Ms. Donna Scheuring  
Acting Environmental Health Coordinator  
Department of Human Resources  
Government of the Federated States of Micronesia  
Kolonia, Pohnpei FM 96941

Dear Ms. Scheuring:

Fish Processing Plant  
Pohnpei, Micronesia

In response to your request of last summer, we have completed our review of the four volume set of plans for a fish processing plant to be developed in Pohnpei. An apology seems in order, given the time it has taken for us to respond to your request. I can only tell you that our work load is heavy, and it was difficult to find reviewers who felt competent to comment on the proposed project. I hope the comments that we can now provide will be of help. In accordance with our usual review procedures, we have been assisted in the preparation of these comments by various members of the University of Hawaii including: Peter Rappa, Sea Grant; Salvatore Comitini, Economics; Reginald Young, Engineering; and C. Anna Ulaszewski, Environmental Center.

General Comments

We emphasize that some of our reviewers have limited experience with the specific needs, issues, and physical attributes of Pohnpei. For this reason, you may find that some of the concerns expressed in this review are more pertinent than others, depending on your own broad personal knowledge and experience. I have included all the comments submitted to the Environmental Center, without significant editorial changes, on the basis that you are in a better position than we, to make meaningful evaluations of their significance.

One major concern was expressed by each of our reviewers: most of the information provided is in the form of "slick brochures," from which the maintenance needs are frequently omitted. The entire processing plant is built around high-tech equipment. It is our understanding that the
expertise to operate and maintain this type of equipment properly is essentially nonexistent in Pohnpei at the present time.

Since efficient operations and economic viability of the plant are directly tied to this high-tech equipment, provision for training programs (and the corresponding costs) and technical support after the sale must be assured before "go" decisions are made.

Wastewater Issues

The treatment of waste water effluent from the plant is an issue of some concern. We understand that the waters in the vicinity of the proposed fish processing plant are classified as 'B' waters according to the water quality standards and classification scheme for Pohnpei (Attachments 1 and 2). It is our further understanding that these waters were tested by the University of Guam in 1980 (Cowan and Clayshulte, 1980. Marine baseline water quality of the Trust Territory of the Pacific Islands, University of Guam, Water Resources Research Center, Technical Report No. 14). Their report states that water quality standards for total coliform and fecal coliform were exceeded in the area of the proposed plant (station 7 on the report) for all days tested. While we recognize that these figures represent data collected eight years ago, it is our understanding that water quality conditions now may be worse than those recorded in 1980. This problem is attributed to dredge and fill operations that have closed off parts of Kolonia harbor from the ocean and thereby reduced circulation. The proposed wastewater and disposal system needs very close attention to assure that health and environmental conditions are not degraded further. Outfall(s) from the waste processing plant must be located to assure maximum mixing and dilution of the wastewater with the receiving waters.

Fish Supply

According to the plans received, the proposed plant can process an average of 10 metric tons of fish per day in a normal 8 hour operation. Assuming that the plant operates 200 days a year, it will require an input of 2000 tons of fish a year to keep the plant at its normal capacity. By comparison, Hawaii's commercial fishermen harvested 4750 (short) tons in 1986 (Hawaii State Data Book, 1987) but there are many more commercial fishermen in Hawaii than in Pohnpei. There is no discussion of harvesting capacity of Pohnpei state and no presentation of fishery statistics in the document. This information may not be readily available, however, it is necessary for making an informed decision on the feasibility of a fish processing plant. Furthermore, the population of Pohnpei is still heavily dependent on subsistence harvest of nearshore reef and bottom fish. If these resources are used for the commercial purposes what will happen to the subsistence fisherman?

The proponents of this project contend that the processing plant can be supplied by foreign fishing fleets. Is there documentation to support this statement? The Japanese have said elsewhere that they would not be likely to land fish in Majuro in the Marshall islands for the purpose of
transhipment or cold storage. Will Japanese fishermen be inclined to have their fish processed in Pohnpei? We believe this topic should be discussed further in the plans.

According to this document, one of the "main contributions," to this plant will be fish and prawns from proposed aquaculture activities. We have very little knowledge about these planned activities and their present status. However, given the high risk nature of aquaculture developments and our experience in Hawaii, it seems essential that the economic viability of the fish processing venture be evaluated both with and without contributions from aquaculture.

Waste Products

The plans state that if a use for the offal created during processing is not forthcoming, the material would be dumped at sea in PVC bags. This document should describe how much offal will be created over what time period and the location and water depth of the proposed dumping sites. Sufficient information on these sites should be provided to assure that the receiving waters and marine fauna are not adversely affected. This information should be discussed in the plans.

Flotation and extended aeration are possible for wastewater treatment, but there are limited personnel trained either to operate or repair the necessary equipment. Gravity separators and stabilization ponds are reasonable alternative treatment systems but are less efficient. Treatment units should be enclosed where odor control is a problem and the gases subjected to oxidation treatment. This form of treatment is not included in the plans as presently designed.

Water Supply

Information in section 00.05 states that water will be consumed at a rate of "approximately 7 cubic meters/hour. This figure seems to be rather low in view of the water-intense activities of fish processing, and the production of "10-20 tons" of ice per day. There are three alternatives given for water supply: rain water, local water supply and desalinized water. What is the projected volumes of water to be obtained from each of these sources? It is our understanding that there are places in Pohnpei which have designated "water hours." Will this plant exacerbate this situation? Also, desalinization is costly to operate and maintain (including the disposal of the waste brine). Have these costs been included in the financial data that were provided to us?

Economics

As far as we can judge from the information in the four volumes, there is no formal project feasibility study which one can refer to and which would give the derivation of the projections of sales revenues, investment costs, and operating costs of the project. Thus, one has to take these estimates at face value from the computer printout (provided with the four volumes) and enclosed separately with the loose-leaf binder.
It must be recognized that the ability to evaluate the reasonableness of the economic assumptions used is limited by the fact that a breakdown by species of fish, and the processing method to be used is not provided. Nor can one determine how the sales volume and selling prices were derived.

Various items included in fixed costs are questionable, while for others there is not enough information given. For example, wages are included as a fixed cost regardless of plant utilization capacity. This is clearly unreasonable, since the number of employees would vary according to the plant operating rate. The same would be true of fuel costs and, to some extent, repairs and maintenance. Both insurance and repair and maintenance costs are calculated as percentages of some larger figure; however, that figure is not specified.

The schedule of project financing, profit and loss budget, and cash flow budget appear correct and straightforward as to methodology and procedure; however, the beginning year of tax payments should be year four rather than five, and this, in turn would affect the cash outflow and cash balance for year four which is under and overstated, respectively. However, this would have only a small effect on any revision of the internal rate of return of the project.

It is not clear how the working capital requirement was estimated since there is no accounts receivable item included in current assets nor accounts payable as a current liability, both of which would have an effect on the amount of working capital required.

Although the internal rate of return on investment in the project is a respectable 30 percent before tax, this assumes that all the sales, production, and cost estimates are accurately estimated. For example, there are no allowances for physical contingencies, e.g., cost escalation of capital components by the time the project gets underway, nor a miscellaneous item in the budget which would cover unforeseen expenditures.

A sensitivity analysis should have been carried out assuming changes in the important components of the financial cash flows. For example a 25 percent reduction in sales price, a 10 percent increase in cost of raw material, a 10 percent reduction in production volumes, a one or two year delay in startup production, etc. An investor would want to know how sensitive the IRR is to changes in these factors and how likely these might occur in the future.

A breakeven analysis should have been done which determines the required production volume (capacity utilization) of the fish processing plant to breakeven on operations.
Ms. Donna Scheuring

November 3, 1988

Thank you for the opportunity to comment on this document. While we realize that our comments are not as timely as you had wished, we hope they will help you and your staff in making decisions about this project.

Yours truly,

[Signature]

Jacquelin N. Miller
Associate Environmental Coordinator

cc: L. Stephen Lau
    Salvatore Comitini
    Peter Rappa
    Reginald Young
    C. Anna Ulaszewski
Table 2. Trust Territory of the Pacific Islands (TTPI) classification of coastal waters.

Class AA Waters

The uses to be protected in this class of waters are oceanographic research, the support and propagation of shellfish and other marine life, conservation of coral reefs and wilderness areas, compatible recreation, and aesthetic enjoyment.

It is the objective of this class of waters that they remain in as nearly their natural, pristine state as possible with an absolute minimum of pollution from any source. To the extent possible, the wilderness character of such areas shall be protected. No zones of mixing will be permitted in these waters.

The classification of any water area as Class AA shall not preclude other uses of such waters compatible with these objectives and in conformance with the standards applicable to them.

Class A Waters

The uses to be protected in this class of waters are recreational (including fishing, swimming, bathing, and other water-contact sports), aesthetic enjoyment, and the support and propagation of aquatic life.

It is the objective for this class of waters that their use for recreational purposes and aesthetic enjoyment not be limited in any way. Such waters shall be kept clean of any trash, solid materials or oils, and shall not act as receiving waters for any effluent which has not received the best degree of treatment or control practicable under existing technology and compatible with the standards established for this class.

Class B Waters

The uses to be protected in this class of waters are small boat harbors, commercial and industrial shipping, bait fishing, compatible recreation, the support and propagation of aquatic life, and aesthetic enjoyment.

It is the objective for this class of waters that discharges of any pollutant be controlled to the maximum degree possible and that sewage and industrial effluents receive the best degree of treatment control practicable under existing technology and compatible with the standards established for this class.

The Class B designation shall apply only to a limited area next to boat docking facilities in bays and harbors. The rest of the water area in such bay or harbor shall be Class A.
Table 3. Trust Territory of the Pacific Islands (TTPI) marine water quality standards

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>UNITS</th>
<th>CLASS AA</th>
<th>CLASS A</th>
<th>CLASS B</th>
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<tr>
<td>Total Coliform</td>
<td>#/100ml</td>
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<tr>
<td>Fecal Coliform</td>
<td>#/100ml</td>
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<td>&lt;400</td>
<td></td>
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<tr>
<td>pH</td>
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<td></td>
<td></td>
<td>Normal ± 0.2 6.5≤pH≤8.5</td>
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<td>Total Nitrogen (TN)</td>
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<td></td>
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<td>Normal ± 10%</td>
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<tr>
<td>Total Phosphorus (TP)</td>
<td>mg/l</td>
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<td></td>
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<td></td>
<td></td>
<td>Normal ± 10%</td>
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<tr>
<td>TN/TP</td>
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<td></td>
<td>Normal ± 10%</td>
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<tr>
<td>Dissolved Oxygen (D.O.)</td>
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<td>≥5.0</td>
<td>≥4.5 of saturation, whichever is greater</td>
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<td>Total Dissolved Solids (TDS)</td>
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<td>[Normal ± 10%]</td>
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<td>Temperature</td>
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<td>[Normal ± 0.9]</td>
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<td>Turbidity</td>
<td>NTU, JTU</td>
<td>Normal ± 5%</td>
<td>Normal ± 10%</td>
<td>Normal ± 20%</td>
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