ECCS Suction Strainers
Latent Debris
Issue No. 6

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Issue Overview

The NRC noted that the BWR methodology assumed that latent debris (dirt/dust) is made up solely of particulate with a total drywell quantity of 150 lbs. with no requirement on the validation of this quantity or guidance on size characteristic.

PWRs validated the quantity and size characteristic of latent debris through source term walkdowns and analysis and determined that this source term may contain a fibrous component.

Neglecting this fibrous component can be potentially non-conservative for plants with little or no fiber as this can be the dominating fibrous component.

Objective

1. Define dirt/dust term
2. Provide a method to conservatively determine the mass and characteristics of dirt/dust.
3. Provide guidance on evaluating the impact of dirt/dust on existing analysis.

Background

Sources of Other Debris

Category	URG Guidance	NEI-04-07 Guidance
Dirt/Dust	*150 lbs.*	*Plant specific*
Other Transient Debris	Plant specific	Plant specific
Rust from Unpainted Steel	*50 lbs.*	*Not applicable*
Particulate Debris Sources	Plant specific	Plant specific
Paint/Coatings (Qualified)	*85 lbs.*	*Plant specific*
Concrete	*Included in dirt/dust*	*Unspecified*
Unqualified Coatings	Plant specific	Plant specific
Other Latent Material (tags, tape)	Plant specific	Plant specific

Key Differences Between PWRs and BWRs

1. Dirt/Dust source term is determined from plant specific surveys for PWRs, generic for BWRs.
2. Rust is an explicit debris source for BWRs (although based on engineering judgment) and not PWRs.
3. Destroyed qualified coatings are determined from a plant specific analysis for PWRs and generic for BWRs (this is being tracked under a separate issue).
4. Ablated concrete assumed in BWRs (again, engineering judgment) not PWRs.

Resolution – Objective 1

BWRs will retain the current categories of “other debris sources” as they represent the balance of debris sources not represented by insulation and suppression pool sludge.

The current definitions are adequate within the URG.

Resolution – Objective 2

- Provide guidance to determine the mass of dirt/dust
- Define debris characteristics for dirt/dust
- Accept URG guidance for rust and ablated concrete

Resolution – Objective 2

Dirt/Dust – plant specific

BWRs are performing walkdowns to verify the mass of dirt/dust similar to the PWRs through surveys and sampling.

The size characteristics of the dirt/dust will be defined by the PWR dirt/dust characteristics approved by the NRC as 85%/15% particulate/fiber.

Resolution – Objective 2

Rust

The current URG value of 50 lbs is based on engineering judgment and represents the rust that would be removed from unpainted steel surfaces and transported to the suppression pool. The current URG value will be retained.

The debris characteristic was assumed to be a flake and had relatively small impact on the debris head loss.

Resolution – Objective 2

Ablated Concrete

The URG recommended that the amount of concrete dust generated from a LOCA jet be determined on a plant specific basis. During the development of the 150 lbs. of dirt/dust, concrete dust was also included in this term.

Consistent with PWR treatment of ablated concrete, BWROG recommends that this term not be explicitly developed as most concrete surfaces could contain a surface coating and the expected amount of dust generated from a jet would be relatively small in comparison to the other particulate source terms.

Resolution – Objective 3

Guidance on Evaluating Changes to the dirt/dust source:

Plants will realize changes in the mass/size characteristics of dirt/dust as well as gain a fibrous component.

These changes in debris mass and properties will need to be evaluated in the plant specific head loss correlations.

This will have minimal impact on the head losses since the size distribution for the original dirt/dust source term was defined at 10 micron and PWR dirt/dust data has provided a mean much larger than 10 micron.

The fiber source term in the dirt/dust could be accommodated through available margin/future allowances.

Key Relationships to Other Issues

Issues 1 & 2: *Downstream Effects*

– A different latent debris source term at the strainer, would possibly impact the quantity and characteristics of the debris that bypasses the strainer and transported downstream of it.

Issue 3: *Debris Bed Head Loss Predictions*

– A different latent debris source term at the strainer would impact the debris bed and debris head loss predictions.

Issue 4: *Chemical Effects*

– A different latent debris source term could have different material characteristics and possibly impact the chemical interactions in the suppression pool water.

Next Steps and Milestones

Prepare a report that provides recommended BWR latent debris characteristics	3Q 2011
Provide the report to the NRC for review and comment	3Q 2011
Issue revised report addressing NRC concerns	3Q 2011