EXTERNAL INDEPENDENT REVIEW

STANDARD OPERATING PROCEDURES

DEPARTMENT OF ENERGY

OFFICE OF ENGINEERING AND CONSTRUCTION MANAGEMENT

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1.0 INTRODUCTION

Under DOE M 413.3-1, Project Management for the Acquisition of Capital Assets, the Office of Engineering and Construction Management (OECM) must perform a Performance Baseline External Independent Review (EIR) prior to Critical Decision (CD) 2. This Manual also requires OECM to perform a Construction/Execution Readiness EIR for all Major System projects prior to CD-3.

The EIR Standard Operating Procedures (SOP) discuss all elements of EIRs including review scope, review process, Corrective Action Plans, and OECM's Performance Baseline Validation Process.

The intent of the SOP is to make clear the OECM expectations for both the CD-2 and CD-3 EIR, and thereby facilitate the project planning process. In particular, OECM expects that the Scope of Review and Required Documentation sections will be very helpful to Programs/Projects in their preparation for External Independent Reviews.

2.0 BUDGETING AND PLANNING

Appropriate funding of EIRs is essential for the development of a responsive and effective EIR program. Accordingly, by June 30th of the year in which the budget is being developed (e.g. June 30, 2004, for Budget Year FY 2006), the Project Management Support Organization (PMSO) or Program must provide the OECM Projects Team an estimate of the number of EIRs expected to be required during the budget year by the following break-out: Major Systems, Non-Major Systems greater than $20 million, and Non-Major Systems less than $20 million.

During the execution year, the PMSO or Program shall provide OECM, at the beginning of each quarter, a 12-month look-ahead that lists by project the projected dates EIRs will be required. OECM will use this list to identify EIR contractors, and make preliminary site visit arrangements.

3.0 APPLICABILITY AND PURPOSE OF EXTERNAL INDEPENDENT REVIEWS

The applicability and purpose of the EIR varies somewhat depending on whether the review is a Performance Baseline Review or a Construction/Execution Readiness Review. Each is discussed below.

3.1 Applicability and Purpose of EIRs for Performance Baseline Reviews (in support of CD-2)

EIRs must be conducted for all Capital Asset Projects greater than $5 million prior to CD-2. This requirement applies regardless of whether the project is capital or expense funded. An EIR (usually a limited EIR) may also be required to validate a new baseline resulting from a Performance Baseline Deviation.

The purpose of the Performance Baseline EIR is to support validation of the Performance Baseline by OECM, and to provide reasonable assurance that the project can be successfully executed. The Performance Baseline EIR and Performance Baseline validation provides confirmation to the Deputy Secretary, the Chief Financial Officer, OMB, and Congress that the project scope and key performance parameters are well defined and the project can be completed for the Total Project Cost (TPC) and schedule associated with the Performance Baseline. **In general, the Performance Baseline at CD-2 should be considered as "cast in concrete."** Programs/Projects should not expect to deviate from the Performance Baseline as a result of subsequent contract awards.

Although detailed resource loaded schedules, in general, provide the underpinning for sound project planning and development of technically defensible Performance Baselines, it is well understood that the cost and scheduling details will change to some extent following award of contract (i.e. contractors may find it more efficient to perform work in a different sequence). Nevertheless, the TPC, project completion date, key performance parameters, and overall scope are not expected to change -- nor should they change if the project has been well planned in terms of defining the work to be done, scheduling the work, and estimating the cost of the work.

3.2 Applicability and Purpose of EIRs for Construction or Execution Readiness Reviews (in support of CD-3)

EIRs must be conducted prior to CD-3 for all Major System Projects, i.e. projects with TPCs greater than $400 million or designated by the Deputy Secretary.

The purpose of the EIR performed prior to CD-3 is to assess the readiness for construction or execution and to confirm the completeness and accuracy of the Performance Baseline established earlier at CD-2. In addition to the review elements for the Performance Baseline, this EIR focuses on the final drawings and specifications and construction/execution planning.

4.0 SCOPE OF REVIEW and REQUIRED DOCUMENTATION FOR PERFORMANCE BASELINE REVIEW (in support of CD-2)

Below is a discussion of the 13 elements that will, in general, form the scope of review of the Performance Baseline review, as well as the required documentation for this review. It is important to recognize that both the scope and required documentation may vary for specific projects depending on the type of project and tailoring (see Section 7.0 for a further discussion of tailoring).

4.1 Scope of Review

For each of the 13 review elements, we have identified the specific lines of inquiry that the EIR Team will address.

1. **Resource Loaded Schedule**. For selected Work Breakdown Structure (WBS) elements (typically, those constituting significant cost and/ or risk), the EIR team will summarize the detailed basis for the cost estimate and schedule duration. The EIR Team will assess the method of estimation and the strengths/weaknesses of the cost and schedule estimates for each WBS element reviewed. The EIR Team will identify and assess key cost and schedule assumptions and evaluate the reasonableness of these assumptions as related to the quality of the cost and schedule estimates for each WBS.

   Note: DOE uses the term resource loaded schedule to refer to the linkage of scope, schedule, and budgeted cost of specific WBS elements. Near term estimates are generally supported by "work packages", while future estimates are supported by "planning packages." The ANSI Standard for Earned Value Management System uses the term "resource plan" or "time phased budget" in lieu of resource loaded schedule.

2. **TPC and Project Schedule**. Provide an independent evaluation of the TPC and overall Project Schedule. This evaluation will, to a large extent, depend on the assessment of the specific WBS elements reviewed under the resource loaded schedule above. In addition, the EIR team should assess cost and schedule contingency and other cost and schedule factors related to TPC and the project completion schedule. The EIR team should review the Critical Path schedule and assess whether the Critical Path is reasonably defined and whether the schedule is integrated and reflects reasonable schedule durations.

   The EIR team should ensure that the TPC and project completion date incorporates all activities necessary to successfully complete the project. For production type projects, this would include appropriate start-up testing and readiness reviews and appropriate contingencies. For "science type" projects the TPC and schedule should include all activities necessary to ensure that the project is ready for the start of experimental activities.

   Finally, the EIR team will assess whether the project funding profile is consistent with the resource loaded schedule. In general, the EIR assessment of the overall cost (i.e. TPC) represents an Independent Cost Review (ICR), **and not an Independent Cost Estimate or "bottoms-up" estimate.** As such, the ICR generally represents a comparison to typical cost and schedule ranges and comparisons to similar type projects.

3. **Work Breakdown Structure**. Assess whether the WBS incorporates all project work, and whether it represents a reasonable breakdown of the project work scope. Assess whether the resource loaded schedule is consistent with WBS for the project work scope.

4. **Risk Management**. Describe the approach used to identify project risks and assess adequacy of this approach. Assess whether risks have been quantified

based on the probability and consequence of occurrence, and have been properly classified as high, medium, and low. Assess whether all appropriate risk mitigation actions have been incorporated into the Performance Baseline to include cost and schedule contingency.

5. **Preliminary Design and Design Review**. Evaluate adequacy of preliminary design including adequacy of drawings and specifications, and assess whether they are consistent with system functions and requirements. Assess whether all safety structures, systems, and components (SSC) are incorporated into the preliminary design. Review results of the preliminary design review and assess whether additional work identified in the design review has been incorporated into the Performance Baseline as appropriate.

6. **System Functions and Requirements**. Assess whether "design to" functions and requirements are complete and have a sound technical basis. The EIR assessment of requirements should include safety and external requirements such as permits, licenses, and regulatory approvals. For Design-Build projects, the EIR team should assess whether project requirements are well-defined and unlikely to result in significant scope changes. The EIR team should also assess whether system requirements are derived from and consistent with Mission Need. Finally, assess whether the CD-4 (i.e. project completion) activities are clearly identified in the Requirements document, and whether these activities are quantified and measurable, or can otherwise be reasonably determined as complete.

7. **Hazards Analysis**. Evaluate the quality of the Hazard Analysis and assess whether all scope, schedule, and costs necessary for safety are incorporated into the baseline. Review the classification of SSCs as safety class or safety significant. Assess the Hazards Analysis process, including the use of internal and external safety reviews. Review any Defense Nuclear Facilities Safety Board and/or Nuclear Regulatory Commission interface and discuss the status of their involvement.

8. **Value Management/Engineering**. Assess the applicability of Value Management/Engineering, and whether a Value Management/Engineering analysis has been performed with results being incorporated into the baseline. Also provide an assessment of the Value Management/Engineering process for this project.

9. **Project Controls/Earned Value Management System**. Assess whether all project control systems and reporting requirements will be in place prior to CD-2. For projects where Earned Value Management System is not required, assess the adequacy of an alternate project control system for monitoring, controlling and reporting project cost and schedule performance.

10. **Project Execution Plan**. Review the Project Execution Plan and determine if it reflects and supports the way the project is being managed, is consistent with the other project documents, and establishes a plan for successful execution of the project.

11. **Start-up Test Plan**. For all production type projects (i.e., projects with follow-on operational activities), assess whether the start-up test plan identifies the acceptance and operational system tests required to demonstrate that system meets design operational specifications, and safety requirements. The EIR team should review key tests to ensure that sufficient description is provided to estimate cost and schedule durations associated with these tests. The EIR team should ensure that the start-up test plan identifies how tests will be determined to be successful, and that associated equipment and instrumentation has been included in the preliminary design. Finally, the EIR team should assess whether there is sufficient cost and schedule contingency for test and equipment failure during start-up testing.

12. **Acquisition Strategy**. Review the Acquisition Strategy to determine if it is consistent with the way the project is being executed. The Review Team should evaluate any changes from CD-1 that may impact whether the current strategy represents best value to the government.

13. **Integrated Project Team**. Assess whether the project management staffing level is appropriate, and determine if appropriate disciplines are included in the Integrated Project Team. Identify any deficiencies in the Integrated Project Team that could hinder successful execution of the project.

4.2 Required Documentation

In general, the following documents are required for the Performance Baseline Review. Other associated material may be requested by the Review Team to ensure a complete and accurate review is performed.

- Detailed Resource Loaded Schedule
- Detailed Cost Estimate
- System Functions and Requirements Document (also referred to as the "Design-to" requirements or Design Criteria)
- Results of and Responses to Site Preliminary Design Review
- Preliminary Design Drawings
- Project Execution Plan
- Start-up Test Plan (as appropriate)
- Hazards Analysis
- Risk Management Plan/Assessment
- Acquisition Strategy
- Value Management/Engineering Report

5.0 SCOPE OF REVIEW FOR CONSTRUCTION OR EXECUTION READINESS (in support of CD–3)

The purpose of the Construction or Execution Readiness Review is to assess the readiness for construction or execution and to confirm the completeness and accuracy of the Performance Baseline. The Scope of review has several elements relative to construction readiness, but retains many of the elements contained in the Performance Baseline Review. The Required Documentation is also presented below.

5.1 Scope of Review

1. **Final Drawings and Specifications**. Assess completeness and quality of drawings and design specifications. This is typically accomplished by reviewing selected construction elements or systems, including the key project elements posing the more difficult construction challenges. Assess whether bid packages are sufficiently clear and well defined as to be ready for bid.

2. **Construction/Execution Planning**. Assess adequacy of construction/project execution planning and staffing. Assess logistics including interface with operating facilities, infrastructure interfaces, adequacy of lay-down areas, temporary construction facilities, security and badging readiness, and other logistical elements. Federal and contractor staffing should also be reviewed to ensure adequate oversight of the work, including safety, performance, and quality.

3. **Resource Loaded Schedule**. Review the Resource Loaded Schedule to ensure that it is consistent with the approved Performance Baseline at CD-2 with no changes to the TPC, completion schedule, and key performance metrics. Also assess the reasonableness of the schedule relative to the critical path.

4. **Final Design Functions and Requirements/Site Final Design Review**. Assess whether all final design functions and requirements are reflected in the Performance Baseline, including safety SSCs and external requirements such as permits, licenses, and regulatory approvals. Also, assess whether all required changes from the Site Final Design Review are incorporated into the Performance Baseline, and assess whether the Performance Baseline remains consistent with that approved at CD-2.

5. **Risk Management**. Assess whether the risk assessment has been updated, as appropriate, to address any new risks identified in final design. Assess whether cost and schedule contingency remains sufficient for project risks.

6. **Value Management/Engineering**. Assess the application of Value Management/Engineering during Final Design, and if results have been incorporated into the Performance Baseline.

7. **Acquisition Strategy**. Review the Acquisition strategy to determine if there have been any significant changes and if the acquisition approach continues to represent the best value to the government.

8. **Project Execution Plan**. Review the Project Execution Plan and determine if it reflects and supports the way the project and construction effort is being managed. It should be updated to reflect any changes as a result of Final Design and be consistent with the other project documents.

9. **Project Controls/Earned Value Management System**. Assess whether all project control systems and reporting requirements are in place and are being properly used to correctly report Earned Value.

10. **Integrated Project Team**. Assess whether the staffing level is appropriate and determine if appropriate disciplines are included in the Integrated Project Team. Identify any deficiencies in the Integrated Project Team that could hinder successful construction or execution.

5.2 Required Documentation

In general, the following documents are required for the Construction or Execution Readiness Review. Other associated material may be requested by the Review Team to ensure a complete and accurate review is performed.

- Final Design Drawings and Specifications
- Results of and Responses to Site Final Design Review
- Construction Planning Document
- Project Execution Plan
- Detailed Resource Loaded Schedule
- Detailed Cost Estimate
- System Functions and Requirements Document
- Risk Management Plan/Assessment
- Safety Documentation
- Acquisition Strategy
- Value Management/Engineering Report

6.0 EIR PROCESS/CORRECTIVE ACTION PLAN

6.1 EIR PROCESS

The OECM EIR process places a great deal of importance on having documents well in advance of the on-site review. There are several reasons:

i) It ensures that sites are ready for the review and minimizes expenditure of EIR resources for on-site visits with limited value.
ii) Review of advance documentation allows OECM and the EIR team to develop specific Review Questions that are generated from the document review and that are the focus of the on-site portion of the EIR. Effectively, we can inform the project team, in advance of the on-site review, of the specific data and information needed to address EIR concerns related to the various review elements discussed earlier.
iii) Having key documentation well in advance of the review allows OECM to perform reasonably comprehensive assessments without tying up site resources with lengthy on-site visits.

The specific duration of the Performance Baseline and the Construction or Execution Readiness Review depends on the size and complexity of the individual project being reviewed. The typical process for conducting a review takes 8 weeks from the time OECM receives the required review documents. This process is described below followed by a timeline for a typical EIR. (Limited EIRs can be done more quickly, and have been completed in less than 2 weeks.) During the EIR, final design and other on-going project activities may continue.

- **Week 1**. Following receipt of the review documents, OECM, in conjunction with the EIR contractor, develops a draft EIR Review Plan. OECM provides the Project Team, the PMSO and/or Program support staff a draft of the EIR review plan for review and comment. The PMSO/Program is responsible for coordinating any comments.

- **Week 2**. At the end of Week 2, the PMSO and/or Program provides comments on the draft Review Plan, as well as provides suggestions, if any, for additional review elements

- **Week 3.** OECM finalizes the EIR Review Plan and provides it to the PMSO, Program, and Site Project Team. In general, the Final Review Plan will also include specific Review Questions that will need to be addressed at the on-site review. The purpose of the Review Questions is to obtain data and information needed to address Scope of Review lines of inquiry, but not provided in the site project documents.

- **Week 4**. The Site Project Team reviews the EIR Final Review Plan, including specific EIR team Review Questions to be addressed during the on-site review, and makes final preparations for the EIR.

- **Week 5**. The EIR Team conducts the on-site review, and concludes with an outbrief to the Site Project Team. *Note: The PMSO/ Program are encouraged to arrange for a teleconference/ televideo connection to the site outbrief.*

- **Week 6**. OECM issues the draft report to the PMSO and/or Program, and Site Project Team for a factual accuracy review.

- **Week 7**. The Program and Project Team reviews the draft EIR report and provides factual accuracy comments to OECM. The Program/Project Team should strictly limit comments to the factual content of the EIR report. Any disagreements with the specific Findings or Observations should be noted in the Corrective Action Plan.

- **Week 8**. OECM incorporates comments, as appropriate, and issues the Final Report with recommended corrective actions to the PMSO and/or the Program, and the Site Project Team.

Typical Timeline for Performance Baseline External Independent Review (timeline starts when review documents are received by OECM)

	Week 0	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
OECM Receives documents	◆								
EIR Draft Review plan is prepared and submitted for comment		↔							
Program/ Project / Site provides comments			↔						
EIR team develops Final Review Plan and adds specific Review Questions				↔					
Site reviews questions and prepares for EIR					↔				
On-site review ending with Outbrief to Project Team						↔			
OECM transmits Draft EIR Report for factual accuracy review							↔		
Program/ Projects submits factual accuracy comments								↔	
OECM transmits Final EIR Report including Corrective Action Plan									↔

6.2 Corrective Action Plan

The Findings and recommended corrective actions from the EIR Team are provided by OECM to the Program/Project team in the final EIR report in the form of a "corrective action" template. The template will include fields to be completed by the Program/Site Project Team. The Corrective Action Plan template will include the following fields:

- Review Team Findings, including report page.
- Review Team recommendation
- Program/Project Team response (including whether the Review Team Finding is accepted or rejected)
- Response status for accepted Findings. The status should identify whether corrective actions are completed or pending, as well as the appropriate date.

Note: Programs/ Project teams may not always agree with EIR Findings. If the Program/Project disagrees with a Finding, the response should contain the supporting technical rationale.

For Performance Baseline reviews, the Corrective Action Plan should be approved by the Program and provided to OECM at least two weeks prior to a (pre)ESAAB-equivalent or prior to OECM scheduling of an ESAAB. For CD-3 reviews, the approved Corrective Action Plan should be submitted to OECM prior to scheduling the ESAAB.

7.0 EIR TAILORING

Tailoring is an essential component of EIRs. Tailoring can apply to any project, but has increased applicability to projects that are considered to be routine in nature, such as traditional construction projects, and have relatively low risk. Tailoring will also be used by OECM when validating Performance Baselines as part of a Baseline Change Proposal following a deviation.

A key consideration when tailoring the Performance Baseline EIR is to ensure the EIR supports OECM validation of the Performance Baseline. Tailoring may include:

- Use of summary level Resource Loaded Schedules
- Use of summary cost and schedule supporting documents
- Conducting limited interviews with selected members of the Integrated Project Team over the telephone or in a videoconference
- Reviewing key documents with minimal site visit, if any
- Reducing the scope of review requirements

Note: The nature of environmental restoration and closure activities performed by the Office of Environmental Management requires a tailored approach to EIRs. For these type of projects, EIRs may include additional review elements or deletion of some of the standard elements. The overall process described in Section 6 will be followed.

8.0 EIR REPORT

The format and content of the EIR report will, in general, be consistent with the EIR Review Plan. For each element of the review scope identified in the Review Plan, the EIR Team will discuss what was done by the Project to address this element followed by any EIR team findings or observations. There will not be a separate Independent Cost Review report --- findings or observations in this area will be incorporated into the overall EIR report. The EIR Report will also contain an Executive Summary that discusses significant Findings.

Formal transmittal of the EIR Report will be from the Director of OECM to the Deputy Administrator or Program Secretarial Officer.

9.0 OECM PERFORMANCE BASELINE VALIDATION PROCESS

Consistent with DOE Order 413.3, all projects must have the Performance Baseline validated by OECM. Baseline validation occurs prior to CD-2 or prior to Baseline Change Proposal approval.

OECM will use the EIR Final Report, in combination with any corrective actions identified in the approved Corrective Action Plan, to assess whether the Performance Baseline can be validated. OECM may also use information from Independent Project Reviews, IG reports, or other such information in assessing whether a Performance Baseline can be validated.

OECM is required to validate the Performance Baseline prior to a program requesting construction funds from Congress. On an exception basis, and to conform to the budget cycle, projects may need to be in the budget prior to OECM validation. All OECM Performance Baseline validations will be documented in a memorandum from the OECM Director to the Deputy Administrator or Program Secretarial Officer.

10.0 EIR EVALUATION AND FEEDBACK

Program offices, project teams and PMSOs are encouraged to provide OECM with feedback on the conduct of the EIR including any comments related to:

- Quality of the review and findings
- Knowledge and professionalism of the review team members
- Preparation of the review team
- Scope of the review
- Timeliness and responsiveness of OECM and the EIR team

Evaluation comments and feedback will be used to improve the quality of the overall EIR process.