CFS EDR KICK OFF MEETING
Air Treatment

August 23, 2007

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CFS

RDR - Air treatment Design Basis

- Tunnel Ventilation – Conditioned dehumidified air is ducted into the service tunnel at each shaft. A volume of 20,000cfm (566meter^3/min) flows at approximately 88fpm (1.6km/hr) to the midpoint between shafts where it is routed into the beam tunnel and returned to the shaft area. Conditioned fresh air at a rate of 20% is mixed into the air and it is recirculated back to the service tunnel. Air volumes for the DR and BDS are similar

- The air direction is reversible and capable of being doubled (unconditioned) during hazardous situations.

- The design temperature for the ML service and beam tunnel is 80-90F (29-32C). ML electronic's heat rejection is mainly to CHW and small amounts to the ventilation air. AHU and FCUs used at alcoves and shaft areas.

- The design temperature for the DR tunnel is 104F (40C), using fan coil units, process water and the tunnel wall as a heat rejection source.

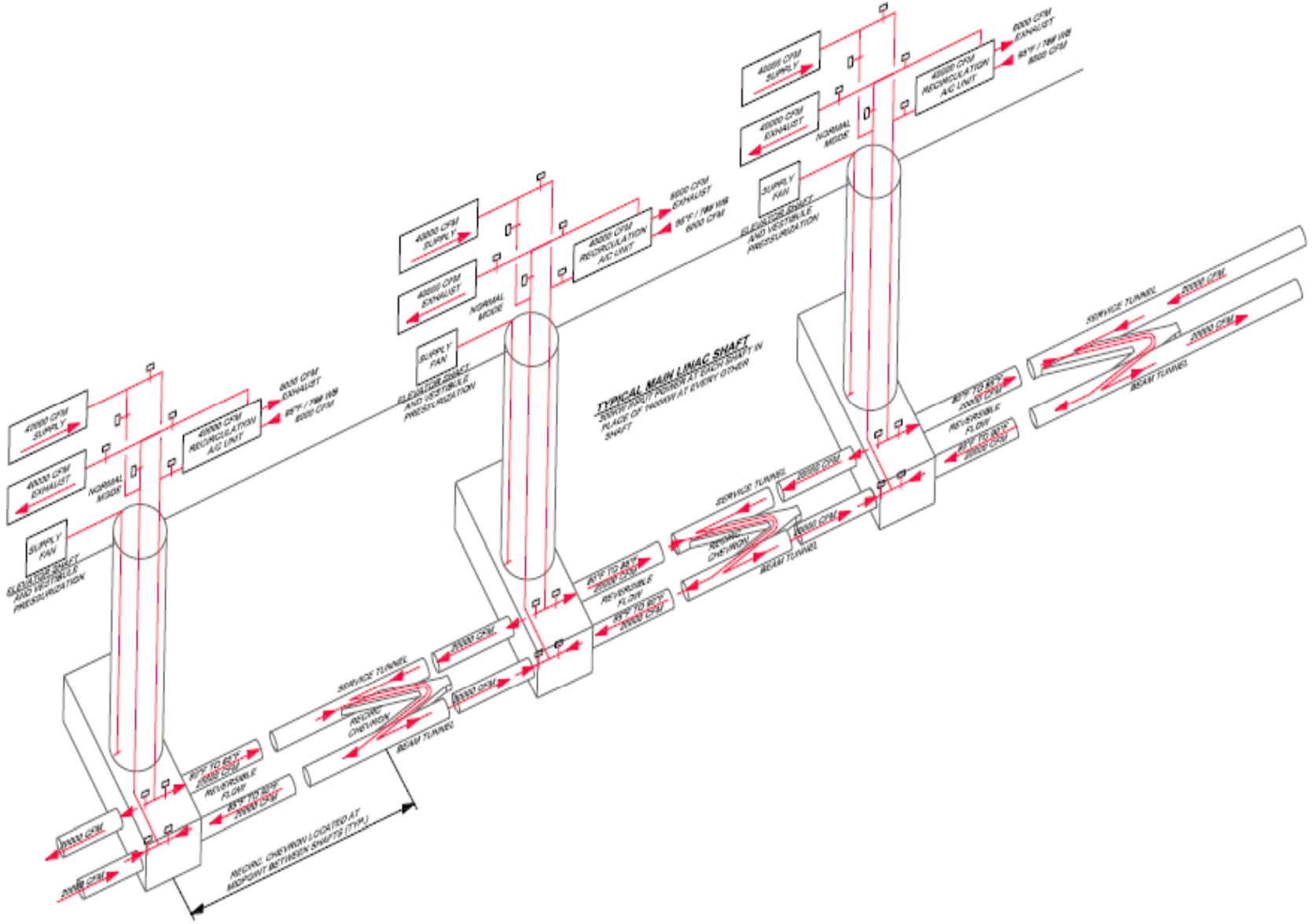
Air treatment Design Basis

- The design temperature for the BDS is 85-90F (29-32C). The low “heat to air” load is mainly absorbed by the tunnel wall. Air mixing fans will be used for temperature stability as required by the BDS, possibly using process water for minor temperature adjustment.

- Used the basis that airflow could pass from the service tunnel to the beam tunnel through fire/smoke/ODH/radiation protected passages between the tunnels. This assumes that radiation/oxygen deficiency hazards (ODH) do not exist or can be mitigated between the tunnels from the standpoint of air mixing. This item needs concurrence as soon as possible.

- AHU and FCU sizes in the alcoves and tunnels did not consider Heat Rejection/Absorption into the rock wall. These units use chilled water from the surface as the heat rejection source.

CFS Air Treatment Layout



RDR Process Water WBS

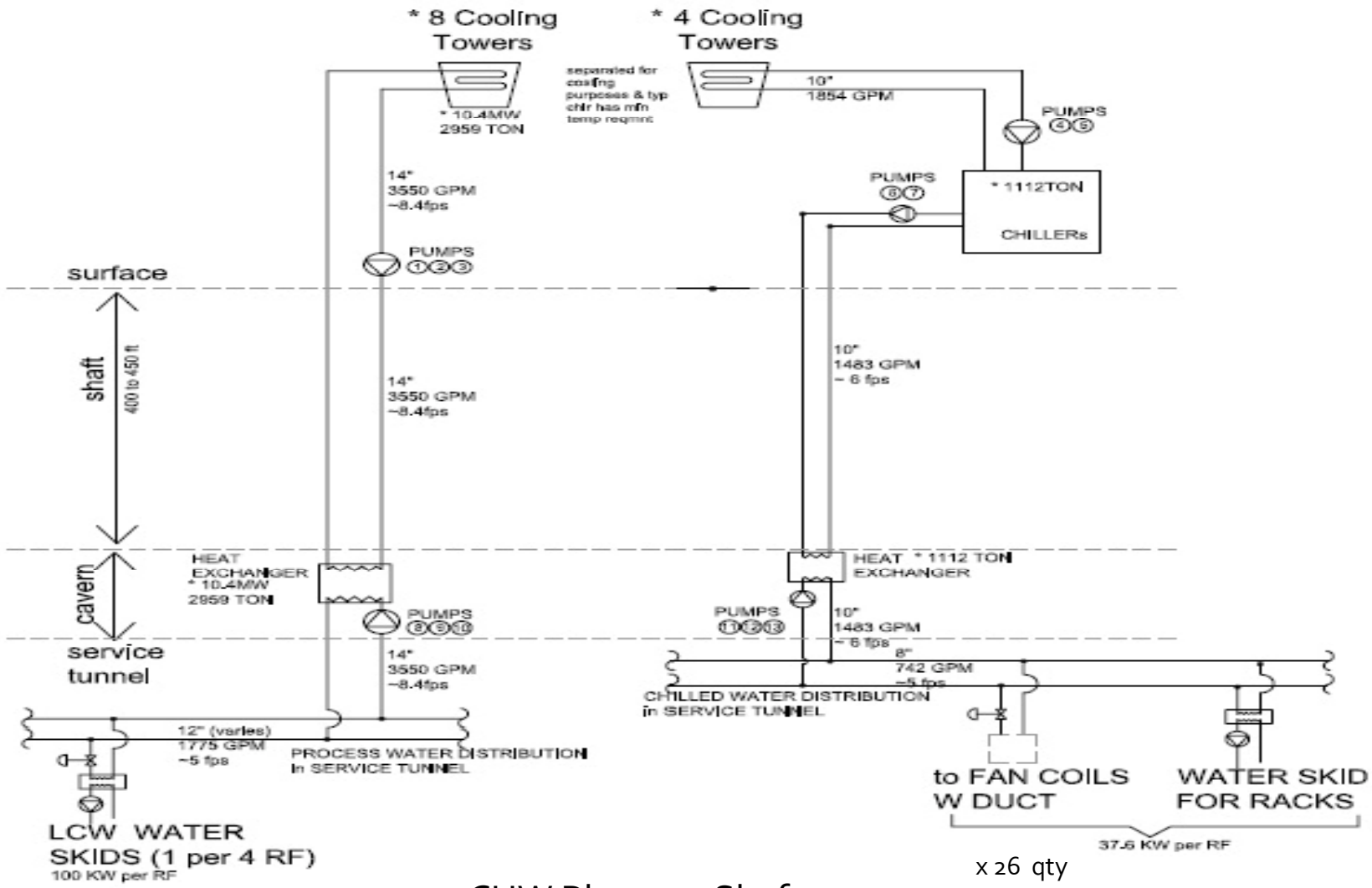
- Air Treatment is about 1% (or 5.5% of CFS *when CHW system is moved to the air treatment section*)

RDR		RDR Cost (America)		RDR with CHW adjustment
1.7.1	Civil Engineering	64.3%		64.3%
1.7.2	ELECTRICAL	13.2%		13.2%
1.7.3	AIR TREATMENT EQUIPMENT	1.0%		5.5%
1.7.4	PIPED UTILITIES	0.1%		0.1%
1.7.5	PROCESS (COOLING) WATER	14.9%	Includes CHW	10.3%
1.7.6	Handling Equipment	1.6%		1.6%
1.7.7	Safety Equipment	1.3%		1.3%
1.7.8	Survey and Alignment	3.7%		3.7%
		100.0%		100.0%

Moved CHW to Air Treatment

Same Totals

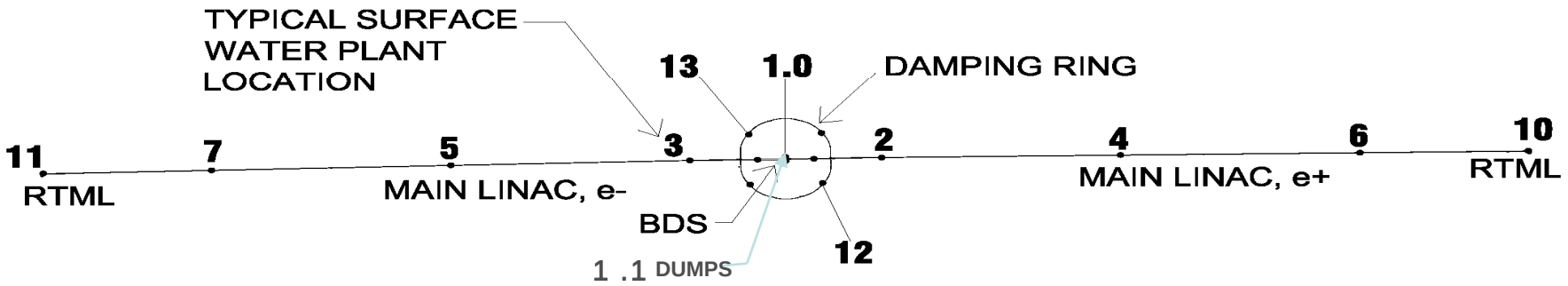
RDR Chilled Water Schematic



x 26 qty

CHW Plant at Shaft 7

RDR Surface Air/CHW Plant locations



RDR HVAC: Cost Basis

- Used R.S.Means Cost Book for typical HVAC items such as ducting, fans, piping, insulation etc
- Used vendors budgetary quote for large dehumidification air handling systems not in R.S.Means

RDR CHW Loads: Heat Load Basis- Total Loads

Snapshot Nov 27 2006

Area System	LCW	Chilled Water	Total
SOURCES e-	2.880	1.420	**4.300**
SOURCES e+	17.480	5.330	**22.810**
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	56.000	21.056	**77.056**
BDS	10.290	0.982	**11.272**
DUMPS	36.000	0.000	**36.000**
	149.58	*31.971*	**182**

RDR Air Treatment Summary

- Air Treatment Components in RDR:
  - Large air handling systems providing heating, cooling, dehumidification, humidification.
  - Fans for air purge, tunnel and shaft pressurization
  - Miscellaneous ducting and accessories, dampers, insulation, etc

- Air treatment design is dependent on the ventilation requirements and the heat load criteria received from area system

- Air treatment and purge systems were not fully investigated for radiation and ODH issues

- Air treatment and purge systems configuration were not developed with consensus of any AHJ (authority having jurisdiction, even who this is may not be identified some time)

EDR Air Treatment/CHW Summary

- Components in EDR:
  - Large air handling systems providing heating, cooling, dehumidification, humidification.
  - Fans for air purge, tunnel and shaft pressurization
  - Miscellaneous ducting and accessories, piping, dampers, insulation, etc
  - Chilled water systems including chillers, cooling towers, piping and accessories

- Need further input on air flow configuration concerning radiation and ODH issues.

- Develop further information on required ventilation/smoke/purge/safety systems. . Need fire protection consultant

EDR - Basic Approach

- Receive the criteria & requirement
- Design systems (for baseline)
- Cost the design
- Reviews (value engg etc)
  - Update criteria
  - Update baseline
  - Update cost

EDR Air Treatment - Goals & deliverables?

Goals

- Work with " *integration group*" to get criteria and establish a preliminary conceptual design baseline
- Provide bottoms up cost estimate
- Provide various option studies to support the value engineering effort

Deliverables

- Conceptual design with Interfaces established
- Cost Estimate
- Other reports or other design work needed for the EDR

EDR Air Treatment/CHW – Value engineering/optimization

- Combine currently separated Fan Systems
- Make all chilled water aircooled
- Consider heat rejection to cooling ponds where possible
- Make dehumidification equipment desiccant type
- Make air handling systems chilled water instead of DX
- Totally Remove Chilled Water
  - Racks still need cooler water
- Piping Materials, why stainless, why not PVC, copper, HDPE
- Optimize CHW temperature for electronics and air cooling