Coil Fabrication Status

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Status

- QXFA202 - Complete and shipped (1st coil fabricated at BNL).
- QXFA203 - Complete and shipped.
- QXFA204 - Complete and shipped.
- QXFA205 - Cable damaged during winding – fabrication stopped.
- QXFA206 - Complete and ready to be shipped.
- QXFA207 - Reacted, prep for impregnation underway.
- QXFA208 - Cable damaged during IL cure – fabrication stopped.
  - Transition lead out of position, damaged during L1 curing.
- QXFA209 – Preparing to start winding.
Cable was damaged during curing of inner layer coil QXFA208.

- Cable was not in correct position in the transition ramp area during curing of layer 1.
  - A portion of the lead was below the ramp groove in the layer 1 pole segment, so part of lead was shifted azimuthally by 1 turn – therefore lead was not aligned with slot in the curing filler.
  - Sharp corner at lower edge of filler (b) damaged lead during curing.
- Transition lead was dislodged during prep for curing / Teflon wrapping.
- Lead was thought to have been repositioned correctly prior to curing.
- Damage was discovered after curing layer 1, when setting up to wind layer 2.

LE filler (b)  LE filler (a)  L2 Pole Segment (installed to show position of lead)

Lead not fully in ramp groove  Insulation damage visible
Contributing factors:

- The increased multiple layers of fiberglass (now 5) on the pole made it difficult to determine if lead was positioned correctly in the ramp.
- After installing lead into the pole ramp at the start of winding, there previously was no positive clamping of the lead into the ramp groove for the duration of winding and curing.
- After winding is complete, the cable spool with the outer layer conductor is repositioned from over the straight section to beyond the coil so that it is out of the way for curing. This action causes potential shifting in the position of the lead ramp.
- After repositioning the outer layer cable spool there previously was a long length of unsupported cable beyond the lead ramp.

Improvements made to prevent in future:

- Added clamp on pole to be installed at start of winding and to remain in place thru curing.
  - Clamp to be installed when the lead is initially positioned in the ramp.
- Added clamp at end of coil to be installed before moving L2 spool prior to Teflon wrapping.
  - Clamp will secure the lead so it does not shift during Teflon wrapping.
- Revised procedure for installing LE filler segments & inspecting lead prior to curing.
- Eased sharp edges on filler segments.
QXFA208

- Modified tooling:
Additional

- Additional slides – shown previously…
Cable was damaged during winding of inner layer of coil QXFA205.

- Winding was paused to address oil leaking from a gearbox.
- Cable spool was clamped and control power was turned off.
- When ready, winding was resumed without removing the spool clamp.
- Immediately paused to remove clamp.
- When resume again there was some slack in the cable that went unnoticed, as a result the cable was not fully in contact with the guide pulley.
- When cable tension was applied, the cable was pulled below the guide pulley and got caught against the guide roller bracket.

Improvements made to prevent in future:
- Added a guard below the guide pulley to prevent cable from dropping / becoming caught in the event of tension loss.
- Incorporated interlock to prevent start when spool is clamped.
Guide Pulley

Guide Roller / Spring Loaded Lump Detector

Guard Added