

Cleanliness Program

Steve Dye

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WATCHMAN Collaboration Meeting at Hawaii

Primary Members*

- Marc Bergevin- Simulations/Analysis
- **Barb Brittella- PMTs**
- **Ferenc Dalnoki-Veress- Non-proliferation**
- Steven Dazeley- Calibration
- **Trevor Gamble- Tank**
- Rob Hills- Project Management
- Christopher Mauger- Project Science
- Tony Papatyi- Project Coordination
- **Paul Scovell- Site**
- Robert Svoboda- PMTs
- Mark Vagins- Gd-H2O
- Steve Dye- Lead
- **DAQ?**
- **PMT Support?**

**Representation from
most sub-systems**

**New
Please add delegate**

Regular meetings continue

***All collaborators are members!!!**

Attention

- WATCHMAN is wonderful opportunity
- AIT could be there long after Hartlepool shuts down
- Post-WATCHMAN uses could continue for decades and have far more stringent cleanliness requirements
- We may not foresee all future uses
- Let's not mess it up
- Cleanliness plan required

Inherent radioactivity

- Radioactivity log implemented ✓
 - Glass, water: U-238 (8α , 6β), Th-232 (6α , 4β), K-40 (1β)
 - SS: Cs-137 (1β), Co-60 (1β); Welding rod: Th-232 (6α , 4β)
 - Specs? Tolerances? Test samples at BUGS?
- Simulations specify low-activity PMT glass ✓
 - Specs? Tolerances? Testing? Is 1 PMT/batch sufficient?
- Radon in water: Removal by degassing. Measure samples at BUGS?

Material compatibility

- Degradation in Gd-H₂O
 - Component failure and/or cloudy water
 - Testing protocol and Compatibility Log required
 - Can water system measure/identify removed material?
- Pickling of SS: hydrofluoric acid removes oxide scale, heat tint, and dissolves steel flecks to greatly improve passivation
- Passivation of SS: acid wash removes free iron to prevent rust
- If pickling prohibited, then electropolish, which is superior

Mine dust / biologics control

- Filtered intake, smart air flow- clean to dirty
- Clean work begins after tank construction
- Clean tank, clean prep-room, clean components, clean workers, clean tank access paths
- How clean is clean?
- Mine dust must not produce background events at a level interfering with WM mission... then cleaner if we can

Discussion

- Comments? Balance budgets- dirt vs funds. ALARA
- Questions?
- Issues raised in pre-meetings? Detector deck is clean area: DAQ station locations vs cable lengths

Conclusion

- We have a wonderful opportunity to build a long-operating, useful neutrino detection platform
- The cleaner we make it, the more useful it becomes