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1.0 PURPOSE AND SCOPE

(5.1.1., 5.1.2, 5.1.4)

This standard provides the design and installation requirements for electrical raceways for WRPS facilities. The general electrical raceway requirements are provided in the National Electrical Code (NEC) and this standard clarifies NEC requirements and provides supplementary requirements applicable to WRPS facilities. In cases of conflict between this standard and the NEC, this standard is the prevailing requirement.

2.0 IMPLEMENTATION

This standard is effective on the date shown in the header.

Above-ground cable protectors installed under metal plates may be used until adequately rated protectors are available or until August 2, 2010.

Approved deviations from the requirements of this standard are identified in Attachment A.

3.0 STANDARD

New electrical raceways shall be installed according to the 2005 edition of the NEC.

3.1 Requirements

1. Indicate sizes of conduits, etc. on the as-built drawings (e.g., within wire-run and conduit/raceway schedules and/or electrical plans).
2. An equipment grounding conductor is required in all raceways.
3. The design shall provide conduit sealing fittings with approved sealant at the following locations:
 - Where conduits pass between areas where air pressure differential must be maintained.¹
 - Where conduits pass between areas where vapor separation must be maintained (e.g., flammable gas environment on one side of the seal).
4. Electrical Metallic Tubing (EMT) shall not be embedded in concrete or buried in earth.
5. Polyvinyl chloride (PVC) coated rigid metal conduit is the preferred material installed inside Tank Farm Areas.
6. PVC conduit is not to be used inside Tank Farm Areas for permanent wiring methods.

¹Occupancies where air pressure differential is used to assure containment or confinement.

3.2 Underground Raceway Systems Located Within the Tank Farm Fences Criteria

1. Underground Rigid Metallic Conduit (RMC) up to and including four-inch diameter shall be installed at a minimum depth of 12 inches to the top of conduit for traffic areas or a minimum depth of 6 inches in non-traffic areas.²
2. Design drawings shall identify physical routing and usage parameters for the underground raceway systems.
3. The minimum size of underground RMC within the tank farm fenced areas shall be one-inch in diameter.

3.3 Above-Ground Cables and Flexible Cords

1. Above-ground cables or flexible cords may be used where buried conduit is unable to be installed (e.g., underground contamination, underground interferences, concrete pads) or for short term activities or projects (normally 6 months or less).
2. Above-ground power cables or flexible power cords for longer term activities or projects can only be used with prior approval of the Electrical Engineering Discipline Lead.
3. Above-ground cables and flexible cords must be installed and used consistent with NEC requirements (e.g., Article 400.7).
4. The assured grounding program requirements identified in TFC-ESHQ-S-STD-03 apply to flexible cords. (5.1.4)

3.4 Above-Ground Cable Protectors Criteria (Not a Raceway)

1. Above-ground cables or flexible cords used in foot traffic areas shall be provided with cable protection or areas cordoned off to prevent personnel from stepping or tripping on the cables.
2. Above-ground cables or flexible cords used in vehicle traffic areas shall be cordoned off to prevent accidental damage to cables and flexible cords or protected with above-ground cable protectors.
3. Above-ground cable protectors shall comply with TFC-OPS-OPER-C-10 and be installed per the manufacturer's instructions. (5.1.5)
4. Cables entering or exiting the above-ground cable protectors shall use cable protector transition devices as provided and/or recommended by the manufacturer.
5. Installation of the above-ground cable protectors within Tank Farm fences shall be documented on the Approved Route Map Drawings required by TFC-ENG-FACSUP-C-10. (5.1.3)

²These RMC burial depths are less than NEC requirements, Reference RPP-21726 Rev. 0, Attachment N: *Conduit Burial Depths in Tank Farm Facilities*.

6. Use flexible cords and cables in cable protectors only in continuous lengths without splices or taps, unless specifically allowed by the NEC (e.g., Article 400.9).
7. Cables installed in above-ground cable protectors shall be armored cables or as acceptable for wet locations, be sunlight resistant and have the proper insulation/jacket material for hard or extra-hard usage as specified in the NEC Table 400.4 except where the cord or cable is supplied as part of an NRTL listed appliance.
8. Above-ground cable protectors are to only be used above ground.

4.0 DEFINITIONS

Raceway. An enclosed channel of metal or nonmetallic materials designed expressly for holding wires, cables, or busbars, with additional functions as permitted in the NEC. Raceways include, but are not limited to, rigid metal conduit, rigid nonmetallic conduit, intermediate metal conduit, liquid-tight flexible conduit, flexible metallic tubing, flexible metal conduit, electrical nonmetallic tubing, electrical metallic tubing, under-floor raceways, cellular concrete floor raceways, cellular metal floor raceways, surface raceways, wire ways, and busways.

Non-Traffic Area. Any area where vehicles cannot travel due to permanently installed barriers (e.g., structures, equipment, tank risers, concrete barriers, and fencing).

Traffic Area. Any area that is not a Non-Traffic Area.

5.0 SOURCES

5.1 Requirements

1. DOE O 252.1, "Technical Standards Program."
2. NFPA-70-2005, National Electrical Code (NEC).
3. TFC-ENG-FAC SUP-C-10, "Control of Dome Loading."
4. TFC-ESHQ-S-STD-03, "Electrical Safety."
5. TFC-OPS-OPER-C-10, "Vehicle and Dome Load Control in Tank Farm Facilities."

5.2 References

No documents external to this standard are required for performance.

ATTACHMENT A – APPROVED DEVIATIONS

The following Deviations to the provisions of this standard are approved:

1. A deviation is approved for Above Ground Cable Protector (AGCP) installations at the C-tank farm area.

Requirement 3.1.8; (Above-Ground cable protectors are only to be used above ground) , is not applicable to the C-tank farm area to allow installation of ABCPs under steel plates when they are installed in accordance with TE-05-034 (Technical evaluation for Bridging of Yellow Jacket Cable Protection System) and an air gap between the top of the ABCP and the steel plate is maintained and verified during performance of quarterly cord inspection PMs.