

NOTES FOR DESIGNER: (DO NOT INCLUDE ON CONSTRUCTION DRAWINGS)

1. REVIEW DETAILS AND EDIT AS NEEDED TO SUIT PROJECT REQUIREMENTS.
2. REFER TO THE FOLLOWING LANL STANDARDS FOR ADDITIONAL REQUIREMENTS:
 - A. ENGINEERING STANDARD MANUAL MECHANICAL CHAPTER.
 - B. MECHANICAL DRAWING ST-D3030-1, COOLING TOWER & CHILLER PIPING FLOW DIAGRAM.
 - C. SPEC 01 3545, WATER DISCHARGE REQUIREMENTS.
 - D. SPEC 23 2113, HYDRONIC PIPING.
 - E. SPEC 23 2500, HVAC WATER TREATMENT.

3. TOWER PUMP FLOW:

$$\text{GPM CIRCULATED} = \frac{\text{SYSTEM LOAD (BTUH)}}{500 \times (T^{\circ}\text{F (TWR)} - T^{\circ}\text{F (TWS)})}$$

4. COOLING TOWER WATER EVAPORATION:

$$\text{GPM EVAPORATED} = \text{GPM CIRCULATED} \times (\text{TWR} - \text{TWS}) \times 0.001$$

5. BLOW DOWN (DRAIN):

$$\text{GPM} = \frac{\text{GPM EVAPORATED} \times ((\text{NUMBER OF CYCLES} - 1) \times 0.0002)}{\text{NUMBER OF CYCLES} - 1}$$

CYCLES = RATIO OF TOTAL DISSOLVED SOLIDS (TDS) OF TOWER WATER DIVIDED BY TDS OF MAKE-UP WATER.

MINIMUM CYCLES OF CONCENTRATION = 2.5, 4 OR BETTER IS RECOMMENDED

6. SYSTEM NON-POTABLE MAKE-UP WATER (NPMW):

$$\text{NPMW} = \text{GPM EVAPORATED} + \text{GPM BLOW DOWN}$$

7. BAG FILTER HOUSING: (GUIDANCE)

- A. SIZE MULTI-ROUND LIQUID BAG HOUSING FOR 10% OF SYSTEM FLOW.
- B. MINIMUM INLET PRESSURE SHOULD BE AT LEAST 15 PSI OR EQUAL TO THE PRESSURE LOSS ANTICIPATED THROUGH THE MULTI-ROUND LIQUID BAG HOUSING PLUS THE SYSTEM DOWNSTREAM PRESSURE REQUIREMENTS.
- C. 200 MICRON POLYESTEC COLLECTION BAG(S)

8. LOCATE FLOOR DRAINS CLOSE TO COOLING TOWER CONTROL SYSTEM.

9. LOCATE CONTROL CABINET AND CHEMICAL TANKS IN AN ACCESSIBLE AREA SO SYSTEM CAN BE MAINTAINED AND DRUMS REPLACED.

10. SIZE INHIBITOR TANK FOR 10 DAYS OPERATION BETWEEN RE-FILLS.

11. SIZE NEUTRALIZER TANK FOR 10 DAYS OPERATION BETWEEN RE-FILLS.

COOLING TOWER WATER TREATMENT SCHEDULE	
SYSTEM LOAD	TON BTUH
COOLING TOWER PUMP FLOW	GPM
CHILLED WATER SYSTEM FLOW	GPM
WATER TREATMENT FLOW A TO B	GPM
COOLING TOWER EVAPORATION	GPM
SEPARATOR BLOWDOWN	GPM
SYSTEM MAKE-UP WATER (NPMW)	GPM

DRAWING DEVELOPED FOR ML-3/
ML-4 PROJECTS. FOR ML-1/
ML-2, ADDITIONAL REQUIREMENTS
AND QA REVIEWS ARE REQUIRED.
(REMOVE THIS NOTE WHEN IN-
SERTED INTO A DRAWING PACK-
AGE)

NO	DATE	CLASS REV	ADC	DESCRIPTION	DWN	DSGN	CHKD	SUB	APP
2	9-3-14	U	ML	GENERAL REVISION.	JM	SH	RC	ML	TO
1	6-23-05	U	DY	GENERAL REVISION. DWG. NO. WAS ST6800.	RP	MN	RF	CD	TO

ENGINEERING STANDARDS PROGRAM

STANDARD DRAWINGS & DETAILS	DRAWN	R.PEARSON
	DESIGN	R.ROMERO
	CHECKED	D.NGUYEN
	DATE	6-28-99

BLDG X TA-X

SUBMITTED	APPROVED FOR RELEASE
PROJECT ENGINEER	PROJECT TEAM LEADER

SHEET 2

Los Alamos NATIONAL LABORATORY PO Box 1663 Los Alamos, New Mexico 87545 2 OF 2

CLASSIFICATION: U	REVIEWER: LARRY BAYS	DATE:
PROJECT ID	DRAWING NO	REV
CHAPTER 6	ST-D30GEN-1	2