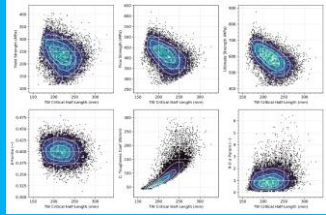# EPRI Project Overview

PFM Evaluation of PWR CASS Piping Components
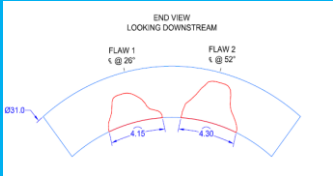
DJ Shim, *EPRI-MRP*

NRC Public Meeting
Rockville, MD
July 16, 2024

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EPRI's Major Focus Areas for CASS

Probabilistic Fracture Mechanics Evaluation of CASS PWR Piping Components
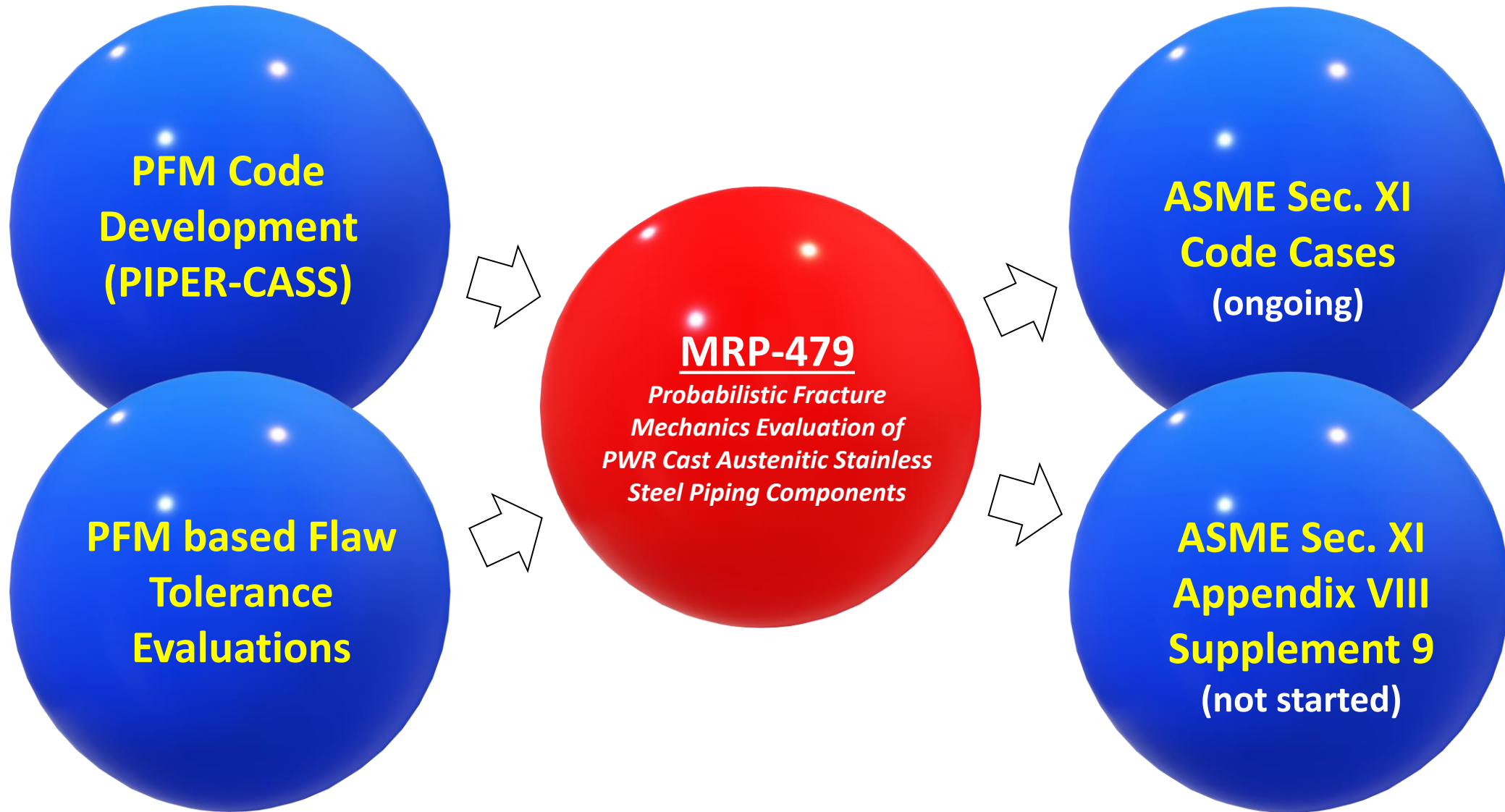

Flaw Fabrication for CASS Examinations

Background and Objectives

- Because of the CASS material microstructure, Ultrasonic Testing (UT) technology applied to CASS components is not currently capable of meeting the PDI qualification standards that have been developed for other piping materials, particularly with regards to:

  - Detection of axial flaws and

  - Depth-sizing of circumferential flaws

- In addition, thermal embrittlement of aged CASS material results in degraded material toughness, reducing acceptable flaw sizes

- In 2019, EPRI began a project using probabilistic fracture mechanics (PFM) to evaluate the effect of these limitations

  - Work to support development of a Supplement 9 to ASME Boiler and Pressure Vessel, Section XI, Appendix VIII and alternatives to Section XI, IWB-2500 inspection requirements for CASS piping components and potential changes to IWB-3514 and IWB-3640 flaw acceptance and flaw evaluation procedures

EPRI

Project Tasks

PFM Code Development (PIPER-CASS)

PFM based Flaw Tolerance Evaluations

MRP-479
Probabilistic Fracture Mechanics Evaluation of PWR Cast Austenitic Stainless Steel Piping Components

ASME Sec. XI Code Cases (ongoing)

ASME Sec. XI Appendix VIII Supplement 9 (not started)

NRC Engagements

- **Technical Meeting on PFM and NDE of CASS (Closed Meeting)**
  - August 22, 2023
  - Meeting summary (ML23234A136)
  - Provided update on development of PFM Code – PIPER-CASS
  - Discussed technical approach for PFM evaluations for axial and circumferential flaws
  - Update on EPRI NDE research on CASS

- **Industry / NRC Materials Technical Exchange Meeting**
  - June 26, 2024
  - EPRI presentation (ML24173A154)
  - High-level summary of MRP-479 and proposed Code Cases

- **Public Meeting (today)**
  - July 16, 2024
  - Discuss details of MRP-479
  - Discuss plans for proposed Code Cases
  - Update on EPRI NDE research on CASS

- **ASME Code Meetings**
  - Task and Working Groups
- **Conferences**
  - ASME PVP, International Symposium on Probabilistic Methodologies for Nuclear Applications

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