

2001 RATIONALE FOR PART P

CONTINGENCY PLANNING FOR RESPONSE TO RADIOACTIVE MATERIAL EMERGENCIES

Introduction

Part P provides for preparedness and response to events involving actual or potential release of radioactive material by specifying the content and exercise of a licensee contingency plan. Certain licensees are required to evaluate and prepare to respond to any release of radioactive material in an accident.

By addition of this Part P, the requirements for immediate containment, rescue, notifications, and securing the scene of an event are now located separate from Part C (Licensing of Radioactive Material) in the *Suggested State Regulations for Control of Radiation* (SSRCR) of the Conference of Radiation Control Program Directors (CRCPD).

The U.S. Nuclear Regulatory Commission regulations upon which Part P is based--in particular 10 CFR 30.4, 30.32(i), 30.72 Schedule C, 40.31(i), 40.31(j), 40.34(f) & 70.22(i)--were published by April 7, 1989 (54 FR 14051), *Emergency Preparedness for Fuel Cycle and Other Radioactive Material Licenses* (10 CFR parts 30, 40, and 70), effective April 7, 1990. The U. S. Nuclear Regulatory Commission considers their adoption a matter of compatibility for an Agreement State. CRCPD considers these regulations essential to a Naturally Occurring and Accelerator Produced Radioactive Material (NARM) Licensing State. Cognizance was also taken of the June 22, 1995 (60 FR 32430-32442), *Emergency Planning Licensing Requirements for Independent Spent Fuel Storage Facilities (ISFSI) and Monitored Retrievable Storage Facilities (MRS)*, 10 CFR Part 72, Final Rule.

General

The purpose of Part P stated in Section P.1 is for a licensee to be prepared to respond to an event involving actual or potential release of radioactive material.

The term "Contingency" in the title of Part P emphasizes planning and preparedness to respond to multiple eventualities. An effort was made to achieve consistency with response planning and practices between and among multiple types of radiological, and also nonradiological, preparedness and response perspectives, including that of the International Atomic Energy Agency and under the Comprehensive Environmental Response, Compensation and Liability Act as implemented by the U.S. Environmental Protection Agency and the State agencies.

Decisions to include or exclude certain detailed provisions of this part were based primarily on the peer review recommendations of CRCPD Committee E-6, Emergency Response Planning.

Key definitions are provided in Section P.3. For clarity of definition in Part P, reliance was placed upon

NUREG-1140, *A Regulatory Analysis on Emergency Preparedness for Fuel Cycle and Other Radioactive Material Licensees* (January 1988). The U.S. Environmental Protection Agency, Federal Emergency Management Administration, U.S. Department of Energy and U.S. Department of Transportation also have significant roles in emergency preparedness. Some Part P definitions are based on EPA 400-R-92-001, *Manual of Protective Action Guides and Protective Actions for Nuclear Incidents*, May 1992. In addition, cognizance was taken of the relevant International Atomic Energy Agency (IAEA) guides, including the International Nuclear Event Scale for prompt communication of safety significance and IAEA Safety Series I, numbers 115 and 109.

As prescribed by P.4, a license application must either (1) provide a contingency plan for responding to any accident in which specified quantities of radioactive material (Appendix A to Part P) could be released from the licensed site or (2) show that 0.01 Sievert (1 rem) total effective dose equivalent or 0.05 Sievert (5 rems) to the thyroid will not be exceeded by any accident. The applicant's dose calculation may take into account the factors in Section P.5.

The applicant's contingency plan must contain the information in Sections P.6a. through P.6l. Section P.7 requires comment on the contingency plan to be solicited from offsite response organizations including, but not limited to, local fire, police, ambulance and hospital services.

Section P.8 relates Part P to the public information requirements of the *Emergency Planning and Community Right-to-Know Act of 1986*, Title III, Pub. L. 99-499, pertaining to hazardous materials. Sections P.9 and P.10 specify required training, drills and exercises.

Section P.11 specifies what must be done in cases when the plan is put into action. Section P.12 specifies how often the contingency plan is to be revised and how revision is to be done. Section P.13 contains recordkeeping requirements.

This Part was based upon existing US Nuclear Regulatory Commission and state regulations (AR indicates Arkansas, CO indicates Colorado, and IL indicates Illinois). Wording was used for some provisions from AR RH-403g, adopted August 15, 1990, CO 3.9.11, effective January 1, 1994, and IL 330.500.

Part P is not intended to regulate radioactive material "in transport". See 49 CFR 172.600-604, in particular 49 CFR 172.602. Part P may relate to a licensed shipper or a facility with potential responsibility for an offsite radioactive material transportation accident.

Specific Provisions

Section P.1 - Purpose. Part P specifies requirements on a licensee for accidents only. The relationship of "accident" and "incident" is that in the International Basic Safety Standards and International Atomic Energy Agency International Nuclear Event Scale. This is reflected in P.2b. and later in Part P. The key distinction between accident and incident is whether a public dose limit is likely to be exceeded or not. The International Atomic Energy Agency usage fits a wider range of licensees than United States government agency usages and is more self-consistent and less confusing. The International Atomic Energy Agency usage differs semantically from (1) the use of the word "incident" in reporting abnormal occurrences and also (2) the fixed facility definition

of “nuclear incident” (EPA 400-R-92-001, p. 1-1), which includes “accidents”, both “deliberate or accidental” releases, and the possibility of release “in sufficient quantity to warrant consideration of protective actions” (EPA 400-R-92-001, p. 1-1 & A-2).

Section P.3 - Definitions. The definitions in Part P have been judiciously crafted for clarity in their application by state radiation control staff. For example, some planners use a definition of “abnormal exposure condition”, defined as when a source, or the radiation from it, is not under control. The Part P definitions do not include abnormal exposure or potential exposure in order to avoid the multiple and often confusing meanings of “exposure” in radiation protection and hazardous material regulation.

As used in this Part, “accident” is defined (1) semi-quantitatively in relation to public dose in excess of regulatory limits (consonant with both 10 CFR and the International Atomic Energy Agency), then (2) also in relation to consequences of the unintended event and whether facility protection or safety are degraded. The phrase “in sufficient quantity to warrant consideration of protective actions” is from the definition of a “nuclear incident” in EPA 400-R-92-001.

Some definitions of “accident” refer to the loss of normal control of a source. This is not included in Part P. Some definitions include “loss” of radioactive material. For Part P, “release” is sufficient.

Other phrases considered but not included in the definition of “accident” were: “unauthorized release of radioactive material due to human error or negligence, system failure, an act of God, or defective components”, as well as theft.

Although NRC does not specifically define “accident”, it does list classifications of accidents as being alerts or site area emergencies, for example, 10 CFR §30.32h(3)(iii).

The definition of alert is essentially identical to 10 CFR §30.4, which says alert means events may occur, are in progress, or have occurred that could lead to a release of radioactive material but that the release is not expected to require a response by offsite response organizations to protect persons offsite. The preferred singular “event” is used for definiteness and enforceability, rather than plural “events”.

CRCPD proposed a similar definition, enhanced slightly. CRCPD proposed that “alert” be defined to mean an accident has occurred, is in progress, or is imminent which involves actual or potential degradation of the level of safety of the facility and requires response, possibly including that off-duty staff of the facility or offsite response organizations report to duty stations. During an alert, the potential release of radioactive material is not expected to require a response by offsite response organizations to protect persons offsite unless the situation becomes more serious. The phrase “may occur” is too general and isn’t time-bound, so the word “imminent” is used. The references to “off-duty staff” and “duty stations” help make very clear the distinction between “alert” and “site area emergency”.

NRC found the proposed Part P definition to be sufficiently different from 10 CFR §30.4 that it may cause confusion. The differences cited are the additional information provided (type of on-site and off-site response and “unless the situation becomes more serious”). NRC staff believed this information best provided in guidance. The U.S. Nuclear Regulatory Commission stated in a June 12, 2000 letter that the definition should

be essentially identical to meet compatibility category A, as defined in Office of State and Tribal Programs (STP) Procedure SA-200.

A definition of “emergency” is added in the sense of EPA 400-R-92-001 (danger to life and property).

The definition of “Emergency Planning Zone” is from federal guides.

The definition of “evacuation” is from EPA 400-R-92-001, p. A-1.

The definition of “event” is meant to be general.

The definition of “exercise” is from federal guides.

A definition of “facility” or “fixed facility” is not included at this time.

A definition of “general emergency” is added in brackets. This would possibly apply in a state evaluating an irradiator facility accident or fire at a radiopharmaceutical laboratory and if a state were to at some future time regulate certain U.S. Department of Energy facilities. The 1989 and 1995 U.S. Nuclear Regulatory Commission NUREG documents and Federal Register notices upon which Part P is based do not anticipate this class of response for non-nuclear-power-plant licenses.

NRC in its June 12, 2000 letter to CRCPCD cites the Statements of Consideration for the NRC emergency plan rule (54 FR 14054, April 7, 1989), based on NUREG-1140:

“For nuclear power plants, a general emergency means there is a possibility of very large releases that could cause acute radiation effects miles from the plant. Neither releases nor doses of those magnitudes could result from accidents at fuel cycle or other radioactive materials facilities. Therefore, the general emergency class is not used for these facilities.”

States are advised to consider this premise in deciding whether to include or exclude the bracketed definition of “general emergency”.

A definition of “immediate” is included (“15 minutes” is from NUREG-0654), with provision for flexibility.

A definition of “incident” as used internationally is included. Incident is not used at this time in any regulatory requirement of Part P. NRC in its June 12, 2000 letter to CRCPCD suggested that use of the term “incident” has the potential to cause confusion on the part of licensees. “Incident” is not used in NRC regulations. NRC recognizes that the way Part P distinguishes “incident” from “accident”, only an event at level of significance to safety higher than an incident, that is, an alert or site area emergency, requires a contingency plan. Reference to “incident” is deleted from P.6e. to avoid confusion.

The definition of “offsite response organizations” is taken from wording in 60 FR 32430-32442, modified by replacing “for example” with “including, but not limited to,” and replacing “medical” with “ambulance and hospital services”.

The definition of “projected dose” is from EPA 400-R-92-001, p. A-2.

The definition of “protective action” is from 10 CFR. For comparison, the definition in EPA 400-R-92-001, p. A-2, is: “An activity conducted in response to an incident or potential incident to avoid or reduce radiation dose to members of the public (sometimes called a protective measure)”.

The definition of “protective action guide” is condensed from EPA 400-R-92-001, p. A-3, which has: “The projected dose to reference man, or other defined individual, from an accidental release of radioactive material at which a specific protective action to reduce or avoid that dose is warranted.”

The definition of “relocation” is from EPA 400-R-92-001, p. A-3.

The definition of “sheltering” is from EPA 400-R-92-001, p. A-3.

The definition of “site” is generically adapted from state radiation regulations (e.g. CO ‘1.4). It includes the term “restricted area”, which is defined in Part A, and also includes a sub-definition of site boundary. which is from 10 CFR §20.1003.

The definition of “site area emergency” is essentially identical to 10 CFR §30.4 which says site area emergency means events may occur, are in progress, or have occurred that could lead to a significant release of radioactive material and that could require a response by offsite response organizations to protect persons offsite. The preferred singular “event” is used for definiteness and enforceability, rather than plural “events”.

CRCPD proposed a similar definition, enhanced slightly. CRCPD proposed that “site area emergency” be defined to mean that an accident has occurred, is in progress, or is imminent which involves actual or probable major failures of facility functions needed for the protection of the public. A site area emergency will require contact with offsite response organizations to protect persons offsite.

NRC found the proposed Part P definition to be sufficiently different from 10 CFR §30.4 that it needs to meet compatibility category A, as designated in Office of State and Tribal Programs (STP) Procedure SA-200. NRC’s definition is said (June 12, 2000 letter) to set the threshold for a site area emergency at events that could lead to a significant release and could require a response by offsite response organizations to protect persons off-site. NRC interprets the Part P definition to use a higher threshold than the NRC’s “could require” contact with off-site response organizations to protect persons off-site, with the result that a site area emergency is declared sooner by NRC. A site area emergency is declared sooner by the licensee under NRC regulations.

Section P.4 - Dose Evaluation and Contingency Planning. A 10 mSv effective dose equivalent is used, consistent with the U.S. Nuclear Regulatory Commission administrative threshold to determine whether a contingency plan is required. AR uses 5 mSv. “Projected dose” is “in the absence of protective actions”, thus, the 10 mSv administrative level (10 times the 10 CFR Part 20 annual limit for an individual member of the public) is in part because in practice (1) actual dose may well be less than 1 mSv and (2) the plan is to prepare

(and help prevent) a potential as well as an actual accident. For IAEA, “accident” is at the prescribed public total effective dose equivalent limit, while “incident” is 0.1 of the total effective dose equivalent limit for a member of the public.

Since Appendix A, footnote 1, provides for combinations of materials, “quantities” is used in P.4 and the title to Appendix A.

The word “maximum” was not included, since it adds no meaning to “not exceed”.

Section P.5 - Evaluation of Potential Dose. Part P uses language from Illinois, “may take into account whether”, rather than 10 CFR and Arkansas, which use “One or more of the following factors may be used to support an evaluation submitted under this section.” NRC in its June 12, 2000, letter observed that the rationale for not including §30.32g(2)(vii) is that it is included in P.5e.

Section P.5b. - Evaluation of Potential Dose. The wording “because of the way it is stored or packaged” (AR) is used rather than “due to the method of storage or packaging” (IL).

Section P.5f. - Evaluation of Potential Dose. The phrase “or larger than” (IL) is added to the 10 CFR phrasing.

Section P.5g. - Evaluation of Potential Dose. “Other factors appropriate for the specific facility” as included by NRC, AR & CO but excluded by IL, is not added to P.5g. The CRCPD believes P.5e. includes this flexibility.

Section P.6 - Contents of a Contingency Plan. Part P uses IL “shall” rather than AR “must”.

To make explicit the accountable and dynamic nature of the contingency planning document, Part P includes “in separate sections having each page labeled with a date and revision number.”

Section P.6e. - Contents of a Contingency Plan. P.6e. includes both incidents and accidents, since the ALARA principle applies to both. Radiological exposure controls for both onsite and offsite response personnel are to be included.

Section P.6h.ii. - Contents of a Contingency Plan. This provision is based on 60 FR 32441. Notification is by telephone only, since facsimile or electronic mail can go for hours or days before being read. Arrangements for backup communication and 24-hour capability are required.

Section P.6h.iii. - Contents of a Contingency Plan. This provision is from 60 FR 32441.

Section P.6j.ii. - Contents of a Contingency Plan. The phrase “radiation workers and non-radiation workers including off-site responders” was substituted for “personnel” in order to be explicitly consistent with the recent clarification in 10 CFR of radiation and non-radiation worker and to make it clear that training include responders.

Section P.6k.i. - Contents of a Contingency Plan. Quarterly is a usual frequency of communication drills.

Section P.6k.ii. - Contents of a Contingency Plan. A biennial frequency is required, with at least one drill in between which combines some of the principal functional areas of the licensee's emergency response capabilities.

Section P.6k.iv. - Contents of a Contingency Plan. The most probable scenario may be a minor event. Drills and exercises are to deal with events up to and including the maximum credible accident.

Section P.6k.v. - Contents of a Contingency Plan. Since it can be helpful to have participants think about an exercise in advance, the question of whether scenarios are announced or unannounced is left to be "prescribed in the contingency plan." NUREG-0654 evidently doesn't require that participants not know the scenario, although 10 CFR §30.32(i)(3)(xii) stipulates that the scenario "shall not be known to most exercise participants".

Section P.7 - Comment from Offsite Response Organization. 60 FR 32433 discusses whether amendments should also be subject to 60-day comment specification.

The phrase "including, but not limited to, local fire, ambulance, and hospital emergency response officials" was added for explicitness.

Section P.11b. - Plan Implementation. The word "immediately" (IL) is used, consonant with the definition in P.3j. 10 CFR and AR include "not later than one hour after the licensee declares an emergency." Per 60 FR 32435, one commenter on ISFSI emergency response advocated 15 minutes.

Section P.12a. - Plan Revision. 10 CFR "report" is modified to "provide" (meaning "send in").

Section P.12b. - Plan Revision. Plan revisions are to be "in writing", to make explicit that Agency approval is to be documented not just verbal.

Based on comments, the second sentence was added: "For information purposes only, updates of individual names, titles, assignments of responsibility, and telephone numbers are to be reported to the Agency and to affected offsite response organizations within 30 days."

Appendix A - Quantities of Radioactive Materials Requiring Consideration of the Need for a Contingency Plan for Responding to a Release. In the table (10 CFR Part 30.72, Schedule C) of "quantities of radioactive materials requiring consideration of the need for an emergency plan for responding to a release", naturally occurring and accelerator-produced radioactive materials are covered by limits for "any other beta-gamma emitter", "any other alpha emitter" and other special case.

Matters for Future Consideration

These matters for future consideration came from state radiation control agency comments and from federal

and state agency documents used by the working group.

1. The working group will consider the following regarding definitions in Sec. P.3:
 - a. The relationship of event to “accident” and “incident” in the International Basic Safety Standards and International Atomic Energy Agency International Nuclear Event Scale, deserves closer comparison to usages in the United States.

Information on the International Nuclear Event Scale is readily available at:

<http://www.iaea.org/ns/nusafe/nusafe3/ineimage.htm>

<http://www.iaea.org/worldatom/Periodicals/Factsheets/English/ines.html>

<http://www.iaea.org/ns/nusafe/nusafe3/ines.htm>
 - b. The definition of “emergency” could be refined in comparison to the usages of the U.S. Environmental Protection Agency and Federal Emergency Management Agency.
 - c. The word “demonstration” may be preferable to “exercise”.
 - d. A definition of “facility”, or reference to one elsewhere, for example, “fixed facility” or “facility alert”, could be made.
 - e. A definition of “protective measure”, used as different from “protective action” by some possession-only license holders to distinguish between onsite and offsite emergency preparedness needs, could be added.
 - f. A definition of “release fraction” could be included.
 - g. Define “respirable size range” in relation to Sec. P.5c., perhaps by citing an American National Standards Institute or similar reference.
 - h. Reexamine the basis for and perceived differences between NRC’s and the IAEA-based proposed CRCPD usages related to site area emergency.
 - i. Define “solubility” in relation to Sec. P.5c., perhaps by citing an American National Standards Institute or similar reference.
2. The working group will consider deriving specific release fraction values for naturally occurring radionuclides to be added to the table in Appendix A, “Quantities of Radioactive Materials Requiring Consideration of the Need for a Contingency Plan for Responding to a Release.” This matter is interrelated with the potential necessity of calculations using revised methods and definitions prior to modifying table entries.

- a. An updated methodology could be used to calculate estimated offsite dose and to relate the release fraction to the calculated total effective dose equivalent. An updated methodology would use and likely replace the present basis, as found in pages 70-101 of U.S. Nuclear Regulatory Commission NUREG-1140, January 1988.
 - b. The table values at present do not reflect differences in the chemical state of an element and also the type of material (paper, metal, liquid, etc.) as they might modify the release fraction.
 - c. The table values pertain to releases which are airborne. Scenarios exist for waterborne releases that require a response plan.
 - d. An updated methodology will likely use a revised definition for release fraction.
 - e. Release fraction table values could be calculated for specific naturally occurring and accelerator produced radionuclides (in particular ^{226}Ra , ^{57}Co , $^{67}\text{Gallium}$, ^{111}In , and $^{201}\text{Thallium}$). These nuclides could then be added to the table in Appendix A.
3. The working group will consider adding additional specifications of the kind usually required for nuclear power plants, uranium enrichment facilities or an interim spent fuel storage installation. Some of these specifications may be more appropriately included in regulatory guidance. Alternatively, such specifications could be added to Part P in brackets, as optional regulatory language.

Requirements which could be considered include:

- a. Sec. P.6b.: When radioactive material inventories or industrial applications change, the license should be required to change the offsite release scenarios, making the contingency plan inventory- and process-specific.
- b. Sec. P.6d.: Specifications for the type of monitoring, for example, area monitors.
- c. Sec. P.6e.: Description of radiological exposure controls should specifically state how exposure is estimated (whether based on source term measurements or field airborne radioactivity detectors) and minimized, including how authorization, if any, to exceed limits or guidelines is obtained.
- d. Sec. P.6e.: Description of radiological exposure controls should explicitly state whether respirators will be used, and, if so, whether they're maintained and whether workers receive medical exams.
- e. Sec. P.6g.ii.: Description of responsibilities should explicitly state the role of site Radiation Protection Officer. State radiation control programs expect the Radiation Protection Officer to

be responsible, since the Radiation Protection Officer will usually have the best information regarding current uses and inventory.

- f. Sec. P.6g.iii.: Capabilities and notification procedures of offsite response personnel should be documented, with clearly defined roles and 24-hour telephone and pager numbers.
 - g. Sec. P.6g.iii.: The description should identify how contractors will be coordinated.
 - h. Sec. P.6j.ii.: Hazard training should conform to specifications of the Occupation Safety and Health Administration for hazardous waste operations (HAZWOPER).
 - i. Sec. P.6k.i.: Communications drills should be monthly.
 - j. Sec. P.6k.ii.: Radiological/health physics drills should be conducted every year with a medical emergency every other year.
 - k. Sec P.6k.iii.: Fire/ambulance services should be invited to participate every other year.
 - l. Sec. P.6k.v.: Explicitly state a frequency of unannounced drills or exercises (being unannounced is not necessary every time).
 - m. Sec. P.10a.: An exercise should be conducted each year and deficiencies corrected before the subsequent drill or exercise is conducted.
 - n. Sec. P.10b.: Be more explicit about who is to do the critique and evaluation, for example. the licensee Radiation Protection Officer.
 - o. Sec. P.10c.: Here or in a footnote, be explicit as to whether the Agency is required to participate. The Agency should observe or participate every two years.
 - p. Sec. P.12: A process for maintaining, updating and distributing controlled copies to onsite and offsite response organizations and to the public should be required.
4. In Sec. P.4, a 1 mSv (100 mrem) may be a more consistent threshold for requiring a contingency plan. As an alternative, a smaller scale of contingency planning (strictly onsite emergency planning) could be required for the 1 mSv to 10 mSv range.
 5. Clarify how the thyroid (iodine) special dose limit, included by the U.S. Nuclear Regulatory Commission in 1989, is best understood in relation to total effective dose equivalent.
 6. By analogy to the environmental report requirement for some radioactive material licensees, consider providing discretion to the Agency by adding “Notwithstanding P.4a., if the Agency determines a

credible accident may affect the quality of the human environment by reason of exposure to radiation, a contingency plan for mitigation shall be included in the application.”

7. A question which remains is whether to require delineation of an “emergency planning zone” of set radius, for example 10 miles, or perhaps 1-5 miles as regarded appropriate for an Interim Spent Fuel Storage Installation by the U.S. Nuclear Regulatory Commission in the June 22, 1995, 60 FR 32430-32442, Emergency Planning Licensing Requirements for Independent Spent Fuel Storage Facilities (ISFSI) and Monitored Retrievable Storage Facilities (MRS), 10 CFR Part 72, Final Rule.
8. Part P contains minimal requirements for public information. If a reasonable likelihood existed for offsite consequences of a credible accident, a public education program could let people know ahead of time, possibly through a warning system. If protective action by the public is part of the contingency plan, a description of how the public will be trained in what might happen and how to perform the action (such as removal and disposition of contamination). If no such likelihood exists, the licensee’s contingency plan could still describe who is responsible for public information and how news releases will be coordinated.
9. Consider whether Part P might be strengthened by a provision for the Agency to take possession of radioactive material in emergency.
10. Consider whether Part P might be strengthened by a provision for the Agency to assert Agency authority for access to accident site for specific purposes.
11. Consider whether Part P might be strengthened by a provision for the Agency to have certain capabilities in place.