ABSTRACT
During his April 5th 2009 Prague Speech, President Obama stated, “Today, I am announcing a new international effort to secure all vulnerable nuclear material around the world within four years. We will set new standards, expand our cooperation with Russia, and pursue new partnerships to lock down these sensitive materials.” The U.S. Department of Energy’s Global Threat Reduction Initiative (GTRI) plays a major role in achieving President Obama’s goal. To date, GTRI has planned and executed over 1,000 projects in over 100 countries. This presentation discusses the threat reduction results, program management challenges and project risk mitigation actions that GTRI is addressing. The concepts of program, portfolio, and project management have been adapted to the global scope of GTRI’s efforts, including:

- Methods in place to organize, plan, schedule, monitor and control GTRI threat reduction activities
- Tools and processes in place to effectively track and articulate results
- Risk identification and mitigation methods used on the many interrelated technical, political, health, economic, environmental, and logistical risks that exist at all levels.
- Practices in place for the continued improvement in our management and technical methods, including using an independent Technical Evaluation Team
- A summary of overall progress to date in reaching GTRI goals and the remaining challenges that lie ahead.

INTRODUCTION
The greatest threat to global security is the possibility of terrorists acquiring the materials needed to construct and use a crude nuclear bomb or a radiological dirty bomb, the detonation of which would result in major consequences that would forever change the world. President Barack Obama identified preventing terrorists from acquiring nuclear and radiological weapons as his number one security priority.
Stockpiles of nuclear and radiological materials are located at thousands of civilian sites across the globe. These materials are used for legitimate and beneficial commercial, medical, and research purposes. Unfortunately, materials at many civilian sites are not sufficiently protected or are no longer needed, making them attractive targets for theft or sabotage.

The Global Threat Reduction Initiative (GTRI) within the Department of Energy’s National Nuclear Security Administration (NNSA) is a vital part of the global efforts to combat nuclear terrorism. GTRI’s unique mission to reduce and protect vulnerable nuclear and radiological materials located at civilian sites both in the United States and abroad directly addresses recommendations of the bipartisan 9/11 Commission. GTRI efforts are focused on the first line of defense, namely securing or removing vulnerable nuclear and radiological material at the source. GTRI accomplishes this global mission through the implementation of three principal tenets:

1) **Convert** reactors from the use of highly enriched uranium (HEU) to low enriched uranium (LEU). These efforts result in permanent threat reduction by minimizing and, to the extent possible, eliminating the need for HEU in civilian applications – each reactor converted or shut down eliminates a source of bomb material;

2) **Remove** or dispose of excess WMD-usable nuclear and radiological materials. These efforts result in permanent threat reduction by eliminating bomb material at civilian sites – each kilogram or curie of this dangerous material that is removed reduces the risk of a terrorist bomb. and;

3) **Protect** at-risk WMD-usable nuclear and radiological materials from theft, diversion and sabotage. These efforts result in threat reduction by improving security on the bomb material remaining at civilian sites – each vulnerable building that is protected reduces the risk until a permanent threat reduction solution can be implemented.

GTRI cooperates with foreign governments to secure nuclear and high-risk radioactive sources in a variety of commercial, medical and industrial settings including waste storage sites, oncology treatment centers, nuclear power plants, irradiation facilities, isotope production sites, oil exploration sites, and research institutes.

**OVERVIEW OF GTRI PROGRAM MANAGEMENT CHALLENGES**

Managing a program with GTRI’s unique mission and scope presents several program and project management challenges including working on a global scale, large and dynamic scope, organizational complexity, a program that is cooperative and voluntary, resource limitations, increasing pressure to demonstrate measurable results and time sensitive scope. Nuclear and radiological materials are located at thousands of civilian sites and are used for legitimate and beneficial commercial, medical and research purposes. Civilian sites generally have less protection than military facilities with nuclear and radiological materials.

GTRI’s mission to work with civilian sites both in the United States and abroad translates to a program that is global in scale. GTRI cooperates with over 120 countries worldwide to secure or remove vulnerable nuclear and radiological materials. The scope is large and complex and no single source of information exists to accurately capture and monitor all the civilian materials that exist in the world. Additionally, the GTRI organization is very complex and consists of technically diverse but interrelated activities. GTRI was formed in May 2004 by consolidating several pre-
existing programs with similar, but separate, missions. Each program then had its own management, structure, and reporting requirements. In addition, GTRI now consists of distributed project teams from DOE headquarters, technical experts from 11 national laboratories located around the country, dozens of local private contractors in over 100 countries, and international agency partners such as the IAEA, who need to coordinate efforts to successfully implement the program.

By its very nature, the GTRI is cooperative and voluntary. GTRI works cooperatively with foreign governments, international agencies, other US government agencies, industry groups, and individual civilian facility operations. GTRI is a voluntary program and is subject to international treaties, government-to-government agreements, local regulations and laws, contractual negotiations, and industry complexities.

Other management challenges include resource limitations, increasing pressures to demonstrate measurable results and extremely time-sensitive scope.

OVERVIEW OF GTRI PROGRAM MANAGEMENT EVOLUTION

In 2006, the GTRI performed a comprehensive strategic review. The review identified areas for improvement such as creating a unified program vision, implementing organizational integration, creating standard technical guidance, defining roles and responsibilities, and implementing structured project management.

The comprehensive strategic review led to the creation of an action plan to address the areas identified during the review. The action plan led to the creation of the GTRI Strategic Plan, organizational restructuring, structured project management and a Program Management Plan, standardized technical guidance via the Technical Criteria Document, and the creation and implementation of a state of the art Program Management Information System.

GTRI Strategic Plan

The GTRI Strategic Plan presents GTRI’s mission, goals and priorities in meaningful and measurable terms, and explains the critical role that GTRI plays in achieving national and global security objectives.

GTRI Organizational Structure

GTRI is organized into three regional offices as shown below to ensure effective integration and implementation of all threat reduction activities.

GTRI is also organized into three key subprograms to ensure consistency in approach and implementation of convert, remove, and protect activities worldwide. Roles and
responsibilities were defined to proved clear project management requirements and expectations for staff. Each role was then linked with individual portfolios and projects to assign and communicate management and oversight responsibility.

**Global Work Breakdown Structure**
The work breakdown structure (WBS) is organized geographically to facilitate organizational summary of project data. The WBS consists of portfolios and projects that can be assigned to individual program and project managers, estimated and controlled. All projects are tied to their corresponding building, site, country, regional, and office portfolios via the WBS hierarchy so that they can be grouped together for various levels of information analysis and reporting.

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**Program Management Plan**
The purpose of the Program Management Plan (PMP) is to establish and clearly describe the GTRI program management requirements, including specific instructions that are essential for successful management of projects in accordance with DOE, the NNSA, and the Office of Defense Nuclear Nonproliferation (DNN) guidelines. The detailed information provided in this document applies to GTRI Headquarters (HQ) staff as well as National Laboratory and contractor personnel. It is intended to be a living document and will be appended to include best practices and process improvements.

GTRI is committed to a management culture that ensures effective planning, execution, and achievement of measurable results in accordance with the GTRI mission. Outcomes of such a culture have resulted in better communication, delegated authority, accountability, and increased emphasis on safely achieving GTRI objectives.

**Standardized Technical Guidance**
GTRI developed technical criteria documentation to provide a systematic approach to integrated risk reduction. The Protection and Sustainability Criteria document was created to articulate GTRI’s systematic approach to integrated threat reduction. These guidelines apply to prioritizing all GTRI threat reduction efforts including conversions, removals, and security upgrades; designing and installing
all GTRI security upgrades including fixed site and transportation security; and ensuring operation and sustainability of all GTRI security upgrades including sustainability commitments, alarm responder training, and tabletop exercises.

In addition to the Protection and Sustainability Criteria document, standardized project types and weighted milestone templates were created to provide consistency in planning, execution and reporting across geographic portfolios.

Risk Identification and Mitigation

Risk Management is a systematic and proactive approach to taking control of projects and decreasing uncertainty in order to ensure project completion on schedule and within budget. Examples of major program risks for GTRI include: 1) foreign government cooperation and their willingness to enter into agreements; 2) ability of site operators to acquire the financial and human resources needed to implement and/or maintain threat reduction actions; 3) coordination with external stakeholders including the IAEA, NRC, Department of State, and other U.S. government agencies at the federal to local levels; 4) logistical hurdles such as availability of certified shipping containers, shipping vessels, raw materials (e.g., steel), cranes, skilled labor, etc at the proper time and within reasonable costs; 5) technical hurdles inherent to converting, removing and protecting nuclear and radiological materials such as the development of new LEU fuels, establishment of new fuel fabrication capabilities, etc.; and 6) competing priorities and funding constraints external to the program imposed by Congress and/or the Administration such as uncertainties in execution year budgets due to prolonged continuing resolutions that vary significantly from planned budget levels. These risks are inherent to all federal programs that deal with sensitive nuclear and radiological materials worldwide.

Risks are managed at the most appropriate level within the overall Program and some risks may occur at one or more levels within the Program. Where risks occur at multiple levels, coordination is carried out at the Program level. At the Program level, owners of strategic risks are assigned by the ADA. Portfolio Managers are responsible for identifying risk owners at the portfolio level and Project Managers are responsible for identifying risk owners for project level risks. At each level, Risk Owners are responsible for monitoring their allocated risks and for implementing risk mitigation actions.

Program Management Information System, Generation 2 (G2)

The GTRI program management process has evolved from the original Project Management Information System (PMIS) into the GTRI PMIS, Generation 2 (G2) system to provide timely and effective management information. G2 is designed to accommodate varied levels of management controls and is intended to be the key management communication tool for assisting in project planning, leading to the development and posting of Project Work Plans (PWPs), measuring project and program performance in a fully integrated fashion, and enforcing change control procedures. G2 uses a web based system that
facilitates lifecycle project planning, baseline change control, funds management, project performance monitoring, business intelligence, automated reporting, records management and communication.

The G2 management dashboard uses custom business intelligence and metric scorecards to present data in multiple, easy to read formats. Authorized users can drill-down by region, country, site and building to identify and track funding and field performance data. The advanced filtering techniques allow users to roll-up, cross-cut, or pinpoint real-time data and allows for trend analysis and advanced warning of potential issues.

The G2 system also facilitates a bottoms-up, project-level lifecycle planning and annual re-planning process that integrates scope, schedule, and budget, provides process automation for baseline change control, performance reporting and review and approvals routing, and allows on-demand reporting to view project, portfolio, and program metric, schedule, and financial information in multiple formats and in real time.

**Benchmarking and Review**

To minimize risk to ensure that common risk assessment/mitigation strategies are applied and documented, and to share best practices and lessons learned, GTRI has implemented several benchmarking and review vehicles, such as Quality Review Teams (QRTs) and annual Lessons Learned Workshops (LLWS).

QRTs are comprised of senior experts and conduct key gateway reviews and reviews of project documents to ensure consistent interpretation and implementation of the GTRI PMP and Protection and Sustainability Criteria. QRTs provide support to the GTRI portfolio and project managers and project teams for implementing continuous quality improvement and effectively managing project risks. For example, GTRI has created a QRT called the Technical Evaluation Team (TET) to provide review and recommendations to improve GTRI’s project management plans, procedures, and tools. The TET consists of GTRI HQ managers, senior GTRI managers from selected National Laboratories, and four internationally recognized, independent project management experts. The TET meets several times each year, participates in the annual LLWS meetings, and has been instrumental in assuring that the GTRI Program management policies, systems, and methods reflect the international state-of-the-art for global endeavors.

GTRI also hosts an annual LLWS during which participants from each laboratory and DOE meet to discuss lessons learned through the implementation of program scope. The LLWS serves to provide a forum to make recommendations and suggestions on program management policies and systems to ensure continuous improvement of the GTRI management processes. Recommendations from the LLWS are analyzed by GTRI management and implemented as quickly as feasible and provide the basis for updates to the GTRI PMP and G2.

**Threat Reduction Acceleration Results**

GTRI’s consolidated efforts to reduce and protect vulnerable nuclear and radiological materials located at civilian sites both in the United States and abroad have greatly increased threat reduction accomplishments worldwide. To date, GTRI has achieved the following threat reduction results:
72 of 200 HEU reactors converted or verified as shut-down, 36% complete. In the 6 years prior to GTRI’s creation only 8 reactors were converted. By comparison, in the 6 years since GTRI was established, the program has converted or verified as shutdown 33 reactors, a 413% increase in threat reduction.

2,792.2 of 4,322.5kg of vulnerable nuclear material removed or disposed of, 65% complete. In the 6 years prior to GTRI’s creation only 851.1 kilograms were removed. By comparison, in the 6 years since GTRI was established, the program has removed 1,781.8 kilograms of HEU and plutonium. By comparison, a 209% increase in threat reduction.

785 of 3,950 high-priority nuclear and radiological buildings protected worldwide, 20% complete. In the 6 years prior to GTRI’s creation only 33 buildings were protected. By comparison, in the 6 years since GTRI was established, the program has protected 752 buildings, a 2,278% increase in threat reduction.

Such increases in threat reduction activities, combined with the transparency afforded the program by utilizing best in class program management tools have increased management credibility in the GTRI program.

Conclusion
The urgency of the United States’ international strategic objective “to secure all vulnerable nuclear material around the world within four years” was emphasized in the Joint Obama-Medvedev Statement on nuclear security initiatives on July 6 2009, by the UN Security Council Resolution 1887 concerning nuclear terrorism dated September 24 2009, and during the Nuclear Security Summit in Washington DC on April 12-12 2010. The effective and continuously improving management practices described in this paper have enabled GTRI to accelerate the accomplishment of this vital mission at civilian sites around the world in the most expeditious and cost effective manner.

References
Strategic Plan, Global Threat Reduction Initiative, DOE, NNSA, January 2009

Program Management Plan, Global Threat Reduction Initiative, DOE NNSA, November 2009

GTRI Fact Sheet: http://nnsa.energy.gov/mediaroom/factsheets/reducingthreats