



Technical Briefing on the Safe Transport of Steam Generators

Presented by

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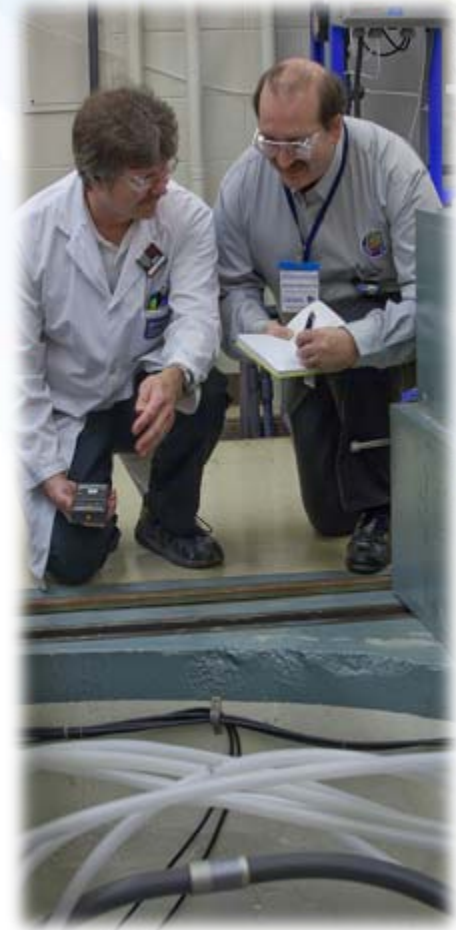
Canadian Nuclear
Safety Commission

Commission canadienne
de sûreté nucléaire

Canada 

Safety First!

- The CNCS ensures that all regulatory requirements are met.
- The CNCS issues an authorization when it is convinced that an activity is safe.
- The CNCS would never jeopardize the health, safety or security of the public or the environment.





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



How are nuclear substances transported?

Millions of shipments of nuclear substances in Canada each year

In Montreal alone, each year:

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

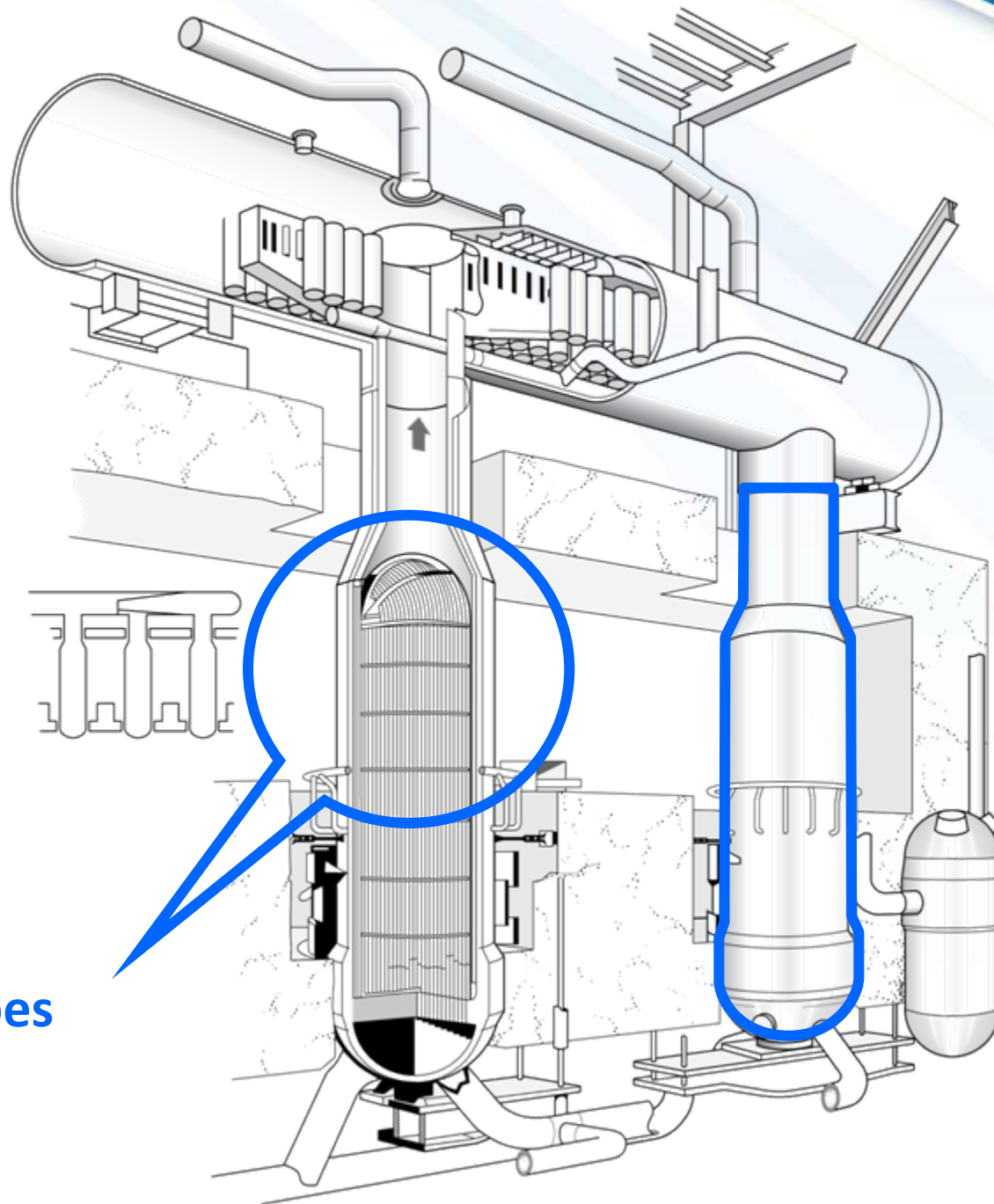
**No Precedent is Being Set
This is Routine Activity**

Steam Generators



**100 tons of steel but less than 4g of
radioactive substances**

Steam Generator



Inner tubes

Radiation Dose Rate in Perspective

Medical isotopes



~ 0.5 mSv/hr

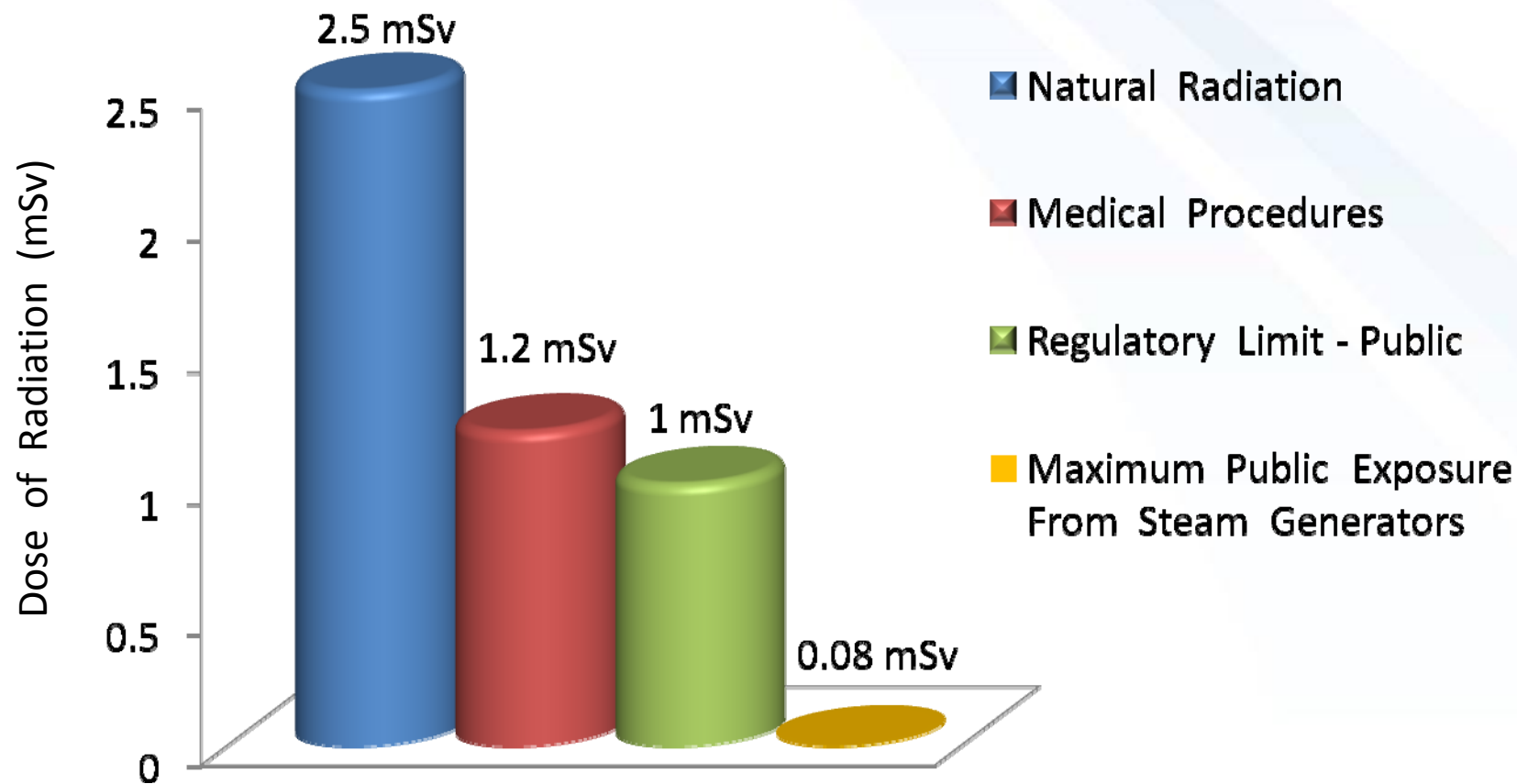
Steam Generators



0.08 mSv/hr

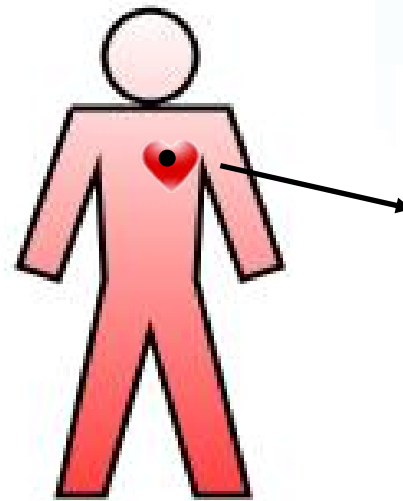
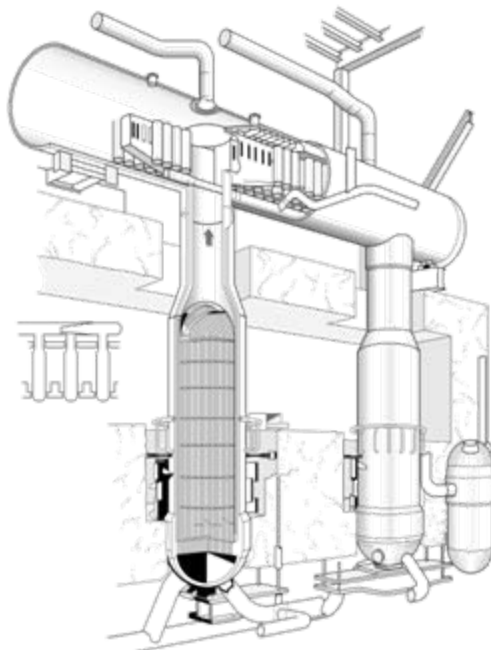
Safe to be Around

Radiation in Perspective



Small Quantities of Radioactivity

Each steam generator contains small quantities of radioactivity that is less than the radioactivity of a pacemaker



Pacemaker



Transport Packages



Due to their size the steam generators do not fit in approved package; hence, the need for special arrangement licence.



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**

1. Packaging and Transport: Marine Transport

- Transport saddles welded to the floor of the cargo hold
- No other cargo on board
- Ship only loaded to 25% capacity
- Ship crew is trained in radiation safety and emergency measures

Conclusion: CNPC staff conclude that 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*
- Evaluated worst-case incident scenarios for a credible marine accident
- In a very unlikely worst case accident the public dose would be less than 1% of the public dose limit of 1 mSv/year

Conclusion: CNSC staff conclude that the environmental and human health risk from a release from an accident 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, CNSC, Canadian Coast Guard, Ontario Provincial Police

Conclusion: The security measures are adequate.

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
- Presentations posted on the CNSC Web site

Conclusion: Public hearings provided opportunity for all to intervene

Conclusion

- The Commission in rendering its decision stated it is satisfied that the transport:
 - can be completed safely and that risk to persons and the environment are negligible
 - the shipment meets all Canadian and international regulations and requirements
 - Bruce Power is qualified to carry out the project.
- Shipping the generators will recycle 90% of the clean metal. This is good for the environment and in accordance with CNSC policy.
- Shipping the generators will reduce the environmental footprint. This is good nuclear management.

Conclusion: The shipment of 16 steam generators from Bruce Power to Sweden is safe.



Questions?

nuclearsafety.gc.ca