

# **CORRECTIVE ACTION PLAN REVIEW AND REVISED PERFORMANCE BASELINE FOR THE FERMILAB NOvA PROJECT**

**EXTERNAL INDEPENDENT REVIEW**

**REPORT DE820T1-1(SUPPLEMENTAL)**

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# Chapter 1

## Corrective Action Plan Review

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### INTRODUCTION

The Department of Energy (DOE) Office of Engineering and Construction Management (OECM) asked LMI to update the EIR conducted in November 2007 of the NOvA Project at Fermi National Accelerator Laboratory and accomplish the following:

- ◆ Selectively review a limited number of available project management documents e.g., resource-loaded Integrated Project Schedule, WBS, schedule critical path, the Project Execution Plan, Acquisition Strategy, Contingency Analysis, Start-Up Test Plan, and other pertinent project documentation to verify existing document baseline.
- ◆ Review the December 2007 NOvA CAP to ensure the program office addressed and closed out all five Major Findings and report on the status of the other eleven Findings. Status of the seven recommendations related to Observations was included but their closure is not a requirement for a baseline validation recommendation.
- ◆ Review the revised project elements in sufficient detail to assess whether the project planning, schedule and cost estimate are sufficient and adequately developed, coordinated, and documented to support a reasonable expectation that the proposed baseline will endure through the remaining life of the project.

This report is a supplemental update to the EIR report published in December 2007.

### BACKGROUND

We conducted an external independent review (EIR) of the NOvA Project at Fermi National Accelerator Laboratory. The purpose of the EIR was to support OECM's validation of the performance baseline, Critical Decision (CD)-2. LMI conducted the review using the guidelines and procedures in DOE Order 413.3A<sup>1</sup> and DOE Manual (M) 413.3-1.<sup>2</sup> The EIR produced 23 recommendations for im-

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<sup>1</sup> U.S. Department of Energy, Office of Management, Budget and Evaluation, *Program and Project Management for the Acquisition of Capital Assets*, DOE O 413.3A, July 28, 2006.

<sup>2</sup> U.S. Department of Energy, Office of Management, Budget and Evaluation, *Project Management for the Acquisition of Capital Assets*, DOE M 413-3-1, March 2003.

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proving project management. These recommendations were supported by 5 major findings, 11 findings, and 7 observations. Our overall conclusion, at that time, was that the project could be successfully executed and the performance baseline validated once the project team resolved the major findings and had an acceptable plan in progress to resolve the other findings.

Shortly after the EIR report was issued, Congress cut all FY08 funding to the project. The project team then re-planned the project in anticipation of funding being restored in FY09. The project team also initiated the corrective action plan at Appendix A to resolve the findings identified in the EIR.

## OVERALL EIR TEAM ASSESSMENT

The project team's response to the CAP recommendations in Appendix A was generally satisfactory, and the resulting documents were updated appropriately. There is one finding that remains open (A1) however, the project team's plan to resolve the finding is adequate and in progress. Recommendation O1 is also open however, it came from an observation and closure is not required for a validation recommendation. Documentation reviewed as part of this review is identified in Appendix B.

The revised cost profile is consistent with the revised funding profile and the revised schedule. There is a reasonable expectation that the proposed baseline will endure through the remaining life of the project. The revised project planning and documentation is sufficient for CD-2, Approve Performance Baseline.

# Chapter 2

## Revised Proposed Performance Baseline

### COST BASELINE

The proposed performance baseline for the NOvA Project in November 2007 was \$260 million. Table 1 shows the revised proposed performance baseline of \$278 million. The \$18 million increase includes approximately \$9 million in CD-0 to CD-1 costs included as a result of EIR finding F2, \$8 million in escalation for the one year deferral, and a \$1 million increase in contingency. Comparing contingency amounts between the two proposed baselines shows an actual increase of approximately \$9 million. The additional \$8 million contingency increase came from the reduction in mass of the Far Detector.

*Table 2-1. Revised Proposed Performance Baseline (\$000)*

Description	FY06–07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	Total
PED	—	—	—	—	—	—	—	—	—
Construction	17	736	12,526	29,986	56,299	46,924	39,998	2,313	188,799
TEC	17	736	12,526	29,986	56,299	46,924	39,998	2,313	188,799
OPC (R&D and Ops)	13,428	1,953	10,542	4,022	1,685	231	—	—	31,862
OPC (CA only)	—	313	14,775	34,281	7,970	—	—	—	57,339
OPCs (expense funded)	13,428	2,266	25,318	38,303	9,656	231	—	—	89,201
TPC	13,445	3,002	37,844	68,289	65,955	47,155	39,998	2,313	278,000
PMB	13,445	2,893	30,330	53,500	48,413	34,652	24,348	1,194	208,674
MR	—	—	—	—	—	—	—	—	—
Fee	—	—	—	—	—	—	—	—	—
Noncontract/ DOE direct costs	—	—	—	—	—	—	—	—	—
Contingency	0	109	7,513	13,840	16,078	9,239	249	1,119	69,326
Performance baseline (TPC)	13,445	3,002	37,844	68,289	65,955	47,155	39,998	2,313	278,000

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## SCOPE BASELINE

The NOvA Project will produce near and far detectors that can perform the state-of-the-art study of neutrino oscillations. The project consists of four main elements:

1. An upgrade of the Fermilab accelerator complex from 400 kilowatts (kW) to a complex capable of 700 kW of beam power
2. A 222-ton Near Detector
3. A Far Detector Experiment Hall built on a site near the U.S.-Canadian Border in Ash River, MN
4. A 14,000 ton (14 kiloton) NOvA Far Detector.

Following the November 2007 EIR, the scope of the far detector was reduced from 15 KT to 14 KT to allow an increase in contingency funds within the TPC. Project performance is a function of detector mass. The project should still achieve its planned objectives with the smaller detector through a longer operating duration. We were not provided a copy of the Project Data Sheet to verify that the scope change was consistent with the scope presented for the funding request.

The proposed cost and schedule baselines reflect the 14 KT far detector scope.

We did note a discrepancy in the assumptions document which still reflects the 15 KT far detector mass. The Project Execution Plan and Resource Loaded Schedule included the correct 14 KT far detector scope.

## SCHEDULE BASELINE

The project timeline was extended a total of 14 months from that proposed in November 2007. The proposed schedule is consistent with the revised funding profile. The Resource Loaded Schedule reflects the proposed cost and scope baselines. The resources loaded in the schedule are not escalated so there is no direct comparison to the cost and funding profile. Escalation is added in COBRA. Base values in the schedule were consistent with the estimate and reasonable compared to expected escalation.

The schedule contains 10 months of schedule contingency between the completion of tasks and CD-4. Table 2 shows the revised proposed performance baseline schedule Level 1 milestone schedule.

*Table 2-2. Proposed Performance Baseline Schedule*

Milestone	Date
CD-0 (Approve Mission Need)	Nov 22, 2005 (A)
CD-1 (Approve Alternative Selection and Cost Range)	May 11, 2007 (A)
CD-2 (Approve Performance Baseline)	Oct 2008
CD-3a (Long Lead Procurement/Site Work)	Feb 2009
CD-3b (Approve start of Construction)	Oct 2009
CD-4 (Project Closeout)	Nov 2014

Note: A=actual.

## REVISED FUNDING PROFILE

The revised funding profile reflects the loss of funding in FY08 and the addition of funding in FY14. Table 3 shows the revised funding and cost profiles which indicate that the project will not have a negative variance during its life. We note that these are values provided by the project team and we did not review updated project data sheets.

*Table 2-3. TPC Funding and Cost Profiles (\$000)*

Fiscal year	Funding profile	Cost profile	Cumulative variance
Prior years	16,858	13,445	3,413
2008	1,600	3,002	2,012
2009	37,000	37,844	1,168
2010	68,000	68,289	879
2011	71,220	65,955	6,144
2012	51,245	47,155	10,234
2013	32,077	39,998	2,313
2014	—	2,313	0
Total	278,000	278,000	—



# Appendix A

## Corrective Action Plan

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The following table presents the current corrective action plan based on the recommendations presented in the EIR report for the NOvA Project. Included are the Project Team's response to the recommendations in the report, the status of the corrective action and the EIR team's evaluation of the responses and status.

Items are identified by letter corresponding to EIR elements and then numbered sequentially within the element. In the report these recommendations appear in logical sequence based on the subject area. In the CAP shell they appear in order of their appearance in the report.

Items noted with \*\* are the result of Major Findings. A single \* indicates items related to Findings. All other items are the result of observations.

### CAP Shell Sections

- A. WBS
- B. Project Costs and Resource-Loaded Schedule
- C. Project Schedule and Critical Path
- D. Risk Management
- E. Funding Profile
- F. Key Project Cost, Schedule, Technical, and Programmatic Assumptions
- G. System Functions and Requirements
- H. Basis of Design
- I. Preliminary Design, Design Review, and Comment Disposition
- J. Value Management/Engineering
- K. Start-Up Test Plan
- L. Acquisition Strategy
- M. Hazards Analysis
- N. Sustainability

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- O. Project Execution Plan
  - P. Integrated Project Team
  - Q. Project Execution.

ID no.	Sec ref	Page ref	Recommendation	Required action (discussion)	Current status	OECM perspective
K1*	2.1.3.2	2-4	Clearly document the justification for excluding the commissioning of the modified beamline and the ARR from the project.	This is documented in the NOvA MoU with the Directorate and AD. NOvA accelerator/beamline upgrades are to the existing Fermilab complex of already operating machines. The ARR is included as part of the project as it occurs prior to commissioning. It is part of the documentation required to in order to be ready to start commissioning with beam. Commissioning is planned and conducted by the Fermilab operating and ESH organizations according to the accelerator operations (not NOvA project) schedule, and is completed fully in compliance with existing Fermilab and DOE FSO commissioning procedures. The NOvA Start-Up Plan further documents this.	Complete 3/1/08	CLOSED: The justification, as presented in the MOU, has been documented as recommended. The EIR team remains concerned that the full project scope is not being covered by project funds, however it does appear there are assurances in place that the required efforts will be completed in a way that supports project completion
A1*	2.1.3.4	2-5	Revise the WBS dictionary to contain more information about each WBS activity, such as comprehensive scope description, deliverables, milestones, basis of estimate, assumptions, and resource requirements.	The current WBS dictionary follows the guidance in DOE order 413.3. Additional information is included in Open Plan which is the ultimate encyclopedia for the entire project. We will extract this information in some presentable fashion and add it to the dictionary. We have done this for WBS 2.4 to see if the content and format is acceptable before we do it for the entire project.	In progress	OPEN: The intent of this recommendation is to expand on the current dictionary shown in Chapter 7 of the Technical Design Report. That dictionary is developed at Level 3, which is fine, and which only needs to be expanded to incorporate the items listed in the recommendation A1, specifically a more comprehensive scope description, deliverables list, milestones, brief basis of estimate, major assumptions, and resource requirements. The sample WBS dictionary provided by the site is structured to Level 7, which is more detail than necessary, will take a lot of time and effort to create, and will likely result in a massive and possibly unusable document.

ID no.	Sec ref	Page ref	Recommendation	Required action (discussion)	Current status	OECM perspective
B1*	2.2.3.10.2	2-20	Ensure plans are in place to complete a preliminary design and the associated cost estimate for the Near Detector site preparation, including the required tunnel excavation, in FY09. Complete a BCP at that time and include more detailed and supportable cost and schedule details in the revised project cost and schedule baseline.	A Purchase Order is in place with an engineering firm to provide a 30% design. We will update the cost and schedule when they complete the design.	Complete 3/24/08	CLOSED: The project appears to be complying with the EIR recommendation, although the timing of this effort has obviously been delayed due to the funding cut for FY09.
C1	2.3.3	2-24	Expand the schedule to include the CD and EVMS certification process.	A number of programmatic milestones were already included in the schedule. We have since added some additional milestones such that all of the CD decisions and the EVMS certification process are now included. The milestones can be found in Appendix B of the Project Management Plan.	Complete 4/15/08	CLOSED: The EIR recommendation has been adequately addressed.
D1	2.4.3	2-26	Consider re-organizing the risk list so that the same risk is not repeated.	Because of the nature of our WBS and the way in which Welcome Risk maps to our WBS, we prefer to leave it the way it is. The same risks are repeated, but at different times in the schedule. In this way the risk as related to a particular task can be retired while the other similar risks in the future can remain (or perhaps be decreased). This makes it easier to track risks versus time and specific tasks. Thus we will leave risks repeated. By linking the risk to the WBS, we know that the risk is retired when the WBS item is completed.	Complete 2/28/08	CLOSED: This was not a Finding and therefore not a required recommendation. The project team's response and rationale are reasonable.

ID no.	Sec ref	Page ref	Recommendation	Required action (discussion)	Current status	OECM perspective
D2**	2.4.3	2-27	Increase the contingency to \$60.8 million by incorporating the costs defined as management reserve into the project contingency.	The \$696.2 k defined as Management Reserve (MR) during the EIR was subsequently incorporated into the project contingency. The contingency documented in the Project Management Plan (Table B7) and PEP (Sec. 7.3) now includes the MR amount.	Complete 12/6/07	CLOSED: The EIR recommendation has been adequately addressed.
D3*	2.4.3	2-27	Evaluate whether all significant DOE risks are captured in the current risk register and incorporate additional risks as appropriate. Consider such programmatic risks as stakeholder issues and University of Minnesota capabilities and performance.	A number of programmatic risks were already included in the risk register. We have since added an additional 9 risks. These include risks associated with delay in approval of CD-2 and/or CD-3, the risk of delaying the Project because of delays in the NEPA process, delays stemming from issues related to the National Historic Preservation Act, the risk from continuing resolutions, the risks and opportunities related to changes in the funding profile and the risks that could lead to a delay in CD-4. These risks have all been entered into our risk registry and risk forms have been written for the four of them (255, 254, 256, 253) that pose a high or medium risk.	Complete 3/20/08	CLOSED: The project has identified a number of additional programmatic risks, and has prepared risk forms for several that are deemed top priority. Mitigation strategies are explicitly discussed in the risk forms for each risk, and are well thought out. The project has a good list of DOE risks at this point. The EIR recommendation has been adequately addressed

ID no.	Sec ref	Page ref	Recommendation	Required action (discussion)	Current status	OECM perspective
E1*	2.5.3	2-29	Evaluate opportunities for a compressed project schedule given the large positive carryover evident from the NOvA Project funding profile.	As a result of the funding cut in FY08 we have reworked our cost and schedule to meet new guidance and we are investigating ways of accelerating our schedule. Our schedule is funding limited and we can and will accelerate activities when possible and when the resources are available. There is currently considerable uncertainty as to when FY09 funds might be available. We currently allow for a 4-month CR in our cost and schedule, but the CR could be longer (or shorter). Once we know more we will take a fresh look at possibilities for accelerating activities.	Complete 4/30/08	CLOSED: The new cost and funding profiles are more closely aligned, and the large carryovers are no longer apparent.
F1**	2.6.3	2-31	Consolidate the key project technical, cost, schedule, and programmatic assumptions into a single document.	This was done in a new document "Key Cost, Schedule, Technical and Programmatic Assumptions for the NOvA Project"	Complete 12/11/07	CLOSED: The EIR recommendation has been adequately addressed and a very complete assumptions document has been produced.
F2**	2.6.3	2-32	Identify and reflect all NOvA project costs in the TPC consistent with the DOE definition.	The TPC was revised to be consistent with the expectation to include costs starting with CD-0, and this is documented in the Project Management Plan (Table B7) and PEP (Sec. 7.3). Other aspects of this finding are addressed in items F3 and K1.	Complete 12/6/07	CLOSED: The EIR recommendation has been adequately addressed. Costs starting with CD-0 are now included in the TPC. This added about \$9 million to the TPC.
F3**	2.6.3	2-32	Review and clearly document the practice of not charging Fermilab physicist direct labor to the NOvA project.	OHEP guidance on this practice has been documented in NOvA-doc-3083. The NOvA "Key Assumptions" document (Sec. 1.2) incorporates the practice specifically into the NOvA Project.	Complete 3/31/08	CLOSED: This issue is documented in a March 25, 2008 memo from M. Procario, and is further documented in the "Key Cost, Schedule, Technical and Programmatic Assumptions" document. Fermilab physicists who provide direct labor to the project are not charged against the project unless they are WBS Level 1 or 2 managers. OECM concurrence with this guidance/approach should be obtained.

ID no.	Sec ref	Page ref	Recommendation	Required action (discussion)	Current status	OECM perspective
I1*	2.9.3	2-35	Update the status of all design review comments to reflect their status at CD-2 to support the design baseline.	Done. A Consolidated list of design review comments is now in NOvA-doc-3079.	Complete 2/28/08	CLOSED: The EIR recommendation has been adequately addressed
J1	2.10.3	2-37	Consider the use of cost savings incentive clauses in contracts awarded post CD-2.	We have considered these in the past. As the time approaches for putting contracts into place we will review all alternatives and determine the best approach, which in some cases may include the use of incentives.	Complete 2/28/08	CLOSED. The recommendation was a suggestion that would lead to better compliance with OECM expectation, and was not related to a "finding." The project's position on this item is satisfactory and no further action is needed.
K2*	2.11.3	2-37	Expand the schedule to include detailed start-up test plan activities.	Done. We have added 12 new startup activities to the schedule along with the resources required to accomplish these activities. The Startup Test Plan describes these activities. In addition, we have added 11 new milestones to the schedule, marking the completion of various startup activities.	Complete 5/7/08	CLOSED: The EIR recommendation has been adequately addressed
M1	2.13.3	2-41	Suggest updating the HA for Accelerator and NuMI Upgrades to document that all requirements of DOE O 420.2B are being met by virtue of following the DOE-approved equivalent, Fermilab ES&H Manual 2010, <i>Planning and Review of Accelerator Facilities and their Operations</i> . Clearly state that the accelerator work will comply with its requirements.	The accelerator modification work does not fall under the applicability of DOE O 420.2B, but rather an equivalent DOE approved "Work Smart Standard" (which is Fermilab ES&H Manual 2010) that is incorporated into the DOE contract for Fermilab to govern all accelerator operations. As described in the PEP, the HA was used as a basis to develop the draft Preliminary Safety Assessment Document (PSAD), which will be updated into the Final SAD. The SAD, along with safety envelope and readiness review requirements will meet the Fermilab required standard, which includes the elements of DOE O 420.2B.	N/A	CLOSED: The recommendation was a suggestion that would lead to better compliance with OECM expectation, and was not related to a finding therefore no further action is needed.

ID no.	Sec ref	Page ref	Recommendation	Required action (discussion)	Current status	OECM perspective
M2*	2.13.3	2-41	Update the Hazards Analysis for NuMI Off-Axis $v_e$ Appearance Experiment to ensure that all references to scintillator mixing as a hazard are removed from the document.	Done. NOvA-doc-618 has been updated.	Complete 2/28/08	CLOSED. Review of the revised HA (NOvA-doc-618, Rev 3, 3/4/08) indicates that all instances of scintillator mixing have now been removed from the document, and it is fully endorsed by appropriate approvers. No further action is needed.
N1	2.14.3	2-43	Encourage the University of Minnesota to either seek LEED certification for the Far Detector building, or at a minimum, to apply LEED concepts to the design of the facility.	Done. We have encouraged them to do so as recently as March 4, 2008 via an email exchange with the CAM for the Site and Building and the PI of the Cooperative Agreement at UM. Part of this exchange is documented in NOvA-doc-3076.	Complete 3/4/08	CLOSED: The EIR recommendation has been adequately addressed

ID no.	Sec ref	Page ref	Recommendation	Required action (discussion)	Current status	OECM perspective
O1	2.15.3	2-44	Include a proper life-cycle cost analysis in the PEP; include acceptance criteria and KPPs as required in section 2.17.3 of this report.	Startup costs are included in the Cost and Schedule (see K2). Operations is not included in the Project, but the costs are approximately known based on experience with NuMI. The PEP currently contains a rough estimate for D&D.	Complete 4/30/08	OPEN: From DOE O 413.3A, "Cost estimating must be an integral part of cost baseline including life cycle cost development and maintenance..." From DOE M 413,3-1, "All organizations in the Department prepare life-cycle cost estimates in support of their programs and projects. A life-cycle cost estimate attempts to identify all the costs of an acquisition, from its initiation through disposal of the resulting system at the end of its useful life." Clearly the intent of OECM is to require development and maintenance of a life cycle cost estimate for every project. There is at present no such estimate for the NOvA project. However, since operating costs are "approximately known," and there is a "rough estimate" for D&D, combining these time phased costs with the TPC and bringing the total to a single, present worth figure does not appear to be an onerous task. The recommendation was a suggestion that would lead to better compliance with OECM expectation, and was not related to a "finding." No further action is needed however for the reasons stated above the recommendation cannot be considered CLOSED.
P1	2.16.3	2-45	Consider making the IPT charter a stand alone document with a page of "acceptance" signatures for the appointed core members in order to better comply with OECM expectations.	This was considered, but since the IPT has been meeting weekly for over a year, with clear buy-in of key members, we don't feel it's necessary. The IPT charter is contained in the PEP (Appendix 1), a DOE approved document.	Complete 12/19/07	CLOSED. The recommendation was a suggestion that would lead to better compliance with OECM expectation, and was not related to a "finding." No further action is needed

ID no.	Sec ref	Page ref	Recommendation	Required action (discussion)	Current status	OECM perspective
P2*	2.16.3	2-46	Develop a plan or strategy for either meeting the requirements of DOE O361.1A to provide a Level 3 certified FPD for this project, or to obtain a waiver from this requirement. Submit the plan as part of CD-2 documentation for approval by the Acquisition Executive.	A plan has been developed for the NOvA FPD to reach Level 3 certification. The plan will be included as part of the CD-2 documentation for approval.	Complete 1/14/08	CLOSED. A plan for the FPD to meet DOE O 361.1A requirements for Level 3 certification by the end of CY 2008 has been developed. No further action is needed.
Q1*	2.17.3	2-47	Develop both a list of appropriate Key Performance Parameters and a list of CD-4 deliverables for the project. Clearly delineate the lists and include them in the PEP.	Listings of both key performance parameters and CD-4 project deliverables have been delineated and included in the PEP (Sec. 3.2 and 7.2), along with descriptions of related parameters and requirements further described in the technical design report and project parameter sheets.	Complete 12/18/07	CLOSED. The requirement for defining KPPs and CD-4 deliverables, and related requirements in the PEP has been met. No further action is needed.
Q2**	2.17.3	2-47	Make execution of the Fermilab/University of Minnesota MOU for implementation of the University of Minnesota/DOE Cooperative Agreement (CA) a high priority. The CA should be executed prior to CD-2.	The Fermilab/University of Minnesota MOU for implementation of the University of Minnesota/DOE Cooperative Agreement was signed by all parties and executed. The MOU can be viewed at NOvA-doc-2824. Cooperative Agreement No. DE-FC02-07ER41471 (CA) between the U.S. Department of Energy, Office of Science and the Regents of the University of Minnesota was executed in September 2007.	Complete 12/18/07	CLOSED. The MOU for implementation of the University of Minnesota/DOE Cooperative Agreement (CA) is fully executed and the documentation is otherwise in order. No further action is needed.

ID no.	Sec ref	Page ref	Recommendation	Required action (discussion)	Current status	OECM perspective
Q3*	2.17.3	2-47	Ensure that the project controls system is completely “debugged” and capable of producing accurate EVMS reports prior to CD-2. If this cannot be done, obtain a written waiver from OECM that specifically allows a delay in EVMS reporting until the current errors can be corrected.	<p>The project controls system was debugged and used to generate EVMS Cost Performance Report data for a cumulative period and a Monthly period. This establishes capability for monthly updates and variance analysis using the NOVA EVMS data. See e.g. pages 15-18 of the Feb. 2008 monthly report. The FY08 funding cut required modifications to the Cost and Schedule. Tasks that were underway were suspended until funds are available to restart them. These tasks had to be split into two pieces in the Cost and Schedule. We are in the process of incorporating these split tasks into COBRA so that we can resume production of EVMS reports.</p> <p>7/2/08–John Cooper - “Deltek did finally point us at a way to move the 3,000 tasks which now start no sooner than Feb 1, 2009. That glitch has been resolved and fixed. We are still working on a couple of other much more minor problems found in cross-checking Open Plan info with Cobra info.”</p>	Complete 3/15/08	CLOSED. The update from Deltek indicates that the EVMS is now “debugged” and capable of accurate reporting. Apart from continuing to resolve the minor Open Plan versus Cobra discrepancies, no further action is needed for this finding.



## Appendix B

# Documents Reviewed

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- [1] NOvA Project Schedule for Detector R&D, June 10, 2008
- [2] NOvA Project Schedule for Detector Construction, June 10, 2008
- [3] NOvA Change Request Record #14, initiated December 19, 2007
- [4] NOvA Change Request Status Report, April 15, 2008
- [5] NOvA Risk Accounting Form, March 10, 2008
- [6] NOvA Risk Accounting Form, March 13, 2008
- [7] NOvA Risk Accounting Form (Continuing Resolution), March 14, 2008
- [8] NOvA Risk Accounting Form (funding profile), March 14, 2008
- [9] Email Guidance on Capturing Labor Costs in the Total Project Costs, March 25, 2008
- [10] NOvA Estimate at Completion (EAC) Calculation , June 12, 2008
- [11] NOvA Monthly Report for February 2008
- [12] Cooperative Agreement DE-FC02-07ER41471, September 27, 2007
- [13] MOU between University of Minnesota and Fermi National Accelerator Laboratory, September 27, 2007
- [14] MOU between NOvA Project and Fermilab Directorate, March 4, 2008
- [15] MWH Revised Proposal for Engineering Services, April 15, 2008
- [16] MWH Meeting Notes from NOvA Preliminary Design Site Visit, May 21, 2008
- [17] Fermilab Responses to Recommendations from the EIR Corrective Action Plan, June 12, 2008
- [18] Fermilab Consolidated Review Recommendations and Responses (NOvA-doc-3079), June 10, 2008

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- [19] NOvA EVMS Summary of Contract Performance Reports, June 12, 2008
  - [20] NOvA Key Assumptions, May 8, 2008
  - [21] NOvA Milestone Analysis, June 12, 2008
  - [22] NOvA Project Execution Plan, June 12, 2008
  - [23] NOvA Project Management Plan, June 7, 2008
  - [24] NOvA Response to EIR Finding E1, June 11, 2008
  - [25] NOvA ANU Construction Schedule, June 10, 2008
  - [26] NOvA Variance Analysis, June 12, 2008
  - [27] NOvA Project Level 3 PMCDP Certification Plan, January 2008
  - [28] NOvA Updated Hazard Analysis, May 2, 2008
  - [29] NOvA Start-Up Test Plan (NOvA-doc-2646), May 7, 2008
  - [30] Updated Risk Management Table for NOvA Construction, undated
  - [31] NOvA Activity Information for WBS Dictionary, June 9, 2008

Plus various working documents, spreadsheets, and briefings provided by the project team.