

TITLE: Similar Service Assessment

AGENDA ITEM: 653-204

PURPOSE: To provide industry with performance based guidance on conducting a similar service assessment.

IMPACT: Currently, there is no definition for similar service and no clear guidance on conducting a similar service assessment. This effort contributes significantly to helping to ensure the safety of the public, protection of the environment and operational reliability by providing industry with performance based guidance on conducting a similar service assessment.

SOURCE: API Standard 653 (a proposed new appendix)

PROPOSAL: See Attached.

SECTION 3 - DEFINITIONS

3.7 candidate tank: The tank(s) for which corrosion rates are not known.

3.9 control tank: The tank(s) for which corrosion rates and service history are known and documented.

3.15 product-side: The side of the tank that is in contact with the stored liquid product.

3.20 similar service assessment: The process by which corrosion rates and inspection intervals are established for a candidate tank using corrosion rates and service history from a control tank for the purpose of establishing the next inspection date.

3.21 soil-side: The side of the tank bottom that is in contact with the ground.

Note: The existing definitions in Section 3 will need to be renumbered accordingly.

APPENDIX H – SIMILAR SERVICE ASSESSMENT

This Appendix is provided as guidance for performing a similar service assessment. This Appendix is not all inclusive and is not mandatory. It is not intended to prevent the use of other similar service assessment methods. Appendix H contains sample data sheets illustrating items that should be considered when conducting a Similar Service Assessment. The data sheet format facilitates the recording of assessment findings.

H.1 Scope

This appendix provides guidance for conducting a similar service assessment to establish inspection intervals for tanks for which corrosion rates have not been directly measured as referenced in 6.3.2 and 6.4.2. This appendix is intended for use by an Authorized Inspector, Storage Tank Engineer and other person(s) having knowledge and experience in performing similar service assessments.

H.2 Similar Service Assessment

Several criteria must be evaluated to determine whether the candidate tank is in similar service with the control tank. Similar service assessment requires a sufficient amount of data collection and analysis and needs to be performed in a comprehensive and thorough fashion in accordance with an established risk management program. Similar service assessment is conducted using design, construction, operation, maintenance and inspection data. Data should be obtained by using direct and indirect examination procedures such as MT and UT, evaluating product corrosivity, measuring CP levels, determining soil properties, and other factors. Refer to the “Similar Service Assessment – Data Sheet”, which provides a place to record the required data. Data should be collected for each of the tank characteristics listed on the data sheet for both the control tank and candidate tanks and an assessment made to determine if the services are similar. Typically, there will not be an exact match of all data, or some of the required data will not even be known. When there is not an exact match between one or more criteria, additional evaluation is necessary to determine whether the tanks can be considered to be in similar service. Figure H.1 illustrates the steps in conducting a similar service assessment. The “Similar Service Assessment – Data Sheet” is to facilitate the comparison of data for the two tanks. If the criteria for the control tank and candidate tank match, the candidate tank may be considered in similar service as the control tank for that particular criterion.

H.2.1 ADDITIONAL ASSESSMENT

When additional assessment is required because an individual basic criterion does not match, the table references the section describing additional factors that must be assessed. If the additional factors in the specified reference section are assessed to be sufficiently similar, the tanks are considered in similar service for that factor. If all additional provisions are satisfied, the tanks are considered in similar service. Additional assessment(s) must be documented and maintained in the record file as per Section 6.8.

H.2.1.1 Year Tank Erected: If the criteria for the control tank and candidate tank do not match, the following additional provisions must be satisfied to consider both tanks in similar service:

- a. The difference in ages of the tanks must be considered in the corrosion rate calculations, and
- b. Any substantive differences in the design and/or construction standards to which the tanks were constructed must be considered in the similar service evaluation.

H.2.1.2 Bottom Material: If the criteria for the control tank and candidate tank do not match, the following additional provisions must be satisfied to consider both tanks in similar service:

- a. The bottom material of the candidate tank must have similar corrosion-resistance properties as the bottom material of the control tank, and
- b. The candidate tank, or both the candidate and the control tanks, utilize an effective lining to prevent corrosion of the product-side of the bottom, and
- c. The potential for corrosion of the soil-side of the bottom is assessed to be similar for both tank bottom materials.

H.2.1.3 Shell Material: If the criteria for the control tank and candidate tank do not match, the following additional provisions must be satisfied to consider both tanks in similar service:

- a. The shell material of the candidate tank must have similar corrosion-resistance properties as the shell material of the control tank, and
- b. The candidate tank, or both the candidate and the control tanks, utilize a suitable lining to prevent corrosion of the product-side of the shell, and
- c. The candidate tank, or both the candidate and the control tanks, utilize a suitable paint or coating to prevent corrosion of the external side of the shell.

H.2.1.4 Corrosion Allowance, Bottom/Shell: If the criteria for the control tank and candidate tank do not match, the difference in corrosion allowance should be accounted for in the remaining life and inspection interval calculations to consider both tanks in similar service.

H.2.1.5 Bottom Lining Type/Thickness/Age: If the criteria for the control tank and candidate tank do not match, the differences in the bottom lining systems must be assessed. The provisions of API RP 652 should be used to assess the relative corrosion protection provided by the different lining systems.

H.2.1.6 Cathodic Protection: If the criteria for the control tank and candidate tank do not match, the following additional provisions shall apply. The provisions of API

RP 651 should be used to assess the relative corrosion protection provided by the cathodic protection systems.

- a. If the candidate tank is protected with a properly designed and functional cathodic protection system, and the control tank is not, the candidate tank may be considered to be in similar service with respect to cathodic protection.
- b. If the control tank is protected with a properly designed and functional cathodic protection system, and the candidate tank is not, the candidate tank may not be considered to be in similar service with respect to cathodic protection.
- c. If the control tank and the candidate tank are protected with properly designed and functional cathodic protection systems, the tanks may be considered to be in similar service with respect to cathodic protection.

H.2.1.7 Double Bottom: If the candidate tank and/or the control tank has multiple bottoms, the similar service assessment of soil-side corrosion should be based on the material that is in contact with the underside of the primary (upper) bottom plate

H.2.1.8 Soil/Material in Contact With Bottom Plate: Any differences in the following factors between the control and the candidate tank must be assessed in determining whether the candidate tank is in similar service as the control tank:

- a. Soil or material type
- b. pH
- c. Alkalinity
- d. Moisture
- e. Salinity
- f. Resistivity
- g. Oil Type (if oiled sand foundation)
- h. Soil/Material Cleanliness
- i. Soil gradation
- j. Chlorides
- k. Sulfates

H.2.1.9 Ambient Conditions: Any differences in the following factors between the control tank and the candidate tank must be assessed in determining whether the candidate tank is in similar service as the control tank:

- a. Low one day mean temperature
- b. Exposure to salt air or other corrosive elements

H.2.1.10 Current Service Conditions: Any differences in the following factors between the control tank and the candidate tank must be assessed in determining whether the candidate tank is in similar service as the control tank:

- a. Product classification (Table H.1)
- b. Specific Gravity of Liquid
- c. Reid Vapor Pressure at 60°F
- d. Normal Operating Temperature
- e. Inert gas blanket, if used

- f. Water bottom, if used
- g. Sulfur content
- h. Length of time in service
- i. Product corrosivity

H.2.1.11 Previous Service Conditions: If the control tank and/or candidate tank have previously been used for different services than the current service, the same factors described in H.2.1.10 should be evaluated for the previous service conditions.

H.2.1.12 Product Classification: Table H.1 classifies a wide variety of liquids commonly stored in aboveground storage tanks. This table serves as guidance in assessing current or previous service conditions.

H.2.1.13 Additional Considerations: In addition to the factors discussed above, the following data, if available for the control tank and the candidate tank, should be assessed in determining whether the candidate tank is in similar service as the control tank:

- a. MFL data for the tank bottom
- b. Ultrasonic thickness (UT) measurement data
- c. Fiber optic monitoring system data
- d. Cathodic protection monitoring tube data
- e. Tank bottom integrity testing data
- f. Maintenance procedures, including frequency and methods of tank cleaning.

H.3 Example of Remaining Life Determination

H.3.1 TANK BOTTOM

Figure H.2 illustrates one method of determining the time interval in which a tank bottom will reach its minimum bottom plate thickness, beyond which the tank should be repaired or removed from service. In this example, the original metal thickness was 1/4 inch when the tank was constructed in 1970. The minimum bottom plate thickness at the next inspection interval was 0.05 inches (See also Table 6-1). At the time of this evaluation (June 10, 1990), the tank was in sour crude service. Previous service included 20 years in sour crude service. Based on thicknesses measured and the calculated corrosion rate, the remaining life, or time to reach the minimum bottom plate thickness of 0.050 inches is projected to be approximately 20 years, or June 10, 2010. See 4.4.7 for the minimum thickness calculation for a tank bottom.

H.3.2 TANK SHELL

Figure H.3 illustrates one method of determining the time interval in which a tank shell course will reach its limit of metal loss, beyond which the tank should be repaired or removed from service. In this example, the original metal

thickness was 1/2 inch when the tank was constructed in 1990. The limit of metal loss of the top shell course was calculated to be 1/4 inch. At the time of this evaluation (November 15, 2002), the tank was in sweet gasoline service. Previous services included nearly 7 years in sweet crude and nearly 3 years in sour crude service. Based on thicknesses measured at periodic inspections and corrosion rates calculated from them, the remaining life, or time to reach the metal loss limit of 1/4 inch is projected to be approximately 4 years, or August 1, 2006. See 4.3.3 for the minimum thickness calculation for an entire shell course.

TABLE H.1 - SIMILAR SERVICE PRODUCT CLASSIFICATION

| Class. | Description | Example |
|--------|--------------------------------------|--------------------------------------------------------------|
| A | Low sulfur light oil (< 1% sulfur) | No. 2 fuel oil, diesel, kerosene, jet fuel, gasoline |
| B | High sulfur light oil (>1% sulfur) | Unfinished heating oil, distillate |
| C | Sweet sulfur heavy oil (< 1% sulfur) | Heavy gas oil & sweet residual |
| D | Sour sulfur heavy oil (>1% sulfur) | Sour residual |
| E | Slop & process water | see description |
| F | Finished lube oil | Automotive, diesel and aviation oil |
| G | Sludge | Acidic, non-acidic |
| H | Crude oils | Light volatile oil (Class 1) |
| | | Non-sticky oil (Class 2) |
| | | Heavy sticky oil (Class 3) |
| | | Non-fluid (heavy crude, high paraffin) (Class 4) |
| I | Additive | Gasoline performance additives |
| J | Solvent | Ketones, alcohol, toluene, xylene, glycols, glycol ethers |
| K | Chemicals | Phosphoric, sulfuric, hydrochloric, formic, and nitric acids |

Note: This table is not all inclusive. Additionally, there may be significant variability in the chemical composition of products within a listed classification.

FIGURE H.1 – STEPS IN CONDUCTING SIMILAR SERVICE ASSESSMENT

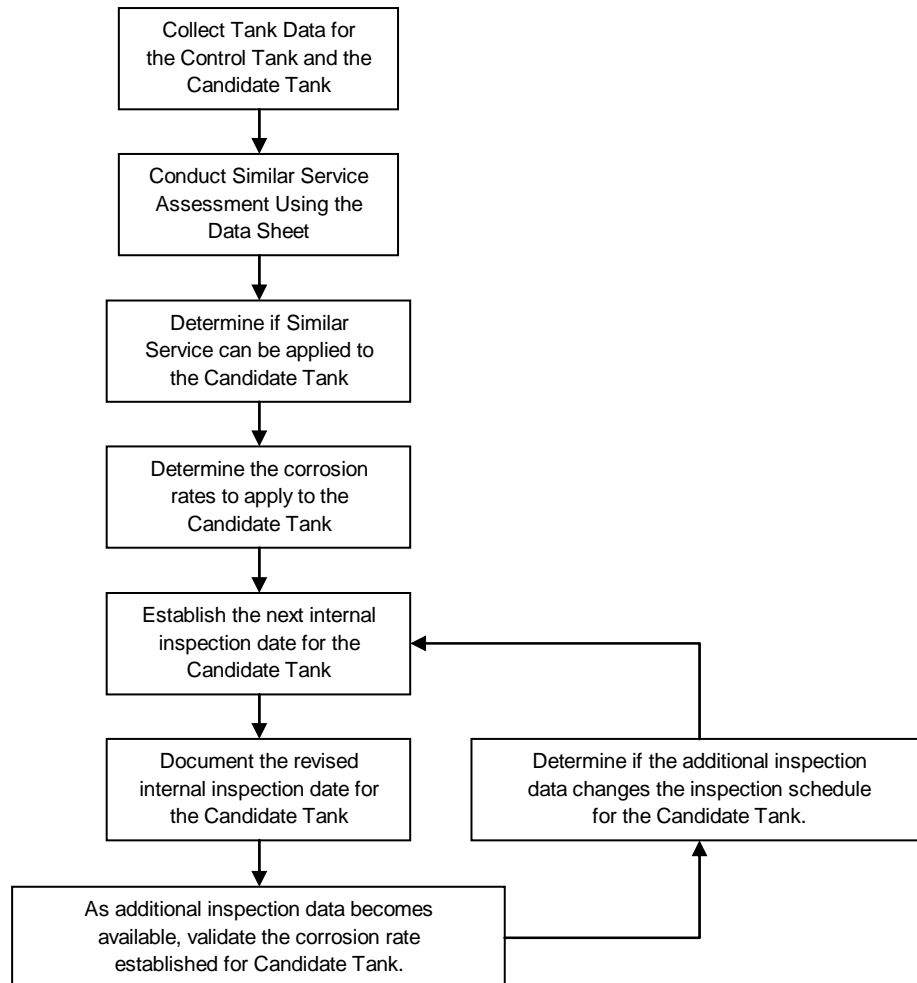


FIGURE H.2 – EXAMPLE CORROSION RATE CURVES FOR BOTTOM OF STORAGE TANK

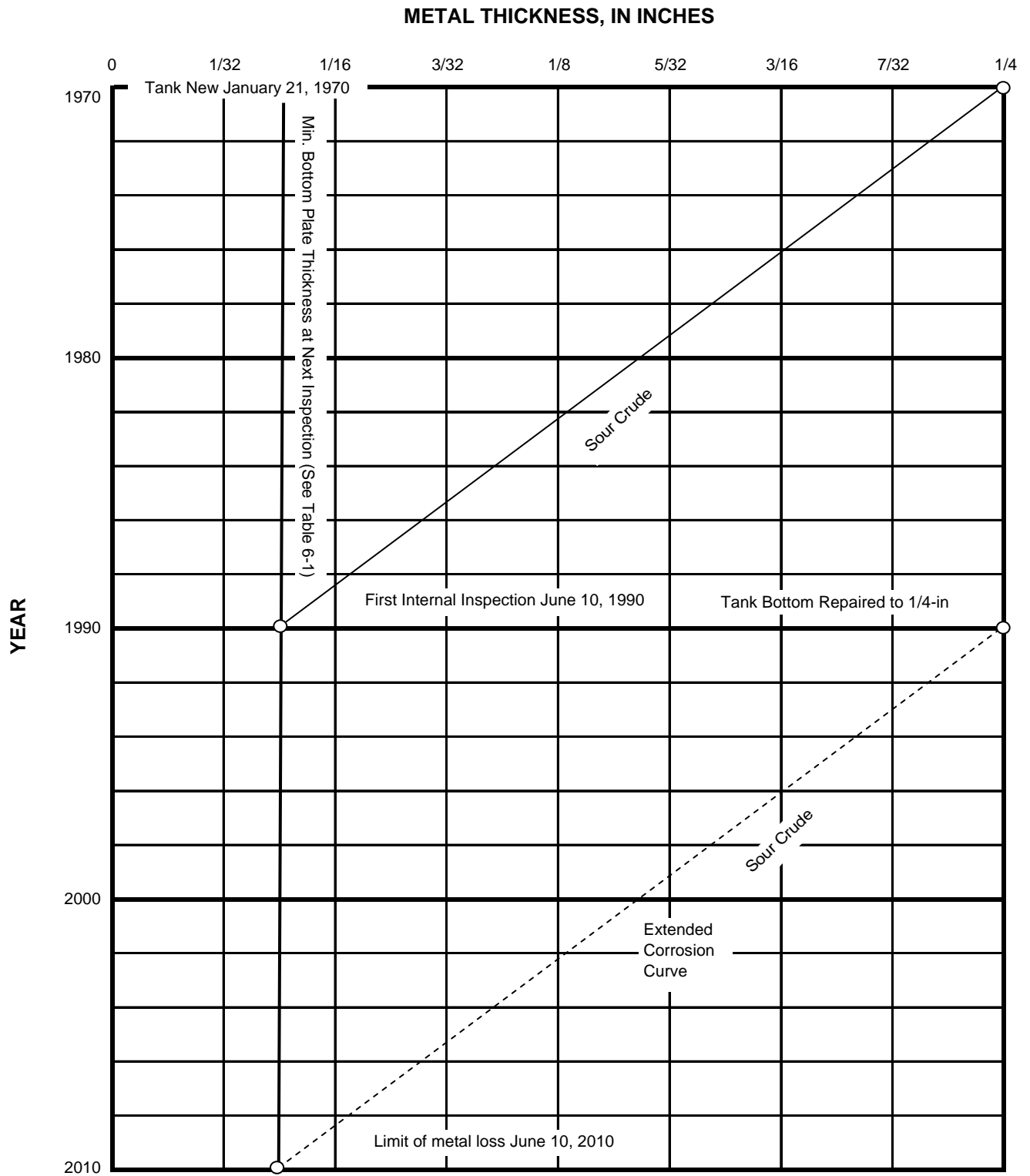
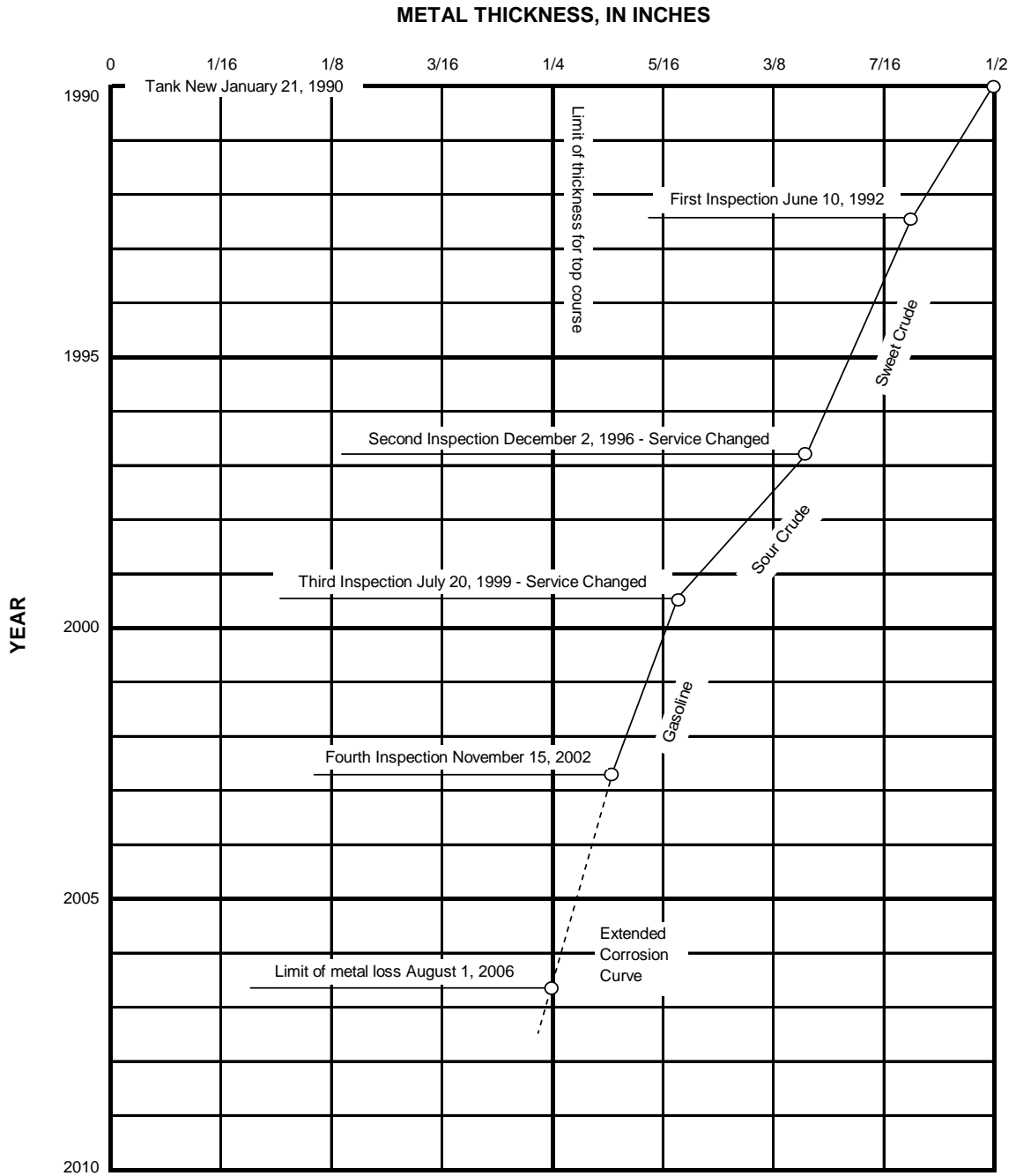


FIGURE H.3 – EXAMPLE CORROSION RATE CURVES FOR TOP COURSE OF STORAGE TANK



SIMILAR SERVICE ASSESSMENT - DATA SHEET

CONTROL TANK ID: _____ LOCATION: _____
 DIAMETER (FT): _____ HEIGHT (FT): _____ CAPACITY: _____ BBLs

CANDIDATE TANK ID: _____ LOCATION: _____
 DIAMETER (FT): _____ HEIGHT (FT): _____ CAPACITY: _____ BBLs

SECTION 1.0 - TANK BOTTOM (PRODUCT-SIDE) ASSESSMENT

H.1.1 TANK CHARACTERISTICS

| | Control Tank ¹ | Candidate Tank ² | MATCH ³ | | IF NO, SEE SEC. ⁴ |
|----------------------------|---------------------------|-----------------------------|--------------------------|--------------------------|---------------------------------|
| | | | Yes | No | |
| a. YEAR TANK ERECTED | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.1 |
| b. BOTTOM MATERIAL | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.2 |
| c. CORROSION ALLOWANCE | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.4 |
| d. BOTTOM LINING TYPE | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.5 |
| e. BOTTOM LINING THICKNESS | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.5 |
| f. BOTTOM LINING AGE | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.5 |

H.1.2 CURRENT SERVICE CONDITIONS:

| | Control Tank ¹ | Candidate Tank ² | MATCH ³ | | IF NO, SEE SEC. ⁴ |
|--------------------------------|---------------------------|-----------------------------|--------------------------|--------------------------|---------------------------------|
| | | | Yes | No | |
| a. CURRENT PRODUCT NAME | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.10 |
| b. PRODUCT CLASS. (TABLE H.1) | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.10 |
| c. SPECIFIC GRAVITY OF PRODUCT | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.10 |
| d. NORMAL OPERATING TEMP. | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.10 |
| e. WATER BOTTOM? | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.10 |
| f. SULFUR CONTENT | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.10 |
| g. TIME IN THIS SERVICE | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.10 |
| h. PRODUCT CORROSIVITY | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.10 |

H.1.3 PREVIOUS SERVICE CONDITIONS

| | Control Tank ¹ | Candidate Tank ² | MATCH ³ | | IF NO, SEE SEC. ⁴ |
|--------------------------------|---------------------------|-----------------------------|--------------------------|--------------------------|---------------------------------|
| | | | Yes | No | |
| a. PREVIOUS PRODUCT NAME | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.10 |
| b. PRODUCT CLASS. (TABLE H.1) | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.10 |
| c. SPECIFIC GRAVITY OF PRODUCT | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.10 |
| d. NORMAL OPERATING TEMP. | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.10 |
| e. WATER BOTTOM? | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.10 |
| f. SULFUR CONTENT | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.10 |
| g. TIME IN THIS SERVICE | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.10 |
| h. PRODUCT CORROSIVITY | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.10 |

H.1.4 CONCLUSIONS

- a. Does this assessment include additional assessment documentation (see H.2.1), YES or NO
- b. Based on the criteria reviewed in this Similar Service evaluation,
 Similar Service Is OR is NOT recommended for this tank (check appropriate box)
- c. The corrosion rate to be applied to the product side of the tank bottom is: _____ mpy.

COMMENTS:

NOTE: THE DATA SHEET SHALL BE MAINTAINED IN THE RECORD FILE AS PER SEC. 6.8.

ASSESSED BY: _____ DATE: _____

APPROVED BY: _____ DATE: _____
 (tank owner/operator)

NOTES:

1. The Control Tank is the tank for which service conditions and corrosion rates are well known.
2. The Candidate Tank is the tank to be compared to the Control Tank to determine if similar service concepts apply.
3. "Y" or "Yes" indicates that the Candidate Tank criterion essentially matches the Control Tank .
4. If the Candidate Tank criterion does not match the Control Tank criterion, see H.2.1.

SIMILAR SERVICE ASSESSMENT - DATA SHEET

CONTROL TANK ID: _____ LOCATION: _____
 DIAMETER (FT): _____ HEIGHT (FT): _____ CAPACITY: _____ BBLs
 CANDIDATE TANK ID: _____ LOCATION: _____
 DIAMETER (FT): _____ HEIGHT (FT): _____ CAPACITY: _____ BBLs

SECTION 2.0 - TANK BOTTOM (SOIL-SIDE) ASSESSMENT

H.2.1 TANK CHARACTERISTICS

| | Control Tank ¹ | Candidate Tank ² | MATCH ³ | | IF NO, SEE SEC. ⁴ |
|------------------------|---------------------------|-----------------------------|--------------------------|--------------------------|---------------------------------|
| | | | Yes | No | |
| a. YEAR TANK ERECTED | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.1 |
| b. BOTTOM MATERIAL | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.2 |
| c. CORROSION ALLOWANCE | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.4 |
| d. DOUBLE BOTTOM | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.7 |

H.2.2 SOIL/MATERIAL IN CONTACT WITH OR AROUND BOTTOM PLATE⁵

| | Control Tank ¹ | Candidate Tank ² | MATCH ³ | | IF NO, SEE SEC. ⁴ |
|--------------------------------------|---------------------------|-----------------------------|--------------------------|--------------------------|---------------------------------|
| | | | Yes | No | |
| a. SOIL TYPE | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.8 |
| b. SOIL pH | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.8 |
| c. SOIL ALKALINITY | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.8 |
| d. SOIL MOISTURE | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.8 |
| e. SOIL SALINITY | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.8 |
| f. SOIL CONDUCTIVITY | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.8 |
| g. OIL TYPE (if Oil Sand Foundation) | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.8 |
| h. SOIL CLEANLINESS | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.8 |

H.2.3 CURRENT OPERATING CONDITIONS

| | Control Tank ¹ | Candidate Tank ² | MATCH ³ | | IF NO, SEE SEC. ⁴ |
|-------------------------------------|---------------------------|-----------------------------|--------------------------|--------------------------|---------------------------------|
| | | | Yes | No | |
| a. NORMAL OPERATING TEMP. | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.10 |
| b. CATHODIC PROTECTION ⁵ | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.6 |
| c. PONDING/WATER | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.8 |

H.2.4 PREVIOUS OPERATING CONDITIONS

| | Control Tank ¹ | Candidate Tank ² | MATCH ³ | | IF NO, SEE SEC. ⁴ |
|-------------------------------------|---------------------------|-----------------------------|--------------------------|--------------------------|---------------------------------|
| | | | Yes | No | |
| a. NORMAL OPERATING TEMP. | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.10 |
| b. CATHODIC PROTECTION ⁵ | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.6 |
| c. PONDING/WATER | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.8 |

H.2.5 CONCLUSIONS

- a. Does this assessment include additional assessment documentation (see H.2.1), YES or NO
- b. Based on the criteria reviewed in this Similar Service evaluation,
Similar Service Is OR is NOT recommended for this tank (check appropriate box)
- c. The corrosion rate to be applied to the soil side of the tank bottom is: _____ mpy.

COMMENTS:

NOTE: THE DATA SHEET SHALL BE MAINTAINED IN THE RECORD FILE AS PER SEC. 6.8.

ASSESSED BY: _____ DATE: _____

APPROVED BY: _____ DATE: _____

(tank owner/operator)

NOTES:

1. The Control Tank is the tank for which service conditions and corrosion rates are well known.
2. The Candidate Tank is the tank to be compared to the Control Tank to determine if similar service concepts apply.
3. "Y" or "Yes" indicates that the Candidate Tank criterion essentially matches the Control Tank .
4. If the Candidate Tank criterion does not match the Control Tank criterion, see H.2.1.
5. See API 651, Section 5.3.

SIMILAR SERVICE ASSESSMENT - DATA SHEET

CONTROL TANK ID: _____ LOCATION: _____
 DIAMETER (FT): _____ HEIGHT (FT): _____ CAPACITY: _____ BBLs

CANDIDATE TANK ID: _____ LOCATION: _____
 DIAMETER (FT): _____ HEIGHT (FT): _____ CAPACITY: _____ BBLs

SECTION 3.0 - TANK SHELL (PRODUCT-SIDE) ASSESSMENT

H.3.1 TANK CHARACTERISTICS

| | Control Tank ¹ | Candidate Tank ² | MATCH ³ | | IF NO, SEE SEC. ⁴ |
|---------------------------|---------------------------|-----------------------------|--------------------------|--------------------------|---------------------------------|
| | | | Yes | No | |
| a. YEAR TANK ERECTED | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.1 |
| b. SHELL MATERIAL | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.3 |
| c. CORROSION ALLOWANCE | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.4 |
| d. SHELL LINING TYPE | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.5 |
| e. SHELL LINING THICKNESS | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.5 |
| f. SHELL LINING AGE | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.5 |

H.3.2 AMBIENT CONDITIONS:

| | Control Tank ¹ | Candidate Tank ² | MATCH ³ | | IF NO, SEE SEC. ⁴ |
|---------------------------|---------------------------|-----------------------------|--------------------------|--------------------------|---------------------------------|
| | | | Yes | No | |
| a. LOW ONE DAY MEAN TEMP. | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.9 |
| b. EXPOSURE TO SALT AIR | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.9 |

H.3.3 CURRENT SERVICE CONDITIONS:

| | Control Tank ¹ | Candidate Tank ² | MATCH ³ | | IF NO, SEE SEC. ⁴ |
|--------------------------------|---------------------------|-----------------------------|--------------------------|--------------------------|---------------------------------|
| | | | Yes | No | |
| a. CURRENT PRODUCT NAME | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.10 |
| b. PRODUCT CLASS. (TABLE H.1) | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.10 |
| c. SPECIFIC GRAVITY OF PRODUCT | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.10 |
| d. REID VAPOR PRESSURE @ 60°F | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.10 |
| e. NORMAL OPERATING TEMP. | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.10 |
| f. INERT GAS BLANKET? | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.10 |
| g. WATER BOTTOM? | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.10 |
| h. SULFUR CONTENT | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.10 |
| i. TIME IN THIS SERVICE | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.10 |
| j. PRODUCT CORROSIVITY | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.10 |

H.3.4 PREVIOUS SERVICE CONDITIONS

| | Control Tank ¹ | Candidate Tank ² | MATCH ³ | | IF NO, SEE SEC. ⁴ |
|--------------------------------|---------------------------|-----------------------------|--------------------------|--------------------------|---------------------------------|
| | | | Yes | No | |
| a. PREVIOUS PRODUCT NAME | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.10 |
| b. PRODUCT CLASS. (TABLE H.1) | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.10 |
| c. SPECIFIC GRAVITY OF PRODUCT | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.10 |
| d. REID VAPOR PRESSURE @ 60°F | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.10 |
| e. NORMAL OPERATING TEMP. | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.10 |
| f. INERT GAS BLANKET? | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.10 |
| g. WATER BOTTOM? | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.10 |
| h. SULFUR CONTENT | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.10 |
| i. TIME IN THIS SERVICE | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.10 |
| j. PRODUCT CORROSIVITY | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.10 |

H.3.5 CONCLUSIONS

- a. Does this assessment include additional assessment documentation (see H.2.1), YES or NO
- b. Based on the criteria reviewed in this Similar Service evaluation, Similar Service Is OR is NOT recommended for this tank (check appropriate box)
- c. The corrosion rate to be applied to the product side of the tank shell is: _____ mpy.

COMMENTS:

SIMILAR SERVICE ASSESSMENT - DATA SHEET

NOTE: THE DATA SHEET SHALL BE MAINTAINED IN THE RECORD FILE AS PER SEC. 6.8.

SUBMITTED BY: _____ DATE: _____

APPROVED BY: _____ DATE: _____

NOTES:

1. The Control Tank is the tank for which service conditions and corrosion rates are well known.
2. The Candidate Tank is the tank to be compared to the Control Tank to determine if similar service concepts apply.
3. "Y" or "Yes" indicates that the Candidate Tank criterion essentially matches the Control Tank .
4. If the Candidate Tank criterion does not match the Control Tank criterion, see H.2.1.

SIMILAR SERVICE ASSESSMENT - DATA SHEET

CONTROL TANK ID: _____ LOCATION: _____
 DIAMETER (FT): _____ HEIGHT (FT): _____ CAPACITY: _____ BBLs

CANDIDATE TANK ID: _____ LOCATION: _____
 DIAMETER (FT): _____ HEIGHT (FT): _____ CAPACITY: _____ BBLs

SECTION 4.0 - TANK SHELL (EXTERNAL SIDE) ASSESSMENT

H.4.1 TANK CHARACTERISTICS

| | Control Tank ¹ | Candidate Tank ² | MATCH ³ | | IF NO, SEE SEC. ⁴ |
|-------------------------|---------------------------|-----------------------------|--------------------------|--------------------------|---------------------------------|
| | | | Yes | No | |
| a. YEAR TANK ERECTED | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.1 |
| b. SHELL MATERIAL | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.3 |
| c. CORROSION ALLOWANCE | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.4 |
| d. INSULATION TYPE | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.4 |
| e. INSULATION THICKNESS | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.4 |
| f. INSULATION AGE | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.4 |
| g. COATING TYPE | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.4 |
| h. COATING THICKNESS | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.4 |
| i. COATING AGE | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.4 |

H.4.2 AMBIENT CONDITIONS:

| | Control Tank ¹ | Candidate Tank ² | MATCH ³ | | IF NO, SEE SEC. ⁴ |
|---------------------------|---------------------------|-----------------------------|--------------------------|--------------------------|---------------------------------|
| | | | Yes | No | |
| a. LOW ONE DAY MEAN TEMP. | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.9 |
| b. EXPOSURE TO SALT AIR | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.9 |

H.4.3 CURRENT OPERATING CONDITIONS:

| | Control Tank ¹ | Candidate Tank ² | MATCH ³ | | IF NO, SEE SEC. ⁴ |
|---------------------------|---------------------------|-----------------------------|--------------------------|--------------------------|---------------------------------|
| | | | Yes | No | |
| a. PONDING/WATER | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.10 |
| b. NORMAL OPERATING TEMP. | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.10 |

H.4.4 PREVIOUS OPERATING CONDITIONS

| | Control Tank ¹ | Candidate Tank ² | MATCH ³ | | IF NO, SEE SEC. ⁴ |
|---------------------------|---------------------------|-----------------------------|--------------------------|--------------------------|---------------------------------|
| | | | Yes | No | |
| a. PONDING/WATER | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.10 |
| b. NORMAL OPERATING TEMP. | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | H.2.1.10 |

H.4.5 CONCLUSIONS

- a. Does this assessment include additional assessment documentation (see H.2.1), YES or NO
- b. Based on the criteria reviewed in this Similar Service evaluation,
 Similar Service Is OR is NOT recommended for this tank (check appropriate box)
- c. The corrosion rate to be applied to the ambient side of the tank shell is: _____ mpy.

COMMENTS:

NOTE: THE DATA SHEET SHALL BE MAINTAINED IN THE RECORD FILE AS PER SEC. 6.8.

ASSESSED BY: _____ DATE: _____

APPROVED BY: _____ DATE: _____

(tank owner/operator)

NOTES:

1. The Control Tank is the tank for which service conditions and corrosion rates are well known.
2. The Candidate Tank is the tank to be compared to the Control Tank to determine if similar service concepts apply.
3. "Y" or "Yes" indicates that the Candidate Tank criterion essentially matches the Control Tank .
4. If the Candidate Tank criterion does not match the Control Tank criterion, see H.2.1.

SIMILAR SERVICE ASSESSMENT - DATA SHEET

CONTROL TANK ID: _____ LOCATION: _____
 DIAMETER (FT): _____ HEIGHT (FT): _____ CAPACITY: _____ BBLS

CANDIDATE TANK ID: _____ LOCATION: _____
 DIAMETER (FT): _____ HEIGHT (FT): _____ CAPACITY: _____ BBLS

SECTION 5.0 - CONCLUSION SUMMARY

- a. From Section 1.0, the corrosion rate to be applied to the product-side of the tank bottom is: _____ mpy.
- b. From Section 2.0, the corrosion rate to be applied to the soil-side of the tank bottom is: _____ mpy.
- c. From Section 3.0, the corrosion rate to be applied to the product-side of the tank shell is: _____ mpy.
- d. From Section 4.0, the corrosion rate to be applied to the external side of the tank shell is: _____ mpy.
- e. Based on the corrosion rates applied, the next internal inspection for this tank will be completed in Year _____.

COMMENTS:

NOTE: THE DATA SHEET SHALL BE MAINTAINED IN THE RECORD FILE AS PER SEC. 6.8.

ASSESSED BY: _____ DATE: _____

APPROVED BY: _____ DATE: _____
 (tank owner/operator)