



**GSI-191**  
**Fibrous Debris Characterization Bench-Top Test**  
**Program**

# Overview

- Bench-Top Test Objective
- Methodology
- Fiber Preparation
- Parameters
- Bench-Top Testing
- Report



# Bench-Top Test Objective

- Establish a fiber length distribution to represent the prototypical fiber that may bypass containment ECCS strainers.
  - Inputs to testing based on the results from a PWROG industry survey
  - Testing will be generic, but will use parameters important to bypass testing to determine appropriate length distribution(s) (reduced scale) for use in future fuel testing
  - The objective is not to determine the quantity of fiber bypass



# Methodology

- Fiber-only bypass tests on a bench-top test loop
- Incremental fiber introduction – NEI Fiber Prep
- Isokinetic debris sampling
  - Not used to quantify bypass
- Debris capture downstream of the sampling ports to prevent debris re-circulation using filter bags
- Post-test microscopic analysis of bypassed fiber to determine the length distribution(s)

# Fiber Preparation

- NEI Debris Preparation: “ZOI Fibrous Debris Preparation: Processing, Storage, and Handling”
  - Pressure washer
- Will use representative fiber types



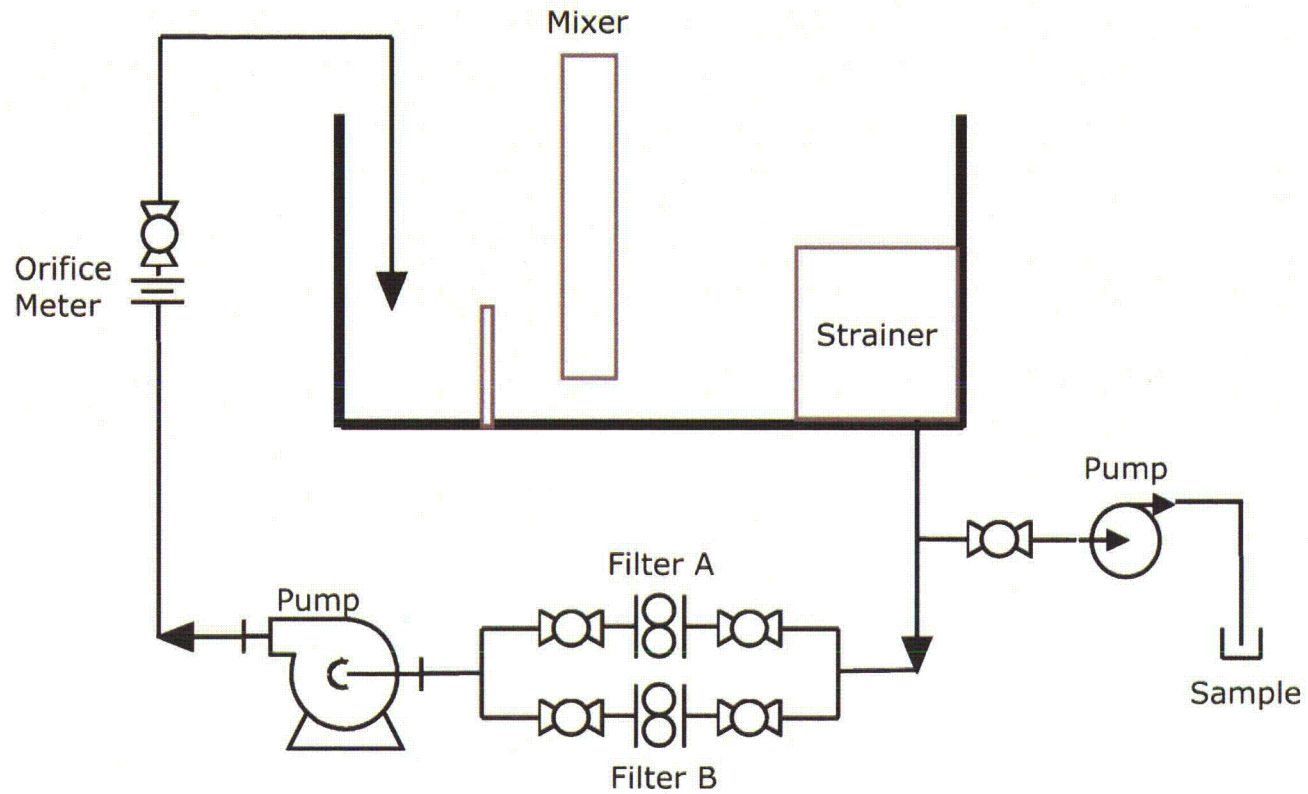
## Parameters – Not Important

- Strainer configuration / location within the plant
  - Debris prepared by NEI fiber prep only
- Plant specific strainer area
  - Not a head loss or bypass quantity test
- Quantity of fiber debris generated
  - Debris addition only up to an established fiber bed
- Rate of fiber arrival
  - Small incremental batches of NEI debris prepared fiber will provide the data required to meet the test objective

# Parameters – Evaluated

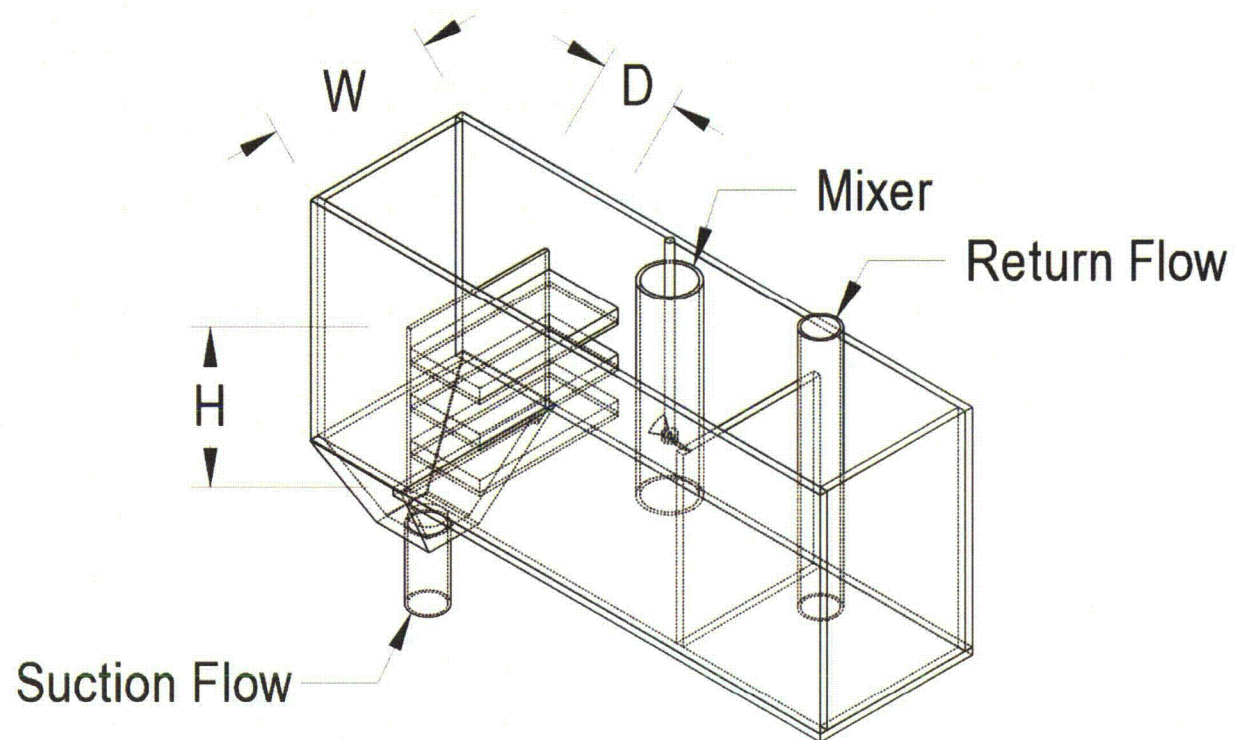
- Based on the results of the PWROG survey
- Strainer perforation hole size
- Screen surface velocity
- Water temperature
- Water chemistry - Tap, DI Buffer/Borated
- Localized Flow Conditions
  - Different shaped filter media to change the flow approach angle of attack

# Bench-Top Testing



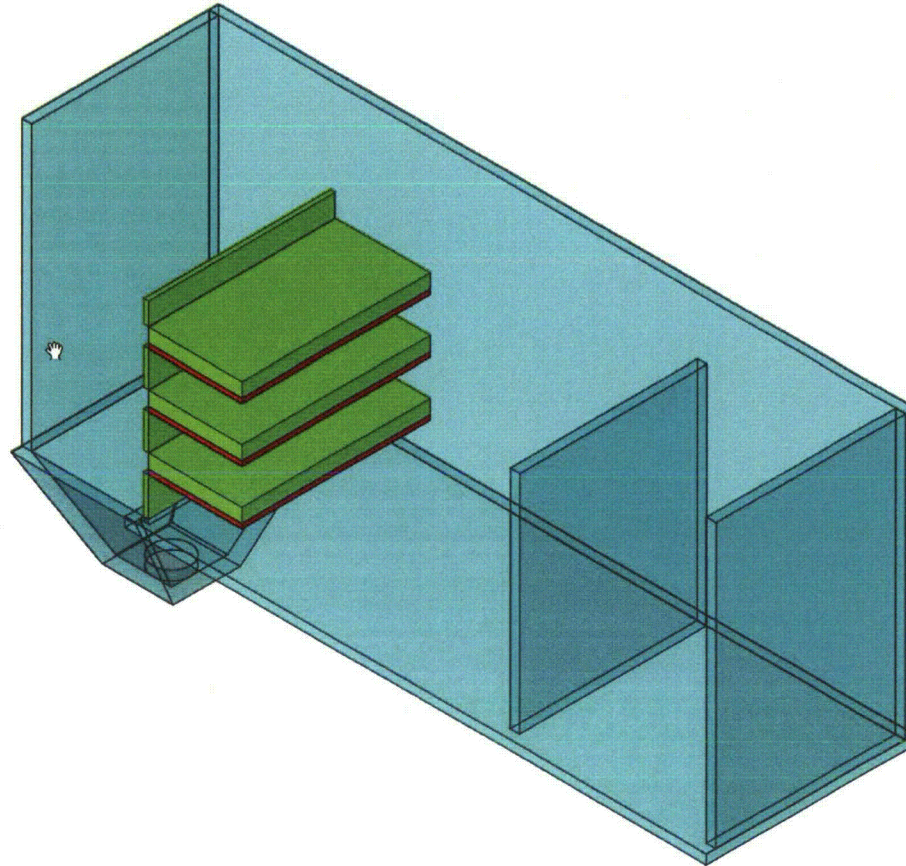


# Bench-Top Testing



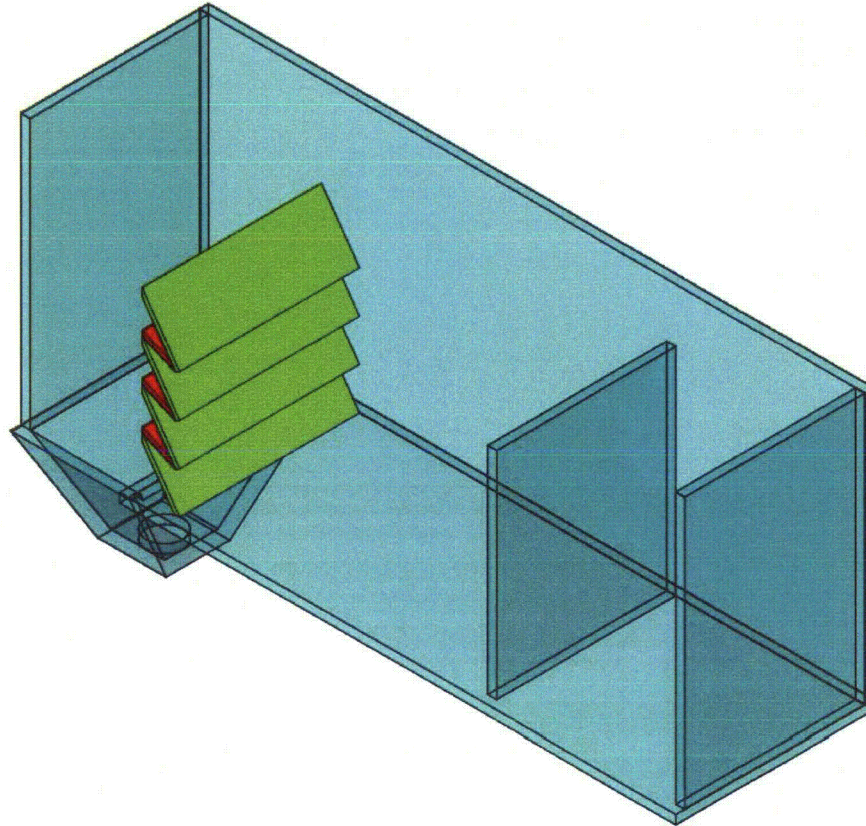
**Test Tank:  $\approx 10''W \times 12''D \times 36''L$**

# Bench-Top Testing



**Iso of Filter Media in Tank**

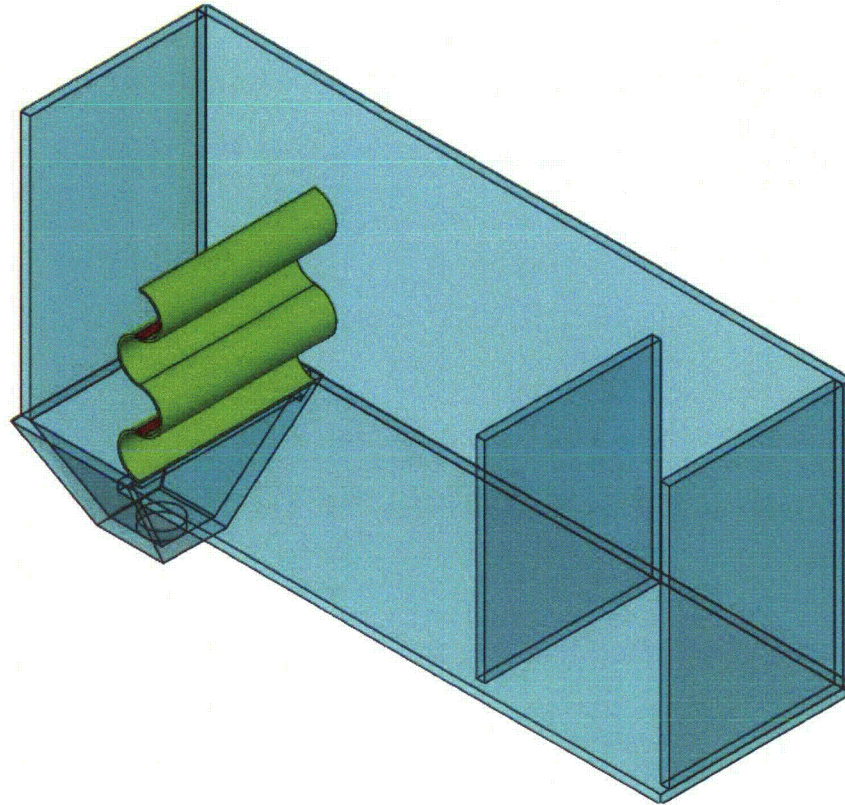
# Bench-Top Testing



**Iso of Filter Media in Tank**



# Bench-Top Testing



**Iso of Filter Media in Tank**

# Bench-Top Testing

- Debris addition sequence
- All fiber tested will be assume to be Low Density Fiber Glass (LDFG)

Batch #	Fiber Addition (bed thickness in inches)	Total Bed Thickness (inches)
1	1/16	1/16
2	1/16	2/16
3	1/16	3/16
4	1/16	2/8
5	1/8	3/8
6	1/8	1/2



# Bench-Top Testing

- Introduce debris
- Wait 10 turnovers and take downstream samples
- Sample timing
- Repeat the process until a ½ inch thick bed has been introduced
- After last batch, visually confirm a fiber bed, wait 10 turnovers and terminate

# Report

- Microscopic characterization of fiber length
- Categorization into “bins”
  - 20 microns and less
  - 20-40 microns
  - 40-1000 microns (best fit categorization)



# Questions



**COVER SHEET FOR CORRESPONDENCE**  
**USE THIS COVER SHEET TO PROTECT ORIGINALS OF**  
**MULTI-PAGE CORRESPONDENCE**