



COSTAIN

Plasma Arc Technology

MEETING NATIONAL NEEDS

IGD-TP, London, 4 November 2015

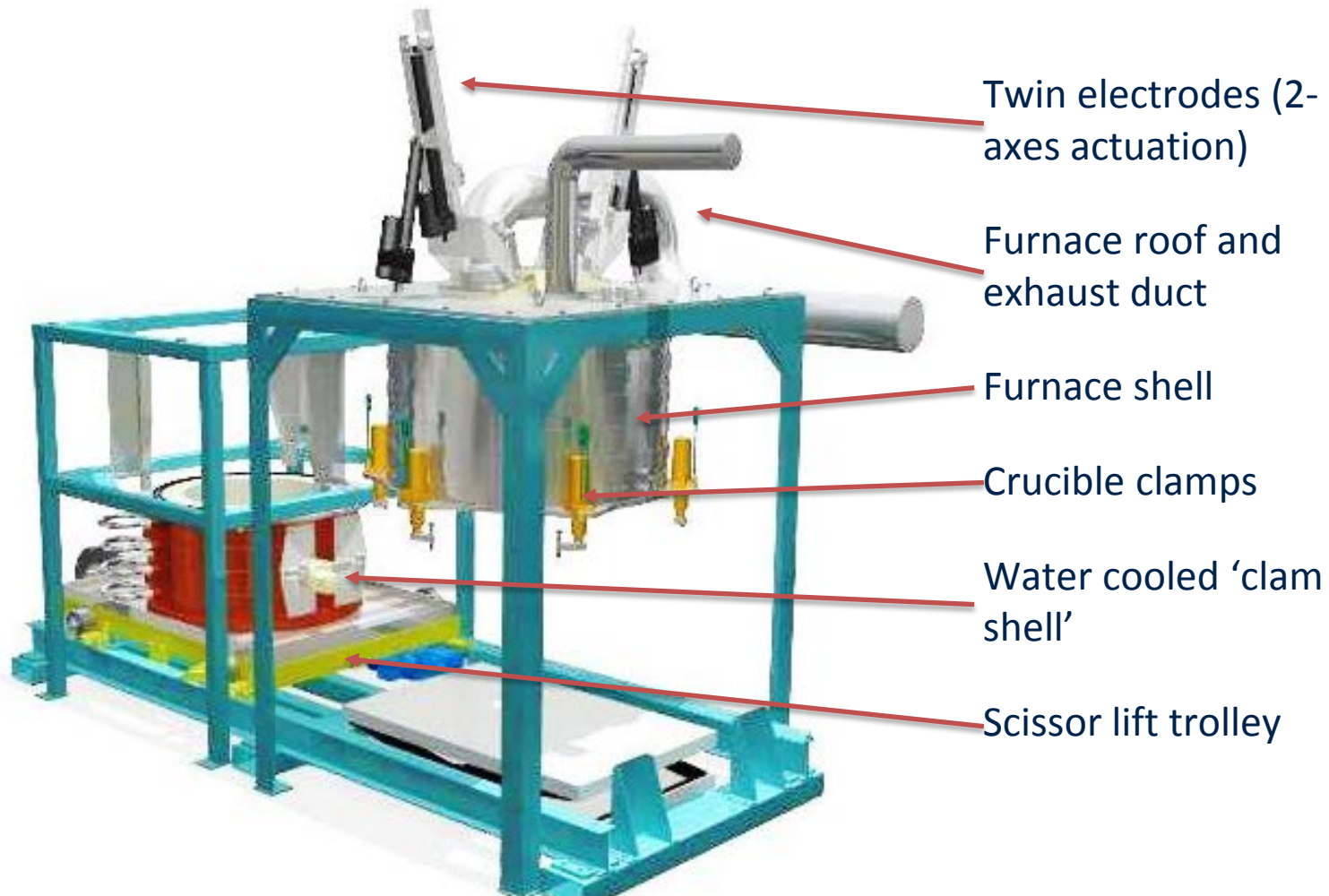




- Innovate UK funded collaborative R&D project
 - Pairs SME with large business to bring a technology into the market
- Project Partners – Costain, Tetronics International and others
- Demonstration of nuclear-ready operations
 - Concept Design
 - Safety Case
 - Demonstration Plant

- Magnox pond sludge
- SIXEP sand/clino
 - High radiation - shielding and remote operation
 - Current priority
 - Natural organics
 - Continuity of development
- Future decommissioning wastes
 - High contamination
 - Very large volume arisings in the future
 - Heterogeneity - large metal items
 - Synthetic organics

Plasma Furnace Detail





Feeding of sludges
and fluxes

Twin electrodes

Plant cell (cage)

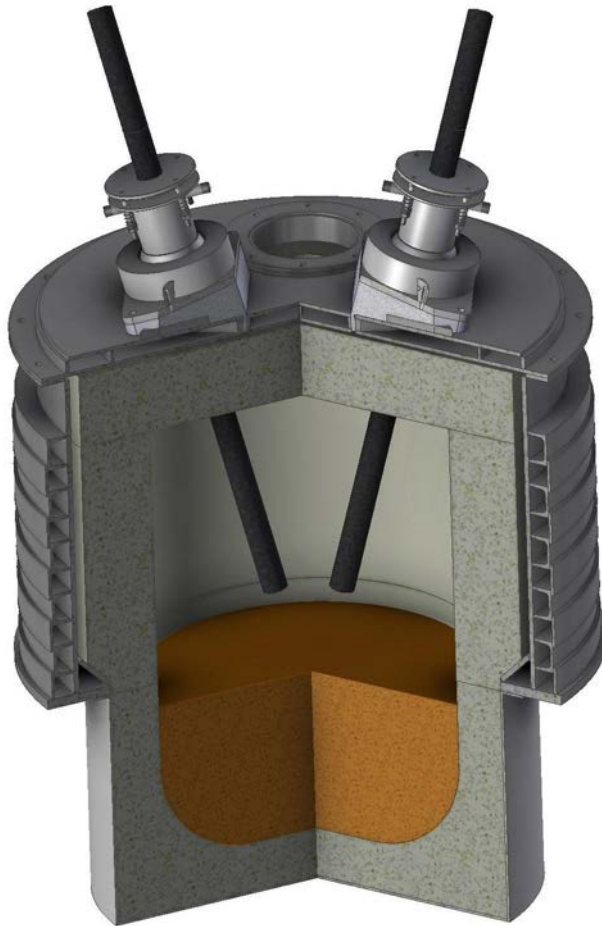
Plasma furnace

Water-cooled 'clam
shell' and base

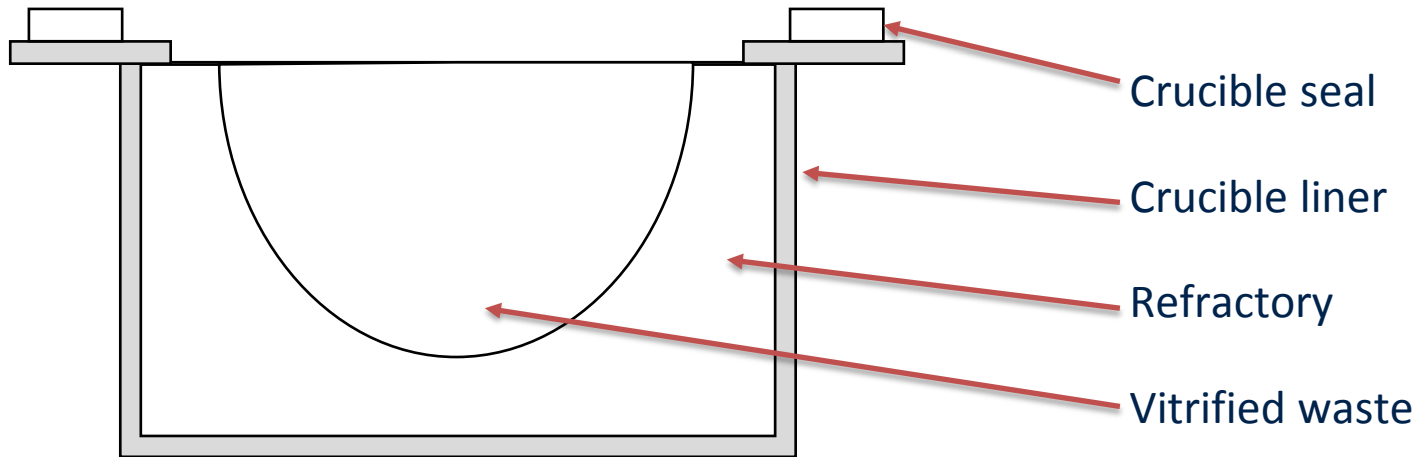
Remote loading and
unloading of
crucible

Simulated final
waste container

The Developed Furnace



- From Engineering Schedule
 - Crucible Clamps and Seal
 - Electrode Clamps and Seal
 - Replaceable roof refractory
 - Remote drives



Results of Trials



~60% bulk waste volume reduction

>95% of caesium retained in wasteform (single pass)

Uniform, unreactive monolith



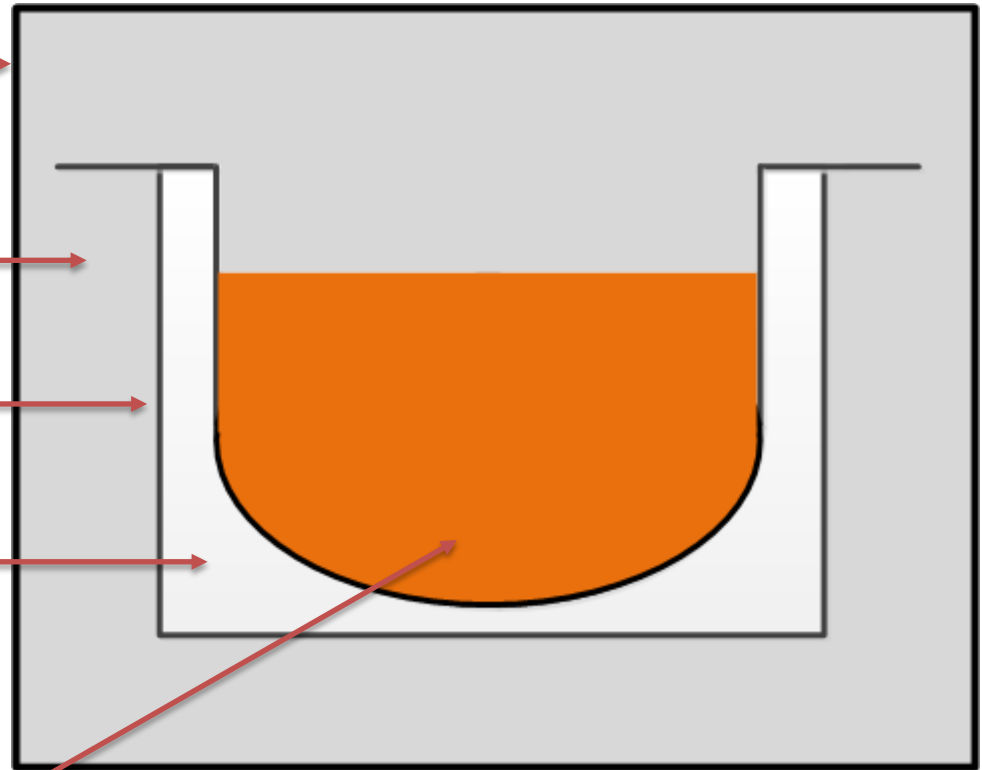
Single-skinned waste
container

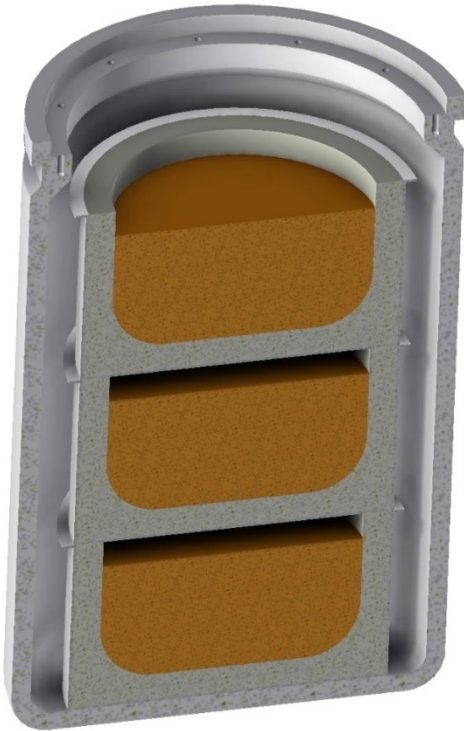
Grout

Crucible liner

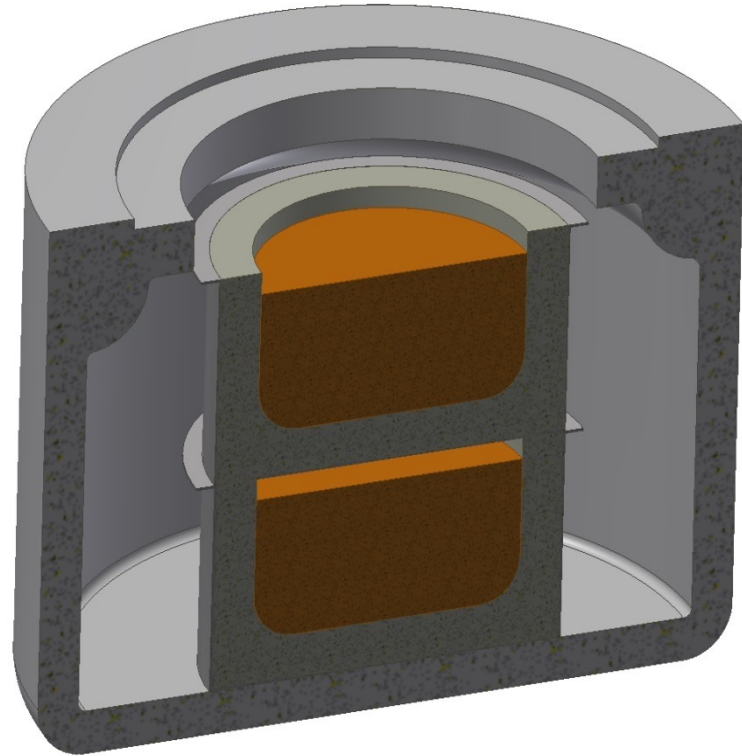
Refractory

Vitrified waste





500 litre drum



3m³ drum



- Wastes with immobilisation issues
 - Sludges
 - Containers
 - Particles
 - Oils and greases
- Wastes which are reactive during processing
- Wastes which otherwise remain reactive during storage

Future work



- This project value ~£1.8M - a lot of this funded by project partners
- Next stage will be much more expensive.
- Involvement in Integrated Project Team
- Commercial Development on lower activity wastes
- Graphite Gasification with UoM, MDecon and Tetronics

Thankyou