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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

OFFICE OF SECRETARY  
RULEMAKINGS AND  
ADJUDICATIONS STAFF

THE ATOMIC SAFETY AND LICENSING BOARD

Before Administrative Judges:  
Michael C. Farrar, Chairman  
Lawrence G. McDade  
Dr. Nicholas G. Trikouros

In the Matter of

SHAW AREVA MOX SERVICES, LLC

(Mixed Oxide Fuel Fabrication Facility  
Possession and Use License)

May 18, 2012

Docket No. 70-3098-MLA

ALSBP No. 07-856-02-MLA-BD01

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SHAW AREVA MOX SERVICES, LLC'S  
PROPOSED REPLY FINDINGS OF FACT AND CONCLUSIONS OF LAW  
FOR CONTENTIONS 9, 10, AND 11

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Shaw AREVA MOX Services, LLC (MOX Services or Applicant) herein submits its reply proposed findings of fact and conclusions of law in the licensing proceeding for the Mixed Oxide (MOX) Fuel Fabrication Facility (MOX Facility), in accordance with the schedule agreed to by the Parties and approved by this Atomic Safety and Licensing Board (Board) in an Order dated March 20, 2012. These reply findings supplement MOX Services' initial proposed findings and are limited to the matters raised by the Intervenor<sup>1</sup> in their proposed findings of fact and conclusions of law.<sup>2</sup> As with MOX Services' initial findings, these reply findings are based on the evidentiary record in this proceeding and are submitted in the form of a proposed supplement to the Initial Decision<sup>3</sup> by the Board. These reply findings, together with MOX Services' initial findings, support an initial decision by the Board, under 10 CFR § 2.1210, in favor of MOX Services' application for an NRC license under 10 CFR Part 70 to possess and use special nuclear material at the MOX Facility.

## **I. INTRODUCTION**

1.1 This issuance is a supplement to and is part of our Initial Decision on MOX Services' application for an NRC license to possess and use special nuclear material at the MOX Facility, and on the Intervenor<sup>1</sup>'s three contentions challenging the adequacy of MOX Services' Material Control and Accounting (MC&A) program, with respect to certain NRC requirements at 10 CFR §§ 74.55(b)(1), 74.57(b), and 74.57(e).

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<sup>1</sup> "Intervenor<sup>1</sup>" are Nuclear Watch South, Blue Ridge Environmental Defense League, and Nuclear Information and Resource Service.

<sup>2</sup> In its proposed findings of fact and conclusions of law, the NRC Staff adopted MOX Services' initial findings, with some modifications and additions. See Letter from B. Klukan, Counsel for NRC Staff, to Licensing Board at 1 (May 3, 2012) ("Klukan May 3 Letter") (submitting NRC Staff's Proposed Findings of Fact and Conclusions of Law for Contentions 9, 10, and 11 ("Staff's Initial Findings")). MOX Services herein accepts the modifications and additions to its initial findings proposed by the NRC Staff.

<sup>3</sup> The "Initial Decision" is that presented by MOX Services on April 13, 2012, as modified by the NRC Staff on May 3, 2012.

1.2 Rather than reproduce in full the procedural history, relevant law, and positions on Contentions 9, 10, and 11 – all of which we presented in detail in our Initial Decision – the Sections that follow present only that information which is responsive to the Intervenor’s proposed findings and therefore necessary to supplement our Initial Decision. We do provide again, in full, our summary findings and conclusions and Order, although they are unchanged from our Initial Decision.

1.3 Indeed, this supplement does not alter the Board’s conclusion that MOX Services’ MC&A program – specifically its program related to item monitoring, alarm resolution, and alleged theft assessment – satisfies the NRC requirements at issue. In particular, the Board concludes that MOX Services has demonstrated the following capabilities: (1) contrary to the allegation in Contention 9, using certain automated equipment and computer systems, as well as periodic monitoring of secured and tamper-safed item storage area boundaries, MOX Services can verify the presence and integrity of all items in storage as specified by 10 CFR § 74.55(b)(1); (2) contrary to the allegation in Contention 10, MOX Services can resolve the nature and cause of an alarm in the four storage areas at issue in Contention 10 within approved time periods as required by 10 CFR § 74.57(b); and (3) contrary to the allegation in Contention 11, MOX Services can assess the validity of alleged thefts of plutonium within 8 hours for a single item, and within 72 hours for all items in vault storage as required by 10 CFR § 74.57(e).

1.4 Section II below summarizes the relevant recent background of this proceeding. Section III sets forth the factual findings and legal conclusions that are relevant to Contentions 9, 10, and 11 and the matters raised by the Intervenor in their proposed findings of fact and conclusions of law. Section IV sets forth our summary findings and conclusions, and we issue our Order in Section V.

## **II. RELEVANT BACKGROUND**

2.1 Our Initial Decision summarized the relevant history of this proceeding. Here we briefly summarize the most recent, relevant history of this proceeding that our Initial Decision did not address.

2.2 MOX Services submitted its Proposed Findings of Fact and Conclusions of Law on Contentions 9, 10, and 11 on April 13, 2012.<sup>4</sup> On May 3, 2012, the Intervenors and NRC Staff each submitted Proposed Findings of Fact and Conclusions of Law on Contentions 9, 10, and 11. The NRC Staff's initial findings adopted MOX Services' initial findings, with some modifications and additions.<sup>5</sup> Intervenors' initial findings, on the other hand, challenged certain aspects of MOX Services' initial findings.<sup>6</sup>

2.3 Also on May 3, 2012, the Board issued its Order (Regarding Transcript Corrections), in which it tentatively accepted the parties' proposed corrections, but reserved its right to reject some or all of the corrections at a later date, if necessary.

## **III. REPLY FACTUAL FINDINGS AND LEGAL CONCLUSIONS**

### **A. GENERAL RESPONSES TO INTERVENORS' INITIAL FINDINGS**

3.1 As a threshold matter, we found that the Intervenors' initial findings raised certain generic issues, or were subject to certain generic flaws, that warrant attention at the outset of this supplement. In particular, Intervenors:

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<sup>4</sup> Hereinafter, "MOX Services' Initial Findings."

<sup>5</sup> See Klukan May 3 Letter at 1.

<sup>6</sup> See generally Intervenors' Proposed Findings of Fact and Conclusions of Law for Contentions 9, 10, and 11 (May 3, 2012) ("Intervenors' Initial Findings").

- refer to determinations made in the Construction Authorization Request (CAR) proceeding;<sup>7</sup>
- characterize representations by the Applicant in prior superseded versions of the FNMCP and the withdrawn Exemption Request;<sup>8</sup>
- suggest that the Applicant has wasted this Board's and the parties' resources by pursuing item monitoring methods that are not Intervenor's preferred methods;<sup>9</sup>
- claim that detailed operating procedures are required at this stage of facility licensing;<sup>10</sup> and
- overstate the qualifications of Dr. Lyman to testify on MC&A issues,<sup>11</sup> while vastly understating the qualifications of Mr. Pham to do the same.<sup>12</sup>

Each of these matters is resolved below.

3.2 We also note that Intervenor's did not refute any of MOX Services' initial findings with respect to the inapplicability of EURATOM requirements or the lack of the necessity for a computer code review as an alarm resolution method. Thus, we decide in favor of MOX Services on those matters, and we do not address them further here.

### 1. Intervenor's Raise a Number of Ancillary Points that are Outside the Scope of this Proceeding

3.3 Throughout Intervenor's initial findings, they raise challenges that go beyond the scope of the license application that is at issue in this proceeding, or the requirements of the NRC regulations that are the subject of Contentions 9, 10, and 11. For example, Intervenor's mention

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<sup>7</sup> See Intervenor's Initial Findings ¶ 2.1.

<sup>8</sup> See *id.* ¶¶ 2.2 – 2.6.

<sup>9</sup> See *id.* ¶¶ 4.40 – 4.43.

<sup>10</sup> See *id.* ¶¶ 4.20, 4.44.

<sup>11</sup> See *id.* ¶¶ 4.2 – 4.4.

<sup>12</sup> See *id.* ¶¶ 4.5 – 4.6.

issues related to the CAR proceeding,<sup>13</sup> which was before a different licensing board and was terminated more than seven years ago.<sup>14</sup> Intervenor discuss prior, superseded versions of the FNMCP and the withdrawn Exemption Request,<sup>15</sup> although those documents predate Contentions 9, 10, and 11, are not at issue in Contentions 9, 10, and 11, and are not part of MOX Services' license application.<sup>16</sup> Likewise, Intervenor allege that the Applicant has wasted this Board's and the parties' resources by pursuing item monitoring methods that are not Intervenor's preferred methods.<sup>17</sup> While Intervenor may prefer that MOX Services employ a different item monitoring approach than that which it has proffered in its license application,<sup>18</sup> MOX Services' proposed approach is the only one at issue in this proceeding. And there is no requirement that MOX Services amend its FNMCP to account for methods merely preferred by another party to the licensing proceeding.<sup>19</sup>

3.4 In addition, although Intervenor claim that MOX Services has failed to provide detailed operating procedures to demonstrate its compliance with certain NRC regulations,<sup>20</sup> at no point

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<sup>13</sup> See *id.* ¶ 2.1 (discussing the relevance of MC&A design information on the disposition of contentions at the CAR proceeding).

<sup>14</sup> See Shaw AREVA MOX Services, LLC's Initial Statement of Position on Contentions 4, 9, 10 and 11, at 4 (Sept 9, 2011) ("MOX Services' Initial Statement of Position") (noting that the CAR was terminated on March 30, 2005).

<sup>15</sup> See Intervenor's Initial Findings ¶¶ 2.2 – 2.6, 3.2, 4.59 (citing the timing commitments in prior iterations of the FNMCP and Exemption Request).

<sup>16</sup> See, e.g., *id.* ¶ 3.2 ("[t]his proceeding does not involve a request for an exemption from the NRC's MC&A regulations, because the exemption request was withdrawn and abandoned").

<sup>17</sup> See Intervenor's *id.* ¶¶ 4.40 – 4.43.

<sup>18</sup> See *id.* ¶¶ 2.9, 4.15, 4.40 – 4.43 (surmising that MOX Services could satisfy the requirements of 10 CFR § 74.55(b)(1) using physical verification of item presence).

<sup>19</sup> But see Intervenor's Initial Findings at ¶ 4.40 ("MOX Services has not revised its approach for compliance by taking this new data into account.").

<sup>20</sup> See *id.* ¶ 4.20 ("[w]ithout providing detailed procedures to independently and periodically verify the performance of the PLCs, MOX Services has simply failed to demonstrate the system can operate with the astonishingly high level of accuracy"); *id.* ¶ 4.44 ("Without providing detailed procedures to periodically verify the performance of the PLCs, MOX Services has simply failed to demonstrate the system can operate with this astonishingly high level of accuracy.").

in this proceeding have Intervenor's shown that such procedures are required at this stage of the licensing process. And indeed, they are not. As Judge Trikouros asked counsel for MOX Services at the hearing:

Judge Trikouros: . . . In a normal Part 50 proceeding, correct me somebody if I'm wrong here, one of the parties, plant procedures are not written at the time that the plant is issued a license to operate. Is that not correct? Do we have the same situation going on here?

Ms. Jones: That's correct, Your Honor, it's the same situation here.<sup>21</sup>

3.5 That is not to say that there is no mechanism by which the NRC, as MOX Services' regulator, will ensure that MOX Services implements detailed operating procedures to provide reasonable assurance that it will meet its FNMCP commitments. As counsel for the NRC Staff explained at the hearing,

[MOX Services is] now bound to develop such a procedure, as there are a variety of other compliance items.

Compliance items are treated as commitments, meaning this – how the Staff will – this will work is at the operational readiness review. The staff will review these procedures or any commitments that they have developed prior to [MOX Services'] receipt of [special nuclear] material. And if the staff does not find these procedures sufficient, then [MOX Services doesn't] get their material. And again, this occurs at the operational readiness review.<sup>22</sup>

3.6 But such detailed procedures need not be submitted at this stage in facility licensing. Accordingly, Intervenor's claim that MOX Services has failed to provide detailed operating procedures, is not material to this proceeding.

3.7 We give no further treatment to the matters raised by Intervenor's that are beyond the scope of this proceeding.

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<sup>21</sup> Tr. 1187–88.

<sup>22</sup> Tr. 1364–65 (Klukan).

**2. Intervenor Misstate the Qualifications of Mr. Pham and Dr. Lyman to Testify as Experts in this Proceeding**

3.8 Intervenor's initial findings wrongfully discredit the twenty plus years of experience Mr. Pham has as an inspector and regulator in the field of MC&A.<sup>23</sup> Mr. Pham's resume and experience, which we summarized in our Initial Decision,<sup>24</sup> speaks for itself. The NRC's Meritorious Service Award, which Mr. Pham received on May 17, 2012, for his work with MC&A, speaks for Mr. Pham's qualifications as well.<sup>25</sup>

3.9 And Intervenor apparently have no basis to discredit Mr. Pham. Although Intervenor claim that Mr. Pham's testimony deserves "less weight" "because he was unable to support the conclusions of the Safety Evaluation Report ("SER") with a documented analysis,"<sup>26</sup> no such documentation is required. For years, the Intervenor have had many resources available to them documenting the NRC Staff's review of the FNMCP, and thus, the basis for the conclusions set forth in the SER. Intervenor claim that RAIs on MOX Services' MC&A program "were not produced,"<sup>27</sup> is simply incorrect. The NRC Staff disclosed documents pertaining to MC&A RAIs on multiple occasions in 2008, 2009, and 2010.<sup>28</sup> Similarly, MOX Services identified a very large number of documents related to MC&A RAIs on its log of protected information,

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<sup>23</sup> Compare Intervenor's Initial Findings ¶¶ 4.5 – 4.6, with Exhibit NRC000007, *Curriculum Vitae* of Thomas N. Pham (Oct. 2011).

<sup>24</sup> MOX Services' Initial Findings ¶¶ 4.7 – 4.9.

<sup>25</sup> Press Release No. 12-059, NRC, "Nuclear Regulatory Commission Honors Employees in Rockville, Maryland, Ceremony" at 3 (May 18, 2012), <http://www.nrc.gov/reading-rm/doc-collections/news/2012/12-059.pdf>.

<sup>26</sup> Intervenor's Initial Filings ¶ 4.6.

<sup>27</sup> *Id.* ¶ 4.6.

<sup>28</sup> See, e.g., NRC Staff's 3rd Update to the Hearing File (Oct. 27, 2008); NRC Staff's 5th Update to the Hearing File (Dec. 19, 2008); NRC Staff's 8th Update to the Hearing File (Mar. 19, 2009); NRC Staff's 16th Update to the Hearing File (Nov. 18, 2009); NRC Staff's 18th Update to the Hearing File (Jan. 19, 2010); NRC Staff's 23rd Update to the Hearing File (June 21, 2010).

provided to Intervenor in its first disclosures for the MC&A contentions on June 1, 2011.<sup>29</sup> In response to Intervenor's July 20, 2011 request for all protected, non-UCNI documents related to Contentions 9, 10, and 11, MOX Services provided the MC&A RAI documents to Intervenor on July 27, 2011.<sup>30</sup> If the Intervenor wanted to put the adequacy of the Staff's review underlying the SER at issue in this proceeding, they had ample opportunity to do so.<sup>31</sup>

3.10 Thus, we conclude that Intervenor's attacks on Mr. Pham are without foundation and are a diversion from the issues at hand.

3.11 We also conclude that Intervenor's initial findings vastly overstate the qualifications of Dr. Lyman to testify on MC&A issues. Certainly, Dr. Lyman has been involved in the nuclear industry for a considerable number of years.<sup>32</sup> But Intervenor has not shown that Dr. Lyman has any particular experience with the types of practical, operational MC&A matters at issue in the admitted contentions.<sup>33</sup> His participation in other licensing proceedings and his access to "safeguards-level" information do not alter that fact.<sup>34</sup>

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<sup>29</sup> See Letter from D. Silverman, Counsel for MOX Services, to D. Curran, Counsel for Intervenor, encls. (June 1, 2011) (MOX Services' Initial Disclosures for Contentions 9, 10, and 11).

<sup>30</sup> See Letter from D. Silverman, Counsel for MOX Services, to D. Curran, Counsel for Intervenor at 1 (July 27, 2011) (transmitting MOX Services' Production of Protected Information Related to Contentions 9, 10, and 11).

<sup>31</sup> MOX Services, however, does not concede that the adequacy of the Staff review is a relevant issue to be litigated in this proceeding.

<sup>32</sup> See Exhibit INT000001, Direct Testimony of Dr. Edwin S. Lyman in Support of Intervenor's Contentions 9, 10, and 11 (Oct. 19, 2010); MOX Services Initial Findings ¶¶ 4.10 – 4.11.

<sup>33</sup> See Intervenor's Initial Findings ¶¶ 4.2 – 4.4; *see also generally* Exhibit INT000001.

<sup>34</sup> See Intervenor's Initial Findings ¶¶ 4.3 – 4.4. Intervenor notes that Dr. Lyman "was granted a 'need to know' by NRC's Office of Nuclear Security and Incident Response (NSIR) to review a safeguards-level draft guidance document, DG-5033, in order to provide comments." *Id.* at ¶ 4.4. Draft Regulatory Guide DG-5033, "Security Performance (Adversary) Characteristics for Physical Security Programs for 10 CFR Part 72 Licensees" pertains to the impacts of terrorist attacks on spent fuel storage installations, and has no relation to MC&A or item monitoring. *See Background on the Proposed Security Rulemaking for Independent Spent Fuel Storage Installations*, NRC, available at <http://www.nrc.gov/about-nrc/regulatory/rulemaking/potential-rulemaking/isfsi-security/background.html>. Of the four proceedings

3.12 We turn now to the contention-specific matters raised in the Intervenor's initial findings.

## B. CONTENTION 9

3.13 Contention 9 alleges the following:

[MOX Services'] [2010 FNMCP] does not satisfy the MC&A requirements in 10 C.F.R. § 74.55(b)(1) because it does not demonstrate that [MOX Services'] item monitoring program has the capability to verify, on a statistical sampling basis, the presence and integrity of SSNM items. In particular, [MOX Services] fails to show that it is capable of detecting item losses that total 5 formula kilograms of plutonium or more plant-wide within the time frames specified by the regulation (30 calendar days for Category 1 [sic] items and 60 days for Category 1B items contained in a vault or permanently controlled access area isolated from the rest of the material access area (MAA)).<sup>35</sup>

3.14 The regulation at issue in this Contention is 10 CFR § 74.55(b)(1), which states as follows:

The licensee shall verify on a statistical sampling basis, the presence and integrity of SSNM items. The statistical sampling plan must have at least 99 percent power of detecting losses that total five formula kilograms or more, plant-wide, within:

(1) Thirty calendar days for Category IA items and 60 calendar days for Category IB items contained in a vault or in a permanently controlled access area isolated from the rest of the material access (MAA).

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that the Intervenor's cite for the premise that Dr. Lyman has been qualified to testify on nuclear issues in other proceedings, only one involved MC&A matters. See *Duke Cogema Stone & Webster* (Mixed Oxide Fuel Fabrication Facility), LBP-01-35, 54 NRC 403, 425 (2001) (involving one MC&A contention); *Duke Energy Corp.* (Catawba Nuclear Station, Units 1 & 2), LBP-04-13, 60 NRC 33, *aff'd*, CLI-04-21, 60 NRC 21 (2004) (involving security-related issues); *Duke Energy Corp.* (Catawba Nuclear Station, Units 1 & 2), LBP-04-32, 60 NRC 713 (2004) (involving nuclear safety issues for fuel cladding); *Duke Energy Corp.* (McGuire Nuclear Station, Units 1 & 2; Catawba Nuclear Station, Units 1 & 2), LBP-02-04, 55 NRC 49, 120-21, 127 (2002) (involving various nuclear safety issues).

<sup>35</sup> Motion for Admission of Contentions 9, 10, and 11 Regarding Shaw AREVA MOX Services' Revised Fundamental Nuclear Control Plan at 7-8 (July 26, 2010) ("Petition").

3.15 As explained in our Initial Decision, there are two fundamental aspects of Contention 9 and 10 CFR § 74.55(b)(1) that formed the basis for the parties' testimony. These are the concepts of verifying the "presence" and the "integrity" of SSNM items within the 30 and 60 day time frames set forth in 10 CFR § 74.55(b)(1), for Category IA and IB items, respectively. In accordance with the language of the rule, MOX Services must conduct this verification with a "statistical sampling plan" that has at least a 99 percent "power of detecting" losses of SSNM that total five formula kilograms (kg) plant wide.<sup>36</sup> We continue to address presence and integrity verification separately, because Intervenorors have raised different challenges to the separate methods MOX Services relies upon for meeting those two requirements.

#### **1. ITEM PRESENCE VERIFICATION**

3.16 As we summarized in our Initial Decision, MOX Services verifies the presence of SSNM items using a comparison of a "Perpetual Inventory Report" generated by the MMIS, with item locations and identities determined by the PLCs (the record of those items is referred to as "mapping"), along with certain robust physical protection features that ensure the accuracy of the Perpetual Inventory Report and PLC mapping.<sup>37</sup>

3.17 Intervenorors' initial findings raised multiple challenges to MOX Services' presence verification method. In particular, they:

- assert that MOX Services believes it is excused from compliance with the regulatory requirement, or has proposed an item monitoring approach for verifying the presence of SSNM items that is a substitute for regulatory compliance;<sup>38</sup>

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<sup>36</sup> 10 CFR § 74.55(b)(1).

<sup>37</sup> See MOX Services' Initial Findings at ¶ 4.18; *see also* Exhibit APPR00014, [MOX Services'] Revised Prefiled Direct Testimony on Contentions 9-11 at Q 23 (Mar. 1, 2012).

<sup>38</sup> See Intervenorors' Initial Findings at ¶¶ 1.7, 4.7, 4.17, 4.28.

- suggest that 10 CFR § 74.55(b)(1) requires that verification of presence include verification of facility records, and that it must be “independent” and include “physical” aspects;<sup>39</sup>
- continue to claim that Section 74.55(b)(1) includes some quantitative requirement for accuracy;<sup>40</sup> and
- argue that MOX Services claims its item monitoring approach is “100 percent accurate” and “infallible.”<sup>41</sup>

3.18 Each of these challenges is resolved below.

**a. Intervenor Mischaracterize the Applicant’s Position that MOX Services’ Proposed Item Monitoring Approach Meets the NRC’s Regulatory Requirements**

3.19 Intervenor’s initial findings repeatedly mischaracterize MOX Services’ representations about regulatory compliance, claiming that MOX Services believes it is somehow excused from such compliance,<sup>42</sup> and has proposed instead a “substitute” for compliance.<sup>43</sup>

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<sup>39</sup> See *id.* ¶¶ 4.16, 4.21, 4.27 – 4.28.

<sup>40</sup> See *id.* ¶¶ 4.14, 4.24, 4.27, 4.44.

<sup>41</sup> See *id.* ¶¶ 4.18, 4.44.

<sup>42</sup> See Intervenor’s Initial Findings ¶ 1.2 (“MOX Services would have us overlook these shortfalls [in its regulatory compliance] on the ground that . . . *regulatory compliance is not necessary* because the MOX facility is different from the facilities that the NRC had in mind when the original rule was promulgated” ((emphasis added)); *id.* at ¶ 4.17 (“MOX Services proposes no means of independently verifying the presence and integrity of SSNM items. Instead, MOX Services seeks to take credit for the asserted accuracy of the PLC and MMIS system and the rigor of its security program.”); *id.* ¶ 4.28 (“We also find that underlying much of the evidence presented in this hearing --- starting with the language in the *initial FNMCP* --- is a *pervasive belief on the part of MOX Services that it does not need to comply with traditional item verification requirements* because of certain plant features.” (emphasis added)).

Intervenor’s characterization that MOX Services “proposes no means of independently verifying the presence and integrity of SSNM items,” Intervenor’s Initial Findings at ¶ 4.17, is plainly hyperbole in light of the lengths MOX Services has gone to demonstrate its methods for item tracking and mapping, *see, e.g.*, MOX Services’ Initial Findings ¶¶ 4.15, 4.41 – 4.55, and the redundant mechanisms to ensure the accuracy of that mapping, *see, e.g., id.* ¶¶ 4.58 – 4.65.

<sup>43</sup> Intervenor’s Initial Findings ¶ 4.7 (“A great deal of MOX Services’ testimony was devoted to the unrelated question of whether MOX Services’ reliance on the data derived from its automated process control and inventory systems and various physical protection measures serves as an effective substitute for the verification of the presence and integrity of items required by the item monitoring regulations.”); *id.* ¶ 4.17 (“MOX Services proposes no means of independently verifying the presence and integrity of SSNM items. Instead, MOX Services seeks to take credit for the asserted accuracy of the PLC and MMIS system and the rigor of its security program.”).

3.20 It is simply not MOX Services' position that it is excused from compliance with 10 CFR § 74.55(b)(1). Nor has MOX Services suggested that its proposed item monitoring approach is a "substitute" for regulatory compliance. In our Initial Decision, we cited MOX Services' direct testimony that its daily, on demand, and continuous mapping functions provide the timely verification of presence of SSNM items required by the rule.<sup>44</sup> We also noted the Staff's direct testimony that the daily mapping comparisons meet the requirements of the rule.<sup>45</sup> At the hearing, MOX Services' outside expert, a distinguished former NRC MC&A inspector, testified that "the facility FNMCP plan *meets* the regulations."<sup>46</sup> These sworn statements stand in stark contrast to the suggestion by Intervenors that MOX Services has represented to this Board that its "reliance on the data derived from its automated process control and inventory systems and various physical protection measures serves as an *effective substitute* for the verification of the presence and integrity of items required by the item monitoring regulations."<sup>47</sup>

3.21 Because Intervenors provide no support for the characterization that MOX Services believes it is excused from regulatory compliance, and multiple sworn statements by MOX

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<sup>44</sup> See MOX Services' Initial Findings ¶ 4.8; see also Exhibit APPR20014, at Q 25 (providing testimony by MOX Services' internal experts that "the daily and on demand mapping comparisons, in conjunction with the robust physical protection features, provide a sample size that contains 100% of SSNM items in storage locations, thus providing at least 99% power of detection of item losses of at least 5 formula kilograms"); *id.* at Q 26 (providing testimony by MOX Services' internal experts that "MOX Services meets the 30 and 60 day regulatory requirements"); *id.* at Q 27 (providing MOX Services' external expert testimony that "PLC and MMIS mapping, automation, and physical protection features that limit human access to items enable MOX Services to determine the presence of all SSNM items in storage on a daily basis, and therefore satisfy the regulatory requirement").

<sup>45</sup> See MOX Services' Initial Findings ¶ 4.9; see also Exhibit NRC000006, NRC Staff's Prefiled Direct Testimony of Tom Pham Concerning Contentions 9-11, at Q 14 (Oct. 19, 2011) (providing the Staff's expert testimony that the comparison of MMIS and PLC records "would meet the requirement to verify the presence of Category 1A . . . and 1B items").

<sup>46</sup> Tr. 1571-72 (Williams) (emphasis added).

<sup>47</sup> Intervenors' Initial Findings ¶ 4.7 (emphasis added).

Services' experts refute that characterization, we find that Intervenor's claim in this regard has no merit.

**b. Intervenor's Misinterpret the NRC Regulatory Requirement that Licensees "Verify" the Presence of SSNM Items**

3.22 In four ways, Intervenor misstate what 10 CFR § 74.55(b)(1) requires as far as presence verification. Specifically, Intervenor allege that such verification must: (1) be, in some unspecified way, "physical;"<sup>48</sup> (2) have some "independent" component, although Intervenor do not clarify what that component is independent of;<sup>49</sup> (3) include some assurance regarding the licensee's records;<sup>50</sup> and (4) include some quantitative measurement or have a certain quantifiable level of accuracy.<sup>51</sup> We will address the fourth misstatement in the next section, Section III.B.1.c.

3.23 Plainly, the regulation itself requires no such components. Recall that the regulation states only:

The licensee shall verify on a statistical sampling basis, the presence and integrity of SSNM items. The statistical sampling plan must have at least 99 percent power of detecting losses that total five formula kilograms or more, plant-wide, within:

(1) Thirty calendar days for Category IA items and 60 calendar days for Category IB items contained in a vault or in a permanently

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<sup>48</sup> See *id.* ¶¶ 4.27 – 4.28 (comparing MOX Services' proposed approach to "physical verifications").

<sup>49</sup> See *id.*; *id.* ¶ 4.21 ("requirements that verifications must be independent").

<sup>50</sup> See *id.* ¶ 4.16 ("the clear meaning of the word 'verify' as used in 10 CFR § 74.55(b) is to prove or confirm, through some statistically measurable and independent evidence, the truth of the licensee's records with respect to the presence and integrity of SSNM items.").

<sup>51</sup> See *id.* ¶ 4.14 ("the concept of verification as used in Section 74.55(b) includes . . . a quantitative statistical measure"); *id.* ¶ 4.27 ("[MOX Services] elides over its failure to prove that its proposal can provide the quantitative level of verification required by the regulations"); *id.* ¶ 4.44 ("the item monitoring scheme proposed by MOX Services is deficient and does not meet the quantitative assurance standards specified by the regulations").

controlled access area isolated from the rest of the material access (MAA).<sup>52</sup>

And the regulatory history of Section 74.55 does not suggest that verification of item presence must be “independent,” “physical,” or encompass a verification of facility records.<sup>53</sup>

3.24 Simply because other facilities may physically inspect an item’s unique identifier and check the item off a list that may be independently maintained by facility records,<sup>54</sup> does not mean that MOX Services’ plans to conduct the same verification using automation is noncompliant. Nowhere does the NRC require that such verifications be in some way “independent,” that they verify facility records, or that they be accomplished by human interaction with the material or even remote physical manipulation of items. In fact, with respect to physical inspection and as the NRC Staff’s and MOX Services’ experts testified at the hearing, NRC regulatory guidance encourages the use of automation, and for the especially relevant reason that use of automation reduces the opportunity for human error.<sup>55</sup> Specifically, and as MOX Services’ experts testified, NRC Staff guidance at NUREG-1280, Section 4.9.3, *Automation of MC&A*, recommends that: “MC&A data are directly collected, inputted, checked, manipulated, reported and audited by computer where it is practical and advantageous to reduce the consequences and frequency of human error in MC&A data as much as practical.”<sup>56</sup>

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<sup>52</sup> 10 CFR § 74.55(b).

<sup>53</sup> See Final Rule; [MC&A] Requirements for Facilities Licensed to Possess and Use Formula Quantities of Strategic Special Nuclear Material, 52 Fed. Reg. 10,033 (Mar. 30, 1987); Proposed Rule; [MC&A] Requirements; Facilities Possessing Formula Quantities of Special Nuclear Material, 49 Fed. Reg. 4091 (Feb. 2, 1984).

<sup>54</sup> See Intervenor’s Initial Findings ¶ 4.15 (noting that NFS and B&W use item sampling and direct physical inspection to comply with the item monitoring requirements of Section 74.55(b)).

<sup>55</sup> See MOX Services’ Initial Findings ¶¶ 4.66 - 4.66(a).

<sup>56</sup> See Exhibit APP000031, [MOX Services’] Prefiled Reply Testimony on Contentions 9-11, at Q 22 (Jan. 24, 2012).

3.25 Accordingly, Intervenor's have failed to state a noncompliance and their challenges to MOX Services' item monitoring approach on these grounds have no bearing on this proceeding.

**c. Intervenor's Continue to Misunderstand the Quantitative Aspects of 10 CFR § 74.55(b)(1)**

3.26 As indicated in the previous section, Intervenor's' initial findings reflect a continued misunderstanding as to the quantitative aspects of 10 CFR § 74.55(b)(1). Specifically, they claim that Section 74.55(b)(1) requires "a quantitative statistical measure,"<sup>57</sup> and Intervenor's fault MOX Services for failing to "quantify the potential for an adversary to take measures to conceal any abnormalities [in MMIS and PLC mapping]."<sup>58</sup> Intervenor's also continue to suggest that Section 74.55(b)(1) includes some quantitative requirement for accuracy or "quantitative assurance standards."<sup>59</sup>

3.27 We and the parties have spent a considerable amount of time discussing the quantitative aspects of Section 74.55(b)(1). The NRC Staff and MOX Services both provided testimony on the scope and limits of the quantitative requirements in Section 74.55(b)(1), in response to Intervenor's' testimony that first called into question the quantitative aspects of the rule.<sup>60</sup> As MOX Services' experts testified:

[T]he NRC's item monitoring requirements are quantitative with respect to:  
(1) the required power of detection for the licensee's statistical sampling plan  
(i.e., a 99% power of detecting item losses that total 5 formula kilograms or

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<sup>57</sup> Intervenor's' Initial Findings ¶ 4.14.

<sup>58</sup> *Id.* ¶ 4.24.

<sup>59</sup> *Id.* ¶ 4.44; *see also id.* at ¶ 4.25 (finding fault with MOX Services for claiming that it can verify the accuracy of automated movements through visual inspections, without "quantitatively defin[ing]" the terms "verify" and "accuracy."); *id.* at ¶ 4.27 (alluding to "the quantitative level of verification required by the regulations").

<sup>60</sup> *See* Exhibit NRC000008, NRC Staff's Prefiled Response Testimony of Tom Pham Concerning Contentions 9, 10, and 11, at Q 2, Q 5 (Dec. 20, 2011); Exhibit APP000031, at Q 10 – Q 21, Q 24 (*citing* Exhibit INT000001, at A.5).

more, plant-wide); and (2) the time for detecting such item losses (*i.e.*, 30 or 60 calendar days).<sup>61</sup>

3.28 MOX Services discussed “power of detection” and explained that, “[a]s suggested by NRC guidance (*i.e.*, NUREG-1280), ‘power of detection’ is mathematically related to the sample size, the number of items that comprise a target quantity of SSNM, and the total number of items in the inventory.”<sup>62</sup> Using the calculation provided in NUREG-1280 for illustration, MOX Services’ experts concluded:

The only variables that affect power of detection are the minimum number of items to divert 2000 g Pu (d), the number of items in the population (N), and the number of items to be verified (n). And the only variable that can be adjusted for a given storage area (that is, where d and N are fixed), is the number of items to be verified (n). Thus, the only way to increase the power of detection in a given storage area is to increase the number of items to be verified.<sup>63</sup>

3.29 MOX Services’ experts further testified that the accuracy of the method employed to verify item presence does not affect the power of detection of the statistical sampling plan.<sup>64</sup>

3.30 Likewise, the NRC Staff’s expert testified:

A 99% power of detection means there is a 99% probability that the test will detect a loss of five formula kilograms of material. The term “power of detection” refers only to the missing item or the item(s) missing

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<sup>61</sup> Exhibit APP000031, at Q 11.

<sup>62</sup> *Id.* at Q 13.

<sup>63</sup> *Id.* at Q 14.

As an aside, Intervenor’s initial findings suggest again, as Intervenor did at the hearing, that MOX Services’ approach monitoring the location of 100% of items fails to satisfy the requirement for at least a 99% power of detection. *See* Intervenor’s Initial Findings at ¶ 4.22 n.1; *see also* Tr. 1231 (Lyman) (claiming MOX Services actually samples “not 100 percent of items but zero percent”). We have already made clear that Intervenor’s suggestion that MOX Services does not satisfy the statistical sampling aspect of Section 74.55(b)(1) is not credible. *See* MOX Services’ Initial Findings ¶ 4.35. The suggestion that MOX Services cannot meet the regulatory requirement for use of a statistical sampling approach, when its sample size is 100% rather than a statistical subset, defies logic. *See* MOX Services’ Initial Findings at ¶ 4.35. What Intervenor truly challenge is item monitoring method accuracy. *See id.*

<sup>64</sup> *See* Exhibit APP000031, at Q 16.

material being chosen for verification as part of the statistical sample. It does not address the accuracy of the method used to detect if an item is missing or missing material.<sup>65</sup>

3.31 As we explained in our Initial Decision, we further inquired at the hearing about the quantitative aspects of the rule and whether there was any quantitative standard for the accuracy of the item verification method in 10 CFR § 74.55(b)(1).<sup>66</sup> We found that at the hearing, the parties were in agreement about accuracy and the quantitative nature of the rule.<sup>67</sup> For example, MOX Services' expert, Mr. Gary Clark, testified that "[a]ccuracy . . . goes to how confident you are that if you select the defective item for the item monitoring test[,] will you be able to detect that it is, in fact, defective. . . . The regulations don't actually have any . . . quantitative measure around that."<sup>68</sup> The NRC Staff's expert, Mr. Pham, testified that "the regulation [does] not address the accuracy of the method you're going to use."<sup>69</sup> And Intervenor's expert, Dr. Lyman, testified that he "mean[s] accuracy the same way the Applicant means it."<sup>70</sup> Dr. Lyman further testified "[a]ccuracy means the representation of the actual items by what the information in the PLCs [sic]. . . . It has nothing to do with power of detection or anything."<sup>71</sup> As we explained in our Initial Decision, we agree that there is no separate legal requirement for MOX Services' item monitoring method to meet some standard of "accuracy," as opposed to the quantitative standard in the rule for power of detection.<sup>72</sup>

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<sup>65</sup> Exhibit NRC000008, at Q 2.

<sup>66</sup> See MOX Services' Initial Findings ¶¶ 4.27 – 4.28.

<sup>67</sup> See MOX Services' Initial Findings at ¶ 4.29.

<sup>68</sup> Tr. 1211–12 (Clark).

<sup>69</sup> Tr. 1227 (Pham).

<sup>70</sup> Tr. 1230 (Lyman).

<sup>71</sup> Tr. 1230–31 (Lyman) (emphasis added).

<sup>72</sup> As we discussed in the following section, Section III.B.1.d, this conclusion should not suggest that there is no requirement that MOX Services' approach be accurate. MOX Services need only demonstrate that its

3.32 Intervenor's initial findings provide no further evidence or argument as to any quantitative requirement for accuracy in Section 74.55(b)(1). The vague references to "quantitative assurance standards" contained in their initial findings do not dissuade us from the conclusions we drew in our Initial Decision that: (1) power of detection does not address the accuracy of the method used to detect whether or not an item is missing<sup>73</sup>; and (2) there is no quantitative accuracy requirement in 10 CFR § 74.55(b)(1) or related guidance in NUREG-1280.<sup>74</sup>

3.33 Thus, we find that the quantitative aspects of Section 74.55(b)(1) are limited. Although Intervenor's initial findings attempt to attribute a number of quantitative requirements to Section 74.55(b)(1), those requirements simply do not exist. For example, there simply is no regulatory requirement that presence verification include a quantitative measurement. The plain language of Section 74.55(b)(1) requires no such measurement, and as MOX Services' expert Ms. Martha Williams testified at the hearing, the relevant NRC guidance, NUREG-1280:

[E]ssentially says do not measure the items as part of the item monitoring test. What it says is you're just checking for presence and integrity. And the item has already been measured and has been tamper sa[f]ed. Those are requirements to be an item, and that is not repeated in the item monitoring test.<sup>75</sup>

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chosen approach provides "reasonable assurance" that plant-wide SSNM losses totaling 5 formula kilograms will be detected.

<sup>73</sup> See MOX Services' Initial Findings ¶ 4.29.

<sup>74</sup> See *id.* ¶¶ 4.36 – 4.37 ("We agree that no such quantitative requirement exists in 10 CFR § 74.55(b)(1)"). Intervenor's conclude elsewhere in their initial findings that MOX Services has not demonstrated that periodic physical inventories "would be sufficient to 'validate the accuracy of MMIS and PLC mapping' *to the extent required* so they can be relied on for item monitoring." Intervenor's Initial Findings at ¶ 4.26 (emphasis added). Because the rule provides no express standard for the required level of accuracy of MOX Services' item monitoring method, Intervenor's claim raises a non-issue.

<sup>75</sup> Tr. 1214–15 (Williams).

3.34 Nor is there any requirement that MOX Services quantify the threat from an adversary. Nowhere does the rule require or even suggest such quantification is necessary.<sup>76</sup> Intervenor has not raised this claim previously, and absent any support for this vague assertion, we give it no further treatment here.

**d. By Claiming that MOX Services' Relies on an Item Monitoring Approach that Must be "Infallible," Intervenor Misstates MOX Services' Position and Ignores the Multiple, Redundant Means Available to MOX Services to Monitor and Validate the Accuracy of its Item Monitoring System**

3.35 Intervenor's initial findings assert that MOX Services' proposed item monitoring approach cannot be relied upon to verify the presence of SSNM. Specifically, the Intervenor claims that MOX Services must demonstrate the reliability of its proposed approach, and they assert that "[t]here is no indication in MOX Services' direct testimony that it intends to do such validation."<sup>77</sup> Intervenor states that MOX Services assumes its proposed approach is "infallible" and "100 percent accurate."<sup>78</sup>

3.36 In so doing, Intervenor mischaracterizes MOX Services' representations about accuracy, and ignores the multiple ways in which MOX Services has demonstrated that it will validate the accuracy of its item monitoring systems. MOX Services has not claimed that its method is 100% accurate or infallible, and Intervenor's assertion to the contrary is unsupported. MOX Services' experts have explicitly testified that "MOX Services has not asserted that its PLC mapping data is '100 percent accurate' . . . . Rather, MOX Services' item monitoring program relies on

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<sup>76</sup> See 10 CFR § 74.55(b)(1).

<sup>77</sup> Intervenor's Initial Findings ¶ 4.12; see also *id.* ¶ 4.19 ("MOX Services must also show that it can 'verify' that the MMIS and PLC mapping data represents the 'truth' with regard to the actual location of items within the MOX plant.").

<sup>78</sup> *Id.* ¶¶ 4.18, 4.44; see also Intervenor's Initial Findings at ¶ 4.18 ("MOX Services assumes that the MMIS and PLCs cannot fail and cannot be tampered with undetected under any circumstances").

multiple, redundant methods to provide reasonable assurance of the accuracy and integrity of the MMIS and PLCs.”<sup>79</sup> As we explained in our Initial Decision, MOX Services has presented at least five ways in which it verifies that the MMIS and PLCs present an accurate representation of SSNM items in storage: (1) MOX Services verifies that the records maintained by the MMIS and PLCs are accurate by comparing the two;<sup>80</sup> (2) MOX Services continually verifies the accuracy of PLC and MMIS mapping data during facility operation;<sup>81</sup> (3) any failure of the systems would be readily detectable, either because the process stops or because all errors are logged;<sup>82</sup> (4) MOX Services can verify the accuracy of automated movements through visual inspection;<sup>83</sup> and (5) the physical inventory requirements (which are separate and apart from the requirements of Section 74.55(b)(1)) will validate the accuracy of MMIS and PLC mapping.<sup>84</sup> This list of activities demonstrates that MOX Services has redundant means to detect errors or discrepancies in its systems. In other words, MOX Services has redundant means that provide exactly the validation Intervenor seeks.

3.37 As an aside, Intervenor’s initial findings seem to confuse these validation methods with MOX Services’ presence verification methods (*i.e.*, MMIS/PLC mapping). For example, Intervenor concludes that “collecting information on containers that are moving through the processing system does not constitute a sufficient sampling of item inventories for some of the storage areas on question.”<sup>85</sup> We place no weight on these claims. Plainly, MOX Services did

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<sup>79</sup> Exhibit APP000031, at Q 47.

<sup>80</sup> See MOX Services’ Initial Findings ¶¶ 4.59 – 4.61.

<sup>81</sup> *Id.* ¶ 4.62.

<sup>82</sup> *Id.* ¶ 4.63.

<sup>83</sup> *Id.* ¶ 4.64.

<sup>84</sup> *Id.* ¶ 4.65.

<sup>85</sup> Intervenor’s Initial Findings ¶ 4.23.

not suggest that the validations that occur during normal facility evolutions – or any of the other four validation activities – meet, or are intended to meet the requirements of Section 74.55(b)(1). Rather, MOX Services identified these activities as redundant means to provide ongoing verification of the accuracy of PLC and MMIS mapping.

3.38 As we explained above and in our Initial Decision, there is no quantitative requirement in 10 CFR § 74.55(b)(1) regarding the accuracy of MOX Services’ proposed item monitoring approach.<sup>86</sup> MOX Services need only demonstrate that its chosen method for presence verification provides reasonable assurance that item losses totaling five formula kilograms plant wide will be detected.<sup>87</sup> Intervenors provide nothing in their initial findings that calls into question the conclusion in our Initial Decision that there was a wealth of information in the record—including information about the design of the MMIS and PLCs, the physical protection features that preserve the integrity of the MMIS and PLCs, and the five ways in which MOX Services can verify that the MMIS and PLCs provide an accurate representation of SSNM items in storage—that gives us ample confidence that MOX Services’ chosen method of MMIS/PLC mapping meets a “reasonable assurance” test.<sup>88</sup>

3.39 Therefore, our overall conclusion as to SSNM item presence verification is unchanged from that presented in our Initial Decision. MOX Services has met its burden to demonstrate, with a preponderance of the evidence, that it complies with 10 CFR § 74.55(b)(1). This aspect of Contention 9 must be resolved in MOX Services’ favor.

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<sup>86</sup> See MOX Services’ Initial Findings ¶ 4.37.

<sup>87</sup> See *id.* ¶¶ 4.36 – 4.37.

<sup>88</sup> See MOX Services’ Initial Findings ¶¶ 4.37 – 4.68.

## 2. ITEM INTEGRITY VERIFICATION

3.40 The second fundamental aspect of Contention 9 is the requirement of Section 74.55(b)(1) to verify, on a statistical sampling basis, the “integrity” of SSNM items, again with at least a 99 percent power of detecting 5 formula kg losses plant wide, within 30 and 60 calendar days respectively for Category IA and IB items.<sup>89</sup>

3.41 “Integrity” refers to the condition of the containment boundary around a discrete quantity of SSNM.<sup>90</sup> MOX Services explains that where the material in question is a single item, “integrity” may refer to the item packaging itself not being breached, but that this can also be expanded to encompass multiple items located in storage areas that are sealed and designed to be tamper-safed or protected equivalent to tamper-safing.<sup>91</sup> As we explained in our Initial Decision, MOX Services has defined a “containment boundary” around each SSNM item storage location.<sup>92</sup> Access to enter within these boundaries is controlled by design and/or security features, and MOX Services verifies on a daily basis that the containment boundaries have not been breached.<sup>93</sup>

3.42 Intervenors’ initial findings raised several challenges to MOX Services’ integrity verification method. In particular, Intervenors:

- characterize MOX Services’ integrity verification approach as not involving sampling;<sup>94</sup>

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<sup>89</sup> See 10 CFR § 74.55(b)(1).

<sup>90</sup> See MOX Services’ Initial Findings ¶ 4.75.

<sup>91</sup> See *id.*.

<sup>92</sup> See *id.* ¶¶ 4.75 – 4.77.

<sup>93</sup> See *id.*

<sup>94</sup> See Intervenors’ Initial Findings ¶ 4.30.

- claim that Section 74.55(b)(1) requires “physical” verification of item integrity, and that MOX Services’ approach does not verify the physical integrity of items;<sup>95</sup>
- assert that MOX Services’ integrity verification approach is “novel”;<sup>96</sup>
- suggest MOX Services’ approach renders all items stored within a single containment boundary to be a single item;<sup>97</sup>
- claim that if it were acceptable to verify item integrity by verifying the integrity of storage boundary areas, then it should be possible to verify presence the same way;<sup>98</sup> and
- argue that MOX Services’ integrity verification approach would render the item monitoring requirements of Section 74.55 “meaningless.”<sup>99</sup>

3.43 Each of these challenges is resolved below.

**a. Intervenor Mischaracterize MOX Services’ Approach for Verifying the Integrity of SSNM Items**

3.44 In at least four ways, and despite considerable live and prefiled testimony on the matter, Intervenor’s initial findings mischaracterize MOX Services’ approach for verifying the integrity of SSNM items. Specifically, Intervenor claim that MOX Services’ integrity verification approach: (1) “does not involve sampling”;<sup>100</sup> (2) “does not involve . . . physical integrity of items”;<sup>101</sup> (3) is “new”<sup>102</sup> or “novel”;<sup>103</sup> and (4) causes “all SSNM items within a single ‘containment boundary’ [to] become a single ‘item’ for the purposes of item monitoring.”<sup>104</sup>

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<sup>95</sup> See *id.*

<sup>96</sup> See *id.* ¶ 4.33.

<sup>97</sup> See *id.* ¶ 4.36.

<sup>98</sup> See *id.* ¶ 4.37.

<sup>99</sup> See *id.* ¶ 4.38.

<sup>100</sup> Intervenor’s Initial Findings at ¶ 4.30.

<sup>101</sup> *Id.*

<sup>102</sup> *Id.*

<sup>103</sup> *Id.* ¶ 4.33.

<sup>104</sup> *Id.* ¶ 4.36.

3.45 Intervenor provide no further support or explanation for the claim that MOX Services' approach "does not involve sampling."<sup>105</sup> We assume, therefore, that Intervenor's assertion refers to the requirement in Section 74.55(b)(1) to verify the integrity of SSNM items with a 99% power of detection. As we discussed above, for the parameters provided by the rule, the only way MOX Services' can increase the power of detection in a given storage area is to increase the number of items to be verified.<sup>106</sup> And MOX Services' expert Mr. Clark testified that the 99% power of detection is achieved by "verify[ing] the integrity of 100 percent of the items in storage."<sup>107</sup> As we explained in our Initial Decision, logic demands the conclusion that MOX Services satisfies the regulatory requirement for use of a statistical sampling approach, when it samples 100% of SSNM items, rather than a subset.<sup>108</sup> Intervenor's claim regarding sampling therefore has no merit.

3.46 Intervenor likewise provide no further support or explanation for the claim that MOX Services' approach "does not involve . . . physical integrity of items."<sup>109</sup> As an initial matter, we note that Intervenor's incorrectly conclude that "[a]n applicant must demonstrate the same capability to . . . physically inspect items to verify their integrity as it does to verify their presence."<sup>110</sup> As we explained above with respect to presence, neither the plain language of Section 74.55 nor its regulatory history suggests that verifications of item integrity must be in

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<sup>105</sup> *Id.* ¶ 4.30.

<sup>106</sup> *See supra* para. 3.28.

<sup>107</sup> Tr. 1350–51 (Clark).

<sup>108</sup> *See* MOX Services' Initial Findings ¶ 4.35.

<sup>109</sup> Intervenor's Initial Findings ¶ 4.30.

<sup>110</sup> *Id.* ¶ 4.29.

any way “physical.”<sup>111</sup> Regardless, MOX Services’ integrity verification approach *does* involve physical, human confirmation that the containment boundaries around SSNM items have not been breached.<sup>112</sup> As we explained in our Initial Decision, for all item storage area containment boundaries except one (the Assembly Storage Area or TAS), the integrity of the tamper-indicating device (TID) seals will be inspected every day by Operations personnel.<sup>113</sup> As for TAS, MOX Services ensures the integrity of the fuel assemblies by controlling access to the TAS crane, and it confirms the TAS integrity boundary by reviewing crane access logs daily for unauthorized use.<sup>114</sup> Accordingly, although the rule does not require any physical aspect to item integrity verification, MOX Services’ approach involves daily, physical confirmation of the integrity of SSNM item containment boundaries. Intervenors’ claim therefore has no merit.

3.47 Intervenors’ assertion that MOX Services’ integrity verification approach is “novel”<sup>115</sup> is similarly false and irrelevant to this proceeding. There simply is no regulatory prohibition on using new or innovative techniques for item monitoring or compliance with NRC regulations. And MOX Services has nevertheless demonstrated that its item monitoring approach is *not* novel or untested. Ms. Williams and Mr. Pham, both of whom have decades of experience as MC&A inspectors, testified that MOX Services’ integrity boundary concept was not “novel,” and referenced comparable examples at the B&W, NFS, and Humboldt Bay facilities.<sup>116</sup>

Intervenors’ suggestion that these examples are not “similar enough to the case at hand” is

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<sup>111</sup> See *supra* paras. 3.23 – 3.24; see also 10 CFR § 74.55(b)(1); Final Rule; [MC&A] Requirements, 52 Fed. Reg. at 10,033–43; Proposed Rule; [MC&A] Requirements, 49 Fed. Reg. at 4091–97.

<sup>112</sup> See MOX Services’ Initial Findings ¶¶ 4.76 – 4.77.

<sup>113</sup> See *id.* ¶ 4.77.

<sup>114</sup> See *id.*

<sup>115</sup> Intervenors’ Initial Findings ¶ 4.33.

<sup>116</sup> See Tr. 1396-97 (Williams); Tr. 1402–03 (Pham).

farcical.<sup>117</sup> Intervenor’s explain, “it is hard to see how a sealed 55-gallon drum most likely containing only a small number of items could present the same item monitoring challenge as a storage area containing hundreds of items.”<sup>118</sup> It is not the number of items in the storage area but the integrity verification method that is in question. Whether MOX Services has one or one thousand items in a sealed storage container, if it verifies that the seal and the storage container are intact, it can reasonably conclude that the items contained within are intact. Plain logic must prevail. Intervenor’s claim in this regard has no merit.

3.48 We next turn to Intervenor’s claim that “all SSNM items within a single ‘containment boundary’ would effectively become a single ‘item’ for the purposes of item monitoring.”<sup>119</sup> Intervenor raises this allegation apparently out of the concern that if the containment boundary were breached, “it could be necessary to inventory the entire storage area in order to resolve an alarm.”<sup>120</sup> Intervenor identifies no resulting deficiency insofar as integrity verification requirements are concerned. Once a storage area boundary is found breached, an alarm condition exists. That is the subject of Contention 10. Because we separately address MOX Services’ compliance with the regulatory requirements at issue in Contention 10, we give Intervenor’s assertion no further treatment here.

3.49 In short, we find that Intervenor’s characterizations of MOX Services’ integrity verification methods are inaccurate and immaterial to the decision before the Board.

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<sup>117</sup> Intervenor’s Initial Findings ¶ 4.35.

<sup>118</sup> *Id.*

<sup>119</sup> *Id.* ¶ 4.36.

<sup>120</sup> *Id.*

**b. Intervenor's Incorrectly Suggest that MOX Services' Approach to Verify Integrity, If Valid, Should Be Able to Verify Presence, and Wrongly Conclude that MOX Services' Approach Therefore Renders the Applicable NRC Regulations "Meaningless"**

3.50 Intervenor's initial findings claim:

If it is possible to satisfy the requirement for verifying the integrity of items containing SSNM by verifying the integrity of storage area boundaries, then it follows logically that it should be possible to verify the presence of an item in the same way. After all, if the system is sensitive enough to detect removal of the partial contents of a container it should also be sensitive enough to detect the removal of the entire container. If one knows the identity of all items within the containment boundary at any time, and it is assumed that the area has not been entered as long as the boundary remains intact, then there would never be a need to re-verify the identity of the items contained within the boundary.<sup>121</sup>

3.51 Intervenor's conclude, "[a]s a result of this logical inference, however, much of the language in 10 C.F.R. §§ 74.55 would be superfluous, starting with the header "Item Monitoring" — because no items would need to be monitored."<sup>122</sup>

3.52 Intervenor's raised the same concern in their rebuttal statement of position.<sup>123</sup> In response to that concern, MOX Services' experts testified that because movement of SSNM items throughout the MOX Facility is controlled by automation, "even if a containment boundary is not breached, items will move in and out of the storage area (and through portals that are not accessible to humans under normal operation)."<sup>124</sup> We understand and agree with MOX Services' position. Items move in and out of storage areas as part of normal facility processing. As MOX Services' explained in its direct testimony, those movements are automated, all

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<sup>121</sup> *Id.* ¶ 4.37.

<sup>122</sup> *Id.* ¶ 4.38.

<sup>123</sup> See Intervenor's Statement of Position in Rebuttal to NRC Staff's Statement of Position on Conventions 9, 10, and 11, at 5 (Dec. 19, 2011).

<sup>124</sup> Exhibit APP000031, at Q 32.

automated movements of SSNM items are stored in the memory of the PLCs and MMIS, and human access to SSNM storage areas is controlled.<sup>125</sup> As a result, a containment boundary that has not been breached, may nonetheless have items moving in and out as appropriate for facility operation.

3.53 And MOX Services has also previously addressed Intervenor's allegation that Section 74.55 is rendered "superfluous" by a reading that verifying the integrity of a storage area boundary will suffice to verify the integrity of the items contained therein.<sup>126</sup> MOX Services explained that other facilities to which these regulations apply have item storage areas that are regularly accessed by humans and thus, cannot use the storage area boundary to verify integrity.<sup>127</sup> In other words, because those storage areas are routinely accessed by humans, monitoring the integrity of the storage area boundary would not facilitate integrity monitoring. And Intervenor ignores the active, physical verification step that MOX Services' approach includes: on a daily basis, MOX Services' personnel confirm that the established containment boundary for each area has not been breached.<sup>128</sup> MOX Services does not simply rely on its physical protection features, personnel access restrictions, or the fact that all storage areas are a vault or permanently controlled access area.

3.54 We find that Intervenor's premise has no merit, because MOX Services' integrity verification approach could not also be employed for presence verification. And MOX Services does not simply take credit for MOX Facility features already required by the regulations to satisfy the requirement to verify SSNM integrity. Rather, verifying the integrity of SSNM items

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<sup>125</sup> See Exhibit APPR20014, at Q 13, Q 28.

<sup>126</sup> Exhibit APP000031, at Q 31.

<sup>127</sup> *Id.*

<sup>128</sup> See *id.*

at the MOX Facility involves physically verifying, on a daily basis, that the SSNM item storage area containment boundaries enclosing the particular, uniquely identified SSNM items have not been breached, so that it is apparent that the discrete, identified, and previously measured SSNM contained within those items has not changed from the previously measured value.

3.55 Thus, we conclude that the Intervenor has not carried their burden on the item “integrity” aspect of Contention 9, and that MOX Services has, by a preponderance of the evidence, demonstrated that it meets this aspect of the regulation. In summary, for the reasons provided here and in our Initial Decision, we conclude that Contention 9 must be resolved in MOX Services’ favor.

### C. CONTENTION 10

3.56 Contention 10 alleges the following:

The [2010 FNMCP] is inadequate to satisfy the alarm resolution requirements in 10 C.F.R. § 74.57(b), which requires that licensees “shall resolve the nature and cause of any MC&A alarm within approved time periods.” In the event that alarm resolution requires an inventory of one of the four item storage areas identified in [MOX Services’] December 17, 2009 Exemption Request, [MOX Services] has not demonstrated it can meet that commitment to normally resolve the alarm within three days.<sup>129</sup>

3.57 The regulation at issue in this contention is 10 CFR § 74.57(b), which states:

Licensees shall resolve the nature and cause of any MC&A alarm within approved time periods.

The regulation does not prescribe a specific time period, but instead envisions that the NRC Staff will approve, based upon its expert judgment, a satisfactory time period to which the licensee

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<sup>129</sup> Petition at 12. An “alarm,” as defined in 10 CFR § 74.4 and as relevant to SSNM items, is “a situation in which there is: (1) an out-of-location item or an item whose integrity has been violated.” 10 CFR § 74.4; *see also* Exhibit APPR00014, at Q 44.

will adhere. MOX Services proposed, and the NRC approved, the commitment that its alarm resolution procedures “will normally be completed within three calendar days after an item is declared missing.”<sup>130</sup> MOX Services identified a dozen available procedures or methods it intends to use, as appropriate, to resolve an alarm within this timeframe.<sup>131</sup>

3.58 Intervenor’s initial findings raised two main concerns with MOX Services’ alarm resolution commitment. Specifically, Intervenor alleges that MOX Services uses the term “normally” to “absolve[ ] it from the responsibility to resolve alarms in a timely fashion.”<sup>132</sup> And Intervenor is troubled that MOX Services cannot complete an inventory<sup>133</sup> of the four storage areas that are the subject of Contention 10 (were those areas to be filled to maximum capacity), within three days.<sup>134</sup> Intervenor alleges that MOX Services must amend its license application to include only those storage capacities for which it can complete an inventory within three days.<sup>135</sup> We addressed both concerns in our Initial Decision.<sup>136</sup>

3.59 In response to Intervenor’s concern that MOX Services inappropriately uses the term “normally,” our Initial Decision first noted that MOX Services’ use of the term “normally” in its

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<sup>130</sup> Exhibit APP000020, FNMCP Ch. 3, § 3.1.3 (Apr. 2010); *see also* Exhibit APP000021, Final Safety Evaluation Report for the License Application to Possess and Use Radioactive Material at the Mixed Oxide Fuel Fabrication Facility in Aiken, SC at 13-7 (Dec. 2010).

<sup>131</sup> *See* Exhibit APP000020, at 147.

<sup>132</sup> Intervenor’s Initial Findings ¶ 4.48; *see also id.* ¶¶ 4.49 – 4.55.

<sup>133</sup> Intervenor notes that MOX Services’ timing projections for item inventories “do not take into account the time needed to perform other activities that would be conducted during a physical inventory, including assay of the contents.” *Id.* ¶ 4.53 n.4; *see also id.* at ¶ 4.47 (referring to the time required for an “actual inventory (which may require re-measurement of item contents)”). But MOX Services’ alarm resolution methods include an *item* inventory, not a *physical* inventory. *See* Exhibit APP000020, at 147. MOX Services has not represented – in testimony or in legal statements of position – any intention of conducting a physical inventory or measuring items as part of alarm resolution.

<sup>134</sup> *See* Intervenor’s Initial Findings ¶¶ 4.49 – 4.55.

<sup>135</sup> *See id.* ¶ 4.54.

<sup>136</sup> *See* MOX Services’ Initial Findings ¶¶ 4.96 – 4.107 (responding to Intervenor’s assertion that MOX Services uses the term “normally” as a “loophole” for compliance); *id.* ¶¶ 4.114 – 4.122 (explaining that MOX Services can normally complete an inventory of the four storage areas in question within three days).

timing commitment is consistent with NRC guidance at NUREG-1280.<sup>137</sup> We then cited testimony by experts for the NRC Staff and MOX Services demonstrating that MOX Services can resolve an alarm within three days *in most cases*.<sup>138</sup> We also considered testimony from present and former NRC MC&A inspectors that MOX Services’ use of the term “normally” is appropriate under the rule.<sup>139</sup> And we are mindful that the NRC Staff would become involved in any alarm that took longer than three days to resolve.<sup>140</sup> Our Initial Decision concluded that “the preponderance of the evidence supports MOX Services’ use of the term ‘normally.’”<sup>141</sup> Intervenor’s initial findings provided no additional evidence or arguments to call that conclusion into question.

3.60 Our Initial Decision also included an extensive analysis of whether MOX Services can meet its alarm resolution commitment if it has not demonstrated that it can inventory each of the four storage areas at maximum capacity within three days.<sup>142</sup> MOX Services provided calculations demonstrating that it can inventory all items within storage areas TAS and STK – whether at normal or maximum capacity – within three days.<sup>143</sup> MOX Services’ calculations also demonstrate that it can inventory the other two storage areas in question, DCE and DCM, within three days when those areas are filled to their normal or expected capacity.<sup>144</sup> (Engineering calculations underlie the values MOX Services’ provided for normal capacity of its

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<sup>137</sup> See *id.* ¶ 4.98.

<sup>138</sup> See *id.* ¶¶ 4.100 – 4.103.

<sup>139</sup> See *id.* ¶¶ 4.102 – 4.103.

<sup>140</sup> See *id.* ¶¶ 4.105 – 4.106.

<sup>141</sup> *Id.* ¶ 4.104.

<sup>142</sup> See *id.* ¶¶ 4.114 – 4.122.

<sup>143</sup> See *id.* ¶ 4.114.

<sup>144</sup> See *id.*

storage areas.<sup>145</sup>) We concluded that even in light of these calculations, MOX Services can satisfy its timing commitment for alarm resolution for three reasons, each supported by testimony or documentary evidence (or both): (1) maximum capacity of DCE and DCM is not an expected condition, as demonstrated in the engineering calculations for storage sizing;<sup>146</sup> (2) MOX Services has not committed to resolve an alarm in DCM by way of an inventory;<sup>147</sup> and (3) even if an inventory of DCM or DCE became necessary, an inventory of the entire storage area is not likely necessary.<sup>148</sup>

3.61 Intervenor's initial findings raise only one additional argument in this regard. Intervenor's allege, "minor deviations from MOX Services' assumptions of 'normal' conditions could easily lead to a situation where an inventory could exceed the three calendar day time period."<sup>149</sup> By way of example, Intervenor's cite a 20% increase in capacity within DCM or a failure of the crane or barcode reader as "minor deviations."<sup>150</sup> But Intervenor's forget that these postulated deviations are relevant only in a scenario that is already highly unlikely, a scenario that requires the confluence of multiple unexpected events. As we reasoned in our Initial Decision,

[A] complete inventory of DCM or DCE when the storage areas are at maximum capacity . . . becomes necessary only if all of the following conditions apply: (1) the alarm concerns the material stored in DCE or DCM, which are only two of the eleven item storage areas in the MOX Facility; (2) the actual capacity of DCE or DCM exceeds the anticipated number of items for that area; (3) multiple other alarm resolution methods fail to resolve the alarm; (4) an inventory of the stored items is determined

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<sup>145</sup> See Exhibit APP000023, MOX Process: Store Sizing, DCS01-ZJJ-CG-NTE-F-00075-F (Dec. 2004); Exhibit APP000024, Update Storage Sizing Document, ECR-013808 (Sept. 13, 2011).

<sup>146</sup> See MOX Services' Initial Findings ¶¶ 4.117 – 4.118.

<sup>147</sup> *Id.* ¶ 4.119.

<sup>148</sup> *Id.* ¶ 4.120.

<sup>149</sup> Intervenor's Initial Findings ¶ 4.55.

<sup>150</sup> *Id.*

to be a necessary to resolve the alarm; and (5) an inventory of a portion of the DCM or DCE contents is inconclusive, such that the *entire* capacity of DCM or DCE must be inventoried.<sup>151</sup>

The occurrence of the additional “minor deviations” suggested by Intervenors make this scenario even more remote, or *abnormal*.

3.62 Moreover, we note that MOX Services *can* complete an inventory of DCM within three days, even if that storage area is filled to a capacity that is 20% higher than normal levels.

Normal capacity for DCM is 261 items, which MOX Services can inventory within 2.5 days.<sup>152</sup>

Thus, MOX Services can inventory 313 items in DCM, or 120% of normal capacity, within 3.0 days.<sup>153</sup> And recall that MOX Services has not even committed to resolve an alarm using an inventory in DCM.<sup>154</sup> Thus, MOX Services’ capabilities with respect to its timing commitment are not as tenuous as Intervenors would suggest.

3.63 MOX Services has committed that its alarm resolution procedures “will normally be completed within three calendar days after an item is declared missing.”<sup>155</sup> We find that MOX Services has provided reasonable assurance that it can normally resolve an alarm within three

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<sup>151</sup> MOX Services’ Initial Findings ¶ 4.122. In response to MOX Services’ stated expectation that other alarm resolution methods usually will be effective in resolving an alarm and that a plant inventory will rarely be required, Intervenors allege: “we do not believe that the regulatory scheme allows us to approve an FNMCP whose provision for the use of a plant inventory to resolve an alarm would be ineffectual.” Intervenors’ Initial Findings ¶ 4.52. Intervenors misconstrue MOX Services’ position. MOX Services has not stated that an inventory is an ineffective means of resolving an alarm. Rather, MOX Services simply concludes that other methods normally will be more effective in resolving an alarm. See MOX Services’ Initial Findings ¶¶ 4.110 – 4.113.

<sup>152</sup> Exhibit APPR00014, at Q 47; see also Exhibit APP000023; Exhibit APP000024.

<sup>153</sup> See Exhibit APP000025, MFFF PuO<sub>2</sub> 3013 Container Storage Unit (DCM), Inspection Time Engineering Calculation, DCS01-DCM-DS-CAL-M-59999-0 (Sept. 26, S011) (providing the calculation for the average time to inventory one 3013 canister).

<sup>154</sup> See Tr. 1436-37 (King) (noting that MOX Services did not commit to inventory DCM) (citing Section 3.1.4.3 of the FNMCP).

<sup>155</sup> Exhibit APP000020, § 3.1.3; see also Exhibit APP000021, at 13-7.

days.<sup>156</sup> That some hypothetical scenario exists in which MOX Services may not be able to resolve an alarm within three days, does not call into question MOX Services' compliance with its commitment. We therefore reject Intervenor's suggestion that the MOX Facility should be licensed at a capacity for which it can complete an inventory within three days.<sup>157</sup>

3.64 Intervenor's initial findings therefore raise no additional arguments or evidence that call into question the conclusions presented in our Initial Decision. For the reasons provided here and in our Initial Decision, the Board decides Contention 10 in favor of MOX Services.

#### **D. CONTENTION 11**

3.65 Contention 11 alleges the following:

At page 161, [MOX Services] claims that in the event of alleged theft of plutonium from the [MOX Facility], it is capable of confirming the presence of a specific individual plutonium item within eight hours and verifying the presence of all Pu in item form in vault storage within 72 hours. But [MOX Services] does not support this assertion with any information that would show how such confirmation and verification will be carried out in the specified timelines. In addition, as discussed above in Contentions 9 and 10, other statements by [MOX Services] in its exemption application and RAI responses strongly indicate that in fact, [MOX Services] is not capable of meeting these timelines with respect to certain categories of plutonium in vault storage. Therefore [MOX Services] has not demonstrated that it satisfies [10 C.F.R. § 74.57(e)].<sup>158</sup>

3.66 At issue is the requirement in 10 CFR § 74.57(e):

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<sup>156</sup> See MOX Services' Initial Findings ¶¶ 4.95 – 4.122.

<sup>157</sup> See Intervenor's Initial Findings at ¶ 4.54.

<sup>158</sup> Petition at 14 (citation omitted). The text of the contention, as presented by the Intervenor and admitted by the Board, incorrectly cites 10 CFR § 75.57(e). There is no "§ 75.57." The correct reference is to 10 CFR § 74.57(e), which the Intervenor correctly cite in presenting the basis for the Contention. *See id.*

The licensee shall provide an ability to rapidly assess the validity of alleged thefts.<sup>159</sup>

As with the regulation at issue in Contention 10, Section 74.57(e) does not provide a specific time frame, but instead requires rapid assessment of alleged thefts. Again, it is a performance-based regulation.<sup>160</sup> MOX Services proposed the eight and 72 hour time periods that are the subject of this Contention.<sup>161</sup> The Staff approved those time frames, which are consistent with NRC guidance at NUREG-1280.<sup>162</sup>

3.67 To meet its commitment, MOX Services plans to use the same reconciliation of the MMIS and PLC maps discussed with respect to Contention 9.<sup>163</sup> As with the regulation at issue in Contention 9, Section 74.57(e) addresses the ability to verify *presence* of SSNM items.<sup>164</sup> Because it can initiate this reconciliation on demand and complete the reconciliation almost instantaneously, MOX Services states that it can confirm the presence of a single item in a vault well within 8 hours, and all items in vault storage well within 72 hours.<sup>165</sup>

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<sup>159</sup> Alleged thefts, according to NRC guidance at NUREG-1280, are those that “originate external to the MC&A system.” Exhibit APP000030, NUREG-1280, Standard Format and Content Acceptance Criteria for the Material Control and Accounting (MC&A) Reform Amendment, Rev. 1, § 3.3.2 (Apr. 1995). Specifically:

Among these [alarms] are any statements communicated directly or indirectly to facility staff, NRC, FBI, police, etc., that diversion of SSNM under license has occurred. The statements may or may not include details such as the plant area from which SSNM was allegedly taken, which item(s) was (were) taken, a description of the container(s) or material allegedly taken, or other information in support of the allegation. This covers threats allegedly from within as well as from outside the facility.

*Id.*

<sup>160</sup> Exhibit NRC000006, at Q 29.

<sup>161</sup> See Exhibit APP000020, § 3.3.1.6.

<sup>162</sup> See Exhibit APP000021, at 13-7; Exhibit APP000030, § 3.3.1.

<sup>163</sup> See Exhibit APPR00014, at Q 53.

<sup>164</sup> See *id.* Verification of item *integrity* is not a component of 10 CFR § 74.57(e); see also 10 CFR § 74.57(e).

<sup>165</sup> See Exhibit APPR00014, at Q 58 – Q 59.

3.68 Intervenor’s initial findings raised several challenges to MOX Services’ proposed theft resolution approach. In particular, Intervenor’s:

- reiterate the same concerns with MOX Services’ MMIS and PLCs mapping that they raised in connection with Contention 9;<sup>166</sup>
- allege that the hearing testimony revealed “vulnerabilities” in the MMIS and PLCs to malicious action;<sup>167</sup> and
- assert that MOX Services cannot resolve an alleged theft because it cannot complete a physical inventory of all storage areas within 8 or 72 hours.<sup>168</sup>

3.69 Intervenor’s expressly state, “[f]or the same reasons we disapproved MOX Services’ proposed methods for complying with the item monitoring requirements of 10 C.F.R. § 74.55(b), we also find its proposed method for resolving alleged thefts deficient.”<sup>169</sup> Specifically, Intervenor’s characterize MOX Services as assuming that its methods are “100 percent accurate,” and claim that MOX Services’ mapping approach is not “independently and quantitatively verified.”<sup>170</sup> Intervenor’s plainly reiterate the same concerns with MOX Services’ MMIS and PLCs mapping that they raised in connection with Contention 9. For the reasons we outlined in the context of Contention 9, we find that Intervenor’s characterizations are incorrect and their concerns have no bearing on the outcome of this proceeding.<sup>171</sup>

3.70 The Intervenor’s remaining two arguments concerning this Contention are resolved below.

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<sup>166</sup> See Intervenor’s Initial Findings ¶ 4.61.

<sup>167</sup> See *id.* ¶ 4.62.

<sup>168</sup> See *id.* ¶¶ 4.64 – 4.65.

<sup>169</sup> Intervenor’s Initial Findings ¶ 4.61.

<sup>170</sup> *Id.*

<sup>171</sup> See *supra* paras. 3.16 – 3.39.

**1. Intervenor's Have Not Identified Vulnerabilities in MOX Services' Item Monitoring Program that Would Not Be Detected Through MOX Services' Redundant Means for Validating the Accuracy of the MMIS and PLCs Mapping**

3.71 Intervenor's claim that "[t]he hearing testimony . . . revealed vulnerabilities in the MMIS and PLCs to malicious manipulation."<sup>172</sup> For support, Intervenor's provided the following example:

[S]uppose the threat was from an individual who asserted that he or she had diverted a formula quantity of plutonium and had infiltrated and corrupted the MMIS and PLC systems in order to conceal the theft. . . . This would immediately render all data suspect and trigger time-consuming audits. Ultimately, there would be no way to assess the validity of the threat without conducting a complete inventory of the facility, including an inventory of the DCM vault.<sup>173</sup>

3.72 This is the same hypothetical scenario that Intervenor's expert posed in his direct testimony.<sup>174</sup> MOX Services and the NRC Staff responded to this hypothetical scenario in their reply testimony, rebuttal statements of position, and through live testimony at the hearing.<sup>175</sup> And we addressed this hypothetical at length in our Initial Decision.<sup>176</sup> In short, we identified multiple ways MOX Services can resolve the alleged theft scenario posed by Intervenor's:

(1) separation of duties required by regulation and enforced by MOX Services' procedures and physical access barriers will prevent any one person from having access to records and access to material;<sup>177</sup> (2) MOX Services can instantaneously compare its records of where items are,

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<sup>172</sup> Intervenor's Initial Findings ¶ 4.62.

<sup>173</sup> *Id.*

<sup>174</sup> Exhibit INT000001, at A.7, ¶ 5.

<sup>175</sup> See Exhibit NRC000008, at Q 12; NRC Staff's Response to Intervenor's Initial Statement of Position on Contentions 9, 10, and 11, at 6–7 (Dec. 20, 2011); Exhibit APP000031, at Q 48; MOX Services' Reply Statement of Position on Contentions 9, 10, and 11, at 24–25 (Jan. 24, 2012); Tr. 1488–533.

<sup>176</sup> See MOX Services' Initial Findings ¶¶ 4.137 – 4.156.

<sup>177</sup> See *id.* ¶ 4.138.

against its records of where items should be;<sup>178</sup> (3) MOX Services can visually count the number of items within each storage area well within 72 hours;<sup>179</sup> and (4) MOX Services has demonstrated reasonable assurance that it can protect against the vulnerabilities that the Intervenor pose in their hypothetical allegation, and that MOX Services can rapidly validate the integrity of its records system.<sup>180</sup> We found these reasons support a conclusion that MOX Services can assess the validity of Dr. Lyman's hypothetical theft within the timeframes to which it has committed.<sup>181</sup>

3.73 Intervenor's initial findings provide no new argument or evidence to refute the conclusions we drew in our Initial Decision. Accordingly, the findings presented in our Initial Decision with respect to this hypothetical scenario are unchanged.

## **2. Intervenor Mistakenly Assert that Completion of a Physical Inventory is Necessary To Resolve an Alleged Theft**

3.74 The remaining claims in Intervenor's initial findings on Contention 11 are intended to support their position that MOX Services cannot resolve an alleged theft within the timeframes to which it has committed, because it cannot complete a physical inventory within those timeframes. In particular, Intervenor asserts that MOX Services could not identify a specific

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<sup>178</sup> See *id.* ¶ 4.140.

<sup>179</sup> See *id.* ¶¶ 4.142 – 4.143. Although Intervenor's initial findings allege that "a counting procedure could be spoofed," Intervenor's Initial Findings ¶ 4.63, we addressed that precise allegation in our Initial Decision. See MOX Services' Initial Findings ¶¶ 4.142 – 4.143. In particular, MOX Services' expert Ms. King testified that there is not "a credible scenario for somebody to have gone in there and spoofed that to have placed something under a can because of the access controls that prohibit somebody from going in there." MOX Services' Initial Findings at ¶ 4.142 (*citing* Tr. 1529 (King)). Dr. Lyman provided no further testimony on this matter in response. See Tr. 1529-37. The NRC Staff affirmed the conclusion that the counting option is a viable one. See NRC Staff's Initial Findings (cover letter). Intervenor simply reiterates the concern, and provide no new arguments or evidence to refute the conclusion that MOX Services can resolve an alarm by visually counting the number of items in a storage area. See Intervenor's Initial Findings ¶¶ 4.63 – 4.65.

<sup>180</sup> See MOX Services' Initial Findings ¶¶ 4.144 – 4.155.

<sup>181</sup> See *id.* ¶¶ 4.155 – 4.156.

item within 8 hours, because it could not complete a full inventory of a storage area within that time.<sup>182</sup> Intervenors note that “MOX Services commits only to *commencing* a physical inventory within 24 hours, but makes no commitment with respect to the time frame for completing the inventory.”<sup>183</sup>

3.75 As Mr. Pham and Ms. King testified at the hearing, the commitment to commence an emergency inventory within 24 hours is born out of NUREG-1280.<sup>184</sup> Of course, NUREG-1280 does not impose a regulatory requirement, but rather *recommends* that “[a] contingency capability is maintained to *initiate* an emergency physical inventory of all SSNM in the plant, or in any portion of the plant, within 24 hours after receipt of an NRC order.”<sup>185</sup> The guidance does not recommend a completion date for the emergency inventory, nor do the regulations impose one.<sup>186</sup> And furthermore, as counsel for MOX Services noted at the hearing, this aspect of NUREG-1280 is outside the scope of Contention 11.<sup>187</sup>

3.76 Similarly, Intervenors’ claim that MOX Services cannot complete an inventory of a storage area within 8 hours goes beyond the scope of Contention 11. Contention 11 pertains to MOX Services’ ability to rapidly resolve alleged thefts. MOX Services has committed to rapidly resolve alleged thefts by way of its MMIS and PLCs mapping capabilities.<sup>188</sup> We detailed in our Initial Decision and summarized above the bases for our conclusion that MOX Services’ proposed approach provides reasonable assurance that it can resolve alleged thefts in the

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<sup>182</sup> See Intervenors’ Initial Findings ¶ 4.64.

<sup>183</sup> *Id.* ¶ 4.65.

<sup>184</sup> Tr. 1478 (Pham); Tr. 1481–82 (King).

<sup>185</sup> Exhibit APP000030, at 49 (emphasis added).

<sup>186</sup> See *id.*

<sup>187</sup> See Tr. 1483 (Silverman).

<sup>188</sup> See Exhibit APPR20014, at Q 58.

timeframes to which it has committed.<sup>189</sup> The physical inventory requirements of 10 CFR §§ 74.51(d) and 74.59(f) are separate from the theft resolution requirements of 10 CFR § 74.57(e). And there is no requirement in Section 74.57(e) that licensees use physical inventories to meet the regulation. Accordingly, we conclude that Intervenor's concern is beyond the scope of Contention 11 and the regulatory requirements at issue therein.

3.77 In sum, the Board finds a preponderance of the evidence demonstrates that MOX Services has developed a program that "satisfies the requirement in 10 CFR 74.57(e) to respond rapidly to alleged thefts."<sup>190</sup>

3.78 For the reasons provided here and in our Initial Decision, the Board decides Contention 11 in favor of MOX Services.

#### **IV. SUMMARY FINDINGS OF FACT AND CONCLUSIONS OF LAW**

Based upon a review of the entire hearing record and the foregoing discussion, the Board concludes as follows:

5.1 MOX Services' reconciliation of the MMIS Perpetual Inventory Report and PLCs mapping provides reasonable assurance that it can verify the presence of all SSNM items in storage within the 30 and 60 day timeframes required by 10 CFR § 74.55(b)(1).

5.2 By verifying the integrity of seals or TIDs on storage area boundaries, MOX Services can verify the integrity of all SSNM items in storage within the 30 and 60 day timeframes required by 10 CFR § 74.55(b)(1).

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<sup>189</sup> See *supra* para. 3.72.

<sup>190</sup> Exhibit APP000021, at 13-7.

5.3 MOX Services can normally resolve an alarm within three days, consistent with the requirements of 10 CFR § 74.57(b) and MOX Services' commitments in the FNMCP, even if it must conduct an inventory of DCE, DCM, STK, or TAS.

5.4 Using its MMIS and PLC mapping, MOX Services can rapidly assess the validity of an alleged theft by locating one SSNM item in eight hours, and all SSNM items in vault storage in 72 hours, consistent with 10 CFR § 74.57(e) and MOX Services' commitments in the FNMCP.

5.5 MOX Services has met its burden of proof as to Contentions 9, 10, and 11, and thus Contentions 9, 10, and 11 are resolved in favor of the Applicant.

## **V. ORDER**

6.1 WHEREFORE, IT IS ORDERED, in accordance with 10 CFR § 2.1210, that Intervenor's Contentions 9, 10, and 11 are resolved on the merits in favor of MOX Services.

6.2 IT IS FURTHER ORDERED that the Initial Decision, as supplemented herein, will constitute a final decision of the Commission forty (40) days from the date of issuance (or the first agency business day following that date if it is a Saturday, Sunday, or federal holiday, *see* 10 CFR § 2.306(a)), unless a petition for review is filed in accordance with 10 CFR § 2.1212, or the Commission directs otherwise.

6.3 IT IS FURTHER ORDERED that any party wishing to file a petition for review on the grounds specified in 10 CFR § 2.341(b)(4) must do so within fifteen (15) days after service of this Partial Initial Decision, as supplemented. The filing of a petition for review is mandatory for a party to have exhausted its administrative remedies before seeking judicial review. Within ten (10) days after service of a petition for review, parties to the proceeding may file an answer

supporting or opposing Commission review. Any petition for review and any answer shall conform to the requirements of 10 CFR § 2.341(b)(2)-(3).

**UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION**

**THE ATOMIC SAFETY AND LICENSING BOARD**

**Before Administrative Judges:  
Michael C. Farrar, Chairman  
Lawrence G. McDade  
Dr. Nicholas G. Trikouros**

In the Matter of

SHAW AREVA MOX SERVICES, LLC

(Mixed Oxide Fuel Fabrication Facility  
Possession and Use License)

May 18, 2012

Docket No. 70-3098-MLA

ALSBP No. 07-856-02-MLA-BD01

**CERTIFICATE OF SERVICE**

I hereby certify that on May 18, 2012, copies of "Shaw AREVA MOX Services, LLC's Proposed Reply Findings of Fact and Conclusions of Law For Contentions 9, 10, and 11," were served upon the persons listed below by first class mail.

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Dated: 18 May 2012

  
\_\_\_\_\_  
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May 18, 2012

**VIA EMAIL AND FIRST CLASS MAIL**

Michael C. Farrar, Chair  
Lawrence G. McDade, Administrative Judge  
Nicholas Trikouros, Administrative Judge  
Atomic Safety and Licensing Board  
Mail Stop: T-3 F23  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Re:    Docket No. 70-3098-MLA: Shaw AREVA MOX Services, LLC's Proposed Reply  
      Findings of Fact and Conclusions of Law for Contentions 9, 10, and 11

Dear Administrative Judges:

Shaw AREVA MOX Services, LLC ("MOX Services") herein submits to the Atomic Safety and Licensing Board ("Board") and the parties copies of its Proposed Reply Findings of Fact and Conclusions of Law for Contentions 9, 10, and 11.

MOX Services has determined that the contents of this submittal *do not* contain security sensitive information. Accordingly, this transmittal letter and the enclosed submittal may be recorded on the public docket.

Please contact me if you have any questions.

Michael C. Farrar, Chair  
May 18, 2012  
Page 2

Sincerely,



Anna V. Jones

AVJ

Enclosures

c: Secretary of the Commission  
Office of Commission Appellate Adjudication  
Diane Curran  
Brett Klukan  
Catherine Scott  
Christopher Hair  
Marcia Simon  
Joshua Kirstein  
Shelbie Lewman  
Dealis Gwyn  
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K-282

## Hearing Docket

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**From:** Jones, Anna V. [anna.jones@morganlewis.com]  
**Sent:** Friday, May 18, 2012 4:07 PM  
**To:** 'Diane Curran'; Klukan, Brett; Scott, Catherine; Hair, Christopher; Silverman, Donald J.; 'Glenn Carroll (atom.girl@mindspring.com)'; 'Janet Marsh and Lou Zeller (bredl@skybest.com)'; Kirstein, Josh; McDade, Lawrence; Simon, Marcia; 'Mary Olson (maryolson@main.nc.us)'; Farrar, Mike; Trikouros, Nicholas; Docket, Hearing; OCAAMAIL Resource; Harich, Patricia; Lewman, Shelbie  
**Cc:** 'Gwyn, Dealis W.'; 'King, Sue'; Silverman, Donald J.  
**Subject:** Docket No. 70-3098-MLA  
**Attachments:** (69879730)\_1\_FINAL Reply Findings of Fact and Conclusions of Law.PDF

Dear Administrative Judges and Parties,

Today MOX Services submits its Proposed Reply Findings of Fact and Conclusions of Law for Contentions 9, 10, and 11 by first class mail. Because MOX Services has determined that the filing does not contain security sensitive information, I have attached the submittal to this email as well.

Regards,

Anna Vinson Jones  
*Counsel for MOX Services*

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