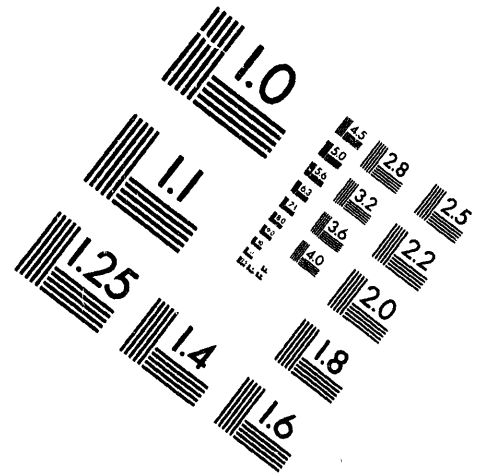
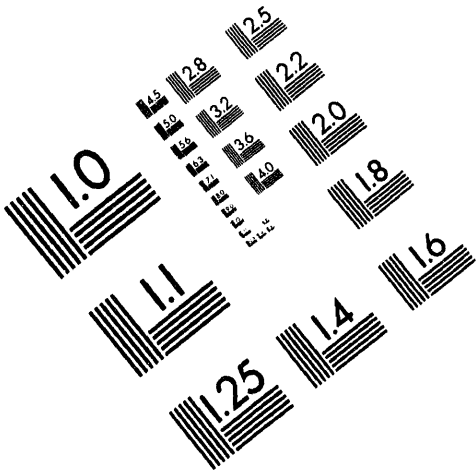




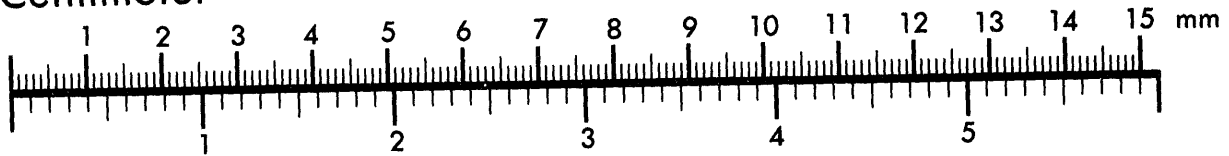
AIM

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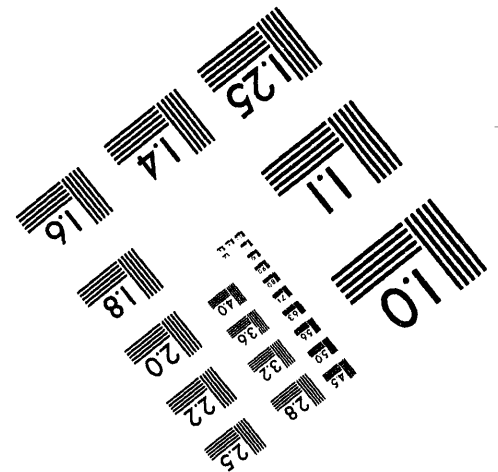
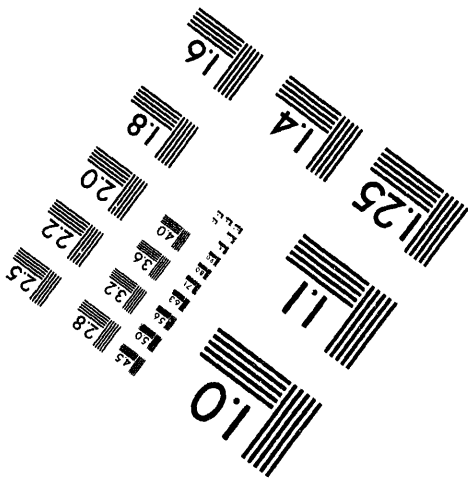
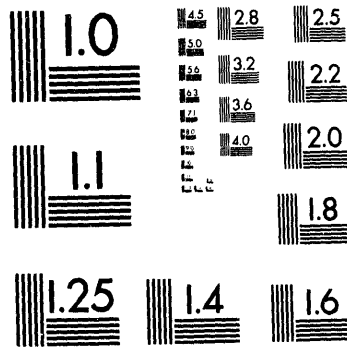
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RFP-4848

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ESTABLISHING QUANTITIES OF HAZARDOUS MATERIAL BELOW WHICH USQD/ASA PROCESS IS NOT INITIATED

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This summary presents a method to apply DOE Order 5480.21 to hazardous material. The method determines when to initiate the Auditable Safety Analysis (ASA) process. The definition of hazardous material is as follows: 'Solid, liquid, or gaseous substances in quantities that either alone, when combined with another substance through a credible mechanism, or when in contact with an available energy source are determined to be capable of posing an unacceptable risk to the environment and/or to the health and safety of workers or the public.' For the purposes of this Summary, the ASA process uses qualitative and quantitative methods of risk analysis as is appropriate. This approach is in conceptual stages. The Rocky Flats procedure that implements DOE Order 5480.21 dictates an evaluation be performed for changes to Vital Safety Systems or procedures that involve hazardous material. This procedure includes increasing previously established quantity limits and introducing new hazardous material into a facility. An average evaluation and related documentation requires approximately 80 hours to complete. Limiting the amount of material evaluated is done by developing a fundamental basis to which an appropriate criterion and method are applied. The method is part of process, which includes efforts from Health and Safety groups such as Industrial Hygiene and a Risk Analysis group, that demonstrates no undue risk is imposed on workers or the public, a requirement of the Department of Energy (DOE) safety analysis orders. The basis is derived from reviewing (1) federal statutes and regulations, as well as DOE Orders and standards and (2) responsibilities of each group. The review focused on the requirements, the reasoning or basis for the requirements, as well as the purpose and intent of the regulations.

REVIEW OF STATUTES, REGULATIONS AND DOE ORDERS

The review included documents such as Federal Statutes (1990 Clean Air Act Amendments and the Occupational Health and Safety Act), Federal regulations (e.g., 29 CFR 1910.119, 40 CFR 68, 40 CFR 302.4 and the federal registrars that provided the basis for implementation of the regulations), and DOE Orders (e.g., 5480.23 and associated standards). Each regulation defined hazardous material according to its intent. DOE Standards 3009 and 3005 elicit the identification of hazardous materials covered by an ASA and the material handled by safety programs. 'This boundary should be well defined, as poor definition could allow some issues to "slip through the cracks" and receive no coverage in any facility program.' Furthermore, the general duty clauses of the federal Acts require employers to furnish workplaces 'free of recognized hazards that are causing or are likely to cause death or serious harm' to workers regardless of whether a substance is on a list. This represents the minimum protection level applicable for all employees.

DELINEATING SAFETY ASSURANCE RESPONSIBILITIES

Two types of groups (i.e., RA and H&S) provide safety assurance. Coordinating the appropriate review or analysis for the level of hazard entails delineating areas of responsibility between these groups. H&S groups typically review static or near static hazards of normal operations and issue Personal Protective Equipment (PPE) for persons directly involved in the operation. Typically, risk analysts analyze circumstances not covered by standards such as pressure vessel codes. They implement a systematic process to identify all hazards resulting from failures and adverse system interactions. These fundamental distinctions along with the fact that H&S groups do not implement programs such as OSRs/TSRs or USQD provide the basis for the hazard level that defines the responsibilities of these groups.

POTENTIAL CONSEQUENCE LEVEL AND STRUCTURED INTERFACE

Because of the dilution effects of atmospheric dispersion, accidents large enough to affect the public have also imposed health risks to the worker. The converse of this is not true; lesser consequence accidents may only affect workers. Therefore, the consequence level is oriented towards smaller accidents that may threaten the health and safety of workers inside a facility. The annual probability of the accident (i.e., $1E-6$ /yr) limits the scope of ASAs for large

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consequence accidents. Defining the scope for ASAs at the other end of the spectrum recognizes that applying the rigors of the ASA process is inefficient and inappropriate at some level. For instance, the ASAs for a SAR usually do not analyze hoisting and rigging accidents. Rather than risk or probability, potential consequence level defines the scope at this end of the spectrum. This is because a quantity of hazardous material has the potential, though the degree of the potential or probability has not been evaluated, to threaten the health and safety. Given the expertise of risk analysts and the tools available to the RA group (i.e., USQD and TSRs) plus H&S groups require PPE for only those persons directly associated with the process, the responsibilities of RA group start with hazards that have the potential to significantly affect the health and safety of persons outside the immediate area (i.e., persons not directly involved with the process). The OSH Act requires employers to furnish workplaces 'free from recognized hazards that are causing or are likely to cause death or serious harm. This is minimum level of protection. Exceeding this level initiates the ASA process. Otherwise, the H&S group implements appropriate safety measures. This is the structured interface.

METHOD FOR IMPLEMENTING THE STRUCTURED INTERFACE

Due to the variety of materials (e.g., wastes and proprietary substances) requiring evaluation, a method, rather than a list of single substances, is proposed to implement the structured interface. In this method, the analyst does not credit administrative or engineering features that prevent or mitigate the release. The ASA process provides the recognition of the need of such features. The method is applicable for individual circumstances or accidents. It is a screening tool. As such, it should be easy to use and implement. Other than the simplifying time variant parameters to be constant (i.e., instantaneous release, uniformly dispersed, and concentration not influenced by ventilation systems), the method is the standard method used for dose or dosage assessment. The concentration of material is calculated using

$$C = SF*Q/V.$$

SF is a suspension factor, Q is the quantity of hazardous material, and V is the generic room volume (1000 m³). Because suspension factors are based primarily on the physical and chemical characteristics as well as accounting for the energetics of the accident, caution should be used in developing them. The EPA believes that chemical and physical properties are so closely linked to both the likelihood and severity of a chemical accident that they deserve the greatest weight. Substances can be divided into the following general categories: Gas & highly volatile liquids, volatile liquids, viscous liquids, finely divided powder, granular, and bulk solid. If the airborne concentration exceeds ERF-G-3 or IDLH values, this implies the quantity of hazardous material has the potential to impact the health and safety of persons outside the immediate area. This method is flexible in that a singular substance as well as combinations of substances such as waste can be evaluated with it. Combinations of substances are evaluated by summing ratios of the calculated concentrations and the concentration limits.

The above is adequate for evaluating separate substances (i.e., existing alone or in combination with other materials). The next step is to addressing the products of substances combined due to an accidental mixing. Material Safety Data Sheets have information in this regard. This effort is also supported by similar methods presented by the Federal Emergency Management Agency and the EPA. The method consists of using a matrix of chemical family or reactivity group numbers which indicates the type of by-products. This type of analysis should be performed by personnel familiar with the process as well as risk analysts.

CONCLUSION

The need to protect all persons from the hazards in the work place that may cause death or serious physical injury has been clearly defined. To this end, this summary presents how a structured interface between a Risk Analysis group and a Health and Safety group such as Industrial Hygiene may be created, delineating of the responsibilities of these groups with respect to providing a continuous function of safety review for the range of hazards. Risk analysts are trained to recognize failures and system interactions and have at their disposal tools such as USQDs and TSRs, while an Industrial Hygiene group typically provides personnel protective equipment only for those persons directly involved in the operation. Therefore, the RA group should initiate ASA when the safety of persons outside the immediate area may be threatened. The proposed method used to evaluate this basis is a standard method used for dose assessment with simplifications. These simplifications enforce a non-transient concentration. The method is capable of analyzing combination of substances. At this point, the proposal is for acute health hazards of toxic chemicals. Other types of material hazards (e.g., carcinogenic) require an appropriate criterion that should be different from that used for acutely toxic chemicals.

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