Canadian Nuclear Safety Commission | Commission canadienne de sûreté nucléaire

Counterfeit, Fraudulent and Suspect Items Reported in Canada

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Canada

Canadian Nuclear Power Reactor Fleet

All stations are CANDU* design

- In service within design life
- In service or returned to service
- Safe storage state

Bruce Nuclear Generating Station, Ontario

A1	A2	A3	A4
In service 1977/2012 Mwe 750	In service 1977/2012 Mwe 750	In service 1978/2003 Mwe 750	In service 1979/2003 Mwe 750
B5	**B6**	**B7**	**B8**
In service 1985 Mwe 882	In service 1984 Mwe 882	In service 1986 Mwe 882	In service 1987 Mwe 882

Darlington Nuclear Generating Station, Ontario

1	2
In service 1992 Mwe 881	In service 1990 Mwe 881
3	**4**
In service 1993 Mwe 881	In service 1993 Mwe 881

Pickering Nuclear Generating Station, Ontario

A1	A2	A3	A4
In service 1971/2005 Mwe 515	In service 1971 Safe storage state	In service 1972 Safe storage state	In service 1971/2003 Mwe 515
B5	**B6**	**B7**	**B8**
In service 1983 Mwe 516	In service 1984 Mwe 516	In service 1985 Mwe 516	In service 1986 Mwe 516

Gentilly-2 Nuclear Facility, Quebec

In service 1983 Safe Shutdown since Dec. 2012

Point Lepreau Generating Station, NB

In service 1983/ 2012 Mwe 635

* CANDU (Canada Deuterium-Dranium) is a pressurized heavy water reactor (PHWR) type that uses heavy water for moderator and coolant, and natural uranium for fuel

Regulatory Reporting of CFSI

The CNSC has a specific counterfeit, fraudulent and suspect items (CFSI) reporting requirement for nuclear power plants (NPPs) that is described in the Regulatory Document REGDOC 3.1.1

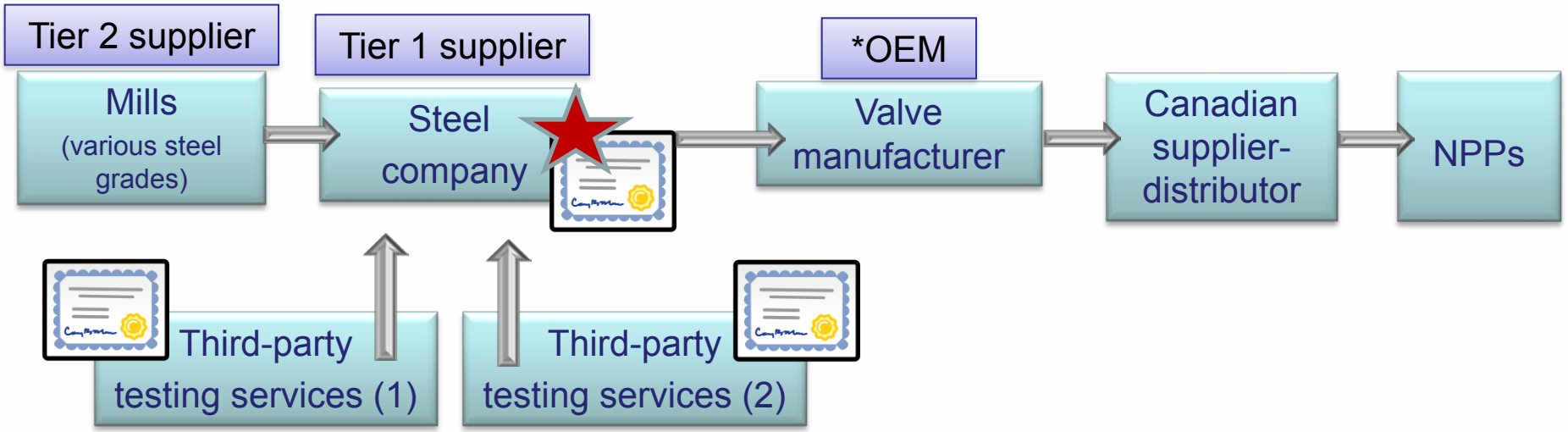
"*The licensee shall report on the discovery of counterfeit, fraudulent or suspect items during the conduct of licensed activities*"

Recent Cases of CFSI: Canadian NPPs

Licensee's investigations	CFSI description
2015	Nuclear class valves: two inches and smaller • CFSI not detected and installed in the plant • non-conforming valve material: material properties did not meet ASME boiler and pressure vessel requirements
2014	Pressure gauge • CFSI detected during the receiving inspection • gauge did not match description on certificate  • CNSC presentation at the IAEA "Technical Meeting on Procurement Activities and on CFSIs: Experiences and Lessons Learned", September 8–10, 2014

Review of Nonconforming Valves (1)

Simplified Valve's Supply Chain



Between 2001 and 2011, substandard material valves were sold with falsified certified material test reports

* Original equipment manufacturer

Review of Nonconforming Valves (2)

Investigation period

August **2013**	• The valve manufacturer started an investigation following the discovery of suspect test material certificates
March 3, **2015**	• All Canadian NPPs informed by their suppliers
March 25, **2015**	• CNSC staff provided preliminary information to the Commission
June 17, **2015**	• The Commission was updated on latest information
December **2015**	• NPPs submitted their final event reports to CNSC staff

Review of Nonconforming Valves (3)

Investigation by the valve manufacturer

- **Results of the investigation of valves manufactured from 2001 to 2011**
  - ✓ the steel company:
    - ➢ modified results on certified material test reports (CMTR) provided by its third-party testing services
    - ➢ created CMTR with the letterhead of its third-party testing services without testing the material
- **Results of the engineering assessment on valves manufactured with substandard material**
  - ✓ no safety risk for the continuous use of the valves because there is sufficient design margin associated with the valve design stresses

Review of Nonconforming Valves (4)

NPPs' investigations*

Licensees reported that the valves containing substandard material had been received as early as 2001

- ✓ **216 valves are in storage** and have been quarantined until fitness for service is assessed
- ✓ **349 valves were installed**
  - ➢ all equipment failure history has been reviewed, from 2001 to date
  - ➢ no impairments in special safety systems or safety-related systems were found to be caused by the valves
  - ➢ an authorized inspection agency will assess if the valves are acceptable from a code equivalence
  - ➢ licensees removed the steel company from their approved supplier lists

* Information extracted from the NPPs' detailed event reports finalized in December 2015

Review of Nonconforming Valves (5)

Extent of condition

- Review of the history dockets of all valve assemblies (connectors, discs, bonnets, plugs and stems) and component parts supplied by the Canadian supplier and the valve manufacturer was conducted to identify if any of the component steel was supplied by the steel company
- Review of other valves in the materials catalogue was conducted to ensure that no material had been supplied by the steel company to other valve suppliers
- The steel company confirmed that the materials in question were supplied only to the valve manufacturer and specifically in regard to orders that required testing

Review of Nonconforming Valves (6)

NPPs share experience through

- COG
- *WANO
- *INPO
- EPRI through COG
- CANPAC
- NUPIC

CNSC sharing of experience

April 13, 2015
- CNSC presentation on the valve issue at the 49th meeting of CNRA WGIP

March–June 2015
- CNSC staff provided the Commission with a status update during two public meetings

May 2015
- CNSC memorandum sent to NEA MDEP-VICWG members informing of the Valve issue

* CMD15-M20, Public Meeting, June 17, 2015

CNSC Oversight of CFSI

- The CNSC continues to verify that licensees follow established engineering assessment and technical operability evaluation processes; these are used to determine any potential safety impacts and, if necessary, any needed mitigation measures
- Licensees are obliged to examine their management system processes (e.g., procurement, receipt and testing) to ensure that everything possible is being done to prevent recurrence of this type of event
  - the CNSC will verify that licensees execute this examination
- Licensees are cooperating on this issue and are working with the valve supplier and the authorized inspection agency (Technical Standards and Safety (TSSA) in Ontario) to disposition affected valves against Canada Standards and performance criteria (CSA N285.0)
  - the CNSC will review and, if appropriate, accept the dispositions proposed by licensees

An update on the results of all investigations will be presented to the Commission in April 2016

Next Steps

***Licensees initiated actions to prevent recurrence** of this event; one consists of working with the industry and nuclear organizations to set up an audit committee similar to CANPAC, i.e. CANIAC

- CANPAC: CANdu Procurement Audit Committee for auditing the quality program of Licensees' suppliers
- CANIAC: CANdu Industry Audit Committee for auditing the quality program of sub-suppliers of Licensees' suppliers. It is expected to be fully operational by the end of 2016

*CMD 15-M20 Public Meeting June 17, 2015

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Canada