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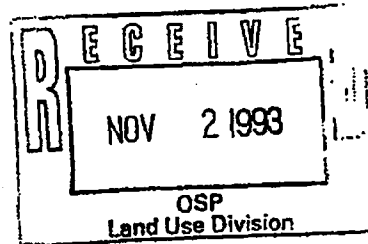
RAE M. LOUI, P.E.
DEPUTY

REF:WRM-FC

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Mr. Thomas C. Leppert
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DIRECTOR'S OFFICE

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Dear Mr. Leppert:

Testimony of Ms. Rae Loui at LUC Hearing on Lanai
August 12, 1993

Thank you for your letter of September 9, 1993 indicating your concerns relative to some aspects of Ms. Rae Loui's testimony to the Land Use Commission (attached). I can appreciate your concerns regarding Ms. Loui's testimony, but it is clear that her testimony accurately reflects the latest position of the Commission on Water Resource Management (Commission).

Sustainable Yield for Lanai High-Level Aquifer

There are three Commission documents that relate to Ms. Loui's testimony, of which I am sure you are aware. Listed in chronological order, they are: 1) Lanai Water Resources Findings of Fact (FOF), January, 1990; 2) State Water Resources Protection Plan, June 1990 (Protection Plan); and 3) redraft of the State Water Resources Protection Plan, March 1992. Further, there is a letter from Mr. William Meyer of the U.S. Geological Survey (USGS) to Mr. William Paty, dated December 7, 1992 (attached). This letter was written with the concurrence of Mr. Mink and addressed the validity of sustainable yield numbers presented in the Protection Plans.

Mr. Mink had major input to all of these documents, but more specifically he was the principal author of the portions of the Protection Plans to which I will be referring. Although the FOF assigned a high degree of confidence to the value of 6 mgd for the high-level aquifer on Lanai, the subsequent documents do not take as strong a position regarding the confidence of this estimate.

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In both editions of the Protection Plan, Mr. Mink characterizes the sustainable yield numbers almost word-for-word as Ms. Loui describes them in her testimony on Lanai. The following quotations are from both editions of the Water Resources Protection Plan:

1990 and 1992 Protection Plan:

"Sustainable yield... is based on a simple pre-development water balance equation."

"The estimates of sustainable yield are not meant to be an exact number which could be used in final planning documents. The estimates are constrained not only by the scanty data base but also by the fact that they do not consider the feasibility of developing the groundwater. The estimates should not be equated to developable groundwater. In many regions, taking advantage of a high estimate would not be economically feasible."

"... the sustainable yield estimates should be used as a guide in planning rather than as an inflexible constraint."

1992 Protection Plan:

"The yields are estimated both through hydrologic budgeting and analyses of groundwater response to exploitation. Yet even after more than a century of extensive groundwater development in the islands, only in southern Oahu and West Maui do we have an accurate appreciation of groundwater behavior. In these sectors the excellent records of rainfall, evapotranspiration, stream flow and aquifer behavior in response to pumping have provided a reliable framework for computing hydrological balances and creating analytical and numerical models."

In Mr. Meyer's December 7, 1992 letter to Mr. Paty, which Mr. Mink agreed to, the following is stated:

"On the question of using the RAM (Robust Analytical Model) equation to calculate sustained yield values presented in the Hawaii Water Plan, John and I both agreed that: 1) The RAM provides a straightforward, relatively simple methodology for the engineering community to use. However, values for sustained yield derived from the RAM and used in the Hawaii Water Plan should be considered as preliminary estimates of sustainable yield only, particularly given the time and data available to John for making those estimates. We both agreed that refinement of these numbers is possible and that it's reasonable to expect them to be continually improved upon by using newer techniques as they become available. Areal ground-water models that incorporate variations in aquifer properties and calculate the position of the fresh-water salt-water interface represent one such technique."

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I believe it is evident from the above information that Ms. Loui's statements regarding the accuracy of the value of 6 mgd for the Lanai high-level aquifer and the methodology used to determine it are consistent with those of the Commission's publications and with Mr. Mink's most recent statements on this subject.

Your letter raised concern over three other subjects: 1) the discussion by Ms. Loui of some of the preliminary results of the Kona ground-water model and its applicability to the Lanai situation, 2) the use of Well 9 for golf course irrigation, and 3) whether or not drawing brackish water affects the potable resource. I would like to address these in order.

Kona Ground Water Model

As you are aware, Lanai is one of the few places in the state where the principal source of water is a high-level aquifer. As a result we have only limited information on the long-term availability of the ground water from these areas and what controls this availability. The Kona ground-water model is helping us to understand some of these factors in a generic sense, not simply in a context related to Kona alone.

A preliminary model of the Kona area has been constructed by Ed Bolke of my staff. (Mr. Bolke is a hydrologist retained by the Commission through an interagency loan agreement with the USGS.) The model was constructed in order to help us better understand the water resources of the Kona area. Because not much is presently known about the geology and hydrology of the area, the model will have to be perfected over many years into the future. Because Mr. Bolke is actually working for the Commission, your statements about a USGS model requiring a USGS peer review have no applicability in this case.

Let us put Ms. Loui's comments about the 30% of recharge in context. They were made in response to Mr. Tom Nance's testimony to the Land Use Commission. He stated:

"...as regards to a portion of recharge that you can develop in a high-level compartment, he (Dr. Mink) has used essentially 2/3. The reality is, if it's a fairly well-defined aquifer, we probably can do even better than that. Maybe up to 85, 90 percent."

In response, Ms. Loui stated:

"I think I read somewhere that it's been testified here that it may be possible to take up to 90 percent of the recharge out of an aquifer... In the Pearl Harbor aquifer, we're looking at more like 60 percent. And in the Kona area where a model has been developed jointly between us and the USGS, because of --- it's also a high level situation in Kona, but the impediment is not --- it's not a dike-confined situation. There is an impediment that runs parallel to the coast that is holding up this high-level water.

"In the Kona area we're looking at more like 30 percent of the recharge. So that kind of gives you the range of what might be possible to withdraw safely. I don't --- so it could

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range anywhere from say 30 percent. I don't think I've ever heard of anything as high as 90 percent... "

As you know, there is no other high-level aquifer in the state where more experience exists than with the Lanai aquifer. We would appreciate any additional information or calculations that Mr. Nance may have to substantiate his contention that 90% of recharge might be an appropriate basis to establish Lanai's sustainable yield.

Use of Well 9 for Golf Course Irrigation

Water usage generally is not a consideration for the issuance of well construction and pump installation permits. It could, however, be brought into consideration in special instances where a proposed water use would likely result in harm to the aquifer; e.g., where brackish water or wastewater effluent is to be applied over a fresh water aquifer. Only in designated water management areas where water use permits are required does water usage become a necessary consideration.

In the case of Well 9, aquifer harm from the use of water was not evident; hence, the question of prudence in allowing non-potable water to be used for irrigation at Manele Bay, as raised at the LUC hearing, was not material to the Commission deliberations when it issued the Well 9 permit. Accordingly, please bear in mind that the Commission permit for Well 9 does not preclude the use of the well water for other than irrigation purposes. 11

Threatening or Harming the High Level Aquifer

The following is an excerpt from the LUC transcript:

Commissioner Nip: "... Does the drawing of brackish water from the aquifer affect the potable water resource?"

The Witness (Ms. Loui): "Yes."

This question of EFFECT is very different from that denoting THREAT or HARM. It is clear from the testimony of Mr. Nance that pumping brackish water does affect the potable water in the high-level aquifer. He testified for Lanai Company that the chlorides in Well 1 dropped from about 700 ppm to between 320 to 350 ppm. This fact alone implies that at least half the water pumped from Well 1 is potable water.

On the other hand, harm to the aquifer from pumping Well 9 could happen, for example, from the mining of ground-water storage. We still do not believe that pumping the well, given the current pump size, would HARM the aquifer. If we did, the permit for Well 9 would not have been issued.


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In summary, although I appreciate your concern relative to Ms. Loui's testimony, I believe that her statements were consistent with the current Commission position on this subject and that her statements correctly represented Mr. Mink's current position as well. The Commission's trust responsibility places with it an affirmative duty to protect Hawaii's water resources. I am sure that you would agree that it is in everyone's best interest for the Commission to continually refine and improve its knowledge of the water resources in Lanai and other areas of the state. Toward this end, we are establishing a forum of hydrologists and other experts to address and clarify these issues.

Very truly yours,


KEITH W. AHUE
Chairperson

Attachments

- c. Commission on Water Resource Management
Land Use Commission
✓ Harold Masumoto
Lanai Water Committee

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