

# **CNWRA** *A center of excellence in earth sciences and engineering™*

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August 31, 2006  
Contract No. NRC-02-04-014  
Account No. 20.10890.10.010

U.S. Nuclear Regulatory Commission  
ATTN: Mr. Matthew Blevins  
Division of Waste Management and  
Environmental Protection  
Two White Flint North  
Mail Stop 7-J8  
Washington, DC 20555

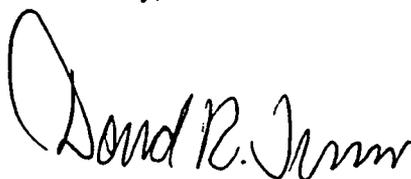
Subject: Letter Report—Site Visit to Clayton H. Landis Systems, Souderton, Pennsylvania  
(Milestone 10890.10.010.100)

Dear Mr. Blevins:

The purpose of this letter is to transmit the subject deliverable described under Task 1 of Task Order 10—Technical Assistance for the Development of a Topical Report for the Pa'ina Hawaii, LLC Irradiator License Application. The trip report summarizes the discussions and activities during the August 22, 2006, site visit to Clayton H. Landis Systems in Souderton, Pennsylvania.

If you have any questions about this deliverable, please contact me at 210.522.2139 or Dr. Jim Durham by email ([jdurham@swri.org](mailto:jdurham@swri.org)) or at 210.522.6934.

Sincerely,



David R. Turner  
Assistant Director  
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# **CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES**

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## **TRIP REPORT**

**SUBJECT:** Site Visit to Clayton H. Landis Systems  
IM: 20.10890.10.010.100

**DATE/PLACE:** August 22, 2006  
Souderton, Pennsylvania

**AUTHORS:** J. Durham, A. Ghosh

**PERSONS PRESENT:** J. Durham and A. Ghosh [Center for Nuclear Waste Regulatory Analyses (CNWRA)]  
M. Blevins and J. Moore [U.S. Nuclear Regulatory Commission (NRC) Headquarters]  
R. Kellar and R. Torres (NRC, Region IV)  
M. Stein and R. Stein (Gray\*Star)  
R. Keiper (Clayton H. Landis Systems)

### **BACKGROUND AND PURPOSE OF TRIP:**

By letter dated June 23, 2005, Pa'ina Hawaii, LLC, submitted an application to NRC for a new license for the possession and use of a sealed source in a proposed commercial pool-type industrial irradiator to be located near the Honolulu International Airport on the island of Oahu, Hawaii. The application for the irradiator is being reviewed under the provision of 10 CFR Part 36, Licenses and Radiation Safety Requirements for Irradiators.

To meet its responsibilities in accordance with the National Environmental Policy Act, NRC WILL prepare an environmental assessment to evaluate the potential for significant environmental impacts of the proposed action. The CNWRA staff will assist NRC in part by preparing a topical report that addresses the potential environmental impacts and consequences of natural phenomena and potential aviation accidents associated with the irradiator. This topical report will serve as a reference for the accident impact analyses portion of the environmental assessment. The applicant did not submit an environmental report with the license application. The information in the CNWRA topical report will be based, in part, on the irradiator design criteria.

The purpose of this meeting was to clarify information in the license application on the irradiator design and address potential environmental impacts and consequences of natural phenomena and aviation accidents associated with the proposed facility. Attendees included a representative from Clayton H. Landis Systems, the company that will manufacture the irradiator. At the request of Pa'ina Hawaii, LLC, two representatives from Gray\*Star attended the meeting. Gray\*Star is the company that designed the irradiator and will provide operator training. Two CNWRA staff members and NRC staff from both Headquarters and Region IV (which includes Hawaii) attended. The meeting was held at the Clayton H. Landis Systems manufacturing facility in Souderton, Pennsylvania.

## **SUMMARY OF PERTINENT POINTS/ACTIVITIES:**

The meeting began with introductions after which R. Stein (Gray\*Star) provided a discussion about the design of the Pa'ina irradiator. He began by defining the four classes of irradiators:

- Category 1: cabinet irradiator—self-contained source, dry storage, personnel cannot enter irradiation chamber
- Category 2: panoramic irradiator—source stored dry, irradiation performed in air, personnel can enter irradiation chamber
- Category 3: pool irradiator—self-contained source in shielded position during irradiation
- Category 4: pool-stored panoramic irradiator—source in wet storage, irradiations performed in air behind large shielding materials

R. Stein stated that Category 3 irradiators are inherently safe and suitable for food irradiation. He presented a case for the Pa'ina irradiator to be classified as a Category 3 irradiator although the category of the irradiator has not yet been established. The source in the Pa'ina irradiator, marketed under the product name of Genesis, is located and fixed in place at the bottom of a pool of water at a depth of 5.6 m [18.5 ft]. The product to be irradiated is placed in a large hollow "bell" and the bell is lowered until it resides next to the source. After a predetermined time, the bell is lifted out of the pool and placed on the opposite side of the source for a uniform irradiation. He described the safety features associated with movement of the bells.

Next, R. Stein discussed the details of installing the irradiator. The irradiator consists of an outer tank and an inner liner separated by 15 cm [6 in] of steel-reinforced concrete. The outer tank is coated with corrosion resistant polyurethane. The outer tank will be backfilled with concrete and, if necessary, the sheet pilings will be permanently left in place. The source is located in a plenum that is fixed in place at the bottom of the tank.

Next the potential effects from a tsunami or flooding from a hurricane were discussed. Because the pool extends below grade and below the water table, R. Stein made the argument that flooding should not be an issue. In addition, there is no coupling between the source rack and the surface structure. Should the surface structure be removed completely, Stein argued that the pool would remain intact and undamaged. The decoupled design of the irradiator was also used as an argument that an aircraft crash would not damage the sources, even if the crash resulted in complete destruction of the surface structure.

Finally, the potential effects of an earthquake on the integrity of the pool were discussed by R. Keiper (Clayton H. Landis Systems). The pool is designed to allow a total lateral displacement of 15 cm [6 in], which according to R. Stein, is greater than the design requirement of the Universal Building Code. Therefore, R. Stein argued that the pool could withstand a design basis earthquake.

Following the presentation by R. Stein and R. Keiper, NRC staff (supported by CNWRA staff) asked specific questions that primarily concerned information relevant to the environmental assessment preparation and not specifically to the topical report. Upon conclusion of the question and answer session, the meeting

participants toured the production facility and viewed equipment from a decommissioned Genesis irradiator.

**IMPRESSIONS/CONCLUSIONS:**

The meeting was useful because it allowed the key participants to meet and openly exchange information. The description of the irradiator will be particularly useful during preparation of the topical report.

**PROBLEMS ENCOUNTERED:**

None.

**PENDING ACTIONS:**

Requests for additional information, if necessary, will be prepared in accordance with the project plan. The draft topical report will be submitted on a mutually agreed upon schedule.

**RECOMMENDATIONS:**

None.

**SIGNATURES:**

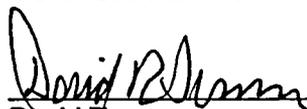
  
\_\_\_\_\_  
J. Durham  
Senior Research Engineer

8-30-06  
Date

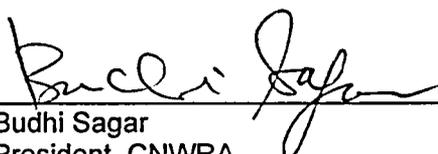
  
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A. Ghosh  
Staff Engineer

8-30-2006  
Date

**CONCURRENCE:**

  
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David Turner  
Assistant Director, Non-Repository Programs

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