APS

Palo Verde Nuclear
Generating Station

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ATTN: Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Reference: Letter No. 102-05116-CDM/TNW/RAB, Dated July 9, 2004, from C. D. Mauldin, APS, to U. S. Nuclear Regulatory Commission, "Request for a License Amendment to Support Replacement of Steam Generators and Uprated Power Operations in Units 1 and 3, and Associated Administrative Changes for Unit 2"

Dear Sirs:

Subject: Palo Verde Nuclear Generating Station (PVNGS) Units 1 and 3, Docket Nos. STN 50-528 and STN 50-530 Response to Request for Additional Information Regarding Steam Generator Replacement and Power Uprate – Electrical Engineering Section

In the referenced letter, Arizona Public Service Company (APS) submitted a license amendment request to support steam generator replacement and uprated power operations for PVNGS Units 1 and 3. The NRC provided a request for additional information from the Electrical Engineering Section of the Electrical and Instrumentation and Controls Branch.

The Enclosure to this letter provides written responses to the staff's questions.

This letter contains the following commitment to the NRC:

> APS will complete its evaluations and analyses for coping with a station blackout for 16 hours and will submit them to the NRC, for review and approval, by October 31, 2005. At that time, APS will also provide a schedule for implementation of the revised coping strategy.

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Should you have any questions, please contact Thomas N. Weber at 623-393-5764.

Sincerely,

David Mauldin

CDM/TNW/RAB/ca

Enclosure:

1. Notarized Affidavit
2. Electrical Engineering Section, Electrical and Instrumentation and Controls Branch Questions and APS Responses

cc:	B. S. Mallet	NRC Region IV
	M. B. Fields	NRC Project Manager
	G. G. Warnick	NRC Senior Resident Inspector for PVNGS
	A. V. Godwin	Arizona Radiation Regulatory Agency (ARRA)

ENCLOSURE 1

NOTARIZED AFFIDAVIT

STATE OF ARIZONA)
) ss.
COUNTY OF MARICOPA)

I, David Mauldin, represent that I am Vice President Nuclear Engineering and Support, Arizona Public Service Company (APS), that the foregoing document has been signed by me on behalf of APS with full authority to do so, and that to the best of my knowledge and belief, the statements made therein are true and correct.

David Mauldin

Sworn To Before Me This 19th Day Of July, 2005.

Notary Public

SUSIE LYNN ERGISH
Notary Public - Arizona
Maricopa County
My Comm. Expires Jul 14, 2007

Notary Commission Stamp

Enclosure 2

Electrical Engineering Section, Electrical and Instrumentation and Controls Branch Questions and APS Responses

REQUEST FOR ADDITIONAL INFORMATION
2.94% THERMAL POWER UPRATE
ARIZONA PUBLIC SERVICE COMPANY
PALO VERDE NUCLEAR GENERATING STATION UNITS 1 AND 3
DOCKET NO.: 50-228 AND 50-530

NRC Question 1a
Identify the nature and quantity of MVAR support necessary by each Palo Verde Unit to maintain post-trip loads and minimum voltage levels.

APS Answer
Due to the large number of generators connected to the Palo Verde transmission hub (9300 MW of connected generation with more than 3000 MVAR net capability), and the automatic voltage regulation capability of these generators, the change in switchyard voltage resulting from a Palo Verde unit trip is negligible for most operating conditions.

Palo Verde has taken a conservative approach when only one unit is in operation to ensure adequate switchyard voltage if a design basis event should occur. When only one Palo Verde unit is operating, Technical Specification (TS) Limiting Condition of Operation (LCO) 3.8.1, Action G specifies the action to be taken if the required offsite circuit(s) do not meet required capability. The Bases for TS 3.8.1, Actions G.1 and G.2 provide methods to restore required capability of the offsite circuit(s). These methods do not involve actions that require the unit to be operated near its maximum MVAR loading capability.

NRC Question 1b
Identify what MVAR contributions each Palo Verde Unit is credited in its support of the offsite power system or grid.

APS Answer
There are no specific levels of MVAR contribution that are credited to support the offsite power system or grid. Even under transmission grid heavy load conditions, the Palo Verde generators are usually operated within only about 50% of the maximum MVAR capability.

Transmission grid power flow models consider the generator maximum MVAR output level only for steady-state analysis. This value only serves as a constraint on maximum steady-state switchyard voltage and has no effect on the results of dynamic calculations, such as stability runs. The parameter that affects stability is the generator transient MVAR output which can reach several times the steady state limit during grid disturbances. This transient capability is unaffected by power uprate.

NRC Question 1c

After the power uprate, identify any changes in MVAR quantities associated with Items a. and b. above.

APS Answer

The maximum gross generator MVAR level is usually set at 600 MVAR in the transmission grid power flow models for pre-uprate models, 541 MVAR for the post-uprate summer models, and 510 MVAR for the post-uprate winter models. Winter and summer models are provided for post-uprate, because generator output, in summer, is limited due to increased condenser backpressure caused by higher circulating water temperatures. The minimum MVAR level is usually set at -310 MVAR based on generator minimum terminal voltage considerations, and is unaffected by power uprate.

The grid power flow models are used to verify the capability of the transmission system to operate properly following various contingencies that are simulated. Palo Verde does not rely on these models to determine switchyard voltage following tripping of a Palo Verde unit. The methods that Palo Verde uses to assure adequate post-trip switchyard voltage are discussed in the answer to Question 1e below.

NRC Question 1d

Discuss any compensatory measures necessary to adjust for any shortfalls in Item c. above.

APS Answer

No compensatory measures are necessary for the reduction in generator maximum MVAR output due to power uprate because:

1. Palo Verde does not operate in the 500 to 600 MVAR range, but almost always below 300 MVAR. Recent transmission grid changes, such as the addition of numerous non-nuclear generating plants in the Palo Verde area and the addition of the Palo Verde to Rudd 525 kV transmission line, have reduced the need for reactive power support from Palo Verde. Unusual grid conditions involving MVAR demand significantly higher than historic levels would only be caused by excessively high customer loading and high transmission line flows. In this case, to provide for the customer loads, many of the non-nuclear generators near Palo Verde would have to be operating, so they, too, would be sharing in transmission grid MVAR support. Furthermore, a high Palo Verde switchyard voltage would be needed to support sagging distribution system voltages in Phoenix in this scenario.
2. For transmission grid studies, the only way for the analyst to force the generator MVAR output to reach its maximum limit is to artificially lower bus voltages to unrealistic levels at other switchyards. Whether pre or post-uprate, the results of the heavy boosting conditions demonstrate higher stability margin than for heavy bucking conditions. Since the heavy boosting condition is not the limiting case with regard to stability, the change in maximum MVAR capability is

inconsequential for these studies. For the bucking case, the MVAR absorption level of the Palo Verde generator is forced down to a level that causes generator terminal voltage to reach its minimum limit of 22.8 kV while the generator is still well within its MVAR capability band. Therefore, there is no impact on stability results due to power uprate.

NRC Question 1e

Evaluate the impact of any MVAR shortfall listed in Item d. above on the ability of the offsite power system to maintain minimum post-trip voltage levels and to supply power to safety buses during peak electrical demand periods. The subject evaluation should document any information exchanges with the transmission system operator.

APS Answer

Adequacy of post-trip voltage when two or three units are initially operating is assured as discussed in a letter from Palo Verde to the NRC dated July 16, 1999, "Response to NRC Request for Additional Information Regarding Proposed Amendment to Technical Specifications (TS) 3.8.1, AC Sources - Operating and 3.3.7, Diesel Generator (DG) - Loss of Voltage Start (LOVS)." As discussed above, since 1999 a number of transmission grid changes have occurred that have reduced the need for reactive power support from Palo Verde. As discussed in the 1999 letter, there is no credible scenario where tripping of one Palo Verde unit with one or more of the other units still on line would result in inadequate switchyard voltage.

When only one Palo Verde unit is initially operating, adequacy of post-trip voltage is assured by the conservative measures governed by Technical Specification LCO 3.8.1, Action G discussed above. Reduction of generator maximum MVAR capability has no effect on the allowed plant operating parameters during this condition.

Compliance with LCO 3.8.1, Action G does not rely on any information exchanges with the transmission system operator. Switchyard voltage is monitored by a meter in the Unit 1 control room. Generator gross MVAR output is monitored by a meter in the affected unit's control room.

NRC Question 2

Provide major assumptions, results, and conclusions of the current grid reliability analysis. Provide contingency management details necessary for maintaining grid stability of the control area surrounding the Palo Verde site. What are the contingencies analyzed? Does it include the tripping of all three Palo Verde Units? If not, why?

APS Answer

Power uprate has no effect on the contingencies that are analyzed to demonstrate offsite power stability.

Contingencies analyzed for maintaining grid stability are based on the NRC Standard Review Plan (NUREG 0800), Section 8.2, 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.

Analyzed contingencies, as discussed in UFSAR section 8.2.2, are tripping of one Palo Verde unit, faulting and tripping of the most significant transmission line, and loss of the largest major customer load—each at maximum boosting and maximum bucking conditions and with 7% Palo Verde generation margin added for conservatism. These studies conclude that such contingencies would not result in instability providing that the transmission system is operated in accordance with the Palo Verde Transmission System operating procedure. Construction of numerous non-nuclear generating stations in the Palo Verde area created the possibility that heavy generating levels could compromise stability margin under certain operating conditions involving heavy bucking of switchyard voltage (absorption of MVARS by the generators) and transmission lines out of service prior to the disturbance. To ensure adequate stability margin, the grid operator implemented an operating procedure that limits the generation levels of the non-nuclear plants when such conditions occur.

Simultaneous tripping of multiple Palo Verde units is not included in the stability analysis discussed in UFSAR section 8.2.2. A design basis event in one unit, such as a LOCA, would not cause tripping of the other units. Although a major transmission system disturbance could cause tripping of multiple units due to loss of the Palo Verde transmission system, such tripping would be a consequence, rather than a cause of the event.

Analysis of the effects of major transmission system disturbances is under the purview of transmission grid organizations, the Western Electric Coordinating Council (WECC), and the North American Electric Reliability Council (NERC), rather than Palo Verde. It is the responsibility of these organizations to establish reliability criteria for transmission system design and operation and to verify that those criteria are met. Some of the studies that are performed for this purpose consider the effect of the simultaneous loss of multiple elements, such as two transmission lines or two generating units, including simultaneous tripping of two Palo Verde generators. These studies are not part of the Palo Verde design bases.

The transmission lines that comprise the California to Oregon intertie (COI) can be affected by loss of significant generation resources in the Southwest. This limitation has been recognized for many years, and operating constraints and a remedial action scheme have been implemented to protect against instability. The remedial action scheme is designed to mitigate the effects of the tripping of two Palo Verde units, considering the effects of power uprate.

The NERC reliability criteria include consideration for "Category D" contingencies. This level of contingency is defined as an "Extreme event resulting in two or more (multiple) elements removed or cascading out of service". This could be caused by various initiators, such as "loss of all generating units at a station". However, it is recognized that such an event "May involve substantial loss of customer demand and generation in a widespread area or areas", and that "Portions or all of the interconnected systems may or may not achieve a new, stable operating point." Simultaneous tripping of three Palo Verde units is in this category. NERC does not require that transmission systems be designed or operated to ensure stability or continuity of offsite power to nuclear generating plants during such events. If such a requirement were implemented, it would require substantial changes in the amount of spinning reserve needed, as well as additional operating margin for transmission lines involving either curtailment of flow during normal operation or installation of additional lines. The probability of grid instability during an event that involves tripping of the three Palo Verde units is not significantly increased as a result of power uprate, since the remedial action scheme sheds at least as much load as the uprate levels of two units.

NRC Question 3

You have stated that increasing the rated thermal power limit of PVNGS Units 1 and 3 from 3876 MWt to 3990 MWt would result in an increase in electrical output of approximately 55 MWe in each unit. What is the output power in MWe for licensed power level of 3876 MWt ?

APS Answer

Per UFSAR Section 1.1.4, the nominal net output of each unit is 1270 MWe.

NRC Question 4

In Section 6.3.8.3, "Station Blackout," you have indicated that there are no changes to this section. However, on June 14, 2004, all three Palo Verde units lost offsite power caused by the loss of the transmission and distribution system due to dynamic instability. As a result, offsite ac power design characteristic group (P group) should be classified as P3 instead of original P1 that will change the coping duration time from 4 hours to 16 hours. Provide justification why offsite ac power design characteristic group should not be changed as discussed above.

APS Answer

Although, power uprate has no effect on the frequency or duration of station blackout (SBO) events, APS has evaluated the feasibility of changing the classification of the Palo Verde units to P3 with a 16 hour coping capability. In order to gain margin relative to nuclear safety, APS agrees that P3 would be the appropriate offsite power design characteristic group for Palo Verde. In accordance with Regulatory Guide 1.155 and NUMARC 87-00, maintaining the current unit average emergency diesel generator reliability of 0.95, requires Palo Verde to plan for a loss of power lasting for up to 16 hours.

On May 24, 2005, APS met the NRC staff to discuss the evaluations which had been conducted. Using the guidance in NUMARC 87-00, preliminary evaluations and analyses indicate that changing to P3 with a 16 hour coping plan is feasible.

The 4 hour coping strategy (original study) assumed that the unit would achieve and maintain Hot Standby using the atmospheric dump valves (ADVs) for heat removal, and that the charging pumps would be used for RCS inventory control. The 16 hour coping strategy (revised study) assumes minimal operator action in the first hour, and at the end of four hours the operators would start a cooldown to shutdown cooling entry conditions during the remaining 12 hours of the coping period. The ADVs will be used for heat removal, the pressurizer vent will be used for RCS pressure control, and RCS inventory will be controlled using a high pressure safety injection pump.

The decay heat used for the analyses discussed herein is based on the ANSI/ANS-5.1 1979 decay heat curve, plus a 2 sigma uncertainty. The time dependent decay heat is developed using the following parameters:

- Fuel enrichment = 5%
- Fuel burnup up to 70,000 MWD/MTU
- Three operating cycles, each cycle consists of 505 days plus a 25 day outage
- Power level = 3990 MWe

The resultant decay heat curve is conservative, bounding and consistent with industry practices for type of evaluation.

Areas of evaluation for the 16 hour coping period include:

<u>RCS Inventory</u>

The analysis for the 16 hour coping strategy assumes continuous seal leakage from each of the four reactor coolant pumps (RCPs) of 25 gpm. The 25 gpm rate is more conservative than the maximum expected leakage of 17 gpm. At the time of the May 24, 2005 meeting with the NRC, APS had been using 17 gpm in its calculations. Additionally 10 gpm identified leakage (Technical Specification (TS) 3.4.14) and 1 gpm leakage unidentified leakage (TS 3.4.14) is assumed. Total analyzed RCS leak rate is 111 gpm for the entire coping duration. The preliminary results of the revised study indicate that the core remains covered. The RCS leak rate does not affect the condensate storage tank inventory.

<u>Condensate Inventory</u>

The original study, completed per NUMARC guidelines, required approximately 156,000 gallons of condensate to make-up for decay heat, sensible heat and steam generator (SG) inventory recovery. The revised study, using the CENTS Code, requires approximately 266,000 gallons to make-up for decay heat, sensible heat and replacement SG inventory. The TS require 300,000 gallons in the condensate storage tank. Additionally 300,000 gallons of water are available from the reactor makeup water tank (no TS requirement).

Class 1E Battery Capacity

There is no effect on the Class 1E batteries as a result of the increased coping period. As in the original study, the battery chargers are loaded onto the gas turbine generators (GTGs) within 1 hour. The batteries are sized to support station blackout (SBO) for 2 hours.

Compressed Air Capacity

The atmospheric dump valves (ADVs) are the primary means of heat removal during a SBO. The ADVs are air operated valves with a backup nitrogen accumulator. For the 16 hour coping time, the backup accumulators would be marginal, requiring the compressed air system to be supplemented or operator manual action to be taken. An analysis is being performed to determine if the environmental conditions in the vicinity if the ADVs would permit operators to work in the area. The acquisition of a portable diesel driven air compressor is being considered if operator action could not be used.

Loss of Ventilation in Areas Containing Equipment Needed During a SBO

Loss of ventilation in areas outside of containment

There are no effects due to loss of ventilation in the control room, auxiliary feedwater pump rooms, DC equipment rooms, and battery rooms because the cooling equipment for these rooms is loaded onto the GTGs within 1 hour. No credit is given for room cooling in the charging pump rooms or the upper levels of the main steam support structure, however, the steady state temperature for these rooms remain below equipment qualification temperature criteria.

Loss of ventilation in the containment

Palo Verde is performing an assessment to determine how the plant can cope with a postulated 16 hour Station Blackout (SB0). To support this assessment an analysis will be performed which will determine the 16 hour SBO temperature and pressure response of the Palo Verde containment atmosphere. The analysis will be done using the COPATTA computer program. COPATTA is the same program previously used to perform Palo Verde's LOCA and MSLB containment temperature and pressure analyses as presented in the Palo Verde UFSAR. The design basis accident model would be adjusted for SBO as required after performing a critical review of heat sinks to assess the applicability for use in the SBO event.

The Palo Verde containment temperature and pressure response to a 16 hour SBO will consider both the sensible and the latent heat addition to the containment. The sensible heat is from plant heat from hot surfaces including the primary and secondary system. The latent heat addition is from the reactor coolant system leakage into the containment. To evaluate the response of the containment to the SBO, heat transfer to passive heat sinks in the containment will be considered. No active cooling by sprays or air coolers will be assumed. For this 16 hour SBO the reactor coolant leakage will produce a saturated atmosphere and the dominant means of heat transfer will be by condensation. Consistent with previous analyses of the Palo Verde long-term containment responses, the Uchida condensing heat transfer correlation will be used. Use of the Uchida condensing heat transfer is conservative, as the turbulence induced by the RCS discharge into the containment is not considered.

Containment Isolation

During the original study, the containment isolation valves were reviewed for the applicability or exclusion to NUMARC 87-00 and were found to be acceptable. This is noted in UFSAR Tables 6.2.4-1 and 6.2.4-2. The revised study indicates that the conditions for containment sump recirculation will not be reached. There is no impact to containment isolation capability due to power uprate or the 16 hour coping period.

Communication

The primary modes of communication during a SBO are the telephone system, the plant 2-way radio system and the sound powered phone system. The telephone system has 8 hour battery capability, and the 2-way radio system has a 4 hour battery system that can be transferred to the GTGs within 1 hour. The sound powered phone system requires no external power source to operate.

Preliminary results indicate that some procedures will need to be revised and the compressed air system will need to be supplemented. The following table illustrates potential procedure changes to be made to change from a 4 hour coping strategy to a 16 hour coping strategy.

4 HOUR COPING	16 HOUR COPING
120 gpm RCS leak for 4 hours	111 gpm RCS leak for 16 hours
Use steam driven auxiliary feedwater pump and ADVs to maintain RCS conditions	Use steam driven auxiliary feedwater pump and ADVs to maintain RCS conditions
Essential pumps, battery chargers, essential HVAC, charging and HPSI pumps, and pressurizer heaters available @ 1 hour	Essential pumps, battery chargers, essential HVAC, charging and HPSI pumps, and pressurizer heaters available @ 1 hour
Maintain RCS inventory with charging and HPSI pumps	Maintain RCS inventory with HPSI pumps

Approximately 156,00 gallons of condensate needed for 4 hours (NUMARC equations)	Approximately 266,000 gallons of condensate needed for 16 hours (CENTS analysis)
Use Reactor Makeup Water Tank when Condensate Storage Tank (CST) reaches 9 feet	Use Reactor Makeup Water Tank when Condensate Storage Tank reaches 9 feet
Cooldown if needed to maintain subcooling	After 4 hours at hot standby, start cooldown to shutdown cooling using natural circulation. Use ADVs for heat removal, pressurizer vent for RCS pressure control and HPSI for RCS inventory control
Cooldown to shutdown cooling if required, based on CST volume available	
	Need backup air supply to operate ADVs for 16 hours

APS will complete its evaluations and analyses for coping with a SBO for 16 hours and will submit them to the NRC, for review and approval, by October 31, 2005. At that time, APS will also provide a schedule for implementation of the revised coping strategy.

NRC Question 5

Electrical Equipment Qualification for Unit 2 is discussed in Section 9.4 but Section 9.5 is used for Units 1 and 3. Why the difference?

APS Answer

The numbering in the PUR submittal Section 9 changed due to the addition of Section 9.2, Integrated Leakage Rate Testing. The numbering of the Sections after 9.2 increased by one.

NRC Question 6

In Section 8.14.11, you have stated that "the higher current due to increased non-class pump BHP decreases the voltage at the 4.16 kV ESF bus and downstream equipment when the house loads are fed from the startup transformers. However, analysis of this effect demonstrates that the voltage decrease will not result in spurious operation of the loss of voltage or degraded voltage relay. In addition, the decreased voltage will not adversely affect the function of any class 1E equipment downstream of the breakers and relays." Provide the basis of the above conclusion with old and revised calculated values and assumptions. Also, provide the non-class 1E pumps (Reactor Coolant Pumps, Condensate Pumps, and Heater Drain Pumps) motors BHP changes and terminal voltages under power uprate (PUR) and pre-PUR conditions.

APS Answer
The effect of power uprate on non-class 1E pumps is as follows:

Power Source	Pump	ID	BHP			Voltage*		
			Old	New	Δ	Old	New	Limit
NANS01	Reactor Coolant	MRCEP01A	8850	9025	175	12676	12673	11880
		MRCEP01C	8850	9025	175	12681	12678	11880
	Condensate	MCDNP01A	3300	3450	150	3732	3730	3600
		MCDNP01B	3300	3450	150	3733	3731	3600
	Heater Drain	MEDNP01B	960	1211	251	3745	3743	3600
				total	**901**			
NANS02	Reactor Coolant	MRCEP01B	8850	9025	175	12648	12646	11880
		MRCEP01D	8850	9025	175	12650	12648	11880
	Condensate	MCDNP01 C	3300	3450	150	3742	3741	3600
	Heater Drain	MEDNP01A	960	1211	251	3740	3738	3600
				total	**751**			

*Voltage for Unit 1. Voltages for other units are similar.

In terms of calculated voltages, the effects of the pump brake horsepower changes can be quantified as follows. The voltage on the Class 1E 4160 V buses needs to recover to at least 3805 V following automatic load sequencing (resulting from a design basis event such as a LOCA) to ensure that the degraded voltage relays reset, thus avoiding their actuation. At minimum allowable switchyard voltage (taking into account metering uncertainty) the voltage will recover to at least 3842 V. The increased loading on the non-Class 1E buses lowers this value about 4 V, so the Class 1E buses will still recover to at least 3838 V which provides margin above the 3805 V limit.

NRC Question 7
The initial conditions and assumptions for an SBO under PUR conditions shall include an operating history of 100 days at PUR power conditions. Clarify that the assumptions used for the maximum decay heat for SBO analysis applies for PUR conditions.

APS Answer
The decay heat used for the analyses discussed herein for the 16 hour coping strategy is based on the ANSI/ANS-5.1 1979 decay heat curve, plus a 2 sigma uncertainty. The time dependent decay heat is developed using the following parameters:

- Fuel enrichment = 5%
- Fuel burnup up to 70,000 MWD/MTU
- Three operating cycles, each cycle consists of 505 days plus a 25 day outage
- Power level = 3990 MWe

The resultant decay heat curve is conservative, bounding and consistent with industry practices for type of evaluation.

NRC Question 8

The SBO evaluation did not provide any discussion about the adequacy of the areas of concern (Auxiliary Feed Water pump room, DC equipment room, battery room, battery charging room, and containment building) evaluated in the submittal. The SBO coping analysis includes an alternate AC power source which will not be available for the first hour of the event. Provide a discussion about the adequacy of the areas of concern for the first hour of the SBO event.

APS Answer

There were no changes to the electrical loads in the areas mentioned above as a result of power uprate. The heat load calculations for the turbine-driven auxiliary feedwater pump room, the charging pump room and the containment were reviewed in light of changes resulting from power uprate. The results of this review indicate that, as a result of power uprate, there are no changes to the original conclusions reached in the SBO evaluation. Please refer to the loss of ventilation discussion in the response to question 4.

NRC Question 9

Provide a discussion about the effect of PUR on onsite dc power system. The discussion should include but not limited to dc load changes if any, battery capacity margins, voltage drop and short circuit current values.

APS Answer

Power uprate has no effect on the design or operation of the DC power system or DC load devices. Therefore, loading, voltage, and short circuit current values are unaffected.