



AUP Coil Fabrication - Status at BNL

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11th Collaboration Meeting - October 22, 2021



AUP Coil Fab at BNL - Acknowledgment

- Brookhaven Coil Fabrication Team:
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 - R. Ceruti, C. Atanasio, M. Hartsough, G. Jochen, T. Levine, M. Milidantri, J. Perreco, W. Themann, T. Van Winckel

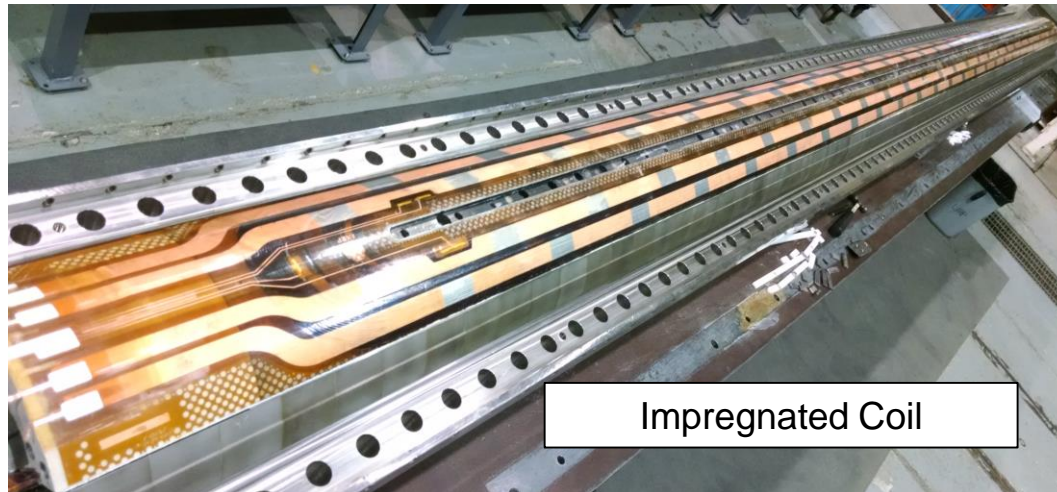
AUP Coil Fab at BNL

- Scope
- Equipment / Tooling
- Schedule
- Status
- Rejected coils
- Coils on hold

AUP Coil Fab at BNL - Scope

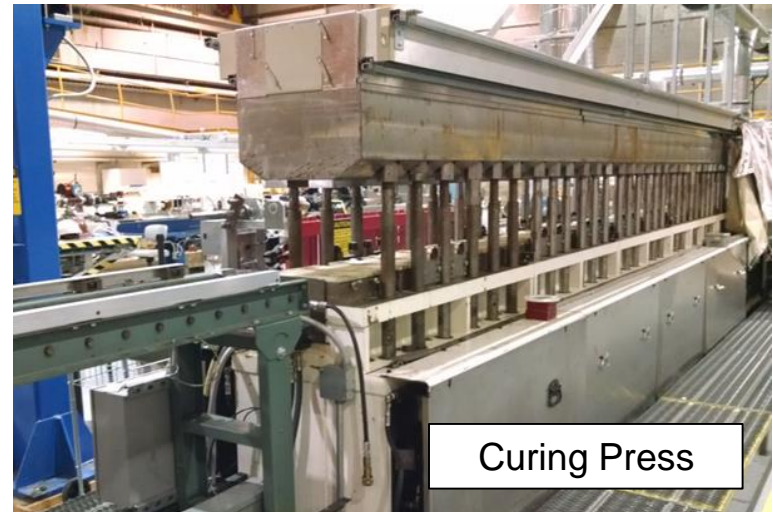
- Fabricate 49 coils (QXFA202 - QXFA250).
 - Fabrication includes winding, curing, reaction, impregnation and shipping.
 - Receive insulated cable and coil parts from FNAL.
 - Send completed coils to LBNL.

(there is a 2nd coil fabrication line at FNAL)



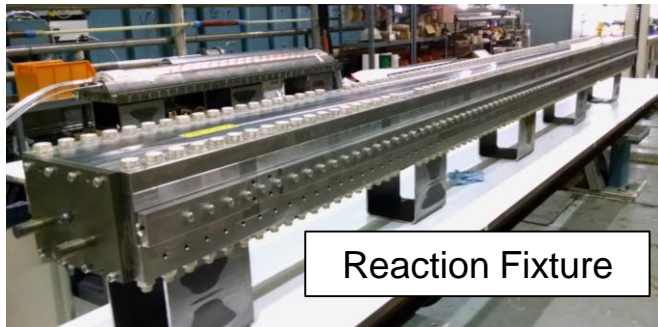
AUP Coil Fab at BNL – Equipment / Tooling

- Multiple tooling sets in use to achieve peak production rate:
 - 2 winding mandrels
 - 3 reaction fixtures
 - 2 impregnation fixtures
 - 3 coil shipping fixtures

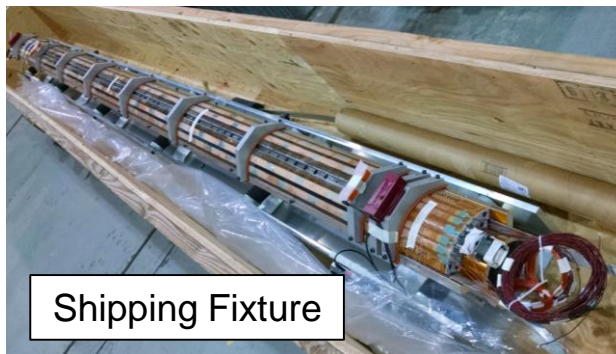


AUP Coil Fab at BNL – Equipment / Tooling

- Multiple tooling sets in use to achieve peak production rate:
 - 2 winding mandrels
 - 3 reaction fixtures
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 - 3 coil shipping fixtures



Reaction Fixture



Shipping Fixture



Impregnation Tooling

AUP Coil Fab at BNL - Schedule

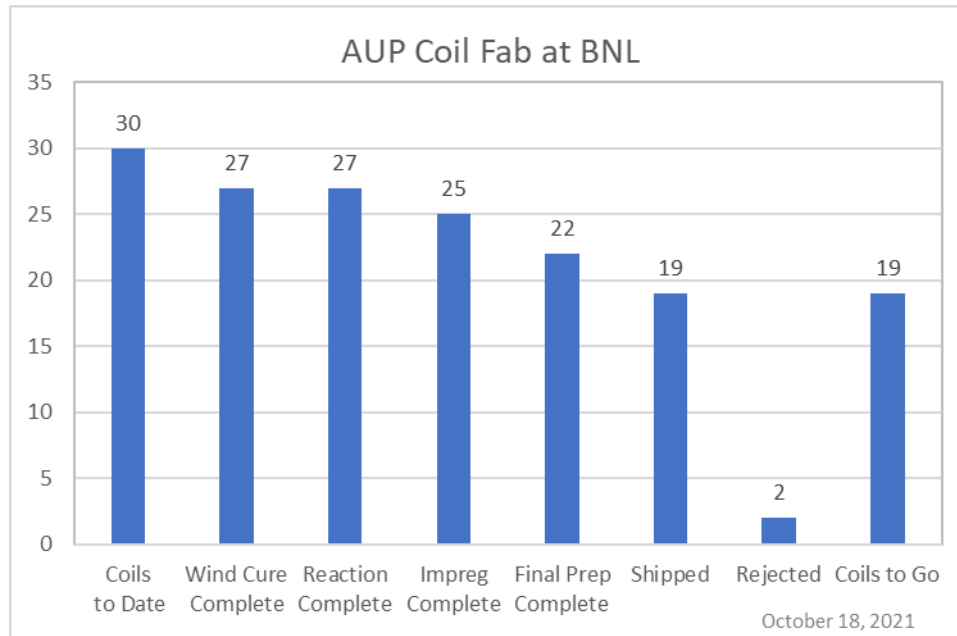
- Coil fabrication started in late 2018.
- Duration of 85 days per coil.
- Peak rate of 1 coil every 18 days.
- COVID shutdown - coil fab halted for ~3 months.
- Coil fabrication to finish in mid 2023.

- Coil fabrication is on schedule.
- We are producing coils at peak rate.



AUP Coil Fab at BNL - Status

- Coils to date = 30
 - Accepted = 21 (shipped = 19)
 - Rejected = 2 (QXFA205, QXFA208)
 - On Hold = 2 (QXFA210, QXFA226)
 - In Progress = 5
- Coils to go = 19



AUP Coil Fab at BNL - Status

- Coils in progress:

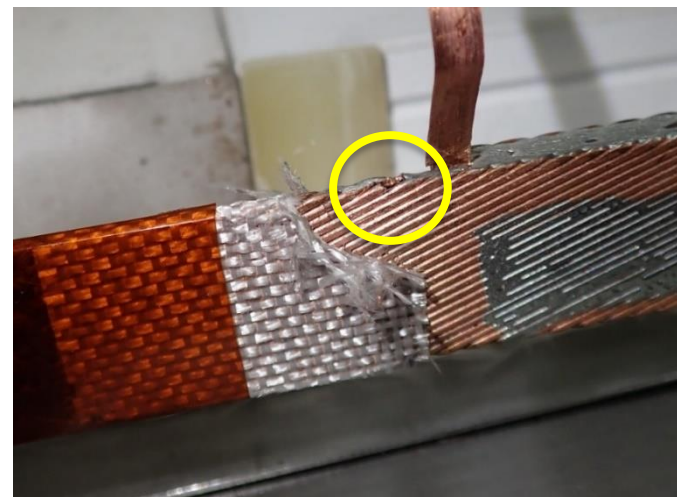
Coil	Fabrication Status
227	Impregnation complete, final prep underway
228	Impregnation complete, final prep next
229	Reaction complete, prep for impregnation underway
230	Reaction complete
231	Wind Cure underway

AUP Coil Fab at BNL – Rejected Coils

- QXFA205 – Cable damaged during winding of inner layer.
 - Cable dropped of guide pulley and caught on bracket.
 - Coil was unwound, all parts were recovered.
 - Improvements made to prevent in future:
 - Revised tooling - added a guard below the pulley.
 - Revised procedure - incorporated interlock.
- QXFA208 – Cable damaged during curing of inner layer.
 - Cable was not in correct position in the transition ramp area during curing. Damage was discovered after curing layer 1.
 - Coil was unwound, all parts were recovered.
 - Improvements made to prevent in future:
 - Revised tooling - added clamps.
 - Revised procedure – added inspection.

AUP Coil Fab at BNL – Coils On Hold

- QXFA210 – Damage to the inner layer coil lead after reaction.
 - Two Nb₃Sn strands broken.
 - Damage is just before the Nb₃Sn to NbTi splice.
 - Damage occurred when removing some excess solder.
 - Coil fabrication complete, coil in storage.
 - Improvements made to prevent in future:
 - Revised procedure.
- QXFA226 – Heater to coil short.
 - Heater damage attributed to glass bead from laser cut fiberglass.
 - Coil fabrication complete.
 - Repair work in progress.
 - Improvements made to prevent in future:
 - Adjusted setting for laser used to cut fiberglass.



AUP Coil Fab at BNL - Conclusion

- Coil fabrication is proceeding smoothly & is on schedule.
- We are running at peak production rate.
- Coil fabrication to finish in mid 2023.

- Thank you.
- Questions?