

# Run '20, Covid, Maintenance, Shutdown, prep for run '21

RHIC Retreat Thursday October 15<sup>th</sup>, 2020



# Outline:

- Run 20, transition to Min-Safe
- Systems maintenance, emergency repair during Min-Safe
- Return to Ops critical running, repair and maintenance methods
- Shutdown status and project updates
- Testing and other work
- Red letter dates
- Startup

# Covid and Run 20


- Quarantine
  - Initial impact, home setup
- Transition to Min-Safe
  - Systems shutdown
  - Planning, prioritization
- Min-Safe Ops:
  - PPE management, shortages, rules...
  - Personnel management
  - Precautionary measures, modifications
  - Daily Maintenance: POD
  - Work planning, approval, execution evolution
  - Emergency repair, mission critical programs

# Covid Timeline: Early Adaptation

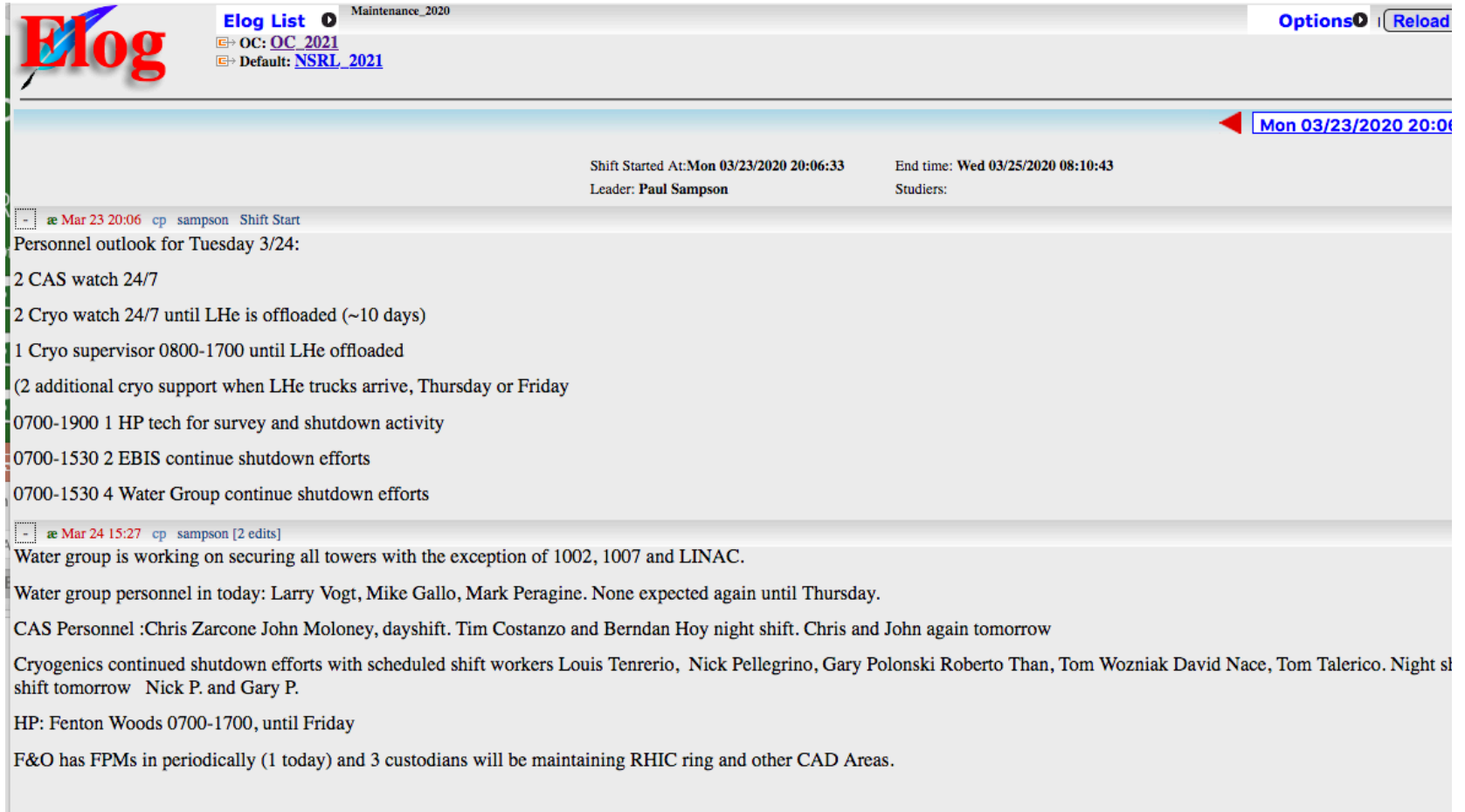
- March 9<sup>th</sup>: 911 exposure to 1<sup>st</sup> BNL Covid case
  - Quarantine and home office setup
  - RHIC run continues
- March 20<sup>th</sup>: Site shutdown to Min-Safe
  - All systems shutdown
  - Partial yellow warm up
  - LEReC and CeC systems off, cavities remain cold
  - MCR unstaffed, calls forwarded to home



# Use, Adapt tools for work and personnel tracking

- Maintenance elog
  - CATV/WEB page
  - JRS
- 

# Elog: Initial use of elog for personnel tracking



The screenshot displays the Elog web interface. At the top left is the Elog logo. To its right is a navigation bar with 'Elog List' and a dropdown menu showing 'OC: OC\_2021' and 'Default: NSRL\_2021'. Further right is the text 'Maintenance\_2020'. On the far right of the navigation bar are 'Options' and 'Reload' buttons. Below the navigation bar is a header section with a date and time 'Mon 03/23/2020 20:04' on the right. In the center of the header, it says 'Shift Started At: Mon 03/23/2020 20:06:33' and 'End time: Wed 03/25/2020 08:10:43'. Below the header, the main content area shows a list of personnel outlooks. The first entry is dated 'Mar 23 20:06' and is by 'cp sampson'. It starts with 'Personnel outlook for Tuesday 3/24:' and lists various tasks and personnel assignments. The second entry is dated 'Mar 24 15:27' and is also by 'cp sampson' with '[2 edits]'. It contains several paragraphs of text detailing the work of the Water group, CAS Personnel, Cryogenics, HP, and F&O.

**Elog** Maintenance\_2020 Elog List OC: OC\_2021 Default: NSRL\_2021 Options Reload

Mon 03/23/2020 20:04

Shift Started At: Mon 03/23/2020 20:06:33 End time: Wed 03/25/2020 08:10:43  
Leader: Paul Sampson Studiers:

Mar 23 20:06 cp sampson Shift Start  
Personnel outlook for Tuesday 3/24:  
2 CAS watch 24/7  
2 Cryo watch 24/7 until LHe is offloaded (~10 days)  
1 Cryo supervisor 0800-1700 until LHe offloaded  
(2 additional cryo support when LHe trucks arrive, Thursday or Friday  
0700-1900 1 HP tech for survey and shutdown activity  
0700-1530 2 EBIS continue shutdown efforts  
0700-1530 4 Water Group continue shutdown efforts

Mar 24 15:27 cp sampson [2 edits]  
Water group is working on securing all towers with the exception of 1002, 1007 and LINAC.  
Water group personnel in today: Larry Vogt, Mike Gallo, Mark Peragine. None expected again until Thursday.  
CAS Personnel :Chris Zarcone John Moloney, dayshift. Tim Costanzo and Berndan Hoy night shift. Chris and John again tomorrow  
Cryogenics continued shutdown efforts with scheduled shift workers Louis Tenrerio, Nick Pellegrino, Gary Polonski Roberto Than, Tom Wozniak David Nace, Tom Talerico. Night shift tomorrow Nick P. and Gary P.  
HP: Fenton Woods 0700-1700, until Friday  
F&O has FPMs in periodically (1 today) and 3 custodians will be maintaining RHIC ring and other CAD Areas.

[Elog List](#)

Maintenance\_2020

[Options](#)[Reload](#)[OC: OC\\_2021](#)[Default: NSRL\\_2021](#) [Wed 06/10/2020 07:39](#)Shift Started At: [Wed 06/10/2020 07:39:11](#)End time: [Thu 06/11/2020 06:24:35](#)Leader: [Paul Sampson](#)

Studiers:

[10 07:39](#) [cp](#) [sampson](#) Shift Start

h : Workers at CAD:

[workers: 2](#)[Startup Support:](#)[NSRL: 8](#)

orkers:

ift 2

ift 2

upply 14

s 2

nications 2

sion/Management 6

ians 4

otal (excluding BLIP/MIRP) 50

[10 07:54](#) [cp](#) [sampson](#) [3 edits]

## Notes

continue LEReC gun conditioning, pulse AGS Main Magnets, begin AGS checkout. AtR checkout, restore STAR tower, power supply and RF work in RHIC, STAR systems re-start.

## Closeout

ted today: LEReC gun conditioning, AGS MMPS pulsing and STAR tower turn on. Progress made on AGS and AtR checkout and STAR systems re-start. FTEs on site were as per

# Job Request System was modified for tracking

- 100 Jobs During Min Safe
- 170 Jobs during Phase I and II



## Job Request - Terminate CeC dipole magnet DC cables

### Job Status - Open

**Status:** New Job  
**Group:** Power Supply (RHIC)  
**Estimated Time:** 5 dys  
**Affected Machine:** RHIC  
**Job Title:** Terminate CeC dipole magnet DC cables  
**Contact(s):** bruno@bnl.gov, zapasek@bnl.gov  
**Requested Date:** Min Safe  
**Ring Access:** 2z1  
**Building Access:** N/A  
**Hazards:** N/A  
**Submitted On:** Jun 3 2020 9:13AM  
**Submitted By:** bruno@bnl.gov  
**Approved On:** Jun 4 2020 7:08PM  
**Approved By:**  
**Scheduled Date:** 2020-06-05  
**Job Number:** 4

**Description:** Don Gosline, Rich Negron will be terminating DC cables for the CeC dipole magnets in the tunnel from 6/4/20 until 6/12/20. Anthony DiLieto will be providing guidance along with Ron Zapasek

**Impact Statement:** N/A

**Comments / Additional Support:** N/A

**Closeout Feedback:**

# Personnel tracking added to JRS

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# Return to Ops Critical running

- Start-up:
  - PODs
    - On-site personnel management- Essential list maintenance
    - Scheduling, planning and execution evolution and adaptation
- Control Room, other access management
  - Administrative control of access, postings, procedures
  - Installation of no touch access “Toe Kicks”
  - PPE, keyboard covers, stylus, sanitizer, masks etc.
  - Subsystems, water towers
    - Plan, prioritize, plan and execute with minimal risk
  - Checkout, repair
  - Cooldown
  - Systems turn on
  - Return to operations

# Repair and Maintenance during Min-Safe and phased return

- Remote work planning, walk throughs
- Daily plans for activity
- Explicit individual roles defined
- Population control
- Access Methodology Changes
- Well defined access and work execution windows

# Items during shutdown and MinSafe periods

- Quick adaptation and evolution of available tools and systems greatly aided in maintaining critical systems
- CAS was very successful adapting to becoming the center for activity, especially early on
- Very good response by management, area office for mission critical approval
- All groups excellent response throughout, despite uncharted waters
- Many tools and methods developed during the shutdown and re-start periods will be assessed for possible SOP

# Extraordinary effort:

- EBIS, R. Schoepfer, J. Ritter et al- emergency repair of SC solenoid
- LINAC: Deepak & co
- RFG: Support across the board
- Vacuum group: LINAC, BLIP and other items
- IBCS: Chipmunk recalibration
- RPSG: Repair and setup of SC magnets following shutdown and partial warm up
- Cryo Group: Maintained shifts, responded to all issues, maintained system in standby for re-start
- CAS
- ALL CAD- Excellent work for those I missed

# Sustainability

- Centralized, focused personnel, priority and work control
- Large pool of expertise from end to end available for singular efforts
  - Efficient safe and compliant work plans
  - Execution under extra protocols went very well
  - No safety incidences
  - Affect of “Emergency Mode”?
- Other work must re-start for progress and improvements to continue
- Some methods may be adapted for Stat up '21

# Return to full productivity

- Population control
- Work plans
- Work hours and area access
- PPE

# On site population control for CAD

## C-AD Weekly Staff Reporting Form

Form for entering weekly staff FTE reporting for C-AD work groups.

Supervisors should enter FTE reports on a weekly basis.

Hi Paul, when you submit this form, the owner will be able to see your name and email address.

\* Required

### 1. Work Group \*

*Enter work group.*

Select your answer



### 2. Week of Report \*

*Enter Friday date of week for reporting.*

Please input date in format of M/d/yyyy



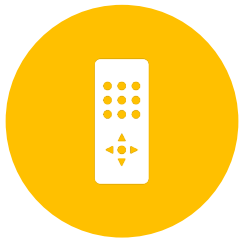
# Work plans



Developed remote methods for review approval



Paper less approval documentation



Remote walk through, training



Prioritization methods, upper management approval methods developed

# Maintenance and repair Adaptations

- Procedural modifications to minimize risk, exposure:
  - Minimize/eliminate contact for access: RA windows during maintenance days
  - Schedule specific group occupation during access windows
  - Reduce/eliminate and or reschedule non-critical work

# Lessons learned

- PPE and safety equipment shortages and hoarding a problem
  - Personal use
  - Outside purchase
  - Donation
  - Improvisation
- Communication
  - In CAD very good
  - Room for improvement with outside entities

# Shutdown 2020

- Injector Status:
  - LINAC
    - Running for NSRL through Dec 23
    - Polarized Protons in January (!?)
  - \*During November 21-30 shutdown RA zones 2,3&4
  - RF remains in RFNA and standby for BLIP
  - EBIS
    - On for NSRL through December 23<sup>rd</sup>
  - Tandem
    - Local schedule, protons as necessary for NSRL if LINAC off

# Booster and AGS

- **Booster:**
  - Running for NSRL in RA
  - BtA foil replacement bake during late November
  - AC dipole commissioning in January
    - Presently testing (Posting on ring)
- **AGS:**
  - No major changes
  - HSSD installation
  - Legacy component removal
  - IPM gas upgrade

# RHIC Shutdown 2020

- Progressing in all areas
- LEReC and CeC RF cavity/waveguide installations progressing on schedule
- RF dummy load testing later in the month (Need 1002 cooling tower)
- Early Blue cooldown for LEReC and CeC cooldown
- sPHENIX work ongoing

# RHIC: Major works at a glance

- EBIS upgrade installation
- BOOSTER Change BTA foils – define new foils and order. (Bakeout)
- AGS Remove SEB Lambertson magnets and splitter drives and shielding?
- AGS Inspect J10 dump copper insert for beam induced surface erosion.
- RHIC 0200 Install CeC diagnostic line: new high-power dump, copper RF cavity, instrumentation, magnets etc.
- RHIC 0200 Install LEReC 1.4 GHz RF cavity in transport line, fast valve?
- RHIC 0800 sPHENIX rail modifications/upgrade and cryogenic installation: valve box in 1008B, transfer lines to tunnel, in tunnel installations. (Bakeout)
- RHIC Cryo controls upgrade/move at 12 o'clock

# Service Outages:

- Electrical, Water, Air conditioning and other service outages be scheduled around critical path work.
- Immediate and immanent Outage schedule displayed on CATV and on the web.
- Full schedules available on the web and updated weekly.



# Other items:

- Mowing, tree removal, grounds..
- Water, AC, heat and other system maintenance, upgrades, outages.
- PSE&G outages:
  - Annual equipment maintenance TBD

# Dates of note:

Day	Activity
Nov 21	End of NSRL, Begin BtA foils
Nov 23	Begin Cryo scrub
Dec 3	Resume NSRL
Dec 23	End NSRL, begin 40k Wave
Jan 25	Blue 4k wave, LEReC and CeC cooldown

# Schedules and timelines:

- Available on the web “This Week”.
- Weekly updates at Tuesday planning and scheduling meeting.
  - 1430hrs online
- Other items and updates at the Supervisor’s meeting
  - Thursdays 0915hrs online
- Links:
  - [This Week](#)
  - [CATV](#)

# Shutdown Summary and comments:

- Schedules frequently modified and adapted for safety, accessibility, priority and workforce considerations
- Work Coordination is critical for the mission and safety.
- A complete list of work in the CAD maintained [online.](#)