September 14, 2016

CVP/SRAG Meeting

NJDEP, Trenton, NJ

Green and Sustainable Remediation

ITRC Technical & Regulatory Guidance Document: *Green and Sustainable Remediation: A Practical Framework* (GSR-2, 2011)

Sponsored by: Interstate Technology and Regulatory Council (www.itrcweb.org)
Hosted by: US EPA Clean Up Information Network (www.cluin.org)

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- Host organization
- Network
  - State regulators
    - All 50 states, PR, DC
  - Federal partners

DOE DOD EPA

  - ITRC Industry Affiliates Program
  - Academia
  - Community stakeholders

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  - Full version in "Notes" section
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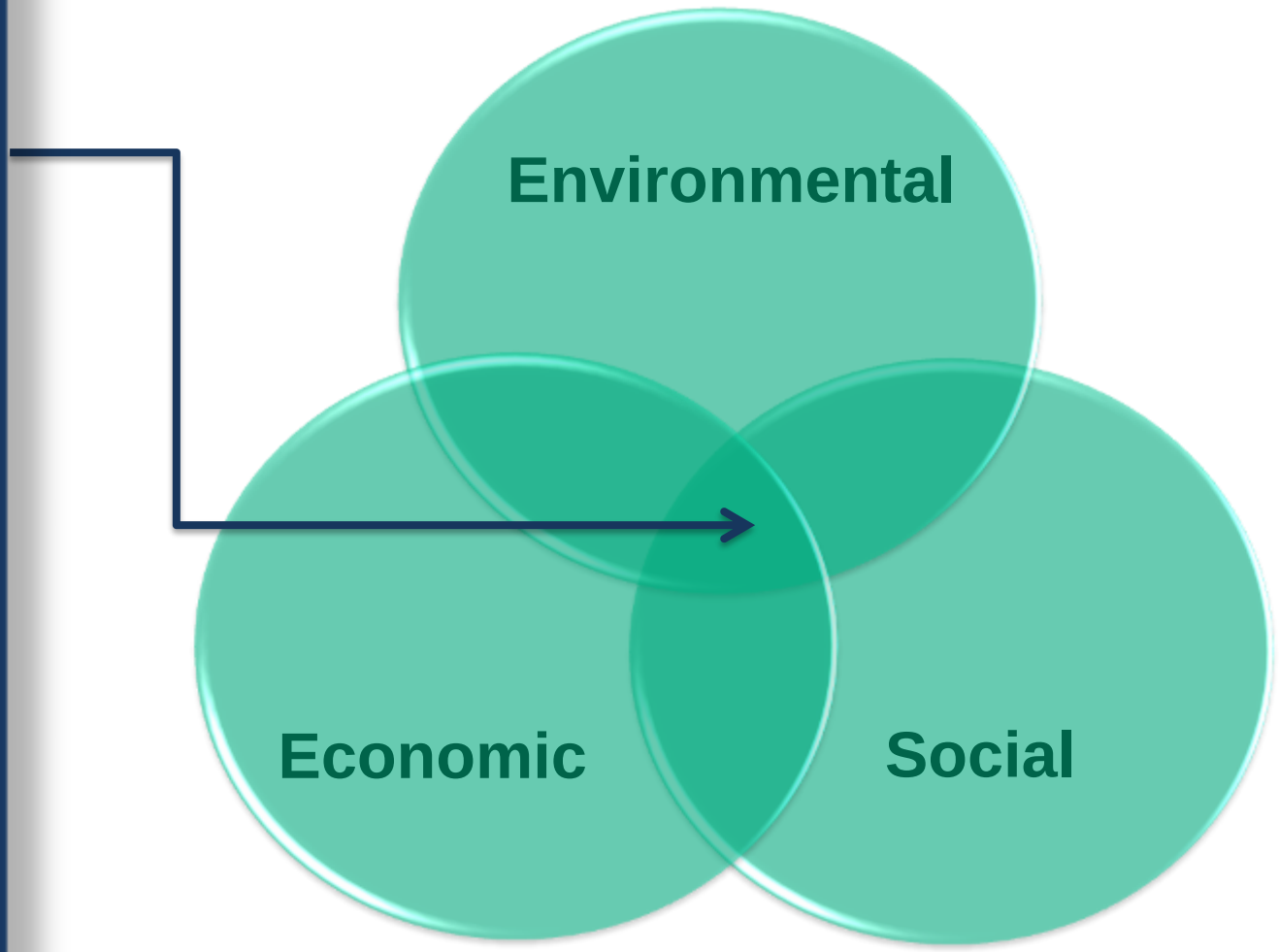
- Available from www.itrcweb.org
  - Technical and regulatory guidance documents
  - Internet-based and classroom training schedule
  - More…

ITRC's GSR Definition

The site-specific employment of products, processes, technologies, and procedures that mitigate contaminant risk to receptors while making decisions that are cognizant of balancing community goals, economic impacts, and net environmental effects.

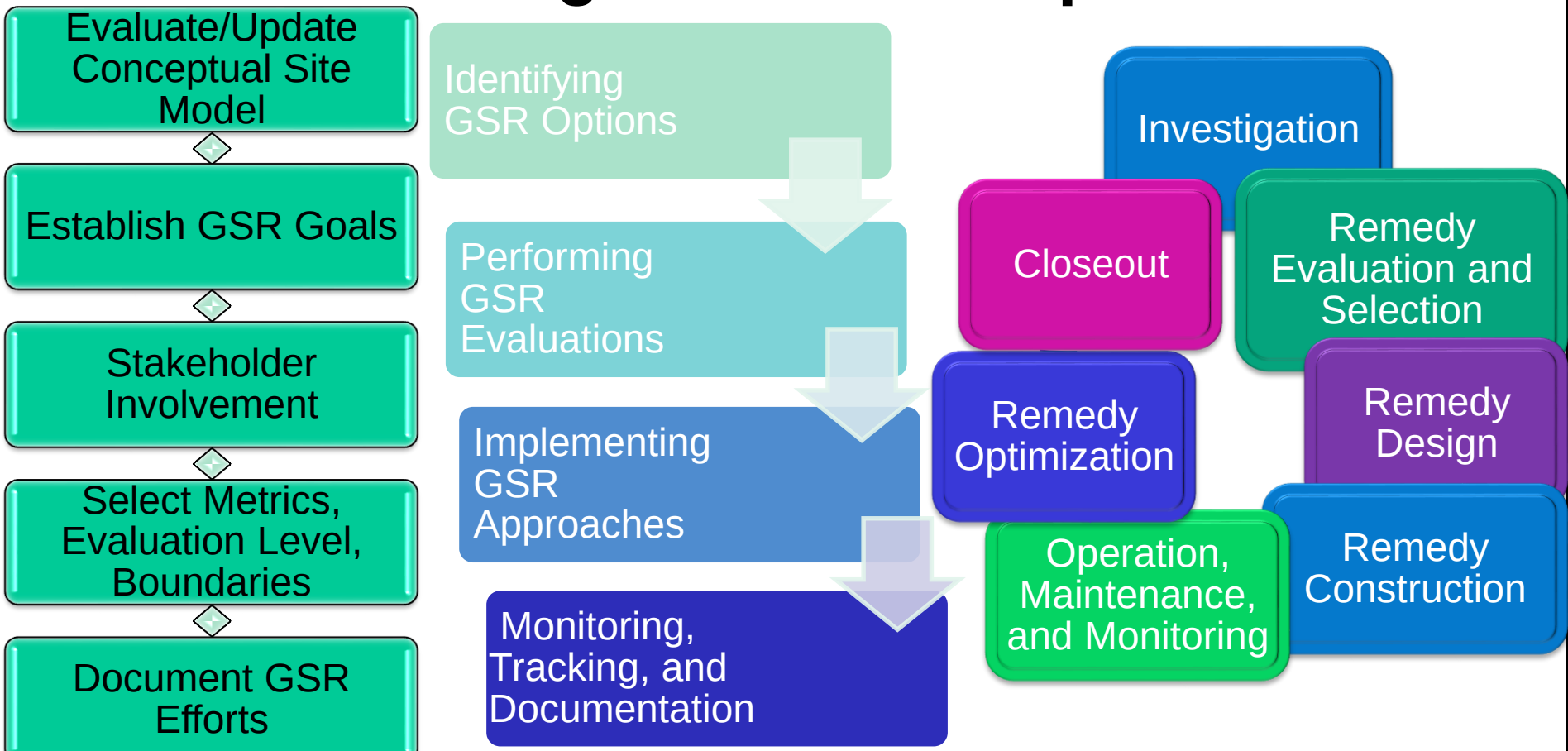
Green & Sustainable Remediation

Sustainability



GSR Framework

GSR Planning + GSR Implementation



= GSR Framework

GSR Framework

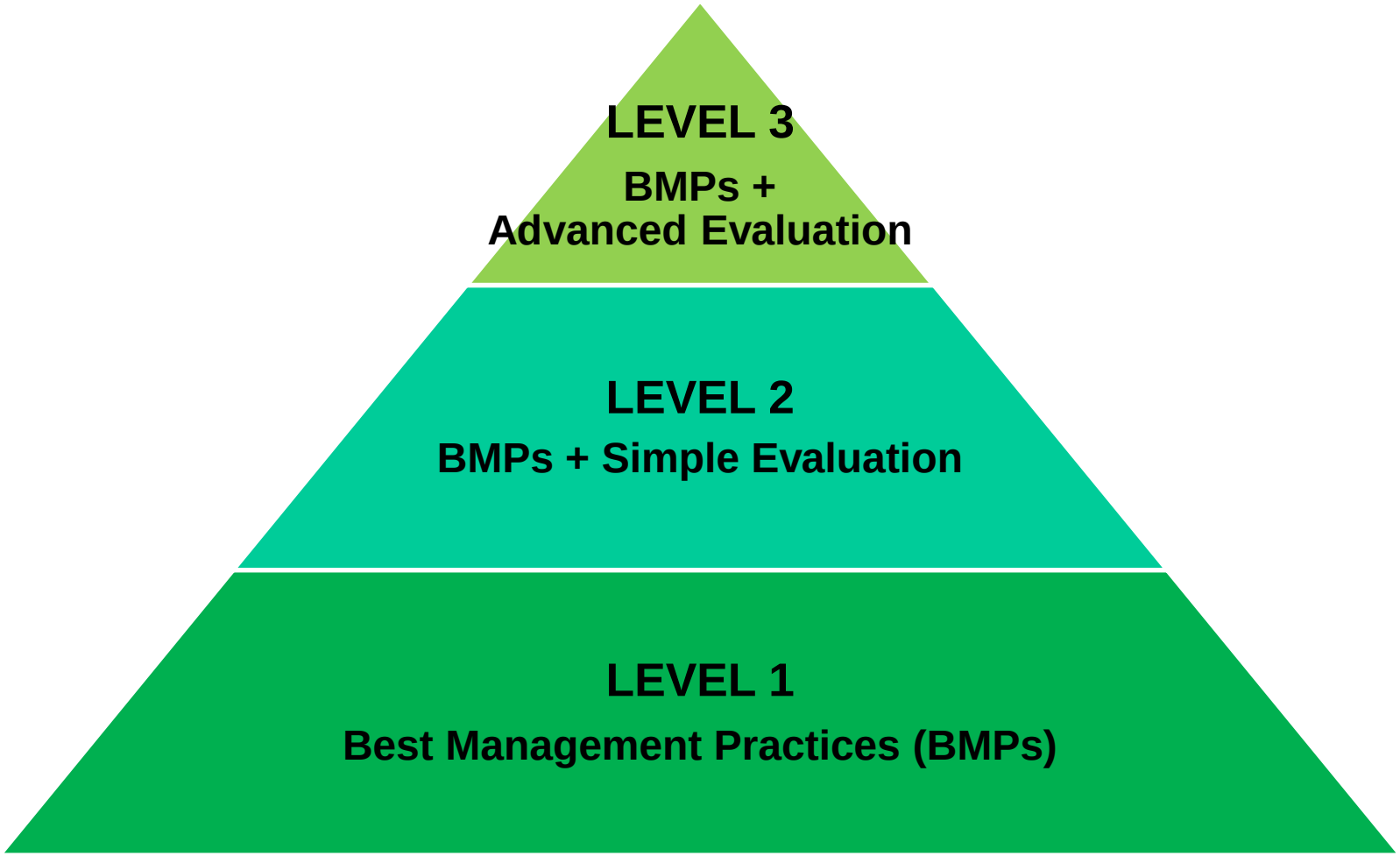
Flexible and Scalable

- Flexibility similar to that found in conceptual remedial designs
- Scalable to the size and level-of-detail of the project

Example: UST site vs. Superfund site

GSR Planning

GSR Evaluation Levels



GSR Evaluation

Level 1 Example

Operation, maintenance, and monitoring example BMPs

- Select local contractors
- Minimize mobilizations
- Engage the local community
- Use renewable energy
- Reduce noise, especially beyond site boundary
- Implement land revitalization opportunities

GSR Evaluation

Level 2 Example

Hypothetical Remedy Evaluation and Selection

Metric	In Situ Thermal	Bioremediation	In Situ Chemical Oxidation
Greenhouse gases	☹	☺	😐
Solid waste	☺	☺	☺
Sensitive species	😐	☺	😐
Community disturbance	☺	☺	☺
Community acceptance	☺	😐	😐
Cost	☹	☺	😐

GSR Evaluation

Level 3 Example

Hypothetical Investigation

Metric	Approach 1	Approach 2
Carbon dioxide	2 metric tons	1.5 metric tons
Investigation Derived Waste	1,750 pounds	1,230 pounds
Waste Water	500 gallons	390 gallons
Local Economy Benefit	$62,000	$35,000
Cost	$120,000	$85,000

Before Selecting GSR Tools

Set GSR Goals and Select Metrics

Goals → Metrics → Tools

Example Goals	Example Metrics
Reduce emissions	Greenhouse gases Air quality emissions
Conserve natural resources	Energy and water use Resource consumption
Create habitat	Ecological service value
Improve community	Traffic volume Jobs for local workers

GSR Planning

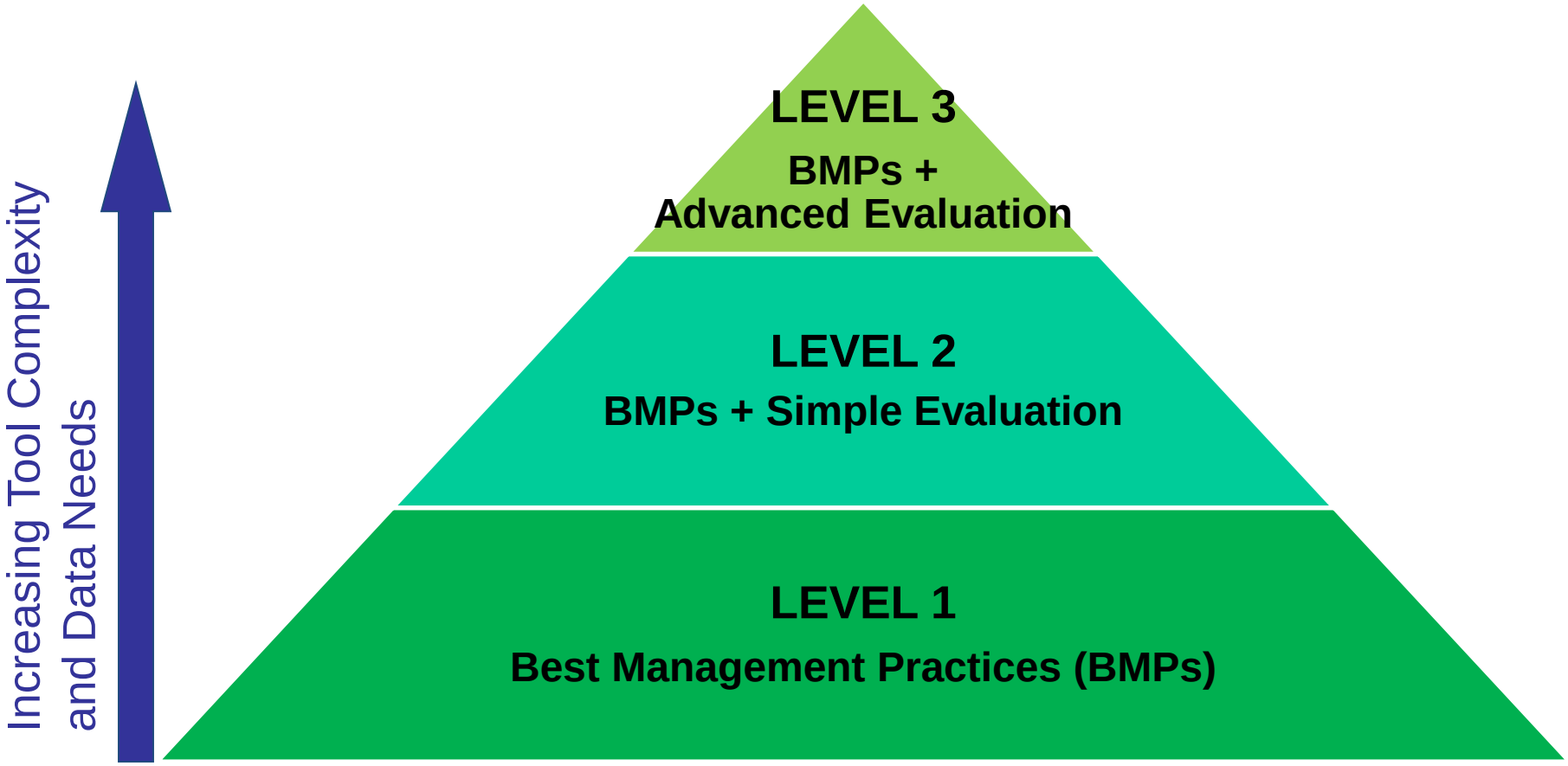
Metric Examples from Part of Table 4-1 in GSR-1

Metric	Land	Water	Waste	Community	Economic	Metric Units	Metric Description
Fresh Water Consumption						gallons	volume of fresh water used
Biodiversity						species count	assessment of impacts on biodiversity
Renewable Energy Use						gallons; BTU; kWh	measure of use of renewable energy
Greenhouse Gas Emissions						CO_2 equivalents emitted	tons of GHGs emitted
Material Use						Kg	kg of total material use, or mass by category of material
Employment						jobs created	number of jobs created as a result of implementing remedy
Capital Costs						$	capital costs of project
Community Impacts						subjective	impacts of project on the community
Cultural Resources						subjective	impacts of project on cultural resources

Tool Selection

Wide Range of Available Tools

- Choose simplest tool that gets the job done
- BMPs (Level 1) are most often used



Tool Selection

Select the Right Level of Evaluation

	Level 1 BMPs	Level 2 BMPs + Simple	Level 3 BMPs + Advanced
Description	• Best practices (e.g., no idling of truck engines at job site)	• Qualitative ranking process	• Quantitative analysis (e.g., footprint analysis, Net Environmental Benefits Analysis)
Pros	• Simple • Cost-effective • Easy to implement	• Evaluates multiple metrics • Simple calculations only (lb CO_2/lb contaminant treated)	• Quantifies multiple metrics • Track impacts from cradle to cradle
Cons	• Does not evaluate trade-offs	• Requires scoring method	• Requires scoring method • More costly, time-consuming • More data required

Key Lessons

- **Flexibility**: GSR process can be applied to a variety of sites, remediation phases and regulatory programs
- **Communication**: Communication with stakeholders is critical to successful application of GSR
- **Assumptions**: Because evaluation methods are new, users must understand the assumptions of the tools being used
- **Holistic**: This holistic approach will minimize a project's life cycle impacts

Relationship to Other GSR Efforts

Information clearinghouse, Core Elements, fact sheets, best management practices, standard guide

Detailed information specific to metrics, framework, and life-cycle assessment

White papers, BMPs, and incentives

Sustainable Remediation Tool™, SiteWise™ Tool, Fact Sheets, Case Studies

Practical guidance with a framework, metrics and tools for remedial practitioners

Resources and Contacts

ITRC Guidance Document

http://www.itrcweb.org/GuidanceDocuments/GSR-2.pdf

Internet Based Training

https://cluin.org/live/archive/default.cfm?display=all&group=itrc

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