



Closeout Presentation

Director's CD-1 Review of SLI-UUP

July 6, 2010

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Table of Contents

Executive Summary.....	4
1.0 Introduction	5
2.0 Assessment of Technical Design Review.....	6
2.1 High Voltage (HV)	6
2.2 Industrial Chilled Water (ICW)	7
3.0 Cost, Schedule, ESH and Project Management.....	8
3.1 Cost	8
3.2 Schedule.....	9
3.3 ES&H.....	10
3.4 Project Management	11
4.0 Charge Questions.....	13
5.0 Appendices	16
Charge	17
Agenda.....	19
Report Outline and Reviewer Writing Assignments	20
Reviewers' Contact Information	21

Executive Summary

The focus of this Director's Review of the SLI Modernization FNAL-11-002 Utility Upgrade Project (SLI-UUP) was to evaluate the results of the Independent Design Review, the project cost estimate, schedule development and the project's management to determine if the project meets DOE O 413.3A requirements for CD-1.

Much work has been done by the project team to prepare for CD-1. There are a few items that need to be addressed for the DOE Independent Project Review (IPR) scheduled for August 24, 2010. These specific items are contained in the body of this closeout document. The team has also identified several items that need to be addressed to get to CD-2. One of the more critical items to get started is moving from the cost loaded schedule to a resource loaded schedule. This will give a higher level of confidence in establishing the dates for the project's high level milestones, especial the CD-4 "project complete" date.

Technical

SLI-UUP work scope consists of High Voltage Electrical Upgrades (HV) and Industrial Chilled Water (ICW). A detailed independent technical design review was conducted by Thomas Jefferson National Accelerator Facility (TJNAF) by reviewing the projects Conceptual Design Report (CDR). The results of this design review are documented in CDR Appendix E. The project did respond to the recommendations from the review which are also included in the CDR's Appendix E. This committee concurs that the independent design review evaluated and confirmed that the designs are sound and meets the requirements and specifications, and that the project has addressed the report's recommendations.

Schedule

A cost loaded schedule was developed in Primavera P6. This schedule is at a high level at this stage of the project. As part of the steps to move from CD-1 to CD-2 the project needs to develop a resource loaded schedule (RLS). This will allow the development of a CD-4 date that takes into consideration holidays, detailed schedule relationships, and risk factors.

Cost

SLI-UUP is a Line-Item project with a Total Project Cost range of \$32.4M - \$36M. The costs are based the preliminary design at a very high level. The costs estimate will be broken down to more detail when the RLS is developed for CD-2.

Management

SLI-UUP has most of their management organization identified. The CD-1 project management documents have been developed. The project needs to insure that time allocated for each member of the project office is appropriate to support the requirements for managing and reporting on a DOE O 413.3A project and that effort is reflected in the schedule and cost estimate.

1.0 Introduction

A Director's CD-1 Review of the SLI Modernization FNAL-11-002 Utility Upgrade Project (SLI-UUP) was held on August 6, 2010. The charge included a list of topics and charge questions to be addressed as part of the review. This review also assessed the projects readiness for the DOE CD-1 Independent Project Review (IPR) scheduled for August 24, 2010.

A detailed independent technical design review was conducted by Thomas Jefferson National Accelerator Facility (TJNAF) by reviewing the projects Conceptual Design Report (CDR). The results of this design review were made available to the review team to evaluate the results and the actions taken by the project.

The first section in this closeout presentation is generally organized by Findings, Comments and Recommendations. Findings are statements of fact that summarize noteworthy information presented during the review. The Comments are judgment statements about the facts presented during the review and are based on reviewers' experience and expertise. The comments are to be evaluated by the project team and actions taken as deemed appropriate. Recommendations are statements of actions that should be addressed by the project team. The second section has the answers to all of the review charge questions. The last section of this presentation is the Appendices that contain the reference materials for this review. Appendix A shows the charge for this review. The review was conducted per the agenda shown in Appendix B. The review team contact information is listed in Appendix C.

This closeout presentation is considered the review's final report. The SLI Utility Upgrade Project is to develop a response to the review recommendations and implement the recommendations required to be completed prior to the DOE IPR expeditiously. The project is to regularly report on their progress of resolving the recommendations during OPMO's Project Working Group Meetings.

2.0 Assessment of Technical Design Review

2.1 High Voltage (HV)

Primary Writer: Jason Budd

Contributor: Mark Kaducak

Findings

- The project presented the modernization of the existing High Voltage (HV) electrical utility system. The major components of this project are the replacement of 13 Oil Switches, a maximum of 36 Unit Substations, replacement of 66,530 lin-ft of feeder cable and modification to the distribution system.
- An alternatives analysis was present for three options. Option 1 (base) is to maintain the current maintenance and repair approach ongoing at Fermilab. Option 2 is an Industrial Chilled Water (ICW) Dominant Solution that focuses on the fire protection system concerns. Option 3 is an HV Dominant Solution that focuses on the reliability of the HV system.
- An independent assessment of the conceptual design was conducted by Thomas Jefferson Lab National Accelerator Facility. The assessment concluded the HV system design was thorough and of a greater level of detail than historically experienced at the conceptual design level.

Comments

- The committee agrees with the findings of the independent assessment of the conceptual design. The HV design is expected to meet the requirements outlined for support the Fermilab mission needs.
- The one HV finding by Thomas Jefferson Lab was not documented by the project in the CDR. The project however has stated they have incorporated the shut down coordination efforts into the project plan.
- The key performance parameters (KPP) for the HV system are quantifiable except for the Major Substation Upgrades.

Recommendations

1. The project should update the CDR to document the formal response to the HV comment provided by Thomas Jefferson Lab.
2. The project should update the description of the Major Substation Upgrade KPP to include quantifiable metrics for assessing the upper and lower threshold requirements for this goal.

2.2 Industrial Chilled Water (ICW)

Primary Writer: Jason Budd

Contributor: Mark Kaducak

Findings

- The project presented the modernization of the existing Industrial Chilled Water (ICW) system. The major components of this project are the replacement of 33,000 lin-ft of pipe, upgrading or replacing the C-4 Pumphouse, upgrading or replacing Casey's Pumphouse and providing cross-connections to the lakes and ponds for redundancy.
- An alternatives analysis was presented for three options. Option 1 (base) is to maintain the current maintenance and repair approach ongoing at Fermilab. Option 2 is an ICW Dominant Solution that focuses on the fire protection system concerns. Option 3 is an HV Dominant Solution that focuses on the reliability of the HV system.
- An independent assessment of the conceptual design was conducted by Thomas Jefferson Lab National Accelerator Facility. The assessment concluded the ICW system design was thorough and modeled to a great level of detail.

Comments

- The committee agrees with the findings of the independent assessment of the conceptual design. The ICW design is expected to meet the requirements outlined for support the Fermilab mission needs.
- The committee concurs with the responses the project has made to the independent assessment of the CDR by Thomas Jefferson Lab.

Recommendations

None

3.0 Cost, Schedule, ESH and Project Management

3.1 Cost

Primary Writer: Mark Kaducak

Contributor: Terri Templeton

Findings

- The SLI Modernization project has a cost range of \$32.4M to \$36M.

Comments

- The project has minimum threshold quantities and optimistic targets for replacement and upgrades of oil switches, substations, feed lines, water piping and pump houses which define the KPPs. The minimum thresholds fall comfortably within the cost range, so scope contingency can be used to mitigate cost risks. The project plans to use any available contingency funds to accommodate the optimistic targets.

Recommendations

3. Compare project management costs that were estimated by taking a percentage of construction costs to an estimate generated by adding FTEs/hours required for project management personnel. Be able to explain at CD-1 that this number of FTEs is reasonable for this level of management tasks.
4. Be prepared to explain at CD-1 which resources are in the Project Management budget and their planned levels of effort throughout the project's lifetime.
5. Create a table of annual escalation rates used in the cost estimate and cite their sources.
6. Specify which costs include escalation and burdening on the cost slides for the CD-1 presentation.

3.2 Schedule

Primary Writer: Terri Templeton

Contributor: Mark Kaducak

Findings

- The project presented a cost loaded schedule and is planning to develop a resource loaded schedule for CD-2.

Comments

- Certain items such as substations have long lead times, so quotes and bids will need to be obtained and the project schedule and scope will have to be defined well in advance of construction in order to consider options and find the optimal balance of installed equipment.

Recommendations

7. For CD-2 ensure the P6 project calendar includes holidays for the resource loaded schedule.
8. Be prepared at CD-1 to discuss the float relative to the CD-4 date included in Acquisition Strategy and current PPEP. The presentation showed a range of CD-4 dates.
9. Consider project risks including but not limited to shutdown schedules, equipment availability, and funding availability when calculating float required to CD-4 and other Level 1 Milestones. These milestones may need to be adjusted, and if so agreed to by their owners prior to CD-2. One year of total float to CD-4 is commonly used, but the project should analyze their specific needs.
10. For CD-2, include schedule activities for known shutdowns in the project schedule.
11. Acquiring quotes and bids, and developing a plan for a specific quantity of equipment will be required such that a detailed schedule can be developed for CD-2.
12. For CD-2 develop the plan for staging and/or combining Critical Decisions, e.g. CD-2/3A.
13. For CD-2, consider decision points in the schedule for undergoing change control to use available contingency funds for replacing equipment beyond the minimum KPP.

3.3 ES&H

Primary Writer: Mke Andrews

Findings

- The Project has developed a Preliminary Hazard Analysis report which has started to identify the hazards of the project, as well as, oversight of ESH on the Project. The PHA has been approved by DOE-FSO.
- The Project Management Plan has attempted to define ESH responsibilities for some members of the project management team and has outlined the Integrated Safety Management aspects of the Project.

Comments

- The Preliminary Hazard Analysis needs to specifically address additional hazards including basic construction hazards relating excavation, welding activities, rigging, and cranes. Also there is no discussion in the document under the Radiation Safety Section discussing the issues or defining the requirements for excavating into the berm areas which are Radiation Controlled Areas.
- The Project Organization chart does not specifically identify an ESH Coordinator within the Project Office.
- The Project Management Plan (PMP) does define ESH responsibilities for the Construction Coordinator; however, does not define ESH responsibilities for the other members of the Project Team including the Project Manager and L2 Managers.

Recommendations

14. The Preliminary Hazard Analysis report should address high voltage, excavation and work in the Radiation Controlled Areas (Berms) by CD-1.
15. The Project should include an ESH Coordinator function on the project organization chart for CD-1.
16. The Project Management Plan should specify ESH responsibilities for each member of the Project Team by CD-1.

3.4 Project Management

Primary Writer: Peter Garbincius

Contributor: Mike Dinnon

Findings

- The cost numbers and schedules are very preliminary based on a build-to-cost limit, and the actual scope of deliverables can and will be adjusted to provided maximum benefit to Fermilab without surpassing the TPC. So CD-1 Approve Alternative Selection and Cost Range translates into “scope range”.
- Is the size and expected scope of work envisioned for the management team adequate? # CAMs (3) and # Control Accounts (1 + HV design + HV procurements + # HV installation contracts + ICW design + ICW procurements + # ICW installation contracts) = 7 – 9. Considering EVMS, the Project Budget Officer, Jolie Macier, is listed as part of indirect costs, not as direct cost to project. (does this move reduce FESS indirect for UPP). These project management requirements will be an extra unexpected burden on the FESS staff.
- The time fraction devoted to the SLI UPP by the HV and LCW Level 2 Managers is expected to increase from ~ 25% now, to 75% during the A&E design phase, and back to 25% during the actual construction phase. The Construction L2 Manager will increase from 0% now, to 10% during design, to Full Time during construction. It has not been determined whether additional Construction Management personnel will be provided by an external A&E firm or by internal FESS personnel. The Project Manager time will increase from 25% now to 50% for the design and construction phases.
- For the financial tables, the individual project management component is rolled into Design, which includes both Design and Construction Management (both in-house FESS and external contracts) at CD-2. EVMS will require that Project Management be explicitly broken out, tracked, and reported.
- Earned Value reporting will be required from CD-2.
- A monthly report sample is shown in PPEP Appendix B – nice outline, should have brief backup text (not cumulative, just incremental progress), and cumulative schedules, finances, CPI, SPI plots. Maybe similar monthly report template should be applied to each of the 7-9 Control Accounts.
- Explicit project personnel with Oversight, ES&H, and Quality responsibilities were not listed on the organization chart.
- Ratio of Management (including Design & Indirect Costs) to Construction, defined by PPEP – Cost Estimate by WBS Element Table, seems high 38%, especially for an essentially 1-to-1 replacement project. Such a high ratio may generate some discussion at the CD-1 review. These estimates for Design and Management were scaled (from experience with much smaller projects), not a realistic bottom-up

calculation (based on a resource loaded schedule). This should be shown in hours. Is this realistic?

- It was not indicated how uncertainties with respect to Continuing Resolutions/Funding Availability, or Fermilab operating schedules be handled in UPP activity schedules and milestones.
- Although an adequate Integrated Project Team has been commissioned, there is no Project Management Group (PMG) for UPP which would provide resource and scheduling coordination and optimization across Fermilab.

Comments

-

Recommendations

17. Consider whether Project Management tasks are fully understood and whether additional staffing needs to be assigned.
18. For WBS and EVMS, explicitly show Project Management tasks, not rolled into “Design (and Construction Management)” for the post-CD-2 period.
19. Explain how Management/Construction Ratio = 38% is estimated based on prior FESS experience. Such a high ratio may generate some discussion at the CD-1 review. Can a more realistic bottom-up estimate be generated at this stage? Is a more realistic estimate needed for CD-1?
20. The FESS Budget Officer activities and costs should be explicitly listed under Project Management, rather than included under FESS indirect costs.
21. Explain how uncertainties due to Continuing Resolutions/Funding Availability or Fermilab operating schedules will be handled.
22. Consider utilizing a more Fermilab-wide Project Management Group.
23. Start practicing Earned Value reporting well before CD-2.
24. Define a short, but adequately informative narrative for the monthly report for each Control Account. Start practicing before CD-2.
25. Ensure all documentation is consistent for CD-1.

4.0 Charge Questions

4.1 Have performance requirements been appropriately and sufficiently defined for this stage of the project? Is the conceptual design sound and likely to meet the performance requirements?

The project team has done an excellent job at documenting a conceptual design approach that will meet the mission needs of Fermilab and address the aging infrastructure, redundancy and capacity issues identified. An independent assessment was conducted by Thomas Jefferson Lab National Accelerator Facility. The assessment concluded the conceptual design is detailed and meets the identified requirements with exception to provided comments. The project team has addressed all ICW comments satisfactorily. The project team needs to document the HV shutdown comment. The project team has been working to incorporate shut down coordination into the schedule.

The conceptual design can meet all the lower threshold key performance parameters. The upper thresholds may not be attainable due to funding constraints (e.g. 36 substations replaced and installed.) Further definition is required to clarify the lower and upper threshold requirements for the Master Substation upgrades. Quantifiable goals should be included to adequately define the parameter.

4.2 Has a credible and sufficient alternatives analysis been performed that supports the proposed technical scope, cost, and schedule?

The project has developed a significantly detailed alternatives analysis consisting of five potential approaches. These five approaches were further defined and resulted in three technical alternatives for meeting the project requirements. A life cycle cost analysis was performed and the ICW heavy alternative selected was found to have the greatest net savings and shortest simple payback. The independent assessment by Thomas Jefferson Lab National Accelerator Facility also found the alternatives presented were all adequate for meeting the project requirements and the analysis approach was sound.

4.3 Are the cost and schedule estimates credible and realistic for this stage of the project? Is adequate contingency included?

The basis of the cost estimates were developed by an Independent Engineering Firm and are adequate for this stage of the project, the Cost Loaded Schedule is also adequate. Until the Major Milestone dates are confirmed, it is hard to establish if the current schedule contingency is adequate at this time.

4.4 Is the project being managed (i.e., properly organized, adequately staffed) as needed to begin the Preliminary Design and to support the project through construction to successful completion?

The Fermilab FESS group is dedicated to managing projects similar to SLI and has great experience. However, status reporting and reviews required to meet 413.3 is not typical of these types of projects so appropriate resources such as project controls, budgeting, QA, and

Safety need to be explicitly assigned and accounted for in Project Management. The Project Management function will be required for reporting throughout the project lifetime.

4.5 Are ES&H aspects being properly addressed given the project's current stage of development? Are Integrated Safety Management Principles being followed?

Yes, the Project has addressed Integrated Safety Management in their Project Management Plan and has identified a general plan for construction activities.

4.6 Is project documentation (e.g., Acquisition Strategy, Preliminary Project Execution Plan, Preliminary Hazard Analysis Report, Preliminary Project Management Plan, and Risk Management Plan) complete and ready for CD-1 approval?

The SLI-UUP Project appears to have most documentation complete and ready for the CD-1 Review. As long as the information put forth in the recommendations are implemented prior to the CD-1 review. The Project needs to address that documents such as the Project Schedule and Requirements Documentation will need to exist after the CDR has been finalized. They should pull the required CD-1 documentation from the CDR to account for future changes in these documents. Representing contractor expectations in Quality and ES&H should be documented up front in the appropriate documents. A stand alone spreadsheet with a checklist of required documentation should be developed to have an upfront representation of CD-1 requirements. With these minor changes the documentation should be complete.

4.7 Is the SLI Utility Upgrade Project appropriately prepared for the DOE Independent Project Review scheduled for August 24, 2010?

The SLI Utility Upgrade Project is not quite ready yet.

Can they be ready? There seem to be no show-stoppers for successfully passing a CD-1 Review. Here are a few suggestions which may make the presentations more self-contained to minimize discussions with the review panel:

Make sure that every table indicated whether costs are burdened and/or escalated.

Provide an explicit model of the escalation assumed. Note that the standard DOE escalation tables might not be acceptable for construction projects.

The UUP (SLI) Organization Chart should explicitly show, with actual names or TBA, the FESS Quality Assurance and ES&H personnel to be assigned to UUP.

Schedule Float should be defined, especially for the Construction Complete and CD-4 milestones.

As part of discussion, we suggested some general items to improve the presentation.

Assure that the numbers and dates presented in the documents are consistent. This is especially evident in the discrepancy for the CD-4 Milestone between the Acquisition Strategy and other documents.

We suggest providing a simple web page for the UUP Documentation to act as a checklist, including status (not started, draft/preliminary, awaiting approval, complete etc.), with URL links to the actual documents.

Closeout Presentation Issued 6-Aug-2010

5.0 Appendices

Charge

Agenda

Report Outline and Reviewer Writer Assignments

Reviewers Contact Information

Appendix A

Charge

Director's CD-1 Review of SLI-UUP

July 6, 2010

This charge is for the committee to conduct a Director's CD-1 Review of the SLI Modernization FNAL-11-002 Utility Upgrade Project (SLI-UUP) at Fermilab. The review team is to assess the project's efforts at meeting DOE O 413.3A requirements for CD-1 approval. Additionally, constructive comments on presentation content, format, and style are also requested to help the project prepare for the DOE CD-1 Independent Project Review.

Approval of CD-1 by DOE officials is based on a Conceptual Design documented in Conceptual Design Report (CDR) for the project. The project scope with defined options, preliminary cost, and schedule range are to be defined at this point in the project based on the conceptual design. Some additional documents that support the CD-1 determination are a Preliminary Project Execution Plan (PEP), a Preliminary Project Management Plan (PMP) and the Preliminary Hazard Analysis report.

A detailed independent technical design review was conducted by Thomas Jefferson National Accelerator Facility (TJNAF) by reviewing the projects Conceptual Design Report (CDR). The results of this design review are to be made available to this review team. This committee is to evaluate the results of that review to determine if the design review committee acceptably answered the question: Will these designs meet the requirements and specifications, and are the designs sound?

The cost, schedule and scope are usually based on an initial set of documentation such as the following: WBS – Work Breakdown Structure, WBS Dictionary, BOE – Basis of Estimate documentation, risk and contingency analyses, RLS – Resource Loaded Schedule, and time phased funding and cost profiles. The level of detail is to be commensurate with the conceptual design and the phase of the project. The committee is asked to review each of these items, for quality, completeness, and accuracy. The committee is asked to review and assess the quality of and comment on the additional formal project management documentation required for CD-1 approval. Additionally, confirm that the project is prepared for the DOE Independent Project Review (IPR) scheduled for August 24, 2010.

In performance of a general assessment of the project's preparations for CD-1, the committee should respond to the following questions:

1. Have performance requirements been appropriately and sufficiently defined for this stage of the project? Is the conceptual design sound and likely to meet the performance requirements?
2. Has a credible and sufficient alternatives analysis been performed that supports the proposed technical scope, cost, and schedule?
3. Are the cost and schedule estimates credible and realistic for this stage of the project? Is adequate contingency included?
4. Is the project being managed (i.e., properly organized, adequately staffed) as needed to begin the Preliminary Design and to support the project through construction to successful completion?

Closeout Presentation Issued 6-Aug-2010

5. Are ES&H aspects being properly addressed given the project's current stage of development?
Are Integrated Safety Management Principles being followed?
6. Is project documentation (e.g., Acquisition Strategy, Preliminary Project Execution Plan, Preliminary Hazard Analysis Report, Preliminary Project Management Plan, and Risk Management Plan) complete and ready for CD-1 approval?
7. Is the SLI Utility Upgrade Project appropriately prepared for the DOE Independent Project Review scheduled for August 24, 2010?

Finally, the committee should present findings, comments, and recommendations at a closeout meeting with SLI-UUP's and Fermilab's management. The closeout presentation document is considered the final review report.

Appendix B

Agenda

Director's CD-1 Review of SLI-UUP

July 6, 2010

Friday, August 6, 2010 – Black Hole (WH2NW)

8:00 am	Executive Session (Committee Only).....	Dean Hoffer
8:30 am	FNAL Utility Upgrades Project Requirements.....	Randy Ortigiesen
	• Mission Need	
	• Performance Parameters	
8:45 am	FNAL Utility Upgrades Project Introduction	Russ Alber
	• Project Overview	
	• Alternative Analysis	
	• ES&H Considerations	
	• Safeguards & Security Considerations	
	• User Interface	
9:15 am	Break	
9:30 am	FNAL Utility Upgrades Project Scope, Schedule and Cost	Russ Alber
	• Project Management	
	• Risk Management	
	• Proposed Project Scope	
	• Conceptual Design Description	
	• Proposed Cost and Schedule	
	• Acquisition Plan	
10:45 am	Executive Session (Committee Only).....	Dean Hoffer
11:30 am	Lunch	
12:15 pm	Additional Presentations and Discussion requested by the Committee.....	All
12:45 pm	Committee Executive Session – Discussion/Report Writing/Dry Run	Dean Hoffer
3:00 pm	Closeout Presentation.....	All
4:00 pm	Adjourn	

Appendix C

Report Outline and Reviewer Writing Assignments

Director's CD-1 Review of SLI-UUP

July 6, 2010

Executive Summary	<u>Dean Hoffer</u>
1.0 Introduction	<u>Dean Hoffer</u>
2.0 Assessment of Technical Design Review	<u>Jason Budd</u>
2.1 High Voltage (HV)	<u>Mark Kaducak</u>
2.2 Industrial Chilled Water (ICW)	
3.0, Cost, Schedule, ES&H and Project Management	
3.1 Cost	<u>Marc Kaducak</u> <u>Terri Templeton</u>
3.2 Schedule	<u>Terri Templeton</u> <u>Marc Kaducak</u>
3.3 ES&H	<u>Mike Andrews</u>
3.4 Management	<u>Peter Garbincius</u> <u>Mike Dinnon</u>
4.0 Charge Questions	
4.1 Have performance requirements been appropriately and sufficiently defined for this stage of the project? Is the conceptual design sound and likely to meet the performance requirements?	<u>Jason Budd</u> All
4.2 Has a credible and sufficient alternatives analysis been performed that supports the proposed technical scope, cost, and schedule?	<u>Jason Budd</u> All
4.3 Are the cost and schedule estimates credible and realistic for this stage of the project? Is adequate contingency included?	<u>Terry Templeton</u> All
4.4 Is the project being managed (i.e., properly organized, adequately staffed) as needed to begin the Preliminary Design and to support the project through construction to successful completion?	<u>Marc Kaducak</u> All
4.5 Are ES&H aspects being properly addressed given the project's current stage of development? Are Integrated Safety Management Principles being followed?	<u>Mike Andrews</u>
4.6 Is project documentation (e.g., Acquisition Strategy, Preliminary Project Execution Plan, Preliminary Hazard Analysis Report, Preliminary Project Management Plan, and Risk Management Plan) complete and ready for CD-1 approval?	<u>Marc Kaducak</u> All
4.7 Is the SLI Utility Upgrade Project appropriately prepared for the DOE Independent Project Review scheduled for August 24, 2010?	<u>Peter Garbincius</u> All

Note: Underlined names are the primary writer

Appendix D

Reviewers' Contact Information

Director's CD-1 Review of SLI-UUP

July 6, 2010

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