

**SAFETY AND ENFORCEMENT DIVISION DR 002**  
**SOCALGAS/SDG&E RAMP I.19-11-010/-011 (cons.)**  
**DATE RECEIVED: JANUARY 9, 2020**  
**DATE RESPONDED: JANUARY 15, 2020**

**SED Data Request 002, Question 1: Chapter SCG-1-C1 Cathodic Protection**

- a. What cost value in dollars was used to determine the RSE of 5.06 for this Control?
- b. How does that cost relate to the figures given for cost in Table 6?
- c. Please confirm the single point Risk Score delta (pre minus post mitigation score) = (1581.09 - 2064.67) \* 100000 = -48,358,000?
- d. This Risk Score delta with an RSE of 5.06 indicates the Cost [in Millions] is then = (risk delta)/RSE = \$9,556,917 Million?
- e. It seems there are some powers of 10 errors somewhere?
- f. Please demonstrate the calculation of the RSE = 5.06 with all formulas and values.

**SoCalGas Response:**

- a. Forecasted costs for SCG-1-C1 were used to determine the RSE, which were comprised of Test Year 2022 O&M costs of \$19.09 Million, 2020 capital costs of \$10.01 Million, 2021 capital costs of \$10.94 Million, and 2022 capital costs of \$11.86 Million.
- b. SoCalGas' 2019 RAMP report presents costs in ranges. The costs provided in SCG-1 Table 6 are direct charges and do not include company loaders, with the exception of vacation and sick. The costs are also in 2018 dollars and have not been escalated to 2019 amounts. In Table 6, low and high cost ranges are shown in rounded figures. The costs used for the RSE calculation is a single point within that range.
- c. Risk Score delta (pre minus post mitigation score) = (1581.09 - 2064.67) = -483.58. Both 1581.09 and 2064.67 were already multiplied by 100,000.
- d. The formula for RSE calculation is:

$$RSE = \frac{\sum_{i=1}^3 PV_i(\text{Discount factor}, \text{Project Life}, (\text{Post-Mitigation Risk Score} - \text{Pre-Mitigation Risk Score}) \times \frac{\text{O\&M} + \text{Capital Cost}_i}{\text{Total Cost of Mitigation}})}{-(1 + \text{Discount Factor})^{i-1} \times \text{Total Cost of Mitigation}}$$

The discount factors and project life were also applied in the RSE calculation.

- e. In Table 6, forecasted cost ranges are shown in thousands of dollars. The costs used for the RSE calculation are in millions.
- f. The formula for RSE calculation is:

$$RSE = \frac{\sum_{i=1}^3 PV_i(\text{Discount factor}, \text{Project Life}, (\text{Post-Mitigation Risk Score} - \text{Pre-Mitigation Risk Score}) \times \frac{\text{O\&M} + \text{Capital Cost}_i}{\text{Total Cost of Mitigation}})}{-(1 + \text{Discount Factor})^{i-1} \times \text{Total Cost of Mitigation}}$$

Where,

O&M cost (in \$Million) = \$19.09

Capital Cost<sub>1</sub> for 2020 (in \$Million) = \$10.01

Capital Cost<sub>2</sub> for 2021 (in \$Million) = \$10.94

Capital Cost<sub>3</sub> for 2021 (in \$Million) = \$11.86

Discount Factor = 3%

Project Life = 1 year

Pre-Mitigation Risk Score = 542 \* 2.92 = 1581.09

Post-Mitigation Risk Score = 707.77 \* 2.92 = 2064.67

$$\frac{\sum_{i=1}^3 PV_i(3\%, 1, (2064.67 - 1581.09) \times \frac{\$19.09M + \text{Capital Cost}_i}{\$19.09M \times 3 + (\$10.01M + \$10.94M + \$11.86M)})}{-(19.09 + 10.01 + 10.94 + 11.86)} \div (1 + 3\%)^{i-1} = 5.06$$

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**SED Data Request 002, Question 2: Chapter SCG-1-C-8 Sewer Lateral Inspection Program (SLIP)**

I understand the Risk Score delta is negative because the RSE is representing the increased risk if the Control was not applied, so the Cost is actually a cost savings if the Control was not applied. The cost forecast for this Control is purely O&M Expense, no Capital. Because some of the results given in the chapter don't agree with my application of the SCG formulas please answer the following or explain as indicated.

- a. The Pre-Mitigation Risk Score is the product of LoRE x CoRE = 542 x 2.92 = 1582.64, correct?
- b. The Post-Mitigation LoRE x CoRE should be 1584.246 correct?
- c. Then the single-point Risk Score delta is equal to (1582.64 – 1584.246) \* 100000 = -1,606,000, correct?
- d. The three-year forecasted cost from Table 6 is 3 x \$12,000, or \$36 Million. Correct?
- e. Then RSE = Risk Score delta divided by total 3-year O&M Cost in Millions = -160,600 / - \$36M = 4,444.44, correct?
- f. Overall there appears to be an error in the given RSE of 4.46 by a factor of 1000. Is that correct?

**SoCalGas Response:**

- a. The Pre-Mitigation Risk Score was the product of LoRE x CoRE = 542 x 2.917144 = 1581.09. The difference mentioned in the question is due to rounding.
- b. The Post-Mitigation Risk Score was the product of LoRE x CoRE = 542.55 x 2.917144 = 1582.70. The difference mentioned in the question is due to rounding.
- c. The single-point Risk Score delta was equal to (1581.09 – 1582.70) = -1.61. The Risk Scores were already multiplied by 100,000.
- d. The three-year forecasted cost was 3 x \$10.07M, or \$30.21M. In SCG-1 Table 6, forecasted costs are shown in ranges.
- e. No that is not correct; the discount factor and project life were also applied in the RSE calculation. The formula for the RSE calculation is:

$$RSE = \frac{\sum_{i=1}^3 PV_i(Discount\ factor, Project\ Life, Post-Mitigation\ Risk\ Score - Pre-Mitigation\ Risk\ Score)}{-(1 + Discount\ Factor)^{i-1} \times Total\ Cost\ of\ Mitigation}$$

- f. In Table 6, forecasted costs are shown in thousands of dollars. The costs used for the RSE calculation are in millions. Per the formula in Part E above, O&M cost (in \$Million) = \$10.07, Discount Factor = 3%, Project Life = 67 years, Pre-Mitigation Risk Score = 1581.09, Post-Mitigation Risk Score = 1582.70, the RSE is 4.46.

$$\frac{\sum_{i=1}^3 PV_i(3\%, 67, 1582.70 - 1581.09)}{-(1 + 3\%)^{i-1} \times (3 \times \$10.07M)} = 4.46$$

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**SED Data Request 002, Question 3: Chapter SCG-1-C-9 Distribution Riser Inspection Project (DRIP)**

The Risk Score values do not agree with the result of multiplying the LoRE and CoRE values.

- a. Pre-mitigation LoRE of 542 x CoRE of 2.92 = 1582.64, not 1581.09 as given in the Chapter. Why the difference?
- b. Post-mitigation LoRE of 543.28 x 2.92 = 1586.38, not 1584.83. Why is this different?
- c. However, the Risk Score delta = -374,000, is the same for both sets of numbers. Please confirm.
- d. Then the RSE given of 6.21 indicates a cost in Millions of (risk delta / RSE) = 374,000 / 6.21 or \$60,225 Million?
- e. Confirm - The cost in Table 6 is given as \$19,000,000 a year or \$57 Million total, not \$57,000 Million.

**SoCalGas Response:**

- a. The Pre-Mitigation Risk Score was the product of LoRE x CoRE = 542 x 2.917144 = 1581.09. The difference mentioned in the question is due to rounding.
- b. The Post-Mitigation Risk Score was the product of LoRE x CoRE = 543.28 x 2.917144 = 1584.83. The difference mentioned in the question is due to rounding.
- c. Yes, they are the same for both sets of numbers. The risk delta was (1581.092-1584.825) = -3.73.
- d. Besides the Risk Score delta, the discount factor and project life were also applied in the RSE calculation. Discount factor was 3%, project life was 67 years, and the cost of mitigation was 3 x \$16.787M, or \$50.362M. The formula for the RSE calculation is:

$$RSE = \frac{\sum_{i=1}^3 PV_i(\text{Discount factor}, \text{Project Life}, \text{Post-Mitigation Risk Score} - \text{Pre-Mitigation Risk Score})}{-(1 + \text{Discount Factor})^{i-1} \times \text{Total Cost of Mitigation}}$$

$$\frac{\sum_{i=1}^3 PV_i(3\%, 67, 1584.83 - 1581.09)}{-(1 + 3\%)^{i-1} \times (3 \times \$16.787M)} = 6.21$$

- e. Correct; it is \$57M total, not \$57,000M. In Table 6, forecasted cost ranges are shown in thousands of dollars. O&M costs are presented for the projected GRC test year (2022) and are shown in a range of \$15M to \$19M. Therefore, the three-year (2020 – 2022) total O&M cost forecast would be \$45M to \$57M.