

Hello Amy Snyder,

Thank you for sending the Environmental Radiation Monitoring Plan (ERMP) for Pohakuloa, September 2016, ML16265A231.

I urge NRC to require a complete rewrite. There are factual errors about groundwater depth, ownership of Pohakuloa land, and which troops train at Pohakuloa. Far more depleted uranium may be present than the ERMP assumes. The ERMP appears to say sampling will be cancelled, not just postponed, in unfavorable weather. It assumes there is depleted uranium only in the Radiation Control Areas, and does not consider the inhalation pathway of exposure, despite years of extensive comments to the contrary from professionals, and from residents including myself. Mike Reimer has also raised serious concerns about the ERMP.

Specific comments follow. Thank you for considering them.

aloha,
Cory Harden, Hilo, Hawai'i 333cory@gmail.com

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1.1 PURPOSE

p. 1-1 sampling quarterly "unless prevented by weather"
Sampling should be done more often, and postponed--not cancelled--for inclement weather.

1.1 INSTALLATION BACKGROUND

p. 1-1 "Pohakuloa TA was acquired by the United States from the State of Hawaii and private landowners."

Part of the TA is leased from the State Department of Land and Natural Resources.

"A lawsuit claiming the state breached its duties to protect public lands used for the Army's Pohakuloa Training Area will go to trial this week.

...the suit says the Department of Land and Natural Resources failed to ensure that munitions are cleaned up after military exercises as the Army's existing 65-year lease for the lands between Mauna Kea and Mauna Loa requires....

The Army leases 22,836 acres from the state to hold military training exercises..."

PTA lawsuit heads to trial, Hawai'i Tribune-Herald, 9-27-15, <http://hawaii.tribune-herald.com/news/local-news/pta-lawsuit-heads-trial>

p. 1-1 "The facility is used by the U.S. Army Hawaii, the U.S. Marine Corps, and the Hawaii Army National Guard (HARNG)."

It is also used by foreign troops.

"The U.S. Army's Pohakuloa Training Area hosted the live-fire portion of this year's Rim of the Pacific exercise, with ground forces from eight countries leaving amphibious ships for about 12 days to practice..."

USNI [United States Naval Institute] News, 7-29-16, <https://news.usni.org/2016/07/29/rimpac-2016-hawaiian-combat-training-range-offers-unique-opportunities>

"About a battalion's worth of Singaporean soldiers will train in Hawaii's Pohakuloa Training Area for Tiger Balm in July."

Here's how the Army's Pacific mission is expanding now, Army Times, May 14, 2016, <https://www.armytimes.com/story/military/2016/05/14/heres-how-armys-pacific-mission-expanding-now/84241910/>

p. 1-2 Radiation Control Area map

The assumption that DU is only in the Radiation Control Areas is highly questionable, as professionals and residents, including myself, have repeatedly told NRC for years.

1.3 HISTORICAL INFORMATION

p. 1-5 " it is assumed that most, if not all, of the 140 kilograms (kg) of DU from the rounds fired into RCAs at Schofield Barracks and Pohakuloa TA remains in the RCAs."

There may be about 380 kilograms of DU from the spotting rounds, since were probably over 2,000 spotting rounds fired at Pohakuloa. This is based on three lines of evidence: old training manuals, the number of pistons found, and the Archive Search Report.

Manuals:

"U.S. Army Colonel Killian...said the types of exercises conducted at PTA (Pohakuloa Training Area) would require the firing of at least 2,050...spotting rounds." *[Depleted Uranium at Pohakuloa, West Hawai'i Today, 2-4-09]*

"**Killian** ...if you go through the training manuals of the era...it would require more than 714 rounds over an 8 year period of time to qualify the requisite amount of crews..."

Councilmember Hoffmann Is there any possible support for a figure of 2,000 spotting rounds at PTA?

Killian If you, if you do the math, if you extrapolate the math with the, the contemporary training manuals I think you'd come up with number of 2, 050."

[from Harden's transcript of the official DVD of Hawai'i County Council Public Works & Intergovernmental Relations Committee meeting, 2-3-09]

Pistons:

"An environmental consultant [Peter Strauss, hired by Sierra Club] estimated there may be as many as 2,000 depleted uranium rounds at Pohakuloa Training Area...The consultant's analysis was based on an Army report estimating that between 120 and 400 firing pistons are scattered around impact ranges at PTA...Each piston would have fired up to five of the DU rounds, for a total of between 600 and 2,000 rounds fired, Strauss said." *[Sierra Club consultant disputes Army's DU tally, Hawai'i Tribune-Herald, 8-26-08]*

Archive Search Report

"Total rounds verified shipped from Oahu from Lake City Ordnance Plant were 714 rounds... It is highly probable that additional stocks of the Cartridge, 20 mm Spotting M101 were order [sic] from one of the Ordnance Depots (Letterkenny or Pueblo) during the six active years of the Davy Crockett Weapon System in Hawaii." *[ASR p. 41]*

Thorough surveys were impossible.

"The Army acknowledged in its license application that rough terrain and hazards presented by unexploded ordnance made it impossible to conduct a thorough survey for DU at Pohakuloa and Schofield." *[Waste not, Honolulu Weekly, 10-17-12]*

"...the overflights are using equipment to detect very low energy gamma rays from the decay of the material. They have stated that to detect a spotting round, it must be at the surface and to detect fragments one-third the size of the spotting round, they can be buried no deeper than 2-4 inches." *[e-mail from Reimer to Harden, 12-18-09]*

Instead of 2,000 spotting rounds, only a few rounds and fragments were found. A contractor speculated the missing rounds had been cleaned up.

"...the team located a Davy Crockett SRB..." *[Final Technical Memorandum, Depleted Uranium Scoping Investigation, Makua...Pohakuloa...Schofield...prepared for Army by Cabrera Services, p. 4-3]*

"Ground based GWS [Gamma Walkover Survey] located and identified 2 DU metal fragments, one essentially intact spotter round body with no tail fin assembly...and one aluminum tail fin [sic] with some DU spotter round body still attached. ..."

The number of DU spotter round bodies, aluminum fin assemblies and DU fragments are much fewer than would be expected given the total number of pistons which were identified. This fact, and in comparison to the number of DU fragments and portions of the Davy Crockett spotter rounds found at Schofield Barracks, suggests that some type of range clearance may have occurred at PTA." *[Memorandum pp. 5-1 to 5-2, indentations added]*

But there are other possibilities.

"...the "ENVIRONMENTAL RADIATION MONITORING PLAN FOR DEPLETED URANIUM AND BERYLLIUM AREAS, YUMA PROVING GROUND" (Ebinger and Hanson, Los Alamos Report LA-UR-94-1838, May 11, 1994) prepared for the U.S. Army Test and Evaluation command [notes]...fired rounds have the propensity of skipping across the surface, like a thrown stone skipping across water, ending up at distances much greater than the calculated range of the munitions.

...as the firing ranges searched for DU have been used for training with explosive ordinance and vehicular traffic after DU was used, the DU may have been highly distributed as aerosols from the decades of continued explosions and grinding under tires and tracks of vehicles. Now continued use of these areas will only result in the continuous airborne resuspension of the material." *[e-mail from Reimer to Dominick Orlando of NRC, 7-11-12]*

"[perhaps] ...the searches were conducted in areas that were not primary target areas." *[e-mail from Reimer to Harden, 7-8-12]*

"...Fort Benning range personnel recently found a Davy Crockett piston on a range that previously was not an area of interest to the research team." *[Robert Cherry of the Army speaking at a November 16, 2010 meeting with the Nuclear Regulatory Commission (NRC), from meeting transcript, pp. 34-35]*

Aerial searchers looked for highly visible back/ rear plate assemblies as markers for old spotting round areas.

"The components of the Davy Crockett system particularly back plate assemblies and windscreens have a very distinct coloring as seen in photos 4-4 and 4-5 [actually 4-9 and 4-10] and are readily observable from the air." *[Memorandum, pp. 4-26 to 4-27]*

But the Davy Crockett could be fired from a truck. [[Archive Search Report On the Use of Cartridge, 20mm Spotting M101 for Davy Crockett Light Weapon M28, Schofield Barracks and Associated Training Areas, Islands of Oahu and Hawai'i, Army Corps of Engineers, May 2007, p. 3-11]

This might leave back/ rear plate assemblies on the truck instead of on the ground. Hawai'i had 14 trucks for the Davy Crockett. [ASR p. C-291]

Hazardous disposal practices were used during the spotting round era.

"...until the late 1960s, ocean dumping was one of the ways chemical agents and munitions were routinely disposed of since World War I. The other means were **open-pit burning and land burial...**" *[Honolulu Star-Bulletin, 11-9-05, bold added]*

The spotting rounds might have been treated as scrap, since a 1961 study recommended

"that all spotting rounds be left in the impact area and that the impact area not be considered a radiation area. This suggestion was favorably considered by the...Atomic Energy Laboratory [of the Atomic Energy Commission] *[Uranium Alloys for Critical Ordnance Components, Watertown Arsenal Labs, 23 Oct 1961, p. 3; ASR p. 5-26 and p. C-120]*

A memo describes how scrap from range clearance (not DU, not from Pohakuloa) was dumped into a crater in 1962--

"The 6th Ordnance Detachment (ED) conducted range clearance in the Lalamilo Farm Lot, near Kamuela, Hawaii, during 19 February 1962 through 2 March 1962. Recovered were 800+ items of which 333 were destroyed by demolition and the remaining items

were classified as scrap. With permission received from the Base Camp Commander, this scrap was dumped into a crater in the artillery impact area at Pohakuloa.”
[Appendix C-20, NARA College Park, Maryland (CP), Report for HQ, United States Army, Hawaii, APO 957 entitled Staff Office Report, Office of the Ordnance Officer, January-March 1962, dated spring 1962, RG 550, Records of the United States Army, Pacific, Entry 17, U.S. Army Hawaii 1959-1963, Box 10, CP-121406-003, in ASR, p. C-296]

1.4 PHYSICAL ENVIRONMENT

p. 1-5 “...it is believed that groundwater beneath Pohakuloa TA occurs primarily as deep basal water...”
See comment for 2.2.

1.5 EVALUATION OF POTENTIAL SOURCE-RECEPTOR INTERACTIONS

The pathway of dust inhalation must be evaluated, with DU dust re-suspended repeatedly by impacts and explosions from bombs and projectiles, and by fires.

2.0 ERMP SAMPLE DESIGN

According to my notes, during a teleconference on December 12, 2013, NRC said it would monitor for DU when high explosives are used in DU areas. This monitoring should be included in the ERMP and noted in the NRC meeting summary (ML13352A214).

2.2 GROUNDWATER

p. 2-1 “The depth to groundwater in the vicinity of Pohakuloa TA is approximately 1,000 feet bgs.”
Incorrect--water has been found 500 feet down in the general area:

“Unexpectedly high water in the Humuula saddle region, between Mauna Kea and Mauna Loa, prompted a University of Hawaii researcher to seek a new site for additional tests. Donald Thomas, director of the university’s Center for the Study of Active Volcanoes, in 2012, received permission to drill two bore holes to collect core samples. While drilling the first sample, Thomas said, scientists got some interesting preliminary results.

“We found water that was at a higher elevation than expected,” Thomas said.

They found the first thin band of water about 500 feet below the surface. A thicker band was present at about 700 feet, and a regional water table was at 1,800 feet, Thomas said....Thomas decided to seek a new site, about seven miles from the original one, to check to see how widespread that water table is...Drilling on the new site, which is on U.S. Army garrison property, could begin within a few months.”

Higher Waters: Unexpected discovery in Humuula saddle region prompts new tests, Hawai'i Tribune-Herald, 2-18-14,

<http://hawaii.tribune-herald.com/news/local-news/higher-waters-unexpected-discovery-humuula-saddle-region-prompts-new-tests>

“Researchers with the Hawaii Institute for Geophysics and Planetology have found water at much higher elevations than they had thought possible before the recent drilling of a test well around the 6,000 foot level in the Saddle region.

“The regional water table within the Humuula Saddle region appears to be much higher — about 4,600 feet above sea level — than anyone had thought, and that there are at least two so-called perched water tables that are shallower still,” said Donald Thomas, director of The Center for the Study of Active Volcanoes at the University of Hawaii at Hilo. “The second test hole is intended to test that hypothesis by drilling at a considerable distance from the first one.”

Researchers drilled down 5,800 feet near Mauna Kea State Park over the winter, and are preparing to measure the flow rate in the well to determine how viable the source is. A second site in the northwest corner of Pohakuloa Training Area is also set for drilling.

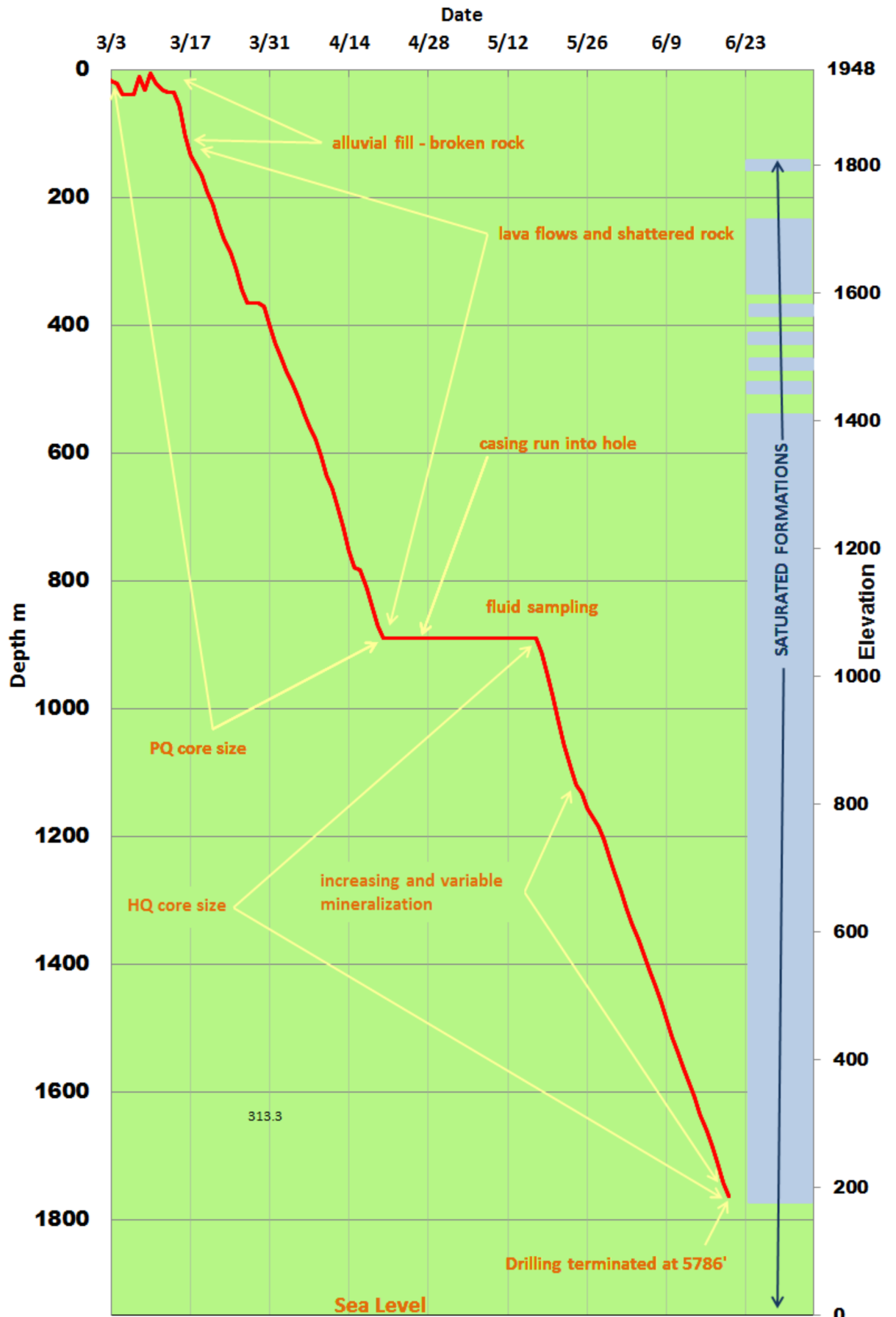
“It appears that there is a substantial volume of water stored at high elevation within the island. There are indications that the resource could extend over a significant area of the island — although that remains to be fully demonstrated,” Thomas said. “In terms of available water in the region, it appears that there are resources that far exceed the current demand in the area.”

‘I think one of the broader implications of the findings in the Saddle is the general statement that we still have a lot to learn about the groundwater resources of Hawaii.’ “

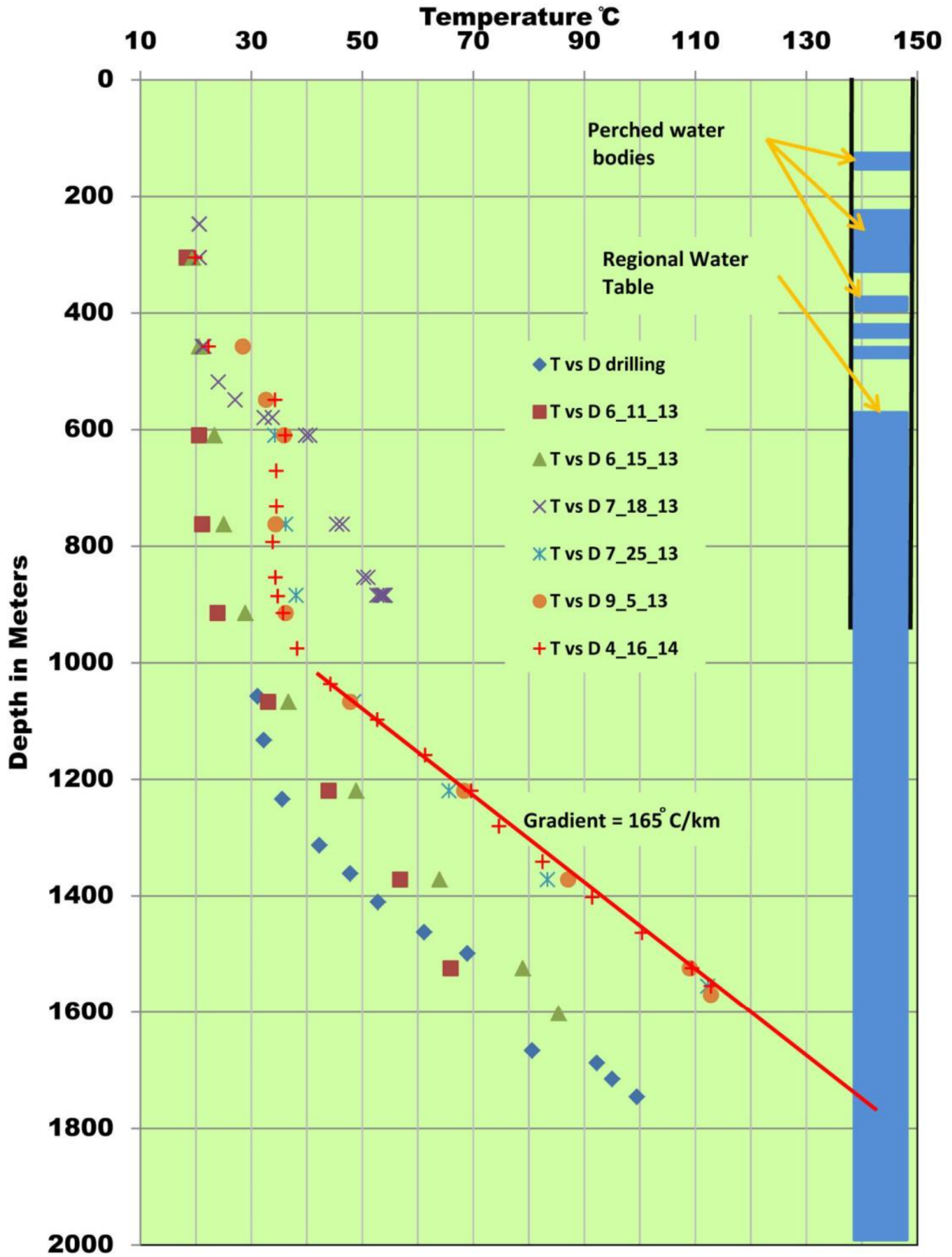
New database a tool in groundwater, geothermal discussions, West Hawai'i Today, 3-5-15, http://webcache.googleusercontent.com/search?q=cache:62Pqeza_1vgJ:westhawaii.com/news/local-news/new-database-tool-groundwater-geothermal-discussions&num=1&hl=en&gl=us&strip=1&vwsrc=0

“Groundwater conditions were remarkably different from expected: an initial (thin) water table was encountered at 1800 m amsl [above mean sea level]; more substantial saturated zones were encountered at ~1750 m amsl, that extended over an interval of >160 m, and below that aquifer were several intervals of saturated and unsaturated formation to ~1400 m amsl where continuous saturation was found to the total depth of the hole at 183 m amsl.”

Analysis of the hydrologic structures within an ocean island volcano using diamond wireline core drilling, Donald Thomas and Eric Haskins, <http://www.higp.hawaii.edu/hggrc/wp-content/uploads/2014/05/ThomasHaskinsAGU2013.pdf>



Analysis of the hydrologic structures within an ocean island volcano using diamond wireline core drilling, Donald Thomas (dthomas@soest.hawaii.edu) and Eric Haskins (haskins@hawaii.edu)
<http://www.higp.hawaii.edu/hggrc/wp-content/uploads/2014/05/ThomasHaskinsAGU2013.pdf>



New insights into structural controls affecting groundwater flow within an ocean island volcano, Mauna Kea, Hawaii, Donald Thomas (dthomas@soest.hawaii.edu), E. Haskins (haskins@hawaii.edu); E. Wallin (ewallin@hawaii.edu); and H. Pierce (tahoepierces@gmail.com)
<http://www.higp.hawaii.edu/hggrc/wp-content/uploads/2014/05/ThomasetalFall2015.pdf>

4.0 RESRAD CALCUALTIONS

The ERMP fails to evaluate the cumulative effects of radiation from Pohakuloa combined with other hazards people are exposed over the course of their lifetime.

<http://hawaiitribune-herald.com/news/local-news/pta-lawsuit-heads-trial>

PTA lawsuit heads to trial Published September 27, 2015 [Hawai'i Tribune-Herald]

A lawsuit claiming the state breached its duties to protect public lands used for the Army's Pohakuloa Training Area will go to trial this week.

Filed by Big Island residents Clarence Ching and Mary Kahalelio, the suit says the Department of Land and Natural Resources failed to ensure that munitions are cleaned up after military exercises as the Army's existing 65-year lease for the lands between Mauna Kea and Mauna Loa requires.

The plaintiffs, represented by the Native Hawaiian Legal Corp., are asking Oahu Circuit Court Judge Gary Chang to order DLNR to fulfill its trust duties and prevent the Army from receiving a new lease until it satisfactorily fulfills the terms of the existing agreement.

The complaint says it doesn't allege the United States government violated its lease, but that violations may have occurred and the state has a "duty to investigate and take all necessary steps to ensure compliance with lease terms." It alleges the state failed to fulfill this duty.

To support the plaintiffs' concerns, the suit cites empty casings seen on the ground within 10 yards of Saddle Road and "rifle casings, machine gun cartridge links, unfired blanks and other rubbish on the ground at Pohakuloa Training Area."

It also refers to environmental documents that state there is significant risk to encountering ordnance at the training area and that "past and current activities at PTA have resulted in contamination of soil by explosives and other chemicals."

The trial starts Tuesday in Honolulu. Sharla Manley, NHLC litigation director, said she expects it to last about a week.

The Army leases 22,836 acres from the state to hold military training exercises at the cost of \$1 for its duration.

The lease started in 1964 and expires Aug. 16, 2029.

The training area includes ceded lands, which belonged to the crown or government of Hawaii prior to annexation by the United States. The lands became the state's responsibility following statehood.

The lawsuit was filed in 2014. The state unsuccessfully sought to dismiss it since it doesn't cite the lessee as a defendant.

Defendants are DLNR and the Board of Land and Natural Resources. William Aila, who was DLNR chairman at the time, also is listed as a defendant.

"The way we see it, at the end of the day, who is the trustee of these lands?" Manley said, regarding the decision to leave the United States out of the lawsuit.

The Army and DLNR both declined to comment on the complaint since it involves ongoing litigation.

The state denied the allegations or cited sovereign immunity as part of its defense, according to its September 2014 response.

The suit says weapons that have been used at PTA include "small arms, grenades, machine guns, shotguns, antitank weapons, howitzers, mortars, field artillery, air defense artillery, explosives, rockets, missiles and weapons using ammunition containing depleted uranium."

The plaintiffs say they are adversely impacted by the military's actions as they engage in traditional and customary practices within and around the area.

The lawsuit says Ching is a Native Hawaiian cultural practitioner and a former member of the Pohakuloa cultural advisory committee. Kahalelio is a Waimea resident.

A DLNR spokesman said there have been internal discussions about the Army's request to seek a new lease for PTA but nothing is pending before the Land Board.