ONE
TEAM
ONE
GOAL...

Darlington/Pickering Community Advisory Committee

Refurbishment Update

Safety
Quality
Schedule
Cost

amec foster wheeler
Black & McDonald
BWXT Canada Ltd.
FOX
GE
SNC·LAVALIN Nuclear
AECON Joint Venture
WorleyParsons resources & energy
ONTARIO POWER GENERATION

2017 Open House

- Student Day – 200 grade 9/10/11
- Indigenous Trade Fair – close to 100
- Open House
  - close to 40 vendors
  - 70 volunteers
  - 2,138!

2017 Open House

2017
Darlington Refurbishment
Open House

ONTARIO POWER GENERATION

Support for the Project

- **85** per cent public support

Long-Term Energy Plan

- Highlights important role of nuclear energy
- Notes **Darlington Refurbishment** progress and commitment to refurbish
- Recognizes the value of continued operations of **Pickering** to 2024.
- **Nuclear innovation** is also highlighted

Financial Accountability Office

- long-term environmental and cost benefits
- concludes, “There are no alternative scenarios”
- Best value for rate payers

Refurbishment: What's Involved

Refurbishment: Steps Involved

1 ✓	2 ✓	3	4	5
Defuel & Isolate	**Prepare For Disassembly**	**Remove Reactor Components**	**Install Reactor Components**	**Restart Reactor**
Shutdown Defuel Install Barriers Isolate	Open Airlocks Install Re-tube Tooling Platform Remove Feeder Tubes Prepare for component removal	Remove: End fittings ▪ Pressure Tubes ▪ Calandria Tubes	Inspect Reactor Install: ▪ Calandria Tubes ▪ Pressure Tubes ▪ End Fittings ▪ Feeder Tubes	Load Fuel Remove Equipment Low power test High power Test Connect to Gird

Safety Performance

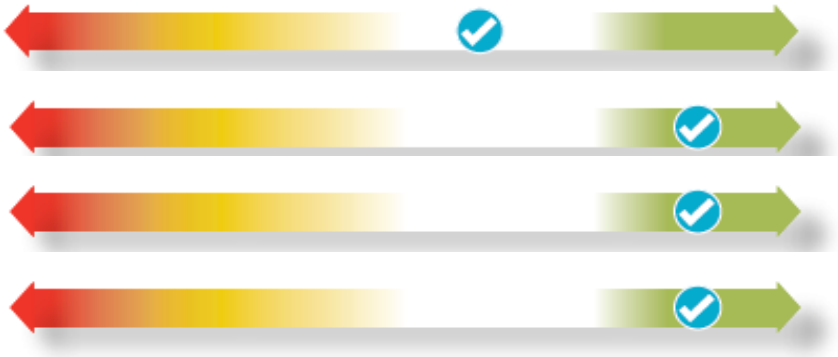
- Good **SAFETY** performance
- Many new workers coming to OPG
- Nuclear safety and culture is paramount – *very high standards for transient workforce*
- Working to ensure OPG safety standards are met
- Significantly fewer injuries compared to construction sector - **10x** better then construction industry
- Excellent radiation protection

Project Status

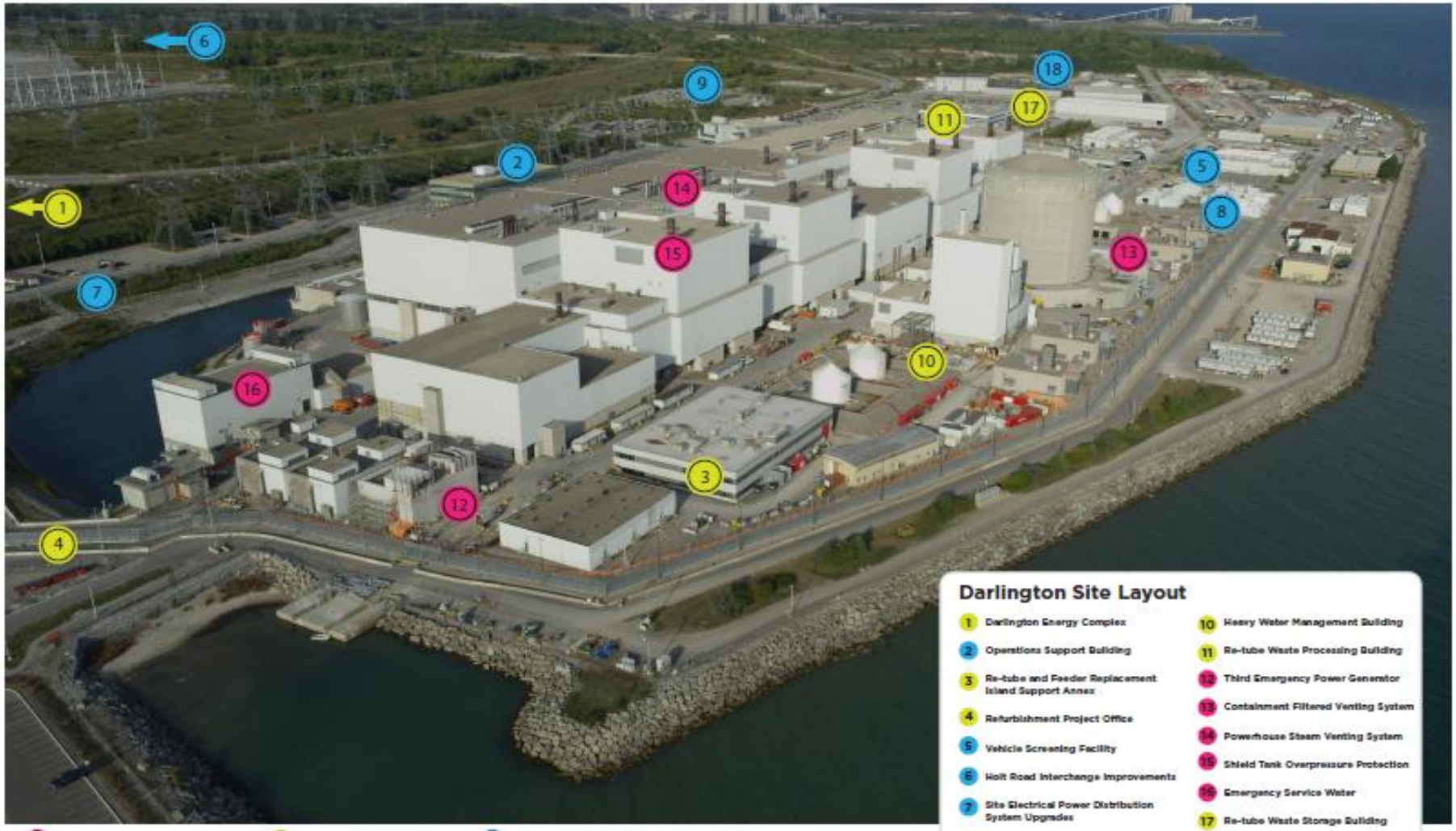
- Preparation for component removal underway
  - **Ahead of schedule and on budget**

Well above industry – Focus on Zero injuries

- **COST: On Budget**
- **SCHEDULE: Ahead**
- **QUALITY: Excellent**
- **ENVIRONMENT: Excellent**

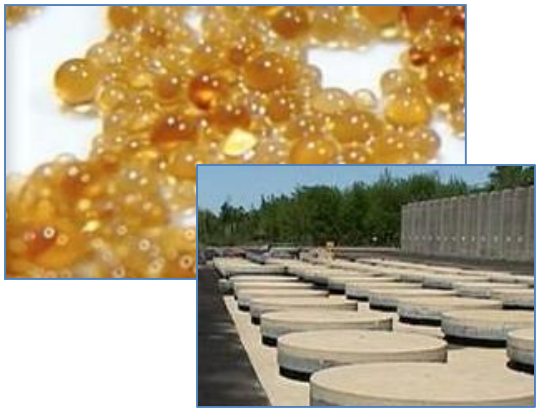
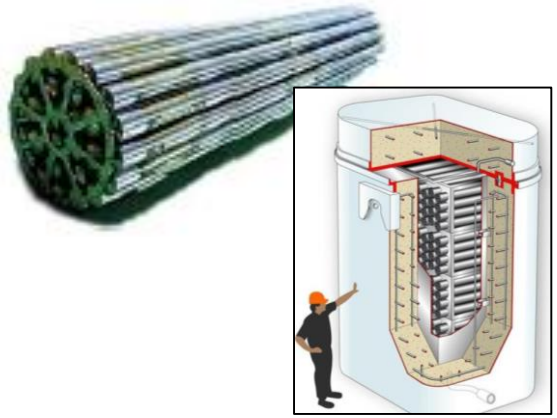


Infrastructure and Safety Projects



ONTARIO POWER GENERATION

Three Types of Nuclear Waste

Low-level	Intermediate-level	High-level
Clothing, mops, rags, paper, plastic, wood	**Resins, filters, used reactor components**	**Used fuel rods (spent uranium)**
		
Radioactive for about 100 to 300 years	Radioactive for about 100,000 years	Radioactive for about 1 million years
Destined for OPG's proposed DGR at the Bruce site		Destined for a separate repository

Darlington Refurbishment Waste

Unit 2 Feeder Removal at the Darlington site.

Retube waste is related to fuel channel components such as pressure tubes, annulus spacers, calandria tubes, inboard end fittings, shield plugs and garter springs.

Operational Low and Intermediate Level Waste is waste created to support refurbishment such as mop heads, clothing, contaminated tooling, resins and feeder pipes.

Estimated total volume is 3,400 m^3 of retube waste and 20,000 m^3 of operational waste.

Refurbishment Waste Storage

- Purpose built building to store Intermediate level waste
- Stored on an interim basis – eventual permanent disposal off-site
- Located on east side of the site

Refurbishment Waste Processing

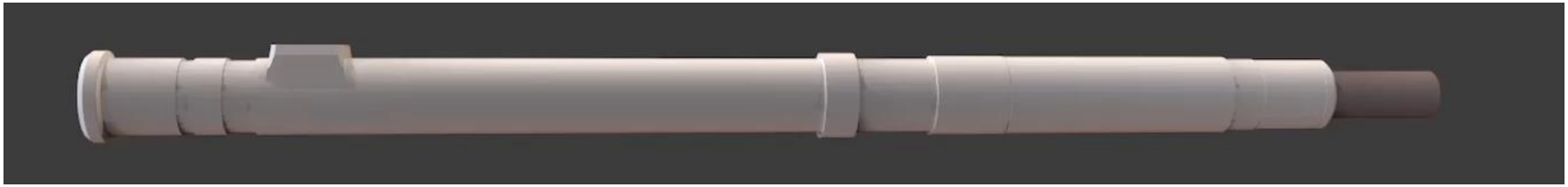
- a state-of-the-art waste system to process and package low and intermediate-level refurbishment waste
- Transporting and filling of specially designed containers
- Volume reduction processes to reduce storage requirements

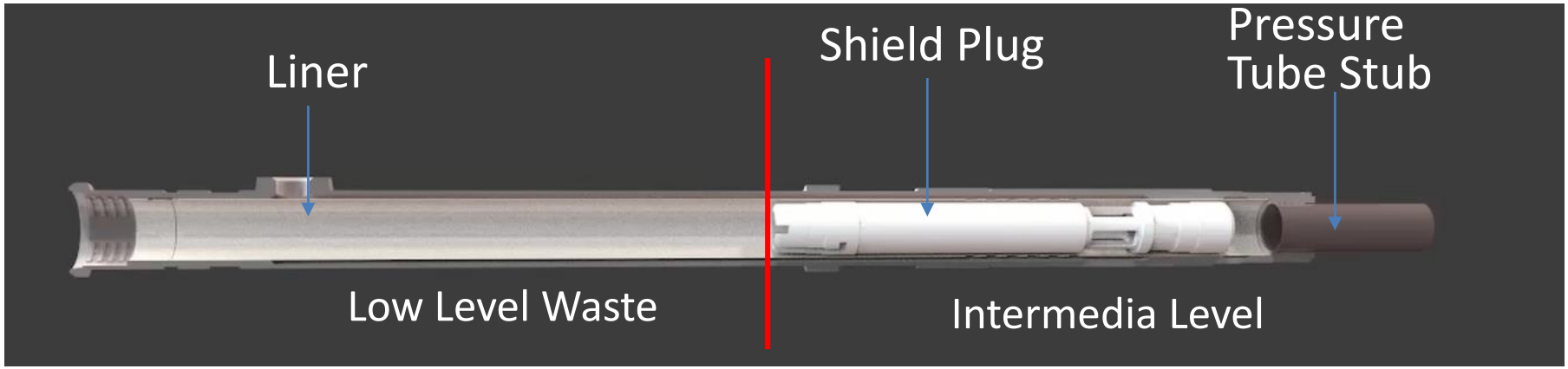
End Fitting Flask for movement

- End fittings placed in flask inside the reactor building
- Flask moves along designated route to Retube Waste Processing Building
- 30+ shipments per day

End Fitting Assembly

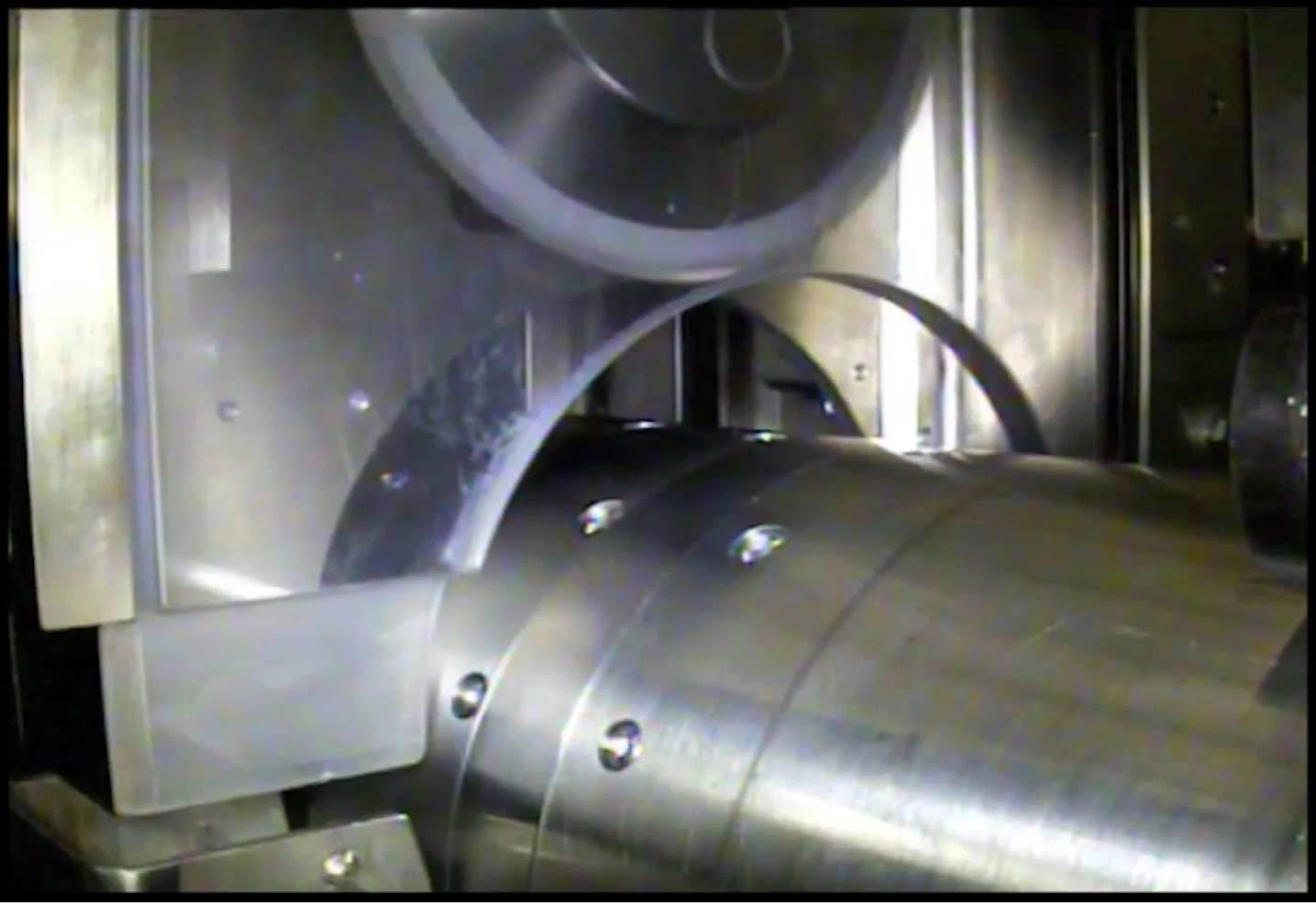
- Full End Fitting assembly will be removed from calandria
- Cut in two - separate low and intermediate level waste





Cutting of End Fitting Assembly

Actual SCADA video

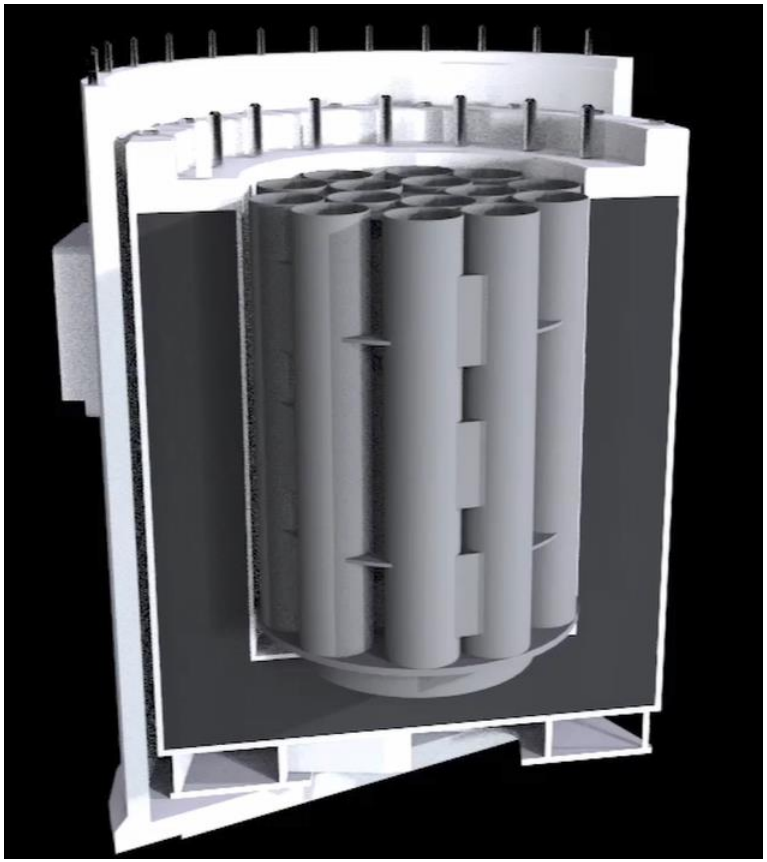


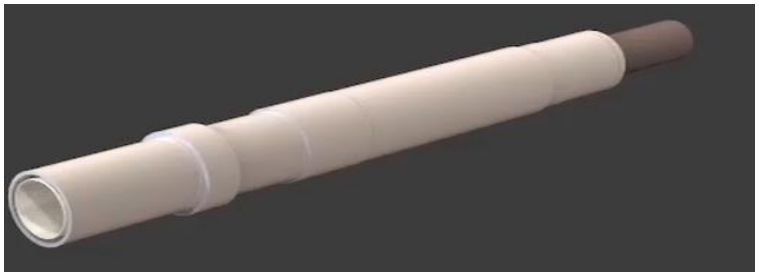
End fitting placed in storage bin

Outboard portion of the end fitting (low level waste) placed and stored in low level storage bins for transport and interim storage

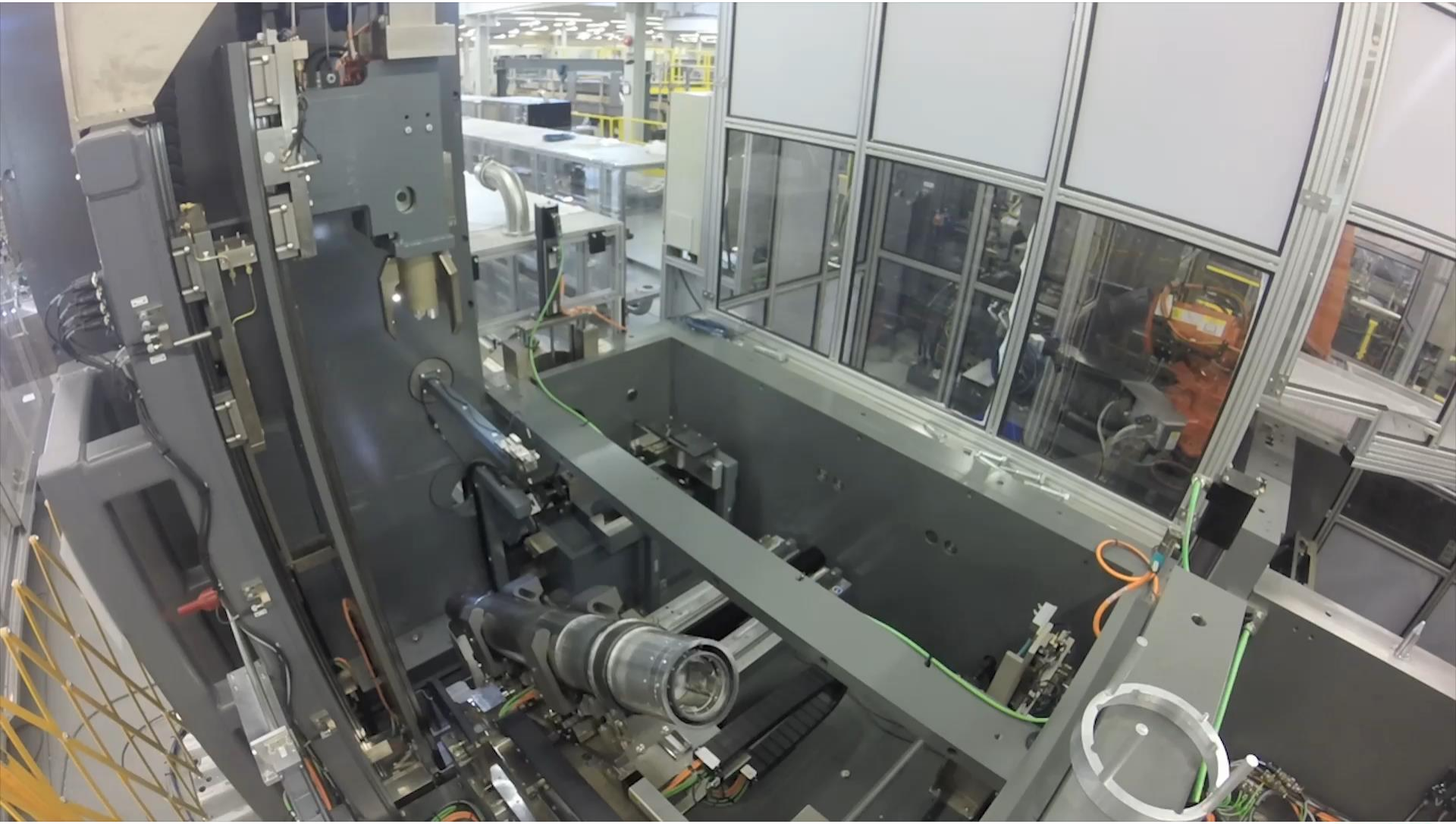
End Fitting Storage

- Inboard End Fitting (intermediate level waste) storage container
- Placed in shielded container – stored at site



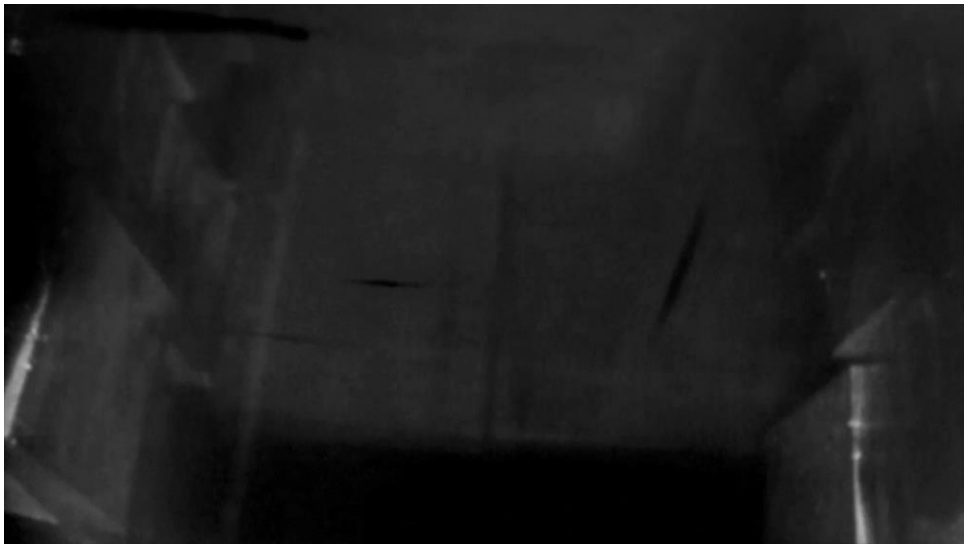


End fitting placed in DSO

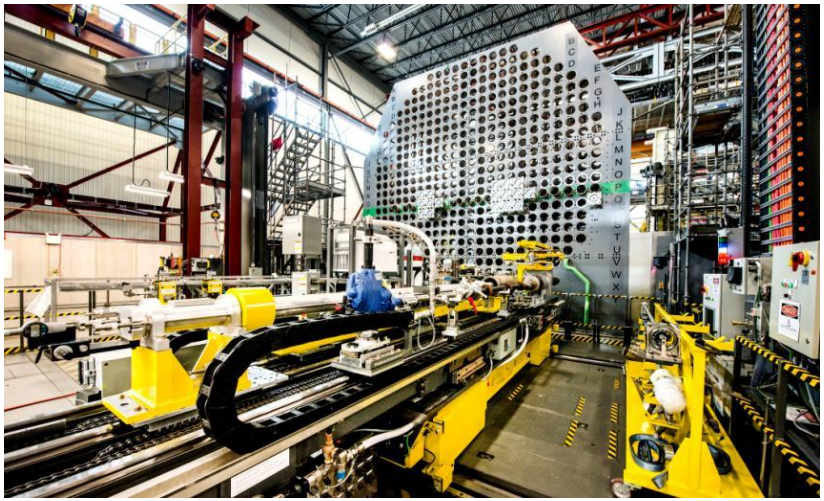


Pressure Tubes/Calandria Tubes

- transported to the Retube Waste Processing Building for volume reduction
- Intermediate level waste – crushed and chipped in two small 2” coupons for volume reduction and storage



Questions?



To learn more about Canada's Largest Clean Energy Project visit: www.opg.com and subscribe to the Darlington Refurbishment Newsletter

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