

Sub-Element 2.a—Emergency Worker Exposure Control

<p>What the Policy Says</p>	<p>Intent This sub-element derives from NUREG-0654, which provides that OROs have the capability to assess and control the radiation exposure received by emergency workers and have a decision chain in place, as specified in the ORO's plans and procedures, to authorize emergency worker exposure limits to be exceeded for specific missions.</p> <p>Radiation exposure limits for emergency workers are the recommended accumulated dose limits or exposure rates that emergency workers may be permitted to incur during an emergency. These limits include any pre-established administrative reporting limits (that take into consideration Total Effective Dose Equivalent or organ-specific limits) identified in the ORO's plans and procedures.</p> <p>Criterion 2.a.1: OROs use a decision-making process, considering relevant factors and appropriate coordination, to ensure that an exposure control system, including the use of KI, is in place for emergency workers including provisions to authorize radiation exposure in excess of administrative limits or protective action guides. (NUREG-0654, K.4, J.10. e, f).</p> <p>Minimum Frequency Criterion 2.a.1 is to be evaluated every exercise.</p> <p>Extent of Play ORO's authorized to send emergency workers into the plume exposure pathway EPZ should demonstrate a capability to meet the criterion based on their emergency plans and procedures.</p> <p>Responsible OROs should demonstrate the capability to make decisions concerning the authorization of exposure levels in excess of pre-authorized levels and to the number of emergency workers receiving radiation dose above pre-authorized levels.</p> <p>As appropriate, OROs should demonstrate the capability to make decisions on the distribution and administration of KI as a protective measure, based on the ORO's plan and/or procedures or projected thyroid dose compared with the established Protective Action Guides (PAGs) for KI administration.</p> <p>All activities must be based on the ORO's plans and procedures and completed as they would be in an actual emergency, unless noted above or otherwise indicated in the Extent of Play agreement.</p>
------------------------------------	--

<p>Preparing to Evaluate This Criterion</p>	<p>Before the exercise, determine, according to the ORO's plan/procedures and the Extent of Play agreement:</p> <ul style="list-style-type: none"> • Who will authorize exposure levels to emergency workers in excess of pre-authorized levels? • What approach has been used to correct DRD readings to the correct Total Effective Dose Equivalent (TEDE) (e.g., the dosimeter correction factor)? • Who makes the decision to authorize KI (for emergency workers, institutionalized, etc.) to be taken?
<p>During the Exercise</p>	<p>During the exercise, in addition to evaluating activities related to the items listed above, be sure to:</p> <ul style="list-style-type: none"> • Observe whether decision-makers considered projected doses and likely exposure rate patterns before dispatching workers into the Emergency Planning Zone (EPZ). • Note whether the decision-makers considered: <ul style="list-style-type: none"> ➤ Alternate entry and exit routes, ➤ Potential changes in meteorological conditions, ➤ Areas or roads to be avoided, ➤ What to do in the event of equipment and vehicle failure, and ➤ Previous exposure(s) of personnel. • Note whether the decision to use KI was based on projected thyroid dose compared with the established Protective Action Guides (PAGs) for KI administration. • Note if the KI decision-making process involved close coordination among assessment and decision-making staff. • Document that the correct dosimeter correction factor was used.

**Sub-Element 2.b—Radiological Assessment and Protective Action
Recommendations and Decisions for the Plume Phase of the Emergency**

<p>What the Policy Says</p>	<p>Intent NUREG-0654 provides that OROs have the capability to use all available data to independently project integrated dose and compare the estimated dose savings with the protective action guides. OROs have the capability to choose, among a range of protective actions, those most appropriate in a given emergency situation. OROs base these choices on PAGs from the ORO's plans and procedures or EPA 400-R-92-001 and other criteria, such as, plant conditions, licensee protective action recommendations, coordination of protective action decisions with other political jurisdictions (for example, other affected OROs), availability of appropriate in-place shelter, weather conditions, and situations that create higher than normal risk from evacuation.</p> <p>Minimum Frequency Criteria 2.b.1 and 2.b.2 are to be evaluated every exercise.</p> <p>Criterion 2.b.1: Appropriate protective action recommendations are based on available information on plant conditions, field monitoring data, and licensee and ORO dose projections, as well as knowledge of onsite and offsite environmental conditions. (NUREG-0654, I.8, 10 and Supplement 3).</p> <p>Extent of Play ORO's authorized to send emergency workers into the plume exposure pathway EPZ should demonstrate a capability to meet the criterion based on their emergency plans and procedures.</p> <p>Responsible OROs should demonstrate the capability to make decisions concerning the authorization of exposure levels in excess of pre-authorized levels and to the number of emergency workers receiving radiation dose above pre-authorized levels.</p> <p>As appropriate, OROs should demonstrate the capability to make decisions on the distribution and administration of KI as a protective measure, based on the ORO's plan and/or procedures or projected thyroid dose compared with the established Protective Action Guides (PAGs) for KI administration.</p> <p>All activities must be based on the ORO's plans and procedures and completed as they would be in an actual emergency, unless noted above or otherwise indicated in the Extent of Play agreement.</p>
------------------------------------	--

<p>What the Policy Says</p>	<p>Criterion 2.b.2: A decision-making process involving consideration of appropriate factors and necessary coordination is used to make protective action decisions (PAD) for the general public (including the recommendation for the use of KI, if ORO policy). (NUREG-0654, J.9, 10.f, m).</p> <p>Extent of Play OROs should have the capability to make both initial and subsequent PADs. They should demonstrate the capability to make initial PADs in a timely manner appropriate to the situation, based on notification from the licensee, assessment of plant status and releases, and PARs from the utility and ORO staff. The dose assessment personnel may provide additional PARs based on the subsequent dose projections, field monitoring data, or information on plant conditions. The decision-makers should demonstrate the capability to change protective actions as appropriate based on these projections.</p> <p>If the ORO has determined that KI will be used as a protective measure for the general public under offsite plans, then the ORO should demonstrate the capability to make decisions on the distribution and administration of KI as a protective measure for the general public to supplement sheltering and evacuation. This decision should be based on the ORO's plan and/or procedures or projected thyroid dose compared with the established PAG for KI administration. The KI decision-making process should involve close coordination with appropriate assessment and decision-making staff.</p> <p>If more than one ORO is involved in decision-making, OROs should communicate and coordinate PADs with affected OROs. OROs should demonstrate the capability to communicate the contents of decisions to the affected jurisdictions.</p> <p>All decision-making activities by ORO personnel must be performed based on the ORO's plans and procedures and completed as they would be in an actual emergency, unless noted above or otherwise indicated in the Extent of Play agreement.</p>
------------------------------------	--

<p>Preparing to Evaluate These Criteria</p>	<p>Before the exercise, determine, according to the ORO's plan/procedures and the Extent of Play agreement:</p> <p>Criterion 2.b.1</p> <ul style="list-style-type: none"> • Who (identify by title and organization) develops Protective Action Recommendations (PARs)? • Are PARs based on dose projections? • Does the ORO develop or independently validate dose projections? • Does the ORO calculate projected dose, including quantities and units that are the same as the PAGs to which they will be compared? • Who (identify by title and organization) transmits PARs to decision-makers? <p>Criterion 2.b.2</p> <ul style="list-style-type: none"> • Who (identify by title and organization) makes Protective Action Decisions? • Is the use of KI for the general public specified? If so, who makes this decision? • How is the general public notified to ingest KI, if applicable? • Do PADs need to be coordinated with other jurisdictions?
<p>During the Exercise</p>	<p>During the exercise, in addition to evaluating activities related to the items listed above, be sure to:</p> <p>Criterion 2.b.1</p> <ul style="list-style-type: none"> • Note whether PARs were developed based on, for example: <ul style="list-style-type: none"> ➢ Information/recommendations from the licensee (plant), ➢ Field monitoring data, ➢ Release data, and/or ➢ Meteorological data. • Note whether differences in dose projection greater than a factor of ten were discussed with the licensee. If so, were the differences resolved and considered in the PAR? • Observe whether changes were made to the PARs. If so, note times of the changes and document on what basis changes were made (e.g., field monitoring data, exposure rates, release data, meteorological data). • Observe whether the plume location was plotted on a map on the basis of monitoring data received by the ORO. • Note if the PARs were coordinated with other political jurisdictions (e.g., other affected OROs). <p>Criterion 2.b.2</p> <ul style="list-style-type: none"> • Note whether initial PADs are made based on: <ul style="list-style-type: none"> ➢ Notification from the licensee, ➢ Assessment of plant conditions and/or radiological releases, or ➢ PARs from the utility and ORO staff (dose assessment group). • Note whether the subsequent PADs are made based on: <ul style="list-style-type: none"> ➢ Subsequent dose projections, ➢ Field monitoring data, or ➢ Information on plant conditions. • Evaluate the decision-maker(s) capability to change protective actions as appropriate based on new information. • Follow the KI decision-making process. Did the decision require coordination with assessment and decision-making staff and was it based on projected thyroid dose compared with the established PAG. • Note how KI information was provided to those who needed to take it. Evaluate message content for timeliness and clarity on KI instructions.

Sub-Element 2.c—Protective Action Decisions for the Protection of Special Populations

What the Policy Says	<p>Intent NUREG-0654 provides that OROs should have the capability to determine protective action recommendations, including evacuation, sheltering and use of potassium iodide (KI), if applicable, for special population groups (for example, hospitals, nursing homes, correctional facilities, schools, licensed day care centers, mobility impaired individuals, and transportation dependent individuals). Focus is on those special population groups that are (or potentially will be) affected by a radiological release from a nuclear power plant.</p> <p>Criterion 2.c.1: Protective action decisions are made, as appropriate, for special population groups. (NUREG-0654, J.9, J.10.d, e).</p> <p>Minimum Frequency Criterion 2.c.1 is to be evaluated every exercise.</p> <p>Extent of Play Usually, it is appropriate to implement evacuation in areas where doses are projected to exceed the lower end of the range of PAGs, except for situations where there is a high-risk environment or where high-risk groups (for example, the immobile or infirm) are involved. In these cases, examples of factors that should be considered are: weather conditions, shelter availability, availability of transportation assets, risk of evacuation versus risk from the avoided dose, and precautionary school evacuations. In situations where an institutionalized population cannot be evacuated, the administration of KI should be considered by the OROs.</p> <p>Applicable OROs should demonstrate the capability to alert and notify all public school systems/districts of emergency conditions that are expected to or may necessitate protective actions for students. Contacts with public school systems/districts must be actual.</p> <p>In accordance with plans and/or procedures, OROs and/or officials of public school systems/districts should demonstrate the capability to make prompt decisions on protective actions for students. Officials should demonstrate that the decision making process for protective actions considers (that is, either accepts automatically or gives heavy weight to) protective action recommendations made by ORO personnel, the ECL at which these recommendations are received, preplanned strategies for protective actions for that ECL, and the location of students at the time (for example, whether the students are still at home, en route to the school, or at the school)."</p> <p>All decision-making activities associated with protective actions, including consideration of available resources, for special population groups must be based on the ORO's plans and procedures and completed as they would be in an actual emergency, unless noted above or otherwise indicated in the Extent of Play agreement.</p>
-----------------------------	--

<p>Preparing to Evaluate This Criterion</p>	<p>Before the exercise, determine, according to the ORO's plan/procedures and the Extent of Play agreement:</p> <ul style="list-style-type: none"> • Are the special populations considered part of the general population or are protective action decisions made for any special populations only? • Who (identify by title and organization) will make the protective action decision for special populations? • What factors will be considered when making protective action decisions for special populations? • What types of special needs facilities are within the affected area for your evaluation location? • What types of special populations are in the affected area of the EPZ for your evaluation location? • Review scenario material; identify what areas will be affected by the plume? • What types of protective actions do the plans/procedures indicate could be decided for special populations?
<p>During the Exercise</p>	<p>During the exercise, in addition to evaluating activities related to the items listed above, be sure to:</p> <ul style="list-style-type: none"> • Note what PADs are made for special populations, including schools, e.g.: <ul style="list-style-type: none"> ➤ Evacuation, ➤ Shelter-in-Place, ➤ Administration of KI, ➤ Precautionary Evacuations. • Note the time of the protective action decision (or precautionary protective action decision), its implementation, and who made it. • If there was a delay in making the decision, document what the delay was. • Note the organization/title of the individual who makes the PADs for special populations. • Note whether decisions for school children were based on: <ul style="list-style-type: none"> ➤ ORO recommendation, ➤ ECL at time of notification, ➤ School plans, ➤ Location of students, and/or ➤ Time of day. • Note the basis of the PADs for other special populations, e.g.: <ul style="list-style-type: none"> ➤ Emergency Classification Level (ECL) ➤ Weather conditions, ➤ Shelter availability, ➤ Availability of transportation assets ➤ Availability of alternate locations for special populations, ➤ Risk of evacuation vs. risk from avoided dose.

Sub-Element 2.d—Radiological Assessment and Decisionmaking for the Ingestion Exposure Pathway

What the Policy Says	<p>Intent NUREG-0654 provides that OROs should have the means to assess the radiological consequences for the ingestion exposure pathway, relate them to the appropriate PAGs, and make timely, appropriate protective action decisions to mitigate exposure from the ingestion pathway.</p> <p>During an accident at a nuclear power plant, a release of radioactive material may contaminate water supplies and agricultural products in the surrounding areas. Any such contamination would likely occur during the plume phase of the accident and, depending on the nature of the release, could impact the ingestion pathway for weeks or years.</p> <p>Criterion 2.d.1: Radiological consequences for the ingestion pathway are assessed and appropriate protective action decisions are made based on the ORO's planning criteria. (NUREG-0654, J.9, J.11).</p> <p>Minimum Frequency Criterion 2.d.1 is to be evaluated once in 6 years. The plume phase and the post-plume phase (ingestion, relocation, re-entry, and return) can be demonstrated separately.</p> <p>Extent of Play We expect that the Offsite Response Organizations (ORO) will take precautionary actions to protect food and water supplies, or to minimize exposure to potentially contaminated water and food, in accordance with their respective plans and procedures. Often such precautionary actions are initiated by the OROs based on criteria related to the facility's Emergency Classification Levels (ECL). Such actions may include recommendations to place milk animals on stored feed and to use protected water supplies.</p> <p>The ORO should use its procedures (for example, development of a sampling plan) to assess the radiological consequences of a release on the food and water supplies. The ORO's assessment should include the evaluation of the radiological analyses of representative samples of water, food, and other ingestible substances of local interest from potentially impacted areas, the characterization of the releases from the facility, and the extent of areas potentially impacted by the release. During this assessment, OROs should consider the use of agricultural and watershed data within the 50-mile EPZ.</p> <p>The radiological impacts on the food and water should then be compared to the appropriate ingestion PAGs contained in the ORO's plan and/or procedures. (The plan and/or procedures may contain PAGs based on specific dose commitment criteria or based on criteria as recommended by current Food and Drug Administration guidance.) Timely and appropriate recommendations should be provided to the ORO decision-makers group for implementation decisions. As time permits, the ORO may also include a comparison of taking or not taking a given action on the resultant ingestion pathway dose commitments.</p>
-----------------------------	--

	<p>The ORO should demonstrate timely decisions to minimize radiological impacts from the ingestion pathway, based on the given assessments and other information available. Any such decisions should be communicated and, to the extent practical, coordinated with neighboring and local OROs.</p> <p>OROs should use Federal resources, as identified in the Federal Radiological Emergency Response Plan (FRERP), and other resources (for example, compacts, nuclear insurers, etc.), if available. Evaluation of this criterion will take into consideration the level of Federal and other resources participating.</p> <p>All activities must be based on the ORO's plans and procedures and completed as they would be in an actual emergency, unless noted above or otherwise indicated in the Extent of Play agreement.</p>
<p>Preparing to Evaluate This Criterion</p>	<p>Before the exercise, determine, according to the ORO's plan/procedures and the Extent of Play agreement:</p> <ul style="list-style-type: none"> • Who (identify by title and organization) has the authority to make decisions in the ingestion exposure pathway? • Are the decision makers and the dose assessment staff located in the same facility? If not, arrange with another evaluator so that both parts of the criterion can be observed (and ensure that the Team Leader is aware of the arrangement). • What precautionary actions are considered before any analytical result is available on contamination levels in food or water? When, and on what basis are decisions made to implement precautionary actions? • How are the boundaries of any temporary embargo zones determined, if this approach is contemplated? • What laboratory provides testing for radionuclide concentrations in edible food or water? • Does the dose assessment staff compare analytical results with pre-determined Derived Intervention Levels (DILs) or are dose projections made based on the analytical results? If the latter, what assumptions are made with respect to; fraction of the diet assumed to be contaminated, quantity consumed, consumption period, dose conversion factors, and decay corrections. • Are the pre-determined DILs the same as the 1998 Food and Drug Administration (FDA) DILs? If not what are the differences? • What projected dose or doses are used to decide if protective actions are warranted? If other than the FDA PAGs (DILs as a surrogate) are used, what rationale is given for other decision criteria? • What are the options described for potential protective actions in the ingestion exposure pathway? • What arrangements are made to coordinate potential decisions with other political jurisdictions, if necessary? • What is the appropriate coordination between decision makers, if more than one individual has jurisdiction? • Are representatives from Nuclear Insurers going to play in the exercise and address compensation for loss of goods?

During the Exercise	During the exercise, in addition to evaluating activities related to the items listed above, be sure to: <ul style="list-style-type: none">• Note times for all decisions including precautionary actions.• Observe all coordination activities between decision makers and technical staff.• Obtain copies of all;<ul style="list-style-type: none">➤ Laboratory data input (real or controller injected)➤ Calculations➤ Maps or descriptions of impacted areas➤ Formal recommendations made to decision makers
----------------------------	---

Sub-Element 2.e—Radiological Assessment and Decisionmaking Concerning Relocation, Reentry, and Return

<p>What the Policy Says</p>	<p>Intent NUREG-0654 provides that OROs should have the capability to make decisions on relocation, re-entry, and return of the general public. These decisions are essential for the protection of the public from the direct long-term exposure to deposited radioactive materials from a severe accident at a nuclear power plant.</p> <p>Criterion 2.e.1: Timely relocation, re-entry, and return decisions are made and coordinated as appropriate, based on assessments of the radiological conditions and criteria in the ORO's plan and/or procedures. (NUREG-0654, I.10; J.9; M.1).</p> <p>Minimum Frequency Criterion 2.e.1 is to be evaluated once in 6 years. The plume phase and the post-plume phase (ingestion, relocation, re-entry, and return) can be demonstrated separately.</p> <p>Extent of Play</p> <p>Relocation: OROs should demonstrate the capability to estimate integrated dose in contaminated areas and to compare these estimates with PAGs, apply decision criteria for relocation of those individuals in the general public who have not been evacuated but where projected doses are in excess of relocation PAGs, and control access to evacuated and restricted areas. Decisions are made for relocating members of the evacuated public who lived in areas that now have residual radiation levels in excess of the PAGs. Determination of areas to be restricted should be based on factors such as the mix of radionuclides in deposited materials, calculated exposure rates versus the PAGs, and field samples of vegetation and soil analyses.</p> <p>Re-entry: Decisions should be made regarding the location of control points and policies regarding access and exposure control for emergency workers and members of the general public who need to enter the evacuated area temporarily to perform specific tasks or missions.</p> <p>Examples of control procedures are: the assignment of, or checking for, direct-reading and non-direct-reading dosimetry for emergency workers; questions regarding the individual's objectives and locations expected to be visited and associated time frames; availability of maps and plots of radiation exposure rates; advice on areas to avoid; and procedures for exit including: monitoring of individuals, vehicles, and equipment; decision criteria regarding decontamination; and proper disposition of emergency worker dosimetry and maintenance of emergency worker radiation exposure records.</p>
------------------------------------	--

	<p>Responsible OROs should demonstrate the capability to develop a strategy for authorized re-entry of individuals into the restricted zone, based on established decision criteria. OROs should demonstrate the capability to modify those policies for security purposes (for example, police patrols), for maintenance of essential services (for example, fire protection and utilities), and for other critical functions. They should demonstrate the capability to use decisionmaking criteria in allowing access to the restricted zone by the public for various reasons, such as to maintain property (for example, to care for farm animals or secure machinery for storage), or to retrieve important possessions.</p> <p>Coordinated policies for access and exposure control should be developed among all agencies with roles to perform in the restricted zone. OROs should demonstrate the capability to establish policies for provision of dosimetry to all individuals allowed to re-enter the restricted zone. The extent that OROs need to develop policies on re-entry will be determined by scenario events.</p> <p>Return: Decisions are to be based on environmental data and political boundaries or physical/geological features, which allow identification of the boundaries of areas to which members of the general public may return. Return is permitted to the boundary of the restricted area that is based on the relocation PAG.</p> <p>Other factors that the ORO should consider are, for example: conditions that permit the cancellation of the Emergency Classification Level and the relaxation of associated restrictive measures; basing return recommendations (that is, permitting populations that were previously evacuated to reoccupy their homes and businesses on an unrestricted basis) on measurements of radiation from ground deposition; and the capability to identify services and facilities that require restoration within a few days and to identify the procedures and resources for their restoration. Examples of these services and facilities are: medical and social services, utilities, roads, schools, and intermediate term housing for relocated persons.</p>
<p>Preparing to Evaluate This Criterion</p>	<p>Before the exercise, determine, according to the ORO's plan/procedures and the Extent of Play agreement:</p> <p>Relocation:</p> <ul style="list-style-type: none"> • Is there a description of a procedure to estimate integrated dose in contaminated areas and compare it to the PAGs? • Is there a description of how areas to be restricted are determined based on the following factors: <ul style="list-style-type: none"> ➢ The mix of radionuclides in deposited materials, ➢ Calculated exposure rates vs. the PAGs, and ➢ Field samples of vegetation and soil analyses? • Does the plan use the optional approach (230 µR/hr) to determine the restricted area boundary? • Is there provision to relocate those who reside in areas where the projected dose is in excess of relocation PAGs? • Is there a procedure to control access to evacuated and restricted areas and what agencies have that responsibility?

	<p>Re-entry:</p> <ul style="list-style-type: none">• Is there a description of how to develop a coordinated strategy for authorized re-entry of individuals to the restricted zone? In this description, is consideration given to:<ul style="list-style-type: none">➤ Established exposure limits,➤ Maintenance of essential services (e.g., fire protection, utilities),➤ Security needs (e.g., police patrols),➤ Maintenance of property (e.g., care for farm animals), and➤ Retrieval of important possessions?• Is there a procedure for controlling the exposure of workers and members of the general public who temporarily re-enter the restricted zone(s)?• Does the procedure for exposure control include:<ul style="list-style-type: none">➤ Provisions for direct-reading dosimeters and non direct-reading dosimeters to individuals and/or their escorts entering the restricted zone,➤ Ascertaining where workers and members of the public are going, why and for how long,➤ Provision of maps and plots of radiation exposure rates, and➤ Advising workers and members of the public on which areas to avoid?• Is there a description of how to develop exit procedures, including:<ul style="list-style-type: none">➤ Monitoring of individuals, vehicles and equipment,➤ Decision criteria for decontamination, and➤ Disposition of dosimeters and maintenance of the re-entry radiation exposure records of workers and members of the public who re-entered. <p>Return:</p> <ul style="list-style-type: none">• Is it indicated that return is permitted to the boundary of the restricted area(s) based on:<ul style="list-style-type: none">➤ The relocation PAG,➤ Changing conditions (e.g., cancellation of the ECL, relaxation of restrictive measures, change in measurements of radiation from ground deposition), and/or➤ Restoration of services and facilities (e.g., medical and social services, utilities, roads, and schools)?
--	---

During the Exercise	<p>During the exercise, in addition to evaluating activities related to the items listed above, be sure to:</p> <ul style="list-style-type: none">• Document how the ORO determined the area(s) to be restricted.• Note what the ORO does to control access to restricted areas.• Note the exposure limits, including the time period over which the dose would accumulate.• Document how the ORO determined who should be allowed to re-enter the restricted zone, and what provisions were made to determine and control their exposure. Where and to whom were dosimeters and exposure record cards to be turned in?• Document how the ORO provided for exit from the restricted area, including monitoring of persons, vehicles and equipment.• Note what the decision to allow people to return to the boundaries of the restricted area was based on.• Note if implementation of the decision was supported by restoration of services and facilities, such as:<ul style="list-style-type: none">➤ Decontamination of hot spots, if necessary,➤ Utilities,➤ Food stores and restaurants reopened,➤ Hospitals restaffed and reopened, and➤ Schools reopened.• Is there a procedure for providing medical and social assistance for relocated individuals?
----------------------------	---