DRAFT Performance Work Statement (PWS)
for
Blast Consequence Model Development and
Risk-Based Criteria Support for Explosives Safety

1.0 INTRODUCTION

The Department of Defense Explosives Safety Board (DDESB) maintains and improves the standards for storing, handling and maintaining explosives within the Military Services worldwide. This work statement is to provide risk-based explosives safety criteria support and blast consequence model development to two of the DDESB working groups: the Risk-Based Explosives Safety Criteria Team (RBESCT) and the DDESB Science Panel.

2.0 BACKGROUND

In December 1999, the RBESCT recommended and the DDESB approved the use of the Technical Paper (TP) 14 quantitative risk assessment model and DoD risk acceptance criteria for a 3-year trial period. The trial period for explosives safety risk-based siting was periodically extended until the methodology was officially adopted and incorporated into DoD 6055.09-M. The DoD Components are authorized by DoD 6055.09-M to apply the guidance and criteria for submitting DoD risk-based explosives safety site plans to the DDESB for review and approval.

In January 2007, the DDESB Chairman approved the DDESB Science Panel as a DDESB Working Group. Initially the Science Panel was a subpanel of the RBESCT that developed the physical science and consequence algorithms and conducted test programs to support the development of TP-14 and the DDESB risk-based software SAFER. The applicability of the resulting test data transcends risk-based and applies to other standards, i.e., Quantity-Distance (QD) standards. To accommodate the Science Panel addressing broader applications, the decision was made to transform the RBESCT subpanel to a DDESB Working Group. The Science Panel continues to support the RBESCT, as well as the DoD Explosives Safety Testing Steering Group (DDESTSG) and other DDESB-sponsored endeavors.

In 2012, work began on merging the DDESB's risk-based siting software tool into DDESB's Automated Site Planner (ASP) tool. DDESB's ASP tool is the Explosives Safety Siting (ESS) software, and has been developed based on requirements defined by the Services. The primary requirement was to link non-graphic facilities and explosives data to facilities represented in electronic maps, and then develop an automated process to access that information and evaluate it against automated explosives safety siting regulations that specify minimum required separation distances between a Potential Explosion Site (PES) facility and its surrounding facilities. The geospatial relationships provided by the mapping data and explosives information already stored within ESS will be used for the risk-based siting tool.

Whereas ESS implements the QD requirements defined within DoD 6055.09-M and the other Component level explosives safety criteria, the risk-based siting tool implements the methods defined with TP-14 and other relevant documents. Both DoD 6055.09-M and TP-14 are updated periodically as the state of the art in explosives safety knowledge advances.

3.0 SCOPE

The scope of this effort will support the RBESCT and DDESB Science Panel. The support is defined as two separate but related, tasks.

3.1. RBESCT Support

Research historical accident data and develop analytical procedures to quantify the probability of event for various operation types. This shall include any environmental or other factors that could increase or decrease the likelihood of a mishap. Additionally, the exposure algorithms shall be reviewed, and enhanced as needed within the context of the method. Also, a top-down assessment of the uncertainty model is to be performed, and an improved uncertainly method shall be generated using the most appropriate statistical assessment and probability distributions for the inputs. Any and all changes to the algorithms and methods shall need to be updated, and all changes shall be incorporated into Technical Papers (TP) 19 and 14 with review and oversight from the RBESCT and the Services. Basic maintenance of these documents, the review process, and general operational support shall be required. Operational support shall include training of risk-based methods to various DoD personnel as directed by the RBESCT.

3.2. DDESB Science Panel Support

The DDESB Science Panel has conducted numerous explosives safety related tests over the past decade. Testing support is required, though the contractors will not be required to take the lead on running a test. Testing support includes data collection, drafting of test plans, data analysis, report generation, and interpretation of results. Ultimately, test data is used to updated the state of the art of explosives safety, and will be incorporated in criteria as appropriate.

DDESB Science Panel support shall also include support of meetings. Typically, there will be two or three in-person meetings per year, in addition to monthly telecons. Assignments will be as directed per task order, based on the TP 14 priority list as determined by the RESCT and DDESB Science Panel, as well as other explosives safety-related tasking. It is also required to provide support to the DDESB Science Panel in the Klotz Group, an international group of explosion produced debris experts, as well as the NATO Risk Analysis Working Group. These international forums represent bodies that develop explosives safety models, and implement them in manuals and criteria for operational use. Various explosives safety documentation, as outlined in Section 4, will require upkeep and maintenance at periodic intervals, which will required Science Panel support where needed.

4.0 MANDATORY COMPLIANCE REFERENCES

4.1. DOD Ammunition and Explosives Safety Standards, DoD 6055.09-M, Volume 1 Change 1, 12 March 2012.

4.2. DDESB Technical Paper No. 14, Revision 4, Approved Methods and Algorithms for DoD Risk-Based Explosives Siting, 21 July 2009.

4.3. DDESB Technical Paper No. 19, Revision 4, User’s Reference Manual Safety Assessment for Explosives Risk, November 2008.

4.4. DDESB Technical Paper No. 23, Assessing Explosives Safety Risks, Deviations, and Consequences, 31 July 2009.

4.5. DDESB Technical Paper No. 17, Revision 1, DDESB Blast Effects Computer Version 6 User’s Manual and Documentation, 11 March 2005.

4.6. DDESB Technical Paper No. 21, Procedures for the Collection, Analysis, and Interpretation of Explosion-Produced Debris – Revision 1, 22 October 2007.

4.7. Allied Ammunition Storage and Transport Publication, AASTP-1, Edition 1 Change 3, Manual of NATO Safety Principles for the Storage of Military Ammunition and Explosives, May 2010.

4.8. Allied Ammunition Storage and Transport Publication, AASTP-4, Edition 1 Change 2, Manual on Explosives Safety Risk Analysis, October 2011.

4.9. "Risk-Based and Hybrid Explosives Safety Siting Requirements", December 2012.

5.0 PERSONNEL MINIMUM EDUCATION/EXPERIENCE QUALIFICATIONS

Requirements of any one category and any one person may meet some of the requirements of one or more categories.

Program Manager

This individual must have:

a. A Bachelors Degree in Science, Information Systems, Computer Science or Engineering, at a minimum

b. A demonstrated capability to organize and direct technical and management programs which include multidiscipline tasks and requirements.

c. Experience in the application of DoD, Army, Navy and/or Air Force explosives safety criteria.

d. A minimum of five years experience with risk-based explosives safety siting, to include both application of models and knowledge of the DoD approval process.

e. Knowledge of and experience with developing explosion effects and consequences models for the application of explosives safety purposes.

f. Experience with, and an understanding of the DoD explosives safety site planning submittal and approval process.

g. A detailed knowledge of DoD contracting procedures and regulations.

Blast Effects and Consequences Engineer

This individual must have:

a. A Bachelors Degree in Science or Engineering, at a minimum.

b. A minimum of ten years experience in the prediction and modeling of explosion effects and consequences.

d. A minimum of five years experience using and applying risk-based models for explosives safety purposes.

e. Experience with prediction models for explosives-produced debris, to include both modeling of primary fragmentation from munitions and secondary fragmentation from donor structures.

f. Experience and ability to analyze structural response of buildings and windows under blast loading. Experience includes, but is not limited to, single-degree-of-freedom

analysis (e.g. UFC 3-340-02), advanced finite element analysis, and development of fast-running models.

g. Experience and knowledge of using applicable software tools. These software tools include, but are not limited to, SBEDS, Wingard, BlastX, SHOCK, FRANG, ConWep, HAZL, SAFER, ESS, and any number of finite element codes.

h. Knowledge and understanding of risk-based siting models as it relates to the incorporation of blast effects and consequence models.

Statistician/Analyst

This individual must have:

a. A Bachelors Degree in Science, Mathematics, or Engineering, at a minimum.

b. Possess knowledge and familiarity with quantitative risk assessments as they are used within the explosives safety community.

c. Demonstrate an understanding of risk management and risk modeling.

d. Possess a background in application of statistical distributions to represent various phenomena, to include quantitative assessments and representations of uncertainty.

e. Knowledge of and experience in the application of DoD, Army, Navy and/or Air Force explosives safety criteria.

f. Show familiarity with uses and characteristics of different statistical distributions.

g. Possess an understanding of statistical modeling methods and manipulating their algebraic representations.

h. Familiarity with various risk criteria used within the United Sates and in international communities.

Analysis and Testing Engineer

This individual must have:

a. A Bachelors Degree in Science, Mathematics, or Engineering, at a minimum.

b. Have extensive experience in the conduct of explosives safety testing.

c. Familiarity and experience with debris collection procedures outlined within DDESB Technical Paper No. 21.

d. Experience and proficiency with data analysis, interpretation of results, and application of empirical data to analytical models.

e. Experience and ability to write and produce technical reports and documentation, to include generation of applicable graphics and figures.

6.0 PERFORMANCE REQUIREMENTS

Support of the RBESCT shall include the following:

6.1. Assist the RBESCT in providing the technical backup to support proposed new or evolving policy in quantitative risk assessment and in preparing briefings and correspondence for building consensus with policy.

6.2. Document and/or develop proposed explosives safety guidance, criteria, policy, or regulations. Develop and propose risk-based explosives safety criteria for consideration by the team.

6.3. Conduct technical analyses and research of explosives risks to people, facilities/infrastructure, and mission performance, as well as for state-of-the-art risk assessment/acceptance methodologies.

6.4. Prepare technical documents in formats suitable for publication. These may include technical memos, papers, user's manuals or conference papers.

6.5. Support RBESCT meetings by preparing agendas, briefings, progress reports, scheduling, minutes and defining alternative ways forward. Prepare status or consensus briefings, prepare, publish, and distribute meeting minutes, and maintain a matrix of actions assigned and status.

6.6. Provide expert consultants or subcontractors if needed to assure state-of-the-art input in all areas to include but not limited to explosive blast effects analysis (structural and personnel related), systems safety, explosives safety quantity distance criteria, risk analysis/assessment/management, and explosive characteristics of military munitions.

6.7. Assist the DDESB in support of NATO AC/326 Subgroup C to develop improvements to the NATO Risk Analysis Manual. Provide support to model comparisons by comparing quantitative risk assessment results with those of other AC/326 nations' risk software. Support development of AASTP-4 and AASTP-5.

6.8. Provide training, as directed, for use of risk-based explosives safety siting methods. Proper training entails education on blast effects algorithms, selection of correct input parameters, assessing relationships, and interpretation of output results.

Support of the DDESB Science Panel shall include the following:

6.9. Provide general support to the DDESB Science Panel. Conduct technical analyses to assess the physical effects of explosives hazards and to assess the risks associated with the physical effects.

6.10. Develop and/or modify physical effects and consequence algorithms for inclusion in DDESB Technical Paper 14 and merger with the Explosives Safety Siting software.

6.11. Assist in the investigation and analysis of DoD explosives safety quantity-distances and protective construction criteria for potential technology and information gaps and make recommendations for changes where applicable.

6.12. Support the DDESB Science Panel in international science and technology forums for explosives safety, specifically participation in NATO AC/326 and its participation in the Klotz Group.

6.13. Review and analyze explosives safety test plans and reports, develop and design explosives tests and test programs, and participate in tests, and prepare tests reports in support of SAFER/ESS.

6.14. Provide testing support for a variety of explosives safety testing as defined by the DDESB and/or DDESB Science Panel. Testing support includes, but is not limited to, test

set-up and documentation, post-test debris collection, post-test structural/component assessment, and data reduction.

6.15. Perform data analysis as directed and extrapolate results of analysis to develop methods and algorithms for models as directed.

7.0 DELIVERABLES

The contractor shall provide the following deliveries during the performance of the contract. All deliverables are due on the 10th of the month.

7.1 Project Management Report

The contractor shall provide project management support to ensure the successful and timely completion of all tasks and deliverables. Project management shall include monthly status reports as described in the following section. In addition to the current financial management information contained in the monthly reports, the Contractor shall submit a breakout of the current monthly burn rate and an averaged burn rate (calculated from totals of previous and current month's project expenditures divided by number of months work has been performed/reported). Burn rates and the averaged burn rate shall be computed and reported against each major labor category and the monthly total.

7.2 Status Reports

Monthly Status Reports shall address the current status of all work and plans for coming months. Contractor format is acceptable. Electronic delivery, in the form of email attachments, is acceptable.

7.3 Task Order Deliverables

The Contractor Performance Requirements is outlined in the Quality Assurance Surveillance Plan (QASP) for each task order. Specific performance requirements for each Task Order will be decided upon prior to award of each individual task order. The Performance Requirements Summary Matrix for each Task Order will be formatted similar to the following:

Performance Objective	**Performance Standard**	**Acceptable Quality Level**	**Assessment Level**	**Incentive**	**Remedy**