



NUCLEAR AMRC

Waste Container Integrated Innovation Team (IIT)

IGD-TP 7th Exchange Forum
Córdoba, Spain

25-26 October 2016

Agenda

1. Background
2. The Challenge
3. The Plan
4. Case Study
5. Next Steps

Waste Container IIT

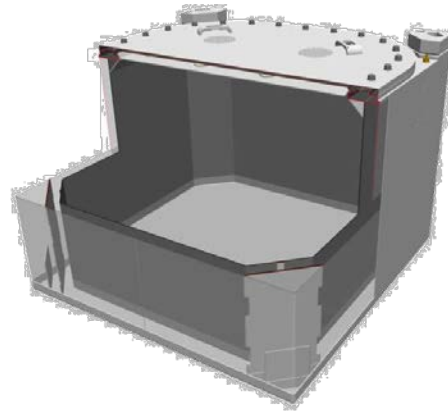
1. Background

1. Background



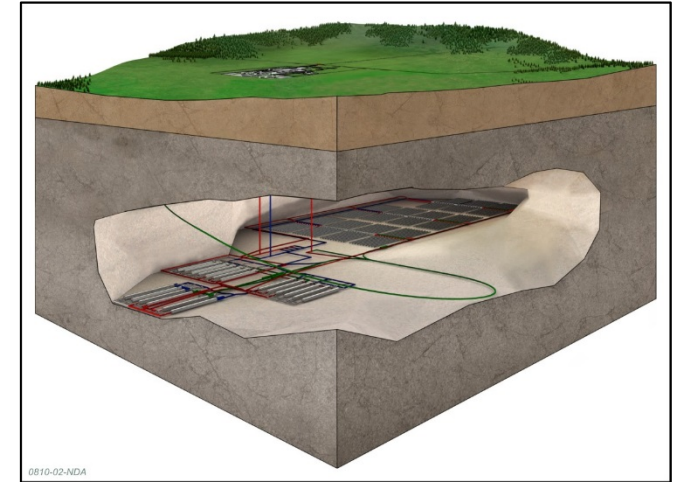
Sellafield

100,000 packages



Waste Containers

3m³ Duplex SS Box
Avg. £40,000 each



UK Geological Disposal Facility

= £4 billion (+ other UK sites...)

1. Background

Integrated Innovation Teams (IITS)

1. Characterisation
2. Waste Treatment
3. Waste Encapsulation
- 4. Waste Containers**
5. Monitoring and Inspection
6. Post Operational Clean Out (POCO)
7. Beta/gamma dismantling
8. Alpha dismantling
9. Long-term Care and Maintenance (LC&M)

Cost Reduction
< £125 billion



Sellafeld Ltd Technical Innovation Strategy

1. Background

Scope

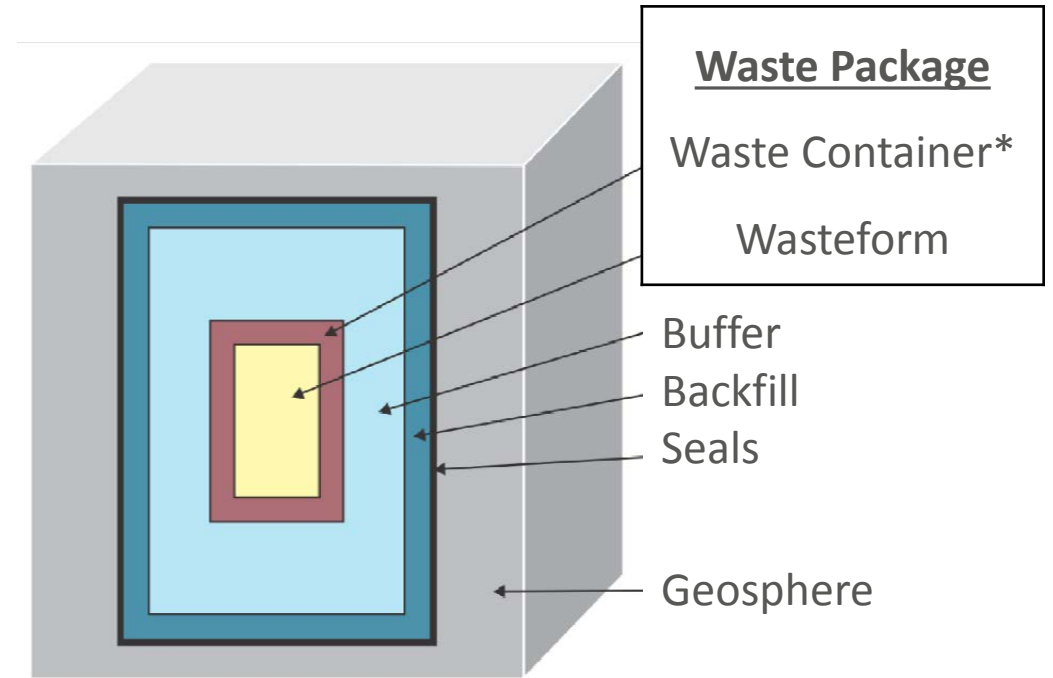
HAW = ILW + PCM

Higher Activity Waste (HAW)

Intermediate Level Waste (ILW)

Plutonium Contaminated Material (PCM)

Waste Container*



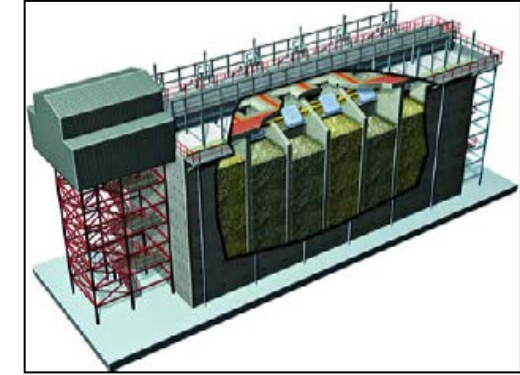
Engineered Barrier System

Waste Container IIT

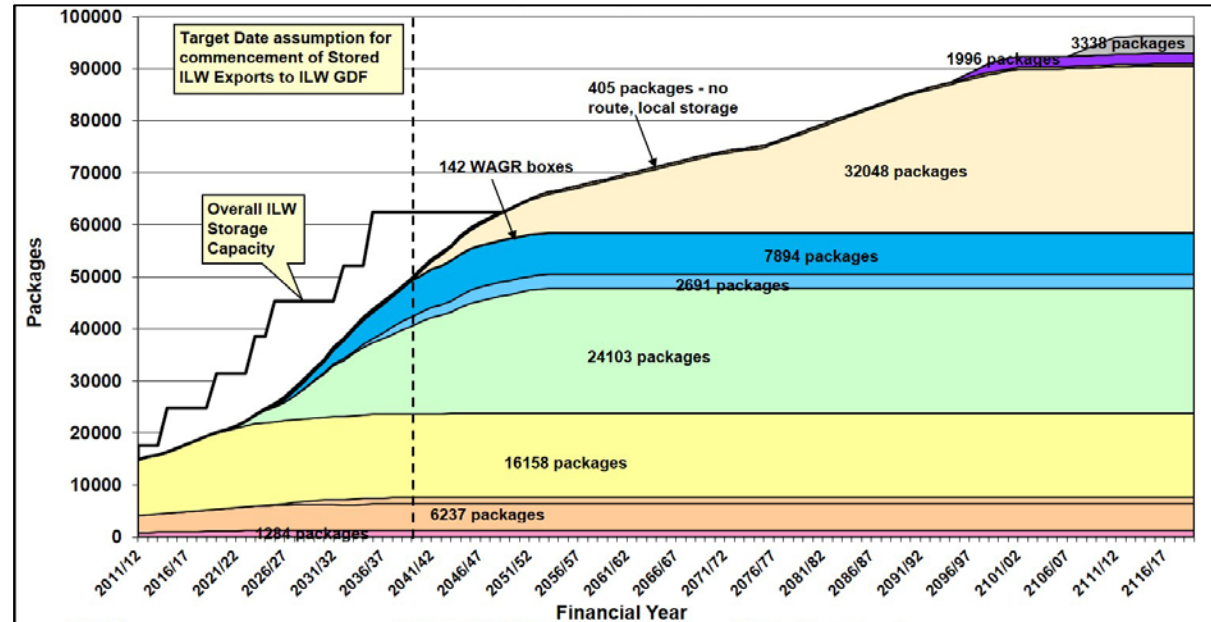
2. The Challenge

2. The Challenge

- Many waste streams
- Challenging waste forms
- Time constraints
- Funding pressure

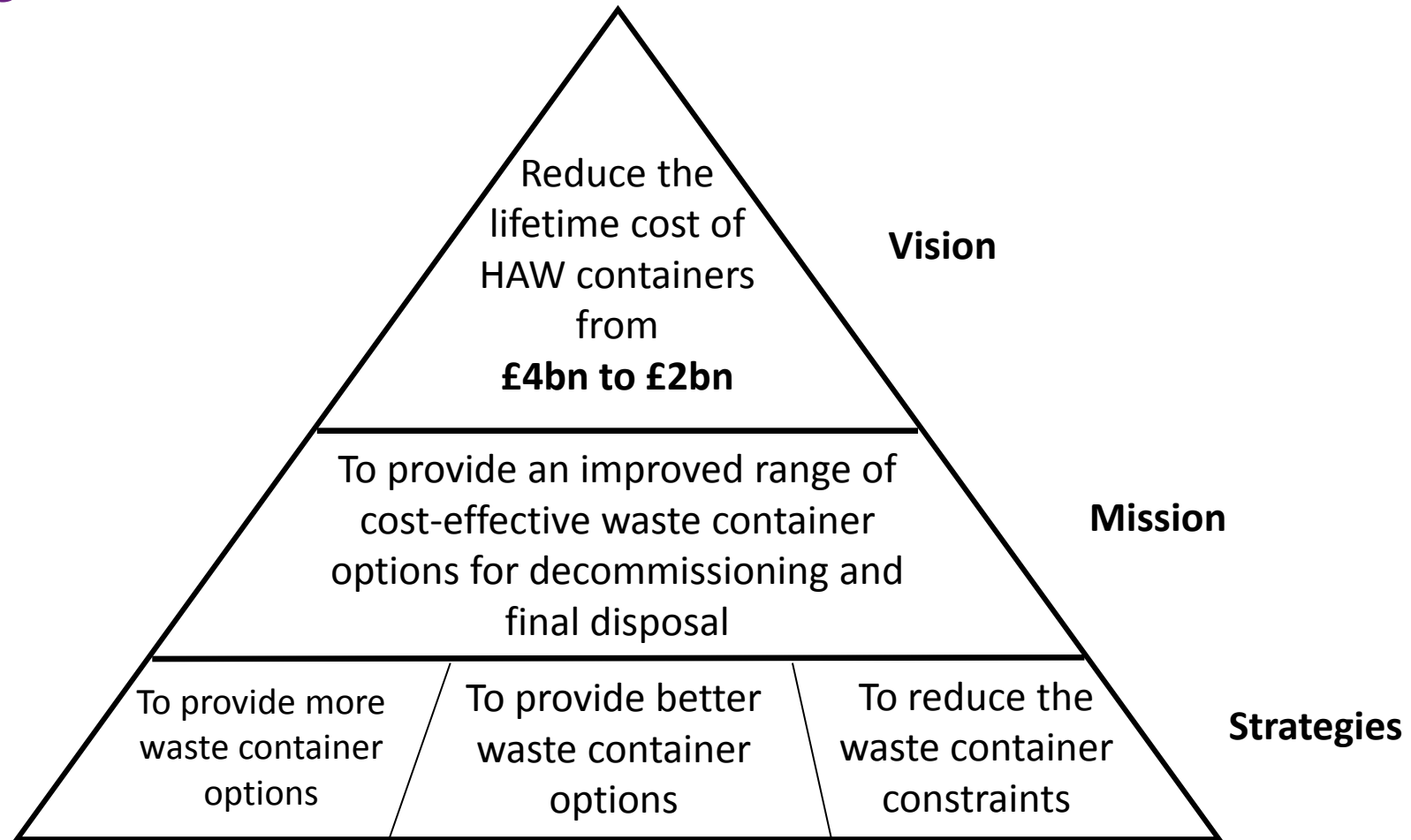


Legacy Ponds & Silos



Sellafield ILW Waste Arising's to 2120 (ex PCM)

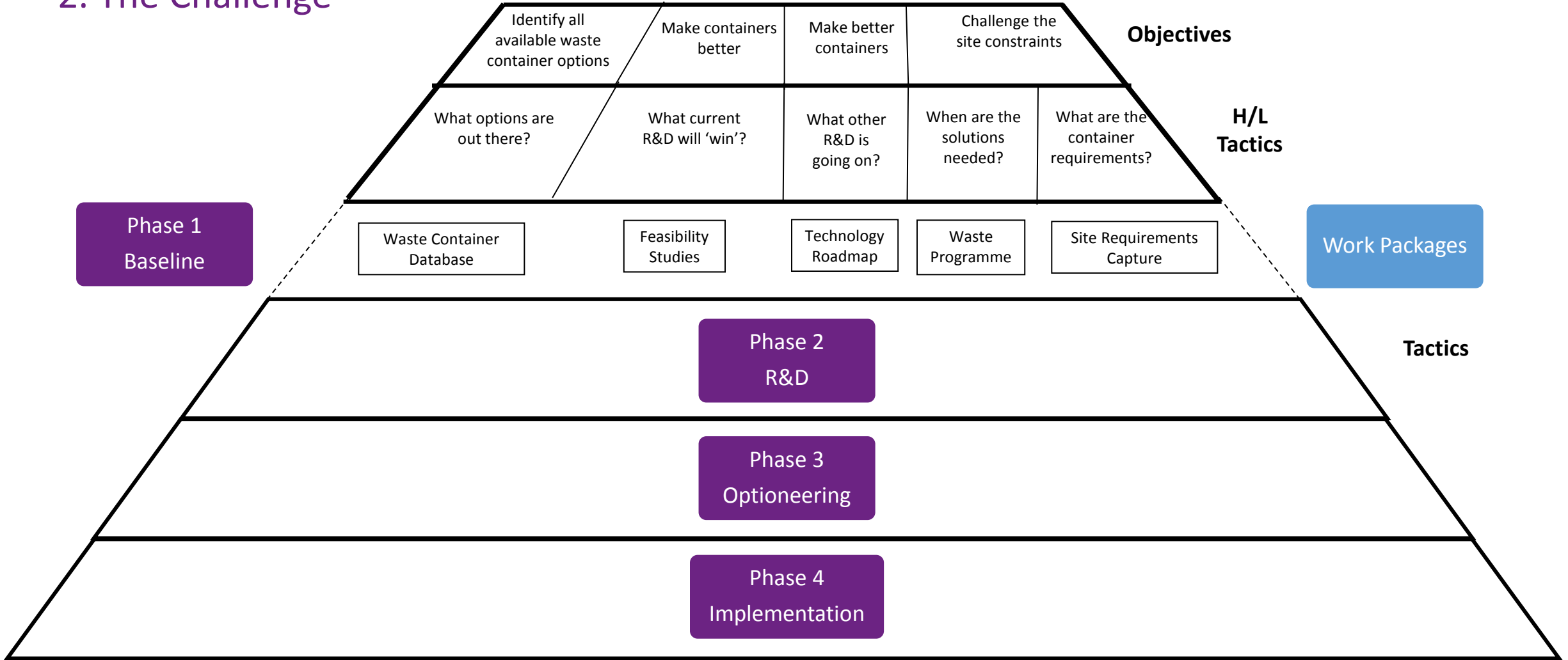
2. The Challenge



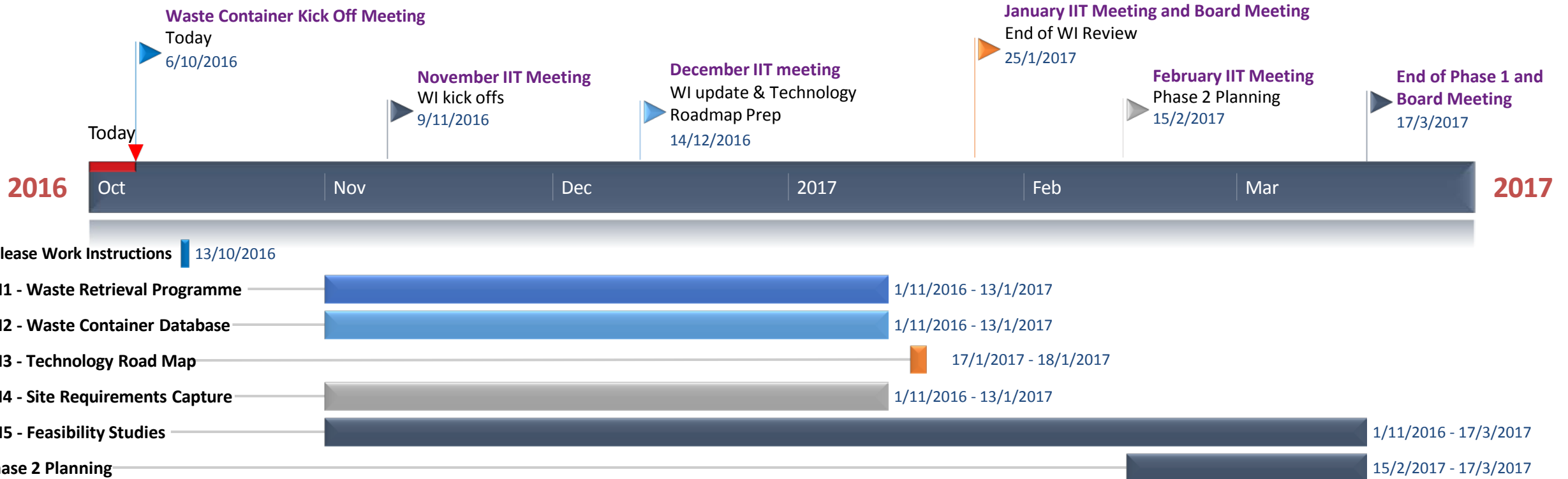
Waste Container IIT

3. The Plan

2. The Challenge



3. The Plan



Waste Container IIT

4. Case Study

4. Case Study



Case study



Slashing the cost of waste box manufacture for **Sellafield**

Project NI255: 3m³ box manufacturing improvements

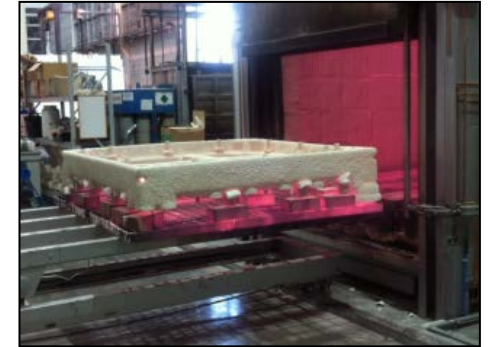
<http://namrc.co.uk/wp-content/uploads/Sellafield-3m3-case-study.pdf>

4. Case Study

Aim	Reduce the overall manufacturing cost by 25%
Scope	Casting Welding Inspection
Start	June 2014
Finish	February 2017
Technology Readiness Level (TRL)	5 (1-9)



1. Pattern Manufacture



2. Investment Manufacture



3. Pouring & Solidification



4. Heat Treatment

**Casting of the Top Flange
Replicast®**

4. Case Study

Aim	Reduce the overall manufacturing cost by 25%
Scope	Casting Welding Inspection
Start	June 2014
Finish	February 2017
Technology Readiness Level (TRL)	5 (1-9)

Criteria	Rating						
	MAG	CMT	K-TIG	PAW	TOPTIG	LASER	
						Disc	Fibre
Capital Cost	Low	Lower	Higher	Lowest	High	Highest	
Potential for producing high quality welds	Good	Medium	Good	Good	Poor	Medium/poor	
Processing speed	Medium	Medium	High	Lowest	Low	Highest	
Integration with wire feeding system	Good	Good	Medium	Medium	Good	Medium	
Integration with robot	Good	Good	Medium	Good	Good	Good	
Joint preparation	Medium	Medium	Good	Good	Poor	Medium	
Distortion	Low	Low	Medium	Medium	Highest	Lowest	
Require root gap	No	No	No	No	Yes	No	
Ferrite content	42.2-60.6	45.0-59.6	48.4-59.2	49.8-58.2	45.4-56.8	49.4-75.0	48.6-56.2

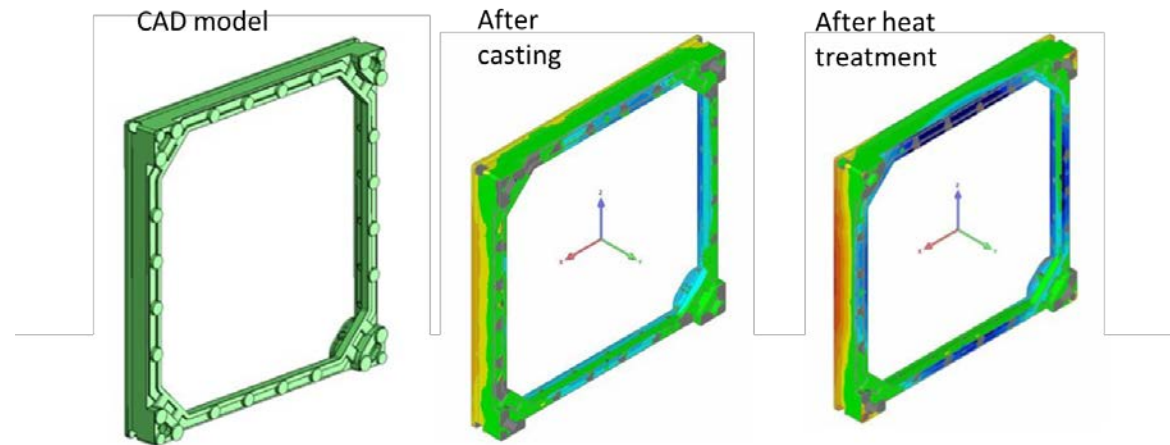
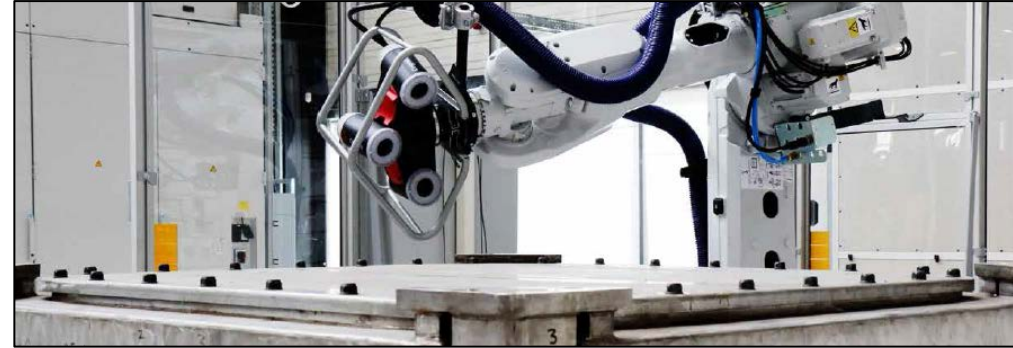
Welding Technique Optioneering



Automated Welding

4. Case Study

Aim	Reduce the overall manufacturing cost by 25%
Scope	Casting Welding Inspection
Start	June 2014
Finish	February 2017
Technology Readiness Level (TRL)	5 (1-9)



Automated Inspection

Waste Container IIT

5. Next Steps

5. Next Steps

- International Collaboration
- Share: challenges, ideas, capabilities, technologies.
- Technology Roadmap
- Research & Develop Solutions
- Leverage Funding





NUCLEAR AMRC

Waste Container Integrated Innovation Team (IIT)

Jack Hardy

email: jack.hardy@namrc.co.uk

Tel: 0114 222 9900 Mob: 07860 179 589