EXHIBIT A

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

COMMISSIONERS:

Allison M. Macfarlane, Chairman
Kristine L. Svinicki
George Apostolakis
William D. Magwood, IV
William C. Ostendorff

In the Matter of	)	
SHIELDALLOY METALLURGICAL CORPORATION	)	Docket No. 40-7102-MLA
(Decommissioning of the Newfield, New Jersey Site)	)	

CLI-13-06

MEMORANDUM AND ORDER

The matter before us today originally arose from our 2009 transfer of regulatory authority over specified categories of nuclear material to the State of New Jersey under section 274 of the Atomic Energy Act (AEA).[1] Section 274 authorizes the Commission to enter into an agreement with the governor of any state if we find that the state's regulatory program is "adequate" to protect the public health and safety with respect to the materials the state seeks to regulate and is "compatible" with our program for regulation of such materials.

Prior to the 2009 transfer, Shieldalloy Metallurgical Corporation (Shieldalloy) had been pursuing license termination with respect to a source material license associated with the company's metal alloy manufacturing site in Newfield, New Jersey. Shieldalloy challenged the 2009 transfer to New Jersey in the United States Court of Appeals for the District of Columbia

[1] Atomic Energy Act of 1954, as amended, § 274, 42 U.S.C. § 2021.

Circuit. In 2010, that court unanimously vacated the 2009 transfer as to the Shieldalloy site and transferred regulatory authority back to the NRC.[2] On remand from the D.C. Circuit's 2010 decision, we addressed the issues identified by the court and reinstated transfer of our regulatory authority over the site to New Jersey.[3] In 2011, Shieldalloy filed a second appeal in the D.C. Circuit. This time, the court voted two to one to vacate the transfer once again and to remand the case to the NRC for further proceedings.[4]

The three-judge panel unanimously deferred to the NRC on two issues: (1) that section 274 of the AEA does not permit the NRC to retain jurisdiction over a site at a licensee's request where the state seeks to assume regulatory authority over the site and meets section 274's "adequacy" and "compatibility" criteria;[5] and (2) that the NRC's agreement-state "Criterion 25," which requires appropriate arrangements to ensure that transfer of NRC's regulatory authority does not interfere with or interrupt the licensing process, did not compel the NRC to retain jurisdiction over the Shieldalloy site.[6] But the court, with one judge dissenting, found in favor of Shieldalloy and vacated the transfer to New Jersey based on an issue involving our interpretation of our license termination regulations. The court held that, in finding New Jersey's license termination regulations to be "adequate" and "compatible" with our regulations, we had failed to explain how our interpretation of one particular provision—10 C.F.R. § 20.1403(a)—was grounded in the regulatory text.

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[2] *Shieldalloy Metallurgical Corp. v. NRC*, 624 F.3d 489 (D.C. Cir. 2010).

[3] *Shieldalloy Metallurgical Corp* (Decommissioning of Newfield, New Jersey Site), CLI-11-12, 74 NRC 460 (2011).

[4] *Shieldalloy Metallurgical Corp. v. NRC*, 707 F.3d 371 (D.C. Cir. 2013).

[5] *Id.* at 376.

[6] *Id.* at 377.

The purpose of our decision today is to provide a textual analysis and additional clarifying explanation of our interpretation of § 20.1403(a) in light of the court's remand. This analysis supports the conclusion we reached in CLI-11-12—that there is no incompatibility between New Jersey's license termination regulations and ours. Contrary to Shieldalloy's position, New Jersey's standards for license termination are not less protective of public safety than are the NRC's. Indeed, the NRC mandates that, upon license termination, the annual radiation dose to the public be limited to 25 mrem, while New Jersey requires that it be reduced even further, to 15 mrem.[7] And, as a means of ensuring long-term compliance with these requirements and maintaining adequate protection of the public health and safety, both the NRC and New Jersey have taken steps to limit the use of restricted-release decommissioning. In our case, we have implemented by regulation a preference for unrestricted-release decommissioning. While the court did not raise issues with the technical and policy reasons we have supplied for our preference, the court believed that the text of our regulations and guidance documents suggest that we have *no* favored option as between restricted and unrestricted release and require the selection of the decommissioning option that yields the lowest dose achievable. This order provides additional explanation to clarify that § 20.1403(a) is consistent with (and, in fact, codifies) our preference that licensees satisfy our radiation dose criteria for license termination through unrestricted-release decommissioning if it is cost-

[7] As stated in our regulation relating to unrestricted use, "[a] site will be considered acceptable for unrestricted use if the residual radioactivity that is distinguishable from background radiation results in a TEDE [Total Effective Dose Equivalent] to an average member of the critical group that does not exceed 25 mrem (0.25.mSv) per year, including that from groundwater sources of drinking water, and that the residual radioactivity has been reduced to levels that are as low as reasonably achievable (ALARA)." 10 C.F.R. § 20.1402. For license termination under restricted conditions, the related criterion is that "[t]he licensee has made provisions for legally enforceable institutional controls that provide reasonable assurance that the TEDE from residual radioactivity distinguishable from background to the average member of the critical group will not exceed 25 mrem (0.25 mSv) per year." 10 C.F.R. § 20.1403(b).

beneficial to do so. In light of this explanation, we reinstate the transfer of our regulatory authority over Shieldalloy's site to New Jersey.

I. THE NRC'S INTERPRETATION OF ITS LICENSE TERMINATION REGULATIONS

Before engaging in a textual analysis of § 20.1403(a), we set forth the regulatory interpretation that was the subject of the court's remand decision. In reviewing our (and Shieldalloy's) construction of our regulations, we refer to our earlier remand order, CLI-11-12, and various characterizations of our position reflected in the court's majority and dissenting opinions.[8]

In the first remand proceeding, we understood Shieldalloy to assert that our license termination regulations require a licensee to compare radiation doses resulting from restricted-release and unrestricted-release decommissioning options and to choose the option that yields the lowest achievable dose.[9] Shieldalloy claimed that New Jersey's license termination program was incompatible with, and less protective of, the public health and safety than the NRC's because New Jersey had not adopted such a "comparative-dose" requirement. Before us, Shieldalloy did not cite § 20.1403(a) as the basis for its claim that our license termination regulations embody a comparative-dose requirement, referring only to our general ALARA principle. Given that New Jersey had in fact adopted the general ALARA requirement for all of its radiation protection programs, including license termination,[10] we surmised that

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[8] The procedural history and regulatory background relevant to this case are detailed in our earlier order on remand. That order discusses the regulatory framework regarding our agreement state policy, our license termination rule, and our general regulatory principle known as "ALARA" (as low as is reasonably achievable), which requires licensees engaged in all regulatory activities, including license termination, to reduce radiation dose levels as far below regulatory dose limits as is cost-beneficial. *See* CLI-11-12, 74 NRC at 464-67, 478-83.

[9] CLI-11-12, 74 NRC at 488-89.

[10] *Id.* at 492-93.

§ 20.1403(a),[11] which uses the term "ALARA" and which New Jersey did not adopt, may have been the source of Shieldalloy's comparative-dose claim.[12]

Despite Shieldalloy's limited explanation of its comparative-dose argument, we addressed its explanation in our remand decision and concluded that Shieldalloy had misconstrued our license termination regulations, including the role of an ALARA analysis in § 20.1403(a). Accordingly, we explained that regulation's basic "purpose and method."[13] We made clear that nothing in our license termination regulations, including the ALARA principle incorporated into § 20.1403(a), "call[s] for a comparison of doses of restricted-release and

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[11] Section 20.1403(a) provides in relevant part:

> A site will be considered acceptable for license termination under restricted conditions if:
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> (a) The licensee can demonstrate that further reductions in residual radioactivity necessary to comply with the provisions of § 20.1402 [governing unrestricted release] would result in net public or environmental harm or were not being made because the residual levels associated with restricted conditions are ALARA. Determination of the levels which are ALARA must take into account consideration of any detriments, such as traffic accidents, expected to potentially result from decontamination and waste disposal[.]

[12] Our understanding of Shieldalloy's argument during the first remand comports with the D.C. Circuit's subsequent characterization of Shieldalloy's position on appeal:

> . . . [I]f we understand Shieldalloy correctly, the proper application of the emphasized language [in § 20.1403(a)] would entail a comparison between restricted and unrestricted release, and the former would win when it yielded lower risks than unrestricted [release]. By contrast, Shieldalloy asserts, New Jersey does not contemplate any form of radiation dose comparison between restricted and unrestricted release, and may require unrestricted release even where restricted release would have been safer.

Shieldalloy, 707 F.3d at 378.

[13] *See id*. at 394 (Rogers, J., concurring in part and dissenting in part).

unrestricted-release decommissioning options."[14] The doses yielded by the restricted-release and unrestricted-release decommissioning options, we explained, are "not susceptible to being compared meaningfully"[15] because of the "significantly different risks and uncertainties associated with" each option.[16] We emphasized, however, that due to the inherent complexities and uncertainties associated with restricted release, including reliance on engineered barriers and long-term monitoring over a 1000-year compliance period, our preference, made explicit when we adopted the license termination rule, was for unrestricted-release decommissioning.[17] In light of our preference for unrestricted release, we incorporated into our license termination regulations a threshold eligibility provision for restricted release that requires licensees to demonstrate that remediation to the level of adequate protection for license termination[18] cannot be achieved cost-beneficially through unrestricted release before allowing them to pursue restricted-release decommissioning.[19]

This initial eligibility requirement is contained in § 20.1403(a). As we explained in our order on remand, the eligibility test in § 20.1403(a) postulates a cost-benefit inquiry that, in its

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[14] CLI-11-12, 74 NRC at 491.

[15] *Id.* at 489.

[16] *Id.*

[17] *Id*. at 491. This principle is reflected in the Statements of Consideration accompanying our license termination rule, in which we explained that decommissioning under an unrestricted-release plan is "generally preferable" because "it requires no additional precautions or limitations on use of the site after licensing control ceases." Final Rule, Radiological Criteria for License Termination, 62 Fed. Reg. 39,058, 39,069 (July 21, 1997).

[18] To provide adequate protection to the public upon license termination, we have established a maximum dose level to the public of 25 mrem per year. A licensee must satisfy this limitation without regard to cost, and regardless of whether decommissioning is to be accomplished through restricted or unrestricted release. CLI-11-12, 74 NRC at 480-81; *see* 10 C.F.R. §§ 20.1402, 20.1403(b).

[19] CLI-11-12, 74 NRC at 492; *see also Shieldalloy*, 707 F.3d at 392 (Rogers, J., concurring in part and dissenting in part).

technical approach, is modeled on a traditional ALARA cost-benefit analysis (i.e., a comparison of the potential costs and benefits of incremental reductions in radioactivity levels below a particular radiation level), but that, in this context, serves a different regulatory purpose.[20] Whereas the traditional purpose of an ALARA analysis (which is made applicable by § 20.1101(b) to all licensed activities[21]) is to reduce doses below a specified regulatory dose limit if cost-effective,[22] the ALARA principle incorporated into § 20.1403(a) serves as a regulatory tool to "limit the use of restricted release—effectively, to screen out sites that should be removing contamination to achieve unrestricted use."[23] Accordingly, the ALARA analysis required under § 20.1403(a) calls for a licensee seeking to use restricted release to analyze whether it would be cost-beneficial to remove enough radioactive contamination from the site so that doses to the public are no higher than 25 mrem per year without reliance on restricted-release controls. The results of a § 20.1403(a) analysis will determine the licensee's initial eligibility to pursue restricted release.

As we indicated, § 20.1403(a) permits a licensee to weigh the costs and benefits of removing radioactive contamination using one of two alternative analyses modeled on the ALARA principle. The licensee may perform an analysis that either (1) compares all of the potential benefits to all of the potential costs that are typically evaluated in an ALARA analysis for its traditional purpose; or (2) considers the "net public and environmental harm" as a cost and compares those costs against the health and environment-related benefits of removing

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[20] CLI-11-12, 74 NRC at 480-81, 491-92.

[21] *Id. at 480.*

[22] *Id.*

[23] *Id*. at 491-92.

radioactive contamination.[24] If under either test removing radioactive contamination to a level at or below the 25-mrem-per-year threshold would not be cost-beneficial, the licensee will be eligible to pursue restricted release.[25]

We further noted that the requirement that a licensee reduce radiation doses associated with restricted release to regulatory limits—or below regulatory limits if cost-effective (i.e., ALARA for its traditional purpose)—is the subject of separate regulatory provisions that come into play *after* a licensee demonstrates initial eligibility to pursue restricted release as required under § 20.1403(a). As we explained, if a licensee demonstrates, through either of the two cost-benefit approaches incorporated into § 20.1403(a), that removing radioactive contamination to the unrestricted use level would not be cost-beneficial, the licensee then must show that, with the addition of engineered barriers and institutional controls, the average annual dose to the public will not exceed 25 mrem per year *and* is as low as is reasonably achievable.[26] Also, the licensee must show that, in the event institutional controls fail, enough residual radioactivity has been removed from the site so that the average annual dose to the public will

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[24] *Id.* at 481; *Shieldalloy*, 707 F.3d at 392 (Rogers, J., concurring in part and dissenting in part). In a full-fledged ALARA analysis, the potential "costs" of removing contamination to achieve unrestricted release include transportation-related doses to workers and the public, occupational doses, and occupational non-radiological risks such as traffic accidents, as well as the out-of-pocket costs of removing soil to reach the 25 mrem per year unrestricted-use level and transporting and disposing of the soil at a low-level radioactive waste facility. *See* NUREG-1757, Vol. 2 at N-3. The potential "benefits" of removing contamination to the unrestricted-release level include collective dose averted, regulatory costs avoided, changes in land values, esthetics, and reduction in public opposition. *Id*. Most of the potential benefits and costs (including occupational and transportation-related doses and transportation risks) are converted to a dollar value. *Id*. at N-3 to N-9. The "net public or environmental harm" analysis compares the health and environment-related benefits of reduction in residual radioactivity to a subset of potential costs and excludes consideration of the out-of-pocket costs of soil removal, transportation, and disposal. *See* NUREG-1757, Vol. 1 at 17-70; *id.*, Vol. 2 at N-13 - N-14.

[25] CLI-11-12, 74 NRC at 481.

[26] *Id.*; 10 C.F.R. § 20.1403(b).

not exceed 100 mrem per year and is as low as is reasonably achievable.[27] We made clear that, despite having passed the initial eligibility test,"[i]f a licensee cannot satisfy those criteria, its site will not 'be considered acceptable for license termination under restricted conditions.'"[28] In that event, the site must be remediated to the level of adequate protection for license termination using unrestricted release pursuant to § 20.1402.[29]

In light of our interpretation of § 20.1403(a) and our rejection of Shieldalloy's assertion that the provision contains a comparative-dose requirement, we concluded that New Jersey's omission of a provision analogous to § 20.1403(a) is "immaterial to adequacy or compatibility."[30] As we explained, we have assigned license termination a "Category C" classification, which means that states are free to adopt criteria in this area that are more restrictive than ours.[31] Because New Jersey, like the Commission, has adopted the objective of seeking "to *limit* the use of restricted release," and because New Jersey has, in fact, adopted "more stringent criteria for license termination under restricted release than for unrestricted release, as well as more conservative criteria than ours," we deemed New Jersey's regulations to be compatible with our program under our agreement-state policy.[32]

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[27] CLI-11-12, 74 NRC at 481-82; 10 C.F.R. § 20.1403(e). A 500 mrem per year dose criterion is also available under limited circumstances. *Id.*

[28] CLI-11-12, 74 NRC at 482 (quoting 10 C.F.R. § 20.1403); *see also Shieldalloy*, 707 F.3d at 393 (Rogers, J., concurring in part and dissenting in part).

[29] CLI-11-12, 74 NRC at 481-82; *see* n.17, *supra*.

[30] CLI-11-12, 74 NRC at 493.

[31] *Id.* at 479, 482, 493, 496. The compatibility classification for license termination was adopted at the time the license termination rule was promulgated, after being subject to public comment at the proposed rule stage. *See id.* at 482.

[32] *Id*. at 493 (emphasis in original); *see also* N.J. Admin. Code §§ 7.28-6.1, 12.8, 12.9, 12.10, 12.11, and 12.12.

II. THE COURT'S REMAND

In its recent decision, the D.C. Circuit found that the text of § 20.1403(a) neither "precludes" Shieldalloy's reading of the provision to compel selection of the lowest-dose reasonably achievable decommissioning option "nor, at least without exegesis that is completely missing here," supports our contention that the provision was intended to compel selection of unrestricted release if cost-beneficial.[33] Examining the phrase "were not being made because the residual levels associated with restricted conditions are ALARA" in the text of § 20.1403(a), the court suggested that "the availability of restricted release under § 20.1403 would appear to have nothing to do with whether unrestricted release can be attained in a cost-beneficial manner, and everything to do with some property of restricted release."[34] The court acknowledged that this construction of § 20.1403(a) "jars with" the NRC's stated preference for unrestricted release[35] and is "in tension" with the second sentence of the provision.[36] But the court nevertheless concluded that the language at issue seemed to require a showing regarding restricted release that is unrelated to whether unrestricted release would be cost-beneficial.[37] The court also observed that other "NRC regulations and statements," including the definition of ALARA in § 20.1003, certain statements in NUREG-1757 (our license termination guidance),[38]

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[33] *Shieldalloy*, 707 F.3d at 379.

[34] *Id*.

[35] *Id*. at 380.

[36] The second sentence of § 20.1403(a) provides that the "[d]etermination of the levels which are ALARA must take into account consideration of any detriments, such as traffic accidents, expected to potentially result from decontamination and waste disposal." The court observed that, in contrast to unrestricted release, "traffic accidents related to waste disposal would seem to have little to do with restricted release, which involves on-site disposal of radioactive materials." *Shieldalloy*, 707 F.3d at 380.

[37] *Shieldalloy*, 707 F.3d at 379-80.

[38] Consolidated Decommissioning Guidance: Decommissioning Process for Materials Licensees, NUREG-1757, Vol. 1 (Rev. 2, Sept. 2006); Consolidated Decommissioning (continued . . .)

and staff requests for information from Shieldalloy, did not appear to "square" with the NRC's position that § 20.1403(a) employs the ALARA principle as part of a threshold assessment of eligibility to pursue restricted release.[39]

Although it found our explanation lacking, the court did not necessarily endorse Shieldalloy's comparative-dose position. Instead, it required us to explain, based on the text of § 20.1403(a), how New Jersey's regulations are compatible with ours:

> In the present case, our study of the text led to the conclusion that the Commission's response to Shieldalloy lacked an apparent textual basis; but that finding of course does not obligate the NRC to accept *Shieldalloy's* interpretation of § 20.1403(a). Rather, it requires only that the Commission explain itself in a way that rationally addresses the concerns we set out above.[40]

Accordingly, the court granted Shieldalloy's petition challenging the NRC's transfer of NRC's authority to New Jersey, vacated the transfer of authority as to Shieldalloy's site, and remanded the case for proceedings consistent with its opinion.[41] In the discussion below, we endeavor to address the court's concerns.

III. DISCUSSION

As explained above, Shieldalloy contends that New Jersey's regulations are not compatible with ours because New Jersey lacks a comparable regulation to § 20.1403(a), which in Shieldalloy's view requires a comparison between doses to the public under restricted release and unrestricted release and selection of the alternative that yields the lowest dose. On remand, the D.C. Circuit asked us to provide the textual basis for our interpretation of

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Guidance: Characterization, Survey and Determination of Radiological Criteria, NUREG-1757, Vol. 2 (Rev. 1, Sept. 2006).

[39] *Shieldalloy*, 707 F.3d at 380.

[40] *Id.* at 382.

[41] *Id.* at 383.

§ 20.1403.[42] As shown below, the pivotal inquiry in § 20.1403(a) is whether it is cost-beneficial to reduce residual radioactivity to or below the level of unrestricted release, not whether unrestricted release leads to a higher or lower public dose than restricted release.

A. *Textual Analysis of § 20.1403(a)*

We begin by examining the words "further reductions in residual radioactivity necessary to comply with the provisions of § 20.1402"[43] as these words are the subject of the central inquiry mandated by § 20.1403(a). That inquiry focuses on a specific activity—making the "further reductions in residual radioactivity" that would be necessary to decommission a site pursuant to an unrestricted-release plan—and, in relevant part here, requires the licensee to demonstrate why those reductions "were not being made."[44] An accurate understanding of what "further reductions in residual radioactivity" means and does not mean is critical to understanding the demonstration of initial eligibility for restricted release required by § 20.1403(a).

"Residual radioactivity" is defined in our regulations—"radioactivity in structures, materials, soils, groundwater, and other media at a site resulting from activities under the licensee's control."[45] While it is possible to use restricted-release decommissioning to reduce the *dose* to the public from "residual radioactivity"—i.e., by creating institutional controls to restrict future land use and in some cases constructing engineered barriers to reduce exposure to radioactivity—it is not possible to *reduce* "residual radioactivity" itself simply by taking these

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[42] *Id.* at 382.

[43] The provisions of 10 C.F.R. § 20.1402 govern unrestricted release.

[44] *See* 10 C.F.R. § 20.1403(a) ("A site will be considered acceptable for license termination under restricted conditions if . . . the licensee can demonstrate that further reductions in residual radioactivity necessary to comply with [the radiological criteria for unrestricted use] . . . were not being made because the residual levels associated with restricted conditions are ALARA . . . .").

[45] 10 C.F.R. § 20.1003.

steps. Instead, "residual radioactivity," as defined, can only be "reduced" through removal of radioactive material from a site or site decontamination. Accordingly, our use of the phrase "reductions in residual radioactivity" in § 20.1403(a) refers only to dose reductions to the public that can be accomplished solely through the steps associated with unrestricted-release decommissioning—i.e., removal of contaminated material or decontamination.

The first sentence of § 20.1403(a) requires licensees seeking restricted release to examine why "*further* reductions in residual radioactivity . . . were not being made" (emphasis added). Our use of the term "further" in connection with the phrase "reductions in residual radioactivity necessary to comply with the provisions of § 20.1402" is significant. Given that the provision applies solely to licensees seeking authorization to use restricted release, "further reductions" necessarily refers to further reductions from the level of residual radioactivity that a licensee proposes to leave in place under its proposed restricted-release decommissioning plan. Depending on a licensee's proposal, what is proposed to be left in place could consist of residual radioactivity from contaminated material existing at a site when a restricted-release application is filed, or, if the licensee proposes to remove (or decontaminate) some of the existing contaminated material, the residual radioactivity that would remain after removal (or decontamination).

As for the particular demonstration required, the first sentence of § 20.1403(a) ties the language, "further reductions in residual radioactivity necessary to [accomplish unrestricted release]," to two alternative showings. Specifically, a licensee seeking to demonstrate eligibility to pursue restricted release must show that further reductions—to a dose level of 25 mrem—of the levels of residual radioactivity proposed to be left in place under a restricted-release plan either "[1] would result in net public or environmental harm or [2] were not being made because the residual levels associated with restricted conditions are ALARA." This sentence in its entirety requires a licensee to demonstrate through either method that further reducing

proposed residual radioactivity to unrestricted-release levels, without considering the impacts of institutional controls and engineered barriers associated with restricted release, would not be cost-beneficial.

The language in § 20.1403(a) upon which the court focused—"were not being made because the residual levels associated with restricted conditions are ALARA"[46]—describes the alternative of using a full cost-benefit analysis to examine whether further reductions in proposed residual radioactivity, to the level of unrestricted release, would not be cost-beneficial. The court did not appear to take issue with the "net harm" analysis as a cost-benefit screening mechanism for sites that should be decommissioning to unrestricted release. The court did take issue with our explanation as to how the portion of the regulation referring to an ALARA analysis was related to "whether unrestricted release can be attained in a cost-beneficial manner."[47] It appears that the court's concern stems from the words "residual levels associated with restricted conditions," and, in particular, its understanding that these words speak to "some property of restricted release."[48]

The central "property" of restricted release that distinguishes it from unrestricted release, however, is the reliance on engineered barriers and institutional controls to reduce doses to the public to regulatory compliance levels and to maintain doses at those levels. By contrast, unrestricted release involves removal or decontamination of material to achieve and maintain doses at regulatory compliance levels without relying on the controls inherent in a restricted-use plan. As we have explained above, "residual radioactivity," as defined, can only be "reduced" through removal or decontamination and not through the engineered barriers and institutional

[46] This is the same language that Shieldalloy relied on in briefing before the D.C. Circuit to support its comparative-dose position. *See Shieldalloy*, 707 F.3d at 386 (Rogers, J., concurring in part and dissenting in part).

[47] *Id*. at 380.

[48] *Id.*

controls that would come into play under a restricted-release plan. Considering its placement in the first sentence of § 20.1403(a), the term "residual levels," as used in the phrase "were not being made because the residual levels . . . are ALARA," refers back to, and is shorthand for, the term "residual radioactivity" used earlier in the introductory language.[49] Accordingly, the determination expressly required by the text of § 20.1403(a)—whether "further reductions in residual radioactivity . . . were not being made because the residual levels associated with restricted conditions are ALARA"—is an inquiry that, by definition, focuses on how far it is possible, on a cost-effective basis, to further reduce the "residual levels." Consequently, the inquiry necessarily focuses on the actions required to accomplish unrestricted release (i.e., removing or decontaminating radioactive materials).[50] This means that the "residual levels . . . are ALARA" inquiry has nothing whatever to do with accomplishing or assessing dose reductions using restricted release or comparing restricted-release and unrestricted-release dose. Rather, given the link to the introductory clause—"further reductions in residual radioactivity necessary to comply with . . . § 20.1402"—this inquiry has everything to do with assessing whether "further radioactive materials can be cost-beneficially removed, washed away, or the like so that the site can be decommissioned under [unrestricted release]."[51]

Our construction is supported by the second sentence of § 20.1403(a), which instructs licensees, in determining whether "levels . . . are ALARA," to consider "detriments, such as

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[49] This is the only permissible construction of the term, given that there is no other term in the regulation that is modified by the word "residual." *Accord* NUREG-1757, Vol. 1 at 17-70 (calling for the licensee to demonstrate that the reason that further reductions were not being made is because the "residual radioactivity levels are ALARA").

[50] This interpretation is consistent with our license termination guidance, which describes the "residual radioactivity level that is ALARA" to mean the "concentration. . .at which the benefit from removal equals the cost of removal." NUREG-1757, Vol. 2 at N-10.

[51] *Shieldalloy*, 707 F.3d at 392 (Rogers, J., concurring in part and dissenting in part).

traffic accidents." Traffic accidents, as the court's opinion itself acknowledged,[52] would generally only be relevant to activities necessary to accomplish unrestricted release (e.g., removal and transportation of contaminated material away from the site and to a place of disposal). The construction also comports with § 20.1403(e), which, due to our concern that institutional controls might fail, requires that, notwithstanding a licensee's plan to rely upon restricted release, the licensee still must make certain efforts to reduce the amount of residual radioactivity. These passages confirm the fundamental lesson to be gleaned from § 20.1403(a)'s focus on reductions in residual radioactivity—that, by definition, taking steps to reduce residual radioactivity involves activities that are separate from the introduction of restricted-release controls and, instead, involves activities that can only be associated with unrestricted release.

To be sure, the language "associated with restricted conditions" might, at first glance, appear to focus on some defining property of restricted release, such as the dose that could be cost-beneficially achieved under a licensee's restricted-release plan. However, the placement and use of those words within the sentence at issue (i.e., in connection with the inquiry as to why "further reductions in residual radioactivity . . . were not being made") undermines that reading. These words necessarily refer to the residual levels of radioactivity that a licensee proposes to leave in place as part of its proposed restricted-release plan.[53] Construed in context with the entire introductory clause in § 20.1403(a), the inquiry whether "residual levels associated with restricted conditions are ALARA" calls for a licensee to demonstrate that "further reductions" (that is, further removal of contaminated soil or decontamination) from *proposed* residual radioactivity levels to the level necessary to achieve unrestricted release are "not being

[52] *Id*. at 380 (majority opinion).

[53] This is consistent with our license termination guidance, which describes the test at issue in § 20.1403(a) as requiring a "demonstration that the *proposed* residual radioactivity levels at the site are ALARA." *See* NUREG-1757, Vol. 1 at 17-70 (emphasis added).

made" because the proposed "residual levels" are *already* as low as is reasonably achievable, such that "further" removal or decontamination would not be cost-beneficial. Thus the phrase "associated with restricted conditions" does not suggest a comparison between restricted and unrestricted release.

As this analysis makes clear, licensees pursuing restricted release must reduce residual radioactivity levels as low as is reasonably (i.e., cost-beneficially) achievable through removal and decontamination *before* relying on engineered barriers and institutional controls to reduce doses to the public to regulatory compliance levels. If the licensee's proposed level of residual radioactivity is as low as is cost-beneficially achievable but still exceeds the level required for unrestricted release (25 mrem), the licensee will have demonstrated that it is not possible to further reduce residual radioactivity to a point where unrestricted release is cost-beneficial and will be eligible to pursue restricted release. Conversely, if analysis reveals that the proposed residual radioactivity level is not as low as is cost-beneficially achievable and that further reductions to 25 mrem or below would be cost-beneficial, the licensee will not be eligible for restricted release and must decommission to unrestricted-release criteria. This would be true even if it were possible to cost-beneficially reduce the dose to the public to infinitesimally small levels through restricted release, as Shieldalloy claims to be able to do in this case.[54]

Our regulatory preference for unrestricted release requires that the licensee meet the 25-mrem dose requirement by removing or decontaminating radioactive material if it is cost-effective to do so. We observe, however, that even if unrestricted release cannot be achieved cost-effectively, requiring that a licensee reduce residual radioactivity to the lowest cost-effective level under a restricted-release plan serves the beneficial regulatory purpose of optimizing protection of public health and safety and is consistent with our preference for unrestricted release. In particular, reducing residual radioactivity from pre-existing levels to the lowest level

[54] CLI-11-12, 74 NRC at 490.

that can be accomplished cost beneficially facilitates greater protection of public health and safety in the event engineered barriers and institutional controls fail over the long term,[55] and may also result in the need for fewer and less complex engineered barriers and institutional controls, substantially lessening the risk of failure of such barriers and controls over the 1000-year compliance period.

In sum, the above analysis of the text of § 20.1403(a), informed by the regulatory definition of residual radioactivity in § 20.1003, clarifies that the provision does not entail any comparison between the individual annual doses associated with restricted release and the individual annual doses associated with unrestricted release. Rather, as a matter of initial eligibility for consideration of restricted release, § 20.1403(a) requires licensees seeking to pursue restricted release to demonstrate through a cost-benefit analysis that reduction of residual radioactivity to 25 mrem or below would not be cost-beneficial. If, and only if, such reductions cannot be made on a cost-beneficial basis by using the tools associated with unrestricted release—most notably, removing contaminated material—will the licensee be eligible to pursue restricted release.

B. *Response to the Court's Other Concerns*

Beyond calling for a textual analysis of § 20.1403(a), the court also indicated that guidance published by the Commission, namely NUREG-1757, "evinces a clear expectation that a licensee must compare unrestricted and restricted release in order to establish eligibility" for restricted release under § 20.1403(a). The court further observed that NUREG-1757 "can reasonably be read to call for precisely the kind of comparative dose analysis that Shieldalloy

[55] *See* § 20.1403(e) (requiring a demonstration, for those licensees eligible to pursue restricted release, that "[r]esidual radioactivity at the site has been reduced" so that if institutional controls fail, the dose to the public will be as low as reasonably achievable and will not exceed 100 mrem or 500 mrem under some circumstances).

claims is contemplated by" that section.[56] The "comparisons" associated with an ALARA cost-benefit analysis, however, do not require the comparative dose analysis that Shieldalloy postulates.

As described above, to establish eligibility for restricted release, a licensee must demonstrate that residual levels of radioactivity cannot cost-beneficially be reduced to the unrestricted-release level. Such a determination, by definition, requires an identification and, if possible, a reduction to a dollar value, of the costs and benefits of reducing residual radioactivity levels at or below this level. The most obvious examples of the costs and benefits of such an effort are the cost of performing the work (i.e., the cost of removal, transport, and disposal), and the benefits to the public of reducing the dose by a particular amount. The financial value of these costs and benefits can be calculated solely with reference to the activity involved. Thus, there is a cost to remove a particular amount of contaminated soil, measured as a function of the amount of waste and the cost of waste disposal per unit volume.[57] Likewise, there is a value to the public in reducing the dose to which it might be exposed. This benefit is referred to as "collective dose averted" and is a function of the reduction in individual dose, the number of people affected by the reduction, and the length of time people are affected.[58]

Other components of the ALARA cost-benefit analysis cannot be calculated without reference to a proposed alternative. These components necessitate the references to "comparisons between restricted and unrestricted release" in our guidance,[59] which the court

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[56] *Shieldalloy*, 707 F.3d at 381 (citing NUREG-1757, Vol. 2, at 6-3, N-6).

[57] *See* NUREG-1757, Vol. 2, at N-7.

[58] *Id.* at N-4 ("An acceptable value for a collective dose is $2000 per person-rem averted, discounted for a dose averted in the future.").

[59] *Id.* at 6-3; *see also id.* at N-6 (referring to "ALARA analyses of restricted release versus unrestricted release decommissioning goals").

cited.[60] Indeed, the benefits of reducing the levels of residual radioactivity include not only a benefit that is calculated in *absolute* terms, i.e., collective dose averted, but also benefits associated with avoiding restricted release that can only be calculated in *relative* terms, such as regulatory costs avoided, changes in land values, and reductions in public opposition. The benefits associated with, for example, regulatory costs avoided, that will result from unrestricted release can only be measured by comparing (1) the regulatory costs if the site were decommissioned pursuant to an unrestricted-release plan with (2) the regulatory costs if the site were released pursuant to a restricted-release plan. In the latter case, the licensee would be required to make expenditures on items such as additional licensing fees to develop an environmental impact statement, additional financial assurance, costs associated with public meetings, and future liability.[61] In other words, one of the benefits of reducing residual levels of radioactivity to levels that do not exceed 25 mrem is the avoidance of costs that would otherwise be incurred were the licensee to pursue restricted release.

The same is true of other benefits that inform the ALARA analysis. For example, the benefits associated with changes in land value can only be measured by comparing the value of the land before the contemplated remediation activity is completed against the value of the land after the activity is completed. Where the remediation activity brings residual levels of radioactivity to or below the 25 mrem threshold (and the licensee is therefore eligible to pursue unrestricted release), the licensee is likely to derive substantial pecuniary benefit. The value of the land will increase if it is free from the need to maintain institutional controls and the landowner has the ability to use the land without restriction. Thus, one of the benefits of removing enough radioactivity to cross the 25-mrem threshold is that the value of the affected property is likely to increase, and this increase must be part of the ALARA analysis, which seeks

[60] *Shieldalloy*, 707 F.3d at 381.

[61] *See* NUREG 1757, Vol. 2, at N-6.

to accurately compare the costs with the benefits of reducing residual radioactivity to a qualifying level for unrestricted release. It is in this sense (and in this sense only) that our guidelines contemplate, as part of the ALARA analysis required by § 20.1403(a), a comparison between restricted release and unrestricted release. Thus, to reasonably calculate the benefits of unrestricted release, the licensee must account for the costs of restricted release that the licensee will avoid through unrestricted release. But, such a limited comparison, necessary for the cost-benefit analysis of reducing residual radioactivity to a qualifying level for unrestricted release, does not constitute the comparison between the doses to the public under restricted and unrestricted release postulated by Shieldalloy.

As analysis of these benefits demonstrates, reducing residual radioactivity levels from a point above 25 mrem to a point at or below that threshold results in several benefits that would not be realized (or would be realized to a much lesser extent) if the remediation only were able to reduce the residual levels to a point that remained above 25 mrem (for example, from 80 mrem to 30 mrem). The fact that additional benefits can be achieved by crossing the 25 mrem threshold explains the observation in our guidance that "[i]n most comparisons between alternatives in the same class[62] . . . the only important benefit should be collective dose averted."[63] Stated differently, reducing residual radioactivity from 80 mrem to 20 mrem results not only in the absolute benefit of collective dose averted, but also results in the relative benefit of no longer having to maintain institutional controls. By contrast, reducing residual radioactivity from 80 mrem to 30 mrem has value in terms of the collective dose averted, but it is unlikely to result in avoided regulatory costs or to produce a substantial difference in land value because

[62] "[A]lternatives in the same class" refers to situations in which both alternatives result in restricted release or both alternatives result in unrestricted release.

[63] NUREG-1757, Vol. 2, at 6-3.

the reductions at issue do not reduce the level below the 25 mrem dose threshold and, consequently, are not likely to change the regulatory environment.

Finally, and relatedly, the court expressed concern that a request for additional information sent by the NRC staff to Shieldalloy[64] suggests the need for a comparative dose analysis between restricted and unrestricted release. Specifically, the court cited the staff's statement that "overestimating the cost of unrestricted release 'would bias the net harm or ALARA comparison away from the unrestricted use option.'"[65] This statement in the RAI suggests no comparative dose analysis between restricted and unrestricted release. Instead, the statement merely reflects a fundamental truth about weighing the costs and benefits of any proposed action. Increasing the amount of work performed to a point beyond that which is necessary to achieve a desired result may result in a finding that the action under consideration is not cost-beneficial. Here, the staff simply requested that Shieldalloy consider the cost of removing only those materials that would be required to reduce the residual radioactivity levels so as not to exceed 25 mrem per year.[66] Because Shieldalloy's calculations may have overstated the amount of work needed to pursue unrestricted release, the staff observed that such an overstatement could erroneously suggest eligibility for restricted release. Of principal concern here, none of these statements implies that the relevant inquiry under § 20.1403(a) is a comparative dose analysis between restricted and unrestricted release. Rather, these

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[64] Request for Additional Information for Safety Review of Proposed Decommissioning Plan for Shieldalloy Metallurgical Corporation (License No. SMB-743) (July 5, 2007) (RAI), at 21 ("The licensee has not demonstrated that complete removal and offsite disposal is necessary to achieve the unrestricted use criteria. If the amount of remediation work is overestimated, then the cost of the [license termination] alternative would also be overestimated, which would bias the net harm or ALARA comparison away from the unrestricted use option. Thus, the unrestricted use option considered should be an option with minimal incremental remedial actions to achieve the unrestricted use criteria.").

[65] *Shieldalloy,* 707 F.3d at 381.

[66] RAI at 21.

statements support the Commission's consistently stated position that the relevant inquiry under § 20.1403(a) is a comparison of the costs and benefits of reducing residual radioactivity to a qualifying level for unrestricted release.

C. *Adequacy and Compatibility of New Jersey's Program*

Today, we have provided the textual analysis that the court found lacking when we concluded in our first remand order that New Jersey's license termination regulations were adequate and compatible with our regulations. We also have explained why our regulatory guidance and our communications with Shieldalloy do not contradict and are entirely consistent with the regulatory interpretation that we have provided. Shieldalloy's claim that New Jersey's license termination regulations are inadequate and incompatible with ours is grounded in its understanding of the regulation at issue—§ 20.1403(a). That understanding contemplates that § 20.1403(a) requires a comparative dose analysis between restricted- and unrestricted-release decommissioning, whereas New Jersey's regulations do not. Our analysis today, however, confirms that Shieldalloy postulates a distinction between our regulations and New Jersey's regulations that simply does not exist. Nothing in § 20.1403(a), or in any of our other regulations relevant to license termination, calls for a comparison between unrestricted-release and restricted-release doses (or selection of the lower dose as between restricted release and unrestricted release). Instead, as we have explained here, the language of 20.1403(a), which focuses on "further reductions to residual radioactivity," a concept necessarily linked to unrestricted release, supports our reading of the regulation to essentially require a cost-benefit analysis of the measures needed to achieve unrestricted release. This embodies our preference for unrestricted release, a preference that is reflected in New Jersey's regulations without an initial eligibility provision such as § 20.1403(a).[67] Accordingly, we reaffirm our finding

[67] *See* CLI-11-12, 74 NRC at 492-93, 495-96.

that New Jersey's regulatory program is adequate and compatible with our program within the meaning of AEA § 274.[68]

IV. CONCLUSION

For the foregoing reasons, we *reinstate* New Jersey's authority to regulate Shieldalloy's Newfield, New Jersey site.

IT IS SO ORDERED.

For the Commission

/RA/

Rochelle C. Bavol
Acting Secretary of the Commission

Dated at Rockville, Maryland,
this 5th day of August 2013.

[68] Because we only provide the textual analysis specifically requested by the court, we need not and do not address what consequences would follow if Shieldalloy's characterization of our license termination rule were accurate.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of	)	
	)	
SHIELDALLOY METALLURGICAL CORP.	)	Docket No. 40-7102-MLA
	)	
(License Amendment Request for Decommissioning the Newfield, New Jersey Facility)	)	

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing **COMMISSION MEMORANDUM AND ORDER (CLI-13-06)** have been served upon the following persons by U.S. mail, first class, and NRC internal mail.

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Docket No. 40-7102-MLA
COMMISSION MEMORANDUM AND ORDER (CLI-13-06)

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[Original signed by Clara I. Sola]
Office of the Secretary of the Commission

Dated at Rockville, Maryland,
this 5th day of August 2013