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A “Rulebook” approach to Hazard Analysis (HA) development with application to a HA program

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ABSTRACT:

A novel rulebook method is being used at LANL to ensure consistency and completeness of HA development. A problem that arises in the performance of software based qualitative HAs is a lack of consistency between analysis of hazard scenarios of the same type, across different accident families, and between individual analysts. A set of semi-quantitative rules was developed and applied to the analysis of DSA hazard scenarios to develop a qualitative HA. The HA is being developed using proprietary software (i.e. eCHAP©), but this rulebook approach is not restricted to that software and would improve any HA regardless of chosen documentation method.

The semi-quantitative rules assign unmitigated consequence and frequency (and risk) bins consistent with DOE-STD-3009 for each hazard scenario. The consequence rules (for worker, collocated, public) are based on quantity and form of MAR and energy sources, while the frequency rules are based on scenario details and human and equipment reliability data. The rules guide crediting of administrative and engineered controls to estimate consequence and frequency reduction and assign mitigated consequence and frequency (and risk) bins. Additional rules include risk matrices, clarifications, and definitions. This work is performed at LANL and supported by the U.S. DOE: contract DE-AC52-06NA25396. LA-UR-11-000576.