IN THE PRIVY COUNCIL

ON APPEAL FROM THE COURT OF APPEAL OF BELIZE

BETWEEN:

BACONGO	Appellant
and	
The Queen	
and	
The Department of the Environment	1st Respondent
Belize Electric Company Limited	2nd Respondent

Affidavit of William Eaton dated July 21, 2003

I, Dr. William Eaton of Peninsula College, 1502 East Lauridsen Blvd Port Angeles, Washington, USA,
MAKE OATH AND SAY as follows:

1. I am a microbiologist specializing in microbial ecology, the role of microbes in ecosystems and nutrient cycles. I am also the Senior Vice President of Peninsula College. I have more than 18 years of experience as a microbiologist. During this time I have conducted numerous scientific research projects resulting in over 30 publications in international scientific journals. Between 1996-1999 I co-authored and co-supervised a Canadian International Development Agency Grant, along with Dr. Vincent Palacio (my Belizean counterpart) between my former institution (Malaspina University College) and the University of Belize (known at the time as the University College of Belize). The project was to develop an environmental monitoring program in Belize for their university.

2. As part of the above consortium, a survey was conducted of the quality of the water from the Macal River upstream and downstream from the Mollejon Dam in 1999. The work was published in *Mesoamericana* 4(4): 1999, pages 132-137. The study involved an examination of water chemistry and microbial indicators of water quality. The results of this study showed that the water quality upstream of the Mollejon dam was much better

than the water quality downstream of the dam, and that eutrophication was occurring downstream of the dam.

3. Eutrophication is essentially the product of excessive decomposing organic material, and most certainly can be associated with slow moving water, such as can be caused by dams in tropical ecosystems. Eutrophication occurs as the result of an increase in organic material entering into an aquatic ecosystem. It is indicated by increases in the nitrogen, phosphorous, and organic carbon content in water; and causes an increase in microbial, algal and planktonic cellular and photosynthetic biomass. This excess biomass results in a transient increase in oxygen during the daytime—while photosynthesis is occurring. However, at night, and eventually during the day, the oxygen content drops dramatically as the need for oxygen in the decomposition process is also enhanced and is far greater than the level of production of oxygen.

   The end result of eutrophication is a system with excessive amounts of organic sediment building up on the substrate due to an increase in dead cellular material, low oxygen levels, changes in aquatic zoological species and a significant change in the make-up of the habitat. At this point, the water becomes less fit for a variety of human uses. Another concern is that as eutrophication increases, the level of physical and biological irritants in the water also increases, making the water less usable for bathing, swimming, and recreational activities. This also is associated with a change of fish species, selecting for only those species that can withstand such irritants in their gills. These species are generally smaller and not species used for food by humans (i.e., minnows).

4. It appears that the presence of the Moellejon Dam is resulting in eutrophication downstream in the Macal River. This is likely due to the fact that the water is held behind the dam for an excessive length of time, with the 'flood gates' only being opened for several hours per week. This would provide the opportunity for a large open and stagnant surface area of water behind the dam to be exposed to sun; thus allowing for increases in photosynthesis, cellular material, organic carbon, nitrogen, phosphorous, etc. in the water behind the dam.

When the 'flood gates' are opened, it is quite likely that several things are happening. First, the concentrated organic 'soup' of cellular material and nutrients is being released and flows down the river. Second, as the river rises several feet during this process, silt and organic material from the shore also runs into the river. Thus, there is an extensive amount of organic and cellular input into this region of the Macal River. It is no surprise then that this region of the Macal River is experiencing clear signs of eutrophication: cloudy water; large increases in microbial, planktonic, and algal photosynthetic and cellular biomass; large increases in nitrogen, phosphorous, and daytime oxygen levels; sediment on the rocks and substrate below the water line and a band of sediment left behind on the rocks above this, representing the level of the water during the release from the dam; and a change in species of fish present in this region of the river (all referenced in the *Mesoamericana* article).

5. It is my professional opinion that the construction of the Chalillo dam, with a reservoir area that is vastly larger than that of the Mollejon dam, will likely cause further deterioration of the water quality of the Macal River due to eutrophication that would result from the same factors described above. Should this happen, the loss of water quality would result in diminished use of the river by the communities living along it, and alteration of habitat quality and of the species present in and along the riparian habitat associated with the Macal River.

6. The process of construction itself, even before impoundment of the dam, can cause significant erosion along the riverbanks. In addition, the drilling and blasting of the riverbed is likely to cause a significant increase in suspended particles, increasing the turbidity of the river, increasing the organic content of the river, and thus beginning the eutrophication process. Construction activities may also increase the level of irritants that would affect bathing as well as fish species in the river.

Sworn to by the above-named)
William Eaton at Port Angeles,)
California, USA)

on the day of July)
2003)_____
William Eaton

Before me,

_____
print name of witness:

This affidavit is filed on behalf of the Applicant (Appellant) herein AND TAKE NOTICE that it is intended to use this affidavit at the hearing of the application for an injunction and for Judicial Review.