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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
Pa'ina Hawaii, LLC	)	Docket No. 30-36974-ML
	)	ASLBP No. 06-843-01-ML
Material License Application	)	
	)	

INTERVENOR CONCERNED CITIZENS OF HONOLULU'S
REPLY IN SUPPORT OF AMENDED SAFETY CONTENTION 7

I. INTRODUCTION

Pursuant to this Board's April 2, 2008 order, intervenor Concerned Citizens of Honolulu hereby files its reply to Pa'ina Hawaii, LLC's and the Nuclear Regulatory Commission ("NRC") Staff's answers to Amended Safety Contention 7, which were served on May 16, 2008 and May 19, 2008, respectively.[1] For the reasons set forth herein and in Concerned Citizens' initial filing, the Board should admit Concerned Citizens' contention that Pa'ina's failure to address the likelihood and consequences of an aviation accident involving its proposed irradiator violates 10 C.F.R. § 30.33(a)(2)'s requirement to demonstrate its "proposed equipment and facilities [would be] adequate to protect health and minimize danger to life or property." See also 10 C.F.R. §

[1] Concerned Citizens' counsel was in Pennsylvania on May 16, 2008, and received Pa'ina's electronic transmission after 5 p.m. in "the recipient's time zone on the date of transmission." 10 C.F.R. § 2.306 (2007). Pursuant to the rules for computation of time applicable to this proceeding, the seven-day period for Concerned Citizens to reply to Pa'ina's answer was "extended by one (1) business day," to Tuesday, May 27, 2008. Id.; see also 72 Fed. Reg. 49,139, 49,139 (Aug. 28, 2007) (amendments to, inter alia, 10 C.F.R. § 2.306 "apply only to new proceedings noticed on or after" October 15, 2007). Likewise, since the last day of the seven-day period to reply to the Staff's answer fell on Memorial Day, a legal holiday, the deadline for Concerned Citizens' reply was extended until Tuesday, May 27, 2008. See 10 C.F.R. § 2.306.

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36.13(a) (applicant for irradiator license must "satisfy the general requirements specified in § 30.33 of this chapter").[2]

II. AMENDED SAFETY CONTENTION 7 IS TIMELY

Pa'ina's and the Staff's arguments that Concerned Citizens could have – and, thus, should have – submitted Amended Safety Contention 7 earlier in this proceeding and that the contention is therefore untimely ignore two critical facts. First, in its original hearing request, Concerned Citizens did include a safety contention – Safety Contention 7 – alleging that Pa'ina's application was deficient due to its complete failure "to address the likelihood and consequences of an air crash" and that these issues needed to be addressed given the elevated risk of an aviation accident due to the proposed irradiator's location adjacent to active runways at Honolulu International Airport. Pa'ina Hawaii, LLC (Material License Application), LBP-06-12, 63 NRC 403, 418 (2006) (quoting 10/3/05 Hearing Request at 15). Second, the Board admitted that contention, holding that it met "all the ... pleading requirements for admissible contentions." Id. at 420.

Since the Board had already admitted Safety Contention 7, Concerned Citizens did not, prior to the issuance of the Board's April 2, 2008 order dismissing that contention, have any reason to file an amended contention providing additional supporting documentation or analysis. That is not to say that Concerned Citizens did not previously bring to the Board's attention some of the evidence now proffered in support of Amended Safety Contention 7. Following the

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[2] As stated numerous times previously in this proceeding, a failure to comply with 10 C.F.R. § 30.33(a)(2) also constitutes a failure to satisfy 10 C.F.R. § 36.13(a). See Pa'ina Hawaii, LLC (Material License Application), CLI-08-03, 67 NRC ___, slip op. at 12-13 (Mar. 17, 2008) (hereinafter "3/17/08 Commission Order"). There is, accordingly, no basis for Pa'ina's claim Concerned Citizens "has nowhere alleged or shown that Licensee's irradiator fails to comply with any of the provisions in 10 C.F.R. § Part 36." Pa'ina's Answer at 15.

issuance of the draft and final versions of the Topical Report, Concerned Citizens – acting under the reasonable, yet ultimately mistaken, impression these documents were safety documents – timely filed additional safety contentions containing expert reports and calculations to demonstrate the inadequacy of the Topical Report's analysis of the likelihood and consequences of aviation accidents involving Pa'ina's proposed irradiator. Cf. 4/2/08 Board Order at 2 n.8 ("Everyone, but the Staff (and it until cornered), believed this Draft Topical Report was a safety document").

It was not until the Board's April 2, 2008 determination the initially admitted Safety Contention 7 did not satisfy the Commission's "newly prescribed and rigorous safety contention admissibility standards" (which were not announced until March 17, 2008) that Concerned Citizens had any reason to file additional materials in support of its contention that Pa'ina's application improperly omitted discussion of potential aviation accidents involving its proposed irradiator. Id. at 5. Implicitly recognizing this, the Board afforded Concerned Citizens "the opportunity to file new safety contentions in accordance with" the newly announced standards. Id.[3] Concerned Citizens timely did so, filing Amended Safety Contention 7 within "thirty (30) days from the issuance of" the Board's April 2, 2008 Order. 4/2/08 Board Order at 5.

This case is indistinguishable from Texas Utilities Elec. Co. (Comanche Peak Steam Electric Station, Unit 1), LBP-86-36A, 24 NRC 575 (1986), in which the Board certified a question related to the admissibility of a proffered contention and, following guidance from the Commission, held the issuance of the Commission's clarifying order provided "good cause for late filing." Id. at 579. In Texas Utilities, the Commission relied on the existing "statute,

[3] If, as the Staff argues, the Board did not intend to allow Concerned Citizens to "provide new documentary support for its contention" to satisfy the Commission's newly announced standards, it presumably would have said so in its April 2, 2008 order. Staff's Answer at 10.

implementing regulation, and agency case law" to answer the certified question; it did not create an entirely new legal principle out of whole cloth, as the Staff argues. Texas Utilities Elec. Co. (Comanche Peak Steam Electric Station, Unit 1), CLI-86-15, 24 N.R.C. 397, 399 (1986); see also Staff's Answer at 9. On remand, the Board held the intervenors' amended contentions, which modified their earlier contentions in response to the Commission's clarification, were "not late because they [were] merely a more clearly worded version of portions of prior allegations that were timely." LBP-86-36A, 24 NRC at 579. The Board should similarly find Amended Safety Contention 7 timely.

III. AMENDED SAFETY CONTENTION 7 SATISFIES THE STANDARDS FOR ADMISSION SET FORTH IN CLI-08-03

In opposing admission of Amended Safety Contention 7, both Pa'ina and the Staff act as if the Commission never issued CLI-08-03, which articulated the "requirements uniquely applicable to the admission of a safety contention challenging the siting of an irradiator." 4/2/08 Board Order at 3. Instead, they seek to re-invent the wheel, recycling well-worn arguments that the Statements of Consideration ("SOC") accompanying promulgation of the Part 36 rules preclude admission of Concerned Citizens' contention.[4] These arguments improperly ignore that the Commission already expressly factored in "the SOC's conclusions" when it announced the standards for admitting "contentions questioning an irradiator facility's siting." 3/17/08 Commission Order at 20. In making its decision regarding Amended Safety Contention 7's

[4] The Staff's suggestion that Concerned Citizens was obliged to "argue that the Licensee's irradiator will be constructed at a site where local authorities would not allow other occupied buildings to be placed" is nonsensical. Staff's Answer at 11. If local regulations precluded occupied buildings at Pa'ina's chosen site, Pa'ina could not build its irradiator there, eliminating the unique threat of aviation accidents and mooting the need for the Board to consider this contention.

admissibility, the Board should limit its inquiry to the standards the Commission articulated in CLI-08-03, not the additional burdens Pa'ina and the Staff seek to impose.

To be admissible, Amended Safety Contention 7 "must set forth, with adequate elaboration and support, a plausible claim that [Pa'ina's proposed irradiator] would not be adequately protective in the event of" an aviation accident. Id. at 21. "Asserted threats must be supported by asserted facts, or expert opinions, including appropriate references to the specific sources and documents on which [Concerned Citizens] intends to rely." Id. at 21-22. Moreover, the contentions must include "an explanation of how a significant harm may result given the design of the facility and sources." Id. at 22 (emphasis added).

Amended Safety Contention 7 fully satisfies the standards for admission the Commission set forth in CLI-08-03. Far from presenting mere "generalized, conclusory claims of a potential for an aircraft crash because of a nearby airport," Concerned Citizens submitted extensive expert analysis from Dr. Marvin Resnikoff and Purdue University Professor of Structural Engineering Mete Sozen. Id. at 20. These experts' declarations, reports and calculations abundantly support Concerned Citizens' claims regarding (1) the unusually elevated risk of an aviation accident created by Pa'ina's decision to locate its proposed irradiator immediately adjacent to active runways at Honolulu International Airport and (2) the reasonable scenarios in which an airplane striking Pa'ina's proposed irradiator would result in radiation exposures in excess of applicable safety standards and off-site releases of contaminated pool water. As the Commission required, Dr. Resnikoff details how the particular design of Pa'ina's proposed facility and the specific sources Pa'ina proposes to use could fail in the event of an aviation accident, creating the conditions under which "significant harm may result." Id. at 22.

The Staff's argument that Concerned Citizens' scenarios are too speculative misconstrues CLI-08-03 as imposing a burden to establish excessive radiation exposures or off-site releases are certain to occur in the event of an aviation accident. See Staff's Answer at 14 (experts "merely identify scenarios that could conceivably result in severe radiological consequences"). The Commission said nothing of the sort. Rather, for Amended Safety Contention 7 to be admissible, Concerned Citizens must present evidence of only "a plausible claim that a proposed facility would not be adequately protective in the event of" an aviation accident and of "'a reasonable scenario' of potential consequences." 3/17/08 Commission Order at 21 (quoting Private Fuel Storage, LLC (Independent Spent Fuel Installation) ("PFS"), CLI-04-22, 60 NRC 125, 138 (2004)) (emphasis added). By using terms like "plausible" and "potential," the Commission made clear Concerned Citizens need present only evidence of credible scenarios under which "significant harm may result." Id. at 21-22 (emphasis added); see also Merriam Webster's Collegiate Dictionary at 892, 912 (10th ed. 1993).[5]

The Staff and Pa'ina are simply wrong when they assert Concerned Citizens "has not made any attempt to show that the aircraft crash consequences it identifies are unique to the

[5] The Staff's claim that the likelihood of an aviation accident involving Pa'ina's proposed irradiator is irrelevant to the issues before the Board cannot be squared with the Commission's requirement that Concerned Citizens present reasonable scenarios and plausible claims of harmful consequences. See Staff's Answer at 12. To determine whether a scenario involving potential consequences is reasonable or plausible, there must be some consideration of the likelihood an accident involving the proposed irradiator will occur. See 3/17/08 Commission Order at 23 (need to "assess in qualitative terms the significance and plausibility of the particular asserted siting-related threats"). It is the elevated risk of such an occurrence – due to a combination of the proximity of the proposed irradiator to active runways, the large number of take-offs and landings on those runways, and the high accident rate at Honolulu International Airport – that makes evaluation of the safety of the proposed irradiator of particular concern. Cf. Exh. 1: M. Resnikoff, "The Probability of Aircraft Impact into the Proposed Pa'ina Hawaii Irradiator" at 20 (Feb. 7, 2007) ("Resnikoff Report") ("If the proposed facility were located over ten miles from the center of the runways, the conditional probability [of an aviation accident] would decline by a factor of 1,000").

Licensee's proposed irradiator." Staff's Answer at 13; see also Pa'ina's Answer at 10. In their declarations, reports and calculations, Concerned Citizens' experts examine the specific design of Pa'ina's proposed irradiator and explain why the irradiator pool liner Pa'ina proposes to construct could easily be penetrated by a jet engine, allowing vital shielding water to escape. See 5/2/08 Resnikoff Declaration ¶¶ 11-17 & Exhs. 2-3. The experts further evaluated the standards to which the specific sources Pa'ina seeks to use have been tested and performed calculations to demonstrate the sources would be unable to withstand the forces of an aviation accident. See id. ¶¶ 18-20 & Exh. 4. Moreover, the experts considered the unique geologic setting of the site Pa'ina proposes for its irradiator – a site near the ocean's edge where the lower portion of the irradiator pool would be surrounded by groundwater – and explained how the geologic conditions provide a vector for contaminated pool water to spread offsite into the groundwater and nearby Ke'ehi Lagoon. See id. ¶ 20; Resnikoff Report at 21.

By focusing on the specific design and setting of Pa'ina's proposed irradiator, Amended Safety Contention 7 identifies "feature[s] that would render the consequences of an aircraft crash at the Licensee's irradiator more severe than those resulting from a crash at" the generic irradiator the NRC considered in promulgating the Part 36 regulations. Staff's Answer at 13. The combination of the irradiator pool's flimsy design with the unique characteristics of the proposed site (where the lower portion of the irradiator pool would be below the surrounding groundwater and the irradiator would be immediately adjacent to the ocean) present risks of radioactive contamination "spread[ing] from the immediate vicinity of the source rack" that would not be present at a run-of-the-mill irradiator. 58 Fed. Reg. 7,715, 7,726 (Feb. 9, 1993). In adopting Part 36, the NRC expressly contemplated the need to review facility siting "on a case by case basis" in situations like this, where a "unique threat is involved." Id. at 7,725.

IV. PA'INA'S AND THE STAFF'S ARGUMENTS ON THE MERITS OF AMENDED SAFETY CONTENTION 7 ARE IRRELEVANT TO ADMISSIBILITY

The Board should reject Pa'ina's and the Staff's attempts to convert the decision on the admissibility of Amended Safety Contention 7 into a ruling on the merits of Concerned Citizens' claims. As the Board has emphasized throughout this proceeding, resolving the parties' disputes "is not the appropriate subject of [the Board's] inquiry at the contention admission stage of the proceeding." Pa'ina Hawaii, LLC (Material License Application), LBP-06-04, 63 NRC 99, 112 (2006); see also LBP-06-12, 63 NRC at 406 ("At the contention admissibility stage of the proceeding ... a factual defense is generally irrelevant and inappropriate"); 69 Fed. Reg. 2,182, 2,190 (Jan. 14, 2004) ("The contention standard does not contemplate a determination of the merits of a proffered contention"). In CLI-08-03, the Commission likewise affirmed that "we do not expect a petitioner to prove its contention at the pleading stage." 3/17/08 Commission Order at 21 (quoting PFS, CLI-04-22, 60 NRC at 139); see also id. ("'quality of the evidentiary support' at the contention filing stage .. 'need not be of the quality necessary to withstand a summary disposition motion'") (quoting 54 Fed. Reg. 33,168, 33,171 (Aug. 11, 1989)). The various factual and legal disputes Pa'ina and the Staff raise in their answers merely confirm the existence of "genuine dispute[s]" on "material issue[s] of law [and] fact" that should be resolved following admission of the contention. 10 C.F.R. § 2.309(f)(vi).

Even were the Board to consider the merits, the evidence presented would compel a ruling in Concerned Citizens' favor. Notably, neither the Staff nor Pa'ina provide any expert testimony to back up their challenges to the analysis of highly technical issues by Concerned Citizens' experts. Cf. 8/31/07 Board Memorandum (Certifying Question to the Commission) at 2 (noting Pa'ina's lack of expertise in evaluating safety considerations related to irradiator siting). Pa'ina's counsel's unsupported assertion that Dr. Resnikoff overstated the likelihood of

an airplane accident and the Staff's lawyer's inaccurate claim Dr. Resnikoff failed to provide data or analysis to substantiate his conclusions about the Cobalt-60 sources' vulnerability or the potential for contaminated pool water to escape the facility do not provide any basis for the Board to reject Amended Safety Contention 7. See Pa'ina Answer at 11-12; Staff's Answer at 15; see also 5/22/08 Resnikoff Supplemental Declaration ¶¶ 3-4, 14-15.[6] Likewise, while both the Staff and Pa'ina question – again without any supporting expert testimony – Concerned Citizens' experts' analysis that a jet engine could enter the irradiator pool and rupture its liner, the evidence Concerned Citizens has proffered is more than adequate to establish "a plausible claim" at the contention filing stage. 3/17/08 Commission Order at 21; see also id. (no need to present evidentiary support adequate "to withstand a summary disposition motion").[7]

The Board should also reject Pa'ina's assertion it was somehow improper for Dr. Resnikoff to critique the Staff's application of NUREG-0800 and to use an alternate Department of Energy ("DOE") methodology to calculate the likelihood of an aviation accident involving the proposed irradiator. Pa'ina's Answer at 11.[8] The Board has previously held that NUREG-0800

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[6] The Board should reject Pa'ina's implied Daubert challenge to Dr. Resnikoff's testimony. See Pa'ina's Answer at 12 n.4. Dr. Resnikoff is well-qualified to offer opinions regarding statistical probability, and there is nothing counter-intuitive about his statistical conclusions. 5/22/08 Resnikoff Supplemental Declaration ¶¶ 3-4. Moreover, Pa'ina's reliance on Cano v. Everest Minerals Corp., 362 F. Supp. 2d 814 (W.D. Tex. 2004), to cast aspersions on Dr. Resnikoff is misplaced since, in that case, the court expressly declined to rule on the Daubert challenge to Dr. Resnikoff. Id. at 818-19; see also id. at 858 (court's analysis assumes Dr. Resnikoff's calculations are correct).

[7] The jet engine shaft that Dr. Resnikoff's calculations demonstrate could pierce the irradiator pool measures only 18 inches in diameter and, thus, could easily enter the pool in any number of crash scenarios. Resnikoff Supplemental Declaration ¶¶ 5-7. The potential for shielding water to escape through a rupture does not change if one factors in the concrete grout surrounding the pool's outer liner, which Pa'ina alleges – for the first time in this proceeding and without expert support – would provide additional protection. Id. ¶¶ 8-13.

[8] Concerned Citizens does not understand the relevance to the admissibility of the pending safety contention of Pa'ina's argument about what constitutes a claim under the National Environmental Policy Act.

does "not establish binding principles that must be followed in all instances." PFS, LBP-03-04, 57 NRC 69, 92 (2003). It is only a guidance, not a regulation, and presents "just 'one way' of calculating the probability of an aircraft crash." Id. (quoting NUREG-0800 at 3.5.1.6-3). Thus, Concerned Citizens "is free to take issue with the terms of [NUREG-0800], which represents only Staff guidance and thinking, not official Commission requirements." Id.

The Staff lacks any basis for its claim there is no potential for emergency responders to receive excessive radiation doses following an aviation accident at Pa'ina's proposed irradiator. Staff's Answer at 16. The Staff simply assumes that compliance with the Uniform Fire Code ("UFC") would protect emergency responders from radiation exposures in excess of regulatory standards, but fails to back up its claim with reference to any applicable provision in the UFC. Moreover, the Staff ignores that, even if plans and procedures look good on paper, they often are not followed in the wake of catastrophic accidents.

As a threshold matter, the Staff references the wrong version of the UFC, citing the 2003 UFC, which neither the State of Hawai'i nor the City and County of Honolulu has adopted. Id. at 16 n.25. Rather, the State of Hawai'i adopted as its Fire Code much of the 1997 version of the UFC, as amended by the 1998 and 1999 Supplements. Haw. Admin. Rules § 12-45.1-4. The City and County of Honolulu, in turn, has adopted the State Fire Code, with amendments. Revised Ordinances of Honolulu § 20-1.1.

Examination of the relevant fire codes reveals that emergency responders may have little information about the hazards posed by the irradiator's Cobalt-60 sources as they rush to the scene following an airplane accident. Notably, the State Fire Code – and, by extension, Honolulu's code – does not incorporate UFC Appendix II-E, which sets forth requirements for hazardous materials management plans and hazardous materials inventory statements. Haw.

Admin. Rules § 12-45.1-4; see also 1997 UFC, App. II-E. Under both state and local versions of the code, whether a management plan or inventory statement would even be required for the irradiator is left to the fire chief's discretion. 1997 UFC §§ 8001.3.2, 8001.3.3. Neither the Staff nor Pa'ina make any showing that, in fact, a management plan or inventory statement would be required or otherwise prepared for Pa'ina's proposed irradiator.

Even if there were a plan in place and emergency responders were apprised beforehand about the radiation risks of responding to an aviation accident at Pa'ina's proposed irradiator, there would still be no way to ensure against excessive exposures. The destructive force of an airplane crash could destroy all radiation detectors and associated alarms and kill or incapacitate irradiator personnel, precluding implementation of emergency procedures. See 5/2/08 Resnikoff Declaration ¶ 17; Exh. 7: 2/1/07 Sozen/Hoffmann Report at 5.[9] In this entirely plausible scenario, emergency responders seeking to rescue irradiator personnel or extinguish a jet-fuel fire could easily find themselves near the irradiator pool, receiving in mere moments excessive radiation exposures. 5/2/08 Resnikoff Declaration ¶¶ 14-16.

Finally, the Staff's argument that Concerned Citizens is limited to challenging the adequacy of Pa'ina's emergency procedures, rather than its failure to comply with 10 C.F.R. § 30.33(a)(2), cannot be squared with the Commission's holding in CLI-08-03 that Concerned Citizens may seek a siting analysis if it presents "a plausible claim that a proposed facility would not be adequately protective in the event of specific phenomena." 3/17/08 Commission Order at 21; see also LBP-06-12, 63 NRC at 419-20 (rejecting Staff's claim Concerned Citizens must "demonstrate that the emergency procedures required by 10 C.F.R. § 36.53(b) are inadequate to address an aircraft crash"). Amended Safety Contention 7 focuses on the inadequacy of the

[9] Among other things, an aviation accident could destroy all controls on access to high radiation areas. See 10 C.F.R. § 1601.

design of Pa'ina's proposed irradiator "to protect health and minimize danger to life [and] property" in the event of an aviation accident. 10 C.F.R. § 30.33(a)(2). If the Staff or Pa'ina believe that emergency procedures can prevent excessive radiation exposures and offsite releases, they are free to present evidence at hearing to back up their claims.[10] While consideration of emergency procedures may be relevant to deciding the merits of Concerned Citizens' contention, it does not render Amended Safety Contention 7's call for a siting review "inadmissible as a matter of law." 3/17/08 Commission Order at 20.

V. PA'INA'S LICENSE APPLICATION MUST INCLUDE CONSIDERATION OF THE DOSES EMERGENCY WORKERS MIGHT RECEIVE FOLLOWING AN AVIATION ACCIDENT

The Board should reject the Staff's unsubstantiated claim the NRC regulations do not require an irradiator license applicant to "address doses that may potentially be received by emergency workers following an accident." 5/19/08 Staff Response at 2.[11] As discussed below, the applicant must demonstrate adequate protection for emergency workers as part of the required showing under 10 C.F.R. § 30.33(a)(2).

Initially, as the Staff concedes, the NRC regulations governing all licensed activities, including irradiators, sets dose limits for the public and do not "distinguish between emergency workers and any other member of the public for purposes of determining doses." 5/19/08 Staff Response at 2; see also 10 C.F.R. § 20.1003 (defining "member of the public"). The maximum dose to which an emergency worker may lawfully be exposed is normally 0.1 rem in a year, and,

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[10] That said, the Staff and Pa'ina will be hard-pressed to demonstrate the adequacy of "procedures that apparently do not exist." LBP-06-12, 63 NRC at 420.

[11] In its May 7, 2008 order, the Board required the Staff to address "in its response" to Amended Safety Contention 7 various questions related to emergency worker doses following an accident. 5/7/08 Board Order at 1. For reasons unknown, the Staff provided those answers in a separate filing, rather than in its answer.

even where special authorization is received in advance, the radiation dose received by an emergency worker may not exceed 0.5 rem. 10 C.F.R. § 20.1301(a)(1), (c)-(d). These same dose limits apply regardless of whether the emergency responder is onsite or offsite. See id. § 20.1301(b).

In promulgating the Part 20 standards for protection against radiation, the NRC emphasized the dose limits apply not only to "normal operations," but also "remain the primary guidelines in emergencies." 56 Fed. Reg. 23,360, 23,365 (May 21, 1991); see also 10 C.F.R. § 20.1001. While the NRC recognized "that, in an emergency, operations that do not conform to the regulations may have to be carried out to achieve the high-priority tasks of work, public, and facility protection," it did not intend for the dose limits to be ignored with impunity in emergencies, as the Staff suggests. 56 Fed. Reg. at 23,365; see also 5/19/08 Staff Response at 2. Rather, the NRC specified that the existence of an emergency could serve only as a mitigating factor "[i]n evaluating any ensuing violations [of the dose limits] and their severity." 56 Fed. Reg. at 23,365. In other words, even in emergency situations, radiation exposures to emergency workers in excess of Part 20's dose limits are still safety violations.

The mere fact the sealed sources in an irradiator are not subject to 10 C.F.R. § 30.32(i)(1), does not exempt Pa'ina's application from the requirement to evaluate the radiation doses emergency workers might receive in responding to an accident, as the Staff claims. See 5/19/08 Staff Response at 2, 4. During the rulemaking for 10 C.F.R. § 30.32(i)(1), the NRC specifically responded to a comment urging that all sealed sources be covered. The NRC stated there was no need to extend the rule's coverage since "sealed source accidents are already adequately dealt with in other parts of the regulations." 52 Fed. Reg. 12,921, 12,923 (Apr. 20,

1987). The NRC then expressly cited 10 C.F.R. § 30.33(a)(2) as one of the regulations obliging applicants to address accident-related safety. Id.[12]

This regulatory history makes clear that 10 C.F.R. § 30.32(i)(1)'s promulgation did not evince an intent to demand less scrutiny of potential harm to emergency workers and others in the event of an accident involving an irradiator's sealed sources than is required for unsealed sources. Rather, the NRC understood that 10 C.F.R. § 30.33(a)(2) already requires an applicant to address the doses emergency workers might receive following an accident and demonstrate that its "proposed equipment and facilities [would be] adequate to protect health and minimize danger to life." Pa'ina's failure to do so renders its application deficient.

VI. CONCERNED CITIZENS DOES NOT HAVE TO CATALOG EVERY STATE AND LOCAL REQUIREMENT THAT MIGHT APPLY TO PA'INA'S PROPOSED IRRADIATOR AND EXPLAIN WHY IT WOULD NOT ENSURE ADEQUATE PROTECTION IN THE EVENT OF AN AVIATION ACCIDENT

In promulgating the Part 36 regulations, the NRC recognized "there could be a need ... to review facility siting 'on a case by case basis, if a unique threat is involved which may not be addressed by State and local requirements.'" 3/17/08 Commission Order at 20 (quoting 58 Fed. Reg. at 7,725) (emphasis added).[13] The Staff seizes on this language to argue that, for Amended Safety Contention 7 to be admissible, Concerned Citizens must first catalog every state and local requirement that might arguably apply to Pa'ina's proposed irradiator and demonstrate that each

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[12] Notably, the NRC did not cite 10 C.F.R. § 30.32(g), which the Staff argues substitutes for section 30.32(i)(1) in the case of irradiators. See 5/19/08 Staff Response at 2, 4. Neither section 30.32(g)'s source identification requirement nor any of the other regulations the Staff cites in its response would provide any protection for emergency responders in the event an aviation accident destroys the radiation monitors and breaches the pool liner, allowing vital shielding water to escape.

[13] The inclusion of this provision in the SOC demonstrates the NRC did not make a decision that it would always "rely[] on the expertise of local governments," as the Staff suggests. Staff's Answer at 17.

one would not ensure adequate protection in the event of an aviation accident. See Staff's Answer at 16-17. Requiring Concerned Citizens to prove a negative – that no state or local requirement adequately addressing this threat exists – would impose an impossible burden and is clearly not what the SOC intended. The SOC's use of the words "may not" makes clear Amended Safety Contention 7 is admissible as long as there is the potential that state or local requirements would not be adequate to prevent harm should an airplane strike Pa'ina's proposed irradiator. See Merriam Webster's Collegiate Dictionary at 719 ("may" is "used to indicate possibility or probability").

Notably, the Staff is no more able than Concerned Citizens to identify a state or local requirement that would eliminate the threats of excessive radiation exposures and offsite releases of contamination associated with the irradiator pool's fragile design and the proposed location for the facility adjacent to busy runways. While the Staff speculates government officials may have "concluded building code requirements presently in effect sufficiently address the risk of aircraft crashes at ... irradiators," it presents no evidence that any building official has ever considered the issue. Staff's Answer at 17 (emphasis omitted). Moreover, even had an official reached such a conclusion, Dr. Resnikoff's calculations demonstrating the irradiator pool's vulnerability to a crashing jet engine would prove the official's views to be in error.

The Staff further speculates that Pa'ina's "ongoing negotiations with the State of Hawaii to lease the land on which it intends to build the irradiator" might involve discussions of how to ensure safety in the event of an aviation accident. Id. at 17 n.26. There is no evidence of this, and it is more likely Pa'ina and the State are simply waiting for these proceedings to come to a close before finalizing a deal. The fact is that neither the State nor Pa'ina have the technical expertise to evaluate safety issues related to the irradiator. See 1/8/07 Pa'ina's Motion to

Dismiss Safety Contention #7 at 4 n.2 (Topical Report's analysis of aviation accident consequences "beyond the technical expertise of Applicant"); 11/18/05 Letter from Hawai'i Governor Linda Lingle (NRC, "rather than the State of Hawaii, has sole jurisdiction governing storage, use, safety, and security" of Cobalt-60) (ML053340592). The State is relying on the NRC's expertise in evaluating safety issues related to radioactive materials to ensure Pa'ina's "proposed equipment and facilities are adequate to protect health and minimize danger to life or property" before it allows Pa'ina to construct and operate its irradiator at Honolulu International Airport. 10 C.F.R. § 30.33(a)(2); see also 1/13/06 Letter from Governor Lingle (Hawai'i depending on NRC to "address[] the safety, health, and environmental considerations that this type of irradiation facility raises") (ML060240275). Because of the lack of effective state or local oversight, it is all the more important to admit Amended Safety Contention 7 to evaluate Pa'ina's compliance with 10 C.F.R. § 30.33(a)(2).

VII. CONCLUSION

For the foregoing reasons, Concerned Citizens respectfully asks the Board to admit Amended Safety Contention 7.

Dated at Honolulu, Hawai'i, May 27, 2008.

Respectfully submitted,

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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Pa'ina Hawaii, LLC	)	Docket No. 30-36974-ML
	)	ASLBP No. 06-843-01-ML
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	)	

SUPPLEMENTAL DECLARATION OF MARVIN RESNIKOFF, Ph.D., IN SUPPORT OF CONCERNED CITIZENS' AMENDED SAFETY CONTENTION 7

Under penalty of perjury, I, Dr. Marvin Resnikoff, hereby declare that:

1. I am a physicist with a Ph.D. in high-energy theoretical physics from the University of Michigan and also the Senior Associate of Radioactive Waste Management Associates, a private technical consulting firm based in New York City. I previously filed declarations in support of Concerned Citizens of Honolulu's Request for Hearing and Concerned Citizens' contentions regarding the draft and final versions of the environmental assessment and of the Topical Report on the Effects of Potential Natural Phenomena and Aviation Accidents at the Pa'ina Hawaii, LLC Irradiator Facility. My credentials to discuss risk assessment and other technical issues related to Pa'ina Hawaii, LLC's proposed irradiator were previously stated in my prior declarations and will generally not be repeated here.

2. I have reviewed both Pa'ina Hawaii, LLC's and the Nuclear Regulatory Commission ("NRC") Staff's answers to Concerned Citizens' Amended Safety Contention 7. Nothing in these submittals – which notably lack any supporting affidavits from experts – provides any reason to alter my opinions about either (1) the unusually

elevated risk of an aviation accident created by Pa'ina's decision to locate its proposed irradiator immediately adjacent to active runways at Honolulu International Airport or (2) the reasonable scenarios in which an airplane striking Pa'ina's proposed irradiator would result in radiation exposures in excess of applicable safety standards and off-site releases of contaminated pool water.

3. On page 12 of its answer, Pa'ina inaccurately states I do not claim any expertise in statistical probability. As set forth in my resume, which was attached to the declaration I submitted in support of Concerned Citizens' initial hearing request, I was a joint math/physics major through my master's degree. In the 47 years since I earned my master's degree, I have frequently prepared expert analyses involving the application of principles of statistical probabilities. Among other projects, I served as an expert witness for the State of Utah before an NRC hearing panel, analyzing the probability of air crashes into the proposed Private Fuel Storage facility, and have been a consultant to the State of Nevada on the probability and consequences of transportation accidents involving shipments of radioactive waste to the proposed Yucca Mountain repository.

4. It does not, however, require a profound understanding of statistics to realize that, if the annual probability of an airplane striking Pa'ina's proposed irradiator is 1 in 1,757, the probability of one aviation accident occurring over the ten-year term of the material license Pa'ina seeks would be nearly 1-in-175. While Pa'ina's lawyer considers this "counter-intuitive," most people understand the analogous situation involving a lottery ticket with a one-in-a-million success probability. If one were to buy ten such tickets, the odds of having a winning ticket would increase by ten times, to one-in-100,000.

5. On page 13 of its answer, Pa'ina questions how a "GE jet engine with a diameter of 168 inches [could] fall to the bottom of the irradiator pool, which measures only 69 inches across." The Staff similarly claims (on page 15 of its answer) I have not adequately explained how the engine would strike the liner given that "the irradiator pool will be almost entirely below ground level and the pool surface will be only approximately 81" by 95" wide."

6. As an initial matter, Pa'ina cites no source in support of its claim the GE model CF6-80C2 engine on which I based my calculations measures 168 inches in diameter. According to the GE website (http://www.geae.com/engines/commercial/cf6/cf6-80c2.html), it is the length, not the diameter, of the engine that is 168 inches. The maximum diameter is only 106 inches.

7. In any event, both Pa'ina and the Staff improperly ignore the fact that the maximum diameter of the GE model CF6-80C2 engine includes the rotor blades, which would easily break off in an accident. The maximum diameter of the jet engine shaft, which is the robust portion of the engine that my calculations show could easily pierce the irradiator pool lining, is only 18 inches. In any number of crash scenarios, the 18-inch wide shaft could easily enter the pool, whether it measures 69 inches across (as Pa'ina claims) or 81 inches (as the Staff asserts).

8. On pages 13 through 14 of its answer, Pa'ina challenges my alleged failure "to provide any engineering calculations regarding the forces which must be focused directly on the site of the underground pool, in order to overcome the tons of earth surrounding the 18-foot deep pool, in order to overcome the 1.5 feet of concrete

forming the outer shell of the pool, then to overcome the concrete and steel structures forming the pool, and also to overcome the tons of water within the pool."

9. Pa'ina fails to explain the relevance of the "tons of earth" surrounding the irradiator pool. Once the pool is breached, the surrounding earth can do nothing to keep vital shielding water – which, in the event the Cobalt sources are pulverized by the impact, would be contaminated with radiation – from draining into the surrounding groundwater and reaching nearby Ke'ehi Lagoon.

10. I have carefully reviewed the documents in the hearing file related to the construction of the irradiator pool. None I have seen refers to "1.5 feet of concrete forming the outer shell of the pool," and Pa'ina fails to cite to the document that allegedly includes this construction detail. The closest document I could find was Pa'ina's March 9, 2006 letter responding to various deficiencies noted by the NRC Staff (ML060730528), which discusses construction details for the pool.

11. The March 9, 2006 letter states that, prior to excavating for the irradiator pool, steel sheet piles would be driven into the soil. The area within the piles would be excavated, and then the pool shell would be suspended from beams, with the concrete to which Pa'ina refers poured between the pool shell and the sheet piles. Subtracting the area of the pool from the area of the excavated hole results in approximately 1.5 feet of concrete on two sides of the pool, and approximately one foot of concrete backfill on the other two sides.

12. Whether the concrete backfill on the outside of the pool liner is one-foot thick or 1.5-feet thick has no bearing on whether the irradiator pool would be breached in the event of an aviation accident, allowing vital – and potentially contaminated –

shielding water to escape. As the calculations attached to my initial declaration as Exhibit "2" show, almost all the engine's kinetic energy is required to penetrate the irradiator pool's steel liners; relatively little kinetic energy is needed to penetrate the six inches of concrete sandwiched between those steel liners. Notably, in performing my calculations, I assumed the concrete in the pool liner had a compressive strength of 576,000 psi, orders of magnitude greater than the strength of the "flowable grout" Pa'ina proposes to use both within and outside the pool's steel shells, which has a compressive strength of only 1,000 psi. Pa'ina's concrete grout would easily crumble on impact.

13. The engine shaft would expend very little energy in penetrating the grout surrounding the irradiator pool. As for "the tons of water within the pool," the engine shaft would expend a negligible amount of energy as it sliced through the few meters of water before rupturing the pool liner.

14. On page 15 of its answer, the Staff claims I failed to provide any data or analysis showing an aviation accident could exert enough force to breach the sealed sources. This claim is baseless, since I attached precisely such calculations as Exhibit "4" to my initial declaration. Those calculations show that, even if a jet engine were dropped onto the sources from only the height of the water in the irradiator pool (a very conservative assumption), it would exert over 7,500 times the energy Pa'ina's sources have been tested to withstand.

15. The Staff also inaccurately claims (on page 16 of its answer) that I failed to "address portions of the Licensee's application discussing the design of the irradiator pool—which includes both inner and outer steel tanks with an intermediate concrete liner—and the geology of the irradiator site." Exhibit "2" to my initial declaration

contains calculations showing that a jet engine traveling only 38.5 miles per hour could breach the irradiator pool's steel and concrete liner. As for the site geology, my analysis fully considered the depth of the water table, which is too deep to ensure adequate shielding of the sources in the event the irradiator pool liner is breached, but provides a vector for contaminated pool water to spread through a breach in the liner to reach the groundwater and nearby Ke'ehi Lagoon.

I declare under penalty of perjury that the factual information provided above is true and correct to the best of my knowledge and belief, and that the professional opinions expressed above are based on my best professional judgment.

Executed at New York, New York on this 22nd day of May, 2008.

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that, on May 27, 2008, a true and correct copy of the foregoing document was duly served on the following via e-mail and first-class United States mail, postage prepaid:

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In addition, the undersigned hereby certifies that, on May 27, 2008, a true and correct copy of the foregoing document was duly served on the following via e-mail:

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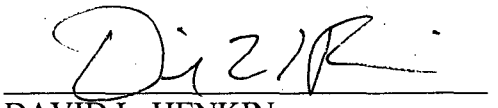
Dated at Honolulu, Hawai'i, May 27, 2008.



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