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5.4 Use of Data Libraries for IAEA Nuclear Security Assessment Methodologies (NUSAM)

D. Shull, M. Lane

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Disclaimer

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5.4 Use of Data Libraries (D.S., - T.M, P.L, A.I)

Comments from D. Greenhalgh incorporated

Applicability of basis data for use in facility assessments

Data libraries are essential for the characterization of the facility and provide the documented input which enables the facility assessment results and subsequent conclusions. Data Libraries are historical, verifiable, quantified, and applicable collections of testing data on different types of barriers, sensors, cameras, procedures, and/or personnel. Data libraries are developed and maintained as part of any assessment program or process. Data is collected during the initial stages of facility characterization to aid in the model and/or simulation development process. Data library values may also be developed through the use of state testing centers and/or site resources by testing different types of barriers, sensors, cameras, procedures, and/or personnel. If no data exists, subject matter expert opinion and manufacturer's specifications/ testing values can be the basis for initially assigning values, but are generally less reliable and lack appropriate confidence measures. The use of existing data libraries that have been developed by a state testing organization reduces the assessment costs by establishing standard delay, detection and assessment values for use by multiple sites or facilities where common barriers and alarms systems exist. For example, physical security response uses the measure of "time to respond" as a measure of effectiveness of defeating an adversary along a given "pathway." The values used for detection and delay elements along the path determine 1) the probability of detection of the adversary, 2) the delay (in seconds) the adversary encounters along the path, 3) the time (in seconds) the responders required to interrupt the adversary, and 4) the critical point (or critical detection point) at which assessment must be made and the responders must be notified to be able to respond in a timely manner.

Adjusting data library input

There are various reasons to modify data library values. Site specific installation conditions for barriers or alarm systems may be different than the data library tested configuration. Minor design changes in barrier design and construction may dramatically affect standard adversary defeat times and methods. Furthermore, advances in both physical protection technologies and adversary defeat capabilities are also a justification to adjust historical or site specific testing data. The data library should be updated regularly for physical security systems, nuclear material accounting and control (NMAC), and protective force, as well as any other configuration changes to the security system.

Subject Matter Experts

In some cases, defeat testing of a barrier or alarm system may be prohibitive due to cost, safety, or other operational constraints at a site/facility. These constraints may include the restrictions to test alarm sensors or barriers in areas of high radiation or contamination where personnel safety is a concern. Based on documented years of experience, subject matter experts use both qualitative and quantitative analyses to assign assessments inputs. The subject matter experts may review historical testing data for similar types of protection elements and assign testing results, which are reported; peer reviewed, and made part of the historical record.

Performance Testing

In other cases, where testing of a barrier or alarm system is possible, data collected by the site/facility on specific adversary scenarios may provide additional insight on existing data

library values. Site-specific conditions and protection measures can differ from generic testing conditions performed at a state testing location. As a result, site specific testing of both the site protection capabilities (alarm, assessment, response) and the adversary attack method is always recommended to justify or confirm assessment model inputs. Testing methodologies and results must be well-documented in order to justify revision of generic testing values. The use of video, observational evidence and a full documented explanation of the performance test methodology can be very useful to document test data. Performance testing data can also be derived from state oversight inspections results, routine facility testing organizations, or specific testing as requested by the assessment team to validate critical system element assumptions and input.

Annexes on Data Libraries

One method to document changes or modifications to standard data library values is for the facility/site to develop a separate annex to data libraries. This annex contains detailed testing information and assumptions used to justify standard or historical revised data library values. Additionally, the annex is used to document assessment inputs for model or simulation validation. If new information becomes available which modifies the assumptions, conditions, or criteria for data in the Annexes, additional validation and verification may be necessary for data contained within data libraries.

(Will be a portion of the IAEA Nuclear Security Assessment Methodologies (NUSAM) document)