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73 FR 66685

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Rulemaking, Directives, and Editing Branch  
Office of Administration  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

**Subject:** Draft Regulatory Guide DG-1186 "Measuring, Evaluating, and Reporting Radioactive Material In Liquid And Gaseous Effluents And Solid Waste" and Draft Regulatory Guide DG-4013 "Radiological Environmental Monitoring For Nuclear Power Plants" (Federal Register Notices 73 FRN 65705 and 73 FRN 66685).

**Project Number: 689**

The Nuclear Energy Institute (NEI),<sup>1</sup> on behalf of the nuclear energy industry, submits these comments on the subject federal register notices that solicit public comments on Draft Regulatory Guide DG-1186, "Measuring, Evaluating, And Reporting Radioactive Material In Liquid and Gaseous Effluents and Solid Waste" and Draft Regulatory Guide DG-4013, "Radiological Environmental Monitoring For Nuclear Power Plants". NEI also appreciates the opportunity to have provided industry comments at a public workshop on the draft regulatory guides conducted on January 15, 2009.

We encourage the NRC to withdraw the draft regulatory guides at this time because the proposed revisions have been overtaken by a broader, integrated approach developed by NRC staff for updating radiation protection regulations and guidance that was submitted to the Commission as SECY 08-197. The SECY paper recommends that the complete NRC regulatory framework for radiation protection be aligned through a careful and comprehensive process with the current recommendations of the International Commission on Radiation Protection (ICRP) contained in ICRP Publication 103 (ICRP 103). An important first step in this approach includes a two-year process of engagement with stakeholders for NRC staff to gain a thorough understanding of the impacts and

<sup>1</sup> NEI is the organization responsible for establishing unified industry policy on matters affecting the nuclear energy industry, including regulatory aspects of generic operational and technical issues. 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 materials licensees, and other organizations and individuals involved in the nuclear energy industry.

F-RIDS = ADM-03

SUNSI Review Complete  
Template = ADM-013

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benefits associated with changing the regulations and guidance and develop a sound technical basis and regulatory analysis for proceeding.

We support the staff's recommendation in SECY 08-197. The SECY paper lists some 40 regulatory documents and associated computer codes related to nuclear power plant radiological effluents and environmental monitoring that are interdependent and should be updated in a concurrent and coordinated manner with rulemaking to 10 CFR Part 20 and Appendix I to 10 CFR Part 50. Selecting only a few documents for partial revisions at this time, as is being done with the proposed draft regulatory guides, reflects a piecemeal approach that will propagate inconsistencies within NRC's regulatory framework and create confusion and unnecessary burden in licensee implementation efforts. From our review of the draft regulatory guides and supporting information, we do not believe that such impacts are justified nor is there any material benefit to public health and safety.

In the event that NRC chooses to continue with finalizing the proposed revisions to the two regulatory guides, we have included comments (below and in the enclosures to this letter) aimed at improving the clarity and usefulness of the proposed guides. However, we suggest that these draft regulatory guides be withdrawn.

The proposed Draft Revision 2 of RG 1.21 (DG-1186) imposes a number of new approaches in terms of monitoring requirements, characterizing and reporting activity, multiple and divergent methods for assessing and summing dose impacts, etc. and is likely to require, among other things, a substantial revision to and verification and validation (V&V) of licensee's dose assessment software and procedures. Likewise, Draft Revision 2 to RG 4.1 (DG-4013) greatly expands the scope of current guidance for licensee radiological environmental monitoring programs. Neither the draft guides nor supporting information contained in the subject notices provide any explicit discussion of how such changes will improve protection of health and safety or otherwise provide benefits in a regulatory context that justify the additional burden that will be imposed on licensees. We believe that the proposed revisions to the two guides constitute changes in the respective regulatory positions and should therefore include a backfit analysis.

Alternatively, if the intent is that the new and revised guidance will not apply to currently licensed facilities or in the review and approval of Part 52 license applications submitted prior to six months following issuance of the final guides, then this would not constitute a backfit and a corresponding analysis would not be needed. In this case, the final guides should explicitly state that previously established methods for complying with applicable requirements being used by current Part 50 licensees and Part 52 license applicants remain acceptable to the staff and no imposition or backfit on such licensees and applicants is intended or required.

Based on discussions with NRC at the January 15 workshop, additional clarity is needed to identify where various discretionary guidance is included in the regulatory guidance offered by DG-1186 and DG-4013. A significant example would be the reporting of C-14 as defined in DG-1186. The discussion states that "if" a licensee chose to report C-14 then the licensee would have the option to monitor or calculate C-14 based on a formula as a function of reactor power.

The draft guides contain duplications and conflicts with other regulatory guidance and regulatory requirements, for example:

- There are new criteria in Draft RG 1.21 that are inconsistent with other NRC regulations and guidance including: NUREG-1301/1302, RG 1.109, NUREG-0133, NUREG-0543, 10 CFR Part 20, and many licensee Technical Specifications. For example, under existing regulations and guidance, the licensee is only required to demonstrate compliance with 40 CFR Part 190 if a 10 CFR Part 50 effluent dose objective is exceeded by a factor of two or more.
- The NRC is generating several guidance documents on the subject of groundwater monitoring that are duplicative and are likely to have the unintended consequence of resulting in conflicting guidance. These include Regulatory Guide 4.21, Draft Regulatory Guide 4.1 (DG-4013) and the Draft Guidance to Implement Survey, and Monitoring Requirements Pursuant to Proposed Rule Text in 10 CFR 20.1406(c) and 10 CFR 20.1501(a) that supports the proposed Decommissioning Planning Rule. NRC should consider development of a single guidance document that comprehensively covers groundwater monitoring to meet any and all of applicable NRC requirements.

There are examples of improper treatment of doses calculated by different radiological standards and the methods associated with these. The summation of liquid and gaseous effluent whole body doses (Page A-15, Table A-5) per ICRP-2 in RG 1.109 is incongruent with TEDE dose requirements in 10CFR20. Adding a direct radiation component assessed by TLDs may result in duplication of dose from effluents, and would result in an overestimation of dose impact. At the NRC workshop conducted on January 15, 2009, NRC staff suggested a small working group to assist in avoiding such issues. The industry is supportive of such an effort and would like to participate, should it be undertaken.

There is also an opportunity to reduce unnecessary regulatory burden in regard to the the regulatory guidance in DG-1186 for reporting of "Solid Radioactive Waste." This can be accomplished by utilizing the existing Department of Energy (DOE) requirements for the reporting of solid radioactive waste. Such reporting to the DOE is accomplished by electronic reporting and one common electronic report with alignment of the reporting guidance of the DOE and NRC would eliminate the need for duplicative reports. We also suggest that clarification be provided that shipments of solid radioactive waste for final disposal is the intended subject of the regulatory reporting, rather than shipments of waste to radiological processors.

The proposed reduction of the lower limits of detection (LLD) for tritium in DG-4013 of 300 pCi/l is without technical or regulatory justification. The proposed LLD would place an additional burden on licensees without any commensurate benefit in public health and safety. The NRC staff offered clarifying remarks at the workshop conducted on January 15, 2009, that it was not their intent to establish new requirements regarding the LLD for tritium, but rather to acknowledge "optional enhanced detection capability". Further clarification of what this means and how it should be applied in a regulatory context should be provided in DG-4013.

Our detailed comments on the draft guides are included in the two enclosures to this letter. We note that the potential changes to DG-4013 and DG-1186 may be extensive in response to public comments, including those provided with this letter, those of other stakeholders, and comments offered at the public workshop on January 15. We request that NRC hold a public meeting to discuss the staff's resolution of stakeholder comments, prior to issuing the final guides. Such meetings have been held in regard to other recently revised regulatory guides and have proven to be useful in clarifying the intent and in addressing potential implementation issues arising from changes made in the final guides to address stakeholder comments.

If you have any questions regarding our comments, please do not hesitate to contact me at 202.739.8111; [rla@nei.org](mailto:rla@nei.org) or George Oliver at 202.739.8016; [gxo@nei.org](mailto:gxo@nei.org).

Sincerely,



Ralph L. Andersen

Enclosures

c: Mr. Steven M. Garry, NRR, NRC

<b>Matrix Of Issues Regarding Draft Regulatory Guide 1.21 (DG-1186)</b>				
	<i>Issue</i>	<i>Proposed Guidance Text</i>	<i>Citation</i>	<i>Comment</i>
<i>1</i>	A comprehensive revision of regulations and regulatory guidance to consistently use current radiation protection science would be more productive.		Throughout the document	<p>Radiation protection overall would be better served if the NRC were to revise all of the regulations and regulatory guidance concurrently to reflect the current radiation protection standard.</p> <p>The current piecemeal approach has resulted in inconsistencies and confusion. This document references ICRP 2, and ICRP 26. The ICRP recently released ICRP 103 and the NRC is actively considering amending the basis for its regulations as a result. NRC should adopt a more holistic approach to revising the regulatory guidance for calculating dose to the public (and workers). There is limited benefit to revising RG 1.21 to reflect ICRP 26 when 10CFR 50 Appendix I, 40 CFR 190, RG 1.109, and NUREG 0133 all continue to use ICRP 2 and the NRC is planning to update 10 CFR 20 to meet ICRP 103. All of the radiation protection-effluent control documents should be revised concurrently to avoid confusion and to minimize the potential for inadvertent non-compliance</p>
2	Backfit Analysis Needed for Significant Expansion in Scope	“There will be minimal impact to licensees since the information to be supplied in accordance with this draft guide (with the exception of groundwater data) was required by the previous version (Revision 1) of this	Page 31, Section 3.2:	This draft imposes a number of new approaches in terms of monitoring requirements for radionuclides, characterizing and reporting activity, multiple and divergent methods for assessing and summing dose impacts, etc. and is likely to require, among other things, revision and V&V of dose assessment software. A realistic backfit analysis needs to be performed using the existing regulations and regulatory guidance as the baseline. In the past, the NRC had stated that it was unnecessary to revise Regulatory Guide 1.109 because the cost to the licensees to revise dose assessment

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		Regulatory Guide”		software could not be justified relative to the anticipated benefit. Many, if not most, of the new requirements set forth in this revision to RG 1.21 would have very limited impact in regard to improving the health and safety of the public.
3	Conflicting And Duplicative Regulatory Guidance		Page 4, first paragraph	This paragraph states that NUREG-1301/1302 provide the detailed implementation guidance for effluent and environmental monitoring. Having said that, there should be no need to duplicate, nor expand upon, those requirements in RG 1.21. RG 1.21 should emphasize reporting effluent releases, and assessing the impact of those releases to areas beyond the site boundary, only to the extent necessary to provide additional clarification or guidance that does not exist in NUREG-1301/1302. RG 1.21 should not establish additional requirements above and beyond what is required to show compliance with effluent dose limits, such as imposition of calculation of dose to occupational workers onsite.
4	Duplicative and Conflicting Requirements for Dose Calculations	“Due to differences between these regulations, only demonstrating compliance with radiological effluent technical specification (based on Appendix I to 10 CF Part 50) does not necessarily ensure compliance with 10 CFR 20.1301(a) or 40 CFR 190, particularly	Entire Document  Page 16, section B.5  Page 18, section B.5.7  Page 22, section B.5.11.5.2	There are new requirements in draft RG 1.21 that are inconsistent with other NRC regulations and guidance including: NUREG-1301/1302, RG 1.109, NUREG-0133, NUREG-0543, and the Federal Register for the most recent 10CFR20 revision (FR, Vol. 56, No. 98, 5/21/91), as well as licensee Technical Specifications. Under existing regulations, the licensee is only required to demonstrate compliance with 40CFR190 if a 10CFR50 effluent dose objective is exceeded by a factor of two or more.  Federal Register, Vol. 56, No. 98, page 23374, states that demonstrating compliance with 10CFR50, App. I and/or

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		if there is a direct radiation component (e.g., from BWR shine, ISFSI, or radioactive materials storage)”		<p>40CFR190 will be deemed to demonstrate compliance with the 0.1 rem 10CFR20 dose limit. However, DG-1186 requires dose calculations for the 0.1 rem TEDE (10CFR20) limit in addition to 10CFR50, App. I, and 40CFR190 calculations. Further, for 10CFR20 doses, it is technically incorrect to sum whole body doses calculated with ICRP-2 dose factors (RG 1.109 dose conversion factors) to demonstrate compliance with TEDE dose limits from ICRP-30.</p> <p>Please provide a credible scenario where 10CFR50, App I and 40CFR190 dose limits are met, but the 10CFR20 0.1 rem TEDE limit is exceeded?</p>
5	Incorrect Method to Calculate Dose		Page A-15, Table A-5:	As stated above, the summation of liquid and gaseous effluent whole body doses per ICRP-2 in RG 1.109 is incongruent with TEDE dose requirements in 10CFR20. Adding a direct radiation component assessed by TLDS may result in duplication of dose from effluents, and would result in an overestimation of dose impact. See comments on pages 22 and 23 of the draft regulatory guide. In addition, the dose contribution from a direct radiation component most likely will result in a different sector and distance being identified than would occur for effluent releases only.
6	Regulatory Guidance		Section B.1 Regulatory Guidance	Since RG 1.109 is referred to by NUREG 1301/1302 and in the draft RG 1.21, it should be included as a reference in section B.1 Regulatory Guidance.
7	Editorial		Page 4 Section B.2 (5)	In section B.2, the second item (5) should be corrected as follows: “Compliance with the effluent reporting requirements of 10 CFR 50.36a”.

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8	Burdensome New Guidance		Page 5, Item 1(b):	This example of less significant or intermittent release points includes many systems that are most likely not currently captured in many plant's ODCMs, nor identified as required in NUREG-1301/1302. The NRC should perform a meaningful backfit analysis before proceeding.
9	Clarification Of Regulatory Guidance	“If activity is detected when monitoring a significant release point, it must be reported in the effluent totals...”	Page 6, second paragraph  Page 9, first full paragraph	The Reg. Guide should explicitly state that only plant-related licensed material must be reported in the ARERR. Naturally-occurring and/or background radioactivity, such as K-40 and U/Th progeny, should not be reported in the effluent reports.
10	Changing Threshold For Dose Impact, Resulting in Conflicting Regulatory Guidance.		Entire Document, including Page 6, paragraphs 3 & 4	This revision establishes a new threshold for what is considered “significant” related to release activity or dose impact. Regulatory Guide 1.109 established 10% as the threshold for determining whether an exposure pathway should be factored into dose calculations. This draft RG 1.21 drops that threshold to 1%, and applies it to all activity released and/or to overall dose impact without any meaningful backfit analysis or health-based justification. Other than the subjective phrase “...to the extent reasonable”, this revision does not allow licensees to omit an impact less than 1%; licensees are effectively required to continue to track these as “less than significant”, with apparently no lower cutoff.
11	Notification of local authorities not required by regulation	Local authorities should be notified of the leak or spill.....	Page 7 Section 1 Effluent Monitoring, Leaks and	The notification of the public is described in detail in NEI 07-07 “INDUSTRY GROUND WATER PROTECTION INITIATIVE – FINAL GUIDANCE DOCUMENT” issued August 31, 2007. There is no known regulatory basis for the inclusion of such a

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			Spills	requirement by the staff in this regulatory guide. We believe this to be good practice and would continue to do so as a part of the GWPI.
12	<i>Unreasonable timeframe for “promptly remediate”</i>	<i>“e.g. within 48 hours” timeframe to promptly remediate</i>	Page 7 Monitoring Leaks and Spills	The proposed definition of “promptly” with regards remediation of a leak or spill is unreasonable and is not always practically achievable. Licensees should have the flexibility to define the appropriate timeframe for clean-up of a spill or leak, taking into consideration ALARA, realistic exposure pathways, and the site-specific soil and ground water characteristics. This apparently arbitrary time frame is inconsistent with current requirements for materials and fuel cycle.
13	Clarity Of Regulatory Guidance – Principal Radionuclides		Page 8, “Principal Radionuclides ”	This discussion states that the list of nuclides in NUREG-1301/1302 for which LLDs are specified is not a list of principal nuclides and is only a starting point. The draft goes on to say that “principal” nuclides may be site specific and could make compliance with “requirements” difficult. This definition conflicts with the definition in the NUREGS and is likely to result in confusion and potential non-compliance. Further, the risk-based approach could have the unintended consequence of allowing licensees to trim the list of “principal” nuclides to only one or two nuclides. For example, if gaseous tritium releases account for curie-level quantities and 99.99% of the total activity and also account for 95% of the dose (with the other 5% coming from I-131 and C-14), then potentially, all other nuclides would not be analyzed or reported as long as they contribute less than 1% of the activity or dose. In addition, this allowance for licensees to drop nuclides from the principal nuclides list directly conflicts with the requirement to report ALL

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				activity as established on Page 6.
14	Regulatory Guidance on Reporting Uncertainties For C-14 Needed		Page 9, second paragraph  Tables A1A through A1F And Page 9 Section 1 Effluent Monitoring	The reg. guide requires the reporting of carbon 14 which is a new reporting requirement for U. S. reactors. Carbon 14 is a very low energy beta release with very low dose conversion factor. The basis for the new reporting requirement is discussed in Section 1. The option to calculate C-14 effluent discharge is a reasonable alternative to monitoring.  Since we are required to report uncertainties on our measurements, the NRC needs to provide guidance on how licensees should determine what uncertainties would apply to C-14 release estimated by scaling the power rating of the reactor.
15	Clarity Of Regulatory Guidance	"...a large tank may be mixed...or re-circulated by up to three volumes..."	Page 9, "Sampling Liquid Radwaste":	The words "up to three volumes" implies that anything in excess of 3 volumes is not desirable, and that even 1/10 <sup>th</sup> of a tank volume would be adequate, since it meets the definition of "up to three". The language needs to be clarified.
16	Conflicting Regulations and Regulatory Guidance  Impracticable Guidance For Decay Correction		Page 10, "Short-lived Nuclides and Decay Corrections"	There are several concerns about short-lived nuclides and the proposed changes to regulatory guidance, chief among which is the conflict with current regulation in 10CFR50, and guidance in RG 1.109 and NUREG-1301/1302.  Also, there seems to be confusion in the basis and a potential misleading statement made regarding decay-correcting short lived activity to sample midpoint. Short-lived activity collected on days 1 through 6 of a 1-week sample period should be accounted for in the buildup-decay equation in gamma spec software. However, if the

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				activity is decay-corrected to the sample mid-point, the activity level will be grossly OVERESTIMATED by several orders of magnitude, potentially by as much as a factor of 1E+47 for <sup>138</sup> Cs and other short-lived nuclides. One option to avoid this overestimation would be to delay the counting of particulate filters for 24 hours following collection to allow these nuclides, and any naturally-occurring radon progeny, to decay before counting the filters.
17	Regulatory Guide Commitments		Page 10 -11 Section C.3 “Meteorologic al Data	Not all existing plants are committed to RG 1.23. Each plant’s licensing basis identifies the regulatory guide commitments.
18	No Regulatory requirement For Onsite Environmental Program and Groundwater Monitoring		Pages 11-12 section C.3	The NRC “Liquid Radioactive Release Lessons Learned Taskforce Final Report” (LRLLTF) concluded that no regulatory requirement exist for the monitoring of groundwater onsite exists {“... <i>there are no specific regulatory requirements for licensees to conduct routine on-site environmental surveys and monitoring for potential abnormal spills and leaks of radioactive liquids</i> ” page 19 of the LRLLTF report}.
19	Unjustified Emphasis on Ground Water Monitoring and Expanded Scope not Risk-Justified		Pages 11-12 Section C.3	The emphasis on on-site groundwater monitoring for inadvertent subsurface contamination from leaks and spills is unjustified given that the NRC’s Liquid Effluent Releases Task Force Lessons Learned Final Report issued September 1, 2006 stated, “The most significant conclusion of the task force regarded public health impacts. Although there have been a number of industry events where radioactive liquid was released to the environment in an unplanned and unmonitored fashion, based on the data available, the task force did not identify

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				any instances where the health of the public was impacted.” (page 4 LRLLTF report)
20	Duplication and Potential Conflict of Regulatory Guidance		Entire Document	The NRC has now generated several guidance documents on the same subject of groundwater monitoring that are duplicative and are likely to have the unintended consequence of resulting in conflicting guidance. These include Regulatory Guide 4.21, Regulatory draft Regulatory Guide 4.1 and the Draft Guidance to Implement Survey and Monitoring Requirements Pursuant to Proposed Rule Text in 10 CFR 20.1406(c) and 10 CFR 20.1501(a) that supports the Decommissioning Planning Rulemaking. All of the proposed guidance documents should be withdrawn and, if risk-justified, a single guidance document provided. These all claim to be implementing the same regulatory requirements but with different results. These multiple regulatory guidance documents create a high likelihood for conflict and confusing licensees.
21	Clear Statements of Applicability Needed			The Regulatory Guide needs to clearly state the applicability of the on-site environmental monitoring program for the existing as well as new plants. NRC should give licensees the option to continue using the current version of R. G. 1.21, as referenced by licensing documents.
22	Graded Approach to Groundwater Monitoring		Entire Document	Draft RG 1.21 appropriately recognizes the need for a graded approach to ground water monitoring and characterization studies even though the proposal to impose requirements for on-site monitoring of ground water is not justified from a risk-informed perspective.

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23	Reference to Unpublished Standards		Page 12, section 3 Spills and Leaks Reference 19	The reference to an unapproved and unpublished standard (ANSI 2.17) is inappropriate; delete
24	The EPRI Groundwater Guidelines		Page 12 Section 3 Spills and Leaks	The EPRI Groundwater Protection Guidelines (1015118, Ref. 32) should be referenced directly in the text and not left to the imagination of the reader as to what the reference to various other industry documents might include. There is a public version of EPRI Groundwater Protection Guidelines and therefore no transparency issues.
25	Low Level Spills and Leaks	“In general, sites with low-level spills or leaks (e.g. resulting in residual contamination that is within approximately a factor of 10 to 100 above the laboratory LLD for the nuclide of concern) generally do not require extensive site characterization or monitoring	Page 12 Spills and Leaks to the Ground Water	The quoted statement implies that sites with residual contamination more than a factor of 10 to 100 above laboratory LLDs require extensive site characterization or monitoring. This statement does not appear to be risk-informed. Tritium, for example, has a required LLD of 2000 pCi/l. At a concentration of 20,000 pCi/l (10 times the LLD), the potential dose impact is less than 1 mrem/year using ICRP 30 methodology (see also Federal Guidance Report 11) to calculate the MCL at 86,000 pCi/l for <sup>3</sup> H.
26	Unnecessary Conflict with NEI 07-07	“Groundwater information that is not related to the current year’s effluents...”	Page 13 Section C.3 “Spills and Leaks	This requires reporting of on-site ground water sample results in the AREOR. This creates unnecessary conflict with NEI 07-07 Objective 2.2 acceptance criterion b, which requires the reporting of non-REMP ground water samples in the ARERR, and REMP ground water

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				samples in the AREOR.
27	Measurement Uncertainty Does Not Appear to be Comprehensive		Page 15, "Measurement Uncertainty":  Page 22, Section 5.11.3	<p>The discussion of elements to include in measurement uncertainty identifies some contributions that may not be obvious but does not appear to include uncertainties contributing to dose assessment, such as meteorology measurements, dispersion (X/Q, D/Q) factors, environmental buildup and transport factors, dose conversion factors, TLDs, etc.</p> <p>Also, using the square root of the sum of squares of the pooled uncertainties is a bit of an oversimplification and potentially misleading. The uncertainties presented in tables A-1 and A-2 pool all release points and all nuclides within a given category, including those release points that contribute much less than 1% of the total activity or dose. The pooled uncertainty needs to be somehow weighted with respect to the release point's relative contribution, and the simplified approach of taking the square root of the sum of squares of pooled uncertainties does not accomplish this.</p>
28	Consistency with 10 CFR 50 Appendix I		Page 16 Section C.5.3 Members of the public	Is the correct verb "reside"? and note that this definition continues to be inconsistent with 10 CFR 50 Appendix I definition – see 5.7.2
29	Inappropriate Inclusion of Occupational Workers in Effluent Control Program		Page 16, "Dose Assessments for Members of the Public": Section B.5.2	The discussion about "Occupational Workers" in section B.5.2 is not appropriate for the effluent control program. These individuals' exposure are managed under the Radiation Protection Program

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30	Conflicting Definition Of Member Of The Public		Page 16, "Dose Assessments for Members of the Public" Under 5.3  Page 17, first full paragraph	The on-site monitoring program in the draft RG 1.21 promulgates the unintended confusion caused by the 1991 revision to 10 CFR 20 without the concurrent revision to 10 CFR 50 Appendix I or RG 1.109, particularly with regards to the definition of a "member of the public." As stated earlier, all of the regulations and regulatory guidance should be revised in a comprehensive effort to implement the most recent radiation protection recommendations.
31	New Requirement to Include Dose from Previously Discharged Effluents, Not Risk-Informed	"Sources that exist or remain in the area" includes doses from radioactivity remaining in the environment as a result of prior-years effluents..."	Page 18, Section 5.6.4  Page 18, Section 5.7.7  Page 22, Section 5.11.4, Accumulated Activity	Licensees already account for and report dose impacts from releases to the environment. Requiring licensees to effectively reduce (handicap) the dose limit by taking into account that residual dose is not risk-justified, particularly when considering RIS 2008-03 and given that the licensee must include any dose from residual activity at decommissioning.  The discussion in this section is misleading and incorrect. While dose contributions from tritium and other nuclides dissolved or suspended in water continue after the release has occurred but may not have been included in the ARERR, it does not apply to all effluent exposure pathways. To the contrary, the RG 1.109 methodologies for sediment exposure, ground plane shine, and vegetable+milk+meat pathways already assume a 15-year buildup period. As such, these exposure pathways already account for radioactivity remaining in the environment from prior years' effluent releases. This imposes new requirements that will result in licensees potentially overestimating dose to the public. A

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				<p>meaningful backfit analysis should also be performed.</p> <p>In addition, there is no guidance in existing Reg Guides or NUREGs on how to assess dose contributions from previous years' discharges. The NRC needs to provide methodologies and a means of assessment for this additional pathway source term.</p>
32	Regulatory Guidance Clarity On Requiring Land Use Census		Page 20, Section 5.8.6	<p>This section essentially requires licensees to perform a land use census. Under current guidance in NUREG-1301/1302, licensees are allowed to forego a land use census if they sample and monitor vegetation from the two sectors yielding the highest D/Q. This new requirement in RG 1.21 conflict with existing guidance and allowances in other NUREGs. Conversely, there needs to be an allowance to permit licensees to omit an exposure pathway (e..g, cow or goat milk) if it does not exist. This section should be retained, but clarified to state that it does not impose the requirement for a land use census.</p>
33	New and Inconsistent Requirement to Include Particulate Matter with Half-Lives less than 8 days		<p>Tables A1A through A1F</p> <p>Page 10 Section 2 Effluent Sampling</p> <p>Page 19, Section 5.8.2.2</p>	<p>The reporting of gaseous effluents requires the reporting short lived airborne particulate activities such as Cesium 138 with a 2 minute half life. There is no apparent technical justification for reporting isotopes with a half-life of less than eight days in air particulate matter. Some of the "particulate" nuclides listed in the example airborne tables, such as Tc-99m, Nb-95m, Te-132m, Cs-138, La-142, etc. have half lives much less than 8-days. Note this requires the reporting short lived airborne particulate activities such as Cesium 138 with a 2 minute half life.</p>

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			Page 20, section 5.9.1.2	If we report nuclides with half life less than 8 days, do we now have to perform dose assessments for those nuclides? This is inconsistent with NUREG-1301/1302 and Reg Guide 1.109 dose assessment guidance/requirements and even section 5.8.2.2 of the draft.
34	Incorrect Dose Calculation Methodology		Page 22 Section 5.11.2  Page 23, section 5.11.5.1	Draft RG 1.21 directs licensees to sum maximum organ doses from liquid and gaseous effluent pathways even though the releases will most likely affect different organs. Summing the GI-LLI In the case of liquid effluents, in which dose will likely occur from activation products such as Mn-54 or Co-60, the critical organ is most likely going to be GI-LLI. In the case of gaseous doses, which will likely be dominated by H-3, C-14, and I-131, the critical organ will be the thyroid. When organ doses are summed as in Section 5.11.5.1.2 one will be adding GI-LLI dose to thyroid dose. Such summation of doses across different organs is inappropriate and incorrect.
35	Over Estimating Radiation Dose		Page 22 Section 5.11.3	TLDs do not selectively respond only to direct radiation from ISFSI and shine but are also responsive to exposure/dose from noble gas plumes and immersion, as well as any dose from particulate radioactivity deposited on the ground. These latter exposure pathways are already calculated and accounted for in RG 1.109 effluent dose calculations. Further, most environmental TLDs are specifically “calibrated” against Cs-137 exposure in air, and as such do NOT precisely measure deep-dose equivalent (i.e., total body dose) received by an individual. Deep-dose equivalent is usually considered to be some fraction of the air exposure.

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	<i>Issue</i>	<i>Proposed Guidance Text</i>	<i>Citation</i>	<i>Comment</i>
				Summing effluent doses and TLD exposure in such situations will likely result in overestimating total dose.
36	Typographical Error		Page 22 Section C.5.11.3.2 Third Line,	Should that be TLDs (not Tads)?
37	Estimating Uncertainty For TLD Measurements		Page 22 Section 5.11.3	The average “background” dose should be calculated from both Control TLDs as opposed to one control TLD to account for uncertainty. As such, the pooled uncertainty for background radiation assessed from the two control locations must incorporate the between-location-based variance in addition to the within-location uncertainty. The NRC should also consider and provide guidance on reporting direct radiation when the difference from background is not statistically different from zero.
38	Dose Contributions From Pond Evaporation and Accumulated Radioactivity		Page 22 Section 5.11.4	Section 5.11.4 requires performing dose calculations from on-site pond H-3 evaporation. Unless this pathway represents a “significant exposure pathway” (contributes $\geq 10\%$ of the total dose from all pathways considered), dose calculations should not be required. In addition, the NRC needs to provide clear guidance, and possibly an example of a dose calculation for this pathway.
39	Improper Combination Of Radiation Dose Calculations Methodologies		Page 23, Section 5.11.5.2	Draft RG 1.21 directs licensees to sum 10CFR50 Appendix I whole body doses calculated based on ICRP-2 methodologies to approximate TEDE dose for 10CFR20, which are based on assumptions of ICRP-26/30. ICRP-26/30 uses different methodologies, different metabolic models, different organ weighting factors and different dose factors than ICRP-2. This is technically incorrect; the NRC should revise all of the

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	<i>Issue</i>	<i>Proposed Guidance Text</i>	<i>Citation</i>	<i>Comment</i>
				radiation protection regulations and regulatory guidance in a comprehensive, holistic manner rather than piecemeal
40	Eliminate Solid Radwaste Reporting From Regulatory Guide 1.21		Page 23 Section C.6 and Table A-3	NRC should give consideration to deleting any Solid Radioactive Waste reporting requirements from RG 1.21 since DOE is already charged with collecting LLRW disposal data nationally (via the Manifest Information Management System (MIMS) "and irradiated fuel transport via the SNM Form 741"). This would align the two Federal government agencies and reduce the burden on licenses for redundant reporting
41	Provide For Electronic Transfer of the Data From The MIMS Data		Page 23 Section C.6 and Table A-3	If NRC believes it needs Solid Radwaste Shipment data, then a means should be provided within Rev 2 of RG 1.21 for DOE MIMS data to be transferred or released to the NRC. This will enable electronic reporting in compliance with the paperwork reduction act and again unburden licenses from redundant reporting of the same data to two different Federal Agencies.
42	Small Errors		Page 23. Section 7.1	The presentation of "small errors" in sections 7.1.1 and 7.1.2 can be mutually exclusive. For example, a Sr-90 activity with an associated error of 300% after all of the error terms are pooled may only contribute 0.0001% of the total dose from all gaseous effluents, resulting in a impact. The discussion of small versus large errors needs to somehow incorporate the relative impact on dose/risk to a member of the public.
43	Data Trending and Clarification Needed		Page 24 Section 8	Given that there has been a marked decrease in radioactive effluents from nuclear power plants over time, what is the purpose for the new requirement for data trending over a 10 year period? The new requirement is not risk-informed and will not result in

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	<i>Issue</i>	<i>Proposed Guidance Text</i>	<i>Citation</i>	<i>Comment</i>
				any improvement in radiation protection  As a minimum, the NRC should clarify whether the source term to be trended is by site or by release point.
44	Reporting Format Could Lead to Confusion		Page 24 Section 9	Typically Gross Alpha has been identified as less than a given curie level. The wording here seems to suggest that the whole cell will be left BLANK if no Alpha counts come back positive. If a nuclide is detected in one quarter but not others, and entry of "NDA" should be made to indicate "No Detectable Activity" as opposed to leaving the table cell empty. This indicates that that nuclide was actually assessed during that period. (need more editorial work)
45	Clarification Of Guidance – Dilution Flow	"Report internal plant dilution flow rate during periods of release (in-plant dilution flow, before effluent discharge to receiving water body), and external dilution flow rate, average (river or stream flow rates)."	Page 26, Section 9.2.1, top paragraph  Glossary  Page A-8, Table A-2	The discussion about dilution flow needs to be clarified. Does the licensee account for dilution flow only during the summation of periods when the discharges are occurring, or total dilution flow over the entire quarterly or annual period? For example, if I have a single discharge during a quarter in which I release 1 Curies of tritium in a discharge which takes 100 minutes while the dilution flow rate is 100,000 Liters/min, then my effective concentration of tritium during period of discharge is 1 Ci divided by 10 million liters, or 1E-7 Ci/L, or 1E-4 uCi/mL. I would use this to determine my compliance with the Effluent Control Limit (ECL) in 10CFR20 Appendix B, Table 2, Column 2 value of 1E-3 uCi/mL. However, the effective tritium concentration in the environment over the course of the quarter is orders of magnitude lower. The buildup of tritium in fish, shellfish, and crops is not going to be based on a tritium concentration of 1E-4 uCi/mL for the entire quarter, but

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				instead the effective concentration will be based on a total dilution volume of over 1E+10 Liters (100,000 L/min * 60 min/hr * 24 hr/day * 91 days/qtr), yielding an effective tritium concentration of 8E-8 uCi/L. Perhaps two definitions of dilution volume are in order. The first definition of dilution volume would refer to that available only during actual releases, as used to demonstrate compliance with 10CFR20 Appendix B ECL values, whereas the second dilution volume would apply to the total dilution volume available during the entire release period, as would be used to calculate exposure pathway media concentrations. (Ken Sejkora)
46	Clarification Of Guidance		Page 26, Section 9.3:	Is the terminology of “principal isotopes” as used in Table A-3 for reporting solid waste synonymous with “principal radionuclides” as defined for effluent releases? Does the same 1% threshold apply? If not, this needs to be clarified.
47	Improper reference to the NEI Groundwater Protection Initiative Threshold For Public Disclosure		Page 27 & 28 Section 9.5.13	The 100 gallon threshold is a very low threshold established to establish transparent public disclosure. This standard was not established as part of any regulatory requirement and does not of itself represent any health and safety significance
48	Clarification Of Guidance		Page 27, Section 9.4.1.2:	Does the terminology of “...could be occupied” imply a real individual at a real residence (house, apartment, etc.)? Or could it be construed as to applying to a “fencepost” individual at the site boundary? Since licensees do not control the area beyond their site boundary, they cannot assume zero occupancy for the “fencepost” location. Can licensees take credit for occupancy factor in such cases? If so, this needs to be clarified. Discussion of member of the public on Page 17

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				goes to length to emphasize that doses are to be calculated to REAL individuals. This discussion also needs to mesh correctly with “realistic individual” as described in NUREG-0133 and 40CFR190, as well as the definition of maximally-exposed individual in the context of RG 1.109 and 10CFR50.
49	Imposes New Requirements for Ground Water Monitoring and Expands Effluent Control Program to Include On-site Radiological Controls		Pages 27 and 28, Section 9.5.1:	The specific definition of “Abnormal Releases” imposes new requirements above and beyond what is currently in RG 1.21. This is especially true as related to groundwater and onsite contamination that is of interest to future decommissioning, but is not related to offsite effluent releases and dose impact. This appears to be an attempt to codify the groundwater monitoring program, and to carry over requirements for onsite radiological controls as related to 10CFR50.75g and decommissioning.
50	Reporting of Dose		Page 28 Section C.9.5.2.1	Ground water that is released through an ODCM-credited release point is already included in the ARERR.
51	Typographical Error		Page 28 Sections C.9.5.8 and D.3.2	This should be ARERR not Arrears.
52	Industry Ground Water Protection Initiative is Voluntary	“Since licensees have been reporting ground water information in Arrears {ARERRs} since 2006 (in accordance with industry guidance, Ref. 31) there will be	Page 31 section D.3.2	The NRC is asserting under Alternative 2 that the industry’s implementation of the voluntary Ground Water Protection Initiative results in minimal impact from the expanded scope of draft RG 1.21. The NRC should perform a back fit analysis, using existing regulatory requirements as the baseline.

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	<i>Issue</i>	<i>Proposed Guidance Text</i>	<i>Citation</i>	<i>Comment</i>
		minimal impact to licensees		
53	Inconsistent Definitions in Glossary		Pages 32-37	Terms in the glossary need to be consistent with existing regulations, regulatory guidance, and proposed revisions to regulatory guidance (i.e. RG 4.1). For example: a priori; abnormal release; effluent discharge; impacted areas; lower limit of detection; monitoring; restricted area; significant exposure pathway; significant residual radioactivity; site environs; unrestricted area. See below for additional details
54	Consistent Glossary		Page 33 Glossary	“Effluent Discharge” should be revised for consistency as follows “A discharge of licensed material through from a liquid or gaseous release point at a pathway from a facility into the site environs.”
55	Consistent Glossary		Page 33 Glossary	Revise “Effluent Monitor Inoperability” to avoid confusion – a monitor that is classified as not inoperable. It is reportable in the ARERR if the instrument is unavailable for a period of time greater than 30 continuous days (in accordance with NUREG-1301 or and NUREG-1302, Section 3.3.3.10.b).” The monitor is inoperable whenever it is not operable. However, it is only included in the ARERR if it remains not operable for more than 30 days.
56	Consistent Glossary		Page 33 Glossary	“Impacted Area”: Draft RG 1.21 imposes new requirements related to onsite radioactivity, 10CFR50.75g, and decommissioning criteria do not belong in RG 1.21 as it relates to effluents and offsite dose impact.
57	Spelling		Page 33 Glossary	Glossary “Leachate” is one word.

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	<i>Issue</i>	<i>Proposed Guidance Text</i>	<i>Citation</i>	<i>Comment</i>
58	Consistent Glossary		Page 34 Glossary	“Minimum Detectable Concentration” – is there any intent to define this term as a priori or a posteriori?
59	Spelling and Word Use		Page 35 Glossary	“Principal Radionuclide” should also refer to NUREG-1301/1302 as an acceptable basis per the discussion on page 8. Spell check throughout the document – should be “principal” not “principle”
60	Consistent Glossary		Page 35 Glossary	“Restricted Area” seems to be missing part of the definition from 10 CFR 20.1003
61	Consistent Glossary		Page 35 Glossary	“Significant Release Point” see earlier comment. Draft RG 1.21 imposes a 1% threshold in delineating minor release point, significant release point, and principal radionuclide and is a significant departure from previously established thresholds in RG 1.109 and other guidance. . (
62	Consistent Glossary		Glossary	Should there be a definition for “spill or leak”
63	Consistent Glossary		Glossary	“Uncontrolled Release” – replace “release path” with “release point” for consistency. This definition appears to say that unless the uncontrolled release results in (1) not monitored) and (2) results in significant amounts of radioactive material (not defined) being discharged, and (3) did not have a preplanned method for terminating the release, it was (by default) controlled. This also seems to contradict existing requirements to control essentially all detectable concentrations of radioactive material. Is this a deliberate choice by the NRC?
64	Consistent Glossary		Page 36 Glossary	“Unplanned Release” also appears to be a significant change, particularly in the paragraph following (3)
65	References and Bibliography		Pages 38-41, References and	Several citations relevant to effluent monitoring and compliance need to be added, including NUREG-0133; NUREG-0475; NUREG-0543, “Methods for

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	<i>Issue</i>	<i>Proposed Guidance Text</i>	<i>Citation</i>	<i>Comment</i>
			Bibliography	demonstrating LWR compliance with the EPA uranium fuel cycle standard: 40 CFR Part 190"; and RIS 2008-003. In addition, if it is deemed necessary to maintain requirements for 10CFR50.75g and decommissioning issues within RG 1.21, NUREG/CR-5512.
66	References and Bibliography		Page A-1	The term "Alpha" in this table should be replaced with "Gross Alpha" to match Tables A-1A through A-1F, and past-established terminology. Also, this table is missing a column to record total uncertainty, as is presented in Table A-2 for Liquid Effluents on page A-8.
67	Monitoring for Zinc - 72		Tables A1A through A1F	Zinc-72 is a very unusual isotope and is not typically identified in operating reactors
68	Monitoring for Rhodium 188		Tables A1A through A1F	Rhodium 188 is not listed in the table of the isotopes. Is this a typographic error?
69	Burdensome Assessments of Overall Measurement Uncertainty		Table A.2	<p>Requiring the ARERR to include an estimate of overall measurement uncertainty over an entire year for various fission product groups would not provide any more useful or accurate information than the current measurement error requirement has provided.</p> <p>It's not clear why DG-1186 requires an uncertainty estimate for Liquid Effluents in Table A-2, but not for Gaseous Effluents in Table A-1. In either case the proposed measurement uncertainty requirement for the ARERR would be difficult to accurately determine if done correctly, is redundant to existing QA/QC requirements, and would provide little, if any, benefit.</p>
70	Regulatory Guidance Consistency		<p>Pages A-2 through A-7</p> <p>Pages A-9</p>	<ul style="list-style-type: none"> <li>• The listing for Xe-131m should use a lower case "M" to follow standard convention.</li> <li>• The inclusion of I-132, I-134, and I-135 is a departure away from current requirements in RG 1.21, and is not</li> </ul>

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	<i>Issue</i>	<i>Proposed Guidance Text</i>	<i>Citation</i>	<i>Comment</i>
			Through A-12	<p>in accordance with the radioiodines required per NUREG-1301/1302. Also, as pointed out in comments related to nuclides with short half-lives on Page 10, these nuclides could be subject to gross overestimation if decay-corrected to sample midpoint.</p> <ul style="list-style-type: none"> <li>• These tables should be simplified to contain only those nuclides actually detected by the licensee over the course of the reporting period. If a nuclide is detected in one quarter but not others, and entry of "NDA" should be made to indicate "No Detectable Activity" as opposed to leaving the table cell empty. This indicates that that nuclide was actually assessed during that period.</li> </ul>
71	Reporting of radiological waste volumes.		Table A-3	The volumes are listed in cubic feet rather than cubic meters. Is this the intent to change from cubic meters for reporting solid waste volumes as is the current requirement? All other references in this document are in metric units.
72	Waste Classifications in Table A-3		Table A-3	The Table does not provide entry rows for Class C waste. Some plants generate Class C filters and some Class C resin. I suggest the three rows that list "Class B Resins, Filters, Evaporator bottoms" be changed to "Class B/C Resins, Filters, Evaporator bottoms" (
73	Clarity in Waste Reporting		Table A-3	Section header title from "2 LLW Shipped for Processing (before disposal or return to site)" to "LLW shipped by Processor to a LLW disposal site". This change will align the Solid Radwaste Reporting with the DOE MIMS report.

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	<i>Issue</i>	<i>Proposed Guidance Text</i>	<i>Citation</i>	<i>Comment</i>
74	If NRC Accepts The Recommendation to Use the MIMS Data (See Item 40 Above)		Glossary	This change also eliminates the need for NRC to define what a Waste Processor is and when potential radioactive material is a waste.
75	Additional Guidance Needed for LLRW Reporting		Page 23 Section C.6 and Table A-3	<p>There are several items or types of waste materials (e.g. single use protective clothing, secondary filter cake, trash from the RCA, metal, equipment for refurbishing and return) that are being processed or decontaminated, resulting in very little LLRW. Additional clear guidance is needed from the NRC on whether these shipments to waste processors are to be included in the RG 1.21 (ARERR) Report and the volume and activity of the waste to be reported. Further examples where additional guidance is indicated include:</p> <ol style="list-style-type: none"> <li>1- Shipments of contaminated laundry for dissolving (the domestic section of NRC has defined this as radiological material for decontamination [not waste], the Import/Export Section of NRC has defined this material as waste).</li> <li>2-Shipments of contaminated equipment (pumps, valves &amp; motors) for refurbishment.</li> <li>3- Shipments of contaminated metals for recycling by smelting or decontamination and clearance.</li> <li>4- Shipments of material for clearance.</li> </ol>
76	Table A-4 Does Not Support Variation In Affected Sectors In Different Quarters		Page A-14, Table A-4	The affected Sector/Distance could be different from quarter to quarter. In the case of gaseous effluent discharges, the limiting sector/distance may be driven by the majority of activity released from an elevated release point during routine operation. However, during an outage quarter, ground-level releases may dominate and

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	<i>Issue</i>	<i>Proposed Guidance Text</i>	<i>Citation</i>	<i>Comment</i>
				may result in the highest dose occurring in a totally different sector. The table is too simplistic to accommodate such differences. Also, this table requires assessment of gaseous doses from particulates with half-lives of greater than 8 days, and may be out of step with short-lived activity presented in Tables A-1A through A-1F.
77	Screening Values		Page A-17 Table A-8	Table A-8 is a partial list of screening values for soil from NUREG-1757. What values should the licensee use for water?
78	Inappropriate Expansion of Effluent Control Program to Impose Remediation Criteria that is already Covered in the LTR		Page 28, section 9.5.1.4.15  Page A-17, Table A-8:	It appears that the NRC is attempting in draft RG 1.21 and other regulatory guidance revisions (i.e. RG 4.1) to impose, without meaningful backfit analysis, operational remediation requirements that effectively are the 10 CFR 20 Subpart E criteria for unrestricted license termination. Existing programs for radiation protection, recordkeeping under 10CFR50.75g, and decommissioning regulations and guidance already address this issue. These new effluent control requirements are not justified based on public health or protection of the environment and should be assessed under the backfit rule.

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	<i>Issue</i>	<i>Proposed Guidance Text</i>	<i>Citation</i>	<i>Comment</i>
1	A comprehensive revision of regulations and regulatory guidance to consistently use current radiation protection science would be more productive.			<p>Radiation protection overall would be better served if the NRC were to revise all of the regulations and regulatory guidance concurrently to reflect the current radiation protection standard.</p> <p>The current piecemeal approach has resulted in inconsistencies and confusion. For example, the on-site monitoring program in the draft RG 4.1 promulgates the unintended confusion caused by the 1991 revision to 10 CFR 20 without the concurrent revision to 10 CFR 50 Appendix I, particularly with regards to the definition of a "member of the public." This and other inconsistencies are exacerbated in the draft RG 4.1.</p>
2	Extensive Change in Scope and Lack of a Meaningful Backfit Analysis			<p>The NRC's Liquid Radioactive Release Lessons Learned Task Force Final Report (Sept. 1, 2006) section 3.2 discusses extensively the existing regulations that require control of radioactive effluents, on-site surveys and monitoring for radiation protection, and the role of the radiological environmental monitoring program (REMP) to evaluate the potential impacts of the facility on the environment and public exposure. This NRC taskforce concluded: "<i>Although there have been a number of industry events where radioactive liquid was released to the environment in an unplanned and unmonitored fashion, based on the data available, the task force did not identify any instances where the health of the public was impacted.</i>"</p> <p>Draft revision to RG 4.1 (section 2) greatly expands the scope of current guidance for the REMP into</p>

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	<i>Issue</i>	<i>Proposed Guidance Text</i>	<i>Citation</i>	<i>Comment</i>
				control of radioactive material, control of radioactive effluents, remediation, record keeping for decommissioning, site characterization, and notification of the NRC, among other things. The proposal for an extensive an on-site monitoring program, including that for ground water, does not consider whether there is a credible exposure pathway to the public, and, as such, is not risk-informed. No justification or backfit analysis is provided for this significant expansion beyond the scope of environmental monitoring.
3	The Outline Should be Replaced With a Table of Contents		Page 1 Section A Introduction	Introduction – Although the major sections are listed, a more formal and extensive Table of Contents would be useful.
4	Duplicative and potentially conflicting guidance on radiation protection programs for workers and on-site members of the public – monitoring, contamination control, and remediation		Throughout  Page 7 Section 2.3.2 Information Sources	The draft RG 4.1 imposes duplicative requirements for on-site monitoring to protect the 10 CFR 20 “member of the public”; on-site monitoring is already being performed under existing radiation protection programs. The requirements for licensees to perform surveys and monitoring under 10 CFR 20.1501 to demonstrate that the on-site “member of the public” does not exceed the 100 mrem/year limit ensure adequate protection; duplication of effort under an expanded REMP will not result in additional protection for those individuals.  Similarly, remediation to control contamination is already performed under existing radiation protection programs. This revision to RG 4.1 inappropriately proposes that the REMP program serve as the basis for decision making on remediation. Licensees are required under 10 CFR 20 to control radioactive

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	<i>Issue</i>	<i>Proposed Guidance Text</i>	<i>Citation</i>	<i>Comment</i>
				<p>material; RG 8.8 provides additional regulatory guidance on control of contamination. The radiological protection program, not the environmental monitoring program, is the appropriate programs to control radioactive material. This includes the mechanisms for the licensee to identify and plan any remediation activities that are necessary.</p> <p>If the NRC intends to provide additional guidance on demonstration of compliance with 20.1301 for onsite members of the public, such guidance should be in a new Section 1 Regulatory Guide (RG). Section 4 of the Regulatory Guides is related to "Environmental" guidelines. Further, if the NRC insists on proceeding as proposed, the NRC should, as a minimum, allow the licensee to reference the existing programs and controls to demonstrate satisfaction of the new, expanded requirements in RG 4.1 to avoid duplication of effort</p>
5	<p>Duplicative and potentially conflicting regulatory guidance on radioactive effluent controls for radiation protection of the public</p>	<p>"This information may also</p>	<p>Throughout</p> <p>Page 7, Section 2.3.1</p>	<p>The existing SDP for the radioactive effluent release program was revised in Sept 2007 to include leaks and spills - the expanded scope for this draft of RG 4.1 is inconsistent with the existing SDP and will likely result in the unintended consequence of confusion both on the part of the licensees and the public.</p> <p>The last item in section 2.3.1 lists meteorological data as a program consideration. Is this now a (duplicative) requirement of the REMP, beyond the requirements established in Regulatory Guide 1.21?</p>

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	<i>Issue</i>	<i>Proposed Guidance Text</i>	<i>Citation</i>	<i>Comment</i>
		supply supporting evidence in evaluating the performance of systems and equipment installed to control release to the environment.”	Page 5 section C	The performance of radwaste processing systems and radiation monitoring systems are already evaluated under the effluent control program and other equipment maintenance programs. This duplication of effort conflicts with the existing description under section 6.8.4.g of NUREG-1301/1302 that states: <i>“The program shall provide ... verification of the accuracy of the effluent monitoring program and modeling of environmental exposure pathways.”</i>
6	Duplicative Requirements and Guidance for Decommissioning Surveys	“Identify the potential environmental accumulation of radioactivity that could impact decommissioning.”	Page 5 Section B.2 (5) and C.2  Page 8 Section C.2.3.3	10 CFR 20 Subpart E establishes the criteria for license termination (decommissioning). Regulatory guidance on decommissioning surveys already exists in NUREG-1757. In addition, typically after an event such as a leak or spill, surveys are performed (1) to ensure control of contamination and worker protection under the 10 CFR 20 radiation protection program and (2) to obtain information for decommissioning planning purposes in accordance with 10 CFR 50.75(g). The expanded scope for REMP is redundant and will require significant resources to obtain information that will have very limited usefulness at decommissioning.
7	Duplication of Guidance NUREG 1301 and 1302			Many of the items added to RG 4.1 are duplicative of existing, more detailed guidance in NUREG-1301 and 1302. A more appropriate action would be to update and improve NUREG 1301/1302 and delete RG 4.1 as being redundant. See other comments
8	Guidance Expanded to Fuel Storage Facilities and Conflicts with 10		No Specific Citation  Related to Page	10 CFR 72 requires an Environmental Monitoring program for dry fuel storage facilities. These facilities are often co-located at the nuclear power plant site. For such co-located facilities, the licensee

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	<i>Issue</i>	<i>Proposed Guidance Text</i>	<i>Citation</i>	<i>Comment</i>
	CFR 72		5 Section 2	typically takes credit for the existing nuclear power plant REMP to meet the requirements of 10 CFR 72. Augmentation of the existing program, such as new direct dose TLD locations at the site boundary in proximity to the dry fuel storage facility, may be implemented. The RG should be revised to recognize the 10 CFR 72 requirements and specify how the 10 CFR 50 licensed program can be used.
9	No Regulatory requirement For Onsite Environmental Program and Groundwater Monitoring		Pages 6-10 section 2.3	The NRC "Liquid Radioactive Release Lessons Learned Taskforce Final Report" concludes that no regulatory requirement exist for the monitoring of groundwater onsite exists {"... <i>there are no specific regulatory requirements for licensees to conduct routine on-site environmental surveys and monitoring for potential abnormal spills and leaks of radioactive liquids</i> " page 19 LRLLTF report}.
10	Unjustified Emphasis on Ground Water Monitoring and Expanded Scope not Risk-Justified		Page 4 Section B.2(4) Objectives of the Radiological Environmental Monitoring Program	The emphasis on on-site groundwater monitoring for inadvertent subsurface contamination from leaks and spills is unjustified given that the NRC's Liquid Effluent Releases Task Force Lessons Learned Final Report issued September 1, 2006 stated, "The most significant conclusion of the task force regarded public health impacts. Although there have been a number of industry events where radioactive liquid was released to the environment in an unplanned and unmonitored fashion, based on the data available, the task force did not identify any instances where the health of the public was impacted."
11	Duplication and Potential Conflict of Regulatory Guidance		Entire Document	The NRC has now generated several guidance documents on the same subject of groundwater monitoring that are duplicative and are likely to have the unintended consequence of resulting in

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	<i>Issue</i>	<i>Proposed Guidance Text</i>	<i>Citation</i>	<i>Comment</i>
				<p>conflicting guidance. These include Regulatory Guide 4.21, Regulatory draft Regulatory Guide 4.1 and the Draft Guidance to Implement Survey and Monitoring Requirements Pursuant to Proposed Rule Text in 10 CFR 20.1406(c) and 10 CFR 20.1501(a) that supports the Decommissioning Planning Rulemaking. All of the proposed guidance documents should be withdrawn and, if risk-justified, a single guidance document provided. These all claim to be implementing the same regulatory requirements but with different guidance. To say the least, the multiple regulatory guidance documents create a high likelihood for conflict and confusing licensees.</p>
12	<p>Inappropriate Constraint on Regulations through Regulatory Guidance</p>		<p>Page 5, Item 2.(6):</p> <p>Page 5, Item C.2</p>	<p>As part of the site license, plants are allowed to release activity to the environment through permitted releases. In fact, Reg Guide 1.109 even assumes some level of buildup in the environment from such releases. Given that ODCM-permitted releases are assessed as well below ALARA objectives established in 10CFR50, the proposed expansion of REMP to decommissioning is not risk-justified.</p> <p>Statements in this draft RG and in other draft revisions to other RGs to the effect that remediation is warranted or would be required at decommissioning to meet unrestricted release of the site and screening DCGLs in NUREG 1757 effectively foreclose the existing option under 10 CFR 20 Subpart E for restricted release of the facility. It is inappropriate for RGs to be used to change or modify existing regulations</p>



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				when new pathways or critical locations are identified.”
16	Clarification or Required Pathways		Page 6, Section C.2.1	Are all the primary pathways listed required? All of the exposure pathways will be not applicable at many sites. If they are required, how does a site take exemption to these pathways?
17	Improper Description of Waterborne Exposure Pathways and Definitions		Page 6 Section C.2.1  Page 6 Section C.2.1.c. (iii)  Page 10, C.2.4.c  Glossary, page 19	The principal exposure pathways listed in C.2.1 for waterborne radioactivity are not properly characterized – surface and subsurface water and sediment are not in themselves exposure pathways. Revise the listing to c.i. drinking water; c.ii irrigation of foodstuffs; c.iii immersion (recreational)  Subsurface water is listed as principle exposure pathway without listing a definition for subsurface water. Ground water is defined; subsurface is not.  “as applicable” should be added to the end of this sentence since each item does not necessarily represent an exposure pathway at all plants.  See comment below on definition of “Drinking Water”
18	Specific Guidance Needed		Page 6 Sections C.2.1, C.2.2, C.2.4	At what distance do these sampling requirements apply? In Section 2.1 there is an example that says “no milk animals in proximity.” Where is proximity defined? For milk, NUREG-1301/2 states to sample at 3 locations within 5 km, and if none exist that close, sample between 5 and 8 km if the projected dose exceeds 1 mrem. It is likely that no site’s projected dose beyond 5 km exceeds 1 mrem. As mentioned earlier, it would be better to only have

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				one set of guidance (e.g. NUREG-1301/2) on this and other information in this RG.
19	Specific Guidance Needed		Page 6 Section C.2.1	In Section C.2.1, under food products, the parenthetical phrase “(if used as a local, common food product)” is only included next to “invertebrates.” Must all other listed food products be sampled if they exist, even if not used as a food product? Should this section also include the statement that only those exposure pathways need to be monitored if the pathway is considered significant
20	Specific Guidance Needed		Page 6 Section C.2.1	Does “meat” in Section C.2.1 mean just commercial meat production facilities? If not, why is hunting listed in C.2.2.c as an additional pathway (if of local interest). If meat is not just commercial, but also includes individual use, hunting could be a baseline meat pathway? Are any of the listed food product pathways considered as principal exposure pathways only if commercial facilities exist
21	Redundant Guidance		Page 6 Section C.2.1.e	There is no difference between C.2.1.e and Section C.2.2? Suggest deleting C.2.1.e.
22	Clarification of Reporting Requirements or Program Documentation		Page 7 Section 2.3.1.e	Section C.2.3.1 (if this section is not deleted) – Does the list of Program Considerations in section C.2.3.1.b mean these items must be included in the Annual Radiological Environmental Operating Report? Activity released under the effluent control program is reported in the Annual Radiological Effluent Report. These requirements are more appropriate for DG-1186 (or another Section 1 RG
23	Inconsistent Treatment of Unlicensed Radioactive Material		Page 7 Section C.2.3.1.h	RIS 2008-03 clarified that previously discharged radioactive materials in gaseous or liquid effluents that are returned from the environment to an operating nuclear power facility are no longer

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				<p>required to be controlled as licensed material. Under the existing effluent control program, potential dose impacts to the public are already evaluated and reported to the NRC. This document should also be added to the references.</p> <p>The list of on-site samples to be considered in 2.3.1 is not justified. This includes the “re-capture” of airborne effluents in equipment/HVAC condensation or through rain-out, or by re-use of the receiving water body for liquid effluents does not represent an exposure pathway from licensed material</p>
24	Duplicative Requirement for Site Characterization		Page 8 Section 2.3.3	Ground water characterization is already required as part of site characterization and is included in the UFSAR. The draft imposes duplicative requirements, including an evaluation of plant systems and components that is well outside the scope for an environmental monitoring program.
25	No Known Regulatory Requirement For Public Communication	An evaluation should be made as to whether to notify the local authorities and NRC of the event in accordance with 10 CFR 50.72, “Immediate Notification Requirements for Operating Nuclear Power Reactors	Page 9 Section 2.3 Groundwater Characterization	The notification of the public is described in detail in NEI 07-07 “INDUSTRY GROUND WATER PROTECTION INITIATIVE – FINAL GUIDANCE DOCUMENT issued August 31, 2007.” There is no <u>regulatory basis</u> for the inclusion of such a requirement by the staff in this regulatory guide. We believe this to be good practice and would continue to do so as a part of the GPI. This guidance should be removed from the regulatory guide.
26	Unnecessary Conflicts with NEI 07-07		Page 9 Section B.2.3.3	The proposal that reporting “other ground water sample results” that are not part of REMP should be in the AREOR unnecessarily conflicts with NEI 07-07 Objective 2.2 acceptance criterion b that requires non-REMP samples be included in the ARERR.

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				Delete the last sentence of the paragraph that begins at the end of page.
27	Reference to NUREG 1301 & 1302 Needed		Page 10 C.2.4.b,	In discussion of monitoring downwind sectors with highest annual average deposition does not specify the number of sectors. Should refer to NUREG 1301 or 1302.
28	Clarity of Guidance		Page 10, item 2.4.c:	Add "...if applicable" at the end of the sentence. Many sites do not have drinking water pathways, but this item requires reporting them.
29	Hard to Detect Analysis – Clarification needed		Page 10, item 2.5.b	Does this requirement mean that plants now have to analyze for Sr-90 and other HTDs in REMP samples and pathways, even if such nuclides are not detected in effluents?
30	Tritium LLD		Page 11 Section 2.6 Analytical Detection Capabilities	<p>The use of a tritium LLD of 300 picocuries/liter does not appear to be technically justified. This low LLD would place an additional burden on licensees without any commensurate benefit in public health and safety.</p> <p>What are the ramifications if a licensee does not meet the level of 300? Does the licensee have to report not achieving the LLD, even though it's not required?</p> <p>Citing early detection as the basis for this change is without merit since the samples being referred to are off-site. Properly placed sentinel wells positioned near potential leaks on site as discussed in NEI 07-07 provide better indicators.</p>
31	REMP Changes Allowed with Appropriate		Page 11, last paragraph	Changes to the REMP are currently allowed if they do not reduce the overall effectiveness of the program. Due to the subjective nature of the

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	Evaluation			language, a licensee could demonstrate through historical monitoring results and Regulatory Guide 1.109 calculations that there is no potential for detecting activity in that exposure pathway. However, other individuals could view the pathway as being important just because it once had been in the REMP.
32	Sampling Schedule Contingencies For Equipment Failures		Page 11 Section 2.7	There needs to be a clearer definition of a sample deviation and contingent actions when dealing with equipment failures of continuous / composite samplers (i.e. air, surface water, drinking water).
33	Inconsistent Regulatory Guidance		Page 12 Section 2.8	There are a number of inconsistencies between the RG 4.1 requirements for a Land Use Census and those found in NUREG-1301. For example, NUREG-1301/1302 states that in lieu of performing a garden census, broadleaf vegetation may be sampled at the site-boundary. The current draft does not allow for that option; instead it requires the licensee determine drinking water supplies and feeding characteristics. The inconsistencies between this draft and existing programs or regulatory guidance to control radioactive effluents needs to be resolved.
34	Correct Terminology		Page 13, Section 2.10, first paragraph	The second sentence refers to "...direct radiation levels..." Recommend "measured radiation levels..."
35	Duplicative Table 1 with Incorrect Values		Page 13	Table 1 should be removed from RG 4.1. This duplicates the table already in the NUREG-1301/1302. There are also the following problems: <ul style="list-style-type: none"> <li>• Differs from the table in NUREG-1301/1302</li> <li>• Footnote (a) for tritium in water is missing</li> <li>• The values for milk appear to be those for</li> </ul>

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			Page 13 Section C.2.10 "Reporting Levels"	<p>broadleaf vegetation</p> <ul style="list-style-type: none"> <li>• The column for broadleaf vegetation is empty</li> </ul> <p>If this table is included in RG 4.1, either duplicate the table from NUREG-1301/1302 exactly, or reference the NUREG itself.</p> <p>Another case of inconsistencies with the NUREG. For example, NUREG 1301 and 1302 more clearly state that Table 1 reporting criteria only apply if the activity is plant related. Such a caveat is missing from the draft RG.</p>
36	Misplaced Table		Page 15 Table 2	Table 2 should be placed after page 16, where the table is first discussed. This table should include all nuclides for which there is a required LLD in NUREG-1301/1302 or, preferably, it should reference NUREG-1301/1302 for the complete list.
37	Guidance for Maps Provided with AREOR		Page 16 Section C.2.12	Recommend that "...a map of all sampling locations..." be revised to state "...a map of all indicator sampling locations..." While control locations need to be listed, it is not always necessary to show these locations on the map.
38	Requirement not Risk-Informed		Page 16, Section 2.11	This is really only applicable if REMP results are readily detectable in the majority of samples collected. It is difficult, and meaningless, to compare non-detectable (<MDC) analytical results to predicted concentrations that are also below the target LLD. If the predicted concentrations are much less than achieved LLD, one cannot validate modeling assumptions with most REMP data, which are also <LLD. This argument also applies for ground water monitoring, in which the projected concentration would be below the LLD.

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39	Varying Due Dates for AREOR		Page 16 Section C.2.12 "Annual Radiological Environmental Operating Report"	Per some Technical Specifications, the annual report is submitted to the NRC Document Control Desk, with a copy to the Regional Administrator. Some plants must submit by May 1 per the TS. Delete the details on actual submittal dates and defer to clear TS requirements.
40	Clarity of Guidance		Page 16, Section 2.12, first paragraph	This section refers back to Table 2. Is the format presented in Table 2 required, or only an example of a suggested format? If it is only an example, and not a requirement, then this needs to be stated as such.
41	Inconsistent Definitions in Glossary		Pages 19-21 Glossary	Terms in the glossary need to be consistent with existing regulations, regulatory guidance, and proposed revisions to regulatory guidance (including draft Regulatory Guide 1.21 and Regulatory Guide 4.21). For example: a priori; abnormal release; effluent discharge; impacted areas; lower limit of detection; monitoring; restricted area; significant exposure pathway; significant residual radioactivity; site environs; sub surface water, unrestricted area. See below for additional details
42	Inaccurate Definition in Glossary		Page 19 Glossary	"Drinking water" – for the purposes of REMP compliance, drinking water is not the same as potable water as implied in the definition. To be considered drinking water, the water supply must be physically used to supply public drinking water, and not just considered satisfactory for human consumption.
43	Glossary		Page 20 Glossary	"Realistic exposure" is not appropriately included in environmental monitoring requirements. If the NRC proceeds as currently proposed, SECY-03-0069 should be added to the list of references.

44	Glossary – Clarification Needed		Page 20 Glossary	“Significant Exposure Pathway”: Clarify if the use of “total public dose” applies to the maximum exposed individual, realistic exposed individual, or population dose.
45	Glossary – Inappropriate change to Regulations using Regulatory Guidance		Page 20 Glossary	“Significant Residual Radioactivity”: This definition states “... would later require remediation during decommissioning”. As discussed earlier, this effectively precludes restricted releases as currently allowed under 10 CFR 20 Subpart E.
46	Glossary Clarification Suggested		Page 21 Glossary	“Unlicensed material” Add reference to RIS 2008-03 for last sentence. Consider including the last sentence in this definition in the definition for “Effluent Discharge”
47	Add References		Page 22 and Page 3 Section B.1	<p>Add RG 1.109 to references and to B.1 since NUREG 1301/1302 rely heavily on this document and it contains the usage factors.</p> <p>Suggest adding RIS-2008-03 to the list of references.</p> <p>If the NRC proceeds to inappropriately expand the REMP to include decommissioning surveys and screening criteria, NUREG-1757 should be referenced with regards to “significant residual radioactivity”.</p>
48	Improper Reference of an Unpublished Standard		Page 24 Reference 19	ANS/ANSI 2.17 is unpublished and therefore it is inappropriate to reference it.
49	Clear Statement of Applicability is Needed			Clear statements of applicability should be provided including the application to existing plants as well as new plants. Current licensees should be given the option to continue using the current version of R. G. 4.1, as referenced by licensing documents.