Answer Key
for
The Inspector's Calc's Exercises

Exercise 1: Calculate the Corrosion Rate

$$CR = \frac{0.400 - 0.260}{2003 - 1983} = \frac{0.14}{20} = 0.007 \text{ ipy}$$

Exercise 2: Another Corrosion Rate Calculation

$$CR = \frac{0.750 - 0.675}{2003 - 1988} = \frac{0.075}{15} = 0.005 \text{ ipy}$$

Exercise 3: Calculate the Corrosion Rate with Mils

$$CR = \frac{480 - 410}{2003 - 1981} = \frac{70}{22} = 3.2 \text{ mpy}$$

What is this Corrosion Rate in "ipy"? 0.0032 ipy

Exercise 4: Convert Months to Years

	Date	Month #	Fractional Year	Decimal Year	Total Years
1	April 1988	4^{th}	4/12	0.33	1988.33
2	Feb. 1995	2^{nd}	2/12	0.17	1995.17
3	June 2001	6^{h}	6/12	0.5	2001.5
4	Nov. 1997	11^{th}	11/12	0.92	1997.92

Exercise 5: Calculate a Corrosion Rate with "Odd" Months

Step 1 - Convert the months to years.

September 2003 = **9/12 = 0.75 = 2003.75**

April 1999 = **4/12 = 0.33 = 1999.33**

Step 2 - Calc Corrosion Rate

$$CR = \frac{0.565 - 0.521}{2003.75 - 1999.33} = \frac{0.044}{4.42} = 0.010 \text{ ipy}$$

Exercise 6: Calculate the Remaining Life

$$Life = \frac{0.198 - 0.150}{0.007} = \frac{0.048}{0.007} = 6.9 \text{ yrs}$$

Exercise 7: Another Remaining Life

$$Life = \frac{0.211 - 0.150}{0.003} = \frac{0.061}{0.003} = 20.3 \text{ yrs}$$

Exercise 8: Calculate the Next Inspection Date

Step 1 - Calculate the Interval

Interval = Lesser of: ½ life or 10 years
= Lesser of: 14 x ½ = 7 years or 10 years
= 7 years

Step 2 - Calculate the Next Inspection Date (NID)

NID = Last Inspection Date + interval
= March 2003 + 7 years
= March 2010

Exercise 9: Calculate the Next Inspection Date

	Last Insp Date	Last Insp Date (number)	Remaining Life (yrs)	Inspection Interval (yrs)	Next Insp Date (number)	Convert Partial Yr to Months	Next Insp Date
V-10	April 2001	2001.33	18.7	9.35	2010.68	8.16	Aug 2010
V-20	Feb. 2002	2002.17	9	4.5	2006.67	8.04	Aug 2006
V-30	Sept 2003	2003.75	5.5	2.75	2006.5	6	June 2006
V-40	Nov. 2001	2001.92	20	10	2011.92	11.04	Nov 2011
V-50	May 2003	2003.42	11.2	5.6	2009.02	0.24	Jan 2009

Exercise 10: Short & Long-Term Corrosion Rates

Step 1 - Calculate Short-Term Corrosion Rate

$$ST\ Rate = \frac{0.742 - 0.718}{2003 - 1997} = \frac{0.024}{6} = 0.004 \text{ ipy}$$

Step 2 - Calculate Long-Term Corrosion Rate

$$LT\ Rate = \frac{0.750 - 0.718}{2003 - 1990} = \frac{0.032}{13} = 0.0025 \text{ ipy}$$

Step 3 - Pick the Controlling Corrosion Rate (the highest)

0.004 ipy

Step 4 - Calculate Remaining Life

$$Life = \frac{0.718 - 0.640}{0.004 \text{ ipy}} = 19.5 \text{ years}$$

Exercise 11: The Monster Calc

Step 1 - Convert Dates to Numbers

Feb 2003 = 2003-2/12 = 2003.17

May 1997 = 1997-5/12 = 1997.42

Nov 1985 = 1985-11/12 = 1985.92

Step 2 - Calculate Short-Term Corrosion Rate

$$ST\ Rate = \frac{0.296 - 0.288}{2003.17 - 1997.42} = \frac{0.008}{5.75} = \mathbf{0.0014\ ipy}$$

Step 3 - Calculate Long-Term Corrosion Rate

$$LT\ Rate = \frac{0.322 - 0.288}{2003.17 - 1985.92} = \frac{0.034}{17.25} = \mathbf{0.002\ ipy}$$

Step 4 - Pick the Controlling Corrosion Rate (the highest)

0.002 ipy

Step 5 - Calculate Remaining Life

$$Life = \frac{0.288 - 0.212}{0.002\ ipy} = \mathbf{38\ years}$$

Step 6 - Calculate Inspection Interval

Lesser of ½ life or 10 years

38 x ½ = 19, or 10 years = ***10 years***

Step 7 - Calculate the Next Inspection Date (NID)

Last Inspection Date + Interval = 2003.17 + 10 = ***2013.17***

Step 8 - Convert Partial Year to Month

0.17 x 12 = 2.04 = ***February***

Step 9 - Final Answer:

February 2013