PSFC West Cell Power Convertors

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at the
Mercury Target Collaboration Meeting
MIT-PSFC
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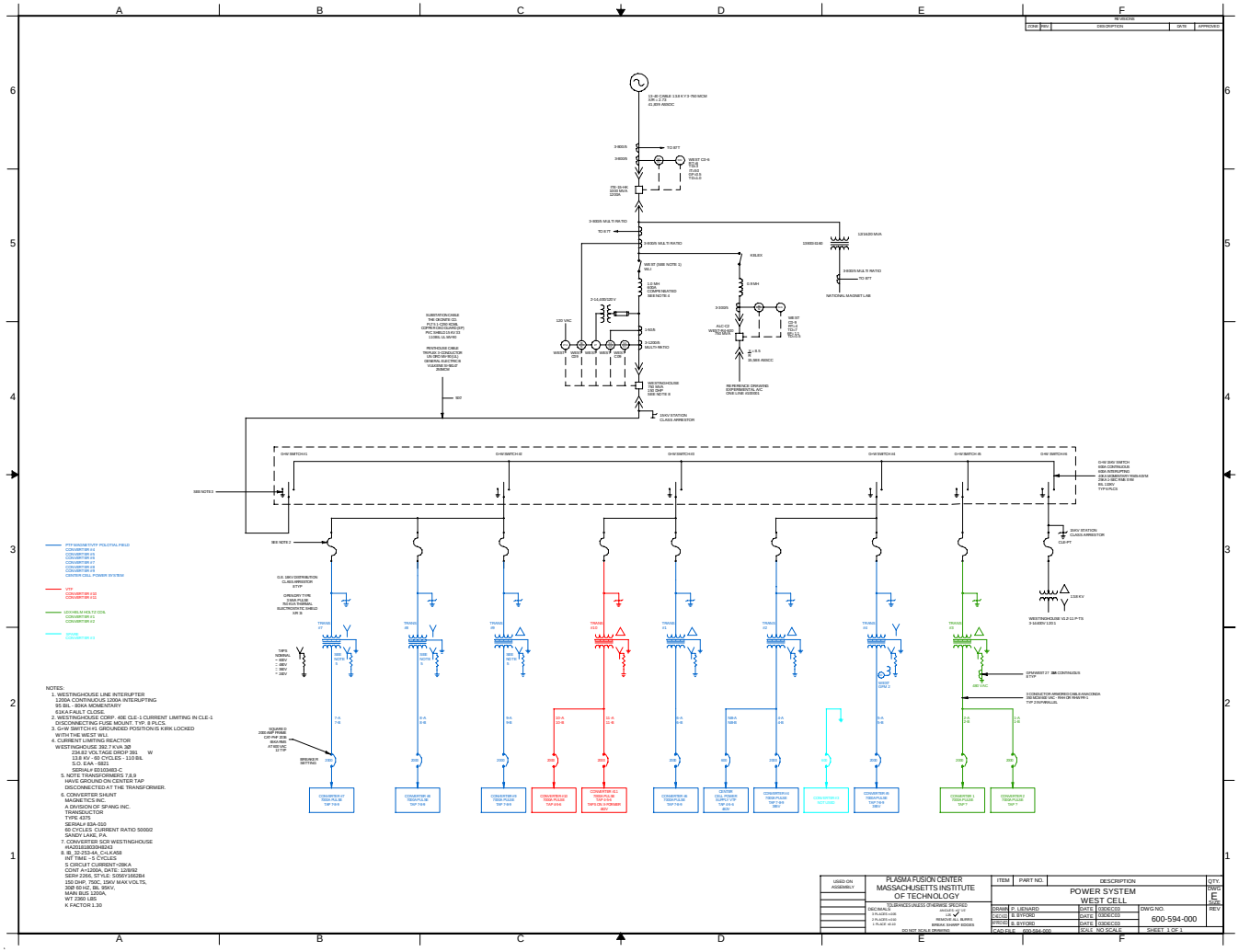
System overview

- 3-phase 13.8 kV power feed to West Cell penthouse
- Distributed to several pulsed power transformers
- 6-pulse rectification for each convertor
- Six convertors connected via interphase transformer to create 12-pulse supply
- Various transformer tap settings to select maximum dc output voltage

System schematic

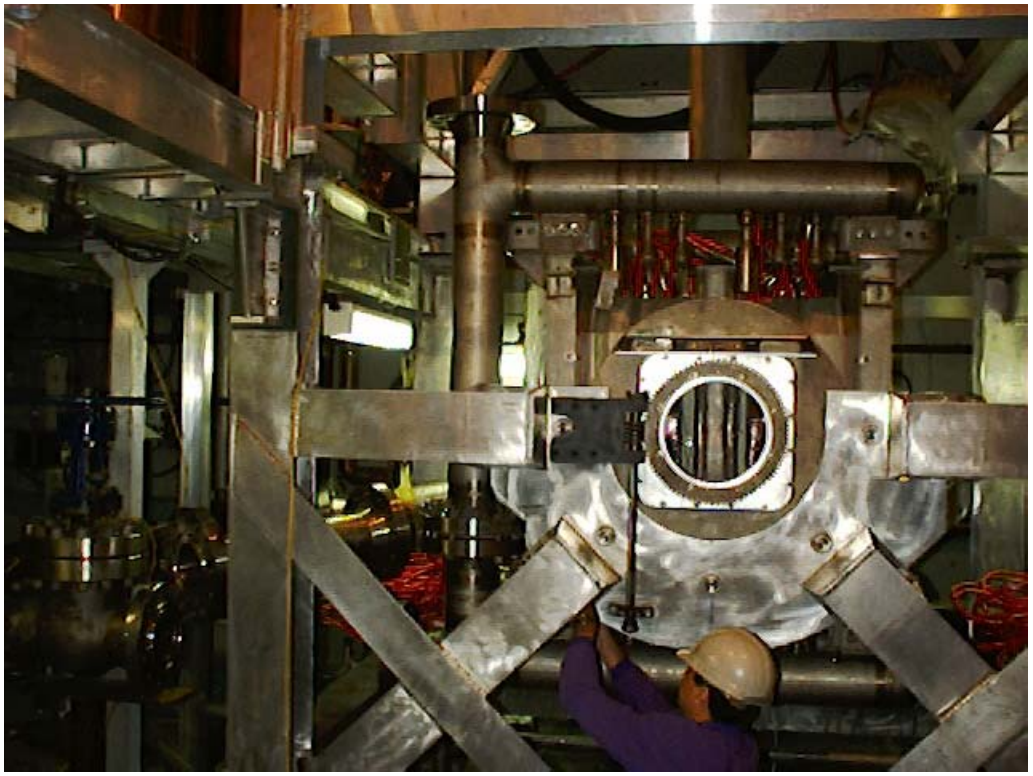


Power convertor utilization

- Reassembled for Pulsed Test Facility to provide up to 8 MW for up to 45 s duration
- Loaned to Versatile Test Facility for magnetic reconnection experiments
- Upgraded for pulse coil testing

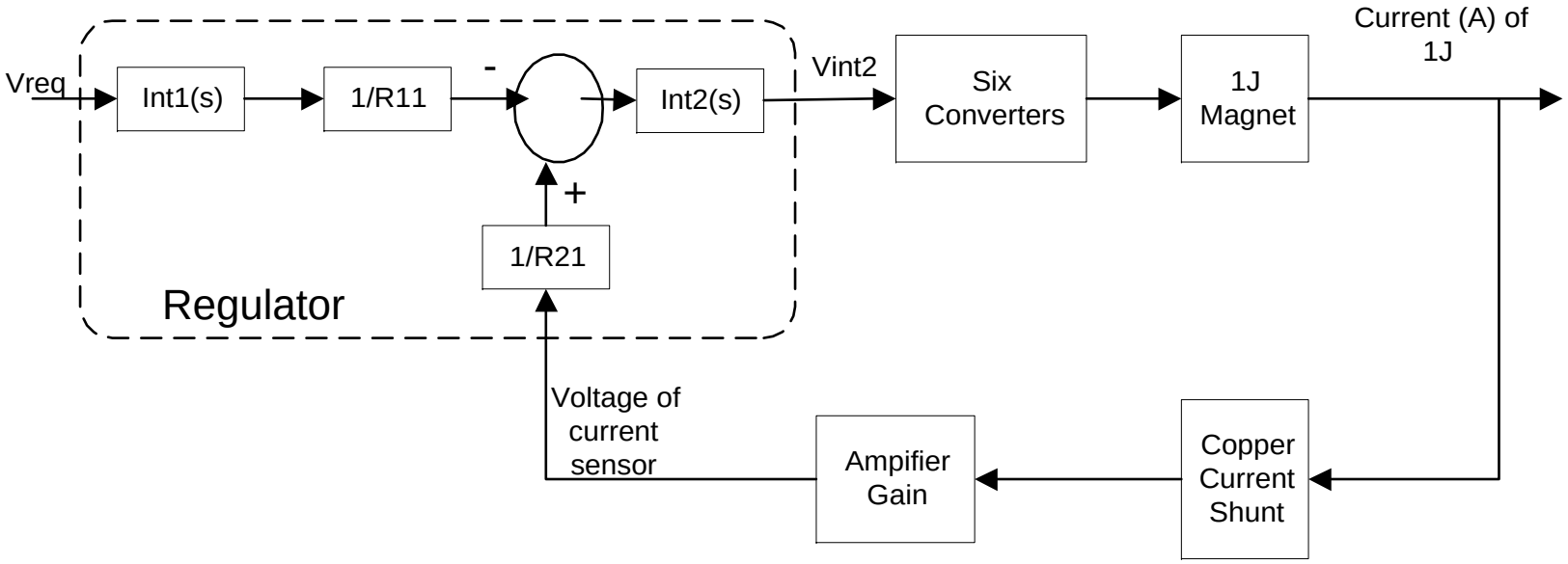
Power convertor photo

PTF Power Supplies



Regulator dynamic model

G. Dekow

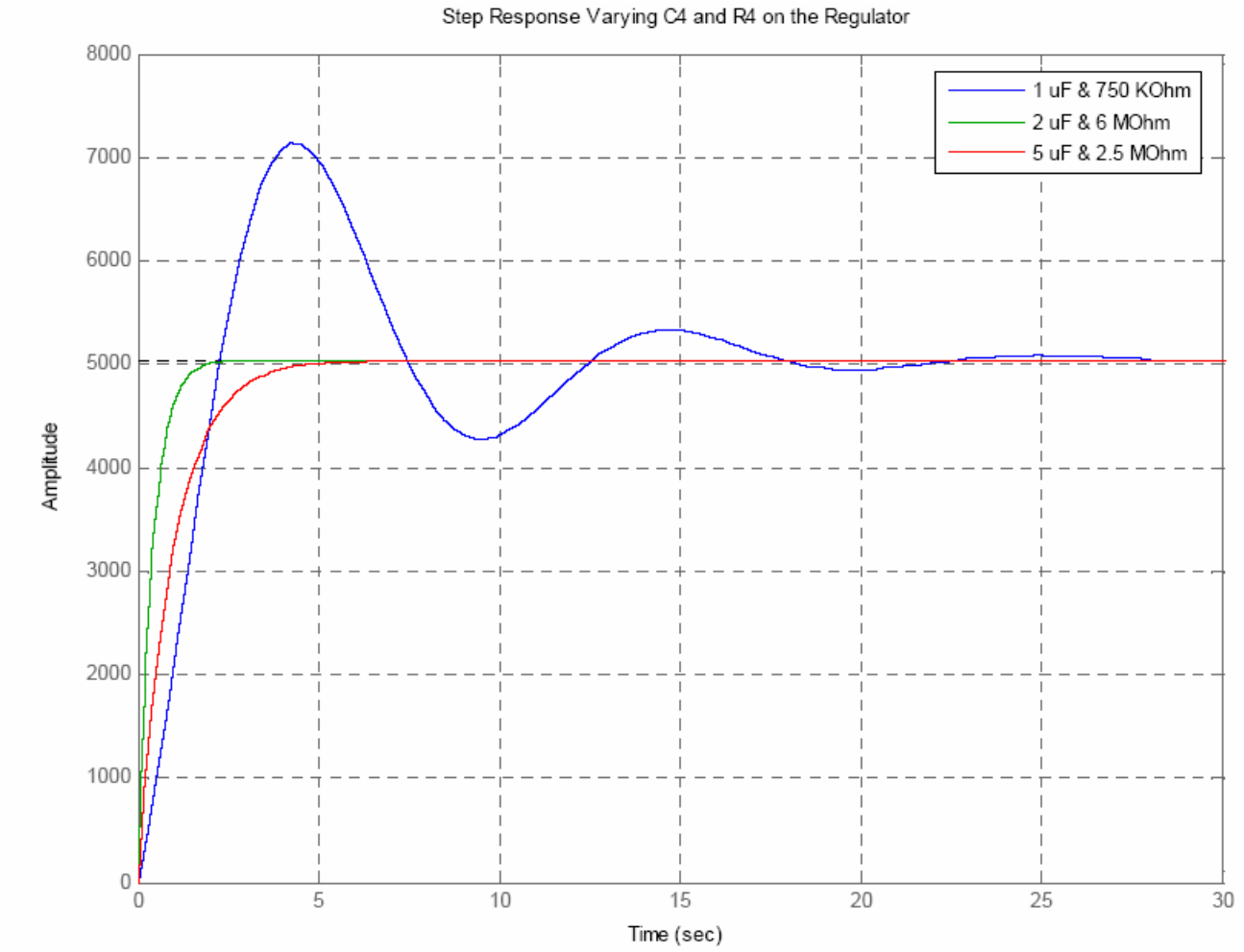


Detailed Block Diagram of Power Convertor System Feedback Circuit

Regulator dynamic response

- Regulator presently tuned for 10.6 mH, 11.6 mOhm load
- The Mercury Target Pulse Coil provides a nominal load of 484 mH and 40 mOhm
- The feedback regulator needs to be retuned during start of test program

Simulation results



Blue trace shows MT coil response with present regulator tuning

Operation voltage

- For the past 10 years the convertor transformers has been set to 385 Vac
- Testing of the MT pulse coil will require resetting the taps to roughly 590 Vac
- The fault protection circuitry in the covertors is ~20 yr old
- Several fault protection components are being upgraded for higher us voltage

Preparation activities

- Modifications can start during APS fall meeting - Oct. 24~28, 2005
- Completion of present VTF test program
- Installation of over voltage protection components
- Retest of system using PTF coil as reference
- Completion of bus work to pulse coil
- Tuning of requlator
- Implementation of test program