

throughout the process to gain their input and address their concerns.

#### A. Preliminary Interviews

As part of the initial effort in the development of the Protocol, the DoD work group conducted a small number of preliminary interviews of people within and outside DoD, including representatives of the DoD Components, other Federal and State agencies, American Indian and Alaska Native Tribes, and the public. The intent of these preliminary interviews was to query a small number of people familiar with or interested in the prioritization of DoD's munitions response sites to establish a baseline for the development effort. Approximately 100 people were interviewed.

The interviews involved a standard questionnaire requiring a combination of structured (e.g., multiple choice) and narrative answers related to four areas the work group thought important to developing the Protocol:

- General characteristics for the Protocol
- The respondents' knowledge of the requirements for developing the Protocol, as those requirements were detailed in 10 U.S.C. 2701(b)
- The respondents' views on the importance of various data elements found in similar priority setting models, and
- Whether or not the respondent had any additional comments not covered in the structured questions

In general, the responses indicated that the Protocol should:

- Be simple in approach and operation
- Be easy to understand
- Have standardization of application
- Provide consistent and repeatable results
- Prioritize all munitions response sites into between 3 and 6 categories, and
- Keep the evaluation of the explosive hazards and the environmental hazards separate

The information gathered during these interviews provided the DoD work group with ideas for the initial characteristics that the Protocol should and should not contain. The work group considered these characteristics throughout the process of constructing the Protocol, including during the review of selected priority setting models.

#### B. Review of Selected Priority-Setting Models

Reflecting on the preferred characteristics identified during the

preliminary interviews, DoD reviewed six existing tools used to prioritize sites for environmental restoration activities and analyzed the characteristics of each. Among the characteristics reviewed, the DoD work group sought to understand the means each tool used to balance differing concerns so that no one type of information dominated the model. One characteristic that became readily apparent was the number of major factors considered. Adopting the term "axis" to describe each major factor in the construct of the models reviewed, the work group sought to determine the number of axes the Protocol should have as the number of axes determines or limits the weight that can be applied to any one type of information. To achieve sufficient differentiation among sites, it is important that no one axis dominate the method.

*Risk Assessment Code (RAC).* Since 1990, the U.S. Army Corps of Engineers (USACE) has applied the RAC at both Formerly Used Defense Sites (FUDS) and Base Realignment and Closure installations as a tool for prioritizing ordnance and explosives response actions. In the Management Guidance, DoD adopted the RAC as an interim tool for prioritizing munitions response sites. The RAC is a two-axis model that assumes risk is a function of (1) exposure and (2) the hazard posed by the munitions present. The RAC assigns sites to one of five classes from high risk (RAC Score 1) to negligible risk (RAC score 5). It is a simple model that can be applied with limited information.

*Range Rule Risk Methodology (R3M).* The R3M was developed during DoD's effort to promulgate the DoD Range Rule. The Qualitative Risk Evaluation (QRE) is the first of three evaluations under the R3M. It is a three-axis, qualitative system designed as a screening tool for determining which sites required additional risk evaluation for explosive hazards. Its three factors (i.e., axes) are UXO density, frequency of entry to the site, and UXO type. The Detailed and Streamlined Risk Evaluation (DRE and SRE) are the other two elements of the R3M and are applied to sites that were not screened out by the QRE. The SRE estimates the maximum quantitative degree of UXO risk to which receptors may be exposed. The DRE is a comprehensive assessment that uses site characterization data. The SRE and the DRE essentially are one-axis, quantitative models that focus on the probability of exposure.

*Former Lowry Bombing and Gunnery Range Prioritization Tool.* USACE and stakeholders developed this site-specific model to prioritize sites that encompass a very large FUDS. It is a one-axis

system with multiple data elements. It requires extensive information and input from internal and external stakeholders.

*Interim Range Rule Risk Methodology (IR3M) Baseline Explosives Hazard Evaluation.* The IR3M baseline explosives risk evaluation tool was derived from the R3M and focused on the comparative evaluation of response alternatives against the baseline (i.e., the amount of potential risk prior to response). It is a three-axis system, which assigns sites to one of five classes. The three axes are accessibility, overall hazard, and exposure. Modeling has suggested that application of the IR3M to sites results in reasonable distribution among the five classes.

*Native American Lands Environmental Mitigation Program (NALEMP) Model.* DoD developed this model to assist in prioritizing actions to be conducted under the NALEMP. It is a three-axis, quantitative system, specifically designed to consider risk and non-risk-based factors, such as life ways, programmatic, government-to-government, and economic considerations that are unique to Indian lands. The NALEMP model uses RRSE and RAC for the risk evaluation components. It also takes into consideration a range of potential impacts affecting traditional and customary uses of land and cultural and ecological resources vital to American Indian and Alaska Native life ways.

*Hazard Ranking System (HRS).* The U.S. Environmental Protection Agency developed this system to score sites for inclusion on the National Priorities List. It is a quantitative system that assigns a numerical score to each site based on the contaminant hazards in the groundwater, surface water, soil, and air. The HRS requires extensive data to operate and does not address explosive hazards.

While the USACE has used RAC for 13 years as a means of assigning a relative priority to FUDS, the DoD work group determined that neither RAC nor any of the other models reviewed provided the characteristics necessary to meet all the requirements in 10 U.S.C. 2710(b). The analysis of each model's strengths and weaknesses provided DoD with critical information regarding the characteristics the Protocol should possess. Based on information from this review and the preliminary interviews, the DoD work group began constructing a new model (i.e., the Protocol) to more effectively evaluate the explosive safety and environmental hazards posed by UXO, DMM, and MC at munitions response sites.