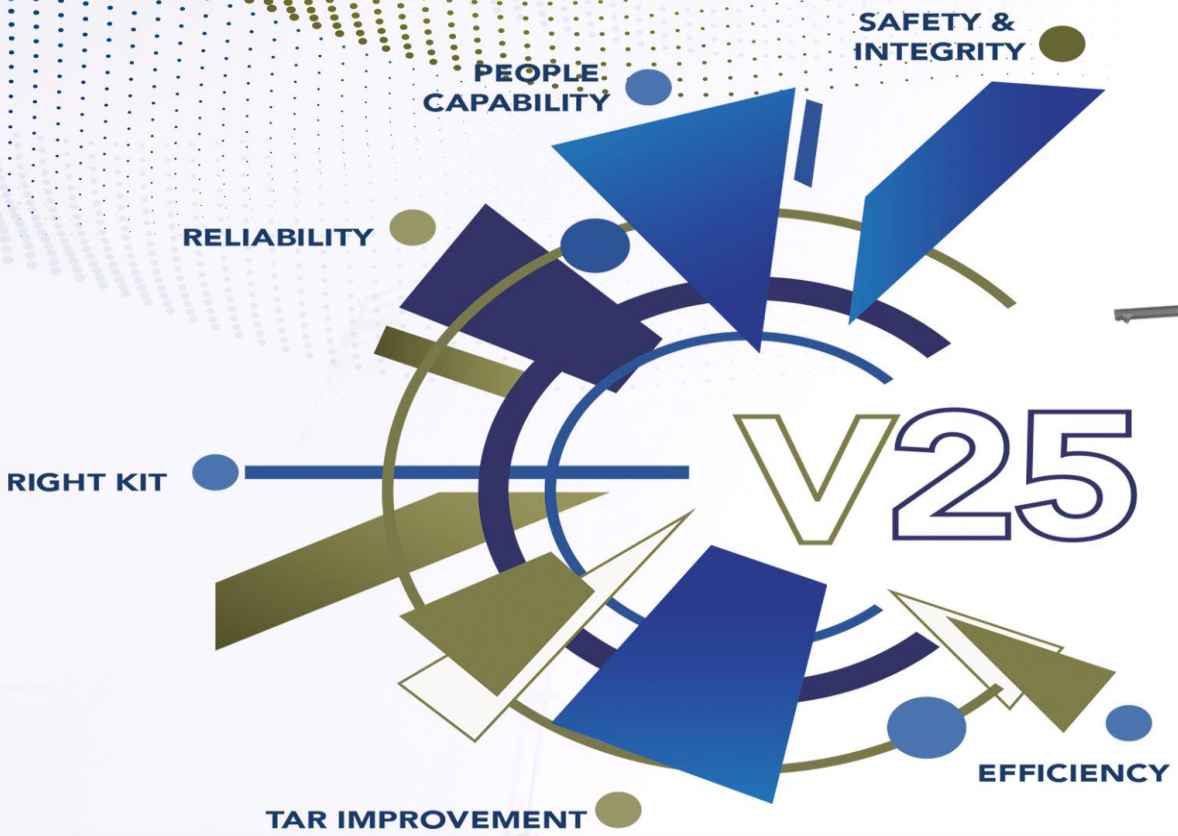


SAPREF RAPID DRAINAGE SYSTEM 2021

SAPREF
One Team One Purpose

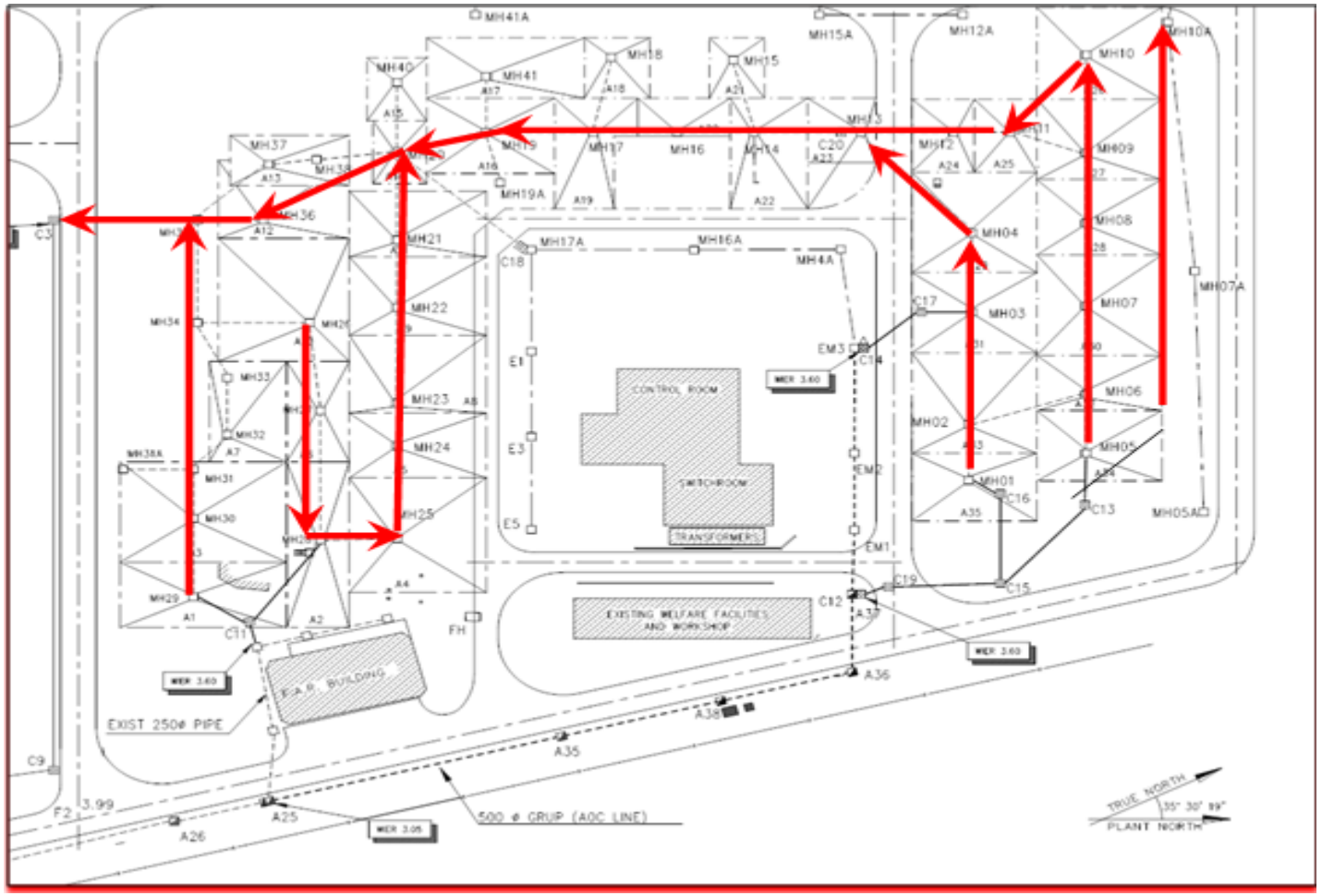
PROCESS RAPID DRAINAGE SYSTEM

API 2001

The design of drainage and the determination of the means and capacity required to control refinery wastes are of prime importance in minimizing the size of liquid hydrocarbon fires. Maximum fire water runoff, rain runoff, and spill size requirements should be considered in designing drainage and containment systems

From a fire protection standpoint, the purpose of drainage and containment systems in process areas is to minimize the area subject to hydrocarbon spills and to direct those spills away from critical equipment. Process areas are generally paved with a hard surfacing material. The pavement should slope toward catch basins located in open areas so that spills will flow away from the equipment rather than under it.

PROCESS RAPID DRAINAGE SYSTEM



PROCESS RAPID DRAINAGE SYSTEM

Surface Area for Testing South Zone			
Test Pt.	**Area**	**Surface Area Covered in test (m^2)**	**Sewer Number (CB)**
Area A:			
1	C8001 Area (Sewers at Base of column near C8002/3, P8005 A/B and P8004 A/B)	651	CB 18 CB 19
2	K8001 Area (Underneath V8005 fire deck)	364	CB 17
3	P8308/E8352 A-C Area (Caustic area)	300	CB 6 CB 1
4	P8001 A/B Area (near E8039 and E8040's)	378	CB 15 CB 15A
5	P8015 A/B Area	200	CB 20 CB 21
6	P8017 A/B and P8019 A/B Area (Sewers on West side of P8019's)	450	CB 6710 CB 6711
7	P9102 A/B/C Area	450	CB 6704 CB 6703
8	P9103 A, P9103 and P9104 Area	300	CB 6705 CB 6706
Area B:			
9	F8001 Area	798	CB 26 CB 27
10	C8601 Area (South of SRU)	336	AS1 AS2 MHA

SAPREF
One Team One Purpose

PROCESS RAPID DRAINAGE SYSTEM

Pre-requisites:

•A Clearance certificate needs to be obtained for sewer flow test and this must be arranged 1 day prior for planning purposes.
•A copy of the sewer flow test procedure must be at hand at all times.
•Vehicle entry safety certificate
•Operators and EMS to do the test and the results to be compiled and recorded.
•Inform Firestation, Utilities and Shift Manager regarding Firewater usage.
•Have unit operators to standby to assist in flow testing activities.
•Inform Oil Movements and Shift Manager regarding the CPI, Watch oil content, (to be monitored during and for several hours after the test).

PROCESS RAPID DRAINAGE SYSTEM

Procedure:

1. Select an area or sewer drain to be tested as per the flow test checklist.(Highest point to lowest point – CPI)
2. Ensure that there are no additional water sources in the area being flow tested e.g. process water, fire water from another area, rain fall etc. – do a site walk.
3. Start opening hydrants. (slowly)
4. Keep opening until the required area is flooded.
5. Maintain the high level by adjusting the water flow.
6. Once the raised level can be maintained take reading on the flow meter to determine flow capacity.

Flow calculation

1. 1 Full rotation = 1000 litres
2. amount of rotations in 1 min
3. rotations in 1min x 1000 litres = flow/min

7. Monitor test area and ensure water flow remains within test area.
8. Calculate the flow rate of water applied and record on checklist.
9. Ensure operator monitors CPI area for flooding and oil carry over.
10. Care must be taken not to lift sewers and flood area with hydrocarbons.
11. Keep a record of flow capacities and mark on drawing as per the number of sewers / areas tested.
12. Make up equipment and wash down area, (if oil is present).

SAPREF
One Team One Purpose

PROCESS RAPID DRAINAGE SYSTEM

Analyzing Sewer Flow Test Results:

1. Check flow test results against SHELL Specification. (250m^3 over 600m^2 area and at an application rate of 6.8 lt/min/m^2)
2. If not compliant, check if Project scope will address short comings.
3. Check that flow test results is within Projects design requirements and if Project scope meets SHELL Specification – If not take action to amend Project scope to satisfy SHELL Specification or arrange clean up if design is correct but performance is poor.
4. Compile report with relevant reference to findings.
5. Send report to relevant stake holders.
6. Track action via Electronic action tracker to close out.

PROCESS RAPID DRAINAGE SYSTEM

Equipment needed:

1. 8 x pig tails.
2. 2 x 4” Flow meters.

3. 1 x collector.
4. 2 x 30m high volume hoses, (100mm).
5. 2 x 10m high volume hoses.
6. 2 x Hydrant Plugs
7. 2 x Stortz spanners.
8. Weight with Stortz fitting, for end of hose
9. Strainer (To prevent damage to flow meter)
10. Rope to secure hose.
11. Trolley to move the Equipment.
12. Stop Watch
13. Barricading boards
14. Flow Test Procedure.
15. Drawings.

TEST REQUIREMENT FLOW CHART

Flow Rate for 600m² (Lt/min/m²)

↓

Flow Rate for 600m² (m³/ hour)

↓

Surface Area Covered in test (m²)

↓

Maximum Flow Rate Achieved (Lt/min)

↓

Maximum Flow Rate Achieved (m³/hour)

↓

Water Application(SHELL requires 6.8 Lt/min/m²)

↓

Design Flow Rate Achieved (Yes/No)

↓

NO – Request cleaning and Re-Test

TEST REQUIREMENT FLOW CHART

Central Zone Sewer Flow Test								
Test Pt.	Area	DEP Flow Rate for 600m² (lt/min/m²)	DEP Flow Rate for 600m²(m³/ hour)	Surface Area Covered in test (m²)	Maximum Flow Rate Achieved (lt/min)	Maximum Flow Rate Achieved (m³/hour)	Water Application(DEP requiers 6.8 Lt/min/m²)	Design Flow Rate Achieved (Yes/No)
FCCU, HFA and Treaters								
U6100 (R&R) Area: :								
1	F6101 Area (North of F6101)	4166	250	330	3400	60	10.3030303	Yes
2	F3262 Area (East of old CO Boiler)	4166	250	230		150	0.00	
3	F6351 Area (East)	4166	250	480	**3300**	60	**6.88**	Yes
4	F6351 Area (underneath)	4166	250	414	**2900**	120	**7.00**	Yes
5	F6351 Area (West)	4166	250	425	**2900**	314	**6.82**	Yes
U6250 Area:								
6	C6255 Area	4166	250	525	1100	314	2.095238095	No
7	C6254 Area	4166	250	420	1050	108	2.5	No
8	C6101 Area	4166	250	399	1100	120	2.756892231	No
9	North of T6301/K6301 Area	4166	250	525	**2700**	108	**5.14**	No
10	K6102 Area (underneath Compressor)	4166	250	460	**3400**	314	**7.39**	Yes
11	V6108 Area	4166	250	288	**3800**	120	**13.19**	Yes