<th>Likelihood (L)</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Unlikely (&gt; 0 but &lt; 0.1)</td>
<td>Will most likely not occur in the life cycle of the Mission, program, project or activity.</td>
</tr>
<tr>
<td>Unlikely (≥ 0.1 but &lt; 0.35)</td>
<td>Will likely not occur in the life cycle of the Mission, program, project or activity.</td>
</tr>
<tr>
<td>Somewhat Likely (≥ 0.35 but &lt; 0.65)</td>
<td>Nearly equal likelihood of occurrence during life cycle of the Mission, program, project or activity.</td>
</tr>
<tr>
<td>Likely (≥ 0.65 but &lt; 0.9)</td>
<td>May occur sometime during the life cycle of the Mission, program, project or activity.</td>
</tr>
<tr>
<td>Very Likely (≥ 0.9 but &lt; 1.0)</td>
<td>Will likely occur sometime during the life cycle of the Mission, program, project or activity.</td>
</tr>
</tbody>
</table>

2.3.1 Mission Level R&O Consequence/Benefit Assessment Criteria

The criteria shown in Table 2 and Table 3 will be used to assess and grade Mission level R&Os for their impact.
Table 2. Mission Level Risk Consequence Assessment Criteria.

<table>
<thead>
<tr>
<th>Consequence (C)</th>
<th>Threshold Definition</th>
</tr>
</thead>
</table>
| Negligible      | • Minimal impact to overall PBS.  
                  | • Additional cost < $100M       
                  | • Mission Schedule extended < 1 month |
| Marginal        | • Minor impact to overall PBS.   
                  | • Additional cost ≥ $100M but < $500M  
                  | • Mission schedule extended ≥ 1 month but < 6 months |
| Significant     | • Some impact to PBS including major modification or repair to facility.  
                  | • Additional cost ≥ $500M but < $1B    
                  | • Mission schedule extended ≥ 6 months but < 12 months |
| Critical        | • Serious impact to PBS requiring major facility redesign or loss of ability to accomplish key objectives/milestones.  
                  | • Additional cost ≥ $1B but < $2B       
                  | • Mission schedule extended ≥ 12 months but < 24 months |
| Crisis          | • Catastrophic impact to PBS mission completion.  
                  | • Additional cost ≥ $2B               
                  | • Mission schedule extended ≥ 24 months |

Table 3. Mission Level Opportunity Benefit Assessment Criteria.

<table>
<thead>
<tr>
<th>Benefit (B)</th>
<th>Threshold Definition</th>
</tr>
</thead>
</table>
| Negligible  | • Minimal improvement to PBS.  
                  | • Cost savings < $100M        
                  | • Mission schedule reduced < 1 month |
| Marginal    | • Minor improvement to overall PBS.   
                  | • Cost savings ≥ $100M but < $500M  
                  | • Mission schedule reduced ≥ 1 month but < 6 months |
| Significant | • Some improvement to resulting in improved facility performance.  
                  | • Cost savings ≥ $500M but < $1B    
                  | • Mission schedule reduced ≥ 6 months but < 12 months |
| Excellent   | • Substantial improvement to PBS improving key facility performance or increased ability to meet objectives/milestones.  
                  | • Cost savings ≥ $1B but < $2B       
                  | • Mission schedule reduced ≥ 12 months but < 24 months |
| Exceptional | • Great benefit to PBS resulting in dramatically improved facility performance and multiple milestones achieved ahead of schedule.  
                  | • Cost savings ≥ $2B               
                  | • Mission schedule reduced ≥ 24 months |

The defined assessment criteria presented in Table 1 through Table 3 are then used to qualitatively grade R&Os at the Mission level using the grading matrix shown below in Figure 10.
Quantitative impact information is also developed for Mission level R&Os. This information is used by RPP Mission models to perform Monte Carlo simulations.

The following information must be determined for each R/O and captured within the WRPS EROM Mission Risk Register for Mission level R&Os:

1) Likelihood of R/O – Using the assessment criteria provided, the likelihood of the event occurring is defined along with a basis for that judgment. Initial R/O likelihood and residual likelihood after application of handling actions is captured.

2) Consequence/Benefit of R/O – In a similar fashion, the appropriate assessment criteria is used to define the consequence(s) of a risk or benefit(s) of an opportunity along with a basis for that judgment. Both initial consequence/benefit and residual consequence/benefit information after the application of handling actions is captured.

3) R/O Level – Using the qualitative grading matrix each R/O is evaluated as Low, Medium, or High based upon the assessed likelihood and consequence/benefit of that R/O.

4) Quantitative Impact Information – Quantitative impact information should also be captured along with the basis for developing risk-based cost/schedule contingency estimates as appropriate. The period of R/O exposure and activity(s) impacted should also be captured.

5) Basis for R&O Closure - The basis for closure of each R/O should be captured to preserve the rationale for closure. Generally speaking, R&Os will be closed when the period of their realization has passed.

6) Other register information includes:
   - R/O title
   - R/O description
- R/O SME and DOE coordinator
- Risk triggers
- R/O handling actions.

The results of all assessments are reviewed and confirmed by the appropriate responsible Manager.

After appropriate handling strategies are selected (see Section 2.4), each of the R&Os are assessed again based on the assumption that all related planned handling actions are completed successfully. The result of this second assessment provides a target residual R/O level for each R/O. Tracking and managing planned R&O handling actions to achieve target residual R/O levels is accomplished during the Monitor/Control step of the EROM Process (see Section 2.5).

Risk consequence and opportunity benefit criteria at the program and project levels are established by applying the EROM Framework in a similar manner to determine their specific grading criteria.

### 2.4 R&O Handling

Handling strategies must be identified for each “high” level R&O with the goal of integrating the causes of risks or helping to enable opportunity causes thereby cost effectively minimizing risk impacts and maximizing achievement of opportunity benefits. Ideally, handling actions should be within our control and not cause other problems. Available R&O handling strategies are shown in Figure 11.

![Figure 11. R&O Handling Strategies.](image-url)

No R&Os are to use an “accepted” strategy without investigation into alternatives for R/O handling strategies. The technical basis for proposed strategies should be referenced, and handling strategies broken down into specific action items. Each action item should be described in detail and assigned to specific owners with responsibility for ensuring the action is executed and monitored to completion. An estimate of the R/O handling strategy cost and the schedule for
action item completion must be included with the description of the action item when the action is not already included within the existing baseline.

2.5 R&O Monitoring/Control

R&O monitoring and control involves validation of R&O ownership, assessment, handling actions, and their implementation. R&O SMEs monitor mission execution and R&O triggers/R&Os, and associated handling actions to provide status information.

The status of the mission level R&Os will be reviewed and updated periodically throughout the TOC contract period. Section 4.0 discusses reporting details.

Analysis of the RPP mission is captured in a separate report. The report will describe the process used to identify and assess mission R&Os and document the results of Monte Carlo analysis.

Program and project R&O monitoring/control activities are determined by the individual program and project managers and documented in their ROMPs.

3.0 EXECUTION OF THE EROM PROCESS

3.1 Roles and Responsibilities

WRPS Work Area Managers, Work Area Project Managers, Task Project Managers, and supporting Department Managers are expected to understand the uncertainties, risks, and opportunities that are inherent in their assigned work scopes and to prudently apply the necessary actions to avoid, reduce, or eliminate risks and to take advantage of opportunities. These managers are also expected to understand the baseline change control process, including management reserve (MR), and contingency, and their relationship to R&O management.

The TOC Risk Management Program Manager is responsible for implementing the EROMP across the TOC. Work Area Managers, supporting Department Managers, Work Area Project Managers and Task Project Managers oversee the risk management activities in their work areas, including R&O analysis, coordination and facilitation of the R&O assessment process, and interface with the Integrated Project Team (IPT) members and DOE-ORP as required.

Overall R&O management responsibilities are summarized in Table 4. Specific roles and responsibilities are defined in the WRPS Risk Management procedure, TFC-PRJ-PC-C-13.
### Table 4. Risk Management Responsibilities Summary.

<table>
<thead>
<tr>
<th>Activity</th>
<th>EROM Board</th>
<th>Risk Management Program Manager</th>
<th>Work Area Manager&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Project Manager</th>
<th>R/O SME</th>
<th>IPT Member (R&amp;O Coordinator)</th>
<th>Project Team Member</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policies and Procedures</td>
<td>Oversight</td>
<td><strong>Responsible</strong></td>
<td>Contributes</td>
<td>Contributes</td>
<td>Contributes</td>
<td>Contributes</td>
<td>Contributes</td>
</tr>
<tr>
<td>Mission R&amp;O Planning</td>
<td>Oversight</td>
<td><strong>Responsible</strong></td>
<td>Contributes</td>
<td>Contributes</td>
<td>Contributes</td>
<td>Contributes</td>
<td>Contributes</td>
</tr>
<tr>
<td>Program R&amp;O Planning</td>
<td>Oversight</td>
<td>Contributes</td>
<td><strong>Responsible</strong></td>
<td>Contributes</td>
<td>Contributes</td>
<td>Contributes</td>
<td>Contributes</td>
</tr>
<tr>
<td>Project R&amp;O Planning</td>
<td>Oversight</td>
<td>Contributes</td>
<td>Contributes</td>
<td><strong>Responsible</strong></td>
<td>Contributes</td>
<td>Contributes</td>
<td>Contributes</td>
</tr>
<tr>
<td>R&amp;O Assessment</td>
<td>Oversight</td>
<td>Contributes</td>
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</table>

<sup>1</sup> Or supporting Department/Program Manager or Work Area Project Manager.

IPT = Integrated Project Team  
R/O = risk or opportunity  
R&O = risk and opportunity  
SME = subject matter expert

RPP Mission risks generally will have a subject matter expert (SME) assigned to them by a senior level manager that owns them. This SME can be located anywhere within the TOC organization, but is usually within the senior level manager’s organization. Program and project level risks are also generally assigned to a SME, but in these cases, the SME resides within the program or project.

Assigned SMEs not only have technical expertise related to the R&O, they ideally have some level of control over handling actions associated with their particular R/O.

Figure 12 shows the interaction between the various EROM activities by area of responsibility.
3.2 EROM Board

To help guide and facilitate the TOC transition to an EROM program, initially an EROM Steering Committee was assembled. Membership on this committee included the following WRPS personnel: Project Integration Manager, ESH&Q Manager, Tank Farm Projects Manager, Deputy Project Manager Office, and TOC Risk Management Program Manager.

The EROM Steering Committee transitioned into an EROM Board in fiscal year 2016. The EROM Board meets periodically to review the TOC cross-cutting risk register and significant program and project risks of interest.

3.3 Requirements for ROMPS (7.1.3)

All Category 1, 2, and 3 Projectized Operational Activity (POA) graded projects must have a documented R&O management plan (ROMP). Category 1 POAs and Line Item projects will require a qualitative and quantitative analysis consistent with DOE O 413.3B requirements. Category 2 and 3 POAs will exercise a graded approach based upon the complexity of the activity, and at a minimum will include a qualitative analysis. Their ROMP may also be a part of their Project Execution Plan instead of being a stand-alone document.
3.4 R&O Classification and Screening

Figure 13 shows the TOC R&O classification process. The classification process and associated screening is used to help determine if an R/O is owned by ORP or the TOC and when change control may be necessary to manage the R/O. Final determination of R/O ownership is negotiated between the WRPS and ORP contracting officers.

3.5 River Protection Mission R&O Analysis

Whenever there is a major revision to the System Plan or there is a rebaselining of the TOC Performance Measurement Baseline, an R&O analysis should be performed. There are some exceptions, one being when directed not to do so by ORP.

Analysis of the RPP mission has been removed from this plan and will be captured in an RPP Mission Risk and Opportunity Analysis Report. Table 5 shows a typical RPP mission analysis update cycle.

Completion of the joint RPP mission review sessions takes up the majority of the time as TOC risk owners, ORP coordinators, and other SMEs assemble to discuss and characterize mission R&Os. Analysis of the RPP mission is a joint responsibility of the TOC and ORP and the joint reviews are important to help ensure a balanced assessment.

Program and project ROMP and R&O register updates occur at a periodicity determined by the individual programs or projects.
Figure 13. TOC R/O Classification Process.

- **New Risk Identified**: Yes -> Manage as TOC Risk
  - No -> Is Risk Outside TOC Baseline Scope? Yes or No?
- **Assign Handling Action to TOC?**
  - No -> Manage as Federal Level Risk
    - Yes -> DOE Manage Handling Action
- **Manage as Federal Level Risk**
  - Yes -> Assign Handling Action to TOC?
  - No -> DOE Manage Handling Action
- **DOE-EM Liability**
  - Yes -> DOE Unfunded Contingency
  - No -> May Include Utilization of Management Reserve
- **Manage per Earned Value Management System and/or Process Lower Level Baseline Change Request if Required by Procedure**
- **Update TOC Risk Register**
  - Yes -> Track/Report Status
  - No -> Track/Report Status
- **DOE Manage Handling Action**
  - Yes -> Re-evaluate TOC Management Reserve
  - No -> Is Residual Risk Outside TOC Baseline Scope? Yes or No?
- **Does Risk or Handling Action Change R/O Analysis?**
  - Yes -> Review Cost/Schedule Factors and Re-run Monte Carlo Simulations
  - No -> No New Actions Related to Residual Risk
- **Process Baseline Change Request Per Procedure**
  - Yes -> TOC Execute Handling Action
  - No or No New Actions Related to Residual Risk
- **Negotiate Ownership with ORP Contract Officer**
  - Yes -> Re-evaluate TOC Management Reserve
  - No -> Manage as TOC Risk
- **Update TOC Risk Register**
  - Yes -> Track/Report Status
  - No -> Track/Report Status
Table 5. Typical RPP Mission Analysis Update Cycle.

<table>
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<tr>
<th>Activity ID</th>
<th>Activity Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>001</td>
<td>Precursor(s) - Completion of a major System Plan revision or TOC Performance Measurement Re-Baseline</td>
</tr>
<tr>
<td>002</td>
<td>Determine active RPP mission risks and opportunities and identify any TOC owner and ORP coordinator changes</td>
</tr>
<tr>
<td>003</td>
<td>Determine number and member composition of joint ORP/TOC review sessions</td>
</tr>
<tr>
<td>004</td>
<td>Schedule joint review sessions and conduct joint reviews</td>
</tr>
<tr>
<td>005</td>
<td>Develop RPP mission risk and opportunity analysis model</td>
</tr>
<tr>
<td>006</td>
<td>Load RPP mission risk and opportunity information into the RPP mission model, perform initial runs, and validate model operation</td>
</tr>
<tr>
<td>007</td>
<td>Interpret RPP model data and share analysis results with ORP</td>
</tr>
<tr>
<td>008</td>
<td>Revisit RPP mission risk and opportunity characterization information and make adjustments</td>
</tr>
<tr>
<td>009</td>
<td>Draft RPP mission risk and opportunity analysis report</td>
</tr>
<tr>
<td>010</td>
<td>Review RPP mission risk and opportunity analysis report</td>
</tr>
<tr>
<td>011</td>
<td>Incorporate RPP mission risk and opportunity analysis report comments and perform additional RPP mission model runs</td>
</tr>
<tr>
<td>012</td>
<td>Publish RPP mission risk and opportunity analysis report</td>
</tr>
</tbody>
</table>

3.6 R&O Handling Action Prioritization

Resources are not normally available to implement handling strategies for all R&Os, whether they are Mission level or Program/Project level. The EROM Framework suggests that R&O handling actions may be selected based upon a number of factors (see Framework Section 4.4.4.7). These factors include such things as overall risk reduction or opportunity enhancement and the associated risk reduction or opportunity enhancement that may be gained per unit of cost. A multi-attribute decision making process may also be used to consider additional criteria important to the program/project manager and program/project team such as the timing of when the R/O may occur, speed of handling/enhancement action deployment, execution confidence, stakeholder preferences, etc.

The results of these ranking processes are typically captured into an integrated priority list (IPL), which along with EROM Board recommendations can be used to form the basis for handling strategy/plan prioritization recommendations.

4.0 EROM METRICS AND REPORTS

4.1 Monthly Reviews

The WRPS Monthly Performance Report will address key program and large project R&Os of concern. R&Os of concern tend to be those of a high impact level, those where the impact level is changing (worsening), or new R&Os where the potential impact level needs to be determined. Actions planned and actions taken will be discussed along with potential problems (e.g., quality and staffing issues, engineering, or technology needs), impacts, alternative courses of action, and status regarding any recovery plans. The WRPS monthly performance report will also contain a
table documenting the use of management reserve to manage contractor R&Os. A status of register development will also be provided.

Other program and project level reporting is the responsibility of individual program and project managers who will determine reporting content, audience, and periodicity.

4.2 Other Reviews

The Quarterly R&O Status Report has changed from a formal report to ORP on mission R&Os to a periodic review of key cross-cutting program and large project R&Os of concern to better focus resources to manage R&Os during the contract term. Risk registers will be produced for C-Farm Retrieval, A and AX Farm Retrieval, AY-102 Recovery, Tank Farm Projects, Direct Feed Low Activity Waste Program, and the Low Activity Waste Pretreatment System project. Key cross-cutting R&Os of concern will also be discussed. Other program and project risks may be added in the future as their registers are developed.

5.0 MANAGEMENT RESERVE AND CONTINGENCY

5.1 Management Reserve

Management Reserve (MR) and Contingency are used to provide resources to combat the realization of technical and programmatic risks and the negative impacts of schedule and estimate uncertainty. MR is managed by the TOC in accordance with TFC-PLN-147, and assessed through change control to manage contractor risk.

MR during the TOC contract period is determined in accordance with 48 CFR 31.205-7 (also known as FAR 31.205-7). According to the FAR contingencies fall into two categories:

1. Those that may arise from presently known and existing conditions, *the effects of which are foreseeable within reasonable limits of accuracy*; e.g., anticipated costs of rejects and defective work. Contingencies of this category *are to be included in the estimates of future costs* so as to provide the best estimate of performance cost.

2. Those that may arise from presently known or unknown conditions, *the effect of which cannot be measured so precisely as to provide equitable results to the contractor and to the Government*; e.g., results of pending litigation. Contingencies of this category *are to be excluded from cost estimates* under the several items of cost, but should be disclosed separately (including the basis upon which the contingency is computed) to facilitate the negotiation of appropriate contractual coverage.

During the contract period type (1) contingencies are priced and included as part of the TOC total proposed cost, and upon their acceptance are converted to MR (see Figure 14). Type (2) contingencies are not priced as part of the TOC total proposed cost, and instead Monte Carlo modeling is used to quantify them and provide a MR recommendation for use during the contract period.
5.2 Contingency

Contingency is usually defined at several confidence levels (e.g., 50% and 80%) as a result of Monte Carlo modeling. Contingency is managed by DOE, is forecasted for both the contract period and the remainder of the RPP mission period, and is used by DOE to manage DOE owned risks.

At the RPP mission level, DOE Contingency is forecast at both a 50% and 80% confidence level based upon the analysis of mission risks and opportunities.

Capital Asset (Line Item) projects and projectized operational activity Category 1 projects apply the EROM Framework in a similar manner along with guidance in Section 5.0 to develop their MR and Contingency. The process used by the projects to forecast MR and Contingency is described within their ROMPs.
6.0 DEFINITIONS

See Attachment B for a list of acronyms.

Accept. A risk or opportunity handling strategy that involves no direct action to reduce risk level or improve opportunity level.

Assess. Third step in the EROM Process. R&Os are evaluated qualitatively against Likelihood and Consequence/Benefit criteria, and then scored as High, Medium, or Low using predefined grading matrices.

Assessable Elements. The enterprise elements that will be considered during the Identify step of the EROM process. These elements are selected to enable a more thorough and comprehensive assessment of the enterprise for R&O.

Assessment/Analysis Criteria. The criteria for likelihood, and consequence(s)/benefit(s) that will be used to assess and analyze risks and opportunities. In general, likelihood criteria will be common across the enterprise, whereas consequence/benefit criteria will be specific for the various enterprise levels.

Avoid. A risk handling strategy that involves action to drive likelihood to zero, eliminate all consequences, or both.

Benefit. The positive outcome of an opportunity, should it occur. Evaluated qualitatively, it is used in the grading of opportunities as High, Medium, or Low.

Consequence. The negative outcome of a risk, should it occur. Evaluated qualitatively, it is used in the grading of risks as High, Medium, or Low.

Enhance. An opportunity handling strategy that involves action to improve the likelihood and/or benefit(s) of the opportunity.

EROM Board. A board comprised of senior TOC managers to provide ongoing oversight for execution of the EROM Program throughout WRPS. Detailed board objectives, membership, and roles and responsibilities are outlined in their charter.

Exploit. An opportunity handling strategy that involves action to drive likelihood of the event occurring to certainty – the opportunity will be made to happen.

Handle. Fourth step in the EROM Process. Strategies are developed to address R&O, generally with the objective to minimize risks and maximize opportunities. An essential part of this step is the evaluation of any residual risk or opportunity using the same process performed during the Assess step.

Handling Action. Specific actions required to implement or execute a proposed handling strategy.

Handling Strategy. A strategy selected to address any specific R/O. Risk handling strategies are: 1) Avoid, 2) Transfer, 3) Mitigate, or 4) Accept, and opportunity handling strategies are: 1) Exploit, 2) Share, 3) Enhance, or 4) Accept.
Identify. Second step in the EROM Process defined in this Plan. Events or conditions that could have a negative impact (risks with consequences) or a positive impact (opportunities with benefits) on the enterprise are identified with clearly defined R/O statements that include three important elements: 1) Context, 2) ‘If…Then’ Statement, and 3) Title.

Likelihood. A qualitative judgment regarding the occurrence (chance of happening) of a potential risk or opportunity, used in the grading of risks or opportunities as High, Medium, or Low.

Mitigate. A risk handling strategy that involves action to reduce likelihood of occurrence, reduce magnitude of consequences, or both.

Monitor/Control. Fifth step in the EROM Process. This phase captures all of the elements (e.g., implementing handling strategies, tracking and trending, reporting) that must take place to ensure successful implementation of the process throughout the enterprise.

Opportunity. An event or condition with uncertainty that, if it occurred, would have a positive impact on any one or more activity objectives.

Opportunity Level. The grading of opportunity as High, Medium or Low based upon a matrix combination of Likelihood and Benefits.

Plan. First step in the EROM Process. This phase focuses on establishing a plan for what process will be used and how the process will be implemented for an activity, up to and including an enterprise.

Residual Opportunity. Opportunity that remains assuming successful completion of a proposed handling strategy.

Residual Risk. Risk that remains assuming successful completion of a proposed handling strategy.

Risk. An event or condition with uncertainty that, if it occurred, would have a negative impact (consequence) on any one or more activity objectives.

Risk Level. The grading of risk as High, Medium or Low based upon a matrix combination of Likelihood and Consequences.

R&O Register. An R&O Management tool used as a central repository for all pertinent information related to R&Os identified by TOC. Data contained in the R&O Register is used to support the monitoring and control of R&Os and is also the source of information used to develop and prepare reports.

Share. An opportunity handling strategy that involves action to share or allocate ownership of the opportunity to some other entity (e.g., activity, organization, individual) that is more appropriate for developing and implementing the opportunity.

Transfer. A risk handling strategy that involves action to transfer a risk to some other entity (e.g., activity, organization, individual) that will accept responsibility for the risk and all of its impacts.
### SOURCES

#### Requirements

7.1.1 DE-AC27-08RV14800, “Tank Operations Contract.”

7.1.2 DOE O 413.3B, “Program and Project Management for the Acquisition of Capital Assets.”


7.1.5 TFC-PLN-147, “Project Control System Description.”

#### References


7.2.2 DOE G 413.3-7A, “Risk Management Guide.”

7.2.3 ORP-11242, “River Protection Project System Plan.”

7.2.4 RPP-52149, “One System Risk Management Team Charter.”

7.2.5 TFC-PRJ-PC-C-13, “Enterprise Risk and Opportunity Management.”

7.2.6 WRPS-57232, “Enterprise Risk and Opportunity Management (EROM) Framework.”
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**ATTACHMENT B – COMMON ACRONYMS/ABBREVIATIONS**

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<th>Description</th>
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<td>U.S. Department of Energy</td>
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