



OUTSIDE TERMINAL
Circuit 1
- Cargo line -

Navy tie in area



Road area



LINE SERVICE	DRAWING REFERENCE
14" & 24" Residual Fuel Oil No. 6 (RFO no. 6)	ISO drawing no. 1 to 6
DESCRIPTION	LOCATION
Circuit 1 – Cargo line	Outside Terminal – Navy tie in area <i>*Please refer Appendix 3 for detail location</i>
FINDING	RECOMMENDATIONS
<ol style="list-style-type: none"> 1. General view of 14" and 24" RFO pipeline. 2. Excessive in contact between piping and pedestal support. 	<ol style="list-style-type: none"> 1. Nil. 2. Consideration to modify existing support and to install rounded/angle bar or others material to give single contact point between piping and support. Single contact point is to prevent moisture or water sitting against the piping surface and promote to corrosion.

<p>Location 1</p>  <p>Max. pits depth = 0.12"</p>	
<p>Location 2</p>  <p>Max. pits depth = 0.06"</p>	
<p>LINE SERVICE</p>	<p>DRAWING REFERENCE</p>
<p>24" Residual Fuel Oil No. 6 (RFO no. 6)</p>	<p>ISO drawing no. 1</p>
<p>DESCRIPTION</p>	<p>LOCATION</p>
<p>Circuit 1 – Cargo line</p>	<p>Outside Terminal – Navy tie in area <i>*Please refer Appendix 3 for detail location</i></p>
<p>FINDING</p>	<p>RECOMMENDATIONS</p>
<p>Localized corrosion/pits was noted at bottom section of 24" and 14" pipeline, marked as locations 1 & 2 in ISO drawing. <i>*Please refer Appendix 2 for ½ remaining life calculation at pits area.</i></p>	<p>To perform surface preparation and follows by maintenance painting as per client's specification.</p>

<p>LINE SERVICE</p>	<p>DRAWING REFERENCE</p>
<p>24" Residual Fuel Oil No. 6 (RFO no. 6)</p>	<p>ISO drawing no. 1</p>
<p>DESCRIPTION</p>	<p>LOCATION</p>
<p>Circuit 1 - Cargo line</p>	<p>Outside Terminal – Navy tie in area <i>*Please refer Appendix 3 for detail location</i></p>
<p>FINDING</p>	<p>RECOMMENDATIONS</p>
<p>Corrosion under wrapping was noted at soil to air interface area due to wrap failure and gives a path to water ingress inside, marked as location 3 in ISO drawing. No sign of corrosion propagate deeper after the wrapping end. <i>*Please refer Appendix 2 for ½ remaining life calculation at pits area.</i></p>	<p>To perform surface preparation extend to the last corrosion, apply coal tar enamel and re-wrap with proper procedure and suitable wrapping for buried piping up to 6 inch from soil to air interface.</p>



LINE SERVICE	DRAWING REFERENCE
24" Residual Fuel Oil No. 6 (RFO no. 6)	ISO drawing no. 1
DESCRIPTION	LOCATION
Circuit 1 - Cargo line	Outside Terminal – Navy tie in area <i>*Please refer Appendix 3 for detail location</i>
FINDING	RECOMMENDATIONS
<ol style="list-style-type: none"> 1. Crevice corrosion was noted between 14" of flanges. 2. Stud bolts of 24" flanges was noted not extend out through their nuts. 	<ol style="list-style-type: none"> 1. To monitor for leaking or to dismantle the flange to check for corrosion at raise face and replace with new gasket. 2. To replace with longer stud bolts of the same material, specification and diameter and to ensure both side of nuts engage the bolts at least one complete thread as per ASME B31.3, <i>Section 335.2.3, bolts should extend completely through their nuts and any which fail to do so are considered acceptable if the lack of complete engagement is not more than one thread.</i>



LINE SERVICE	DRAWING REFERENCE
24" Residual Fuel Oil No. 6 (RFO no. 6)	ISO drawing no. 1
DESCRIPTION	LOCATION
Circuit 1 - Cargo line	Outside Terminal – Navy tie in area <i>*Please refer Appendix 3 for detail location</i>
FINDING	RECOMMENDATIONS
H type support was observed deteriorated, severe corrosion (through hole) was noted at bottom section of the support legs.	To be repaired as per approve procedure and to monitor periodically for soil to air interface corrosion.

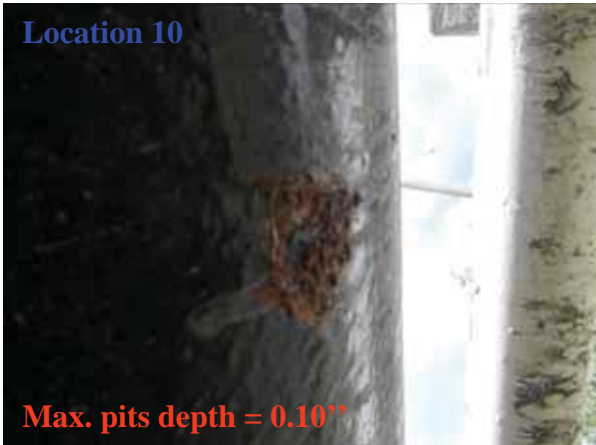
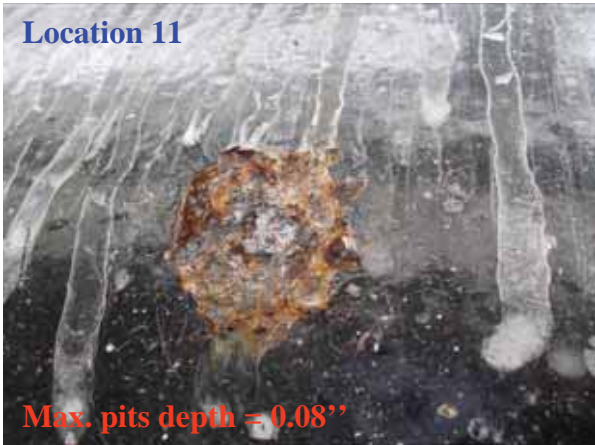
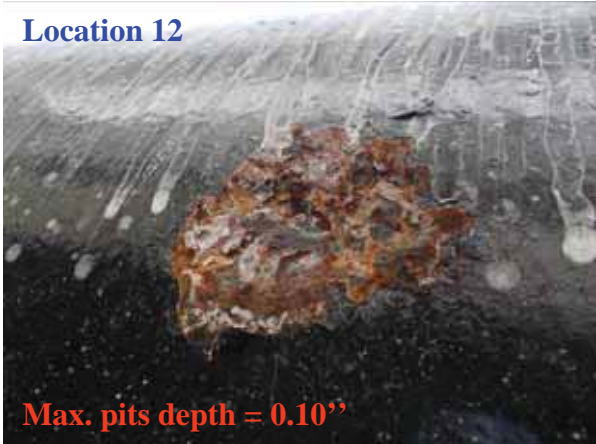
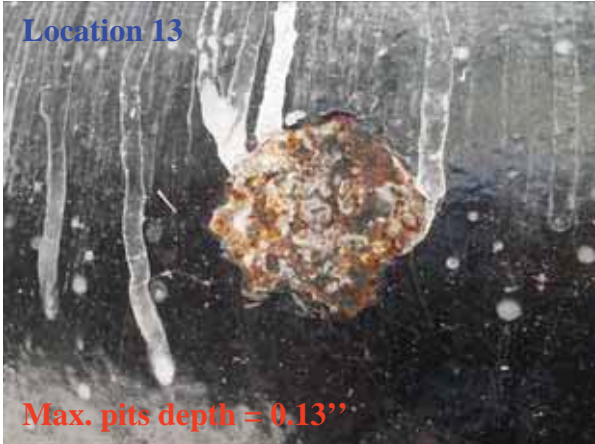
 <p>Location 4</p> <p>Max. pits depth = 0.05"</p>	
	
<p>LINE SERVICE</p>	<p>DRAWING REFERENCE</p>
<p>24" Residual Fuel Oil No. 6 (RFO no. 6)</p>	<p>ISO drawing no. 2</p>
<p>DESCRIPTION</p>	<p>LOCATION</p>
<p>Circuit 1 - Cargo line</p>	<p>Outside Terminal – Road area <i>*Please refer Appendix 3 for detail location</i></p>
<p>FINDING</p>	<p>RECOMMENDATIONS</p>
<p>Corrosion under wrapping was noted at soil to air interface area due to wrapping failure and gives a path to water ingress inside, marked as location 4 in ISO drawing. No sign of corrosion propagate deeper after the wrapping end. <i>Please refer Appendix 2 for 1/2 remaining life calculation at pits area.</i></p>	<p>To perform surface preparation extend to the last corrosion, apply coal tar enamel and re-wrap with proper procedure and suitable wrapping for buried piping up to 6" from soil to air interface.</p>


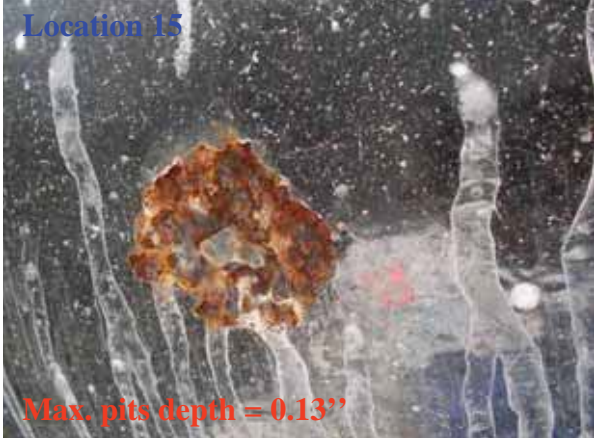




LINE SERVICE	DRAWING REFERENCE
24" Residual Fuel Oil No. 6 (RFO no. 6)	ISO drawing no. 2
DESCRIPTION	LOCATION
Circuit 1 - Cargo line	Outside Terminal – Road area <i>*Please refer Appendix 3 for detail location</i>
FINDING	RECOMMENDATIONS
Pedestals support was noted deteriorated (cracked).	To be repaired as per approve procedure. Consideration to replace/modified the existing support to give single contact point between piping and support to prevent water seep/accumulate underneath and promote to corrosion.

	
	
<p>LINE SERVICE</p>	<p>DRAWING REFERENCE</p>
<p>24" Residual Fuel Oil No. 6 (RFO no. 6)</p>	<p>ISO drawing no. 3</p>
<p>DESCRIPTION</p>	<p>LOCATION</p>
<p>Circuit 1 - Cargo line</p>	<p>Outside Terminal – Road area <i>*Please refer Appendix 3 for detail location</i></p>
<p>FINDING</p>	<p>RECOMMENDATIONS</p>
<p>1. Localized corrosion/pits was noted at bottom section of piping, marked as locations 5 and 6 in ISO drawing. 2. Pedestals support was noted deteriorated (cracked). <i>Please refer Appendix 2 for ½ remaining life calculation at pits area.</i></p>	<p>1. To perform surface preparation and follows by maintenance painting as per client's specification. 2. To be repaired as per approve procedure. To be repaired as per approve procedure. Consideration to replace/modified the existing support to give single contact point between piping and support to prevent water seep/accumulate underneath and promote to corrosion.</p>

<p>LINE SERVICE</p>	<p>DRAWING REFERENCE</p>
<p>24" Residual Fuel Oil No. 6 (RFO no. 6)</p>	<p>ISO drawing no. 4</p>
<p>DESCRIPTION</p>	<p>LOCATION</p>
<p>Circuit 1 - Cargo line</p>	<p>Outside Terminal – Road area <i>*Please refer Appendix 3 for detail location</i></p>
<p>FINDING</p>	<p>RECOMMENDATIONS</p>
<p>Localized corrosion/pits was noted at bottom section of Piping, marked as locations 7, 8 and 9 in ISO drawing. <i>Please refer Appendix 2 for ½ remaining life calculation at pits area.</i></p>	<p>To perform surface preparation and follows by maintenance painting as per client's specification.</p>

<p>Location 10</p>  <p>Max. pits depth = 0.10''</p>	<p>Location 11</p>  <p>Max. pits depth = 0.08''</p>
<p>Location 12</p>  <p>Max. pits depth = 0.10''</p>	<p>Location 13</p>  <p>Max. pits depth = 0.13''</p>
<p>LINE SERVICE</p>	<p>DRAWING REFERENCE</p>
<p>24" Residual Fuel Oil No. 6 (RFO no. 6)</p>	<p>ISO drawing no. 5</p>
<p>DESCRIPTION</p>	<p>LOCATION</p>
<p>Circuit 1 - Cargo line</p>	<p>Outside Terminal – Road area <i>*Please refer Appendix 3 for detail location</i></p>
<p>FINDING</p>	<p>RECOMMENDATIONS</p>
<p>Localized corrosion/pits was noted at bottom section of Piping, marked as locations 10, 11, 12 & 13 in ISO drawing. <i>Please refer Appendix 2 for ½ remaining life calculation at pits area.</i></p>	<p>To perform surface preparation and follows by maintenance painting as per client's specification.</p>

<p>Location 14</p>  <p>Max. pits depth = 0.08''</p>	<p>Location 15</p>  <p>Max. pits depth = 0.13''</p>
<p>Location 16</p>  <p>Max. pits depth = 0.08''</p>	<p>Location 17</p>  <p>Max. pits depth = 0.12''</p>
<p>LINE SERVICE</p>	<p>DRAWING REFERENCE</p>
<p>24" Residual Fuel Oil No. 6 (RFO no. 6)</p>	<p>ISO drawing no. 5</p>
<p>DESCRIPTION</p>	<p>LOCATION</p>
<p>Circuit 1 - Cargo line</p>	<p>Outside Terminal – Road area <i>*Please refer Appendix 3 for detail location</i></p>
<p>FINDING</p>	<p>RECOMMENDATIONS</p>
<p>Localized corrosion/pits was noted at bottom section of Piping, marked as locations 14, 15, 16 and 17 in ISO drawing. <i>Please refer Appendix 2 for ½ remaining life calculation at pits area.</i></p>	<p>To perform surface preparation and follows by maintenance painting as per client's specification.</p>



LINE SERVICE	DRAWING REFERENCE
24" Residual Fuel Oil No. 6 (RFO no. 6)	ISO drawing no. 5
DESCRIPTION	LOCATION
Circuit 1 - Cargo line	Outside Terminal – Road area <i>*Please refer Appendix 3 for detail location</i>
FINDING	RECOMMENDATIONS
<ol style="list-style-type: none"> 1. Pedestals support was noted deteriorated 2. Gap was noted between piping and support. 	<ol style="list-style-type: none"> 1. To be repaired as per approve procedure. Consideration to replace/modified the existing support to give single contact point between piping and support to prevent water seep/accumulate underneath and promote to corrosion. 2. To install rounded or angle bar to close the gap.

<p>Location 18</p>  <p>Max. pits depth = 0.13''</p>	
<p>Location 19</p>  <p>Max. pits depth = 0.10''</p>	
<p>LINE SERVICE</p>	<p>DRAWING REFERENCE</p>
<p>24" Residual Fuel Oil No. 6 (RFO no. 6)</p>	<p>ISO drawing no. 6</p>
<p>DESCRIPTION</p>	<p>LOCATION</p>
<p>Circuit 1 - Cargo line</p>	<p>Outside Terminal – Road area <i>*Please refer Appendix 3 for detail location</i></p>
<p>FINDING</p>	<p>RECOMMENDATIONS</p>
<p>1. Old corrosion with maximum pits depth up to 0.13" was noted at bottom section of piping, marked as location 18 in ISO drawing. 2. Corrosion under wrapping was noted at soil to air interface area due to wrapping failure and gives a path to water ingress inside, marked as location 19 in ISO drawing. No sign of corrosion propagate deeper after the wrapping end. <i>Please refer Appendix 2 for ½ remaining life calculation at pits area.</i></p>	<p>1. To monitor the painting condition periodically. 2. To perform surface preparation extend to the last corrosion, apply coal tar enamel and re-wrap with proper and suitable wrapping for buried piping up to 6" from soil to air interface.</p>



INSIDE TERMINAL
Circuit 1
- Cargo line -



LINE SERVICE	DRAWING REFERENCE
24" Residual Fuel Oil No. 6 (RFO no. 6)	ISO drawing no. 7 & 8
DESCRIPTION	LOCATION
Circuit 1 – Cargo line	Inside Terminal – Tank 1934 & 1935 Farm Area <i>*Please refer Appendix 3 for detail location</i>
FINDING	RECOMMENDATIONS
<ol style="list-style-type: none"> 1. General view of 24" RFO pipeline inside terminal. 2. Discoloration was noted all along of piping. 3. Excessive in contact between piping and pedestal support. 	<ol style="list-style-type: none"> 1. Nil. 2. To perform surface preparation and follows by maintenance painting as per client's specification. 3. Consideration to modify existing support and to install rounded/angle bar or others material to give single contact point between piping and support. Single contact point is to prevent moisture or water sitting against the piping surface and promote to corrosion.

 <p>Location 20</p> <p>Max. pit depth = 0.08''</p>	
	
<p>LINE SERVICE</p>	<p>DRAWING REFERENCE</p>
<p>24" Residual Fuel Oil No. 6 (RFO no. 6)</p>	<p>ISO drawing no. 7</p>
<p>DESCRIPTION</p>	<p>LOCATION</p>
<p>Circuit 1 – Cargo line</p>	<p>Inside Terminal – Tank 1934 Farm Area <i>*Please refer Appendix 3 for detail location</i></p>
<p>FINDING</p>	<p>RECOMMENDATIONS</p>
<p>1. Corrosion under wrapping was noted at soil to air interface area due to wrap failure and gives a path to water ingress inside, marked as location 20 in ISO drawing. No sign of corrosion propagate deeper after the wrapping end.</p> <p>2. Support design seems water pocket and excessive in contact between piping and support. <i>*Please refer Appendix 2 for 1/2 remaining life calculation at pits area.</i></p>	<p>1. To perform surface preparation extend to the last corrosion, apply coal tar enamel and re-wrap with proper procedure and suitable wrapping for buried piping up to 6" from soil to air interface.</p> <p>2. Consideration to replace/modified the existing support to give single contact point between piping and support to prevent water seep/accumulate underneath and promote to corrosion</p>



LINE SERVICE	DRAWING REFERENCE
24" Residual Fuel Oil No. 6 (RFO no. 6)	ISO drawing no. 7
DESCRIPTION	LOCATION
Circuit 1 – Cargo line	Inside Terminal – Tank 1934 Farm Area <i>*Please refer Appendix 3 for detail location</i>
FINDING	RECOMMENDATIONS
<ol style="list-style-type: none"> 1. Piping was observed too close with ground level and V-141 was noted in contact with soil. 2. Crevice corrosion was noted between flanges of valve. 3. Stud bolts of flange was noted not extend out through their nut. 	<ol style="list-style-type: none"> 1. To ensure the gap 6 inch between piping and soil surface as per API 570 and piping in contact with soil should be insulated. 2. To perform surface preparation and follows by maintenance painting as per client's specification. 3. To replace with longer stud bolt with the same material and specification.

<p><u>Location 21</u></p>  <p>Max. pit depth = 0.17"</p>	
<p><u>Location 22</u></p>  <p>Max. pit depth = 0.05"</p>	
<p>LINE SERVICE</p>	<p>DRAWING REFERENCE</p>
<p>24" Residual Fuel Oil No. 6 (RFO no. 6)</p>	<p>ISO drawing no. 7</p>
<p>DESCRIPTION</p>	<p>LOCATION</p>
<p>Circuit 1 – Cargo line</p>	<p>Inside Terminal – Tank 1934 Farm Area <i>*Please refer Appendix 3 for detail location</i></p>
<p>FINDING</p>	<p>RECOMMENDATIONS</p>
<p>Localized corrosion/pits was noted at bottom section of piping, marked as 21 and 22 in ISO drawing. <i>*Please refer Appendix 2 for 1/2 remaining life calculation at pits area.</i></p>	<p>To perform surface preparation and follows by maintenance painting as per client's specification.</p>

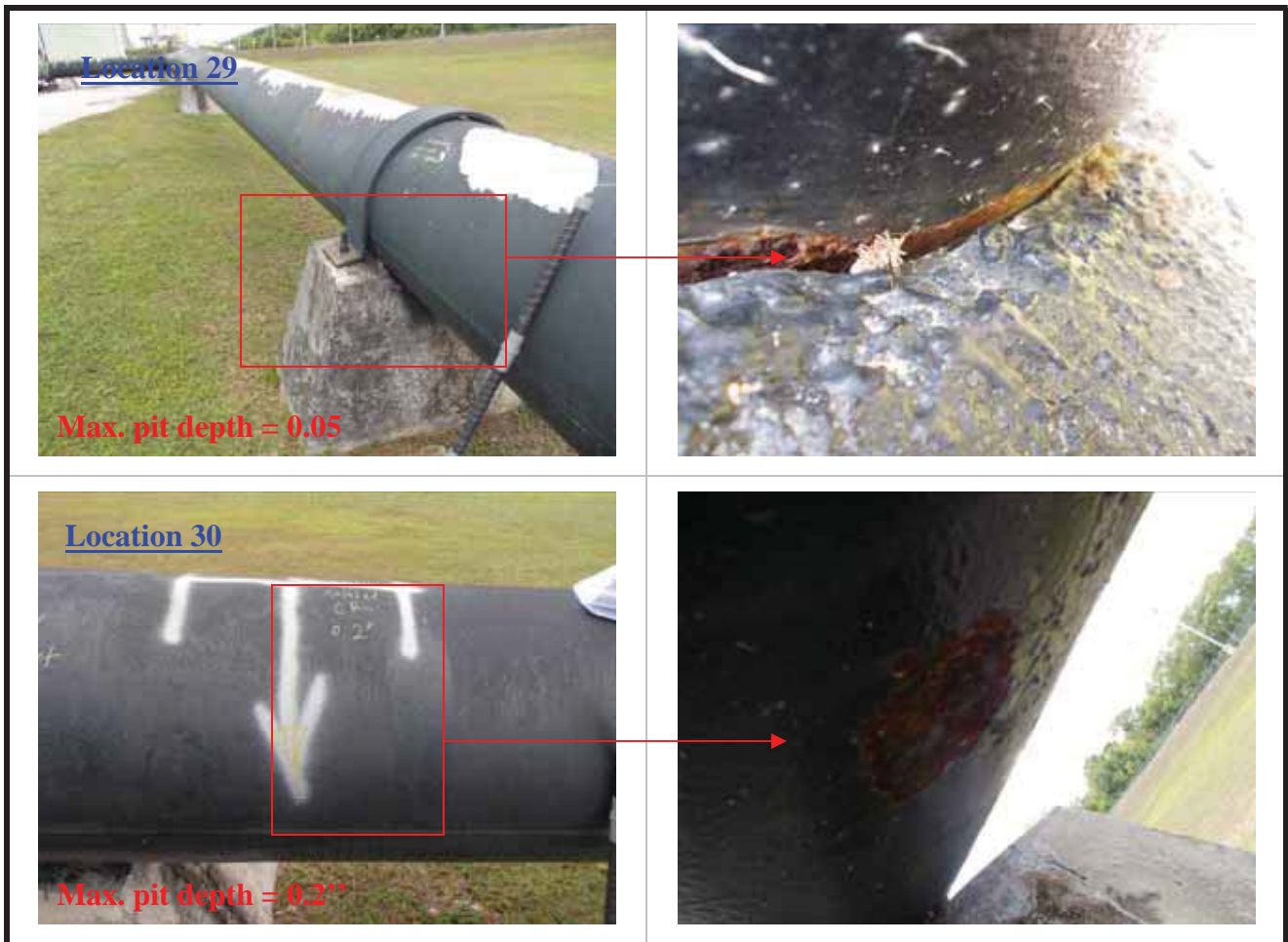


LINE SERVICE	DRAWING REFERENCE
24" Residual Fuel Oil No. 6 (RFO no. 6)	ISO drawing no. 7
DESCRIPTION	LOCATION
Circuit 1 – Cargo line	Inside Terminal – Tank 1934 Farm Area <i>*Please refer Appendix 3 for detail location</i>
FINDING	RECOMMENDATIONS
Localized corrosion/pits was noted at bottom section of piping, marked as 23 and 24 in ISO drawing. <i>*Please refer Appendix 2 for 1/2 remaining life calculation at pits area.</i>	To perform surface preparation and follows by maintenance painting as per client's specification.

<p>Between support 22 & 23</p> 	
<p>Between support 23 & 24</p> 	
<p>LINE SERVICE</p>	<p>DRAWING REFERENCE</p>
<p>24" Residual Fuel Oil No. 6 (RFO no. 6)</p>	<p>ISO drawing no. 7</p>
<p>DESCRIPTION</p>	<p>LOCATION</p>
<p>Circuit 1 – Cargo line</p>	<p>Inside Terminal – Tank 1934 Farm Area <i>*Please refer Appendix 3 for detail location</i></p>
<p>FINDING</p>	<p>RECOMMENDATIONS</p>
<p>1. Permanent repair (insert weld patch) was noted on top section of piping. Remaining thickness from ultrasonic thickness measurement is 9.13mm. 2. Temporary repair was noted at bottom section of piping. According to API 570 paragraph 8.1.4.1, <i>the design of temporary enclosures and repair shall be approved by piping engineer and temporary repairs should be removed and replaced with a suitable permanent repair at the next available maintenance opportunity.</i></p>	<p>1. Nil 2. Consideration to perform permanent repair in accordance to API 570, restore with weld metal deposited/insert weld patch follows by NDE and painting as per client's specification.</p>

 <p>Location 25</p> <p>Max. pit depth = 0.08"</p>	
 <p>Location 26</p> <p>Max. pit depth = 0.05"</p>	
<p>LINE SERVICE</p>	<p>DRAWING REFERENCE</p>
<p>24" Residual Fuel Oil No. 6 (RFO no. 6)</p>	<p>ISO drawing no. 7</p>
<p>DESCRIPTION</p>	<p>LOCATION</p>
<p>Circuit 1 – Cargo line</p>	<p>Inside Terminal – Tank 1934 Farm Area <i>*Please refer Appendix 3 for detail location</i></p>
<p>FINDING</p>	<p>RECOMMENDATIONS</p>
<p>1. Localized corrosion/pits was noted at bottom section of piping, marked as 25 in ISO drawing. 2. Corrosion was noted at contact area between piping and support, marked as location 26 in ISO drawing. <i>*Please refer Appendix 2 for ½ remaining life calculation at pits area.</i></p>	<p>1. To perform surface preparation and follows by maintenance painting as per client's specification. 2. To lift the piping and perform surface preparation and follows by maintenance painting as per client's specification. Note:-Pits depth measurement at contact area between piping and support based on estimation due to inaccessible area.</p>

<p>Location 27</p>  <p>Max. pit depth = 0.07"</p>	
<p>Location 28</p>  <p>Max. pit depth = 0.15"</p>	
<p>LINE SERVICE</p>	<p>DRAWING REFERENCE</p>
<p>24" Residual Fuel Oil No. 6 (RFO no. 6)</p>	<p>ISO drawing no. 7</p>
<p>DESCRIPTION</p>	<p>LOCATION</p>
<p>Circuit 1 – Cargo line</p>	<p>Inside Terminal – Tank 1934 Farm Area <i>*Please refer Appendix 3 for detail location</i></p>
<p>FINDING</p>	<p>RECOMMENDATIONS</p>
<p>1. Localized corrosion/pits was noted at bottom section of piping, marked as 27 in ISO drawing. 2. Corrosion was noted at contact area between piping and support, marked as location 28 in ISO drawing. <i>*Please refer Appendix 2 for ½ remaining life calculation at pits area.</i></p>	<p>1. To perform surface preparation and follows by maintenance painting as per client's specification. 2. To lift the piping and perform surface preparation and follows by maintenance painting as per client's specification. Note:-Pits depth measurement at contact area between piping and support based on estimation due to inaccessible area.</p>






LINE SERVICE	DRAWING REFERENCE
24" Residual Fuel Oil No. 6	ISO drawing no. 7
DESCRIPTION	LOCATION
Circuit 1 – Cargo line	Inside Terminal – Tank 1934 Farm Area <i>*Please refer Appendix 3 for detail location</i>
FINDING	RECOMMENDATIONS
<p>1. Corrosion was noted at contact area between piping and support, marked as location 29 in ISO drawing.</p> <p>2. Severe localized corrosion/pits was noted at bottom section of piping, marked as 30 in ISO drawing.</p> <p><i>*Please refer Appendix 2 for 1/2 remaining life calculation at pits area.</i></p>	<p>1. To lift the piping and perform surface preparation and follows by maintenance painting as per client's specification.</p> <p>2. Consideration to perform permanent repair at this area with remove the corrosion, restore with weld metal deposited/insert weld patch, follow by NDE and re-painting as per client's specification.</p> <p>Note:-Pits depth measurement at contact area between piping and support based on estimation due to inaccessible area.</p>

<p>LINE SERVICE</p>	<p>DRAWING REFERENCE</p>
<p>24" Residual Fuel Oil No. 6 (RFO no. 6)</p>	<p>ISO drawing no. 7</p>
<p>DESCRIPTION</p>	<p>LOCATION</p>
<p>Circuit 1 – Cargo line</p>	<p>Inside Terminal – Tank 1934 Farm Area <i>*Please refer Appendix 3 for detail location</i></p>
<p>FINDING</p>	<p>RECOMMENDATIONS</p>
<p>Corrosion was noted at contact area between piping and support, marked as locations 31 and 32 in ISO drawing. <i>*Please refer Appendix 2 for ½ remaining life calculation at pits area.</i></p>	<p>To lift the piping and perform surface preparation and follows by maintenance painting as per client's specification. Note:-Pits depth measurement at contact area between piping and support based on estimation due to inaccessible area.</p>



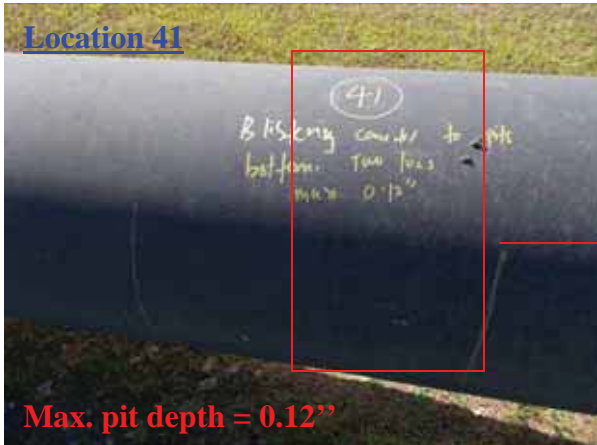
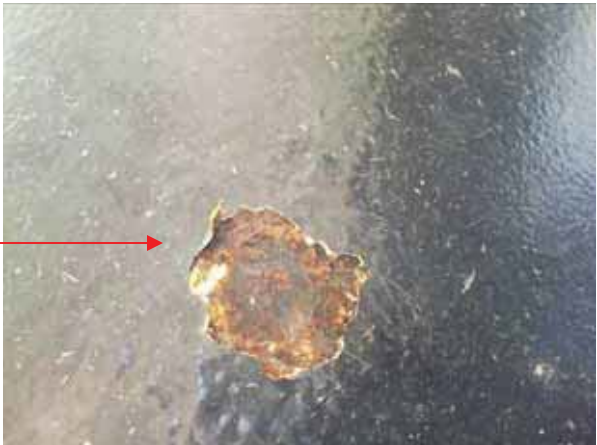


LINE SERVICE	DRAWING REFERENCE
24" Residual Fuel Oil No. 6 (RFO no. 6)	ISO drawing no. 7
DESCRIPTION	LOCATION
Circuit 1 – Cargo line	Inside Terminal – Tank 1934 Farm Area <i>*Please refer Appendix 3 for detail location</i>
FINDING	RECOMMENDATIONS
<ol style="list-style-type: none"> 1. Stud bolts of flanges was observed not extend out from their nuts. 2. Product stain sign of leak and crevice corrosion was noted at flanges area. 	<ol style="list-style-type: none"> 1. To replace with longer stud bolt with the same material and specification. 2. Consideration to dismantle the valve and check for corrosion at raise face and replace with new gasket.

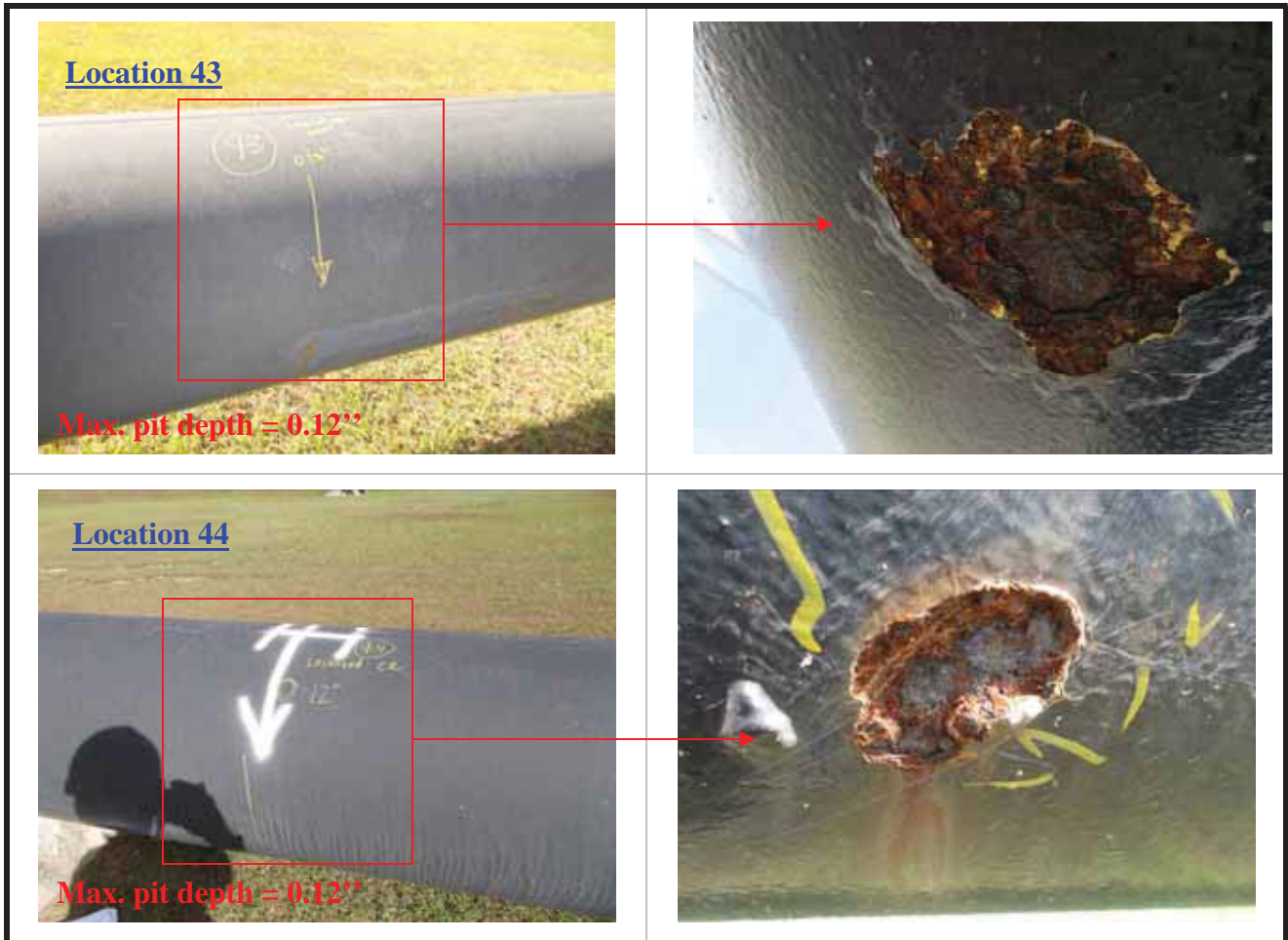
 <p>Location 33</p> <p>Max. pit depth = 0.08"</p>	
 <p>Location 34</p> <p>Max. pit depth = 0.03"</p>	
<p>LINE SERVICE</p>	<p>DRAWING REFERENCE</p>
<p>24" Residual Fuel Oil No. 6 (RFO no. 6)</p>	<p>ISO drawing no. 7</p>
<p>DESCRIPTION</p>	<p>LOCATION</p>
<p>Circuit 1 – Cargo line</p>	<p>Inside Terminal – Tank 1934 Farm Area <i>*Please refer Appendix 3 for detail location</i></p>
<p>FINDING</p>	<p>RECOMMENDATIONS</p>
<p>1. Localized corrosion/pits was noted at bottom section of piping, marked as 33 in ISO drawing. 2. Corrosion was noted at contact area between piping and support, marked as location 34 in ISO drawing. <i>*Please refer Appendix 2 for ½ remaining life calculation at pits area.</i></p>	<p>1. To perform surface preparation and follows by maintenance painting as per client's specification. 2. To lift the piping and perform surface preparation and follows by maintenance painting as per client's specification. Note:-Pits depth measurement at contact area between piping and support based on estimation due to inaccessible area.</p>

<p><u>Location 35</u></p> <p>Max. pit depth = 0.07''</p>	
<p><u>Location 36</u></p> <p>Max. pit depth = 0.11''</p>	
<p>LINE SERVICE</p>	<p>DRAWING REFERENCE</p>
<p>24" Residual Fuel Oil No. 6 (RFO no. 6)</p>	<p>ISO drawing no. 8</p>
<p>DESCRIPTION</p>	<p>LOCATION</p>
<p>Circuit 1 – Cargo line</p>	<p>Inside Terminal – Tank 1934 Farm Area <i>*Please refer Appendix 3 for detail location</i></p>
<p>FINDING</p>	<p>RECOMMENDATIONS</p>
<p>Corrosion was noted at contact area between piping and support, marked as locations 35 and 36 in ISO drawing. <i>*Please refer Appendix 2 for ½ remaining life calculation at pits area.</i></p>	<p>To lift the piping and perform surface preparation and follows by maintenance painting as per client's specification. Note:-Pits depth measurement at contact area between piping and support based on estimation due to inaccessible area.</p>

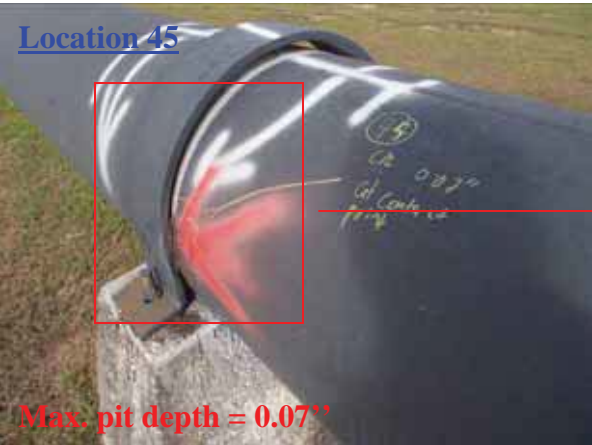
<p><u>Location 37</u></p>  <p>Max. pit depth = 0.10"</p>	
<p><u>Location 38</u></p>  <p>Max. pit depth = 0.06"</p>	
<p>LINE SERVICE</p>	<p>DRAWING REFERENCE</p>
<p>24" Residual Fuel Oil No. 6 (RFO no. 6)</p>	<p>ISO drawing no. 8</p>
<p>DESCRIPTION</p>	<p>LOCATION</p>
<p>Circuit 1 – Cargo line</p>	<p>Inside Terminal – Tank 1934 Farm Area <i>*Please refer Appendix 3 for detail location</i></p>
<p>FINDING</p>	<p>RECOMMENDATIONS</p>
<p>1. Localized corrosion/pits was noted at bottom section of piping, marked as 37 in ISO drawing. 2. Corrosion was noted at contact area between piping and support, marked as location 38 in ISO drawing. <i>*Please refer Appendix 2 for ½ remaining life calculation at pits area.</i></p>	<p>1. To perform surface preparation and follows by maintenance painting as per client's specification. 2. To lift the piping and perform surface preparation and follows by maintenance painting as per client's specification. Note:-Pits depth measurement at contact area between piping and support based on estimation due to inaccessible area.</p>

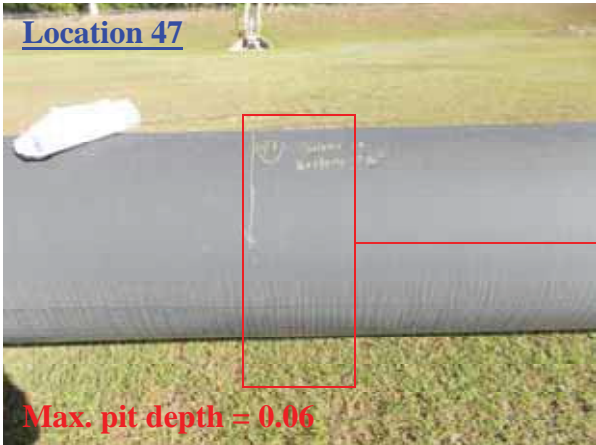
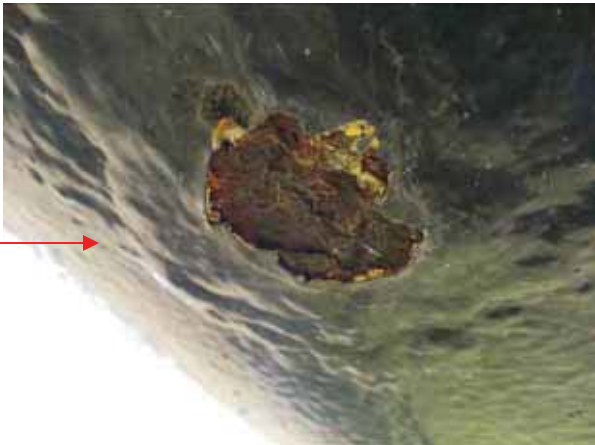


<p>Location 39</p>  <p>Max. pit depth = 0.13"</p>	
<p>Location 40</p>  <p>Max. pit depth = 0.05"</p>	
<p>LINE SERVICE</p>	<p>DRAWING REFERENCE</p>
<p>24" Residual Fuel Oil No. 6 (RFO no. 6)</p>	<p>ISO drawing no. 8</p>
<p>DESCRIPTION</p>	<p>LOCATION</p>
<p>Circuit 1 – Cargo line</p>	<p>Inside Terminal – Tank 1934 & 1935 Farm Area <i>*Please refer Appendix 3 for detail location</i></p>
<p>FINDING</p>	<p>RECOMMENDATIONS</p>
<p>1. Corrosion was noted at contact area between piping and support, marked as location 39 in ISO drawing. 2. Corrosion under wrapping was noted at soil to air interface area due to wrap failure and gives a path to water ingress inside, marked as location 40 in ISO drawing. No sign of corrosion propagate deeper after the wrapping end. <i>*Please refer Appendix 2 for 1/2 remaining life calculation at pits area.</i></p>	<p>1. To lift the piping and perform surface preparation and follows by maintenance painting as per client's specification. 2. To perform surface preparation extend to the last corrosion, apply coal tar enamel and re-wrap with proper procedure and suitable wrapping for buried piping up to 6" from soil to air interface.</p>

<p><u>Location 41</u></p>  <p>Max. pit depth = 0.12''</p>	
<p><u>Location 42</u></p>  <p>Max. pit depth = 0.10''</p>	
<p>LINE SERVICE</p>	<p>DRAWING REFERENCE</p>
<p>24" Residual Fuel Oil No. 6 (RFO no. 6)</p>	<p>ISO drawing no. 8</p>
<p>DESCRIPTION</p>	<p>LOCATION</p>
<p>Circuit 1 – Cargo line</p>	<p>Inside Terminal – Tank 1935 farm area <i>*Please refer Appendix 3 for detail location</i></p>
<p>FINDING</p>	<p>RECOMMENDATIONS</p>
<p>Localized corrosion/pits was noted at bottom section of piping, marked as locations 41 and 42 in ISO drawing. <i>*Please refer Appendix 2 for 1/2 remaining life calculation at pits area.</i></p>	<p>To perform surface preparation and follows by maintenance painting as per client's specification.</p>

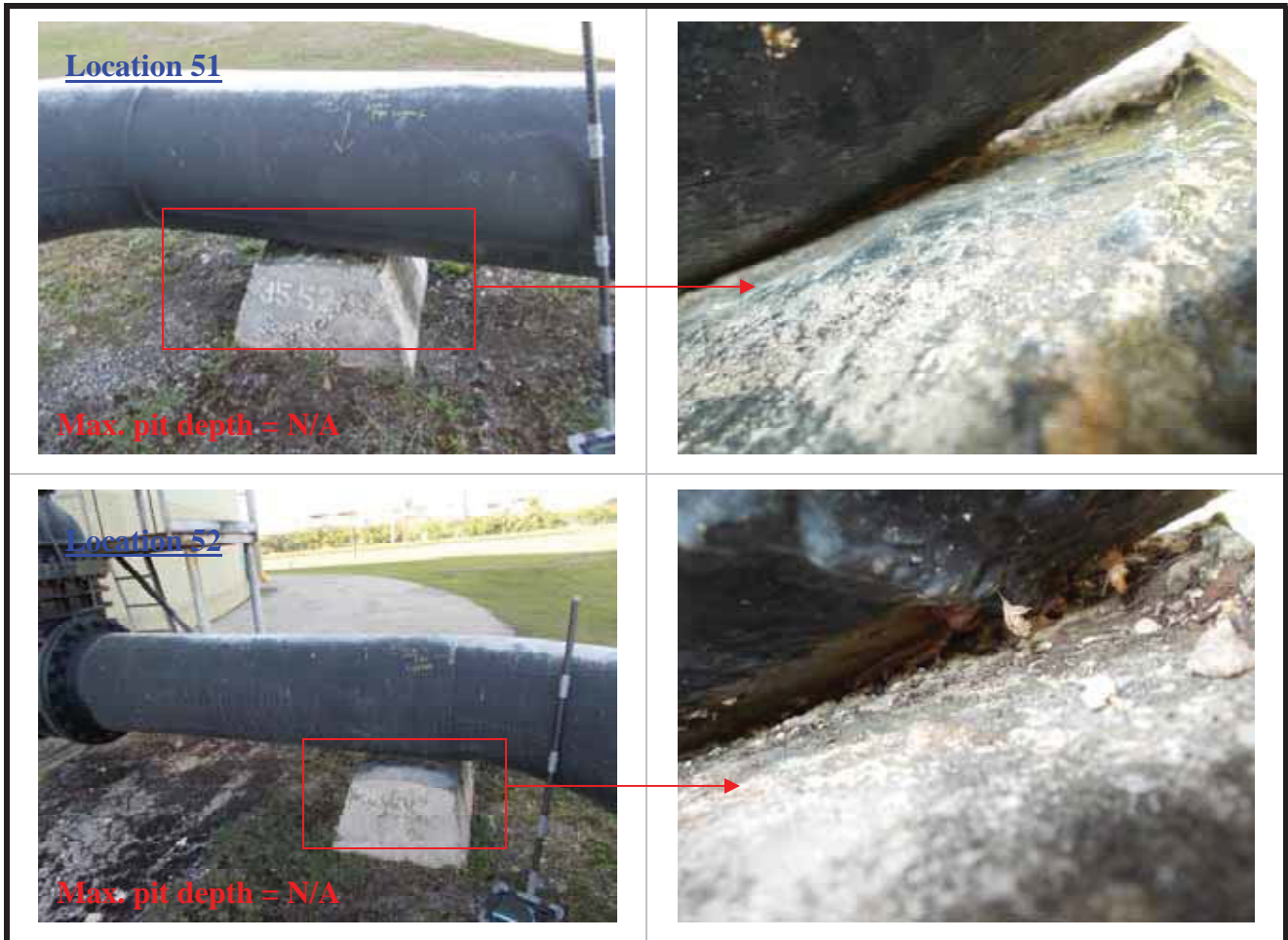


LINE SERVICE	DRAWING REFERENCE
24" Residual Fuel Oil No. 6 (RFO no. 6)	ISO drawing no. 8
DESCRIPTION	LOCATION
Circuit 1 – Cargo line	Inside Terminal – Tank 1935 farm area <i>*Please refer Appendix 3 for detail location</i>
FINDING	RECOMMENDATIONS
Localized corrosion/pits was noted at bottom section of piping, marked as locations 43 and 44 in ISO drawing. <i>*Please refer Appendix 2 for 1/2 remaining life calculation at pits area.</i>	To perform surface preparation and follows by maintenance painting as per client's specification.





<p><u>Location 45</u></p>  <p>Max. pit depth = 0.07"</p>	
<p><u>Location 46</u></p>  <p>Max. pit depth = 0.05</p>	
<p>LINE SERVICE</p>	<p>DRAWING REFERENCE</p>
<p>24" Residual Fuel Oil No. 6 (RFO no. 6)</p>	<p>ISO drawing no. 8</p>
<p>DESCRIPTION</p>	<p>LOCATION</p>
<p>Circuit 1 – Cargo line</p>	<p>Inside Terminal – Tank 1935 farm area <i>*Please refer Appendix 3 for detail location</i></p>
<p>FINDING</p>	<p>RECOMMENDATIONS</p>
<p>1. Corrosion was noted at contact area between piping and u-bolt clamp area, marked as location 45 in ISO drawing. 2. Localized corrosion/pits was noted at bottom section of piping, marked as location 46 in ISO drawing. <i>*Please refer Appendix 2 for ½ remaining life calculation at pits area.</i></p>	<p>1. To perform surface preparation and follows by maintenance painting as per client's specification, to ensure the u-bolt clamp installed with clearance to prevent abrasion during product loading/unloading and lead to corrosion. 2. To perform surface preparation and follows by maintenance painting as per client's specification.</p>

<p>Location 47</p>  <p>Max. pit depth = 0.06</p>	
<p>Location 48</p>  <p>Max. pit depth = N/A</p>	
<p>LINE SERVICE</p>	<p>DRAWING REFERENCE</p>
<p>24" Residual Fuel Oil No. 6 (RFO no. 6)</p>	<p>ISO drawing no. 8</p>
<p>DESCRIPTION</p>	<p>LOCATION</p>
<p>Circuit 1 – Cargo line</p>	<p>Inside Terminal – Tank 1935 farm area <i>*Please refer Appendix 3 for detail location</i></p>
<p>FINDING</p>	<p>RECOMMENDATIONS</p>
<p>1. Localized corrosion/pits was noted at bottom section of piping, marked as location 47 in ISO drawing. 2. Corrosion was noted at contact area between piping and support, marked as location 48 in ISO drawing. <i>*Please refer Appendix 2 for ½ remaining life calculation at pits area.</i></p>	<p>1. To perform surface preparation and follows by maintenance painting as per client's specification. 2. To lift the piping and perform surface preparation and follows by maintenance painting as per client's specification. Note:-Pits depth measurement at contact area between piping and support based on estimation due to inaccessible area.</p>

<p>Location 49</p>  <p>Max. pit depth = 0.08''</p>	
<p>Location 50</p>  <p>Max. pit depth = 0.03''</p>	
<p>LINE SERVICE</p>	<p>DRAWING REFERENCE</p>
<p>24" Residual Fuel Oil No. 6 (RFO no. 6)</p>	<p>ISO drawing no. 8</p>
<p>DESCRIPTION</p>	<p>LOCATION</p>
<p>Circuit 1 – Cargo line</p>	<p>Inside Terminal – Tank 1935 farm area <i>*Please refer Appendix 3 for detail location</i></p>
<p>FINDING</p>	<p>RECOMMENDATIONS</p>
<p>Corrosion was noted at contact area between piping and support, marked as locations 49 and 50 in ISO drawing. <i>*Please refer Appendix 2 for ½ remaining life calculation at pits area.</i></p>	<p>To lift the piping and perform surface preparation and follows by maintenance painting as per client's specification. Note:-Pits depth measurement at contact area between piping and support based on estimation due to inaccessible area.</p>



LINE SERVICE	DRAWING REFERENCE
24" Residual Fuel Oil No. 6 (RFO no. 6)	ISO drawing no. 8
DESCRIPTION	LOCATION
Circuit 1 – Cargo line	Inside Terminal – Tank 1935 farm area <i>*Please refer Appendix 3 for detail location</i>
FINDING	RECOMMENDATIONS
Corrosion was noted at contact area between piping and support, marked as locations 51 and 52 in ISO drawing. <i>*Please refer Appendix 2 for ½ remaining life calculation at pits area.</i>	To lift the piping and perform surface preparation and follows by maintenance painting as per client's specification. Note:-Pits depth measurement at contact area between piping and support based on estimation due to inaccessible area.

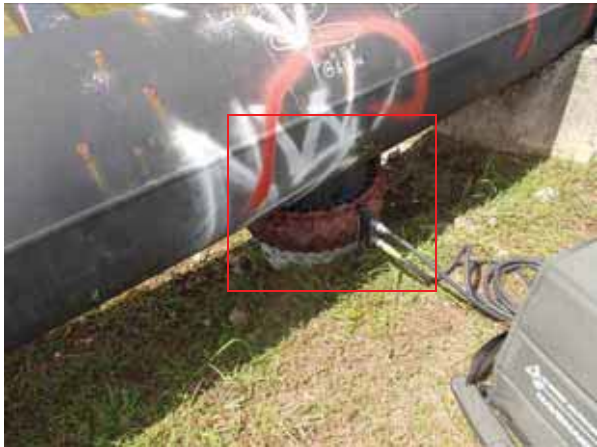
	
	
<p>LINE SERVICE</p>	<p>DRAWING REFERENCE</p>
<p>24" Residual Fuel Oil No. 6 (RFO no. 6)</p>	<p>ISO drawing no. 8</p>
<p>DESCRIPTION</p>	<p>LOCATION</p>
<p>Circuit 1 – Cargo line</p>	<p>Inside Terminal – Tank 1935 farm area <i>*Please refer Appendix 3 for detail location</i></p>
<p>FINDING</p>	<p>RECOMMENDATIONS</p>
<p>1. Stud bolts of flanges was observed not extend out from their nuts and corroded especially at bottom section. 2. Atmospheric corrosion was noted at some section of the Valve.</p>	<p>1. To replace with longer stud bolt with the same material and specification. 2. To perform surface preparation and follows by maintenance painting as per client's specification.</p>





INSIDE TERMINAL
Circuit 1
- Diesel pump suction line -



LINE SERVICE	DRAWING REFERENCE
16" Residual Fuel Oil No. 6	ISO drawing no. 7 & 9
DESCRIPTION	LOCATION
Circuit 1 – Diesel pump suction line	Inside Terminal – Close to Diesel Pump House
FINDING	RECOMMENDATIONS
General view of 16" diesel pump suction line.	Nil.



LINE SERVICE	DRAWING REFERENCE
16" Residual Fuel Oil No. 6	ISO drawing no. 7
DESCRIPTION	LOCATION
Circuit 1 – Diesel pump suction line	Inside Terminal – Tank 1934 farm area
FINDING	RECOMMENDATIONS
Paint failure with surface rust was observed at soil to air interface area.	To perform surface, apply coal tar enamel and wrap with proper procedure and suitable wrapping for buried piping up to 6 inch from soil to air interface.

	
<p><u>Location 53</u></p>  <p>Max. pit depth = 0.06''</p>	<p><u>Location 54</u></p>  <p>Max. pit depth = 0.07''</p>
<p>LINE SERVICE</p>	<p>DRAWING REFERENCE</p>
<p>16" Residual Fuel Oil No. 6 (RFO no. 6)</p>	<p>ISO drawing no. 9</p>
<p>DESCRIPTION</p>	<p>LOCATION</p>
<p>Circuit 1 – Diesel pump suction line</p>	<p>Inside Terminal – Diesel pump house area</p>
<p>FINDING</p>	<p>RECOMMENDATIONS</p>
<p>1. No sign of corrosion at soil to air interface area. 2. Piping was observed too close with ground level and general corrosion was noted at bottom section of the piping, marked as locations 53 and 54 in ISO drawing.</p>	<p>1. Nil. 2. To perform surface preparation and follows by maintenance painting as per client's specification and to ensure the gap 6 inch between piping and soil surface as per API 570 and piping in contact with soil should be insulated.</p>


<p>LINE SERVICE</p>	<p>DRAWING REFERENCE</p>
<p>16" Residual Fuel Oil No. 6 (RFO no. 6)</p>	<p>ISO drawing no. 9</p>
<p>DESCRIPTION</p>	<p>LOCATION</p>
<p>Circuit 1 – Diesel pump suction line</p>	<p>Inside Terminal – diesel pump house area</p>
<p>FINDING</p>	<p>RECOMMENDATIONS</p>
<p>1. Gap was noted between piping and sealant. Surface rust was noted at the area sign of corrosion under sealant. 2. Stud bolts of V-140 was noted not extend out trough their nuts.</p>	<p>1. To remove the sealant, perform surface preparation on pipe and casing, painting the pipe and sleeve as per client's specification and follows by re-apply new sealant. 2. To replace with longer stud bolt with the same material and specification.</p>


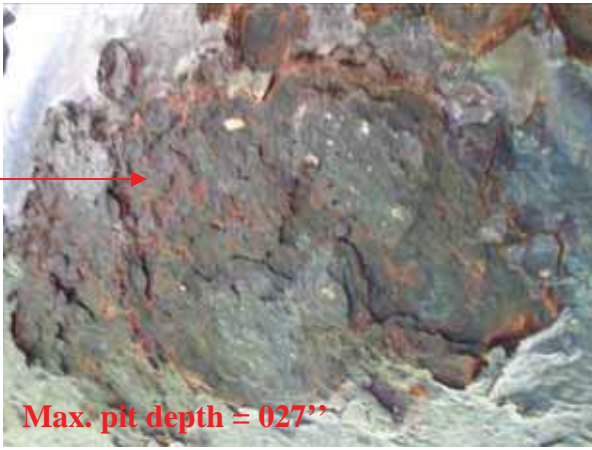




INSIDE TERMINAL
Circuit 2
- Diesel pump discharge line -

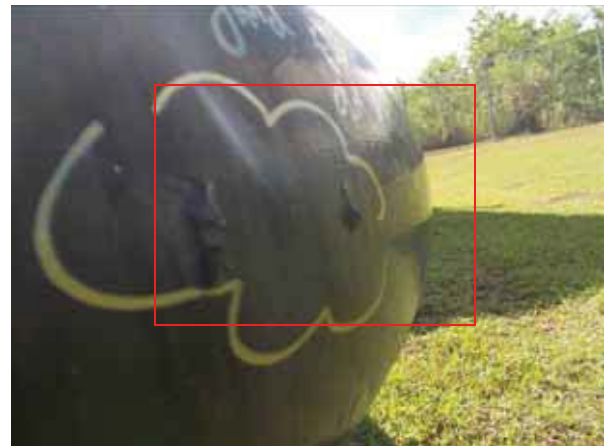


LINE SERVICE	DRAWING REFERENCE
14" Residual Fuel Oil No. 6	ISO drawing no. 10
DESCRIPTION	LOCATION
Circuit 2 - Diesel pump discharge line	Inside Terminal – Diesel pump house area <i>*Please refer Appendix 3 for detail location</i>
FINDING	RECOMMENDATIONS
Wrapping tape at buried piping was observed deteriorated, however no sign of corrosion was noted at soil to air interface area.	To replace the wrapping with suitable material for buried piping and ensure water would not ingress inside and promote to corrosion.

<p><u>Location 1</u></p>  <p>Max. pit depth = 010"</p>	
<p><u>Location 2</u> At support 1</p>  <p>Max. pit depth = 013"</p>	
<p>LINE SERVICE</p>	<p>DRAWING REFERENCE</p>
<p>14" Residual Fuel Oil No. 6</p>	<p>ISO drawing no. 10</p>
<p>DESCRIPTION</p>	<p>LOCATION</p>
<p>Circuit 2 – Diesel pump discharge line</p>	<p>Inside Terminal – Diesel pump house area <i>*Please refer Appendix 3 for detail location</i></p>
<p>FINDING</p>	<p>RECOMMENDATIONS</p>
<p>Localized corrosion/pits was noted at bottom section of piping, marked as locations 1 and 2 in ISO drawing. <i>*Please refer Appendix 2 for 1/2 remaining life calculation at pits area.</i></p>	<p>To perform surface preparation and follows by maintenance painting as per client's specification.</p>

 <p><u>Location 3</u></p>	 <p>Max. pit depth = 027"</p>
 <p><u>Location 4</u></p>	 <p>Max. pit depth = 013"</p>
<p>LINE SERVICE</p>	<p>DRAWING REFERENCE</p>
<p>14" Residual Fuel Oil No. 6</p>	<p>ISO drawing no. 10</p>
<p>DESCRIPTION</p>	<p>LOCATION</p>
<p>Circuit 2 – Diesel pump discharge line</p>	<p>Inside Terminal – Diesel pump house area <i>*Please refer Appendix 3 for detail location</i></p>
<p>FINDING</p>	<p>RECOMMENDATIONS</p>
<p>1. General corrosion with scaling was noted at bottom section of elbow, marked as location 3 in ISO drawing. 2. Surface rust was noted at old corrosion, marked as location 4 in ISO drawing. <i>*Please refer Appendix 2 for ½ remaining life calculation at pits area.</i></p>	<p>1. Consideration to perform permanent repair at this area with replace the corroded elbow, follow by NDE and re-painting as per client's specification. 2. To perform surface preparation and follows by maintenance painting as per client's specification.</p>

<p><u>Location 5</u></p> 	 <p>Max. pit depth = 010"</p>
	
<p>LINE SERVICE</p>	<p>DRAWING REFERENCE</p>
<p>14" Residual Fuel Oil No. 6</p>	<p>ISO drawing no. 10</p>
<p>DESCRIPTION</p>	<p>LOCATION</p>
<p>Circuit 2 – Diesel pump discharge line</p>	<p>Inside Terminal – Diesel pump house area <i>*Please refer Appendix 3 for detail location</i></p>
<p>FINDING</p>	<p>RECOMMENDATIONS</p>
<p>1. Localized corrosion/pits was noted at bottom section of piping, marked as location 5 in ISO drawing. 2. Paint failure with surface rust was noted at some section of 14" x 12" reducer. <i>*Please refer Appendix 2 for ½ remaining life calculation at pits area.</i></p>	<p>To perform surface preparation and follows by maintenance painting as per client's specification.</p>



LINE SERVICE	DRAWING REFERENCE
14" Residual Fuel Oil No. 6	ISO drawing no. 10
DESCRIPTION	LOCATION
Circuit 2 – Diesel pump discharge line	Inside Terminal – Diesel pump house area <i>*Please refer Appendix 3 for detail location</i>
FINDING	RECOMMENDATIONS
Remnant tack weld was noted at some section all along the piping.	To grind flush and follows by maintenance painting as per client's specification.



LINE SERVICE	DRAWING REFERENCE
12" Residual Fuel Oil No. 6	ISO drawing no. 10
DESCRIPTION	LOCATION
Circuit 2 – Diesel pump discharge line	Inside Terminal – Diesel pump house area <i>*Please refer Appendix 3 for detail location</i>
FINDING	RECOMMENDATIONS
<ol style="list-style-type: none"> 1. Paint failure with surface rust was observed at some section of V-139. 2. Stud bolts of the valve was noted not extend out trough their nuts. 	<ol style="list-style-type: none"> 1. To perform surface preparation and follows by maintenance painting as per client's specification. 2. To replace with longer stud bolt with the same material and specification.



LINE SERVICE	DRAWING REFERENCE
12" Residual Fuel Oil No. 6	ISO drawing no. 10
DESCRIPTION	LOCATION
Circuit 2 – Diesel pump discharge line	Inside Terminal – Diesel pump house area <i>*Please refer Appendix 3 for detail location</i>
FINDING	RECOMMENDATIONS
<ol style="list-style-type: none"> 1. Sealant was observed intact and no sign of corrosion under sealant was noted. 2. Paint failure with surface rust was noted on top section of piping. 	<ol style="list-style-type: none"> 1. Nil. 2. To replace with longer stud bolt with the same material and specification.