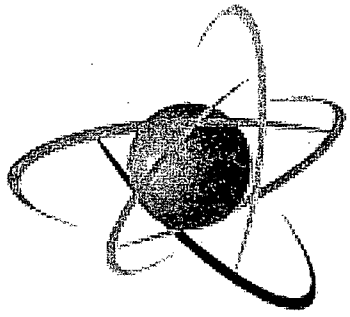


U.S.NRC

UNITED STATES NUCLEAR REGULATORY COMMISSION

Protecting People and the Environment

U.S. EPR Containment Sump

Public Meeting

U.S. NRC Headquarters

TWFN, Room T-2B5

January 27, 2010

9:00a.m.

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

Interactions to date

- July 8, 2009 public meeting to discuss technical issues identified by NRC staff
- Several audits on test protocols and specifications
  - Chemical Effects Testing
  - Downstream Effects Testing
  - Sump Strainer Head Loss Testing
- NRC staff witnessed testing
  - Chemical Effects Test (Lynchburg, VA)
  - Downstream Effects Test (Trenton, NJ)
  - Sump Strainer Head Loss Testing (Holden, MA)
- Subsequent to December 2009 sump strainer head loss testing, AREVA committed to re-design the facility and perform a new set of strainer head loss tests.

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

Future Interactions

- Upcoming audits on test reports when available
  - Chemical Effects Testing
  - Downstream Effects Testing
- Witness new set of strainer head loss tests
  - February, 2010
- Expect submission of revised technical report and RAI responses in April, 2010

U.S. EPR GSI-191 Head Loss Testing

AREVA NP Inc. and the NRC
January 27, 2010

EPR™ by AREVA

AREVA

Objective

- **To keep NRC apprised of AREVA NP's approach and progress toward addressing RAIs related to GSI-191.**

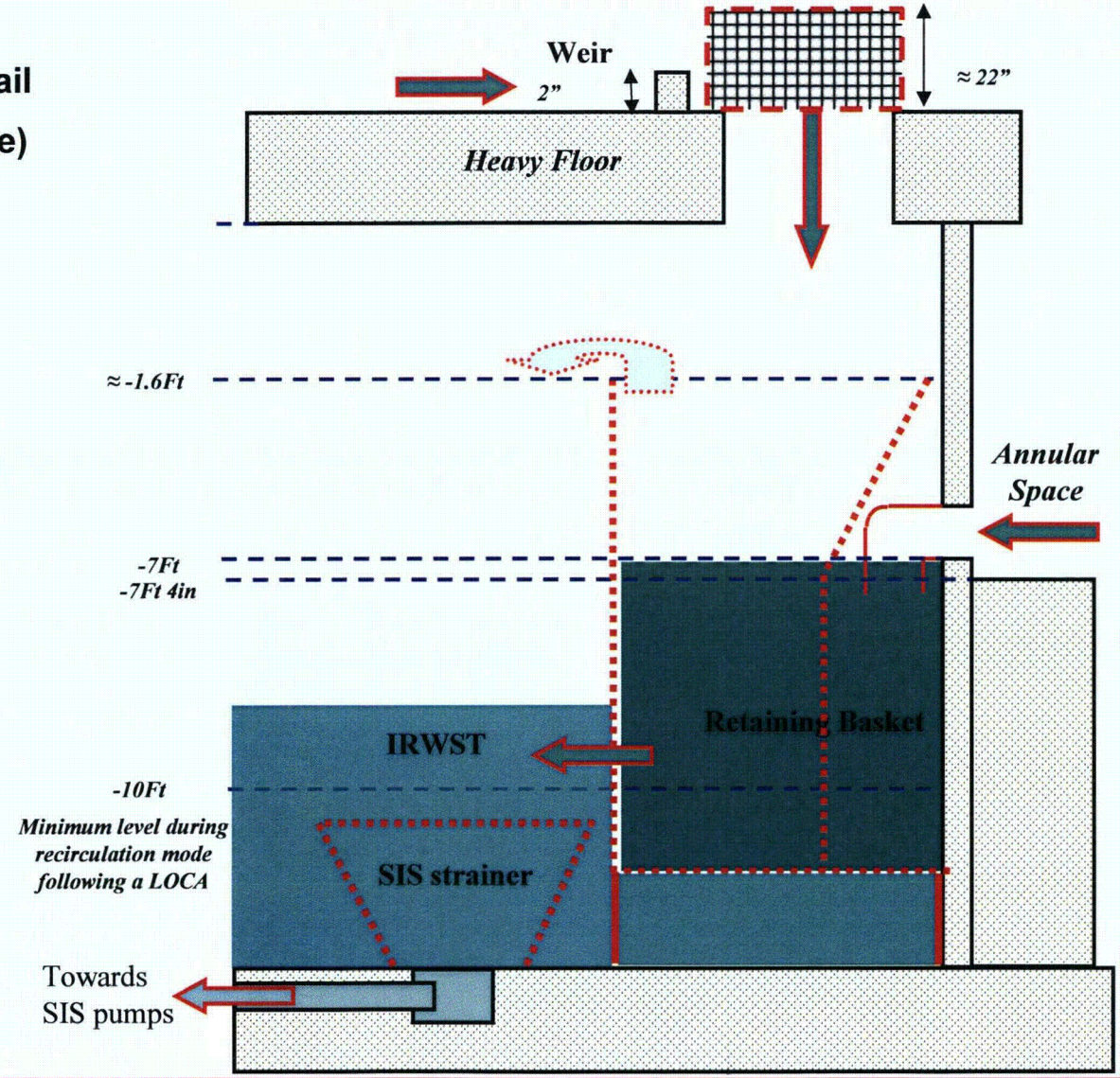
Sump Performance Strategy

- Three tiered debris interceptor approach
- Trash racks/weir
- Retaining basket
- Strainer

Sump Performance Strategy

Design Detail

(not to scale)



Debris Generation Methodology

- **The debris generation evaluation process includes the following and is based on NEI 04-07 and associated NRC safety evaluation:**
  - ◇ **Insulation Inventory (types, locations, amounts)**
  - ◇ **Pipe Break Location Selection**
  - ◇ **Break Jet Destruction Model Zones of Influence (ZOIs)**
  - ◇ **Insulation Debris Quantities (targeted and destroyed)**
  - ◇ **Non-insulation Debris Types and Quantities Generated**
  - ◇ **Debris Characteristics of Debris Generated**

Debris Generation Methodology

- Development of the U.S. EPR debris source term employs the guidance of NEI 04-07 and associated NRC safety evaluation
- The U.S. EPR containment design is low fiber
- The debris generation evaluation performed consistent with methods used for operating plants

Test Facility Description

- **The test facility:**
  - **Flume tank 35.5 ft long x 10.5 ft high x 5 ft wide**
  - **Suction chamber at one end with a slanted strainer**
  - **Recirculation pump (max flow ~ 400 gpm)**
  - **Piping with valves connecting the pump to the suction chamber and the simulated break above the heavy floor**
  - **Retaining basket (RB) with a screen (identical in mesh size to the sump strainer), top open (~ 17 ft)**
  - **Instrumentation for measuring differential pressures, flow rates, and temperature**
  - **System to inject a defined amount of debris**

Strainer Head Loss Testing

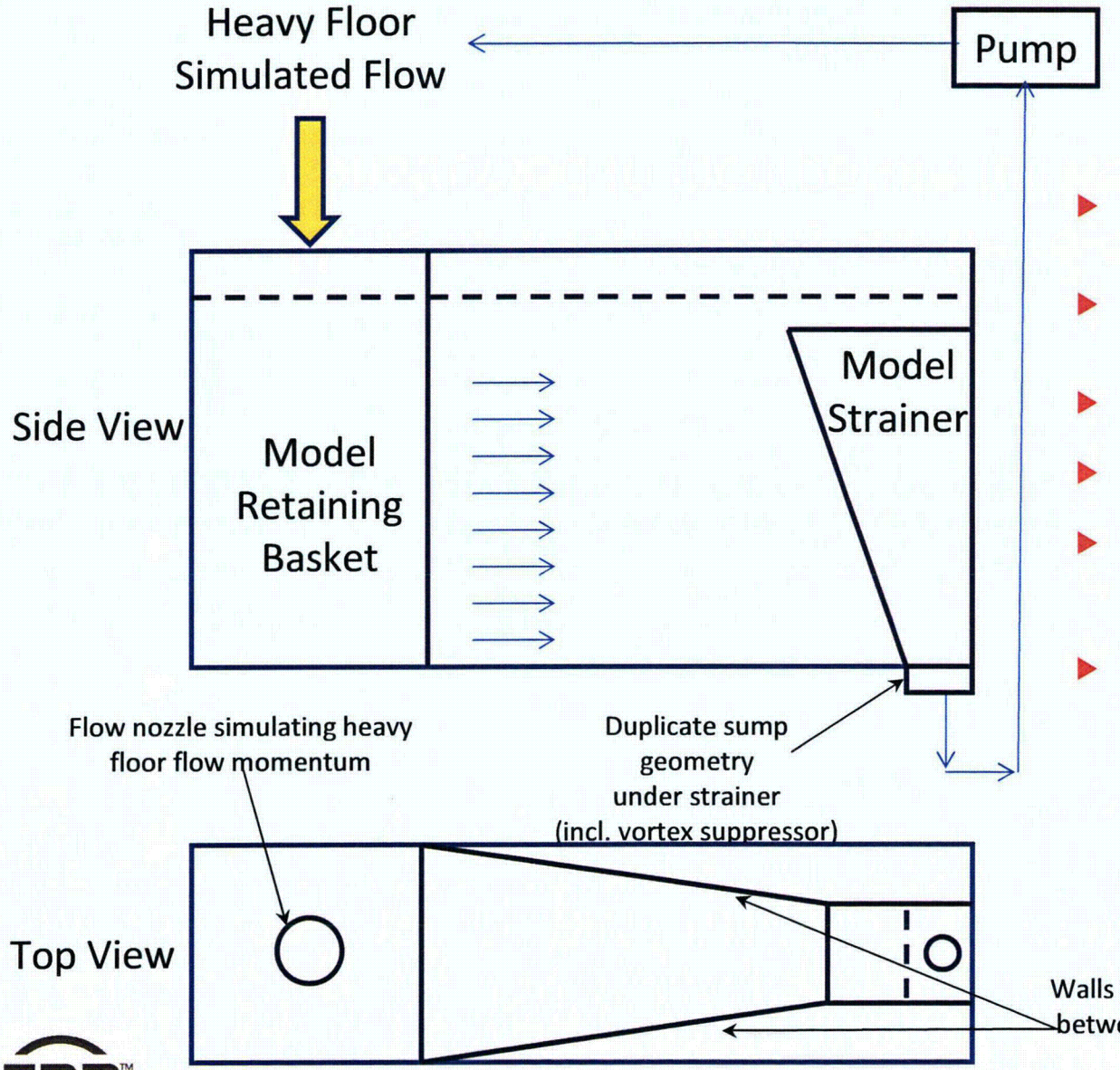
- **Head loss testing protocol:**
  - **Debris introduction system will accommodate debris sequencing**
  - **Chemical precipitant addition will be performed**
  - **Bypass sampling will be performed**

Previous Head Loss Testing

- **Five tests were planned**
  - ◇ **Clean strainer head loss**
  - ◇ **Debris transport**
  - ◇ **Design basis debris load**
  - ◇ **Fiber only**
  - ◇ **Thin bed**

Previous Head Loss Testing

- **Facility scaling was selected at 9.4%, except for height which was 1:1 (within test apparatus limitation)**
- **Facility was constructed based on this scaling**



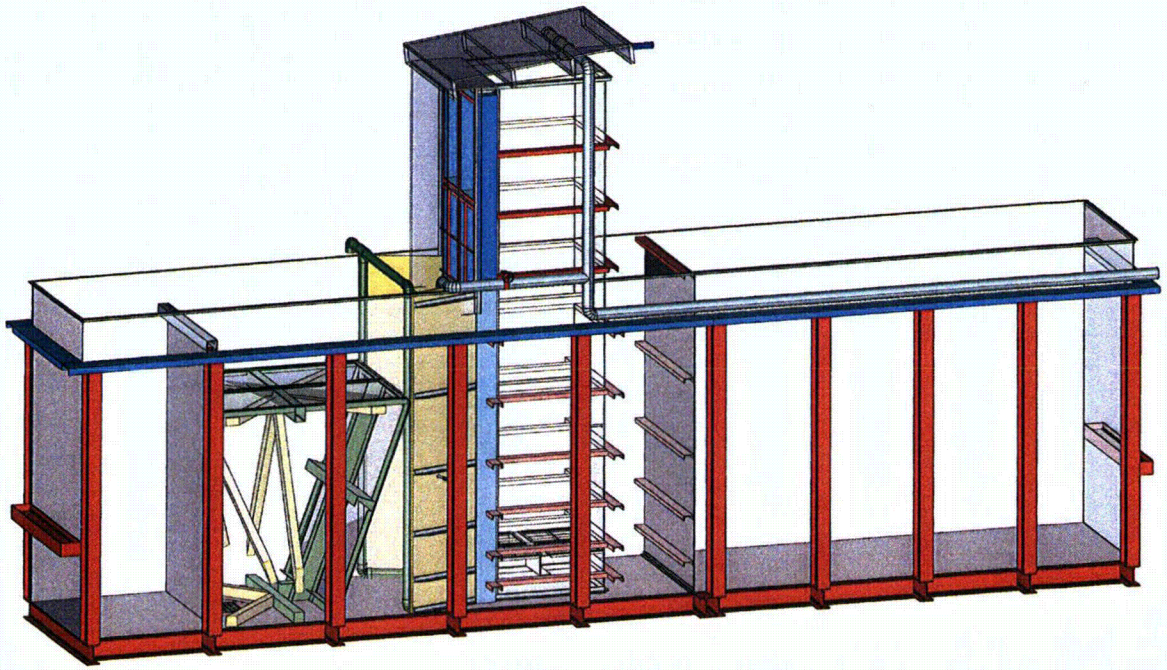
- Heavy floor break flow simulated by flow nozzles approximately 8 ft above the water surface
- Simulated heavy floor break flow represents max. momentum flow achieved falling discharge distance
- Only retaining basket side facing strainer open for flow (via screen)
- Model strainer takes up entire width of flume
- Flow guiding walls between retaining basket and strainer to yield a conservative transport velocity between strainer and retaining basket
- The distance between model strainer and retaining basket at the minimum distance in containment (scaled).

Previous Head Loss Testing

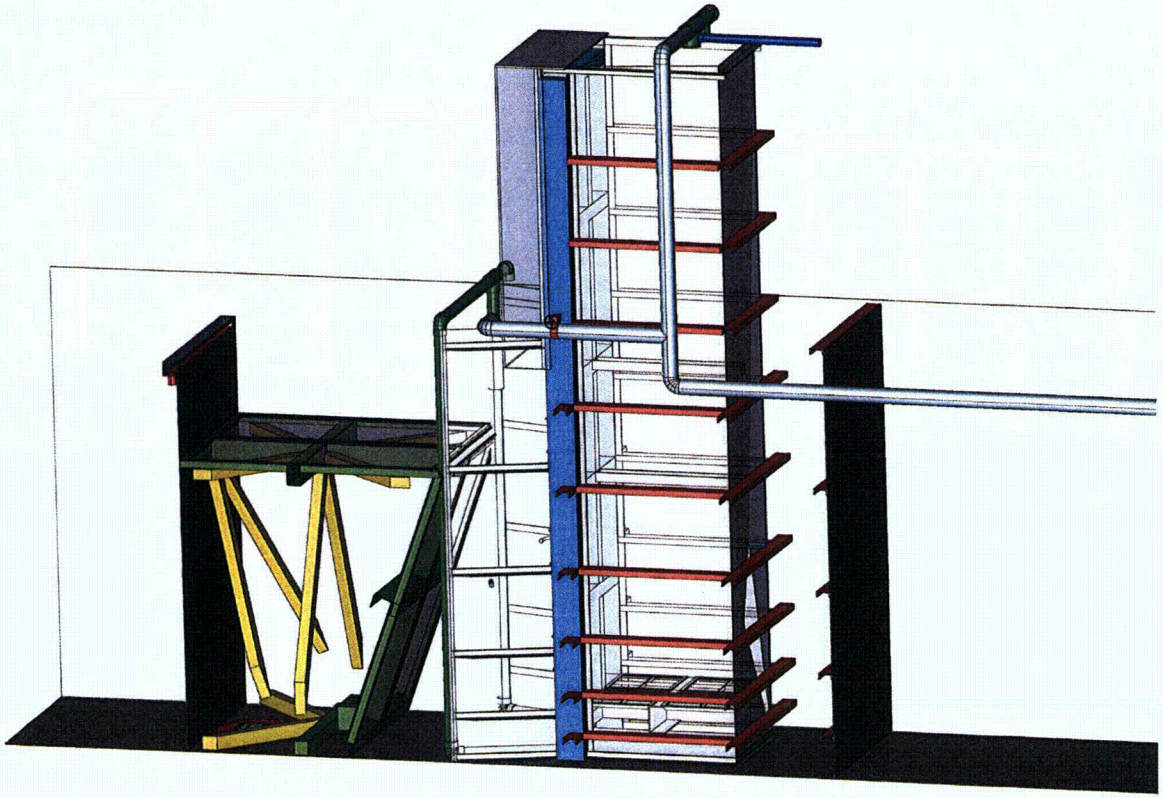
- Debris was introduced directly into the retaining basket (RB)
- During debris introduction, the water volume in RB rose
- RB level continued to rise until it reached the test apparatus height limit
- Test was terminated prematurely due to test apparatus limitation

» Head loss test facility will be re-designed and constructed to incorporate full height RB

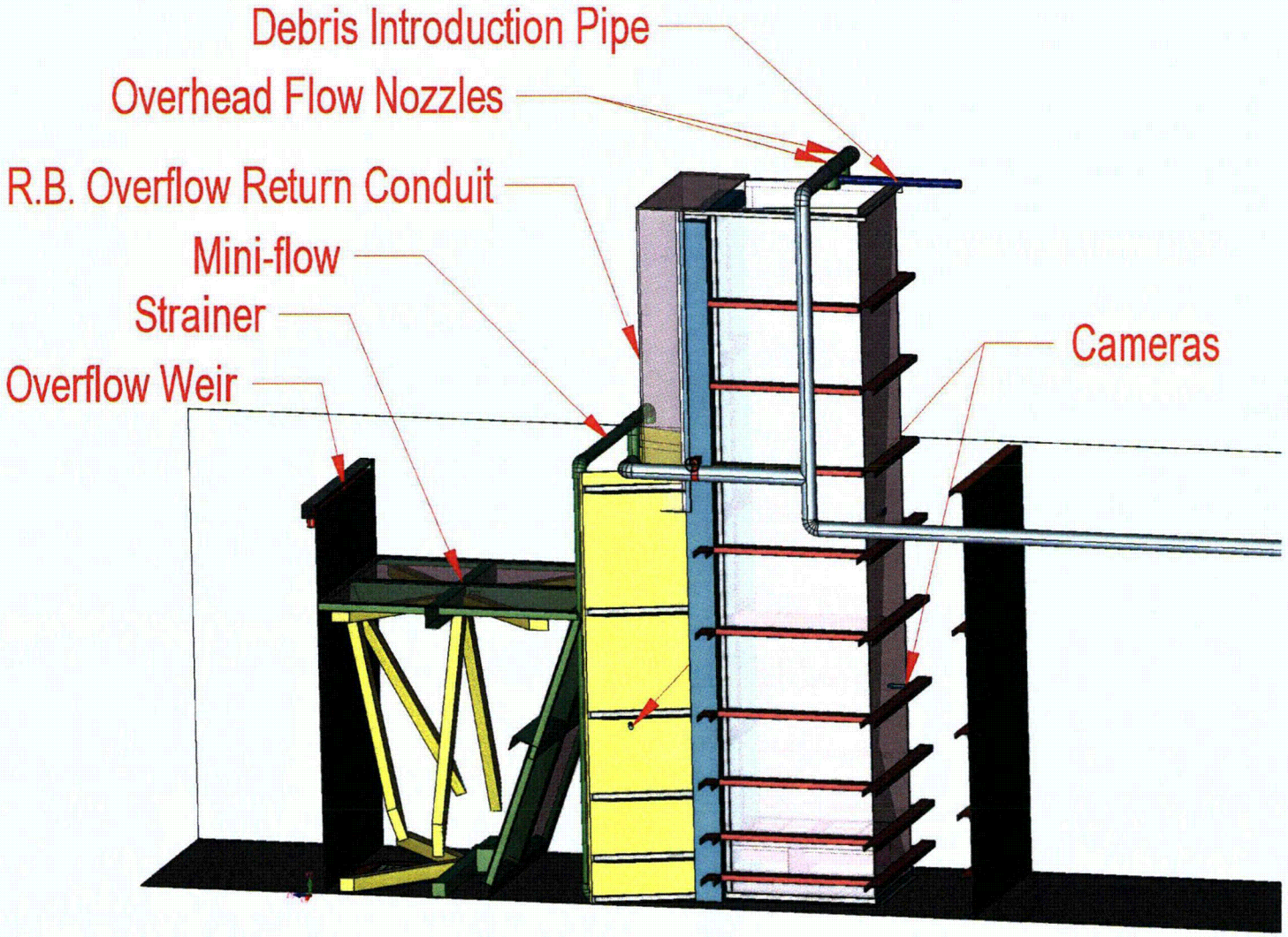
Head Loss Test Facility Re-design



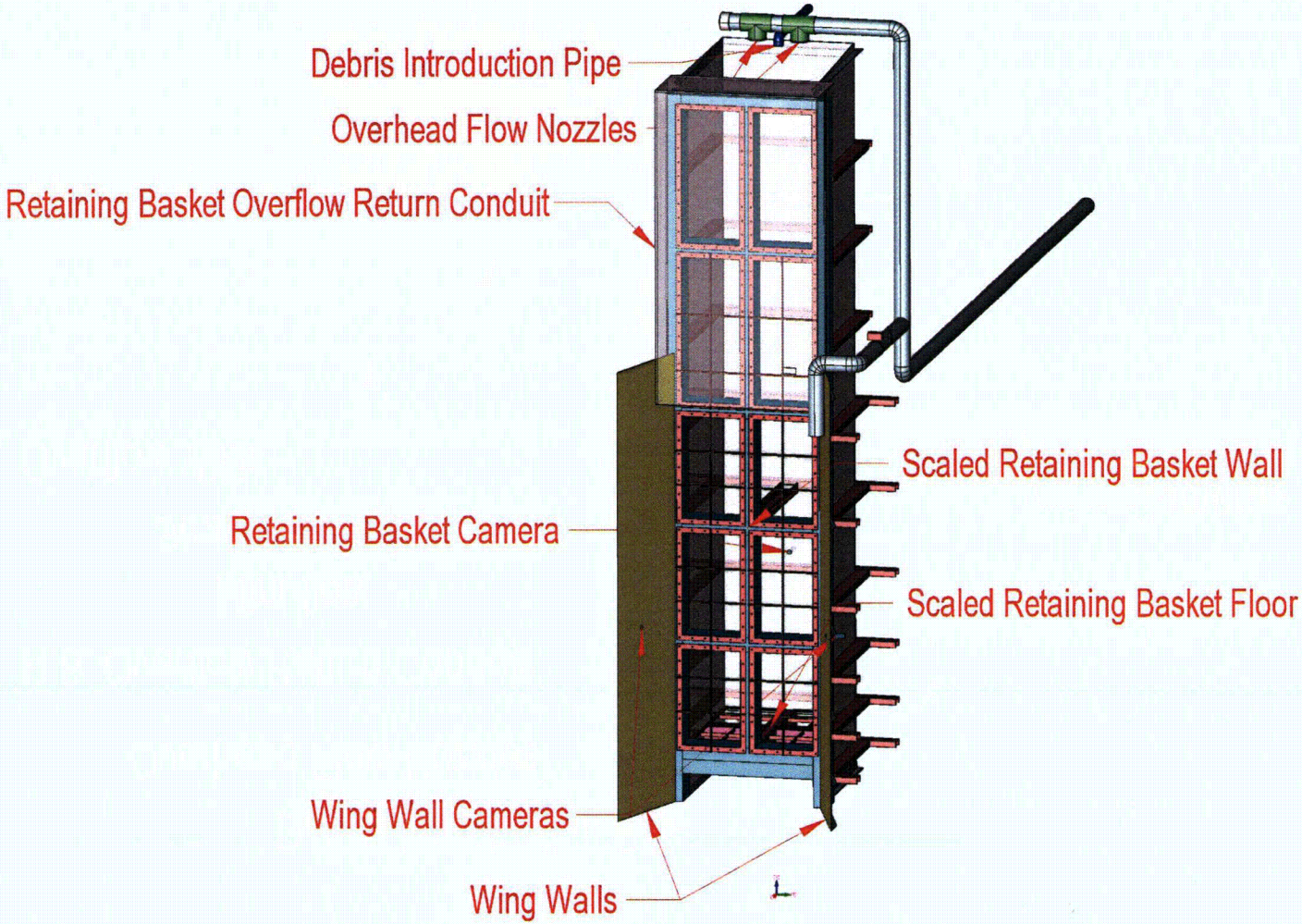
Overview of Basket-strainer Combination



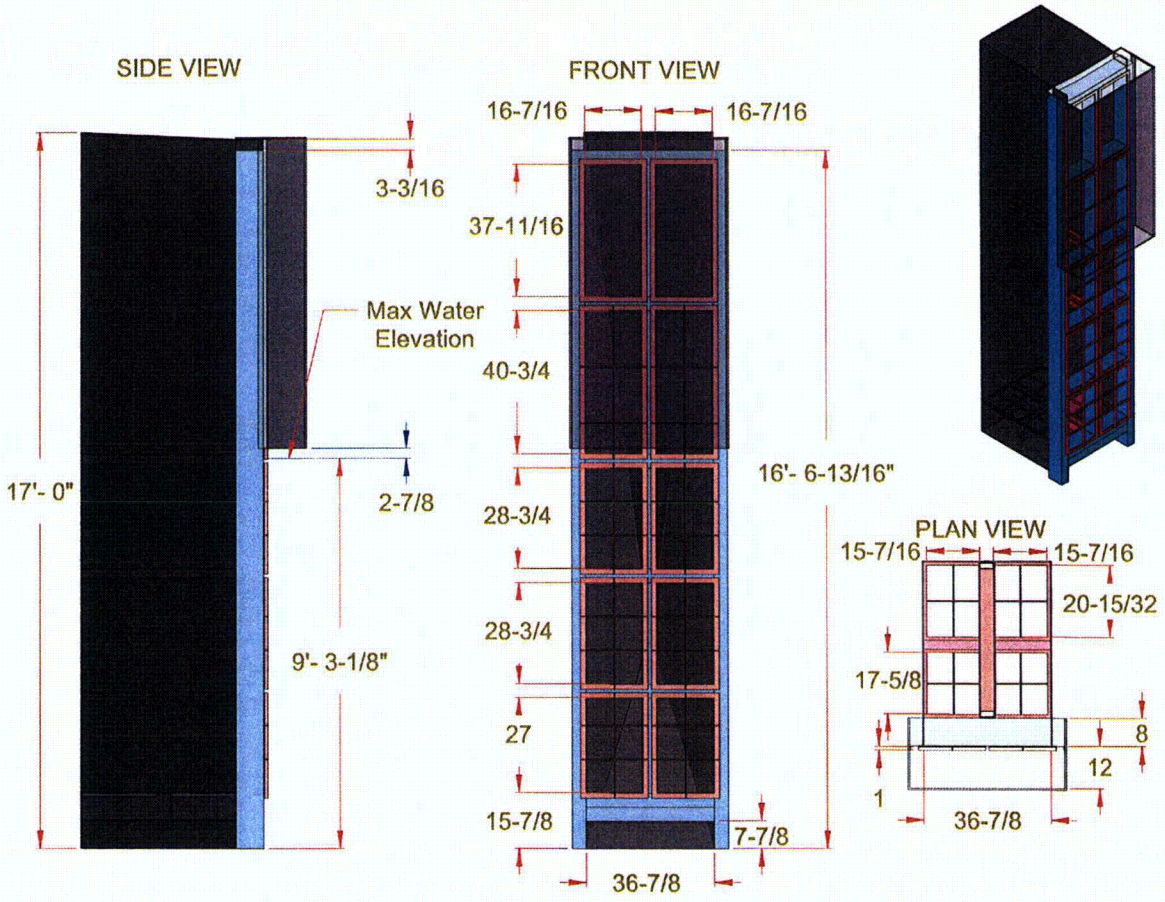
Auxiliary Piping and Features



Retaining Basket Details



Scaled Retaining Basket with Overflow Return Conduit

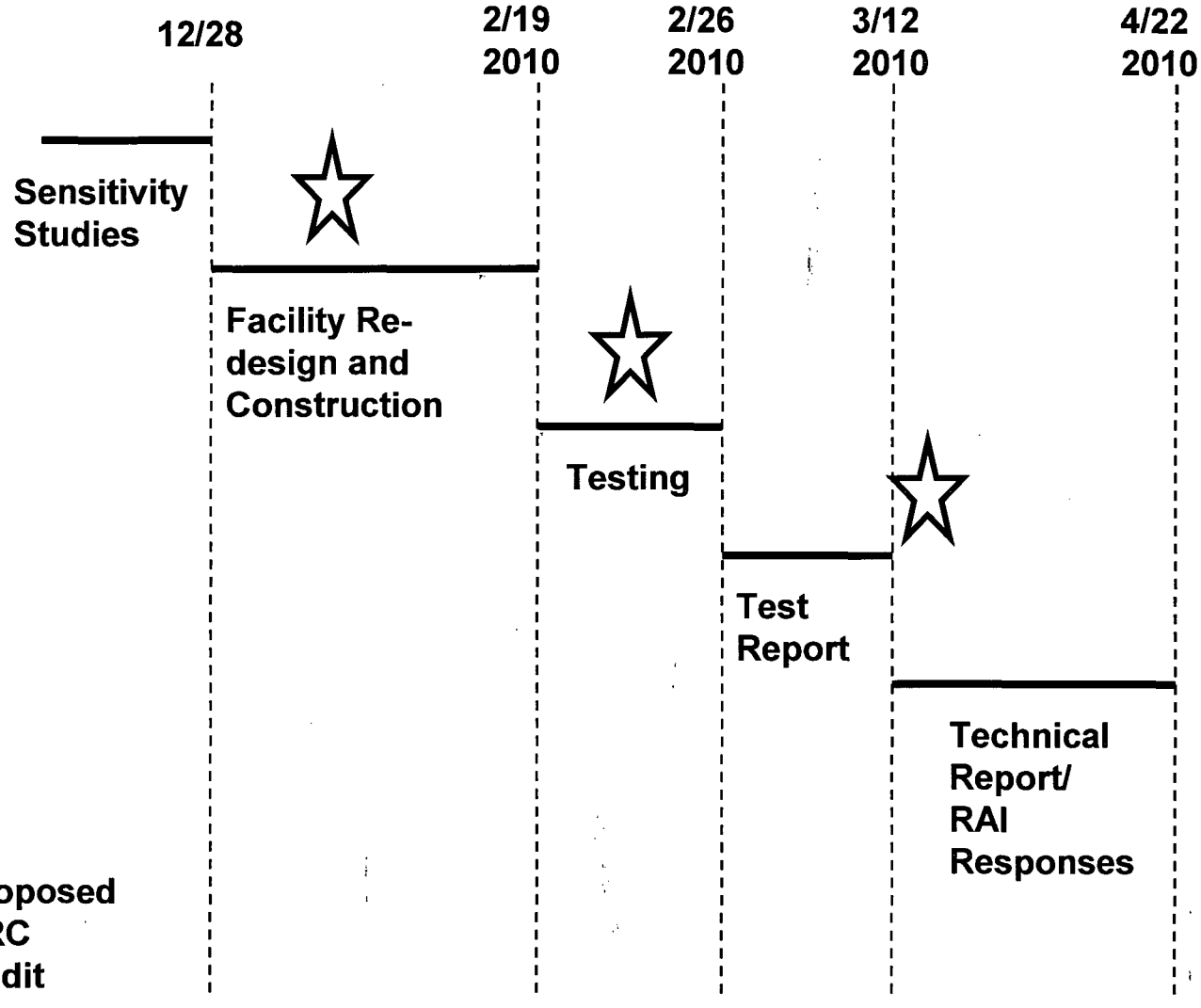


Head Loss Test Facility Re-design

- **Changes to facility include**
  - Steel construction
  - Full height RB
  - Modeling of RB floor screen surface
  - Debris introduction system
  - Improved water level management plan

» Head loss testing representative of U.S. EPR design basis

Timeline


12/28
2/19 2010
2/26 2010
3/12 2010
4/22 2010
Sensitivity Studies
Facility Re-design and Construction
Testing
Test Report
Technical Report/ RAI Responses
Proposed NRC Audit