

# Palo Verde Hub Reliability and Commercial Issues

Report to STEP June 29, 2005

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Manager - APS Transmission

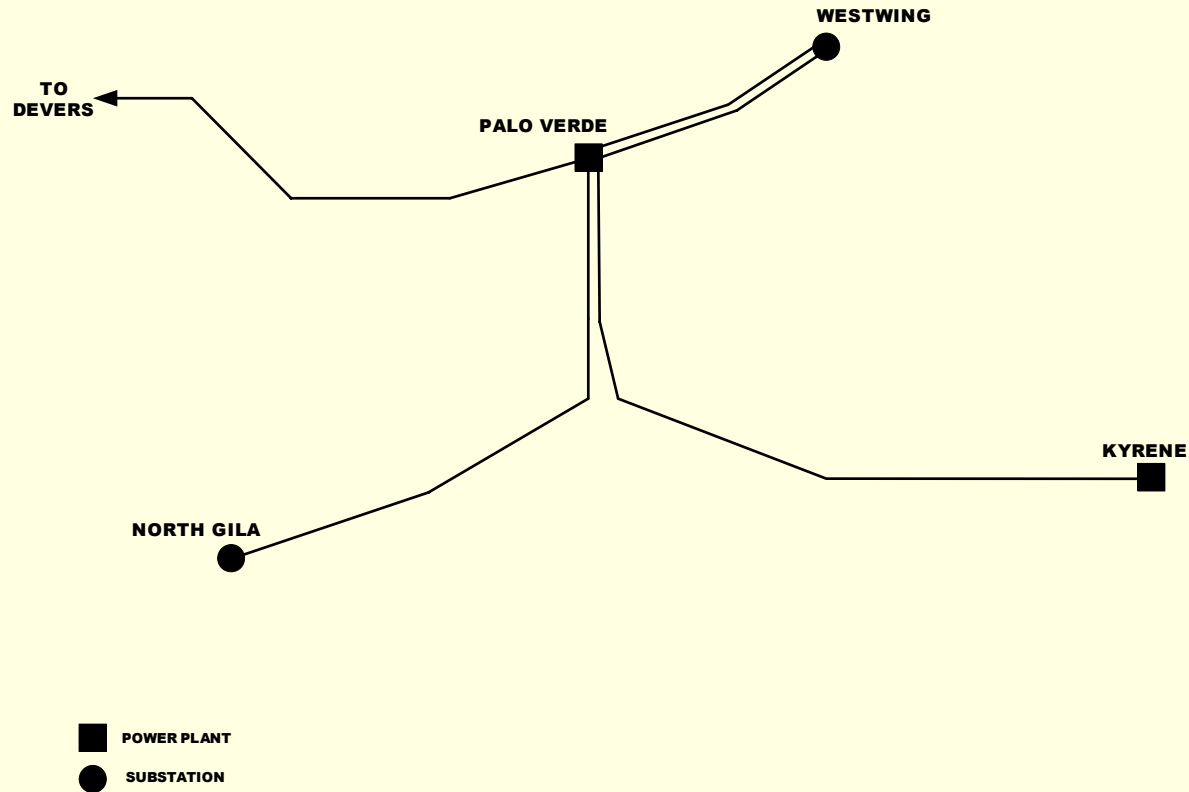
Planning & Engineering

# ACC Staff Reliability Concerns at Palo Verde Hub

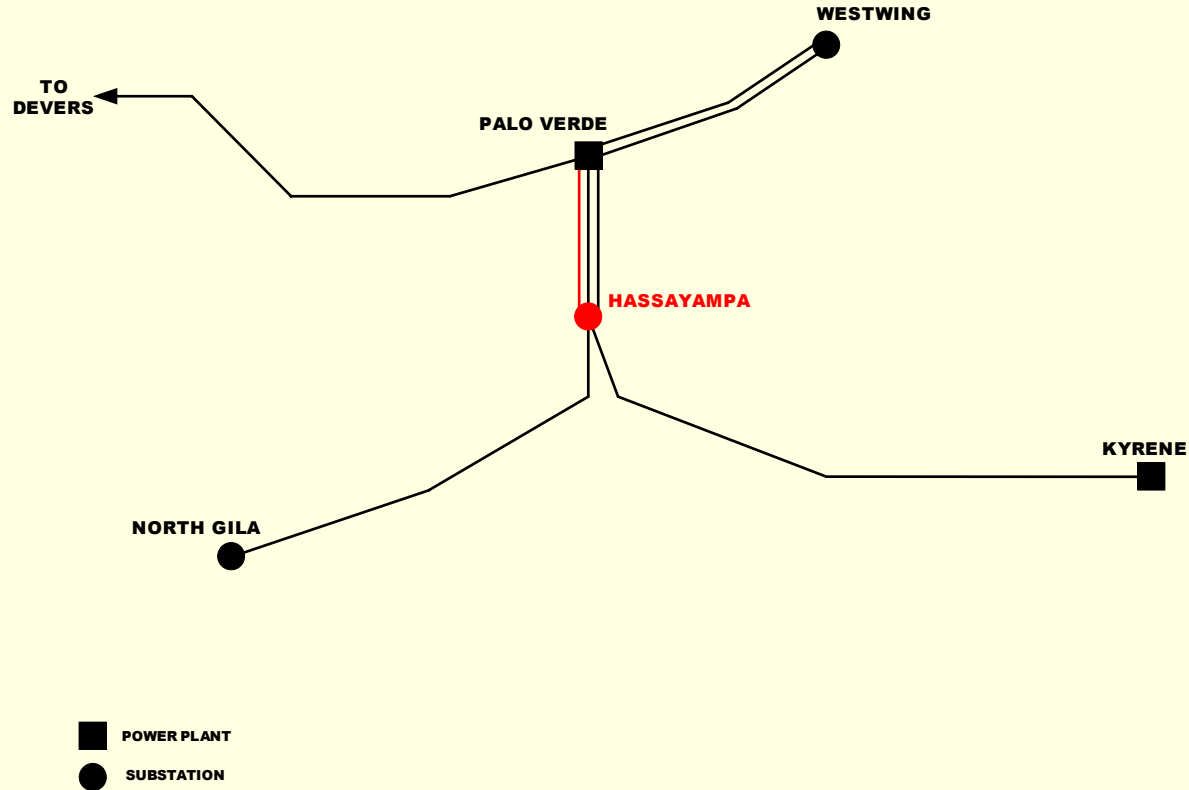
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- Too much generation directly connected to only the Hassayampa Switchyard. Loss of switchyard could result in loss of roughly 4000mw.
- Several generators interconnected with only one line. Loss of that line results in loss of entire generating station.

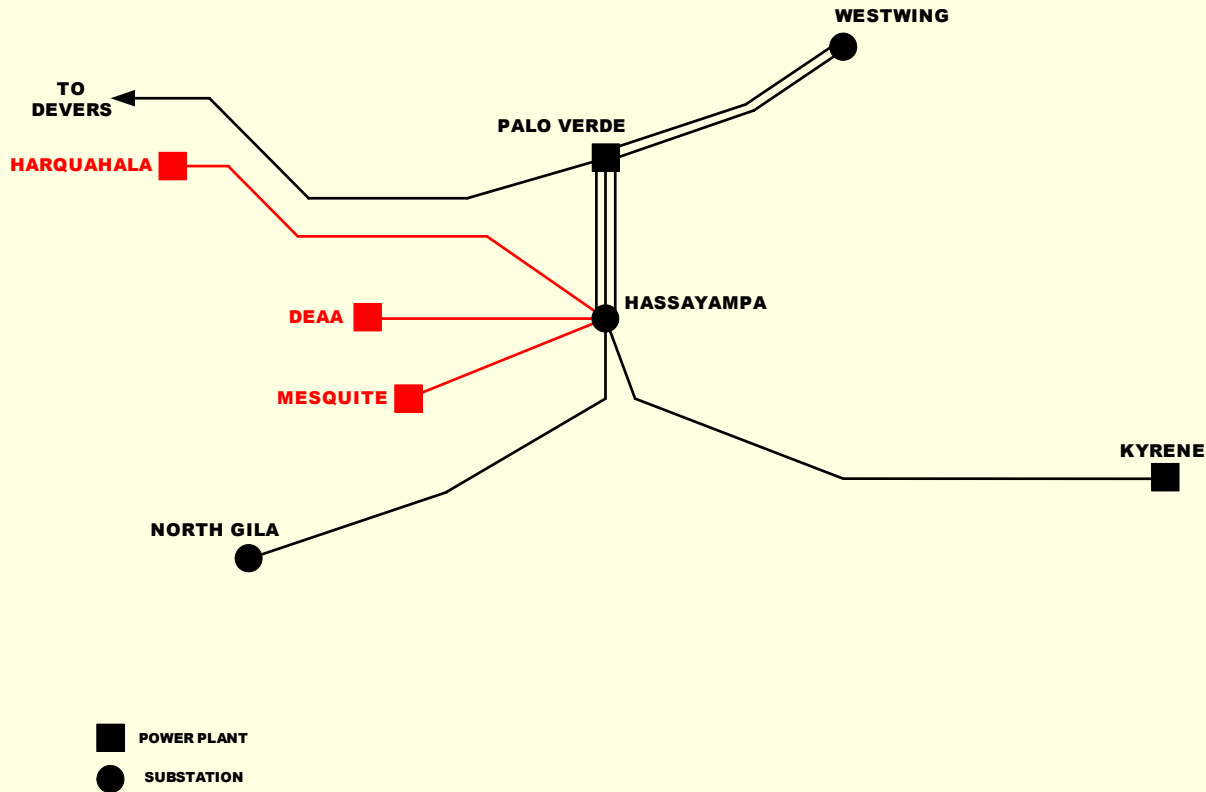
# Palo Verde Area pre-Hassayampa



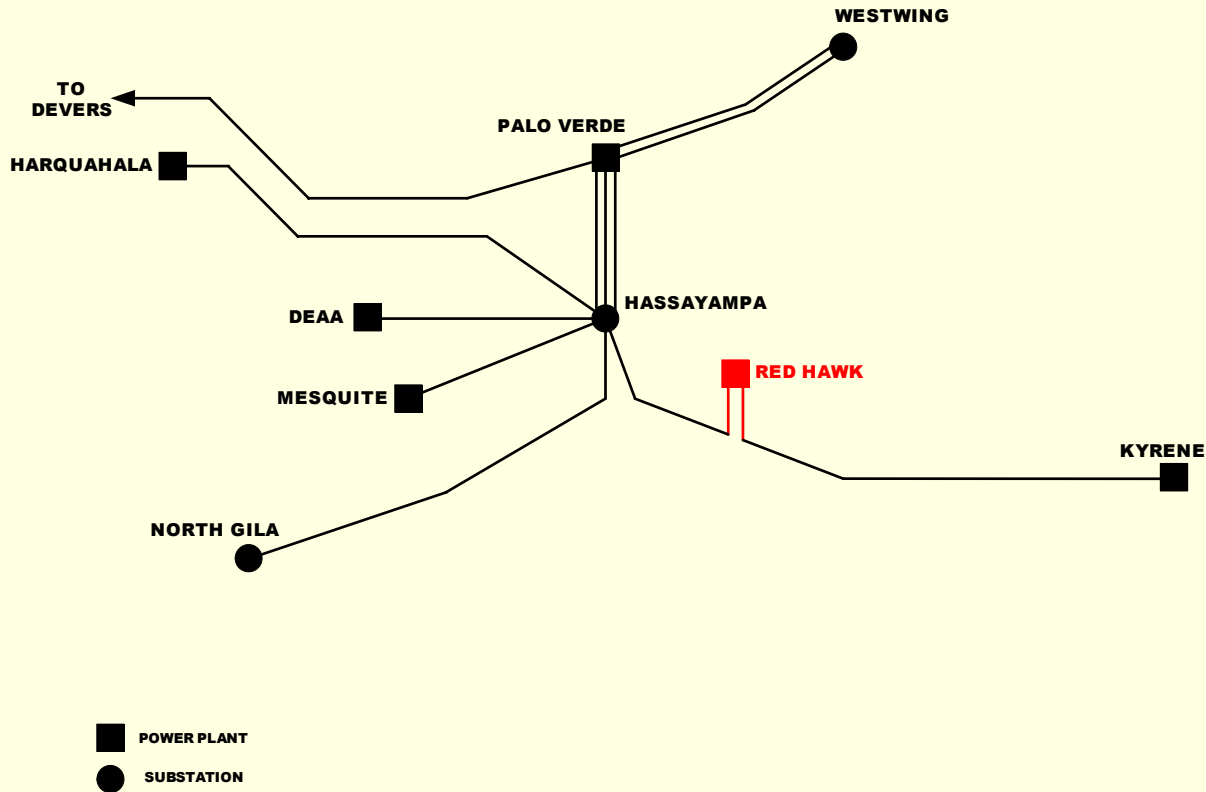
# Addition of Hassayampa Switchyard



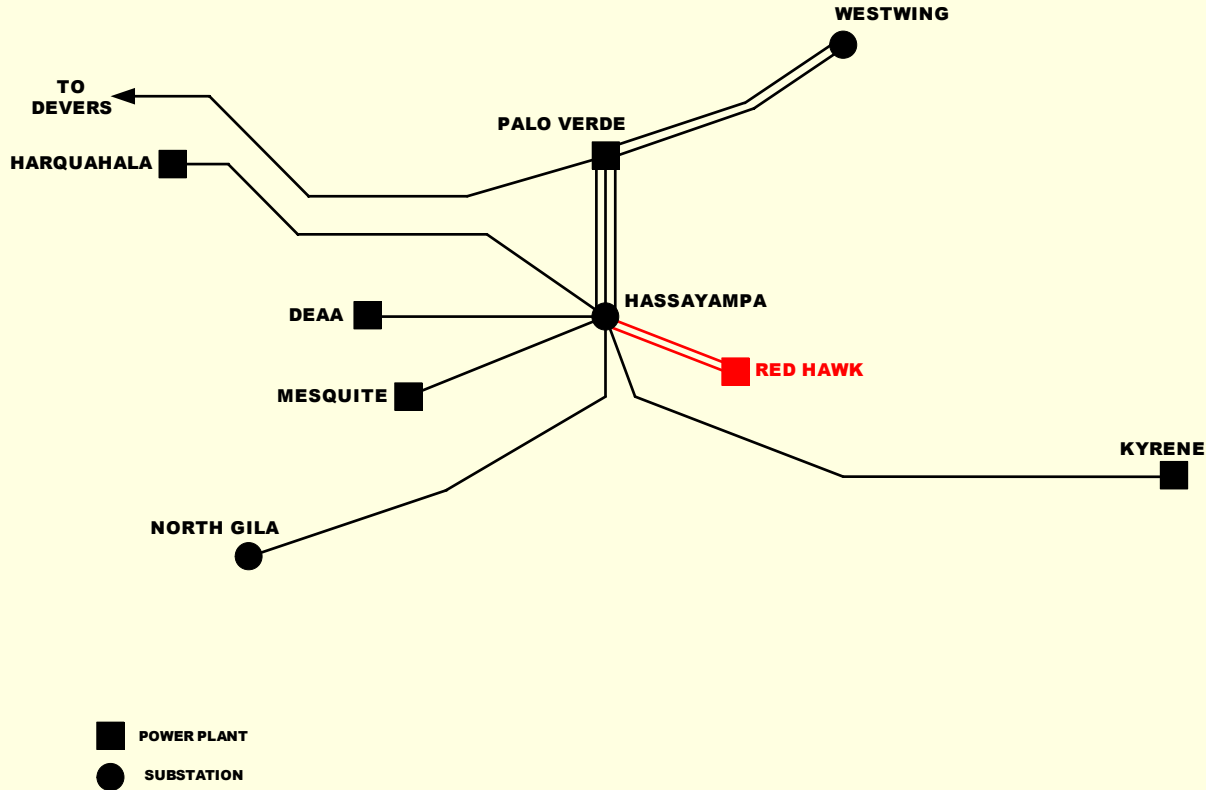
# IPP's Radially Connected at Hassayampa



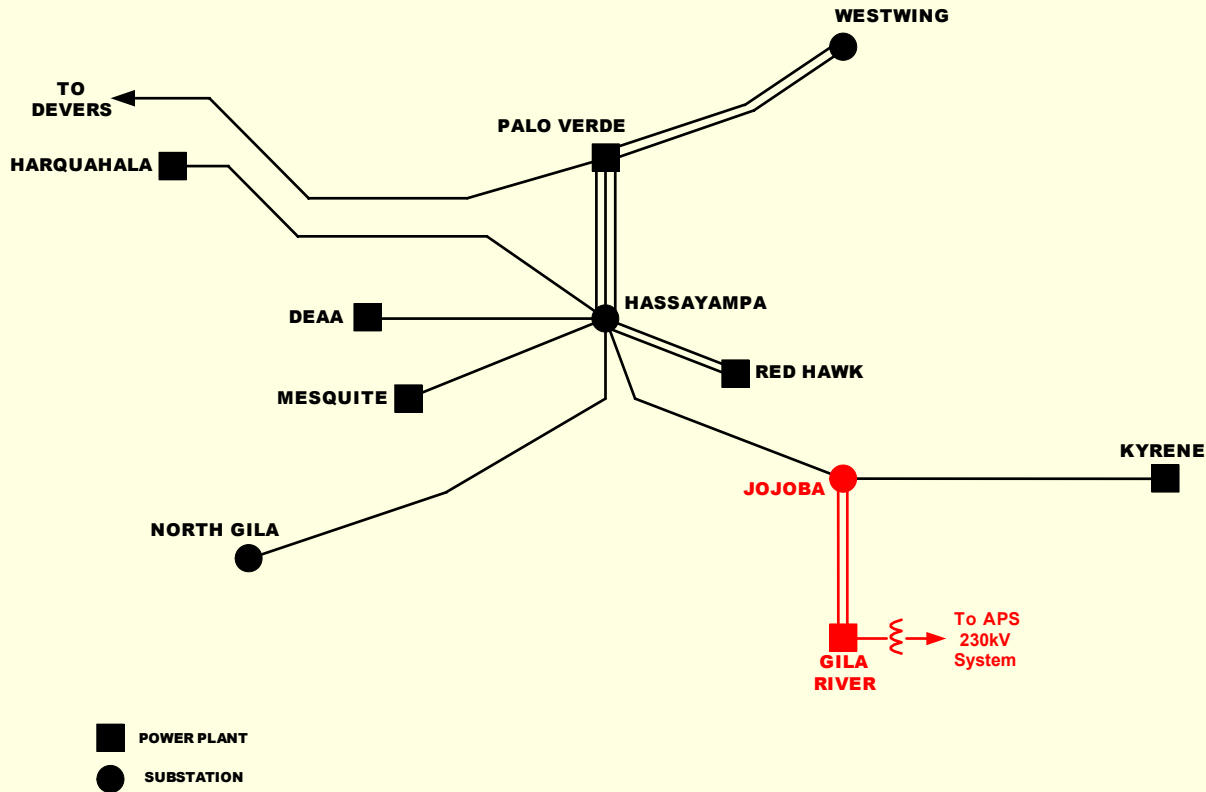
# ACC Staff's Preferred Redhawk Option



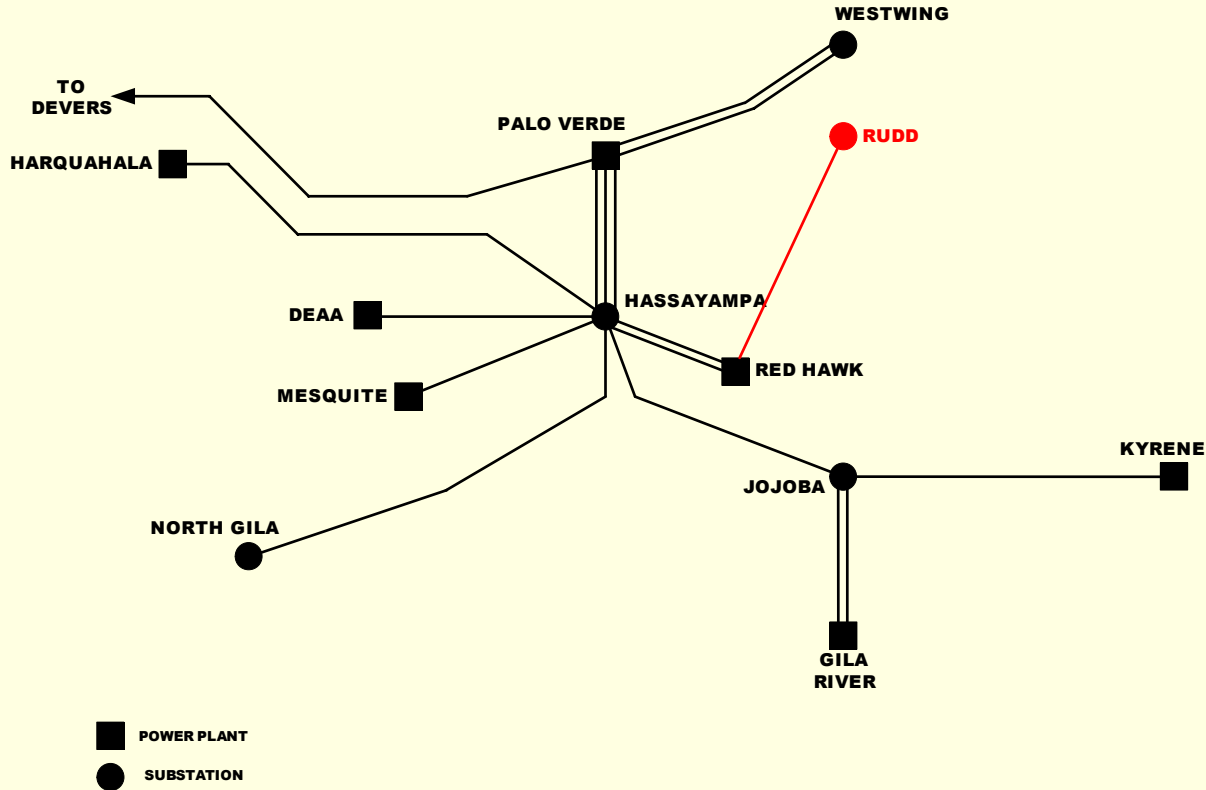
# Actual Redhawk Interconnection



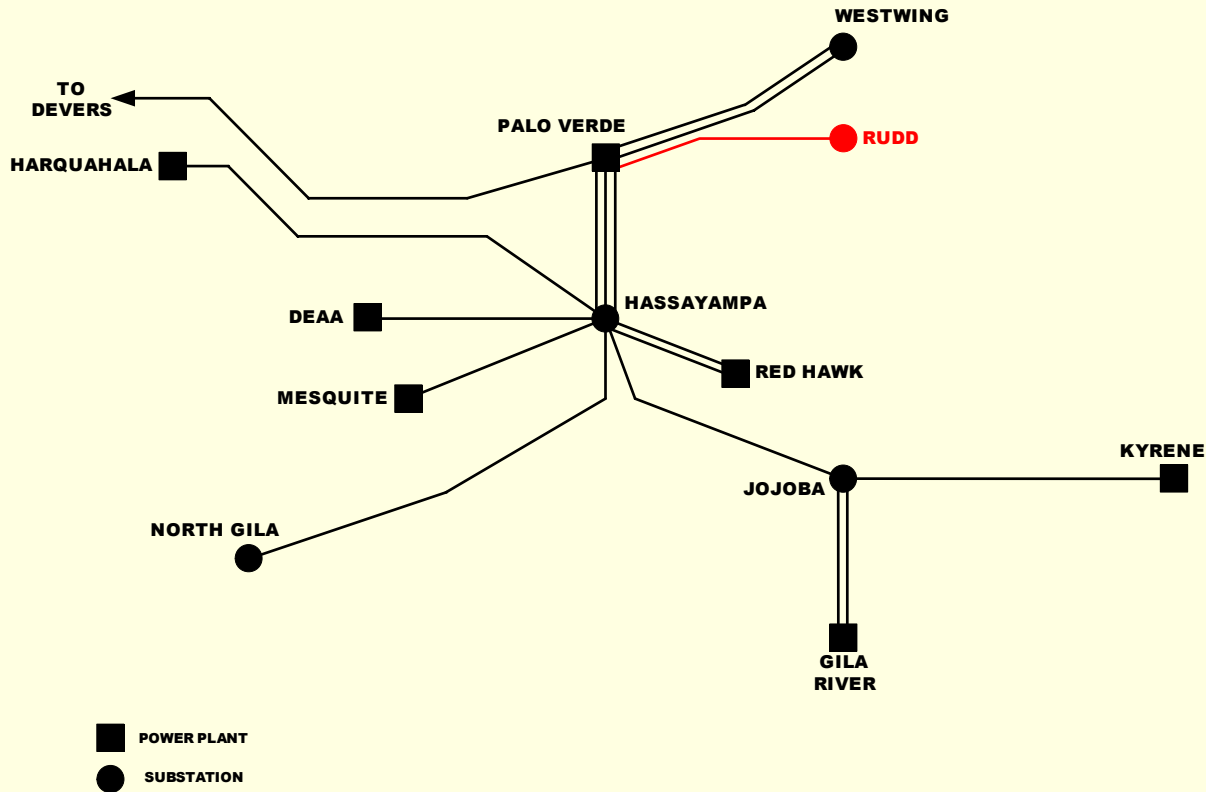
# Panda/Gila River Interconnection



# ACC Staff's preferred Rudd Interconnection



# Actual Rudd Interconnection



# Conditions on CEC for Rudd Project

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- APS and SRP to perform PV Hub risk assessment studies:
  1. Loss of all of Hassayampa Switchyard
  2. Loss of all of Palo Verde Switchyard
  3. Loss of all three ties between Hassayampa and PV
- APS and SRP to seek WECC approval to require similar assessments for other systems.
- APS and SRP to seek PV E&O requirement for future interconnectors at the Palo Verde hub to perform similar assessments.

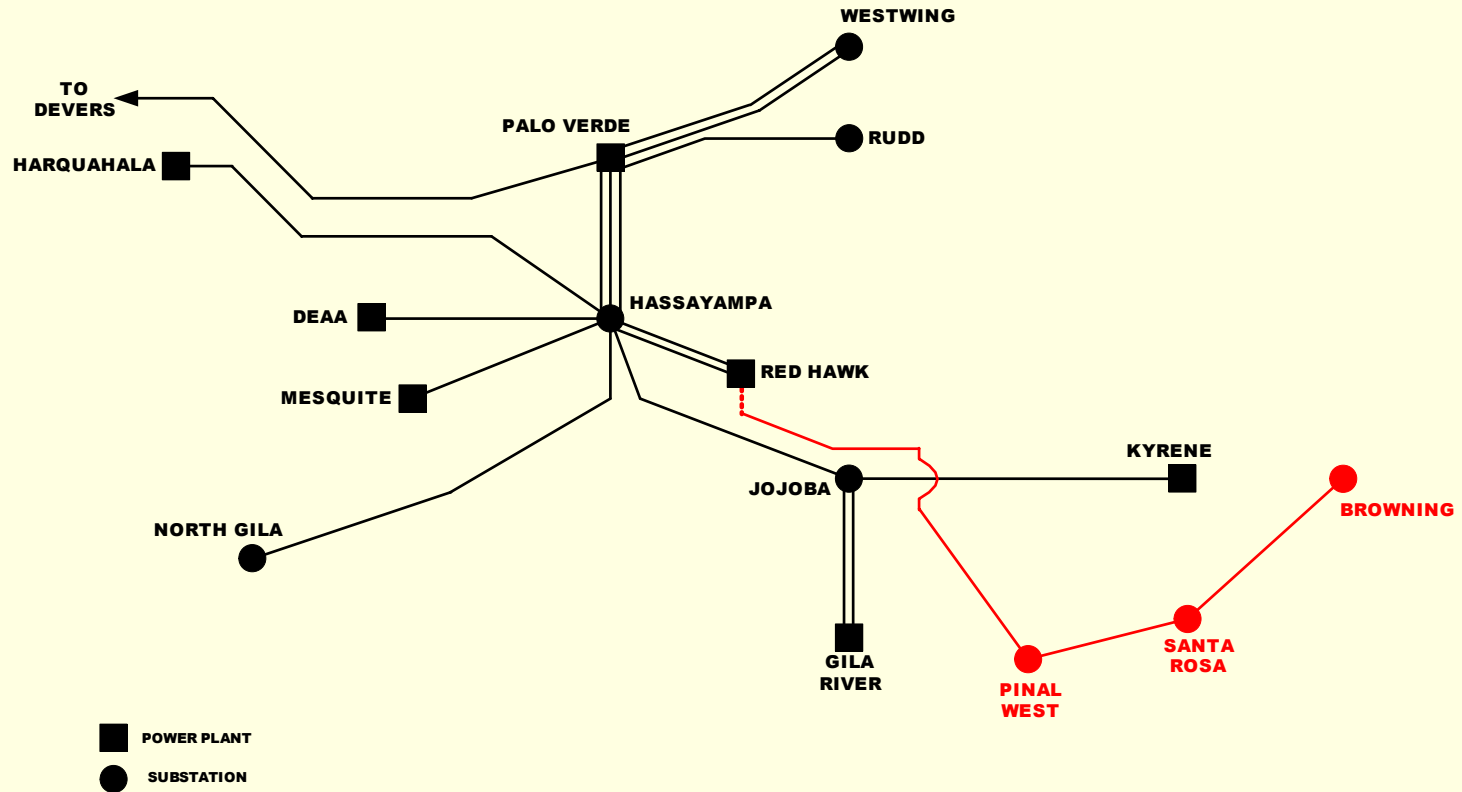
# PV Hub Risk Assessment

## Recommendations

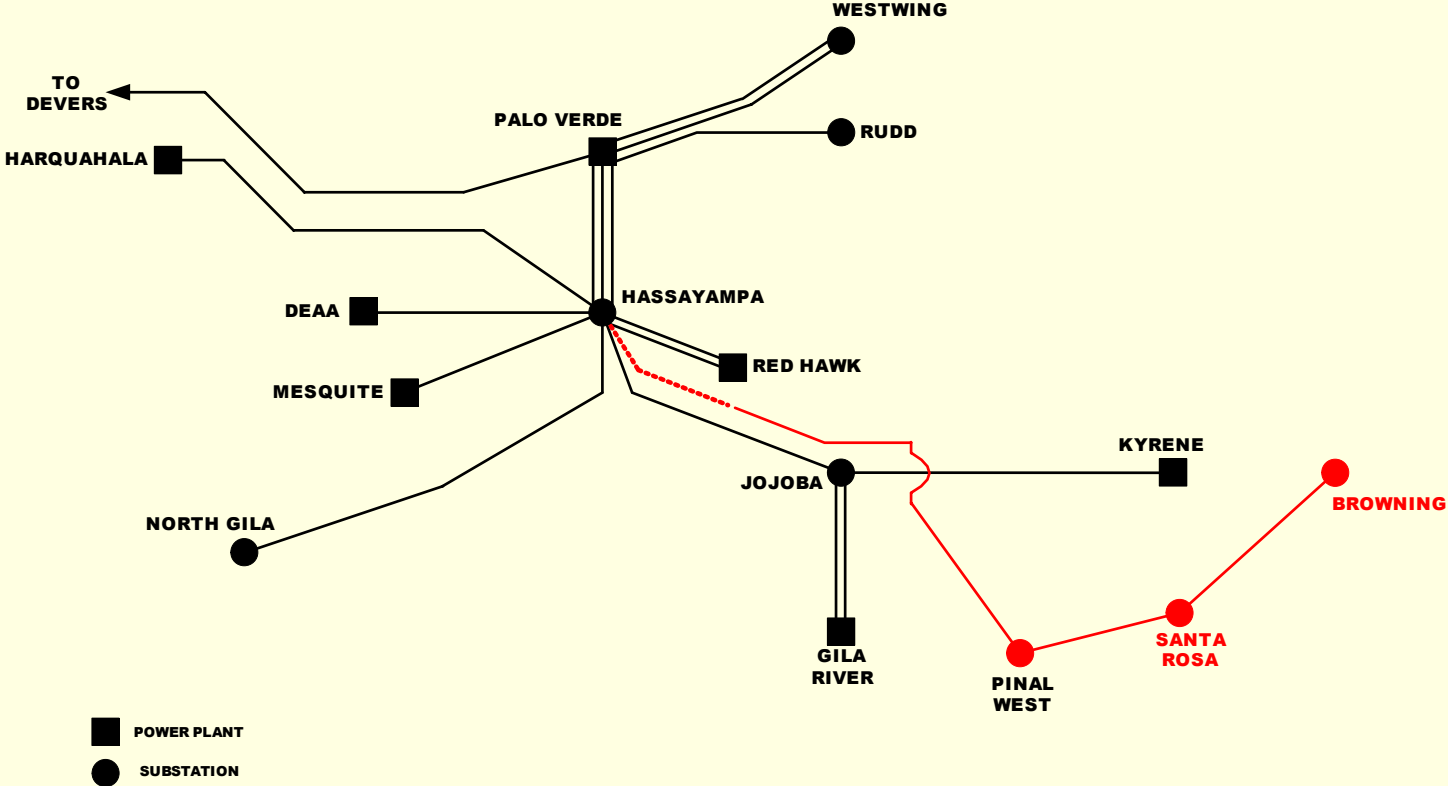
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- Future generation or transmission projects should give consideration to risk mitigation for extreme events.
- For overall diversity, performance and risk mitigation: should consider terminating future lines at generating stations interconnected at the hub rather than at the Palo Verde or Hassayampa Switchyards.
- Future generators desiring to interconnect at the Palo Verde hub should also be interconnected to at least one other location in the transmission network.

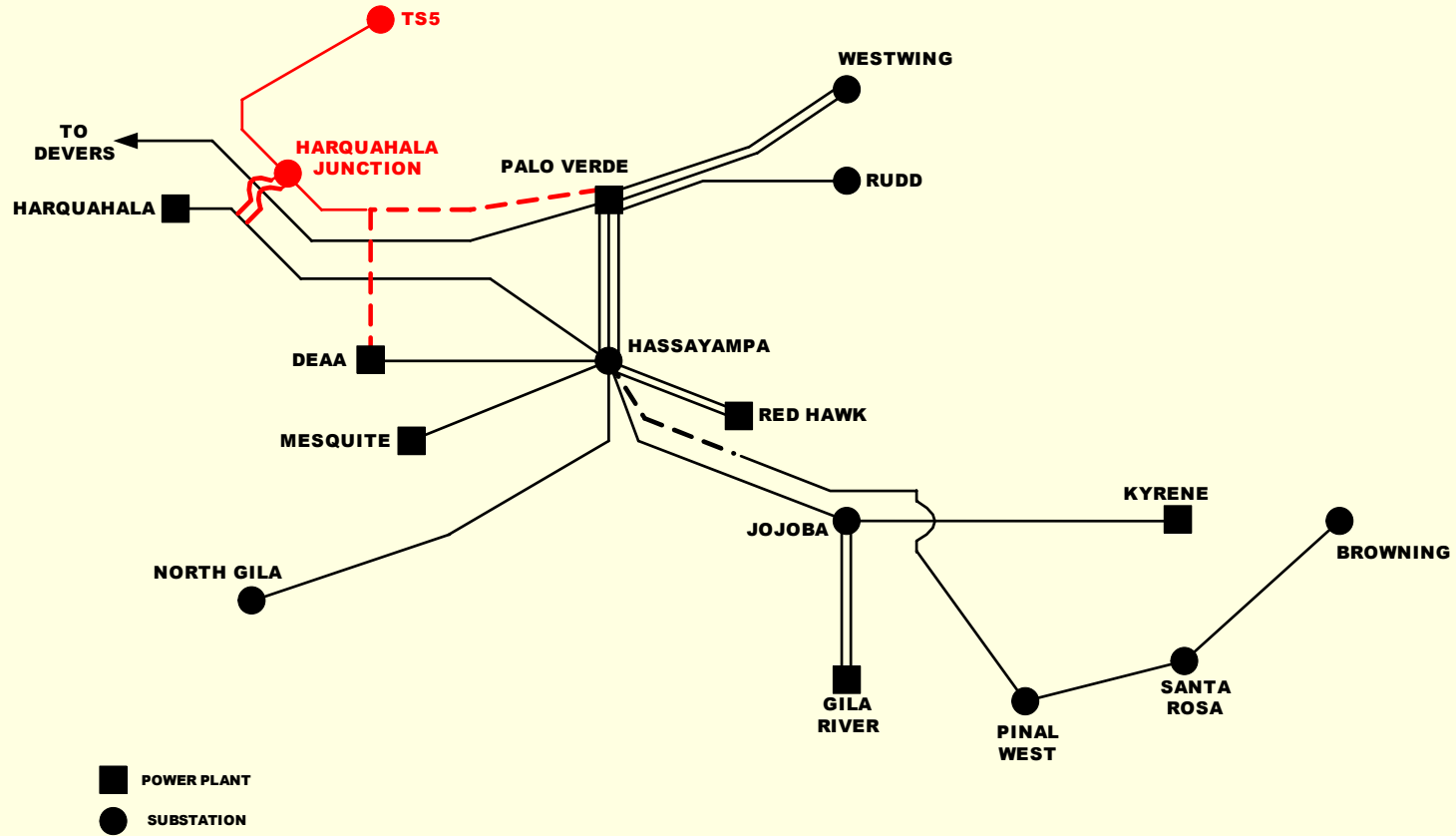
# ACC Staff's Preferred SEV Interconnection



# SRP's Planned SEV Interconnection



# Three Interconnection Options for PV Hub-TS5 Project



# ACC Staff Meeting May 31, 2005

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- APS, SRP, SCE, CAISO, Arlington, Harquahala
- APS and SRP agreed to discuss issue at SWAT and STEP as appropriate study forums.
- SRP agreed as PVTs operating agent to revisit issue at PV E&O.

# APS PV-TS5 Project siting hearing

## June 6 and 7, 2005

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- CEC Condition that APS will continue to pursue interconnection with both Arlington power plant and Harquahala as well as Palo Verde.
- APS to report back to ACC staff on chosen alternative and why and why others were not chosen
- APS to request SRP convene meeting of PV E&O and PV interconnectors to address issue.