



OPEN COOLING TOWER WATER TREATMENT FLOW DIAGRAM
SCALE: NONE

KEYED NOTES:

- ① NUMBER OF ISOLATION VALVES ON A PIPE RUN DEPENDENT ON VISUAL LINE OF SIGHT FROM THE EQUIPMENT ITEM OF THE INTEREST. EXAMPLE: METERING PUMP WITH A CHEMICAL INJECTION POINT THAT IS OUT OF VIEW FROM THE PUMP SHOULD BE PIPED WITH 2 VALVES, ONE VALVE AT THE PUMP AND ANOTHER VALVE AT THE OUT OF VIEW INJECTION POINT.
- ② SURGE ARRESTOR BY ELECTRICAL.
- ③ NEUTRALIZER IS ONLY REQUIRED WHEN TOWER BLOWDOWN IS ROUTED TO A PERMITTED OUTFALL. DELETE LOOP FROM PROJECT FOR SYSTEMS THAT DISCHARGE TO SANITARY SEWER.

LEGEND

SUB-SYSTEM	DESCRIPTION
I	AUTOMATED CONTROL STATION, CHEMICAL MONITORING AND INJECTION
II	BROMICIDE INJECTION
III	NEUTRALIZER INJECTION
IV	INHIBITOR INJECTION
V	WATER FILTRATION
VI	TREATED WATER BLOW DOWN
VII	NON-POTABLE MAKE-UP WATER
VIII	COOLING TOWER BASIN LEVEL SENSING
#	MECHANICAL EQUIPMENT DESIGNATOR (SEE LANL MASTER SPECIFICATION 23 2500, HVAC WATER TREATMENT, ATTACHMENT A)

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).

NOTES TO DESIGNER:

- NEUTRALIZER NOT REQUIRED IF BLOWDOWN TO SANITARY SEWER
- STATIC MIXERS NOT REQUIRED IF BLOWDOWN TO SANITARY SEWER.
- INHIBITOR AND NEUTRALIZER PIPE TYPE IS DEPENDENT ON LENGTH OF RUN:
1/2" PVC AND FITTINGS (SCH 80), LENGTH IS 15' OR MORE
3/8" TUBING FOR LENGTHS LESS THAN 15'

SEQUENCE OF OPERATIONS:

LEVEL CONTROL:

1. WHEN THE BASIN WATER LEVEL DROPS BELOW THE LOW LEVEL PROBE, A LEVEL RELAY OPENS THE MAKE-UP VALVE AND STARTS THE INHIBITOR INJECTION PUMP.
2. WHEN THE BASIN WATER LEVEL RISES ABOVE THE HIGH LEVEL PROBE, A LEVEL RELAY CLOSES THE MAKE-UP VALVE AND STOPS THE INHIBITOR INJECTION PUMP.
3. WHEN THE BASIN WATER LEVEL RISES ABOVE THE HIGH ALARM LEVEL PROBE, A LEVEL RELAY SIGNALS THE ESS SYSTEM THAT THE BASIN WATER LEVEL IS HIGH.
4. WHEN THE BASIN WATER LEVEL DROPS BELOW THE LOW ALARM LEVEL PROBE, A LEVEL RELAY SIGNALS THE ESS SYSTEM THAT THE BASIN WATER LEVEL IS LOW. (THIS ALARM CAN ALSO BE USED TO SHUT DOWN THE TOWER WATER PUMPS AND OTHER EQUIPMENT FOR PROTECTION.)

WATER CONDUCTIVITY CONTROL:

1. WHEN THE CONTROLLER SENSES WATER FLOW FROM THE FLOW SWITCH, IT STARTS AUTOMATIC CONDUCTIVITY CONTROL.
2. WHEN THE CONTROLLER SENSES BASIN WATER CONDUCTIVITY ABOVE THE SET POINT, IT OPENS THE BLOWDOWN VALVE AND STARTS THE NEUTRALIZER INJECTION PUMP.
3. WHEN THE CONTROLLER SENSES BASIN WATER CONDUCTIVITY BELOW THE SET POINT, IT CLOSES THE BLOW-DOWN VALVE AND STOPS THE NEUTRALIZER INJECTION PUMP.

4. THE CONTROLLER CONTINUOUSLY RECORDS MAKE-UP AND BLOW-DOWN WATER FLOW (IN GALLONS) FROM THE WATER METER IMPULSE HEADS.

INJECTION PUMP PRIMING:

1. WHEN THE INHIBITOR INJECTION PUMP PRIMING BUTTON IS DEPRESSED, THE INHIBITOR INJECTION PUMP STARTS AND RUNS FOR 2 MINUTES (ADJUSTABLE). THEN IT STOPS.
2. WHEN THE NEUTRALIZER INJECTION PUMP PRIMING BUTTON IS DEPRESSED, THE NEUTRALIZER INJECTION PUMP STARTS AND RUNS FOR 2 MINUTES (ADJUSTABLE). THEN IT STOPS.

MAKE-UP VALVE TEST:

1. WHEN THE PUSH TO TEST BLOW-DOWN VALVE BUTTON IS DEPRESSED, THE MAKE-UP VALVE OPENS FOR 2 MINUTES (ADJUSTABLE). THEN IT CLOSES.

BLOW-DOWN VALVE TEST:

1. WHEN THE PUSH TO TEST BLOW-DOWN VALVE BUTTON IS DEPRESSED, THE BLOW-DOWN VALVE OPENS FOR 2 MINUTES (ADJUSTABLE). THEN IT CLOSES.

NO	DATE	CLASS REV	DC	DESCRIPTION	DWN	DSGN	CHKD	SUB	APP
4	06-29-18	UNCLASS	ML	UPDATED BASED ON LANL MASTER SPECIFICATION 23 2500.	EM	EM	ML	ML	TO
3	06-29-17	UNCLASS	TO	ADMIN. CHANGES TO CAD STD. REV#5 FORMAT	JB	AJ	ML	ML	TO
2	09-03-14	U	ML	GENERAL REVISIONS.	JM	SH	RC	ML	TO
1	06-23-05	U	DY	GENERAL REVISIONS. DWG. DWG. NO. WAS ST6800	RP	MN	RF	CD	TO

ENGINEERING STANDARDS

MECHANICAL		DRAWN	R.PEARSON
OPEN COOLING TOWER WATER TREATMENT FLOW DIAGRAM		DESIGN	R.ROMERO
		CHECKED	D.NGUYEN
		DATE	06-28-99
TA- XX	BLDG- XX	SHEET 1	
SUBMITTED POC DISCIPLINE: CHARLES DUPRE		APPROVED FOR RELEASE STANDARDS MANAGER: TOBIN ORUCH	
Los Alamos NATIONAL LABORATORY		PO Box 1663, Los Alamos, New Mexico 87545	
D.C.: U	REVIEWER: LARRY BAYS	DATE: 06-28-99	
PROJECT ID	DRAWING NO	REV	
CHAPTER 6	ST-D30GEN-1	4	

00% REVIEW NOT FOR CONSTRUCTION