**Business Case**

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| **Project Name:** SF RAS Descoping Project | **Line of Business:** Transmission Operations |
| **Executive Sponsor:** Wade Smith | **Business Owner:** Stephanie Carstairs |
| **Program Manager**: Rico Garcillano | **Project Manager:** Sutton Smiley |
| **Department:** RAS Ops | **Division/Area:** Multiple |
| **Start Date:** 07/01/2021 | **Completion Date**: 3/31/2022 |
| **Approval Gate:** 1 of 1 | **WBS or Order#:** T.0007421 |
| **Project Team Members:** RAS Operations: Lyle Dixson, Kimberly Castro, Enes Muftic, Thu Duong. Sherrick Slattery, Dennis Dillon, Rico Garcillano  System Protection: Rafael Pineda  Substation Engineering: TBD  Telecom: Adam Fowler  Transmission Ops: Joanna Chong  Project Management: Sutton Smiley, Huiling Han  Construction: Ray Handyside, Eric Burke, Brian Stansbury  Test: Mike Ruiz | |
| **Action Recommended:**  Business Applications - RAS Operations recommends that the Interim Vice President of Transmission Operations approve an expenditure of $1.3 million, which includes $0.4 million or 30% in contingency, to descope the SF RAS controller logic due to a reduction of outages the scheme will protect against. This descoping effort was reviewed and approved by multiple internal stakeholders as well the CAISO.  **Project Cost Summary (x1000)**   |  |  | | --- | --- | | **Costs** | **Project Authorization** | | Base Estimate | $630 | | Risk Allowance | $270 | | Expected Case | $900 | | Risk Contingency | $100 | | Class Contingency | $301 | | Total Contingency | $401 | | High Case Estimate | $1,301 | | |

1. **Project Objective Statement**

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| De-scope the San Francisco Remedial Action Scheme System (SF RAS) by December 2021 for less than $1.3 million. |

1. **Strategic Objective**

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| Simplify SF RAS by limiting the monitored events to only extreme events identified in the Transmission Planning Reliability (TPL) standards and supported by California Independent System Operator (CAISO) planning coordinator. |

1. **Background**

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| Electric load in San Francisco and northern San Mateo County is served from the south by numerous 230kV, 115kV, and 60kV transmission lines supplied from San Mateo Substation and the Jefferson-Martin 230kV underground line.  Extreme contingencies such as the 1989 Loma Prieta earthquake and the December 8, 1998 San Francisco outage originating from San Mateo could cause a partial or complete loss of generation and transmission. These scenarios could lead to a complete blackout of the area if no special protection systems are deployed to limit the extent of the outage. The SF RAS system was installed to provide additional protection to the electric grid and to customers during these extreme outages.  Since the December 8, 1998 Event, PG&E has made and continues to make significant system upgrades to the transmission system along the SF Peninsula. These projects include, but are not limited to capacity increase jobs such as the Jefferson-Martin cable, the AP-1, the HP-4, and most recently the ZA-1 as well as bus reliability jobs such as the BAAH conversions at Martin Sub., Mission Sub., San Mateo Sub. and Embarcadero Sub. Given these system upgrades coupled with the fact that SF RAS is not required to meet any NERC reliability requirements, an effort to either retire or descope SF RAS was presented to the CAISO. While a full retirement of the scheme was not supported by the CAISO, a descoping effort to minimize the outage scenarios that the scheme will protect against down to 8 extreme events that be tied back to the NERC TPL standard (note: TPL extreme events must be studied, but are optional to mitigate). |

1. **Scope**

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| * Review and revise key events/significant scenarios based off of CAISO recommendations. Re-program controller based on events. * Updating scheme due to the following completed projects:   + Embarcadero – Potrero   + East Grand   + Hunters Point distribution changes * Upgrade IT communication equipment as needed to support project. * This project excludes the de-commissioning of SF RAS A. This scope will be covered under the RAS relocation project (74035421). |

1. **Success Criteria**

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| * Zero injuries, zero reliability issues (inadvertent trip signals) and zero environmental notice of violation during construction * Project released to operations by December 31, 2021 and closed out by March 31, 2022 * Scheme released to operations successfully * Updated Description of Operations (DOO) approved prior to release for service * Completion of the project within authorized financial cost * Complete recovery of project cost through FERC |

1. **Project Implementation Plan**

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| **Description of the Phases and Key Milestones/Deliverables** | **Actual/Forecast Completion Date** |
| Project Kickoff | 8/1/2021 |
| Project Walkdown | 8/15/2021 |
| Scope Approved | 8/31/2021 |
| JE Approved | 10/1/2021 |
| Engineering Start | 9/1/2021 |
| Engineering End | 10/31/2021 |
| Construction Start | 11/1/2021 |
| Construction End | 12/31/2021 |
| Forecast In-Service Date (FISD) | 12/31/2021 |
| Project Closed | 3/31/2022 |

1. **Regulatory Cost Recovery and Treatment**

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| The project costs are expected to be included in the PG&E’s base utility revenue requirement when it becomes operational in 2021. The Company expects to recover these costs through its Federal Energy Regulatory Commission Transmission Owner’s (TO) Rate Case, and to earn the authorized return on equity established in that proceeding. |

1. **Funding Status**

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| This project is funded by Major Work Category 63, Electric Transmission System Operations. Approximately $0.76 million has been allocated in the 2021 budget for the Embarcadero – Potrero orders 74015908 & 74016063. This budget will be transferred to order 5797502. |

1. **Project Forecast ($000s)**

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| **Project Costs ($000s)** | **Prior Year Costs** | **2021** | **2022** | **2023** | **Future Year(s)** | **Total** |
| Base Estimate | $ - | $ 630 | $ - | $ - | $ - | $ 630 |
| Contingency | $ - | $ 270 | $ - | $ - | $ - | $ 270 |
| Total Authorized Expected Case | $ - | $ 900 | $ - | $ - | $ - | $ 900 |
| **Total High Case *(for information only)*** | $ 1,300 |  |  |  |  |  |

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| ***Cost Assumptions:***   * AFUDC, material burden, A&G overhead and costs escalation factors are based on current PG&E Capital Accounting Guidelines * Project released to operations by December 2021 |

1. **Cost History Explanation**

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| The SF RAS scope that was funded by the Embarcadero – Potrero (ZA-1) project has evolved to the point that the ZA-1 project is no longer the appropriate funding source for this scope. Transmission Planning and RAS Operations agreed that the ZA-1 project will bear the costs from project inception until 12/31/2020, and all costs from 1/1/2021 onwards will be borne by this SF RAS de-scoping project.  Year-to-date actuals are $300k against the Embarcadero – Potrero (ZA-1) project that will be transferred to this de-scope order number (5797502). This includes IT re-engagement for verification of equipment prior to scheme functional testing, troubleshooting of equipment, re-studying key events, and re-programming control logic. |

1. **Financial Benefits ($000s)**

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| ***Financial Benefits Assumptions:***  This project is not expected to produce any hard financial benefits.  Soft benefits include:   * Easier to define SF RAS scope (i.e. basecases, event detection, etc.) resulting in simpler scheme modifications that can be more readily identified for future projects * More efficient maintenance/troubleshooting of RAS controller logic * A significant reduction in outage event detection will simplify future planning and operational studies |

1. **Issues and Risks**

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| **Risk Description** | **Probability of Occurrence (H, M, L)** | **Impact on Scope and Schedule** | **Impact on Cost** | **Mitigation Strategy / Contingency Plan** |
| Re-assignment of key resources | L | M | $30k in AFUDC (3 month delay) | **Mitigation:** Confirm availability with resource supervisors to support project.  **Contingency:** Escalate resource conflicts with Leadership to align prioritization. |
| Full Functional Testing is delayed | H | M | $30k in AFUDC (3 month delay) | **Mitigation**: Engage team members to ensure full participation in preparation of testing  **Contingency**: Work with Leadership to prioritize resources to re-schedule testing. Worst case re-schedule functional test. |
| Telecom dependencies delay | H | M | $40k | **Mitigation**: Hold bi-weekly team meetings to monitor progress and communicate deadlines  **Contingency**: Authorize overtime or accelerated material procurement; seek reassignment of telecom resources |

1. **Flexibility Matrix**

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|  | **Least Flexible** | **Moderately Flexible** | **Most Flexible** | **Comments** |
| **Schedule** |  |  | X | Project schedule is the most flexible and will adapt to resource availability. |
| **Scope** | X |  |  | Key events for SF RAS are still being finalized with CAISO, once approved there will be little room for variance to the Scheme. |
| **Resources** |  | X |  | Reassignment of most resources will cause a schedule delay, but will not generally jeopardize project success. RAS Ops engineers have significant other capital project workload during the descoping. |

1. **Impacted Metrics**

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| The completion of this project allows for a smaller and simpler scheme to maintain and update, leading to more cost effective maintenance over the long run. |

1. **Environmental Impact**

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| No significant environmental impact is anticipated. The new equipment will be located within existing control center computer rooms and at substation control rooms. |

1. **Approval Plan**

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| **Approval/Gate/ Reauthorization** | **Date** | **Approved or**  **Forecast**  **($000s)** | **AACE**  **Class** | **Forecast at Completion**  **($000s)** | **Approval/Gate Description**  **Reason for Reauthorization**  **Reason for Increase to Total Cost** |
| 1) Full Authorization | 8/31/2021 | 1,300 | 3 | 800 | Full Authorization for total project spend. The project progress has matured significantly under previous project (Embarcadero – Potrero), full project funding is requested to take project into functional testing and completion. |

1. **Additional Information**

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| * The RC West reliability review and approval of the changes to the key events is scheduled for 7/27/21, which will be the formal approval for the changes funded by this Business Case. * Embarcadero – Potrero project has been supporting the SF RAS changes from 2013 until the present date. SF RAS has evolved due to other projects affecting the San Francisco & Peninsula load flow, the project team has determined that Embarcadero – Potrero is no longer the appropriate funding source for the RAS changes. As a result, this project has been created to fund the remaining changes and the de-scope efforts. All costs from 1/1/21 onwards will be transferred from Embarcadero – Potrero to the de-scope project. * The de-scope project assumes that SF RAS A will be decommissioned as part of a separate project (74035421) and the de-scope project (T.0007421) will be re-purposing material from SFCC for VGCC. |

1. **Line of Business Specific**

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| N/A |