

## **White Paper on Evaluating Proposed U12g Facility Upgrades - Mission Performance Risk Reduction Plan**

The U12g mission requires facility availability for important national security related missions to be maintained. Deficiencies in the physical plant and supporting mission upgrades have been previously identified. In order to ensure that availability of U12g when required, it is necessary to manage ongoing activities, avoid degradation of existing systems, and upgrade known deficiencies. Resources are not available to support all desired activities and upgrades. Consequently, a process that will help ensure facility availability and improvement is needed to assist management in understanding current and future risks to mission accomplishment and in evaluation of where limited resources will be most effectively applied to facility upgrade and maintenance. This white paper is intended to define a proposed process to develop a Mission Performance Risk Reduction Plan that will provide National Security Technologies, LLC.(NSTec) and National Nuclear Security Administration (NNSA) management the tools necessary to make more effective decisions regarding ensuring mission capability at U12g.

The U12g facility had been operated by the contractor as a hazard category 2 nuclear facility, according to the approved safety basis documentation. This documentation included a Documented Safety Analysis (DSA). An implementation plan was written to address facility deficiencies identified in the NNSA Safety Evaluation Report (SER) that approved the DSA and other safety basis documents. In 2007, the Nevada Site Office sent a letter to NSTec instructing that the G-Tunnel facility was to be operated as a less than Hazard Category 3 nuclear facility and rescinding the approved status of the SER and the safety basis documents. NSTec now operates G-Tunnel as a radiological nuclear facility, on the basis that legacy contamination from prior underground testing programs remains in the tunnel and is a potential hazard to workers performing maintenance activities.

Facility safety deficiencies and recommended improvements and upgrades were previously identified in an NNSA approved SER. That evaluation, while focusing on nuclear safety issues, is also a starting point for mission capability as the same or similar safety upsets also adversely affect the ability of the facility to execute its assigned mission. Based on the safety evaluation an implementation plan for future facility upgrade projects has been published previously. The implementation plan lists several needed projects for the facility, along with a tentative schedule for completion based on available funding. However, the Implementation Plan was based strictly on compliance to operating the U12g Tunnel as a Hazard Category 2 Nuclear Facility whereas the focus of this new initiative is to help ensure mission availability of the U12g tunnel and supporting mission equipment. This change in focus may alter the priority for facility upgrades from the existing DSA Implementation Plan, since some safety compliance based issues have limited practical impact on mission readiness or worker safety. Items found to have a practical impact would be elevated in priority over issues related to compliance and not having practical impact.

This document proposes a risk based analysis which will look at the needs for facility availability and facility safety, with the goal of quantifying each item contained in the implementation plan with regards to the benefit attained for mission availability. Using the results of the risk analysis, selection decisions can be based on the factors which provide greatest benefit.

Items currently in the safety implementation plan are shown below in Table 1 appearing in no particular rank order. Mission support evaluation criteria will be developed and applied to each item in the list, with the goal of quantifying the benefit to mission readiness so that management decisions with regard to budget, scheduling and quality grading can be made with a documented basis.

**Table 1: Facility Upgrade Issues from DSA Implementation Plan**

<b>Item #</b>	<b>Description</b>	<b>Estimated Cost</b>	<b>Comments</b>
1	Electrical Grounding System in Alcove (No continuous electrically conductive pathway)		Electrical Grounding System and no continuous electrically conductive pathway are implemented through a <b>Faraday cage</b>
2	Automatic Ventilation Shutdown		Part of overall ventilation system upgrade
3	Fire Detection and Alarm System		Conceptual design completed previously based on FM200 system for preparation of cost estimate
4	Fire Suppression System in Mission Alcove		Conceptual design included in item #3
5	Water System Upgrades/Valve Replacement		Includes above ground supply tanks and fire water supply valves compatible with NTS Fire Department
6	Mission Alcove Seismic Evaluation		Completed to determine if alcove hard shell structure required
7	Fire retardant treatment of wood lagging and alcove ceiling support crib		Some treatment completed as part of preventive maintenance
8	Replace refuge chamber door and frame with UL listed components		Included as part of current FY maintenance budget
9	Remove unused legacy cabling		Included as part of current FY maintenance budget; continuing for three year period
10	Remove combustible vegetation annually		Included in maintenance budget; performed semi-annually
11	Carbon Monoxide sensing and removal system		Currently the tunnel is monitored by IH personnel prior to and during entry
12	Upgraded device handling configurations		Includes low boy modification with enhanced tie down system
13	Upgrade portable fire extinguishers		Initially installed to existing mine safety standards in April 2005
14	Develop second tunnel exit		Initial cost estimate was prohibitive
15	Install Criticality Alarm System		Initial cost estimate was prohibitive

<b>Item #</b>	<b>Description</b>	<b>Estimated Cost</b>	<b>Comments</b>
16	Upgraded shipping container configuration		Mission team provides shipping container based on national emergency requirements
17	Alcove Roll-up Door		Additional scope to Faraday cage modification (#1 above) for mission performance criteria
18	Shock absorbing Alcove flooring		Additional scope to Faraday cage modification (#1 above) for mission performance criteria

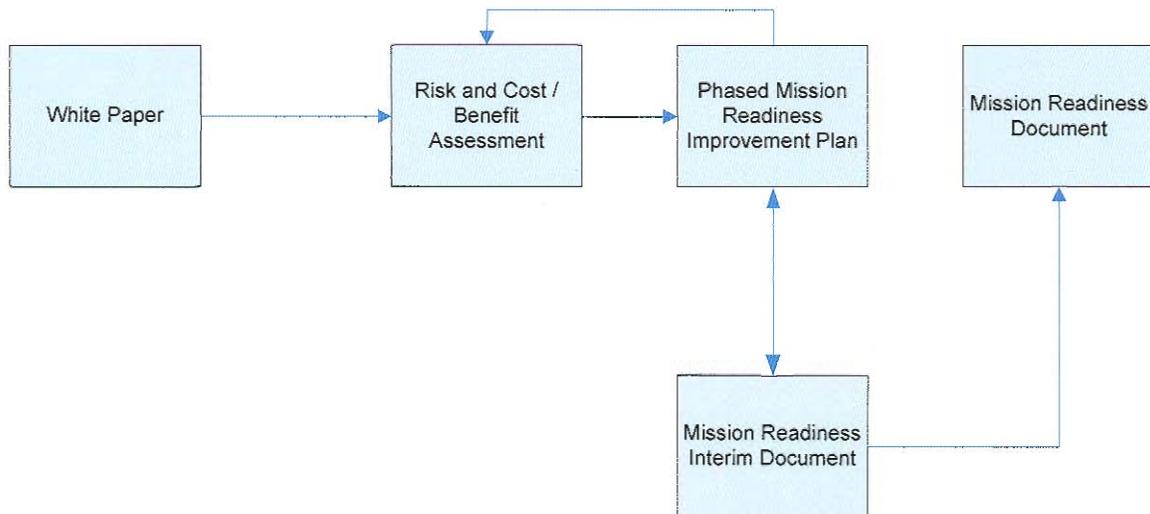
Source: Enclosure 3, U12g DSA Implementation Plan, Revision 1

Items included in this listing as potential candidates for further upgrade/installation will be evaluated for their contribution to mission readiness as will other items that may be identified through an evaluation of mission readiness requirements. The evaluation will be quantified based partially on risk assessment methodology approved in DM-NENG-002, "Hazard Analysis Methodology" modified to account for the mission readiness criteria addressed below. The criteria used for the proposed evaluation will be documented, and the evaluation process will quantify the extent of improvement or value gained from each potential upgrade to determine how the graded quality criteria should be applied. The work impact of each proposed upgrade with respect to specific process upset conditions and some selected Natural Phenomena Hazards events will be evaluated. Proposed facility upgrades with a major impact on the facility mission will be candidates for increased quality assurance requirements in a graded QA system. Both the consequences and the frequency of each impact will be assessed and documented. Assessments will be largely qualitative or semi- quantitative to limit the cost of the assessment.

The mission readiness criteria can include:

- Contribution to consistent online capability
- Need for redundant back up capability
- Potential for mission ending interactions during process
- Contribution to uninterrupted habitation
- Protection of critical processes and personnel
- Preservation of critical mission data

If this approach is accepted, the development of a risk based mission readiness condition will be consistent with the following diagram.



The diagram shows the development of a Risk and Cost Benefit Assessment that provides the basis for which improvements and upgrades may be most beneficial. From this a Phased Mission Readiness Improvement Plan is developed that implements the results of the Risk and Cost Benefit Assessment. As improvements and upgrades are made, a Mission Readiness Interim Document is prepared that defines the level of readiness currently achieved. Finally, all upgrades and improvements are made and a Mission Readiness Document is developed. As time goes on, additional upgrades or improvements may be required and the process will repeat to the extent necessary to identify candidate improvements and support management decisions to implement them or not. The final Mission Readiness Document becomes the operating framework that users may access for the state and capability of mission related information.