BASELINE ASSESSMENT WORKSHOP 2

CONVENTIONAL FACILITIES AND SITING GROUP

Positron Source Relocation (10 Hz)

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Basic CFS Assumptions

- **Main Linacs - Baseline**
  - **RDR Configuration**
    - **Undulator Source was Located at the 150 Gev Point in the Main Linac**
    - **A Positron Transport Line was Required to Connect the e+ Source Output to the 400 Mev to 5 Gev Accelerator**
    - **Two Main Linac Tunnels, No KCS and Hence No Interference from the Large Waveguide and CTO's**
    - **CFS Impact from the Positron Source was not Fully Optimized and Resulted in Some Inflated Criteria w/r to CFS Underground Volume**
  - **The Impact of the KCS RF System w/r to the Original Positron Source Location on the Size of a Single Tunnel was not Considered**
  - **For the Purpose of this Exercise, the RDR Positron Source Criteria was Corrected to Better Reflect Current Design Development**
  - **Comparison will be Based on Reduced Bunch Number, 1312 Bunches per Train at 5 Hz**
- **Damping Ring - Baseline**
  - **Comparison will be Based on a 3.2 km 7.5 m Diameter Damping Ring initially to House 2 Rings (1 e- & 1 e+) But Sized to Allow Upgrade Path to 3 Rings (1 e- & 2 e+)**

CFS Impacts

- General Considerations
  - Only the 3 Major CFS Cost Drivers were Reviewed for this Exercise
    - Civil Construction
    - Process Cooling and HVAC
    - Electrical
  - Civil Construction
    - No Fundamental Impact
  - Process Cooling and HVAC (Mechanical)
    - Mechanical Equipment and Loading Increases as Scaled by Power Loads for the Damping Ring
  - Electrical
    - Electrical Equipment and Distribution Increases as Scaled by Power Loads for the Damping Ring

SUMMARY HEAT LOAD

Low=Reduced Bunch numbers*

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Positron Source Relocation

	ML POWER in MW	
	Low*-5Hz	Low*-10Hz
KCS	**63.6**	*(less than 5 hz Low)*
DRFS	**61.31**	

RDR (ML) =134 MW (reference)

	DR total POWER in MW		
	Low*-5Hz-3.2Km -2 rings	Low*-10Hz-3.2Km -2 rings	FULL-5Hz-3.2Km -3 rings
DR	**8.44**	**12.44**	**14.81**

RDR (DR) =26.3 MW (reference)

green= numbers to be checked

SUMMARY POWER LOAD

Low=Reduced Bunch numbers*

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Positron Source Relocation

	ML POWER in MW	
	Low*-5Hz	Low*-10Hz
KCS	**120**	**113**
DRFS	**131**	

RDR (ML) =134 MW (reference)

	DR total POWER in MW		
	Low*-5Hz-3.2Km -2 rings	Low*-10Hz-3.2Km -2 rings	FULL-5Hz-3.2Km -3 rings
DR	**12.81**	**16.8**	**19.18**

RDR (DR) =26.3 MW (reference)

green= numbers to be checked

Baseline to Relocated Positron Source (10 Hz)

- **Civil Construction**
  - No Fundamental Change
- **Process Cooling and HVAC**
  - Increase in Cooling Towers for Process Water (DR)
  - Increase in Cooling Tower Pump and Accessories for Process Water System (DR)
  - Increase in Chiller Capacity (DR)
  - Increase in LCW System (DR)
- **Electrical**
  - Increase in Medium Voltage Substations (DR)
  - Increase in Medium Voltage Distribution and Transformers (DR)

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POSITRON SOURCE RELOCATION

no drfs 10HZ data (assume same as KCS)?

*** (CFS cost are for Civil, Mechanical, & Electrical only, in Million 2006$)*

	5Hz Low*	10Hz Low*	delta in M$	
KCS CFS* cost	$ 756.0	$ 756.0	$ (0)	**No additional Cost needed
DRFS CFS* cost	$ 883.4	$ 883.4	$ -	**No additional Cost needed

	5Hz Low* 3.2 Km 2 rings, 7.5m Dia	10Hz Low* 3.2 Km 2 rings, 7.5m Dia	delta in M$	
DampingRing CFS* cost	$ 134.8	$ 139.5	$ 4.7	**1.1M elec, 3.6M mech

Upgrade path from 10Hz 3.2Km 2 rings to 5hz 3.2Km 3 rings

	10Hz Low* 3.2 Km 2 rings, 7.5m Dia	UPGRADE PATH to 5Hz Full 3.2 Km 3 rings, 7.5m Dia	delta in M$	
DampingRing CFS* cost	$ 139.5	$ 142.1	$ 2.6	**0.7M elec, 1.9M mech

Upgrade Back to Full Power

- The Primary Upgrade will be the Installation of the Second e+ Damping Ring
  - Tunnel is Already Sized to Receive the Second e+ Damping Ring
  - Mechanical and Electrical Equipment will have to be Added to Support the Additional Ring
- Upgrade should be Fairly Straightforward from the CFS Standpoint

Summary

- Positron Source Relocation Needed Some Adjustment to the RDR Information to Provide an Accurate Comparison
- KCS Impact was not Factored into the Original Positron Source Location
- The Biggest CFS Impact is in the Process Cooling Water and HVAC and Electrical