Item I:

Detailed justification of the **recommended solution** as the best solution, including an explanation of how the proposed project ranks in the SCE capital investment portfolio of infrastructure upgrades

Response to Item I:

1.0 Summary

Southern California Edison (SCE) recommends the Alberhill System Project (ASP) as the best solution to meet the needs of the Valley South System. This and eight other supplemental data request submittals[1] prepared and filed to supplement the ASP proceeding record, demonstrate that a comprehensive system solution is needed now to satisfy the capacity, reliability and resiliency issues in the Valley South System. These data request submittals also show that the ASP is superior to all other alternatives in meeting the Project Objectives detailed in SCE's ASP Application. This conclusion is based on: 1) ASP's superior performance in meeting identified capacity, reliability and resiliency needs over both near term and long term horizons as measured by a set of objective system performance metrics; 2) the cost effectiveness of ASP as demonstrated in a cost-benefit analysis; 3) consideration of option value and risk by evaluating the sensitivity of results to uncertainty and volatility in future load growth and alternative DER development and cost scenarios; and 4) challenges with implementation of alternatives other than ASP to meet imminent near term needs. Overall, ASP is a cost-effective, robust solution that limits the risk of service disruptions to SCE customers during normal and abnormal electrical system events or conditions and minimizes risk of potential delays in implementing an adequate system solution. A detailed justification for these conclusions is summarized below.

Regarding the request for SCE to rank ASP among other projects in its capital investment portfolio, SCE notes that it does not formally rank proposed projects across capital programs or for purposes of system planning. Rather, each project is considered on its own merits relative to the established project need. However, given the unique combination of capacity, reliability, and resiliency challenges currently facing the Valley South System, implementing a project to address these challenges is among the highest priorities for SCE.

2.0 Project Need

The Valley South System requires a comprehensive solution now to address its distinct system needs. The system has evolved through a series of short-term solutions to address a period of rapid load growth in the region[2] and is now critically deficient in its capacity, reliability, and resiliency. Specifically, the Valley South System capacity margin, under normal system

[1] See DATA REQUEST SET ED-Alberhill-SCE-JWS-2 Items B, D, E and H, and DATA REQUEST SET ED-Alberhill-SCE-JWS-4 Items A, C, F and G.
[2] See Appendix B of DATA REQUEST SET ED-Alberhill-SCE-JWS-4 Item C.

conditions with all facilities in service, is already inadequate[3], and requires SCE to place a spare transformer in service during times of peak load as a mitigation measure. This capacity margin is projected to be zero by 2022[4] as growth continues. The area served by the Valley South System is still developing, with about 100 square miles of greenfield land (25% of the area served by the system) designated for future development. Further, the characteristics of the Valley South System, primarily its lack of system tie-lines and very large number of customers served from the Valley Substation, are unique within the SCE system and make it the most vulnerable SCE subtransmission system[5] to future reliability and resiliency problems. These unique characteristics threaten the Valley South System's ability to serve load following various expected and unexpected contingency events. SCE's efforts through the ASP proceeding have been aimed at securing a comprehensive, efficient, long-term solution for the capacity, reliability, and resiliency issues facing the Valley South System.

3.0 Project Objectives

The ASP provides an effective, comprehensive solution that meets all of the Project Objectives detailed in SCE's Application[6] in a manner superior to the other studied alternatives.[7] Specifically the ASP, if implemented, would:

> **Serve current and long-term projected electrical demand requirements in the Electrical Needs Area (ENA).** The ASP would meet the forecasted electrical demand and satisfy SCE Subtransmission Planning Standards and Guidelines related to substation transformer capacity until the year 2048[8]. ASP effectively addresses uncertainty and volatility in future load.

---

[3] See Table 4-1 of DATA REQUEST SET ED-Alberhill-SCE-JWS-4 Item C and DATA REQUEST SET ED-Alberhill-SCE-JWS-2 Item H. Use of this mitigation presents a current and growing risk of substantial service interruptions for customers in the Valley North and Valley South Systems, since the spare transformer cannot be relied on for its function as a spare when used to serve peak load.

[4] See DATA REQUEST SET ED-Alberhill-SCE-JWS-4 Item A and DATA REQUEST SET ED-Alberhill-SCE-JWS-2 Item B.

[5] See DATA REQUEST SET ED-Alberhill-SCE-JWS-2 Item B.

[6] Note that these bolded project objectives are those defined in SCE's Application for the ASP and are also documented in SCE's Proponent's Environmental Assessment (PEA). The CPUC subsequently developed objectives presented in the FEIR (Section 1.2.2 of the FEIR) that are specific to solutions that would require a 500/115 kV substation and system tie-lines to the Valley South System. The project objectives stated in the FEIR are not addressed in the current data request submittals as they would inherently limit the types of alternatives that could be considered.

[7] Over 40 alternatives were considered by SCE, including California Environmental Quality Act (CEQA) analysis and analysis to support the recent supplemental data requests.

[8] See Section 6.4 of DATA REQUEST SET ED-Alberhill-SCE-JWS-4 Item C. The ASP satisfies transformation capacity needs far beyond 2048. A minor project to reconductor a single subtransmission line would be required in the 2038 time frame to satisfy N-1 line violation criteria through 2048.

Increase system operational flexibility and maintain system reliability by creating system ties that establish the ability to transfer substations from the current Valley South 115 kV System. The ASP would create the system tie-lines necessary to allow for operational flexibility and the ability to transfer substations from the Valley South System when needed for planned maintenance outages and to address multiple unplanned contingencies. The system analysis performed to support the supplemental data requests shows that the ASP would provide substantial operational flexibility under specific contingency scenarios.[9]

Transfer a sufficient amount of electrical demand from the Valley South 115 kV System to maintain a positive reserve capacity on the Valley South 115 kV System through the 10-year planning horizon. The ASP would result in additional capacity in the region sufficient to provide positive reserve capacity on the Valley South System through and beyond the 10-year planning horizon.[10,11] In providing an additional source of power it provides Valley South capacity relief without decreasing capacity margins in adjacent systems.

Provide safe and reliable electrical service consistent with SCE's Subtransmission Planning Criteria and Guidelines[12]. The ASP relieves all of the undesired exceptions to SCE's Subtransmission Planning Criteria and Guidelines that have been taken as the Valley South System has evolved.[13]

Increase electrical system reliability by constructing a project in a location suitable to serve the Electrical Needs Area (i.e., the area served by the existing Valley South System). The Final Environmental Impact Report (FEIR) and the analyses for the ASP[14] demonstrate that the project siting and routing is attractive from the perspective of

---

[9] See Section 5 of DATA REQUEST SET ED-Alberhill-SCE-JWS-4 Item F.

[10] See Appendix B, Section 1, and Section 6.4 of DATA REQUEST SET ED-Alberhill-SCE-JWS-4 Item C.

[11] The initial construction of the ASP is proposed to include two 560 MVA transformers of which one would be considered load-serving and the second would be an in-service spare. SCE notes that 1,120 MVA is a large amount of capacity to add to the system considering the incremental system needs of about 10 MVA per year. However, the basis for this is as follows: 1) the ASP includes the addition of two transformers to satisfy SCE and industry-wide N-1 contingency planning criteria. These criteria require a subtransmission system be able to withstand an outage of any single subtransmission system element without disruption of service to customers. The second 560 MVA transformer is the on-site spare. 2) SCE's standard transformer size for 500/115 kV substations is 560 MVA and the potential savings from procuring a smaller capacity custom transformer is relatively small and would likely be offset by the costs of engineering and designing a non-standard transformer. 3) A uniquely sized 500kV transformer would negate benefits achieved from using standard sized equipment between the 500/115 kV systems (i.e., Valley and Alberhill). 4) Lastly, approximately 400 MVA of demand is proposed to be initially transferred from the Valley South System to the Alberhill System and this equates to an approximate 70% utilization of the 560 MVA load-serving transformer initially and it is expected that this utilization would increase over time with load growth in the area.

[12] See SCE Subtransmission Planning Criteria and Guidelines 9/2015.

[13] See Table 4-1 of DATA REQUEST SET ED-Alberhill-SCE-JWS-4 Item C.

[14] See Valley-Ivyglen 115-KV Subtransmission Line and Alberhill System Projects, Final Environmental Impact Report, dated April 2017.

electrical system performance in serving the Electrical Needs Area. Its location in the San Jacinto Valley Region is within the area that directly benefits from the project. In addition to providing a second source of power to the region, the Alberhill Substation in the ASP is proposed in a geographic location distinct from Valley Substation where improvements to system reliability and resiliency would result.

Meet project need while minimizing environmental impacts. The ASP would meet the project need and has been determined in the FEIR to be the environmentally preferred alternative relative to the 30 alternatives considered therein ("FEIR Alternatives").

Meet project need in a cost-effective manner. As demonstrated in the cost-benefit analysis[15], the ASP is a cost-effective solution. Among alternatives considered, the ASP is the lowest cost project alternative that fully satisfies the project objectives and capacity, reliability, and resiliency needs over both short and longer-term planning horizons.

4.0 Performance Metrics

ASP is superior to all other alternatives in resolving the capacity, reliability, and resiliency needs of the Electrical Needs Area analysis[16] over both short term and long term horizons. SCE developed and evaluated the performance of a robust list of 12 project alternatives in addition to the ASP.[17] These alternatives included substations; subtransmission lines that transfer load to adjacent systems; battery energy storage systems (BESS); and combinations of the above. The ASP and these alternatives were evaluated using objective, quantitative, and forward-looking metrics to quantify their effectiveness in addressing capacity, reliability, and resiliency needs over time. The results showed:

- The ASP ranks first among the alternatives in terms of performance in meeting project objectives over both the 10-year (2028) and the 30-year (2048) planning horizons. The ASP resolves over 96%[18] of the projected capacity, reliability, and resiliency shortfalls in the region through 2028, and over 95% of the shortfalls through 2048. Other alternatives resolve at most 73% of the projected shortfalls through 2028, and 69% through 2048. When considering only lower-cost alternatives, only 69% and 61% of shortfalls are resolved through 2028 and 2048, respectively.
- All alternatives with lower costs than the ASP require SCE to implement incremental investments to maintain compliance with SCE Planning Criteria and Guidelines over the

[15] See Section 8.2 of DATA REQUEST SET ED-Alberhill-SCE-JWS-4 Item C.
[16] See DATA REQUEST SET ED-Alberhill-SCE-JWS-4 Items C and F.
[17] The alternatives developed in response to this data request were based on a variety of inputs including stakeholder feedback, and are in addition to the thirty "FEIR Alternatives" that were considered during the CEQA process and were deemed less favorable than the ASP. The data request alternatives are described in detail in Section 6 and Appendix C of DATA REQUEST SET ED-Alberhill-SCE-JWS-4 Item C. As directed by the CPUC, SCE did not evaluate any of the FEIR Alternatives other than the ASP in the data request submittals; as the ASP was already deemed to be superior to the FEIR Alternatives.
[18] Calculated as the total reduction in EENS for capacity, reliability, and resiliency metrics through 2048. See Table 6-2 of DATA REQUEST SET ED-Alberhill-SCE-JWS-4 Item C.

next 30 years (with many requiring investments prior to 2028) and do not achieve system reliability and resiliency improvements comparable to the ASP. The ASP is the only solution that does not require incremental capacity additions to address electric service interruptions due to transformer capacity shortfalls through 2048.

5.0 Cost Effectiveness

The ASP is, overall, the most cost-effective alternative in addressing the system needs. The relative cost effectiveness of the ASP and other project alternatives was evaluated by estimating the monetary value of system performance improvements for each alternative from the perspective of the value of electric service to customers[19] then dividing these monetized benefits by total project costs.[20] Specifically:

- The ASP ranks second among the 13 total alternatives in the cost-benefit analysis and first among alternatives that meet project objectives for more than a few years beyond their projected in-service dates. The only higher ranked alternative from a short-term perspective (the Mira Loma Alternative[21]) violates N-0 transformer overload system planning criteria (capacity) in the 2031 time frame (approximately 5 years from its expected earliest possible implementation date), indicating that it is a very short-term solution. When the subsequent investments needed to address this violation and subsequent continuing incremental capacity needs are considered (e.g., the addition of BESS over time to address capacity shortfalls), the Mira Loma Alternative is reduced to ranking 9th of the 13 alternatives considered with respect to cost-benefit analysis.
- An incremental cost-benefit analysis was performed to determine the cost effectiveness of project alternatives that deliver greater value to customers. In this case, the ASP was the highest ranked alternative, with substantial incremental value over the second ranked alternative, Mira Loma.

6.0 Optionality and Risk

When considering a variety of optionality and risk factors such as uncertainty and volatility in future load growth, potential technology or market changes, and risks associated with project development and execution costs, ASP is the preferred solution.

[19] See Section 8.1.2 of DATA REQUEST SET ED-Alberhill-SCE-JWS-4 Item C.
[20] See DATA REQUEST SET ED-Alberhill-SCE-JWS-4 Items C and G.
[21] See Table 6-3 of DATA REQUEST SET ED-Alberhill-SCE-JWS-4 Item C.

- ASP remains cost-effective under future low load growth and low cost DER scenarios[22]; while lower cost, short term alternatives are not effective in addressing future higher load growth scenarios (such as might occur with enhanced electrification) .[23]
- ASP is more effective than lower cost, short term alternatives in addressing other system performance risks such as those associated with year to year volatility in load and degraded capacity margins in adjacent systems.[24]
- ASP has lower risk associated with cost of implementation than other alternatives that have not been subject to years of design, analysis and stakeholder engagement as has been the case for ASP. The project risks that could lead to higher costs during the development, design and licensing include: required undergrounding for long linear projects through congested areas; unknown geotechnical conditions; and rerouting to avoid areas with stakeholder concerns.

7.0 Timeliness of Project Implementation

SCE anticipates that the ASP can be executed in a more timely manner than any other project alternatives considered. This is critical considering the near term project need date and the current reliance on a mitigation for transformer overloads (which, when implemented, introduces additional system reliability and capacity risk).[25]

SCE and other utilities propose projects well in advance of the need date in order to have infrastructure licensed and permitted, constructed, and operational in time to meet the system need as well as to minimize the impacts of forecast volatility. At the onset of the development of the ASP, the Valley South System had experienced unprecedented load growth and given the time to license/permit and construct a project, SCE applied for the ASP years in advance of its projected need to avoid jeopardizing delivery and adequate supply and reliable electric service to its customers. The ASP licensing process has been underway for over a decade and although the original projected need date has been deferred over time as load growth returned to more sustainable levels, the need for a project in the Valley South System is now in the 2022 timeframe as confirmed through SCE's supplemental analysis.[26]

ASP has been substantially vetted through regulatory and public scrutiny and has a current expected in-service date of 2025. While this in-service date could potentially be accelerated with an expedited project decision, the other alternatives have not yet been fully designed, developed,

---

[22] A benefit of projects with incremental capacity additions as opposed to ASP (with its large upfront capacity addition) is that potential technology or market changes can introduce lower-cost capacity solutions in the future. A cost-benefit analysis sensitivity case was considered where BESS costs are assumed to be reduced by 50% from the nominal costs assumed in the analysis. In this case, the ASP would continue to perform substantially better than other alternatives that satisfy a 30-year capacity need. When combining the low load growth forecast with lower cost BESS, the ASP still ranked higher than all alternatives that incorporate BESS as part of the solution to address long-term capacity needs.

[23] Higher load growth scenarios are possible with greater than expected electrification rates. See Section 9.4 of DATA REQUEST SET ED-Alberhill-SCE-JWS-4 Item C.

[24] See Section 9.0 of DATA REQUEST SET ED-Alberhill-SCE-JWS-4 Item C.

[25] See DATA REQUEST SET-ED-Alberhill-SCE – JWS-2, Item H.

[26] See DATA REQUEST SET ED-Alberhill-SCE-JWS-4 Item A.

or engineered and have yet to undergo analysis, public engagement, and regulatory review under CEQA and the G.O. 131-D process. This additional work would almost certainly result in a higher probability of implementation delays and additional costs, as well as the potential for other unexpected developments that could impact the feasibility of the solutions reviewed.

8.0 Conclusion

The superior performance and value to ratepayers of the ASP, combined with the ability to complete licensing and execute the project in a timely manner to address the near term need date and temporary capacity mitigation clearly distinguishes the ASP project from any other alternatives considered. These attributes, along with the ASP's ability to best address future risk factors, are the basis for SCE's recommendation.