

December 14, 2005 (12:42pm)

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

OFFICE OF SECRETARY
RULEMAKINGS AND
ADJUDICATIONS STAFF

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)
Pa'ina Hawaii, LLC)
Materials License Application)
_____)

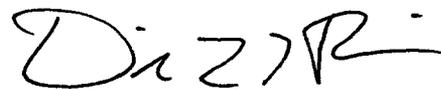
Docket No. 30-36974-ML
ASLBP No. 06-843-01-ML

NOTICE OF FILING ORIGINAL SUPPLEMENTAL DECLARATION OF
MARVIN RESNIKOFF, Ph.D. IN SUPPORT OF PETITIONER'S AREAS OF CONCERNS

Attached hereto is the original, signed supplemental declaration of Marvin Resnikoff,
Ph.D., filed in support of Concerned Citizens of Honolulu's Reply In Support Of Its Request For
Hearing on December 1, 2005.

Dated at Honolulu, Hawai'i, December 2, 2005.

Respectfully submitted,



DAVID L. HENKIN
Earthjustice
223 South King Street, Suite 400
Honolulu, Hawai'i 96813
Tel. No.: (808) 599-2436
Fax No. (808) 521-6841
Email: dhenkin@earthjustice.org
Attorney for Concerned Citizens of Honolulu

TEMPLATE = SECY-035

SECY-02

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)
Pa'ina Hawaii, LLC)
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Docket No. 30-36974-ML
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**SUPPLEMENTAL DECLARATION OF MARVIN RESNIKOFF, Ph.D.
IN SUPPORT OF PETITIONER'S AREAS OF CONCERNS**

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

1. I have reviewed the Declaration of Russell N. Stein that Pa'ina Hawaii submitted with its answer to Concerned Citizens of Honolulu's Request for Hearing, as well as the Nuclear Regulatory Commission ("NRC") Staff's response to the hearing request. A point by point response to every statement made by Mr. Stein or the Staff with which I disagree would needlessly distract from the focus of this stage of the proceedings, which is whether Concerned Citizens has raised contentions relevant to the materials licensing proceeding, rather than resolution of the merits of those contentions. Accordingly, I will limit my response to clarifying the nature of the disputes over whether Pa'ina's proposed equipment and facilities are adequate to protect health and minimize danger to life or property.

2. **Risk of Cask Drop.** In my initial declaration, I stated that "the irradiator must have a system to prevent the cask from passing over the Co-60 pencils." The Staff claims it is difficult to tell whether I am raising concerns about the irradiator design or Pa'ina's proposed operating procedures. The answer is that I have concerns that both the

design and the procedures outlined in Pa'ina's application are inadequate to ensure "that a dropped cask will not fall on sealed sources," as required by 10 C.F.R. § 36.39(c). In my opinion, to ensure safety, Pa'ina must use a single failure proof crane for loading and unloading of sources and must design the irradiator so it is physically impossible for a cask to move over the plenum. Administrative controls alone are inadequate.

3. In paragraph 12 of his declaration, Mr. Stein quotes NRC staff in the CFC Logistics proceeding as having confidence that hoists and administrative controls would minimize the likelihood of a cask drop. This, of course, goes to the merits of the dispute, not whether a dispute over design adequacy exists. What Mr. Stein does not mention is that, in the CFC Logistics proceeding, the hearing officer allowed the contention regarding potential cask drops as a litigable issue. As part of the settlement in that proceeding, the company ultimately agreed to install automatic stops so that the cask could not pass over the Cobalt-60 sources.

4. While Pa'ina's application asserts the shipping cask will not travel over the Cobalt-60 sources at any time, paragraph 14 of Mr. Stein's declaration makes it clear the irradiator is not designed to prevent the casks from moving over the sources. Instead, only administrative controls – which, as discussed below, are inadequate to ensure against accidents – are contemplated. The irradiator design must include a physical stop similar to the one installed in the CFC Logistics irradiator, or the risk of a cask drop will remain, in violation of section 36.39(c).

5. If a 3 to 6.5 ton shipping cask were to fall on the Cobalt-60 pencils, the pencils would bend and potentially break. The pencil cladding may crack, exposing the

Cobalt-60 to the pool water. Under such conditions, it is likely that contamination would spread to the pool water and, ultimately, to the air as the water evaporates.

6. In addition, a dropped shipping cask might damage the structure of the pool in which the Cobalt-60 sources would sit, possibly releasing the pool water into the ground and thus affecting surrounding areas. A leak would also reduce, and potentially eliminate, the pool water's capacity to shield the surroundings from the sources' gamma radiation.

7. Administrative controls are not sufficient to prevent such accidents. I was present at the CFC Logistics facility when the administrative controls were reviewed. I was not impressed. Pa'ina could have an army present, but still could not stop a dropped cask from damaging the sources or pool structure. Physical controls that make movement of a cask over the Cobalt-60 pencils impossible is a necessary, reasonable solution to this problem.

8. In addition, a single failure proof crane is needed to prevent a cask drop. The essential problem is that, occasionally, crane systems fail. As an example, one of the incidents described in the Information Notice No. 89-82: RECENT SAFETY-RELATED INCIDENTS AT LARGE IRRADIATORS, was an uncontrolled descent of a shipping cask into an irradiator pool, due to brake malfunction on a lifting crane. While, in that case, the cask was arrested before causing damage (but only after a 19-foot freefall), the information notice stressed that "had the cask not been secured quickly, it could have damaged the radioactive sources in the pool or the pool itself." That is precisely the issue the Concerned Citizens seek to raise in this proceeding. Excerpts from

a true and correct copy of the information notice from the NRC website are attached hereto as Exhibit "N."

9. While the Staff asserts that an outline of Pa'ina's loading and unloading procedures appears on page 66 of the application, they do not. Only the names of the procedures appear, not any description of the procedures themselves. If these are the same administrative controls included in the CFC Logistics application, they are inadequate to solve the problems discussed above and, thus, do not satisfy the regulations. Alternatively, if the procedures Pa'ina proposes are not the same as those discussed in the CFC Logistics application, then it is anyone's guess regarding their adequacy, since page 66 of Pa'ina's application provides none of the required information.

10. **Thermal Considerations.** In paragraph 17 of his declaration, Mr. Stein states the applicant has shown the plenum will not overheat. At the time I submitted my initial declaration, I was unable to evaluate this claim since the Staff had redacted in its entirety the relevant section of Pa'ina's application. Now that I have had a chance to review Mr. Stein's calculations, I conclude they are flawed.

11. Mr. Stein's calculates thermal projections in three steps, as follows:

Step 1: Calculate the total heat given off by the sources that remains within the plenum. The total wattage is a sum of the beta plus 10% of the gamma power levels, or about 2.1 kilowatts (kW).

Step 2: Calculate the gas temperature within the plenum, fixing the walls at 100 °F (the temperature of water in the pool, assumed constant) and assuming

convection and radiative heat transfer and the wattage dissipated via the plenum walls is the same as the source output.

Step 3: Calculate the temperature of the source, given the gas temperature from step 2 and assuming the total wattage dissipated is the same as step 1.

12. Mr. Stein calculates a temperature of about 532 °F for the sources. But his calculations are wrong because he fails to take the gas temperature from step 2 and plug it into step 3. Instead, ignoring the heat build-up, he simply assumes the gas temperature is 100 °F. If one were to take the correct gas temperature from Step 2 and plug it into Step 3, then the sources are hotter, about 550 °F. Moreover, even if one were to assume the gas temperature were 100 °F in calculating Step 3, one would not end up with a source temperature of 532 °F. Mr. Stein's calculations are in error.

13. Mr. Stein's assumption that the temperature of the water would remain constant at 100 °F is based on his assumption that a heat exchanger would be added to the system if the water temperature were found to exceed 100 °F. There is no question that, absent a heat exchanger (or absent a functioning one, in case of power loss or damage from a natural disaster or human-caused accident), the pool temperature would rise.

14. If the temperature of the water were allowed to rise, then the temperature within the plenum will become hotter and the temperature of the sources will become hotter. In such a case, all of the gamma and electrons (not only 10%, as Mr. Stein assumes for his plenum heat-up calculation) would contribute to heating the water. This amounts to about 15 kW. Given the volume of water in the pool, it would take about 1.5 months for the pool water to reach 212 °F, assuming no heat loss from the open top of the pool.

15. While heat-up of the pool would be a slow process, it would be inexorable once the Cobalt-60 sources are placed in the pool. Evaporation will increase as the temperature rises and makeup water will have to be added to ensure adequate shielding of the sources remains in place. To protect public safety, Pa'ina must ensure a heat exchanger will – not only might – be installed on the system and provide necessary documentation to show the heat exchanger would be adequate to maintain the water temperature at 100 °F. In addition, Pa'ina must provide adequate back-up systems to ensure the heat exchanger will continue functioning in the event of a natural or manmade disaster.

16. At the temperatures the pool may reach, the sources may reach 620 °F. Now that I have had the opportunity to review Pa'ina's calculations, I concur that degradation of the sources at this temperature would not be expected.

17. **Lack of Procedures to Address Break in Helium or Compressed Air Lines.** In my initial declaration, I mistakenly stated that helium, rather than compressed air, was present in the bells. My analysis did not depend on the nature of the gas involved, and I stand by the opinions I previously provided.

18. A break in the compressed air line would allow water to enter the bells, thereby contaminating the water and ion exchange resins with food stuff. A break in the helium line would submerge the Cobalt-60 pencils. A break in either the helium or compressed air line could therefore plug the ion exchange filter and prevent the water from being cleaned. This event would require the system to be shut down and the Cobalt-60 sources to be placed in a cask that would be shipped from the main land. With fouled water, it would be difficult to manipulate the underwater sources into the cask.

The pool could then be emptied and cleaned. Worker exposures would rise during this operation.

19. **Tsunami.** Mr. Stein and the Staff claim not to understand how a tsunami would affect the safety of the system. As the tsunami in southeast Asia in December 2004 abundantly demonstrated, tsunami could bring down the entire building and cranes, shorting out the electricity and radiation monitors in the process. It could undermine the foundation for the irradiator. It could crack the pool lining, allowing the shielding water to escape. Without a viable structure or an intact pool, members of the public could be exposed to unshielded Cobalt-60.

20. Flooding associated with a tsunami could short out the electricity and battery backup. Radioactive monitors, heat exchangers, and tanks containing compressed air for the bells and helium for the plenum could similarly be washed away or disengaged. In this case, water would enter the plenum and the product bells. The full impact of a tsunami and the emergency response by Pa'ina, have not been discussed, as required by 10 C.F.R. § 36.53(b)(9), which requires emergency procedures for “[n]atural phenomena” including flooding and “other phenomena as appropriate for the geographical location of the facility.”

21. **Air crash.** Mr. Stein's observation that irradiators are not prohibited at airports misses the point. The question is whether the particular design Pa'ina proposes would be safe in a location which is adjacent to several runways where it might get hit by an airplane.

22. Unlike the panoramic irradiators the NRC discussed in the rulemaking for Part 36, Pa'ina's irradiator would not be contained “within 6-foot thick reinforced-

concrete walls." Instead, they would be in a pool with a liner consisting of 6 inches of concrete, with ¼-inch steel on the inside and outside. There is little question that the shaft of a jet plane crashing into such a structure would breach the pool lining, allowing the water to leak out, leaving the Cobalt-60 pencils unshielded. Even if some water did remain in the pool following the crash, the fires from burning 100,000 pounds of jet fuel would quickly evaporate it. Moreover, the force of an airplane crash and associated explosions of jet fuel could disperse Cobalt-60 into the surroundings. Finally, such a crash would undoubtedly damage or destroy all required radiation and safety monitoring systems.

23. Due to the risks of catastrophic damage from an airplane crash, the location for Pa'ina's proposed irradiator is clearly inappropriate. Either the facility must be redesigned to withstand an airplane crash, or it should be relocated.

24. **Transportation.** In paragraph 32 and elsewhere, Mr. Stein discusses transportation, primarily to state that transportation does not have to be considered within this proceeding. He also compares shipments of Cobalt-60 pencils to the radioisotopes that are shipped by air into Honolulu Airport. However, as his own statements in paragraph 25 make clear, Mr. Stein knows full well that that the large quantities of Cobalt-60 in question would not be transported by air. He is comparing apples to oranges.

25. The presence of the proposed irradiator means that the local populace would be subjected to potential danger due to transport accidents or sabotage during shipping. If the irradiator were not present, this shipping danger would not exist in

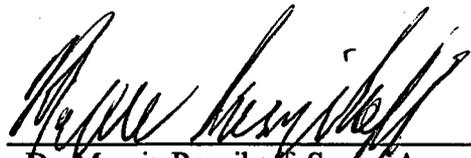
Honolulu's neighborhoods. This precise contention was admitted in the CFC Logistics proceeding and should be admitted here as well.

26. **Security.** Mr. Stein's claim he cannot openly discuss safeguard information (paragraph 21) ignores the fact that some information regarding potential threats to the proposed facility is openly available. My contention is that it is quite simple to overwhelm security personnel and to fire an anti-tank missile that can easily penetrate the walls of the irradiator. The Russian's Kornet missile can penetrate 4.5 meters of concrete and, thus, could easily breach the 6 inches of concrete Pa'ina proposes for its pool liner. See <http://www.defense-update.com/products/k/kornet-e.htm>, attached hereto as Exhibit "O."

27. Without water to shield the Cobalt-60 sources, the dose rates would be extremely high; an LD50 dose could occur within seconds. While Mr. Stein claims that my arithmetic and reading of the gamma dose factors is incorrect, this is a factual dispute that should be decided in a hearing, not at this stage of the proceeding.

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 23rd day of November, 2005.



Dr. Marvin Resnikoff, Senior Associate
Radioactive Waste Management
526 West 26th Street, Room 517
New York, NY 10001
Phone (212) 620-0526
Fax (212) 620-0518

CERTIFICATE OF SERVICE

The undersigned hereby certifies that, on December 2, 2005, a true and correct copy of the foregoing document was duly served on the following via first-class United States mail, postage prepaid:

Fred Paul Benco
Suite 3409, Century Square
1188 Bishop Street
Honolulu, Hawai'i 96813
Attorney for Pa'ina Hawaii, LLC

Office of the Secretary
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
Attn: Rulemakings & Adjudications Staff

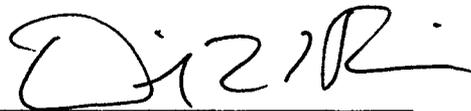
Margaret J. Bupp
Steven C. Hamrich
U.S. Nuclear Regulatory Commission
Office of the General Counsel
Mail Stop - O-15 D21
Washington, DC 20555-0001

Administrative Judge
Paul B. Abramson
Atomic Safety & Licensing Board Panel
Mail Stop - T-3 F23
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Administrative Judge
Thomas S. Moore, Chair
Atomic Safety & Licensing Board Panel
Mail Stop - T-3 F23
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Administrative Judge
Anthony J. Baratta
Atomic Safety & Licensing Board Panel
Mail Stop - T-3 F23
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dated at Honolulu, Hawai'i, December 2, 2005.



DAVID L. HENKIN
Attorney for Petitioner
Concerned Citizens of Honolulu



EARTHJUSTICE

Because the earth needs a good lawyer

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INTERNATIONAL JUNEAU, ALASKA OAKLAND, CALIFORNIA
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TRANSMITTAL LETTER

TO: Office of the Secretary
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
Attention: Rulemakings and Adjudications Staff

FROM: David L. Henkin *DWH/EL*

DATE: December 2, 2005

RE: NRC Docket No. 030-36974
Pa'ina Hawaii, LLC, Irradiator in Honolulu, HI

FIRST CLASS MAIL

COPIES	DATE	DESCRIPTION
Enclosures (original and two copies):		
	12/2/05	NOTICE OF FILING ORIGINAL SUPPLEMENTAL DECLARATION OF MARVIN RESNIKOFF, Ph.D. IN SUPPORT OF PETITIONER'S AREAS OF CONCERNS; CERTIFICATE OF SERVICE

- | | |
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REMARKS: