EPFAQ Number:	2017-001
Originator:	Don A. Johnson
Organization:	NRC
Relevant Guidance:	NEI 07-01, *Methodology for Development of Emergency Action Levels Advanced Passive Light Water Reactors,* Revision 0. NEI 99-01, *Methodology for Development of Emergency Action Levels*, Revisions 4 and 5; and NEI 99-01, *Development of Emergency Action Levels for Non-Passive Reactors*, Revision 6. NUMARC/NESP-007, *Methodology for Development of Emergency Action Levels,* Revision 0.
Applicable Section(s):	Initiating Conditions AS1 and AG1, and AA1 for NEI 99-01, Revision 6, schemes.
Status:	Available for Public Comment

QUESTION OR COMMENT:

What guidance can the NRC provide licensees related to implementation of the January 2017 version of the U.S. Environmental Protection Agency (EPA) Protective Action Guide (PAG) Manual?

PROPOSED SOLUTION:

The NRC will clarify how licensees can implement the 2017 EPA PAG Manual in consultation with offsite response organizations (OROs), specifically in regards to revisions/modifications to licensee emergency action levels (EALs), protective action recommendations (PARs), dose modeling, and the new drinking water PAG.

NRC RESPONSE:

The 2017 EPA PAG Manual, (EPA-400/R-17/001, "PAG Manual: Protective Action Guides and Planning Guidance for Radiological Incidents"), is an update to the guidance from the 1992 version of the EPA PAG Manual (EPA-400/R-92/001) and provides OROs updated guidance related to protecting the public from the radiological consequences of an incident. The 2017 EPA PAG Manual is not a regulation and, as such, is not required to be implemented.
Programs developed using the EPA PAG guidance from 1992 are still acceptable.

For the purposes of this EPFAQ, the incident of concern would be a radiological event at a licensed commercial nuclear power plant (NPP). While the 2017 EPA PAG Manual provides updated guidance, it is the responsibility of OROs to decide the appropriate protective action strategies for their communities, and the responsibility of the licensee to evaluate any impact on its program and align to the extent possible with the ORO plans to ensure effective protective action strategies continue to remain in place.

The NRC staff does not believe that the NRC-endorsed EAL schemes are in conflict with the 2017 EPA PAG Manual. While the 2017 EPA PAG Manual has eliminated the 5 rem thyroid committed dose equivalent (CDE) dose as a PAG for evacuation or sheltering in the early phase, the EAL schemes provide the option for the licensee to use either total effective dose equivalent (TEDE) or thyroid CDE as the bases in developing the Site Area Emergency and General Emergency thresholds for Initiating Conditions (ICs) AS1 and AG1. This same option is available for IC AA1 in schemes based on NEI 99-01, Revision 6. For a licensee

that based these EAL thresholds on thyroid CDE to support ORO protective action schemes, a change to ICs AS1 and AG1, and AA1 when applicable, should be considered if a licensee's ORO revises its protective action scheme to align with the 2017 EPA PAG Manual. Additionally, ~~a~~ corresponding changes to ICs AU1 and AA1 should also be considered if needed to ensure appropriate margin exists between the EALs.

The other change of significance to the licensee is the incorporation in the 2017 EPA PAG Manual of the U.S. Food and Drug Administration (FDA) PAGs on the use of potassium iodide (KI). The FDA "recommends that KI be administered to both children and adults at the lowest intervention threshold (i.e., > 5 rem (50 mSv) predicted internal thyroid exposure in children. The one-year old age group thyroid dose is expected to be limiting" (EPA-400/R-17/001, p. 20). Not all States include thyroid blocking as part of their suite of protective actions. However, a licensee should consider revising/updating its dose assessment program to ensure that the appropriate licensee PAR is provided to the OROs for their consideration, if the OROs include the use of KI as a supplementary protective action for the public. Since IC AG1 is based upon the primary PAGs of evacuation, and/or sheltering in place, not the supplemental PAG of administration of KI (EPA-400/R-17/001, p. 11), a corresponding EAL for KI is not needed

The 2017 EPA PAG Manual has incorporated the International Commission on Radiological Protection (ICRP)-60 dosimetry and associated dose conversion factors. The NRC considers it appropriate for licensees to review their dose assessment software to determine if the software allows the user to select ICRP-60 dose conversion factors/dosimetric models as an option. Some commercial dose assessment software have system manager-controlled options to allow the user to select particular dose conversion factors. If such a capability does not exist, the licensee, working with the OROs, should consider the magnitude of the potential differences between dose conversion factors based upon ICRP-60 and on the earlier calculation methods. The licensee should also consider whether the calculation methods for EAL numeric thresholds based on dose need to be adjusted. As the EPA PAG Manual is only guidance, the NRC is not requiring that licensees migrate to ICRP-60 dose conversion factors or dosimetry. However, the NRC does recommend that licensees compare runs between their dose assessment models and ORO models to identify the magnitude of, and reason for, observed differences. Understanding in advance any differences may avoid delays in communicating and implementing protective actions.

An important addition to the 2017 EPA PAG Manual that licensees should discuss with OROs is the new PAG for drinking water. Licensees with facilities on bodies of water from which public drinking water is drawn may have existing procedures to inform a downstream drinking water plant of a release so that appropriate actions can be taken as necessary. The licensee should consider updating such procedures to incorporate new guidance as necessary. However, a corresponding EAL specifically addressing the new PAG for drinking water, is not needed.

To summarize:

1) Although the *Federal Register* notice of the availability of the 2017 EPA PAG Manual (81 FR 88679, December 8, 2016) states that the Federal Emergency Management Agency (FEMA) plans to begin using the 2017 EPA PAG Manual during its evaluation of OROs around nuclear power facilities twelve months after the publication of the notice in the *Federal Register*, this should not be interpreted as a requirement on licensees or OROs to revise their radiological emergency preparedness (REP) plans within this timeframe or at all. If an ORO chooses to update its plans and processes to reflect the 2017 EPA PAG Manual prior to the licensee's implementation, the NRC understands that licensees and OROs would coordinate, such that they understand what differences may result and how to manage these differences to ensure an appropriate emergency response.
2) Licensees should consider revising their onsite REP plans, if necessary, to support maintaining alignment with ORO protective action strategies.

a) For EALs: If EALs AA1, AS1 and AG1 currently include the CDE threshold, and the ORO decides to adopt the 2017 EPA PAG Manual guidance, then the licensee should consider removing the thyroid CDE threshold from its EAL scheme.

The NRC-endorsed EAL guidance provided in NEI 07-01, Revision 0 (endorsed by the NRC as described in the letter from C. Miller, NRC to A. Nelson, NEI, dated August 12, 2009), NEI 99-01, Revisions 4, 5 and 6 (endorsed by the NRC in Regulatory Guide 1.101, as described in the letter from C. Miller, NRC to A. Nelson, NEI, dated February 22, 2008 and as described in the letter from M. Thaggard, NRC to Ms. Perkins-Grew, NEI, dated March 28, 2013, respectively); and NUMARC/NESP-007 (endorsed by the NRC in Regulatory Guide 1.101) refer to the EPA PAGs as the applicable guidance for addressing the release of gaseous radioactivity under AS1 and AG1, and AA1 for schemes based on NEI 99-01, Revision 6. The 2017 EPA PAG Manual has removed consideration of thyroid CDE as a separate threshold for evacuation or sheltering-in-place. Accordingly, eliminating the thyroid CDE from ICs AA1, AS1 and AG1 would be consistent with the NRC-endorsed EAL guidance and would not reduce the licensee's ability to make the requisite emergency classification as specified in the NRC-endorsed EAL guidance. Since the licensee's EAL scheme would remain consistent with the NRC-endorsed EAL guidance bases for these EALs, licensees should not have to revise their EAL schemes under 10 CFR Part 50, Appendix E.IV.B.2.

In accordance with Regulatory Issue Summary (RIS) 2003-18, Supplement 2, "Use of Nuclear Energy Institute (NEI) 99-01, Methodology for Development of Emergency Action Levels, Revision 4," dated January 2003, the changes to the EALs, as provided in the attached markup of EALs AA1, AS1 and AG1, would be considered a DIFFERENCE. As such, it is reasonable to conclude that the changes as provided, if implemented as written, would not be considered a reduction in effectiveness of a licensee's emergency plan.

b) For licensee PARs:

i) If the OROs decide to implement the protective action strategy for the administration of KI to children and adults, then the licensee should consider how best to support the OROs in this effort, including revising its dose assessment model, if warranted.

ii) If the OROs decide to implement the updated EPA PAG Manual guidance for drinking water, then the licensee should consider how best to support the OROs in this effort.

Any changes made to the licensee's REP plan due to revised PAR strategies, and/or dose assessment methods, would need to be evaluated via 10 CFR 50.54(q). However, if the proposed changes continue to meet the regulations and are in alignment with ORO strategies, then the basis for the licensee REP plan has not changed and, therefore, should not constitute a reduction in effectiveness.

For any proposed change to its onsite REP plan, the licensee is required to perform and document the analysis per 10 CFR 50.54(q)(3), reflecting the information above, and to make the final conclusion regarding whether the proposed change constitutes a reduction in effectives and, therefore, the need for prior NRC approval.

RECOMMENDED FUTURE ACTION(S):

☐ INFORMATION ONLY, MAINTAIN EPFAQ

☒ UPDATE GUIDANCE DURING NEXT REVISION

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Applicable Section(s):	Initiating Conditions AS1 and AG1
Status:	Available for Public Comment

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ATTACHMENT:

EAL Markup (draft) for EALs AS1 and AG1 (applicable to all EAL schemes endorsed by the NRC)

ECL: Site Area Emergency

Initiating Condition: Release of gaseous radioactivity resulting in offsite dose greater than 100 mrem TEDE ~~or 500 mrem thyroid CDE~~.

Operating Mode Applicability: All

Example Emergency Action Levels: (1 or 2 or 3)

Notes:

- The Emergency Director should declare the Site Area Emergency promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.
- If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded 15 minutes.
- If the effluent flow past an effluent monitor is known to have stopped due to actions to isolate the release path, then the effluent monitor reading is no longer valid for classification purposes.
- The pre-calculated effluent monitor values presented in EAL #1 should be used for emergency classification assessments until the results from a dose assessment using actual meteorology are available.

(1) Reading on ANY of the following radiation monitors greater than the reading shown for 15 minutes or longer:

(site-specific monitor list and threshold values)

(2) Dose assessment using actual meteorology indicates doses greater than 100 mrem TEDE ~~or 500 mrem thyroid CDE~~ at or beyond (site-specific dose receptor point).

(3) Field survey results indicate ~~**EITHER** of~~ the following at or beyond (site-specific dose receptor point):

- Closed window dose rates greater than 100 mR/hr expected to continue for 60 minutes or longer.
- ~~Analyses of field survey samples indicate thyroid CDE greater than 500 mrem for one hour of inhalation.~~

Basis:

This IC addresses a release of gaseous radioactivity that results in projected or actual offsite doses greater than or equal to 10% of the EPA Protective Action Guides (PAGs). It includes both monitored and un-monitored releases. Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public.

Radiological effluent EALs are also included to provide a basis for classifying events and conditions that cannot be readily or appropriately classified on the basis of plant conditions alone. The inclusion of both plant condition and radiological effluent EALs more fully addresses the spectrum of possible accident events and conditions.

~~The TEDE dose is set at 10% of the EPA PAG of 1,000 mrem while the 500 mrem thyroid CDE was established in consideration of the 1:5 ratio of the EPA PAG for TEDE and thyroid CDE.~~

Classification based on effluent monitor readings assumes that a release path to the environment is established. If the effluent flow past an effluent monitor is known to have stopped due to actions to isolate the release path, then the effluent monitor reading is no longer valid for classification purposes.

Escalation of the emergency classification level would be via IC AG1.

Developer Notes:

While this IC may not be met absent challenges to multiple fission product barriers, it provides classification diversity and may be used to classify events that would not reach the same ECL based on plant status or the fission product matrix alone. For many of the DBAs analyzed in the Updated Final Safety Analysis Report, the discriminator will not be the number of fission product barriers challenged, but rather the amount of radioactivity released to the environment.

The EPA PAGs are expressed in terms of the sum of the effective dose equivalent (EDE~~) and the committed effective dose equivalent (CEDE), or as the thyroid committed dose equivalent (CDE)~~. For the purpose of these IC/EALs, the dose quantity total effective dose equivalent (TEDE), as defined in 10 CFR Part 20, is used in lieu of "…sum of EDE and CEDE [committed effective dose equivalent]…."

~~The EPA PAG guidance provides for the use of adult thyroid dose conversion factors; however, some states have decided to base protective actions on child thyroid CDE.~~ Nuclear power plant ICs/EALs need to be consistent with the protective action methodologies employed by the States within their EPZs. ~~The thyroid CDE dose used in the IC and EALs should be adjusted as necessary to align with State protective action decision-making criteria.~~

The "site-specific monitor list and threshold values" should be determined with consideration of the following:

- Selection of the appropriate installed gaseous effluent monitors.
- The effluent monitor readings should correspond to a dose of 100 mrem TEDE ~~or 500 mrem thyroid CDE~~ at the "site-specific dose receptor point" (consistent with the calculation methodology employed) for one hour of exposure.
- Monitor readings will be calculated using a set of assumed meteorological data or atmospheric dispersion factors; the data or factors selected for use should be the same as those employed to calculate the monitor readings for ICs AA1 and AG1. Acceptable sources of this information include, but are not limited to, the RETS/ODCM and values used in the site's emergency dose assessment methodology.
- The calculation of monitor readings will also require use of an assumed release isotopic mix; the selected mix should be the same as that employed to calculate monitor readings for ICs AA1 and AG1. Acceptable sources of this information include, but are not limited to, the RETS/ODCM and values used in the site's emergency dose assessment methodology.
- Depending upon the methodology used to calculate the EAL values, there may be overlap of some values between different ICs. Developers will need to address this overlap by adjusting these values in a manner that ensures a logical escalation in the ECL.

The "site-specific dose receptor point" is the distance(s) and/or locations used by the licensee to distinguish between on-site and offsite doses. The selected distance(s) and/or locations should reflect the content of the emergency plan, and the procedural methodology used to determine offsite doses and Protective Action Recommendations. The variation in selected dose receptor points means there may be some differences in the distance from the release point to the calculated dose point from site to site.

Developers should research radiation monitor design documents or other information sources to ensure that 1) the EAL value being considered is within the usable response and display range of the instrument, and 2) there are no automatic features that may render the monitor reading invalid (e.g., an auto-purge feature triggered at a particular indication level).

It is recognized that the condition described by this IC may result in a radiological effluent value beyond the operating or display range of the installed effluent monitor. In those cases, EAL values should be determined with a margin sufficient to ensure that an accurate monitor reading is available. For example, an EAL monitor reading might be set at 90% to 95% of the highest accurate monitor reading. This provision notwithstanding, if the estimated/calculated monitor reading is greater than approximately 110% of the highest accurate monitor reading, then developers may choose not to include the monitor as an indication and identify an alternate EAL threshold.

Although the IC references TEDE, field survey results are generally available only as a “whole body” dose rate. For this reason, the field survey EAL specifies a “closed window” survey reading.

Indications from a real-time dose projection system are not included in the generic EALs. Many licensees do not have this capability. For those that do, the capability may not be within the scope of the plant Technical Specifications. A licensee may request to include an EAL using real-time dose projection system results; approval will be considered on a case-by-case basis.

Indications from a perimeter monitoring system are not included in the generic EALs. Many licensees do not have this capability. For those that do, these monitors may not be controlled and maintained to the same level as plant equipment, or within the scope of the plant Technical Specifications. In addition, readings may be influenced by environmental or other factors. A licensee may request to include an EAL using a perimeter monitoring system; approval will be considered on a case-by-case basis.

AG1 *(Markup-Draft)*

ECL: General Emergency

Initiating Condition: Release of gaseous radioactivity resulting in offsite dose greater than 1,000 mrem TEDE ~~or 5,000 mrem thyroid CDE~~.

Operating Mode Applicability: All

Example Emergency Action Levels: (1 or 2 or 3)

Notes:

- The Emergency Director should declare the General Emergency promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.
- If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded 15 minutes.
- If the effluent flow past an effluent monitor is known to have stopped due to actions to isolate the release path, then the effluent monitor reading is no longer valid for classification purposes.
- The pre-calculated effluent monitor values presented in EAL #1 should be used for emergency classification assessments until the results from a dose assessment using actual meteorology are available.

(1) Reading on ANY of the following radiation monitors greater than the reading shown for 15 minutes or longer:

(site-specific monitor list and threshold values)

(2) Dose assessment using actual meteorology indicates doses greater than 1,000 mrem TEDE ~~or 5,000 mrem thyroid CDE~~ at or beyond (site-specific dose receptor point).

(3) Field survey results indicate ~~**EITHER** of~~ the following at or beyond (site-specific dose receptor point):

- Closed window dose rates greater than 1,000 mR/hr expected to continue for 60 minutes or longer.
- ~~Analyses of field survey samples indicate thyroid CDE greater than 5,000 mrem for one hour of inhalation.~~

Basis:

This IC addresses a release of gaseous radioactivity that results in projected or actual offsite doses greater than or equal to the EPA Protective Action Guides (PAGs). It includes both monitored and un-monitored releases. Releases of this magnitude will require implementation of protective actions for the public.

Radiological effluent EALs are also included to provide a basis for classifying events and conditions that cannot be readily or appropriately classified on the basis of plant conditions alone. The inclusion of both plant condition and radiological effluent EALs more fully addresses the spectrum of possible accident events and conditions.

~~The TEDE dose is set at the EPA PAG of 1,000 mrem while the 5,000 mrem thyroid CDE was~~

~~established in consideration of the 1:5 ratio of the EPA PAG for TEDE and thyroid CDE.~~

Classification based on effluent monitor readings assumes that a release path to the environment is established. If the effluent flow past an effluent monitor is known to have stopped due to actions to isolate the release path, then the effluent monitor reading is no longer valid for classification purposes.

Developer Notes:

The effluent ICs/EALs are included to provide a basis for classifying events that cannot be readily classified on the basis of plant conditions alone. The inclusion of both types of ICs/EALs more fully addresses the spectrum of possible events and accidents.

While this IC may not be met absent challenges to multiple fission product barriers, it provides classification diversity and may be used to classify events that would not reach the same ECL based on plant status or the fission product matrix alone. For many of the DBAs analyzed in the Updated Final Safety Analysis Report, the discriminator will not be the number of fission product barriers challenged, but rather the amount of radioactivity released to the environment.

The EPA PAGs are expressed in terms of the sum of the effective dose equivalent (EDE) ~~and the committed effective dose equivalent (CEDE), or as the thyroid committed dose equivalent (CDE)~~. For the purpose of these IC/EALs, the dose quantity total effective dose equivalent (TEDE), as defined in 10 CFR Part 20, is used in lieu of "…sum of EDE and CEDE [committed effective dose equivalent]…."

~~The EPA PAG guidance provides for the use of adult thyroid dose conversion factors; however, some states have decided to base protective actions on child thyroid CDE.~~ Nuclear power plant ICs/EALs need to be consistent with the protective action methodologies employed by the States within their EPZs. ~~The thyroid CDE dose used in the IC and EALs should be adjusted as necessary to align with State protective action decision-making criteria.~~

The "site-specific monitor list and threshold values" should be determined with consideration of the following:

- Selection of the appropriate installed gaseous effluent monitors.
- The effluent monitor readings should correspond to a dose of 1,000 mrem TEDE ~~or 5,000 mrem thyroid CDE~~ at the "site-specific dose receptor point" (consistent with the calculation methodology employed) for one hour of exposure.
- Monitor readings will be calculated using a set of assumed meteorological data or atmospheric dispersion factors; the data or factors selected for use should be the same as those employed to calculate the monitor readings for ICs AA1 and AS1. Acceptable sources of this information include, but are not limited to, the RETS/ODCM and values used in the site's emergency dose assessment methodology.
- The calculation of monitor readings will also require use of an assumed release isotopic mix; the selected mix should be the same as that employed to calculate monitor readings for ICs AA1 and AS1. Acceptable sources of this information include, but are not limited to, the RETS/ODCM and values used in the site's emergency dose assessment methodology.
- Depending upon the methodology used to calculate the EAL values, there may be overlap of some values between different ICs. Developers will need to address this overlap by adjusting these values in a manner that ensures a logical escalation in the ECL.

The "site-specific dose receptor point" is the distance(s) and/or locations used by the licensee to distinguish between on-site and offsite doses. The selected distance(s) and/or locations

should reflect the content of the emergency plan, and procedural methodology used to determine offsite doses and Protective Action Recommendations. The variation in selected dose receptor points means there may be some differences in the distance from the release point to the calculated dose point from site to site.

Developers should research radiation monitor design documents or other information sources to ensure that 1) the EAL value being considered is within the usable response and display range of the instrument, and 2) there are no automatic features that may render the monitor reading invalid (e.g., an auto-purge feature triggered at a particular indication level).

It is recognized that the condition described by this IC may result in a radiological effluent value beyond the operating or display range of the installed effluent monitor. In those cases, EAL values should be determined with a margin sufficient to ensure that an accurate monitor reading is available. For example, an EAL monitor reading might be set at 90% to 95% of the highest accurate monitor reading. This provision notwithstanding, if the estimated/calculated monitor reading is greater than approximately 110% of the highest accurate monitor reading, then developers may choose not to include the monitor as an indication and identify an alternate EAL threshold.

Although the IC references TEDE, field survey results are generally available only as a “whole body” dose rate. For this reason, the field survey EAL specifies a “closed window” survey reading.

Indications from a real-time dose projection system are not included in the generic EALs. Many licensees do not have this capability. For those that do, the capability may not be within the scope of the plant Technical Specifications. A licensee may request to include an EAL using real-time dose projection system results; approval will be considered on a case-by-case basis.

Indications from a perimeter monitoring system are not included in the generic EALs. Many licensees do not have this capability. For those that do, these monitors may not be controlled and maintained to the same level as plant equipment, or within the scope of the plant Technical Specifications. In addition, readings may be influenced by environmental or other factors. A licensee may request to include an EAL using a perimeter monitoring system; approval will be considered on a case-by-case basis.

ECL: Alert

Initiating Condition: Release of gaseous or liquid radioactivity resulting in offsite dose greater than 10 mrem TEDE ~~or 50 mrem thyroid CDE~~.

Operating Mode Applicability: All

Example Emergency Action Levels: (1 or 2 or 3 or 4)

Notes:

- The Emergency Director should declare the Alert promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.
- If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded 15 minutes.
- If the effluent flow past an effluent monitor is known to have stopped due to actions to isolate the release path, then the effluent monitor reading is no longer valid for classification purposes.
- The pre-calculated effluent monitor values presented in EAL #1 should be used for emergency classification assessments until the results from a dose assessment using actual meteorology are available.

(1) Reading on ANY of the following radiation monitors greater than the reading shown for 15 minutes or longer:

(site-specific monitor list and threshold values)

(2) Dose assessment using actual meteorology indicates doses greater than 10 mrem TEDE ~~or 50 mrem thyroid CDE~~ at or beyond (site-specific dose receptor point).

(3) Analysis of a liquid effluent sample indicates a concentration or release rate that would result in doses greater than 10 mrem TEDE ~~or 50 mrem thyroid CDE~~ at or beyond (site-specific dose receptor point) for one hour of exposure.

(4) Field survey results indicate ~~**EITHER** of~~ the following at or beyond (site-specific dose receptor point):

- Closed window dose rates greater than 10 mR/hr expected to continue for 60 minutes or longer.
- ~~Analyses of field survey samples indicate thyroid CDE greater than 50 mrem for one hour of inhalation.~~

Basis:

This IC addresses a release of gaseous or liquid radioactivity that results in projected or actual offsite doses greater than or equal to 1% of the EPA Protective Action Guides (PAGs). It includes both monitored and un-monitored releases. Releases of this magnitude represent an actual or potential substantial degradation of the level of safety of the plant as indicated by a radiological release that significantly exceeds regulatory limits (e.g., a significant uncontrolled release).

Radiological effluent EALs are also included to provide a basis for classifying events and

conditions that cannot be readily or appropriately classified on the basis of plant conditions alone. The inclusion of both plant condition and radiological effluent EALs more fully addresses the spectrum of possible accident events and conditions.

~~The TEDE dose is set at 1% of the EPA PAG of 1,000 mrem while the 50 mrem thyroid CDE was established in consideration of the 1:5 ratio of the EPA PAG for TEDE and thyroid CDE~~.

The assessment of EAL #3 should be performed using a methodology described in (site-specific effluent release controlling document).

Classification based on effluent monitor readings assumes that a release path to the environment is established. If the effluent flow past an effluent monitor is known to have stopped due to actions to isolate the release path, then the effluent monitor reading is no longer valid for classification purposes.

Escalation of the emergency classification level would be via IC AS1.

Developer Notes:

While this IC may not be met absent challenges to one or more fission product barriers, it provides classification diversity and may be used to classify events that would not reach the same ECL based on plant status or the fission product matrix alone. For many of the DBAs analyzed in the Updated Final Safety Analysis Report, the discriminator will not be the number of fission product barriers challenged, but rather the amount of radioactivity released to the environment.

The EPA PAGs are expressed in terms of the sum of the effective dose equivalent (EDE) and the committed effective dose equivalent (CEDE)~~, or as the thyroid committed dose equivalent (CDE)~~. For the purpose of these IC/EALs, the dose quantity total effective dose equivalent (TEDE), as defined in 10 CFR § 20, is used in lieu of "…sum of EDE and CEDE.…".

~~The EPA PAG guidance provides for the use of adult thyroid dose conversion factors; however, some states have decided to base protective actions on child thyroid CDE.~~ Nuclear power plant ICs/EALs need to be consistent with the protective action methodologies employed by the States within their EPZs. ~~The thyroid CDE dose used in the IC and EALs should be adjusted as necessary to align with State protective action decision-making criteria.~~

The "site-specific monitor list and threshold values" should be determined with consideration of the following:

- Selection of the appropriate installed gaseous and liquid effluent monitors.
- The effluent monitor readings should correspond to a dose of 10 mrem TEDE ~~or 50 mrem thyroid CDE~~ at the "site-specific dose receptor point" (consistent with the calculation methodology employed) for one hour of exposure.
- Monitor readings will be calculated using a set of assumed meteorological data or atmospheric dispersion factors; the data or factors selected for use should be the same as those employed to calculate the monitor readings for ICs AS1 and AG1. Acceptable sources of this information include, but are not limited to, the RETS/ODCM and values used in the site's emergency dose assessment methodology.
- The calculation of monitor readings will also require use of an assumed release isotopic mix; the selected mix should be the same as that employed to calculate monitor readings for ICs AS1 and AG1. Acceptable sources of this information include, but are not limited to, the RETS/ODCM and values used in the site's emergency dose assessment methodology.

- Depending upon the methodology used to calculate the EAL values, there may be overlap of some values between different ICs. Developers will need to address this overlap by adjusting these values in a manner that ensures a logical escalation in the ECL.

The "site-specific dose receptor point" is the distance(s) and/or locations used by the licensee to distinguish between on-site and offsite doses. The selected distance(s) and/or locations should reflect the content of the emergency plan, and the procedural methodology used to determine offsite doses and Protective Action Recommendations. The variation in selected dose receptor points means there may be some differences in the distance from the release point to the calculated dose point from site to site.

Developers should research radiation monitor design documents or other information sources to ensure that 1) the EAL value being considered is within the usable response and display range of the instrument, and 2) there are no automatic features that may render the monitor reading invalid (e.g., an auto-purge feature triggered at a particular indication level).

It is recognized that the condition described by this IC may result in a radiological effluent value beyond the operating or display range of the installed effluent monitor. In those cases, EAL values should be determined with a margin sufficient to ensure that an accurate monitor reading is available. For example, an EAL monitor reading might be set at 90% to 95% of the highest accurate monitor reading. This provision notwithstanding, if the estimated/calculated monitor reading is greater than approximately 110% of the highest accurate monitor reading, then developers may choose not to include the monitor as an indication and identify an alternate EAL threshold.

The "site-specific effluent release controlling document" is the Radiological Effluent Technical Specifications (RETS) or, for plants that have implemented Generic Letter 89-01, the Offsite Dose Calculation Manual (ODCM). These documents implement regulations related to effluent controls (e.g., 10 CFR Part 20 and 10 CFR Part 50, Appendix I). Use of another methodology to assess EAL#3 is acceptable and, if used, should be referenced in the Basis.

Although the IC references TEDE, field survey results are generally available only as a "whole body" dose rate. For this reason, the field survey EAL specifies a "closed window" survey reading.

Indications from a real-time dose projection system are not included in the generic EALs. Many licensees do not have this capability. For those that do, the capability may not be within the scope of the plant Technical Specifications. A licensee may request to include an EAL using real-time dose projection system results; approval will be considered on a case-by-case basis.

Indications from a perimeter monitoring system are not included in the generic EALs. Many licensees do not have this capability. For those that do, these monitors may not be controlled and maintained to the same level as plant equipment, or within the scope of the plant Technical Specifications. In addition, readings may be influenced by environmental or other factors. A licensee may request to include an EAL using a perimeter monitoring system; approval will be considered on a case-by-case basis.