



# QUALIFICATION UPDATE

## *Medium Voltage*



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# MEDIUM VOLTAGE

90°C · 60 year · 5-35 KV

**Kerite**<sup>®</sup> Insulation System

40+ Year Experience With Zero Failures

Excellent Performance in Wet/Submerged Conditions

Discharge Resistant Insulation



# **Kerite**<sup>®</sup> System Cable Design



Conductor

Permashield<sup>®</sup>

**Kerite**<sup>®</sup> EPR Insulation

Semicon Insulation Shield

Metallic Shield

CSPE Jacket



# Qualification IEEE 383-1974

- Thermal aging
- Radiation exposure
- Normal service qualification
- DBE qualification
- Vertical flame testing



# Thermal and Radiation Aging

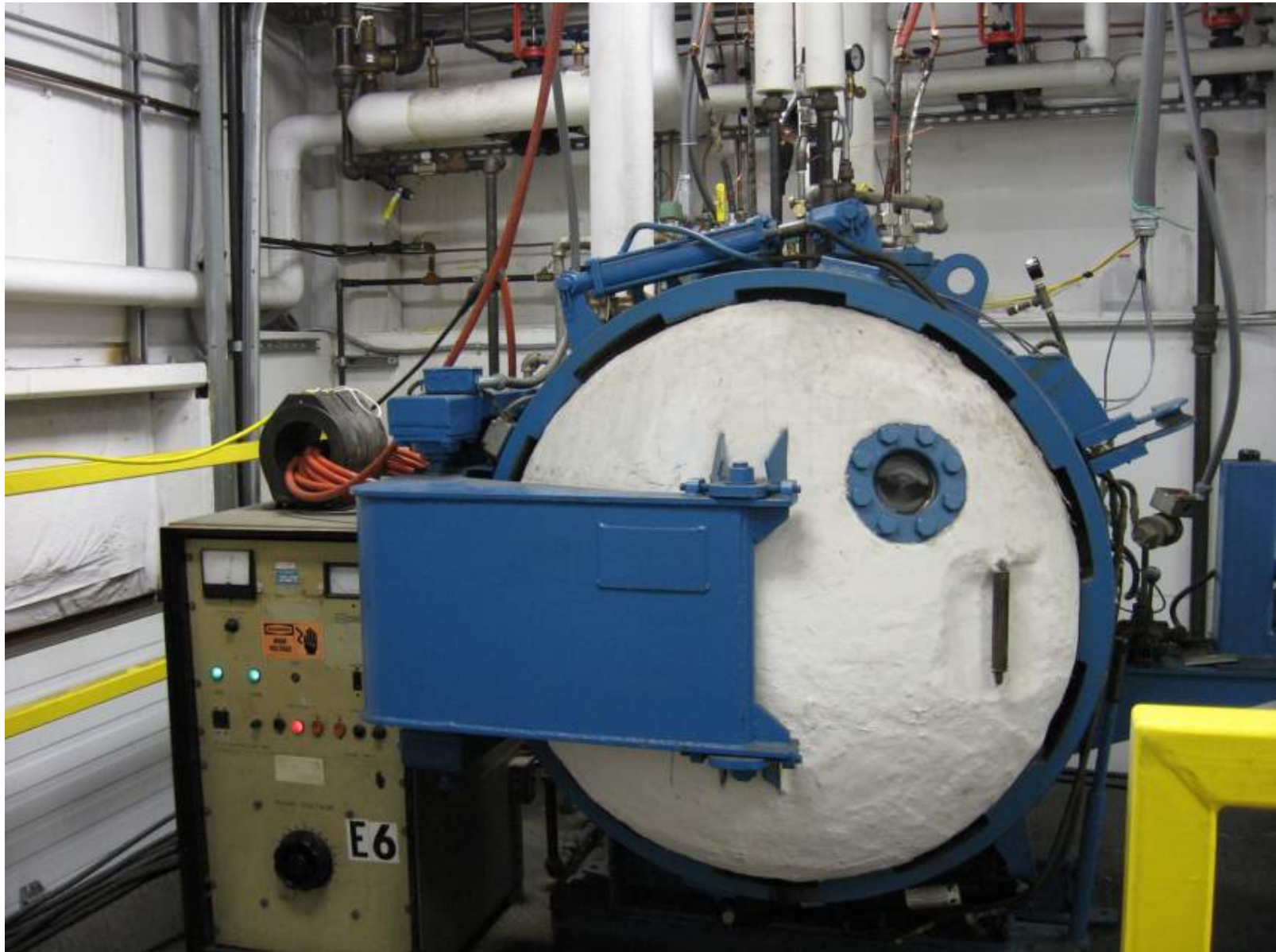
## Normal Service Testing Samples

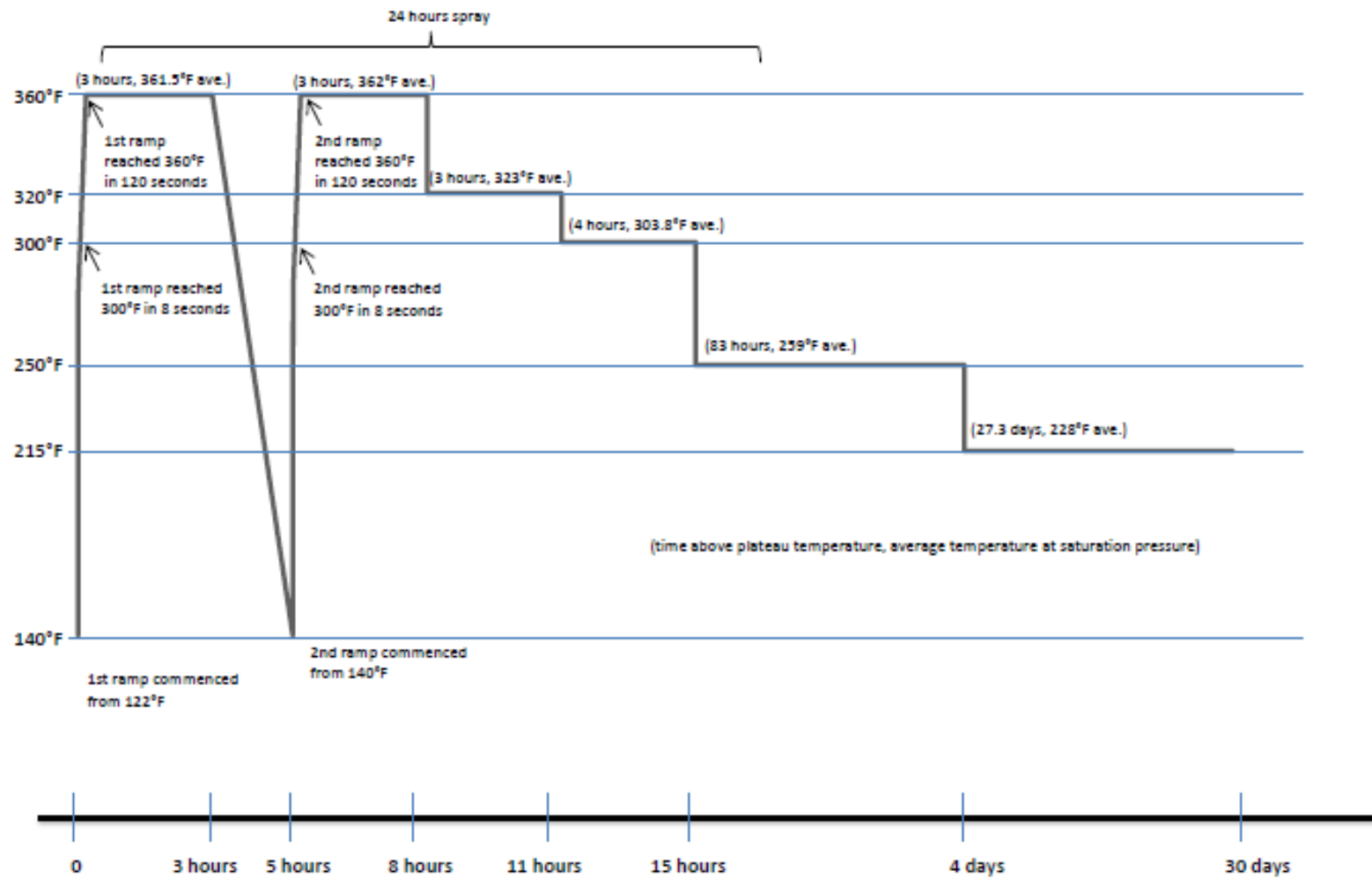
- Set #1: Unaged and 50 Mrads
- Set #2: 40 years aged and 50 Mrads
- Set #3: 60 years aged and 50 Mrads

## DBE Testing Samples

- Set #4: Unaged and 220 Mrads
- Set #5: 40 years aged and 220 Mrads
- Set #6: 60 years aged and 220 Mrads

\*Since thermal aging was based on insulation the CSPE jacket was significantly over aged ~190 years.

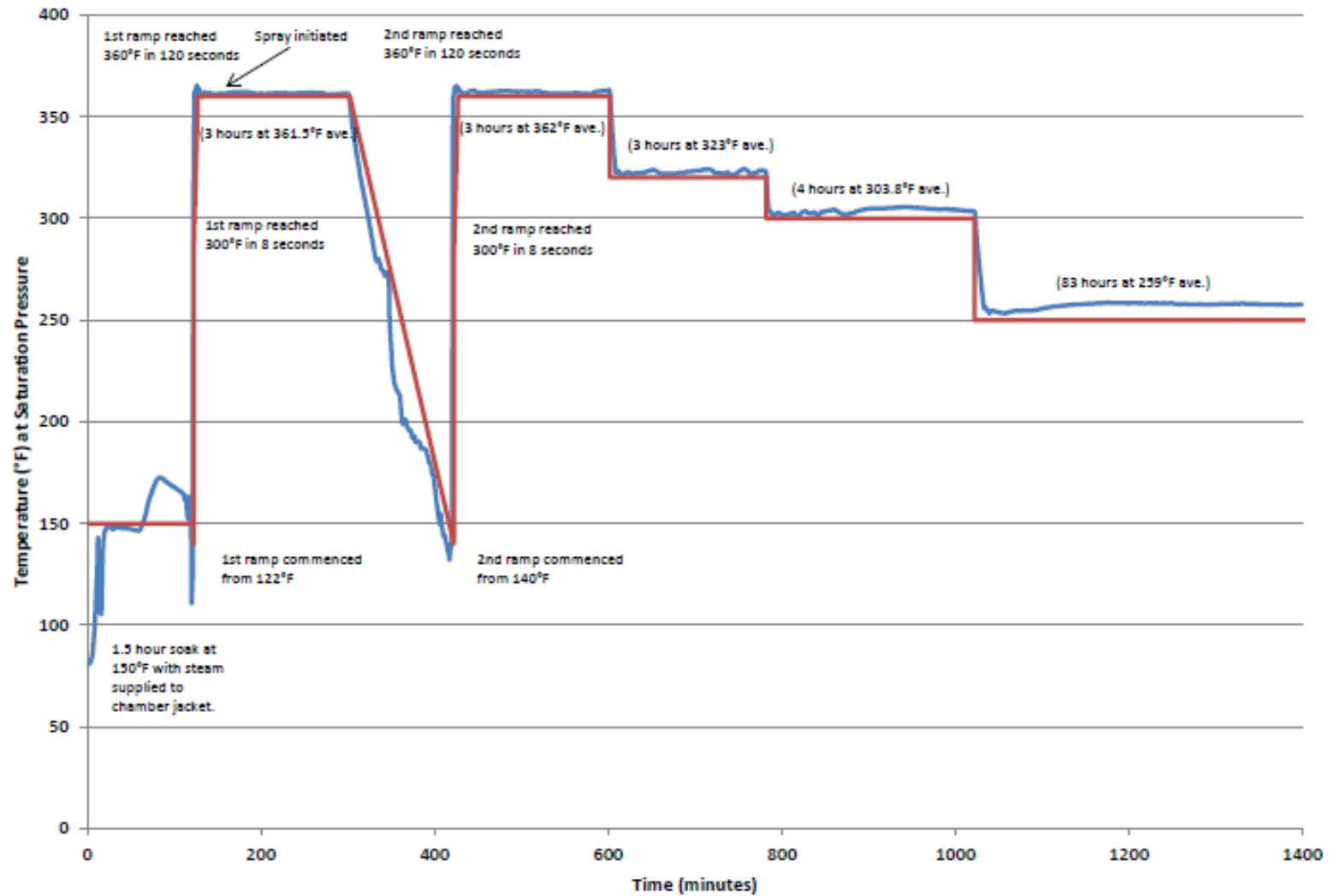




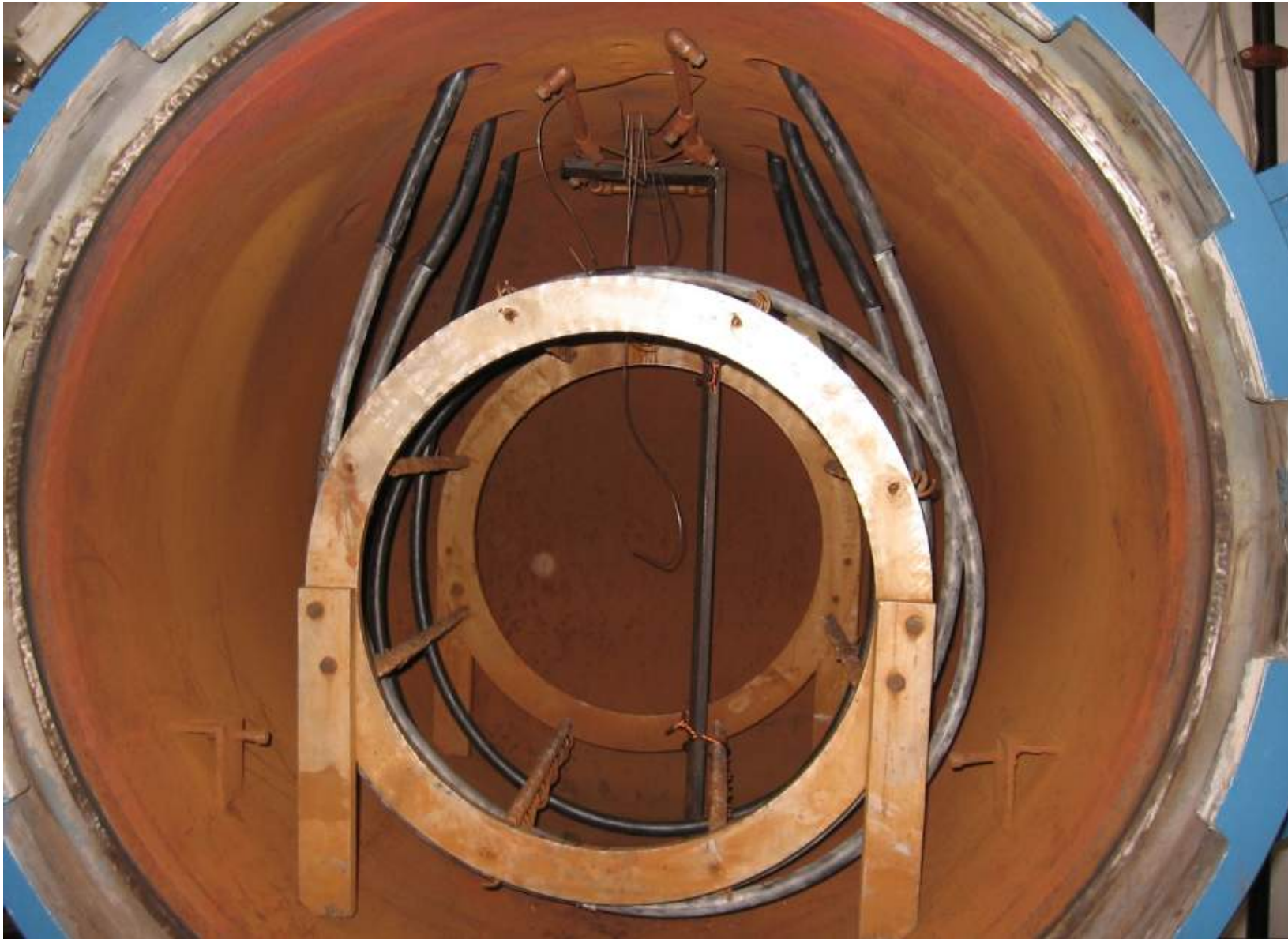
DBE/LOCA/HELB Test Profile  
Required vs. Achieved



### DBE Profile









# Testing Results

## Normal Service Testing

- After thermal and radiation aging, samples were straightened, bent around 20x mandrel, and underwent voltage withstand test after 1 hour submergence

## DBE Testing

- IR measured prior to DBE, at each plateau, and post DBE
- Samples maintained rated voltage and current throughout DBE
- After removal from chamber, samples were straightened, bent around 40x mandrel, and underwent voltage withstand test after 1 hour submergence



# Flame Testing

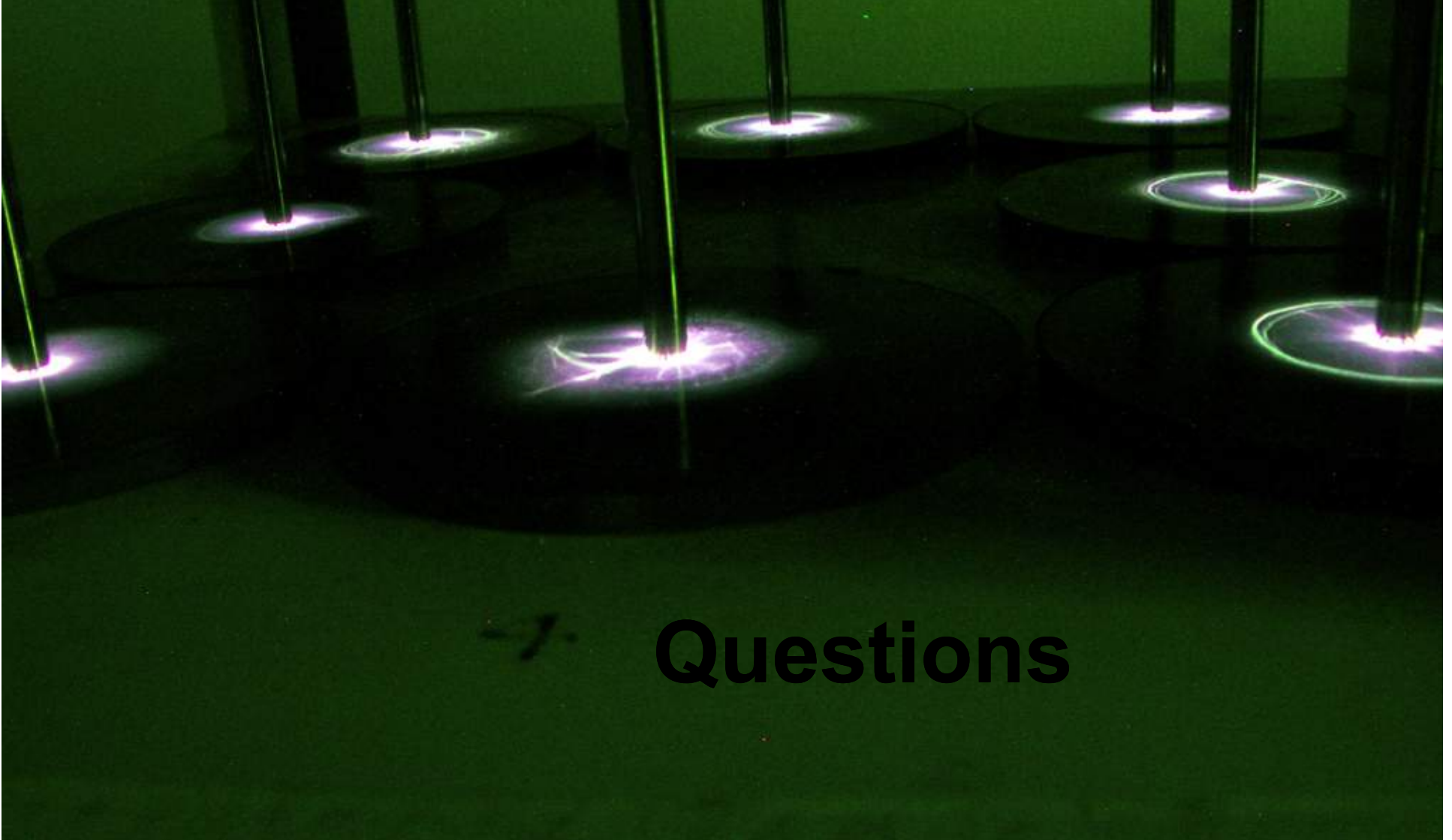
IEEE 383-1974 as modified by NRC Reg. Guide 1.189

- Unaged samples passed
- Aged and irradiated (50 Mrad) samples passed



# Future Qualification

- Non-shielded construction IAW IEEE 383-1974
- Qualification IAW IEEE 383-2003  
Challenge because completed cable and each layer must be aged to end of life.
- Customer recommendations .....



Questions