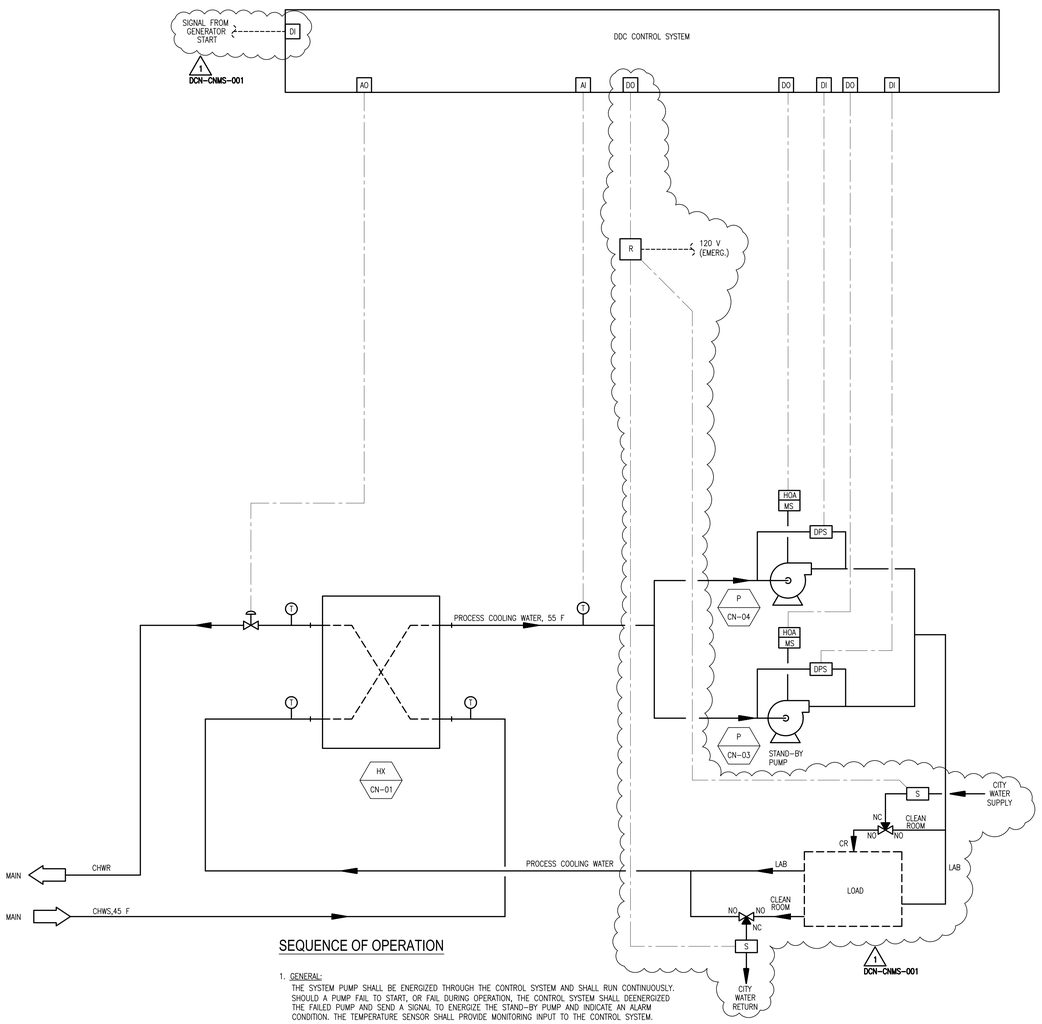
CONTROL POINT LIST - PROCESS COOLING WATER (PCW) SYSTEM

BUILDING:		OUTPUT FROM DDC						INPUT TO DDC											SOFTWARE: ALARMS							SOFTWARE: APPLICATIONS						
		DIGITAL			ANALOG			DIGITAL						ANALOG					DIGITAL			ANALOG										
POINT DESCRIPTION	GRAPHIC DISPLAY(WINDOWS BASED SOFTWARE)	CONTROL RELAY	HAND2/OFF/AUTO	OPEN/CLOSE	CONTROL POINT ADJUSTMENT	PROPORTIONAL CONTROL		CONTACT CLOSURE	PULSE	DIFFERENTIAL PIPES SWITCH	PRESSURE SWITCH	AUXILIARY CONTACT	GENERAL ALARM	TEMPERATURE (F)	% RELATIVE HUMIDITY	RESISTIVITY	POSITION SENSOR	FLOW	CONTACT CLOSURE--DRY FILTER	CONTACT CLOSURE--EQUIPMENT FAILURE		HIGH LIMIT	LOW LIMIT	RUN TIME		DUTY CYCLING	START/STOP	ECONOMIZER OFF/AUTO	REHEAT COIL RESET	LEAD/LAG	CHILLED WATER RESET	FAILURE MODE
PCW WATER SYSTEMS	X																															
CHILLED WATER RETURN CONTROL VALVE						X																										
PUMP – START/STOP		X																									X					
PUMP – STATUS										X										X			X									
CHILLED WATER SUPPLY TEMPERATURE														X								X	X									
GENERATOR START AND RELAY		X										X																				

CONTROL POINT LIST - SENSIBLE COOLING SYSTEM

BUILDING:		OUTPUT FROM DDC						INPUT TO DDC											SOFTWARE: ALARMS							SOFTWARE: APPLICATIONS						
		DIGITAL			ANALOG			DIGITAL						ANALOG					DIGITAL			ANALOG										
POINT DESCRIPTION	GRAPHIC DISPLAY(WINDOWS BASED SOFTWARE)	CONTROL RELAY	HAND2/OFF/AUTO	START/STOP	CONTROL POINT ADJUSTMENT	PUMP SPEED	PROPORTIONAL CONTROL	CONTACT CLOSURE	PULSE	DIFFERENTIAL PIPES SWITCH	PRESSURE SWITCH	AUXILIARY CONTACT	GENERAL ALARM	TEMPERATURE (F)	% RELATIVE HUMIDITY	PUMP SPEED FEEDBACK	DIFFERENTIAL PRESSURE	FLOW	CONTACT CLOSURE--DRY FILTER	CONTACT CLOSURE--EQUIPMENT FAILURE		HIGH LIMIT	LOW LIMIT	RUN TIME		DUTY CYCLING	START/STOP	ECONOMIZER OFF/AUTO	REHEAT COIL RESET	LEAD/LAG	CHILLED WATER RESET	FAILURE MODE
SENSIBLE COOLING WATER SYSTEMS	X																															
CHILLED WATER RETURN CONTROL VALVE							X																									
P-CN-01 (VFD)				X		X										X											X					X
P-CN-02 (VFD)				X		X										X																X
DI WATER SUPPLY TEMPERATURE														X								X	X									
DIFFERENTIAL PRESSURE																	X															
DI RESISTIVITY – POLISHING LOOP																X						X	X									



SEQUENCE OF OPERATION

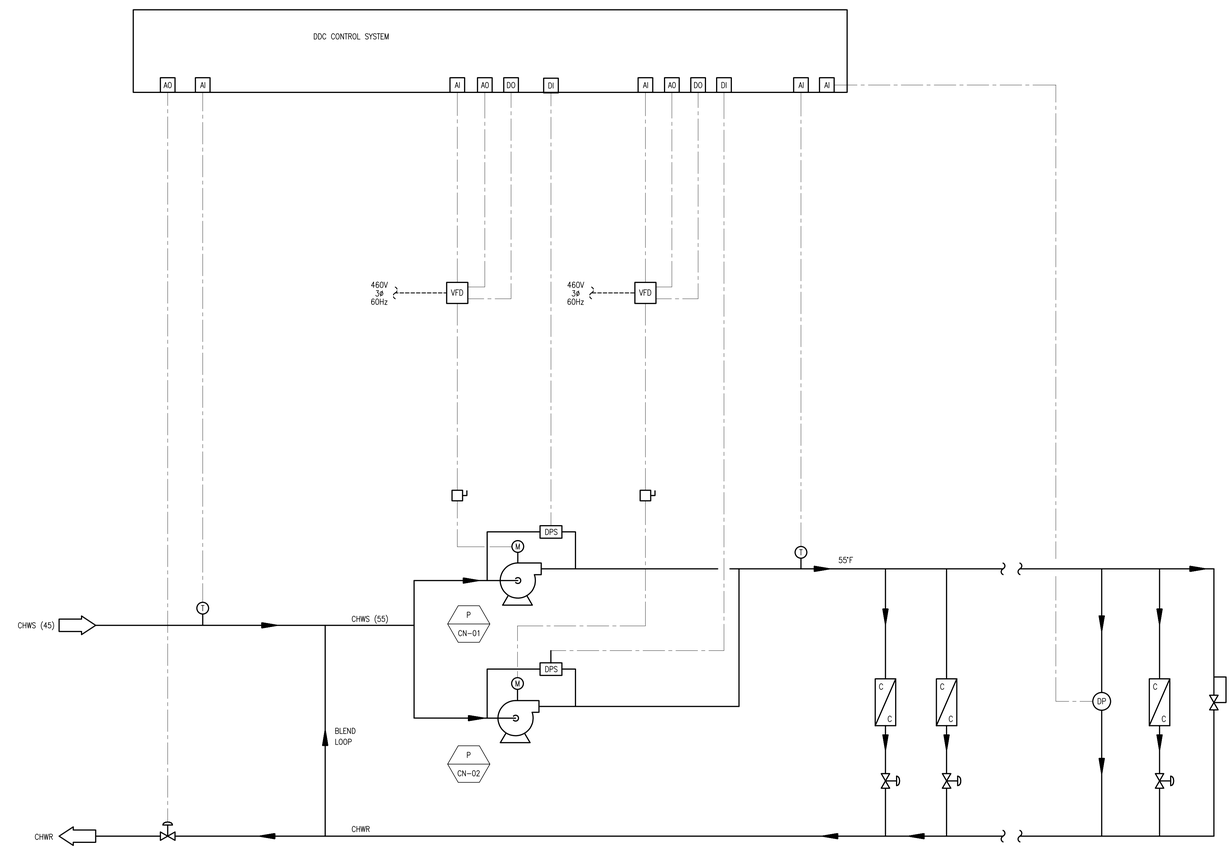
1. GENERAL:
   THE SYSTEM PUMP SHALL BE ENERGIZED THROUGH THE CONTROL SYSTEM AND SHALL RUN CONTINUOUSLY. SHOULD A PUMP FAIL TO START, OR FAIL DURING OPERATION, THE CONTROL SYSTEM SHALL DEENERGIZED THE FAILED PUMP AND SEND A SIGNAL TO ENERGIZE THE STAND-BY PUMP AND INDICATE AN ALARM CONDITION. THE TEMPERATURE SENSOR SHALL PROVIDE MONITORING INPUT TO THE CONTROL SYSTEM.

2. WATER TEMPERATURE:
   A TEMPERATURE SENSOR IN THE PCW WATER SUPPLY LINE SHALL PROVIDE INPUT TO THE CONTROL SYSTEM. THE CONTROL SYSTEM SHALL MODULATE THE CONTROL VALVE IN THE CHILLED WATER RETURN LINE AS REQUIRED TO MAINTAIN THE PCW WATER SUPPLY TEMPERATURE AT 55'F.

2. EMERGENCY PCW BACKUP WITH SANITARY WATER
   AN INPUT SIGNAL TO THE DDC SYSTEM SHALL INDICATE THE EMERGENCY GENERATOR START. UPON ACTIVATION OF THE EMERGENCY POWER, THE RELAY SHALL COMMAND THE THREE-WAY VALVE SOLENOID ON SO THAT THE NORMALLY CLOSED PORT IS SWITCHED TO THE OPEN POSITION. A TIMER FUNCTION IN THE DDC SHALL RETURN THE THREE WAY VALVES TO THEIR NORMAL POSITION AFTER 10 MINUTES OF OPERATION.

PROCESS COOLING WATER CONTROL DIAGRAM

NO SCALE HDG15018-8



SEQUENCE OF OPERATION

1. GENERAL:
   THE SYSTEM PUMP SHALL BE ENERGIZED THROUGH THE CONTROL SYSTEM AND SHALL RUN CONTINUOUSLY. SHOULD A PUMP FAIL TO START, OR FAIL DURING OPERATION, THE CONTROL SYSTEM SHALL DEENERGIZED THE FAILED PUMP AND SEND A SIGNAL TO ENERGIZE THE STAND-BY PUMP AND INDICATE AN ALARM CONDITION.

2. WATER TEMPERATURE CONTROL:
   A TEMPERATURE SENSOR IN THE CHILLED WATER SUPPLY LINE SHALL PROVIDE INPUT TO THE CONTROL SYSTEM. THE CONTROL SYSTEM SHALL MODULATE THE CONTROL VALVE IN THE CHILLED WATER RETURN LINE AS REQUIRED TO MAINTAIN THE CHILLED WATER SUPPLY TEMPERATURE AT 55'F.

3. FLOW CONTROL:
   A DIFFERENTIAL PRESSURE SWITCH SHALL PROVIDE INPUT TO THE CONTROL SYSTEM. THE CONTROL SYSTEM SHALL MODULATE THE PUMP SPEED AS REQUIRED TO MAINTAIN FLOW.

SENSIBLE COOLING SYSTEM CONTROL DIAGRAM

NO SCALE HDG15018-8

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NUMBER OF SECTION OR DETAIL
DRAWING ON WHICH SECTION OR DETAIL IS SHOWN OR TAKEN
SECTION AND DETAIL KEY

THIS DOCUMENT CONTROLLED BY
CHANGE CONTROL SYSTEM
ENGINEERING PROCEDURE

REV	CHANGE TYPE	CHANGE CONTROL SYSTEM	CHANGE REQUEST NUMBER	DESCRIPTION	DSN	CHK	DEPT
0				CERTIFIED FOR CONSTRUCTION – 12/9/02	JG	BWJ	

REVISION OR ISSUE PURPOSE

DATE	PE	DATE	PJ	DATE	REQ	DATE	UTB	DATE	RPE	RPE NO	DATE
									BWJ	105869	12/9/02

REVISION APPROVALS

ST	CV	EC	EE	EM	IE	M	PD	SE	AR
BZ	AW	BWJ	AK	IM	DM	–	BWJ	–	TW

SQUAD CHECK

REV.	DATE

DRAWING APPROVALS

RPE	
DSN	
DRW	
CHK	
DEPT	
PE	CLG
PJ	JS
REQ	
UTB	JRL

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PROJECT NAME:
CENTER FOR NANOPHASE MATERIALS SCIENCES
MISCELLANOUS EQUIPMENT
CONTROL DIAGRAMS-2

1	48	49	50	PLANT	BLDG	FL	SH.	OF	TYPE	CLASS
3	H	X	X	8	8610		1	1	D	U
51		52		53	A/E DRAWING NUMBER:					REV
NC		NA			H8.11.46					0

AutoCAD