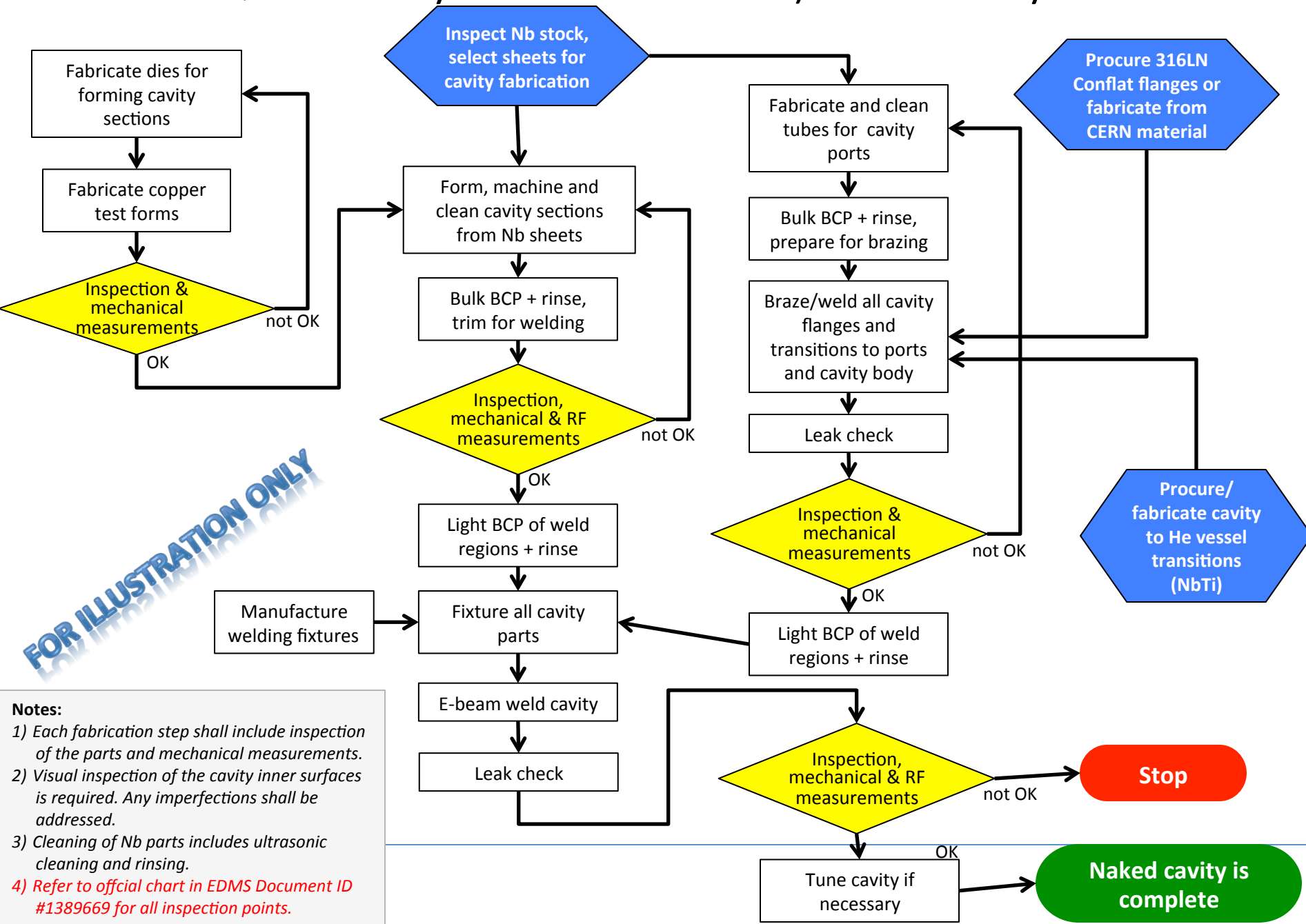


Post Fabrication Plan

Qiong Wu

On behalf of the DQWCC team

DQWCC Cavity Fabrication Plan: 1) Naked cavity



FOR ILLUSTRATION ONLY

- Notes:**
- 1) Each fabrication step shall include inspection of the parts and mechanical measurements.
 - 2) Visual inspection of the cavity inner surfaces is required. Any imperfections shall be addressed.
 - 3) Cleaning of Nb parts includes ultrasonic cleaning and rinsing.
 - 4) Refer to official chart in EDMS Document ID #1389669 for all inspection points.

Bare cavity deliver to BNL

- Heavy Buffered Chemical Polishing (BCP)
- High temp bake
- Light BCP + High Pressure Rinse (HPR)
- Bare cavity testing

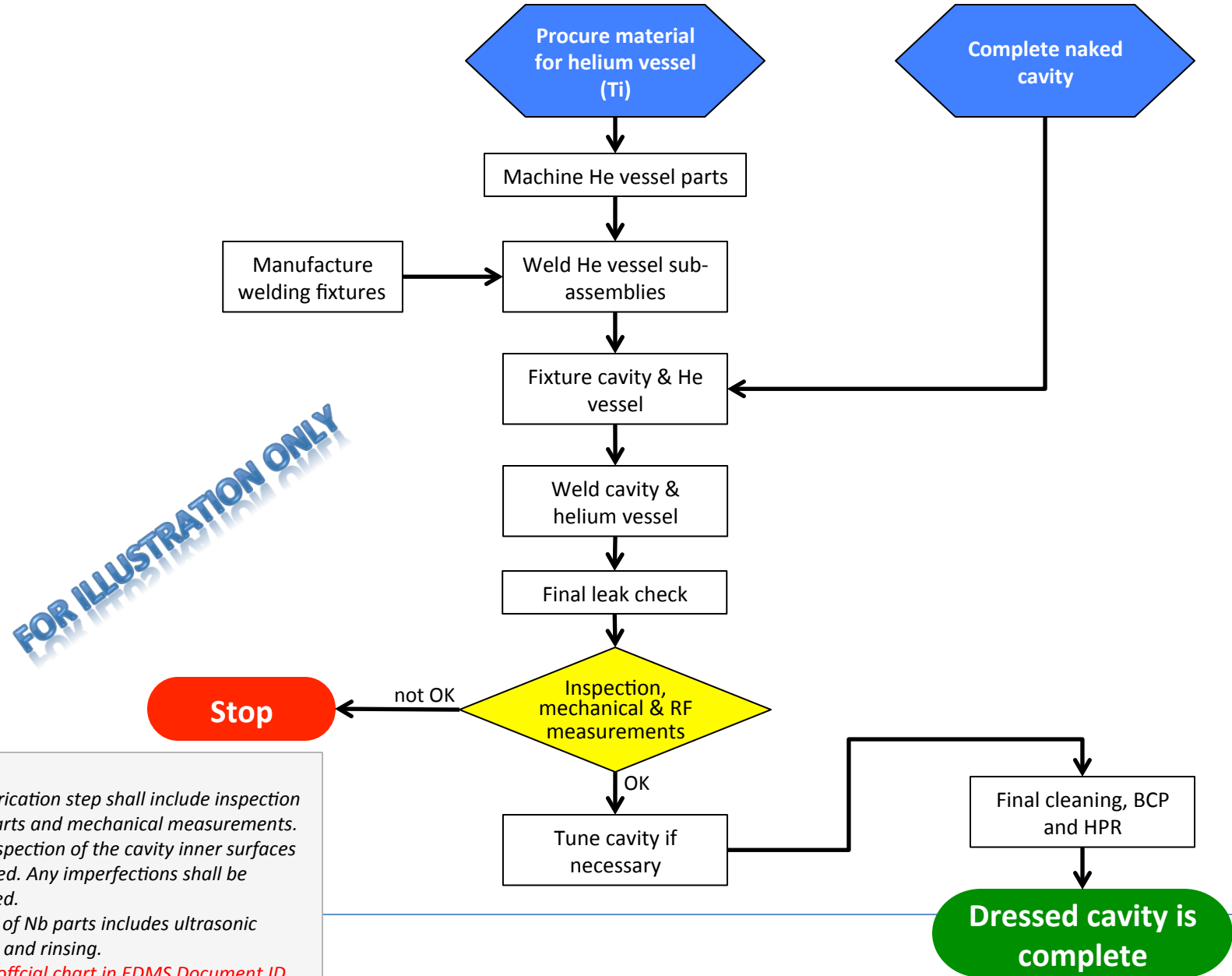
Not OK

Stop

OK

Bare cavity ship to Niowave

DQWCC Cavity Fabrication Plan: 2) Dressed cavity



FOR ILLUSTRATION ONLY

- Notes:**
- 1) Each fabrication step shall include inspection of the parts and mechanical measurements.
 - 2) Visual inspection of the cavity inner surfaces is required. Any imperfections shall be addressed.
 - 3) Cleaning of Nb parts includes ultrasonic cleaning and rinsing.
 - 4) Refer to official chart in EDMS Document ID #1389669 for all inspection points.

Post fabrication

- Bare cavity testing
- Coupler and tuner fabrication
- Dressed cavity assembly
- Dressed cavity testing
- Dressed cavity shipping

Bare Cavity Testing

(all time estimations are based on the DQWCC PoP cavity)

Includes:

- Toolings (FPC, PU, and temp fixture for vertical testing) and prepare vertical dewar top plate assembly
 - BNL
 - Can be done in parallel with cavity fabrication
- Heavy BCP
 - Location TBD
 - ~3 weeks/cavity
- High temp bake
 - BNL
 - ~1week/cavity
- Light BCP and HPR
 - Location TBD
 - Together ~3 weeks/cavity
- RT measurement (frequency)
- Vertical test (including assembly in clean room, leak check, cool down, test at 4K and 2K, and warm up)
 - BNL
 - ~4 weeks/cavity

Tested cavities will be shipped back to Niowave for helium vessel installation.

HOM Coupler and Tuner Fabrication

(Will be done in parallel of the bare cavity fabrication and testing)

Includes

- Coupler design
 - BNL, UK, CERN
 - RF, mechanical, and thermal design (ongoing now)
 - Prototyping 1 coupler and filter
 - Measure prototype in mock up assembly for thermal cycles and RF properties
 - Modification of design according to measurements
- Coupler fabrication
 - Location TBD
 - 8 coupler + filter assembly total
 - Tuning
- Tuner design
 - BNL, CERN
 - Includes coarse and fine tuning
- Tuner fabrication
 - Location TBD
- Coupler and tuner RT and cold tests

Dressed Cavity Assembly

Includes

- Additional toolings and modifications to the vertical dewar top plate
 - BNL
 - In parallel with tuner and helium vessel installation
- Light BCP and HPR
 - Location TBD
 - ~4 weeks/cavity
- Cavity assembly with all couplers (FPC, PU, 3 HOM per cavity) and tuner, mounting to top plate, and leak check
 - BNL
 - ~3 weeks

Dressed Cavity Testing

Includes

- RT test
 - BNL
 - Tuner
 - HOM coupler spectrum (rough measurement)
 - ~1 week/cavity
- Cold test
 - BNL
 - 4K and 2K
 - ~1 week/cavity

Dressed Cavity Shipping

The shipping will be the final step for both dressed cavities. Dedicated crates may need to be fabricated/purchased for each cavity.

Other Tasks in Parallel

- Collaboration on cryomodule development
- Preparing US HL-LHC Project Cost Estimate

Summary

- Fabrication flow chart is provided in this presentation.
- During fabrication, we will participate in the check point inspections. Official inspection/hold points are listed in EDMS document ID 1389669.
- Prepare toolings, fixtures, couplers (for VT) can be done in parallel to the cavity fabrication.
- Bare cavity testing will take approximately 12-14 weeks for a single cavity, including all chemistry and shipping.
- Fabrication site of the HOM couplers and tuner will be decided.
- Dressed cavity test preparation can be done in parallel with helium vessel installation.
- Dressed cavity assembly and testing will take approximately 10-12 weeks for a single cavity, including all chemistry and shipping.
- With careful planning, testing two cavities may take less time than twice as mentioned above.
- All time stated above do not include any margins.