

ENVIRONMENTAL MANAGEMENT IN PHILIPPINE GEOTHERMAL DEVELOPMENT

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SUMMARY — PNOC-EDC's environmental management program was formalized in 1978, as proof of the early corporate recognition of the importance of the environmental mission. Since then it has grown and matured to include the company's positive response to pressures from environmental advocacy groups, and its desire to fully comply with progressively stringent government regulations. PNOC has also been chosen by other governments like New Zealand as partners in various environmental management initiatives. What has developed over the past 14 years is a dedicated environmental group that has stayed and developed the company's and the country's competence in the environmental field.

1. INTRODUCTION

The Philippines along with the 178 countries which participated in the 1992 Earth Summit recognize the continuing deterioration of our common environment on which man's well-being depends. Environmental degradation in the Philippines is aggravated by a high population and stagnant economic growth. Both exert heavy pressure on the natural resources beyond the carrying capacity.

To solve the countries economic problems, there is at present an urgent need for the development of more energy sources and at the same time a need to protect a battered environment. There is apparent conflict between these two requirements which the Philippines can ill afford. A balanced approach to economic growth and environmental issues is the only way to attain a sustainable form of development. The integration of environmental and development concerns is a prerequisite to the fulfillment of man's basic needs and a better protected future. Thus, economic growth provides the resources to achieve environmental protection while environmental protection ensures economic growth which is long term and sustainable.

At this time, Philippine energy requirements have reached crisis proportions which has resulted in severe economic sacrifice. To relieve the situation, the Philippines has been pursuing several thrusts, including ways to assure security of energy supply, stability and diversification of sources, efficiency of utilization, and development of various indigenous resources. Among those options is geothermal which is now a critical component of the Philippine Energy Program.

Hand in hand with the accelerated energy development, environmental management is vigorously being pursued by PNOC-EDC as one of two geothermal developers of the country.

2. ENVIRONMENTAL MANAGEMENT PROGRAM

The varied Philippine landscape contributed to PNOC's development of diverse environmental methodologies. Philippine geothermal sites offer various settings from agricultural plantations, tribal lands, national parks to forest lands teeming with upland communities.

The viability of PNOC-EDC's environmental management program has been tested and further refined by successive governmental initiatives. These include:

1. Deliberate strengthening of non-governmental organizations (NGOs) and the institutionalization of their participation in the environmental preparation and review processes;
2. Establishment of social acceptability as a criterion for project appraisal;
3. Aggressive public campaign on environmental awareness;
4. Legislations on multi-sectoral, management of protected areas; and
5. Strict implementation of environmental laws, with the geothermal agencies and corporations serving as models.

As a result of these initiatives, PNOC-EDC has moulded an organization and an environmental management program that makes geothermal a fitting example of sustainable development.

The program is far from the conventional fire fighting stance where problems are addressed only as necessary. PNOC-EDC's environmental management program is pragmatic and proactive — the environmental mission is recognized as an important business function and a priority item. Following are some of PNOC-EDC's considerations

in the formulation of an environmental management program for geothermal development:

1. Environmental management is one of four pillars of governance in the company. The program has top level support and commitment. The company ensures that its employees and contractors have a high degree of environmental awareness and that they make it their primary responsibility to comply with the environmental laws.
2. Conscious effort for continuous endogenous capability building by commissioning studies, training and seeking bilateral assistance to improve the company's basic understanding of the environment and processes in the energy sites.
3. Maximum use of the Environmental Impact Assessment System (EIA) to identify and deal with environmental problems early in the project cycle. The environmental assessment covers comprehensively the land, water, air and people components.
4. Today, PNOC-EDC goes beyond the implementation of the EIA system. This year it started to undertake Environmental Risk Assessment (ERA) as a complementary tool to the EIA. This study focuses on the uncertainties or the possibility of adverse effects and contingency planning in case of accidents. It consists of hazard identification and characterization, hazard accounting and hazard management and reduction.
5. Resolve to develop technologies for progressive waste minimization and elimination. The underlying principle is that man is development's ultimate beneficiary. Hence, in the process of providing progress to man, the geothermal developer must ensure conservation of natural resources in order to support the multiple goods and services offered by the environment and required by the various publics.
6. Installation of a strong audit program to monitor operations. PNOC itself has initiated the formation of multi-sectoral environmental monitoring involving local government units, local communities and non-governmental organizations (NGOs). This multi-sectoral monitoring helps in promoting transparency in operations while at the same time harnessing the synergistic efforts of all these concerned sectors.
7. As a matter of policy, PNOC-EDC now seeks public response and support through consultation with local government officials, legislators, line agencies, academe, religious sector and NGOs.
8. Formulation of zoning plans in geothermal reservations to define the best land uses and appropriate environmental standards depending on the biophysical attributes of the area.
9. Geothermal being a water-based resource is usually sited in forest environments. In the Philippines, these marginal lands are occupied by settlers with

the potential of degrading the uplands. PNOC-EDC takes it upon itself to assist the government in developing alternative livelihoods to redirect the efforts of forest occupants to more compatible activities. Through the assistance of the New Zealand Government, community-owned plantations are established in geothermal reservations. These projects integrate components for sustainability such as values education, institutionalization of linkages with support organizations and capital formation with the end view of making the community self-reliant after 3-5 years when the company pulls out to develop other communities. A total of 29 communities are being assisted by PNOC-EDC.

10. As the governments surrogate in the geothermal industry, PNOC-EDC has been invited to sit in technical committees for the formulation of environmental policies by government regulatory bodies. PNOC-EDC takes advantage of this opportunity on the following:

a) Development of geothermal specific and locally-based environmental standards for the industry.

b) Reconciliation of the rights of indigenous cultural communities and the eminent domain rights of the State. In recognition of the peoples' rights, PNOC-EDC has supported the following legislations:

- The Philippine Local Government Code that will yield benefits to areas where geothermal resources are found. The code now mandates the allocation of 40 percent of geothermal royalties to the local government units for community development projects and as a subsidy to electric power charges;
 - Ancestral domain bill that defines the respective homeland and rights of each cultural community, as well as their share of other benefits;
 - Integrated Protected Areas System (IPAS) law that provides for the multi-sectoral management of protected areas in support of biodiversity preservation.
- c) Formulation of guidelines for social acceptability are being developed through a multi-agency task force facilitated through the National Economic Development Authority (NEDA).

3. FUTURE PLANNING

Over the past 14 years, the PNOC-EDC environmental management program has nurtured the development of two geothermal areas into operational stages, namely, the Tongonan-I and Palinpinon-I areas. But the future brings more challenges to the fore. Up ahead is the expected operation next year of BacMan-I and II with a combined 150 megawatt capacity, and Palinpinon-II with 80 megawatts. Later next year, too, or early in 1994 will be the first 20-megawatt module of the Mindanao-I geothermal field.

Next in line will be 605 megawatts from Leyte-A, of which 165 will be transmitted to Cebu Island and 440 will be similarly transmitted by subsea cable to Luzon Island. Most of the production wells have been drilled.

There are wider areas to cover and more importantly, an increasing number of complex situations up front. At Mount Apo in Mindanao, for example, we are dealing for the first time with primary forests in a national park declared as an *Asean* Heritage Park. We are also dealing with several ethnic communities with different cultural backgrounds and practices which claim the whole mountain as their common tribal domain. In dealing with this situation, we were guided by your experience with local Maori groups, but we had to add several innovations relative to the socio-economic and cultural demands of affected groups.

Speaking of innovations, PNOC has been in the forefront as you know of several technological breakthroughs involving environmental management and control. In 1983, due to the hostile terrain at Palinpinon, PNOC adopted the multi-well pad system. Several wells were drilled from a single pad by employing directional drilling. In the process, Palinpinon has become a showcase for compact geothermal field development, thus sharply reducing the area of surface disturbance.

In 1990, as some environmentalist groups were demanding that no geothermal effluent should be discharged, even in regulated amounts into the river systems, PNOC experimented with several wastewater treatment methods. The result is the zero discharge system which combines and integrates three methods — the multiple pond at the

drillsite, full containment in thermal ponds, and finally the reinjection of cold waste waters. As you know, in all its operational fields, PNOC has always reinjected hot brine to the underground reservoir in order to withdraw the potential pollutant from the waterways. Next year, 1993, PNOC proposes to pilot gas injection for CO₂ reduction in line with the global effort to reduce greenhouse gas build-up.

In the Philippine setting, there are competing demands for common natural resources from various sectors of society. Geothermal, for example, is often in competition with forest occupants, land developers and municipal water systems. In such cases, an environmental management program that encompasses the whole biophysical catchment and the socio-economic and cultural circumstances therein has become a necessity in the competition. Thus, in the PNOC-EDC, the environmental management group works very closely with the community relations and public communications groups of the company.

In other words, it is not enough that a holistic and comprehensive environmental program should consist of the usual menu of environmental profiling, waste minimization, monitoring and evaluation. The environmental strategy for geothermal development must address more importantly people related issues, including the resolution of conflicts with equally important government thrusts.

Whether we are environmentalists or energy developers, we must never lose sight of our common goal which is the health and welfare of the people.