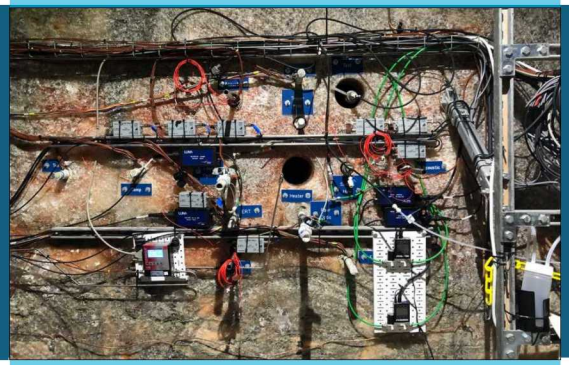
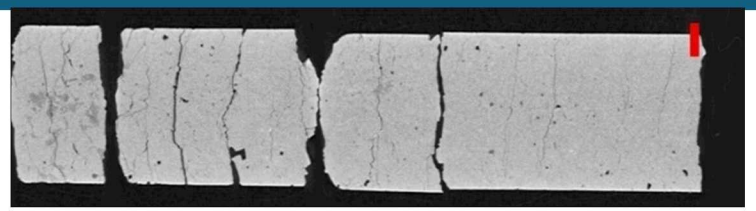
SAND2020-8278PE

From FEPs to Scenarios – Procedures and Methods





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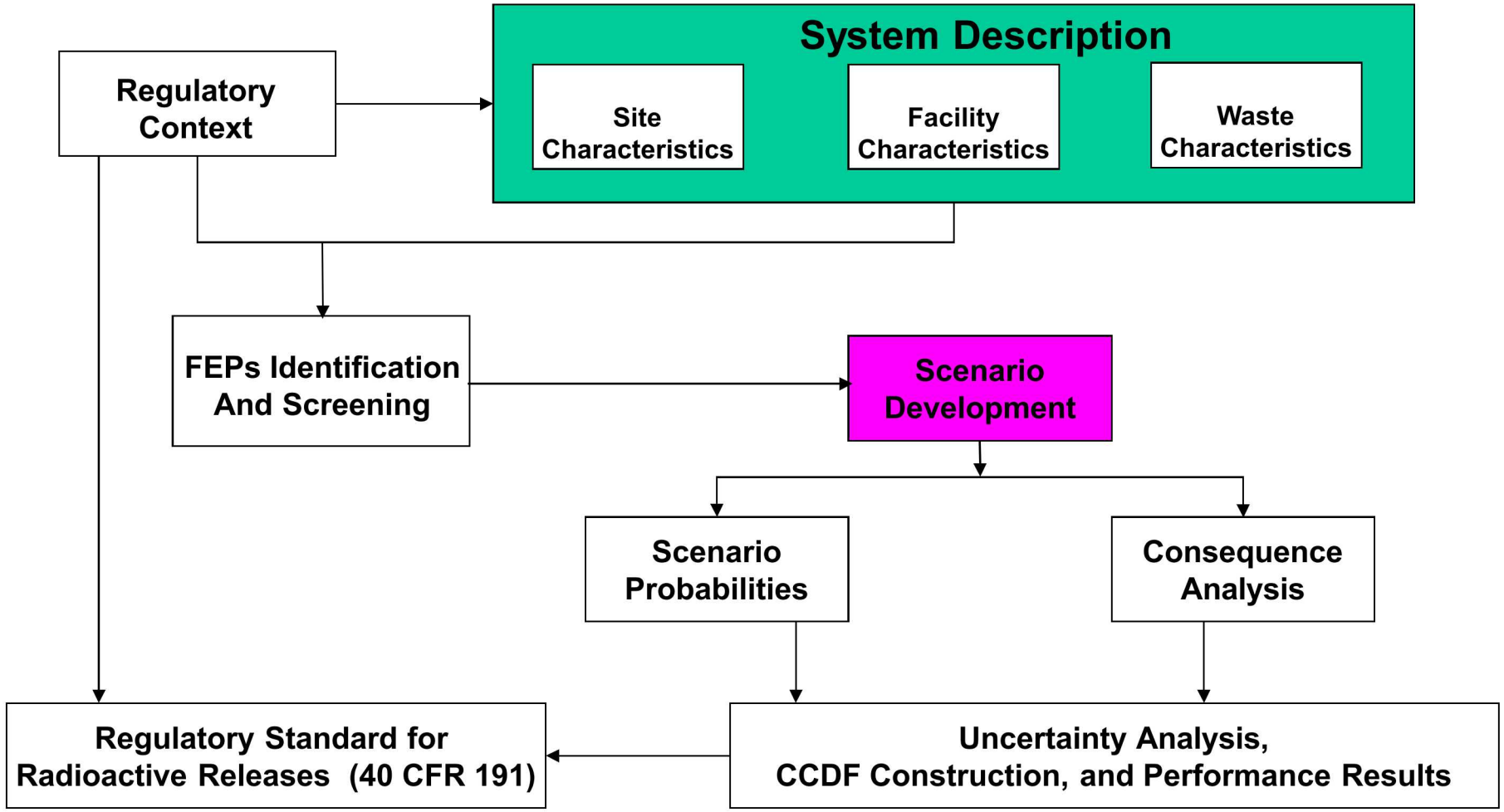
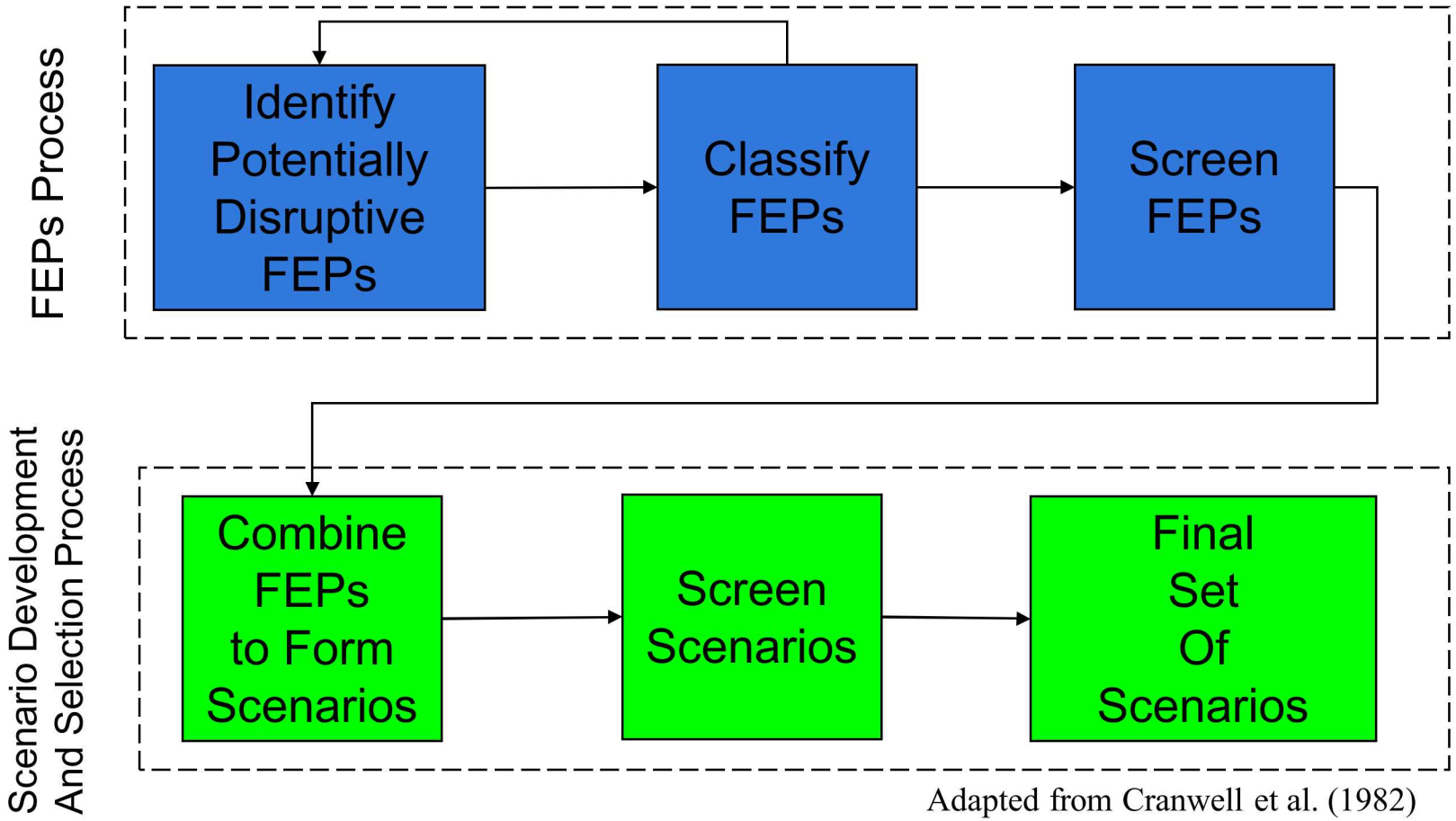
WIPP PA Methodology



Scenario Selection Process



Adapted from Cranwell et al. (1982)

Scenario Development Process

Step 1: Identify disruptive FEPs

- Disruptive FEPs are defined as those FEPs that result in the creation of new pathways, or significant alteration of existing pathways, for fluid flow and, potentially, radionuclide transport within the disposal system.

Step 2: Combine FEPs to form performance scenarios

- Undisturbed Performance (UP) scenarios are considered the "base case"
  - Includes the natural system FEPs that are retained
  - Includes the waste related FEPs that are retained
  - May include certain Human FEPs if such activities are already underway (e.g., mining), at least for the near term.

- Disturbed Performance scenarios (DP) include disruptive events in addition to the base case scenario.

- Use unrestricted brainstorming at first…. Don't discount scenarios at the onset; this comes in Step 5

  Err on the side of inclusion

Scenario Development Process (continued)

Step 3: Screen Scenarios

- Ask, “Is this a credible and realistic scenario?”
- Make adjustments as necessary
- Use peer groups, other repository programs to gauge applicability

Step 4: Finalize Set of Scenarios

- Use these scenarios for PA calculations.
- Perform sensitivity analyses to determine where most sensitive areas of the disposal system
- Make adjustments as necessary

- All components of PA benefit from an iterative process

WIPP Scenario Refinement Used an Iterative Process

- Initial FEPs list development occurred before scenario development, *but*;

- Preliminary PAs were used to refine, and make FEPs list more appropriate and meaningful

- Evolving regulations also caused changes to FEPs (e.g., mandated human intrusion affected disturbed and undisturbed scenarios, specific screening criteria, etc.)

WIPP DP Scenarios

- E1 – drilling intrusion into pressurized brine pocket
- E2 – drilling intrusion that does not hit brine
- E1-E2 – drilling intrusion into the repository that was previously hit by an intrusion that intercepted a brine pocket
- M – mining
- M-E1 – mining in combination with E1
- M-E2 – mining in combination with E2
- M-E1-E2 – mining in combination with E1-E2

Questions?