Proton Source Improvement Plan Workshop Dec 6&7 2010

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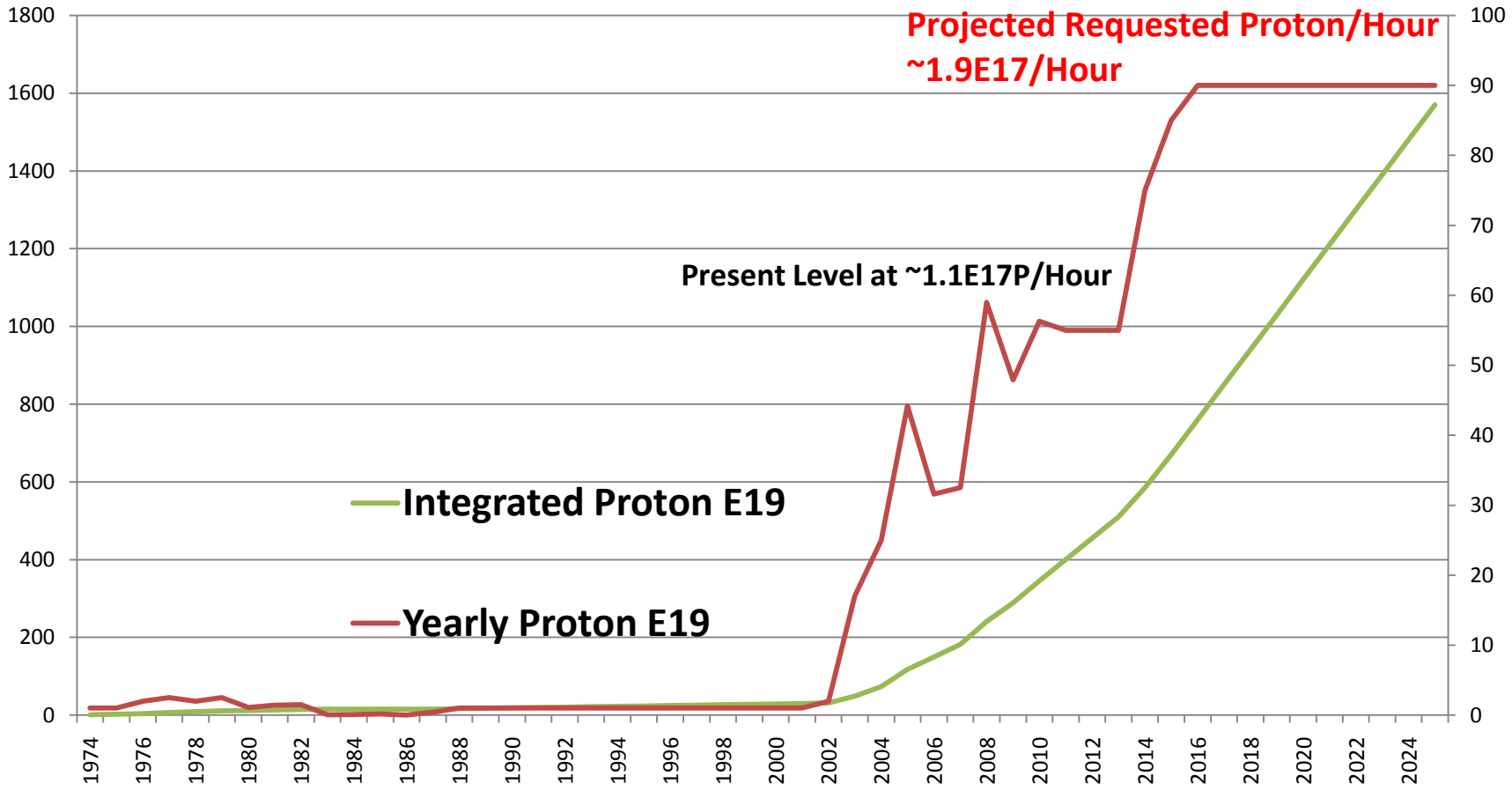
Activity

- There has been a lot of talk about future plans for Proton Source and how it fits the plans for the High Intensity Frontier and/or Collider (RUN III..RUN IIB.)
- The budget, manpower and proton numbers required to meet goals are being discussed –
- Several recent talks and papers on the Proton Source regarding future operations can be found in the Public Document Database.
  - Task Force Report
  - Proton Source Task Force Talk - APT_Seminar
  - Directorate's Meeting – Task Force Report
  - Proton Source Improvement Workshop

Requested Protons



History – Task Force Report

- 2008 Department Review of Linac and Booster

  What systems needed immediate help

  Consider three issues:

  Spares, Manpower, Reliability

  Two systems stood out – Work then start to repair/replace (**No additional funding - use operational task codes – took money from spares**):

  Booster Magnets (No Fully Tested Spare Gradient Magnet)

  Pre-Acc (Cockcroft Waltons – downtime and manpower concerns)

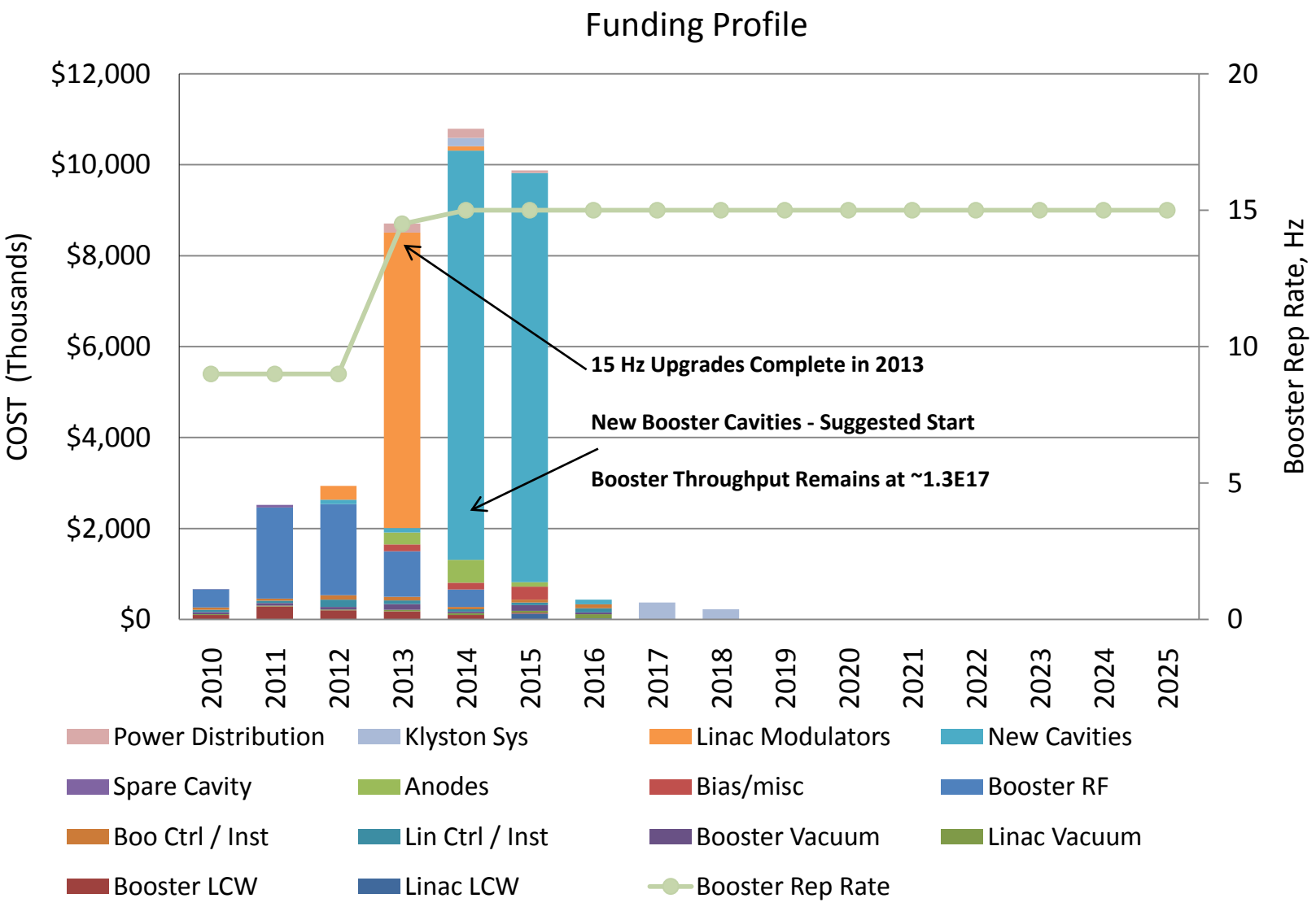
- February 2010 – Projections raised concerns and led to discussions with Dr. Holmes –
  - "OK, if I can't say 20 I will suggest going out 15 years. The current best case scenario for Project X is construction over FY15-19. " Holmes
  - "So let's put together a 15 year plan …" Holmes
- Roger Dixon
  - Proton Source Charge March 3 2010
  - Task Force report released August 17 – Can be found in Doc. Database
- Task Force Report Released – August 2010

Systems found to be of High Concern and (Possible) Solutions:

(Items in Green = Work Underway –> Funding/Manpower Still Required)

- **Cockcroft-Waltons**
  - Replacement Underway - RFQ
- **Low Energy Modulators**
  - Switch to LANL system under development – Testing underway at LANL using Thales Tube
  - Rebuild present Modulators with newer components – In discussion with Continental over rebuild
- **Entire Drift Tube Tanks (Tank 1 - especially) and Drive Systems**
  - Try and copy SNS like system – Big move that needs lots of discussion
- **Linac Momentum Beam Dump**
  - Retro Fit work underway
- **Booster Gradient Magnets (system)**
  - Rebuild/Prepare as many spares as possible (two magnets done)
- **Power Distribution**
  - Buy minimum number of spares – use removed hardware for parts
  - Rework electrical with modern equipment in critical areas
- **Booster Gradient Magnets (system)**
  - Rebuild/Prepare as many spares as possible (two magnets done)
- **Booster High Level Radio Frequency (system)**
  - Solid State work underway – required for running reliably above 10 to 12 Hz
  - New Cavities – Under consideration – Issues with aperture, reliability
- **Anode Supply and 13.8 kV Hardware**
  - Replace with MI style
- **Spare Cavity**
  - Being discussed– needs attention/manpower
- **Bias Supplies**
  - Upgrade hardware for 15 Hz operation
  - Build spare tuners
- **Component Activation/Radiation Issues**
  - <u>Complex issue that needs more attention</u>

One Possible Funding Scenario (TFR)



TFR Conclusion

- Can the Source continue to run for 15 years – Assume Present Throughput
  - **Yes but will require $$ and labor**
  - Will have some risks
    - Linac Tubes
    - Booster Gradient Magnets
    - Linac Low Energy (Tank 1 for example - prototype)
  - New Shielding assessment may constrain throughput (Due Dec.)
    - Higher Efficiency vs. Acceptable Loss Levels
    - Occupancy Questions
    - Equipment Damage to radiation will remain a concern
- Can the Booster Run at 15 Hz
  - **No, not without upgrades**
- Can the Source Deliver the promised beam
  - Program plan needs to mesh with Task Force requests – Both Funding and Manpower
  - Increased Flux **Not Addressed** in task force report although some of the suggested upgrades should improve the flux
    - RFQ (Beam Quality and Reliability)
    - Booster Cavity replacement (Aperture, Reliability and Volts)
- The discussion of the report and what it did/did not say has led to the PIP

Note on Current Project(s)

(Not discussed in Task Force Report…..)

- Fast Kicker(s)
  - Proto Type Short Kicker
- New Low Level System
  - Design considers Damper Needs
  - MI to Booster Phase Lock Testing – getting started
  - Phase Lock for Booster Acceleration – testing started
- Transverse Dampers
- Notching in Pre-Acc (Being considered for NCCycles)
- GMPS/Clock regulation – Effects on Cogging

Next Step – After TFR

- Laboratory management needs to have additional information…….
  - Elaborate on TFR information
    - What (Systems)
    - Why (Why do we need fix the system)
    - When (Optimize manpower and funding)
  - Higher Throughput
    - The Proton/Hour goals are higher then Task Force review
    - PIP needs to assess Task Force report and additional items that have an impact on reaching Proton Goals

Task Force Organization Participants

The charge is broad and intended not to be limited, but rather inclusive of all systems in the Proton Source. After a period of two months, allowing for an initial investigation, several small modifications to the original charge allowed listing the names of responsible individuals along with systems identified as critical. The following task force personnel list was submitted and approved:

- Linac Task Force Candidates:
- Larry Allen (AD/PS) (Modulator)
- Trevor Butler (AD/PS) (Modulator)
- Howie Pfeffer (AD/EE) (Modulator)
- Al Moretti (APC) (New Low Energy)
- Paul Czarapata (AD/HQ) (New Low Energy)
- Ken Quinn (AD/PS) (High Energy Reliability)
- Peter Prieto (AD/Inst.) (High Energy Reliability)
- Mike Kucera(AD/Controls) (Linac Controls)
- Bob Goodwin(AD/Controls) (Linac Controls)
- Steve Hays (AD/EE) (Linac Power Distribution)
- Bob Slazyk (AD/MS/Water Group) (Linac LCW Systems)
- David Hixson (AD/MS/Water Group)(Linac LCW Systems)
- Ben Ogert (AD/MS) (Linac Vacuum)
- David Augustine (AD/MS) (Linac Vacuum)
- Booster Task Force Candidates:
- George Krafczyk (AD/EE)(Pulsed Systems)
- John Reid (AD/RF) (High Level RF systems)
- Jim Lackey (AD/PS) (Pulsed Systems, Magnets)
- Dave Augustine (AD/MS) (Vacuum System)
- Craig Drennan (AD/PS) (Booster LL system)
- Peter Kasper (AD) (Booster Shielding)
- Davis Hixson (AD/MS) (Booster LCW Systems)
- Sharon Lackey (AD/Controls) (Booster)