

Responses to Recommendations from the 9th t-TAC Meeting

Topic/TAC Recommendation	Target Project Response to TAC Recommendation
<p style="color: blue; margin: 0;">Are the measures we have proposed to resolve the issues and review / implement the recommendations of the 1st ESS Annual Review adequate and sufficient?</p>	
<p>– Moderator and reflector system remain on the critical path for the target system. Many new and interesting solutions were presented. Continue to manage these efforts and make decisions as necessary to meet schedule</p>	<p>Moderator and Reflector Systems remain on the critical path for the Target Project. Nevertheless, delaying work on this system to select a more optimal configuration was judged to be worthwhile because of the substantial performance gain offered by the use of new, high-brightness moderators. We have settled on a final configuration that will be presented at the 10th TAC meeting.</p>
<p>– Staffing remains an important issue. Continue to manage it, integrating in kind contributions when possible to try to meet the in kind contribution goal</p>	<p>Target division staff increased significantly in 2014. All Group Leaders and Work Package Managers are now in place. Delays in securing in-kind partners was partially offset by hiring additional contractors. Success in the 2015 plan relies on bringing in-kind partner resources onboard in late 2014 or early 2015 for many parts of the Target Project. The plan for securing partners and staffing will be presented at the 10th TAC meeting.</p>
<p style="color: blue; margin: 0;">Are the technical risks of the construction plans for Accelerator, Target and Controls comfortably low enough for safely achieving start of initial operation in 2019 on time, budget and performance?</p>	
<p>– Complete formal in-kind negotiations as quickly as possible</p>	<p>Engagement with potential in-kind partners has progressed; the first partners are now being brought onboard. Plans for securing partners will be presented at the 10th TAC meeting.</p>
<p>– A more complete answer to the budget & schedule question can be provided at the next meeting, or by the annual review committee, whichever is more appropriate</p>	<p>As mentioned, this information may be more appropriate for the annual review. Nevertheless, a brief summary of the budget, schedule and risks will be presented at the 10th TAC meeting.</p>
<p style="color: blue; margin: 0;">What intermediate early key milestones are required to be met on the way?</p>	
<p>– The current process for deciding the geometry and number of moderators seems sensible; follow the plan</p>	<p>A decision was made as planned on April 30, and has been endorsed by a special advisory committee and the ESS SAC. We have now finalized the overall configuration and plans for the Moderator and Reflector Systems. This information will be presented at the 10th TAC meeting.</p>
<p>– Define the appropriate target instrumentation for the target safety system monitoring</p>	<p>The process for selecting the instrumentation needed for the TSS is ongoing. We plan to settle on safety credited controls following detailed safety hazards analysis process. This will occur in 2016, which is consistent with the timing at other facilities (e.g. SNS). The number of safety-credited controls is expected to be quite small, likely only beam shutdown if loss of wheel rotation or perhaps loss of coolant.</p>
<p>– Consider the lead reflector decision carefully. If you decide to pursue it, decide how you will succeed where others before you have failed.</p>	<p>There are no plans to use a lead reflector.</p>

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<p>Is there a need to identify / study additional back-up options for securing timely start of initial operations?</p>	
<p>– It would be good to see details of both the helium and the water-cooled target analyses at the next meeting</p>	<p>The Target Helium Cooling System held its Preliminary Design Review in September and will soon finalize all required documents needed to complete the PD. A presentation on this system will be included in the 10th TAC meeting. The water-cooled backup study on emergency cooling was successfully completed as planned, and this work is being closed out and will also be presented at the TAC meeting.</p>
<p>The moderator decision</p>	
<p>– Make the decision consistent with your schedule to pursue the flat moderator or not</p>	<p>A decision was made as planned on April 30, and has been endorsed by a special advisory committee and the ESS SAC. We have now finalized the overall configuration and plans for the Moderator and Reflector Systems. This information will be presented at the 10th TAC meeting.</p>
<p>– For the flat moderator, ED&D funding would be better spent on engineering (e.g., thermal hydraulics and manufacturability) versus neutronic performance</p>	<p>We are exploring the idea of measuring the brightness distribution of hydrogen moderators at currently operating facilities to verify/benchmark code predictions for the ESS flat moderator. For example, this could be done by using a pin-hole and an image plate or CCD camera on any of the beam lines viewing a coupled hydrogen moderator at J-PARC or SNS. Plans for engineering prototypes and tests are being developed now that the design configuration has been decided.</p>
<p>Materials issues</p>	
<p>– An evaluation of what target variables should be monitored to protect the public & workers, followed by how or if those variables can be measured, is important for the target safety system</p>	<p>The process for selecting the instrumentation needed for the TSS is ongoing. We plan to settle on safety credited controls following detailed safety hazards analyses. This will occur in 2016, which is consistent with the timing at other facilities (e.g. SNS). The number of safety-credited controls is expected to be quite small, likely only beam shutdown if loss of wheel rotation or perhaps loss of coolant.</p>
<p>– A calculation of the helium production in beryllium should be completed.</p>	<p>Estimates of helium production in the beryllium reflector will be presented at the 10th TAC meeting. The related beryllium swelling rate estimate and its engineering implications will be presented, from a reflector lifetime viewpoint.</p>
<p>– Realistically evaluate waste storage and decommissioning cost for the different materials of the target system. Are there disposal paths for the beryllium and proposed lead concept?</p>	<p>Discussions with the Swedish waste repository operator, SKB, are ongoing. Most wastes from Target Station operations (e.g., tungsten, steel, aluminum) are considered to be straightforward. The disposal path for beryllium is not yet identified. The mitigation strategy is to separate beryllium (along with its aluminum housing) from other wastes and store it until a disposal path is decided. Options for storage include the interim storage facility owned by AB SVAFO where beryllium from a decommissioned research reactor is currently stored. There are no plans to use lead in the spallation target or reflector areas (lead could be used as a shield material in other parts of the facility).</p>