Amman Strategic Reserve Terminal for Petroleum Products

B	10/10/2014	Issued for Review	CLOB	MAPM	PBB	IGC
Rev.	Date	Issue Purpose / Description	Prepared	Checked	Approved	Accepted

Client Ministry Of Energy & Mineral Resources	THE HASHEMITE KINGDOM OF JORDAN MINISTRY OF ENERGY AND MINERAL RESOURCES		
Owner's Engineer ILF CONSULTING ENGINEERS	Document Title **TANKS SRT-T-61-001 / 002 / 003** **FIRE WATER DATA SHEET**		
Contractor OHL Industrial OHLI - MID Joint Venture for ASTPP Project - Amman, Jordan	Contractor's Doc. No. **P40341-EE-420-ME-HE-00G001**	Official Document Number **OMJ-DAT-SRT-ST-0027**	Rev. Code **B**

API	**API Std 650 Storage Tank Data Sheet**	PAGE 1 OF 8

* For boxes marked with *, if blank, Mfr. Shall determine and submit as per Appendix L. For all lines, see Appendix L for line-by-line instructions.

GENERAL Special Documentation Package Requirements:

Measurement Units to be used in API Std 650: SI [X] US Customary [ ]

1. Manufacturer* _____ Contract No.* _____

   Address* _____

   Mfg. Serial No.* _____ Year Built* _____ Edition & Addendum to *API 650* * **12th Edition, 2013**

2. Purchaser _____ Contract No. _____

   Address _____

   Tank Designation **Storage Tanks for Fire Water, Tag No. SRT-T-61-001, 002, 003**

3. Owner/Operator _____ Location **Amman Strategic Reserve Terminal for Petro**

4. Size Limitations* _____ Tank Diameter* **18.0 m** Shell Height* **20,3 m**

   Capacity: Maximum* **4,750 m³** Net Working* _____ Criteria* **See Tank Specifiation**

5. Products Stored: **Fire Water**

   Liquid _____ Max. S.G.: **1** at **15** °

   Blanketing Gas **N/A** Vapor Pressure _____ PSIA at Max. Operating Temp.

   % Aromatic _____ Suppl. Spec. _____ H_2S Service? Yes [ ] No [X] Suppl. Spec. _____

   Other Special Service Conditions? Yes [ ] No [X] Suppl. Spec. _____

DESIGN AND TESTING Purchaser to Review Design Prior to Ordering Material? Yes [X] No [ ]

6. Applicable API Standard 650 Appendices:* A [ ] B [ ] C [ ] F [X] G [ ] H [ ] I [ ] J [ ] L [ ] M [ ] O [ ] P [X] S [ ] U [ ] V [ ] W [ ]

7. Max. Design. Temp. **60** ° Design Metal Temp.* **(MIN) -10** ° Design Liquid Level* **18,7 m**

   Design Pressure **20.0 mbar** External Pressure **5.0 mbar** Maximum Fill Rate **350 m³/h** Maximum Emptying Rate **1,750 m³/h**

   Floatation Considerations? Yes [ ] No [X] Flot. Suppl. Spec:* _____ Applied Supplemental Load Spec. _____

8. Seismic Design? Yes [X] No [ ] Appendix E [X] Alternate Seismic Criteria **See Tank Spec** Seismic Use Group **III**

   MBE Site Class _____ Vertical Seismic Design? Yes [X] No [ ] Vertical Ground Motion Accelerator A_V: **0,32 (g)**

   Basis of Lateral Acceleration (Select one): [ ] Mapped Seismic Parameters? S_s _____ S_1 _____ S_0 _____ ; [ ] Site-Specific Procedures: MCE

   Design Required? Yes [X] No [ ] ; [X] Other (Non-ASCE) Methods **See Tank Specification**

   [ ] Freeboard Required for SUG I Design Roof Tie Rods @ Outer Ring?* Yes [ ] No [ ]

9. Wind Velocity for non-U.S. sites, 50-yr. wind speed (3-sec. Gust)* **160 km/h**

   Top Wind Girder Style* _____ Dimensions* _____ Use Top Wind Girder as Walkway? Yes [ ] No [ ]

   Intermediate Wind Girders?* Yes [ ] No [X] Intermediate Wind Girder Style* _____ Dimensions* _____

   Check Buckling in Corroded Cond.? Yes [X] No [ ]

10. Shell Design: 1-Ft Mthd?* Yes [X] No [ ] ; Variable-Des-Pt Mthd?* Yes [ ] No [X] Alternate [ ] ; Elastic Anal. Mthd?* Yes [ ] No [X] Alternate [ ]

    Plate Stacking Criteria* Centerline-Stacked? Yes [ ] No [ ] Flush-Stacked? Yes [ ] No [ ] Inside [ ] Outside [ ]

    Plate Widths (Shell course heights) and Thicknesses * Numbers below Indicate Course Number.

1. **2255 x 10,5 mm**	2. **2255 x 10,5 mm**	3. **2255 x 10,0 mm**	4. **2255 x 9,0 mm**	5. **2255 x 9,0 mm**
6. **2255 x 9,0 mm**	7. **2255 x 9,0 mm**	8. **2255 x 9,0 mm**	9. **2260 x 9,0 mm**	10.
11.	12.	13.	14.	15.

Joint Efficiency* _____ % Shell-to-Bottom Weld Type* _____ Shell-to-Bottom Weld Insp. Mthd* _____

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11. Open-Top and Fixed Roofs: (See Sheet 6 for Floating Roofs) Open Top?* Yes [ ] No [X]

Fixed Roof Type* **Dome Rafters Supported** Roof Support Columns*: Pipe [ ] Or Structural Shape [ ]

Cone Slope* _____ Dome or Umbrella Radius* **27,0 m (R=1.5D)** Weld Joints* **Lap joints**
(Lap, Butt, Other)

Seal Weld Underside of: Lap Joints? Yes [ ] No [X] ; Seal Weld Underside of Wind Girder Joints? Yes [ ] No [ ]

Gas-tight? Yes [ ] No [ ] Joint Efficiency* _____ %

Thickness* **6.0 mm** In. Snow Load* **N/A** App. Suppl. Load Spec.* _____ Column Lateral Load _____

Normal Venting Devices* **Yes** Emergency Venting Devices* **N/A**

For Non-Frangible Roofs: Seal Weld Roof Plates to Top Angle on the Inside? Yes [ ] No [X] ; Weld Rafters to Roof Plates? Yes [ ] No [X]

Roof-to-Shell Detail* API 650 Fig F.2 Detail "b" Radial Projection of Horizontal Component of Top Angle* Inward [ ] Outward [X]

12. Bottom: Thickness* **8 mm** Style* **Cone up** Slope* **1:100** Weld Joint Type* _____

Provide Drip Ring? Yes [ ] No [X] Alternate Spec. _____

Annular Ring? Yes [X] No [ ] Annular Ring: Minimum Radial Width* **980 mm** Thickness* **10 mm**

13. Foundation: Furnished by* **Contractor** Type* _____

Soil Allow: Bearing Pressure _____ Per Spec.* _____ Anchors: Size* **M 56** Qty.* **36**

Foundation Design Loads: Base Shear Force: Wind _____ Seismic* _____ Overturning Moment: Wind* _____ Seismic* _____

Ring Forces: Weight of Shell + Roof New _____ Corroded* _____ Roof Live Load* _____ Internal Pressure* _____

Partial Vacuum* _____ Wind* _____ Seismic* _____

Bottom Forces: Floor Wt. New _____ Corroded* _____ Product Wt.* _____ Water Wt.* _____ Internal Pressure* _____

Partial Vacuum _____ Other Foundation Loads* _____ Min. Projection of Fdn. Above Grade: _____

14. Responsibility for Heating Water, if Required: Purchaser [ ] Manufacturer [ ]

Hydro-Test Fill Height* **20,3 m** Settlement Measurements Required? Yes [X] No [ ] Extended Duration of Hydro-Test: _____

[ ] Predicted Settlement Profile is Attached

Responsibility for Setting Water Quality: Purchaser [X] Manufacturer [ ] Supplemental Test Water Quality Spec. _____

Test Water Source & Disposal Tie-In Location: **Contractor** Hydro-Test Appendix J Tank? Yes [ ] No [X]

Post-Pressure-Test Activities Required of the Manufacturer: Broom Clean [ ] Potable Water Rinse [ ] Dry Interior [X]

Other [X] **INTERIOR COATING AS REQUIRED**

15. Inspection by **Third Party; Requirements acc. to specification** in Shop; _____ in Field

Supplemental NDE Responsibility _____ Supplemental NDE Spec. _____
(Purch., Mfg., Other)

Positive Material Identification? Yes [ ] No [ ] PMI Requirements: _____

Max. Plate Thickness for Shearing _____

Must Welds not exceeding 6 mm ($^1/_4$ in.) Be Multi-Pass? Yes [ ] No [ ] Must Welds greater than 6 mm ($^1/_4$ in.) Be Multi-Pass? Yes [ ] No [ ]

Leak Test Mthd: Roof _____ Shell* _____ Shell Noz./Manhole Reinf. Plt* _____

Bottom* _____ Floating Roof Components* _____

Modify or Waive API Dimensional Tolerances (see 7.5)? No [ ] Yes [X] Specify: **Acc. to specification**

Specify Additional Tolerances, if any, and Circumferential and Vertical Measurement Locations:

- Allowable Plumbness: _____ Measure and Record at a Minimum of _____ Locations or Every _____ m (ft) around the Tank, at the Following Shell Heights: (select one box): [ ] $^1/_3$ H, $^2/_3$ H and H [ ] Top of Each Shell Course [ ] Other: _____
- Allowable Roundness:** _____ Measure Radius and Record at a Minimum of _____ Locations or Every _____ m (ft) around the Tank, at the Following Shell Heights (select one box):

[ ] Top of Tank, H [ ] $^1/_3$ H, $^2/_3$ H and H [ ] Top of Each Shell Course [ ] Other: _____

**See Data Sheet Instructions for the Maximum Allowable Additional Radial Tolerance.

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16. Coatings:
Internal Coatings by: **Manufacturer** Per Spec.* **Vertical Storage Tanks Specification OHL-SPC-SRT-ST**
(Not Req'd., Others, Tank Mfg.)
External Coating by: **Manufacturer** Per Spec.* **Vertical Storage Tanks Specification OHL-SPC-SRT-ST**
(Not Req'd., Others, Tank Mfg.)
Under-Bottom Coating by: **Manufacturer** Per Spec.* **Vertical Storage Tanks Specification OHL-SPC-SRT-ST**
(Not Req'd., Others, Tank Mfg.)

17. Cathodic Protection System? Yes [X] No [ ] Per Spec.* **OHL-SPC-SRT-EL-0032**

18. Leak Detection System? Yes [X] No [ ] Per Spec.* **OHL-SPC-SRT-IN-0021**

19. Release Prevention Barrier? Yes [ ] No [ ] Per Spec.*

20. Tank Measurement System: Required? Yes [X] No [ ] Remote Capability Required? Yes [ ] No [ ]
By:* **Manufacturer** Per Spec.*

21. Weight of Tank: Full of Water* 5292,6 t Empty* 126,6 t Shipping* Brace/Lift Spec.*

22. References:* *API Std 650, Appendix L*
Other references: *OHL-SPC-SRT-ST-0021 Design Basis for Storage Tanks*

23. Remarks:*
1) DOME ROOF SHALL BE SUPPORTED BY Nº 30 IPE 160 RADIAL RAFTERS PLUS Nº 3 L 70x7 INTERMEDIATE RINGS (NO COLUMNS REQUIRED). (TO BE CONFIRMED BY MANUFACTURER)

2) ALL THICKNESS MENTIONED ON THIS DATA SHEET ARE TO BE TAKEN AS MINIMUM THICNESSES AFTER FORMING. **NO UNDERTOLERANCES S** BE ALLOWED.

MATERIAL NOTES

a) MAT ASTM A 573 Gr 70 GROUP IV SHALL BE FULLY KILLED AND MADE TO FINE-GRAIN PRACTISE WITH CARBON CONTENT 0,23% MAX, IN ADDI CE MAX SHALL BE 0.43% (see Storage Tanks Specification)

b) MAT ASTM A 283 Gr C GROUP I SHALL BE FULLY KILLED AND MADE TO FINE-GRAIN PRACTISE WITH CARBON CONTENT 0,23% MAX AND CE MA (see Storage Tanks Specification)

* If box is blank, Manufacturer shall determine and submit as per Appendix L.

Table 1 MATERIALS OF CONSTRUCTION

Component	Material*/Thickness*	C.A.	Component	Material*	C.A.
Shell, Course _**1**_ to _3__	**A573 Gr. 70 Group IV**	**1 mm**	Reinforcing Pads	Acc to Shell Material	
Shell, Course _4__ to _9__	**A 283 Gr C Group I killed**	**1 mm**	Manhole/Nozzle Necks	Acc to shell / A 106 Gr B	**1 mm**
Shell, Course ___ to ___			Manhole/Nozzle Flanges	Acc to shell / A 105	**1 mm**
Shell, Course ___ to ___			Flange Covers	A 105	
Shell, Course ___ to ___			Anchor Attachments		
Roof	**A283 Gr. C Group I**	**1 mm**	Submerged Piping	A 106 Gr B	
Bottom	**A283 Gr. C Group I**	**2 mm**	Wetted Structurals	A 36 OR SIMILAR	**0,5** +
Annular Ring	**A573 Gr. 70 Group V**	**2 mm**	Non-wetted Structurals	A 36 OR SIMILAR	**0,5** +

+ Check here if C.A. is to apply to each exposed surface ☒

Table 2 BOLTS and ANCHORS

Component	Head Type*	Bolt or Anchor Material*	Nut Material*	Thread Series*	C.A.
Flange Bolting		A 193 GR B7	A 194 GR 2H		++
Structural Bolting					++
Anchor Bolts					++

++ Total C.A., on the nominal diameter.

Table 3 NOZZLE and MANHOLE SCHEDULE* (for Fixed Roof, Shell, and Bottom)

Mark	Service	Size, NPS, or Dia. (in.)	Neck Sch or Wall Thick.	Reinf. Plate Dimensions	Full Pen. On Open. (Y/N)	Flange Type	Flange Class or Thick.	Gasket Bearing Surf. Dimen. and Finish	Gasket Thick. and Dimen.	Gasket Mat'l and Descript.	Proj. to FF or CL or from Datum Lines
M01	**Shell manway**	**24"**	API 650			API 650					
M02	**Shell manway**	**24"**	API 650			API 650					
M03	**Clean-out door**	**900x1200**	API 650			API 650					
N01	**Fire water inlet**	**4"**	SCH 40			SO	150 # RF				
N02	**Fire water outlet**	**20"**	SCH 40			SO	150 # RF				
N03	**Fore water draw-off**	**4"**	SCH 40			SO	150 # RF				
N04	**LSHH A/B/C**	**3 X 2"**	SCH 80			WN	150 # RF				
N05	**LSLL A/B/C**	**3 X 2"**	SCH 80			WN	150 # RF				
N06	**Fire water return**	**16"**	SCH 80			SO	150 # RF				
N07	**Flow meter connection**	**10"**	SCH 40			SO	150 # RF				
N09	**Vent**	**HOLD**	SCH 40			SO	150 # RF				
N10	**Mech liq. Level indicator**	**MFR**	MFR								
M04	**Roof manway**	**24"**	API 650			API 650					
N08	**Level Transmitter**	**2"**	SCH 80			WN	150 # RF				

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OTHER TANK APPURTENANCES

24. Platform, Stairway, and Railing: Galvanizing Req'd?* Yes [X] No [ ] Stairway Style* **Helical** (Straight or Helical) Walk Surf. Type* _____

Stair and Walkway Clear Width* **Min. 1000 mm** National Safety Standards* _____

Architectural/Structural Specification* _____

Gauger's Platform Req'd? Yes [ ] No [X] Qty. Req'd* _____ Per Spec.* _____

25. Jacket Required?* Yes [ ] No [ ] Other Heaters/Coolers Required?* Yes [ ] No [X]

Supplemental Jacket, Heater, or Cooler Specifications* _____

26. Mixer/Agitator: Quantity _____ Size* _____ Per Spec.* _____

27. Insulation: Required? Yes [ ] No [X] Thickness* _____ Material* _____

Per Specs* _____ Responsibility for Insulation and Installation _____ (Purchaser, Manufacturer, Others)

28. Structural Attachments: Lift Lugs?* Yes [ ] No [ ] Desc.* _____

Shell Anchorage?* Yes [X] No [ ] Type* ANCHOR BOLTS SADDLES Scaffold Cable Support? Yes [ ] No [ ]

29. Various Other Items: Welded Flush-Type: Shell Connection [ ] Cleanout Fitting [X] Waive Application of Appendix P? Yes [ ] No [ ]

Miscellany #1 _____ Miscellany #2 _____

Miscellany #3 _____ Miscellany #4 _____

Miscellany #5 _____ Miscellany #6 _____

Table 4 OTHER TANK APPURTENANCES*

Mark	Quantity	Service or Description	Size	Orientation	Height from Datum	Material	Remarks

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FLOATING ROOF DATA **N/A**

30. **Floating Roof Selection**

Design Basis: Appendix C ☐ Or Appendix H ☐

Type of Roof: (External or Internal): Single Deck Pontoon* ☐ Double Deck* ☐

(Internal Only): Tubular Pontoon* ☐ Metallic Sandwich Panel* ☐

Other ☐ _____ Supplemental Spec.: _____

31. **Seals**

Primary Seal: Shoe ☐ Envelope ☐ Wiper/Compression Plate ☐ Other ☐ _____ Supplemental Spec.: _____

Shoe Mechanism: Mfg. Std. ☐ Other ☐ _____

Electrically Isolate Mechanism from Shoes? Yes ☐ No ☐ Wax Scrapers Required? Yes ☐ No ☐

Minimum Shoe Thickness* _____ Carbon Steel Shoes to be Galvanized? Yes ☐ No ☐

Secondary Seal: Shoe ☐ Envelope ☐ Wiper ☐ None ☐ Other ☐ _____ Supplemental Spec.: _____

32. **Data for All Floating Roofs:**

Overflow Openings in Shell Acceptable? Yes ☐ No ☐ Shell Extension? Yes ☐ No ☐

Roof-Drain Check Valves Required? Yes ☐ No ☐ Roof-Drain Isolation Valves Required? Yes ☐ No ☐

Freeze Protection for Roof Drains Required? No ☐ Yes ☐ Supplemental Requirements: _____

Roof-Drain Piping to External Nozzles: Mfg. Std. ☐ Armored Flexible Pipe ☐ Swivels in Rigid Pipe ☐ Other ☐ _____

Foam Dam? Yes ☐ No ☐ Supplemental Spec.: _____

Minimum Deck Thickness* _____

Bulkhead Top Edges to be Liquid-Tight? Yes ☐ No ☐ Seal-Weld Underside of Roof? Yes ☐ No ☐

Electrical Bonding: Shunts: Yes ☐ No ☐ Cables: Yes ☐ No ☐ Supplemental Spec.: _____

Qty. of Non-Guide-Pole Gauge Wells Required _____ Qty. of Sample Hatches Required _____

Guide Pole for Gauging? Yes ☐ No ☐ Slots in Guide Pole? Yes ☐ No ☐ Datum Plates? Yes ☐ No ☐ Striking Plates? Yes ☐ No ☐

Guide Pole Emissions-Limiting Devices: Sliding Cover ☐ Pole Wiper ☐ Pole Sleeve ☐ Float ☐ Float Wiper ☐ Pole Cap ☐

Qty. of Roof Manholes* _____ Minimum High-Roof Clearance Above Bottom: _____

Removable Leg Storage Racks? Yes ☐ No ☐ ; Leg Sleeves ☐ or Fixed Low Legs ☐

33. **Additional Data for External Floating Roofs:**

Weather Shield? Yes ☐ No ☐ Supplemental Spec.: _____

Rolling Ladder Required? Yes ☐ No ☐ Field Adjustable Legs? Yes ☐ No ☐

Design Rainfall Intensity _____ in./hr. (mm/hr) Based on a _____ Minute Duration Associated with the _____ Storm

Design Accumulated 24-Hour Rainfall _____ in. Based on the _____ Storm

Distortion and Stability Determinations Required? Yes ☐ No ☐ Supplemental Specification _____

Landed Live Load* _____

34. **Additional Data for Internal Floating Roofs: N/A**

Two-Position Legs? Yes ☐ No ☐ Cable-Supported Roof? Yes ☐ No ☐ Fixed-Roof Inspection Hatches Required? Yes ☐ No ☐

Internal Roof Drain Required? Yes ☐ No ☐ Omit Distribution Pads Supporting Uniform Live Loads? Yes ☐ No ☐

Corrosion Gauge Required? Yes ☐ No ☐ Fixed Ladder Required? Yes ☐ No ☐ ; Type of Roof Vent:* _____

Modified Minimum Point Load? Yes ☐ No ☐ Supplemental Specification _____

Mfr. To Leak Test* _____ % of Compartments ☐ in Assembly Yard ☐ in Erected Position ☐ Unknown; see separate contract terms

Roof Erector's Flotation Test: w/ Tank Hydro ☐ at Completion of Roof ☐ at a Later Date ☐ _____ Not Required ☐

Flotation Test Media: Water ☐ Product ☐ (see H.6.6.1) Water Quality: Potable ☐ Other ☐ See Supplemental Spec. _____

Flotation Test: Duration _____ Fill Height: _____

Flotation Test Items Provided by Purchaser (see H.6.7): None ☐ List Attached ☐

Responsible Party for Inspecting Roof During Initial Fill: Purchaser ☐ Other ☐ _____

Table 5 FLOATING ROOF MATERIALS

Component	Material*/Thickness*	C.A./Coating*	Component	Material*/Thickness*	C.A./Coating*
Deck Plate			Datum Plate		
Inner Rim Plate			Tubular Pontoon		
Outer Rim Plate			Pontoon Bulkhead		
Foam Dam			Submerged Pipe		
Sandwich Panel Face Plate			Guide Pole		
Sandwich Panel Core			Secondary Seal		
Gauge Well			Secondary Seal Fabric		
Drain Sumps			Wiper Tip		
Opening Sleeves			Wax Scraper		
Floating Suction Lines			Weather Seal		
Primary Fabric Seal			Envelope Fabric		
Foam Log Core			Shoe Mechanisms		
Landing Legs			Primary Seal Shoe		
Landing Leg Bottom Pads			Removable Covers		
Manhole Necks			Rolling Ladder		
Vents			Inlet Diffusers		

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Tank Plan and Sketches:

OMJ-DWG-SRT-ST-0017 Storage Tank SRT-T-61-001 General Assembly
OMJ-DWG-SRT-ST-0018 Storage Tank SRT-T-61-002 General Assembly
OMJ-DWG-SRT-ST-0019 Storage Tank SRT-T-61-003 General Assembly

Notes:

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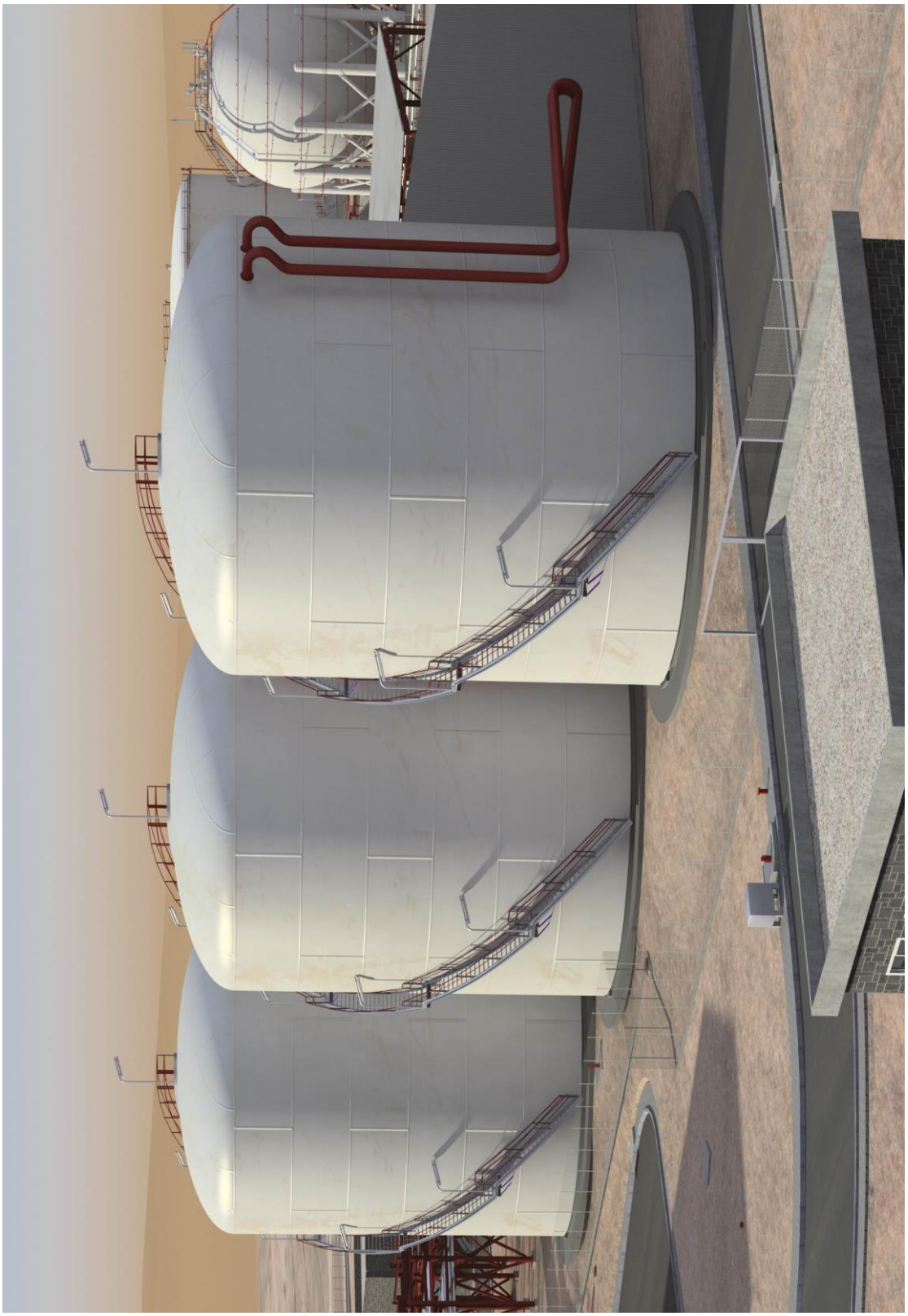

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