

SCAP

OECD-NEA SCC and Cable Ageing Project

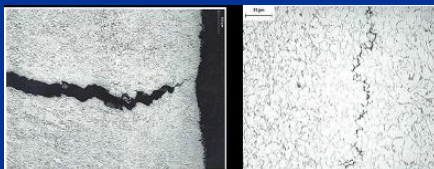


Karen Gott

(SCAP SCC Working Group Chair)
Swedish Radiation Safety Authority

SCAP Objectives

1. Establish a complete database with regard to major ageing phenomena for SCC and degradation of cable insulation through collective efforts by OECD/NEA members,
2. Establish a knowledge-base by compiling and evaluating collected data and information systematically, with regard to major ageing phenomena for SCC and degradation of cable insulation, and
3. Perform an assessment of the data and identify the basis for commendable practices which will help regulators and operators to enhance ageing management

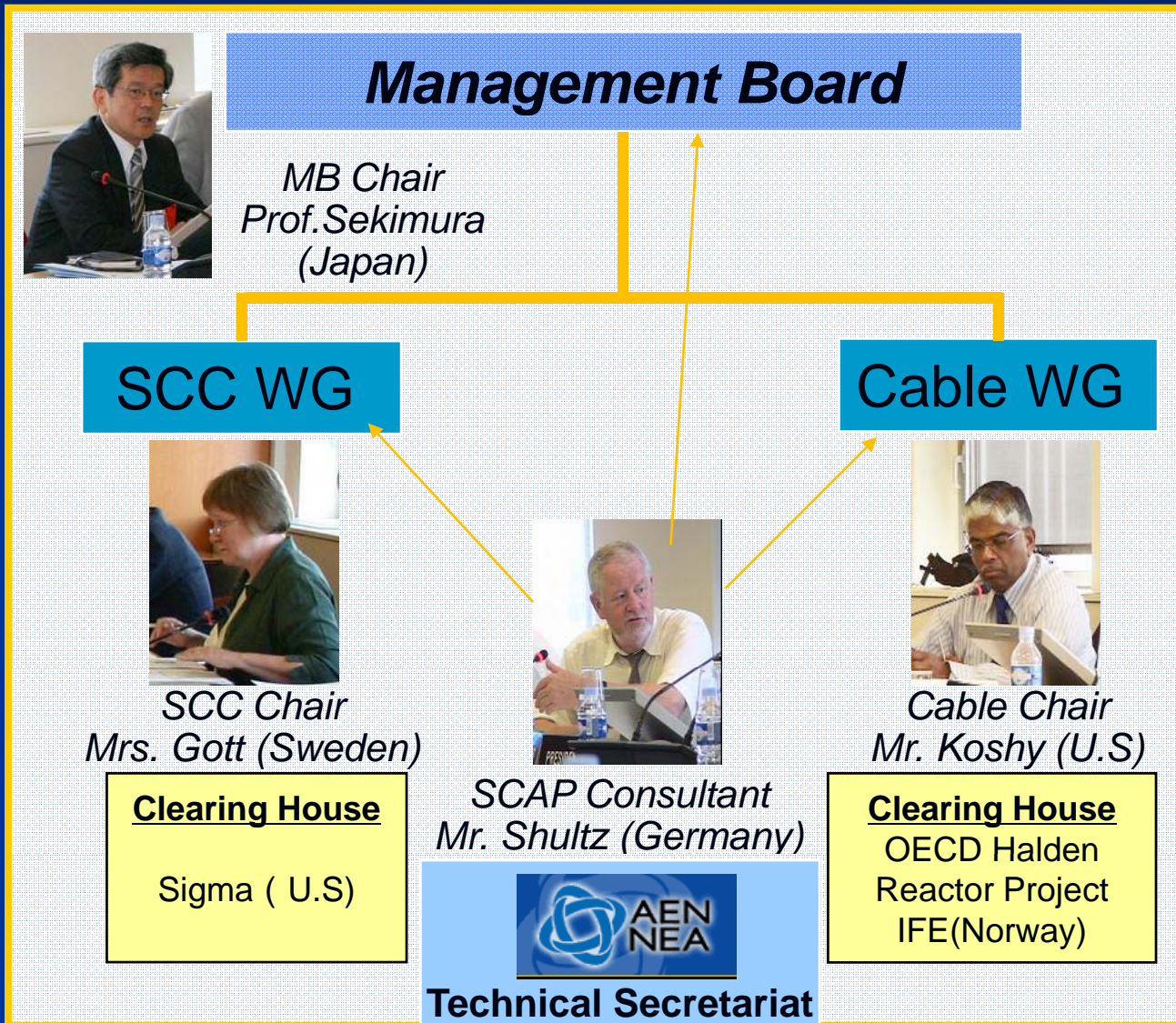


SCAP member countries

	MB	SCC	Cable
Argentina			O
BELGIUM	O	O	O
CANADA	O	O	O
CZECH Rep	O	O	O
FINLAND	O	O	O
FRANCE	O	O	O
GERMANY	O	O	O
Rep of Korea	O	O	O
JAPAN	O	O	O
MEXICO	O	O	
NORWAY	O		O
SLOVAK Rep	O	O	O
SPAIN	O	O	O
SWEDEN	O	O	O
Switzerland		O	
USA	O	O	O
Ukraine			O
IAEA	O	O	O
EC	O	O	

- 17 countries are members of the project
- The IAEA and the EC are participating as observers

OECD/NEA SCAP (Project)



SCAP (Project) Schedule

	2006	2007	2008	2009	2010
MB	▲ 1 st MB(June)	▲ 2 nd MB (May)	▲ 3 rd MB (June)	▲ 4 th MB (May)	△ 5 th MB Workshop
SCC WG	▲ 1 st WG (Oct)	▲ 2 nd WG (Jan) ▲ 3 rd WG (May)	▲ 4 th WG (Nov)	▲ 5 th WG (Mar)	▲ 6 th WG (Nov)
Cable WG	▲ 1 st WG (Sep)	▲ 2 nd WG (Mar)	▲ 3 rd WG (Sep)	▲ 4 th WG (Feb)	▲ 5 th WG (Sep)
				▲ 6 th WG (Feb)	△
	Database, Knowledge base definition and collection of data		Populating data		
			Assessment of data		
				Development of commendable practices	

SCC Working Group

Scope of the SCC Event Database

- The SCC event database addresses passive component degradation or failure attributed to stress corrosion cracking (SCC) occurring at NPP in participating countries.
- The scope of the database includes ASME class 1 & 2 pressure boundary components, reactor pressure vessel internals and other components with significant operational impact, excluding steam generator tubing.
- The following mechanisms are considered in the database:
 - Inter-granular SCC in austenitic stainless steel and nickel-based material
 - Primary water SCC
 - External chloride SCC
 - Irradiated assisted SCC
 - and trans-granular SCC

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SCC Event Database structure – Finalized in Nov 2007

- SCAP SCC is a relational database in Microsoft® Access.
- The data entry is managed via input forms, tables, roll down menus and database relationships.
- Database searches and applications are performed through user-defined queries that utilize the tables and built-in data relationships.
- The data entry forms are organized to capture essential passive component failure information together with supporting information.

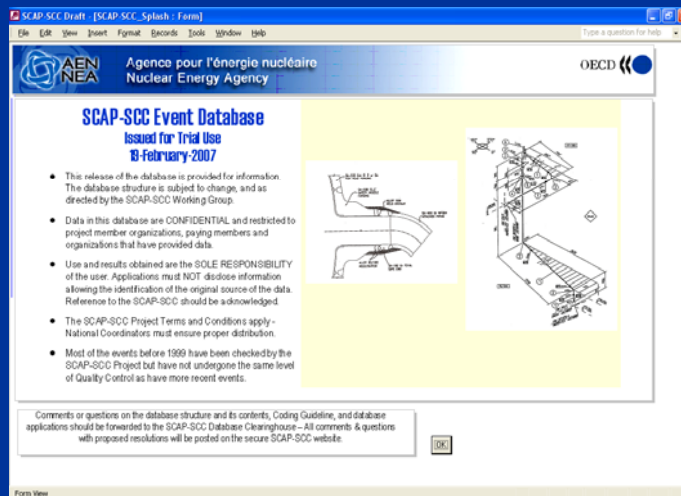


Fig.1 Event Database Opening Screen

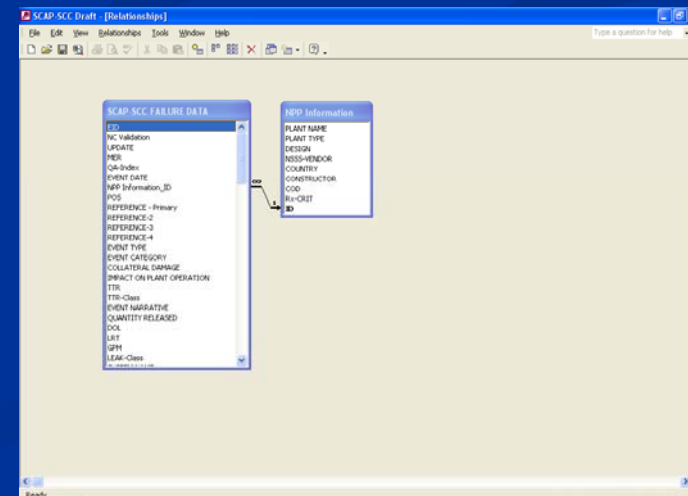


Fig.2 Event Database Relationships

SCC Working Group

SCC Event Database structure (The four data entry forms) [1/2]

1. Failure Data Input

- Type of event (e.g. through-wall crack with active leakage) and corrective actions taken at the plant.
- A detailed description of plant conditions prior to the event and the plant response and method of detection is recorded.

2. Flaw Characterization

- Description in free-format of the flaw. For through-wall flaws information about size, for part through-wall flaws information on flaw depth, length and orientation is included.

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SCC Event Database structure (The four data entry forms) [2/2]

3. ISI History

- Information about ISI of the affected component or ISI history such as time of most recent inspection is recorded including ISI programme weaknesses

4. Root Cause Information

- This form consists of fields to describe the age of the component (in-service life time), location of failure, the method of detection and the apparent cause in terms of the different SCC mechanism along with fields describing contributing factors.

(e.g. Alloying elements, Mechanical properties, Surface finish, Chemical history, Repair weld, Crack morphology, SCC mechanism, Specific regulatory actions)

SCC event database (example of input format)

SCAP-SCC 2007:1 - [Failure Data]

File Edit View Insert Format Records Tools Window Help

mercredi 19 septembre 2007 18:15:23

SCAP-SCC 2007:1 - Form 1

EID	Last Update	Multiple Event Report	Completeness Index	Event Date	Plant Name and Type	Plant Operational State
9	06/06/2007	<input type="checkbox"/> Refer to CG	3			Refueling
Restricted Data (Yes/No)		Reference - Primary		Reference - Secondary	Reference - Tertiary	
<input type="checkbox"/>				Press Release Information ()		
OPDE DATA Transfer (Yes/No)		Reference - Quaternary		Event Type	Collateral Damage	
<input type="checkbox"/>				Crack-Full	N/A - None	
OPDE 2007:1 (11-June-2007)				Impact on Plant Operation		
				Unplanned Outage Work		

Quantity Released	Duration of Leakage	Leak Rate [kg/s]	Leak Rate [gpm]	Event Narrative		
0	0	0	0	The Electric Power Company has been under periodical inspection since. When works prior to the visual inspection of piping nozzle stubs (locations in total) attached to the reactor vessel upper head were conducted, white adhesive material was identified near the base of a piping nozzle stub (No for installment of the control rod drive mechanism.		
LEAK-Class	System	System Group		The adhesive material was analyzed on and was confirmed to be boric acid contained in the primary coolant. Inspection of this piping nozzle stub further revealed that the adhesive material was observed only around this stub. It was confirmed that the adhesive material is attributed to leakage from this piping nozzle stub. Inspections were also conducted on the other piping nozzle stubs, and the adhesive material was identified on the piping nozzle stub (No for installment of the pipe to measure temperature.		
1	RPV	RPV				
Passive Component Category	Passive Component Type					
RPV	CRDM Nozzle					
Weld Configuration - Piping	Safety Class					
J-Groove Weld	1					
Dimensions - Non-Piping Passive Component:	Component Catalog Number:					

Diameter Class	Diameter [mm]	Diameter [inch]	Wall Thickness [mm]
4	102	4	
			Pipe Schedule
			0

Form 2: Flaw Size Information

Form 3: ISI History

Form 4: Root Cause Information

Refer to Section 2.1 of Coding Guideline for important information about "form operations"

Record: 9 of 35

Form View

NUM

SCC event database (*Web based interface and data access policy*)

- The database is located on a secure server at the NEA with username and password to input and retrieve data.
- There are 3 levels of access (Clearing house, National representative, Operator)
- The web interface was launched in October in 2007.

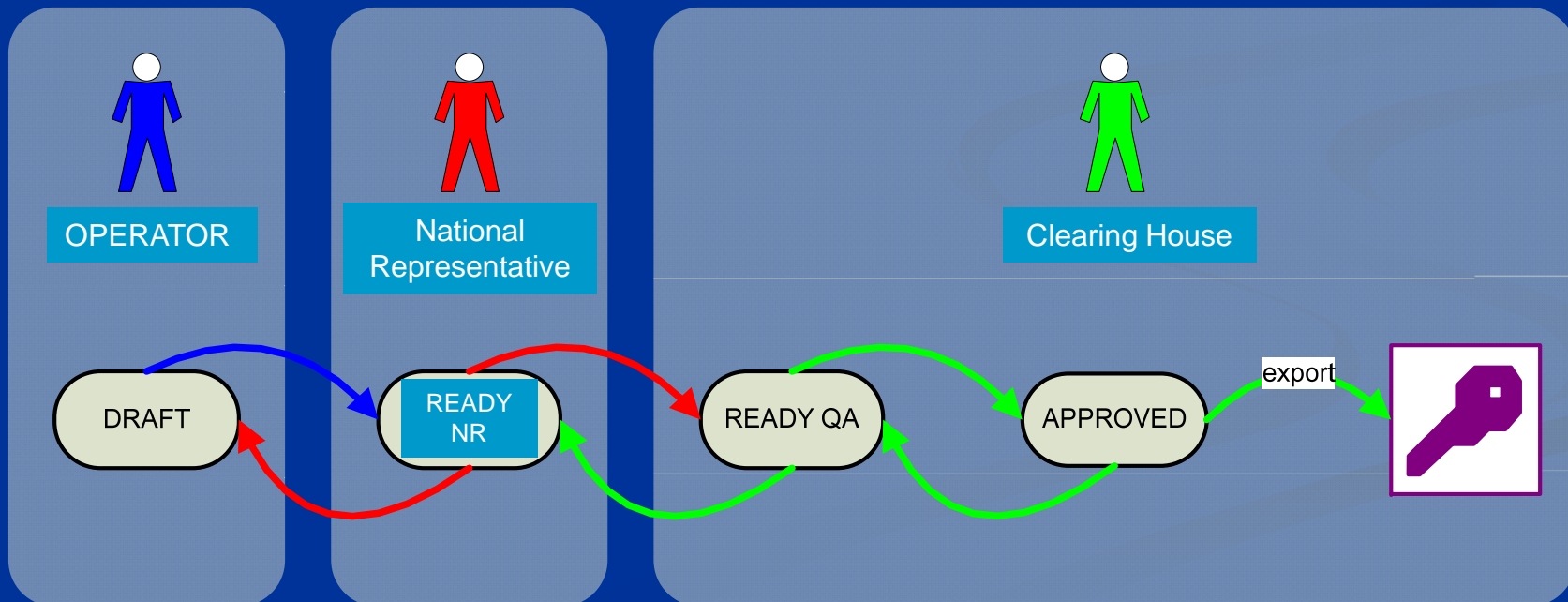
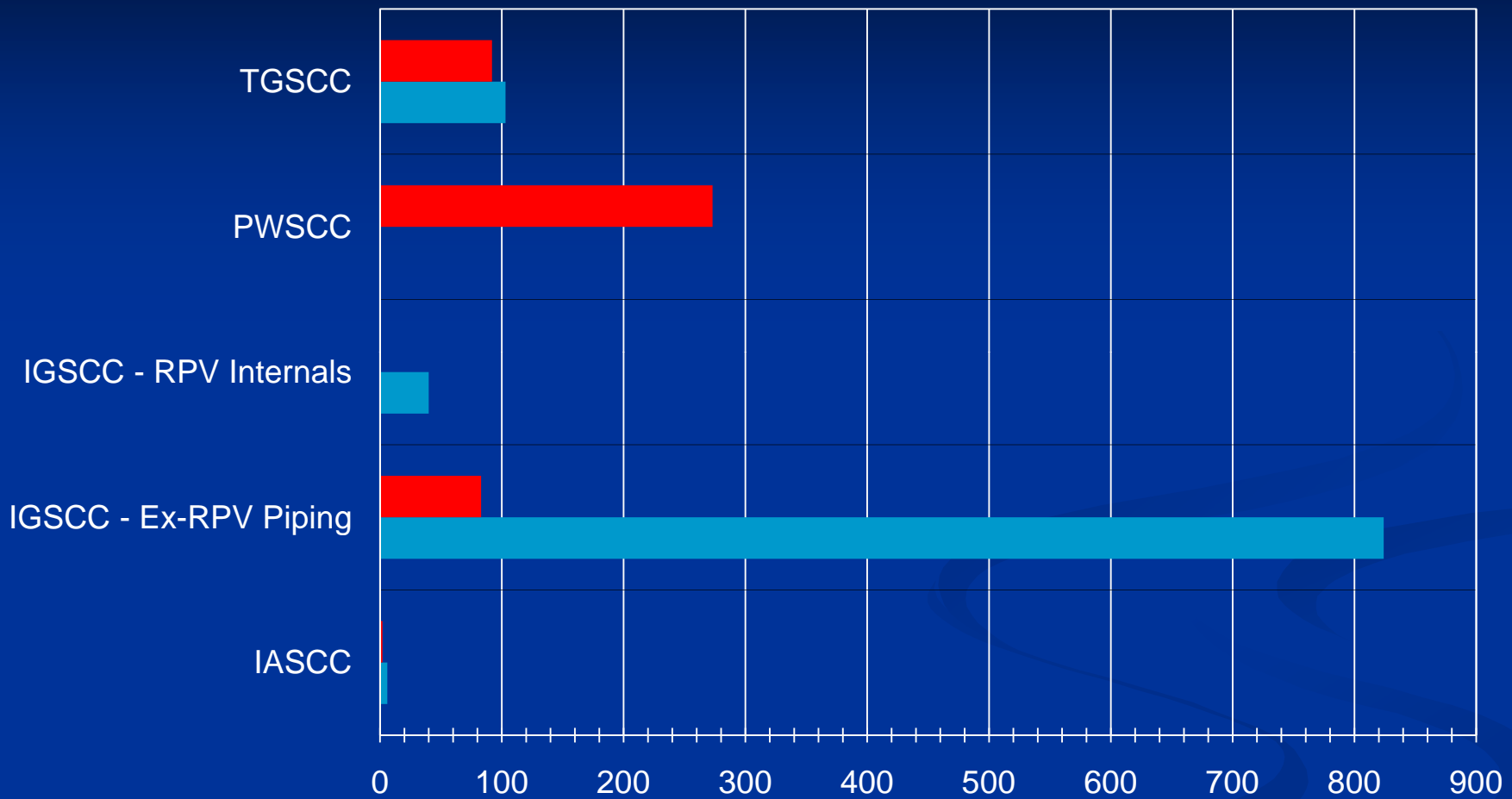


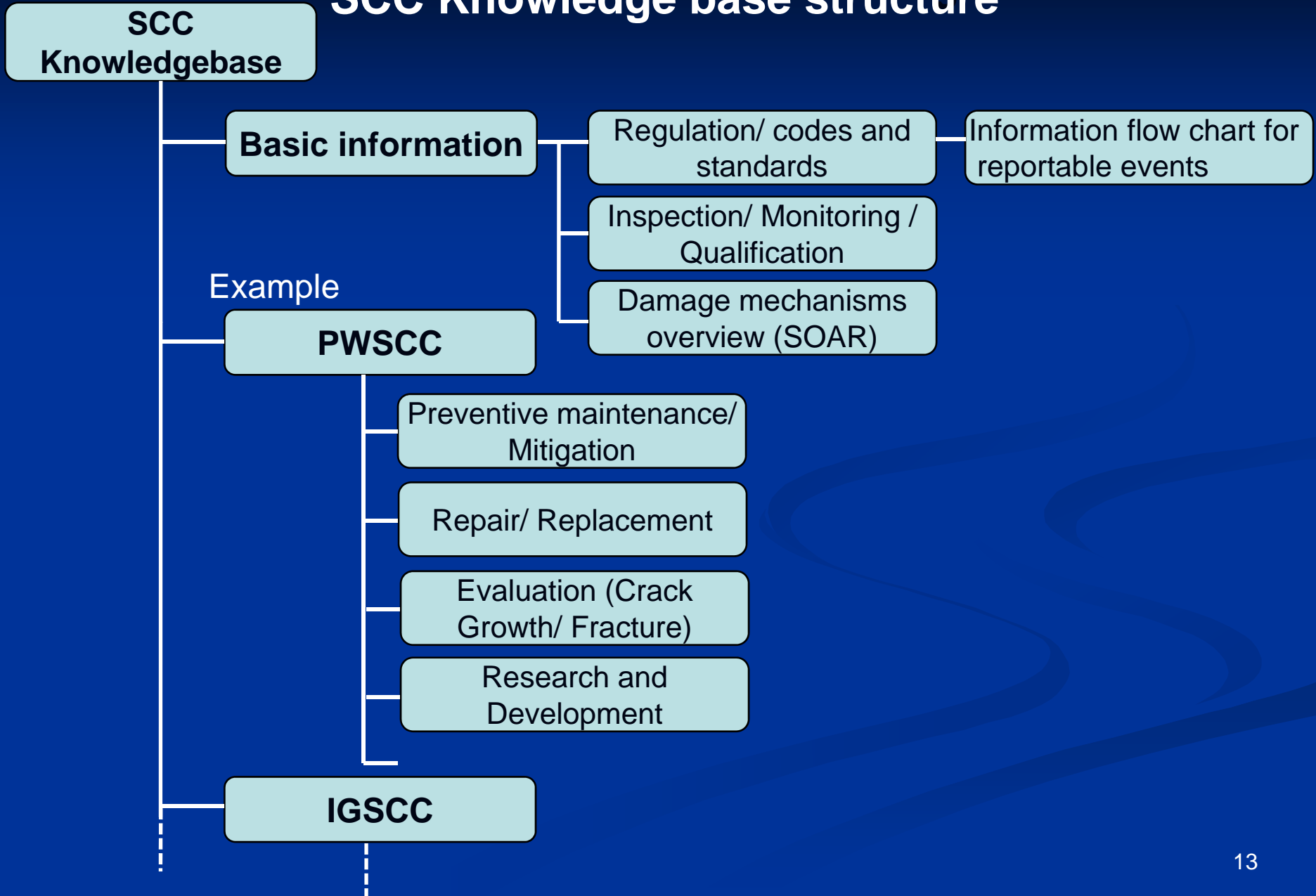
Figure. Interactions (3 levels of the access)

SCC Database content



	IASCC	IGSCC - Ex-RPV Piping	IGSCC - RPV Internals	PWSCC	TGSCC
■ PWR	2	83		273	92
■ BWR	6	824	40		103

Structure of the SCC Knowledge base



SCC working group approach to identify commendable practices

Background information

1. Basic information
 - Information flow chart for reportable events
 - Damage mechanisms (PWSCC, IGSCC - Austenitic Stainless Steel)
 - ✓ Definition
 - ✓ History of selected important events
 - ✓ Affected materials, systems, components, NEA report table
2. Regulation/ codes and standards
3. Inspection/ Monitoring / Qualification
4. Preventive maintenance/ Mitigation
5. Repair/ Replacement
6. Evaluation (Crack Growth/ Fracture)
7. Research and Development

Materials from member countries



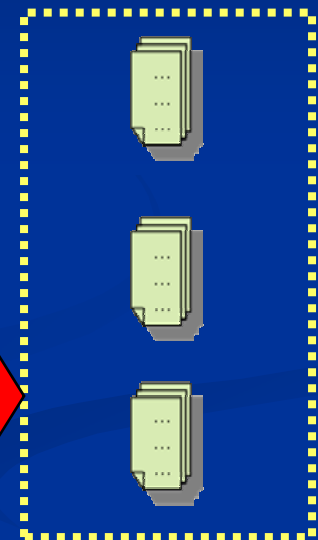
- Evaluation of DB and operating experience
- Comparison of general information



Report from SCC consultants (PWSCC, IGSCC)

Knowledgebase

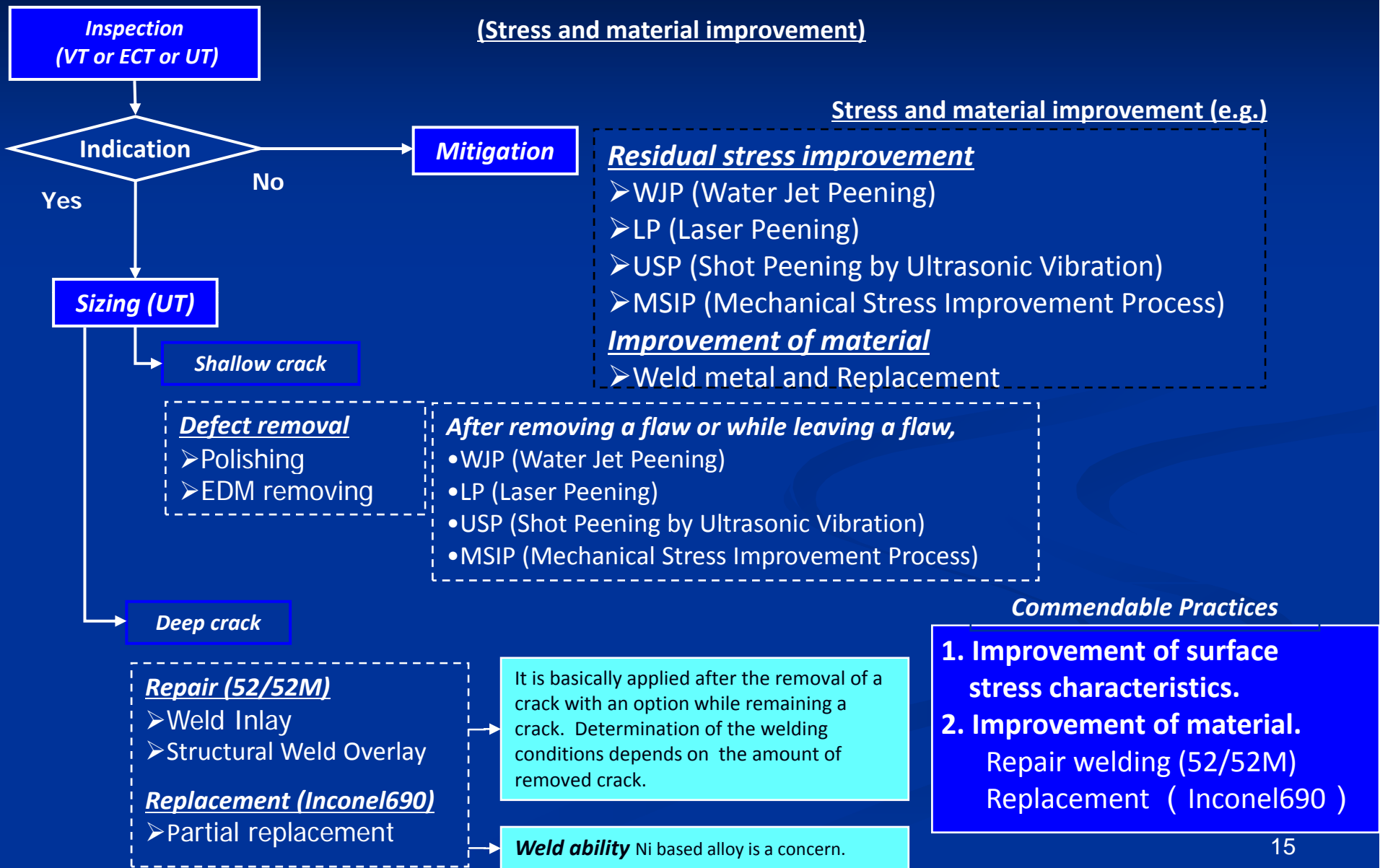
Open to the public



Commendable practice report

(Example) PWSCC of SG nozzles

(Stress and material improvement)



Future steps and intended outcomes

Current status

- The scope of the database and the database structure and format has been defined.
- The element of the knowledge base has identified and the knowledge base platform tools has been developed.
- The project is currently in the phase of populating data and assessing the data

Next steps

- Assessment of data and development of commendable practices (**2009**)
- Report on commendable practices (**May 2010**)
- Workshop (24-25 May 2010, Tokyo, Japan)

Intended outcomes

Project's outcomes will be used by the NEA member countries to:

- Support regulatory authorities' reviews of ageing management programmes
- Evaluate how operating experience and state-of-the-art technology are incorporated into plant operating practices

Project Workshop in 2010

Commendable Practices for Safe Long Term Operation of Nuclear Reactors OECD/NEA SCAP

Location and date:

25-26 May 2010, Tokyo, Japan

Detail information will be available in October at the NEA website:

<http://www.nea.fr/html/jointproj/scap.html>

The workshop will be held in conjunction with International Symposium on the Ageing Management and Maintenance of Nuclear Power Plants (ISaG). This symposium will be held on **27-28 May 2010** and is sponsored by NISA.

Main objectives of the workshop

- To discuss available data and Knowledge base to support long term operation of Nuclear plants
- Present the database and knowledge bases from SCC and Cable working group and identify the outcome of their work
- Share knowledge and experience gathered on SCC and degradation of cable insulation.
- Discuss commendable practices developed within SCAP
- Address the needs for utilization of the databases in the future

Sponsorship

The workshop is organized by NEA/CSNI (Committee on the Safety of Nuclear Installations) and:

- Hosted by the Japan Nuclear and Industrial Safety Agency (NISA) and the Japan Nuclear Energy Safety Organization (JNES)
- Conjunction with NISA program on Ageing Management for Safety Long term operation of Light Water Reactors (International Symposium on the Ageing Management and Maintenance of Nuclear Power Plants (ISaG)
- (Cooperation with the IAEA)

Insight into establishing an international database (1/2)

<International database>

- Complicated task to establish a forum for the exchange of international event data
 - Different regulatory regimes
 - Proprietary nature of much information relating to engineering activities (e.g. structural evaluation of flawed parts, root cause evaluation, and ISI technology)
 - Reporting levels: Vary from country to country
 - Resources must be allocated by all member countries at own cost

To try and overcome these difficulties, the project has brought together SCC experts from regulatory bodies, industry, research institutions and academia.

Insight into establishing an international database (2/2)

<OPDE database>

The experience from the OPDE project has been essential for the establishment of the SCAP SCC event database

- Practical approach for the database development and maintenance
 - Coding guideline and quality assurance program
 - Work done by the Clearing House
 - Expert network already existed (all OPDE members in SCAP SCC WG)
-
- OECD Pipe Failure Data Exchange Project (OPDE) project was formally launched in May 2002 under the auspices of the OECD/NEA but initial discussions started as early as in 1994
 - It now includes approximately 3600 records on pipe failures from 321 NPPs and the current term ends 2011