

Response to Public Comments on Draft Regulatory Guide (DG) -1282 “Fuel Oil Systems for Emergency Power Supplies” Proposed Revision 2 of Regulatory Guide (RG) 1.137

A notice that Draft Regulatory Guide, DG-1282 (Proposed Revision 2 of RG 1.137) was available for public comment was published in the *Federal Register* on July 5, 2012 on page 77 FR 39745. On August 13, 2012, the public comment period was extended from August 31, 2012 until September 28, 2012 by 77 FR 48177. Comments were received from the organizations listed below. The NRC has combined the comments and NRC staff disposition in the following table.

Comments were received from the following:

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Comment From	Section of DG-1282	Comment	NRC Response
NEI-1	All	NEI requests a 30-day extension of comment period.	The NRC agreed to a 30-day extension to the comment period. In a <i>Federal Register</i> notice (77 FR 48177), the NRC extended the deadline for submitting comments on DG-1282 to September 28, 2012.
Exelon	General	American oil refiners supply diesel fuel to the commercial market in accordance with the latest version of ASTM D-975. Therefore, Exelon recommends removing citations to specific years of this standard throughout the draft RG standard since the citations might rapidly become obsolete.	Do not agree - ASTM D-975 prescribes the required properties of diesel fuels at the time and place of delivery. Licensees need to ensure that selected properties of fuel oil meet the requirements of the onsite emergency diesel generators (EDGs). Future revisions to ASTM standards may make changes to the acceptance criteria that may impact reliable operation of EDGs. It is therefore imperative for licensees to evaluate the changes for plant specific applications prior to accepting the fuel for onsite EDGs. Hence the specific vintages of standards that have been reviewed and found acceptable need to be maintained in the RG.
Exelon Singh	Paragraph C.4	Exelon considers that the discussion in this paragraph related to severe natural event or major disaster causing interruption of onsite diesel fuel replenishment might be premature, given that the nuclear	Do not agree - This RG provides recommendations for immediate and short term fuel oil requirements. Many licensees have established agreements with fuel oil suppliers

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Exelon Singh	Paragraph C.5	<p>energy industry is currently developing a comprehensive strategy to implement the lessons learned from the Fukushima event in Japan. This strategy, known as "FLEX," is being developed by the Nuclear Energy Institute (NEI) to deliver a diverse and flexible coping capability in these events.</p> <p>Exelon believes that the prescriptive instruction in this paragraph for establishing pre-disaster fuel replenishment agreements and onsite temporary storage tanks is not necessary given this comprehensive industry initiative, and recommends that this discussion be reconsidered.</p>	<p>for emergency replenishment as a defense-in- depth measure. These agreements facilitate delivery of fuel oil required for site specific application and ensure reliable EDG operation. These recommendations may supplement long term actions also.</p> <p>Part of the NRC’s response to the Fukushima event in Japan was the issuance of the Mitigating Strategies Order, EA-12-049, which does not require the use of diesel driven equipment. While certain synergies would be obtained through the use of diesel driven equipment, should a licensee choose to use a different form of engine for the portable equipment responsive to EA-12-049, the arrangements that are made for consumables for that equipment might be incompatible with emergency diesel generators.</p>
Exelon Singh	Paragraph C.5	<p>Appendix B of ANSI/ANS-59.51 - 1997, "Alternate Calculation of Usable Fuel Oil Storage Capacity," contains a provision for the calculation to include: 1) an allowance for an operator to supply power to equipment other than the minimum required for the plant condition, 2) an explicit allowance for periodic testing, and 3) an additional 10% margin to account for remaining uncertainties. Exelon believes that the justification for the NRC to not accept the time-dependent method for calculating fuel storage requirements that is discussed in the second to last sentence of the introductory paragraph to Section C.5 is unwarranted.</p> <p>Therefore, Exelon suggests that the NRC consider deleting this sentence from the final revision.</p>	<p>Do not agree - Licensees using time dependent method typically assume ‘worst case’ accident loading of the EDG (such as during a large break LOCA) for first few hours of EDG operation and assume load shedding can be accomplished based on engineering judgment for the balance of hours. Depending on the size of break postulated in the primary or secondary systems, the worst case EDG loading from fuel oil consumption perspective may not be a large break LOCA. In addition, symptom based emergency operating procedures may dictate operators to connect additional loads that may not have been considered in the EDG fuel oil consumption calculations. Hence, for bounding analyses, the 7-day operation at rated capacity is recommended in this RG. Licensees of operating plants can continue using RG 1.137, Revision 1, and have the option to use Revision 2 of RG 1.137.</p>
Exelon Singh	Paragraph C.5.1	<p>Exelon believes that it is common practice to include the volume of fuel in day or integral tanks, piping, etc., in the usable fuel storage calculations, since this fuel meets all specification requirements and is viable fuel for operation of the machine.</p> <p>Therefore, Exelon suggests that the NRC consider deleting this discussion since there appears to be no reasonable technical basis for its inclusion.</p>	<p>Do not agree - The intent of section 5.4 of ANSI/ANS-59.51-1997 is to provide guidance on sizing of storage tanks. There are specific requirements for supply tanks and day tanks. There is no guidance on storing fuel in piping. Licensees who have used up the available margin in the original design basis of the plant tank sizing criteria have credited fuel available in the system piping or day tanks to comply with their existing licensing basis. Licensees of operating plants can continue using RG 1.137, Revision 1, and have the option</p>

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NEI-2 Singh	Paragraph C.5.1	<p>This section precludes facilities from taking credit for the useable volume within the day (or integral) tanks on the emergency diesel generators (EDG) when calculating the 7-day useable volume. Some plants currently take credit for their day tank volumes, and disallowing this practice could potentially require a facility to install additional storage volume in order to meet the requirements of the draft RG. Given the lower heat content of ultra-low sulfur diesel (ULSD) fuel, all nuclear facility storage volume margins were reduced by transitioning to ULSD. As a result, some facilities included the day tank storage volume to avoid adding additional storage tank capacity. The previous revision of RG 1.137 did not preclude use of day tanks in the 7-day useable volume calculation.</p> <p>Revise C5.1 so that it does not preclude use of day (or integral) tank volumes in the 7-day useable volume calculation, or provide a basis for this additional requirement.</p>	<p>to use Revision 2 of RG 1.137.</p> <p>Do not agree - The intent of section 5.4 of ANSI/ANS-59.51-1997 is to provide guidance on sizing of storage tanks. There are specific requirements for supply tanks and day tanks. There is no guidance on storing fuel in piping. Licensees who have used up the available margin in the original design basis of the plant tank sizing criteria have credited fuel available in the system piping or day tanks to comply with their existing licensing basis. As indicated in the comment, the previous version of RG 1.137 did not explicitly clarify the requirements of each tank. The intent of Revision 2 is to clarify the separate and conservative design criteria for supply and day tanks. Licensees of operating plants have the option to use Revision 2 of RG 1.137.</p>
Exelon Bob	Paragraphs C.5.3 and C.5.4	<p>Exelon believes that the example of a 2% or more capacity change due to use of Ultra-Low Sulfur Diesel (ULSD) fuel oil seems excessive and might be without practical technical basis. Exelon has analyzed and trended information of tests of ULSD fuel oil samples. The tests indicate that the heat content on a volumetric basis, and thereby the tank capacity to achieve the 7-day storage goal, follows the correlation established in ASTM D-4868, "<i>Standard Test Method for Estimation of Net and Gross Heat of Combustion of Burner and Diesel Fuels</i>," to within 1%. Figure 1 is being provided for information and reference purposes and helps to depict the test result trending data.</p> <p>Exelon suggests that licensees be afforded the option to perform actual heat content testing to establish limiting values. ASTM D-4809, "<i>Standard Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter (Precision Method)</i>," provides a state-of-the-art method for determining this value.</p>	<p>Agree - The example given, "[e.g., a 2% or more capacity change (as applicable) for use of ultra low sulfur diesel (ULSD) fuels]," has been deleted.</p> <p>The NRC staff has not endorsed a specific test method to establish heat content in fuel oil. The test method is determined by the licensee.</p>
Exelon Bob	Paragraph 6.1	<p>Emergency Diesel Generator (EDG) manufacturers typically utilize positive-displacement engine-driven fuel pumps to transfer the fuel from the day tank to feed the engine fuel rail. These pumps have self-priming suction lift capability and Net Positive Suction Head (NPSH) requirements would not necessarily apply.</p>	<p>The NRC staff agrees with the comment. This paragraph has been modified to read, "Net positive suction head requirement of the pump fed from the day tank, if applicable,"</p>

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NEI-2 Burke	Paragraph C.9.1	<p>Therefore, under these circumstances, Exelon suggests that this paragraph be removed or modified accordingly.</p> <p>This section addresses protection against internal and external corrosion by use of coatings and/or cathodic protection, as appropriate. Guidance is provided for internal coating performance. The section does not provide guidance for needed actions for internally coated tanks that may not meet the recommended coating performance criteria.</p> <p>Revise C.9.1 to include guidance for addressing internally coated tanks that may not meet the recommended coating performance criteria.</p>	<p>The NRC staff believes the wording in the draft RG is adequate as is. No changes are necessary.</p> <p>Internal tank coatings, whether they are classified as Coating Service Level III in accordance with RG 1.54 Rev 2, or not, that are not qualified for the service conditions or are degraded such that detachment of the coating from the tank wall is considered likely before the next inspection should have a failure mode analysis performed. The failure mode analysis is to include an evaluation of whether failed, or detached coatings, or resultant corrosion products, block fuel oil filters downstream of the tank, thus affecting diesel generator reliability or performance.</p>
Exelon Emma	Paragraph C.13.1	<p>Substituting the standards of ASTM D-4057, "<i>Practice for Manual Sampling of Petroleum and Petroleum Products</i>," for ASTM D-2276, "<i>Standard Test Method for Particulate Contaminant in Aviation Fuel by Line Sampling</i>," appears inconsistent with the Bases of Improved Technical Specifications Surveillance Requirement (SR) 3.8.3.3 of NUREG-1431 and NUREG-1433. As applied in nuclear plants, ASTM D-4057 is used to obtain "grab" samples from the delivery tankers in order to perform fuel acceptance testing. Flowing samples per ASTM D-2276 are obtained for the periodic storage testing for particulates in order to provide a sample of the fuel that is representative of that which is going to the engine. An alternative to ASTM D-2276 successfully used by many operating nuclear plants is ASTM D-6217, "<i>Standard Test Method for Particulate Contamination in Middle Distillate Fuels by Laboratory Filtration</i>."</p> <p>Therefore, Exelon recommends that this paragraph cite ASTM D-6217 as an alternative to ASTM D-2276, and not cite ASTM D-4057 as currently proposed.</p>	<p>Agree - Paragraph C13.1 has been changed to reflect these comments. ASTM D-6217 is a better standard to use than ASTM D-2276, therefore the NRC staff has included this standard. ASTM D-4057 is still cited as a good way to obtain the samples.</p>
Exelon Emma	Paragraph C.13.2	<p>The range for American Petroleum Institute (API) gravity (or specific gravity) cited in Appendix C of ANSI/ANS 59.51-1997, "<i>Recommended Fuel Oil Practices</i>," was developed prior to the advent of ULSD and may need to be modified by individual plants in order to reflect the properties of locally-available diesel fuel and/or in</p>	<p>Agree - Paragraph C13.2 has been changed to reflect this comment. Since the specific gravity of ULSD and other fuels may not be within the range cited in ANSI/ANS 59.51-1997 and the important attributes are the energy content and that the fuel would accommodate the 7-day requirement, the NRC</p>

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		<p>order to accommodate the 7-day volumetric storage criterion.</p> <p>Therefore, Exelon recommends that the last sentence of this paragraph be deleted for this draft RG.</p>	<p>staff has deleted the last sentence.</p>
<p>Exelon Emma</p>	<p>Paragraph C.13.3.2</p>	<p>The Bases for SR 3.8.3.3 of Improved Technical Specifications NUREG-1431 and NUREG-1433, allows for the determination of a clear and bright appearance with proper color per ASTM D-4176, "<i>Standard Test Method for Free Water and Particulate Contamination in Distillate Fuels (Visual Inspection Procedures)</i>" as a choice in place of specific water and sediment testing per ASTM D-2709, "<i>Standard Test Method for Water and Sediment in Middle Distillate Fuels by Centrifuge</i>." By contemporary standards, diesel fuel should be clean and dry.</p> <p>Therefore, Exelon suggests that this paragraph be revised to include the phrase "clear and bright with proper color" as an alternative to "water and sediment" to reflect contemporary state-of-the-art practice for fuel delivery acceptance.</p>	<p>Agree - Paragraph C13.3.2 has been changed to reflect this comment. In the Improved Technical Specifications the alternative of "clear and bright with proper color" is available. Therefore to have consistent guidance, the NRC staff has added these words to the RG.</p>
<p>Exelon Emma</p>	<p>Paragraph C.13.5</p>	<p>This paragraph is intended to check for and remove any water that may have been transferred from the storage tank and may have settled out in the day and integral tanks. The requirement to laboratory centrifuge the sample per ASTM D-2709 is not necessary because water in the storage tanks has been removed in the monthly checks per Paragraph 13.4 of this draft Regulatory Guide. Only minimal amounts of water could appear at the bottom of the day tank which is easily removed by draining a sufficient volume of oil from the tank bottom. Operating experience has shown that little-to-no water appears at this location in the system. Exelon believes that the use of ASTM D-2709 standards for this practice imposes an unnecessary burden on licensees.</p> <p>Therefore, Exelon suggests that the wording of this paragraph remain as currently discussed in Revision 1 of RG 1.137 (1979).</p>	<p>Do not agree - Water in the day tanks and the integral tanks may also come from other sources besides the storage (supply) tank. Therefore, the NRC staff believes that checking for water should be performed in the day and integral tanks and no changes are necessary.</p>
<p>NEI-2 Emma</p>	<p>Paragraph C13.8</p>	<p>This section addresses monitoring of the on-hand fuel supply to ensure reliability and availability of the fuel oil system. Included is a recommendation for taking biological cultures to assess the presence of fungus and bacteria. No standard or technique is specified for taking the cultures. This section also does not provide guidance for particulate contamination testing, which may be an indicator of</p>	<p>Agree - Paragraph C13.8 has been changed to reflect this comment. The staff has reviewed ASTM D6469-11 and has found it to be good guidance for microbiological contamination. Therefore, the NRC staff has added this standard. Also the NRC staff has added ASTM D6217-11 for particulate testing.</p>

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Exelon Emma	Paragraph C.13.10	<p>oxidation in aging fuel.</p> <p>Revise C13.8 to include a reference or standard for performing fungus and bacteria cultures. Include a recommendation to perform visual inspection for evidence of fungus and bacteria during maintenance evolutions. Guidance should also be provided for actions if fungus and/or bacteria are detected in the fuel oil. Include a recommendation for periodic particulate contamination testing.</p> <p>The specification for ULSD (15 ppm sulfur maximum) first appeared in the 2006 version of ASTM D-975, "<i>Standard Specification for Diesel Fuel Oils</i>," not in the 1992 version as stated in this paragraph. Use of versions of ASTM D-975 prior to 2006 will not address ULSD fuel. Use of versions of ASTM D-975 from 1993 until 2005 address Low Sulfur Fuel which has a maximum sulfur content of 0.05% or 500 ppm, but do not address ULSD. Use of 1992 version and earlier editions of ASTM D-975 address only 5000 ppm sulfur fuel, which is now known as "high sulfur fuel."</p> <p>Exelon recommends that the NRC consider providing the appropriate clarification concerning this aspect.</p>	<p>Agree - Paragraph C.13.10 has been changed to reflect this comment. The NRC staff has changed the year on the standard to -06 for clarification.</p>
NEI-2 Emma	Paragraph C 13.11	<p>This draft revision of RG 1.137 endorses use of ASTM D975-11 "Standard Specification for Diesel Fuel Oils." ASTM D975-11 considers blends containing up to 5% biodiesel not to be a biodiesel grade fuel. There is the potential that fuel purchased to this standard may not be free of biodiesel products. This imposes the need for independent supplier verification of biodiesel content. Biodiesel fuels have the potential to adversely affect the performance of diesel engines.</p> <p>Include a provision in RG 1.137, C13.11 that allows use of an alternative fuel standard (such as Jet A specification fuel which conforms to ASTM Standard D1655) that addresses the concerns regarding biodiesel content and complies with existing licensee requirements for EDG operation and long-term fuel storage.</p>	<p>Do not agree - Paragraph C.13.11 was intended to be for awareness of biodiesel and that it could be present in ASTM D975-11 diesel fuel. Since this section was for awareness, allowing a provision for another standard is not needed. Therefore, the wording in this paragraph does not need to be changed.</p>