GRIDLIANCE

GridLiance West Transco's 2018 Request Window Proposal

CAISO 2018/2019 Transmission Planning Process

September 20-21, 2018

Amargosa Valley Reliability Improvement Project

- Issues: Overloads on 138 kV system under P1, P4, P6, and P7 events
- Proposed Project
  - Install a second 230 kV circuit on an existing vacant tower position from Innovation to Johnnie Tap and upgrade existing Johnnie Tap to Valley Switch Station line to double circuit 230 kV/138 kV
  - Expand Valley Switch Station to install new 230/138 kV transformer and install necessary terminal equipment at Valley Switch and Innovation substations
- Proposed In-Service Date
  - Summer 2022 or earlier
- Estimated Cost: $41.5M
- Alternatives Considered:
  - Install new RAS (status quo and only for gen)
    - » Does not solve transformer overloads
    - » Does not enhance reliability
  - UVLS schemes
    - » Decreases reliability by dropping critical customer load

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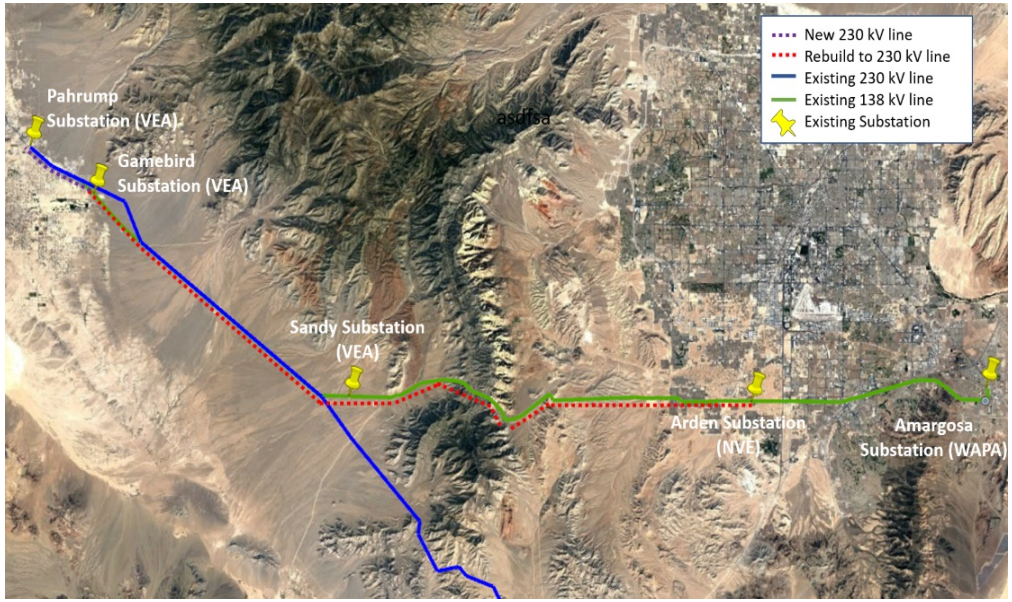
Benefits of the Amargosa Valley Reliability Improvement Project

1. **Improve overall grid reliability and security**
2. **Potentially reduces the number of RAS for each generator**
   a) Past Cluster studies indicate multiple SCE RAS per generator sited in VEA's area
   b) Past phase 1 studies indicate multiple RAS needed by GLW/VEA depending upon the amount of generation in a cluster. Many of these RAS would involve most or all generators sited in GLW/VEA's area.
   c) Every generator sited in GLW/VEA's area may be required to have multiple RAS – up to double digit number of RAS on each generator if no new line options are considered
   ✓ Avoiding RAS increases reliability due to less grid complexity
3. **Potentially reduces number of contingencies monitored by RAS**
   a) CAISO Standards allows up to 6 contingencies and 4 monitored elements per RAS (ISO SPS6).
   b) Every 6 contingencies eliminated potentially saves the cost of a new RAS per ISO SPS6 – potentially reducing interconnection costs of generators
4. **Mitigates system divergence issues**
   a) Reduces the need to use operational action plans for identified system divergence problems
   b) Avoids the use of UVLS schemes that would shed critical customer load for NERC P4 and P6 events that could cause system divergence

Southwest Nevada Reliability Improvement Project

- Issues: Overloads and low voltage on 138 kV system under P1, P4, P6, and P7 events
- Proposed Project
  - Rebuild the Amargosa – Gamebird 138 kV section to NVE's Arden Substation to 230 kV and terminate the Amargosa 138 kV end into Arden
  - Build a new 230 kV line from near Gamebird to Pahrump
  - Add necessary terminal equipment at Arden and Pahrump
- Proposed In-Service Date
  - Spring 2023 or earlier
- Estimated Cost: $65.4M
- Alternatives Considered:
  - Rebuild the Amargosa – Pahrump 138 kV line
    - » More expensive option due to line length
  - UVLS schemes
    - » Decreases reliability by dropping critical customer load

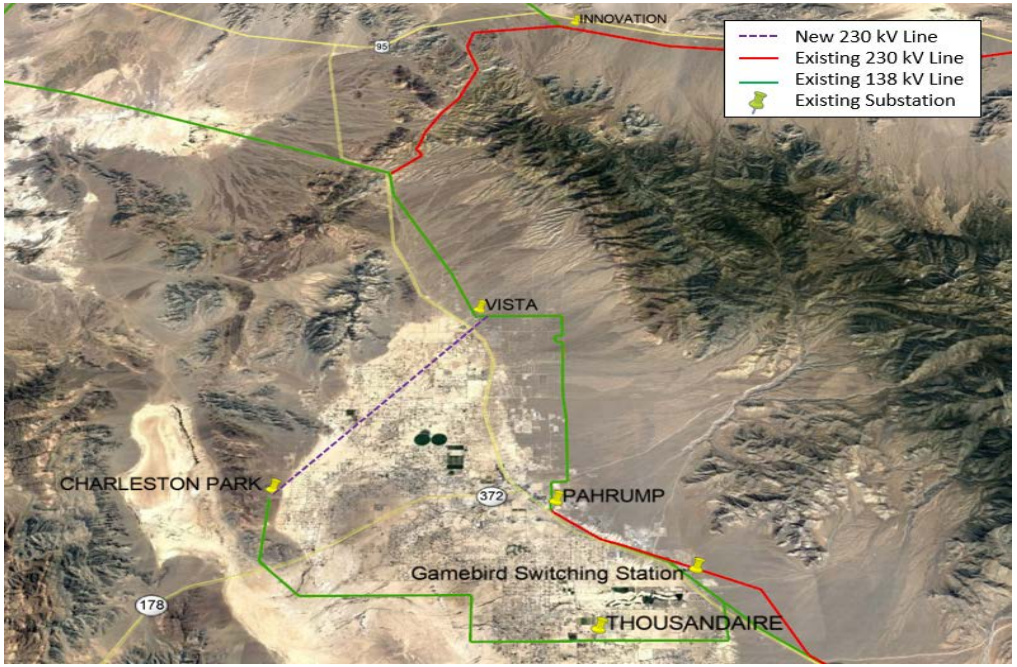


Benefits of the Southwest Nevada Reliability Improvement Project

1. **Improve overall grid reliability and security**
2. **Adds significant transmission capacity by strengthening the existing 230 kV loop in the GLW system**
   a) Significantly reduces the number of contingencies requiring mitigation
   b) Facilitates export of new renewable generation in 2028 scenario as well as cluster studies.
3. **The project provides long-term reliability and voltage support by strengthening the 138 kV loop with a 230 kV source**
   a) Provides much needed voltage support in areas where VEA is experiencing load growth
   b) Eliminates reliability issues created by the loss of the Pahrump-Gamebird 138KV line
4. **Mitigates system divergence issues**
   a) Reduces the need to use operational action plans for identified system divergence problems
   b) Avoids the use of UVLS schemes that would shed critical customer load for NERC P4 and P6 events that could cause system divergence

Pahrump Valley Loop-In Project

- Issues: Overloads and low voltage on 138 kV system under P1, P4, P6, and P7 events
- Proposed Project
  - Build a looped-in three breaker 230 kV switching station on the Pahrump – Innovation 230 kV line near the Vista 138 kV Substation
  - Build an 11.2 mile 230 kV line from the new Vista 230 kV switching station to Charleston Park
  - Expand Charleston Park Substation to install a 230/138 kV transformer at Charleston
  - Add necessary terminal equipment at Charleston
- Proposed In-Service Date
  - Fall 2022 or earlier
- Estimated Cost: $23.6M
- Alternatives Considered:
  - Build the Vista – Charleston Park 138 kV line
    - » not a solution for the single contingency outage of either Pahrump transformer for the other
  - UVLS schemes
    - » Decreases reliability by dropping critical customer load



Benefits of the Pahrump Valley Loop-In Project

1. **Improve overall grid reliability and security**
2. **Provides much needed voltage support in areas where VEA is experiencing load growth the most by providing VEA's local load with multiple 230 kV sources on the west and east side of the load which will have near and long-term benefits**
3. **Performs better than the Charleston Park – Vista 138 kV line because the Charleston Park – Vista 138 kV project is not a solution for the single contingency outage of either Pahrump transformer for the other**
4. **The project provides long-term reliability and voltage support by strengthening the local 138 kV loop with a 230 kV source.**
5. **From the perspective of future growth opportunities, the project provides a 230 kV interconnection point for generation on the west side of VEA's service territory in the Pahrump Valley area and a 230 kV interconnection point for generation in the northern portion of the Pahrump Valley area near the new Vista 230 kV station**
6. **The project eliminates reliability issues created by the loss of the Pahrump-Gamebird 138 kV line which is currently VEA's most impactful outage**
7. **Mitigates system divergence issues**
    a) Reduces the need to use operational action plans for identified system divergence problems
    b) Avoids the use of UVLS schemes that would shed critical customer load for NERC P4 and P6 events that could cause system divergence