RV Nozzle Clad Deposited by Underwater Laser Beam Welding (ULBW)

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Chief Engineer
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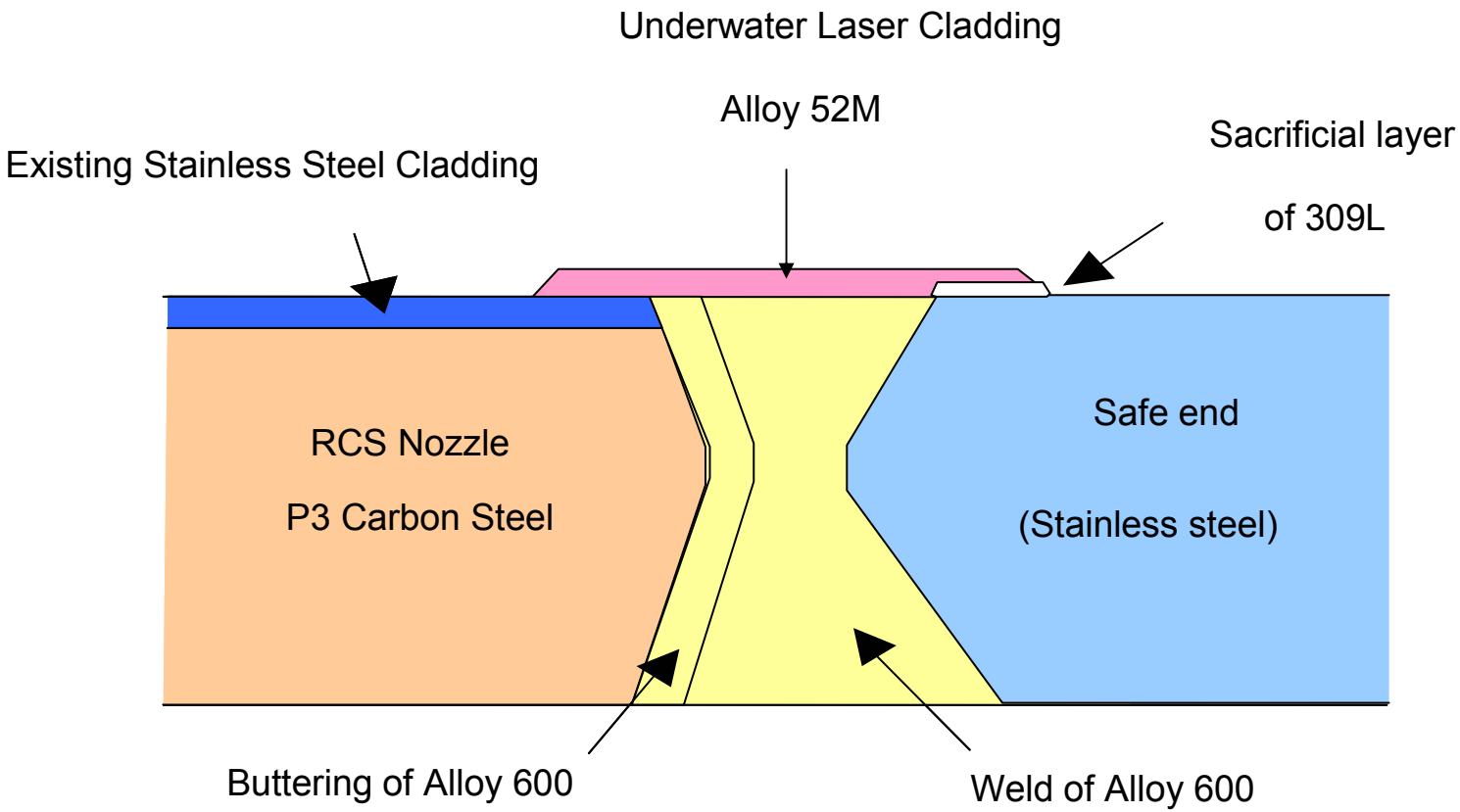
Typical PWSCC Mitigative Clad



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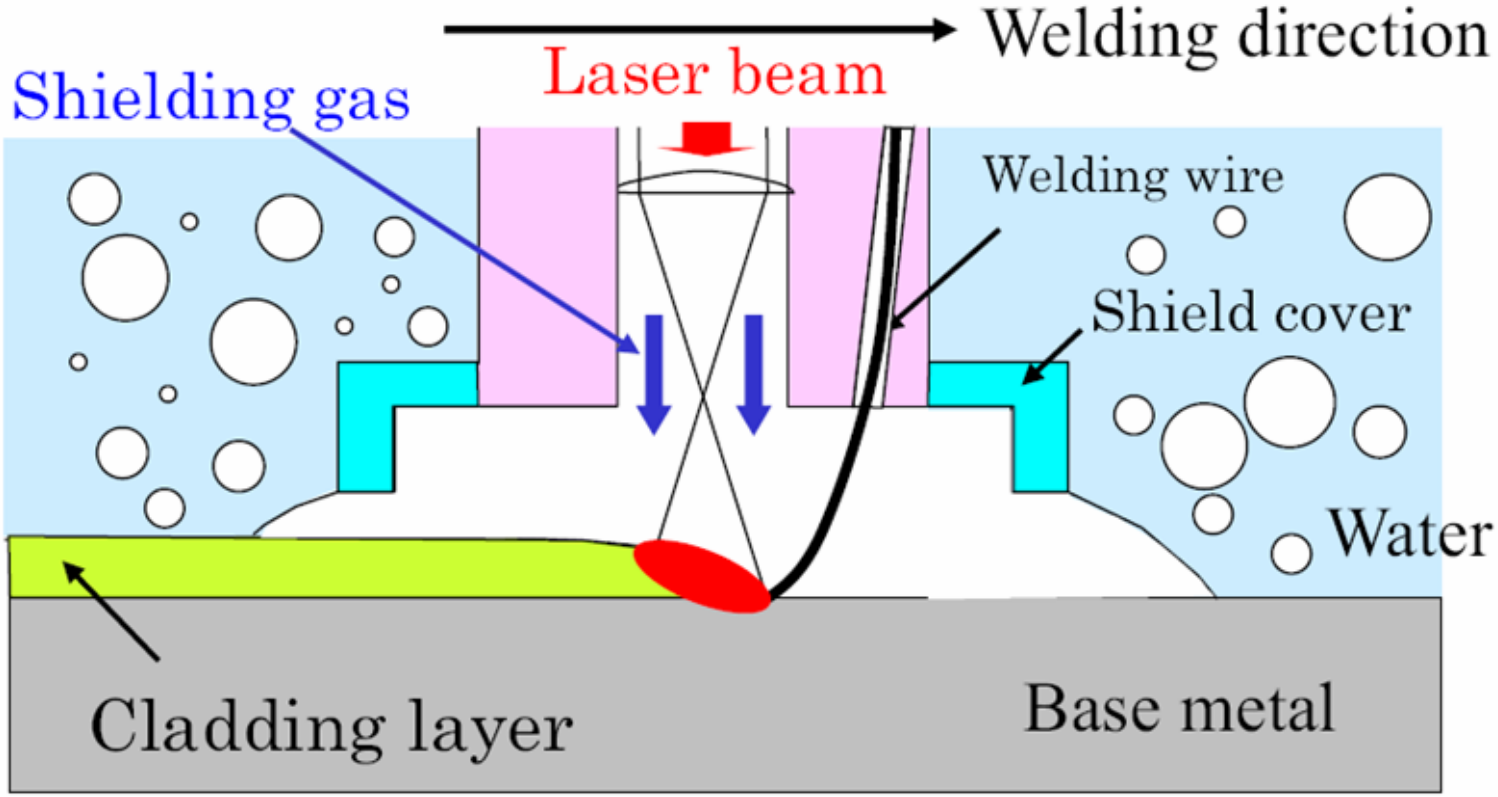
ULBW – How it works



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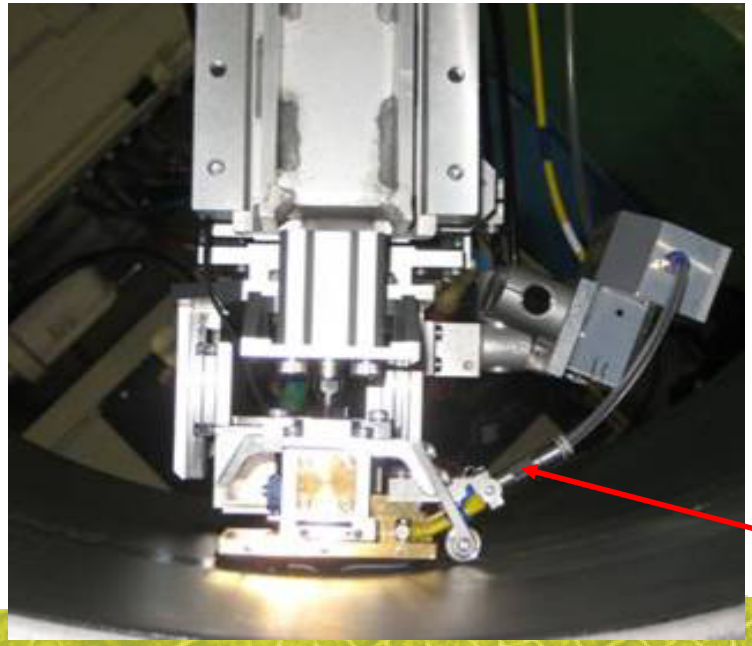
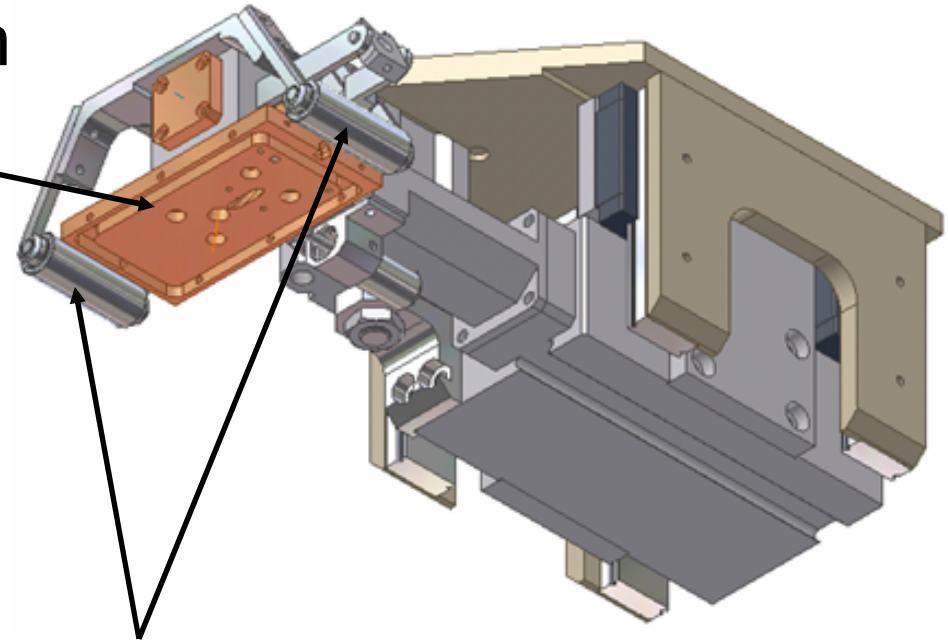
ULBW Welding Head

Water Evacuation Chamber





Contact Rollers

Wire Nozzle

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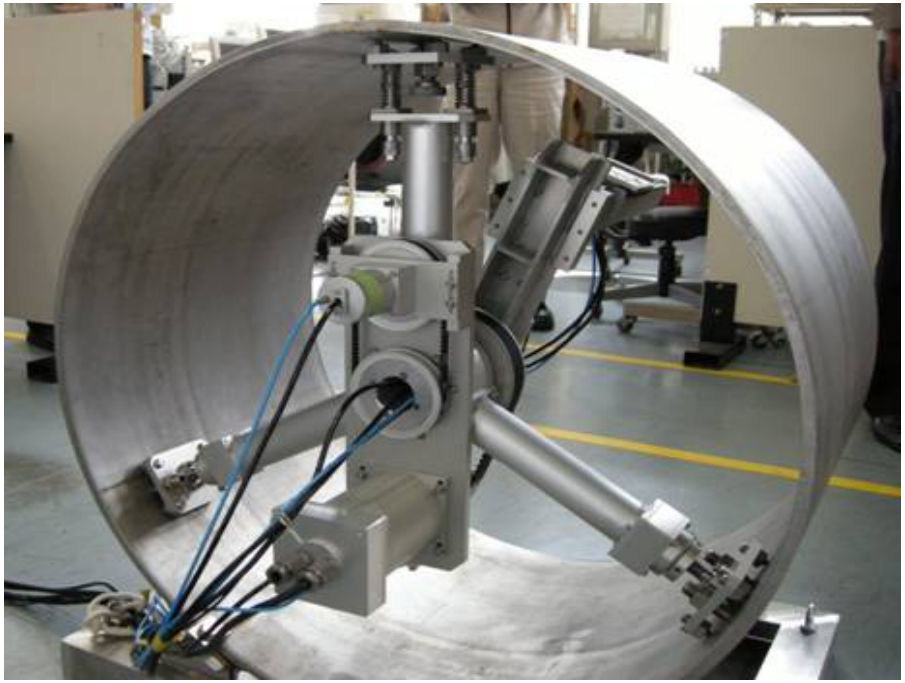
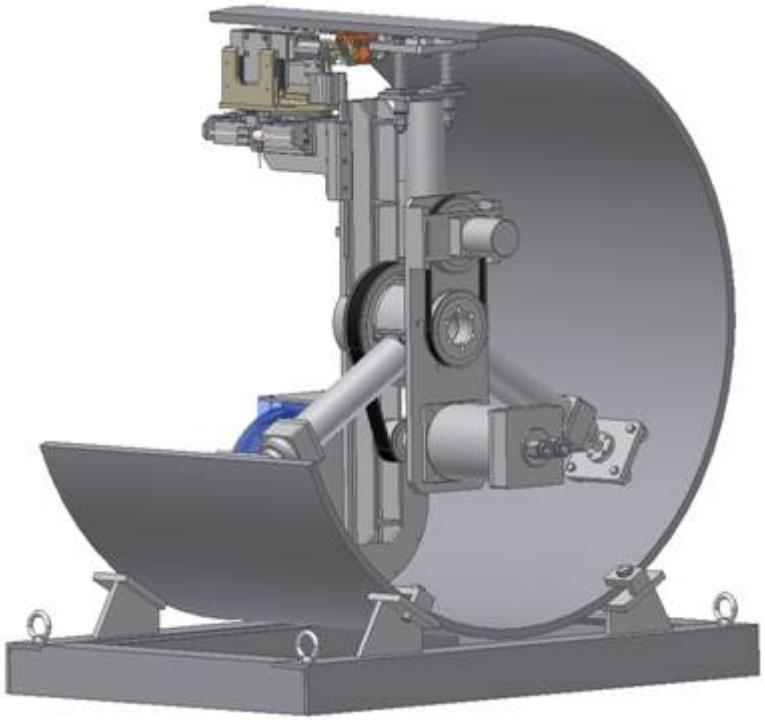
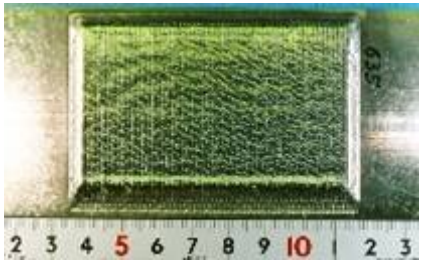
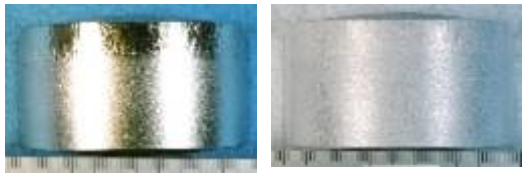
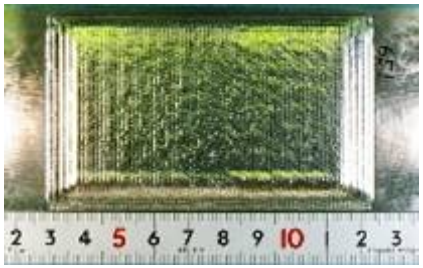
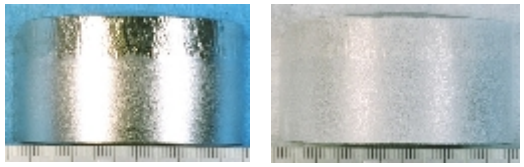
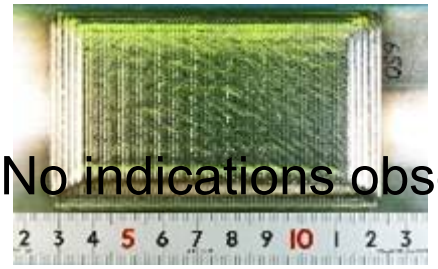
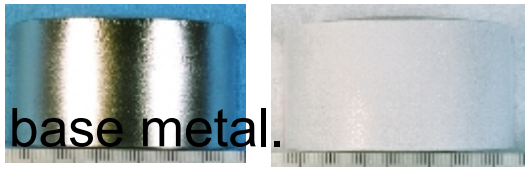
ULBW Delivery System





Weldability - Alloy 52 on RPV Nozzle Base Metals

Base metal	Bead appearance	Penetrant test	Side bend test
Alloy 600 Weld			
308L Weld			
316L Weld			

No indications observed on any tested base metal.

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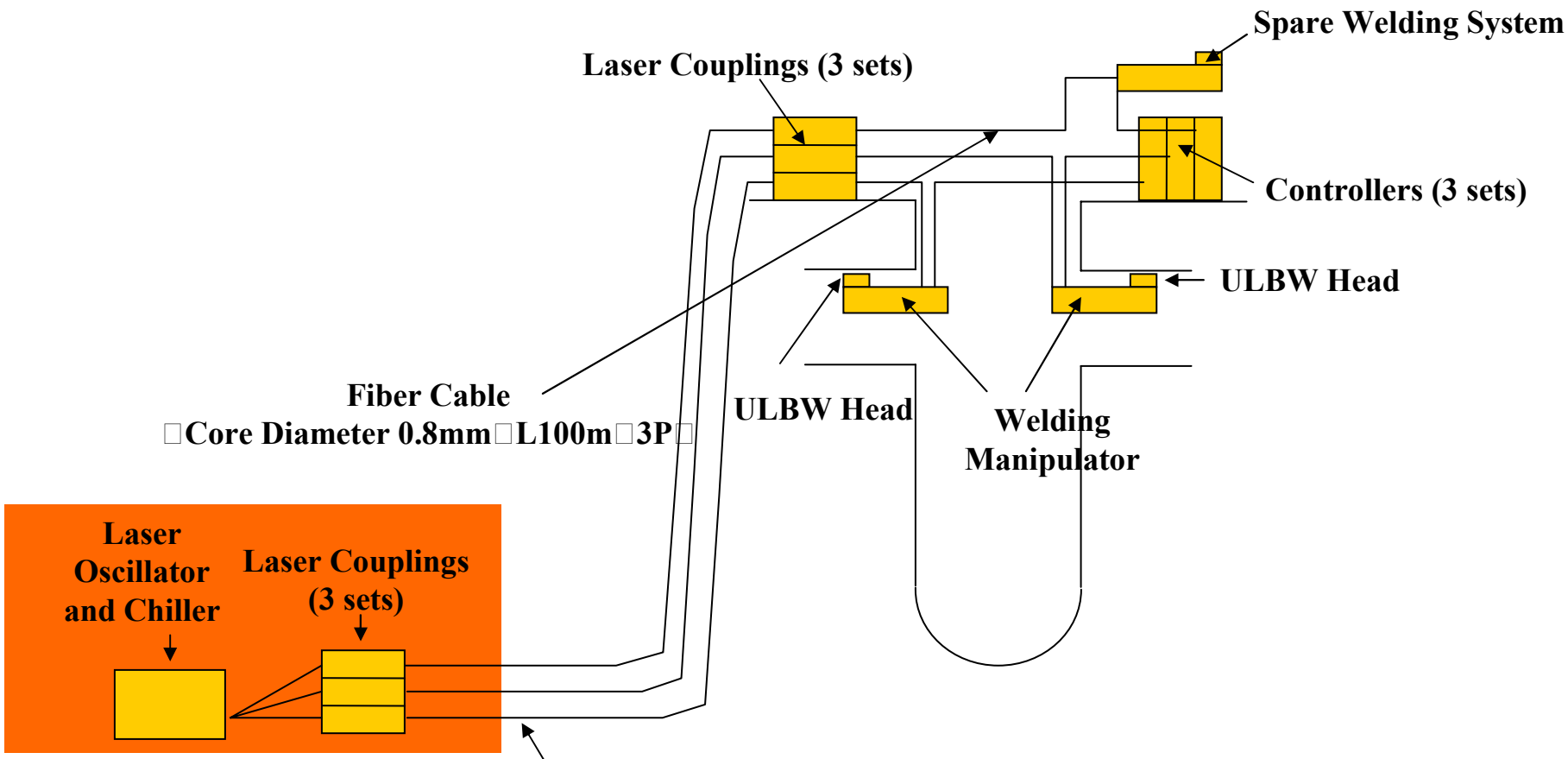
ASME Code Case Development

Applicable Code Cases -

- Inlay & Cladding for Mitigation (CC BC071682)
  - Code Case will permit both inlay and clad
  - Code Case will permit ULBW for mitigation
- ULBW temper bead & P3 materials (CC XXX)
  - Code Case will permit ULBW to be used for temper bead repair on P3 materials
- Pre-service & In-service Inspections (CC N770)
  - Establishes pre-service and in-service inspection intervals & requirements
- ECT Requirements for ID (CC N773)

ASME Code Process is time consuming. May need a relief request for first application if Code Cases not yet approved

Basic Equipment Set-up (Field)



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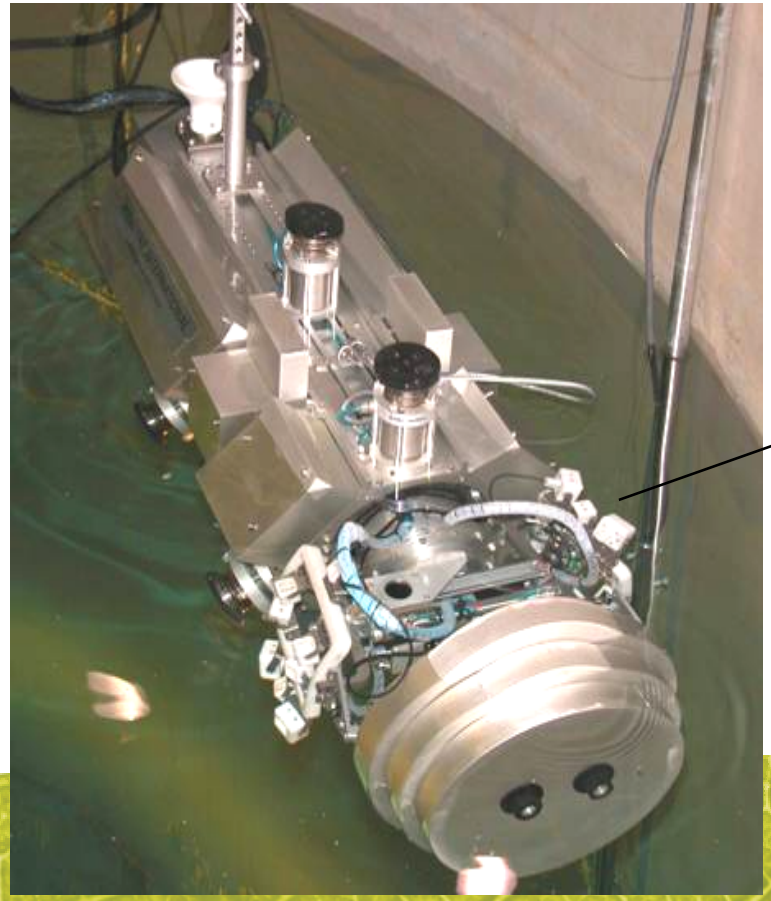
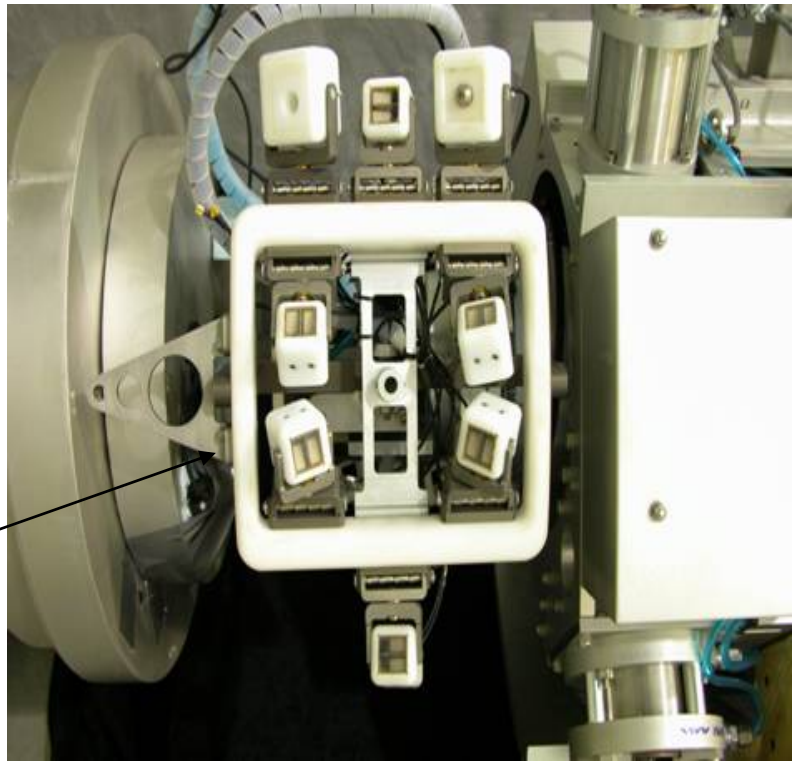
Hot Leg Inspection Without Core Barrel Removal – Inspection Tooling SQUID

UT and ECT inspection probes





Inspection sled

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