

# UNITED STATES HIGH PERFORMANCE RESEARCH REACTOR Fuel Development Plate Checker Project

## Program Objective:

The USHPRR Program aims to eliminate more than 200 kg of HEU from commerce annually by converting five U.S. high performance research reactors and one associated critical assembly to LEU fuel. The Fuel Development Pillar is responsible for the development and qualification of a new high-density U-Mo alloy based fuel that will permit USHPRR conversions to LEU.

## Project Objective:

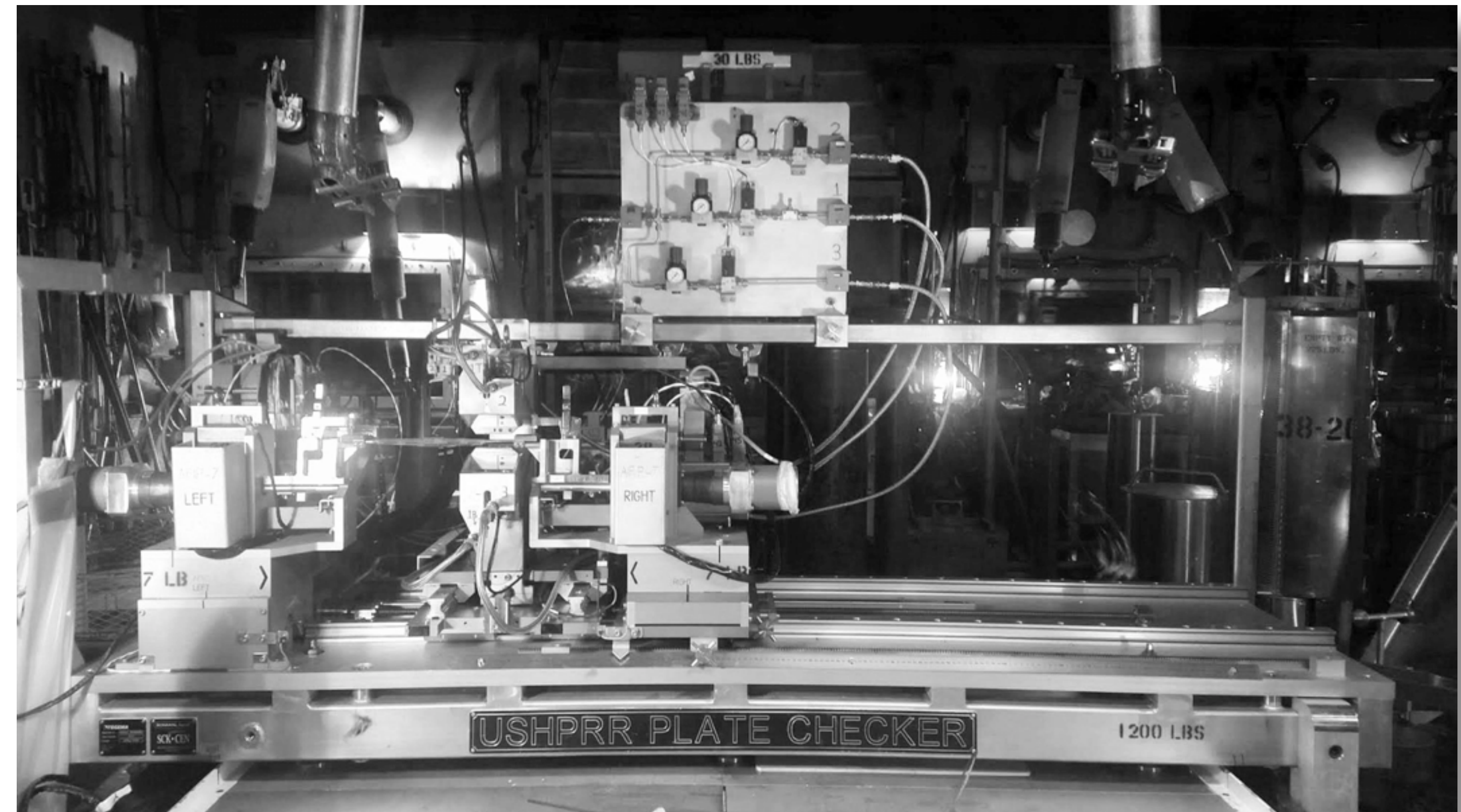
Design, fabricate and install hot cell equipment with the ability to obtain post irradiation examination information on oxide growth, swelling, and deformation of multiple research reactor fuel configurations.

This capability is unique to the DOE complex and international community. INL partnered with Belgian Nuclear Research Center (SCK-CEN) to utilize and improve upon an existing proven design.

The plate checker will be used by other nuclear programs at INL, including the Fuel Cycle Research & Development program. In March 2016, the first of four AFIP-7 plates was measured with the highest degree of resolution that has ever been taken on an irradiated fuel plate.

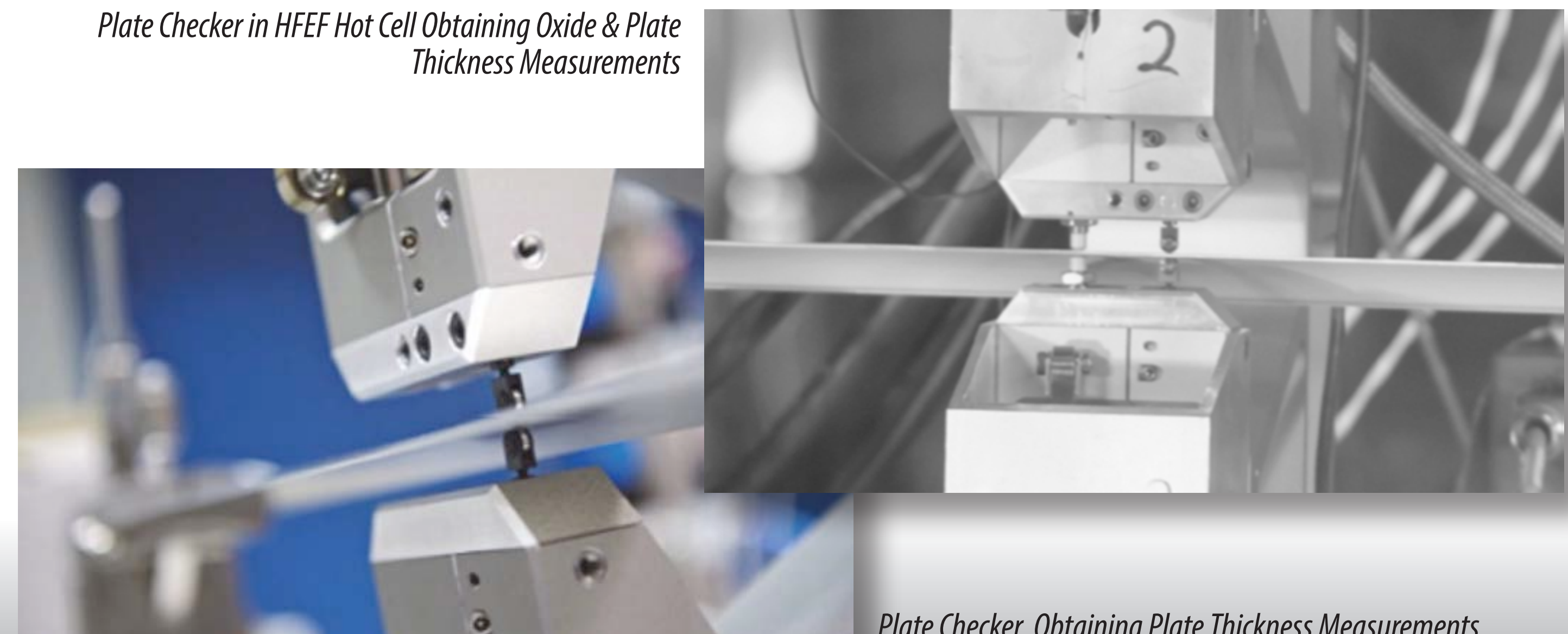
## USHPRR Plate Checker Dimensional Inspection

- Contact profilometry for plate thickness and high precision x-y-z-theta movement
- New measurement bench capable of very high resolution
  - 0.02 mm (0.0008 in) location accuracy
  - 3  $\mu$ m (0.0001 in) thickness accuracy
- Resulting data is used to calculate fuel swelling behavior



*Plate Checker in HFEF Hot Cell*

*Plate Checker in HFEF Hot Cell Obtaining Oxide & Plate Thickness Measurements*



*Plate Checker Obtaining Plate Thickness Measurements*