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:

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

4. COOLING TOWER WATER EVAPORATION:
   GPM EVAPORATED = GPM CIRCULATED X (TWR-TWS) X 0.001

5. BLOW DOWN (DRAIN):

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

   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):
   NPMW = GPM EVAPORATED + 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 INSERTED INTO A DRAWING PACKAGE).

00% REVIEW
NOT FOR CONSTRUCTION

NO	DATE	CLASS REV	DC	DESCRIPTION	DWN	DSGN	CHKD	SUB	APP
3	06-29-2017	UNCLASS	TO	ADMIN. CHANGES TO CAD STD. REV#5 FORMAT	JB	AJ	ML	ML	TO
2	9-3-14	U	ML	GENERAL REVISIONS.	JM	SH	RC	ML	TO
1	6-23-05	U	DY	GENERAL REVISIONS. DWG. DWG. NO. WAS ST6800	RP	MN	RF	CD	TO

ENGINEERING STANDARDS

MECHANICAL

OPEN COOLING TOWER WATER TREATMENT NOTES AND SCHEDULE

TA- XX BLDG- XX

DRAWN R.PEARSON
DESIGN R.ROMERO
CHECKED D.NGUYEN
DATE 06-28-99

SUBMITTED
DISCIPLINE POC: CHARLES DUPRE

APPROVED FOR RELEASE
STANDARDS MANAGER: TOBIN ORUCH

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

SHEET 2
2 OF 2

D.C.: U
REVIEWER: LARRY BAYS
DATE: 06-28-99

PROJECT ID
CHAPTER 6

DRAWING NO
ST-D30GEN-1

REV
3