NEI

NUCLEAR ENERGY INSTITUTE

James H. Riley
DIRECTOR, ENGINEERING
NUCLEAR GENERATION DIVISION

9/22/06
71FR 55517
(19)

December 8, 2006

Chief, Rules and Directives Branch
Office of Administration
U.S. Nuclear Regulatory Commission
Mail Stop T6-D59
Washington, DC 20555-0001

SUBJECT: Draft Regulatory Guide DG-1153, *"Availability of Electric Power Sources"* Request for Comment

PROJECT NUMBER: 689

The Nuclear Energy Institute (NEI)[1] ,on behalf on the nuclear industry, is submitting the following response to the *Federal Register* notice, dated September 22, 2006, *Volume 71, Number 184,* which invited written comments on the Proposed Revision 1 of Regulatory Guide 1.93 (DG-1153), *"Availability of Electric Power Sources".*

NEI's primary comment is that DG-1153 should not be issued. In fact, Regulatory Guide 1.93 should be removed from inventory since it has been superseded. In 1992, the NRC issued the improved Standard Technical Specifications to clarify the content and form of requirements necessary to ensure safe operation of nuclear power plants in accordance with 10CFR50.36. The 2004 NUREG 1430-1434 series that created specific Technical Specifications has superseded the need for the 1974 Regulatory Guide 1.93 and its proposed revision (DG-1153).

To a large extent, Regulatory Guide 1.93 contains the same information as the ac power sources Technical Specifications and their basis. The appropriate location for this information is in the Technical Specifications NUREGs and not in a Regulatory Guide. In fact, there is a possibility that having such information in two places will lead to inconsistency and confusion. It is important to note that TS for new plant designs can follow the well established process used for current plant standard technical specifications (STS) for current plants.

[1] NEI is the organization responsible for establishing unified industry policy on matters affecting the nuclear energy industry. NEI's members include all entities licensed to operate commercial nuclear power plants in the United States, nuclear plant designers, major architect/engineering firms, fuel fabrication facilities, nuclear material licensees, and other organizations and individuals involved in the nuclear energy industry.

SUNSI Review Complete

E-RIDS = ADM-03
Add = S. Aggarwal (SKA)
S. O'Connor (SCO) — J. Ridgely (JNR)

1776 I STREET, NW SUITE 400 WASHINGTON, DC 20006-3708 PHONE 202.739.8137 FAX 202.785.4019 jhr@nei.org

Template = ADM-013

J.T. Yerokun (JTY)

In addition to the previous comments, Enclosure 1 provides comments and recommendations from the NEI Grid Reliability Task Force. Enclosure 2 provides a comparison of the contents of DG-1153 to the contents of the Technical Specifications for an AP1000 unit and an ESBWR unit. The industry review has noted many positive changes in DG-1153 and provides recommendations for further enhancements to improve clarity and ensure consistency with current industry standards and practices.

We appreciate the opportunity to comment on the draft documents. If you have any questions regarding this effort, please contact Gordon Clefton at (202) 739-8086; gac@nei.org.

Sincerely,

James H. Riley

Enclosures

c: Mr. William Kemper
Mr. Satish Aggarwal
Mr. Stephen C. O'Connor
NRC Document Control Desk

DG-1153 Industry Comments

Item Number	DG Location	DG Proposed Text	Suggested Text	Comments/References/Regulatory Basis
	General			The three categories of electrical power sources are: • Offsite AC, • Onsite AC (diesel-generators) and • Onsite DC. Both the ESBWR and AP-1000 Design Certification Documents (DCDs) state that RG 1.93 revision 0 is only applicable for the safety-related DC systems. Neither design utilizes any safety related AC systems for design basis event mitigation.
	General	A comparison of DG-1153 against NUREG 1431 and NUREG 1434 was performed to identify major differences.	Any changes to RG 1.93 need to be aligned with changes to the NUREGs for Standard Technical Specifications.	Technical specifications for the GE Advanced Boiling Water Reactor (ABWR) and ESBWR were developed based on NUREG 1434, Standard Technical Specifications for GE BWR/6. The Westinghouse AP1000 PWR developed its technical specifications based on NUREG 1431, Standard Technical Specifications for Westinghouse PWRs. The action times for the various systems being below LCO requirements are identical for the DG and the NUREG. The major differences between the NUREGs and the DG are that the revised DG requires additional evaluation type actions to support the action completion times. For example, for offsite sources being one less than the LCO, the operator is required to evaluate the grid capability to support continued operation for the one source. When an onsite

Item Number	DG Location	DG Proposed Text	Suggested Text	Comments/References/Regulatory Basis
				source system (diesel generator) is one less than the LCO, the other emergency diesel generator (EDG) must be evaluated to eliminate common cause failure potentials.
	General			A comparison of the AP-1000 and ESBWR Tech Specs, as contained in the Design Certification Documents (DCD) with the requirements of DG-1153, was performed to highlight exceptions from the DG. The requirements from DG-1153 will have no impact on the AP1000 and the ESBWR designs; no changes to the generic TSs proposed will be required.
	General	This uses the words "stability" and instability".	Replace the phrase "reserves and system stability" with "grid conditions".	Use words that are not specific in meaning for the transmission operators.
	General	This section distributes concepts throughout the various scenarios.	Create a stand alone central summary in the 'Discussion' section	Using a central summary, the NRC could put in their grid reliability points regarding state estimators, post trip contingency voltages, and whatever else they wanted. Thus, the industry could better understand the intent of what the NRC is trying to accomplish; it would be more effective than only attempting to distribute concepts throughout the various scenarios.
	General		Create a global disclaimer	Such a global disclaimer stating that variations to the indicated time limits can be obtained utilizing design features in excess of those in GDC-17. This should be done instead of introducing an "alternative source of ac power" as described in section B under The Available Offsite AC Power Sources Are Two Less Than the LCO.
	General		Provide a good explanation of the changes and the background behind them	There must be a better match between the different DG-1153 sections: Discussion and Regulatory Position.

Item Number	DG Location	DG Proposed Text	Suggested Text	Comments/References/Regulatory Basis
	General		State the purpose of the RG revision.	In the public meeting it was stated: 1. Update RG format. 2. Make RG consistent with standard Technical Specifications.
	General		Revise NUREG series 1430-1434	This DG includes changes that would impact existing Technical Specifications. The NUREG series 1430-1434 contain the improved Standard Technical Specifications (STS); TS changes go through the TSTF Travelers process.
	General		Stay within GDC-17	The language in this DG seems to expand upon past interpretations and applications of GDC-17. It also implies when a unit must enter an LCO related to degradation of the offsite power sources to the unit.
	General			There is no IEEE Standard that parallels RG 1.93.
	General			There is nothing wrong with RG 1.93 for existing units and new units being subject to GDC-17. This RG would only be applicable to the advanced passive designs from the DC perspective; this represents only about four paragraphs of the DG entire document.
	Generic		Add "(s)" after "diesel generator"	This will account for the variety of diesel configurations.
	Generic	This uses "capability" instead of "stability"	Specify that voltage, frequency, and capacity for shutdown loads are adequate for post trip conditions, rather than simply using the un-defined word "capability".	The selected word was made because NRC cannot regulate stability of the grid. "Capability" essentially means that voltage, frequency, and capacity for shutdown loads are adequate for post trip conditions where the unit changes from a generator to a load.
	Generic	This uses "plant" instead of "unit"	Substitute "unit" for "plant"	The DG should be applied on a "unit" basis as RG 1.93's previous wording, not on a "plant" basis, since actions are taken on a unit level.
	Introduction	This states "(3) redundant ... sources...to maintain core cooling, containment integrity and other vital	Change to "(3) redundant onsite direct current (dc) sources."	The phrase "...to maintain core cooling..."is applicable to all three listed electric power sources, not just the dc sources. The functional requirements are implied by reference to GDC-

Item Number	DG Location	DG Proposed Text	Suggested Text	Comments/References/Regulatory Basis
		functions"		17.
	Discussion, The Available Onsite AC Power Sources Are Each One Less Than the LCO	This states "Since any inadvertent generator trip could potentially result in a total loss of ac power, the time allowed for continued operation should be severely restricted. In the absence of one onsite power source, the intent is twofold: (1) Avoid the risk associated with immediate shutdown. (2) Minimize the risk associated with this level of degradation by severely limiting its exposure time. "	Delete the first sentence.	GL 2006-02, Q3(a) states: "If the TSO notifies the NPP operator that a trip of the NPP, or the loss of the most critical transmission line or the largest supply to the grid would result in switchyard voltages (immediate and/or long-term) below TS nominal trip setpoint value requirements (including NPP licensees using allowable value in its TSs) and would actuate plant degraded voltage protection, is the NPP offsite power system declared inoperable under the plant TSs? If not, why not?" Typically the answer is "Yes" the offsite source is declared non-functional for a trip of the unit contingency. Thus, if an inadvertent trip of the unit would result in loss of offsite AC, the offsite sources would be considered non-functional and the unit would be in a different section of this DG. Deleting this sentence does not detract from the argument.
	Discussion, The Available Offsite AC Power Sources Are One Less Than the LCO	This states, "However, this apparent difference in severity is usually offset by maintainability considerations; that is, the time required to detect and restore an unavailable offsite source is generally much less than that required to detect and restore an unavailable onsite ac source, especially when the grid operator utilizes real-time	Remove the reference to real-time contingency analysis as consideration for assuring that an offsite system is more readily maintainable and restorable because of this tool.	This discussion of the real-time contingency analysis program implies that the real-time contingency analysis program is required to maintain the offsite power system functional in accordance with the Technical Specifications. The real-time contingency analysis program is not required by the Technical Specifications, nor is it required to ensure offsite power source is functional, since it has no impact on offsite power supply reliability or functions.

Item Number	DG Location	DG Proposed Text	Suggested Text	Comments/References/Regulatory Basis
		contingency analysis."		
	Discussion, The Available Offsite AC Power Sources Are One Less Than the LCO	This states "Thus, the loss of an offsite source resulting from such a cause should be treated as equivalent to the loss of both required offsite sources"	Remove the sentence.	This statement is based on an event associated with "extensive consequences" which is subjective by nature. While the remaining source should be evaluated for common cause, the immediate declaration of loss of functionality of both sources should not be made unless the common cause evaluation determines the need to do so.
	Discussion, The Available Offsite and Onsite AC Power Sources Are Each One Less Than the LCO	This states "Moreover, if the offsite and onsite power were available to only one train, a bus fault could render all emergency power unavailable."	Delete the sentence.	This is essentially the same discussion as the preceding sentence and does not add to the logic.
	Discussion, The Available Offsite AC Power Sources Are Two Less Than the LCO	This states "Since the onsite power system is not degraded and a loss of offsite power simultaneous with a LOCA was postulated as a design basis, a brief interval of continued operation is justified if an alternative source of ac power, independent of grid condition, is readily available and can act as a substitute train of ac power."	Rewrite so that the specified time period for continued operation should be universally based on the availability of the onsite ac sources and not keyed to an alternate AC supply. Reword to: "Since the onsite power system is not degraded and a loss of offsite power simultaneous with a LOCA was postulated as a design basis, a brief interval of continued operation is justified since an onsite source of ac power, independent of grid condition, is readily available."	The last paragraph contains a condition that an alternative source of ac power, independent of grid conditions, be readily available in order to justify a brief interval of continued operation. Unless a nuclear plant has some nearby generating facility, such as a combustion turbine or hydro, that is independent of the transmission network, the only ac source meeting this requirement would be the onsite ac power sources. At the public meeting, it was stated that individual units may justify longer time periods if they have alternate generation readily available in addition to the onsite sources.

Item Number	DG Location	DG Proposed Text	Suggested Text	Comments/References/Regulatory Basis
	Discussion, The Available Offsite AC Power Sources Are Two Less Than the LCO	This states ""this level generally corresponds to total loss of the immediately accessible offsite power sources.""	Reword.	The statement is incorrect. Most commonly, this level is the result of insufficient transmission system voltage support during periods when the immediately accessible offsite power sources have not been lost, but are operating within their normal voltage ranges. Due to the inadequate voltage support, an event involving tripping of the nuclear unit's main generator could cause loss of the offsite power sources due to loss of switchyard voltage support when the generator trips. This would result in actuation of the degraded voltage relays, tripping of the offsite power circuits, and transfer of the safety buses to the diesel generators.
	Discussion, The Available Offsite AC Power Sources Are Two Less Than the LCO	This states "Since the onsite power system is not degraded and a loss of offsite power simultaneous with a LOCA was postulated as a design basis, a brief interval of continued operation is justified if an alternative source of ac power, independent of grid condition, is readily available and can act as a substitute train of ac power. "	Reword the middle sentence of the last paragraph as follows: "Since the onsite power system is not degraded and a loss of offsite power simultaneous with a LOCA was postulated as a design basis, a brief interval of continued operation is justified since an onsite source of ac power, independent of grid condition, is readily available and can act as a substitute train of ac power."	
	Discussion, The Available Onsite AC Power Sources Are Two Less Than the	This states "In multi-unit plants that share onsite ac supplies, this degradation level means that the available onsite supplies, if	Remove the references to sharing of onsite electrical power systems between units.	This DG should be reviewed from the perspective that RG 1.81, 1/1975, prohibits the sharing of onsite electrical power systems between units for any plant with a construction permit application made after 6/1/1973. As this DG will not be

Item Number	DG Location	DG Proposed Text	Suggested Text	Comments/References/Regulatory Basis
	LCO and elsewhere	any, do not have the capacity to mitigate the effects of an event in one unit and safely shut down the other unit(s)."		invoked retroactively, all new plants will have their construction permits after the applicability date of RG 1.81.
	Discussion, The Available Onsite AC Power Sources Are Two Less Than the LCO	This states "Licensees should make a concerted effort to restore at least one onsite ac power source during this restricted time period, and take systemwide actions to ensure that the offsite power system can accommodate the imminent shutdown."	Remove "and take systemwide actions to ensure that the offsite power system can accommodate the imminent shutdown"	Nuclear plant units do not take "systemwide actions". This is the responsibility of the transmission operator.
	Discussion, The Available Onsite DC Power Sources Are One Less Than the LCO	This states "(e.g., a subsequent single failure could render the entire power system ineffective on a generator trip), "	Delete the clause and parentheses.	Although this phrase may be true, single failures do not need to be assumed in response to plant transients, only design basis accidents.
	Discussion, (1)	This uses "single failure" and "double failure"	Do not use the terms single failure and double failure, when discussing offsite AC power systems.	These terms mean very specific things in the nuclear industry. None of those specifics meanings relate to the offsite AC power system. Use terms like "loss" or "unavailability" when discussing offsite AC.
	Discussion, (1)	This states "The LCO of nuclear power plants are met when all electric power sources required by GDC-17 are available at the required voltage and capacity for the nuclear station and capable of withstanding a system contingency such as (a) a single failure involving loss	Delete the sentence.	This position is problematic for the following reasons: • The LCO would always be exceeded, since loss of a transmission line that transmits power from the transmission network to the onsite electric distribution system, for example, would always result in loss of that particular offsite power supply. • It is inconsistent with the definition of

Item Number	DG Location	DG Proposed Text	Suggested Text	Comments/References/Regulatory Basis
		of generation by the nuclear unit, any other critical generation source, or loss of power from a transmission system element, or (b) a double failure involving a loss of power from the transmission network and the loss of one train of onsite ac power "		LCOs in 10CFR50.36(c)(2), which are "the lowest functional capability or performance levels of equipment required for safe operation of the facility." GDC-17 defines the safety function of the electric power sources to be "...to assure that (1) specified acceptable fuel design limits and design conditions of the reactor coolant pressure boundary are not exceeded as a result of anticipated operational occurrences and (2) the core is cooled and containment integrity and other vital functions are maintained in the event of postulated accidents." The offsite power sources are fully capable of meeting these safety functions even during periods when a postulated transmission system disturbance could cause loss of one or both offsite power supplies. This is because (1) the disturbance is only postulated and has not actually occurred, (2) 10CFR50, Appendix A, already acknowledges that a loss of offsite power event is an "anticipated operational occurrence", and (3) postulated accidents would not affect the ability of the electric power sources to perform their safety functions, since the only identified vulnerability is to a disturbance on the transmission network that is unassociated with any occurrences at the nuclear plant. • It reflects a de facto new requirement that the licensee certify that the transmission network be single failure proof (or, in the case of a double failure, double failure proof!). Although GDC-17 mentions the "transmission network", it

Item Number	DG Location	DG Proposed Text	Suggested Text	Comments/References/Regulatory Basis
				does not impose any specific design or operating requirements on it. As such, this would be a backfit if it were to be implemented. • It is contrary to the staff interpretation that there is no "requirement for meeting single failure, and in the absolute sense single failure cannot be met because there is only one power source, the grid" (NUREG 0800, "NRC Staff Interpretation of the Requirements of GDC-17"). • It involves no risk-informed rationale, such as the probability that the particular transmission network disturbance could occur.
	Discussion, (1)	This states "such as (a) a single failure involving loss of generation by the nuclear unit, any other critical generation source, or loss of power from a transmission system element,"	Reword (1) to "'The LCO of nuclear power plants are met when all electric power sources required by GDC-17 are available at the required voltage and capacity for the unit and capable of withstanding loss of generation by the nuclear unit."	Starting with the condition of a functional offsite source, a transmission contingency that has not actually occurred does not degrade the offsite source. Thus, the offsite source is still capable of performing its required functions and should be considered functional. Obviously, when a transmission event does occur that results in inadequate voltage or capacity for the unit, either in real-time or under a contingent unit trip, then the offsite source would be non- functional.
	Discussion, (2)	This states "For example, the risks associated with immediate shutdown upon loss of the onsite ac power source during a period of light transmission system load with high operating reserve would tend to be	Delete the sentence.	This statement is presumptive and may not be true. Under periods of light load, the relative value of a generator may be more significant such that its loss may result in grid issues. Double-failure is beyond design basis.

Item Number	DG Location	DG Proposed Text	Suggested Text	Comments/References/Regulatory Basis
		less than those resulting from shutdown during a peak load period with less operating reserve because the electrical grid may be able to accommodate a loss of power generation."		
	Discussion, (2)	This uses the phrase "(generation, transmission, and capacitor banks)"	Delete the phrase.	The discussion is related to a (72 hour) LCO. Issues caused by generation and capacitor banks should be able to be resolved within hours and should not enter into the equation. Loss of a transmission line may be more significant if it is directly connected to the offsite source. Overall, this phrase does not add value to the discussion. The phrase also implies that the unit has control over restoration of lost power system elements; often this is not the case.
	Discussion, second paragraph	This states "Plant operators should be aware of (1) the capability of the offsite power system to supply power during operation, and (2) situations that can result in a loss of offsite power or inadequate voltage following a trip of the plant or other transmission contingencies identified by the grid operator. If the offsite power system is not capable of providing the requisite power in either situation, the system should be declared inoperable and pertinent plant TS provisions should be followed. "		According to RIS 2005-20, the term 'Operable/Operability' is defined in the Technical Specifications (TS) and applied ONLY to TS SSCs. Thus, the offsite power system cannot be referred to as 'operable' or 'inoperable', because the grid is not a TS SSC. Everything that is non-TS is referred to as Functional or non-Functional; however, some sites have components in their 'off-site circuit' that are included in their site's Technical Specifications. We as an industry need to be precise in our terminology as provided by the NRC in its own definitions of terminology. The statement in part 2 is very similar to the NRC's Generic Letter (GL) 2006-02 questions 3.a and 3.d. A unit operator declares the offsite power system non-functional for contingent unit trip, after an analysis (operational decision-making) that

Item Number	DG Location	DG Proposed Text	Suggested Text	Comments/References/Regulatory Basis
				determines the offsite power inadequate. The unit operator does not declare the offsite power system non-functional for another facility loss. If notified that a NPP trip would drive voltage below the degraded voltage protection setpoint, the NPP operator would enter LCO 1(b). Postulated contingencies on the transmission grid are not used as a basis for functional determinations since: • such events are only postulated and have not actually occurred, • the offsite power circuits remain capable of effecting a safe shutdown and mitigating the effects of an accident, and • the GDC-17 criterion discussed in the Generic Letter is still met, i.e., loss of power from the transmission network would not occur as a result of loss of power generated by the unit. There is no industry-wide precedent that requires units to monitor the postulated effects of transmission line trips. There is no assessment of the probability of a particular line tripping to allow an informed risk determination. Some line trips will always result in loss of power to one or more safety buses (such as the lines feeding the startup transformers) and there has been no industry dialog on what "preparatory actions", if any, would be necessary or appropriate if such a notification were received.
	Discussion, Second Paragraph	This states "other transmission contingencies identified by the grid operator"	Actions taken for "other transmission contingencies" is different than that for a "unit trip contingency".	Identification of situations in which there would be inadequate voltage following a trip of "other transmission contingencies identified by the grid operator" does not require the offsite power system to be declared non-functional.

Item Number	DG Location	DG Proposed Text	Suggested Text	Comments/References/Regulatory Basis
	Regulatory Position, Second Paragraph	This states in the last sentence "Many plants are now attempting online testing."	Remove the sentence.	This phrase is not necessary to make the point regarding evaluation of other maintenance activities under 10CFR50.65. Plants conduct testing or they do not; there is no attempting.
	Regulatory Position, 1.The Available Offsite AC Power Sources Are One Less Than the LCO	This states "If the available offsite ac power sources are one less than the LCO, power operation may continue for a period that should not exceed 72 hours if the electric grid system capability and reserves are such that a subsequent single failure (including a trip of the unit's generator, but excluding an unrelated failure of the remaining offsite circuit if this degraded state was caused by the loss of an offsite source) would not cause a total loss of offsite power."	Rewrite to "If the available offsite ac power sources are one less than the LCO, power operation may continue for a period that should not exceed 72 hours if the electric grid system capability and reserves are such that a subsequent trip of the unit's generator would not cause a total loss of offsite power."	If an inadvertent trip of the unit would result in loss of offsite AC, the offsite sources would be considered non-functional and the unit would be in a different section of this DG. Rewording this sentence does not detract from the intent.
	Regulatory Position, 4.The Available Offsite and Onsite AC Power Sources Are Each One Less Than the LCO	This states "(1) the reserves and system stability are such that a subsequent single failure (including a trip of the unit's generator, but excluding an unrelated failure of the remaining offsite circuit) would not cause a total loss of offsite power"	Change condition to "(1) grid conditions are such that a subsequent trip of the unit's generator would not cause a total loss of offsite power."	The only contingency (postulated failure) that is relevant to offsite source functional/non-functional discussions is the trip of the unit.
	Regulatory Position, 6.The Available Onsite DC Power Sources Are One	This states "The required functions of the dc system should be critically monitored during the shutdown process, and	Substitute the phrase '. . . process and take unit specific actions to ensure a safe shutdown.'	Taking unit specific actions to ensure a safe shutdown will ensure consistency with what is done today. For example, all plants cannot shed DC loads.

Item Number	DG Location	DG Proposed Text	Suggested Text	Comments/References/Regulatory Basis
	Less Than the LCO	necessary actions taken (such as cross-connecting a supply, or shedding optional loads) to ensure safe shutdown."		
	Implementation		Identify system modifications that would invoke this DG	It is not clear what type of changes in the off-site power sources or on-site power sources would result in having to invoke this DG. Apparently, changes that can result in a License Amendment could expose a plant to having to invoke these changes into their Technical Specifications.
	Implementation	This states "submittals from operating reactor licensees who voluntarily propose to initiate system modifications following the issuance of this guide if there is a clear nexus between the proposed modifications and the subject for which guidance is provided herein."		Interpretations of the "clear nexus" between proposed system modifications and DG-1153 guidance is likely to create controversy.
	Regulatory Analysis, 1.Statement of the Problem	This states that the DG "needs a general update to reflect operating experience gained over the past 30 years, 10CFR50.63 (the Station Blackout Rule), issues related to grid reliability, and deregulation of the electrical industry."		This implies the NRC may invoke the revised RG into a plant's Technical Specifications, if changes in the grid occur that result in reduction in reliability of a unit's offsite power source over which the unit has no control.
	Backfit Analysis			From a regulatory perspective, it would probably make more sense to invoke this DG from a COL date.

Item Number	DG Location	DG Proposed Text	Suggested Text	Comments/References/Regulatory Basis
				As stated here, all previously licensed plants would be subject to these requirements. If it is invoked for all future plants subject to GDC-17, then there's no need to consider backfit. This way the discussion regarding "current regulatory practice" doesn't need to take place. Additionally, RG 1.93 does have a date, so how can a revision not do a backfit analysis if it eliminates the applicability date? The statement that the guide "reflects current regulatory practice" is not accurate. The guide's discussion of the use of the grid operator's real time contingency analysis is consistent with the questions contained in GL 2006-02; however, that does not make the DG reflect current regulatory practice.
	Decision Flow Diagram	This states "Conditions satisfied for power operation to continue?"	Fix Flow Diagram to support DG test.	It's often said that a picture equals 1000 words, this diagram may be the exception. The flow diagram cannot be used by itself, since one of the key decisions is "Conditions satisfied for power operation to continue?". In order to proceed beyond this block, one needs to return to the words for guidance.
	Regulatory Guide 1.93, December 1994, Section C	This states "If the conditions for continued power operation cannot be met, the unit should be ramped down immediately to the minimum power level required for stable operation"	Revisit the ramp down option.	The ability of a plant to ramp down, supply house loads, or VARs to the system was removed from DG-1153. The ramp down option allows the plant and grid operator more flexibility about how to allow the plant to support the grid.
	Conclusion	This states "The NRC	Do not issue a revision to	In 1992, the NRC issued the improved Standard

Item Number	DG Location	DG Proposed Text	Suggested Text	Comments/References/Regulatory Basis
		should issue this regulatory guide to enhance the licensing process."	RG 1.93. Delete RG 1.93 from inventory.	Technical Specifications to clarify the content and form of requirements necessary to ensure safe operation of nuclear power plants in accordance with 10CFR50.36. Major revisions to the Standard Technical Specifications were published in April 2001 and June 2004. The 2004 NUREG 1430-1434 series that created specific Technical Specifications and the NRC Technical Specification Task Force (TSTF) Travelers process for Technical Specifications changing has superseded the need for the 1974 Regulatory Guide RG 1.93 that was originally issued to describe operating procedures/restrictions and the RG's proposed 2007 update DG-1153 to provide current guidance.

Comparison of DG-1153 & AP1000 / ESBWR Technical Specifications

DG-1153	DG Requirement	AP1000 / ESBWR Tech Spec	TS Requirement	Comments
C.1 Offsite AC sources 1 less than LCO	Continued operation for 72 hours provided subsequent single failure not cause total loss of offsite power	None	None	Both designs do not rely upon AC power for accident mitigation
C.2 Onsite AC sources 1 less than LCO	Continued operation for 72 hours provided redundant EDG assessed < 24 hours to be free of CCF	None	None	Both designs do not rely upon AC power for accident mitigation. Both designs have non-safety related diesel generators for investment protection / defense in depth. These EDGs are not safety related.
C.3 Offsite AC Sources 2 less than LCO	Continued operation for 24 hours provided timely restoration of at least 1 source is likely	None	None	Both designs do not rely upon AC power for accident mitigation
C.4 Offsite & Onsite Sources each 1 less than LCO	Continued operation for 12 hours provided subsequent single failure not cause total loss of offsite power AND restoration of at least 1 source within 12 hours	None	None	Both designs do not rely upon AC power for accident mitigation
C.5 Onsite AC Sources 2 less than LCO	Continued operation not to exceed 2 hours	None	None	Both designs do not rely upon AC power for accident mitigation
C.6 Onsite DC Sources 1 less than LCO	Continued operation not to exceed 2 hours	AP1000 3.8.1:	Continued operation not to exceed 6 hours	AP1000 DCD states that an exception was taken from the 2-hour completion time in RG 1.93 rev 0.
		ESBWR 3.8.1	Continued operation not to exceed 2 hours	No difference