PR 20, 30, 40, 50, 70 and 72
(73FR03811)

Secy

(15)

From: Smith, Tyson R. [TrSmith@winston.com]
Sent: Thursday, May 08, 2008 1:47 PM
To: Secy
Cc: Neuman, Jeffrey N.; Parscale, Larry V; Stokes, Robert C (Bob); Repka, David A.; Horin, William A.
Subject: Honeywell - Decommissioning Planning Proposed Rule, 73 Fed. Reg. 3812, RIN 3150-AH45
Attachments: Decommissioning Planning Proposed Rule - 5-8-08 MTW to NRC Secretary.PDF

Please find the attached comments submitted on behalf of Honeywell International in the above-referenced rulemaking. A hard copy was also sent today via first class mail. If you have any trouble with the transmission, please contact me at the number or address below.

Tyson Smith

<<Decommissioning Planning Proposed Rule - 5-8-08 MTW to NRC Secretary.PDF>>

Tyson R. Smith
Winston & Strawn LLP
1700 K St. NW
Washington, DC 20006
(202) 282-5756
trsmith@winston.com

DOCKETED
USNRC

May 8, 2008 (2:20pm)

OFFICE OF SECRETARY
RULEMAKINGS AND
ADJUDICATIONS STAFF

Template = SECY-067

SECY-02

Received: from mail1.nrc.gov (148.184.176.41) by TWMS01.nrc.gov
(148.184.200.145) with Microsoft SMTP Server id 8.0.751.0; Thu, 8 May 2008
13:47:19 -0400
X-Ironport-ID: mail1
X-SBRS: 6.3
X-MID: 25063039
X-IronPort-AV: E=Sophos;i="4.27,455,1204520400";
d="pdf'?scan'208";a="25063039"
Received: from smtp2.winston.com ([38.100.3.163]) by mail1.nrc.gov with
ESMTP; 08 May 2008 13:47:15 -0400
X-TM-IMSS-Message-ID: <5f7f99820000888a@winston.com>
Received: from wsdcmrs02.winston.com (wsdcmrs02 [10.3.1.136]) by winston.com
([10.12.1.40]) with ESMTP (TREND IMSS SMTP Service 7.0) id 5f7f99820000888a
for <TrSmith@winston.com>; Thu, 8 May 2008 13:49:08 -0500
Received: from wsdcexv3.winston.com ([10.3.1.132]) by wsdcmrs02.winston.com
with Microsoft SMTPSVC(6.0.3790.1830); Thu, 8 May 2008 13:46:48 -0400
X-MimeOLE: Produced By Microsoft Exchange V6.5
Content-Class: urn:content-classes:message
MIME-Version: 1.0
Content-Type: multipart/mixed;
boundary="----_=_NextPart_001_01C8B133.7BFC3C18"
Subject: Honeywell - Decommissioning Planning Proposed Rule, 73 Fed. Reg. 3812, RIN
3150-AH45
Date: Thu, 8 May 2008 13:46:46 -0400
Message-ID:
<0920D893FF3EAF4690745060F81847C50393177F@WSDCEXV3.winston.com>
X-MS-Has-Attach:
X-MS-TNEF-Correlator:
Thread-Topic: Honeywell - Decommissioning Planning Proposed Rule, 73 Fed. Reg. 3812, RIN
3150-AH45
Thread-Index: AcixM3lnfc4VxsElT+uVmlOG+TMa7A==
From: "Smith, Tyson R." <TrSmith@winston.com>
To: <secy@nrc.gov>
CC: "Neuman, Jeffrey N." <Jeffrey.Neuman@Honeywell.com>,
"Parscale, Larry V" <Larry.Parscale@Honeywell.com>,
"Stokes, Robert C \(Bob\)" <Robert.Stokes2@Honeywell.com>,
"Repka, David A." <DRepka@winston.com>,
"Horin, William A." <WHorin@winston.com>
Return-Path: TrSmith@winston.com
X-OriginalArrivalTime: 08 May 2008 17:46:48.0527 (UTC) FILETIME=[7D64DDF0:01C8B133]

Honeywell

Specialty Materials
Honeywell
P.O. Box 430
Highway 45 North
Metropolis, IL 62960
618 524-2111
618 524-6239 Fax

May 8, 2008 (UPS: 301-415-1966)

VIA ELECTRONIC MAIL (SECY@NRC.GOV)

Secretary
Attn: Rulemakings and Adjudication Staff
11555 Rockville Pike, Mail Stop: 016G4
U.S. Nuclear Regulatory Commission
Rockville, MD 20852

Re: Decommissioning Planning; Proposed Rule
73 Fed. Reg. 3812 (Jan. 22, 2008)
RIN 3150-AH45

Dear Secretary:

Honeywell International, Inc. ("Honeywell") is submitting these comments regarding the NRC's proposed rule addressing decommissioning planning. These comments also address aspects of the draft guidance associated with the rulemaking.[1] Honeywell's comments are supported by the attached technical report and comments, dated May 7, 2008, prepared by a radiation protection consultant. In addition, Honeywell hereby endorses the comments on the proposed rulemaking submitted by the Nuclear Energy Institute.

Honeywell is the Part 40 licensee for the Metropolis, Illinois UF6 conversion facility ("MTW"). Honeywell believes that the proposed rule is written too broadly in that it fails to properly account for the different activities and varying risks associated with different categories of NRC licensees. In particular, the rule does not adequately account for the type of operations or low radiological risks associated with facilities at the front end of the fuel cycle — that is, Part 40 licensees such as uranium mills, UF6 conversion facilities, and solution mining facilities. These comments also address the portion of the rulemaking that would result in new site characterization and monitoring. If, as the NRC estimates, only a small number of materials licensees would need to perform additional site surveys, then a more efficient, and less-burdensome approach should be used. We also comment on the need to consider remediation prior to cessation of operations and on financial assurance tests and trusts for long-term surveillance and monitoring.

---

[1] "Draft Guidance to Implement Survey and Monitoring Requirements Pursuant to Proposed Rule Text in 10 CFR 20.1406(c) and 10 CFR 20.1501(a)" (January 2008) ("Draft Survey and Monitoring Guidance").

Definition of Residual Radioactivity Is Over Inclusive

The proposed rule would require[2] licensees to identify and address "residual radioactivity" both during operations and in anticipation of decommissioning.[3] Use of this broad definition is an overly-conservative measure for Part 40 facilities that handle only natural uranium ores and U3O8 such as the MTW. Unlike enrichment facilities, fuel fabrication facilities, and power reactors, Part 40 facilities handle only source material that has not been enriched. Most Part 40 licenses do not contain restrictions on the release of uranium in solid form to the environment. The existence of natural uranium in the near-surface soils is an expected condition that is nearly impossible to prevent due to mining and ore dust.

Moreover, for certain Part 40 licensees (*e.g.*, in situ recovery facilities), the proposed rule and associated guidance fails to address the unique regulatory and process-related conditions that are present at such facilities. For example, there is no discussion of how the definition of residual radioactivity applies to in situ mining units and no discussion of the interplay between natural ore and residual radioactivity. Given the relatively low radiological risks associated with source material at these facilities, it is not always necessary to fully contain the material. In fact, most Part 40 licenses acknowledge that some release of natural uranium, ore, and yellowcake dust is likely to occur, if not impossible to prevent.

In issuing a license, the NRC would have previously determined the licensed activities to be protective of the public health and safety and the environment. Yet, the requirements in the proposed rule to address residual radioactivity — during operations pursuant to the proposed §§ 20.1501(a) and 20.1406(c) and as an input to decommissioning cost estimates under proposed § 40.36(d) — would result in new operational restrictions well-beyond those imposed by an existing Part 40 license. A broadly-applicable rulemaking that fails to distinguish between the types of licenses and the relative risks of contamination is no substitute for the detailed technical reviews and reasonable assurance determinations that preceded issuance of each Part 40 license. While use of a broad definition of residual radioactivity may be useful with respect to certain licensees, application of such a definition to Part 40 licensees is unrealistic and inconsistent with current, licensed practices which fully protect the public health and safety.

Additional Site Characterization Surveys and Monitoring Are Unnecessary

The guidance on site characterization and monitoring would result in unnecessary and counterproductive changes to current licensee programs. The proposed rule and associated

---

2 *See* Proposed 10 CFR §§ 20.1406(c), 20.1501(a)(2).

3 "Residual radioactivity" means "radioactivity in structures, materials, soils, groundwater, and other media at a site resulting from activities under the licensee's control. This includes radioactivity from all licensed and unlicensed sources used by the licensee, but excludes background radiation. It also includes radioactive materials remaining at the site as a result of routine or accidental releases of radioactive material at the site and previous burials at the site, even if those burials were made in accordance with the provisions of 10 CFR part 20." 10 CFR § 20.1003.

guidance would have the unintended consequence of requiring new and extensive characterization and remediation efforts, without regard to the degree of actual health and safety impact. The proposed regulations would also require the evaluation during operation of subsurface contamination based on projected decommissioning exposure scenarios, even where no operating exposure limits would be exceeded.

The draft guidance suggests that licensees may need to construct new means of confining materials or to install new leak detection equipment, particularly where portions of systems cannot be visually inspected. Draft Survey and Monitoring Guidance, at 12-13. Such costly retrofits are unnecessary. Existing Part 40 facilities have survey, monitoring, and leak detection programs. *See* 10 CFR Part 40, Appendix A, Criteria 5 and 7; *see also*, 10 CFR § 20.1101 (radiation protection programs). These programs, which would have been reviewed and approved by the NRC during licensing, are more than adequate to assess decommissioning obligations. Indeed, the statements of consideration for the proposed rule and the regulatory analysis recognize that these programs are functioning as intended.[4]

The proposed rule would benefit from a clear statement that existing licensees programs satisfy the proposed requirements. This determination should be made affirmatively and without qualification. If additional information is developed to suggest a need for enhancements in surveying and monitoring, then NRC already has sufficient tools at its disposal to address any concerns. The NRC can identify issues through its inspection and oversight programs and require additional action through license conditions, as part of licensing reviews, or through orders. There simply is no demonstrated need for additional rules of guidance in this area. Rather, the proposed rule and draft guidance unnecessarily complicate activities that the NRC acknowledges have not resulted in significant problems.

The type of site characterization contemplated by the proposed rule and associated guidance would be a complex undertaking and would be well beyond what is necessary to properly characterize a site for decommissioning purposes. According to one cost estimate prepared for a Part 40 facility, setting up the initial near-surface soil characterization and installing the necessary monitoring equipment would cost between $30,000 and $50,000 for a site with a relatively small footprint. This cost would include obtaining the necessary samples and conducting the associated laboratory work. Additionally, requiring maintenance and ongoing monitoring would result in annual expenditures of approximately $10,000/year. Extrapolated to encompass the range of Part 40 licenses, these costs exceed the values presented in Table 5-3 of the Regulatory Analysis. As a result, the overall cost/benefit analysis is flawed.

Yet, despite the high costs, the characterization is unlikely to reduce the already-low radiological risk associated with the natural uranium at Part 40 facilities such as MTW, or reduce the already-

---

[4] *See* 73 Fed. Reg. at 3821 ("NRC staff concludes that the monitoring and survey processes and related reports prepared at these facilities likely would contain sufficient information to satisfy the proposed §§ 20.1406(c) and 20.1501 requirements."); *see also* "Regulatory Analysis for Proposed Rulemaking – Decommissioning Planning; Draft for Comment," at 15-16 (concluding that uranium mills, UF6 conversion facilities, and solution mining facilities should not be affected by the proposed rulemaking).

low risk of contamination of groundwater from natural uranium. This is because natural uranium ore and U3O8 are not highly soluble and therefore have a low potential to cause groundwater contamination during the period of operation. For dry processes and solid material, the risk of groundwater contamination is therefore quite low. Further, at solution mining sites, the groundwater already contains high levels of radionuclides, rendering these provisions superfluous.

The monitoring decision logic path in the guidance appears to apply to any unplanned released of significance with respect to decommissioning costs. It could be inferred that the NRC's objective was to limit the new survey and monitoring requirements to unplanned releases from fluid processes. Given the low risk of groundwater contamination from dry processes and the properties of uranium, this would be a risk-informed approach. To the extent that any new survey and monitoring requirements are necessary beyond those already in place, the NRC should focus them on fluid processes.

The NRC also notes in the statements of consideration for the proposed rule (73 Fed. Reg. at 3815) that licensees with subsurface radioactivity with no ground water implications may rely on a minimal, routine monitoring program, which is described in the guidance. However, the "routine" monitoring program described in the guidance would require a more complex and expensive program than is presently necessary to adequately characterize contamination or support decommissioning. The monitoring program described in Section 3.2.2 of the Draft Survey and Monitoring Guidance would require, in effect, all licensees to develop three-dimensional flow and transport models *even where no subsurface contamination has been identified.* The level of detail and level of effort that is apparently expected under the draft guidance far exceeds that which is necessary to properly identify and address potential contamination.

Remediation During Operations Is Not Warranted

Against the background of the low risk of significant soil or groundwater contamination from natural uranium in solid form, as well as the costs associated with the implementation of the requirements contemplated by the proposed rule and draft guidance, it makes little sense to require remediation during operation of the site. In the guidance, the NRC encourages licensees to perform cost-effectiveness analyses of prompt versus delayed clean up of residual radioactivity at the site. *See* Draft Survey and Monitoring Guidance, at 30. However, the broad definition of residual radioactivity would result in near constant cost-effectiveness evaluations by Part 40 licensees. The nature of the radioactive material at such facilities (natural uranium ore and U3O8 "dust" from drums and pallets) means that there will regularly be new residual radioactivity at a site — whether from normal operations or spills. The expectation of ongoing cost-effectiveness evaluations for all residual radioactivity at Part 40 facilities is unrealistic and inconsistent with risk-informed regulation.

And, with a strong likelihood that additional residual radioactivity will occur as part of normal operations, it makes little sense to remediate soils, only to have to do it again and again. This would create a huge volume of soil with only slight contamination. This would be wasteful of resources, and wasteful of already-limited low-level waste disposal capacity. It will nearly

always be more cost-effective to wait until a site has ceased operations to dispose of contaminated soil or conduct any remediation. This is especially true given the nature of residual radioactivity at a Part 40 facility such as MTW. Moreover, the dust and other materials stirred up during decommissioning could lead to greater exposures for site personnel, thus obviating much of the already-small benefit of requiring site cleanup while operations are ongoing. The prospect of "continual decommissioning" may also be contrary to the principles of ALARA embodied elsewhere in 10 CFR Part 20.

The guidance on deciding when to conduct prompt cleanup or delayed cleanup of residual radioactivity also fails to recognize the unique issues associated with certain Part 40 facilities. The guidance suggests using EPA screening values that are based on the use of ground water as a drinking water source. Draft Survey and Monitoring Guidance, at 33. However, not all groundwater is suitable for drinking even before introduction of residual radioactivity. And, this is clearly an inappropriate application of the screening values for solution mining facilities, where the an aquifer cannot be a drinking water source.

Moreover, the rule fails to distinguish between residual radioactivity resulting from process spills, leaks, or upsets, and residual radioactivity that was permitted under previous regulatory approaches. Controlling or limiting the release of radioactivity is the primary objective of licensed operations, and practical restrictions on public exposures are expected. However, intervention to address residual radioactivity that was previously permitted requires a different approach. In such cases, no general solutions are available; a case-by-case analysis will be necessary. This is exactly what has taken place at the existing legacy sites. To the extent that the proposed rule seeks to require intervention to address residual radioactivity resulting from past, permissible activities, the rule is unlikely to have any impact on reducing the cost or complexity of decommissioning. Ultimately, the NRC's licensing and oversight programs are adequate to reduce introduction of residual radioactivity from current practices, but a different approach is needed to determine when to intervene to address residual activity from operations that were permitted under a previous regulatory system. The decommissioning rules should appropriately distinguish between practices and interventions.

The proposed rule and draft guidance are attempting to apply a "one size fits all" approach to "residual radioactivity" at all NRC-licensed facilities without regard to the varying processes, radionuclides, and risks at different categories of licensees. Uranium mills, conversion facilities, and solution mining facilities have unique attributes that preclude — or render unnecessary — application of the specific principles described in Section 4 of the Draft Survey and Monitoring Guidance. The proposed rule and associated guidance is impracticable and unwieldy as written, and should be revised to better reflect the circumstances at Part 40 facilities such as the MTW.

Financial Assurance – Financial Tests Should Be Amended

The proposed rule includes several changes in 10 C.F.R. Part 30, Appendix C, which specifies criteria and financial tests relating to the use of self-guarantees as a form of financial assurance for decommissioning. Honeywell has relied upon the self-guarantee method for the MTW facility as authorized by 10 C.F.R. § 40.36(e)(2) and is therefore required to satisfy the financial test criteria of Part 30, Appendix C. Honeywell, however, has received an exemption in

accordance with 10 C.F.R. § 40.14 from the aspect of the test that currently requires a showing of tangible net worth at least 10 times the total decommissioning cost estimate. Specifically, the NRC has allowed Honeywell to include goodwill assets in net worth for purposes of demonstrating a high ratio of net worth (including goodwill) to the decommissioning obligation.

Similar to the exemption previously granted to Honeywell, the proposed rule would modify Part 30, Appendix C to allow companies with an investment grade bond rating to consider intangible assets to meet the 10 times ratio test. Intangible assets generally include assets such as goodwill, brand value, or patents. As the Commission recognizes in the proposed rule (73 Fed. Reg. 3812, 3825), financial accounting standards issued since the NRC's original decommissioning rule was adopted in 1988 provide objective methods for valuation of intangible assets. For example, under Federal Accounting Standard ("FAS") 142, *Goodwill and Other Intangible Assets*, recognition of goodwill on a company's balance sheet must be annually tested and adjusted to reflect any impairment. For a diversified technology and manufacturing company with a history of acquisitions, such as Honeywell, intangible assets are a significant measure of the financial stability of the company. Accordingly, Honeywell fully supports this aspect of the proposed revision to the Part 30, Appendix C financial tests.

The proposed rule would also modify Part 30, Appendix C to add a new test for an entity that would provide a self-guarantee. The proposal is to add a showing of a tangible net worth of $19 million (in addition to the ratio discussed above). The only basis given for this change is that it would make Appendix C consistent with the financial tests for Appendix A (parent company guarantees) and Appendix D (companies with no outstanding rated bonds). Honeywell believes this proposed change is unnecessary. First, the proposed test ($19 million) has no correlation to the decommissioning obligation (in the case of MTW, currently estimated to be approximately $156 million). Therefore, the proposed change will not appreciably increase assurance of decommissioning funding. Second, for the reasons discussed above and recognized by the NRC in connection with the ratio test, a focus on tangible net worth as a measure of financial stability and risk of default is unnecessary. For a company such as Honeywell, with billions of dollars in net worth, a $19 million tangible net worth test that excludes intangible assets, would serve little purpose. Accordingly, the NRC should not adopt this aspect of the proposed rule.

Financial Assurance – Trusts Should Permit 2% Rate of Return

The NRC proposes a further change to 10 CFR § 20.1403(c)(1) to include a new requirement that the initial amount of the trust fund established for long-term care and maintenance be based on a 1 percent annual real rate of return on investment. In the statements of consideration, the NRC correctly notes that a similar provision is currently contained in 10 CFR Part 40, Appendix A. Criterion 10 provides that if a site-specific evaluation shows that a sum greater than the minimum amount specified in the rule is necessary for long-term surveillance following decontamination and decommissioning of a uranium mill site, the total amount to cover the cost of long-term surveillance must be that amount that would yield interest in an amount sufficient to cover the annual costs of site surveillance, assuming a 1 percent annual real rate of interest.

However, the proposed 10 CFR § 20.1403(c)(1) requires that the long-term surveillance and monitoring funds be placed into a trust, segregated from the licensee's assets and outside the licensee's administrative control. As a result, the trust funds would be managed to the standard

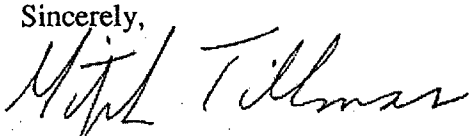
of care required by State or Federal law or one or more State or Federal regulatory agencies with jurisdiction over the trust funds, or, to the standard of care of that a prudent investor would use in the same circumstances. In light of these new restrictions on the handling and segregation of long-term funds, the adequacy of the trust funds should be assessed based on an assumed annual *2 percent real rate of return* on investment. This would bring the treatment of long-term surveillance and monitoring funds into line with the other NRC regulatory provisions,[5] such as 10 CFR 50.75(e)(1)(ii), which permit credit for projected earnings using up to a 2 percent annual real rate of return.[6]

Conclusion

On balance, the NRC's ability to prevent future legacy sites would be best enhanced through improved inspection and oversight of existing requirements, including reviews of environmental monitoring data, regular decommissioning cost estimates, adequate funding for decommissioning, and recordkeeping to facilitate decommissioning. The rule, as proposed, seems to be an over-broad response to a narrow problem. If the NRC has concerns regarding the potential for "legacy sites" for only five to six licensees, then the more efficient path would be to impose site-specific and license-specific conditions on the limited set of facilities rather than impose regulations on all licensees with uncertain costs and even more uncertain benefits. Given the limited scope of the problem, as defined by the NRC, it does not make sense to introduce a new layer of NRC review and approval of survey and monitoring programs outside of licensing reviews.

The final rule should be revised to adequately account for the types of operations and low radiological risks associated with Part 40 licensees such as uranium mills, UF6 conversion facilities, and ISR facilities.

Sincerely,



Mitch Tillman
Plant Manager

Attachment: Technical Report and Comments

---

5 The NRC previously evaluated and established a sound regulatory basis for assuming a 2% real rate of return under such investment restrictions. *See* "Financial Assurance Requirements for Decommissioning Nuclear Power Reactors," 63 Fed. Reg. 50465, 50476-77 (September 22, 1998).

6 The NRC attempts to distinguish long-term surveillance and monitoring funds from reactor decommissioning funds on the basis that there is no longer a "licensee" after license termination. This is a distinction without a difference. In the case of a shuttered reactor, the licensee may not have access to additional revenue because it will not be generating power.

Technical Report and Comments on NRC Proposed Rule on Decommissioning Planning (73 FR 3812) Prepared For Honeywell International

Thomas E. Potter
Radiation Protection Consultant
Washington, DC

May 7, 2008

OVERVIEW

The stated purpose of the proposed rule is to "improve decommissioning planning to reduce the likelihood that any currently operating facility will become a legacy site."[1] In NRC terminology, a "legacy site" is "a facility that is in decommissioning status with complex issues and an owner who cannot complete the decommissioning for technical or financial reasons."[2]

In its discussion of legacy sites, NRC states that it considers 8 of 32 complex materials sites undergoing decommissioning (as identified in its Decommissioning Program 2006 Annual Report) to be legacy sites. The legacy sites are not explicitly identified, but most, if not all, are readily identifiable from status summaries in the annual report. One feature common to all of these sites is that the inventory of residual radioactive material that was sufficient to cause these sites to become legacy sites was released to the environment decades ago or earlier under a substantially different regulatory regime.

This raises the question whether, under the current regulatory system, the creation of new legacy sites by way of significant unevaluated radioactive material releases occurring or having some reasonable chance of occurring is in fact likely. Experience suggests not. Consideration of current regulatory requirements suggests why not. And, indeed, the NRC regulatory analysis[3] supporting the new rule indicates that only a few licensees in one particular class of facilities — rare metal extraction facilities — will need to conduct extensive additional surveillance, indicating that the problem is, effectively, already solved.

---

1 73 FR 3812.

2 73 FR 3817.

3 Regulatory Analysis for Proposed Rulemaking — Decommissioning Planning, draft for comment, USNRC, December, 2007. As discussed further below, this conclusion is clouded somewhat by apparent conflicts in language between the supporting information published with the proposed rule, the regulatory analysis, and the draft guidance.

This state of affairs leads to the questions whether any regulatory changes related to radioactive material control and surveillance are necessary at all, and, if so, whether all of the proposed changes are appropriate.[4]

LACK OF NEED FOR AND LACK OF CLARITY IN 10 CFR 20.1406(c)

The proposed language is:

> Licensees shall, to the extent practical, conduct operations to minimize the introduction of residual radioactivity into the site, including the subsurface, in accordance with the existing radiation protection requirements in Subpart B and radiological criteria for license termination in Subpart E of this part.

One can hardly object to the aim of this section. But, to a considerable extent, it is already required under existing NRC regulations. Subpart B is reproduced in its entirety below:

> Subpart B—Radiation Protection Programs
>
> Source: 56 FR 23396, May 21, 1991, unless otherwise noted.
>
> 20.1101 Radiation protection programs.
>
> (a) Each licensee shall develop, document, and implement a radiation protection program commensurate with the scope and extent of licensed activities and sufficient to ensure compliance with the provisions of this part. (See § 20.2102 for recordkeeping requirements relating to these programs.)
>
> (b) The licensee shall use, to the extent practical, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and doses to members of the public that are as low as is reasonably achievable (ALARA).
>
> (c) The licensee shall periodically (at least annually) review the radiation protection program content and implementation.

---

4 Legacy sites could also be created by substantial loss of financial capability, which is also addressed in the existing rules and proposed changes. Those proposed changes are beyond the scope of these comments. The comments herein are limited to proposed changes to radioactive material control and surveillance, which are contained in proposed changes to 10 CFR 20.1406 and 10 CFR 20.1501.

(d) To implement the ALARA requirements of § 20.1101 (b), and notwithstanding the requirements in § 20.1301 of this part, a constraint on air emissions of radioactive material to the environment, excluding Radon-222 and its daughters, shall be established by licensees other than those subject to § 50.34a, such that the individual member of the public likely to receive the highest dose will not be expected to receive a total effective dose equivalent in excess of 10 mrem (0.1 mSv) per year from these emissions. If a licensee subject to this requirement exceeds this dose constraint, the licensee shall report the exceedance as provided in § 20.2203 and promptly take appropriate corrective action to ensure against recurrence.

[56 FR 23396, May 21, 1991, as amended at 61 FR 65127, Dec. 10, 1996; 63 FR 39482, July 23, 1998]

The requirement specified in 10 CFR 20.1101(b) should and does effectively achieve much, if not all, of what NRC seeks from 10 CFR 20.1406(c). Radioactive material control practices have improved greatly over the years, and this requirement is probably one important reason for the improvement.

However, it must be placed in context. As important as this requirement may be in preventing the development of legacy sites, it most likely falls far short of the importance of earlier 10 CFR Part 20 regulatory changes — the 1970 effective cessation of authorized on-site disposals of significant quantities of certain very long-lived radioactive materials, including enriched uranium, under 10 CFR Part 20.304[5] and the 1980 complete withdrawal of 10 CFR 20.304.[6] One of the complex sites on the NRC list of 32 consists solely of such approved trenches used for disposal of enriched uranium prior to 1970. And disposal trenches constitute an important portion of the complexity of a number of other sites among the 32. An assessment of the importance of unknown subsurface releases of various types to the complexity of these 32 sites would seem to be an important part of the regulatory analysis, but is not included.

The reference to Subpart B in the proposed change is also problematic in that it is circular. Subpart B requires a radiation protection program that ensures compliance with 10 CFR Part 20. If the explicit requirement of 10 CFR 20.1406(c) is needed, it should be part of Subpart B.

The reference to Subpart E is imprecise, but, more importantly, is inappropriate for sites where currently existing concentrations of near-surface residual radioactive material from operations long ago already exceed DCGLs corresponding to Subpart E limits for unrestricted release, the unspecified but intended aim of 10 CFR 20.1406(c). These are the very licensees that are specially targeted by the proposed rule.

---

5 35 FR 6425.

6 45 FR 71761.

There is merit to acting to prevent significant additions to residual material inventories, but that's not what the proposed 10 CFR 20.1406(c) requires. There is also merit to not worrying about releases small enough not to worry about, but that's not what the proposed 10 CFR 20.1406(c) permits. The proposed revisions to the NRC's regulations and the adoption of extensive new guidance for implementing those new requirements contain, contrary to the NRC's view, provisions that would dictate the modification of plants or their operating procedures. Moreover, the proposed rule applies the same requirements to all types of licensees despite the inherent differences in how each type of licensee safely manages radioactive material and/or the financial assurance instruments for decommissioning.

LACK OF NEED FOR AND LACK OF CLARITY IN 10 CFR 20.1501

The current 10 CFR 20.1501 text is as follows:

> 10 CFR 20.1501 General
>
> (a) Each licensee shall make or cause to be made, surveys that —
>
> (1) May be necessary for the licensee to comply with the regulations in this part; and
>
> (2) Are reasonable under the circumstances to evaluate —
>
> (i) The magnitude and extent of radiation levels; and
>
> (ii) Concentrations or quantities of radioactive material; and
>
> (iii) The potential radiological hazards.
>
> [56 FR 23398, May 21, 1991, as amended at 63 FR 39482, July 23, 1998]

The proposed changes are as follows:

> 20.1501 General.
>
> (a) Each licensee shall make or cause to be made, surveys of areas, including the subsurface, that —
>
> * * * * *
>
> (2) Are reasonable under the circumstances to evaluate —
>
> * * * * *
>
> (ii) Concentrations or quantities of residual radioactivity; and

(iii) The potential radiological hazards of the radiation levels and residual radioactivity detected.

(b) Records from surveys describing the location and amount of subsurface residual radioactivity identified at the site must be kept with records important for decommissioning.

The sense of the language in the proposed changes suggests that "survey" is interpreted to be equivalent to "measure," and does not appear to recognize the much broader definition in 10 CFR Part 20:

10 CFR Part 20.1003 Definitions

As used in this part:

* * * * *

Survey means an evaluation of the radiological conditions and potential hazards incident to the production, use, transfer, release, disposal, or presence of radioactive material or other sources of radiation. When appropriate, such an evaluation includes a physical survey of the location of radioactive material and measurements or calculations of levels of radiation, or concentrations or quantities of radioactive material present.

* * * * *

It is hard to see how the scope of the current form of 10 CFR 20.1501, in conjunction with the current definition of the term "survey" could be broadened or how it could fail to address releases to subsurface soils. In this regard, the proposed change is unnecessary.

The proposed changes to (a)(2)(ii) and (a)(2)(iii) are obviously intended to broaden the scope of each, but, by excluding radioactive material that is not residual, actually narrows it. The addition of the word "detected" in (a)(2)(iii) also narrows the scope.

MONITORING REQUIREMENTS ARE UNCLEAR AND CONFLICTING

In the proposed rule and its supporting documentation, the NRC appears to express conflicting views regarding the level of monitoring to be required under the proposed rule. The previously cited regulatory analysis indicates that the necessary level of monitoring is already underway at all but a few sites, all of which are rare metal extraction sites. The supporting information published with the proposed rule,[7] indicates the same, but also indicates a need for some other licensees for minimal additional

[7] 73 FR 3815.

"routine" surveillance, as outlined in associated guidance.[8] The proposed rule would benefit from a clear and unequivocal statement that the monitoring programs at certain classes of facilities (*e.g.*, ISR, mills, conversion facilities) are acceptable under the rules, and that any additional monitoring deemed necessary would be developed during licensing reviews (*e.g.*, license renewal). The monitoring proposed in the guidance also appears to be substantially more than "routine."

Furthermore, according to the monitoring decision logic path in the guidance document, the additional monitoring requirement appears to apply to any licensee that has experienced unspecified unplanned releases of significance with respect to decommissioning effort and is not currently performing subsurface monitoring in affected areas. It could be that the term "unplanned release" is intended apply in a more limited way to fluid releases from process equipment to the subsurface soils, but that is not clear.

SUBSURFACE RESIDUAL MATERIAL VERSUS RESIDUAL MATERIAL

There appears to be some confusion in the proposed rule and its supporting documentation about the residual radioactive material that is the focus of the rule. The regulatory analysis indicates the rule is intended to limit the accumulation of subsurface residual radioactive material over the remaining processing life of the facility. The rule and the supplementary information published with it address all residual radioactive material, as does the guidance for survey and monitoring requirements. The focus of the proposed rule appears to have broadened after the completion of the regulatory analysis. In any case, the regulatory analysis appears to be incomplete in this respect. The regulatory analysis should include an assessment of the changes on the handling of all residual radioactivity.

Ultimately, the proposed NRC regulations could have the unintended consequences of triggering performance of extensive characterization and remediation efforts, without regard to the degree of actual health, safety, and environmental impact. The proposed regulations would require the evaluation of subsurface contamination based on future decommissioning exposure scenarios, even though no foreseeable operating exposure limits would be exceeded. Moreover, the guidance contemplates documenting any subsurface contamination above background, even if it does not exceed regulatory limits and any leaks and spills within facilities, again without reference to exceeding any regulatory limits. Finally, this low threshold appears to be based upon the NEI Groundwater Protection Initiative. However, NEI threshold is not associated with, and is far more conservative than, any existing regulatory threshold.

SURVEILLANCE VERSUS MONITORING

---

8 Draft Guidance to Implement Survey and Monitoring Requirements Pursuant to Proposed Rule Text in 10 CFR 20.1406(c) and 10 CFR 20.1501(a), Draft Guidance for Comment, USNRC, January, 2008.

The focus of the proposed rule on monitoring (*i.e.*, measurement) rather than surveillance, where "survey" is defined broadly, as in 10 CFR Part 20, severely reduces the flexibility that a licensee should have to use alternate methods to ensure reasonably that operations are not leading to increases in surface and subsurface residual radioactive material that are significant from a decommissioning standpoint. Evaluation methods other than ongoing measurement of radionuclide concentrations in soil and groundwater can be thorough, adequate, and much less expensive substitutes for the relatively more expensive ongoing soil and monitoring in some situations. Theoretical evaluation of process materials and flows, one-time measurement of radionuclide solubility or one-time measurement of radionuclide sorption on subsurface soils, or combinations of such "surveys," for example, could serve as substitutes for ongoing monitoring. The rule and associated guidance do not recognize this, but should.

Consider, for example, the situation at the Honeywell uranium conversion facility in Metropolis, Illinois, which operates under a 10 CFR Part 40 license. Its operation and status with respect to decommissioning are described in its Site Reclamation Cost Estimate.[9] The feed material is dry ore concentrate (primarily U_3O_8) shipped in drums from uranium mills. Uranium in the feed material is converted by a dry fluoride volatility process to gaseous UF_6, which is ultimately transferred to cylinders for shipment. The dry processes present no risk for release of uranium to subsurface soils.

However, over the years, and probably mostly in the earlier years, spills of feed material have resulted in some accumulations of U_3O_8 in soils near plant buildings. These accumulations may require remedial action, such as some soil removal and disposal, when the plant is decommissioned.

In the meantime, however, these materials pose no risk for subsurface migration or groundwater contamination. No additional monitoring of the kind required in the proposed regulation should be necessary to support this generic conclusion. The rule, as written, could impose a substantial operational and financial burden, but without any corresponding benefit. As demonstrated below, this conclusion can be reasonably supported by what is known about the process, what is known about uranium in the environment, and what is known about site characteristics.

Although uranium is highly reactive and although its environmental chemistry is complex, uranium in the form of U_3O_8 in soils is typically highly immobile, especially over periods of time as short as decades.[10] The most obvious demonstration of this is the general behavior of uranium in the environment.

---

9 Site Reclamation Cost Estimate for Plant Located in Metropolis, Illinois, GTS Duratek, Rev. 0, June, 2000.

10 The discussion of the behavior of uranium in the environment is based on information in *Toxicalogical Profile for Uranium*, U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry, Sections 3 and 5, 1999.

Uranium is ubiquitous in the environment, and commonly appears in virtually all soils and rock as uranium oxides, including U_3O_8. Uranium obviously migrates through the environment over long periods (geologic scale) of time, as evidenced by the development of uranium ore formations, but significant redistribution of uranium in soils and rock in a way that concentrates the uranium typically does not occur over time periods on the order of decades or even centuries. Part of the evidence for this is that the concentrations of uranium in natural waters, including groundwaters, are typically very low, well below drinking water standards.

The typically low mobility of uranium in the environment and low solubility in environmental waters results from the geochemical properties of uranium as controlled by typical environmental conditions. The solubility of U_3O_8 in anoxic water[11] is exceedingly low. Any uranium dissolved from U_3O_8 in these conditions is rapidly re-precipitated as UO_2, which is even less soluble than U_3O_8. The solubility of U_3O_8 in water equilibrated with oxygen in the atmosphere is somewhat higher, but still low. Furthermore, the dissolved uranium, typically present as the UO_2^{2+} ion in solution, is strongly and rapidly adsorbed on materials commonly present in most soils, such as clay particles and hydrous ferric oxides. Consequently, even in these conditions the uranium remains effectively immobile.

Uranium can be mobile in the environment and can result in concentrations of uranium in groundwater exceeding drinking water standards by substantial margins. But this only results from atypical conditions. Two examples are provided below:

> Uranium as uranium oxides is readily soluble in concentrations far above drinking water standards (up to concentrations on the order of 100 g/L) in strong oxidizing acids, such as nitric acid, which are used in some chemical processing of uranium (but not at Honeywell Metropolis). Significant migration and groundwater contamination can result from releases of such materials into sandy soils underlain by sandstone rock formations. These soils and rock formations lack the chemical capacity for neutralizing the nitric acid, lack materials capable of reducing the UO_2^{2+} to allow formation of insoluble UO_2 , and lack the sorption capacity of soils with substantial clay content, hydrous ferric oxides, or other sorbants. Consequently, uranium released to the environment in this form remains much more soluble and mobile than in typical circumstances.
>
> The solubility of uranium oxides in oxygenated water and the mobility of the dissolved uranium in water is increased significantly if the water is rich in carbonate. The carbonate could be added intentionally as part of a chemical

---

11 Anoxic water is water depleted of the oxygen dissolved during equilibration with air. This depletion occurs by reaction of the oxygen with reduced materials, such as organic matter in near-surface soils or deeper rock formations, metal sulfides in ore formations, etc. Limited transport of atmospheric oxygen from the surface limits reoxygenation of the flowing water, resulting in oxygen depletion.

process (*in situ* uranium recovery, for example), or could occur naturally, as in water from some limestone formations. In carbonate-rich oxygenated water, the UO_2^{2+} from dissolution rapidly forms anionic carbonate complexes that adsorb only poorly on soil and rock materials.

Conditions such as these have resulted to uranium concentrations in groundwater substantially higher than drinking water standards in certain locales — and have resulted from industrial activities in some cases and natural processes in others.

Atypical conditions of the kind likely to lead to significant migration of uranium do not exist at the Honeywell site.[12] Consequently, it is reasonable to conclude on the basis of analysis of the processes, material characteristics, and site characteristics that subsurface migration of uranium there has not been significant. This conclusion is also supported by groundwater monitoring performed to date.[13] It is also reasonable to project that significant subsurface uranium migration will not occur prior to site decommissioning. No additional monitoring of the kind required in the proposed regulation should be necessary to support this generic conclusion. Consequently, the rule, as written, could impose a substantial operational and financial burden, but without any corresponding benefit.

EXISTING AND PLANNED EXPOSURE SITUATIONS: NRC VS. ICRP

The problem that NRC is concerned about — prevention of sites that have operated for a long time, including long periods of time under substantially less restrictive regulatory requirements from becoming legacy sites — is a problem that NRC has itself has exacerbated. The NRC adopted a one-size-fits-all approach in its license termination criteria, detrimental to sites with already existing residual radioactive material permitted under older regulatory approaches. In doing so, NRC rejected an alternate approach recommended years earlier by the International Commission on Radiological Protection (ICRP). The ICRP recommendations ultimately form the scientific basis for regulation of exposure to radiation for governments around the world.

ICRP 60

In ICRP Publication 60, published in 1990, the ICRP recommended regarding treatment of decommissioning of old sites involving radionuclides already present in the

---

12 Environmental Assessment for Renewal of NRC License No. SUB-526 for the Honeywell Specialty Materials Metropolis Work Facility, Final Report, U.S. Nuclear Regulatory Commission, Office of Nuclear Material Safety and Safeguards, Division of Waste Management and Environmental Protection, Docket No. 40-3392, June, 2006.

13 Ibid.

environment as an *intervention* rather than a *practice* (terms defined below).[14] The ICRP distinguished between radiological protection for proposed and continuing *practices* and for *intervention*.

Before an emission occurs or an environment is contaminated, an activity or operation can be planned and controlled, hence it is treated as a *practice* that might create a source of exposure. Once an environment is contaminated and sources and exposure pathways are present, protection may only be by *intervention*. To the ICRP, distinguishing between a source that can be prevented or constrained by design and operation and one that already exists is important. Two excerpts from ICRP Publication 60 that define and differentiate between *practices* and *intervention* are:

> (Paragraph 111) Existing practices ... at least in principle, can be withdrawn; but the sources and pathways that they involve may persist. Any further changes then require intervention.
>
> (Paragraph 189) The intended emission of radionuclides from installations, including the emission of naturally occurring radionuclides from installations such as mines and waste disposal sites, should be treated as practices. Radon in dwellings and in the open air and radioactive materials, natural or artificial, already in the environment, are examples of situations that can be influenced only by intervention.

The intent of the ICRP with respect to *practices* is best expressed in its own words from ICRP Publication 60, Section 5, particularly in Section 5.5:

> The control of public exposure in all normal situations [*i.e.*, from practices, but not interventions] is exercised by the application of controls at the source . . .
>
> In practice, almost all public exposure is controlled by the procedures of constrained optimisation and the use of prescriptive limits.
>
> The main aim of constrained optimisation in public exposure should be to develop practical restrictions on the sources of exposure, *e.g.*, in the form of restrictions on the release of radioactive waste to the environment.
>
> With widespread use of source-related dose constraints and practical restrictions on the sources of public exposure, generally applicable dose limits are rarely limiting in practice. However, because the constraints are source related they might, at least in principle, fail to take adequate account of the exposures from other sources. Although the Commission does not believe that this occurs to a significant extent, it continues to recommend dose limits for public exposure, if only to provide a limit on the choice of constraints.

The intent of the ICRP with respect to intervention is best expressed in its own words from ICRP Publication 60, Section 6:

---

[14] Int'l Com. on Rad. Prot., 1990 Recommendations of the International Commission on Radiological Protection, ICRP Pub. 60, Paragraph 106, Nov. 1990.

(Paragraph 210) Before a programme of intervention is initiated, it should be demonstrated that the proposed intervention will be justified, *i.e.*, do more good than harm, and that the form, scale, and duration of the intervention have been chosen so as to optimise the protection. As explained in Section 4.4, the Commission recommends against the use of dose limits for deciding on the need for, or scope of, intervention.

(Paragraph 212) As indicated in Section 4.4, the processes of justification and optimisation both apply to the protective action, so it is necessary to consider them together when reaching a decision. Justification is the process of deciding that the disadvantages of each component of intervention, *i.e.*, of each protective action, are more than offset by the reductions in the dose likely to be achieved. Optimisation is the process of deciding on the method, scale, and duration of the action so as to obtain the maximum net benefit. (Paragraph 212)

(Paragraph 219 regarding situations possibly warranting intervention) The most common causes of residues are the burial of long-lived materials from early operations such as mining and luminising with radium compounds. The use of mining spoil as land-fill material, followed by the construction of dwelling houses, has caused substantial problems. Buildings used for radium work have subsequently been put to other purposes, with the radium being discovered only years later. There have been several accidents in which long-lived radioactive materials have been dispersed in residential and agricultural areas. The necessary remedial actions vary greatly in complexity and scale and may themselves give rise to problems of occupational exposure and waste disposal. These [radiation control problems arising during remedial action] should be dealt with in accordance with the Commission's recommendations for practices. The need for and extent of remedial action has to be judged by comparing the benefit of the reductions in dose with the detriment of the remedial work, including that due to the doses incurred in the remedial work. No general solutions are available, but the methods recommended for the optimisation of protection can be used to give guidance in each individual case.

It is ironic that NRC cited Section 5.5 of ICRP 60 in adopting license termination criteria for support in this matter. All of section 5 applies to practices, not intervention. And yet, even in Section 5, ICRP warns against applying its recommendations for practices to interventions. The ICRP language in Section 5.5.2 is unambiguous:

The Commission defines the scope of its dose limits for public exposure by confining it to the doses incurred as the result of practices. Doses incurred in situations where the only available protective action takes the form of intervention are excluded from the scope of the dose limits.

Radon in dwellings and in the open air and radioactive materials, natural or artificial, already in the environment, are examples of situations that can be influenced only by intervention. Doses from these sources are therefore outside the scope of the dose limits for public exposure.

I participated in developing comments on the proposed 10 CFR Part 20 Subpart E license termination criteria.[15] These comments included a recommendation, presented along the lines described above, to follow the ICRP intervention approach for developing criteria for sites that were already contaminated under an older, less restrictive regulatory regime. We also included an analysis demonstrating that the cost-effectiveness analysis performed by NRC as part of its regulatory analysis was flawed and, using NRC data and assumptions, but sound methodology, demonstrated that dose limits less than 100 mrem/y were not cost effective. In the supplementary information published with the final rule, NRC accepted our cost-effectiveness analysis, increased the dose limit from 15 mrem/y to 25 mrem/y (to allow a margin for other sources while assuring a total dose from all sources less than the 100 mrem/y limit, entirely consistent with ICRP recommendations for practices but not for interventions). However, the NRC ignored our comments about intervention versus practice. This rulemaking makes a similar error in failing to recognize the differences between the cause/effect of the need for intervention or the need for changes in practices.

ICRP 82

The position of the ICRP on this matter has continued to evolve, although it still makes a distinction between the two situations. In a document addressing prolonged radiation exposure of the public,[16] the ICRP addressed radioactive residues from both practices and past human activities and events. It discusses practices in Section 5.2.1:

> 5.2.1. Radioactive residues from practices
>
> (102) In cases of radioactive residues that are attributable to current practices, the recommended dose constraints [Here the ICRP uses the term "limit" to apply to all practices combined and uses the term "constraint" as the portion of the limit allocated to a particular practice. The recommended dose limit for all practices combined is 100 mrem/y, and recommended constraints are some fraction of that left up to national authorities.] are applicable to the residues remaining after the discontinuation of operation of the sources within the practice. Therefore, the Commission considers that:
>
>> The recommended dose constraints should be applied prospectively to the prolonged exposure from the radioactive residues expected to remain in human habitats after the discontinuation of a practice — for instance, at the site of a decommissioned installation.

The report continues to discuss release with and without restrictions on use.

The ICRP discusses residues from past activities in Section 5.2.2:

---

15 Comments on Proposed Radiological Criteria for Decommissioning, Potter, Thomas and Morton, Henry, January 24, 1995.

16 Int'l Com. on Rad. Prot., Protection of the Public in Situations of Prolonged Radiation Exposure — The Application of the Commission's System of Radiological Protection to Controllable Radiation Exposure Due to Natural Sources and Long-lived Radioactive Residues, ICRP Pub. 82, 2000.

5.2.2. Radioactive residues from past human activities and events

(105) In the case of human activities which have been carried out in the past without following the current system of radiological protection for practices, the termination of the activity and the handling of the remaining residues would most probably not have been adequately considered when the activity was initiated. [A footnote at this point: The Commission has already recognized the difficulties of handling this problem in Publication 60, paragraph 219, (reproduced above).] Common long-lived radioactive residues from these early operations are from those activities such as luminising with radium compounds and ancient mining and milling of ores containing radioactive materials (see paragraph A.19). However, the most significant residues from the past are those remaining from operations at military facilities. Sometimes the military operations, such as nuclear weapons tests, have resulted in large amounts of radioactive materials being dispersed over vast areas (see paragraphs A.17-A.18).

(106) National authorities should consider options for dealing with radioactive residues remaining from uncontrolled early operations and events. In principle, decisions on the need for intervention and on the scale and extent of any required protective action should be made on a case-by-case basis, as no general solutions are available. The necessary actions may vary greatly in complexity and scale. They may involve site rehabilitation through in situ treatment of residues (covering of residues, deep ploughing, soil treatment to prevent uptake by plants, etc.), or scrapping and removal of residues for storage and ultimate disposal. The methods recommended for justifying intervention and for optimizing protective actions in prolonged exposure situations should be applied in each individual situation. The generic reference levels recommended in Chapter 4 may also provide guidance for the solution of difficult problems. [Chapter 4 recommends case-by-case evaluation, but identifies an annual dose of about 1 rem/y as a reference level below which intervention is not likely to be justifiable and a level of about 10 rem/y as a reference level above which intervention will almost always be justifiable.]

(106) An interesting issue is whether the individual annual doses attributable to radioactive residues from earlier human activities and events should be subject to any restriction criterion. In principle, there are no impediments in these situations to restricting the attributable individual doses to arbitrary levels. But, in many situations, the origins (and originators) of some of these activities and events are not even traceable. Thus, it may not be reasonable or even feasible to impose on society today the costs and other disadvantages of the protective actions needed from restricting individual doses, a posteriori, to levels that were not considered, a priori, by those who decided to carry out the original activity or event at the time.

(108) However, there are many cases of existing radioactive residues that are traceable to a precise original activity or event that sometimes occurred not long ago. Moreover, in many of these cases, those who caused the situation can still be made retrospectively liable for the required protective actions. For example, the radioactive residues remaining from a recent accident have traceable origins and the liabilities of the originators are sometimes (although not always)

straightforward. The existing annual doses before the event are usually well known. The existing annual doses after the optimized protective actions have been undertaken could be much higher that [sic] the existing annual doses existing before the event. In these cases the imposition of additional protective actions to those responsible for the situation, in order to achieve some pre-selected individual dose restriction, could be considered by the competent authorities a reasonable and justifiable measure. This type of posteriori individual dose restriction, however, should not necessarily conform to the individual dose restrictions recommended for practices. Fig. 8 [not included] illustrates the situation.

(109) Once all required protective actions have been undertaken, the situation should be considered "normal" again. No further restriction should be imposed on the basis of radiological protection considerations.

(110) In summary, the Commission considers that:

> For radioactive residues from other past human activities and events that were not regulated as practices, the need, form, scale, and duration of protective actions should be determined on a case-by-case basis. This should be done following the recommended principles of justification of intervention and optimisation of the protective actions, rather than through pre-selected individual dose restrictions. If necessary, the recommended generic reference levels of existing annual dose may be used as guidance.
>
> However, in cases where the origins of the situation are traceable and those who produced the residues can still be made retrospectively liable for the protective actions, national authorities may consider applying a specific restriction to the individual doses attributable to the residues, constraining the resulting doses to levels below those resulting from the optimization process. For this purpose, additional protective actions may be required from those who created the situation. Such specific dose restriction, however, may be higher than the dose constraints and dose limits applied to practices.
>
> Residues that are deemed not to require protective actions should not be the subject of further restrictions.

ICRP 103

The ICRP just last year comprehensively updated its recommendations.[17] In its new recommendations, the ICRP has migrated further from use of the terms "practice" and "intervention," process-focused terms and uses instead the terms "planned" and "existing" exposure situations for the situations we have been discussing, and adds a third: "emergency." The new terms are intended to be more situation-focused, but the basic distinction remains. The recommendations maintain the current individual dose

---

[17] Int'l Com. on Rad. Prot., The 2007 Recommendations of the International Commission on Radiological Protection, ICRP Pub. 103, 2007.

limits for all regulated sources in planned exposure situations and reinforce the principle of optimisation of protection. Section 5.2 presents the definitions of the two new terms of interest for this discussion:

> Planned exposure situations are situations involving the deliberated introduction and operation of [radiation]sources. Planned exposure situations may give rise both to exposures that are anticipated to occur (normal exposures) and to exposures that are not anticipated to occur (potential exposures; see Section 6.1.3).
>
> Existing exposure situations are exposure situations that already exist when a decision on control has to be taken, including prolonged exposure situations after emergencies.

The ICRP continues to apply limits and constraints in planned exposure situations and reference levels for existing exposure situations. However, in ICRP 103, the ICRP has modified the reference levels and their application for existing exposure situations. In Section 6.3 the ICRP recommends a range of reference levels from 100 mrem/y to 2 rem/y for existing exposure situations. The bounds of this range no longer relate to levels below which protective action is likely to be unjustifiable or above which protective action is likely to be justifiable. The newly recommended reference level range is more a matter of ICRP internal simplification, coherence, and consistency. The selection of a reference level from within the fairly broad range is left to the national authority. At the same time, in the new recommendations, the recommended reference levels play a larger role in selecting the most appropriate protective action:

> (286) The Commission recommends that reference levels, set in terms of individual dose, should be used in conjunction with the implementation of the optimization process for exposures in existing exposure situations. The objective is to implement optimized protection strategies, or a progressive range of such strategies, which will reduce individual doses below the reference level.

SUMMARY — EXISTING VERSUS PLANNED EXPOSURE SITUATIONS

For the last 18 years, the ICRP has recommended distinguishing between planned and existing exposure situations in radiation protection requirements. The ICRP has consistently recognized that the cost to avert a unit of dose in an existing exposure situation is likely to be much higher than the cost to avert a unit of dose in a planned exposure situation, where the radiation source is much more easily controlled. The ICRP has consistently recognized that universal application of limits and constraints that may be appropriate for planned exposure situations — what NRC has done in 10 CFR 20 Subpart E — is highly likely to be unduly burdensome to those sites with existing exposure situations.

However, the proposed rule, if adopted as written, would impose a "one size fits all" approach that is unwieldy to implement and that fails to recognize the differences

between planned and existing exposure scenarios. This could dramatically increase the cost of decommissioning, without a corresponding reduction in dose. Driving up the decommissioning cost for existing exposure situations in this way could be just as sure a way of creating legacy sites as inadvertently overlooking a subsurface release path. Accordingly, the proposed rule should distinguish between planned and existing exposure scenarios, adjusting the regulatory response as needed. This would be consistent with the recommendations of the ICRP and risk-informed regulation.