Process Safety Management in Marketing locations

Critical Safety issues in Marketing locations – Striving for improved performance

Design of Fire Safety System in POL Locations

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Design of Fire Safety System in POL Locations

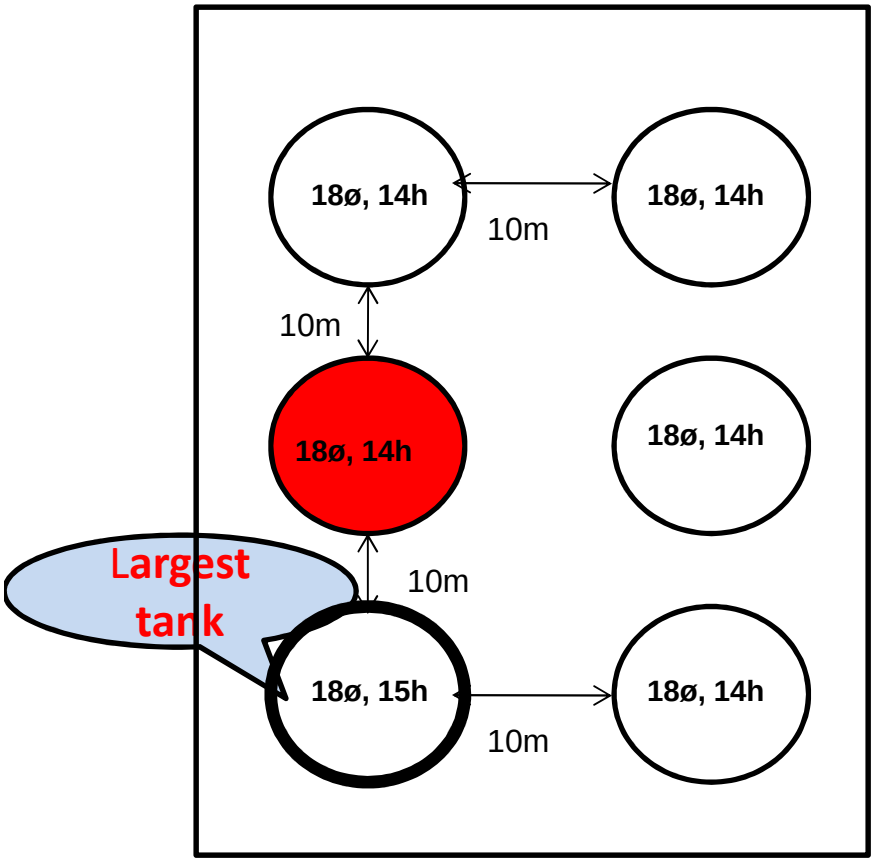
- OISD 117
- OISD 244 (Draft V)

Design of Fire Safety System in POL Locations

Stipulations in OISD Standards needing special attention

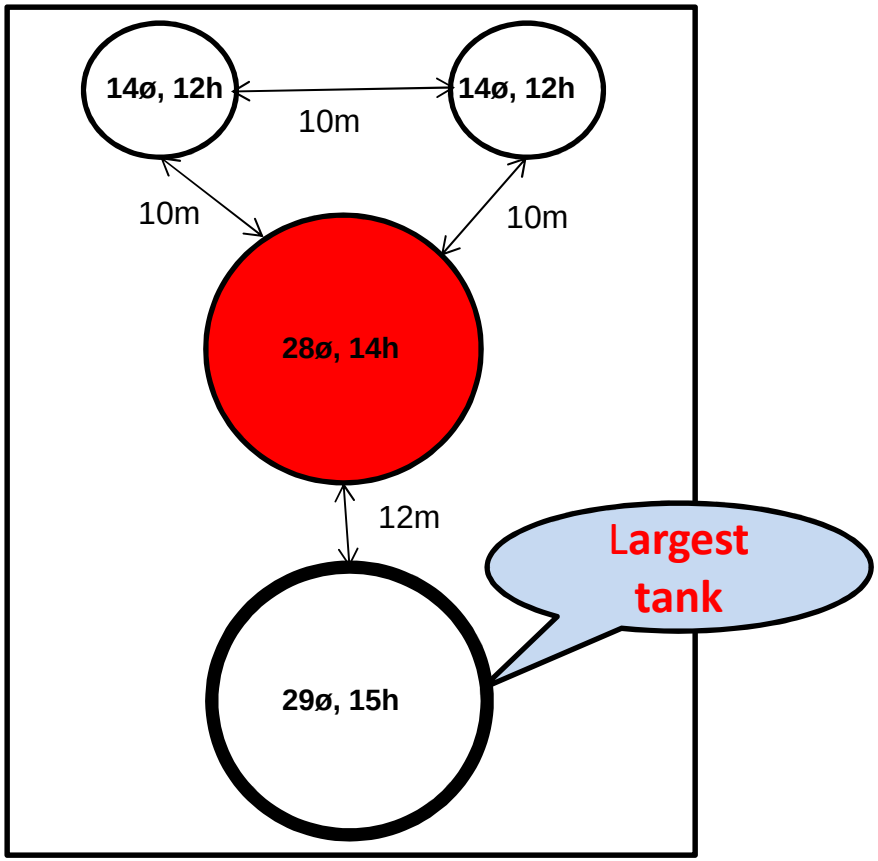
➢ **Two largest Fire contingencies if total tankage > 30 TKL**

Cone Roof Tank Farm



Area - I

Floating Roof Tank Farm



Area - II

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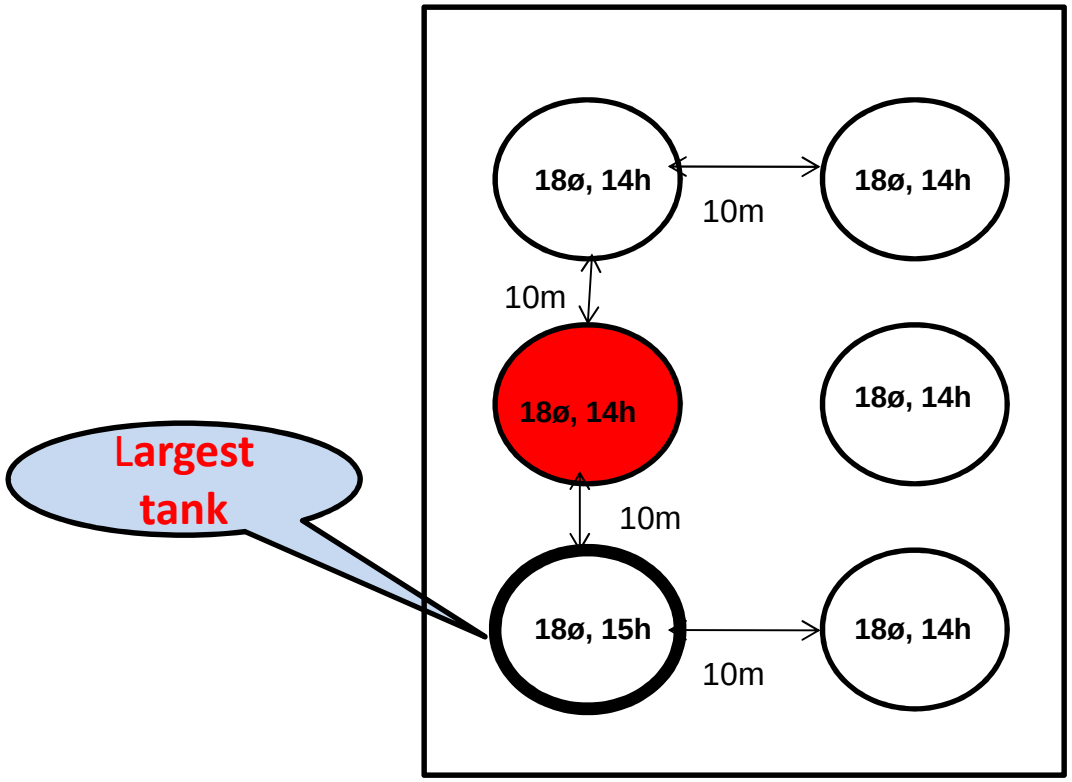

Area - I

Cone Roof Tank Farm

(A) Fire water requirement for area – I (Tank farm containing CR Tanks)

- Cooling (exposure protection) X-1
- Full surface fire (foam application @ 5 lpm/m2) X-2
- Supplementary water (4X36 M3/Hr) X-3
- **Total** **X**

➢ **OISD does not envisage fighting Full surface fire in CR tanks using HVLRMs while working out fire water requirement.**

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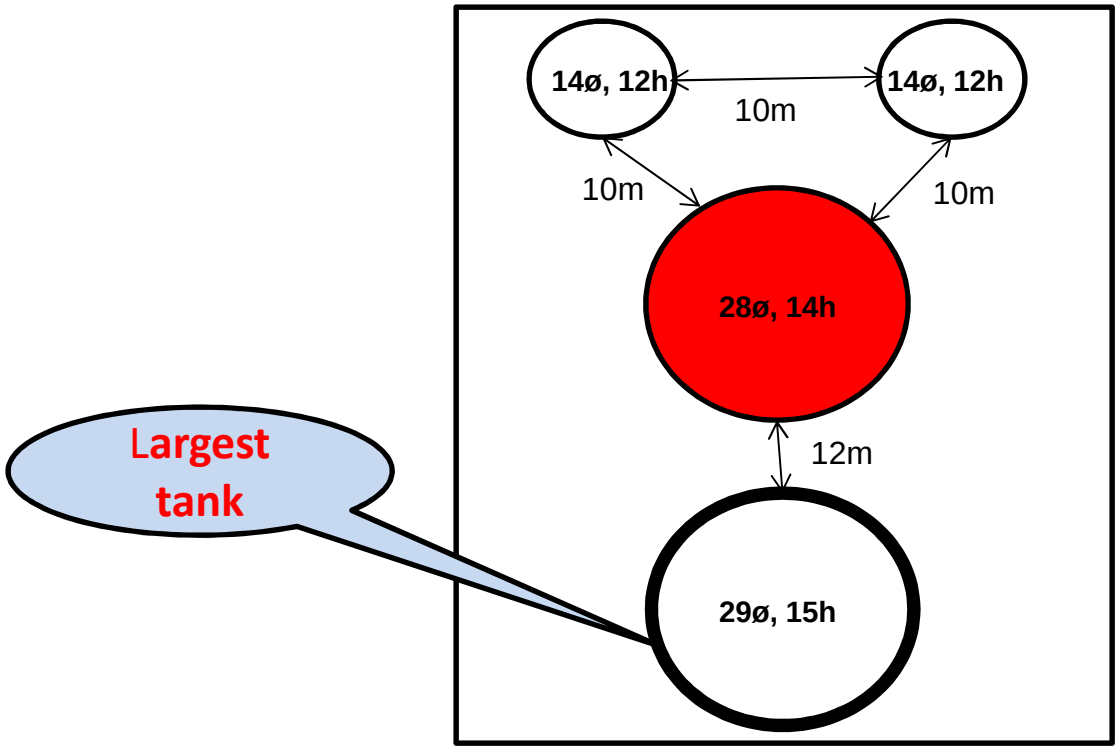

Area - II

Floating Roof Tank Farm

(B) Fire water requirement for area – II (Tank farm containing FR Tanks)

- Cooling (exposure protection) * Y-1
- Rim seal fire (foam application @ 12 lpm/m2) Y-2
- Supplementary water (4X36 M3/Hr) Y-3
- **Total** **Y**

*** Tank on Fire 29 M X 15 M being largest NO**

28 M X 14 M (more cooling water required)

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(C) Fire water requirement – FR Tank on full surface Fire

• Cooling (exposure protection)	Z-1 (= Y-1)
• Full surface Fire (foam application @ 8.1 lpm/m2) **$**	Z-2
• Supplementary water (4X36 M3/Hr)	Z-3
• **Total**	**Z**

$ - Potential foam losses from wind and other sources to be added as per design requirement (HOW MUCH ?)

Fire Water Required:

- **Z** **if Z > X+Y**
- **X+Y** **if Z< X+Y**

- **One FR Tank on full surface fire equivalent to Two Largest Fire contingencies**

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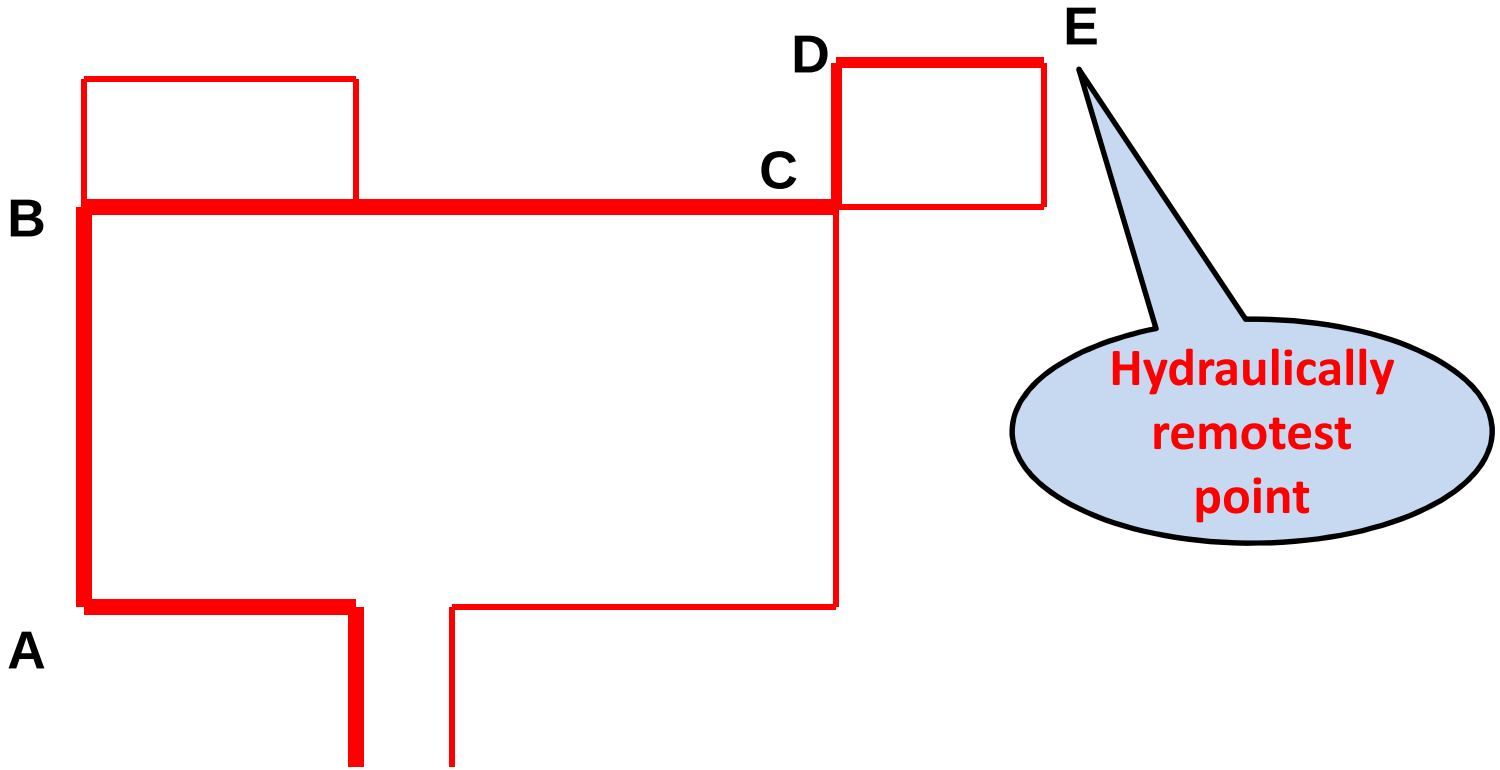
Minimum residual pressure of **7 kg / cm2 (g)** at hydraulically remotest point



Head loss in each segment should be based on design flow in that segment to arrive at residual pressure at hydraulically remotest point.

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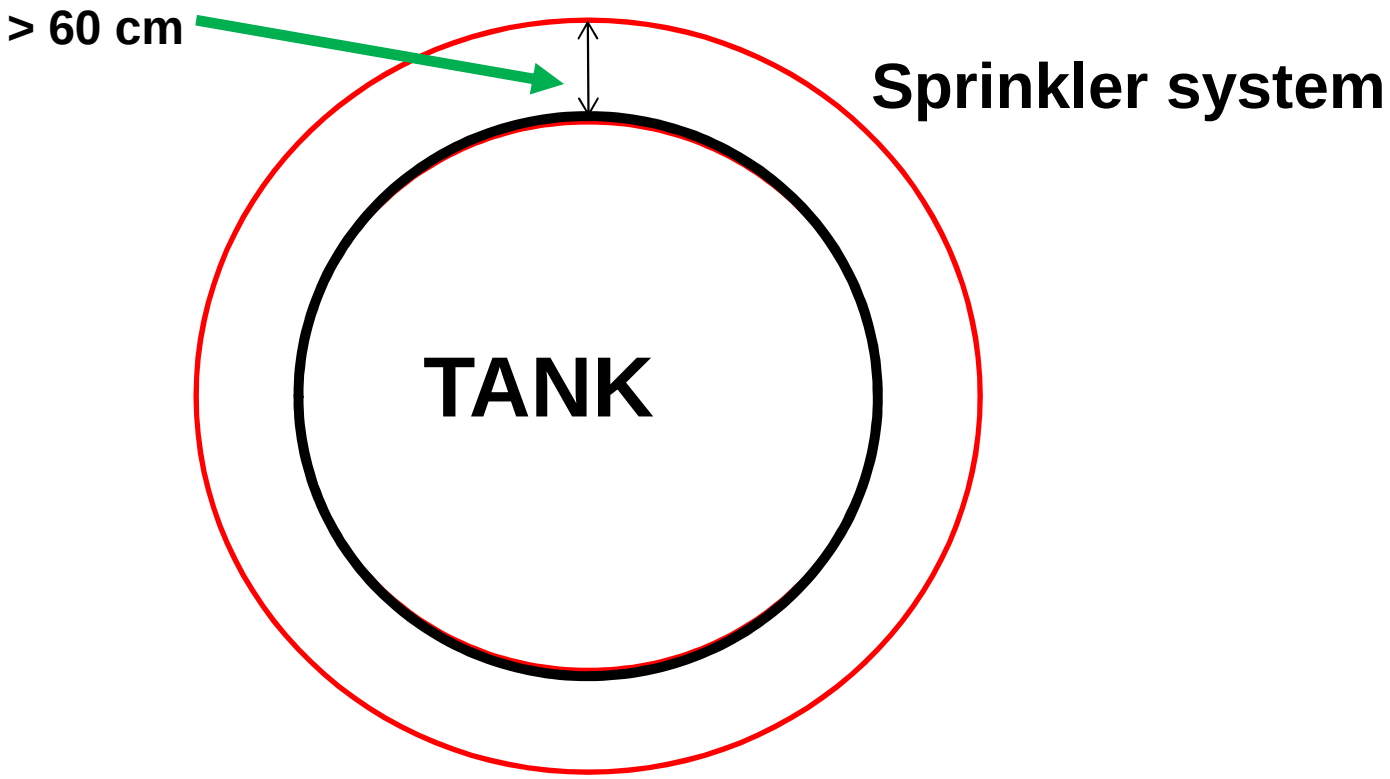


Spray nozzles be directed radically at a distance not exceeding **60 cm** from Tank surface

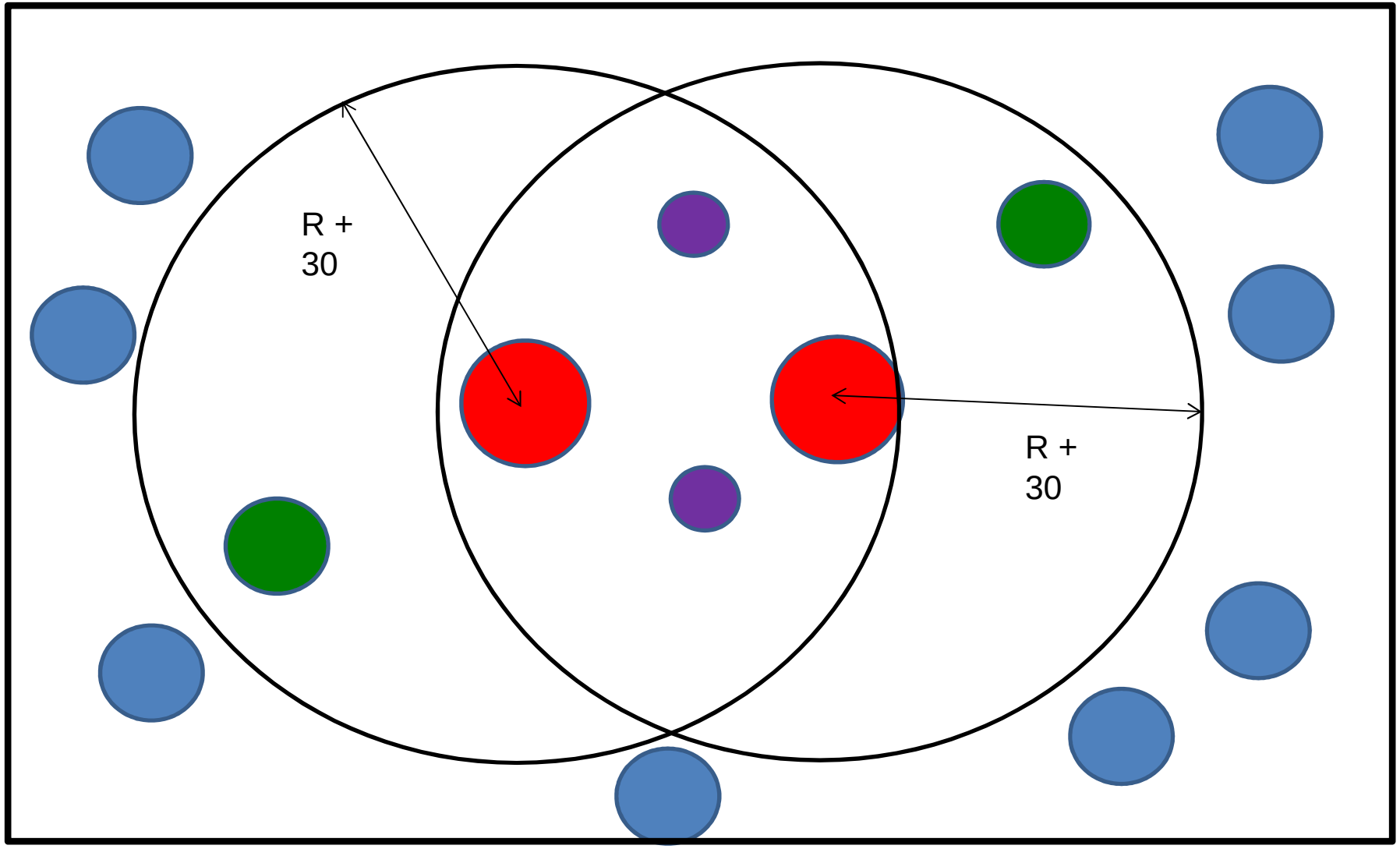
Design of Fire Safety System in POL Locations

Clause 4.3.7 (j) – Well laid procedures & plans shall be made & put into use of HVLRMs to combat emergency without loss of time.

Special attention required for Foam recoupment arrangement

Design of Fire Safety System in POL Locations

What if all tanks are in a single dyke?



Some tanks may not be within horizontal range of HVLRMs

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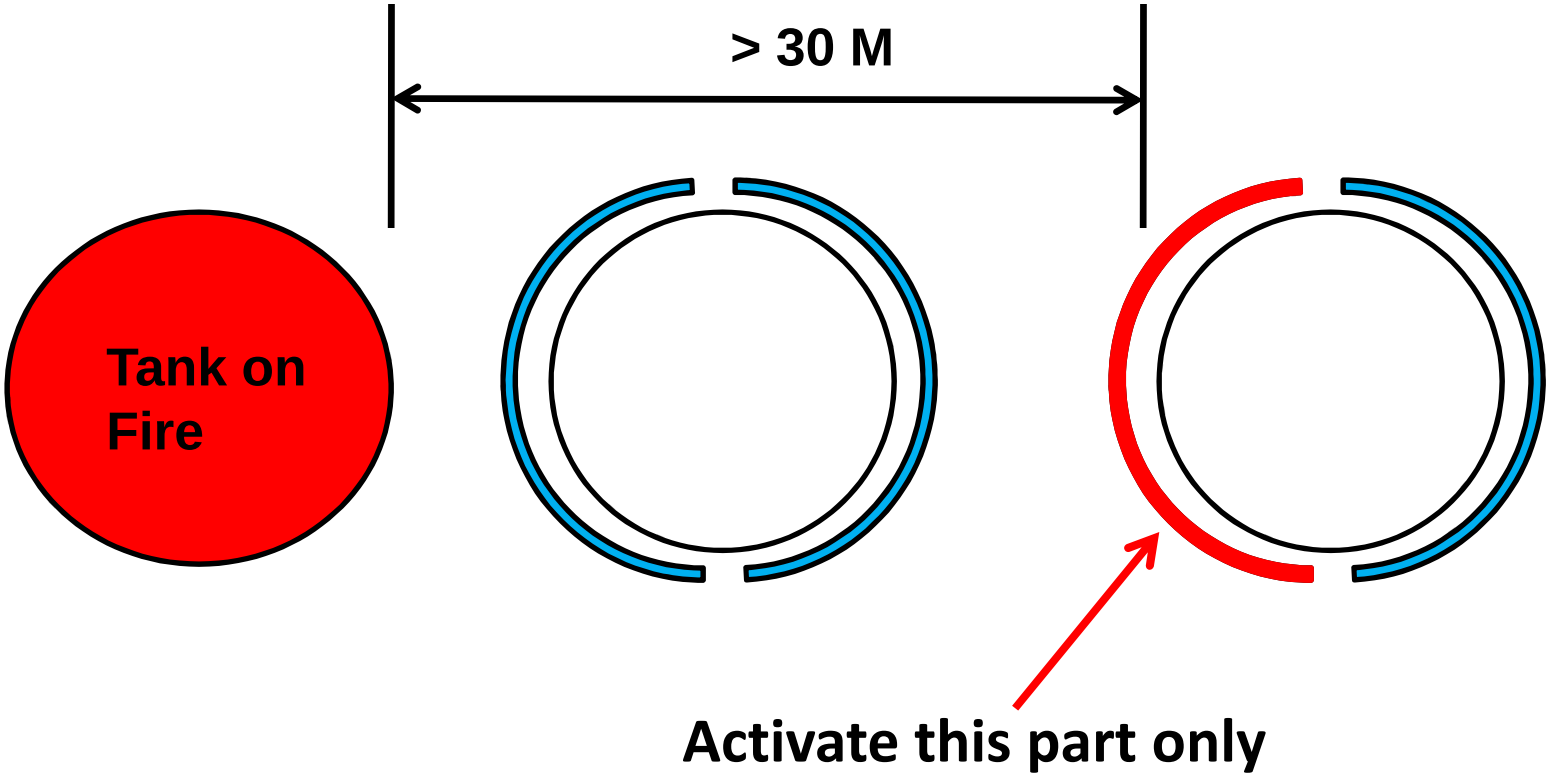
Fire water ring around tank in two parts



Design of Fire Safety System in POL Locations

Common observations needing correction / attention

- RA to be done at the layout stage.
- Mismatch of RPM of Fire Engine & pump
- Fire Engine incapable of reaching desired RPM to deliver Q & H as per design / requirement
- Installation of remote control panels adjacent to HVLRMs.
- Centralized Foam feeding arrangement

Design of Fire Safety System in POL Locations

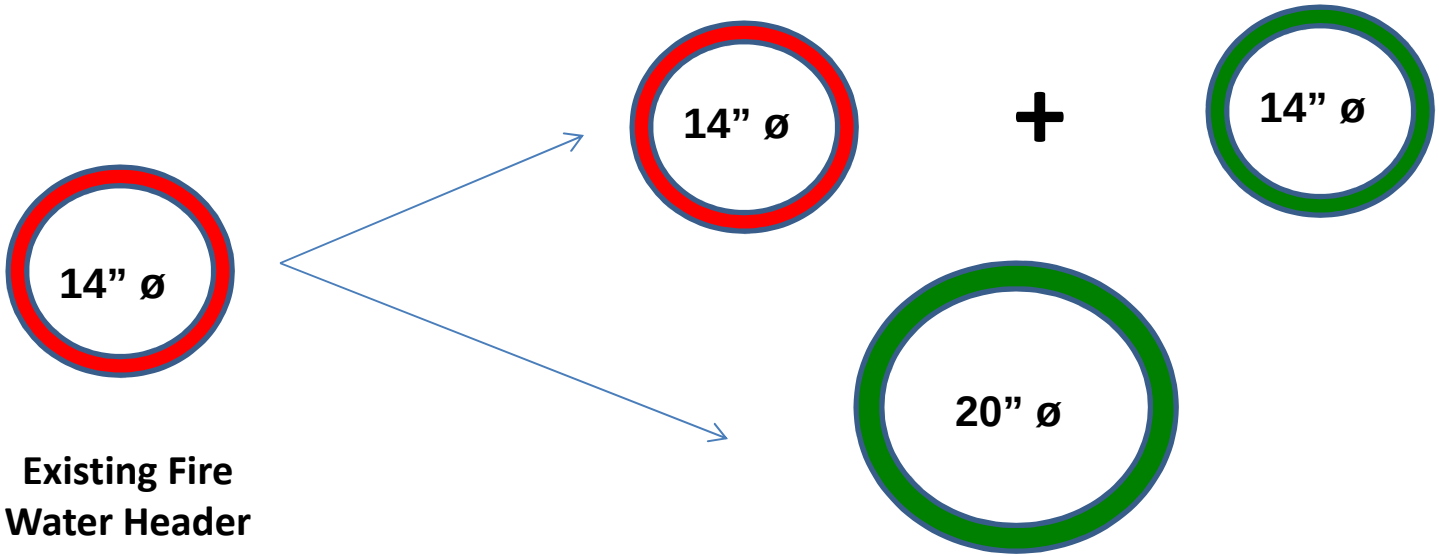
Common observations needing correction / attention

- Inadequate pressure in Fire Hydrant
- Inadequate replenishment capability of Fire Water
- Incorrect placement of monitors
- HVLRM not visible from Remote panel.
- Mismatch of designed heads of Fire pumps
- Ineffective quality management of Fire Water
- Fire system not working in Auto mode
- Incorrect storage and handling of Foam and inadequate foam inventory.
- Improper Mutual aid arrangement . Header to header connection instead of header to water tank.

Design of Fire Safety System in POL Locations

Points to Ponder

- **Can requirement of Remote control, variable Flow HVLRMs be relaxed for IFRTs?**
- **Fire water hydrant header size augmentation - 49 ∏ sq inch to be augmented to 98 ∏ sq inch.**



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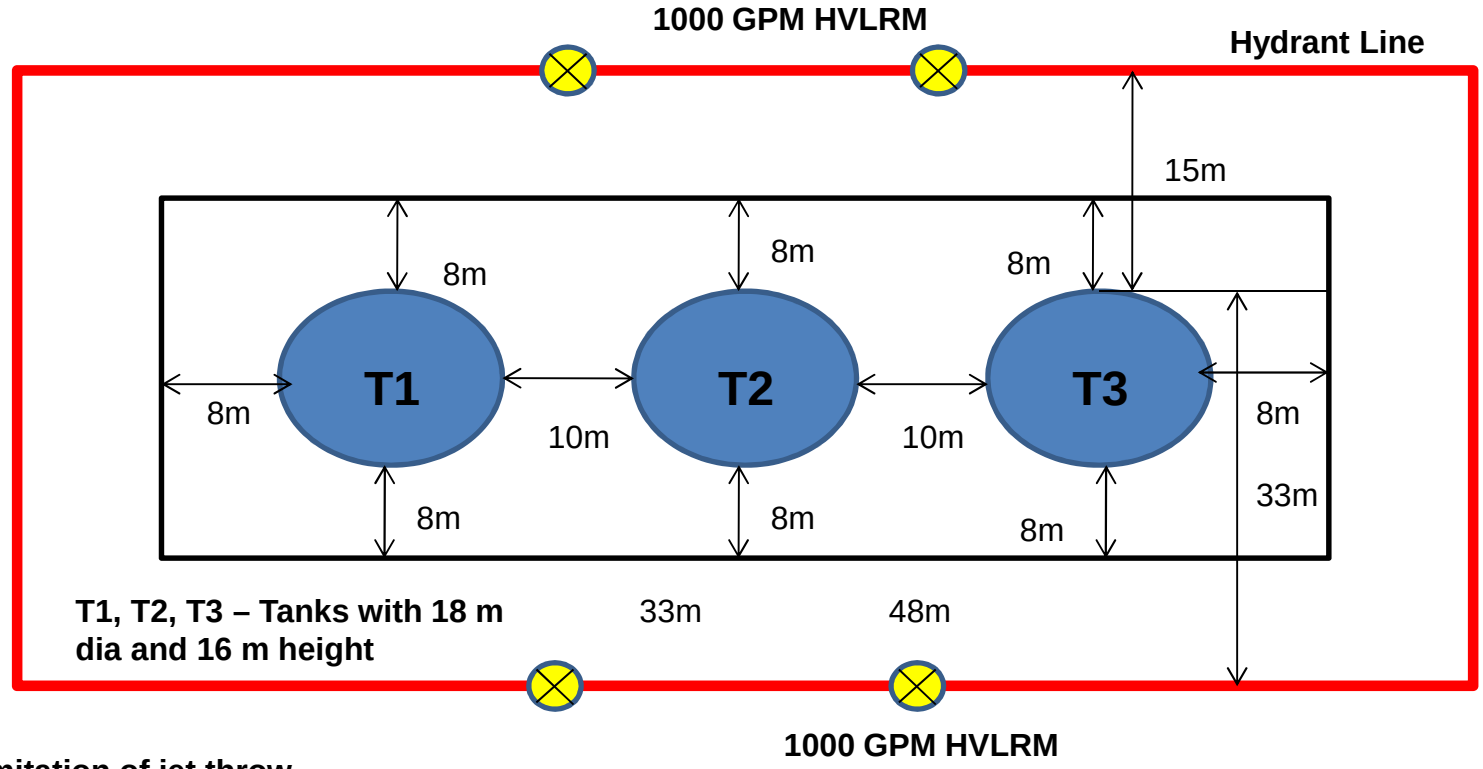
Points to Ponder

- **Will it not be a good idea to provide manifold (for connecting portable HVLRMs) on hydrant headers around Floating Roof Tanks dyke - To take care of situation when a fixed HVLRM in critical position is rendered useless due to wind velocity / malfunctioning etc.?**



Issues: 1.Limitation of jet throw
2. What if monitor malfunctions
3. No variable flow required
4. Better flexibility available in case of mobile equipment.
5. Minimum 4 fixed 1000 GPM HVLRMs required. 1 portable 1000 GPM HVLRM would have worked.

Design of Fire Safety System in POL Locations

Points to Ponder – contd

- **What is impact of wind velocity (> 4 km / hr) or inlet pressure < 7 kg / sq. M on performance of HVLRMs ?**
- **Criteria to be followed for positioning of a fixed HVLRM in such a way that it can be operated manually.**
- **Can we relax requirement of variable flow, remote control features of HVLRMs and make it need based ?**
- **Circumstances under which a location to be treated as " not meeting safety distance norms as per OISD" for the purpose of provision of fixed HVLRMs"**
- **Training needs / SOPs**

Thanks