Technical Briefing on the Safe Transport of Steam Generators

Presented to

Standing House Committee on Natural Resources

Presented by the
Canadian Nuclear Safety Commission

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Canadian Nuclear Safety Commission

Established May 2000,
under the *Nuclear Safety and Control Act*

Replaced the AECB,
established in 1946,
Atomic Energy Control Act

Canada's Independent Nuclear Regulator - 65 Years Of Experience

Independent Commission

- Quasi-judicial administrative tribunal
- Commission members are independent
- Commission hearings are public and Webcast
- Decision can only be reviewed by the Federal Court

Transparent, Science-based Decision-Making

Canada: Clear Radioactive Waste Policy

- Canada's policy framework:

  "The federal government will ensure that radioactive waste disposal is carried out in a safe, environmentally sound, comprehensive, cost-effective and integrated manner."

  Natural Resources Canada *"Radioactive Waste Policy Framework"*
  http://www.nrcan.gc.ca/eneene/sources/uranuc/wasdec/polpol-eng.php

- Applications to CNSC must comply with Canadian and international policy

International Framework

Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, 1997

IAEA, General Safety Requirements, Part 5 – *Predisposal Management of Radioactive Waste*

IAEA, Safety Guide #WS-G-2.4, *Decommissioning of Nuclear Fuel Cycle Facilities*

Domestic Policies

NRCan, *Radioactive Waste Policy Framework*, 1996

CNSC, P-290, *Managing Radioactive Waste*

CNSC, G-219, *Decommissioning Planning for Licensed Activities*

CSA Standard N294-09, Decommissioning of Facilities Containing Nuclear Substances

Reduce, Reuse and Recycle

How is the Transport of Nuclear Substances Regulated?

- Transport of all nuclear substances is governed by:
  - International Atomic Energy Agency (IAEA) *TS-R-1 Regulations for the Safe Transport of Radioactive Material*
  - *International Maritime Dangerous Goods Code*
- In Canada, these regulations are applied through:
  - CNSC *Packaging and Transport of Nuclear Substances (PTNS) Regulations*
  - Transport Canada *Transportation of Dangerous Goods (TDG) Regulations*
- Sweden and the US
  - follow the same IAEA Regulations and will independently evaluate the application, taking into consideration the CNSC decision

Any transport that is required to be compliant with such rigorous regulations would be the safest shipment on the St. Lawrence

Dangerous goods are transported regularly on the St. Lawrence Seaway and Great Lakes

In 2009

Substance	quantity (tonnage)
GASOLINE	481,813
ROAD FUEL & PETROLEUM OILS	638,177
TOLUENE	8,583
UREA	82,509
CALCIUM NITRATE	3,006
CALCIUM AMMONIUM NITRATE	10,000
UREA AMMONIUM NITRATE	78,999
ALCOHOL INDUSTRIAL	4,785
FERTILIZERS	3,245
ASPHALT	462,823
BIOFUELS	14,045
POTASSIUM CHLORIDE	21,273
CALCIUM CHLORIDE LIQUID	53,901
SULPHURIC ACID	20,893
TAR PITCH & CREOSOTE	38,213
YELLOWCAKE / URANIUM	7,000

No Precedent is Being Set

Millions of shipments of nuclear substances in Canada each year

In Montreal alone, each year:

- Over 9,000 shipments pass through the Montréal-Trudeau Airport
- Over 1,050 shipments pass through the Port of Montreal
- Over 50,000 medical isotope shipments within the City of Montreal

This is Routine Activity

Transport Packages

Pre-approved Packages = Routine Shipments

Steam Generators

11.7 m long

2.5 m diameter

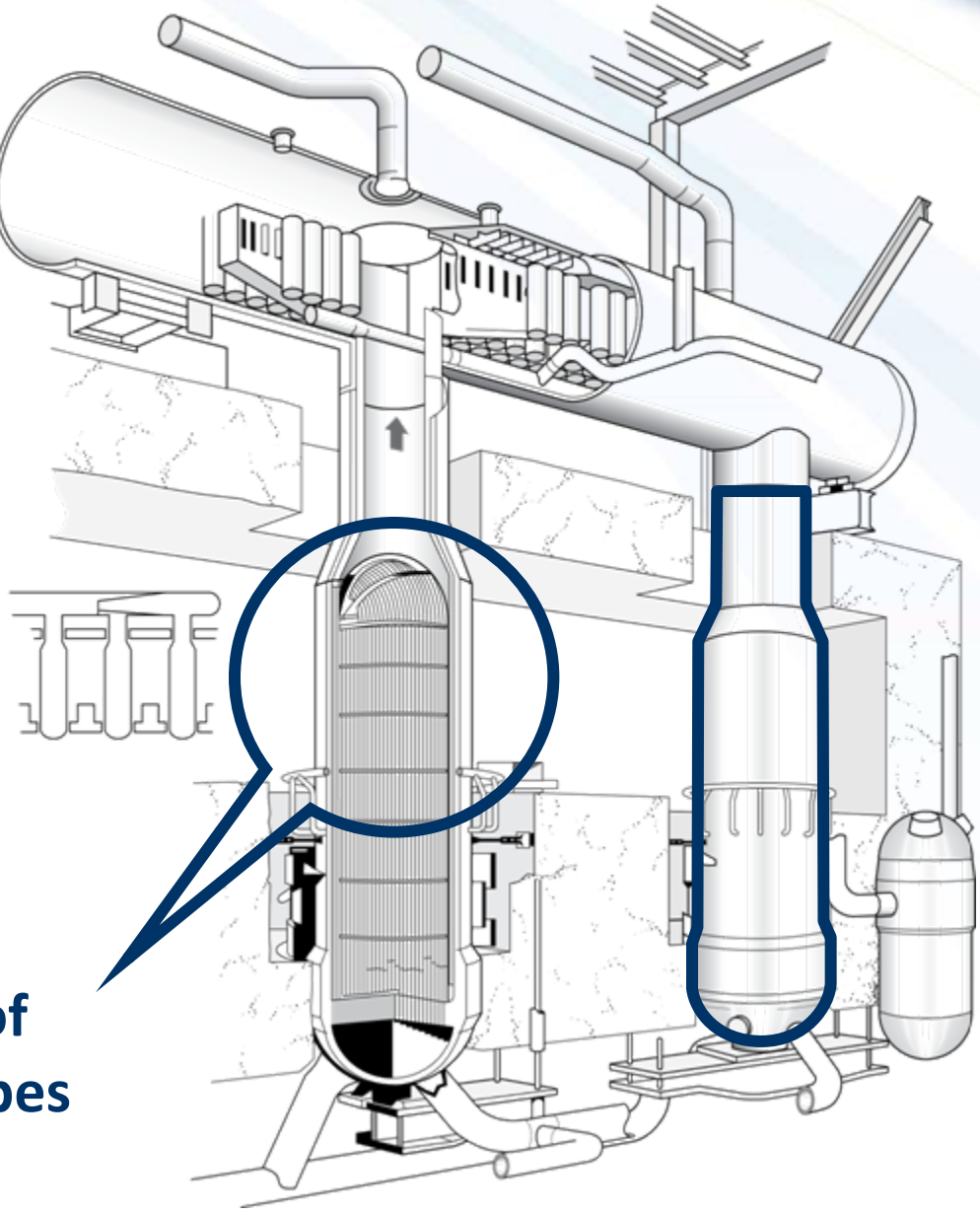
Weight:
100 tonnes . . .

But less than 4g of radioactive substances

Sealed opening

Due to their size the steam generators do not fit in approved package; hence, the need for Special Arrangement licence

Steam Generator



65km of Inner tubes

Outer shell is over 5 cm thick steel = safe container

5 cm

Only Small Quantity Fixed on Inside of Inner Tubes is Radioactive

Radiation Dose Rate in Perspective

Medical isotopes

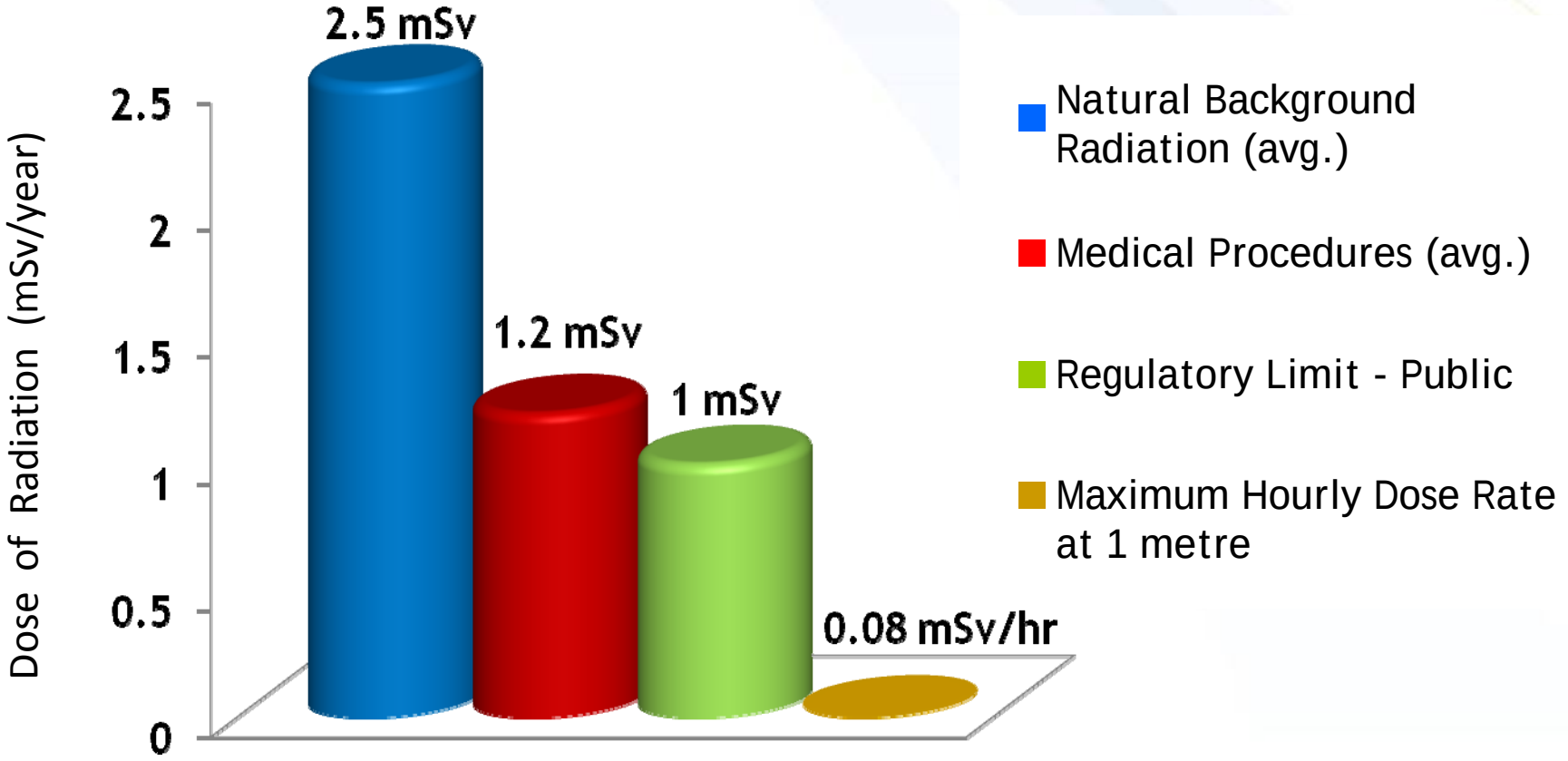
~ 0.5 mSv/hr

Steam Generators

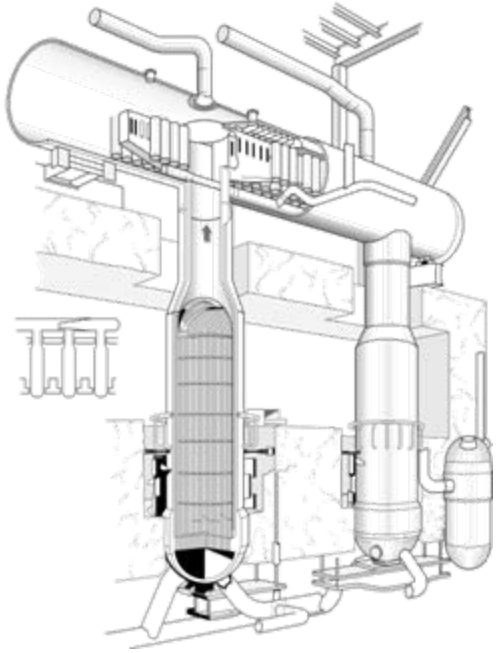
0.08 mSv/hr

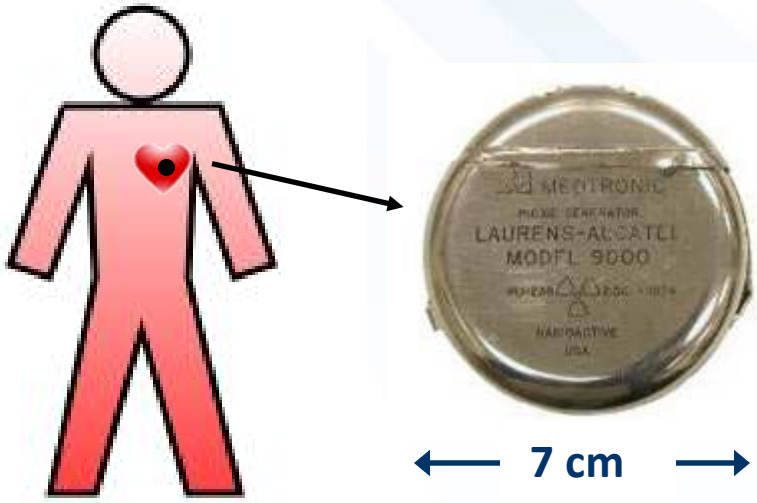
Safe to be Around

Radiation in Perspective



Small Quantities of Radioactivity





Each steam generator is less radioactive than a pacemaker

Commission Process

- Public hearings on September 28 and 29, 2010
  - 78 interventions
  - Over two days and 22 hours of public hearings
  - Many interventions from Quebec
- Additional analysis of the issues raised at the public hearings
  - 32 supplementary submissions by November 22, 2010
- Careful consideration by the Commission Members of all submissions and analysis

Extensive Public Engagement

From Quebec:
Gordon Edwards
Mouvement Vert Mauricie
Alliance des villes des Grands Lacs et du Saint-Laurent (representing 13 municipalities in Québec, including Montréal and Québec)
Ville d'Amqui, including the resolution signed by:
- St-Joseph-de-Sorel
- Amqui
- Saint-Alexis-de-Matapédia
- Beaumont
- St-Vallier
- Lanoraie
- St-Cyrille-de-Wendover
- St-Germain de Grantham
- La Pocatière
- Ste-Florence
- Val-Brillant
- Métis-sur-Mer
- Lyster
- St-Jean-Port-Joli
- Leclercville
- St-Antonin
- St-François-Xavier-de-Viger
- Dégelis
- Kingsey Falls
- La Malbaie
- Tadoussac
- Trois-Pistoles
- Laurier-Station
- Forestville
- MRC d'Avignon

Public and Aboriginal Engagement

- Public hearings well publicized in Ontario and Quebec – widely disseminated by intervenors
- CNSC staff made numerous presentations to City Councils, mayors and aboriginal councils:
  - Owen Sound City Council
  - The Mayor and Fire Chief of St. Catharines
  - The Mayor and Fire Chief of Port Colborne
  - The Mayor of Thorold
  - Staff from the City of Montreal
  - Centre de Sécurité Civile (City of Montreal)
  - Staff from the Union des Municipalités du Québec
  - The Mohawk Council (Akwesasne)
- Presentations posted on the CNSC Web site

Conclusion: Opportunity for All to Intervene

CNSC Staff thoroughly evaluated the following safety areas

1. Packaging and Transport
2. Protection of the Environment
3. Radiation Protection
4. Emergency Measures
5. Security

Science-based Analysis

1. Packaging and Transport: Marine Transport

- Transport vehicle – 30 km/h top speed
- Nuclear qualified ship
- Transport saddles welded to the floor of the cargo hold
- No other cargo on board
- Ship only loaded to 25% capacity
- Crew trained in radiation safety & emergency measures

Conclusion: Packaging and transport comply with all National and International requirements

2. Protection of the Environment

- CNSC staff performed extensive environmental review under the *Nuclear Safety and Control Act*, which is equivalent to *Canadian Environmental Assessment Act*
- Evaluated multiple worst-case incident scenarios for a credible marine accident
- Even in a very unlikely worst case scenario, the public dose would be less than 1% of the public dose limit of 1 mSv/year

Conclusion: The environmental and human health risk from an unlikely worst case scenario would be negligible

3. Radiation Protection

- The programs meet the CNSC requirements
- Doses to workers from all 16 steam generators will be less than 2% of public dose limit
- Negligible dose to people driving or walking by the steam generators while they are transported by road

Conclusion: The dose to members of the public would be less than 0.1 % of the limit for members of the public which is negligible

4. Emergency Measures

- Bruce Power's emergency response plan
- The shipboard emergency plan is compliant with International Maritime Organization Regulations

Conclusion: The emergency measures to protect the health and safety of workers and the public are adequate

5. Security

- Owen Sound Port – Transport Canada provides regulatory direction/oversight for security measures
- Marine vessel – Transport Canada provides regulatory direction/oversight for security measures
- Marine Security Operations Centre (MSOC) will coordinate the threat and risk assessment for the marine part of this shipment
- MSOC is led by the RCMP and consists of a broad range of law enforcement and public safety agencies with responsibilities for marine security including Transport Canada, Canadian Coast Guard, Ontario Provincial Police and la Sûreté du Québec

Conclusion: The security measures are adequate.

Conclusion

- The Commission is satisfied that the transport:
  - can be completed safely and that risk to persons and the environment is negligible
  - the shipment meets all Canadian and international regulations and requirements
  - Bruce Power is qualified to carry out the plan.
- Overall, the plan is:
  - Good for the environment – Recycled Clean Steel
  - Good waste management practice – Reduced Volume by 90%

IT IS SAFE!

We will never compromise safety
Nous ne compromettrons jamais la sûreté

Canadian Nuclear Safety Commission
Commission canadienne de sûreté nucléaire

nuclearsafety.gc.ca
suretenucleaire.gc.ca