NUCLEAR ENERGY INSTITUTE

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May 4, 2010

Mr. Michael T. Lesar
Chief, Rulemaking and Directives Branch (RDB)
Office of Administration
Mail Stop: TWB-05-B01M
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: Comments on Interim Staff guidance on Assessing Ground Water Flow and Transport of Accidental Radionuclide Releases, ISG-014 (75 FR 368412, Dated February 24, 2010, Docket ID NRC-2009-0047) and Interim Staff Guidance on Assessing the Consequences of an Accidental Release of Radioactive Materials from Liquid Waste Tanks, ISG-013 (75 FR 368411, Dated February 24, 2010, Docket ID NRC-2010-0189)

Project Number:

Dear Mr. Lesar,

On February 24, 2010, the U.S. Nuclear Commission (NRC) issued a *Federal Register* Notice (75 FR 368411 through 368413) soliciting public comment on proposed Interim Staff Guidance (ISG) DC/COL-ISG-013, "Assessing the Consequences of an Accidental Release of Radioactive Materials from Liquid Waste Tanks" and DC/COL ISG-014, "Assessing Groundwater Flow and Transport of Accidental Radionuclide Releases." The ISGs provided additional clarification and guidance for the application of SRP NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants," Sections 2.4.12, 2.4.13 and 11.2.

The Nuclear Energy Institute (NEI)[1] provides the enclosed comments on behalf of the nuclear energy industry. A nuclear energy industry task force comprised of subject matter experts from existing licensed utilities, combined licensed applicants and construction companies developed the

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

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SUNSI Review Complete
Template = ADM-013

E-RIDS = ADM-03
Add = S. Borrows (SAB2)

comments. These comments support the NRC's efforts to revise the existing guidance and seek to incorporate industry experience in that clarification.

The industry comments on DC/COL-ISG-013 are included in Enclosure 1 and DC/COL-ISG-014 is in Enclosure 2 of this letter. A few examples of the comments in the attachments include:

ISG-13:

- ISG 13 and BTP 11-6 imply that liquid containing tank radioactivity levels will be evaluated "consistent with the safety evaluation." Current requirements limit Curie content in outside tanks without dikes, but do not provide limits for tanks inside buildings.

- The ISG cites GDC 60 and 61, which apply during normal operations or anticipated operational occurrences and imply that the acceptance criteria for ISG-13 events is potable water concentrations exceeding the limits specified in Appendix B to 10 CFR Part 20. Historically, the application of Appendix B to the nearest potable water source is for gross failure of a radwaste tank and not during normal operations or anticipated operational occurrences. Also, the location to apply the ECLs identified in 10 CFR Part 20, Appendix B, Table 2, Column 2 is not clear. Is it the "nearest [existing or future] potable water supply," the "point of entry in an unrestricted area," regardless of actual or "known future users.

- The LWMS is typically non-safety-related and should not "require a re-evaluation of the LWMS with limiting conditions and controls for operation based on more conservative analysis and assumptions," as given in the bases of this change.

- The dose acceptance criteria for postulated indoor tank radiological releases transported to unrestricted areas by groundwater should be selected consistent with use of a reasonable dose assessment models based on RG 1.113 surface water dilution models (for groundwater to surface water release scenarios), and RG 1.109 for assessment of doses to man from all applicable site specific pathways.

ISG-14:

- It should be clear in the introduction, in Figure 1, Appendix A and throughout that you should use simple tools first: conceptual models and estimated travel times. Based on site-specific variables and concerns, the tools should get incrementally more complex to the point where mathematical models and three-dimensional predictive tools are used.

- Section 6 should emphasize that mathematical modeling is only a tool and an optional method to evaluate groundwater and surface water conditions. If site conditions and assessment objectives warrant the use of a mathematical model, then it should be used, but it is not required.

- Appendix A contains extensive required actions by the modeler, with requirements to provide justification of assumptions used in the analysis, along with sensitivity studies for all plausible pathways. Addressing all the NRC expectations in the development of the groundwater model will likely result in numerous model iterations over several months. The ISG also gives guidance on hydro-geological characterization requirements and provides guidance on the Kd testing, indicating that 2-3 aquifer samples from equally divided segments along each identified pathway should be taken for analysis. Implementing these requirements has the potential for increasing the cost and schedule duration of the hydro-geological characterization effort.

- The purpose of the mathematical modeling should be specific to each facility or to each site and should consider objectives such as:
  - To check the consistency of the Site Conceptual Model internally or with regional conditions;
  - To predict concentrations in space and time that cannot be gathered with reliable, repeatable and real monitoring data;
  - To support the design of remedial actions or other controls.

The ISG implies that the specific regulatory requirements applicable for SRP 2.4.13 are 10 CFR 20 and specifically 10 CFR 20.1101 and 10 CFR 20.1302. The previous SRP made no reference to 10 CFR 20 and did not associate "accidental releases" with the requirement for a Radiation Protection ALARA Program

Implementation of ISG-13 and ISG-14:

- The applicability of both ISGs should be clarified related to applications currently in review status and those that will be received after the ISG's are approved.

NEI appreciates the opportunity to provide these comments on the proposed changes to the Standard Review Plan. We look forward to continuing stakeholder dialogue and engagement in future meetings to discuss the comments.

If you have any questions or need additional information concerning the attached comments, please do not hesitate to contact me (202-739-8111; rla@nei.org).

Sincerely,

Ralph L. Andersen, CHP

Attachments

COMMENT FORM

	Document Reviewed: ISG-13 Assessing the Consequences of an Accidental Release of Radioactive Materials from Liquid Waste Tanks	Date: 4/29/10
No.	**Comment**	
1	Applicability: ISG-013 applicability should be for initial applications received after date ISG is approved.	
2	General: The use of terminology should be consistent and technically correct related to hydrogeologic versus hydrological, hydro geologic properties versus hydrogeological characteristics Hydro geologic characteristics	
3	ISG-13 has expanded applicability of requirement for assessing Accidental Releases of Radioactive Materials From Liquid Waste Tanks to evaluating ' vessels or tanks', tanks and vessels'. Vessels is added and not defined.	
4	General: ISG 13 and BTP 11-6 states, 'The reviewer will evaluate the proposed technical specification limiting the radioactivity content (becquerel, curie) of liquid-containing tanks to ensure that the technical specification is consistent with the safety evaluation.' I am familiar with a TS (actually relocated to ORM or TRM), limiting Curie content in outside tanks that are not diked, but do not recall limits for tanks inside buildings. a. Does this statement in the ISG overstate the TS for inside tanks, or is it addressed someplace that I am overlooking? b. There is no surveillance test for inside tank radioactivity	

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	concentration.	
5	General: The ISG should clearly state as a goal that the site-specific conceptual model for accident release and transport should accurately represent site-specific conditions with reasonable and defensible inputs that produce credible results useful for decision making.	
6	Page 2 – third paragraph: The author cites GDC 60 and 61 which applies during normal operations or anticipated operational occurrences and then implies that the acceptance criteria for these events will not result in potable water concentrations exceeding the limits specified in Appendix B to 10 CFR Part 20. Historically, the application of Appendix B to 10 CFR Part 20 to the nearest potable water source is for gross failure of a radwaste tank and not during normal operations or anticipated operational occurrences. NOTE: The author needs to explain that for normal operation and anticipated operational occurrences, the acceptance criteria is that the concentrations of radioactive materials in liquid effluents released to unrestricted area should not exceed the concentration limits in Table 2, Column 2, of Appendix B, to 10 CFR Part 20	

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7	Page 3, Section labeled "Issue": The premise established in the 1st paragraph is that "SRP Sections 2.4.13 and 11.2 with BTP 11-6" are poorly integrated and confusing. Under item 1, it is inferred that SRP Section 11.2 and BTP 11-6 do not apply conservative assumptions to the same extent as SRP Section 2.4.13. This characterization is overstated. Also, SPR Section 2.4.13 quoted phrases such as "extreme events," or "the most severe of natural phenomena" are taken out of context in drawing comparisons to SRP Sections 11.2 with BTP 11-6. BTP-11-6 establishes conservative assumptions for radioactive liquid-containing tank failure analysis. Although outdoor radioactive liquid containing tank radionuclide concentrations used in tank failure analyses are typically calculated assuming some degree of in-plant processing, they are controlled by technical specifications. Indoors radioactive liquid containing tank radionuclide concentrations are calculated for the bounding tank assuming expected maximum liquid concentrations and spill volume. Whereas it is appropriate to apply "extreme" or "most severe" assumptions for facility design input such as flooding or seismic events, parameters pertinent to ground or surface water dilution are calculated based on reasonable	

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	and defensible inputs and assumptions comparable to those applied in SRP Sections 11.2. Historical site-specific environmental data is used to establish conservative, but not "most severe" assumptions related to environmental parameters important in the evaluation of dose consequences from liquid tank spills. For example, assuming the worst-case 10-yr. minimum average, or 95th percentile statistically derived worst-case minimum dilution flow is reasonably conservative and defensible for the purposes of radioactive tank spill consequence evaluation, but should not be characterized as "most severe".	

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8	Page 3, Section labeled "Issue" Last sentence of Item 1 requires explanation. Why should it be required to use "more conservative analysis and assumptions" than specified by the guidance for demonstrating compliance with acceptance criteria? Acceptance criteria should be established consistent with the expected probability of the event being evaluated. Analysis methods and assumptions should not be arbitrarily made more conservative without a commensurate adjustment in the acceptance criteria to account for lower overall probability of event occurrence as analyzed. Furthermore, the 10 CFR 20 Appendix B, Table 2, Column 2 concentration limits specified as an acceptance criteria in BTP 11.6 corresponds to a normal operation limit, which appears well balanced with the level of conservatism provided by the evaluation guidelines provided in the document.	
9	Page 3, Section labeled "Issue" Item 2 summarizes scope of SRP 11.2 and BTP-11-6. It's not clear how Item 2 identifies "major differences" between SRP Section 2.4.13 and 11.2 with BTP-11-6 as implied by the introductory sentence to items 1 and 2. What point is Item 2 making?	

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10	Page 5 -Issue No 1 Failure Mechanism and Radioactivity Releases The LWMS is typically non-safety related and should not 'require a re-evaluation of the LWMS with limiting conditions and controls for operation based on more conservative analysis and assumptions' as given in the bases of this change. The use of an ISG to 'implement more rigorous design codes, standard, or quality assurance measures' as stated is contrary to providing 'acceptable methods of compliance with NRC regulations and the applicants 'applying a graded approach to considering each type of event, radioactive source terms, design features, and potential offsite impacts as also stated in the ISG.	
11	Page 5 -Issue No 1 Failure Mechanism and Radioactivity Releases • What is consequence analysis relative to tank failure? • Where are 'durable and passive' mitigation features defined/design features?	

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12	Page 6 – Issue #2 Mitigating Design Features • The HP staff is listed as determining 'whether he proposed design is capable of retaining the liquid inventory of failed component. Will this review be in addition to or in place of system engineering reviews?	
13	Page 6- Mitigating Design Features: Application of the following proposed guidance is not clear. "In cases where mitigating design features of tanks and vessels meet the acceptance criteria, the staff might waive the need for a consequence analysis in the context of SRP Section 11.2. However, this provision does not change the requirements of SRP Section 2.4.13 that relate to demonstrating the adequacy of the site's hydro geologic properties, via a consequence analysis that uses combined literature data and site data characterizing transport mechanisms, such as aquifer materials, hydraulic conductivity, porosity, etc." What would be applicable and appropriate acceptance criteria to demonstrate "the adequacy of the site's hydro geologic properties" if mitigating design features are not considered? Limiting tank size and isotopic content would be mitigating design features.	

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14	Page 6 includes the following proposed interim staff guidance: In cases where mitigating design features of tanks and vessels meet the acceptance criteria, the staff might waive the need for a consequence analysis in the context of SRP Section 11.2. However, this provision does not change the requirements of SRP Section 2.4.13 that relate to demonstrating the adequacy of the site's hydro geologic properties, via a consequence analysis that uses combined literature data and site data characterizing transport mechanisms, such as aquifer materials, hydraulic conductivity, porosity, etc.	
15	Page 6 -Item #3 Radioactive Source Term • The source terms that must be considered listed in Attachment A but not included in ANSI/ANS 18.1 1999 or 1984 should be removed (Tc-99)	

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16	Page 7-Item #4 Calculations of Transport Capabilities in Ground Water or Surface Water • The Proposed Interim Staff Guidance on Page 4 states that this item (fourth step) 'Is addressed in SRP Section 2.4.13'. This step is the only item that the Hydrological Engineering staff is designated to perform. • Please clarify whether step #4 provides the guidance for meeting SRP 2.4.13.	
17	Page 7, Calculations of Transport Capabilities in Ground Water or Surface Water: The location to apply the ECLs identified in 10 CFR Part 20, Appendix B, Table 2, Column 2 is not clear. Is it the "nearest [existing or future] potable water supply", the "point of entry in an unrestricted area", regardless of actual or "known future users"	
18	Page 7 includes the following proposed interim staff guidance: For example, the staff may apply simplified calculation procedures and models, such as those contained in RG 1.113 and NUREG/CR-3332 using demonstrably conservative coefficients and assumptions and physical conditions (such as lowest recorded river flow) likely to give the most adverse dispersion of liquid effluents. [*Emphasis*	

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	added] The staff will compare the applicant's model, assumptions, and results with its own to assure that the results are comparably conservative. RAIs on several ESP/COL applications have requested that applicants use worst-case coefficients, assumptions, and physical conditions in assessing accidental releases. In a groundwater analysis for example, the request might require the use of the maximum observed hydraulic conductivity in combination with the minimum observed distribution coefficient while taking no credit for acceptable design features in mitigating an LWMS release. While demonstratively conservative, combining multiple worst-case coefficients, assumptions and physical conditions results in a scenario that has a very low probability of occurrence. Acknowledging the need to be conservative in the interest of public safety, combining worst-case coefficients, assumptions and physical conditions can nevertheless lead to unrealistic outcomes. More definitive staff guidance, other than use of worst-case coefficients, assumptions and physical conditions,	

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	should be provided to better quantify what constitutes an acceptable level of conservatism. This would benefit both NRC staff and applicants as much of the dialogue through the RAI process has focused on what constitutes acceptable conservatism in assigning parameter values. Given the uncertainty inherent to groundwater transport analysis, a path forward might be to adopt a probabilistic framework for assessing regulatory compliance	
19	Page 8 - Item #5 Exposure Scenarios and Acceptance Criteria • Include in discussion of radionuclide concentrations in surface or ground water that acceptance is based on levels at unrestricted area.	

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20	Pg. 8, *Exposure Scenarios and Acceptance Criteria*: "The basis for acceptance is that the staff's review shows that the postulated event would not result in radionuclide concentrations in surface or ground water exceeding the ECLs of 10 CFR Part 20, Appendix B, Table 2, Column 2; ***or*** in a maximum water concentration that when consumed on an annual basis will not exceed a dose limit of 1 mSv (100 mrem) from all relevant pathways." Does this require the applicant to demonstrate compliance with both the ECL limit as well as the annual dose limit, or may the applicant demonstrate compliance with either the ECL limit ***or*** the dose limit.	
21	Pg. 8, Section labeled "Proposed Interim Staff Guidance", Item 5 – Exposure Scenarios and Acceptance Criteria The section should be re-written to rely more heavily on existing NRC guidance establishing site-specific exposure pathways, dose assessment methodology, and provide more definitive acceptance criteria. Outdoor tank radiological releases postulated to be transported to unrestricted areas over surface pathways (e.g., to surface waters via yard drains) occur over relatively short periods of time. The current BTP 11.6 evaluation	

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	guidance and concentration-based limits appear appropriate for such a postulated event. For the purposes of outdoor liquid tank failure consequence analysis, 10 CFR 20 Appendix B, Table 2, Column 2 concentration limits are typically applied as a peak instantaneous limit rather than an annual average. The adoption of a more complex dose assessment methodology for postulated outdoors storage tank spill evaluation is not warranted and would likely be much less protective than the current BTP-11.2 practice. Maintaining outdoor storage tank inventories in compliance with limits imposed by the existing BTP 11.2 methodology has not been a burden on existing reactors and is not anticipated as a burden for new reactor applications. Therefore, it is concluded that there is no obvious benefit from adopting a more complex model and less protective standard for outdoor storage tank radiological release consequence assessment concluded that there is no obvious benefit from adopting a more complex model and less protective standard for outdoor storage tank radiological release consequence assessment. Unlike outdoor tank spills, indoor tank radiological releases	

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	are postulated to be transported to unrestricted areas by groundwater and occur over relatively long periods of time. Consideration of a more complex dose assessment methodology for postulated indoors storage tank spill evaluation might be warranted to ensure all dose pathways is considered. A long-term release model and acceptance criteria as suggested by the draft ISG may be more suitable than guidance provided in the current BTP 11.6. However, the ISG should clearly identify BTP-11.6 as an appropriate basis for determining maximum tank radionuclide source term, and provide more focused guidance regarding a groundwater transport and liquid pathway dose modeling assumptions. Groundwater transport and dose analysis modeling assumptions should be in balance with the non-mechanistic accident spill and release assumptions currently provided in BTP-11.6. The specification of the 10 CFR 20 Appendix B, Table 2, Column 2 equivalent annual dose criteria (i.e., 1.0 mSv/yr) should also be reconsidered. The dose acceptance criteria for postulated indoor tank radiological releases transported to unrestricted areas by groundwater should be selected consistent with use of a reasonable dose assessment models based on RG 1.113 surface water dilution models (for groundwater to surface water release scenarios), and RG 1.109 for assessment of doses to man from all applicable site specific pathways.	

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	10 CFR 50 Appendix I liquid pathway dose objectives may be: a. More appropriate when applying physically accurate representation of the natural systems similar to existing practice for routine release dose assessment, and b. more consistent with limits established for postulated outdoor storage tank releases that are apply 10 CFR 20 Appendix B, Table 2, Column 2 concentration limits as a peak instantaneous concentration limit.	

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22	Page 8, Section labeled "Proposed Interim Staff Guidance", Item 5 – Exposure Scenarios and Acceptance Criteria Items a and b; Consider revising the guidance to require maximum individual dose evaluations performed consistent with RG 1.109 utilizing site specific dilution parameters and applicable pathway assumptions. By splitting the requirement into items a and b, it implies that separate evaluations are performed for each "exposure pathway case", and it is not clear whether results are combined before comparison to the annual dose limit or not. Depending on the site and location being evaluated, drinking water, fish and recreational pathways may all exit at the same location, or not. The guidance should be written more generically and take advantage of existing regulatory guidance through reference.	
23	Page 9 - Item #6 Specifications on Tank Waste Radioactivity Concentrations • Delete vessel from discussion of liquid containing tans and technical specifications.	

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24	Pg. 9, Section labeled "Proposed Interim Staff Guidance", Item 6 – Specifications on Tank Waste Radioactivity Concentration Levels – Item 6 should be revised to acknowledge that not all radioactive liquid containing tanks would require technical specification limits. Although outdoor radioactive liquid containing tanks typically require technical specifications controls to ensure concentrations are maintained below offsite dose analysis assumptions, indoor radioactive liquid containing tank radionuclide concentrations are calculated based on maximum expected liquid concentrations and spill volume. Technical specifications are not required to ensure concentrations are maintained below offsite dose analysis assumptions for tanks analyzed using conservative maximum expected liquid concentrations and spill volume.	
25	Page 9 -Item #7 Evaluation Findings for Combined License Reviews • Specify that the Health Physics and Hydrological Engineering staff as the 'staff' that will document the results of evaluation.	

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26	Page 10 – paragraph e The paragraph is confusing due to the postulated tank failure having to meet the requirements of GDC 60 and 61. These requirements are applicable during normal operations or anticipated operational occurrences.	
27	Page 10 provides the following proposed interim staff guidance: For either case [*presumably with and without mitigating design features*], the staff concludes that the postulated failure of a tank and its associated components has been evaluated and the design is acceptable and meets the requirements of GDC 60 and 61 for the control of releases of radioactive materials to the environment and provides an adequate level of safety during normal reactor operation, including anticipated operational occurrences. Such a release will not result in radionuclide concentrations in surface or ground water exceeding the ECLs of 10 CFR Part 20, Appendix B, Table 2, Column 2; or in a maximum water concentration that when consumed on an annual basis will not exceed a dose limit of 1 mSv (100 mrem) from all relevant pathways, at the nearest source of potable water, as described in the application. The proposed interim staff guidance restated above	

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	suggests that inconsistencies between SRP 2.4.13, SRP 11.2, and BTP 11-6 are not resolved. On one hand, there is acceptance of passive and durable design features in mitigating an accidental release. On the other hand, an applicant that might use such acceptable design features must nevertheless ignore these features, postulate a tank failure, and demonstrate that radionuclide concentrations meet 10 CFR Part 20 or the 100 mrem limit as applicable. Therefore, the possibility exists that an applicant could use acceptable design features, but potentially fail to comply with the concentration/dose limits because no credit can be taken for design features in mitigating the release. The interim staff guidance should be more explicit in defining the NRC's position on this issue (i.e., credit can be taken for design features mitigating a release or not).	
28	ATT A. - Reference to ANSI /ANS 18.1-1999 radionuclide's, in addition the Table in ISG adds I-129 and TC-99. Existing COL applicants (AP-1000) reference 1984 version of ANSI. The current evaluations may not include I-129 and Tc-99 in the list of source terms. Will a new calculation be	

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	required? NOTE: The author needs to determine a graded acceptance criteria depending upon whether the event is normal operation, anticipated operational occurrence or a postulated gross fail of a radwaste tank.	
29	Editorial: Page 1 Should the title be 'Assessing the Consequences of an Accidental Release of Radioactive Materials from Liquid Tanks and Vessels'?	
30	Editorial: Page 2 Consider revising third paragraph 2nd and 3rd sentence to – A single failure of one of these tanks could release radioactive liquids to surface or ground water and potentially endanger the public. Meeting these criteria provides assurance that during normal operations or anticipated operational occurrences releases of radioactive materials due to a single failure of a liquid –containing tank outside containment or outdoors will not result in potable water concentrations exceeding the limits specified in Appendix B to 10 CFR Part 20.	
31	Editorial: Page 2 last paragraph – Add 's' to consequence in first sentence. In third sentence insert 'the' before NRC's public dose limit.	

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32	Editorial: Page 3 Rational section item #2- Consider changing may to 'will'.	
33	Editorial: Page 4 item #4 – Consider revising 'likely future water users'. This sounds like a prediction.	
34	Editorial: Page 5 Item #1 – ▪ In first paragraph first sentence revise 'into' too "to the environment' ▪ Remove the word 'both' in fifth bullet, ▪ Revise 'offsite users' to "members of the public'	
35	Editorial: Page 6 Item 2 and 3- ▪ The first paragraph introduce a new terminology 'waste collector tanks or sample tanks' ▪ Use the term equipment consistently for example ' failed equipment is used one time and in the next time 'failure of a tank and its components' is used. ▪ In the last paragraph what does ' both types of water' refer too?	
36	Editorial: Page 7 Items 3 and 4 ▪ What is meant by 'type of scenario' in first paragraph? ▪ In first sentence should 'useable' water be revised to potable?	
37	Editorial: Page 7 Item 4- ▪ In the first paragraph fourth sentence the statement	

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	'generated subsequently during ground water transport' needs clarification. Is this in reference to transport because of time or interaction with ground water? ▪ In last sentence use lower case for 'confirmatory'	
38	Editorial: Page 9 item 7- Revise the second sentence to remove 'whether' which is typically used with "OR" statements instead of "AND" statements.	
39	Editorial: Page 11 Reference #10- Revise 10 CFR 50.34(a) to read "10 CFR 50.34a"	
40	Editorial: Page 12 Reference 12 – Clarify reference and title, is it 10 CFR 50.36(a) "Technical Specifications" or 10 CFR 50.36a "Technical Specifications on Effluents from Nuclear Power Plants"?	

COMMENT FORM

Document Reviewed: ISG -14 Standard Review Plan Sections 2.4.12 and 2.4.13 Assessing Groundwater Flow and Transport of Accidental Radionuclide Releases		Date: 4/29/10
	Comment	
1	Applicability SG-014 applicability should be for initial applications received after date ISG is approved.	
2	General Appendix A contains extensive required actions by the modeler, with requirements to provide justification of assumptions used in the analysis, along with sensitivity studies for all plausible pathways. Addressing all the NRC expectations in the development of the groundwater model will likely result in numerous model iterations over several months.	
3	General The ISG provides specific guidance that allows applicants to take credit for mitigating design features in precluding an accidental release. Acceptable mitigating design features are defined in BTP 11-6. The ISG indicates that if these features are present, then there is no need to perform a radiological consequence analysis for inclusion in FSAR Section 2.4.13. This position is favorable for the nuclear industry because it would allow siting of nuclear plants at locations where the hydrogeological characteristics are such that Part 20 limits may not be attainable, assuming acceptable design features are provided.	

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	Comment	
4	General The ISG also gives guidance on hydrogeological characterization requirements. In particular the ISG indicates that aquifer pumping tests should be conducted to characterize hydraulic conductivity (versus aquifer slug tests) in order to obtain values that are representative of areal hydrogeological conditions. The ISG further provides guidance on the Kd testing, indicating that 2-3 aquifer samples from equally divided segments along each identified pathway should be taken for analysis. Implementing these requirements has the potential for increasing the cost and schedule duration of the hydrogeological characterization effort.	
5	General A mark-up of SRP 2.4.12 and 2.4.13, and BTP 11-6 should be provided to identify where the ISG-14 information will added/revised to supplement the existing documents.	

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Document Reviewed: ISG -14 Standard Review Plan Sections 2.4.12 and 2.4.13 Assessing Groundwater Flow and Transport of Accidental Radionuclide Releases		Date: 4/29/10
	Comment	
6	General The purpose of the mathematical modeling should be specific to each facility or to each site and should consider objectives such as: • To check the consistency of the Site Conceptual Model internally or with regional conditions; • To predict concentrations in space and time that can NOT be gathered with reliable, repeatable and real monitoring data; • To support the design of remedial actions or other controls. • Define groundwater pathways of potential accidental liquid releases and associated travel times.	
7	General It should be clear in the introduction, in Figure 1, Appendix A and throughout that **you should use simple tools first: conceptual models and estimated travel times first.** Based on site-specific variables and concerns, the tools should get incrementally more complex to the point where mathematical models and three-dimensional predictive tools are used.	

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8	Page1 –Purpose First paragraph: Revise 'radioactive liquid wastes' to read '**radioactive liquid effluent**'.	
9	Page 3 Background The guidance in SRP Section 11.2 and BTP 11-6 are supposed to be supplemented in the ISG-013 document. Therefore it is not clear what the statement means that ISG-014 is supplementing and clarifying some of the same items.	
10	Page 3 Background The second bullet under Issues states ' SRP Section 11.2 and BTP 11-6 specify the use of an 'annual average hydrological occurrence'. Please clarify where this term is used since the only reference to 'annual average' that was obvious in a review was in reference to 'annual average effluent concentrations', 'annual average releases'	
11	Page 6 Figure 1 Figure 1 presents a flow chart, entitled *"Hierarchical approach to analyzing radiological consequences in groundwater"*. A decision point that determines if a conceptual groundwater model is sufficient for a site or if a mathematical model is warranted is represented by the question "Are mitigating design features present and acceptable". This decision point needs to be defined	

COMMENT FORM

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	in the text of ISG-14	
12	Page 6 Section 2-Review Interfaces Item (a) identifies a review interface between SRP 2.4.12 and 2.4.13 with SR 2.5.1 and 2.5.4. Will SRP 2.5.1 and 2.4.5 be updated to identify the review interface with SRP 2.4.12 and 2.4.13?	
13	Page 6 Issues This section identifies changes that will be included in ISG-014 related to 'alternate conceptual models or numerical groundwater flow models'. It was not obvious that any changes relative to alternate conceptual models was presented or is the use of the term' numerical groundwater flow model synonymous with alternate conceptual model for the purpose of this document?	
14	Page 7 Section 2-Review Interfaces Item (b) includes a function of the LWMS from SRP Section 11.2 that is not evident in a review of that document. The ISG include that statement that 'liquid wastes produced during normal operation are handled, processed, **recycled as coolant**, or released in accordance with NRC regulations.' In reviewing SRP 11.2 it was clear that the LWMS included 'collecting, handling, processing, releasing, and disposing of liquid effluents' but not **recycled as coolant.'** Clarify or remove the statement **recycled as coolant**.	

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15	Page 7 Section 2-Review Interfaces Item (c) last sentence should be revised to 'Compliance with 10 CFR Part 20, Appendix B, **Table 2,Cloumn 2** for liquid effluent concentrations.	
16	Page 8 Section 3 Regulatory Requirements Item (a) last sentence states' This requirement is applicable to the analysis of a maximum groundwater level for subsurface hydrostatic loading in SAR Section 2.4.12… Considering that in most sites, the site characterization is based on groundwater level data from a relatively short period of time, please provide more explicit guidance on the definition of the maximum groundwater level for subsurface hydrostatic loading and an acceptable approach for the determination of the maximum groundwater.	

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17	Page 8 Section 3 Regulatory Requirements Item (c) implies that the specific regulatory requirements applicable for SRP 2.4.13 are 10 CFR 20 and specifically 10 CFR 20.1101 and 10 CFR 20.1302. The previous SRP made no reference to 10 CFR 20 and did not associate 'accidental releases' with the requirement for a Radiation Protection ALARA Program. The reference to 10 CFR 20 should identify the applicable requirement reference and not reference 10 CFR 20 as regulatory requirement that was not previously applicable. The ISG appear to impose a regulatory requirement that was not specifically referenced in SRP 2.4.13 or 2.4.12 acceptance criteria.	
18	Page 8 Section 3 Regulatory Requirements Item (d) repeat the requirements for SRP Section 11.2 however since this section identifies Regulatory Requirements for ISG-014 this section should be deleted so that it is not implied that the criteria for accidental releases during normal operations or anticipated operational occurrences include meeting radionuclide concentrations limits specified in 10 CFR 20, Appendix B is applicable to SRP 2.4.12 and 2.4.13	

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19	Page 9. Section 4 On-Site Hydro In item (a) clarification is included on 10 CFR 100.20 (c) (3) objectives that include **'onsite samples'** which was not identified in the requirement for 'measurements' of factors important to hydrological radionuclide transport. Is this a staff interpretation of what was meant by 'measurements'?	
20	Page 9. Section 4 On-Site Hydro Item (b) needs to clarify 'sufficient on-site hydrological data' to 'adequately conceptualize and characterize related groundwater systems'	
21	Page 9. Section 4 On-Site Hydro Item (c) imply that the radiological consequence analysis should be consistent with the annual dose limits specified in 10 CFR Part 20 Appendix B. This section was referenced as applicable to SR 11.2 in the regulatory requirements and should not be applicable here.	

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22	Page 9. Section 4 On-Site Hydro Item (c) and (d) introduces a new requirement for 'annual average hydrological conditions' The previous requirement from10 CFR Part 100, as it relates to identifying and evaluating hydrological features of the site did not identify annual averages. The annual average identified in SRP 11.2 and BTP 11.6 is probably related to the acceptance criteria for radionuclide concentrations in 10 CFR Part 20 Appendix B.	
23	Page 9. Section 4 On-Site Hydro Item (e) appears to introduce new criteria for 'areal hydrological conditions' and requirement for in situ testing as key components during the operational and decommissioning lifecycle. This appears to be a new requirement to address contaminant migration during the decommissioning cycle in SRP 2.4.13. Identify the basis relative to 10 CFR 100 or requirements for assessing groundwater flow and transport of accidental radionuclide releases.	
24	Page 9. Section 4 On-Site Hydro Item (f) appears to specify a minimum number of aquifer samples to take for analysis. Is this consistent with or in lieu of meeting applicable EPA/Industry standards?	

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25	Page 10 Section 5 Contamination Sources & Receptor Location Item (b) implies that ISG-013 provide guidance on 'all radionuclide containing indoor and outdoor tanks and vessels. A review of ISG-013 indicates tanks located outside of containment and outdoors is the focus of concern. Please clarify statement in ISG-014	
26	Page 10 Section 5 Contamination Sources & Receptor Location Item (c) should be deleted from this section and incorporated into ISG-013 as appropriate. This section appears to provide explanation of what is meant by basis in ISG-013. The purpose of ISG-013 was to clarify BTP 11-6 guidance that does not need to be repeated or reinterpreted further in ISG-014.	
27	Page 10 Section 5 Contamination Sources & Receptor Location Item (d) is not clear in defining receptor point applicable to SRP 2.4.13 relative to applicable criteria (i.e. 10 CFR 100) and the use of the term 'pseudo-compliance point'	
28	Page 11 Section 6. Ground-water Modeling and Pathway Prediction Section 6 should emphasize that mathematical modeling is only a tool and an optional method to evaluate groundwater and surface water conditions. If site conditions and assessment objectives warrant the use of a mathematical model, then it should be used...but it is not required.	

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29	Page 11 Section 6. (c) Ground-water Modeling and Pathway Prediction. Section 6c states, "A mathematical model is a realistic representation of the physical hydrogeologic system...." The word realistic should be removed. Mathematical models are only as good as the data used to construct them. If the site conceptual model is ill conceived and based on erroneous data, then the mathematical model will likely be far from realistic.	
30	Page 11 Section 7.1 Ground-water Modeling Item (a) implies that the modeling process is required to consist of 'conceptualization and mathematical modeling' that may or may not be applicable depending on site-specific conditions. This statement seems to eliminate any 'hierarchical approach' as previously discussed.	
31	Page 11 Section 7.1 Ground-water Modeling Item (b) is not clear on how applicant will address 'uncertainty of the future contamination scenarios'. Please explain.	
32	Page 11 Section 7.1 Ground-water Modeling Item (c) and (d) clarify the use of following terminology: mathematical model, in-depth numerical modeling, numerical modeling, numerical groundwater modeling	

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33	Page 11 Section 7.1 Ground-water Modeling Item (d) the impact of developing groundwater models on 'engineered backfills' is implied in this section however no previous interface SRP change is identified relative to the applicable requirements in SRP 2.5.4. This item should be deleted here and clarified in applicable SRP for consideration.	
34	Page 11 Section 7.1 Ground-water Modeling Item (b) clarify the acceptance criteria for SRP 2.4.13 versus SRP 11.2 and BTP 11.6. The question of the consequence analysis meeting 10 CFR Part 20 Appendix B concentration limits is not clear.	
35	Page 12 Section 7.1 Ground-water Modeling Item (c) should be deleted since this requirement is not part of this ISG Regulatory Requirements and it is verified in other SRP's such as SRP 11.2, SRP 12.3-4	
36	Page 12 Section 7.1 Ground-water Modeling Item (e) is not clear on the 'consequence analysis' described above' that may or may not be waived based on BTP 11-6 acceptable criteria. I this stating that item	

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37	Page 12 Section 7.1 Ground-water Modeling Item (f) should identify the relevant information applicable to ISG-014 and not restate the information from ISG-013. Also the correct reference to the approved NEI template should be identified (NEI 08-08A).	
38	Page 12 Section 7.1 Ground-water Modeling The paragraph discussion imply that the staff will 'recommend mitigating design features; if detailed model does not meet art 20 Appendix B limits. Clarify/identify the mitigating design features applicable, how this differ from the requirements in ISG-014/BTP-6 for 'mitigating design features', and the applicability of 10 CFR Part 20 Appendix B limits.	
39	Editorial: Page 1 consider revising the following sentences: ▪ First paragraph ' The purpose of this interim staff guidance (ISG) is to clarify previous U.S. Nuclear Regulatory Commission (NRC) guidance performed during the licensing review for a new nuclear power plant of the required analysis for the radiological consequences of accidental releases of radioactive liquid wastes to groundwater'. ▪ Last paragraph – ' This ISG (ISG-014) provides additional guidance, through the use of a structural hierarchical approach, for analyzing the aqueous transport of radionuclides through the subsurface with groundwater'.	

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40	Editorial: Page 6 Figure 1: The last step "Develop Technical Specifications limiting volume and concentration of tank contents to limit potential release". Imply that shutting down a unit is a logical choice for action to high tank activity, which it is not a logical option.	
41	Editorial: Page 14- Verify reference to 50.36a or 50.36(a) and the appropriate title.	