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e- & e+ Sources Beamline-Service Area Detail - pg. 1 of 3 - 20 Sep 2006

0.0.1 e- Source Injector
- e- Pre-Gun 1
- e- Pre-Gun 2
- e- Gun 1 & Drive Laser
- e- Gun 2 & Drive Laser
- e- 12 MeV Bunching 1
- e- 12 MeV Bunching 2
- e- 70 MeV Pre-acceleration 1
- e- 70 MeV Pre-acceleration 2
- e- Doglegs, Dumps & Wye
- e- 5.5 GeV Pre-accelerator

0.0.2 e- Source to e- Damping Ring
- e- Source to e- Damping Ring Transfer Line

0.0.3 e- Source Keep Alive Source Injector
- e- Aux Gun & Drive Laser
- e- Aux Gun 12 MeV Bunching
- e- Aux Gun 70-100 MeV Pre-acceleration
- e- Aux Gun Pre/Post-Acceleration Transition
- e- Aux Gun 500 MeV Post-Acceleration
- e- Aux Gun Source to e+ KAS Transfer Line

0.0.4 e+ Source Undulator
- ELTU- Electron Linac to Undulator
- EUND- Electron Undulator
- EUTL- Electron Undulator to Linac
- UPT- Undulator Photon Transport
- UPT- Undulator Photon Transport
- TAPA- Target AMD Pre-accelerator A 125 MeV
- TAPB- Target AMD Pre-accelerator B 125 MeV
- PCAPA- Positron Capture A
- PCAPB- Positron Capture B
- PPA- Positron Pre-acceleration 400 MeV
- PPATEL- Positron Pre-acceleration to Electron Linac
- UPD- Undulator Photon Dumpline

0.0.5 e+ Source Keep Alive Target
- KAS TAP- Target AMD Pre-acceleration 125 MeV
- KAS PCAP- Positron Capture
- KAS PPA- Positron Pre-acceleration 400 MeV

0.0.6 e+ Source Timing & Booster
- e+ Timing Trombone
- PBSTR- Positron Booster 1135 MeV
- PBSTR- Positron Booster 2605 MeV
- PBSTR- Positron Booster 5000 MeV

0.0.7 e+ Source Transfer Line
- PTRAN1- 0.4 GeV Positron Transfer Line
- PTRAN2- 0.4 GeV Positron Transfer Line
- PTRAN3- 0.4 GeV Positron Transfer Line
- PTRAN4- 5 GeV Positron Transfer Line

0.0.8 e+ Source to e+ Damping Ring
- e+ Source to e+ Damping Ring Transfer Line

e- & e+ Sources Beamline-Service Area Detail - Pg. 2 of 3 - 20 Sep 2006

Note: Some System Items are Not Required in Every e+ e- Source Area

1.7.1 Underground Housing Structures & Facilities

- Interior Housing Floor Width > 4.5 meters, 2 parallel Housings
- Housing Waveguide, Cooling & Cabling Penetrations
- Ground Water Drains, Control & Discharge
- Access-Exit Surface Shafts > 14 Meters Diameter
- Line-of-Sight to Surface Survey Pipes > 0.3 Meters
- RF Unit Occupancy Space for 8-to-11 Equipment Racks
- RF Unit Occupancy Space for 10 MW Klystrons & Pulse Transformer Tanks
- RF Unit Occupancy Space for Modulators & Charging Power Supplies
- Occupancy Space for e- & e+ Beamlines, Magnets, RF & Ancillary Fixtures
- Occupancy Space for Modular Cryo Units
- Occupancy Space for Cryo Distribution
- Occupancy Space for RF Waveguide Distribution & Related Waveguide Cooling
- Occupancy Space for Modular Clean Rooms
- Occupancy Space for Very High Radiation Shielding Hot Cells
- Occupancy Space for Very High Radiation Material Handling-Rigging

Surface Housing Structures & Facilities

- Cooling Towers with Fans, Pumps, Heat Exchanges, Distribution
- Supply & Exhaust Air Plant with Underground Ventilation Blowers, Distribution
- Power Substations with Transformers, Switchgear & Feeders
- Buildings with Services for Cryo Compressors & Auxiliaries, plus Occupancy Space for Cryo Cooling Towers, Cryo Tank Farm & Cryo Distribution Plant
- Shaft Headhouses for Cranes, Personnel, Vehicle & Utility Transport-Getaways

1.7.2 Underground Electric Power Systems

- Local Low + High Voltage, & High Voltage to Surface AC Power Distribution
- RF Power Transformers & Conventional Power Transformers (Clean Power)
- Ground Grid & Ladder Cable Tray for Non Life-Safety Cable Plant

Surface Electric Power Systems

- Power Substations, Transformers, Switchgear, Feeders, Ground Grid
- Energy Management & Control Systems

1.7.3 Underground Air Treatment Systems

- Housing Humidity Control < Dew Point
- Local Primary & Secondary to Surface Cooling Water Distribution Supply & Return
- Cooling Water Chillers, Heat Exchangers, Fans, Pumps, Filters & Controls

Surface Air Treatment Systems

- Air Filtration & Pre-Conditioning Systems
- Energy Management & Control Systems

Note: Some Technical System Items are Not Required in All e+ e- Source Areas

1.7.4 Underground Process Cooling Systems

- Local Primary & Secondary to Surface Cooling Water Distribution Supply & Return
- Cooling Water Chillers, Heat Exchangers, Fans, Pumps, Filters & Controls
- Very High Radiation Low Conductivity Water Cooling Systems
- Very High Radiation Occupancy Backup Cooling & Support Utilities

Surface Process Cooling Systems

- Cooling Towers with Fans, Pumps, Heat Exchanges, Distribution
- Supply & Exhaust Air Underground Ventilation Blowers, Distribution

1.7.5 Underground Material Handling & Rigging

- Material Handling-Rigging in Very High Radiation Areas, Dumps & Targets

Surface Material Handling & Rigging

- Material Handling-Rigging at Cryo Compressor Buildings & Cryo Cooling Towers
- Material Handling-Rigging at Cooling Towers
- Material Handling-Rigging at Access Shafts

1.7.6 Life-Safety System Equipment

- High-Radiation Occupancy Personnel Shielding
- 2-Way Personnel Access & Escape All Housings
- Shafts to Surface w/ Personnel Stairs & Lift > 3 Ton
- Wall & Cell Phones
- Breathable Controlled Temperature Air Supply for Workers
- Stale Air Exhaust to Surface
- Radioactive Air Control & Isolation
- Low Oxygen Detection & Alarm
- High-Radiation Detection & Alarm
- Radioactive Cooling Water Isolation
- Radioactive Water & Filter Collection, Batching & Control
- Smoke & Fume Exhaust
- Fire & Smoke Detection Sensors
- Fire-Evacuation Alarm Horns & Strobe Lights
- Fire Alarm Manual Pull Stations
- Fire Suppression Water Sprinklers & Manual Fire Extinguishers
- Periodic Fire Rated Isolation Barriers-Doors
- Drain-Flood Water Discharge Pumps & Piping
- All-Stop Manual Emergency Shutdown Stations
- Area Lighting
- Backup Lighting
- Exit Lighting
- Task Lighting
- Conveyance Vehicle Charging Power Stations
- Conveyance Vehicles
- Emergency & Personnel Protection AC Power Transformers & Distribution
- Rigid Steel Conduit for All Life-Safety Power & Control Cables

1.7.7 Surface-Underground Survey & Alignment with Monuments