## VI. ENVIRONMENTAL ENGINEERING

Project Title: SURVEY OF THE MUNICIPAL SOLID WASTE DISPOSAL SYSTEM AND PROBLEMS OF ILIGAN CITY

Investigatora: Blas R. Tabaranza, Jr.
MSU-IIT, Iligan City
Ma. Esperanza Cruz
MSU-IIT, Iligan City

Project Description: The survey was conducted to gain a comprehensive knowledge about the present method of waste disposal and the inherent problems of the system to serve as basis for better solid waste management planning.

Project Cost and Source of Funding: ₱1,000
MSU-IIT, CCRD Research Funds

Cooperating Agencies: City Engineer's Office
Garbage Disposal Unit
Iligan City

Date Started: October 1, 1979

Date of Completion: December 15, 1980

Status: Completed

Other Relevant Information: The survey was conducted as part of the Project entitled "Integrated Community Biogas and Vermiculture Plant for Waste Recycling."

Project Title: BOD TESTS AT ROOM TEMPERATURE

Name and Address of Principal Investigator: Engr. Fredesvinda B. Dura
San Miguel Foundation Professorial Chairholder Chemical Eng'g Dept.
U S C, Cebu City

Project Description: The objective of this investigation was to determine the length of the incubation period of Biochemical Oxygen Demand Tests conducted at room temperature of about 27.2°C (which is practiced in the USC laboratories due to inavailability of a 20°C — incubator) that would yield a result equivalent to BOD after 5 days at 20°C prescribed by the National Pollution Control Commission. It was found that for the same BOD value, incubation at 27.2°C requires a period of 3.3 days only instead of 5 days incubation at 20°C.

Source of Funding: USC Chemical Eng'g. Dept., Water Resources Center

Date Started: December 1, 1979

Date Completed: February 28, 1980

Present Status of Project: completed

Project Title: LLDA-CPMC/WWTP WASTEWATER TREATABILITY STUDY

Name and Address of Principal Investigator: Environmental Protection Division
Laguna Lake Development Authority

Provincial Capitol Compound
Pasig, Metro Manila.

Description of the Project: The wastewater treatability study is jointly undertaken by the Laguna Lake Development Authority and the Canlubang Pulp Manufacturing Corporation through a memorandum of agreement signed June 18, 1979. The study was designed to determine, test and evaluate several alternatives of wastewater treatment processes for the pulp mill and sugar mill effluents of CPMC.

Project Cost and Source of Funding: Approximately ₱ 300,000 funded by Canlubang Pulp Manufacturing Corporation. Technical support by LLDA.

Cooperating Agencies: a. Research Department
Canlubang Sugar Estate
Canlubang, Calamba, Laguna
b. Canlubang Pulp Manufacturing Corporation
Canlubang, Calamba, Laguna

Date Started: May 16, 1979

Duration or Expected Date of Completion: 24 months

Date of Completion or Expected Date of Completion: May 1981

Present Status of Project: As of data, batch study on coagulation, floatation, sedimentation, anaerobic biological, and water hyacinth are being done on the total pulp mill effluent.

Other Relevant Information: An interim report had been submitted in February 1980.

Project Title: ANAEROBIC FILTER TREATMENT OF BLACK LIQUOR

Name and Address of Principal Investigator: Susan M. Manalastas
UST Faculty of Engineering

Description of the Project: The treatment process aims to reduce the BOD content of black liquor and to recover methane gas from this treatment.

Several parameters would be checked: pH, BOD, COD, temp., loading rates, alkalinity and solid contents.

This project is conducted to help the government on its program of maintaining the beneficial use and aesthetic value of the environment and also to come up with energy resource — $CH_4$ recovery from wastewater.

Project Cost and Source of Funding: Approximately, the projects costs ₱ 3,000.00 (set-up & chemicals); Source of funding — LLDA & Canlubang Sugar Estate

Cooperating Agencies: LLDA, Canlubang Sugar Estate and UST, College of Engineering

Date Started: July, 1979

Duration or Expected Date of Completion: 2 years — July, 1981

Present Status of Project: on-going at UST, College of Engineering

Other Relevant Information: The first phase of the project showed that methane gas could be recovered from black liquor.

Project Title: COASTAL ZONE MANAGEMENT UNDER MAN AND THE BIOSPHERE PROGRAM (PUERTO GALERA BIOSPHERE RESERVE ORIENTAL MINDORO).

Name and Address of Principal Investigator: Bureau of Coast and Geodetic Survey — 421 Barraca Street, Binondo Manila.

Description of the Project: The Coastal Zone Management project in Puerto Galera is a multi-disciplinary study and investigation with the primary objectives of protecting and developing the coastal zone, the preservations of ecological balance, and the enhancement of the quality of life. It is also aimed at achieving a balance and maximum utilization of the resources of the coastal zone and the immediate environment.

Project Cost and Source of Funding: Estimate: ₱ 3.2 M for 5- year period/ appropriated in the budget of cooperating agency.

Cooperating Agencies: BFAR, BFD, BS, BPW, PCG, National Museum, PAGASA

Date Started: 1978

Duration or Expected Date of Completion: 5 years (1978—1983)

Present Status of Project: 40%

Project Title: METRO MANILA SEWERAGE AND SANITATION PROJECT

Name and Address of Principal Investigator: Metropolitan Waterworks and Sewerage System (MWSS)
176 Arroceros Street, Manila

Description of the Project: The Project involves the review of all previous work on sewerage and sanitation in the Metropolitan Manila area including other areas within the MWSS service area; the development of a three-year action programme for sanitation; and the preparation of a Master Plan and phased construction for a wastewater system.

Project Cost and Source of Funding: ₱ 1,336.8 M (up to completion of design phase under METROSS II and construction of METROSS I; Source: Government equity, IBRD and ADB loans.

Cooperating Agencies: National Pollution Control Commission — Manila Bay monitoring, U.P. Institute of Public Health — health monitoring program, Metro Manila Engineering District offices — PROGRESS (Program to Remove and Eliminate Sewage from Streets)

Date Started: March 1978

Duration or Expected Date of Completion: Dec. 1985 (METROSS I)

Present Status of Project: The design phase under METROSS II or second stage projects and the prequalification of contractors for METROSS I or first stage projects (new Tondo Pumping Station, Rehabilitation of collection system and lift stations, central outfall, expansion of collection system to Dagupan and Pandacan areas) are currently being undertaken. Construction under METROSS I will start in 1981.

Other Relevant Information:

Major engineering research/studies under Project:

a) Sewerage and sanitation Master Plan for Metro Manila, 1979
b) Design considerations on central initial sewer outfall
c) Sanitation pilot projects (Public Health drainage, Public Sanitary Facilities, and Septic Tank Maintenance)

Project Title: UTILIZATION OF MINE WASTES AND MILL TAILINGS.

Name and Address of Principal Investigator: Bureau of Mines and Geo-Sciences, Pedro Gil St., Manila

Description of the Project: This project will determine the economic utilization of mine wastes and tailings through survey and collection of available samples, screen and chemical analysis of mill tailings. It will study whether or not the individual mining residues still contain recoverable elements of economic value. If not, studies will be made to determine their usefulness for construction and other purposes.

Project Cost and Source of Funding: ₱ 2,000.00 — Bureau of Mines and Geo-Sciences

Cooperating Agencies: National Pollution Control Commission

Date Started: March, 1977

Duration or Expected Date of Completion — 4 years, 1981

Present Status: On-going