	No	Responsible	Recommendations	Status
			Section 1.1 – Main Injector, NuMI Stub, and Pre-Target Area	
1	1.1.1	R. Andrews	The planned installation tasks for the '03 shutdown are reasonable for the duration and completion of these tasks will leave the project in a position that short unscheduled shutdowns could be used to some extent. Beams Division and Lab management should provide sufficient resources and schedule the shutdown duration to allow completion of the scheduled tasks.	The duration of the shutdown was adjusted to accommodate completion of the required tasks. The major goal of the shutdown was accomplished.
2	1.1.2	R. Andrews	Appoint the MI-65 Floor Manager before the May DOE Review, followed by the task managers for the major installation tasks.	This was completed prior to the May DOE Review
3	1.1.3	R. Andrews	Lambertson installation in '03 would allow an additional year of operating experience with the Main Injector, with minimal impact and risk, and would allow power tests to understand any stray-field impact on the Recycler. Understanding this impact earlier would allow mitigation, if needed, during the '04 shutdown. The committee encourages installation of the Lambertson magnets in '03 provided this can be done without extending the shutdown duration.	Installation approval of the Lambertsons was obtained prior to the start of the ’03 Shutdown. The Lambertson magnets are now installed.
4	1.1.4	R. Andrews	The check-in/check-out plan needs to be completed and signed off on, and manpower requirements adjusted accordingly.	This plan has been completed, approved, and implemented.
5	1.1.5	R. Andrews	Discussions with BSS should be initiated/continued to assure that the methods for loading, transporting and unloading are understood and agreed upon.	A Trucking Plan has been developed and is maintained by the Installation Coordinator. Fermilab BSS is supplying our trucking needs.
	No	**Responsible**	**Recommendations**	**Status**
			Section 1.2 – Target Hall and Service Rooms	

6	1.2.1	R. Andrews	Work with Beams Division, PPD, and TD to assign these key roles as soon as possible.	All Floor Managers and key Task Managers have been assigned.
7	1.2.2	G. Bock	The target tech group should be maintained intact and not disturbed by other activities. Project personnel should work with Beams Division HQ and personnel to attain assurances that this will be the case throughout the component fabrication, assembly and installation stages.	Agreed. This is the current plan. The work of the target group was not affected by shutdown activities.
8	1.2.3	R. Andrews	Compare time study estimates with the real-world experiences of Mini-BooNE Target Pile installation and adjust accordingly. This includes the need to shim and level blocks as well as transport of blocks from rail-head (or other source) to MI-65.	The installation cost estimate was validated by the 10% shielding pile prototype. Target pile installation is now more than 50% complete and on schedule.
9	1.2.4	R. Andrews	The floor manager for the area should be assigned responsibility to ensure crane inspections and maintenance is performed adequately and monitor crane usage. In addition, repair times, availability of spare parts, and inspection frequency of the normal Fermilab infrastructure for maintenance and repair of cranes should be investigated.	The Floor Manager has the responsibility for overseeing the inspection and maintenance of the cranes. This will include assuring the crane reliability.
10	1.2.5	G. Krafczyk	A mechanical review of this [horn power supply] structure should be performed in the very near future.	The horn power supply is currently under review for rigging safety.
11	1.2.6	D. Pushka, B. Ducar	NuMI project and BD personnel work together to develop such a cohesive plan for transfer of knowledge.	Drawings, Engineering Notes, Installation Plans and hazard Analyses are completed for each activity, and files are

				maintained in the NuMI Project Office. These will be transferred to the Beams Division on completion of the project. Much of the documentation for the NuMI Project can now be found starting at the NuMI-MINOS Project general Documentation page on the web. We continue to add documents there to facilitate the transfer of knowledge.
12	1.2.7	R. Andrews	Show the integrated schedule (including all WBS level 3 tasks) in the presentation to the DOE review panel.	Done.
	No	**Responsible**	**Recommendations**	**Status**
			Section 1.3 – Absorber Area	
13	1.3.1	B. Baller	Implement ISM by documenting the various reviews and responses to the reviews in a systematic way.	Recommendations from all internal reviews have been collected. L3 managers are charged with addressing all review comments prior to commissioning. These reviews, comments and responses are posted on the web in a systematic way.
14	1.3.2	B. Baller	Specify a review and sign-off procedure for design modifications	A project wide plan has been developed and implemented for approving the Engineering Notes and their changes.
15	1.3.3	B. Baller	Review and document the design, installation plan, and	Design documentation will

			maintenance and fault repair procedures for the Hadron Absorber	reside in the NuMI TDH in a future revision. A detailed installation plan has been developed by the downstream installation team. Since repair of the absorber would be extremely difficult, it was designed with redundant cooling paths and is being tested above ground where feasible.
16	1.3.4	R. Andrews	Identify the MINOS floor manager, preferably before the next review, even though this position may only be part time until FY04.	This task has been completed.
17	1.3.5	R. Andrews	Pre-assemble the Hadron Absorber assembly crane and absorber pile above ground if possible.	The rigging contractor will supply all needed equipment, so this crane was dropped from the plan. The absorber core will be assembled above ground. The project now has significant field experience at MI65 with installation of remaining blocks.
	No	**Responsible**	**Recommendations**	**Status**
			Section 1.3 – Near Detector	
18	1.3.6	N. Grossman	Implement ISM by documenting the various reviews and responses to the reviews in a systematic way including the coordination of the PPD and Beams Division Reviews.	A project wide plan has been developed and implemented for documenting reviews and the approval process. It is documented on the project review web page, along with links to reviews information.
19	1.3.7	N. Grossman	Specify a review and sign-off procedure for the	A project wide plan has been

			proposed installation procedures	developed and implemented for approving the Installation Procedures, and recording this approval.
20	1.3.8	N. Grossman	Actively include the Particle Physics Division in the planning and documentation of the design and installation plans, as well as maintenance and fault repair procedures, since they will eventually become the custodians of the Near Detector Hall	A panel has been created that is authorized by both BD and PPD to review the documentation (for design and installation.) Maintenance and fault repair procedures will need to be addressed.
21	1.3.9	G. Bock	The Beams Div and the Particle Physics Div should independently review the sump pump system to ensure the reliability of the system and its backup equipment and procedures.	An outside consultant with expertise in reliability assessment has performed a quantitative assessment of the reliability of the sump pump systems. This analysis has been reviewed (and remains available for review) by project management and representatives from BD and PPD. This analysis identified to minor changes (which were incorporated) to improve system reliability.
22	1.3.10	R. Andrews	Identify the Floor Manager for the MINOS area and the Task Manager for the detector installation as soon as possible.	Complete
	No	**Responsible**	**Recommendations**	**Status**
			Section 1.4 Integrated Schedule	
23	1.4.1	R. Andrews	Identify as many as possible of the floor managers and task managers before the May DOE review.	Floor Managers and Task Managers are identified for

				both MI-65 and MINOS.
24	1.4.2	R. Andrews	Specifically communicate the NuMI personnel requirements to the BD, PPD, and BSS within the next month.	This has been done, and both Divisions have been responsive with resources.
25	1.4.3	R. Andrews	Restart the NuMI Installation Coordination Meetings before the May Lehman review.	Done.
26	1.4.4	R. Andrews	Work backwards from the installation schedule to set milestones for the timely review and sign off of components to be installed in the tunnel.	This task has been completed, and a regular meeting created for prioritizing work to ensure timely completion of the review process and signoff.
27	1.4.5	G. Bock	BD needs to provide feedback to NuMI on the near term schedule.	This has been done and continues.
28	1.4.6	G. Bock	BD & the Directorate should re-emphasize the importance of NuMI project completion.	Done
	No	**Responsible**	**Recommendations**	**Status**
			Section 1.5 Integrated Safety Management	
29	1.5.1	N. Grossman	The committee recommends that the charge by the BD Head to the BDNSC be updated to reflect inclusion of independent safety reviews, including sign-offs as appropriate, in the charge to the committee.	Done. The charter has been updated and is posted on the NuMI Reviews Web page. The review committee is now a general PPD/BD review committee not restricted to BD.
30	1.5.2	N. Grossman	The committee recommends that the Chair of the BDNSC and the NuMI Project Manager proactively and aggressively see to it that the safety reviews processes be fully implemented.	Done through this “newly” appointed joint PPD/BD committee.
31	1.5.3	N. Grossman	The committee recommends that the BD Head and the NuMI Project Manager should review and revise as appropriate the BD safety-review processes (including radiation safety-related review processes and	Done. It is documented on the NuMI Project Reviews web page.

			construction safety-related review processes), and a description of the safety review processes should be included in the web-based ISM Implementation Plan documentation that is in preparation.	
32	1.5.4	R. Andrews	The committee recommends that the next round of underground installation work be done in accordance with the newly revised and upgraded, fully documented, safety review processes.	Done
33	1.5.5	G. Bock	The committee recommends that the statements in the ICP, and the corresponding chart, be reviewed by NuMI Project Management in consultation with the BD and PPD managements, and revised as needed to make them consistent with one another and to accurately state the single-chain-of-command line of authority and responsibility for both the execution of the installation work and its safe performance.	Done
34	1.5.6	G. Bock	The committee recommends that the chain-of-command line of authority and responsibility must be fully understood and also must be accepted by all personnel who supervise, or perform, or advise concerning, the NuMI Project installation work, and that appropriate training to ensure this should be carried out throughout the installation phase of the NuMI Project (and that the records of such training should be appropriately documented.)	This responsibility has been fully implemented.
35	1.5.7	G. Bock	The committee recommends that, in consultation with the BD Operations Department, the NuMI Project develop, document, and put in place an appropriate access control, monitoring, and management process for installation through the MI-65 and MINOS access shafts, prior to the commencement of technical	This is now complete for MI-65, and the procedure implemented for MINOS will be the same procedure with the caveat that lessons learned from MI-65, and features

			components and detector installation through those two shafts.	unique to MINOS will be addressed.
36	1.5.8	G. Bock	The committee recommends that the NuMI Project Management add an additional high-level person as soon as possible to the NuMI ES&H staff. This person's responsibilities would include the following: 1. Development of ES&H procedures and processes for the oversight/inspection of the NuMI installation work, 2. Development of procedures and processes of additional ES&H-related activities that are discussed in other sections of this Director's Review Report and in particular in other parts of this Section 1.5 (Integrated Safety Management) of the Review Report, 3. Assure that the documentation required to implement all the items noted above are properly completed and maintained, 4. Development of the required training for the procedures and processes noted above, 5. Implementation or coordination of implementation of all the items noted above and assure successful accomplishment of these activities.	Done. Another staff member has been added.
37	1.5.9	N. Grossman	The committee recommends that a description of NuMI Project's Documentation System be developed and the process documented. This process should identify the types of documents within in the scope of the documentation system, which would include all ES&H related documentation. Links to documents themselves should be better organized and linked to a single web site. Also, a person should be assigned the responsibility to assure proper implementation of the	In progress. Alan Wehmann has been assigned to this task. The web page: http://www-numi.fnal.gov/projectdocs.html has been set up and is being updated regularly. Dan Wilson has recently been added to work on the ES&H documentation for the web.

			process.	
38	1.5.10	G. Bock	The committee recommends that, with the approval of the BD Head, and after consultation with Beams Division and Particle Physics Division management personnel, the NuMI Project Management should identify, make known to all affected parties, and document, the procedures and lines of command that include the safety aspects of work done during the NuMI installation phase by MINOS Collaborators who are not Fermilab employees. (This recommendation concerning MINOS Collaborators is implicitly included in earlier recommendations, but is re-stated here for emphasis.)	Collaborators will be required to take all underground safety training, and to participate in daily work planning meetings and hazard analyses.
	No	**Responsible**	**Recommendations**	**Status**
			1.6 Management	
39	1.6.1	R. Andrews	NuMI coordinate closely with Beam Operations on planning the duration of installation activities and resource requirements for these activities.	Regular meetings are scheduled with Operations, BD Management, Main Injector, and Recycler.
40	1.6.2	B. Baller	NuMI should complete the technical component list with review status and implement their Installation QA procedure as planned.	The review list is complete for WBS 1.1. The status is updated weekly. Reviews for WBS 2.0 will be added soon.
41	1.6.3	G. Bock	The BD Head should determine and appropriately document how he plans to discharge his landlord responsibilities in the newly created NuMI project areas.	After discussion, these responsibilities are delegated to the Beams Division Associate Head for the NuMI project.
42	1.6.4	G. Bock	The NuMI Project Director should work with the BD Director to appropriately implement BD NuMI safety oversight.	The review committee is now a general PPD/BD review committee not restricted to BD.
43	1.6.5	G. Bock	NuMI Project Director should work with appropriate	This recommendation is

			Fermilab management to fill the key NuMI Installation Management positions as soon as possible.	complete. See the Installation Organization Chart.
44	1.6.6	G. Bock	The committee recommends that the Deputy Director/PMG Chair, BD Head, NuMI Project Manager, and others as appropriate, should meet regularly and frequently, from now until the NuMI installation work is completed, to review, plan and coordinate the availability of the personnel required for the orderly, efficient, safe, and timely execution of the NuMI installation work, especially the installation work that will be done underground.	Director's Reviews continue. In addition, a representative from the Project Management Office of the Directorate participated in the last MINOS Internal Review. Resource issues are addressed at the appropriate level. Directorate involvement has not been required.