CFS Utilities – What's included in RDR for IR

WATER COOLING: none. Unknown loads on IR. Only have water plants for BDS and BDS dumps, with BDS piping distribution envision to go thru the Service Cavern shaft. BDS scaled from Main Linac concept/cost.

Area System	LCW (MW)	Chilled Water (MW)	Total (MW)
SOURCES e-	2.88	1.42	4.3
SOURCES e+	17.48	5.33	22.81
DR e-	8.838	0.924	9.762
DR e+	8.838	0.924	9.762
RTML	9.254	1.335	10.589
MAIN LINAC	56	21.056	77.056
BDS	10.29	0.982	11.272
DUMPS	36	0	36
TOTAL HEAT LOAD (MW)			182

AIR: No requirement/details on IR. BDS tunnels assumed 85F to 90F (29-32C) at 55F (13C) max dewpoint at 88fpm air velocity based on ML tunnels, based on very small load to air, BUT this needs to be revisited.

LIFE SAFETY SYSTEM/FIRE PROTECTION: None

DRAINAGE AND SANITARY: None. Sump pumps in major shafts

CFS Utilities – What's included in RDR for IR

POWER: IR Power not in the current totals Unknown power needs. Based on 3MVA scaled down from CMS.

AREA SYSTEM	RF POWER	CONVENTIONAL POWER				EMER POWER	TOTAL (by Area)	NOTES
		CONV	NC MAGNETS	WATER SYSTEMS	CRYO			
SOURCES e-	1.05	1.19	0.73	1.27	0.46	0.06	4.76	Pre-Central DR-Loads Likely to Increase
SOURCES e+	4.11	7.32	8.90	1.27	0.46	0.21	22.27	Pre-Central DR-Loads Likely to Increase
DR	14.00	1.71	7.92	0.66	1.76	0.23	26.29	RF / NC Magnets / Cryo per Central DR Other Loads Indicated Pre-Central DR
RTML	7.14	3.78	4.74	1.34	0.00	0.15	17.14	Pre-Central DR Loads
MAIN LINAC	75.72	13.54	0.78	9.86	33.90	0.40	134.21	
BDS	0.00	1.11	2.57	3.51	0.33	0.20	7.72	
DUMPS	0.00	3.83	0.00	0.00	0.00	0.12	3.95	
TOTAL (by System)	***102.0***	***32.5***	***25.6***	***17.9***	***36.9***	***1.4***	***216.3***	

CFS Utilities – What's needed

Need to establish and understand other spaces in the IR (Surface areas and underground areas such as detector hall, Power room, service room, electronic rack room, shafts, other caverns, and their corresponding utilities criteria)

CFS limited to conventional utilities such as conventional power, process water, chilled water, air (hvac), fire protection and safety system, drain and sanitary. Other utilities (argon, cryo, vacuum, nitrogen, detector cooling, other flammable gases etc) and are typically not by CFS

CFS Utilities – What's needed

POWER:

..Experimental Systems power requirements includes detectors, electronic, control rooms, etc.

..UPS (uninterruptible power supply) requirement?

..Grounding , clean power and dirty power?

..Miscellaneous Power – Receptacles, Required Voltages ?

..Interface…conventional power up to where?

..power in Watt (or MW)

CFS Utilities – What's needed

PROCESS COOLING WATER:

..System types, process water, warm LCW, chilled LCW?, chilled water (CHW) ? *The more number of systems, the more cost impact.*

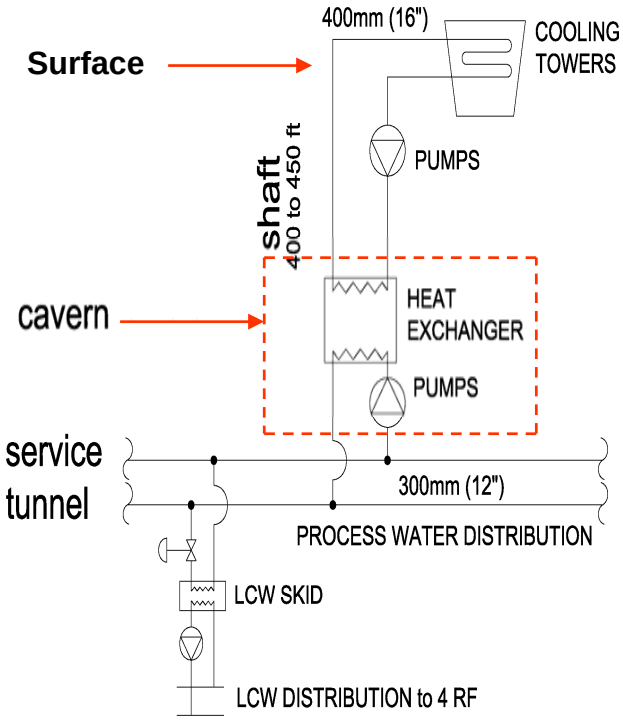
..Temperature requirements (max allowable supply temperature) and tolerances? *Supply temp limit vary by region (ambient condition) and no. of water loops and HX approach temperature*

..Heat loads to water – by system and area? ..Water flow requirements and delta T ? To each system? Components?

..Locations of water cooled components?

..Interface?—water up to what connections ?

Simplified RDR Main Linac Concept



Process Water Distribution
IR will be similar to this

CFS Utilities – What's Needed

AIR (HVAC):

Temperature Requirements and tolerances ? *More stringent =more costly*

Heat loads to air – by area ? Air flow requirements and delta T ?

Humidity Requirements and tolerances?

Pressure as compared to the assembly hall or tunnel or?

Air exchange rates and purge requirements as it relates to heavier or lighter than air gas use ?Other system that may affect air ventilation/life safety (flammable gases, cryo, helium etc)

CFS Utilities – What's Needed

Life Safety System/Fire Protection:

Use of suppression gases, where, required volumes

Sprinkler systems, foam, mist?

Fire detection – spot type, VESDA, line type heat detection

Other system that may affect air ventilation/life safety (flammable gases, cryo, helium etc)

(see Alain Herve email Jul 27 on reqmnts w.r.t. fire safety):

CFS Utilities – What's Needed

Drainage and Sanitary:

(most info come from CFS, but need to know system, services and other space that will impact this)

Need design basis or best estimate of how many people during installation, operation, maintenance?

CFS Utilities – What CFS items in the service cavern*

*size just for the BDS?

Power:
- transformers

Process Water:
- Water pumps (for BDS & IR)
- LCW skids (for BDS & IR)
- Heat Exchangers and misc (BDS & IR)

Air (hvac):
- Fancoils?
- Ductwork?
- Supply/Exhaust Fans

Drainage/Sanitary:
- Sump Pump
- Toilet Facility??

What cannot be in the service cavern? Or what needs to be in the service cavern?