Enclosure 3
Staff Responses to Public Comments on Draft Regulatory Guide DG-1172
(Proposed Revision 4 of Regulatory Guide 1.9)

Comments			NRC Comment Resolution
Originator	**DG-1172 Section**	**Specific Comments**	
Nuclear Energy Institute (NEI) 12/21/206 (ML063620433)	General (comment 1)	In several instances, DG-1172 recommends routine testing under conditions that are not consistent with guidance from the diesel generator manufacturers or IEEE. Testing under these newly postulated "worst-case" conditions instead of the currently recommended practices could potentially be destructive to the long-term function of the equipment and would not provide additional benefit.	The staff disagrees with the comment. Testing of the diesel generators as discussed in DG-1172 is consistent with the current regulatory practice. This draft guide does not impose any new requirements, and the backfit is not intended. The testing should also be consistent with the guidance provided by the manufacturers.
NEI	General (comment 2)	This guide would not apply to the AP1000 or ESBWR projects because in both designs the diesel generators are not safety related. Both design DCDs that have been submitted to the NRC state that Regulatory Guide 1.9 is not applicable. Testing of the nonsafety-related diesel generators will be controlled by "availability controls" based on RTNSS evaluation results (regulatory treatment of nonsafety systems). The testing in DG-1172 is overly stringent for nonsafety-related applications.	The staff agrees with the comment. (See Title 10, Section 52.63, "Finality of the Standard Design Certifications," of the *Code of Federal Regulations* (10 CFR 52.63), which remains applicable to ESBWR and AP1000 designs, specifically paragraph (a)(3).) This comment does not require a change in the regulatory position(s).
NEI	Page 7: Regulatory Position 2.1, "Start Failure": 2nd line (comment 3)	After voltage add "within specified time allowance."	The staff agrees and made the suggested change.
NEI	Page 9: Regulatory Position 2.2.1: 3rd line (comment 4)	After frequency add "within specified time allowance."	The staff agrees and made the suggested change.

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NEI	Page 2: Discussion, 1st para, (2) (comment 5)	Need to clarify here if a LOOP is considered a design-basis event.	The staff postulated a loss of offsite power (LOOP) simultaneous with a loss-of-coolant accident (LOCA) as a design-basis event.
NEI	Page 3: Discussion, last para: last sentence (comment 6)	A numerical value for margin should be specified. A 5% margin is certainly adequate given that virtually all diesels can exceed continuous ratings for a period of time.	The staff agrees.
NEI	Page 3, Discussion, last para: 3rd sentence (comment 7)	This sentence states, "A more accurate estimate of safety loads is possible during the operating license or combined license stages of review because detailed designs have been completed and component test and preoperational test data are usually available." This statement is not necessarily correct given the status of designs and testing at the time of license application submittals and should be corrected or clarified.	The staff agrees because it believes this to be a reasonable assumption. If the load data are not available for any reason during the operating license or combined license stages of review, the licensee can provide them during the detailed review process.
NEI	Page 3, Discussion, last para: last sentence (comment 8)	The sentence should be clarified to explain the basis for the required margin.	See the staff's response to comment 6.

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NEI	Page 5: Regulatory Position 1.3 (comment 9)	A numerical value for margin should be specified. A 5% margin is certainly adequate given that virtually all diesels can exceed continuous ratings for a period of time.	The staff agrees. A minimum of 5% margin is adequate.
NEI	Page 5: Regulatory Position 1.4 (comment 10)	The location where voltage and frequency data are collected should be specified. Add a sentence stating that voltage and frequency data should be collected at the diesel output breaker.	The staff agrees with the comment. The voltage and frequency data may be consistently collected at the diesel output breaker. The objective is to confirm that adequate voltage is available for safety-related equipment. The staff revised the RG accordingly.
NEI	Page 5: Regulatory Position 1.4 (comment 11)	The 10th sentence should be deleted as it is a duplicate of the 7th sentence. "The acceptance value…load interruption."	The staff agrees and deleted the duplicate sentence.
NEI	Page 6: Regulatory Position 1.5: 4th sentence (comment 12)	Regarding "environments (e.g., temperature, humidity)": Sites currently have no capability to control the environment—outside temperature and/or humidity—for current testing. For future plants controlling these parameters would be very cost prohibitive to test at these extremes. Testing from normal standby conditions is appropriate. Delete "and environments (e.g., temperature, humidity)."	The staff disagrees because this language is consistent with RG 1.9, "Selection, Design, Qualification and Testing of Emergency Diesel Generator Units Used as Class 1E Onsite Electric Power Systems at Nuclear Power Plants," Revision 3, issued 1993. Licensees should consider environments (such as temperature and humidity) since these conditions can influence the electrical output of a diesel generator. They should consider capacity derating if the environmental temperature exceeds the specified range used for electrical rating. The staff does not intend that efforts should be made to "control" the environments.

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NEI	Page 6: Regulatory Position 1.7 (comment 13)	Since a 1E source is designed to operate during/after a DBA, it is not clear what this position would require for the EDG design. Does this statement mean that a backup control power system is needed that is powered directly from the emergency generator?	The staff deleted Regulatory Position 1. 7.
NEI	Page 6: Regulatory Position 1.9 (2) (comment 14)	This section implies trips should not be bypassed if operators cannot react in sufficient time. Under DBE conditions, operator response time cannot be assured as operators are not normally present initially or continuously at the EDG during an event. We are of the opinion that trips other than overspeed and generator differential should be bypassed during DBEs due to the possibility of a spurious trip. In addition, this reduces the complexity of the control scheme in the emergency mode. IEEE Clause 4.5.4 a and b language is sufficient. Eliminate clause on operator.	The staff agrees and has deleted Regulatory Position 1.9 (2).
NEI	Page 7: 1st sentence (comment 15)	This should be numbered as 1.10 and not 1.8.	The staff agrees with this comment.
NEI	Page 9: Regulatory Position 2.1, Exceptions: 4th bullet (comment 16)	The term “within a few minutes” is too vague and allows for inconsistent interpretation both from the licensee and the regulator. A numerical value such as 30 minutes should be selected.	The staff expects that the diesel generator is brought to load within 5 minutes. The staff revised the RG accordingly.
NEI	Pages 9, 11 & 12, Regulatory Position 2.2 (2.2.1 to 2.2.11) (comment 17)	This section of the document is very confusing for the following reasons—(1) the section lists only 11 tests, though 21 are listed in Table 1; (2) many tests do not have a description, with most simply notes where the IEEE guidance should be supplemented; (3) site acceptance tests are mixed in with availability tests. Some examples of	The staff disagrees with this comment. This guide should be used in conjunction with Institute of Electrical and Electronic Engineers (IEEE) Std 387-1995. The guide is not a standalone document, since it endorses IEEE Std 387-1995.

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		confusion are (1) starting test (a site acceptance test) as 2.2.1 with slow start test as 2.2.2., and (2) load run (load acceptance) test as 2.2.3, and rated load test as 2.2.4. Though these tests are similar, having them together with very vague descriptions makes the document confusing. Please improve section by (1) having separate sections for site acceptance tests and availability tests; (2) providing brief descriptions (even if repeated from IEEE) for all required tests.	
NEI	Page 11: Regulatory Position 2.2.3 (comment 18)	This test involves demonstrating 90–100 percent of the continuous rating or worst case design-basis event loads (whichever is higher) of the emergency diesel generator. DBE loads in excess of continuous ratings are effectively not permitted by C.1.3 due to margin requirements—as such this should not apply to plants receiving a design certification after 2007. If the site somehow does have maximum design- basis loads greater than the continuous rating (typically only for a short period of time), it is recommended that the EDG not have monthly testing at overload conditions. This is potentially destructive testing that is expected to have a significant impact on EDG reliability over time. Testing at the continuous rating monthly should be sufficient to verify successful performance of the EDG—meeting DBE loading can be satisfactorily verified during part of the endurance run performed every 18–24 months. This is a significant equipment issue that has not been recommended by IEEE. Eliminate “or worst case design-based event loads (whichever is higher)….”	The new nuclear plant designs should prevent this condition, where the design-basis loading exceeds the continuous rating. The continuous rating of the diesel generator for new plants should be a minimum of 5% higher than the worst-case design-basis event loads. Therefore, this condition is not applicable.

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NEI	Page 11: Regulatory Position 2.2.4 (comment 19)	DBE loads in excess of continuous ratings are effectively not permitted by C.1.3 due to margin requirements—as such this should not apply to any plant receiving a design certification after 2007. If the site somehow does have maximum design-basis loads greater than the continuous rating (typically only for a short period of time), it is recommended that the EDG not have monthly testing at overload conditions. This is potentially destructive testing that is expected to have a significant impact on EDG reliability over time. Testing at the continuous rating monthly should be sufficient to verify successful performance of the EDG— meeting DBE loading can be satisfactorily verified during part of the endurance run performed every 18–24 months. This is a significant equipment issue that has not been recommended by IEEE. Eliminate 2.2.4.	The staff disagrees. See the staff's response to the previous comment.
NEI	Page 11: Regulatory Position 2.2.6 (comment 20)	It is our understanding that the NRC is in conversation with the BWR Owners Group regarding the separation of the LOOP and LOCA design-basis events. If this is indeed the case, this test may no longer be necessary. It is suggested that the NRC review its current position on separation of LOOP and LOCA design- basis events and ensure that the testing required in this document (i.e., the combined SIAS/LOOP test) is consistent with the NRC position.	The guidance is consistent with the staff's current position. A LOOP simultaneous with a LOCA is postulated as a design-basis event for electrical systems.
NEI	Page 11: Regulatory Position 2.2.7 (comment 21)	This test involves demonstrating the emergency diesel generator's capability to reject a load equal to loss of the largest single load while operating at largest load power factor and verify that the frequency and voltage requirements are met and the unit will not trip on overspeed. Testing "while operating at the largest load power factor" is a potentially destructive test. When paralleled to the grid, the voltage is artificially offset high to allow rated kvar loading. Upon load rejection, the	The staff agrees in part. This is not a destructive test. This test should envelop the largest load (in kilowatts (kW)) and its power factor. The staff has changed the text to read, "while operating at its design load power factor…." Upon load rejection, the accompanying voltage spike should not exceed the vendor's maximum recommended voltage. This test is necessary for certain LOCA mitigation operation.

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		accompanying voltage spike can potentially exceed max vendor recommended voltage (based on how large the load is). Recommend performing this test at 1.0 power factor and placing limits on maximum voltage seen (overshoot no greater than 15% and/or within 10% in 2 seconds). Eliminate "while operating at largest load power factor…."	
NEI	Page 12: Regulatory Position 2.2.8 (comment 22)	This test involves demonstrating the emergency diesel generator's capability to reject a load equal to 90–100 percent of the continuous rating while operating at a worst-case design load power factor and verify that the voltage requirements are met and that the unit will not trip on "overspeed." Testing "while operating at the worst case design load power factor" is a potentially destructive test. When paralleled to the grid, the voltage is artificially offset high to allow rated kvar loading. Upon load rejection, the accompanying voltage spike will typically exceed max vendor recommended voltage. Recommend performing this test at 1.0 power factor and placing limits on maximum voltage seen (overshoot no greater than 15% and/or within 10% in 2 seconds). Eliminate "while operating at worst case design load power factor…."	The staff agrees that this is a conservative test and has been successfully done in the past. The staff has changed the wording to read, "while operating at its design load power factor…." The applicant should demonstrate that the diesel generator is capable of providing power to emergency buses under design-basis events.

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NEI	Page 12: Regulatory Position 2.2.9 (comment 23)	This test involves demonstrating the full load-carrying capability at a worst-case design load power factor for an interval of not less than 24 hours. The 24-hour endurance run is contrary to the IEEE-387 (1995) recommendation (Section 7.5.9) that the endurance run be completed in 8 hours—2 hours at load equivalent to the short-term rating (110% of continuous), and 6 hours equivalent to 90–100% of the continuous rating. On the preoperational test, the endurance run is still recommended to be a 24-hour run, but it recommends that the 18–24 month periodic endurance run be performed for only a total of 8 hours. Accordingly, there is no regulatory basis for a 24-hour run. Some plants have recently had their technical specifications approved to operate in this manner (8-hour endurance run). Change clause to reflect an 8-hour endurance run.	The staff disagrees with the comment. The 24-hour endurance run is consistent with the current regulatory practice (RG 1.9, Revision 3). The staff has allowed an exception to the 8-hour endurance run for operating nuclear power plants, which did not have any endurance test requirements. However, on further deliberation, the staff has concluded that the 18–24 month periodic endurance run should be performed for 24 hours.
NEI	Page 12: Regulatory Position 2.2.9 (comment 24)	Of this period, 2 hours are at a load equal to 105–110% of the continuous rating or design-basis load with a margin of 5–10% (whichever is higher) of the emergency diesel generator, and 22 hours are at a "load equal to 90–100 percent of the generator's continuous rating." If a 5% margin already exists between the design- basis load and the continuous load rating of the machine, there is no basis to go to 105–110% of the continuous load. It is recommended that the EDG be tested to no more than 5% of design-basis load (not 5–10%). This is a significant equipment issue that has not been recommended by IEEE. Change clause to "Of this period, 2 hours are at a load equal to 105 percent of the continuous rating…."	The range is 105–110% of the continuous load (for 2 hours). As 105% falls within the range, it can be used.

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NEI	Page 12: Regulatory Position 2.2.9 (comment 25)	Of this period, 2 hours are at a load equal to 105–110 percent of the continuous rating or design-basis load with a margin of 5–10 percent (whichever is higher) of the emergency diesel "generator…." DBE loads in excess of continuous ratings are effectively not permitted by C.1.3 due to margin requirements—as such this should not apply to any plant receiving design certification after 2007. If the site somehow does have maximum design- basis loads greater than the continuous rating (typically only for a short period of time), it is recommended that the EDG not be tested with a margin of 5–10 percent above that load. This is a potentially destructive testing that could have an impact on EDG reliability over time. Testing for these two hours at a level of up to 105% of the continuous rating or at a level equal to the design-basis load (whichever is higher) should be sufficient to verify successful performance of the EDG. This is a significant equipment issue that has not been recommended by IEEE. Replace clause with "Of this period, 2 hours are at a load equal to 105 percent of the continuous rating or design-basis load (whichever is higher) of the emergency diesel generator…."	See the staff's response to the previous comment.

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NEI	Page 12: Regulatory Position 2.2.10 (comment 26)	This test involves demonstrating the hot restart functional capability at full load-temperature conditions (after the emergency diesel generator has operated for 2 hours at continuous or design-basis event loads whichever is higher)…." This test should not be contingent on operating the EDG for 2 hours at "design basis loads (whichever is higher). As noted previously, EDG loads for new plants should not exceed the continuous rating, and if they do, the EDG should not be routinely testing at loads exceeding the continuous rating. Performing this test after 2 hours of operation at the EDG's continuous rating is sufficient to meet the objective of this test. Eliminate the clause "or design-basis event loads whichever is higher."	The staff agrees and deleted the suggested words.
NEI	Page 12: Regulatory Position 2.2.11 (comment 27)	"This test should also verify that the critical protective trips that are not automatically bypassed perform their intended function...." It is not recommended that the critical protective trips that are not bypassed are tested to perform their intended function during this test. The function of these trips can be verified in prestart tests, relay tests, or with simulation per the site's existing maintenance program. The intent of the test is to verify that the bypassed trips do not trip the EDG during a design-basis accident. This is not recommended in IEEE-387 and has no regulatory basis. Delete last sentence under 2.2.11.	The staff believes that this test is necessary to verify that the critical protective trips that are not automatically bypassed perform their intended function(s). The staff agrees that the function of these trips can be verified in prestart tests, relay tests, or with simulation per the plant's maintenance program. However, a one-time test is not adequate. Therefore, the licensee should perform these tests periodically to ensure that the trips perform their intended functions.

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NEI	General (comment 28)	There currently exist several different protocols and regulations regarding EDG performance including maintenance rule, mitigating system performance indicators (MSPI), and INPO requirements. Has the NRC performed a review to ensure this guidance is consistent with other documents, specifically MSPI and improved technical specifications?	The guidance provided in DG-1172 is consistent with MSPI and the technical specifications.
NEI	Page 2: Discussion, 1st para (comment 29)	How does a utility determine the period associated with "if an extended loss of offsite power occurs"? What defines this period? A clarification needs to be provided in DG-1172.	A 30-day period should be considered (with refueling every 7 days). The staff revised the RG accordingly.
NEI	Page 3: 2nd para (comment 30)	How will we know if we meet "in about 1 second"? A clarification needs to be provided in DG-1172.	The goal is that adequately sized diesel generators are capable of restoring the bus voltage to 90% of nominal in about 1–2 seconds.
NEI	Page 5: Regulatory Position 1.4 (comment 31)	Page 5, section 1.4: "will not decrease to less than 75 percent of nominal." This does not align with the "20–30 percent" stated on page 3, second paragraph. If we are allowed 20–30 percent, then the minimum should be 70 percent, not 75 percent.	The staff agrees and changed "20–30%" to read "25–30%."
NEI	Page 5: Regulatory Position 1.4 (bottom sentences) (comment 32)	"Speed of the diesel generator should not exceed the nominal speed plus 75 percent of the difference between nominal speed and the overspeed trip set point, or 115 percent of nominal (whichever is lower)." What value for overspeed trip set point do we use for this calculation? We have a specified band of 1035–1053 rpm. What if we test the overspeed trip and find it trips at 1020 rpm; do we have to change the maximum allowable EDG speed on largest single load reject based on an as-found trip set point? What if we decide to continue with the 1020 rpm set point for several months until the next planned outage?	This is a plant-specific condition, and the staff will evaluate it on a case-by-case basis.

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NEI	Page 6: Regulatory Position 1.9 (comment 33)	Recommend specifying what action the operator is expected to take when the abnormal condition (associated with the bypassed trip) occurs. Is the action to trip the engine to protect it? A typical example is that low jacket coolant level is bypassed. If a flex hose or flex pipe coupling blew out, would an operator have time to address this before engine damage occurred? The design function of the EDGs is to operate (not shut down). We are designed to have single failures. Therefore, recommend that item 2 be deleted.	The staff agrees and deleted Regulatory Position 1.9 (2).
NEI	Page 7: Regulatory Position 2.1 (comment 34)	Definitions of demands and failures are not very thorough. Recommend stating that failures identified during postmaintenance testing (provided that the failure was caused during the maintenance period) should not count as a demand or a failure. Failures identified during PMT but not attributed to the maintenance performed should be counted as a demand and a failure. Is this guidance consistent with the maintenance rule guidance for demands and failures?	This guidance is consistent with the maintenance rule. Failures identified during postmaintenance testing (provided that a condition attributed to maintenance caused the failure) should not count as a demand or a failure.
NEI	Page 9: Regulatory Position 2.1 (last para) (comment 35)	Past inoperability should apply to this also. If during a maintenance outage (EDG already inoperable), we find something that would have caused the EDG to not perform its required design function (past inoperability), this also should be counted as a demand and failure.	The staff agrees with this comment.
NEI	Page 10: Table 1 (comment 36)	Change “System operation tests: shutdown/refueling” to “System operation tests: once per operating cycle.” If the plant design and operation conditions force these tests into a refueling outage, then that is when they will be performed. If they can be done with the plant on line, this must be allowed.	This should be decided on a case-by-case basis. Online testing is generally acceptable.

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NEI	Page 10: Table 1 (comment 37)	The “Start” test referenced to IEEE 387 Clause 7.5.1 should be required during monthly availability tests (to make it consistent with Regulatory Position C.2.3.2.1 and existing Standard Technical Specifications and during preoperational tests).	The staff agrees and made the appropriate change.
NEI	Page 10: Table 1 (comment 38)	The “Load Run” test referenced to IEEE 387 Clause 7.5.2 should be required during monthly availability tests (to make it consistent with Regulatory Position C.2.3.2.1 and existing Standard Technical Specifications).	The staff agrees and made the appropriate change.
NEI	Page 10: Table 1 (comment 39)	The “Fast Start” test referenced to IEEE 387 Clause 7.5.3 should be required during the 6-month availability tests (to make it consistent with Regulatory Position C.2.3.2.2 and existing Standard Technical Specifications).	The staff agrees and made the appropriate change.
NEI	Page 10: Table 1 (comment 40)	Have all monthly and 6-month tests gone away? Why are these columns blank?	The staff has made the appropriate corrections.
NEI	Page 11: Regulatory Position 2.2.6 (comment 41)	While this regulatory position is consistent with Regulatory Position C.2.2.6 of Regulatory Guide 1.9, Revision 3, the first sentence (which indicates that this test demonstrates that the emergency diesel generators can satisfactorily respond to a LOOP in conjunction with SIAS in whatever sequence they might occur) is not consistent with the second sentence (which implies that this regulatory position is satisfied by a simultaneous LOOP/LOCA event test). (Given the amount of regulatory interaction that has occurred with respect to delayed LOOP/LOCA at several of the existing U.S. nuclear power plants, it is recommended that this regulatory position be clarified.)	The two sentences refer to two different scenarios.

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NEI	Page 11: Regulatory Position 2.2.7 (comment 42)	"While operating at largest load power factor" is unclear. What if you are not shedding the largest load, but rather doing a full load reject? How close do you need to be to the power factor of this load?	Licensees should be as close to the power factor as the grid conditions permit. The objective is to demonstrate the diesel generator's capability to reject the largest single load while operating at the largest load power factor. The generator should meet the frequency and voltage requirements without tripping the unit on overspeed. Note that Regulatory Position 2.2.7 does not address the full load rejection.
NEI	Page 12: Regulatory Position 2.2.9 (comment 43)	Load tables are naturally very conservative; loading to above them is unnecessary and may be harmful to the EDG. If we have a <10-minute load value and a >10-minute load value, which would we use as the load value for the first 2 hours? We assume that meter tolerances do not need to be factored into these values.	The range 105–110% takes into account the uncertainty of meters. The load testing should envelop actual design-basis loads.
NEI	Page 12: Regulatory Position 2.2.11 (comment 44)	Recommend deleting last sentence. EDG safety function is to run, not trip. We should not be mandated to test that essential trips work.	The staff disagrees with the comment. See the staff's response to Comment 27.
NEI	Page 6: Regulatory Position 1.2 (comment 45)	Clause 1.2 requires that it be ensured accident loading remains below continuous rating plus 10 to 15% margin during design stage. This clause seems to ignore the 2000-hour rating concept of diesel generators. A clarification should be added to this clause concerning a diesel generator's 2000-hour rating.	For new reactors, the total diesel generator loads should not exceed the generator's continuous rating. Therefore, the 2000-hour rating is irrelevant (see Regulatory Position 1.2). Manufacturers generally do not currently provide the 2000-hour rating.
NEI	Page 5: Regulatory Position 1.4 (comment 46)	Clause 1.4 contains a response requirement for disconnection of the single largest load of recovery of the frequency to within 2% of nominal within less than 80% of sequencer interval. What is the basis of this requirement?	This requirement is consistent with current regulatory practice (RG 1.9, Revision 3). The goal is to ensure that the remaining loads on the safety bus are not exposed to high-frequency conditions.

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NEI	Page 6: Regulatory Position 1.8 (comment 47)	Clause 1.8 identifies additional engine status indication requirements in terms of a surveillance system in the control room. The form of acceptability of this remote indication should be clarified in this clause (for example, a combination of indicator lights, computer screen indication, annunciation, etc.).	Remote indications, such as indicator lights and annunciation, are acceptable.
NEI	Page 6: Regulatory Position 1.9 (comment 48)	Clause 1.9 identifies two or more measurements for each protective trip. Protective relay logic, protective relaying other than generator differential, at existing nuclear power stations may not have two or more measurements. Protective relay trips should be identified as an exception in this clause.	If it is not practical, the protective relay trips should be bypassed. The regulatory position intends no backfit.
NEI	Page 5: Regulatory Position 1.4 (comment 49)	Clause 1.4 states in part, "During recovery from transients caused by a disconnection of the largest single load, the speed of the diesel generator should not exceed the nominal speed plus 75 percent of the difference between nominal speed and the overspeed trip set point, or 115 percent of nominal (whichever is lower)." Initially, Fairbanks Morse Engine, the vendor of the Opposed Piston and Pielstick engines within the Fairbanks Morse Owners' Group, recommended the overspeed trip setpoint of these engines be set in the range of 112% to 115% of nominal speed. Fairbanks Morse later revised its position concerning the overspeed setpoint to 115% to 117% of the engine's nominal speed. The nominal speed of Opposed Piston engines is 900 rpm, and the nominal speed of Pielstick engines is 514 rpm. 75% of the difference between nominal speed and the overspeed trip set point will always be lower than 115% of nominal.	The manufacturer's guidance should be considered.

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NEI	Page 10: Table 1 (comment 50)	Table 1 identifies a number of system operation tests: shutdown/refueling. It should be clarified that not all these tests are required to be performed with the unit in shutdown/refueling mode. There are a number of these tests which can be performed with the unit at 100% power without presenting a challenge to the operating unit (for example, (1) largest load rejection, (2) design load rejection, (3) endurance and load margin, and (4) hot restart). Flexibility should be provided to the licensee to perform these tests with the unit at 100% power. It is recommended a clarification be provided to allow licensees to perform tests on a refuel cycle periodicity versus with the unit in shutdown or refuel mode.	The staff has allowed, on a case-by-case basis, the performance of some of these tests during power operations.
NEI	Page 6: Regulatory Position 1.9 (comment 51)	Trips associated with electrical protective relaying should be excluded from this clause. Protective relay trips may be implemented with a single measurement and may not provide the operator with sufficient time to react to an abnormal condition (for example, a generator ground).	See the staff's response to Comment 48. In addition, the staff has deleted Regulatory Position 1.9 (2).
NEI	Page 7: Regulatory Position 2.1 (comment 52)	The definition of "load run demands" should be deleted from DG-1172 and replaced with a reference to the proper regulatory document which contains these requirements.	The staff has included this definition in RG 1.9, Revision 3.
NEI	Page 13: Regulatory Position 2.3.2.4 (comment 53)	This would require the US EPR to start all four engines. Ten-Year Testing Questionable value of a 10-year test to start ALL DGs simultaneously.	The staff disagrees with this comment. All diesel generators should be tested to verify their performance to identify certain common-failure modes.

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NEI	Page 11: Regulatory Position 2.2.3 (comment 54)	Clause 2.2.3 of DG-1172 states, “This test involves demonstrating 90–100 percent of the continuous rating or worst case design-basis event loads (whichever is higher) of the emergency diesel generator for an interval of not less than 1 hour and until attainment of temperature equilibrium. This test may be accomplished by synchronizing the generator with offsite power. The loading and unloading of an emergency diesel generator during this test should be gradual and based on a prescribed schedule that is selected to minimize stress and wear on the diesel generator.” The words “or worst case design-basis event loads (whichever is higher)” should be removed from this clause. The NRC recommended that the emergency diesel generator be loaded in accordance with vendor's recommendations “for all test purposes other than the refueling outage LOOP tests” in NUREG-1366, “Improvements to Technical Specification Requirements,” published in December 1992. Fairbanks Morse Engine’s recommendations for the monthly test were provided in its 1985-1986 letters which recommend that the emergency diesel generators be loaded to between 60% and 100% of their continuous ratings. Further, the Commission approved technical... Contd.	See the staff’s response to Comment 18.

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NEI	(comment 54)	...specification changes on the North Anna docket in 1985 (Docket No. 50-339, Amendment 48) in response to GL 84-15 to address routine emergency diesel generator overloading by stating in their safety evaluation report (page 16), "We [NRC] believe that the monthly test should exercise the EDG, confirm its operability, and detect degradation before a second failure [sic] is likely to occur. During the 18-month testing, the test loads envelop the calculated accident loads. It is our [NRC] position that it is not necessary to envelop the design-basis accident loads, which might occur once in 10,000 years, by a test that is repeated 12 times each year...." (Emphasis added.) The industry and the Commission's collective efforts over the last 20 years have resulted in dramatic improvements in EDG performance and reliability. One of the key components of this effort has been the reduction in overly harsh testing regimens that were prevalent in the 1970s and 1980s, while still maintaining an appropriate balance to nuclear safety. The Commission should not foster regression of these gains through the reimposition of unnecessary testing requirements.	

Comments			NRC Comment Resolution
Originator	**DG-1172 Section**	**Specific Comments**	
NEI	Page 11: Regulatory Position 2.2.3***** (comment 55)	In the section associated with test descriptions, clause 2.2.3, "Load Run (Load Acceptance) Test," identifies the following: "This test involves demonstrating 90–100 percent of the continuous rating or worst case design-basis event loads (whichever is higher) of the emergency diesel generator for an interval of not less than 1 hour and until attainment of temperature equilibrium. This test may be accomplished by synchronizing the generator with offsite power. The loading and unloading of an emergency diesel generator during this test should be gradual and based on a prescribed schedule that is selected to minimize stress and wear on the diesel generator." The load run is currently performed on approximately a monthly basis on existing emergency diesel generators at existing domestic nuclear power stations. Generally the emergency diesel generators are loaded to a kW value equal to or emergency diesel generators are loaded to a kW value equal to or less than the continuous rating of the machine. This is done to minimize stress and wear on the emergency diesel generator. However, draft Revision 4 of Regulatory Guide 1.9 would require the emergency diesel generator to load the machine to "90–100 percent of the continuous rating or worst case design-basis event loads (whichever is higher)." In some existing... Contd.	See the staff's response to Comment 18. *** For the complete text of this comment, see Attachment Comment No. 2 (ML063620433)**

Comments			NRC Comment Resolution
Originator	**DG-1172 Section**	**Specific Comments**	
NEI	(comment 55)	...domestic nuclear power stations, the worse case design-basis event loads may be higher than the continuous ratings of the emergency diesel generators. To account for this possibility, manufacturers have provided standby diesel generators with short-term ratings such as recommended in Safety Guide 9, issued in 1971. For example, ratings such as continuous, 2000 hour, 7 day, and 30 minute can be found on a number of emergency diesel generators. Others may have different short-term ratings. With engines built by Fairbanks Morse Engine, there is a general rule of thumb concerning operation of emergency diesel generators within these ratings and de-energizing these machines for overhaul and inspection when operating at the short-term ratings between normally scheduled overhauls. This rule of thumb can be characterized as follows: When the following equation is equal to or greater than 1.0, the diesel generator should be shut down to undergo a major inspection and overhaul: **For equation and complete text of this comment, see Attachment Comment No. 2 (ML063620433)** Contd.	

Comments			NRC Comment Resolution
Originator	**DG-1172 Section**	**Specific Comments**	
NEI	(comment 55)	Where N equals the number of hours of operation of the emergency diesel generator at R rating. For an emergency diesel generator with the following ratings, the equation would be as noted below: 2600 kW continuous (8760 hours) 3000 kW 2000 hours 3100 kW 168 hours 3250 kW 30 minutes **For equation and complete text of this comment, see Attachment Comment No. 2 (ML063620433)** As can be seen by the above equation, if the worst-case design-basis event loads on an emergency diesel generator were above the machine's 7-day rating and below the machine's 30-day rating, the licensee would load the emergency diesel generator to within its 30-minute rating each month and be required to perform a major inspection and overhaul each month if following the guidance as currently depicted in clause 2.2.3 of DG-1172. It is not prudent to operate the emergency diesel generators above their continuous ratings during the monthly load run test. The machine may experience unnecessary and excessive wear and stress if operated above its continuous ratings on a monthly basis. The purpose of the monthly load test is to verify operability of the emergency diesel generator to start and load, not to demonstrate its ability to meet worst case design-basis event loads each month. This is the purpose of the LOOP and SIAS tests performed during unit outages. The staff has previously demonstrated an understanding of the effects of excessive wear and stress on emergency diesel generators. Contd.	

Comments			NRC Comment Resolution
Originator	**DG-1172 Section**	**Specific Comments**	
NEI	(comment 55)	Previous industry operating experience has demonstrated advanced wear on emergency diesel generators when performing monthly fast starts and loads. To avoid excessive wear on these machines, the NRC gave relief to the industry to perform fast start tests every 6 months versus monthly. It is recommended that the requirement for load run testing of emergency diesel generators at the worst-case design-basis event load be removed from this clause of DG-1172 and clause 2.2.3 be revised to read as follows: "This test involves demonstrating 90–100 percent of the continuous rating ~~or worst-case design-basis event loads (whichever is higher)~~ of the emergency diesel generator for an interval of not less than 1 hour and until attainment of temperature equilibrium. This test may be accomplished by synchronizing the generator with offsite power. The loading and unloading of an emergency diesel generator during this test should be gradual and based on a prescribed schedule that is selected to minimize stress and wear on the diesel generator."	

Comments			NRC Comment Resolution
Originator	**DG-1172 Section**	**Specific Comments**	
NEI	Page 12: Regulatory Position 2.2.9 (comment 56)	In the section associated with test descriptions, clause 2.2.9, "Endurance and Load Margin Test," identifies the following: "This test involves demonstrating the full load-carrying capability at a worst case design load power factor for an interval of not less than 24 hours. Of this period, 2 hours are at a load equal to 105–110 percent of the continuous rating or design-basis load with a margin of 5–10 percent (whichever is higher) of the emergency diesel generator, and 22 hours are at a load equal to 90–100 percent of the generator's continuous rating. The test process should verify that frequency and voltage requirements are maintained." The endurance test is generally performed on a refuel cycle periodicity at domestic nuclear power stations that perform this test. It is not necessary to perform this test on a unit outage, and there is no reason why the endurance test cannot be performed when the unit is at 100% power. This clause of DG-1172 requires the test to be performed for a period of *2* hours "at a load equal to 105–110 percent of the continuous rating or design-basis load with a margin of 5–10 percent (whichever is higher) of the emergency diesel generator, and 22 hours…at a load equal to 90–100 percent of the generator's continuous rating." Existing domestic nuclear power stations have mature emergency diesel generator load profiles with little expected load growth on these machines. It is not necessary nor is it prudent to load the emergency diesel generator for 2 hours at the design-basis load with an additional margin of 5–10 percent if this equivalent load level is... Contd.	The staff disagrees with the comment. The diesel generator's full load-carrying capability should be demonstrated.

Comments			NRC Comment Resolution
Originator	**DG-1172 Section**	**Specific Comments**	
NEI	(comment 56)	greater than 105–110 percent of the machine's continuous rating. This will only burden the machine with unnecessary additional wear and stress. Rather, to ensure the emergency diesel generator will not experience unnecessary wear and stress during the endurance run, the load level of machines at existing domestic nuclear power stations with mature load profiles should be equal to "105–110 percent of the continuous rating or the worst-case steady state design-basis load, whichever is lower" at 2 hours and at their continuous rating for 22 hours. Further, it is not necessary for the emergency diesel generator to run at the worst-case load power factor for a period of 24 hours. The power factor of the generator load should be allowed to vary between 80–90 percent during the period of the test with the generator load power factor approaching expected design-basis load power factor where feasible. It is recommended the requirement for endurance testing of emergency diesel generators, clause the DG-1172 and clause 2.2.9, be revised to read as follows: "This test involves demonstrating the full load-carrying capability at a ~~worst case design load~~ power factor **between 80–90 percent during the period of the test** for an interval of not less than 24 hours. Of this period, 2 hours are at a load equal to 105–110 percent of the continuous rating or **worst-case steady-state** design-basis load ~~with a margin of 5-10 percent~~ (whichever is ~~higher~~ **lower**) of the emergency diesel generator, and 22 hours are at a load equal to 90–100 percent of the generator's continuous rating. The test process should verify that frequency and voltage requirements are maintained."	

Comments			NRC Comment Resolution
Originator	**DG-1172 Section**	**Specific Comments**	
TVA 12/22/206 (ML063620435)	(comment 57)	These comments were included in the comments submitted by NEI.	The staff addressed these comments in the response to NEI comments.
Fair-banks Morse 12/21/206 (ML063620426)	(comment 58)	These comments were included in the comments submitted by NEI.	The staff addressed these comments in the response to NEI comments.