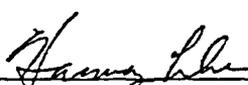
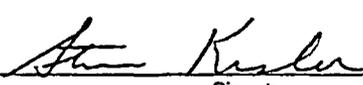
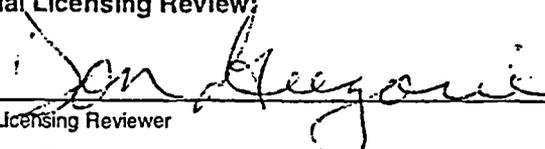


LICENSING DOCUMENT CHANGE REQUEST

I N I T I A T O R	Affected Unit(s): 1, 2, 3	Section(s) Affected (Attach Marked Up Pages): 8.2.2	Log No.: 2003F040
Affected Document <input checked="" type="checkbox"/> UFSAR <input type="checkbox"/> OL <input type="checkbox"/> EPP <input type="checkbox"/> 72.212 Evaluation Report <input type="checkbox"/> TS <input type="checkbox"/> TS Bases <input type="checkbox"/> TRM <input type="checkbox"/> Other _____			
LDCR Related to Plant Change <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO Engineering Doc. No.: <u>N/A</u>			
Estimated Date of Implementation: U1 _____ U2 _____ U3 _____			
Description of Change (Basis / Justification): <p>An updated transmission grid study has been received from Salt River Project to reflect the newly-installed Palo Verde to Rudd 525 kV transmission line and other changes that have been implemented since the previous study referenced in UFSAR section 8.2.2 was performed. The purpose of this LDCR is to replace the old study reference with the new one.</p> <p>The new study is reviewed in 10CFR 50.59 screening S-04-0009, which includes the supporting document list.</p> <p>Additional wording changes address the use of the "Palo Verde Transmission System Interchange Scheduling and Congestion Management Procedure PVTS-01" by transmission personnel to control the amount of generation in the Palo Verde area in order to assure that transmission grid stability requirements are maintained. The use of this procedure was previously reviewed in 10CFR50.59 evaluation E-02-0003.</p>			
For changes to licensing documents, an impact review of all licensing documents must be performed. If a change is required for any other licensing documents, obtain a new LDCR for the required change.			
Other Licensing Document Change Required? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> LDCR No.: _____			
Marked-up pages attached <input checked="" type="checkbox"/> 10 CFR 50.59/72.48 attached <input checked="" type="checkbox"/> No Sig Haz Form (App C) attached <input type="checkbox"/> Supporting Document List attached <input checked="" type="checkbox"/>		If this LDCR was generated as a result of an identified deficiency, list CRDR No. and date deficiency was identified. CRDR No.: _____ Date: _____	
Initiated By:			
<u>Harvey Leake</u> Print Name		 Signature	<u>2/18/04</u> Date
		<u>Elect Design</u> Department	<u>16986</u> / Ext.
Leader Approval:			
<u>Steve Kesler</u> Print Name		 Signature	<u>2/18/04</u> Date
		<u>Elect Design</u> Department	<u>16970</u> / Ext.
NRQ PRIOR APPROVAL OR NOTIFICATION REQUIRED? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>			
Initial Licensing Review:			
R A	 Licensing Reviewer		<u>3/5/04</u> Date
	<u>Thomas N. WCBM</u> Section Leader, Licensing (approval for cross org distribution)		<u>3/9/04</u> Date

A13

8.2.1.3.4 Industry Standards

The design complies with applicable standards and recommendations of:

- Institute of Electrical and Electronics Engineers, Inc. (IEEE) National Electrical Manufacturer's Association (NEMA)
- National Electrical Code (NEC)
- American Society of Civil Engineers (ASCE)
- Underwriters' Laboratory, Inc. (UL)
- American Iron and Steel Institute (AISI)

8.2.2 ANALYSIS

The transmission system associated with PVNGS is planned so that the loss of a single transmission element (i.e., line or transformer) does not result in loss of load, transmission overload, undervoltage condition, or loss of system stability to the Arizona-New Mexico-California-Southern Nevada extra high voltage (EHV) grid. Offsite power supply reliability is determined by the performance of the six 525 kV supply circuits associated with PVNGS. The source stations for these circuits (RUDD Westwing, Kyrene, Miguel, and Devers) all have three or more connected circuits of 230 kV and above, which provide the appropriate reliability.

Power flow studies conducted for the described system indicate that the system can reliably deliver power to all project participants using the above planning criteria. Dynamic stability studies have ~~shown~~ that the system can withstand the following disturbances without loss of system stability or loss of load:

established safe power generation levels for the generating units in the PVNGS area to ensure

- A. A permanent 3-phase fault on the switchyard 525 kV bus with subsequent loss of the critical 525 kV line.
- B. A sudden loss of one of the three PVNGS units with no underfrequency load shedding measures in effect.
- C. The sudden loss of the largest single load on the Arizona-New Mexico-California-Southern Nevada system.

~~In withstanding these disturbances, which are used as design criteria, the system exhibits a very stable response, with significant positive damping achieved and with system frequency deviation held within acceptable limits (Salt River Project letter to APS # SALT RIVER PROJECT 20020206, "Final Report for the 2002 Palo Verde / Hassayampa Operating Study", 2/6/2002). These results represent the response of the system associated with PVNGS with 7% generation stability margin.~~

Although these studies conclude that a PVNGS unit trip would not cause grid instability, certain chapter 15 accident analyses conservatively assume that offsite power is lost as a consequence of a PVNGS turbine trip. Refer to section 8.3.4 and table 15.0-0.

A transmission system operating procedure controls the level of power generation in the PVNGS area to ensure that the safe levels are not exceeded.
Grid availability data on EHV systems in the area indicate an outage rate of 2.08 total outages per year per 100 line miles. Of these, 1.08 are due to planned outages and 1.00 are due to forced outages. Due to all causes, the outage ratio for 500 kV lines in the area is 0.00180.

On 230 kV systems in the area, similar data indicate outage rates of 6.59 total outages per year per 100 line miles. Of these, 2.97 are due to planned outages and 3.61 are due to forced outages. Due to all causes, the outage ratio for 230 kV lines in the area is 0.0394.

(Salt River Project letter to APS # SALT RIVER PROJECT 20031126, "2003-04 Winter Palo Verde Unit 2 Upgrading Net Generating Capacity of 1408 MW For Updated Final Safety Analysis Report (uFSAR)").
June 2003

10 CFR 50.59 SCREENING

Screening/Evaluation Log Number: S-04-0009 Revision: 0

Page 1 of 8

ACTIVITY UNDER REVIEW: (NAME/TITLE) Updated Transmission Grid Stability Study: SALT RIVER PROJECT 20031126 (LDCR 2003F040)
DESCRIPTION OF PROPOSED ACTIVITY: Transmission grid stability study has been revised and forwarded to Palo Verde to show the effect of the new Palo Verde to Rudd 525 kV transmission line, the Unit 2 power uprate, and the addition of new generating stations to the 525 kV transmission system near Palo Verde.
<small>(continue on Response Justification Page)</small>

10 CFR 50.59 SCREENING

NO YES

Provide a separate written response, including references, that provides the basis for the answer to each question. Refer to Section 3.4 of 93DP-0LC07.

NEI 96-07, Revision 1, shall be referred to when answering these questions.

Refer to 93DP-0LC03 and determine if an LDCR is required. If required, contact Regulatory Affairs and obtain an LDCR tracking number, initiate the LDCR and enter the tracking number here 2003-F040

- | | |
|---|----------------|
| 1. Does the proposed activity involve a change to a structure, system or component (SSC) that adversely affects a design function described in the Power Production Facility Licensing Documents? | <u>X</u> _____ |
| 2. Does the proposed activity involve a change to a procedure described in the Power Production Facility Licensing Documents that adversely affects how SSC design functions are performed or controlled? | <u>X</u> _____ |
| 3. Does the proposed activity involve a change that adversely revises or replaces an evaluation or method of evaluation described in the Power Production Facility Licensing Documents that is used in establishing the design bases or used in the safety analyses? | <u>X</u> _____ |
| 4. Does the proposed activity involve a test or experiment not described in the Power Production Facility Licensing Documents, where an SSC is used or controlled in a manner that is outside the reference bounds of the design for the SSC or is inconsistent with analyses or descriptions as provided in the Power Production Facility Licensing Documents? | <u>X</u> _____ |
| 5. Does the proposed activity require a change to the Technical Specifications? | <u>X</u> _____ |
| 6. Does the proposed activity alter or exceed a design basis limit for a fission product barrier? | <u>X</u> _____ |

_____ If the answer to 4 is "YES", then PRB approval **IS REQUIRED** prior to implementing the proposed activity.

_____ If the answer to question 5 or 6 is "YES", then a license amendment is required. Initiate an LDCR per procedure 93DP-0LC03 and enter the LDCR number in the space provided above. NRC approval **IS REQUIRED** prior to implementing the activity. Contact NIRM and obtain a 10 CFR 50.59 *screening* log number and enter in the appropriate spaces on all forms. DO NOT complete an evaluation.

_____ If the answer to any question 1 through 4 is "YES", then a 10 CFR 50.59 evaluation is required.

X If all answers 1 through 6 are "NO", then a 10 CFR 50.59 evaluation or license amendment is **NOT** required. Recommend action approval. Contact NIRM and obtain a 10 CFR 50.59 *screening* log number and enter in the appropriate spaces on all forms.

_____ If SABD or Chapter 6 or 15 analyses assumptions are potentially affected, forward a copy of the screening to Nuclear Fuels Management at Mail Station 7693.

X Convert this screening (including response justification pages) to PDF format, digitally sign and transfer the PDF file to NIRM in accordance with 01DP-0AP08, 01DP-0AP11 and 01DP-0AP05.

I verify that the above screening is complete and accurate and that I am currently qualified to perform activities as a 10 CFR 50.59 Screener/Reviewer.

Digitally signed by: Leake, Harvey C(Z60326)
Date: 02/18/2004 14:27:40
Reason: Screener
Location: PVNGS

Digitally signed by: Gouvier, Edward J(Z38855)
Date: 02/18/2004 14:29:21
Reason: tech review
Location: PVNGS

SCREENER (Digital Signature)

REVIEWER (Digital Signature)

**10 CFR 50.59 SCREENING AND EVALUATION
RESPONSE JUSTIFICATION FORM**

SCREENING/EVALUATION LOG NUMBER:

S-04-0009

REVISION:

0

ACTIVITY UNDER REVIEW:

Updated Transmission Grid Stability Study: SALT RIVER PROJECT 20031126 (LDCR 2003F040)

QUESTION	RESPONSE JUSTIFICATION
	DETAILED DESCRIPTION OF THE PROPOSED ACTIVITY
	An updated transmission grid stability study has been received that reflects recent changes to the grid and demonstrates that stability criteria continue to be met.
	The criteria for the grid stability study are discussed in UFSAR Section 8.2—specifically, that the system can withstand certain postulated disturbances without loss of stability or loss of load. The three postulated disturbances are:
	A. A permanent 3-phase fault on the switchyard 525 kV bus with subsequent loss of the critical 525 kV line.
	B. A sudden loss of one of the three PVNGS units with no underfrequency load shedding measures in effect.
	C. The sudden loss of the largest single load on the Arizona-New Mexico-California-Southern Nevada system.
	For conservatism, the generation level of the Palo Verde units is modeled at 107% of rated output.
	This analysis is based on the NRC's Standard Review Plan (NUREG-75/087) which states: "The results of the grid stability analysis must show that loss of the largest single supply to the grid does not result in the complete loss of preferred power. The analysis should consider the loss, through a single event, of the largest capacity being supplied to the grid, removal of the largest load from the grid, or loss of the most critical transmission line. This could be the total output of the station, the largest station on the grid, or possibly several large stations if these use a common transmission tower, transformer, or a breaker in a remote switchyard or substation. The station layout and the grid system layout drawings are reviewed to determine that all the above events were included in the analysis."
	Changes to the transmission grid can affect the stability results, so the study is periodically updated. Of greatest significance at this time is the addition of the Palo

**10 CFR 50.59 SCREENING AND EVALUATION
RESPONSE JUSTIFICATION FORM**

SCREENING/EVALUATION LOG NUMBER:
S-04-0009

REVISION:
0

ACTIVITY UNDER REVIEW:
Updated Transmission Grid Stability Study: SALT RIVER PROJECT 20031126 (LDCR 2003F040)

QUESTION	RESPONSE JUSTIFICATION
	<p>Verde to Rudd 525 kV transmission line, completion of several natural gas-fired generating stations in the Palo Verde area and uprate of the Palo Verde Unit 2 generation capability. This review only addresses the electrical effects of these changes on the stability of the transmission system. Other aspects of the changes have been addressed in other 10CFR50.59 reviews.</p> <p>The updated transmission system stability study was prepared by Salt River Project (SRP), and it verifies that the current configuration does not degrade the capability of the system to sustain the disturbances discussed above. The study concludes that the grid will remain stable following loss of the largest load (Edmonston Pumping Station), the largest generating unit (a Palo Verde generator), or any transmission line, even with an additional 7% margin added to the Palo Verde generation.</p> <p>The results are based on overall generation levels in the Palo Verde area controlled to predetermined safe levels in accordance with the Palo Verde Transmission System Interchange Scheduling and Congestion Management Procedure PVTS-01. Implementation of this procedure was previously evaluated in 10CFR50.59 E-02-0003.</p>
1	<p>Does the proposed activity involve a change to a structure, system or component (SSC) that adversely affects a design function described in the Power Production Facility Licensing Documents?</p> <p>No. Although the added generation in the Palo Verde area, including the Palo Verde Unit 2 uprate and the nearby cogeneration units provide more local generating capacity, which can result in higher stress on the transmission system, the Congestion Management Procedure PVTS-01 continues to control the actual generation levels to maintain transmission grid stability margins. Furthermore, the addition of the Palo Verde to Rudd 525 kV transmission line has a significant positive effect on stability margin by providing an additional flow path and reducing overall system stress.</p>

**10 CFR 50.59 SCREENING AND EVALUATION
RESPONSE JUSTIFICATION FORM**

SCREENING/EVALUATION LOG NUMBER:
S-04-0009

REVISION:
0

ACTIVITY UNDER REVIEW:
Updated Transmission Grid Stability Study: SALT RIVER PROJECT 20031126 (LDCR 2003F040)

QUESTION	RESPONSE JUSTIFICATION
2	<p>Does the proposed activity involve a change to a procedure described in the Power Production Facility Licensing Documents that adversely affects how SSC design functions are performed or controlled?</p> <p>No. The transmission grid stability study is concerned with reliability of the offsite power system following "the loss, through a single event, of the largest capacity being supplied to the grid, removal of the largest load from the grid, or loss of the most critical transmission line". Although such disturbances would cause perturbations, the study concludes that the system voltage and frequency would quickly recover to acceptable levels without the need for human intervention. Therefore, no procedures have been developed to address such events.</p> <p>To maintain the system within a safe operating range, transmission personnel previously implemented the Palo Verde Transmission System Interchange Scheduling and Congestion Management Procedure PVTs-01. This non-nuclear procedure controls generating levels in the Palo Verde area to ensure that stability criteria are met. The only role that Palo Verde personnel play in the implementation of this procedure is notification to grid operating personnel of changes in Palo Verde generation levels. The notification requirements are not affected by the updated stability study.</p> <p>In the unlikely event of a grid instability condition resulting from a more adverse disturbance than those postulated in the stability study or operation outside of the Congestion Management Procedure, the effect on Palo Verde would be loss of offsite power. This event is already addressed in Procedure 40EP-9EO07 and Technical Guideline 40DP-9AP12.</p> <p>Updating of the stability study is not governed by any Palo Verde procedures, including those discussed in UFSAR Section 13.5.2 ("Operating and Maintenance Procedures"), and it has no impact on any such procedures.</p>

**10 CFR 50.59 SCREENING AND EVALUATION
RESPONSE JUSTIFICATION FORM**

SCREENING/EVALUATION LOG NUMBER:

S-04-0009

REVISION:

0

ACTIVITY UNDER REVIEW:

Updated Transmission Grid Stability Study: SALT RIVER PROJECT 20031126 (LDCR 2003F040)

QUESTION	RESPONSE JUSTIFICATION
3	<p>Does the proposed activity involve revising or replacing an evaluation or method of evaluation described in the Power Production Facility Licensing Documents that is used in establishing the design bases or used in the safety analyses?</p>
	<p>No. The transmission grid stability study, as discussed in UFSAR subsection 8.2.2, evaluates the effect on the transmission system of three postulated disturbances and concludes that none of these events would result in grid instability. The effects of the recent transmission grid changes on the grid stability analysis are documented in the updated study, which verifies that the procedurally-controlled generation levels are safe and will ensure that the stability criteria are met.</p>
	<p>SER subsection 8.2.3 states: "The simulated contingencies included loss of one of the three PVNGS units and the sudden loss of the largest single load on the APS system. In addition, the system is stable for the most severe fault condition on any transmission line or switchyard bus. The results of these grid stability studies indicate that the grid which supplies the offsite power for PVNGS 1-3 remains stable for the conditions noted above." The methodology used to perform the grid stability studies is not discussed in the SER, UFSAR, or other licensing documents. These studies are performed by non-Palo Verde organizations utilizing complex computerized models for the entire Western grid. Although the grid models are more refined than those used in the past, the methodology used to perform the studies is the same as used previously.</p>
	<p>The grid study and associated controls are only used to demonstrate compliance with the grid stability criteria discussed in UFSAR subsection 8.2.2, are not used in any safety analyses, and do not constitute an "evaluation or method of evaluation described in the Power Production Facility Licensing Documents" as defined in Regulatory Guide 1.187, NEI 96-07, or 10 CFR 50.59 procedure 93DP-0LC07.</p>

**10 CFR 50.59 SCREENING AND EVALUATION
RESPONSE JUSTIFICATION FORM**

SCREENING/EVALUATION LOG NUMBER:

S-04-0009

REVISION:

0

ACTIVITY UNDER REVIEW:

Updated Transmission Grid Stability Study: SALT RIVER PROJECT 20031126 (LDCR 2003F040)

QUESTION	RESPONSE JUSTIFICATION
4	<p>Does the proposed activity involve a test or experiment not described in the Power Production Facility Licensing Documents, where an SSC is used or controlled in a manner that is outside the reference bounds of the design for the SSC or is inconsistent with analyses or descriptions as provided in the Power Production Facility Licensing Documents?</p> <p>No. The updated stability study only reevaluates the response of the transmission grid to certain disturbances to reflect the effects of recent upgrades, and it does not involve any tests, experiments, or other work involving the licensed facility.</p>
5	<p>Does the proposed activity require a change to the Technical Specifications?</p> <p>No. Technical Specification LCO 3.8.1 discusses Operability of the offsite power circuits and Required Actions if one or both circuits should become Inoperable. LCOs 3.8.1 A and C are concerned with loss of one or both offsite circuits, respectively. These LCOs are unaffected by the proposed activity. LCO 3.8.1 G is concerned with the ability of the switchyard to maintain adequate voltage following a Palo Verde unit trip. The voltage regulation capabilities of the new cogeneration units will improve this ability, as will the addition of the Palo Verde to Rudd 525 kV transmission line. However, there is no change needed to the Technical Specifications to reflect these improvements.</p>
6	<p>Does the proposed activity alter or exceed a design basis limit for a fission product barrier?</p> <p>No. The proposed activity only updates the transmission grid stability study to reflect the effects of recent changes on transmission grid stability. Other aspects of the changes have been reviewed separately. The offsite power supply has only an indirect effect on the performance of fission product barriers, being one of two sources of power to AC emergency equipment that are designed to mitigate the effects of design basis events.</p>

**10 CFR 50.59 SCREENING AND EVALUATION
RESPONSE JUSTIFICATION FORM**

SCREENING/EVALUATION LOG NUMBER:

S-04-0009

REVISION:

0

ACTIVITY UNDER REVIEW:

Updated Transmission Grid Stability Study: SALT RIVER PROJECT 20031126 (LDCR 2003F040)

QUESTION	RESPONSE JUSTIFICATION
	Therefore, in the context of this review, the performance of the offsite power circuits is not a design basis limit.
	REFERENCES
	1. NRC Regulatory Guide 1.187, Guidance for Implementation of 10 CFR 50.59, Changes, Tests, and Experiments, 11/1/2000.
	2. NRC NUREG-75/087, Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants, as revised through December 31, 1978.
	3. NRC NUREG-0857, Palo Verde SER, November 1981, and Supplement 5, November 1983.
	4. NRC Branch Technical Positions (PSB) BTP ICSB 11 (PSB), Stability of Offsite Power Systems (NUREG-0800 Appendix 8A).
	5. NEI 96-07, Nuclear Energy Institute Guidelines for 10 CFR 50.59 Implementation, Revision 1, November 2000.
	6. NEI 98-03, Guidelines for Updating Final Safety Analysis Reports, Revision 1.
	7. Procedure 93DP-0LC07, Revision 6: 10 CFR 50.59 and 72.48 Screenings and Evaluations.
	8. Procedure 40EP-9EO07, Revision 9, Loss of Offsite Power/Loss of Forced Circulation.
	9. Technical Guideline 40DP-9AP12, Revision 9, Loss of Offsite Power/Loss of Forced Circulation Technical Guideline.
	10. Technical Specifications through Amendment 150.
	11. Technical Specification Bases, Revision 27.
	12. Updated Final Safety Analysis Report (UFSAR) Revision 12, Update B, December 2003.
	13. Combustion Engineering Standard Safety Analysis Report (CESSAR) through

