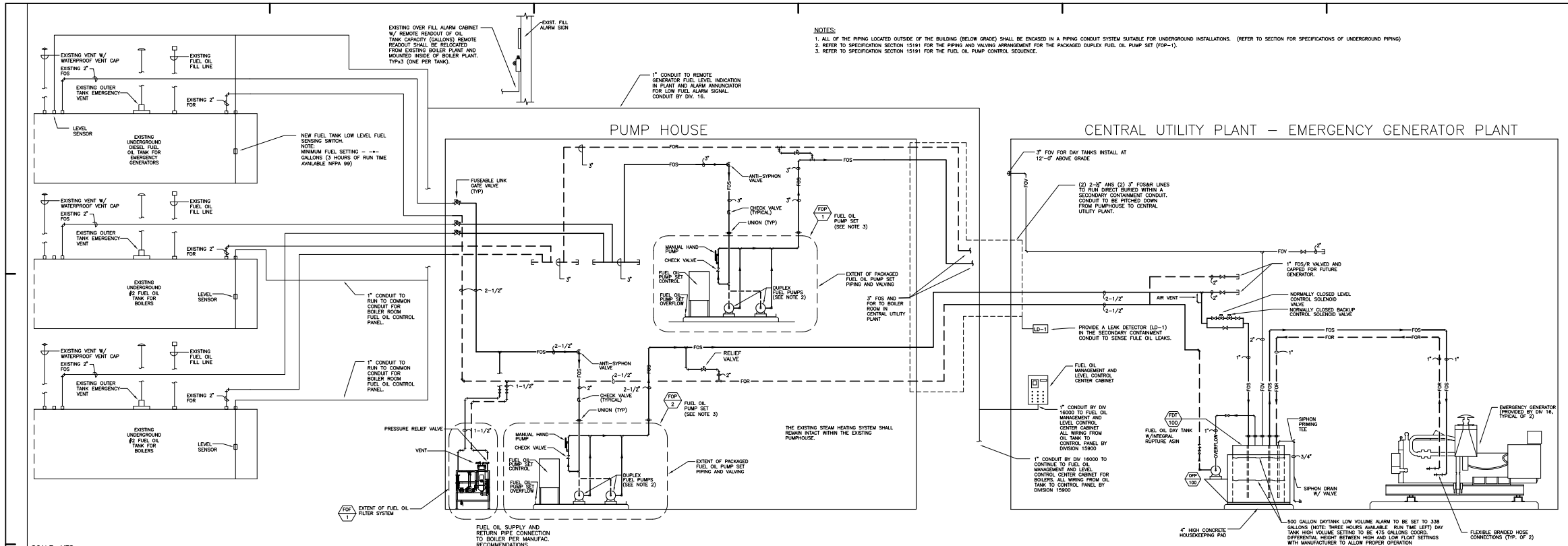
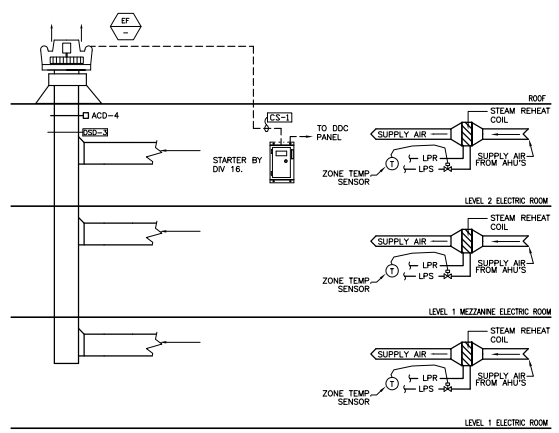
NOTES:
1. ALL OF THE PIPING LOCATED OUTSIDE OF THE BUILDING (BELOW GRADE) SHALL BE ENCASED IN A PIPING CONDUIT SYSTEM SUITABLE FOR UNDERGROUND INSTALLATIONS. (REFER TO SECTION FOR SPECIFICATIONS OF UNDERGROUND PIPING)
2. REFER TO SPECIFICATION SECTION 15191 FOR THE PIPING AND VALVING ARRANGEMENT FOR THE PACKAGED DUPLEX FUEL OIL PUMP SET (FOP-1).
3. REFER TO SPECIFICATION SECTION 15191 FOR THE FUEL OIL PUMP CONTROL SEQUENCE.



SCALE: NTS

FUEL OIL PIPING SCHEMATIC



SEQUENCE OF OPERATION

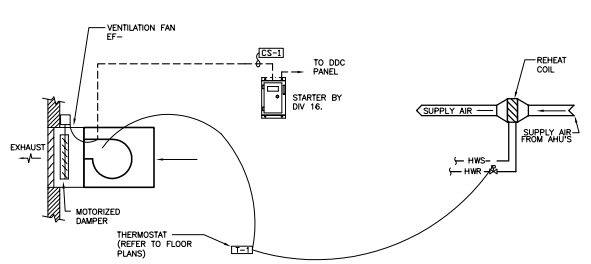
SELF CONTAINED HEATING/COOLING THERMOSTAT MOUNTED IN ROOM SHALL CONTROL SPACE TEMPERATURE.

THE EXHAUST FAN SHALL TYPICALLY RUN CONTINUOUSLY. FAN STATUS SHALL BE OBTAINED BY CURRENT SENSOR CS-1 AND REPORTED TO THE DDC WORKSTATION.

SPACE THERMOSTAT SHALL MODULATE STEAM REHEAT CONTROL VALVE TO MAINTAIN SPACE SETPOINT. THE VALVE SHALL MODULATE OPEN ON A DROP IN SPACE TEMPERATURE AND CLOSE ON A RISE ABOVE SPACE TEMPERATURE SETPOINT.

SCALE: NTS

ELECTRIC ROOM – HEATING AND VENTILATION CONTROL SCHEMATIC



SEQUENCE OF OPERATION

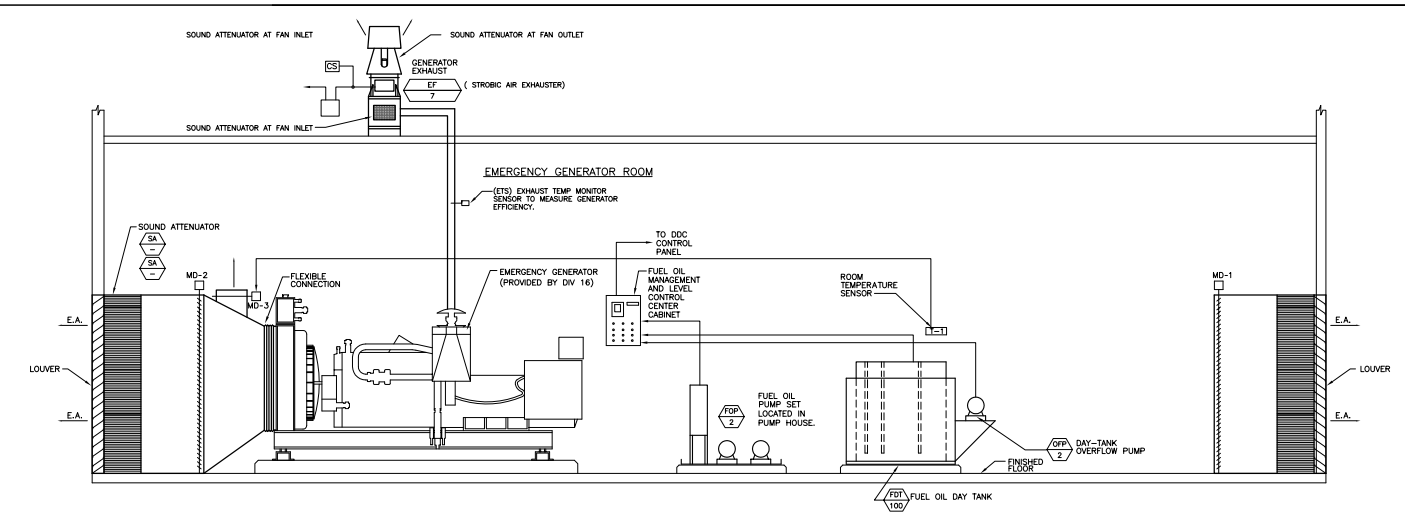
SELF CONTAINED THERMOSTAT MOUNTED IN ROOM SHALL CONTROL SPACE TEMPERATURE.

THE EXHAUST FAN SHALL TYPICALLY RUN CONTINUOUSLY. FAN STATUS SHALL BE OBTAINED VIA CURRENT SENSOR CS-1 AND REPORTED TO THE DDC WORKSTATION.

SPACE THERMOSTAT SHALL MODULATE STEAM REHEAT CONTROL VALVE TO MAINTAIN SPACE SETPOINT (65 DEG F, ADJ.). THE VALVE SHALL MODULATE OPEN ON A DROP IN SPACE TEMPERATURE AND CLOSE ON A RISE ABOVE SPACE TEMPERATURE SETPOINT.

SCALE: NTS

ELECTRIC ROOM – HEATING AND VENTILATION CONTROL SCHEMATIC



SEQUENCE OF OPERATION (EMERGENCY GENERATOR INTAKE/EXHAUST SYSTEM)

A. GENERAL

1. THE EMERGENCY GENERATOR INTAKE/EXHAUST SYSTEM SHALL BE ENABLED AND DISABLED FROM A DIRECT DIGITAL CONTROL PANEL.

B. DISABLED MODE

1. WHEN THE EMERGENCY GENERATOR SYSTEM IS DISABLED THE EXHAUST AIR DAMPER (MD-2) AND INTAKE AIR DAMPER (MD-1) SHALL BE CLOSED.
2. GENERATOR EXHAUST FAN (EF-7) SHALL BE DE-ENERGIZED.

C. EMERGENCY GENERATOR OPERATING MODE

1. WHEN THE EMERGENCY GENERATOR IS ENERGIZED THE SPACE REHEAT COIL SHALL BE DE-ENERGIZED, THE GENERATOR EXHAUST DAMPER (MD-2), THE INTAKE AIR DAMPER (MD-1) SHALL OPEN AND GENERATOR EXHAUST FAN (EF-7) SHALL ENERGIZE. WHEN THE EMERGENCY GENERATOR IS DE-ENERGIZED, THE THE EXHAUST AIR AND INTAKE AIR DAMPERS SHALL REMAIN OPEN FOR A PERIOD OF 5-MINUTES (ADJ.)

2. WHEN THE EMERGENCY GENERATOR IS ENERGIZED AND THE ROOM TEMPERATURE DROPS BELOW 40 DEG. F. (ADJ.) AS SENSED BY TEMPERATURE SENSOR (T-1) THEN DAMPER (MD-3) SHALL OPEN. DAMPER (MD-3) SHALL CLOSE WHEN ROOM TEMPERATURE RISES TO 65 DEG. F. AS SENSED BY TEMPERATURE SENSOR (T-1).

D. SAFETIES AND ALARMS

1. THE CONTROL SYSTEM SHALL MONITOR THE STATUS OF THE INTAKE AND EXHAUST DAMPERS (MD-1 AND MD-2) VIA THE DAMPER MOUNTED END SWITCHES. IF ANYTIME GENERATOR INTAKE/EXHAUST SYSTEM IS "ENABLED" AND AFTER A 20 SECOND DELAY, THE CONTROL SYSTEM SENSES NO END SWITCH CLOSURE, AN ALARM SHALL BE INITIATED.

2. THE CONTROL SYSTEM SHALL MONITOR THE EMERGENCY GENERATOR SPACE TEMPERATURE AS SENSED BY TEMPERATURE SENSOR (T-1). IF ANYTIME THE GENERATOR IS RUNNING AND THE SPACE TEMPERATURE EXCEEDS 100°F OR DROPS BELOW 35°F AN ALARM SHALL BE INITIATED.

3. THE CONTROL SYSTEM SHALL MONITOR THE EMERGENCY GENERATOR FUEL OIL STORAGE TANK FOR A REMOTE ALARM FROM THE PACKAGED FUEL OIL MANAGEMENT AND LEVEL CONTROL CABINET.

4. THE CONTROL SYSTEM SHALL MONITOR THE EMERGENCY GENERATOR DAYTANK AND FUEL OIL PUMPING SYSTEM FOR A REMOTE ALARM FROM THE PACKAGED DAYTANK CONTROLS.

5. THE CONTROL SYSTEM SHALL MONITOR THE EMERGENCY GENERATOR FOR A REMOTE ALARM FROM THE PACKAGED GENERATOR CONTROL PANEL.

8. THE CONTROL SYSTEM SHALL MONITOR THE EXHAUST FAN (EF-7) CURRENT SENSOR FOR PROOF OF OPERATION WHEN THE GENERATOR IS RUNNING.

G. FUEL OIL DAYTANKS, PUMP SET AND CONTROL CABINET

1. THE FUEL-OIL PUMP SET SHALL BE ENABLED TO OPERATE WHEN ONE OR BOTH OF THE FUEL OIL PUMP "HAND-OFF-AUTO" SWITCHES IS IN "AUTO" POSITION.

2. THE 4-STAGE FLOAT SWITCH (PROVIDED WITH DAYTANK) SHALL MAINTAIN FUEL OIL LEVEL BETWEEN SECOND AND THIRD FLOAT STAGES BY STARTING THE SELECTED FUEL OIL PUMP ON SECOND STAGE AND STOPPING IT ON THIRD STAGE. WHENEVER THE PUMP IS RUNNING, BOTH SOLENOID VALVES (NORMALLY CLOSED) SHALL BE POWERED OPEN. WHEN THE PUMP IS STOPPED, VALVES SHALL BE CLOSED.

3. WHEN THE LEAD PUMP IS ENERGIZED AND NO FLOW IS SENSED BY THE FLOW SENSING ELEMENT, A "PUMP FAIL" INDICATOR SHALL BE ILLUMINATED AND THE LAG PUMP SHALL BE STARTED. IF FAILURE OCCURES AT SECOND PUMP, AN AUDIBLE ALARM SHALL BE ISSUED AND THE SECOND "PUMP FAIL" INDICATOR LIGHT SHALL BE ILLUMINATED.

4. WHEN THE 4-STAGE FLOAT SENSES LEVEL AT ITS FIRST (LOWEST) STAGE, THE CONTROL PANEL SHALL SOUND AN AUDIBLE ALARM AND ILLUMINATE A "LOW DAYTANK LEVEL" INDICATOR LIGHT.

5. WHEN THE 4-STAGE FLOAT SENSES LEVEL AT ITS FOURTH (HIGHEST) STAGE, THE CONTROL PANEL SHALL SOUND AN AUDIBLE ALARM AND ILLUMINATE A "HIGH DAYTANK LEVEL" INDICATOR LIGHT. DAY-TANK SOLENOID VALVES SHALL BE CLOSED AND FUEL OVERFLOW PUMP SHALL START TO RETURN FUEL TO MAIN TANK. THE PUMP SHALL REMAIN ON UNTIL THE SECOND STAGE (PUMP START) SWITCH IS ACTIVATED AGAIN. THE ALARM SHALL HAVE A MANUAL RESET.

6. WHEN THE RUPTURE BASIN FLOAT SWITCH SENSES AN OIL LEVEL IN THE RUPTURE BASIN, THE CONTROL PANEL SHALL SOUND AN AUDIBLE ALARM AND ILLUMINATE A "DAYTANK RUPTURE BASIN" INDICATOR LIGHT. RUPTURE BASIN SWITCH SHALL CLOSE THE SOLENOID VALVES TO THAT DAY-TANK.

7. WHEN THE PUMP SET RUPTURE BASIN SWITCH SENSES AN OIL LEVEL IN PUMP SET BASIN, THE PUMP SHALL BE STOPPED AND THE CONTROL PANEL SHALL ISSUE AN AUDIBLE ALARM AND ILLUMINATE A "PUMPSET RUPTURE BASIN" INDICATOR LIGHT.

8. WHEN SECONDARY CONATAINMENT CONDUIT LEAK DETECTOR (LD-1 SENSES A FUL OIL LEAK ALL FUEL OIL PUMPS SHALL STOP AND AN ALARM SHALL BE INITIATED AT THE DDC OPERATOR WORKSTATION..

INPUT/OUTPUT SUMMARY TABLE-EMERGENCY GENERATOR/LOADING DOCK EXH SYSTEM

DESCRIPTION	INPUTS: ANALOG					BINARY			ANALOG			OUTPUTS: BINARY			3- POINT FLOATING		ALARMS			FEATURES								
	ROOM TEMPERATURE	OUTDOOR AIR TEMP.	S.A. TEMPERATURE	S.A. PRESSURE	S.A. VELOCITY	STATUS CLOSURE	CURRENT SENSOR	END SWITCH	MODULATING ACTUATOR	VARIABLE SPEED	VARIABLE SPEED	CONTROL RELAY	SOLENOID VALVE	2-POSITION DAMPER MOTOR	3-POINT FLOATING	4-STATE SENSOR	HIGH LIMIT	LOW LIMIT	RUN TIME	NO AIRFLOW	ALARM DISPLAY	ALARM DISPLAY	OPTIMIZED START (SCHEDULE)	OPTIMIZED START (COAST)	DUTY CYCLE	DUTY CYCLE	ECONOMIZER CYCLE (D.B.)	MIN. OUTDOOR AIR	REMOTE ALARM/RESET	DISPLAY GRAPHICS	FLOOR GRAPHICS	TREND LOG
EXHAUST MOTORIZED DAMPER (MD-2)							●						●															
INTAKE MOTORIZED DAMPER (MD-1)							●						●															
EXHAUST FAN (EF-7)							●						●								●							
FUEL OIL PUMP (FOP-2)																					●							
OVERFLOW PUMP SET (OFP-2)																					●							
FUEL DAY TANK (FDT-1)							●						●				●	●	●		●							
EMERGENCY GENERATOR																					●							
FUEL OIL TANK (FDT-1)																					●							
GENERATOR ROOM TEMP. SENSOR (T-1)	●																●	●										
FUEL OIL CONTROL CABINET																							●					
EXHAUST TEMP SENSOR (EST)		●																										

BRING ONE COMMON ALARM FROM FUEL OIL CONTROL CENTER TO DDC CONTROL PANEL.

SCALE: NTS

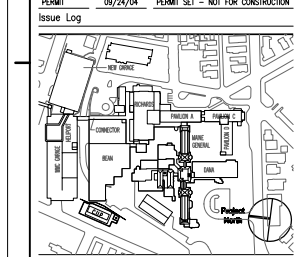
FUEL OIL CONTROL SCHEMATIC AND SEQUENCE

General Notes:

MARK	ISSUE DATE	DESCRIPTION
PERMIT	09/24/04	PERMIT SET – NOT FOR CONSTRUCTION

FOR PERMIT ONLY
NOT FOR CONSTRUCTION

Issue Log



Key Plan

TRO
Architecture
Planning
Engineering
Interior Design
The Ritchie Organization
80 Bridge Street
Newton, MA 02458-1136
617-969-9400

Maine Medical Center
Central Utility Plant
Portland, Maine

Drawing Title
MECHANICAL-CENTRAL UTIL. PLANT EMERG. GENERATOR CONTROLS AND POINTS LIST

0' 0 0 0 0

Commission No.	4677	Date Issued	
Scale	NTS	Sheet Number	
Drawn By	MC		
Approved By	MC		
Filename	4677M504		

M504

Copyright © 2004 The Ritchie Organization