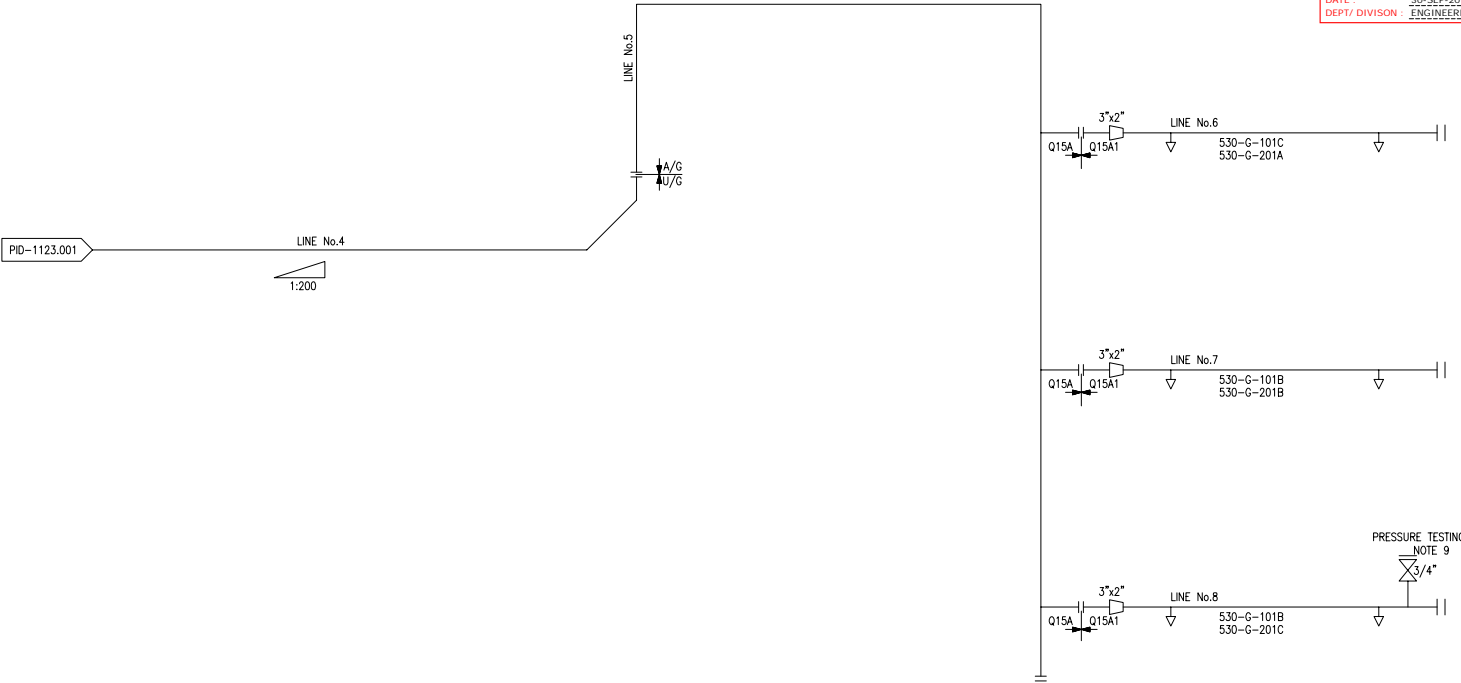


DESALTER FEED PUMPS
TRAIN A & TRAIN B



AS-BUILT
KOC APPROVAL
NAME / KOC No.:
DESIGNATION :
GROUP / TEAM :
SIGNATURE :
DATE :

AS-BUILT
LARSEN & TOUBRO LIMITED
NAME : VAIBHAV VERMA
DESIGNATION : AGM
SIGNATURE : [Signature]
DATE : 30-SEP-2018
DEPT/ DIVISION : ENGINEERING

GENERAL NOTES:

- A. FOR STANDARD SYMBOLS AND NOMENCLATURE SEE DRAWINGS 50489-530-020-PID-1104.001.
B. ALL EQUIPMENT NUMBERS SHOWN ON THIS PAID ARE PRECEDED BY 530-
C. FOR ESDV, SBDV AND MOV DETAILS SEE DRAWINGS 50489-530-020-PID-1106.001.
D. FOR MISCELLANEOUS PIPING DETAILS SEE DRAWING 50489-530-020-PID-1108.001.
E. DELETED.
- NOTES:
1. UV/IR FLAME DETECTORS AUTOMATICALLY DETECT FIRE AND WHEN ACTIVATED A SIGNAL IS SENT TO THE F&O PANEL IN THE CCP.
 2. AIR SET IS FITTED WITH AIR FILTER, REGULATOR AND PL.
 3. RO SUPPLIED TO GIVE PRESSURE/LOSS CHARACTERISTICS OF THE DELUGE VALVE.
 4. 4 WAY SUCTION COLLECTION HEAD IS INSTALLED TO ALLOW SECONDARY SUPPLY OF WATER TO DELUGE SYSTEM.
 5. DELUGE VALVE ARE DIAPHRAGM TYPE DESIGNED FOR DELUGE OPERATION AND BE UL LISTED AND FM APPROVED
 6. TRIGGER HEAD CONFIGURATION
 7. 1/2" FUSIBLE PLUGS OVER PROTECTED EQUIPMENT ON A GENERAL
 8. 3 x 3 METRE MATRIX
 9. 2 VALVES REQUIRED IN BYPASS LINE TO PREVENT UNNECESSARY LOSS OF WATER DUE TO GATE VALVE PASSING.
 10. ADEQUATE DRAINAGE TO BE PROVIDED AROUND DELUGE SYSTEM TO AVOID ACCUMULATION OF WATER AROUND THE EQUIPMENT
 11. PROVISION IS MADE FOR PRESSURE TESTING AS PER NEPA 15, CLAUSE NO. 6.4.4 & 6.4.4.5 NEAR THE HYDRAULICAL REMOTE TEST NOZZLE.
 12. DELUGE VALVES ARE HELD CLOSED BY AIR PRESSURE SUPPLIED FROM THE INSTRUMENT AIR SYSTEM
 13. DELUGE VALVES SHALL FULLY OPEN WITHIN 10 SECONDS ON REMOVE OF INSTRUMENT AIR BY:
A. REMOTE OPERATION OF A PUSH BUTTON AT THE MAIN FIRE AND GAS PENEL, LOCATED IN THE CONTROL ROOM, TO ENERGIZE A SOLENOID VALVES IN INSTRUMENT AIR SUPPLY TO DELUGE VALVE.
B. LOCAL OPERATION OF A MECHANICAL AIR RELEASE UNIT OF DELUGE VALVE STATION.
 14. SPRAY NOZZLE IS CONSTRUCTED FROM MAIN BRASS.
 15. DELUGE VALVE STATIONS SHALL BE PROTECTED FROM RADIATED HEAT BY THE PROVISION OF METAL RADIATION SHIELDS.
 16. PIPE W/OP (AS PER KOC-L-009):
3" SIZE AND BELOW : 90-10 COPPER NIKEL TO ASTM B 466 UNS.
4" SIZE AND ABOVE : CARBON STEEL API 5L GRB WITH PHENOLIC EPOXY COATING.
 17. FLANGE INSULATION KITS ARE PROVIDED AT DISSIMILAR METAL JUNCTIONS HAVING ELECTROMOTIVE POTENTIAL DIFFERENCE GREATER THAN 0.05V AS PER CLAUSE 7.3.1.17 OF KOC-L-009.
 18. INTERNALLY COATED UG PIPING ARE FLANGED SPOOLS AS PER KOC-L-009.
 19. FLUSHING DRAIN PIT IS ACCESSIBLE FROM GROUND LEVEL.
 20. THE UNDERGROUND SECTION IS EXTERNALLY COATED WITH 3 LAYERS EXTRUDED HDPE AS PERKOC-P-004 PART 6, REV-2 WITH THE INTERNAL PHENOLIC EPOXY ON THE PIPING SHALL BE AS PER KOC-P-005 REV-1.
 21. THE ABOVE GROUND PIPING SECTION IS COATED WITH SYSTEM A1-1 OF KOC-P-001 REV 3
 22. TOP CHAMBER OF DELUGE VALVE IS CONNECTED TO WATER LINE & TO WATER INLET OF ACTUATOR WHEN THE AIR PRESSURE DROPS DUE TO DETECTION OF FIRE THE DIAPHRAGM OF ACTUATOR IS LIFTED AND ALLOWS THE WATER PRESSURIZING DIAPHRAGM OF DELUGE VALVE TOP CHAMBER TO DRAIN. THIS RELEASES THE PRESSURE IN THE TOP CHAMBER OF DELUGE VALVE ALLOWING THE DELUGE VALVE TO OPEN.

LEGENDS:

SYMBOL	DESCRIPTION
FW	FIRE WATER PIPING
▽	SPRAY NOZZLE
□	REDUCER
◇	GATE VALVE
—D	END CAP

REFERENCE DRAWINGS:

50489-530-000-CAL-1011	HYDRAULIC CALCULATION FOR WATER SPRAY SYSTEM FOR DESALTER FEED PUMPS TRAIN A & TRAIN B
KOC-L-009	KOC STANDARD FOR FIRE PROTECTION SYSTEMS
50489-530-000-LAD-1065	FIRE WATER NETWORK LAYOUT

21	ISSUED FOR AS-BUILT	PAK/DEU	NIJ	SRA	RAK	30.09.18
20	ISSUED FOR AS-BUILT	PAK/DEU	NIJ	SRA	RAK	05.08.18
01	ISSUED FOR CONSTRUCTION	PAK/DEU	NIJ	SRA	RAK	27.07.16
0	ISSUED FOR CONSTRUCTION	PAK/DEU	NIJ	SRA	RAK	13.05.16
A	ISSUED FOR APPROVAL	PAK/DEU	NIJ	SRA	RAK	15.10.15
REV.	DESCRIPTION	DRAWN	CHECKED	HOOD	PEM	DATE

CONTRACTOR REVISION

KUWAIT OIL CO. K. S. C.  **شركة نفط الكويت ش.م.ك.**
A Subsidiary of Kuwait Petroleum Corporation

CONTRACTOR DETAILS:-
LARSEN & TOUBRO LIMITED
FARIDABAD

PROJECT TITLE:-
NEW GATHERING
CENTRE GC-30 IN NORTH KUWAIT

DOCUMENT TITLE:-
PIPING & INSTRUMENTATION DIAGRAM
FIRE WATER SPRAY SYSTEM FOR
DESALTER FEED PUMPS TRAIN A & TRAIN B

PROJECT NO.	DRAWING NO.	REV.	KOC DRG. NO.	REV.
EF1902	CONTRACTOR DRG. NO. 50489-530-000-PID-1123.002	21		
	SHEET NO. 2 OF 2			
	COMPANY DRG. NO.			
	SHEET NO.			

WATER SPRAY NOZZLE SCHEDULE

TYPE	SIZE	SPRAY ANGLE	K-FACTOR	FLOW @2.0 Bar DISCHARGE PRESSURE	QUANTITY
MV	1/2" NPT MALE	140°	35	50 LPM	06 FOR EACH TRAIN

DESIGN OBJECTIVE : FIRE EXTINGUISHMENT & EXPOSURE PROTECTION	
DESIGN CALCULATION	
SURFACE AREA TO BE PROVIDED	4 m2
WATER APPLICATION RATE (L/MIN/m2)	20.4
THEORETICAL FLOW (LPM)	245
HYDRAULICALLY CALCULATED FLOW (LPM) REFER 50489-530-000-CAL-1011	350

AREA PROTECTED	LINE No. 5	LINE No. 6	LINE No. 7	LINE No. 8
530-G-101 A/B/C	3"-WF-9200-Q15A	2"-WF-9201-Q15A1	2"-WF-9202-Q15A1	2"-WF-9203-Q15A1
530-G-201 A/B/C	3"-WF-9209-Q15A	2"-WF-9210-Q15A1	2"-WF-9211-Q15A1	2"-WF-9212-Q15A1