LCWS12

Conventional **Electrical** System
Americas Region
Power Requirements

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FNAL

LOAD TABLE

TDR Baseline

Peak Operating Loads MW

Area System	RF Power	RF Racks	NC Magnets & Power Supplies	Cryo	Conventional		Total
					Normal Load	Emergency Load	
e-sources	1.28	0.09	0.73	0.80	1.02	0.16	4.08
e+sources	1.39	0.09	4.94	0.59	2.19	0.35	9.56
DR	8.67		2.97	1.45	1.84	0.14	15.08
RTML	4.76	0.32	1.26	part of ML cryo	0.12	0.14	6.59
Main Linac	58.1	4.9	0.914	32	8.10	5.18	109.16
BDS			10.43	0.41	0.24	0.28	11.36
Dumps					1		1.00
IR			1.16	2.65	0.09	0.17	4.07
TOTALS	74.2	5.4	22.4	37.9	14.6	6.4	**161**

Loads Developed and Provided by the Area System Groups

Peak Operating Power Loads –

Loads During Steady State Operations at Baseline Design

LOAD TABLE

TDR Baseline
Peak Operating Loads MW

Developed by CF&S from Loads Provided by the Area System Groups

Area System	RF Power	RF Racks	NC Magnets & Power Supplies	Cryo	Conventional		Total
					Normal Load	Emergency Load	
e-sources	1.28	0.09	0.73	0.80	1.02	0.16	4.08
e+sources	1.39	0.09	4.94	0.59	2.19	0.35	9.56
DR	8.67		2.97	1.45	1.84	0.14	15.08
RTML	4.76	0.32	1.26	part of ML cryo	0.12	0.14	6.59
Main Linac	58.1	4.9	0.914	32	8.10	5.18	109.16
BDS			10.43	0.41	0.24	0.28	11.36
Dumps					1		1.00
IR			1.16	2.65	0.09	0.17	4.07
TOTALS	74.2	5.4	22.4	37.9	14.6	6.4	**161**

General Criteria

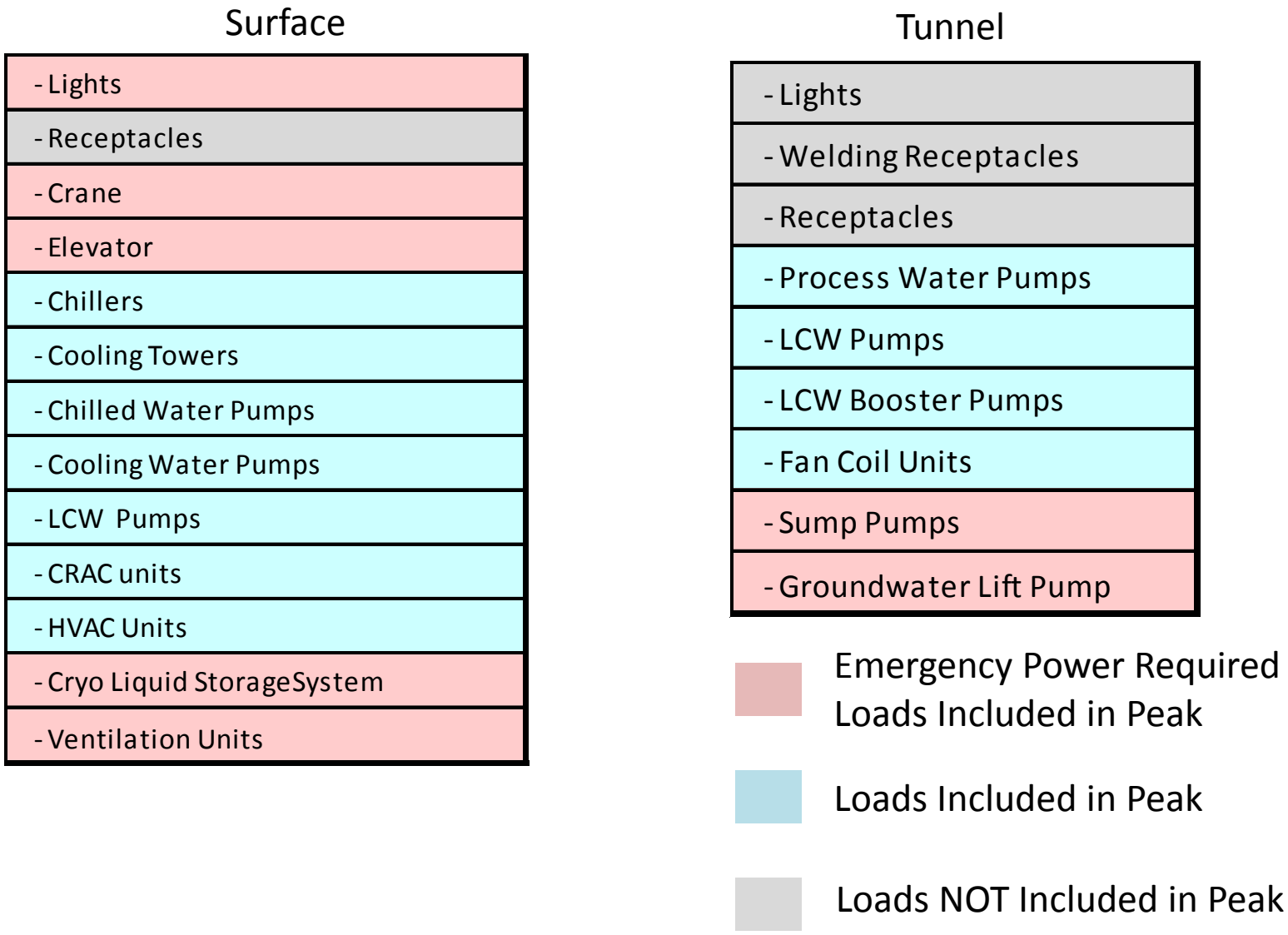
Peak Operating Power Loads – Loads During Steady State Operations at Baseline Design

Conventional Power – Power Required to Support the Facilities and Tech. Loads

Normal – Loads that Do Not Require Alt. Source Backup Power

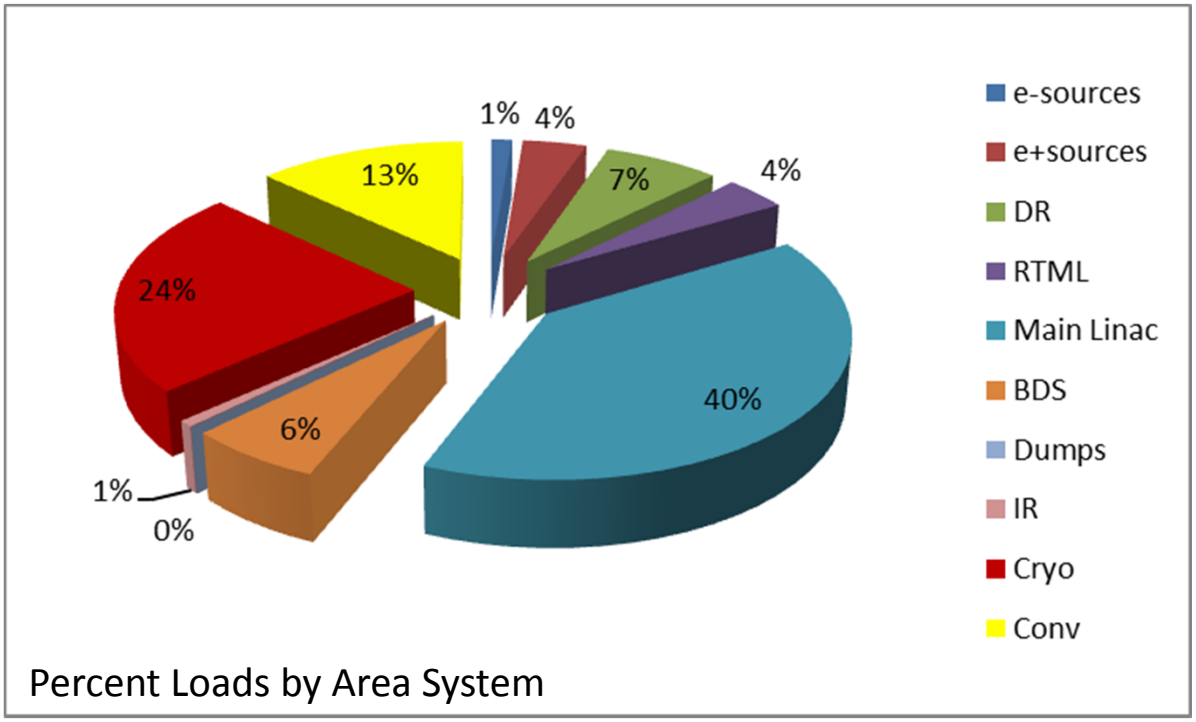
Emergency – Critical Loads that Require Alt. Source Backup Power

Conventional Load Development (Peak During Operations)



Load Distribution

Conventional - 21MW (13% of the total)
Conventional related to heat rejection equipment - 14 MW (8% of total)
Fractional improvements to the heat rejection system can provide small improvements to the overall power load



Percent Loads by Area System

Area System	MW	
e-sources	2.1	1%
e+sources	6.4	4%
DR	11.6	7%
RTML	6.3	4%
Main Linac	63.9	40%
BDS	10.4	6%
Dumps	0.0	0%
IR	1.2	1%
Cryo	37.9	24%
Conv	21.0	13%

Emergency/Standby Power Systems

- Fire detection and alarm systems.
- Exit sign illumination.
- Emergency lighting.
- Elevator car lighting.
- Fire Command Station lighting.
- Two-way fire department communication systems.

  - Ref: Hughes Associates - Life Safety/Fire Protection Code Analysis

  - Project Requirement

- Elevators, elevator equipment, and elevator machine room/controller cooling.
- Air handling systems for the tunnels and elevator lobbies.
- Lighting for HVAC mechanical equipment rooms.

- Cranes, Sump/Lift Pumps.

Operating Modes –
Discussion

Full Capacity (Peak Operating)

- **Drives the Requirements for the Electrical Equipment Installed.**

O&M Cost

Nominal ? (Definition Needed)

- **Generally Determine the Power Bill**

RF Only, No Beam

Shut Down

Standby (Momentary Interruption)

Possible Improvements
Unexplored Concepts

Post RDR VE Exercise

- Provide **one** high efficiency cogeneration power/cooling plant on site and distribute power and 32F+ Chilled Water throughout the facility
- Provide **Distributed** Cogeneration Power/Cryo
- Consider use of Renewable Energy Source with Cogeneration