



# Accelerator Division All Hands Summer Shutdown 7/16/20

Cons Gattuso

AD Shutdown Manager

# Shutdown Parameters

- Original Shutdown Parameters
  - Accelerator Complex Shutdown and LBNF Site Prep
    - 20 Weeks (LBNF Site Prep driven)
      - May 31<sup>st</sup> – Oct 12<sup>th</sup>
- Covid-19 Modified Shutdown Parameters
  - Accelerator Complex Shutdown
    - 18 Weeks
      - June 15<sup>th</sup> – Oct 12<sup>th</sup> (Reached Mission Critical Phase)
  - LBNF Site Prep
    - April 27<sup>th</sup> – Mid Sept.

# Covid-19 Impacts to our Shutdown Planning

- Readiness
  - When the lab went into Safe Standby mode March 23<sup>rd</sup> effectively fabrication and assembly stopped.
    - Our original planning 75%+ of shutdown installation components being in hand and ready for the installation on June 1<sup>st</sup> .
    - Covid-19 Protocols that are used in AD were developed and implemented
- Work Force Limitations
  - Personnel recovery rounds
    - Expanded Essential Mode (Rounds 1-3)
      - Projects were given priority so ~70% of AD personnel brought back during those rounds were to support projects. (LCLSII, PIP2, LBNF)
        - Personnel in Rounds 1-3 began focusing in Shutdown activities between rounds 4-5.
        - At this point most of those people are not focused on Shutdown related activities.
    - Mission Critical/Limited Operations (Round 4- present)
      - Shutdown focused
        - Bulk of our labor force was brought back during this time frame.

# Covid-19 Impacts to our Shutdown Planning

- How Shutdown work is performed during Covid-19
  - Impacts to tasks both in the tunnels and are Tech areas
    - Based on PPE requirements
    - Maintaining Social distancing
      - Work benches
      - To Tunnel environment
    - How we get tunnel keys
  - Incorporating Covid-19 protocols to our HA's and procedures
    - Reviewed how our work was done
      - Adjusted sequencing of steps
      - To time need to complete tasks
- Scope of Shutdown work redefined
  - Complete Schedule was reworked
    - Worked with Machine and Support Department re-prioritizing our shutdown work.
      - High Priority Tasks/ Medium priority tasks/ Low priority wish list tasks
  - Redefined our Approach to global shutdown planning/Execution
    - We have a long-term schedule (road map) for the shutdown but we are only detail planning a short term look out.



# How our Summer Shutdown Will Progress

- We will take it 3 Weeks at a time....
  - Current/Planned week
    - We will have a detailed plan outlining what each crew will be doing
  - Looking 1 Week out
    - We will know what jobs will be in the que for that week
    - We will be preparing anything needed for that Job
    - We will also have a back up job if the intended task can't be done
      - Manpower needs, Job readiness, how are task progressing
  - Looking 2 weeks out
    - The schedule will be less clear
    - Gauge how jobs/task are progressing
    - Line up potential tasks that can occur and
- What are our Expectations?
  - We will **NOT** get everything done that we would want to
  - What we **Do** get done will be done safely
  - People will be respectful and understand that schedule changes and manpower allocation will be in flux.
  - If you see something say something
    - Covid-19 and Machine issues

# Proton Source Shutdown Work list

## RIL (RFQ Injection Line)

- Source maintenance
  - Einzel Lens maintenance
  - RFQ maintenance
  - General maintenance
- ~20% complete

## Linac

- LRF 2 Quad drift tube replacement ~70% complete
  - Task underway
- LE tasks (performed by Linac techs)
  - Modulator/driver maintenance
  - Inductrol maintenance
  - Water skid maintenance

~15% complete
- HE tasks (performed by Linac techs)
  - CS & PFN maintenance
  - PFN cap bank maintenance
  - QPS PM
  - Water skid maintenance
  - Heat exchanger maintenance

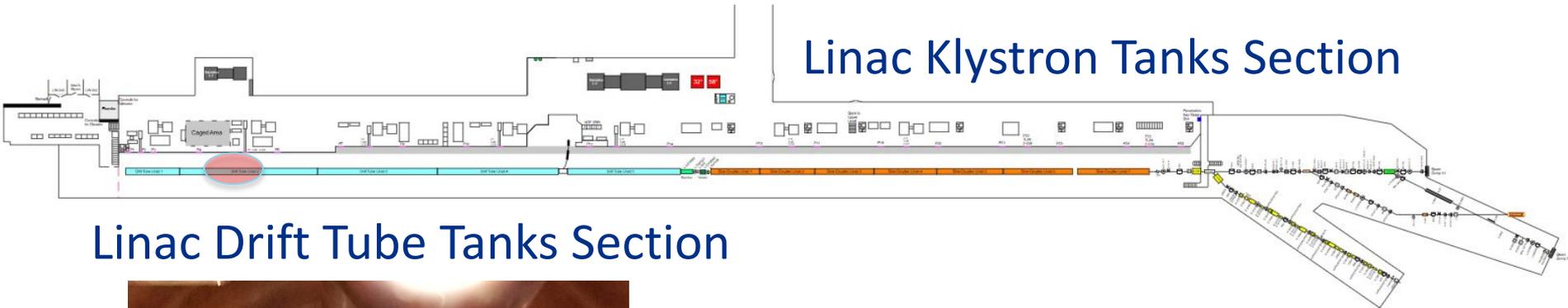
~15% complete

## Booster

- Injection foil Changeout
- Alignment network ~90% complete
- Wide bore install
- General Maintenance
  - Power supplies
  - Cooling Systems
  - Vacuum

~15% complete

# Linac Drift Tube Replacement



Linac Drift Tube Tanks Section

MTA/ITA



Inside of Linac Drift Tube Tanks



Beam Line on the MTA hall side of the shield wall.

# Main Injector/Recycler

## MI

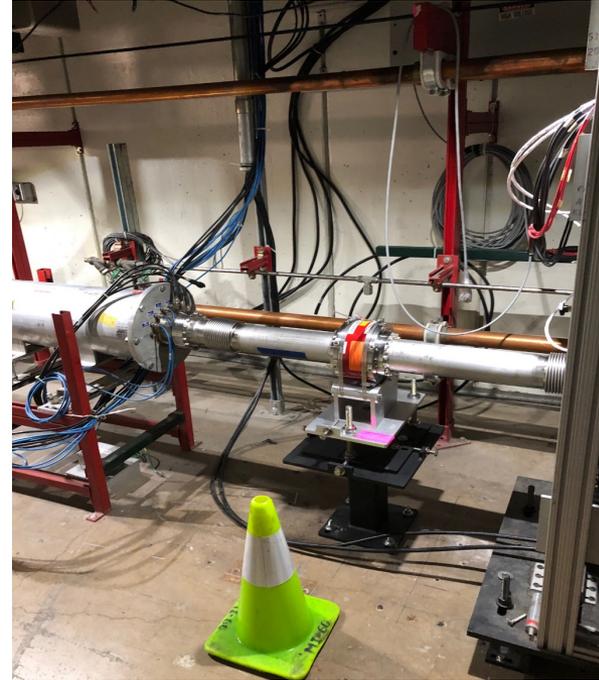
- 8 GeV line
  - Failing ion pumps cable pulls
- General Maintenance for MI/RR
  - ~2-3 weeks
    - Tunnel and service building
- Q110 Quad Water leak repairs ~95% complete
- DCCT Installation ~95% complete
- Collimator Repairs
  - Re-establish Horz control/Motion
  - Insert installation
- RF System ~5% complete
  - Vacuum Maintenance
  - Repair/replace water cooling water path
    - 2 of 20 stations have been pulled and are in the process of repair.
- Cable pulls
  - failing ion pumps Trades will be starting Week of July 13<sup>th</sup>
    - MI40 / MI20-320 / MI607-608

## RR

- Sextupoles installation
  - Location 223, 319, 321 and 323
  - Magnets and cable pull for these locations
- Stripline detector at 201 location
  - Both detector and cable pull
  - Installation of power supplies in the MI21 peanut
- LBNF Site Prep
  - Various power/Comm outages
    - MI10/20
      - Power/comm Path Rework
      - Tie in new Equipment
        - » Mi20 cooling tower
        - » Pump vaults
  - MI10 Pond F removal
  - MI20 Cooling Tower
    - Tie in between Pond E and G



MI110 Quad Replacement



New DCCT installation 620 location

# External Beam line

- F24-1 3Q120 replacement
  - Water leak on magnet which can't be fixed in place. ~ 10% Complete
    - As-Finds are complete...



Water leak

- Enclosure B
  - Multi wire at 105
    - Replacement of the 105 multi wire that failed during Covid 19 Min-safe .
- Transfer Hall
  - Installation of beam pipe segment to allow easier access from Tev
- F-Sector Heat exchanger Cleaning
  - F1/2/3/4 Contractor will be starting Week of July 27<sup>th</sup>

## External Beam line (continued)

- NuMI (~16-18 weeks)
  - Horn 1 replacement
    - Complete Fabrication and Testing **~30% Completed**
    - Installation of 1 MW Horn NuMI beamline
  - Water system upgrades Hadron Absorber Intermediate system **started this week**
    - Piping modifications Absorber Hall
    - Installing backup HX to Absorber Intermediate system
    - Fabrication work will be occurring at MI12
  - Target Chase Chiller and Air handling unit **to start next week**
    - Install new cooling coils, coil piping components, and monitoring instrumentation.
  - General Maintenance **~50% Completed**
    - Dehumidifiers
    - Replace Filter and water in the Absorber and Decay pipe cooling system
    - Drain tile cleaning
    - Ext.

# Muon Campus Work

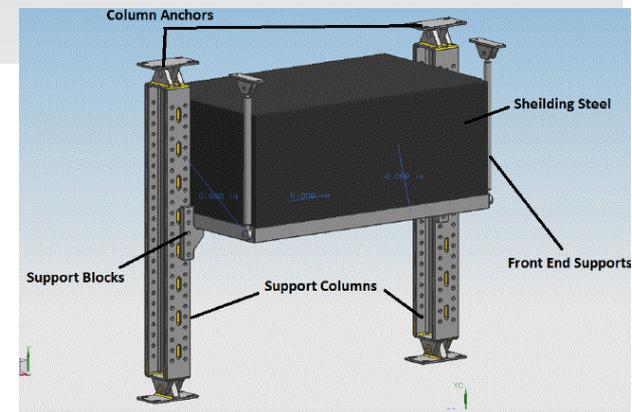
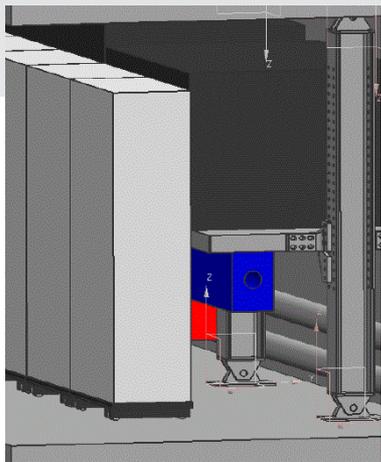
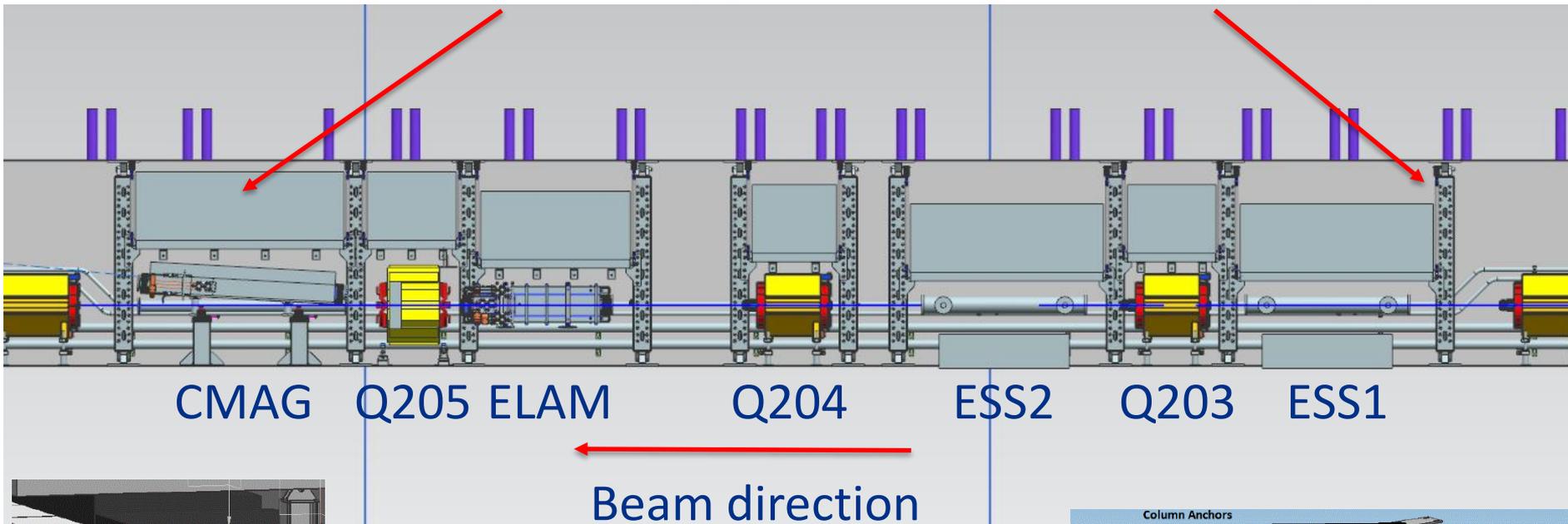
- Delivery Ring
  - General Maintenance
    - Vacuum
    - Power supplies
    - Cooling systems
- Mu2e work
  - D30 Shielding ~5% Completed
    - Installation of steel plates
  - Resonant Extraction ~10% Completed
    - Installation of Sextupoles in the 10,40,50 and 60 sections
    - Cable pulls for the above elements
    - Power supplies in the AP10/30/50 buildings
  - M4 beam line
    - Mask installation
    - Multiwire binding issue investigation
    - 907 Vacuum window
  - M4 Final Focus
    - Instrumentation
    - Cables
      - » Power
      - » Safety system cables
      - » Trims



# In tunnel shielding at resonant extraction

3 foot steel shields (7)

10 column (10)

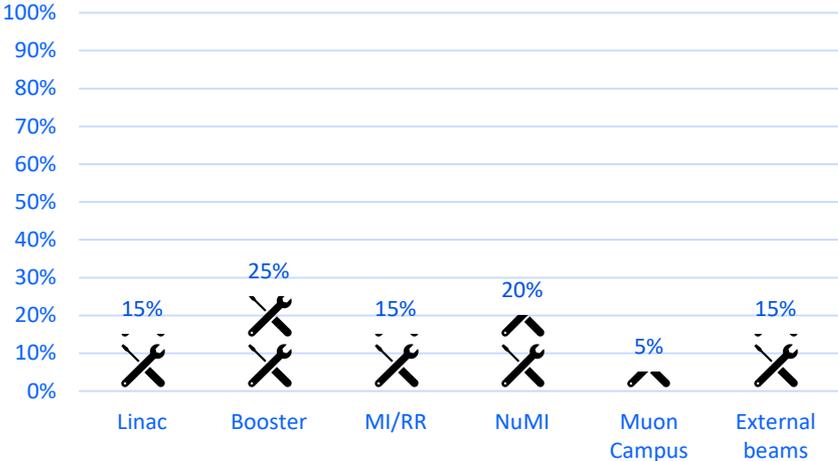


# General Power Outage and Maintenance status



\*% of completed

Maintenance Work Complete



## Power outages/Feeder and Transformer PM

### • Outages (count)

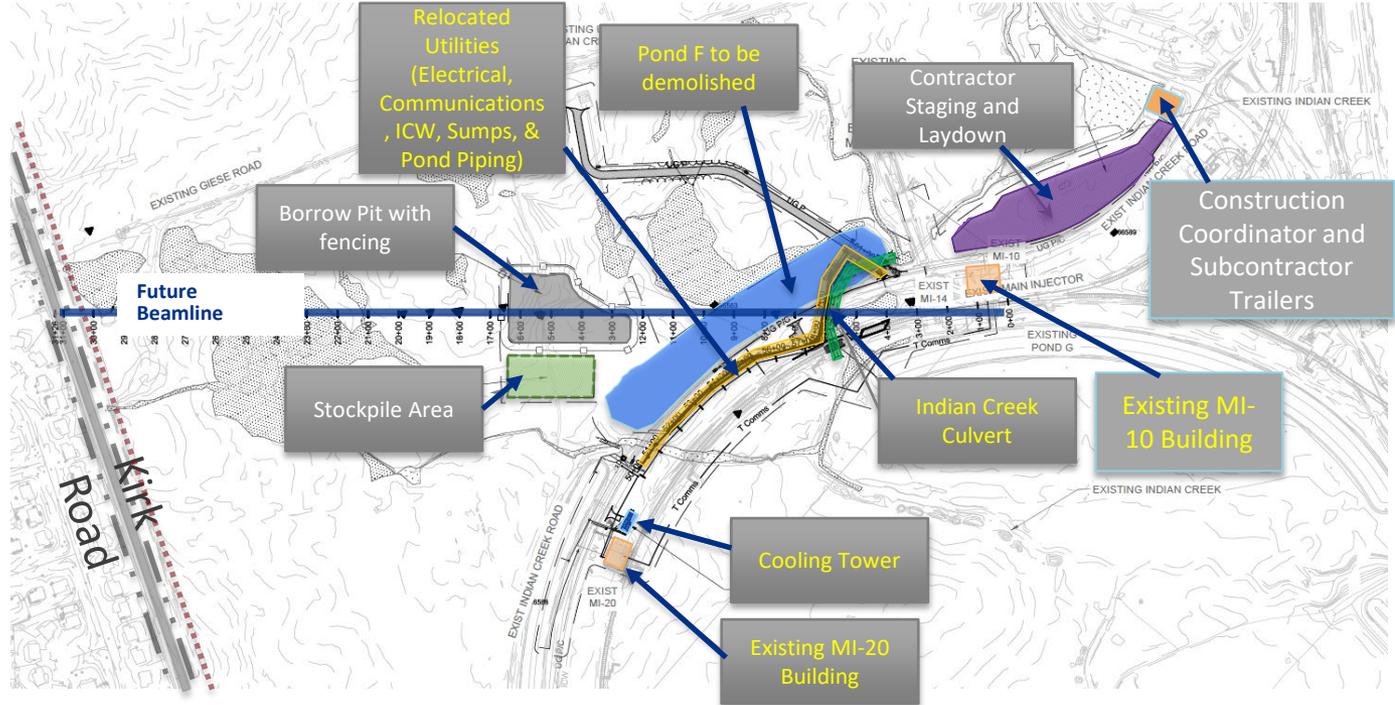
- Planned (currently).....2
- Executed.....23
- Still need to be planned.....45
- Deferred.....2 (by owner)

### • Complication due to IERC Construction

- Feeders 40-44 have been relocated
  - Prior to use they will need to be power and checked out.
    - Tuesday 7/14 energizing

## Power Supply/Vacuum/ Water Maintenance Work Completed

# LBNF Site Preparation Scope of Work



## Relocation

MI Road Between MI10 and 20

Pulsed and House Power Conduit Between MI10 and 20

Removal of Pond F

Installation of MI20 Cooling tower

Relocation of Indian Creek

# Shutdown Progress

