Bruce @ 0830 - 0840

Approved Version

PALO VERDE TRANSMISSION SYSTEM

INTERCHANGE SCHEDULING AND CONGESTION MANAGEMENT PROCEDURE

PROCEDURE NO. PVTS-01

REVISION 8

A/9

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1. PURPOSE

The purposes of this procedure are as follows:

1.1 Ensure the reliability of the Palo Verde Nuclear Generating Station, the Palo Verde 500kV Switchyard, the Hassayampa 500kV Switchyard, the Palo Verde Transmission System, and the generators interconnected to the Palo Verde Transmission System through defined interchange scheduling, congestion management, dispatching, and operating procedures.

1.2 Establish the requirements for compliance with the North American Electric Reliability Council (NERC) and Western Electricity Coordinating Council (WECC) Standards, Policies, and Procedures.

1.3 Define the responsibilities of the:

- Operator for the Palo Verde/Hassayampa Common Bus and the Palo Verde Transmission System.
- Parties conducting business on or through the Palo Verde/Hassayampa Common Bus and the Palo Verde Transmission System.
- Interconnectors to the Palo Verde/Hassayampa Common Bus and the Palo Verde Transmission System.

2 BACKGROUND

The Palo Verde/Hassayampa Common Bus is a major energy-trading hub for the western United States. Additional interconnected generation and transmission has increased the importance of the Palo Verde trading hub and has significantly stressed the associated transmission system. An Interchange Scheduling and Congestion Management Procedure is required to ensure the viability of the Palo Verde trading hub by maintaining the reliability of the Palo Verde Transmission System (PVTS), generation interconnected to the PVTS, and the Western Interconnection.

Salt River Project Agricultural Improvement and Power District (SRP), as the Operator for the PVTS including the Palo Verde/Hassayampa Common Bus, developed this PVTS Interchange Scheduling and Congestion Management Procedure to be consistent with requirements defined in the Arizona Nuclear Power Project (ANPP) Agreements, the ANPP Hassayampa Switchyard Interconnection Agreements, and the Palo Verde/Hassayampa Common Bus as defined in the Open Access Transmission Tariffs of the ANPP Switchyard Participants. The scheduling procedure herein shall be reviewed and revised as required to address new interconnected generation, new transmission interconnections or other significant system changes, prior to the connection or completion of such system modifications.

3 SCOPE

This procedure draws from the individual agreements, practices and procedures developed to address operational issues involving the Palo Verde Area Transmission System. It also summarizes the interaction of many of the agreements, practices, and procedures. A list of the referenced procedures and agreements are located in Section 4.

3.1 Term

This procedure is designed to accommodate the Palo Verde Transmission System, including the Palo Verde/Hassayampa Common Bus, PVNGS generation, the interconnected generation identified in Figure 1. This procedure does not expire until a subsequent revision has been approved. There is the potential for significant change to future versions of this procedure.

Figure 1 lists the PVTS Interconnector generation that has been synchronized and is available to generate during the term of this procedure.

Figure 1 - PVTS Interconnector Generation (Jojoba and Hassayampa)

PVTS Interconnected Generator	Owner	Capacity Estimate Unit ID / Estimated Net Output		Synchronization Date
Arlington Valley 1 (2-CTs, 1-Steam)	Duke Energy Maricopa, LLC	Total	593MW	Synchronized
		CT1	170MW	
		CT2	170MW	
		ST3	253MW	
Harquahala 1 (1-CT, 1-Steam)	Harquahala Generating Company, LLC	Total	382MW	Synchronized
		CT1	253MW	
		ST1	129MW	
Harquahala 2 (1-CT, 1-Steam)	Harquahala Generating Company, LLC	Total	382MW	Synchronized
		CT2	253MW	
		ST2	129MW	
Harquahala 3 (1-CT, 1-Steam)	Harquahala Generating Company, LLC	Total	382MW	Synchronized
		CT2	253MW	
		ST2	129MW	

Mesquite 1 (2-CTs, 1-ST)	Sempra Energy Resources	Total	499MW	Synchronized
		CT1	159MW	
		CT2 ST1	159MW 181 MW	
Mesquite 2 (2-CTs, 1-Steam)	Sempra Energy Resources	Total	499MW	Synchronized
		CT3	159MW	
		CT4	159MW	
		ST2	181MW	
Panda Gila River 1 (2-CTs, 1-Steam)	Panda Gila River, LP	Total	520MW	Synchronized
		CT1	151MW	
		CT2	151MW	
		ST1	218MW	
Panda Gila River 2 (2-CTs, 1-Steam)	Panda Gila River, LP	Total	520MW	Synchronized
		CT3	151MW	
		CT4	151MW	
		ST2	218MW	
Panda Gila River 3 (2-CTs, 1-Steam)	Panda Gila River, LP	Total	520MW	Synchronized
		CT5	151MW	
		CT6	151MW	
		ST3	218MW	
Panda Gila River 4 (2-CTs, 1-Steam)	Panda Gila River, LP	Total	520MW	Synchronized
		CT7	151MW	
		CT8	151MW	
		ST4	218MW	
Redhawk 1 (2-CTs, 1-Steam)	Pinnacle West Energy Corporation	Total	458MW	Synchronized
		CT1	146MW	
		CT2	146MW	
		ST1	165MW	
Redhawk 2 (2-CTs, 1-Steam)	Pinnacle West Energy	Total	458MW	Synchronized
		CT3	146MW	
		CT4	146MW	
		ST2	165MW	

3.2 Operating Studies

This procedure is based on operating studies performed on the latest configurations and generation assumptions within the WECC and the Palo Verde Area Transmission System. The operating studies are specific to the term of the procedure as defined in Section 3.1.

Generation connected to the PVTS is subject to this procedure when the *Palo Verde Transmission System Operating Study* demonstrates that the generation negatively impacts the stability or exceeds the thermal limits of the Palo Verde Area Transmission System. Those generators are identified as Congestion Management Units (CM Units).

Additional operating studies are required prior to the synchronization of generators to be interconnected to the Palo Verde Transmission System but not identified in Figure 1. Additional operating studies are also required if significant changes are made to the PVATS, the local area transmission systems, or to the unit arming scheme of any of the CM Units listed in Figure 1. Such operating studies identify the capability of the PVTS to support the interconnected generation, and the transfer of energy from the interconnected generation to adjacent systems.

This procedure defines a methodology for operating the PVTS in a reliable manner. The procedure does not imply that the PVTS is capable of reliably transmitting the output of all current or planned interconnected generation. The PVTS Operating Study dictates the amount of interconnected generation that can be accommodated depending on system conditions.

4 REFERENCES

4.1 ANPP and Hassayampa Agreements

4.1.1 ANPP Participation Agreement dated August 23, 1973, as amended

4.1.2 ANPP High Voltage Switchyard Participation Agreement dated August 20, 1981, as amended

4.1.3 ANPP Valley Transmission System Participation Agreement dated July 6, 1981, as amended

4.1.4 Funding Agreement for the Development of a Satellite Switchyard to the ANPP High Voltage Switchyard effective May 26, 2000

4.1.5 First Addendum to the Funding Agreement dated January 16, 2001, as amended or supplemented

4.1.6 ANPP Hassayampa Switchyard Interconnection Agreements, partially executed, FERC filing dated August 31, 2001

4.1.7 Palo Verde/Hassayampa Common Bus Agreement, FERC filing dated May 18, 2001

4.2 Interconnection Request Procedures

4.2.1 Procedures for Requesting an Interconnection with the Palo Verde 500kV Switchyard or ANPP Valley Transmission System dated August 27, 1999

4.2.2 Palo Verde Nuclear Generating Station, Units 1, 2, & 3, Regulatory Design Requirements for Palo Verde Switchyard Interconnections, Revision 0, transmitted by letter from James M. Levine to David Areghini, dated June 23, 1999

4.3 WECC Procedures

4.3.1 Arizona Security Monitoring Manual

4.3.2 Agreement On Operational Procedure For Reduction In Loading On The East Of The River Transmission Path (a.k.a. EOR Reduction Procedure) implemented May 16, 2000

4.3.3 WECC Unscheduled Flow Mitigation Procedure

4.3.4 WECC Emergency Transmission Overload Procedure

4.4 Arizona Public Service Company (APS) Operating Procedures

4.4.1 OP #40AO-9ZZ25 – ECC Directed Turbine Unloading

4.4.2 APS Operating Procedure – Palo Verde Generation Requirements

4.5 Engineering & Operating Committee Procedures and Resolutions

4.5.1 PVTS E&O Committee, Resolution for Interconnection, Hassayampa Switchyard, approved 7/9/2001

4.5.2 PVNGS E&O Committee, Resolution for Interconnection, Hassayampa Switchyard, approved 8/2/2001

4.5.3 PVNGS Administration Committee, Resolution for Interconnection, Hassayampa Switchyard, approved 9/21/2001

4.5.4 PVTS Administration Committee, Resolution for Interconnection, Hassayampa Switchyard, approved 10/12/2001

4.6 PVTS Congestion Management Procedures

4.6.1 PVTS-02, Hassayampa Interconnector Meter Reconciliation Procedure, Revision 1, dated 3/1/2002

4.6.2 PVTS-03, Hassayampa Switchyard Clearance, Notification, Line Switching and Testing Procedure

4.6.3 PVTS-04, Hassayampa Voltage Operating Procedure, Revision 1, dated 3/13/2002

4.7 PVNGS Operating Procedures

4.7.1 40DP-9OP34, Palo Verde Switchyard Administrative Control Procedure

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4.9 Study Results

4.9.1 2003 Summer Palo Verde Transmission System Operating Study (referenced herein as the *PVTS Operating Study*). (May 7, 2003; Attachment C) (Superseded)

4.9.2 2003 Fall Palo Verde Transmission System Operating Study (referenced herein as the *PVTS Operating Study*) dated October 1, 2003 (Attachment C). All supplementary operating results will also reside in Attachment C.

5 DEFINITIONS

ANPP: Arizona Nuclear Power Project

ANPP Hassayampa Switchyard Interconnection Agreement: Agreement between the ANPP Switchyard Participants and each of the Hassayampa Interconnectors (Duke Energy

Maricopa, LLC, Gila Bend Power Partners, Harquahala Generating Company, LLC, Pinnacle West Energy Corporation, and Sempra Energy Resources), individually, enabling facility connections to the Hassayampa 500kV Switchyard.

ANPP High Voltage Switchyard: Commonly referred to herein as the "Palo Verde 500kV Switchyard" in the original ANPP agreements, prior to the development of the Hassayampa 500kV Switchyard.

- Termination facilities for the Palo Verde–Devers 500kV Transmission Line, the Palo Verde–Westwing 500kV Transmission Lines #1 and #2, the three Palo Verde–Hassayampa 500kV Tie-Lines, and the Palo Verde Nuclear Generating Station.

ANPP Switchyard Participants: Arizona Public Service Company (APS), El Paso Electric Company (EPE), Department of Water and Power of the City of Los Angeles (LADWP), Public Service Company of New Mexico (PNM), Southern California Edison Company (SCE), Southern California Public Power Authority (SCPPA), and Salt River Project Agricultural Improvement and Power District (SRP), and their respective successors.

ANPP Valley Transmission System (VTS): Commonly referred to herein as the Valley Transmission System or "VTS". The VTS includes:

- Palo Verde–Westwing 500kV Transmission Lines #1 & #2
- Hassayampa–Jojoba–Kyrene 500kV Transmission Line
- Westwing 500kV and 230kV Switchyard Expansions
- Kyrene 500kV and 230kV Switchyard Expansions
- Jojoba 500 kV Switchyard
- Palo Verde-Hassayampa 500kV Tieline #1

Arming Responsibility: The amount of generation each PVTS Interconnector must designate to trip via the Remedial Action Scheme (RAS) to receive additional generating capability.

Common Bus Arrangement: The delivery, sale, purchase, receipt and/or exchange of power and energy at any point within the Palo Verde/Hassayampa Common Bus without a transmission charge, transmission credit, reservation, or schedule for transactions or any portions thereof conducted within the Palo Verde/Hassayampa Common Bus.

Congestion Management: Process developed to maintain the reliability of the interconnected system including generation, and to promote maximum utilization of the transmission system when generation capability exceeds injection or transfer capability.

Congestion Management Contribution (CMC): Factor established by the *PVTS Operating Study* to normalize the performance of the Congestion Management Units based on their ability to impact the stability limit of the VTS.

Congestion Management Generating Capability (CMGC): Maximum generating limit for a PVTS Interconnector. The CMGC is equal to the SGCA for a PVTS Interconnector's generating plant, plus or minus the Coordinated SGCA, plus the generating capability created by arming Congestion Management Units to trip.

Congestion Management Unit (CM Unit): A PVTS connected generator that impacts the stability of the Palo Verde Area Transmission System as demonstrated through analysis during the *PVTS Operating Study*. For example, a combined cycle unit "train" that includes two combustion turbine-generator sets and a steam turbine-generator set is considered to be three Congestion Management Units.

Control Area: An electric system or systems, bounded by interconnection metering and telemetry, capable of controlling generation to maintain its interchange schedule with other Control Areas and contributing to frequency regulation of the Interconnection.

Control Area Services: The schedule-based and energy-based services required to add generation or load to the Interconnection without detriment to reliability or disturbance response. NERC mandates that each generator, load, and transmission facility be included within the metered boundaries of a certified Control Area. Generators may procure Control Area Services from a local or remote certified Control Area, or certify as a Control Area in order to self-provide these services. Control Area Services are similar to the FERC-defined Ancillary Services offered to transmission customers by transmission providers. These Services may include some or all of the following:

- Static and Dynamic Scheduling
- Regulation and Frequency Response
- Energy Imbalance
- Operating Reserve – Spinning
- Operating Reserve – Supplemental

Coordinated Simultaneous Generating Capability Allocation (Coordinated SGCA): By mutual agreement, the unscheduled SGCA of one PVTS Interconnector may be scheduled by another PVTS Interconnector.

Dynamic Schedule: A telemetered reading or value that is updated in real time and used as an Interchange Schedule in the automatic generation control/area control error equation and the integrated value of which is treated as a schedule. Commonly used for "scheduling" jointly owned generation or remote load to or from another Control Area.

EOR: East of the Colorado River Path. Path 49 of the WECC Path Rating Catalog, consisting of the following six (6) transmission lines:

- Navajo–Crystal 500kV

- Moenkopi–Eldorado 500kV
- Liberty–Peacock 345kV
- Palo Verde–Devers 500kV
- Hassayampa–North Gila 500kV
- Perkins–Mead 500kV

Funding Agreement: *The Funding Agreement for the Development of a Satellite Switchyard to the ANPP High Voltage Switchyard Between Participating Interconnectors and Salt River Project Agricultural Improvement and Power District*, effective as of May 26, 2000, together with the *First Addendum to the Funding Agreement*, dated as of January 16, 2001, and as further amended or supplemented from time to time.

Good Utility Practice: Any of the practices, methods and acts engaged in or approved by a significant portion of the electric utility industry within the operating area of the WECC during the relevant time period, or any of the practices, methods and acts which, in the exercise of reasonable judgment in light of the facts known at the time the decision was made, could have been expected to accomplish the desired result at a reasonable cost consistent with good business practices, reliability, safety, and expedition. Good Utility Practice is not intended to be limited to the optimum practice, method, or act to the exclusion of all others, but rather includes any acceptable practices, methods, or acts generally accepted in the region.

Hassayampa 500kV Switchyard: All land, easements and other rights and improvements associated with the Satellite Switchyard (as defined in the Funding Agreement) in accordance with the ANPP Hassayampa Switchyard Interconnection Agreement and the Funding Agreement, including those facilities described in Exhibit B, HASSAYAMPA SWITCHYARD, attached to the ANPP Hassayampa Switchyard Interconnection Agreement, including any capital improvements made to the Hassayampa 500kV Switchyard, but excluding the Hassayampa Interconnection Facilities, as defined therein. This includes Palo Verde-Hassayampa 500kV Tieline #2.

Host Control Area: 1) A Control Area that confirms and implements scheduled interchange for a transmission customer that operates generation or serves customers directly within the Control Area's metered boundaries. 2) The Control Area within whose metered boundaries a jointly owned unit or terminal is physically located.

Interchange Schedule: The planned interchange between two adjacent Control Areas that results from the implementation of one or more interchange transaction(s). Referred to as "Schedule" within this document.

Interconnection: When capitalized, any one of the five major electric system networks in North America: Eastern, Western, ERCOT, Québec, and Alaska. When not capitalized, the facilities that connect two systems or Control Areas. Additionally, an interconnection refers to the facilities that connect a generator to a Control Area or system.

Interconnection Facilities: The equipment and facilities used by a PVTS Interconnector to connect its generating facility to the PVTS, including any capital improvements made to the Interconnection Facilities, as may be added thereto from time to time.

Operating Emergency: An unplanned event or circumstance that reduces or may reduce the capability of the PVTS that would otherwise be available to the Parties under normal system operating conditions.

Operating Procedures: A set of policies, practices, or system adjustments that may be automatically or manually implemented by the system operator within a specified time frame to maintain the operational integrity of the interconnected electric systems.

1. Automatic Operating Systems — Special protection systems, remedial action schemes, or other operating systems installed on the electric systems that require no intervention on the part of system operators.

2. Normal (Pre-contingency) Operating Procedures — Operating procedures that are normally invoked by the system operator to alleviate potential facility overloads or other potential system problems in anticipation of a contingency.

3. Post-contingency Operating Procedures — Operating procedures that may be invoked by the system operator to mitigate or alleviate system problems after a contingency has occurred.

Operator: The Person responsible for the operation of the PVTS, the duties of which are further described in Section 8 of the ANPP Hassayampa Switchyard Interconnection Agreements. As of the effective date of the ANPP Hassayampa Switchyard Interconnection Agreements, the Operator is SRP, acting solely as agent of and for the ANPP High Voltage Switchyard Participants.

Palo Verde Area Transmission System (PVATS): Collective reference herein to the Palo Verde/Hassayampa Common Bus, the Valley Transmission System, the Palo Verde-West Transmission System and the Southwest Valley Transmission System.

Palo Verde 500kV Switchyard: Common reference herein for the "ANPP High Voltage Switchyard".

Palo Verde/Hassayampa Common Bus (PV/HAA): The Palo Verde 500kV Switchyard, the Hassayampa 500kV Switchyard, the string bus facilities connecting them, and any capital improvements thereto.

Palo Verde Nuclear Generating Station (PVNGS): Three generating units with net generation output capability greater than 1287 MW each.

Palo Verde Transmission System (PVTS): Common reference herein for the "ANPP Valley Transmission System" and the "Palo Verde/Hassayampa Common Bus".

Palo Verde-West Transmission System (PV–West): Collective reference herein to the Palo Verde/Devers 500kV transmission line and the Hassayampa/North Gila 500kV transmission line.

Parties: APS, EPE, LADWP, PNM, SRP, SCPPA, SCE, and all of the PVTS Interconnectors.

Person: Any natural person or legal entity of any kind, including any partnership, corporation, limited liability company, association, trust or governmental entity, officer, agency or body of any kind.

Point of Interconnection: The components of a PVTS Interconnector's Interconnection Facilities that comprise the point where the Interconnector connects to the Palo Verde Transmission System.

PVTS Interconnector: Any Person that has executed an interconnection agreement to connect its facilities to any point on the Palo Verde Transmission System or a Person owning a generating facility, other than PVNGS, directly connected to the Palo Verde Transmission System. Such Persons include the entities listed in Section 7.1.9.

Southwest Valley Transmission System (SWVTS): Common reference herein for the Palo Verde/Rudd 500kV transmission line, the Rudd 500kV Switchyard, the Rudd 230kV Switchyard, and the three 500/230kV transformers that connect the two switchyards.

Qualified Transfer Path: A WECC transmission path qualified for unscheduled flow relief under the WECC Unscheduled Flow Mitigation Procedure.

Remedial Action Scheme (RAS): See the definition of Operating Procedures, 1. Automatic Operating Systems

SCIT: Southern California Import Transmission nomogram. Limits the EOR flow and Total Southern California import to ensure system stability for loss of the Hassayampa–North Gila line. Nomogram lines are defined for different levels of Southern California inertia and are adjusted for a combination of PVNGS units off line, Navajo System compensation levels, and associated transmission lines out of service.

Simultaneous Generating Capability (SGC): Maximum limit for simultaneous generation by PVNGS and the PVTS Interconnectors' generating units as defined by the *PVTS Operating Study*. SGC is influenced by various system conditions and the dynamic performance of the online generators connected to the PVTS.

Simultaneous Generating Capability Allocation (SGCA): A distribution of the SGC limit to PVNGS and the PVTS Interconnectors' generating units. Distribution is based on accommodating maximum available PVNGS generation and a performance based pro rata allocation of the remaining capability to each of the PVTS Interconnectors' CM Units. Allocation of SGC provides only for the operation of PVNGS generation and the Congestion

Management Units in a safe operating range. SGCA does not confer or create any transmission rights on the PVTS.

TTC: Total Transfer Capability. The amount of electric power that can be transferred over the interconnected transmission network in a *reliable* manner based on *all* of the NERC imposed conditions. *(Reference the NERC Available Transfer Capability Definitions and Determination document, June 2000)*

VTS: See "ANPP Valley Transmission System" above.

6 RESPONSIBILITIES

6.1 Every Party conducting business on or through the PVTS shall:

- Comply with NERC and WECC Standards, Policies and Procedures.
- Follow the procedures referenced by the Palo Verde Transmission System Interchange Scheduling and Congestion Management Procedure stated herein.

6.2 The Operator of the PVTS shall:

- Report non-compliance of a Party with established Operating Procedures by notifying the ANPP Switchyard Participants and the other Parties of such failure.
- Deny the schedule of such Party until the Operating Procedure has been complied with and its requirements have been met.

6.3 Arizona Public Service (APS)

Operating Agent, Scheduling Agent, and WECC certified Control Area Operator for the PVNGS, the Redhawk Power Project, and the Westwing Switchyard.

Transmission Path Operator for Path 49, East of the Colorado River (EOR).

Operating Agent for the Hassayampa-North Gila 500kV line.

6.4 California Independent System Operator (CISO)

Operating Agent, Scheduling Agent, and WECC certified Control Area Operator for the Palo Verde–Devers 500kV line. Scheduling Agent and WECC Certified Control Area Operator for the Hassayampa–North Gila 500kV line.

6.5 Duke Energy

Operating Agent, Scheduling Agent, and WECC certified Control Area Operator for Arlington Valley Energy, operating a separate Control Area, Duke Energy Control Area (DECA).

WECC certified Control Area Operator for the Panda Gila, LP generators, operating a separate Control Area, Gila River Maricopa Arizona (GRMA).

It is anticipated that Duke Energy will become the WECC certified Control Area Operator for Harquahala Generating Company once those generators are released for commercial operation, operating a separate Control Area yet to be named.

6.6 Harquahala Generating Company (HGC)

Operating Agent for the Harquahala Generating Company.

It is anticipated that Duke Energy will become the WECC certified Control Area Operator for Harquahala Generating Company once those generators are released for commercial operation. SRP was the WECC certified Control Area Operator for Harquahala from initial synchronization through start-up.

6.7 Mesquite Power (MSQ)

Operating Agent for Mesquite Power.

SRP is the WECC certified Control Area Operator for Mesquite.

6.8 Panda Gila River (PGR)

Operating Agent and Scheduling Agent for the Panda Gila River, LP generators.

Duke Energy is the WECC certified Control Area Operator for Panda Gila River, LP, during commercial operation. SRP was the WECC certified Control Area Operator for Panda Gila River from initial synchronization through start-up.

6.9 WECC certified Control Area designated by each PVTS Interconnector

Operating Agent, Scheduling Agent, and/or WECC certified Control Area Operator for a specified PVTS Interconnector.

6.10 Salt River Project (SRP)

Operating Agent, Scheduling Agent, and WECC certified Control Area Operator for the PVTS with the exception of the Westwing Switchyard. Operating Agent, Scheduling Agent, and WECC certified Control Area Operator for the Southwest Valley Project which includes the Palo Verde-Rudd 500kV line, and the Rudd 500kV and 230kV Switchyards.

SRP was the WECC certified Control Area Operator for Harquahala Generating Company and Panda Gila River, LP, from initial synchronization through start-up. SRP is the WECC certified Control Area Operator for the Mesquite Power generators.

6.11 Entergy-Koch Trading (EKT)

Scheduling Agent for the Harquahala Generating Company.

6.12 Sempra Energy Trading (SETC) Scheduling Agent for Mesquite Power

7 PROCEDURE

7.1 Affected Parties

The following parties are affected by the *PVTS Interchange Scheduling and Congestion Management Procedure* and other procedures summarized herein:

7.1.1 Operator - SRP

7.1.2 Host Control Area – SRP

7.1.3 Adjacent Control Areas – APS, CISO, DECA, GRMA, the WECC certified Control Area designated by each PVTS Interconnector

7.1.4 PVNGS Participants – APS, EPE, LADWP, PNM, SCE, SCPPA & SRP

7.1.5 ANPP Switchyard Participants – APS, EPE, LADWP, PNM, SCE, SCPPA & SRP

7.1.6 VTS Owners – APS, EPE, PNM & SRP

7.1.7 PV-West Transmission Operator – CISO

7.1.8 Transmission Customers – Any entity purchasing transmission service on the VTS or the PV-West Transmission System.

7.1.9 PVTS Interconnectors – Duke Energy Maricopa, LLC; Pinnacle West Energy Corporation; Sempra Energy Resources; Harquahala Generating Company, LLC, and Panda Gila River, LP.

7.1.10 Congestion Management Units – The generating units of Arlington Valley Energy, Redhawk Power Project, Mesquite Power, LLC; Harquahala Generating Company, and Panda Gila River, LP.

7.2 Scheduling Procedure Summaries

Scheduling energy and transmission service for the Palo Verde Area Transmission System requires scheduling, congestion management, and dispatching procedures that address operating conditions specific to the PVNGS, the CM Units, the VTS, the Palo Verde/Hassayampa Common Bus, and the Arizona–California EHV system. These procedures are summarized below.

7.2.1 WECC and EOR Schedule Curtailment Procedures

A) Arizona Security Monitoring Manual – Establishes scheduling limits for the East-of-River, Southern Navajo, and Perkins–Mead transmission systems, under normal, abnormal, and emergency operating conditions, at Full, Intermediate and Low series compensation levels. The associated matrices identify the thermal limitations for the EOR flow and stability limits for the Navajo Generating Station. *(Section II.A.)* Abnormal and emergency operating conditions are also detailed to identify different limits based on the "Forced" (unplanned) versus "Scheduled" (planned) nature of an outage.

APS is the Transmission Path Operator for Path 49, East of the Colorado River (EOR). As such, APS monitors Arizona EHV system conditions, coordinates outages that impact the EOR transfer capability and communicates the appropriate scheduling limits to the various Transmission Providers based on the matrices from the Arizona Security Monitoring Manual.

When flows on EOR transmission lines exceed the continuous ratings, APS is responsible for attempting to reduce the EOR path loading with the Perkins and/or Liberty phase shifters, or by bypassing series compensation. If the EOR path flow exceeds the EOR path limit, APS shall check that all parties are within their scheduling rights. If the mitigation efforts described above are not successful, APS will determine the necessary schedule curtailments and immediately notify the adjacent Control Areas, the applicable transmission owners, and transmission customers. *(Arizona Security Monitoring Manual, Section V.)*

VTS Effects: None.

PV-West Effects: East-to-West schedules on the PV–West system may be curtailed to reduce EOR path loading.

Responsible Parties: APS for Path 49 (East of the River, EOR) & CISO for the allocation of loop flow curtailments.

Projected Impact on Procedure by PVTS Interconnectors: The addition of CM Units is not likely to impact the transfer limits established by the Arizona Security Monitoring Manual, however, the EOR may reach its transfer limit more often due to the proximity of the new generation to the Hassayampa-North Gila 500kV line and the expected contribution to actual flow.

B) EOR Reduction Procedure (APS, CISO, LADWP & SRP, 5/16/2000) – Entitled "Agreement On Operational Procedure For Reduction In Loading On The East Of The River Transmission Path". This procedure describes the process for meeting the WECC Operational Transfer Capability (OTC) criteria through reductions to the EOR path loading.

The WECC OTC criteria requires that a defined transmission path cannot: 1) exceed its thermal rating for more than 30-minutes after the start of an overload condition, and 2) exceed its stability rating for more than 20-minutes after the start of an overload condition. The EOR Reduction Procedure provides the steps to be taken when those outlined by Arizona Security Monitoring Manual are not successful at reducing EOR flow. These steps include the implementation of West-to-East Control Area interchange schedules between APS, CISO, LADWP, & SRP of predefined percentages.

When conditions dictate, APS will implement the existing EOR Reduction Procedure as originally written and immediately notify the adjacent Control Areas, the applicable transmission owners, and transmission customers. If the implementation of the EOR Reduction Procedure results in overloaded lines on the VTS, the Operator will curtail West-to-East schedules on the VTS where Palo Verde is the point of receipt to maintain operation within reliability limits.

PV-West Effects: West-to-East schedules on the PV–West system may be rapidly implemented to reduce EOR path loading.

VTS Effects: The implementation of West-to-East Control Area interchange schedules as stated above will change loading of the VTS and may necessitate additional curtailments on the VTS.

Responsible Parties: APS, CISO, LADWP & SRP

Projected Impact on Procedure by PVTS Interconnectors: Schedules with a Palo Verde point of receipt may need to be curtailed to accommodate the West-to-East emergency schedules.

C) WECC Unscheduled Flow Mitigation Procedure – WECC has designated several transfer paths that can be impacted by unscheduled flow (USF). These paths are referred to as "Qualified Transfer Paths. "Seasonal matrices have been developed to identify the amount of unscheduled flow on each Qualified Transfer Path that results from schedules between specified Receiving and Sending Control Areas or Buses. The nine-step USF Mitigation Procedure reduces unscheduled flow by using controllable devices (phase shifting transformers, etc.), and implementing mandatory schedule curtailments. When a Qualified Transfer Path operator makes a request for curtailments, schedules must be checked against the Unscheduled Flow Matrix to determine if reductions in those schedules are required. If schedule reductions are necessary, the Receiving Control Area must make those schedule reductions.

VTS Effects: Entities scheduling across the VTS may be required to curtail schedules that are causing unscheduled flow on a Qualified Transfer Path.

PV-West Effects: Entities scheduling across the PV-West transmission system may be required to curtail schedules that are causing unscheduled flow on a Qualified Transfer Path.

Responsible Parties: Qualified Transfer Path operators and Receiving Control Areas.

Projected Impact on Procedure by PVTS Interconnectors: No impact to this procedure.

D) WECC Emergency Transmission Overload Procedure – Mitigation for **unqualified** paths that are overloading due to unscheduled flow.

VTS Effects: Possible schedule reductions to reduce flows across unqualified paths.

PV-West Effects: Possible schedule reductions to reduce flows across unqualified paths.

Responsible Parties: Transmission Path operators and Receiving Control Areas.

Projected Impact on Procedure by PVTS Interconnectors: No impact to this procedure.

7.2.2 APS Operating Procedures

A) OP #40AO-9ZZ25 – ECC Directed Turbine Unloading. APS Energy Control Center (ECC) may require PVNGS to reduce generation by 200MW per unit up to 400MW total when 2 or more lines of the Arizona–California Transmission System are out of service and: 1) EOR (Path 49) limits are being exceeded or 2) the phase angle across open breakers is too large, preventing reclosure of the breakers. If such a curtailment is required, notice shall be provided to the Parties as soon as practicable.

When either the Palo Verde-Devers or the Hassayampa-North Gila 500kV line of the Arizona-California transmission system is out of service, the Operator will implement congestion management. The PVTS Remedial Action Scheme will be incorporated as appropriate. The Operator first will curtail generation by the CM Units as dictated by the N-1 Analysis of the approved PVTS Operating Study. When APS ECC implements the ECC Directed Turbine Unloading procedure, the Operator will curtail the remaining generation by the Congestion Management Units pro rata with that of PVNGS generation until the EOR is within limits or the phase angle is reduced, enabling breakers to be closed. The Operator shall provide notice of any such CM Unit generation curtailment to the Control Area Operator for each Congestion Management Unit as soon as

practicable. APS, as the Control Area Operator for PVNGS, will provide notice of any such PVNGS generation curtailment to the PVNGS Owners as soon as practicable.

When two or more lines of the Arizona-California transmission system not connected to the Palo Verde/Hassayampa Common Bus are out of service, APS ECC will implement the ECC Directed Turbine Unloading procedure. The Operator will curtail any remaining generation by the CM Units pro rata with that of PVNGS generation until the EOR is within limits or the phase angle is reduced, enabling breakers to be closed.

PVNGS Effects: Curtailment of individual generators

Responsible Parties: APS, PVNGS Operator, PVTS Interconnectors and SRP

Projected Impact on Procedure by PVTS Interconnectors: Incorporated into operating procedure. No additional impact.

B) APS Operating Procedure – Palo Verde Generation Requirements: Procedure to reduce PVNGS generation if required when one or more critical elements of the PVATS are out of service. This generation reduction will prevent unstable system conditions with the loss of another critical element. Upon implementation, PVNGS generation reductions are shared by all PVNGS participants according to their Generation Entitlement Share.

When one or more critical elements of the Palo Verde Area Transmission System are out of service, the Operator will implement congestion management. The Palo Verde/Hassayampa Remedial Action Scheme will be incorporated as appropriate. The Operator will curtail generation by the Congestion Management Units as dictated by the N-1 Analysis of the approved PVTS Operating Study. Then APS ECC will implement the Palo Verde Generation Requirements procedure, curtailing PVNGS generation as necessary to maintain reliability. The Operator shall provide notice of any such CM Unit generation curtailment to the Control Area Operator of each CM Unit as soon as practicable. APS, as the Control Area Operator for PVNGS, shall provide notice of any such PVNGS generation curtailment to the PVNGS Owners as soon as practicable.

PVNGS Effects: Curtailment of total generation.

Responsible Parties: APS, PVNGS Operator, SRP and PVTS Interconnectors

Projected Impact on Procedure by PVTS Interconnectors: Incorporated into operating procedure. No additional impact.

7.3 Communications, Telemetry, and Notification

Reliable methods of communication must be maintained between the Operator, the adjacent Control Areas and the Control Area operator as designated by each PVTS Interconnector at all times. Based on mutual agreement, direct communication capability may be established between the Operator and individual PVTS Interconnectors. Communication consists of the exchange of operating information by voice and data links.

7.3.1 Voice Communication

A dedicated, direct, automatic ring-down trunk (or equivalent) voice circuit is required as the primary means of telephonic communication between the Operator and APS (as PVNGS Control Area operator) or the Control Area operator for each PVTS Interconnector.

A secondary method of telephonic communication is also required. A telephone service provider may provide the secondary communication method. The Operator, each adjacent Control Area operator and the Control Area operator for each PVTS Interconnector must provide and maintain accurate telephone contact information (see Attachment D - Operator Contact Information).

7.3.2 Telemetry

PVNGS operator, APS (as PVNGS Control Area operator), the PVTS Interconnectors, and the Control Area operator for each PVTS Interconnector shall provide the data identified in Attachment B (SRP EMS Generator Remote Control, Metering, Telemetry and Communication) to the Operator's remote terminal unit (RTU) located in the Palo Verde, Hassayampa, or Jojoba 500kV Switchyard.

A secondary method for telemetering instantaneous data will also be provided based on the specifications in Attachment B. At minimum, this secondary method shall be capable of telemetering the PVNGS and each PVTS Interconnector generating plant's net MW and MVAR flow at the Point of Interconnection.

The Control Area operator for PVNGS and each of the PVTS Interconnector generating plants shall be capable of manually providing all of the data required in Attachment B via telephone or other mutually agreed upon method of communication.

7.3.3 Notices

Simultaneous notices required to be made to the Parties may be made by e-mail or Fax, to the e-mail address or attention of a person specified by each Party as the person to receive such notices.

7.3.4 Dissemination of Information

The Operator will utilize information provided by entities doing business on or through the PVTS for system operation and system reliability purposes only. The information provided shall not be disseminated to other entities for non-operational or non-reliability reasons without the permission of the entity involved.

7.4 Outage Scheduling

Scheduled or unscheduled outages of the Interconnection Facilities and facilities included in the PVTS may have a direct effect on the ability of the PVTS Interconnectors to transfer interconnected generation out of the PVTS.

PVNGS operator should reference the existing Palo Verde Switchyard Administrative Control Procedure (40DP-9OP34) when scheduling outages and limitations specific to the Palo Verde 500kV Switchyard.

7.4.1 Work Clearances

The Operator's switching and work clearance procedures apply to all of the PVTS facilities. This includes the Interconnection Facilities that comprise the Point of Interconnection to the PVTS. Reference the "Palo Verde Transmission System Hassayampa Switchyard Clearance, Notification, Line Switching and Testing Procedure, Revision 1" for detailed information and clearance requirements for the Hassayampa Switchyard.

7.4.2 Outage Information

Scheduled and unscheduled outage information for the PVNGS, the Congestion Management Units, the PV-West transmission system and the PVTS facilities must be communicated between the Operator, the adjacent Control Area operators and the Control Area operator for each PVTS Interconnector generating plant. The following information will be required for all outages:

- Station Name or Line Location, including Voltage level
- Type of Outage Request (Clearance, Test Permit, Hold Tag, etc.)
- Equipment to be Taken Out of Service (isolation points)
- Work to be Performed; Reason for the outage

- Outage impacts (transmission transfer capability, generator output, etc.)
- Requested Outage Start and End Dates, and Times
- Emergency Return to Service time estimate
- Miscellaneous Information (testing requirements, etc.)
- Point of Contact Information (Name of Outage Requester, Email, Phone Number, etc.)

7.4.3 Outage Requests & Notification

Planned outages are scheduled to the best ability of the Operator. The Operator may cancel or postpone outages based on changing local or remote system conditions, or as directed by the WECC Reliability Coordinator.

A) Attachment D - Operator Contact Information, lists all E-mail addresses, Phone and FAX numbers for operational issues.

B) All planned outage requests shall be directed to the Operator's Outage Coordinator in writing, by E-mail or FAX.

C) Verbal confirmation of the outage information will be made between the Operator's Outage Coordinator and the Party scheduling the outage.

D) Verbal requests will not be granted for planned maintenance outages.

E) Emergency outage requests may be made verbally.

7.4.4 Long Term Maintenance Outage Scheduling

Requests for outages with a duration greater than 1 week and/or outages expected to commence more than 2 weeks in the future should be scheduled via the Long Term Maintenance Outage Scheduling process. Once accepted by the Operator in the Long Term Maintenance Outage Scheduling queue, the Operator will automatically include the outages in the Short Term Maintenance Outage Scheduling process.

All outages will be coordinated to the maximum extent possible to minimize system impacts (e.g. an outage on a Hassayampa 500kV Switchyard circuit breaker and an outage of the associated tie line may be coordinated).

A) The Outage Coordinator for PVNGS and each of the PVTS Interconnectors will provide planned outage information to the Operator for a rolling 12-month period in a form similar to that of Attachment F – Outage Information Form.

B) The Operator, the Outage Coordinator of the Control Area for PVNGS, and each of the PVTS Interconnectors will use best efforts to provide a minimum of 3 months notice prior to the start of a planned outage of duration greater than 1 week.

C) The Outage Coordinator of the Control Area for PVNGS and each of the PVTS Interconnectors shall provide a written reminder and a verbal confirmation of the outage request to the Operator with a minimum of 72 hours notice prior to the start of the scheduled outage, and a maximum of 2 weeks notice.

D) Outages may be requested up to a maximum of 12 months in advance.

E) Long Term outages may require an operating study to determine the impact to the system

F) The Operator will gather the outage information provided, assess potential overlap and estimate the impact to Simultaneous Generating Capability (SGC). At minimum, the Operator will release the new SGC estimate to the Outage Coordinator of the Control Area operator for PVNGS and the PVTS Interconnectors.

7.4.5 Short Term Maintenance Outage Scheduling

Outage requests of duration less than or equal to 1 week and/or requested to occur within the next 2 weeks may be scheduled via the Short Term Maintenance Outage Scheduling process.

All outages will be coordinated to the maximum extent possible to minimize system impacts.

A) The Outage Coordinator of the Control Area for PVNGS, and each of the PVTS Interconnectors shall provide the Operator with a minimum of 72 hours notice prior to the start of a scheduled outage. Notification must be provided for all outages including scheduled outages that were a part of the long-term maintenance scheduling process.

B) The Outage Coordinator of the Control Area for PVNGS and each PVTS Interconnector shall provide the Operator with a written request and a verbal confirmation for a scheduled outage.

C) The Operator, PVNGS operator, and the PVTS Interconnectors shall provide a maximum of 2 weeks notice prior to the start of a scheduled outage.

D) Short Term outages may require an operating study to determine the impact of a contingency on the system during one or more planned outages.

E) The Operator will gather the outage information provided, assess potential overlap and estimate the impact to SGC. At minimum, the Operator will release the new SGC estimate to the Outage Coordinators of the Control Area operators for PVNGS and the PVTS Interconnectors.

7.4.6 Emergency Outages

A) Outages with less than 72 hours notice prior to the start of the outage constitute an Emergency outage.

B) The Outage Coordinator of the Control Area for PVNGS and each of the PVTS Interconnectors will provide information relative to an emergency outage prior to the start of the outage when possible. The Operator will gather the Emergency outage information provided, assess potential overlap, estimate the impact to SGC, and release the new SGC estimate to the Outage Coordinators of the Control Areas for PVNGS and the PVTS Interconnectors when possible.

C) If it is not possible for one Party to contact the Operator or other Parties prior to the start of the outage, the Party taking the emergency outage will contact the Operator and other Parties as soon as possible after the outage commences.

7.5 Interchange Scheduling Procedures

As Host Control Area and Operating Agent of the PVTS, the Operator shall satisfy all interchange scheduling requirements as defined by NERC, WECC, and the PVTS Operating Procedures.

The scheduling responsibilities of the Operator include, but are not limited to, verifying all Interchange Transactions between adjacent Control Areas are correct, tracking energy transactions at the Palo Verde/Hassayampa Common Bus, and tracking wheeling on the Palo Verde Transmission System. These scheduling processes are performed prior to schedule implementation, during real-time, and on an after-the-fact basis.

7.5.1 Normal Scheduling Procedures and Conditions

A) Submittal of Interchange Transaction information must be consistent with NERC and WECC Standards, Policies, Procedures, and Business Practices.

B) The maximum transfer capability of the VTS is determined by two separate components:

1) Simultaneous Generating Capability (SGC) based on all online generators connected to the PVTS.

2) Non-simultaneous transfer limits established for the VTS and the PV-West transmission system with "all facilities in-service", under normal operating

conditions as established by NERC and WECC procedures.

C) The Operator is required to maintain generation schedules at or below the total SGC and individual CMGC limits dictated by the *PVTS Operating Study* (see Attachment C). The SGC and the CMGC values will change based on system conditions.

D) The Operator is required to maintain transmission schedules at or below the non-simultaneous transfer limits, and maintain actual transmission flows at or below the limits dictated by the *PVTS Operating Study.*

E) PVNGS generation will be accommodated under Normal Scheduling procedures. However, PVNGS will be subject to curtailment under Abnormal and Emergency scheduling procedures.

7.5.2 Abnormal Scheduling Procedures

The Operator shall abide by NERC and WECC Standards, Policies and Procedures regarding scheduling and dispatch during abnormal operating conditions.

Abnormal operating conditions may decrease transfer capability and require schedule curtailments to alleviate overloading and/or over-scheduling. The Operator may request that Transmission Providers on the PVTS curtail transmission reservations. Control Areas for the PVTS Interconnectors may need to curtail energy schedules on a pre-schedule or real-time basis.

PVNGS generation may be subject to curtailment.

The planned loss of one or more PVTS or PV-West transmission system elements or generators is considered an "abnormal" condition. The maximum transfer capability of the VTS is determined by two separate components under the specified "abnormal" condition:

- SGC based on all online generators connected to the PVTS.
- Non-simultaneous transfer limits established for the VTS and the PV-West transmission systems under planned outage conditions as established by NERC and WECC procedures.

A) Based on the existing procedures that address abnormal operating conditions, the Operator may take one or more of the following actions:

1) The Operator will verify existing East-to-West schedules are within the Transmission owner's scheduling rights.

2) When APS requests curtailments to the EOR based on abnormal operating conditions as supported by the Arizona Security Monitoring Manual, the

Operator is required to curtail on a pro rata basis, PV–West schedules that are flowing East-to-West out of PV/HAA.

3) Additionally, the Operator may be required to curtail West-to-East schedules through the VTS (or schedules with a PV/HAA points of receipt that sink East or North of PV/HAA) if they have been shown by the VTS Operating Study to contribute to the overload.

B) When APS determines non-compliance with the Operating Transfer Capability (OTC) limit for the EOR, the Operator is required to curtail schedules to reduce flow below the OTC limit.

C) APS OP #40AO-9ZZ25 – ECC Directed Turbine Unloading. If APS has not already implemented this procedure, the Operator may request implementation when:

1) The restoration of the Arizona–California interconnection (EOR or PV–West) has been unsuccessful.

2) Two or more lines of the Arizona–California Transmission System are out of service and the phase angle across open breakers is too large, preventing the breakers from closing.

D) WECC Unscheduled Flow Mitigation Procedure – When this procedure is implemented by the Qualified Transfer Path operator:

The Operator will, as requested by the Qualified Transfer Path operator, curtail its contributing schedules over other paths to reduce unscheduled flow on the Qualified Transfer Path. It is up to each individual Sink Control Area receiving schedules across the VTS to make the appropriate schedule cuts based on the Procedure.

E) Palo Verde Generation Requirements – When this procedure is implemented by APS ECC:

PVNGS operator will reduce generation to the levels determined by operating studies to avoid unstable system conditions in the event of a critical contingency that would result in one or more Palo Verde Area Transmission System elements out of service.

APS ECC shall give notice of such curtailment to the Parties as soon as practicable.

7.5.3 Emergency Scheduling Procedures

The Control Area Operator for the PVTS shall abide by NERC and WECC Standards, Policies and Procedures regarding scheduling and dispatch during an Operating Emergency.

The unplanned loss of one or more PVTS or PV-West Transmission System elements, PVNGS units, or CM Units is considered an "emergency" condition. The maximum transfer capability of the PVTS is determined by two separate components under the specified "emergency" condition:

- SGC based on all online generators connected to the PVTS.
- Non-simultaneous transfer limits established for the VTS and the PV-West Transmission Systems under unplanned outage conditions as established by NERC and WECC procedures.

Decreased transfer capability may require Transmission Providers to curtail transmission reservations and Control Areas for the PVTS Interconnectors to curtail energy schedules on a real-time basis.

PVNGS generation may be subject to curtailment.

Based on the existing procedures that address emergency operating conditions, the Operator may take one or more of the following actions:

A) The Operator is required to curtail transmission schedules on the VTS from PV/HAA and Jojoba as dictated by the operating conditions.

B) EOR Reduction Procedure: APS consults with CISO about EOR loading prior to utilizing this procedure:

1) When APS invokes the procedure to relieve EOR loading, APS, CISO, LADWP & SRP immediately implement West-to-East Control Area Interchange Schedules in the pre-defined percentages below:
   - 50% of total schedule reduction will be from CISO to SRP at PV/HAA
   - 10% of total schedule reduction will be from CISO to APS at PV/HAA
   - 40% of total schedule reduction will be from LADWP to APS at Navajo (PV/HAA may be used as alternate delivery point)

2) APS will inform CISO, SRP and LADWP of the time when these interchange schedules can go to zero (0).

3) These emergency schedules should not be required for more than the duration of the scheduling hour immediately following the hour in which the overload condition started.

8 CONGESTION MANAGEMENT

Prior to the construction of the Hassayampa Switchyard and its subsequent interconnections, congestion management of the Valley Transmission System was limited to the Total Transfer Capability of the system. Since then, the *PVTS Operating Study* has identified additional operating restrictions for the Palo Verde Transmission System based on analysis conducted in compliance with WECC Minimum Operating Reliability Criteria.

The additional operating restrictions are a result of the potential loss of the Hassayampa-North Gila 500kV line due to a 3-phase fault near PV/HAA when all transmission system elements on the PVATS are in-service. The total generation being injected into the PVTS must be limited to mitigate the effects of this potential contingency. The existing PVTS Remedial Action Scheme (RAS) provides no benefit since it was not designed to address the Hassayampa-North Gila 500kV outage.

When all transmission system elements of the PVATS are not in-service, the critical outage can become the simultaneous loss of both Palo Verde-Westwing 500kV transmission lines. This potential double contingency must currently be accommodated by: (1) limiting the total generation being injected into the PVTS or (2) utilizing the PVTS Remedial Action Scheme (RAS) to trip a specified amount of generation by the armed Congestion Management Units. The operation of the RAS and the subsequent tripping of generation will only occur as a result of the unplanned loss of both Palo Verde-Westwing 500kV lines. The Operator shall maintain the VTS within the safe operating range as defined by the *PVTS Operating Study* values and the congestion management procedures. Deviations from this requirement will only occur during emergency transient conditions. The Operator will restore the system to the safe operating range as soon as possible. All PVTS Interconnectors, PVNGS Operator, and VTS Owners are required to comply with the Operator's directions based on established agreements and procedures.

The following four operating phases define the Congestion Management concepts that the Operator will use to maintain the security of the Valley Transmission System. The SGC values associated with each of the phases are derived from the *PVTS Operating Study* (see Attachment C).

8.1 Operating Phase I: No Congestion.

No congestion management procedures are required at or below a specific level of online generation by the Congestion Management Units as defined by the *PVTS Operating Study.*

Phase I Operation - Monitoring as described in Section 8.8 consists of monitoring system conditions and identifying when Phase II or Phase III operation is required.

8.2 Operating Phase II: Congestion Management is required.

Phase II congestion management is required when:

- Total scheduled or actual generation by PVNGS and the Congestion Management Units would otherwise exceed the Simultaneous Generating Capability (SGC) limit

defined by the *PVTS Operating Study.*

and/or

- An individual PVTS Interconnector generating plant exceeds its actual or scheduled Congestion Management Generating Capability (CMGC).

and

- A Remedial Action Scheme is not available or out of service.

The Operator shall initiate Congestion Management on the PVTS by limiting generation schedules to ensure the SGC and CMGC values are not exceeded.

The CMGC Enforcement procedures identified in Section 8.9 are utilized to accommodate Phase II operation.

8.3 Operating Phase III: Congestion Management is required.

Phase III congestion management is required when:

- Total scheduled or actual generation by PVNGS and the Congestion Management Units would otherwise exceed the Simultaneous Generating Capability (SGC) defined by the *PVTS Operating Study.*

and/or

- An individual PVTS Interconnector generating plant exceeds its actual or scheduled Congestion Management Generating Capability (CMGC).

and

- A Remedial Action Scheme is available for service.

The Operator shall initiate Congestion Management on the PVTS by limiting generation schedules to within the SGC and CMGC values. The RAS Implementation procedures identified in Section 8.10 are utilized to accommodate Phase III operation.

8.4 Operating Phase IV: Congestion Management is required.

Phase IV congestion management is required when:

- Total scheduled or actual generation by PVNGS and the PVTS Interconnector generating plants would otherwise exceed the maximum SGC allowed with a remedial action scheme already armed to trip generating units, as defined by the *PVTS Operating Study.*

The Operator shall uphold Congestion Management on the PVTS by denying any additional generation schedules to ensure that the maximum SGC allowed with an armed RAS shall not be exceeded.

No other enforcement procedures are necessary for Phase IV operation.

8.5 Simultaneous Generating Capability and SGC Allocations

The dynamic performance of online PVTS interconnected generating units during a disturbance is a major influence on the SGC limit. The *PVTS Operating Study* demonstrates that the performance of the PVNGS units can increase the transmission system's ability to accommodate additional generator output and that the performance of the Congestion Management Units provides an incremental increase in SGC.

Phase II was created as an interim operating phase to maintain reliability through generation restrictions whenever a RAS is not available for any reason. Phase II incorporates the Simultaneous Generating Capability Allocation (SGCA), a pro rata allocation of SGC to the PVTS Interconnectors' generating plants based on modeled performance by the CM Units and the qualified maximum output (Section 8.6.1.A.) of those units. SGC is distributed based on accommodating maximum available PVNGS generation and allocating the remaining capability to each of the Congestion Management Units.

Unit performance was gauged during the *PVTS Operating Study* by modeling the various generating units that were directly and remotely connected to the PV/HAA Common Bus. This analysis determined that Congestion Management Units of a similar size and type that were directly connected to the PV/HAA Common Bus had a similar impact to the SGC limit. Congestion Management Units remotely connected to the PV/HAA Common Bus had less impact on PVTS stability. CM Unit performance is affected by several factors, and varies based on the PVATS configuration: 1) the unit's location on the network, 2) the impedance between the unit and the PV/HAA Common Bus, the impedance between the unit and the source of the problem. A radially connected unit will inject 100% of its capability into the PV/HAA Common Bus. A unit not radially connected will inject less than 100% of its capability into the PV/HAA Common Bus. The *PVTS Operating Study* identifies the ability of each CM Unit to increase the stability limit at the PV/HAA Common Bus as compared to the rest of the CM Units. The Procedure factors that relationship into the Congestion Management Generating Capability (CMGC) through the Congestion Management Contribution (CMC, reference Table 1-CMC and Section 8.9).

Operationally, the SGC limit is incrementally expanded for each Congestion Management Unit brought online. CMGC will be revised in the Day Ahead and Current Day congestion management process to facilitate maximum utilization of the SGC. Allocation of SGC provides only for the operation of PVNGS generation and the PVTS Interconnectors generating plants in a safe operating range. SGCA does not confer or create any transmission rights on the PVTS.

Every generator connected to the PVTS is subject to the applicable Scheduling Procedures, which may require curtailments during abnormal and emergency conditions. Curtailments are applied independent from the SGC allocation process.

8.6 Required Information Exchange

8.6.1 General

Certain information is common to all operating phases of the congestion management procedure. This information must be exchanged between the Operator and the PVTS Interconnectors or APS as operator of PVNGS.

A) Each Congestion Management (CM) Unit must have an established capability rating that has been submitted to the Operator on a Resource Qualification Form (Attachment E).

1) The initial capability rating for each CM Unit will be based on the data submitted to the Operator for the *PVTS Operating Study.*

A Resource Qualification Form for the CM Unit must be submitted to the Operator within 45 days of the commercial operation date.. The information on the form will be based on unit testing performed to determine the generator's net generation capability at the Point of Interconnection.

2) If the Resource Qualification Form is not submitted on or before the deadline, SRP, as the Operator, will provide the capability rating. The capability rating will be based on the best four hourly integrated values gathered from the SRP Energy Management System (EMS) within the season in question and implemented as soon as practical after the deadline. The PVTS Interconnector will retain the option to provide a rating capacity that would replace the value obtained by the Operator.

3) A CM Unit may have both a Summer and Winter capability rating; however, testing must be performed at least every two years to determine each rating. If only one rating is used, testing must be performed during the period of May 1 through September 30. Results of the CM Unit testing must be recorded on the Resource Qualification Form and submitted to the Operator before it will be factored into the SGC allocation process.

4) The capability test duration shall be four consecutive hours. The lowest hourly integrated value of the net output of the CM Unit during the four-hour test period shall be used as that CM Unit's maximum capability.

5) Energy Management System (EMS) data shall be acceptable as proof of unit output capability. Actual printouts from EMS systems or other

documentation supporting the current rating must be made available for review upon request by the Operator.

B) All interchange transactions originating from generation connected to the PVTS will be E-Tagged per the specifications and timelines defined in NERC Policy 3.

1) Energy profiles associated with the submitted E-Tags will be used to:

- Determine which congestion management operating phase is in effect
- Determine PVTS Interconnector compliance to their CMGC

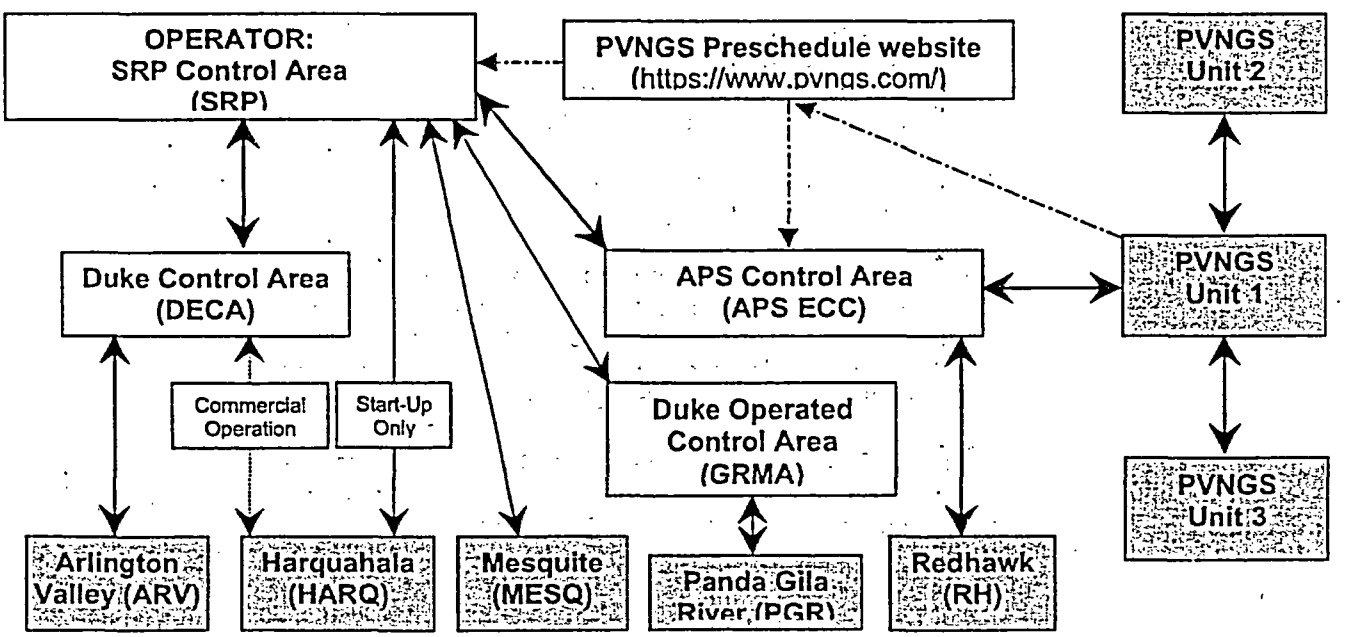
2) The Host Control Area for a generating unit connected to the PVTS will be shown as the Generating Control Area (GCA) on the E-Tag.

3) The name of the CM Unit(s) will be registered with NERC as a Source (www.TSIN.com) and included on the E-Tag.

C) The Operator has developed timelines (Sections 8.6.2 and 8.6.3) and forms for the exchange of congestion management data with the required entities. Each PVTS Interconnector must submit the required information to the Operator to obtain an SGC Allocation in the Day Ahead process. The absence of a valid submittal during the congestion management process is treated as a request for zero allocation for that prescheduled day.

D) The Operator shall communicate to the PVTS Interconnectors and the PVNGS operator through their Control Area Operators in a manner similar to that of Figure 3 below.

Figure 3 – Scheduling Information Exchange Path



Congestion Management Units

8.6.2 One Day Ahead Information Exchange

Information exchange and scheduling functions use the 24-hour clock format. Deadlines in this section occur one day prior to the scheduling day in which the information applies. For example, "Prior to 0700 hrs, one day ahead" would mean prior to 7:00am on Monday for Tuesday. Current WECC scheduling practices include prescheduling two full days on the Thursday and Friday of each non-holiday week. Thursday preschedules address activity on Friday and Saturday, while Friday preschedules address activity on Sunday and Monday. Deadlines for these submittals are 0700 hrs on Thursday for Fridays and Saturdays, and 0700 hrs on Friday for Sundays and Mondays. Holiday preschedules must be submitted by 0700 hrs according to the WECC Prescheduling Calendar. The WECC Prescheduling Calendar identifies NERC Holidays and specific meetings that impact normal prescheduling. Detailed information can be found at: http://www.wecc.biz

The timing below applies to all prescheduled information.

A) Prior to 0700 hrs one day ahead, the PVNGS operator and each PVTS Interconnector respectively must provide the following information:

1) The PVNGS operator shall provide the operating status (units to be synchronized during each scheduling hour and the maximum available generating capability) of PVNGS for each hour of the scheduling day.

2) Each PVTS Interconnector shall provide the operating status (units to be synchronized during each scheduling hour and the maximum available generating capability) of each of its individual CM Units for each hour of the scheduling day.

3) Estimated maximum megawatt output of each CM Unit for each hour of the scheduling day. The estimated maximum megawatt output for a CM Unit may not exceed its anticipated maximum available generating capability nor the value on its Resource Qualification Form.

4) Specific unit(s) that are designated for RAS arming in the order in which they will be armed.

5) PVTS Interconnectors may agree to trade Arming Responsibilities based on bi-lateral agreements. Both parties involved in the agreement must confirm this arming information to the Operator in writing. Notification to the Operator shall include the maximum amount to be armed for the other party, the date and/or scheduling hours of the agreement.

B) Prior to 0800 hrs one day ahead, the Operator will provide the PVNGS operator and each of the PVTS Interconnectors with the following information, as it pertains to their respective generating units:

1) Total estimated maximum megawatt output from PVNGS and the Congestion Management Units for each hour of the scheduling day.

2) SGC for each hour of the scheduling day. The Operator is responsible to interpret operating information (e.g. nomograms or tables) to determine the SGC.

3) SGCA for each PVTS Interconnector generating plant for each hour of the scheduling day.

4) Amount of each PVTS Interconnector generating plant's hourly generation estimate in excess of its SGCA (as required). The Operator communicates this as the difference between the estimated maximum generation output and the SGC Allocation. A negative number reflects a deficiency in SGCA, which must be resolved by:

   - unit arming,
   - exchanging Coordinated SGCA, or
   - reducing generation (curtailment)

5) The Arming Responsibility of each PVTS Interconnector for each hour of the scheduling day.

   - Arming Responsibility is calculated based on the Day Ahead congestion management data submitted by the PVTS Interconnectors.
   - The level of CM Unit arming for RAS tripping must be equal to or greater than the calculated Arming Responsibility.
   - Margin is added to the total Arming Responsibility as required to remain compliant with WECC RAS requirements..
   - The PVTS Interconnectors will arm CM Units for the RAS based on this published list of hourly values unless system conditions or unit status changes.
   - When system conditions change, or a CM Unit status changes, the Operator will communicate the new requirements to the Control Area operators of the PVTS Interconnectors.

6) The Operator will make best efforts to inform the PVTS Interconnectors of any changes to the SGC and SGCA after 0800 one day ahead.

C) Prior to 0900 hrs one day ahead, the PVTS Interconnectors will provide information about Coordinated SGCA to the Operator in writing via fax or email.

Both parties to the Coordinated SGCA exchange must notify the Operator in writing. The Operator will modify hourly CMGC scheduling limits based on data that agrees.

D) Prior to 1000 hrs one day ahead, the Operator will provide to each PVTS Interconnector:

1) Arming Responsibility modifications, if required due to the update of Coordinated SGCA.

2) The final hourly CMGC, which includes the generation capability, created by unit arming, and is the maximum limit that the hourly energy schedule for each PVTS Interconnector generating plant will be compared against.

8.6.3 Current Day Information Exchange

The times listed below represent the amount of time prior to the start of the hour in which the listed information must be provided. For example, "Prior to 50 Minutes before the Start of the Scheduling Hour" would mean by 7:10am for the scheduling hour starting at 8:00am.

A) Prior to 50 minutes before the start of the scheduling hour:

- The PVNGS operator will provide any changes to the PVNGS current generation schedule through an email notice of an update to the PVNGS prescheduling website (www.pvngs.com).

- The PVTS Interconnectors will provide information about Coordinated SGCA to the Operator in writing via email or fax, followed by a phone call to verify receipt.

B) Prior to 40 minutes before the start of the scheduling hour, the Operator will provide a CMGC to each of the PVTS Interconnector generating plants based on anticipated changes to PVNGS generation, Coordinated SGCA and Arming Responsibility (if required).

C) Information resulting from unplanned outages or system emergencies that may effect PVTS congestion management will be communicated by the Operator as soon as practical.

8.7 Congestion Management Process – Monitoring and Checkout

8.7.1 Concept

The Operator must administer two types of congestion management on the VTS and the Palo Verde/Hassayampa Common Bus:

A) Net scheduled and actual generation from PVNGS and Congestion Management Units must be equal to or less than the SGC.

B) Net Scheduled Interchange on the VTS must be equal to or less than the VTS Non-Simultaneous Total Transfer Capability (TTC).

8.7.2 Process

A) The Operator will continually monitor the following information for congestion management purposes:

1) Non-Simultaneous TTC of the VTS

CISO has responsibility to monitor the Non-Simultaneous Limit of the PV-West transmission system.

2) Net Scheduled Interchange through the VTS and the Palo Verde/ Hassayampa Common Bus.

3) Net of each individual VTS Owner's Interchange Transactions on the VTS versus their ownership rights.

Any Interchange Transactions on the VTS, which include the VTS owner as the Transmission Provider, are included in that owner's net.

4) SGC of the VTS based on the *PVTS Operating Study.*

5) Net generation from PVNGS and the CM Units.

6) CMGC for each individual PVTS Interconnector generating plant.

7) RAS Arming Responsibility and the unit arming response of each CM Unit.

B) VTS Non-Simultaneous TTC Hourly Checkout

The Operator performs the following checkout prior to 10 minutes before the start of each scheduling hour:

1) Non-Simultaneous TTC of the VTS and each VTS owner's rights to the capability are determined.

2) Net of each VTS owner's Interchange Transactions is compared against the Owner's VTS rights.

3) If the net of the VTS owner's Interchange Transactions exceed the owner's rights, the owner is requested to reduce the net of its Interchange Transactions to an amount equal to or less than their VTS rights.

C) PVTS SGC Hourly Checkout

The Operator performs the following checkout prior to 10 minutes before the start of each scheduling hour:

1) The SGC is verified for the PVTS based on the *PVTS Operating Study.*

2) Each PVTS Interconnector generating plant's CMGC is verified. The CMGC may have been modified from the Day Ahead prescheduled value if required due to system conditions, Coordinated SGCA or changes to the current PVNGS generation schedule.

3) Each PVTS Interconnector generating plant's output schedule is compared to its CMGC.

4) If the PVTS Interconnector generating plant's output schedule exceeds the CMGC, congestion management Phase II or Phase III operation shall be implemented.

- If the RAS is available to be placed in service for Phase III congestion management, the Arming Responsibility is verified for each PVTS Interconnector CM Unit.

- The Operator will request additional arming of CM Units as required to promote maximum utilization of the available SGC.

- If the RAS is unavailable, or there is inadequate generation armed to trip for Phase III, operation will automatically revert to Phase II of congestion management. The Operator will curtail the CM Units as required to maintain operation within the CMGC limits.

D) Interchange Schedule verification after the fact is covered by the referenced Hassayampa Interconnector Meter Reconciliation Procedure.

8.8 Phase I Operation – Monitoring

8.8.1 Concepts

Phase I operation will be utilized when the total net generation by PVNGS and the CM Units is within the safe operating range defined by the *PVTS Operating Study.*

8.8.2 Procedure

The Operator will continually monitor system parameters to determine if congestion management Phase II or Phase III operation is required.

8.9 Phase II Operation – CMGC Enforcement

8.9.1 Concepts

A) Phase II operation will be utilized when:

1) The total net generation by PVNGS and the Congestion Management Units would otherwise be outside the safe operating range as defined by the *VTS Operating Study.*

2) A RAS is not available.

3) A PVTS Interconnector elects to curtail generation from a CM Unit in lieu of arming units for the RAS.

B) PVNGS maximum available generation will be accommodated prior to generation from the CM Units.

C) SGC Allocation (SGCA)

The remaining SGC will be allocated to the PVTS Interconnector's generating plants based on results from the *PVTS Operating Study*, used in the following SGCA calculation:

1) The incremental increase in SGC due to bringing a CM Unit online, as identified by the *PVTS Operating Study*

divided by

2) The total increase in SGC due to bringing online all of the CM Units expected to be online.

Multiplied by

3) The SGC that remains after subtracting the SGC required to accommodate maximum available PVNGS generation.

4) CM Units that have a CMC of less than 100% may generate more than their SGCA without the benefit gained by arming or Coordinated SGCA. That capability is captured in the calculation of CMGC.

D) Unscheduled SGC due to a PVNGS outage or curtailment is automatically rolled into the SGCA calculation through an update to the maximum available PVNGS generation value supplied to the Operator.

1) The PVNGS operator may reclaim its SGCA as needed once the outage or curtailment has ended by prescheduling its return during the Day-Ahead process according to an ascension plan.

2) The PVNGS operator must provide its planned hourly generation schedule as far in advance as possible but no later than 50 minutes prior to the start of the scheduling hour.

3) The PVNGS operator may not modify its SGCA within 50 minutes before the start of the scheduling hour. The SGCA must be modified in the following scheduling hour.

E) Coordinated SGCA may be exchanged between PVTS Interconnectors in order to obtain additional generating capability on the PVTS.

1) Both parties to the arrangement must agree on the amount and the timeframe.

2) Both parties must notify the Operator in writing via email or fax, followed by a phone call to verify receipt.

3) Coordinated SGCA is included in the calculation of CMGC for each PVTS Interconnector's generating plant.

4) Only PVTS Interconnectors may schedule Coordinated SGCA.

F) Congestion Management Generating Capability (CMGC)

The Operator will manage congestion at the individual plant level by ensuring that each PVTS Interconnector generating plant does not exceed its CMGC. The CMGC calculation is as follows:

CMGC = SGCA/CMC ± Coordinated SGCA/CMC + (Pro rata allocation of generating capability created by unit arming)/CMC. The CMC developed for each PVTS Interconnector CM Unit is used in the CMGC calculation to translate equivalent generation at the PV/HAA Common Bus into the hourly maximum generating limit for the PVTS Interconnector's plant. PVTS Interconnectors CM Units that have a CMC of less than 100% may generate more than the sum of their SGCA, without obtaining Coordinated SGCA or a benefit from unit arming.

8.9.2 Procedure

A) One Day Ahead

1) All Interchange Transactions originating from each individual PVTS Interconnector generating plant shall be E-Tagged.

- The E-Tag transaction path shall indicate the appropriate information such that the Operator can easily identify the CM Unit(s) as the generator of the Interchange Transaction.
- Dynamic Schedules are included in this requirement.

2) The Operator shall receive E-Tags for each PVTS Interconnector generating plant and compare each hour's total energy transaction amount with its CMGC.

E-Tags must be submitted in accordance with the WECC timetable defined in NERC Policy 3.

3) If a PVTS Interconnector's generating plant Interchange Transaction total for a given hour exceeds its CMGC, the E-Tag creating the overage will be denied by the Operator.

4) Changes in SGC and SGCA after 1000 hrs one day ahead of the scheduling day will be administered by the Operator during the current day congestion management process.

B) Current Day

1) All Interchange Transactions originating from an individual PVTS Interconnector generating plant shall be E-Tagged as described in Section 8.9.2 A), One Day Ahead Procedure.

2) The Operator shall receive E-Tags for each PVTS Interconnector generating plant and compare each hour's total energy transaction amount with its CMGC.

E-Tags must be submitted in accordance with the WECC timetable defined in NERC Policy 3.

3) If a PVTS Interconnector generating plant's Interchange Transaction total for a given hour exceeds its CMGC, the E-Tag creating the overage will be denied by the Operator.

8.10 Phase III Operation – RAS Implementation

8.10.1 Concepts

A) Unit tripping to maintain system stability will be applied to the combustion turbines and steam generators of PVTS Interconnectors. In the event of a specific transmission contingency, all generating units armed to trip will be tripped.

B) PVNGS units are not included in the RAS.

C) The RAS automatically monitors the VTS and is ready to send a trip signal to the armed CM Units whenever all of the following inputs are present:

- Three PVNGS units are online

and

- Four-500kV breakers in the Palo Verde Switchyard on the Westwing lines are open

and

- Palo Verde Switchyard voltage drops to less than 310kV line-to-line (or 180kV line-to-ground)D) PVTS Interconnectors may elect to curtail their generation in lieu of arming their units to trip.

8.10.2 Procedure

A) The Operator will review system variables on a real-time basis.

B) The Operator will determine the SGC based on the *PVTS Operating Study*. If the total scheduled or actual generation from PVNGS and the PVTS Interconnector's generating plant exceeds the SGC, arming of the RAS will be required.

C) The Operator will determine the amount of generation to be tripped by the RAS.

The amount of generation armed to trip is the Arming Responsibility calculated for each PVTS Interconnector based on current actual generation by the CM Units or their scheduled generation for a given hour from the congestion management data received during the Day Ahead process.

Arming Responsibility

The primary method for administering Arming Responsibility is described below and shall be the default method in the event of any dispute over an alternate arming plan or procedure:

1) Total scheduled or actual generation greater than the sum of SGCA plus the Coordinated SGCA for each PVTS Interconnector generating plant in a given hour.

divided by

2) Total scheduled or actual generation greater than the sum of SGCA for all of the CM Unit in a given hour.

multiplied by

3) Total Arming Requirement as dictated by the *PVTS Operating Study*

divided by

4) CMC developed for each individual CM Unit.

D) The Operator will notify each PVTS Interconnector of its Arming Responsibility.

1) On a pre-schedule basis, each PVTS Interconnector must either:

- Arm an amount of its generation equal to or greater than its Arming Responsibility, or,
- Curtail generation to less than or equal to its PVTS Interconnector's generating plant CMGC with zero arming benefit.

2) When changes occur real-time, the PVTS Interconnectors must arm to trip an amount of their generation equal to or greater than their Arming Responsibility, or curtail generation. The Operator will call for the immediate arming of additional CM Units as required to maximize the SGC of the PVTS Interconnectors.

3) The PVTS Interconnectors may make arrangements between themselves to arm generation in another manner, provided the total Arming Responsibility is accomplished for every hour that arming is required.

The Operator will make best efforts to support an alternate plan for the administration of Arming Responsibility. The plan should be in writing and mutually agreed to by all of PVTS Interconnectors having synchronized CM Units governed by this revision of the IS&CM Procedure.

Significant changes to the unit arming schemes of the PVTS Interconnectors may require additional operating studies and WECC RAS Task Force review.

E) The Operator can arm the RAS to operate based on a predetermined system contingency.

F) Each PVTS Interconnector will select enough generation to trip via the RAS to accommodate a minimum of its Arming Responsibility.

1) If unit arming is required as a result of total scheduled generation exceeding the SGC, the PVTS Interconnector must arm CM Units to trip prior to 10 minutes before the start of the hour for which the total scheduled generation value applies, or curtail generation.

2) If unit arming is required as a result of total actual generation exceeding the SGC, the PVTS Interconnector must immediately arm CM Units to trip or immediately curtail generation.

3) The Operator will receive an indication of which CM Unit(s) the PVTS Interconnector has armed to trip. Armed units are monitored by the Operator to verify that the appropriate level of protection is in place at all times to accommodate the hourly generation schedules.

G) The Operator may take the RAS out of service for maintenance or operational issues once it is determined that the scheduled or actual generation will not exceed the SGC.

1) The Operator will notify the Control Area Operator of each PVTS Interconnector to de-select its CM Units from the RAS. The Operator may also release an existing generation curtailment.

2) The Operator will receive indication that the units have been deselected from the RAS.

H) If there is disagreement between the Operator and the PVTS Interconnector concerning implementation of the RAS or unit arming, the Operator's decision will prevail.

The Operator's management shall review all disagreements concerning the RAS as soon as possible.

8.11 Palo Verde/Hassayampa Common Bus Transmission Service Charges

The Palo Verde/Hassayampa Common Bus is treated as a single point of receipt and a single point of delivery for transactions scheduled to or from the Common Bus. No

transmission charges are associated with transmission service within the Common Bus facilities and the absence of a charge will not be considered a discount for purposes of the Parties' Open Access Transmission Tariffs.

8.12 Loss Charges

Electrical loss factors are reviewed by the Operator and revised as necessary upon approval from the Palo Verde Transmission System Engineering & Operating Committee. *(Section 7.3.2.11, ANPP Valley Transmission System Participation Agreement)*

Electrical losses in regards to use of the Common Bus Arrangement shall be determined in accordance with Good Utility Practice and allocated between the Hassayampa 500kV Switchyard and the ANPP High Voltage Switchyard by the E&O Committee. *(Section 8.2.3, ANPP Hassayampa Switchyard Interconnection Agreement)*

8.13 Station Service and Generator Test Energy

Energy used by an interconnected facility for generator auxiliary loads or other loads must be procured and scheduled in the same manner as any other Interchange Transaction passing through the PVTS.

Test energy must be scheduled through a Host Control Area in the same manner as any other Interchange Transaction passing through the PVTS.

The Operator is under no obligation to provide station service energy or absorb generator test energy into its Control Area.

The Operator may require CM Units under test or generating test energy to be armed and subject to tripping by the RAS throughout the test period.

8.14 Control Area Services

SRP is the host Control Area for the PVTS, with the exception of the Westwing 500kV Switchyard. SRP is not responsible for providing Control Area Services to facilities outside the scope of the SRP defined control area unless contracted to do so.

PVTS Interconnectors shall procure or self-provide the Control Area Services required for interconnected facilities in accordance with the *ANPP Hassayampa Switchyard Interconnection Agreements*. Such Control Area Services must be provided by a WECC certified Control Area.

9 INDEX OF ATTACHMENTS

ATTACHMENT A - OWNERSHIP PERCENTAGE SHARES

Valley and Southwest Valley Transmission System Ownership

VTS Owners (Bi-Directional)	VTS Percent Participat	VTS Total Transfer Capability	SWV Ownership	SWV Total Transfer Capability
Total	100%	5390 MW		1580 MW
APS	34.6%	1865 MW	50.0%	790 MW
SRP	34.6%	1865 MW	50.0%	790 MW
EPE	18.7%	1008 MW		0 MW
PNM	12.1%	652 MW		0 MW

Palo Verde-West Transmission System Ownership

PV–West Owners (Bi-Directional)	Percent Participation	Total Transfer Capability
PV–West Total		2823 MW
PV–DV:		
SCE (CISO*)	100%	1550 MW
PV–NG:	100%	1273 MW
SDGE (CISO*)	76.2%	970 MW
IID	12.8%	163 MW
APS	11.0%	140 MW

* CISO operates and schedules all SCE and SDGE transmission.

ATTACHMENT B - SRP EMS GENERATOR REMOTE CONTROL,

Metering, Telemetry & Communication

The typical data exchange and operational sequences of remote generation communication and control are defined below. Every generator either interconnected to or otherwise contracted with SRP, will require some part or all of the communication and controls listed below

INDICATION OR STATUS POINTS REQUIRED FROM THE GENERATING PLANT TO SRP RTU (DRY CONTACT):

1. **Generator Breaker/Synchronization Indication** -- a contact closure from each generator that indicates that the generator is on line and synchronized to grid.

2. **Generator Step-Up Transformer Disconnect Position** -- a contact closure from each generator that indicates that the generator step-up transformer high side line disconnect is in the closed position.

3. **Net MWHour Metering** -- Tie point KYZ metering pulses. Billing quality required.

4. **Net MVarHour Metering In/Out** -- Two sets of tie point KYZ metering pulses. Billing quality required.

5. **Aux KWHour Metering** -- Tie point KYZ metering pulses. Billing quality required.

6. **RAS Arming Indication** -- A closed contact from plant controller to indicate individual generating unit is disarmed to trip via action of the RAS. This contact opens to indicate that the unit is armed.

ANALOG SIGNALS REQUIRED FROM THE GENERATING PLANT TO SRP RTU (0 +/- 1MA CURRENT LOOP):

1. **Net MW** - - Analog values representing the net generation output for megawatts from each generator or at the tie point. Typically a 0 +/- 1ma but can be 4 to 20 ma with defined offset. Generator outputs trends will be stored SRP EMS for system analysis.

2. **Net MVar In/Out** -- Analog values representing the Var flow output per generator or at the tie point. Typically a 0 +/- 1ma but can be 4 to 20 ma with defined offset. Generator outputs trends will be stored SRP EMS for system analysis.

3. **Auxiliary MW** -- Analog value representing the total auxiliary power consumed by the generating plant or as appropriate. Typically a 0 +/- 1ma but can be 4 to 20 ma with defined offset.

4. **Bus Volts at Control Bus** -- Analog value representing each generator or controlling bus voltage. Typically a 0 +/- 1ma, but can be 4 to 20 ma with defined offset. Generator outputs trends will be stored SRP EMS for system analysis.

5. **Current MW Capacity Upper Limit - Not needed**

6. **Current MVar or Voltage Upper Limit** -- Analog value representing the real time maximum voltage limit on a per generator basis or as appropriate. Typically a 0 +/- 1ma, but can be 4 to 20 ma with defined offset. (The HAA Interconnector may provide this manually.)

CURRENT MVAR OR VOLTAGE LOWER LIMIT: NOT NEEDED

CONTROL OUTPUTS FROM SRP RTU TO PLANT CONTROLS: NOT NEEDED

RFL OR TONE BACKUP VALUES FOR EMS AGC:

1. **Generator or tie line backup analog values** -- Generator Net output and tie line values for MW and MVars will be backed up using tone equipment to transmit values to the EMS.

METERING/TELEMETERING REQUIREMENTS FOR SRP INTERCONNECTION, CONTROL AREA, OR INTERCONNECTED OPERATIONAL SERVICES (IOS) AGREEMENTS:

2. **Interconnection Requirements** -- An "Interconnection Agreement" between SRP and interconnecting generation owners will be required to identify the requirements for the physical interconnection between interconnecting generating resources and the SRP Control Area. The Interconnection Agreement will not address Control Area operational concerns. It only addresses the minimum requirements for reliable interconnection operation.

   Metering /Telemetering Interconnection requirements are listed by reference to the above sections:

   A.1. **Generator Breaker/Synchronization**

   A.2. **Generator Step-Up Transformer Disconnect Position**

   A.7. **Net MWh Metering**

   A.8. **Net MVarh Metering In/Out**

   A.9. **Aux KWh Metering** (if applicable)

   B.1. **Net MW**

   B.2. **MVar In/Out**

   B.3. **Auxiliary MW**

B.4. Bus Volts at Control Bus

Note: Refer to NERC Policy 1H for minimum metering quality specifications.

ATTACHMENT C – PALO VERDE TRANSMISSION SYSTEM OPERATING STUDY RESULTS

ATTACHMENT D – OPERATOR CONTACT INFORMATION

Operator: SRP

Dispatching

Real-Time Generation Desk:

Phone: (602) 236-4346

FAX: (602) 236-3961

Email: srpcao@srpnet.com

Real-Time Transmission Desk:

Phone: (602) 236-4348

FAX: (602) 236-3808

Email: srpcao@srpnet.com

Outage Scheduling

Generation Desk:

Phone: (602) 236-4306

FAX: (602) 236-3961

Email: mccontre@srpnet.com

Transmission Desk:

Phone: (602) 236-6409

FAX: (602) 236-3961

Email: tgoutage@srpnet.com

ATTACHMENT E – RESOURCE QUALIFICATION FORM

Participant Name: _____ **Report Date:** _____

Facility Name and Number	Facility Type	SUMMER		WINTER	
		MAX CAP (Net)	Test Date	MAX CAP (Net)	Test Date

ATTACHMENT F – OUTAGE INFORMATION FORM

Entity Name: _____ **Date:** _____

PVTS INTERCONNECTOR GENERATING UNITS AND TIE LINES --- PLANNED OUTAGES
JANUARY 2003 to DECEMBER 2003

UNIT/TIE LINE OUTAGE	REASON FOR OUTAGE	OUTAGE DURATION (Days)	APPROXIMATE DATES											
			JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
EXAMPLE: REDHAWK - HASSAYAMPA TIE LINE #1	Maintenance	2			15-16									
UNIT 1A GAS TURBINE														
UNIT 1B GAS TURBINE														
UNIT 1 STEAM														
UNIT 2A GAS TURBINE														
UNIT 2B GAS TURBINE														
UNIT 2 STEAM														
TIE LINE #1														
TIE LINE #2														
OTHER														
Last Updated:														