



ANL/FNAL SCPF EP/HPR Processing Status and Plan

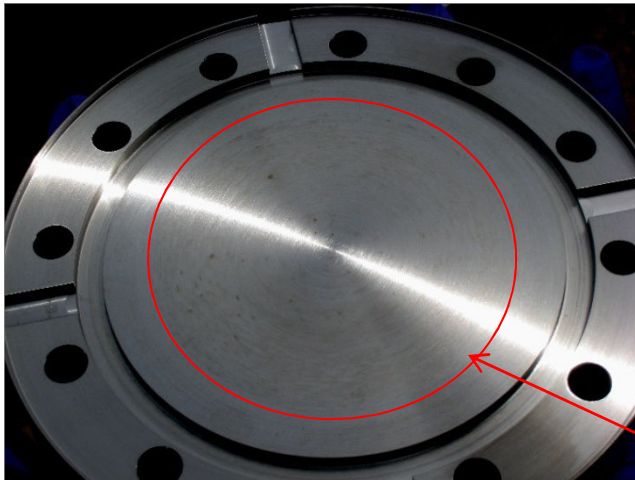
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- **HPR MIC Problem and Lessons Learned**
- **Cavity Handling at ANL/FNAL**
- **Current Status of One-cell Program & Results**
- **One-cell Program Plans**
- **Current Status of Nine-cell Program & Results**
- **Nine-cell Program Plans**
- **Summary**

HPR MIC Problem

- “MIC” = Microbiologically Influenced Corrosion
- Likely ongoing, but unnoticed problem.
- Brown film on HPR’d components yielded first signs. Dozens of rinses prior to residue.



316L SS End Flange



Al/Mg 'Diamond' Flange Seal

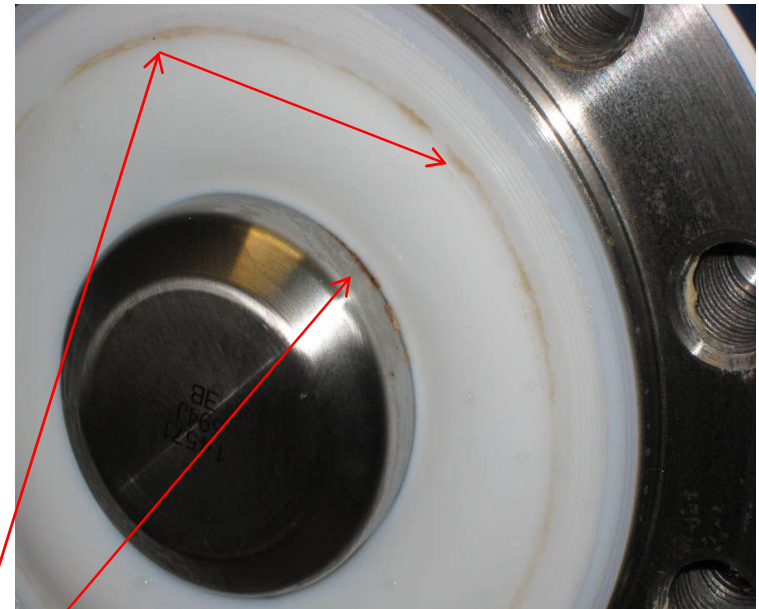
Mysterious brown residue film

HPR MIC Problem

- Initially suspected LEWA pump failure. High carbon content in SEM analysis of seals.
- Removed heads and found bacterial nodules.



LEWA HPR pump and manifolds.



Teflon double diaphragm and bacterial nodules.

Bacterial Nodules

HPR MIC Problem

- Final Filters at HPR wand = 0.04 um polysulphone
- Left filter = new
- Middle filter = 12 hours HPR and 1600 gallons UPW
- Right filter = 100 hours HPR and 13,200 gal. UPW



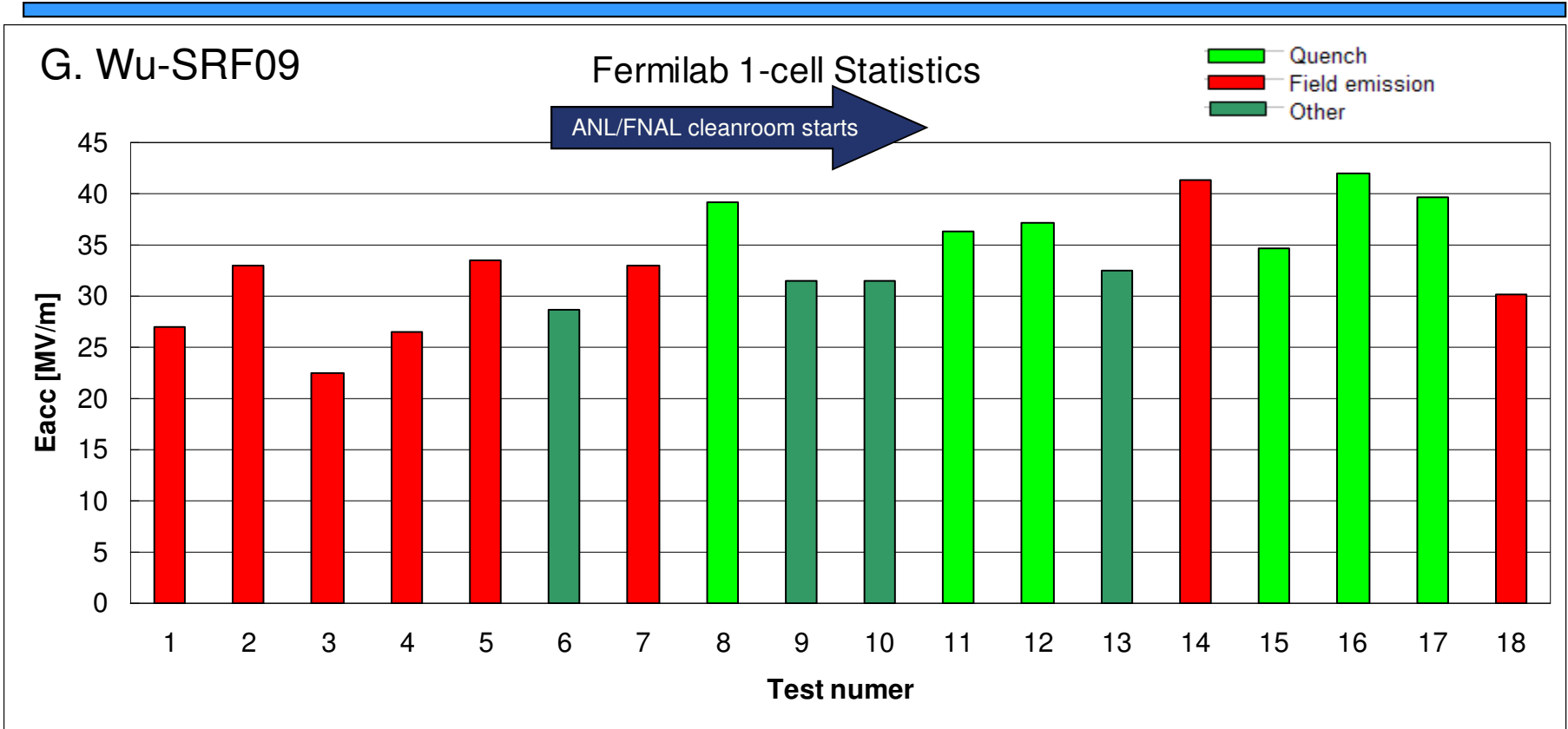
HPR MIC – Lessons Learned

- **Properly specify all S.S. plumbing**
 - **Seamless 316L stainless tubing where possible (do not use pipe!)**
 - **Proper welding specifications with material certs.**
 - **Internal surface finish of 20 u-in or better from honing, EP, and passivation.**
 - **Use fabricators with experience in sanitary SS plumbing**
- **Inspect your hardware prior to installation!**
 - **Use borescope if necessary.**
- **Monitor final filters routinely**
 - **If easy to do without contaminating system, look at least weekly.**
- **Redundant filtration provides a safety net.**

Cavity Handling – Program

- **Processing/testing delays partly due to VTS shut down (thru 3rd week of October.) and....**
- **Formalization of all cavity handling, transport, and storage in every facility.**
- **Controlled Procedures + Cavity Tracking System**
 - **Personnel Training Course**
 - **General guideline documents**
 - **Facility Specific Procedures**
- **<http://tdserver1.fnal.gov/tdweb/qm/OperationProceduresPage.asp>**
- **Documents and training may be shared with vendors and partners.**

1.3 GHz One-Cell Program



Test 7 TE1ACC002 handled with new pumping station and poor evacuation control

Test 14 FE caused by poor vacuum connection before 120 C baking

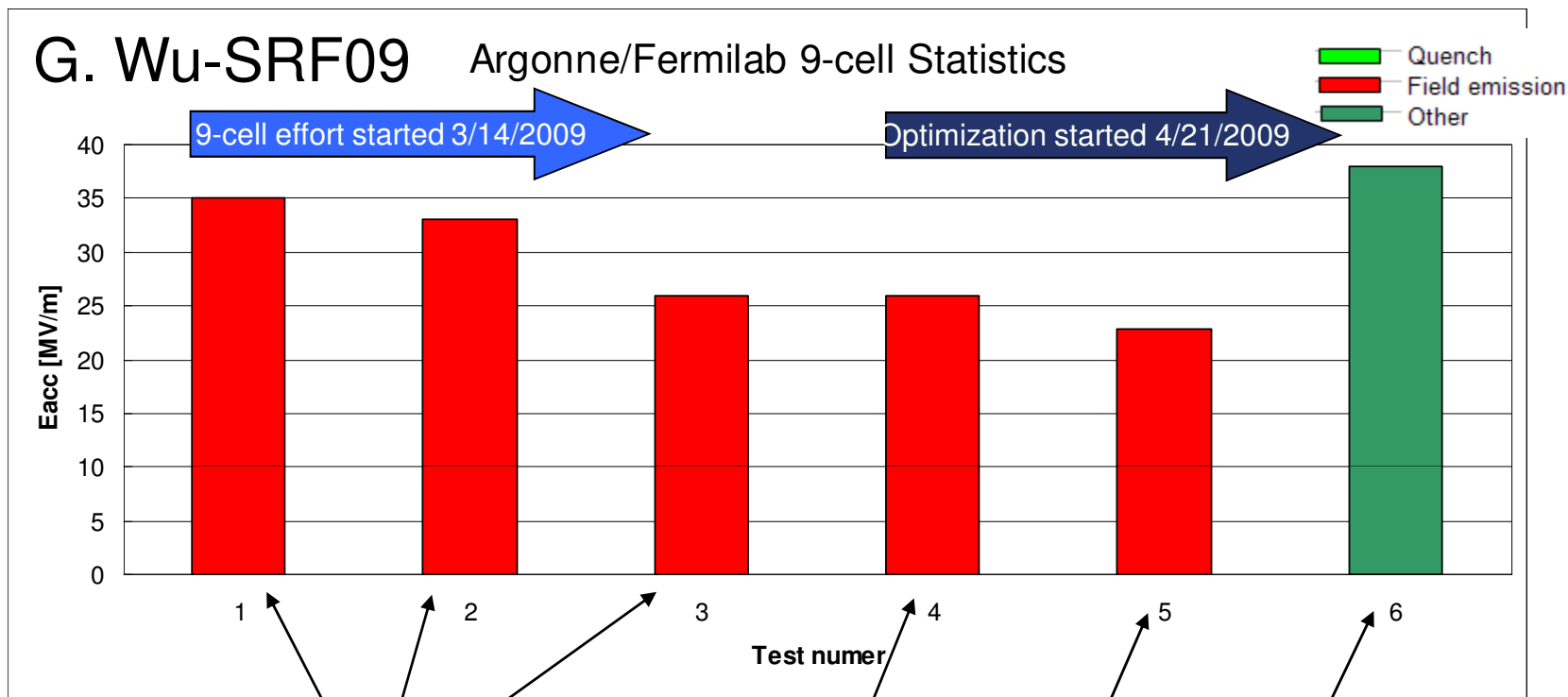
Test 18 First ABLE immersion EP with poor evacuation control

1-cell Field Emission under control at ANL/FNAL

1.3 GHz One-cell Plans

- **Current R&D program avenues**
 - **Tumbling at FNAL + light EP + HPR**
 - **Pit studies – Light EP + HPR**
 - **Vendor polishing efforts –HPR or Light EP+HPR**
- **8 new one-cell cavities arriving from PAVAC**
 - **Cavity vendor qualification**
 - **Full surface processing recipe**
 - **VT verification**
 - **May send others out to ARRA vendors**
 - **CMP & alternative polishing techniques**
 - **Bulk EP industrialization**
- **Monthly program goals over next 6 months.**
 - **2-4 EP's + 4-6 HPRs**
 - **3-4 clean assemblies & tests utilizing VTS and A0**

1.3 GHz 9-Cell Program



7-h HPR 14-h HPR 21-h HPR 14-h HPR

Slow evacuation not achieved due to valve sensitivity Improved

9-cell Preliminary: Field emission was mostly due to vacuum difficulties

New let-up/pump-down manifold in process!

1.3 GHz 9-Cell Plans

- **Continue commissioning for 9-cell cavities**
 - **Build statistics base.**
 - **TB9ACC017 and ACCEL6 will be tested multiple times**
 - **Light EP, HPR, clean assembly**
 - **Should be cycled and tested a minimum of 3 times each.**
 - **Commissioning will be primary effort over next quarter+**
- **Depending on yield of commissioning effort, new cavities may be processed through ANL/FNAL SCPF.**
- **Available processing slots will be given to 6 new RI cavities arriving with bulk EP already performed.**

Summary

- **MIC problems hopefully solved. New manifolds to be installed early Oct.**
- **Formal cavity handling and tracking program implemented. Some work remains, but process well in hand.**
- **Vigorous 1-cell program. Many areas of exploration useful to materials and processing R&D. Promising results with high yield.**
- **9-cell commissioning will finally be in full swing. Statistics over next quarter critical to pre-production push.**
- **Many new cavities arriving. ANL/FNAL SCSPF staff (some new faces) will be busy.**