

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 22 2113, HYDRONIC PIPING.
 - E. SPEC 23 2500, HVAC WATER TREATMENT.

3. TOWER PUMP FLOW:

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

4. COOLING TOWER WATER EVAPORATION:

$$\text{GPM EVAPORATED} = \text{GPM CIRCULATED} \times (\text{TWR} - \text{TWS}) \times 0.0008$$

5. SEPARATOR BLOW DOWN (DRAIN):

$$\text{GPM CIRCULATED} = \frac{\text{COOLING TOWER GPM EVAPORATED}}{\text{NUMBER OF CYCLES} - 1}$$

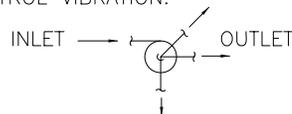
CYCLES = RATIO OF TOTAL DISSOLVED SOLIDS (TDS) OF TOWER WATER DIVIDED BY TDS OF MAKE-UP WATER. BASE CALCULATION ON CYCLES = 2.5

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

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

7. SEPARATOR: (GUIDANCE)

- A. SIZE SEPARATOR FOR 10% OF SYSTEM FLOW.
- B. MINIMUM INLET PRESSURE SHOULD BE AT LEAST 15 PSI OR EQUAL TO THE PRESSURE LOSS ANTICIPATED THROUGH THE SEPARATOR PLUS THE SYSTEM DOWNSTREAM PRESSURE REQUIREMENTS.
- C. SPECIFY A FLANGED SPOOL PIECE ON THE OUTLET OF THE SEPARATOR IN ORDER TO REMOVE THE UPPER FLANGED DOME FOR MAINTENANCE. REFER TO THE MANUFACTURER'S CATALOG DATA FOR RECOMMENDED SPOOL PIECE LENGTH.
- D. PIPE CONNECTIONS TO THE INLET AND OUTLET OF THE SEPARATOR SHOULD BE A STRAIGHT RUN OF AT LEAST 5 PIPE DIAMETERS (INCLUDING OUTLET SPOOL PIECE) TO MINIMIZE TURBULENCE. NOTE THE STRAIGHT PIPE LENGTH ON THE PIPING DRAWINGS. RECOMMENDED DIRECTION OF INLET/OUTLET PIPING TO CONTROL VIBRATION:



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.

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 INSERTED INTO A DRAWING PACK-AGE)

1	6-23-05	U	DY	GENERAL REVISION: DWG. NO. WAS ST6800.	RP	MN	RF	CD	TO
NO	DATE	CLASS	REV	DESCRIPTION	OWN	DSGN	CHKD	SUB	APP
ENGINEERING STANDARDS PROGRAM									
ENGINEERING STANDARDS MANUAL								DRAWN	R.PEARSON
OPEN COOLING TOWER WATER TREATMENT NOTES AND SCHEDULE								DESIGN	R.ROMERO
BLDG X								CHECKED	D.NGUYEN
SUBMITTED								DATE	6-28-99
DISCIPLINE POC: CHARLES DUPRE								APPROVED FOR RELEASE	TA-X
STANDARDS MANAGER: TOBIN ORUCH								SHEET	2
								2	OF
CLASSIFICATION: U								REVIEWER: LARRY BAYS	DATE:
PROJECT ID								DRAWING NO	REV
CHAPTER 6								ST-D30GEN-1	1