CHAPTER 3 IMPLEMENTATION PLAN

Chapter 3. Implementation Plan

3-1 Implementation Plan

3-1-1 Implementation Concept

(1) Construction Method

The Project has been planned to construct water supply facilities to supply safe drinking water steadily for three districts of Mpigi, Mubende and Kiboga of which coverage are far behind average of the country. The contents of the Project are the construction of 435 boreholes and a Level-II System, and the procurement of necessary Equipment and Materials for the construction in cooperation with Japanese Grant Aid assistance.

The construction of boreholes will be implemented by the Japanese Contractor, because the Project is executed by Japan's Grant Aid. There are two borehole construction companies in Uganda. They have drilling rigs and experience, and they are growing as skilled drillers. As employment of those local contractors and transfer of new technologies to the local contractor is the way to cooperate for the privatization of the Ugandan Government policy, the construction is planned to be implemented by applying those local contractors. The construction will be implemented with the main contractor's responsibilities. The selection of borehole sites is also his responsibility. Therefore the contractor shall assign necessary engineers and specialists if the construction needs the skills.

(2) Transfer the Drilling Technologies by the Japanese Contractor

The boreholes shall be constructed with high success drilling rate of 82%, and high quality and durability are guaranteed after construction. Therefore, the bidders for the construction shall have sufficient experiences of drilling in Africa or equivalent area. The facts will be checked before the bidding.

Because the soft formation in the project area is quite deep, the percussion method for drilling which is popular in Uganda is not likely to increase success in the

drilling rate. Therefore, the mud circulating method is introduced for this Project. This method is popular and general drilling method in Japan where there are many areas with soft layers. Therefore there are many special driller in this method in Japan. As those specialists are not available in Uganda, the Japanese contractor shall pay attention to provide sufficient technology transfer and quality control when he uses local drillers.

(3) Drilling Rig

The drilling rigs existing in Uganda including the rigs privately owned are very old and they will be hardly operated even if under good mechanical condition. The available rigs which is operable continuously under good condition are considered only two or three units which are one or two units belonging DWD and one or two units belonging private companies. Therefore, the numbers of available rigs obtained in Uganda 2 units excluding other 1 unit for stand by. These rigs need attachments of mud pumps in order to be possible to adopt mud circulating method. The capacity of those machines is not enough to drill deeper boreholes than the average one, accordingly almost half of the proposed boreholes can not be constructed. Therefore, machines having sufficient capacity shall be introduced from another country.

(4) Others

The construction period shall be four years. The borehole construction will be executed in the order Mpigi, Kiboga and Mubende. In spite of the difficult geological condition, as the drilling shall be executed under high success drilling ratio, the Contractor shall train the local drillers sufficiently.

3-1-2 Implementation Conditions

The construction shall be implemented in consideration of the following conditions:

① The borehole site shall be selected in the center of community or within 500m from the community considering convenience of inhabitants. Therefore, a hydrogeologist who will work for site selection shall have sufficient experiences and capability to judge the result of prospecting and hydrogeological situation.

② The borehole site shall be decided with the agreement of the community(WUC which will be established for the proposed borehole)

③ In order to build stable and sanitary borehole, a hole inspection system shall be set up. The result of inspection will be fed back to site selection and made use of in judging of hydrogeological condition, improvement of success drilling ratio and appropriate design of casing.

④ As the good communication with inhabitants is important for the mobilisation activity, a local consultant who knows the local language and customs will be employed for those assignments.

⑤ The construction schedule shall be established in consideration of weather and public holidays.

3-1-3 Scope of Works

The Project is composed of the construction of boreholes and the procurement of Equipment and Materials. The offerer for the bidding shall be a joint venture of a borehole construction company and a trading company. The construction of water supply facilities, the selection of borehole sites and the procurement of equipment and materials which are necessary for the works will be executed by the borehole construction company. And procurement of the equipment and materials to be supplied will be taken by the trading company.

On the other hand, land acquisition, arrangement of access roads for construction and etc. shall be done by the Ugandan side.

3-1-4 Consultant Supervision

Depending on the Japan' Grant Aid System, JICA will recommend the consultant who had undertaken the Basic Design Study to the Ugandan side, the agreement will be exchanged between the consultant and DWD. According to the

contract, the consultant will execute the detailed design, the preparation of tender documents and the supervision of the project. During construction, the consultant dispatches a resident engineer and special experts when it is necessary for the execution. The contents of main works of consultant are as follows:

(1) Detailed Design

- Detailed designs and tender documents which shall be necessary for the construction and procurement
- Assistance for bidding, bidding procedure, evaluation of tender
- Assistance of contract procedure between successful tenderer and DWD
- Other works which will be necessary in the detailed design

(2) Construction Supervision

- Periodical reporting of construction progress to DWD who is executing agency of Ugandan side
- Arrangement of communication between the contractor and DWD
- Arrangement of communication with target communities
- Recommendation and suggestion on the site selection and the drilling method
- Supervision on the construction and procurement works
- Schedule control on the construction works
- Inspection of the procurement and construction

3-1-5 Procurement Plan

The drilling rigs, supporting vehicles and equipment and materials to be used for the construction shall be procured by the contractor as his own responsibility. The handpumps to be installed at proposed boreholes shall be U2 or U3 type in consideration of maintenance and repair. The construction materials such as cement, steel, aggregate and etc. will be purchased in Uganda.

Road transportation shall be keeping left on the road in Uganda according to the law. And around 80% of vehicles, microbusses, pickup trucks running on the road in Kampala are Japanese made. Therefore, as many Japanese dealers are having

sales shops in Uganda, spareparts are obtainable easily. Although the pickup trucks which will be supplied can be purchased in Uganda, those vehicles are however considered to be procure in Japan because they are ordered and exempted from taxation due to Japan's Grant Aid Project.

The service rig is also to be purchased from Japan because the body of the rig is truck which is very popular in Uganda. The work shop tools also shall be procured in Japan but simmilar to the vehicles and equipment existing in DWD.

Although the water analysis kits can be purchased in European countries, the Japanese made kits are reasonable in order that the quality and cost are not so different from the one in European made, and procurement and transportation are so complex.

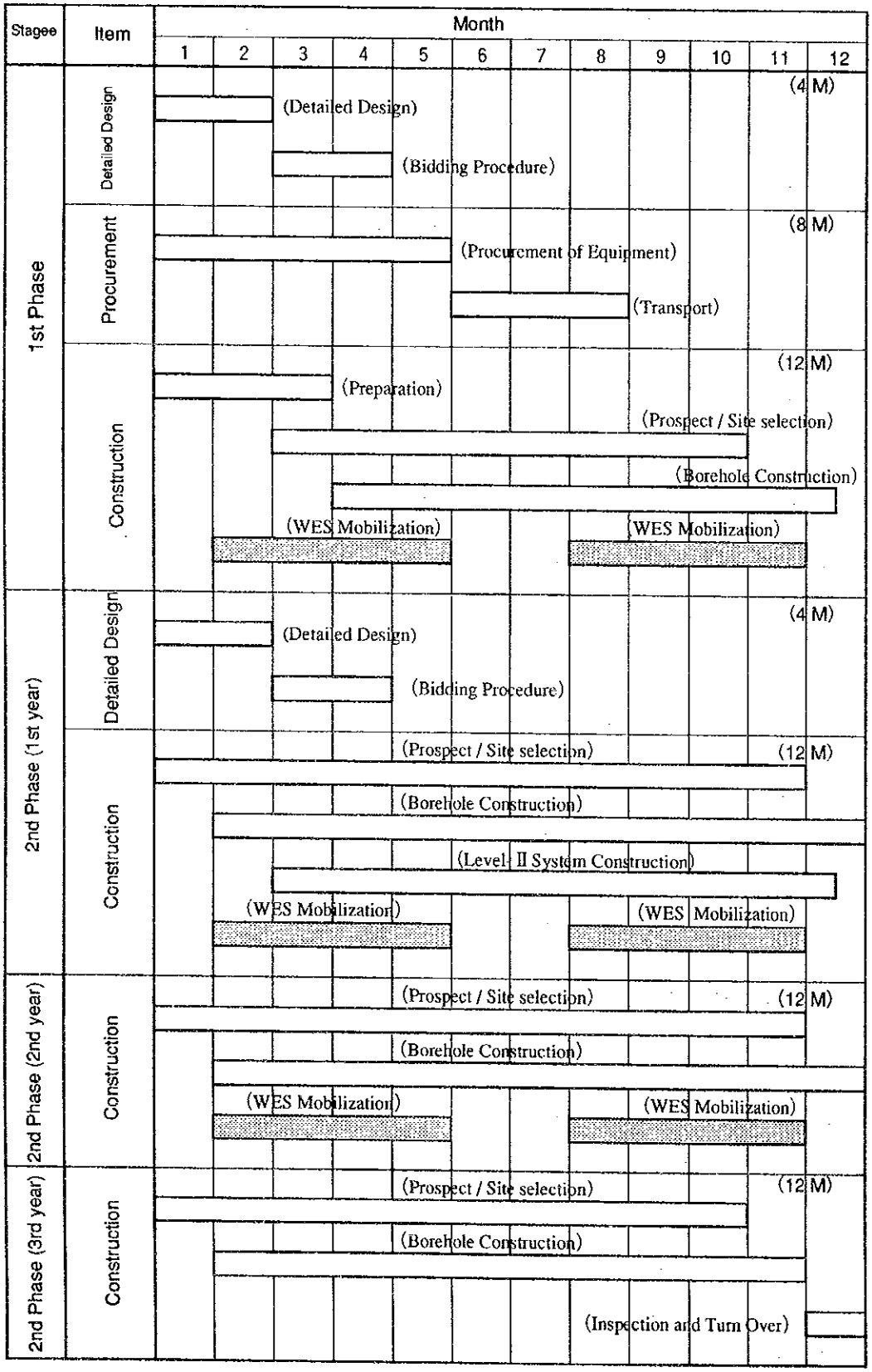
The imported equipment and materials will be unloaded at Mombasa port in Kenya or Dar es Salamin port in Tanzania and transported to DWD in Kampala by land.

3-1-6 Implementation Schedule

The construction period will be in need of four years even if five rigs including Ugandan rigs are used in considering drilling success rate, average depth of borehole, workable day due to public holiday and weather conditions.

The procurement will be executed at the first year. The preparation of construction and purchasing of construction materials takes three month, and the construction works follow after. According to Japanese Government Financial system, it is considered adequate that the Project will be divided into a single year project for first year and a project by national bond for following three years. Tentative implementation schedule is shown in Figure 3-1.

FIG.3-1 IMPLEMENTATION SCHEDULE



3-1-7 Obligation of Recipient Country

The Government of Uganda is required to undertake the following necessary measures when the Project is accepted as Japan's Grant Aid Project:

① to ensure land for borehole sites of target communities prior to commencement of the construction work,
② to ensure the condition of access road and arrangement/repairing access road if necessary,
③ to provide facilities for distribution of electricity, water supply and drainage and other incidental facilities in and around the sites if necessary,
④ to ensure all the expenses and prompt execution for unloading, custom clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid,
⑤ to exempt Japanese Nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts,
⑥ to accord Japanese Nationals whose services may be required in connection with the supply of the products and services under the Verified Contracts, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work,
⑦ to pay the bank commission based on the banking arrangement according to Exchange of Notes between Japan and Uganda (E/N),
⑧ to issue the authorization to pay (A/P) basing on the agreement with the Bank,
⑨ to train the personnel and WUC to operate and maintain after the facilities construction.

3-2 Operation and Maintenance Plan

(1) Operation and Maintenance of Water Facilities

The operation and maintenance will be executed independently by the Water User's Committee(WUC) established prior to the borehole construction. The water user shall establish a WUC according to the law in Uganda. The committee members are composed of a chairperson (woman is often selected), a secretary, a treasurer,

several caretakers (at least two person composed a man and a woman who take care of operation and cleaning of facility, collecting of water fee).

The management of the committee is under the guidance of LC3. The committee fee is collected individually in response to each committee' need. Usually, the fee is of 60,000 Ush as entry fee and periodical fee of 1,000 Ush of payment once every three month or 500 Ush of monthly payment to use for maintenance of handpumps or repairing of boreholes. In any case the amount of the fee in the year is about 6,000 Ush.

A handpump mechanic is employed every sub-county under the guidance of the district. The sub-county made him to take a special training for handpump maintenance method (usually the cause is taken at the technical school in several days), and the sub-county give tools and a bicycle for operation of boreholes in the sub-county. Those expenses will be shouldered by the Project. The handpump mechanic shall maintain every boreholes existing in sub-county once every three months for periodical check and once a year for total maintenance.

DWD sets up 10 Borehole Maintenance Units(BMUs) in whole the country, and the BMU responsible maintenance and repairing of boreholes in the country. A manager and personnel in charge district are assigned in every BMU. The BMU in charge of the Project area is located in Mpigi district.

The Operation and Maintenance is executed as shown in Fig. 3-2.

(2) Mobilization Plan

The following activities are supported by the Project.

a) Sanitation campaign activity for trainers in LC3
b) Sanitation activity for WUC
c) Training activity for HPM

The implementation of mobilization is executed according to the schedule as shown in Fig 3-3.

Fig 3-2 Plan of Operation and Maintenance

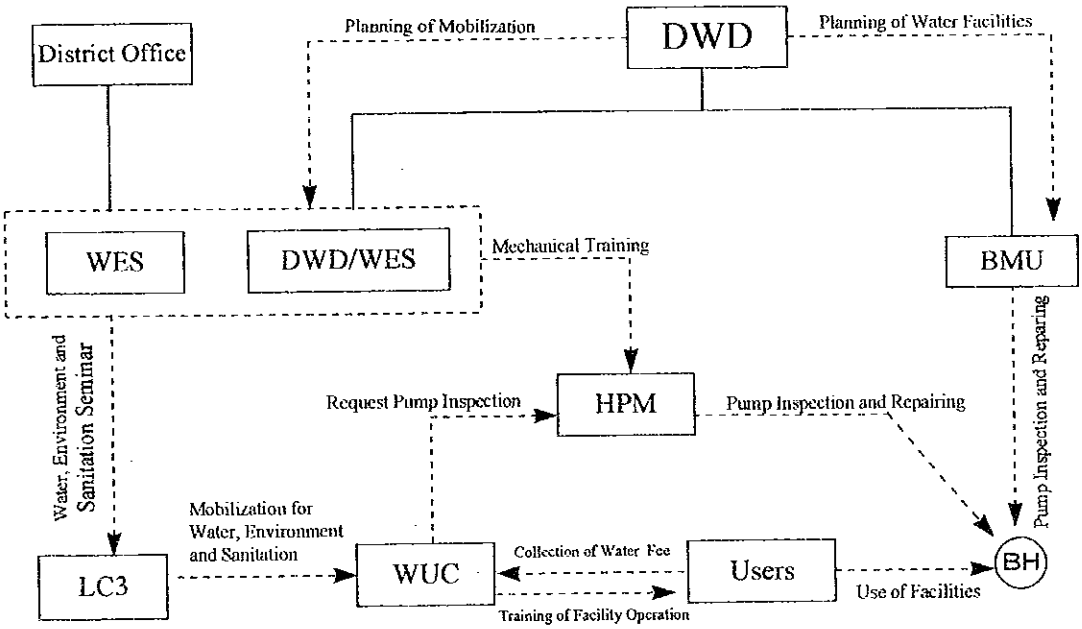
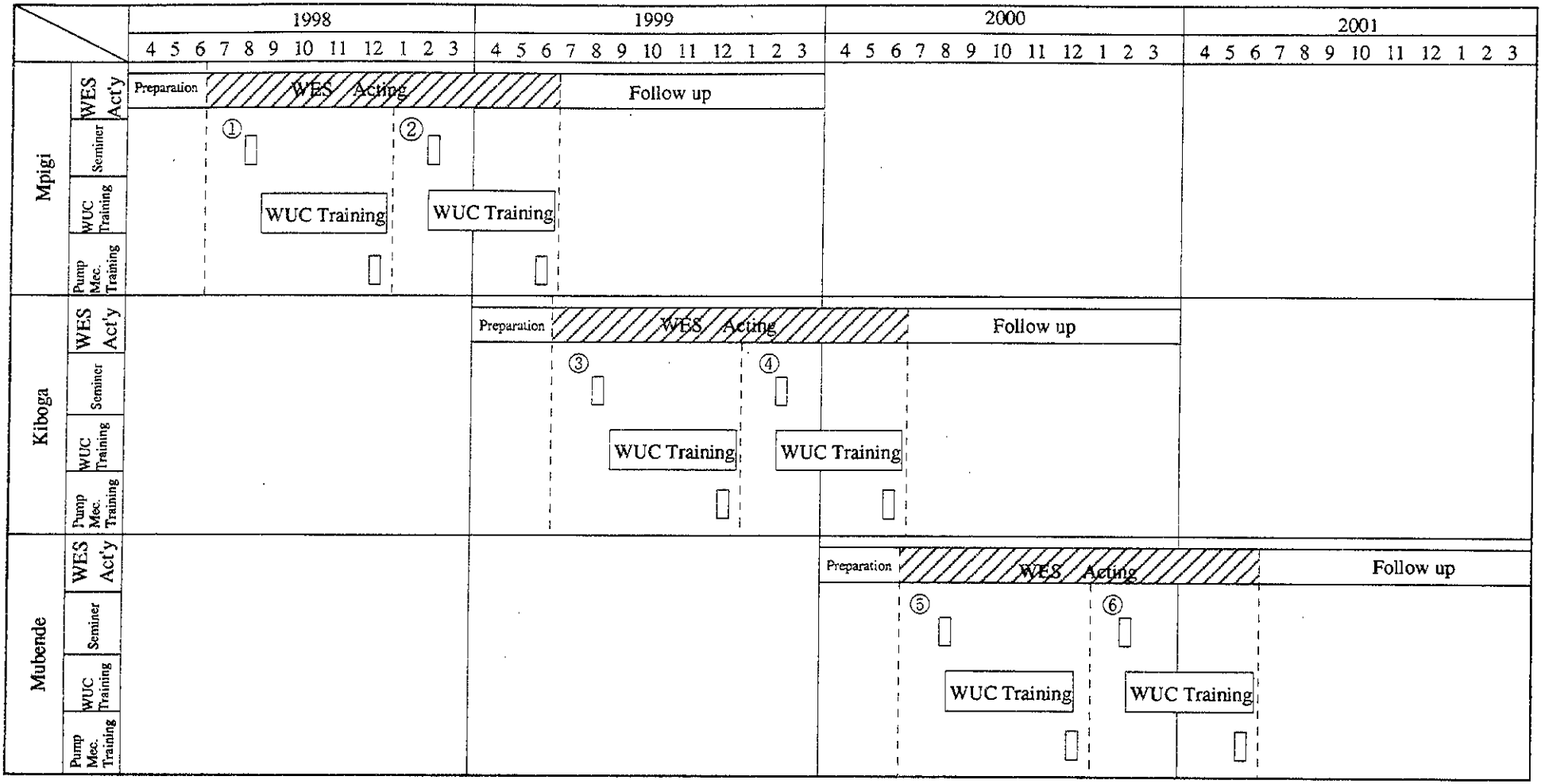


FIG 3-3 SCHEDULE OF MOBILIZATION FOR RURAL WATER SUPPLY PROJECT IN MPIGI,MUBENDE AND KIBOGA DISTRICTS



Grouping for Mobilization

Mpigi
①Maddu(13),Kabulasoke(12),Ngando(8),Kituntu(1),Kiziba(4),Sub-County 5,LC1 38
②Kyanbogo(12),Nangabo(4),Namayunba(11),Wakiso(3),Kikomazi(1),Mpenja(9),Sub-County 6,LC1 40

Kiboga
③Bukomero(11),Muwanga(2),Luwamata(5),Kibiga(11),Kiboga T/C(1),Sub-County 5,LC1 30
④Masodde(7),Ntwetwe(11),Butemba(8),Gayaza(9),Nsambya(8),Sub-County 5,LC1 43

Mubende
⑤Kasambya(2),Kitenga(4),Madudu(2),Bageza(8),Kiyumi(1),Kasanda(7),Bukuya(4),Myanji(10),Sub-County 8,LC1 38
⑥Maanyi(7),Busimbi(7),Bulera(3),Sekanyonyi(6),Kikandwa(2),Butayunja(6),Kakindu(8),Malamgala(4),Sub-County 8,LC1 43

CHAPTER 4 PROJECT EVALUATION AND RECOMMENDATION

Chapter 4 Project Evaluation and Recommendation

4-1 Project Effect

The Project will bring the following benefits.

1) Improvement of Water Supply Coverage

The water supply coverage of the target three districts is quite low as compared with the average in the country of 31%. Particularly boreholes which can supply safe water amount for only 29% of all the water supply facilities. The average coverage of water supply in the target three districts will be improved from 16% in 1994 to 24%.

2) Realization of Safe Water

Water supply facilities are not available at 231 communities in the three districts. Inhabitants of those villages secure drinking water from streams and swamps. The Project will realize for the beneficiaries of 143,000 to secure steadily the safe water of 20 liter per capita per day within a distance of 1.5 kilometers through a year.

3) Reduction of Water Caused Disease

Villager collect water from streams, swamps and rainfall. Lack access of safe water, circumstances of low life level and poor sanitary knowledge and facilities causes into high morbidity and mortality, particularly 50% of morbidity and 12.2% of mortality for infants, of water and fecal related diseases such as malaria, diarrhea, intestinal worms, nutritional deficiency and so forth. After the Project, the beneficiaries can secure safe water steadily and these diseases are reduced.

4) Relief of Women and Children from Heavy Workload

Villager have to collect water far from swamps. Collecting water is usually the works of women and children particularly small children. To carry heavy water from the bottom of valley is hard workload for those children. After the Project, constructed boreholes are located within a distance of 1.5 kilometers from the center of communities, so time of collecting water is reduced and it relieve women and children from heavy workload.

5) Promotion of Sanitary Education

Relief of women and children from heavy workload creates opportunity for sanitary education. On the other hand, villager absorb more knowledge for hygiene and environmental sanitation through the campaign by WES personnel.

6) Long Term Effect

Relief of women and children from heavy workload creates opportunity for education production activity. Thus life level of villager will be improved and growth of national economy will be accelerated.

5-2 Recommendation

1) Construction of boreholes will be executed in cooperation with local contractors using their manpower and equipment. Local contractors are participating the other project such as WES and RUWASA programs. As those programs are executed in parallel with the proposed Project, the main contractor shall consider the way to obtain drilling equipment and technicians.

2) In case the execution of boreholes in cooperation with local contractors using their manpower and equipment, the main contractor shall prepare their own organization for construction supervision.

3) After completion the Project, the beneficiaries shall operate, maintain and manage allocated facilities themselves. Therefore, the target communities shall organize the Water User's Committee (WUC) before the construction of boreholes. WES personnel will assist users to establish WUCs.

4) Local consultants are employed for the mobilization of the education activity on water and environmental sanitation(WES). The supervision of the mobilization shall be undertaken in cooperation with WES personnel of DWD. The mobilization shall be executed making use of materials prepared by WES section of DWD. Therefore, implementation plan for WES activity shall be discussed well with WES personnel.

APPENDICES

APPENDICES

1 Member List of the Survey Team

1-1 Member for the Basic Design Study Mission

Leader	Toshio OKAZAKI Procurement Department, JICA
Project Coordinator	Akihito SANJO First Project Study Division, Grant Aid Project Study Department, JICA
Project Manager	Yasuo TERAMURA Sanyu Consultants Inc.
Hydrogeologist I	Komei OZAKI Sanyu Consultants Inc.
Hydrogeologist II	Haruhiko NAKAMURA Sanyu Consultants Inc.
Geological Prospector I	Tsugio ISHIKAWA Sanyu Consultants Inc.
Geological Prospector II	Masaki KINEMUCHI Sanyu Consultants Inc.
Cost Estimate /Procurement Plan	Etsuji TANAKA Sanyu Consultants Inc.

1-2 Member for the Draft Report Explanation Mission

Leader	Toshio OKAZAKI Procurement Department, JICA
Project Coordinator	Katsuichiro SAKAI First Training Division, Tokyo International Center, JICA

Project Manager	Yasuo TERAMURA Sanyu Consultants Inc.
Cost Estimate /Procurement Plan	Etsuji TANAKA Sanyu Consultants Inc.

2 Survey Schedule

2.1 Schedule for the Basic Study Survey

Apr. 1 (Tue)	Courtesy call at Ministry of Finance and Ministry of Natural Resources
Apr. 2 (Wed)	Courtesy call at Embassy of Japan, Ministry of Planning, explanation of Inception Report to DWD and call at Local contractors
Apr. 3 (Thu)	Site inspection of existing facilities in Kiboga District
Apr. 4 (Fri)	Site inspection at Jinia Workshop
Apr. 5 (Sat)	Site inspection of Pilot Project and Seminar for sanitation in Mpigi District.
Apr. 6 (Sun)	Internal meeting of Mission and Preparation of survey report
Apr. 7 (Mon)	Courtesy call at Embassy of Denmark and UNICEF, meeting with DWD for Minutes of Discussion
Apr. 8 (Tue)	Exchange of signature on Minutes of Discussion
Apr. 9 (Wed)	Courtesy call at World Bank, the official mission left Uganda
Apr. 10 (Thu)	Preparation of site survey
Apr. 11 (Fri)	Preparation of site survey, Mr.Tanaka(Cost estimator) arrive at Kampala
Apr. 12 (Sat)	Demonstration survey of electric exploration at Mpigi pilot borehole
Apr. 13 (Sun)	Internal meeting of Mission
Apr. 14 (Mon)	Electric exploration in Mpigi, survey of local driller
Apr. 15 (Tue)	Electric exploration in Mpigi, survey of local driller
Apr. 16 (Wed)	Electric exploration and geological investigation in Mpigi, survey of workshop at Jinja
Apr. 17 (Thu)	Electric exploration and geological investigation in Mpigi
Apr. 18 (Fri)	Electric exploration and geological investigation in Mpigi, site investigation
Apr. 19 (Sat)	Electric exploration and geological investigation in Mpigi, site investigation
Apr. 20 (Sun)	Internal meeting of Mission and arrangement of data

Apr. 21 (Mon)	Electric exploration and geological investigation in Mpigi, discussion with DWD
Apr. 22 (Tue)	Electric exploration and geological investigation in Mpigi, data collection
Apr. 23 (Wed)	Electric exploration and geological investigation in Mpigi, field survey in Kiboga
Apr. 24 (Thu)	Electric exploration in Mpigi and geological investigation in Mubende
Apr. 25 (Fri)	Electric exploration in Mpigi and geological investigation in Mubende, survey for materials and equipment
Apr. 26 (Sat)	Electric exploration in Mpigi and geological investigation in Mubende, survey for materials and equipment
Apr. 27 (Sun)	Internal meeting of Mission and arrangement of data
Apr. 28 (Mon)	Electric exploration and geological investigation in Mubende, survey for materials and equipment
Apr. 29 (Tue)	Electric exploration and geological investigation in Mubende, survey for materials and equipment
Apr. 30 (Wed)	Electric exploration and geological investigation in Mubende, Mr. Nakamura (Hydrogeologist II) arrive at Kampala
May 1 (Thu)	Electric exploration and geological investigation in Mubende
May 2 (Fri)	Electric exploration and geological investigation in Mubende
May 3 (Sat)	Electric exploration and geological investigation in Mubende
May 4 (Sun)	Internal meeting of Mission and arrangement of data
May 5 (Mon)	Electric exploration and geological investigation in Mubende, field survey
May 6 (Tue)	Electric exploration and geological investigation in Mubende, data collection
May 7 (Wed)	Electric exploration and geological investigation in Mubende, Mr. Ozaki left temporary for Japan due to his father's death
May 8 (Thu)	Visit Mbarara workshop for inspection
May 9 (Fri)	Internal meeting of Mission and arrangement of data
May 10 (Sat)	Electric exploration and geological investigation in Kiboga
May 11 (Sun)	Electric exploration and geological investigation in Kiboga
May 12 (Mon)	Field survey for Level-II system in Kiboga
May 13 (Tue)	Electric exploration and geological investigation in Kiboga, data collection at Mubende
May 14 (Wed)	Electric exploration and geological investigation in Kiboga, field survey for construction
May 15 (Thu)	Electric exploration and geological investigation in Kiboga, field survey for construction
May 16 (Fri)	Arrangement of data

May 17 (Sat)	Electric exploration and geological investigation in Kiboga, Mr. Ozaki arrive from Japan
May 18 (Sun)	Electric exploration and geological investigation in Kiboga, internal meeting
May 19 (Mon)	Field survey for Level-II system in Kiboga
May 20 (Tue)	Electric exploration and geological investigation in Kiboga, survey of Level-II system in Kiboga
May 21 (Wed)	Electric exploration and geological investigation in Kiboga, survey of Level-II system in Kiboga
May 22 (Thu)	Report to DWD
May 23 (Fri)	Report to Embassy of Japan
May 24 (Sat)	Arrangement of data
May 25 (Sun)	Preparation of trip for Japan
May 26 (Mon)	Report to Embassy of Japan and JICA office in Nairobi

2.2 Schedule for the Draft Report Explanation

Aug. 19 (Tue)	Arrive at Nairobi, Courtesy call at Embassy of Japan in Nairobi and meeting with JICA Nairobi office
Aug. 20 (Wed)	Arrive at Entebbe, Courtesy call at Ministry of Planning
Aug. 21 (Thu)	Explanation of Draft Report to DWD
Aug. 22 (Fri)	Meeting with DWD
Aug. 23 (Sat)	Site inspection of Kiboga Level-II system and Kiboga hosipital
Aug. 24 (Sun)	Internal meeting of Mission and preparation of report
Aug. 25 (Mon)	Meeting for Minutes of Discussion with DWD
Aug. 26 (Tue)	Exchange of signature for Minutes of Discussion
Aug. 27 (Wed)	Left Uganda for Nairobi
Aug. 28 (Thu)	Report to Embassy of Japan in Nairobi and JICA Nairobi office and left Nairobi for Japan

3 List of Party Concerned in the Recipient Country

Embassy of Japan in Uganda

Mr. Yonezou Ootake	Councilor

Ministry of Foreign Affairs

Mr. Arthur Gakwandi	Director Asia, Pacific & South America
Mr. Alfred M. Nabeta	Foreign Service Officer
Mr. Ndoboli	Officer

Ministry of Finance and Economic Planning

Ambassador Daudi M. Taliwako	Commissioner, External Aid Coordination
Mr. Yuichi Sasaoka	JICA Expert, Advisor for Japan's Aid
Mr. Katwe	Coordinator
Mr. Magona	Secretary of Development Committee
Mr. Mark Williams	Senior Economist

Ministry of Natural Resources

Mr. Ben Z. Dramadri	Permanent Secretary
Mr. F.A.Kabagambe-Kaliisa	Permanent Secretary

Directorate of Water Development(DWD)

Mr. Patric Kahangire	Director DWD
Mr. S.M.Bomukama	Commissioner of Urban and Institutional Water Development
Mr. Moses K.Gava	Ag. Commissioner of Rural Water Development
Mr. Disan Ssozi	Senior Engineer
Mr. Pantaleo Kabateraine	Hydrologist
Mr. Richard Cong	WES Coordinator
Mr. Sven Jacobi	Chief Advisor to Director DWD
Mr. Omoit Stevenson	Assistant WES Coordinator
Mr. Enoch M. Dribidu	Principal Hydrologist
Mr. Mufisha Shilling	Principal Engineer
Mr. Roger Lubunga	Sr. Engineer
Mr. Patrick Kagoro	Ag. Commisioner(ISSD)
Mr. Henry Twijukye	Hydrogeologist
Mr. Okao	Hydrogeologist
Mr. Ian Arebahona	Coordinator, WES Programme
Mr. S. T. Katuraniu	Senior Driller
Mr. S.Y. R. Busimo	Ag. Borehole Maintenance Superintendent
Mr. Friacious Ssembali	National Coordinator, Gravity Flow Schemes
Mr. Rudolf Glotzbach	Technical Advisor, Gravity Flow Schemes

Ministry of Health

Mr. Charles Tumwebaze	WES programme

UNICEF

Mr. Lloyd Donaldson	Senior Project Officer, WES

Royal Danish Embassy

Mr. Hans Lillelund	Counsellor, Development

DANIDA

Mr. Mogens Mechta	Sector Advisor

Kiboga T/C

Mr. Gashenyi Jhon	Town Cleark
Mr. Kabuye Mariin	Town Council Health Officer

Kiboga Hospital

Ms. Kiyuba Munulo	Senior Nursing Officer

4 Minute of Discussion

4.1 Minute of Discussion for Basic Design Study — See Attachment-1

4.2 Minute of Discussion for Draft Report Explanation — See Attachment-2

5. Cost Estimation Borrne by the Recipient Country — See Attachment-3

5.1 Annual Budget for Project Office

5.2 Import Taxes

5.3 List of Construction Equipment

5.4 List of Temporary Work Tools and Materials

6. Reference Data

1) F/S Report The Study on Rural Water Supply in Mpigi, Mubende and Kiboga Districts Executive Summary September 1996
2) -do- Main Report
3) -do- Supporting Report
4) -do- Appendix
5) Master Plan of Operation Country Programme 1995-2000, GOU & UNICEF
6) Demographic and Health Survey 1995, Ministry of Finance and Economic Planning(MFEP)
7) Equity and Vulnerability: A Situation Analysis of Women, Adolescents and Children in Uganda, 1994 Uganda National Council for Children
8) RUWASA II Inception Workshop Report Norconsult, October 1996
9) RUWASA Semi Annual Progress Report July - December 1994
10) Programme Plans of Action 1997, GOU & UNICEF Country Programme
11) WES Programme Plan of Action 1997, GOU & UNICEF Country Programme
12) Civil Service Reform Programme Restructuring Report, Ministry of Natural Resources May 1995 (Copy)
13) UGANDA 1993, Yearly Review
14) Decentralization in Uganda, The Policy and Its Implication 2

15) Key Economic Indicators January 1996, MFEP
16) Statistical Abstract 1996, MFEP
17) Background to the Budget 1996 - 1997, MFEP
18) Social Studies Atlas for Uganda
19) Guidlines for Training of User Committees Using Participatory Tools, A Handbook for Mobilisers. 1994
20) The Water Statue, 1995 (Copy)
21) Providing for Rural Poor, E. A. Brett
22) Public Investment Plan 1995/96 - 1997/98 (Copy)
23) Stories from Uganda History
24) Draft Phase I Project Completion Report, Rural Water & Sanitation East Uganda Project
25) Organization and Management Study of Water Development Department, Working Document
26) Role of DWD After Restructuring and Decentralization Programmes of Government
27) Kiboga Town Structure Plan, Year 2010. First Draft
28) Topographic Map of Uganda 1 : 900,000
29) Topographic Map of the Project Area, 1 : 250,000
30) Topographic Map of the Project Area, 1 : 50,000
31) Geological Map of the Project Area, 1 : 250,000
32) Geological Map of the Project Area, 1 : 100,000

ATTACHMENT - 1 MINUTES OF DISCUSSION FOR BASIC DESIGN STUDY

MINUTES OF DISCUSSIONS

THE RURAL WATER SUPPLY PROJECT IN MPIGI, MUBENDE AND KIBOGA DISTRICTS IN THE REPUBLIC OF UGANDA

In response to the request from the Government of the Republic of Uganda, the Government of Japan decided to conduct a Basic Design Study on the Rural Water Supply Project in Mpigi, Mubende and Kiboga in the Republic of Uganda (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to the Republic of Uganda a study team (hereinafter referred to as "the Team"), which was headed by Mr. Toshio OKAZAKI, Procurement Department, JICA, and was scheduled to stay in the country from 1 April to 26 May, 1997.

The Team held discussions with the officials concerned of the Republic of Uganda and conducted a field survey at the study area.

In the course of the discussions and field survey, both sides confirmed the main items described in the attached sheets. The Team will proceed to further work and prepare a Basic Design Study report.

Kampala, 8 April, 1997

岡崎俊夫

Mr. Toshio Okazaki
Leader
Basic Design Study Team
JICA

Mr. Ben Z. Dramadri
Permanent Secretary
Ministry of Natural Resources
The Republic of Uganda

ATTACHMENT

1. Objective

The objective of the Project is to supply safe drinking water for peoples living in the Districts of Mpigi, Mubende and Kiboga by construction of boreholes and supply of necessary equipment.

2. Project site

The project sites are located in the Districts of Mpigi, Mubende and Kiboga as shown in Annex I.

3. Executing Organization

The Ministry of Natural Resources is responsible for the administration of the project.

Directorate of Water Development, Ministry of Natural Resources (hereinafter referred to as DWD) is responsible for the implementation of the Project.

4. Items requested by the Government of the Republic of Uganda

After discussions with the Team the items finally requested by the Ugandan side are as follows:

1. Facility Construction
   a) Construction of 446 boreholes of 204 villages in the above three districts
   b) Level II system for Kiboga town 1 unit

2. Equipment Supply
   a) Drilling rigs with supporting equipment 2 units
   b) Supporting vehicles 4 units
   c) Water analysis kit 4 lots
   d) Workshop equipment 1 set
   e) Servicing Rig 1 unit

As to the supply of equipment, the background of the request and other information and data such as availability and cap ability of the local drilling contractors, conditions of DWD's equipment, etc. will be studied and confirmed for further

consideration and discussion. And the final components of the Project will be specifically decided after the completion of the Study.

5. Japan's Grant Aid System

(1) The Ugandan side has understood Japan's Grant Aid system in ANNEX II as explained by the Team.
(2) The Ugandan side will take necessary measures described in paragraph 6) of close 3 ANNEX II for the smooth implementation of the Project, in the event the Grant Aid Assistance by the Japanese Government is extended to the Project.

6. Schedule of the Study

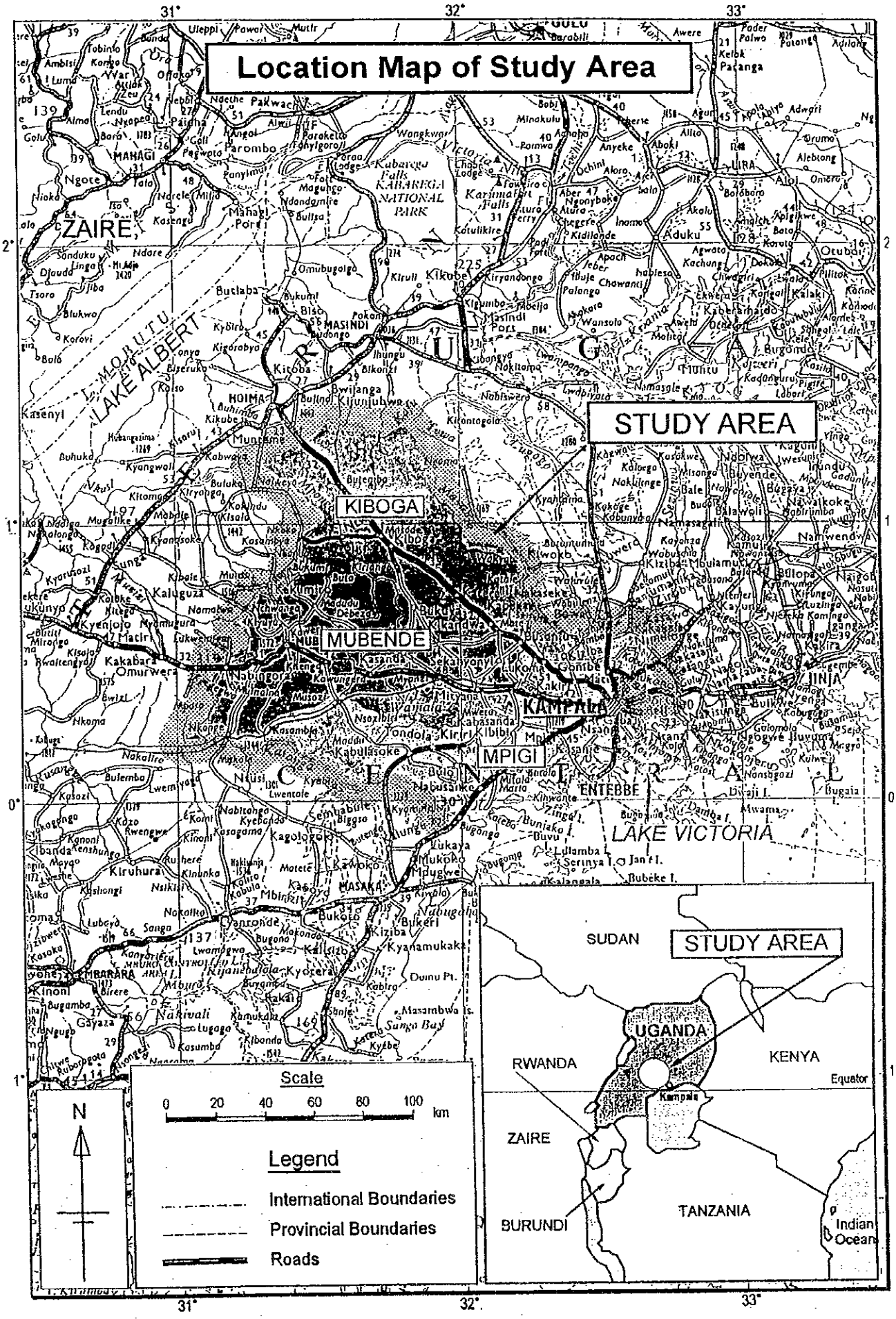
(1) The consultants of the Team will proceed to carry out further studies in the Republic of Uganda until 26 May, 1997.
(2) JICA will prepare the draft final report and dispatch a mission in order to explain its contents at the end of August, 1997.
(3) In the event that the contents of the report are accepted in principle by the Ugandan sides, JICA will complete a final report and send it to the Republic of Uganda by November, 1997.

7. Summary of Discussions

1) The Japanese side explained hereunder:
   (1) The construction target of facilities will be 446 boreholes from the view point of the safe drinking water supply.
   (2) Level II system in Kiboga town shall be studied to be included in the Project.
   (3) Equipment supply will be decided by the Japanese Government basing on the conclusion of studies for its justification.

   And the Ugandan side agreed the above items.
2) The Japanese side explained the system of Japan's Grant Aid Program and the Ugandan side agreed.
3) The Ugandan side agreed that the necessary measures shall be taken in order to execute the Project.
4) The Japanese side explained the implementation schedule for the Project and the Ugandan side agreed.
5) The Ugandan side agreed to set up the Water User's Committee for sustainability of the Project in all villages where water will be supplied.

ANNEX I


Location Map of Study Area
STUDY AREA
KIBOGA
MUBENDE
MPIGI
KAMPALA
ENTEBBE
JINJA
MASAKA
HOIMA
MASINDI
ZAIRE
LAKE ALBERT
LAKE VICTORIA
Kabaregga Falls KABAREGA NATIONAL PARK
Karuma Falls
Victoria Nile
31°
32°
33°
2°
1°
0°
Scale
0 20 40 60 80 100 km
N
Legend
International Boundaries
Provincial Boundaries
Roads
SUDAN
STUDY AREA
UGANDA
RWANDA
KENYA
Equator
Kampala
ZAIRE
TANZANIA
BURUNDI
Indian Ocean

ANNEX II

JAPAN'S GRANT AID PROGRAM

1. Japan's Grant Aid Procedures

(1) The Japan's Grant Aid Program is executed by the following procedures.

- Application
  (request made by a recipient country)
- Study
  (Preliminary Study/Basic Design Study conducted by JICA)
- Appraisal & Approval
  (Appraisal by the Government of Japan and Approval by the Cabinet of Japan)
- Determination of Implementation
  (Exchange of Notes between the both Governments)
- Implementation
  (Implementation of the Project)

(2) Firstly, an application or a request for a project made by the recipient county is examined by the Government of Japan (the Ministry of Foreign Affairs) to see whether or not it is suitable for Japan's Grand Aid. If the request is deemed suitable, the Government of Japan entrusts a study on the request to JICA (Japan International Cooperation Agency)

Secondly, JICA conducts the Study (Basic Design Study), using a Japanese consulting firm. If the background and objective of the requested project are not clear, a Preliminary Study is conducted prior to a Basic Design Study.

Thirdly, the Government of Japan appraises to see whether or not the Project is suitable for Japan's Grant Aid Program, based on the Basic Design Study report prepared by JICA and the Results are then submitted for approval by the Cabinet.

Fourthly, the Project approved by the Cabinet becomes official when pledged by the Exchange of Notes signed by the both Governments.

Finally, for the implementation of the Project, JICA assists the recipient country in preparing contracts and so on.

2. Basic Design Study

1) Contents of the Study

The purpose of the Study (Preliminary Study/Basic Design Study) conducted on a project requested by JICA is to provide a basic document necessary for appraisal of the project by the Japanese Government. The contents of the Study are as follows:

a) to confirm background, objectives, benefits of the project and also institutional capacity of agencies concerned of the recipient country necessary for project implementation,
b) to evaluate appropriateness of the Project for the Grant Aid Scheme from a technical, social and economical point of view,
c) to confirm items agreed on by the both parties concerning a basic concept of the project,
d) to prepare a basic design of the project,
e) to estimate cost involved in the project.

Final project components are subject to approval by the Government of Japan and therefore may differ from an original request.

Implementing the project, the Government of Japan requests the recipient country to take necessary measures involved which are itemized on Exchange of Notes.

2) Selecting (a) Consulting Firm(s)

For smooth implementation of the study, JICA uses (a) consulting firm(s) registered. JICA selects (a) firm(s) through proposals submitted by firms which are interested in. The firm(s) selected carry(ies) out a Basic Design Study and prepares(prepare) a report, based upon terms of reference made by JICA.

The consulting firm(s) used for the study is(are) recommended by JICA to a recipient country after Exchange of Notes, in order to maintain technical consistency and also to avoid possible undue delay in implementation caused if a new selection process is repeated.

3) Status of a preliminary Study in the Grant Aid Program

A preliminary Study is conducted during the second step of a project formulation & preparation as mentioned above.

A result of the study will be utilized in Japan to decide if the Project is to be suitable for a Basic Design Study.

Based on the result of the Basic Design Study, the Government would proceed to the stage of decision making process (appraisal and approval).

It is important to notice that at the stage of Preliminary Study, no commitment is made by the Japanese side concerning the realization of the Project in the scheme of Grant Aid Program.

3. Japan's Grant Aid scheme

1) What is Grant Aid ?

The Grant Aid Program provides a recipient country with non reimbursable funds needed to procure facilities, equipment and services for economic and social development of the country under the following principles in accordance with relevant laws and regulations of Japan. The Grant Aid is not in a form of donation or such.

2) Exchange of Notes (E/N)

The Japan's Grant Aid is extended in accordance with the Exchange of Notes by both Government, in which the objectives of the Project, period of execution, conditions and amount of the Grant etc. are confirmed.

3) "The period of the Grant Aid" means one Japanese fiscal year which the Cabinet approves the Project for. Within the fiscal year, all procedure such as Exchange of Notes, concluding a contract with (a) consulting firm(s) and (a) contractor(s) and a final payment to them must be completed.

4) Under the Grant, in principle, products and services of origins of Japan or the recipient country are to be purchased.

When the two Governments deem it necessary, the Grant may be used for the purchase of products or services of a third country origin.

However the prime contractors, namely, consulting, contractor and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means Japanese physical persons or Japanese juridical persons controlled by Japanese physical persons.)

5) Necessity of the "Verification"

The Government of the recipient country or its designated authority will conclude into contracts in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. The "Verification" is deemed necessary to secure accountability to Japanese tax payers.

6) Undertakings required to the Government of the recipient country

In the implementation of the Grant Aid, the recipient country is required to undertake necessary measures such as the following:

① to secure land necessary for the sites of the project and to clear and level the land prior to commencement of the construction work,
② to provide facilities for distribution of electricity, water supply and drainage and other incidental facilities in and around the sites,
③ to secure buildings prior to the installation work in case the Project is providing equipment,
④ to ensure all the expenses and prompt execution for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid.
⑤ to exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts,
⑥ to accord Japanese nationals whose services may be required in connection with the supply of the products and services under the Verified Contracts, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.

7) Proper Use

The recipient country is required to maintain and use facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for their operation and maintenance as well as to bear all expenses other than those to be borne by the Grant Aid.

8) Re-export

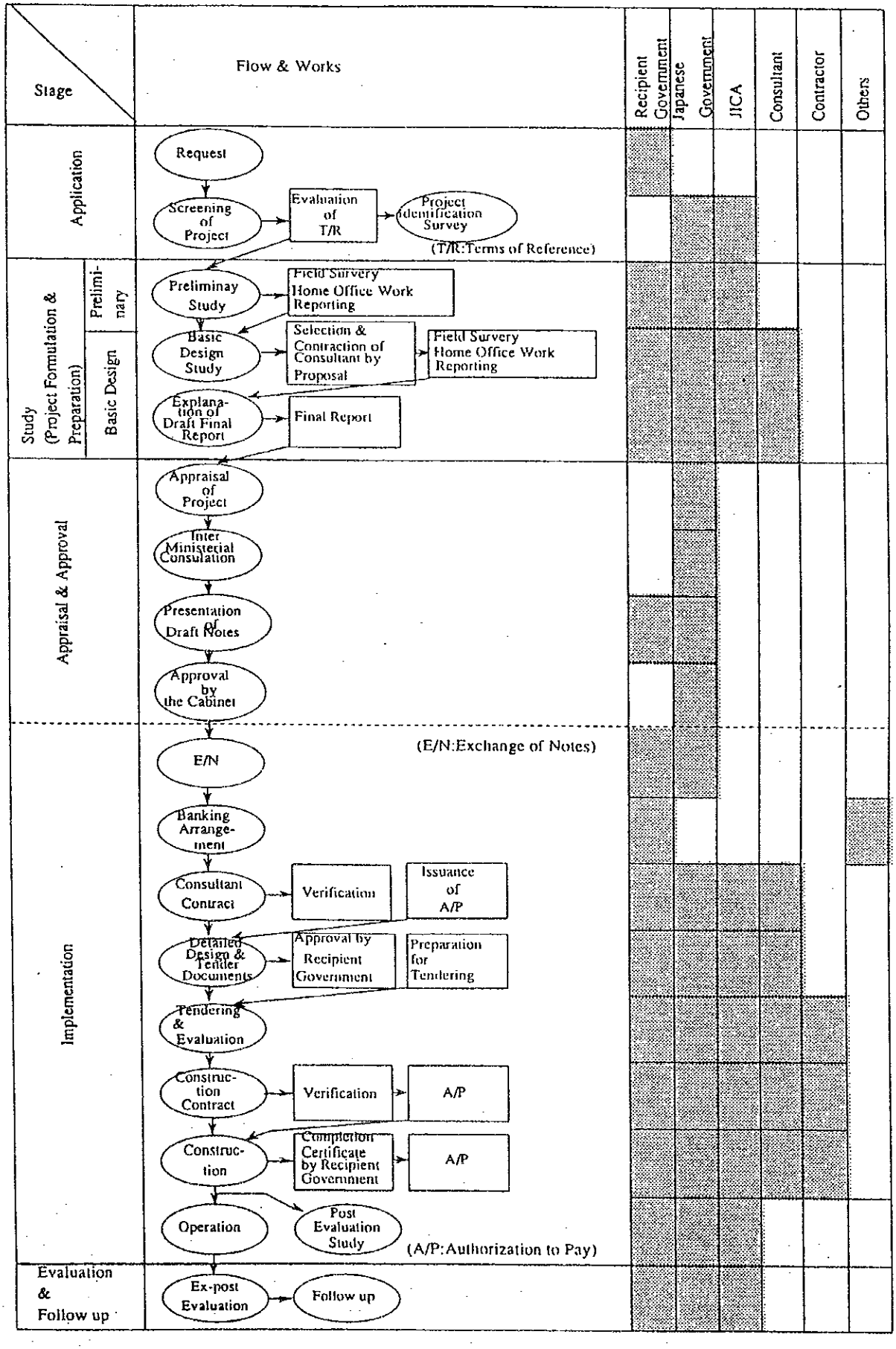
The products purchased under the Grant Aid shall not be re-exported from the recipient country.

9) Banking Arrangement (B/A)

(a) The Government of the recipient country or its designated authority shall open an account in the name of the Government of the recipient country in an authorized foreign exchange bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by Government of the recipient country or its designated authority under the contracts verified.

(b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an Authorization to Pay issued by the Government of the recipient country or its designated authority.

ANNEX III Flow Chart of Japan's Grant Aid Procedures



ANNEX IV Major Undertaking to be taken by Each Goverment

No.	Items	To be covered by Grant Aid	To be covered by Recipient Side
1	To secure land		●
2	To clear, level and reclaim the site when needed		●
3	To construct gates and fences in and around the site		●
4	To construct the parking lot	●	
5	To construct roads		
	1) Within the site	●	
	2) Outside the site		●
6	To construct the buildings	●	
7	To provide facilities for the distribution of electricity, water supply, drainage and other incidental facilities		
	1) Electricity		
	a. The distributing line to the site		●
	b. The drop wiring and internal wiring within the site	●	
	c. The main circuit breaker and transformer	●	
	2) Water Supply		
	a. The city water distribution main to the site		●
	b. The supply system within the site (receiving and elevated tanks)	●	
	3) Drainage		
	a. The city drainage main (for storm, sewer and others) to the site		●
	b. The drainage system (for toilet sewer, ordinary waste, storm drainage and others) within the site	●	
	4) Gas Supply		
	a. The city gas main to the site		●
	b. The gas supply system within the site	●	
	5) Telephone System		
	a. The telephone trunk line to the main distribution frame/panel (MDF) of the building		●
	b. The MDF and the extension after the frame/panel	●	
	6) Furniture and Equipment		
	a. General furniture		●
	b. Project equipment	●	
8	To bear the following commissions to the Japanese foreign exchange bank for the banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●
9	To ensure unloading and customs clearance at port of disembarkation in recipient country		
	1) Marine (Air) transportation of the products from Japan to the recipient country	●	
	2) Tax exemption and custom clearance of the products at the port of disembarkation		●
	3) Internal transportation from the port of disembarkation to the project site		●
10	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contact such facilities as may be neccessary for their entry into the recipient country and stay therein for the performance of their work.		●
11	To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contracts.		●
12	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant.		●
13	To bear all the expenses, other than those to be borne by the Grant, necessary for construction of the facilities as well al for the transportation and installation of the equipment.		●

MINUTES OF DISCUSSIONS

BASIC DESIGN STUDY ON THE RURAL WATER SUPPLY PROJECT IN MPIGI, MUBENDE AND KIBOGA DISTRICTS IN THE REPUBLIC OF UGANDA (CONSULTATION ON DRAFT REPORT)

In April 1997, the Japan International Cooperation Agency (JICA) dispatched a Basic Design Study team on the Rural Water Supply Project in Mpigi, Mubende and Kiboga in the Republic of Uganda (hereinafter referred to as "the Project") to the Republic of Uganda, and through discussion, field survey, and technical examination of the results in Japan, has prepared the draft report of the study.

In order to explain and to consult the Ugandan side on the components of the draft report. JICA sent to the Republic of Uganda a study team (hereinafter referred to as "the Team"), which was headed by Mr. Toshio OKAZAKI, Procurement Department, JICA, and was scheduled to stay in the country from 20th to 27th August, 1997.

As a result of discussions, both parties confirmed the main items described on the attached sheets.

Kampala, 26 August, 1997

Mr. Toshio Okazaki
Leader
Basic Design Study Explanation Team
JICA

Mr. F.A. Kabagambe-Kaliisa
Permanent Secretary
Ministry of Natural Resources
The Republic of Uganda

ATTACHMENT

1. Components of the Draft Report

The Government of the Republic of Uganda (referred to as "The Ugandan side" elsewhere in this document), represented by Mr. F.A. Kabagambe-Kaliisa has agreed and accepted in principle the components of the draft report proposed by the Team.

2. Japan's Grant Aid System

(1) The Government of the Republic of Uganda has understood the system of Japanese Grant Aid explained by the Team, described in ANNEX I

(2) The Government of the Republic of Uganda will take the necessary measures, described in ANNEX II, for smooth implementation of the Project on condition that the Grant Aid assistance by the Government of Japan is extended to the Project.

3. Further Schedule

The Team will make the field report in accordance with the confirmed items, and submit it to the Government of the Republic of Uganda by the end of November, 1997.

4. Other Relevant Issues

The following have been confirmed;

(1) The Ugandan side will allocate the necessary budget, staff and system to construct the boreholes in Mpigi, Mubende and Kiboga districts and a Level-II water supply system in Kiboga T/C.

(2) The Ugandan side will undertake the works such as arrangement of access roads, ensuring land acquisition for borehole construction and necessary measures.

ANNEX I JAPAN'S GRANT AID PROGRAM

1. Japan's Grant Aid Procedures

(1) The Japan's Grant Aid Program is executed by the following procedures.

- **Application**
  (Request made by a recipient country)
- **Study**
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  (Appraisal made by the Government of Japan and Approval made by the Cabinet of Japan)
- **Determination of Implementation**
  (Exchange of Notes between the both Governments)
- **Implementation**
  (Implementation of the Project)

(2) Firstly, an application or a request for a project made by the recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to see whether or not it is suitable for Japan's Grant Aid. If the request is deemed suitable, the Government of Japan entrusts a study on the request to JICA (Japan International Cooperation Agency).

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Thirdly, the Government of Japan appraises to see whether or not the Project is suitable for Japan's Grant Aid Program, based on the Basic Design Study report prepared by JICA and the results are then submitted for approval by the Cabinet.

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Finally, for the implementation of the Project, JICA assists the recipient country in preparing contracts and so on.

2. Basic Design Study

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c) to confirm items agreed on by the both parties concerning a basic concept of the Project,
d) to prepare a basic design of the Project,
e) to estimate cost involved in the Project.

Final project components are subject to approval by the Government of Japan and therefore may differ from an original request.

Implementing the Project, the Government of Japan requests the recipient country to take necessary measures involved which are itemized in the Exchange of Notes.

(2) Selecting (a) Consulting Firm(s)

For smooth implementation of the study, JICA uses (a) consulting firm(s) registered. JICA selects (a) firm(s) through proposals submitted by firms which are interested. The firm(s) selected carry(ies) out a Basic Design Study and write(s) a report, based upon terms of reference made by JICA.

The consulting firm(s) used for the study is(are) recommended by JICA to a recipient country after Exchange of Notes, in order to maintain technical consistency and also to avoid possible undue delay in implementation caused if a new selection process is repeated.

(3) Status of a Preliminary Study in the Grant Aid Program

A Preliminary Study is conducted during the second step of a project formulation and preparation as mentioned above.

A result of the Study will be utilized in Japan to decide if the Project is to be suitable for a Basic Design Study.

Based on the result of the Basic Design Study, the Government would proceed to the stage of decision making process (appraisal and approval).

It is important to notice that at the stage of Preliminary Study, no commitment is made by the Japanese side concerning the realization of the Project in the scheme of Grant Aid Program.

3. Japan's Grant Aid Scheme

(1) What is Grant Aid?

The Grant Aid Program provides a recipient country with non reimbursable funds needed to procure facilities, equipment and services for economic and social development of the country under the following principles in accordance with relevant laws and regulations of Japan. The Grant Aid is not a form of donation or such.

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When the two Governments deem it necessary, the Grant may be used for the purchase of products or services of a third country origin.

However the prime contractors, namely, consultant, contractor and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means Japanese physical persons or Japanese juridical persons controlled by Japanese physical persons.)

(5) Necessity of the "Verification"

The Government of the recipient country or its designated authority will conclude into contracts in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. The "Verification" is deemed necessary to secure accountability to Japanese tax payers.

(6) Undertakings required to the Government of the recipient country

In the implementation of the Grant Aid, the recipient country is required to undertake necessary measures such as the followings;

① to secure land necessary for the sites of the Project and to clear and level the land prior to commencement of the construction works,
② to provide facilities for distribution of electricity, water supply and drainage and other incidental facilities in and around the sites,
③ to secure buildings prior to the installation work in case the Project is providing equipment,
④ to ensure all the expenses and prompt execution for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid,
⑤ to exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts,
⑥ to accord Japanese nationals whose services may be required in connection with the supply of the products and services under the Verified Contracts, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.

(7) Proper Use

The recipient country is required to maintain and use facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for their operation and maintenance as well as to bear all expenses other than those to be borne by the Grant Aid.

(8) Re-export

The products purchased under the Grant Aid shall not be re-exported from the recipient country.

(9) Banking Arrangement (B/A)

(a) The Government of the recipient country or its designated authority shall open an account in the name of the Government of the recipient country in an authorized foreign exchange bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by Government of the recipient country or its designated authority under the contracts verified.

(b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an Authorization to Pay issued by the Government of the recipient country or its designated authority.

ANNEX II Necessary measures to be taken by the Government of the Republic of Uganda on condition that Japan's Grant Aid is executed.

1. To provide necessary data and information for the Project,

2. To secure and clear the site for the Project prior to the commencement of the construction,

3. To arrange the access road to the sites prior to commencement of the construction,

4. To provide facilities for distribution of electricity, telephone, drainage, sewage and other incidental facilities to the Project site as follow;
   1) Electricity distributing line to the site,

5. To bear advising commission of Authorization to Pay (A/P) and payment commission to the Japanese foreign exchange bank for the banking services based upon Banking Arrangement (B/A),

6. To exempt taxes and to take necessary measures for customs clearance of the materials and equipment brought for the Project at the port of disembarkation,

7. To ensure prompt unloading of the equipment procured under the Grant,

8. To accord Japanese nationals whose services may required in connection with the supply of products and the services under the verified contract such facilities as may be necessary for their entry into the Republic of Uganda and stay therein for the execution of the Project,

9. To provide necessary permission, licenses and other authorization for carrying out the Project,

10. To provide necessary action to expedite the approval for execution of the Project by the authorities concerned in the Republic of Uganda,

11. To maintain and make proper and effective use of the equipment purchased under the Grant,

13. To bear all the expenses other than those to be born by the Grant, necessary for construction of the facilities as well as for the transportation and the installation of the equipment.

ATTACHMENT-3 COST ESTIMATION BORNE BY THE RECIPIENT COUNTRY

5.1 Annual Budget for Project Office

1. Remuneration

1) Salary

a)	Project Manager	(1x250,000 Ush)	250,000 Ush
b)	Construction Supervisor	(2x145,000 Ush)	290,000
c)	Geophysical prospector	(2x135,000 Ush)	270,000
d)	Secretary	(1x40,000 Ush)	40,000
e)	Driver	(4x45,000 Ush)	180,000
	Sub-total		1,030,000
		1,030,000 x 12 =	12,360,000 Ush

2) Allowance

a)	Project Manager		
	Transportation and lodging	(250,000x0.4)	100,000 Ush
	Site allowance	(48,000x5d)	240,000
b)	Construction Supervisor		
	Transportation and lodging	(145,000x0.4x2)	116,000 Ush
	Site allowance	(48,000x10dx2)	960,000
c)	Geophysical prospector		
	Transportation and lodging	(135,000x0.4x2)	108,000 Ush
	Site allowance	(48,000x10dx2)	960,000
d)	Secretary		
	Transportation and lodging	(40,000x0.4)	16,000 Ush
e)	Driver		
	Transportation and lodging	(45,000x0.4x4)	72,000 Ush
	Site allowance	(25,000x10dx4)	1,,000,000
	Sub-total		3,572,000
		3,572,000 x 12 =	42,864,000 Ush
	Total		55,224,000 Ush

2. Office expenses

1) Vehicle expenses

a)	Fuel	20 l x 25d x 12m 1,040 Ush x1	=	6,240,000 Ush
b)	Oil and others	6,240,000 x 0.1	=	624,000
c)	Maintenance	20,000x0.05x1	=	1,000,000
	Sub-total			7,864,000 Ush

2) Utilities

a)	Water	20,000 Ush x 12	=	240,000 Ush
b)	Telephone	80,000 Ush x 12	=	960,000
c)	Electricity	20,000 Ush x 12	=	240,000
d)	Office rental	150,000 Ush x 12	=	1,800,000
	Sub-total			3,240,000

3)	Consumable	100,000 Ush x 12	=	1,200,000 Ush
	Sub-total			1,200,000 Ush
	Total			12,304,000 Ush

3. Import Tax

Import Taxes

Unit: '000 Ush

Phase		Import price (a)	Import tax (b=ax0.3)	Total (c=a+b)	VAT (d=cx0.17)	Total tax (e=b+d)
Phase I		1,625,000	488,000	2,113,000	359,000	847,000
Phase II	1st Year	1,650,000	495,000	2,145,000	365,000	860,000
	2nd Year	1,832,000	550,000	2,382,000	405,000	955,000
	3rd Year	1,462,000	439,000	1,901,000	323,000	762,000
Total		6,569,000	1,972,000	8,541,000	1,452,000	3,424,000

4. Project Budget

Yearly Tax

Unit: '000 Ush

	Phase I	Phase II			Total
		1st Year	2nd Year	3rd Year	
Remuneration	55,224	60,746	66,821	73,503	256,294
Office expenses	12,305	13,535	14,889	16,377	57,106
Tax	847,000	860,000	955,000	762,000	3,424,000
Total	914,529	934,281	1,036,710	851,880	3,737,400

Note) Escalation is considered for remuneration and office expenses

5.2 Import Taxes

1. Import price
   1) First Year

Supply equipment	538,000,000	Ush
Construction equipment*	6,545,000,000	
Construction materials	1,087,000,000	
Sub total	8,170,000,000	

   2) Second Year

Construction materials	1,650,000,000

   3) Third Year

Construction materials	1,832,000,000

   4) Fourth Year

Construction materials	1,462,000,000
Total	13,114,000,000

2. Import price except construction equipment
   1) First Year

Supply equipment	538,000,000	Ush
Construction materials	1,087,000,000	
Sub total	1,625,000,000	

   2) Second Year

Construction materials	1,650,000,000

   3) Third Year

Construction materials	1,832,000,000

   4) Fourth Year

Construction materials	1,462,000,000
Total	6,569,000,000

3. Import Tax

Import Taxes

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Total		6,569,000	1,972,000	8,541,000	1,452,000	3,424,000

4. Yearly Tax

Unit: '000 Ush

	Phase I	Phase II			Total
		1st Year	2nd Year	3rd Year	
Tax	847,000	860,000	955,000	762,000	3,424,000

5.3 List of Construction Equipment

(1)	Drilling Rig and Attachment		
	1) Drilling Rig	3	units
	2) Attachment	3	sets
	3) High pressure compressor	3	units
	4) Drilling Tools	3	sets
	5) Casing equipment	3	sets
	6) Accident recovery tools	3	sets
	7) Mud circulation drilling equipment	3	sets
	8) Borehole cleaning tools	3	sets
	9) Other tools	3	sets
	10) Test equipment	3	sets
(2)	Air compressor	3	units
(3)	Pumping test equipment		
	1) Submersible pump	4	sets
	2) Diesel generator	4	sets
	3) Flow meter	4	sets
(4)	Volute type pump	2	units
(5)	Supporting vehicles		
	1) Fuel tank rolly	3	units
	2) Dump track	2	units
	3) Track crane(6 ton)	3	units
(6)	Spare parts	1	lot
(7)	Communication equipment		
	1) Radio transceiver	2	sets
	2) Movable transceiver	5	sets

5.4 Temporary work tools and materials

(1) Base camp

1)	Office house (container house)	4	units
2)	Meeting space(container house)	2	units
3)	Prefabricated toilet	2	units

(2) Generator and potable water supply system

1)	Submersible pump	2	units
2)	Panel	2	sets
3)	Generator(for camp office)	2	sets
4)	Generator(for movable camp)	1	set
5)	Water tank (8 m^3)	1	set
6)	Water tank (4 m^3)	1	set
7)	Fuel tank	1	set

(3) Sitecamp

1)	Sleeping house(container house)	10	units
2)	Kitchen (container house)	2	units
3)	Prefabricated bath1 unit		

(4) Safety measure materials

1)	Safety shoes	80	sets
2)	Leather globe	3	dozens
3)	Army globe	20	dozens
4)	Helmet	80	pieces
5)	Safety belt	10	pieces
6)	Safety rope	20	sets

(5) Temporary equipment and materials

1)	Temporary construction materials	1	lot
2)	Consumable	1	lot
3)	Survey equipment	1	set
4)	Office facility	1	lot
5)	Garage facility	1	lot

(6) Consumable for construction

1) Toriconbit (12-1/4")
2) Toriconbit (10-5/8")
3) Toriconbit (8-1/2")
4) Drill pipe
5) Bentnite
6) Consumable for equipment
7) Workcasing
8) Casing top
9) Hammer bit(10-5/8")
10) Button bit(8-1/2")

ANNEX TABLES AND FIGURES

Table - 1 Result of Water Quality Test at Pilot Borehole(B/D 1997)

NO	JA-2	JA-3	JA-5(1)	JA-5(2)	JA-7	JA-8	JA-9
Location	Ssinde-1	Kawawa	Bekina	Bekina	Ssinde-2	Magere	Seeta
Colour	yellow-brown	clear	clear	clear	clear	clear	clear
Odour	no	no	no	no	no	no	no
Taste	slt, bitter	no	no	no	no	no	no
pH	6.05	5.93	6.15	6.49	6.40	6.36	5.96
Turbidity	160.00	0.00	0.00	0.00	2.18	0.00	0.00
E.C.	136.40	143.00	69.80	68.50	310.00	116.80	126.20
Alkalinity	34.00	36.00	12.00	12.00	0.00	24.00	36.00
Ca++	4.80	4.80	2.00	2.00		2.00	7.50
Total Hard.	20.00	30.00	10.00	7.00	142.00	13.00	32.40
CaCO3	12.00	12.00	5.00	5.00	103.00	5.00	18.76
Mg++	1.94	4.37	1.21	0.49	9.50	1.94	3.31
Na++	10.00	20.00	8.00	8.00	13.40	14.00	15.00
K+	1.00	0.00	1.00	1.00	1.60	2.00	3.00
Fe++	0.10	0.08	0.00	0.00	0.01	0.00	0.05
Fe+++	30.50	1.82	0.25	0.17	0.06	0.08	0.08
Mn++	0.14	0.02	0.03	0.02	0.04	0.02	0.01
F-	1.00	0.10	0.35	0.35	0.20	0.85	0.60
CO3--	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HCO3-	41.45	43.88	14.63	14.63	153.70	29.26	43.88
PO4-	0.00	0.05	0.05	0.00	0.19	0.43	0.26
Cl-	23.00	20.00	0.00	0.00	6.00	3.00	2.00
NO2-	0.00	0.01	0.02	0.01		0.00	0.02
NO3-	0.00	2.20	2.64	0.00	0.00	0.00	5.28
SO4--	0.00	0.00	2.00	2.00	23.00	0.00	10.00
TDS	68.30	71.70	35.00	34.40	154.00	88.50	63.10

Table – 2 Result of Water Quality Test at Pilot Borehole(F/S 1997)

Parameters	Units	JA-7	JA-3	JA-5	JA-9	JA-8	WHO Guidelines	DWD Guidelines
Appearance		Brown	Brown	Colourless	Colourless	Colourless	Acceptable	Acceptable
Taste		Earthy	Tasteless	Tasteless	Tasteless	Tasteless	Acceptable	Acceptable
Odour		Rusty	Odourless	Odourless	Odourless	Odourless	Acceptable	Acceptable
Turbidity	NTU	90	107	0.0	5.0	0.0	5.0	10
TDS	Mg/l	50	27	61.5	79.4	30.3	1500	1000
Electrical Conductivity	μs/cm	99.8	54.3	122.7	158.5	60.1		
pH	Mg/l	5.90	5.54	6.21	6.13	5.69	6.5-9.5	5.5-8.5
Alkalinity (Total) as CaCO3	Mg/l	22.0	5.0	32.0	50.0	3.0		
Hardness (Total) as CaCO3	Mg/l	24.34	10.02	27.21	54.52	9.31	500	600
Calcium	Mg/l	2.29	2.0	7.73	9.16	2.0		
Magnesium	Mg/l	2.78	1.22	1.91	7.68	1.04		
Sodium	Mg/l	7.0	12.0	6.0	8.0	11.0		
Potassium	Mg/l	1.0	0.0	1.0	1.0	5.0		
Iron (Total)	Mg/l	1.87	1.36	0.05	0.02	0.26	0.3	1.0
Manganese	Mg/l	0.031	0.032	0.015	0.14	0.15	0.1	1.0
Bicarbonate	Mg/l	26.82	6.1	39.01	60.95	3.66		
Chloride	Mg/l	5.0	23.0	6.0	7.0	3.0	250	250
Fluoride	Mg/l	0.0	0.5	0.6	0.55	0.3	1.5	2.0
Sulphate	Mg/l	10.8	0	6.2	4	12	250	250
Nitrate	Mg/l	0.0	0.0	1.8	2.0	4.35	50	20
Nitrite	Mg/l	0.0	0.02	0.009	0.004	0.0	3.0	0.0
Phosphate	Mg/l	0.3	0.45	0.38	0.25	0.45		

Table-3 Result of Field Water Quality Test

No.	community	Sub-County	District	lat.	long.	Geology	Borehole		Water Quality						Note
							Number	Depth (m)	Temp. (℃)	pH	EC (μs/cm)	Iron (mg/l)	micro-org. (MPN)	Coliform (MPN)	
1	Seeta	Nangabo	Mpigi	° ′ ″	° ′ ″	B-T	JA-9	50.1	26.0	6.3	170.0	0.2	-	-	Pilot borehole. See Labo-test JA-9
2	Magere	Nangabo	Mpigi	° ′ ″	° ′ ″	B-T	JA-8	63.0	25.5	5.4	60.0	0.2	-	-	Pilot borehole. See Labo-test JA-8
3	Wampeo	Nangabo	Mpigi	° ′ ″	° ′ ″	GC			21.0	6.4	150.0	3.0	58	30	Maddy bit
4	Kasangati	Nangabo	Mpigi	0° 26′ 31″	32° 36′ 31″	GC	5576		23.5	6.7	260.0	0.3	18	1	Clear
5	Magigyo	Kyambogo	Mpigi	0° 29′ 29″	32° 36′ 48″	GC	S/P	0.5	22.5	5.8	80.0	0.5	6	17	Maddy brownish
6	Lukole school	-	Lwelo	0° 34′ 45″	32° 34′ 03″	GC		100f	23.0	6.3	250.0	0.3	2	2	Constructed by DWD
7	Kisimbiri	Wakiso	Mpigi	0° 24′ 28″	32° 29′ 25″	GC	P.S/P		22.0	5.6	60.0	0.6	-	5	
8	Kisimbiri	Wakiso	Mpigi	0° 24′ 28″	32° 29′ 25″	GC			24.0	5.7	90.0	0.3	1	-	Maddy bit. WATSAN Pro. July '95
9	Kiroto	Musulita	Mpigi	0° 33′ 03″	32° 25′ 41″	GC			21.0	5.9	120.0	0.8	31	11	Maddy brownish. Shallow well. Nila-pump
10	Nabusanke T/C	Nabusanke	Mpigi	0° 00′ 49″	32° 03′ 06″	B-T	CD 3880	120f	22.5	5.7	100.0	6.0	57	31	Maddy. DWD 2/2/95
11	Ngando	Ngando	Mpigi	0° 04′ 35″	31° 55′ 01″	B-T			23.0	6.2	150.0	1.5	44	43	Maddy. Unicef 13/1/95
12	Kiriri	Mpenja	Mpigi	0° 12′ 34″	32° 03′ 34″	B-T		100f	22.0	6.2	140.0	7.5	24	11	Hard handle operation
13	Lubare	Kabalusuke	Mpigi	0° 07′ 58″	31° 47′ 30″	B-T		12.0	21.5	6.4	880.0	3.0	6	2	Located at Valley
14	Bekina	Butanyunja	Mubende	° ′ ″	° ′ ″	B-T	JA-5	59.0	22.0	5.9	50.0	0.1	2	4	Pilot borehole. See Labo-test JA-5
15	Mwera	Kakindu	Mubende	0° 18′ 54″	32° 07′ 14″	B-T			24.0	6.6	250.0	8.0	10	2	Maddy with continuous operation 10 years old
16	Kakungabe	Mayanzi	Mubende	0° 27′ 17″	31° 49′ 19″	B-T			22.5	6.3	130.0	8.0	1	9	Maddy quite a lot
17	Mawada	Mayanzi	Mubende	0° 20′ 51″	32° 08′ 54″	B-T		45.0	22.0	6.1	160.0	3.0	22	15	Takes time to get water. Maddy in dry season
18	Mubende T/C	Mubende	Mubendo	0° 33′ 35″	31° 23′ 22″	B-T			23.0	6.8	300.0	0.1	-	21	
19	Kiboga T/C	Kiboga T/C	Kiboga	0° 33′ 54″	31° 23′ 22″	GC		105f	24.5	7.2	570.0	-	-	-	Only early moring clearin dry season
20	Ntwetwe	Ntwetwe	Kiboga	0° 56′ 57″	31° 35′ 27″	GC			25.5	7.7	360.0	-	-	-	
21	Ssinde-1	Lwamata	Kiboga	° ′ ″	° ′ ″	B-T	JA-2	50.1	20.0	6.8	160.0	8.0	-	-	Pilot borehole. See Labo-test JA-2
22	Kawawa	Lwamata	Kiboga	° ′ ″	° ′ ″	B-T	JA-3	13.9	23.5	6.8	150.0	0.6	-	-	Pilot borehole. See Labo-test JA-3

Table-4 Result of Site Investigation in Mpigi District (1/2)

No.	COMMUNITY	SUB-COUNTY	GEO.	ACCESS	POPULATION		BOREHOLE			JICA F/S	JICA B/D	NOTE
					F/S	B/D	E/X	PLAN	B/D	GEP (m)	GEP (m)	
1	Kvabagamba	Maddu	B-T		857	900	0	3	3		120	The water source is a swamp about 0.5 Km away from the village.
2	Kabale	Maddu	B-T		230	230	0	1	1			
3	Kigavaza	Maddu	B-T		400	400		2	2			
4	Kalvanjuba	Maddu	B-T		450	450		2	2			
5	Kvambobo	Maddu	B-T	impossible in the rainy season	300	350	0	1	1			It needed logging for access. A dug-well located about 0.8 miles from the village.
6	Lukonda	Maddu	B-T		400	400		1	1			
7	Makukuru	Maddu	B-T		250	250	0	1	1	○		
8	Kyamabeale	Maddu	B-T		700	700		2	2		200	
9	Kasambya	Maddu	B-T		420	420		2	2		100	
10	Kamengo	Maddu	B-T		436	450		2	2			
11	Kirasi	Maddu	B-T		3550	1500		11	6		200	The population includes the children. DWD has a unsuccessful borehole in the village.
12	Nakitembe	Maddu	B-T		300	410		1	1		100	
13	Kabwire	Maddu	B-T	impossible in the rainy season	600	600	○?	2	2			It needed logging for access. This village located the south of the Kymbobo(No.5).
14	Kalwanga A	Kabulasoke	B-T		450	500	0	1	1			A swamp located 2 miles away, but the souce is a dam 5 miles away for a dry season.
15	Kivanonga	Kabulasoke	B-T		350	350		2	2		140	
16	Kakubansiri B	Kabulasoke	B-T		300	350		1	1		210	The water sourceis a dug-well 2 km away from the village for a dry season.
17	Lubale B	Kabulasoke	B-T		570	600	1	1	1		120	A borehole located in the river bed, and it was covered by water flow in a rainy season.
18	Nkokonjeru	Kabulasoke	B-T		500	0		2	0			This is not a community name that a part of Lugaga community.
19	Lugeaga	Kabulasoke	B-T		350	700	0	2	4			The water souce is a dug-well about 1 km away from the village for a dry season.
20	Lusongode	Kabulasoke	B-T	impossible in the rainy season	467	450	0	2	2			The water souce is a dug-well 1km away, but a dam 5 km away for a dry season.
21	Luzira	Kabulasoke	B-T	impossible in the rainy season	1328	1350		5	4			It needed logging for access. Impossible go to the village by a car becouse of rain.
22	Bulwadda East	Kabulasoke	B-T		580	550	0	2	2			A dug-well located 1 km away from the village.
23	Bulwadda West	Kabulasoke	B-T		800	800		3	3		100	
24	Kawoko	Kabulasoke	B-T		400	400		1	1		100	
25	Nakulamudde	Kabulasoke	B-T		800	800		3	3			
26	Mawuki	Kabulasoke	B-T		480	500	○	2	2	○		
27	Kiriri	Mpenja	B-T		1500	1500	1	4	4		100	
28	Mpogo	Mpenja	B-T		420	450		2	2		160	
29	Buvinjabutoole	Mpenja	B-T		1000	1000		3	3			
30	Ngove	Mpenja	B-T		400	450	0	2	2			There are tree dug-wells. Only one of it is usefull for a dry season, located 1 km away.
31	Busolo	Mpenja	B-T		800	750	0	1	1			The water souce is a dug-well 1km away, but a dam 5 km away for a dry season.
32	Maseruka	Mpenja	B-T		960	950		3	3		120	This village located on the top of rocky hill.
33	Kanzira	Mpenja	B-T		220	250	0	1	1			The road finished at entrance of the village. The souce is a spring in a river bed.
34	Ngomanene	Mpenja	B-T		432	450	1	1	1		110	
35	Kvetume	Mpenja	B-T		800	800	0	3	3			The water souce is a dug-well 1km away.
36	Wamirongo	Kyambogo	B-T		650	600	0	2	2			A dug-well located 1km away from the village.
37	Busuukuma	Kyambogo	GC		340	340		1	1			
38	Kasambya	Kyambogo	GC		491	500		2	2			
39	Kikoko	Kyambogo	B-T		225	250		1	1		100	
40	Setta	Kyambogo	GC		185	200		1	1		100	
41	Njudde	Kyambogo	GC		450	450		2	2		140	
42	Magigi	Kyambogo	GC		450	500	0	1	1		120	

Table-5 Result of Site Investigation in Mpigi District (2/2)

No.	COMMUNITY	SUB-COUNTY	GEO.	ACCESS	POPULATION		BOREHOLE			JICA F/S	JICA B/D	NOTE
					F/S	B/D	E/X	PLAN	B/D	GEP (m)	GEP (m)	
43	Kiwenda T/C	Kyambogo	GC		960	950		3	3		160	Depth of the existing borehole is about 200 ft.
44	Nabitalo	Kyambogo	GC		750	750		2	2			
45	Menvu	Kyambogo	B-T		1700	1700		5	5		110	
46	Kasozi	Kyambogo	GC		1500	1500		5	5			
47	Mairve	Kyambogo	GC		800	850		2	2		100	under the WES program.
48	Kasangati TC/Kazinga	Nangabo	GC		200	300	0	1	1			The souce is a shallow well and a dug-well. The souce dry up in a dry season.
49	Kazinga	Nangabo	GC		330	0	1/3	1	0			A part of Kasangati T/C, this is not community name.
50	Kiwalimu	Nangabo	GC		300	350	0/1	1	1			There is only a spring about 1 km away from the village.
51	Manyangwa	Nangabo	GC		750	750	0	1	1			
52	Nalwamagonia	Nangabo	GC		450	450	0	1	1			
53	Kiwala	Ngando	B-T		800	750	0	3	3			The souce is a dug-well about 1.5 km away, but a swamp 6 km away for a dry season.
54	Ngando	Ngando	B-T		550	550	1	2	2		160	
55	Bwetyaba	Ngando	B-T		475	500	0	1	1			The water souce is a spring about 0.5 km away.
56	Ndibulungi	Ngando	B-T		1000	1000	0	3	3			The souce is a swamp about 2 km away, but it changes 2.5 km away in a dry season.
57	Butende	Ngando	B-T		700	650		3	2		200	
58	Bukeae	Ngando	B-T		300	300	0	1	1			
59	Tufube	Ngando	B-T		400	400	0	2	2		200	Tufube is a school name. This community name is "Kasozi-babengwe"
60	Bugobango	Ngando	B-T		428	450	0	1	1		200	There are not boreholes in the village.
61	Kvengeza	Masulita/Kiziba	GC		500	500	0	2	2			The water souce is a dug-well and a swamp 1 km away for a dry season.
62	Wabivinja	Masulita/Kiziba	GC		750	750		2	2		110	There are outcrops of gniess in the village and the souce is a shallow well.
63	Nakikungube	Masulita/Kiziba	GC	Access from north only	249	250	0	1	1			The water souce is a swamp.
64	Masulita A	Masulita/Kiziba	GC		250	300	○	1	1		100	There is a borehole only for a school.
65	Kvenuna	Namayumba	B-T		1300	1300	○	4	4		100	
66	Kvampipsi	Namayumba	B-T		500	500		2	2			
67	Malangaata	Namayumba	B-T		420	450	0	2	2			A swamp located 3 km away from the village.
68	Bugimba	Namayumba	B-T		526	550		1	1		200	
69	Mugulube	Namayumba	B-T		600	600	0	2	2			The souce is a dug-well in the village, but water from a swamp for a dry season.
70	Buso	Namayumba	B-T		250	250		1	1		140	
71	Kvaaa	Namayumba	B-T		630	650		2	2			
72	Bembe	Namayumba	B-T		500	500		2	2		110	
73	Namayumba	Namayumba	B-T		500	500	1	2	2		140	WDD10958.130ft.
74	Busaku	Namayumba	B-T		800	800		2	2		200	
75	Buwembo	Namayumba	B-T	Access from north only	250	250	0	1	1			The water souce is a spring in the river bed.
76	Kasengejje	Wakiso	GC		960	1000	1	3	3		100	
77	Mende Central	Wakiso	GC		1000	1000	0	3	3			The water souce is a sahflow well, but take water from a river in dry season.
78	Buksas T/C	Wakiso	GC		600	600	1	2	2	○		
79	Kituntu T/C	Kituntu	B-T		630	630		2	2		180	
80	Kikomazi	Nkozi	B-T		650	650		2	2		130	
					49799	48080		165	157			
Total												

Table-6 Result of Site Investigation in Mubende District (1/2)

No.	COMMUNITY	SUB-COUNTY	GEO.	ACCESS	POPULATION		BOREHOLE			JICA F/S	JICA B/D	NOTE
					F/S	B/D	E/X	PLAN	B/D	GEP	GEP	
1	Kibangwa	Kitenga	GC		327	350	0	2	2			A vally-dam located 2 miles away.
2	Kvengeza	Kitenga	GC	impossible in the rainy season	595	600	0	2	2			A swamp located 1 km away.
3	Budigaba	Kitenga	GC		602	600		2	2			
4	Bukongo	Kitenga	GC		400	380		2	2		120	
5	Kalonga	Bageza	Gr		600	600		1	1	○		
6	Mugungulu	Bageza	B-T		700	700	0	3	3		120	The water souce is a swamp but take water from 1.5 km away for a dry season.
7	Kisingizi	Bageza	B-T		800	800		3	3		200	The souce is a swamp, but a borehole 2 km away for a dry season.
8	Kyamkoowa	Bageza	B-T		700	750	0	3	3			The souce located in a swamp 2.5 miles away , but 5 miles away for a dry season.
9	Kvegukuso	Bageza	B-T		400	400		2	2			A dug-well located 3 km away , but 5 km away for a dry season.
10	Bakijulila	Bageza	B-T		325	350	○	1	1		180	A shallow well located 0.5 miles away.
11	Kabowa	Bageza	Gr		350	350		2	2			
12	Kabubu	Bageza	Gr		400	400		2	2			
13	Nakasaga	Kasambya	GC		500	550	0	2	2			A swamp located 0.8 km away and a dam located 1.6 km away for a dry season.
14	Kasambya T/C	Kasambya	GC		800	800		3	3	○		
15	Kikoma	Madudu	Gr		575	600	0	1	1			The souce is a vally-dam 1.6 km away and a swamp 4 km away for a dry season.
16	Ngabano	Madudu	Gr		700	650		3	3		100	The souce is a dug-well because of a spring was abandoned.
17	Katoma	Kiyuni	Gr		400	400		2	2		120	
18	Kassanda T/C	Kassanda	B-T		1700	1500	0/1	6	5	○		Impossible to set six boreholes in the villege because of hydrogeological condition.
19	Namabeale	Kassanda	Gr		350	350		2	2		120	
20	Kvabalanzi	Kassanda	B-T	impossible in the rainy season	280	300		1	1			
21	Kamuli	Kassanda	B-T		300	300		1	1		120	Take water from a vally-dam 5 km away in Kikanda community for a dry season.
22	Kasazi A	Kassanda	B-T		700	700		3	3		140	
23	Kalama	Kassanda	Gr	impossible in the rainy season	360	400	0	1	1			The water souce is a dug-well.
24	Kikandwa	Kassanda	B-T	impossible in the rainy season	200	250	0	1	1			The water souce is a swamp and take water from 3 km away for a dry season.
25	Bulvamaguniu A	Myanzi	B-T		560	560		2	2			
26	Makata	Myanzi	B-T		700	700		3	3		200	A shallow well located 5 km away and take water from next-village for a dry season.
27	Miiembe	Myanzi	M		390	400		2	2	○		
28	Kalama	Myanzi	B-T		450	450		2	2		200	There is not a shallow well.
29	Kvakaeengulu	Myanzi	M		420	420		2	2		200	
30	Kabanvi	Myanzi	M		532	550	0	2	2			The water souce is a swamp and take water from 7 miles away for a dry season.
31	Bukoba	Myanzi	B-T		285	300		1	1			
32	Lukira	Myanzi	B-T		910	950	1	3	3			There is a shallow well with depth of 15m.
33	Kvawatuba	Myanzi	M		630	650		2	2		200	
34	Kasana	Myanzi	B-T		450	450		2	2		200	
35	Mabuubi	Bukuya	B-T		200	200		1	1		200	The souce is a spring thoughout the year.
36	Kalongo	Bukuya	Gr		400	400		1	1		200	
37	Kitumbi	Bukuya	B-T	impossible in the rainy season	300	300		1	1			Impossible to reach the villege by a car in a rainy season.
38	Kanoga	Bukuya	B-T		200	300	0	1	1			
39	Kikumbi-Keba	Busimbi	B-T		360	350		1	1		180	
40	Nakasetta	Busimbi	B-T		1200	1200	1?	4	4			The souce is a protected spring, but take water from 7 miles away for a dry season.
41	Namveso	Busimbi	M		300	350		1	1		200	A borehole was abandoned because of low water level in August 1996.
42	Bugabo	Busimbi	M		500	500		2	2			

Table-7 Result of Site Investigation in Mubende District (2/2)

No.	COMMUNITY	SUB-COUNTY	GEO.	ACCESS	POPULATION		BOREHOLE			JICA F/S	JICA B/D	NOTE
					F/S	B/D	E/X	PLAN	B/D	GEP	GEP	
43	Katakala	Busimbi	M		600	600		2	2		180	Make use of the water souce 1 mile away in Kidde community for a dry season.
44	Megongolo	Busimbi	M		700	700		3	3			
45	Nakibanga-Nvanzi	Busimbi	M		300	300	0	1	1			The water souce is a dug-well 1 km away.
46	Kalangalo	Bulera	B-T		520	550	1	2	2		200	Carried out GEP survy beside the breakdown borehole in the village.
47	Lwogero B	Bulera	M		890	900		3	3		200	There are outcrops of metamorphic rocks.
48	Kiwanda	Bulera	B-T		350	400		1	1			The souce is a protected spring but the souce for a dry season located 7 miles away.
49	Kasikombe	Sekanyonyi	B-T		700	700		2	2			
50	Katungulu	Sekanyonyi	B-T		450	450		2	2			
51	Budimbo	Sekanyonyi	B-T	impossible in the rainy season	1000	1000		4	4			
52	Kisamba	Sekanyonyi	B-T		450	450		2	2		90	Tree shallow wells with depth of 8 feet located 0.5 miles away from the village.
53	Kawolongo'o	Sekanyonyi	B-T		680	680		2	2			
54	Sekanyonyi	Sekanyonyi	B-T		600	650	1	1	1		180	The souce is a dug-well 1 km away and a swamp 5 km away for a dry season.
55	Kabulamuliro	Kikandwa	B-T		430	450		2	2		200	
56	Bambula	Kikandwa	B-T		620	650	0/1	1	1			A borehole for the school that was uesed by the neighboring villages in the dry season.
57	Serirriva	Maanyi	B-T		600	600		2	2		120	
58	Nabale	Maanyi	B-T		600	600		2	2		100	
59	Maanyi	Maanyi	B-T		600	600		2	2		110	A shallow well located 1 mile away to the west of the village.
60	Mpongo	Maanyi	M		200	250		1	1		200	Take water from the lake Wamara 3 miles away for the dry season.
61	Misimba	Maanyi	B-T	impossible in the rainy season	400	450	0	1	1			The souce is a dug-well 2 km away, a dam 6 km away for the dry season.
62	Kabeele	Maanyi	B-T	impossible in the rainy season	400	400	0	2	2			The souce is a dug-well 3 km away, a dam 7 km away for the dry season.
63	Buwala	Maanyi	B-T		500	500		2	2			
64	Bekina	Butayunja	B-T		800	850	0	2	2		110	Bekina A
65	Kkande	Butayunja	B-T		240	250	1	1	1		140	The borehole does not work, take water from a river 5 miles away in the dry season.
66	Kitongo	Butayunja	B-T		400	400		1	1			
67	Nakaziba	Butayunja	B-T		400	400		2	2			
68	Kitebere	Butayunja	B-T		1000	1000	0	3	3			The souce is a dug-well 1 km away in a swamp.
69	Watuba	Butayunja	B-T		650	650		3	3			
70	Nabwiri	Kakindu	B-T		1000	1000		4	4		140	
71	Bulundugulu	Kakindu	B-T		365	370	1	1	1			
72	Banenze	Kakindu	B-T		1200	1200		4	4			
73	Kalama	Kakindu	B-T		460	460		2	2			
74	Ngugulo	Kakindu	B-T		280	300		1	1		200	There is a spring on the east side of the village.
75	Mwera	Kakindu	B-T		780	800	1/2	1	1		200	The borehole for the hospital that impossible to continual use and contains some rust.
76	Kakindu	Kakindu	B-T		1000	950	1/1	3	3			There is a borehole for the school and a dug-well for the villager.
77	Mawanda	Kakindu	B-T		330	350	1	1	1			There are a borehole that dry up in the dry season and a protected spring.
78	Kiwewu	Malangala	B-T		600	600	1/1	2	2			There is a borehole for the school and a swamp for the villager.
79	Magonga	Malangala	B-T		370	400		1	1		130	Tree boreholes in the village but two of them are dry up in the dry season.
80	Lulumbu	Malangala	B-T		700	700		2	2			
81	Kasaiga	Malangala	B-T		500	500		2	2		200	There is a shallow well 1 km away.
					44516	45170		160	159			
Total												

Table-8 Result of Site Investigation in Kiboga District (1/2)

No.	COMMUNITY	SUB-COUNTY	GEO.	ACCESS	POPULATION		BOREHOLE			JICA F/S	JICA B/D	NOTE
					F/S	B/D	E/X	PLAN	B/D	GEP	GEP	
1	Kateera	Bukomero	B-T		504	510		1	1			
2	Kalangala A	Bukomero	B-T		900	900		2	2			
3	Masiriba	Bukomero	GC		300	350		1	1		200	There are Masinba Aand B.
4	Katwe	Bukomero	GC	impossible in the rainy season	470	470	O	2	2		120	Make use of a valley-dam for the dry season.
5	Muvenie	Bukomero	GC	impossible in the rainy season	690	690		3	3			The road was flooded at 7 km away from Bukomero village. Impossible to go by a car.
6	Kavunga	Bukomero	GC		800	800		3	3			
7	Kabamba West	Bukomero	M		250	250		1	1		200	There is a spring at Mpangala community 2 miles away from this village.
8	Kabamba East	Bukomero	M		320	320		1	1			
9	Bukomero T/C	Bukomero	B-T		806	810	O	2	2	O		
10	Namukoko	Bukomero	GC		750	750		3	3			
11	Kagogo	Bukomero	B-T		350	350	1	2	2		160	There is a borehole near the swchool.
12	Kanbizi	Ntwetwe	GC	impossible in the rainy season	175	180		1	1			The road was flooded at 1.8 km away from Ntwetwe community.
13	Ndibata	Ntwetwe	GC		1320	1320	O	4	4			
14	Bugomolwa	Ntwetwe	GC		450	450		2	2	O		
15	Ntwetwe T/C	Ntwetwe	GC		524	530	O	2	2	O		
16	Kilemeera/Lubuga	Ntwetwe	GC		288	300		1	1			
17	Bulagwe	Ntwetwe	GC	impossible in the rainy season	222	250		1	1			The road was flooded at 1.8 km away from Ntwetwe community. Impossible by a car.
18	Nkandwa B	Ntwetwe	GC		500	500		2	2			
19	Nakalama St. Kizito	Ntwetwe	GC		200	200		1	1		140	
20	Ntuuti	Ntwetwe	GC		540	540		2	2		120	The water souce located 3 miles away from the community for a dry season.
21	Kikajjo	Ntwetwe	GC		200	200		1	1			
22	Lwanjolo	Ntwetwe	GC		450	450	0	2	2			The souce is a dug-well and take water from a river 5 miles away for a dry season.
49	Natvole.fegala Mem	Ntwetwe	GC		400	400		2	2		120	
67	Kasambya B	Ntwetwe	GC		350	350		1	1		140	
23	Kasega	Kiboga	GC		380	380		2	2			
24	Kirinda	Kiboga	GC		600	600		2	2	O		
25	Kizinga	Kiboga	B-T		500	500		2	2		200	
26	Nvamiringe	Kiboga	GC		210	210		1	1			
27	Kagobe	Kiboga	GC		330	350		2	2			
28	Seeesa	Kiboga	GC		300	300		1	1			
29	Kambugu	Kiboga	B-T	impossible in the rainy season	400	400		2	2		200	
30	Kambugu	Kiboga	B-T		468	470		1	1			
31	Kilvankozi	Kiboga	B-T		350	350		1	1			
32	Kibiga	Kiboga	GC		600	600		1	1		120	Make use of a protected spring 2 km away from the village for a dry season.
33	Gogonva	Kiboga	GC		500	500		1	1			
34	Nikokonjeru	Lwamata	M		1400	1500		3	0			There is a gravity-fed system of Luwamata community.
35	Kvanika	Lwamata	M		300	300		1	1			There are two protected springs in the village.
36	Lunnva	Lwamata	M		400	400		1	1		200	Requested to for Lunnva A community.
37	Kijumagwa	Lwamata	M	impossible in the rainy season	280	300		1	1			
38	Nsanje	Lwamata	GC		350	350		2	2		120	There is a shallow well 0.5 miles away.
39	Buvonga	Lwamata	M		470	500	,0	1	1			

Table-9 Result of Site Investigation in Kiboga District (2/2)

No.	COMMUNITY	SUB-COUNTY	GEO.	ACCESS	POPULATION		BOREHOLE			JICA F/S	JICA B/D	NOTE
					F/S	B/D	E/X	PLAN	B/D	GEP	GEP	
40	Kambugu	Butemba	GC		235	250	0	1	1			The water souce is a dug-well in a swamp and a dam for a dry season.
41	Kavonza	Butemba	GC		200	200		1	1			
42	Kvarloni	Butemba	GC		515	530	O	2	2			
43	Katanabiro	Butemba	GC		350	350		2	2		160	
44	Kagelema	Butemba	GC		480	500		2	2		180	
45	Bvenima B	Butemba	GC	impossible in the rainy season	380	380	1	2	2		200	There is a private borehole.
46	Bikoma B	Butemba	GC		272	300	1	1	1		200	
47	Bugulumа	Butemba	GC		310	300		1	1			There is a borehole that donated by minister.
59	Kavunga	Butemba	GC		280	300		1	1		160	The water souce located 5 miles away in the next village.
48	Nakasozi	Muwanga	B-T	by way of Muwanga comm.	350	350		1	1		200	
50	Kikonda	Nsambya	GC		140	150	O	1	1	O		
52	Kvambogo	Nsambya	GC		580	600		2	2			
53	Kigando/Buraza	Nsambya	GC		126	150		1	1		200	
54	Mujjunza	Nsambya	GC	impossible in the rainy season	356	350		2	2			
55	Bananywa	Nsambya	GC	impossible in the rainy season	1439	1400		4	4			
56	Nsanbya	Nsambya	GC		195	200		1	1		180	
57	Kvakabuga	Nsambya	GC		160	160		1	1			The water souce located in a swamp and location changes in season.
51	Nakakabsia	Masodde	GC		300	300		1	1			
58	Bamusuuta	Masodde	GC		850	850	O	2	2	O		
60	Masodde	Masodde	GC		900	900	O	2	2		140	The souce is a river 5 miles away from the community.
61	Vvumba	Masodde	GC		500	500		2	2		100	There are some outcrops of gniess around the village.
62	Kalagi	Masodde	GC		350	350	O	1	1			
63	Kivombva	Masodde	GC		500	500		2	2			
64	Mulagi	Masodde	GC	impossible in the rainy season	350	350		1	1			
65	Bulvanzige	Gayaza	GC		450	450	0	2	2			The water souce is a dug-well and a river 3 km away for a dry season.
66	Gayaza West	Gayaza	GC		586	600		2	2			
68	Nkondo	Gayaza	GC		500	500		2	2			
69	Butambuka	Gayaza	B-T		520	520		2	2		160	Take water from Kitumbi River(Permenent).
70	Kirvajjobvo West	Gayaza	GC		400	400		2	2			
71	Luwuna	Gayaza	B-T		300	300		1	1			
72	Kisala	Gayaza	B-T	impossible in the rainy season	750	750		3	3			
73	Kverere East	Gayaza	GC		600	600		2	2		200	
	Kiboga town	kiboga	GC				1/2	4	4		1700	System II. One borehole work only in the moning of a dry season.
					34021	34420		125	122			
Total												

Table-10 Plan of borehole depth by geo-electrical survey (MPIGI DISTRICT : 37 points)

No.	COMMUNITY	SUB-COUNTY	GEOLOGY	SOUNDING DEPTH(m)	WEATHERING DEPTH(m)	BASEMANT DEPTH(m)	BOREHOLE DEPTH(m)
1	Kyabagamba	Maddu	B-T	120	70	40	110
8	Kyamabaale	Maddu	B-T	200	70	10	80
9	Kasambya	Maddu	B-T	100	21	49	70
11	Kirasi	Maddu	B-T	200	55	35	90
12	Nakitembe	Maddu	B-T	100	40	50	90
15	Kiryanongo	Kabulasoke	B-T	140	70	40	110
16	Kakubansiri B	Kabulasoke	B-T	210	120	20	140
17	Lubale B	Kabulasoke	B-T	120	62	8	70
23	Bulwadda West	Kabulasoke	B-T	100	34	66	100
24	Kawoko	Kabulasoke	B-T	100	5	55	60
27	Kiriri	Mpenja	B-T	100	8	72	80
28	Mpogo	Mpenja	B-T	160	86	34	120
32	Maseruka	Mpenja	B-T	120	59	51	110
34	Ngomanene	Mpenja	B-T	110	40	20	60
39	Kikoko	Kyambogo	B-T	100	36	34	70
40	Setta	Kyambogo	GC	100	22	18	40
41	Kjiudde	Kyambogo	GC	140	48	52	100
42	Magigye	Kyambogo	GC	120	28	42	70
43	Kiwenda T/C	Kyambogo	GC	160	35	35	70
45	Menvu	Kyambogo	B-T	110	36	34	70
47	Mairye	Kyambogo	GC	100	pending		-
54	Ngando	Ngando	B-T	160	120	10	130
57	Butende	Ngando	B-T	200	70	20	90
59	Tufube	Ngando	B-T	200	90	-	90
60	Bugobango	Ngando	B-T	200	105	30	135
62	Wabiyinja	Masulita/Kiziba	GC	110	8	82	90
64	Masulita A	Masulita/Kiziba	GC	100	24	46	70
65	Kyanuna	Namayumba	B-T	100	43	27	70
68	Bugimba	Namayumba	B-T	200	1	104	105
70	Buso	Namayumba	B-T	140	60	70	130
72	Bbembe	Namayumba	B-T	110	30	35	65
73	Namayumba	Namayumba	B-T	140	40	50	90
74	Busaku	Namayumba	B-T	200	40	60	100
76	Kasengejje	Wakiso	GC	100	30	50	80
79	Kituntu T/C	Kituntu	B-T	180	80	10	90
80	Kikomazzi	Nkozi	B-T	130	90	40	130
	Seeta(E/X,B.H)	Nangabo	GC	100	40	20	60

B-T:Buganda-Toro System
GC:Gneiss Complex

Boerhole depth on hydrogeology

Unit : m

Hydorogeolgy	Survey point	Drilling depth		
		Soft formation	Hard formation	Total
Buganda-Toro System	28	1581 56	1074 40	2655 95
Gneiss Complex	8	235 29	345 43	580 73

Note : Total drilling depth in the upper.
Average drilling depth in the under.

Table-11 Plan of borehole depth by geo-electrical survey (MUBENDE DISTRICT : 35 points)

No.	COMMUNITY	SUB-COUNTY	GEOLOGY	SOUNDING DEPTH(m)	WEATHERING DEPTH(m)	BASEMANT DEPTH(m)	BOREHOLE DEPTH(m)
4	Bukongo	Kitenga		120	30	65	95
6	Mugunglu	Bagezza	B-T	120	45	35	80
7	Kisingizi	Bagezza	B-T	200	65	35	100
10	Bakijjulala	Bagezza	B-T	180	50	30	80
16	Ngabano	Madudu	Gr	100	40	30	70
17	Katoma	Kiyuni	Gr	120	pending		-
19	Namabale	Kassanda	Gr	120	10	45	55
21	Kamuli	Kassanda	B-T	120	60	20	80
22	Kasaazi A	Kassanda	B-T	140	40	20	60
26	Makata	Myanzi	B-T	200	50	40	90
28	Kalama	Myanzi	B-T	200	115	35	150
29	Kyakasengula	Myanzi	M	200	25	75	100
33	Kyawatuba	Myanzi	M	200	20	100	120
34	Kasana	Myanzi	B-T	200	-	150	150
35	Mabuubi	Bukuya	B-T	200	70	80	150
36	Kalongo	Bukuya	Gr	200	10	60	70
39	Kikumbi	Busimbi	B-T	180	-	100	100
41	Namyeso	Busimbi	M	200	-	75	75
43	Katakala	Busimbi	M	180	-	100	100
46	Kalangalo	Bulera	B-T	200	65	35	100
47	Lwogero	Bulera	M	200	pending		-
52	Kisamba	Sekanyonyi	B-T	90	20	50	70
54	Sekanyonyi	Sekanyonyi	B-T	180	70	50	120
55	Kabulamuliro	Kikandwa	B-T	200	105	45	150
57	Serinnya	Maanyi	B-T	120	30	50	80
58	Nabale	Maanyi	B-T	100	60	40	100
59	Maanyi	Maanyi	B-T	110	50	50	100
60	Mpongo	Maanyi	M	200	45	55	100
64	Bekina A	Butayunja	B-T	110	25	75	100
65	Kande	Butayunja	B-T	140	60	40	100
70	Nabwiri	Kakindu	B-T	140	40	25	65
74	Ngugulo	Kakindu	B-T	200	75	15	90
75	Mwera	Kakindu	B-T	200	60	30	90
79	Malangala	Malangala	B-T	130	-	90	90
81	Kasalaga B	Malangala	B-T	200	100	50	150

B-T:Buganda-Toro System
Gr:Granite
M:Mityana Series

Boerhole depth on hydrogeology

Unit : m

Hydorogeolgy	Survey point	Drilling depth		
		Soft formation	Hard formation	Total
Buganda-Toro System	24	1255 52	1190 50	2445 102
Granite	3	60 20	135 45	195 65
Mityana Series	5	90 18	405 81	495 99
Gneiss Complex	3	30 1	65 1	95 1

Note : Total drilling depth in the upper.
Average drilling depth in the under.

Table-12 Plan of borehole depth by geo-electrical survey (KIBOGA DISTRICT 36 points)

No.	COMMUNITY	SUB-COUNTY	GEOLOGY	SOUNDING DEPTH(m)	WEATHERING DEPTH(m)	BASEMANT DEPTH(m)	BOREHOLE DEPTH(m)
3	Masiriba	Bukomero	GC	300	55	20	75
4	Katwe	Bukomero	GC	120	30	30	60
7	Kabamba West	Bukomero	M	200	90	40	130
11	Kagogo	Bukomero	B-T	160	20	60	80
19	Nakalama St. Kizito	Ntwetwe	GC	140	60	40	100
20	Ntuuti	Ntwetwe	GC	120	55	30	85
49	Natvole.fagala Mem	Ntwetwe	GC	120	40	40	80
67	Kasambva B	Ntwetwe	GC	140	35	25	60
25	Kizinga	Kiboga	B-T	200	10	90	100
29	Kambugu	Kiboga	B-T	200	75	45	120
32	Kibiga	Kiboga	B-T	120	20	50	70
36	Lunnva	Lwamata	M	200	40	40	80
38	Nsanje	Lwamata	GC	120	45	25	70
43	Katanabiro	Butemba	GC	160	65	25	90
44	Kagalama	Butemba	GC	160	60	50	110
45	Bvenima B	Butemba	GC	200	90	30	120
46	Bikoma B	Butemba	GC	200	110	40	150
59	Kavunga	Butemba	GC	160	65	45	110
48	Nakasozi	Nakasozi	B-T	200	60	30	90
53	Kigando/Buraza	Nsambya	GC	200	15	55	70
56	Nsanbva	Nsambya	GC	180	60	20	80
60	Masodde	Masodde	GC	140	35	25	60
61	Vvumba	Masodde	GC	100	pendimg	–	–
69	Butambuka	Gayaza	B-T	160	40	10	50
73	Kverere East	Gayaza	GC	200	40	50	90
	Kiboga town(120m)	Kiboga	GC	200	pending	–	–
	Kiboga town(460m)	Kiboga	GC	200	pending	–	–
	Kiboga town(790m)	Kiboga	GC	140	30	15	45
	Kiboga town(930m)	Kiboga	GC	140	45	55	100
	Kiboga town(1180m)	Kiboga	GC	140	pending	–	–
	Kiboga town(A230m)	Kiboga	GC	200	45	25	70
	Kiboga town(A320m)	Kiboga	GC	140	45	25	70
	Kiboga town(A390m)	Kiboga	GC	140	30	20	50
	Kiboga town(A680m)	Kiboga	GC	100	pending	–	–
	Kiboga town(B220m)	Kiboga	GC	200	50	20	70
	Kiboga town(E/X,B.H)	Kiboga	GC	100	–	50	50

B-T:Buganda-Toro System
GC:Gneiss Complex
M:Mityana Series

Boerhole depth on hydrogeology

Unit : m

Hydorogeolgy	Survey point	Drilling depth		
		Soft formation	Hard formation	Total
Buganda-Toro System	6	225 37	285 48	510 85
Mityana Series	2	130 65	80 40	210 105
Gneiss Complex	23	1105 48	760 33	1865 81

Note : Total drilling depth in the upper.
Average drilling depth in the under.

Figure-1 Location Map of Target Communities (Mpigi)

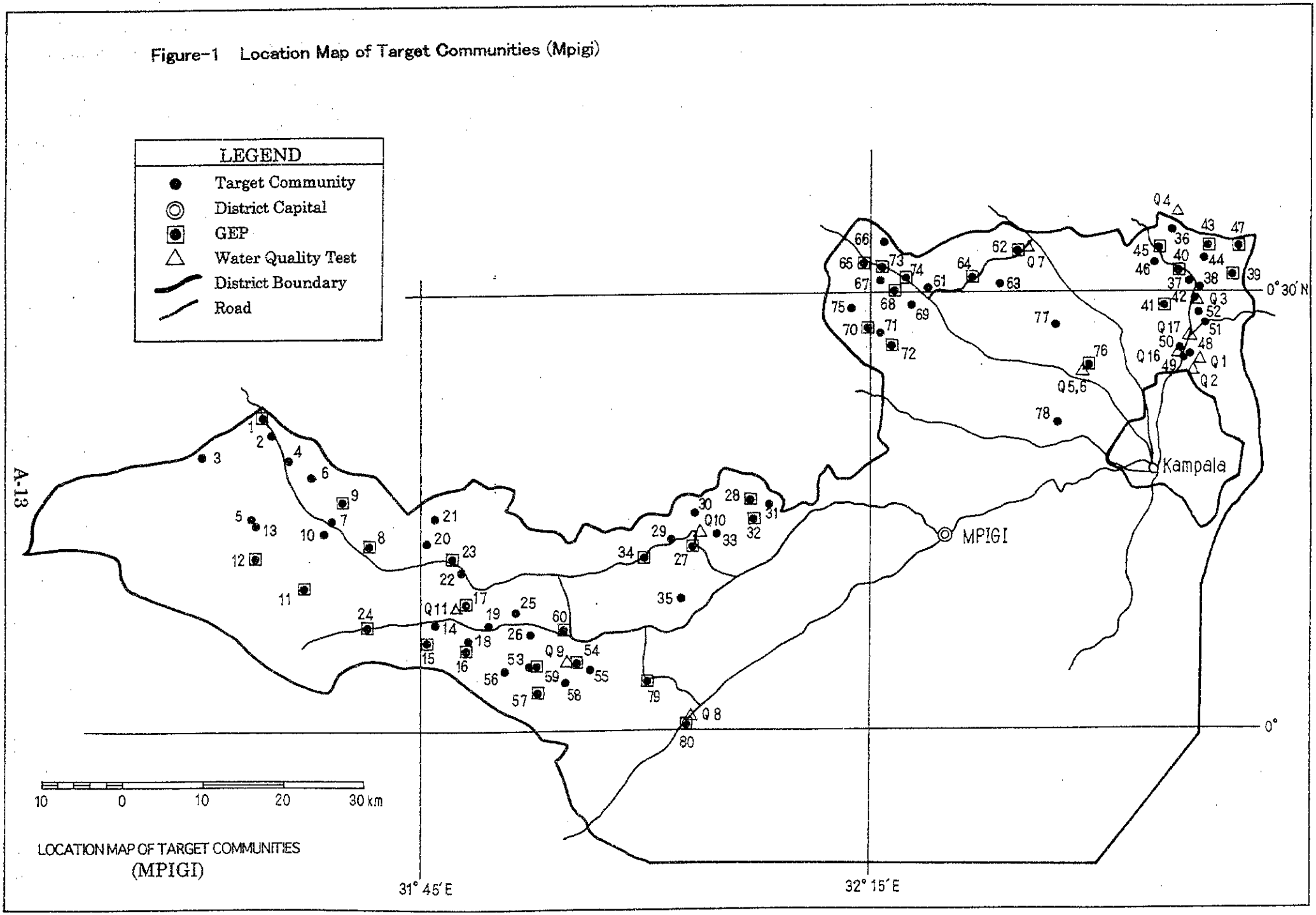
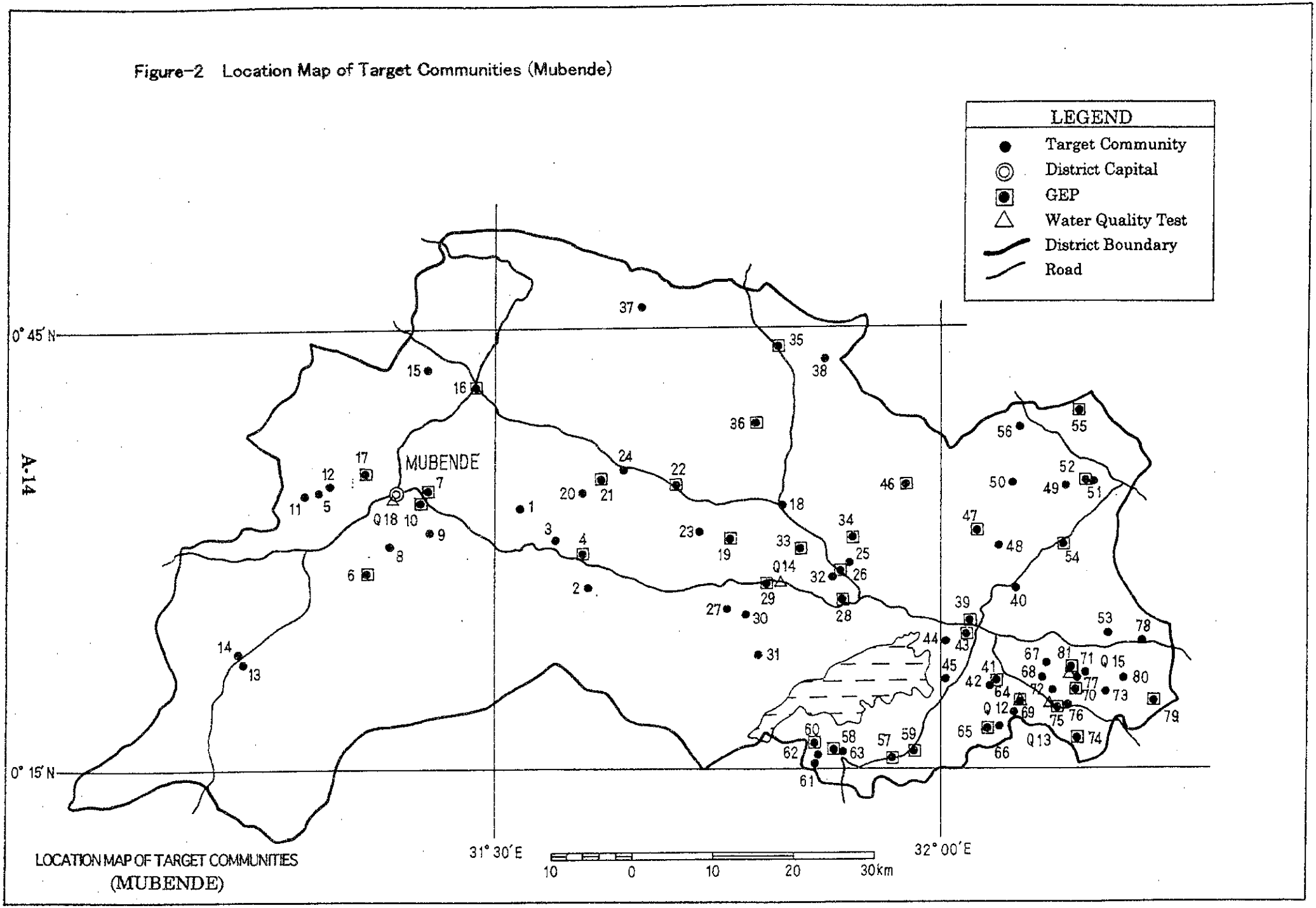
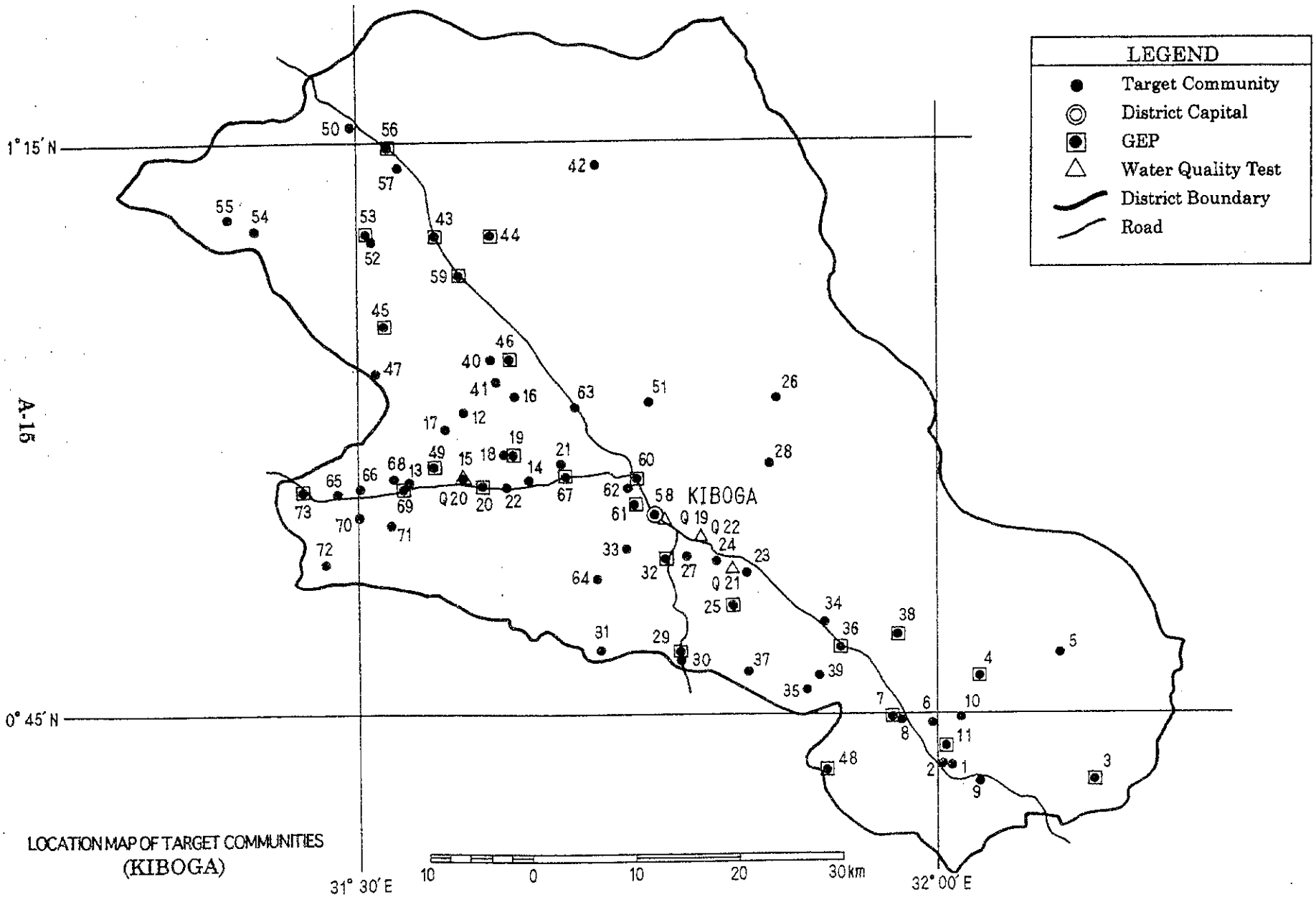


Figure-2 Location Map of Target Communities (Mubende)



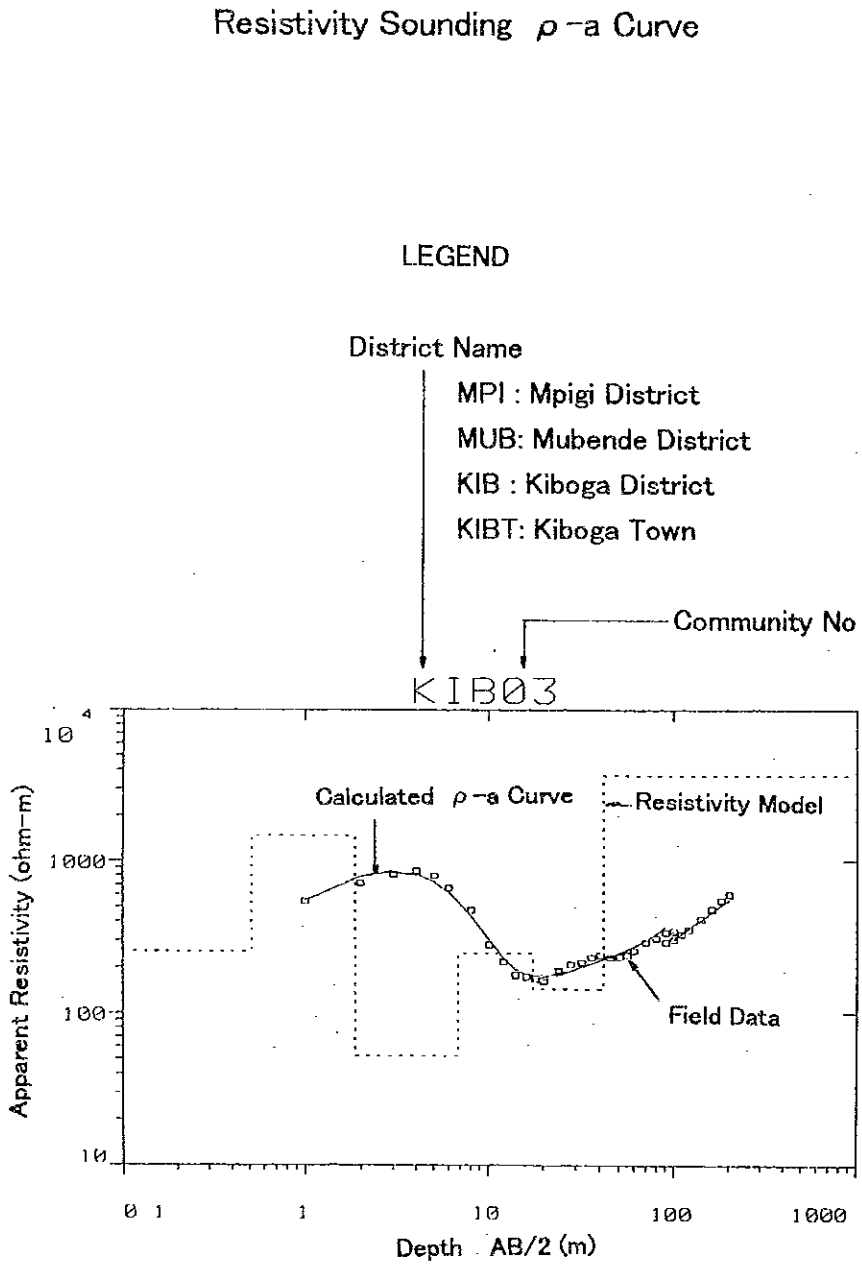
LOCATION MAP OF TARGET COMMUNITIES
(MUBENDE)

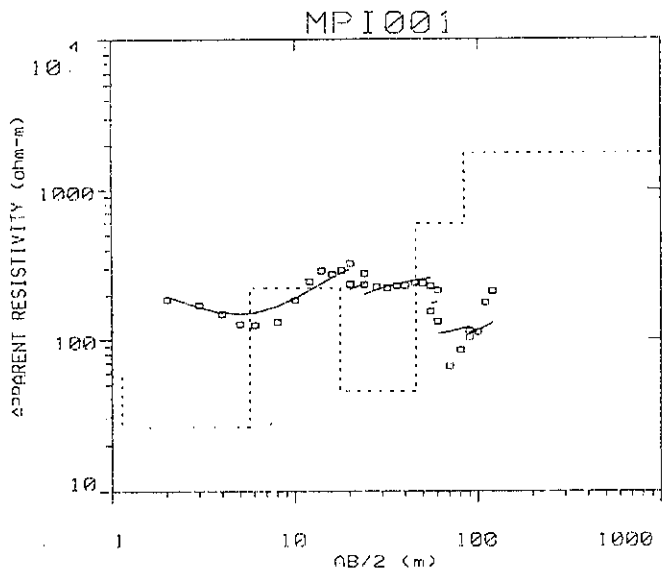
Figure-3 Location Map of Target Communities (Kiboga)

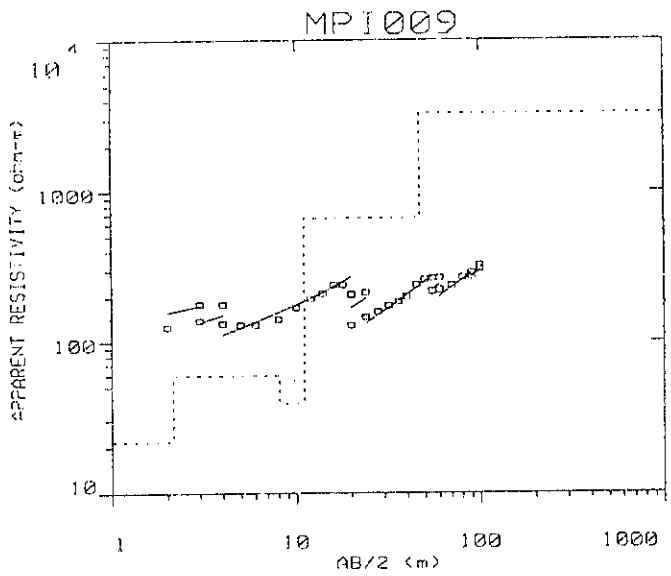


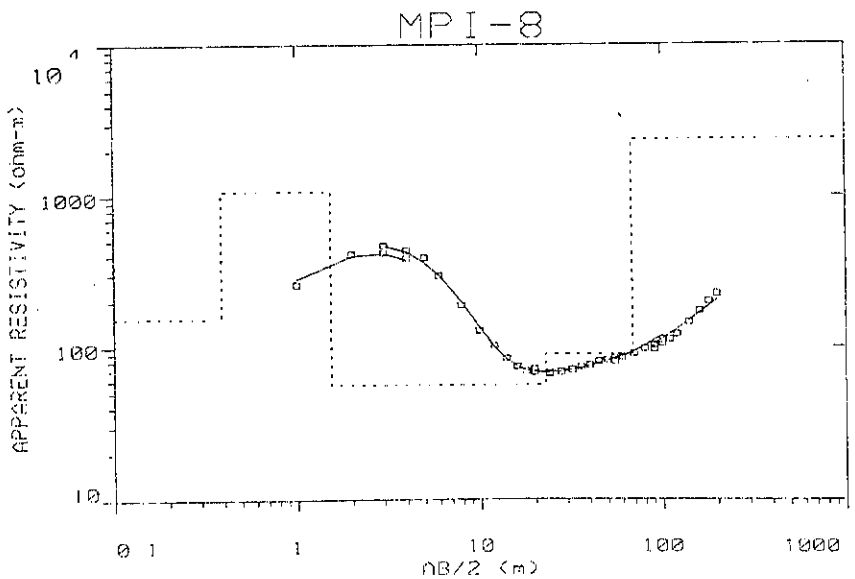
LOCATION MAP OF TARGET COMMUNITIES
(KIBOGA)

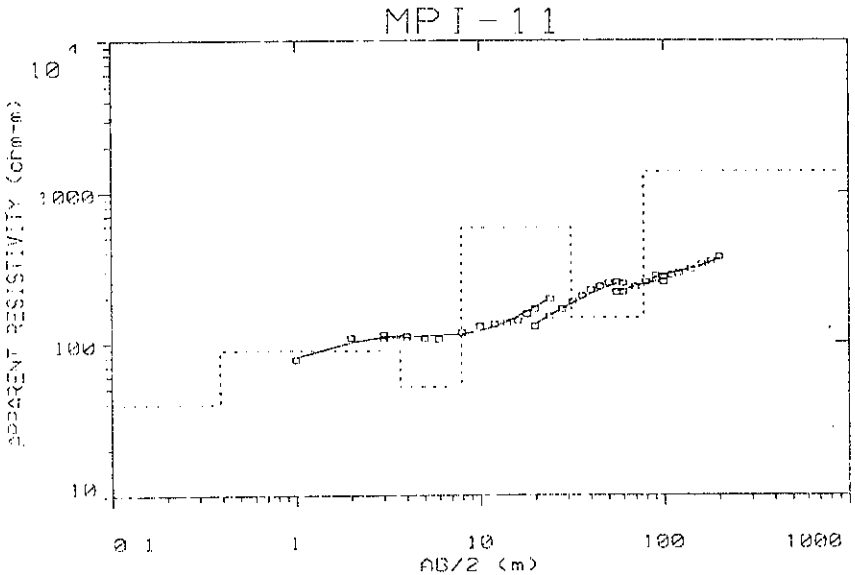
Figure-4 Resistivity Sounding ρ-a Curve (Mpigi District)

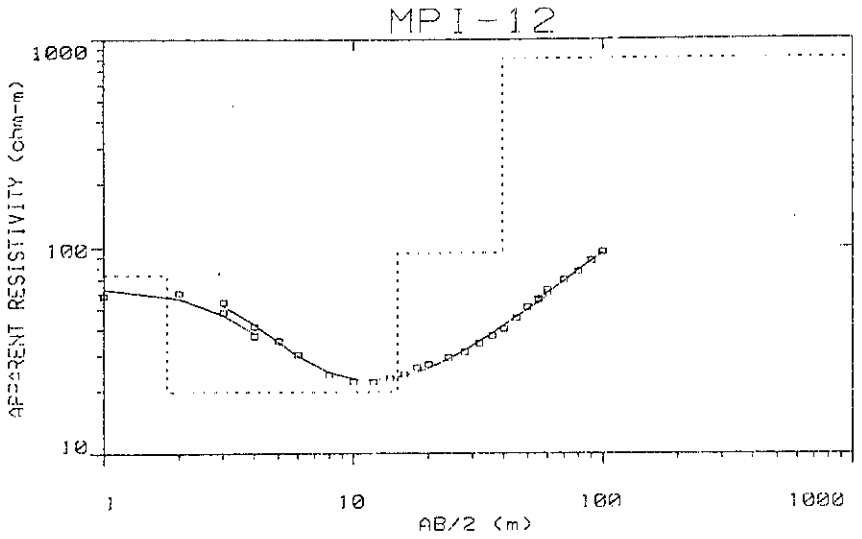


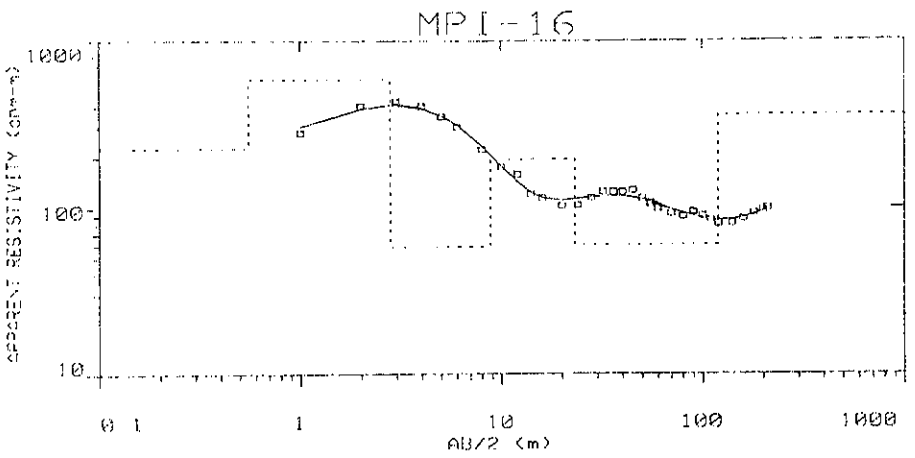

MPI001
APPARENT RESISTIVITY (ohm-m)
AB/2 (m)

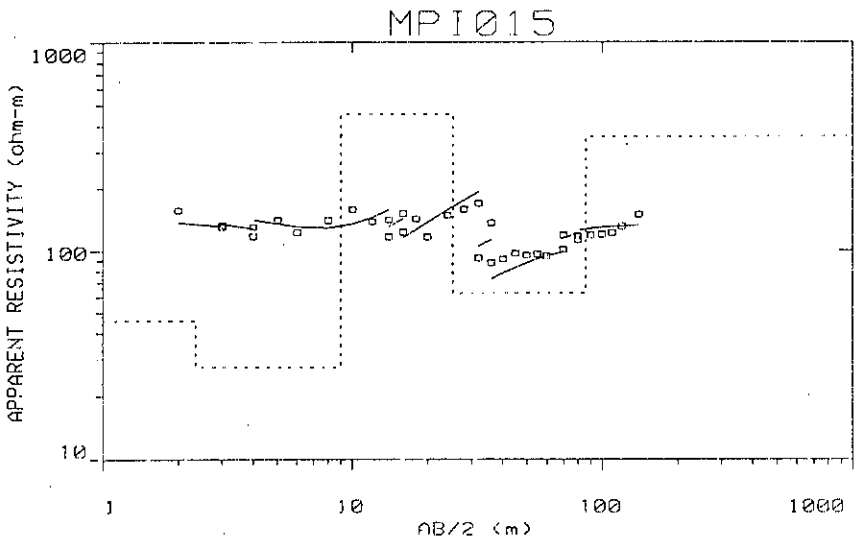

MPI009
APPARENT RESISTIVITY (ohm-m)
AB/2 (m)

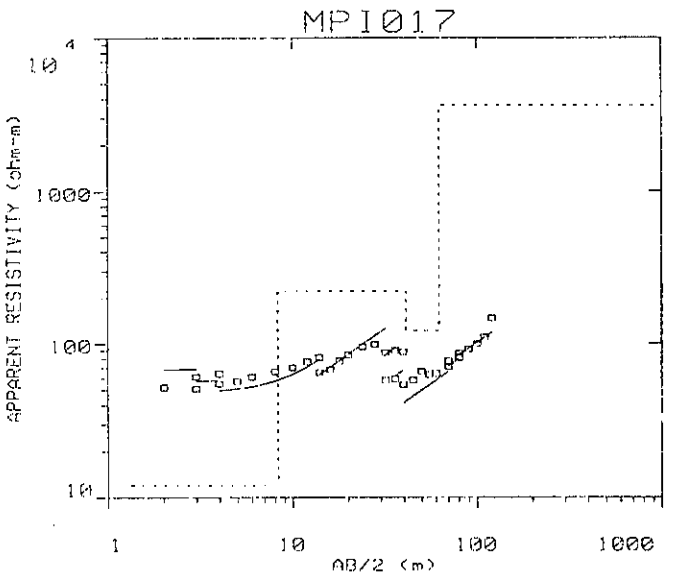

MPI-8
APPARENT RESISTIVITY (ohm-m)
AB/2 (m)

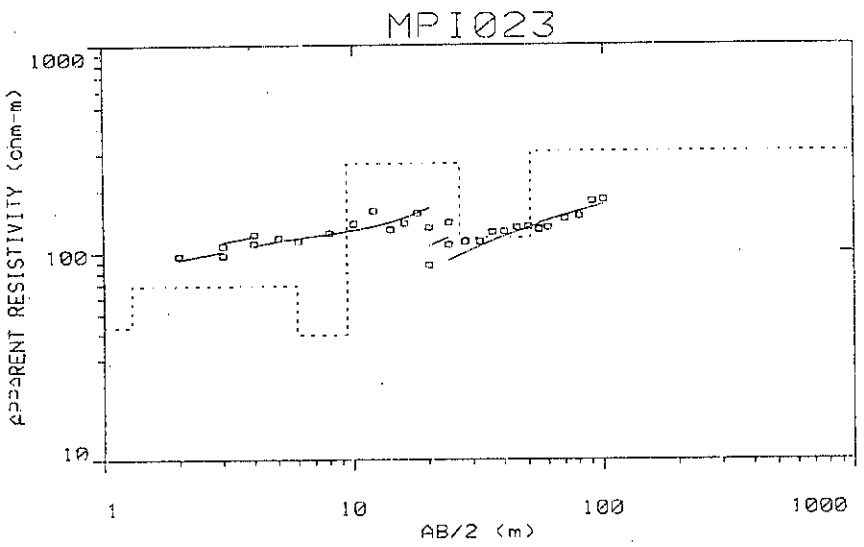

MPI-11
APPARENT RESISTIVITY (ohm-m)
AB/2 (m)

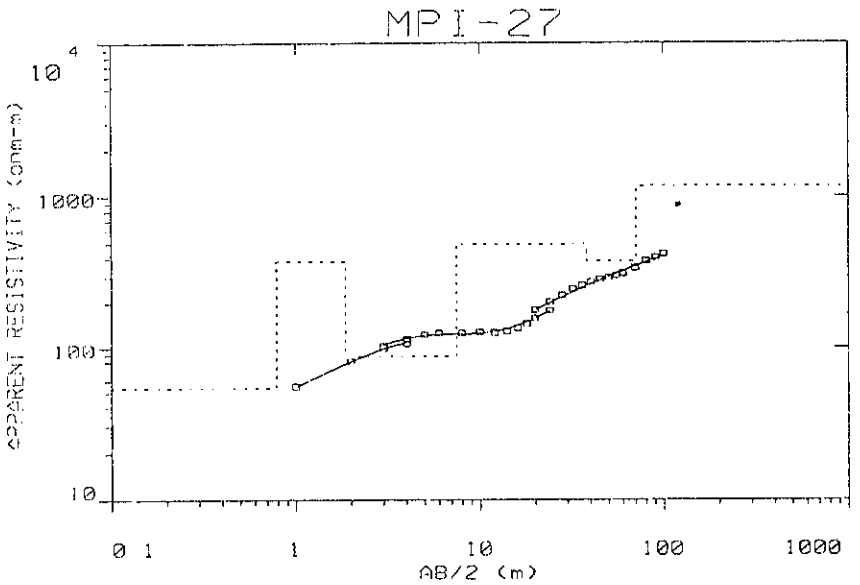

MPI-12
APPARENT RESISTIVITY (ohm-m)
1000
100
10
1
10
100
1000
AB/2 (m)

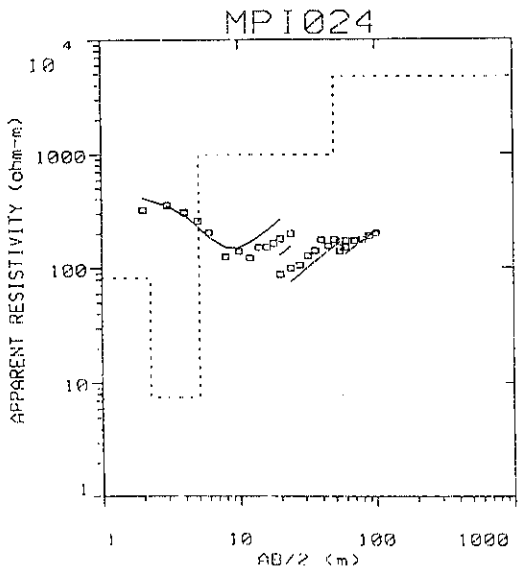

MPI-16
APPARENT RESISTIVITY (ohm-m)
1000
100
10
0.1
1
10
100
1000
AB/2 (m)

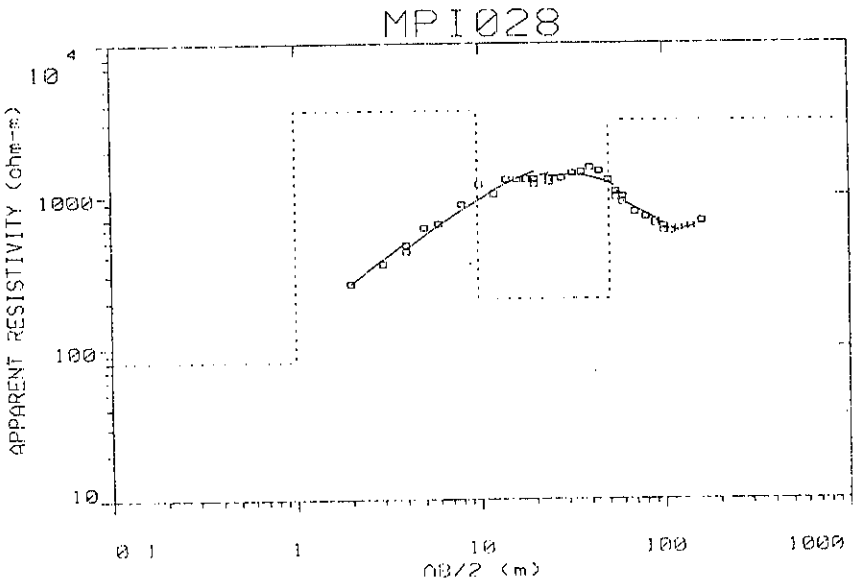

MPI015
APPARENT RESISTIVITY (ohm-m)
1000
100
10
1
10
100
1000
AB/2 (m)

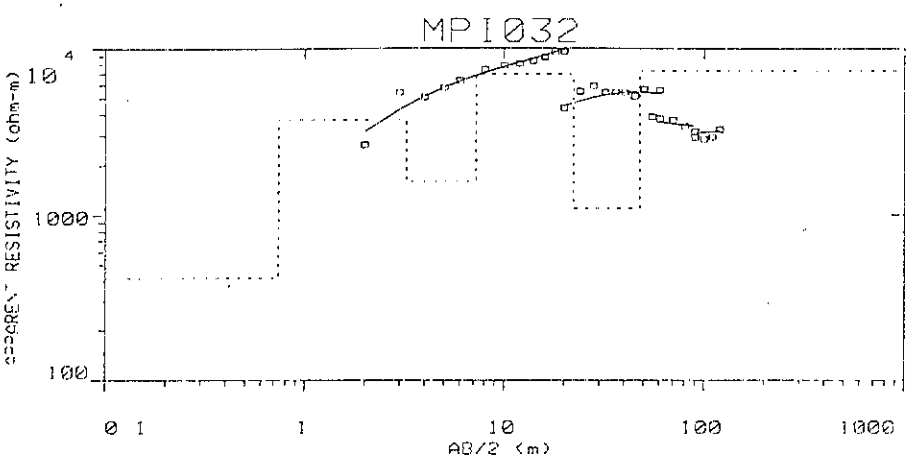

MPI017
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
10
1
10
100
1000
AB/2 (m)

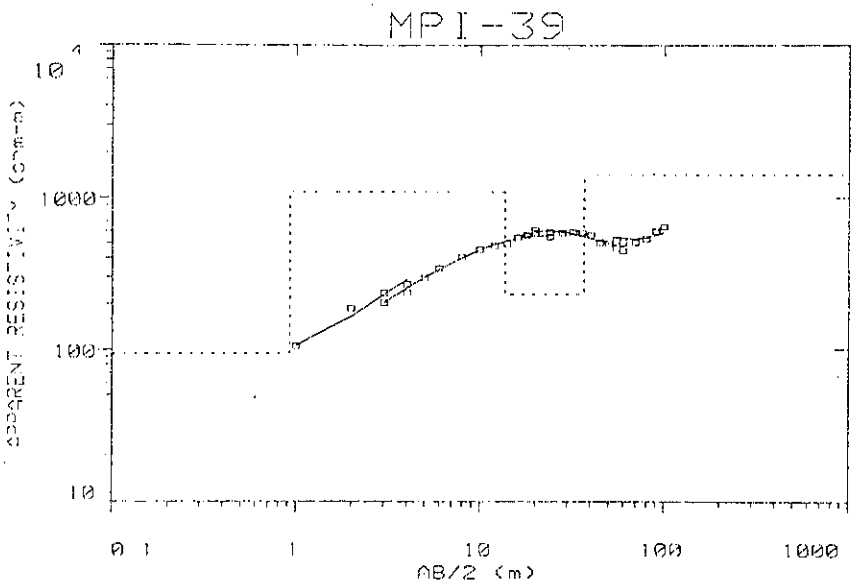

MPI023
APPARENT RESISTIVITY (ohm-m)
1000
100
10
1
10
100
1000
AB/2 (m)

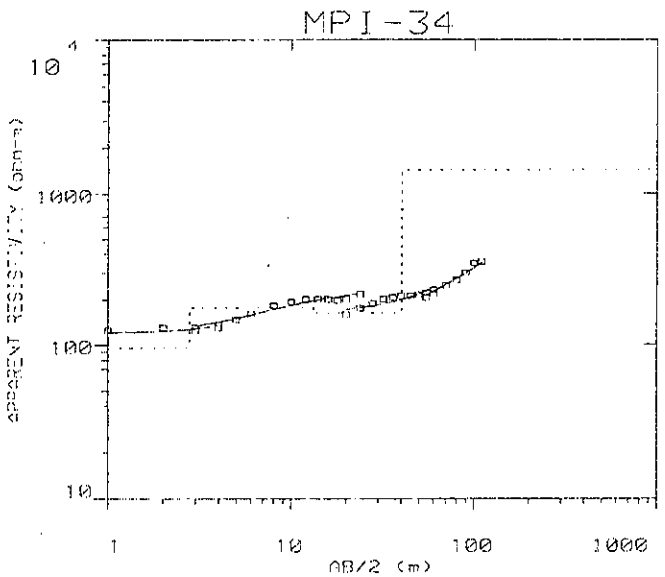

MPI-27
APPARENT RESISTIVITY (ohm-m)
10 4
1000
100
10
0 1
1
10
100
1000
AB/2 (m)

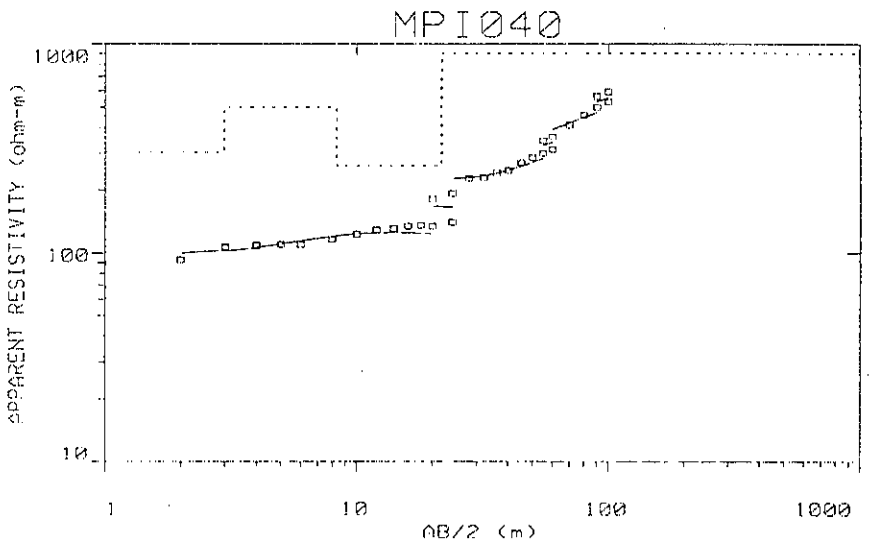

MPI024
APPARENT RESISTIVITY (ohm-m)
10 4
1000
100
10
1
1
10
100
1000
AB/2 (m)

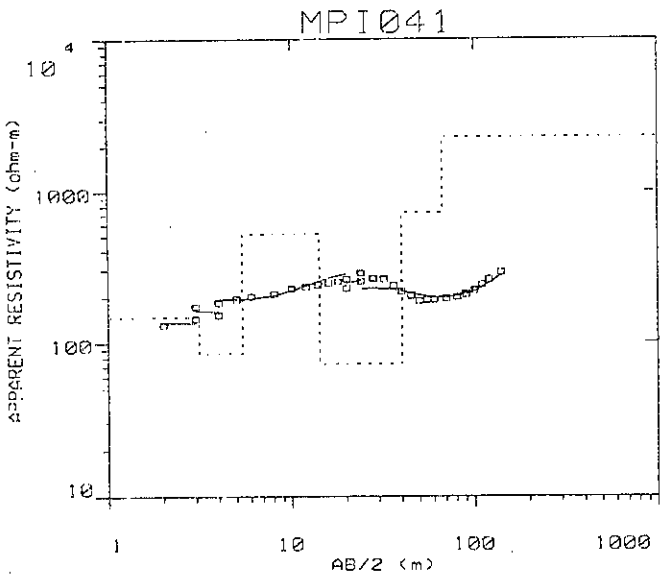

MPI028
APPARENT RESISTIVITY (ohm-m)
10 4
1000
100
10
0 1
1
10
100
1000
AB/2 (m)

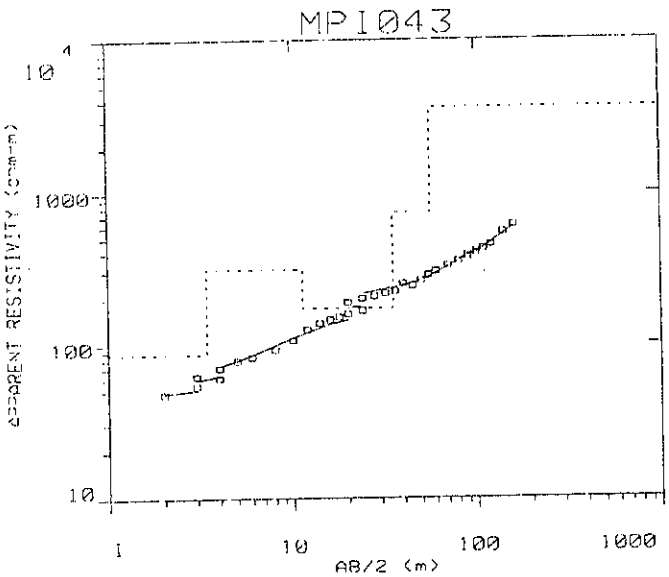

MPI032
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
0.1
1
10
100
1000
AB/2 (m)

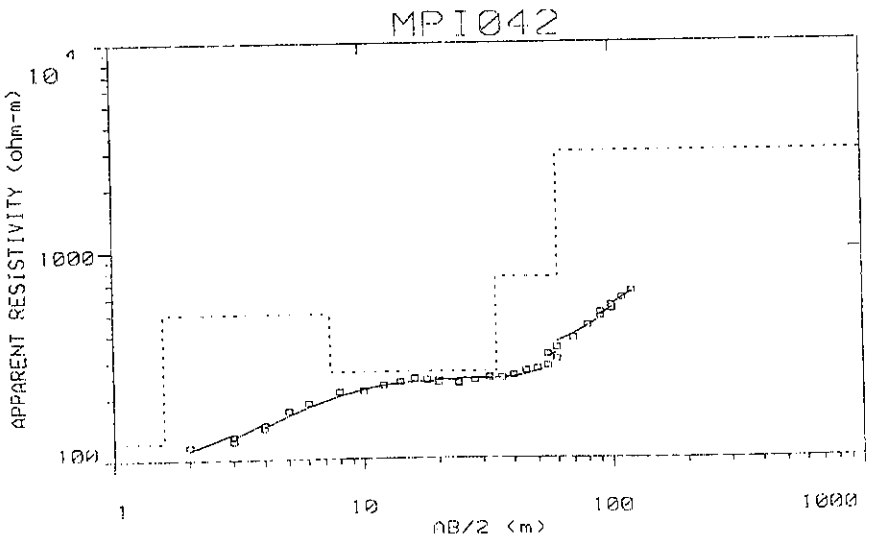

MPI-39
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
10
0.1
1
10
100
1000
AB/2 (m)

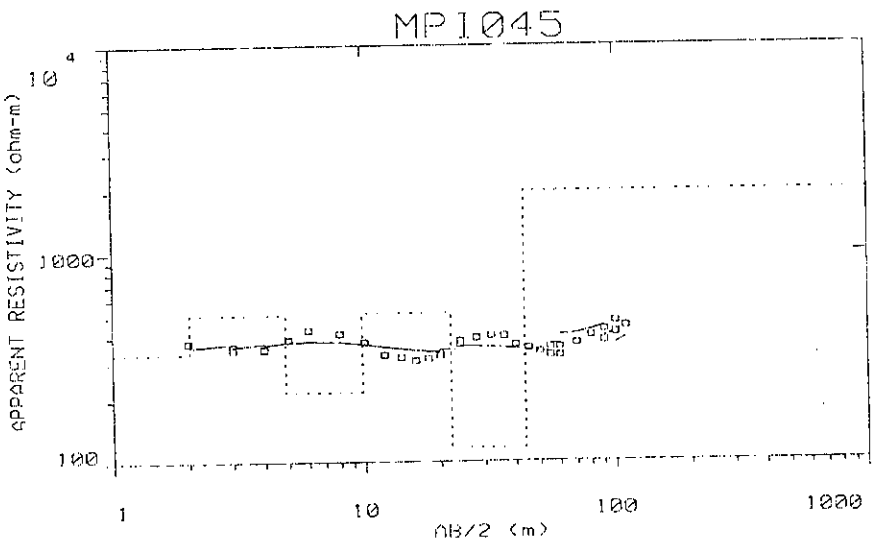

MPI-34
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
10
1
10
100
1000
AB/2 (m)

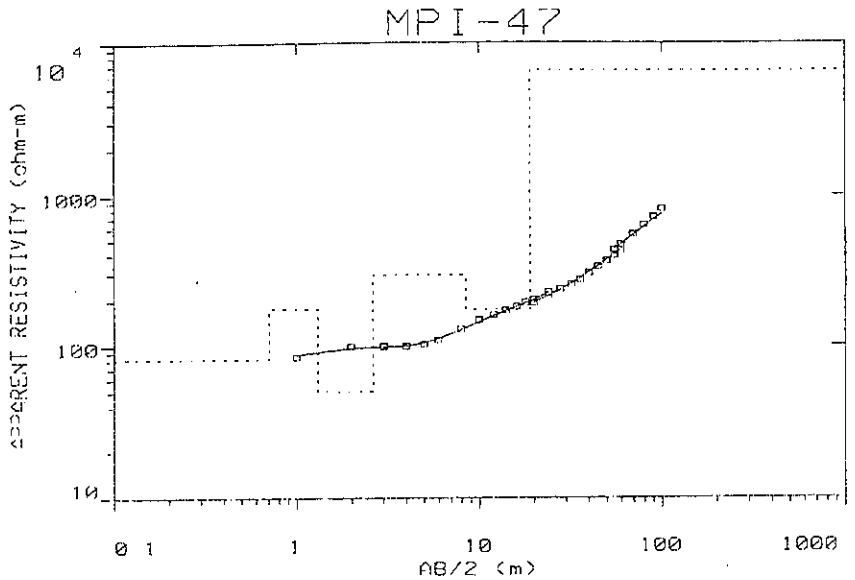

MPI040
APPARENT RESISTIVITY (ohm-m)
1000
100
10
1
10
100
1000
AB/2 (m)

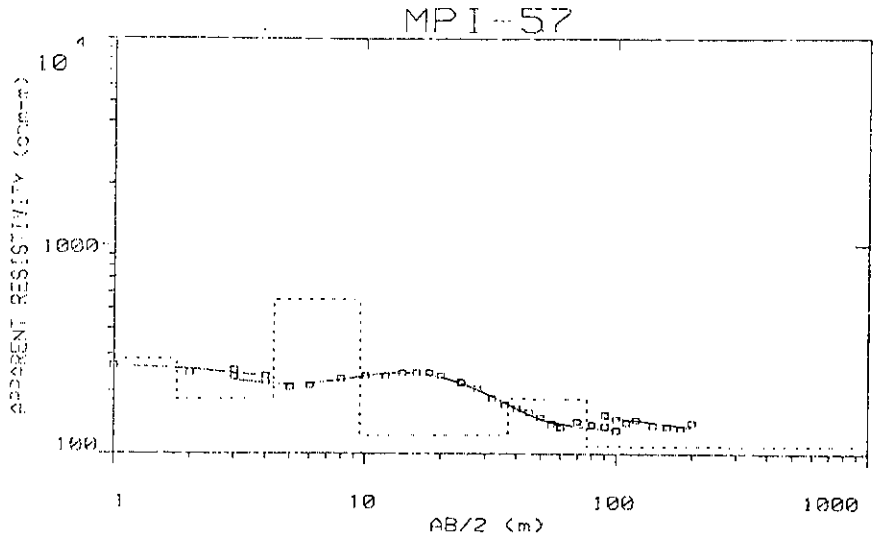

MPI041
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
10
1
10
100
1000
AB/2 (m)

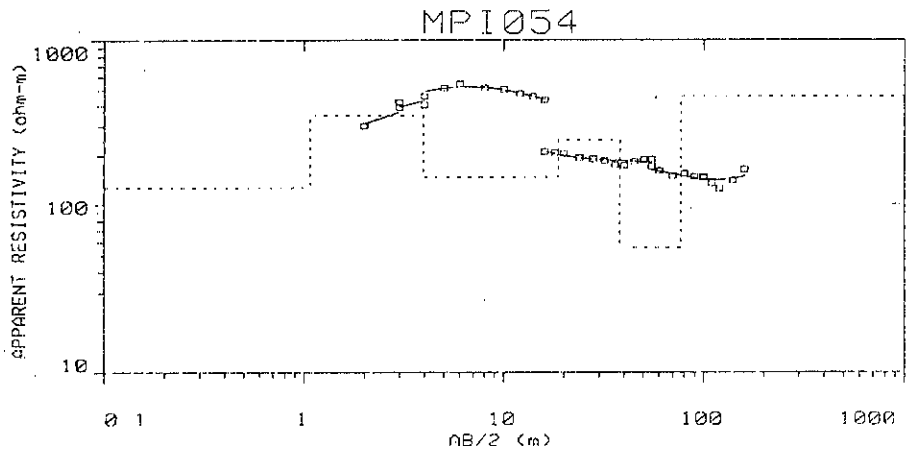

MPI043
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
10
1
10
100
1000
AB/2 (m)

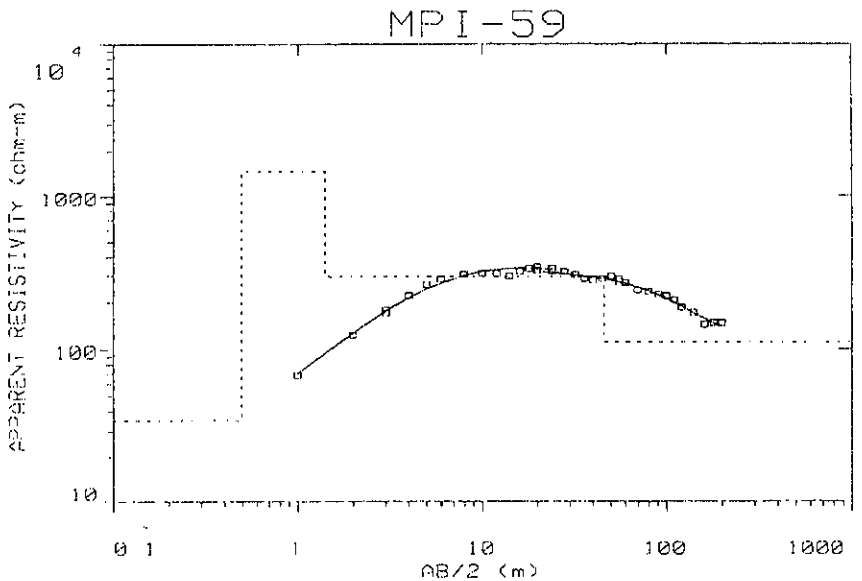

MPI042
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
1
10
100
1000
AB/2 (m)

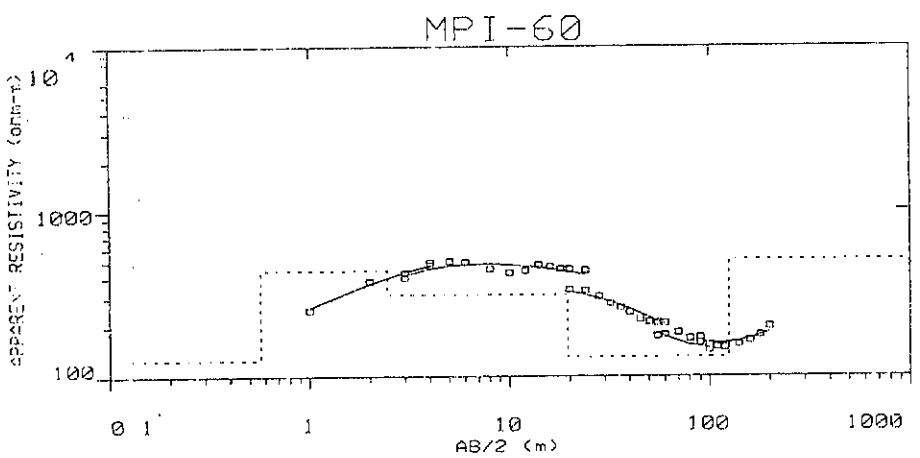

MPI045
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
1
10
100
1000
AB/2 (m)

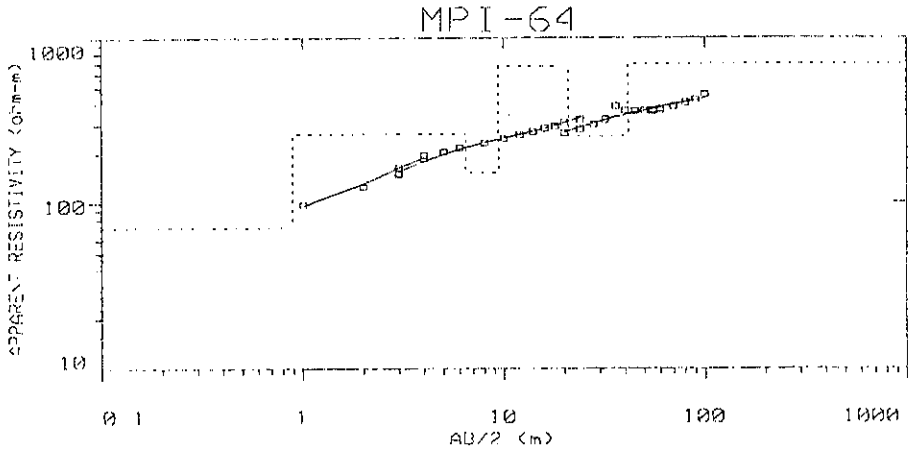

MPI-47
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
10
0 1
1
10
100
1000
AB/2 (m)

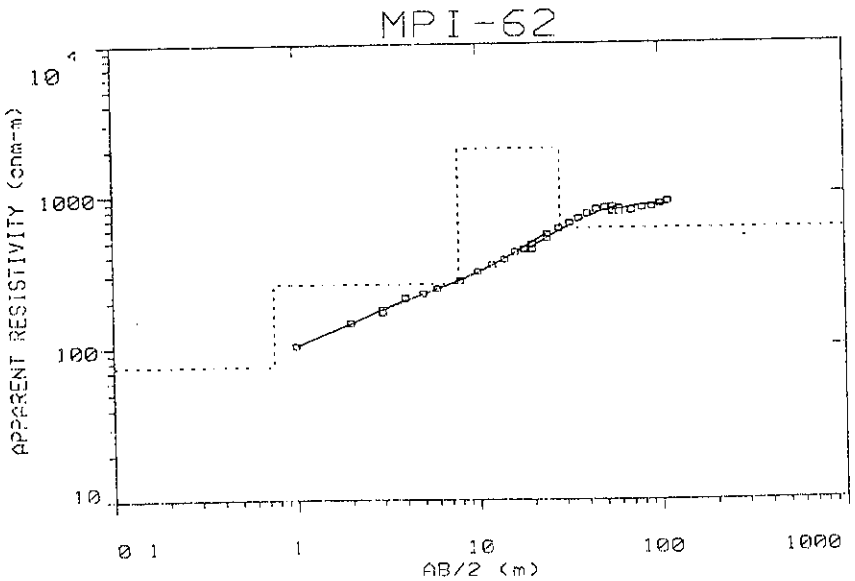

MPI-57
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
1
10
100
1000
AB/2 (m)

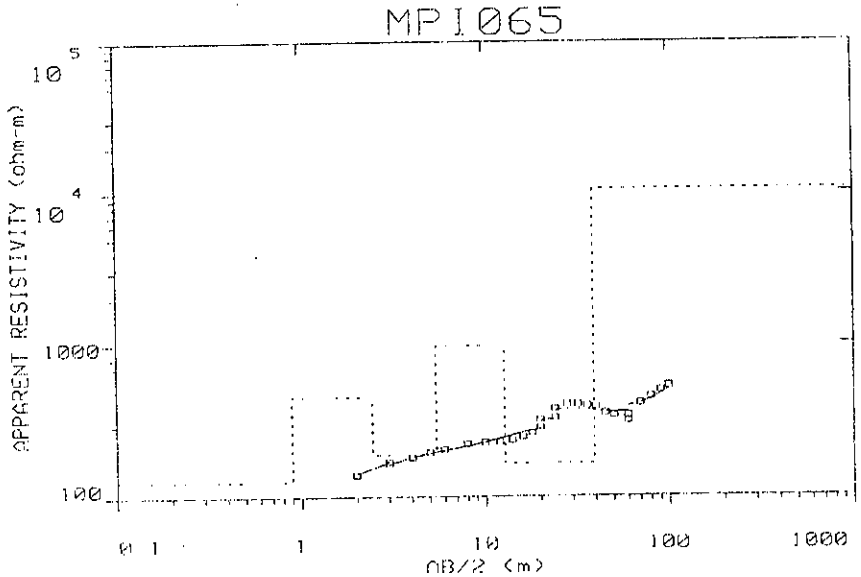

MPI054
APPARENT RESISTIVITY (ohm-m)
1000
100
10
0 1
1
10
100
1000
AB/2 (m)

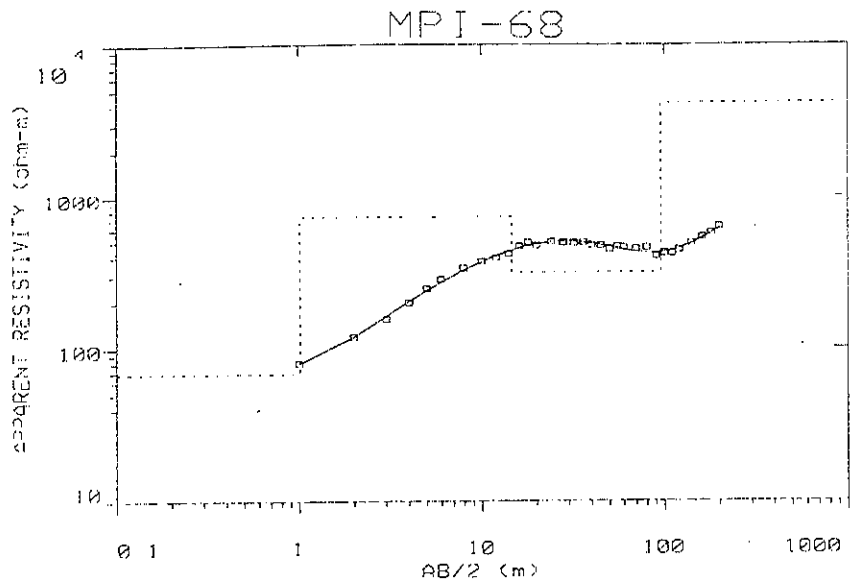

MPI-59
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
10
0 1
1
10
100
1000
AB/2 (m)

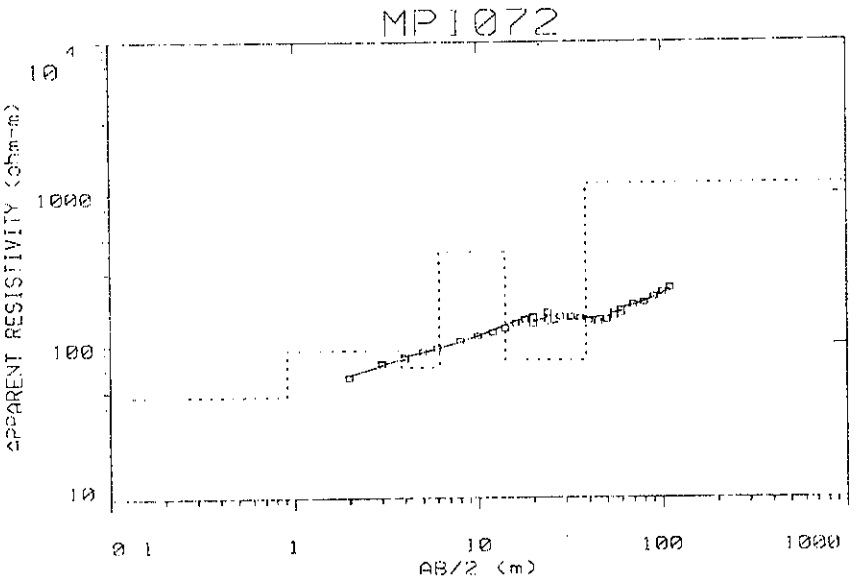

MPI-60
APPARENT RESISTIVITY (ohm-m)
10000
1000
100
0 1
1
10
100
1000
AB/2 (m)

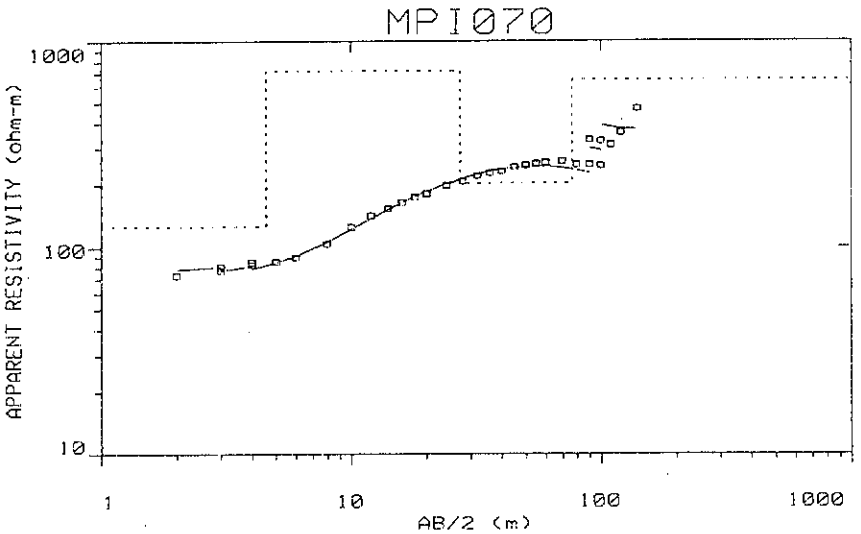

MPI-64
APPARENT RESISTIVITY (ohm-m)
1000
100
10
0 1
1
10
100
1000
AB/2 (m)

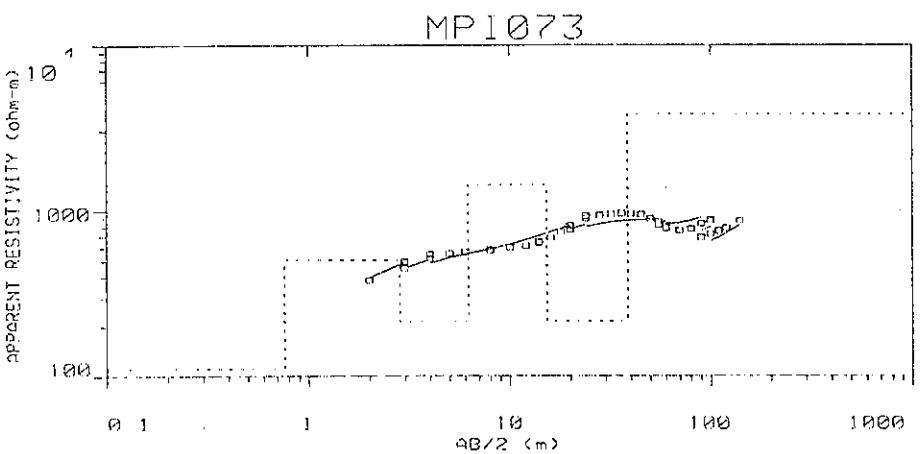

MPI-62
APPARENT RESISTIVITY (ohm-m)
10000
1000
100
10
0 1
1
10
100
1000
AB/2 (m)

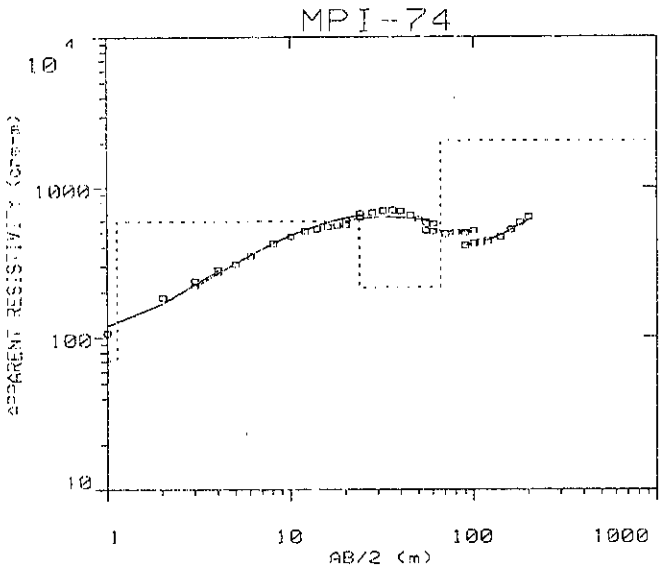

MPI065
APPARENT RESISTIVITY (ohm-m)
100000
10000
1000
100
0 1
1
10
100
1000
AB/2 (m)

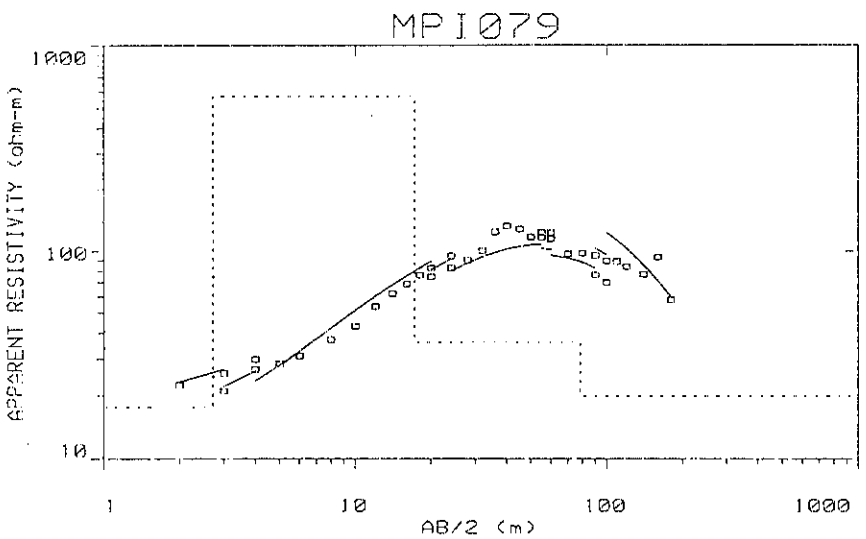

MPI-68
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
10
0 1
1
10
100
1000
AB/2 (m)

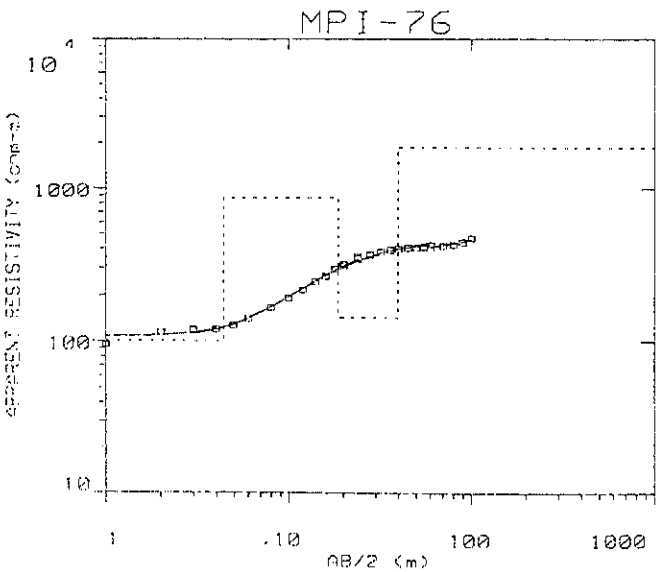

MPI072
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
10
0 1
1
10
100
1000
AB/2 (m)

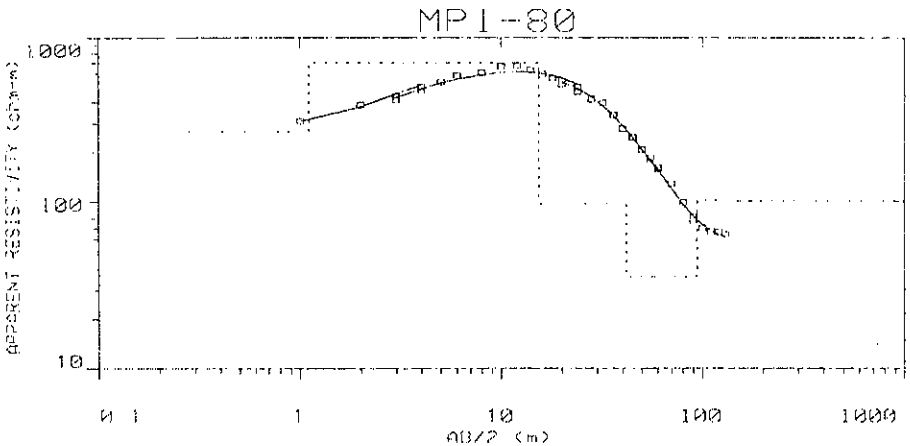

MPI070
APPARENT RESISTIVITY (ohm-m)
1000
100
10
1
10
100
1000
AB/2 (m)


MPI073
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
0 1
1
10
100
1000
AB/2 (m)


MPI-74
APPARENT RESISTIVITY (ohm-m)
10
1000
100
10
1
10
100
1000
AB/2 (m)

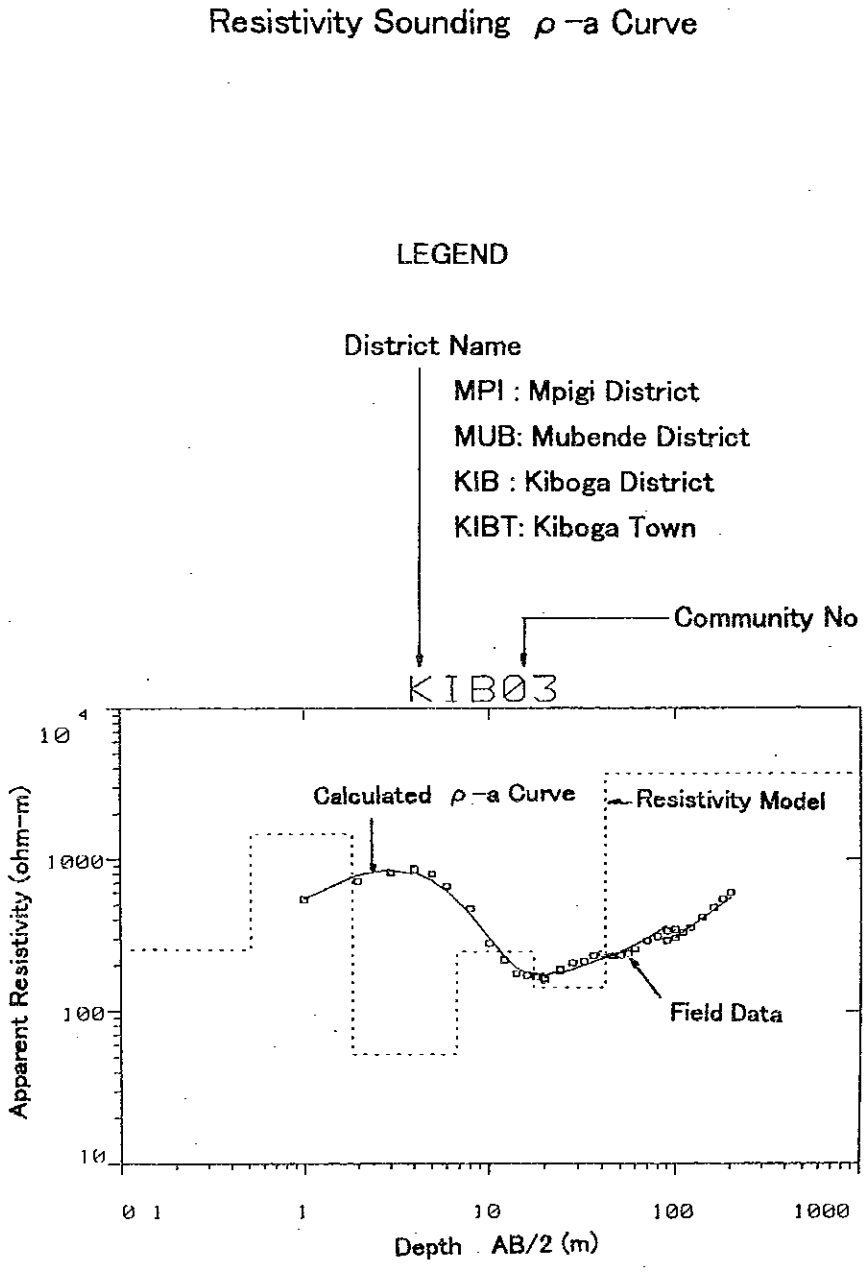

MPI079
APPARENT RESISTIVITY (ohm-m)
1000
100
10
1
10
100
1000
AB/2 (m)

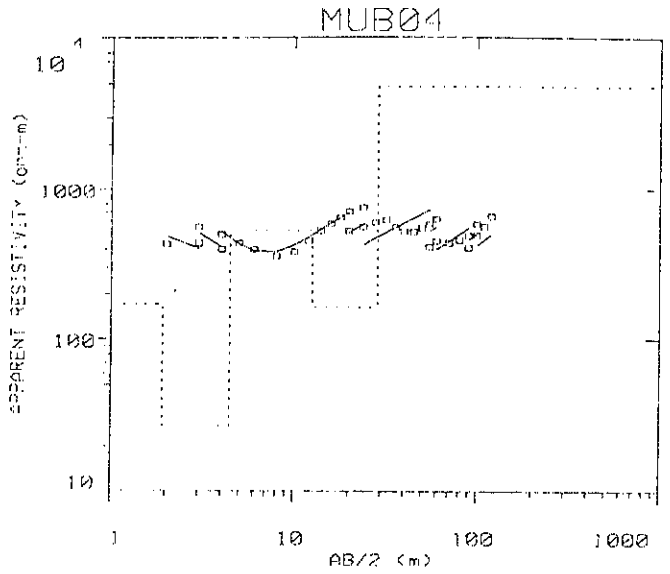

MPI-76
APPARENT RESISTIVITY (ohm-m)
10
1000
100
10
1
10
100
1000
AB/2 (m)

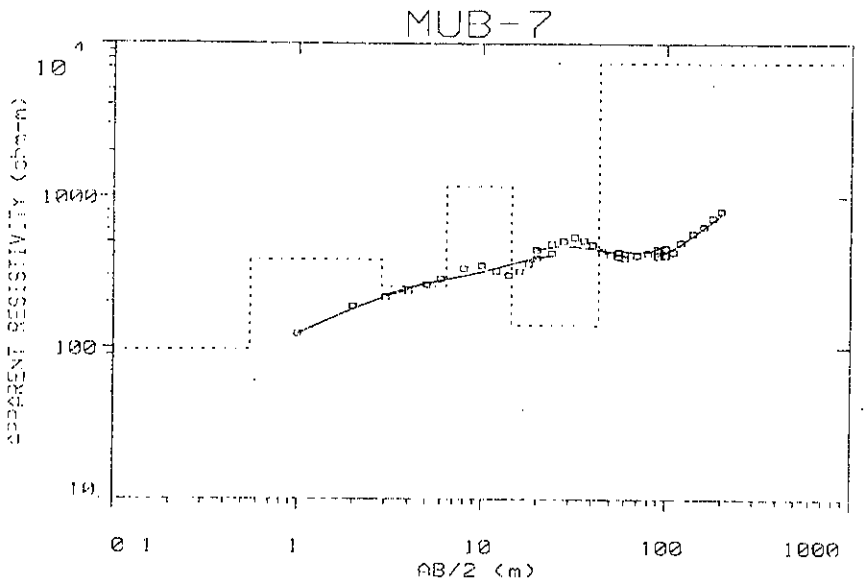

MPI-80
1000
100
10
1
10
100
1000
AB/2 (m)

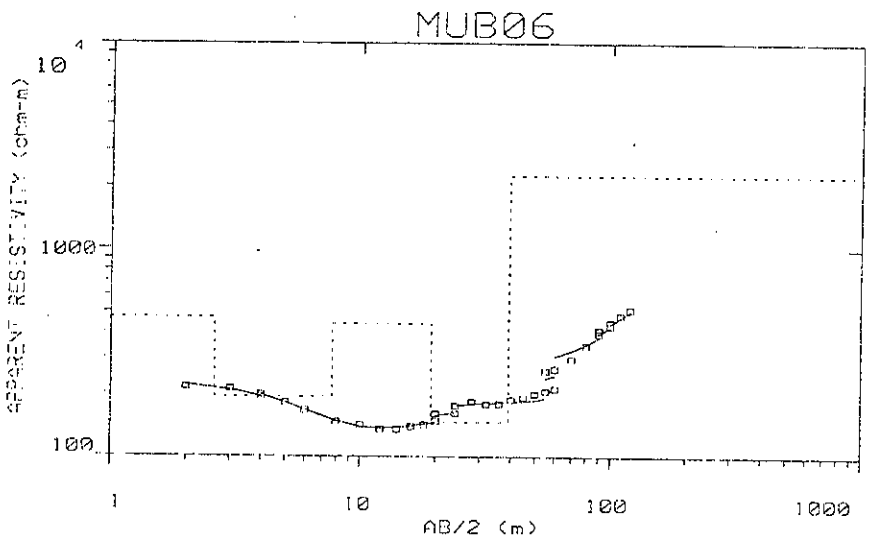
SEETA, BH
APPARENT RESISTIVITY (ohm-m)
1000
100
10
0.1
1
10
100
1000
AB/2 (m)

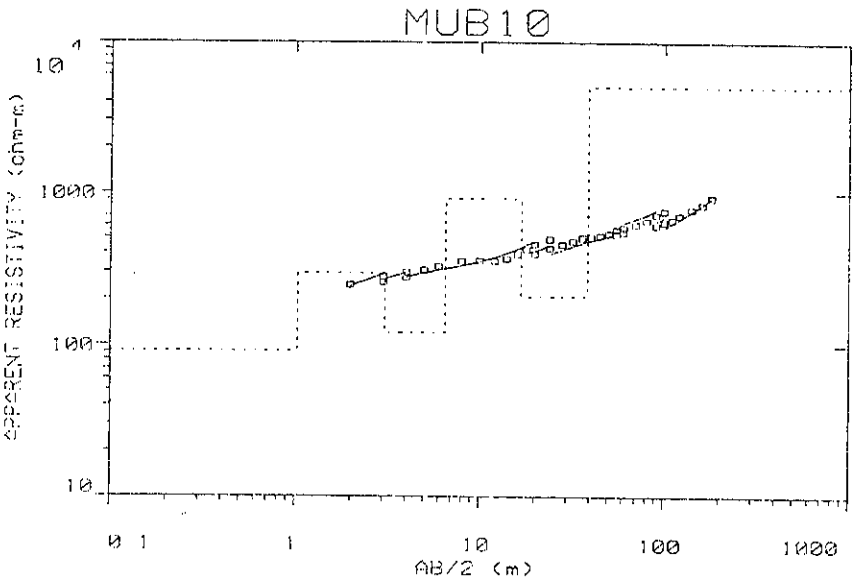
Figure-5 Resistivity Sounding ρ-a Curve (Mubende District)

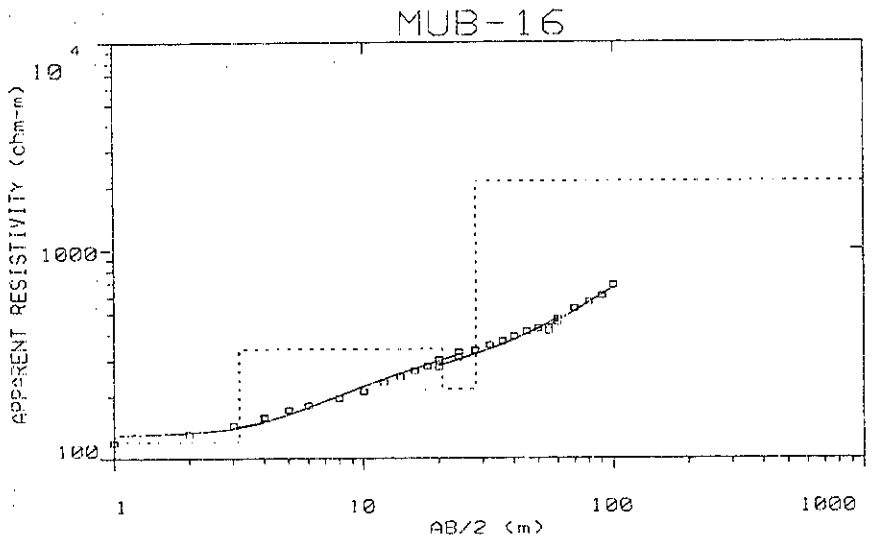


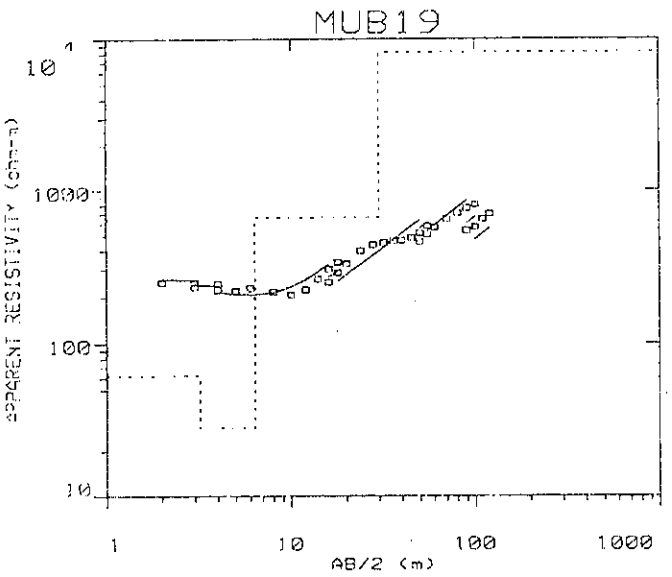

MUB04
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
10
1
10
100
1000
AB/2 (m)

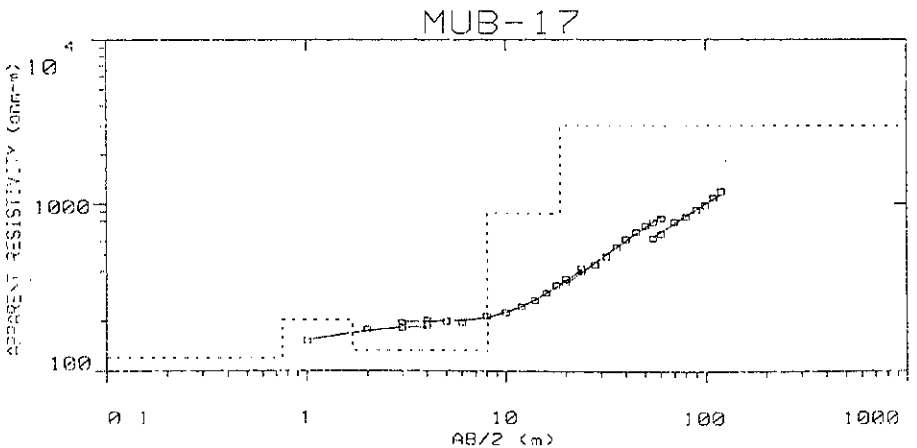

MUB-7
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
10
0.1
1
10
100
1000
AB/2 (m)

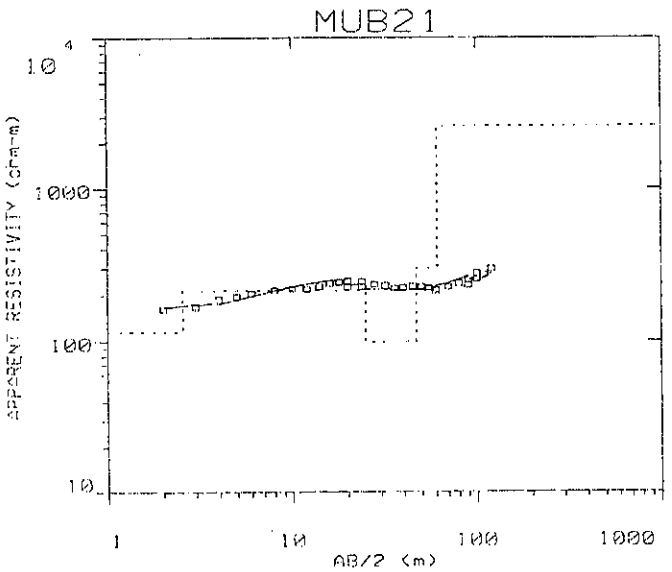

MUB06
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
1
10
100
1000
AB/2 (m)

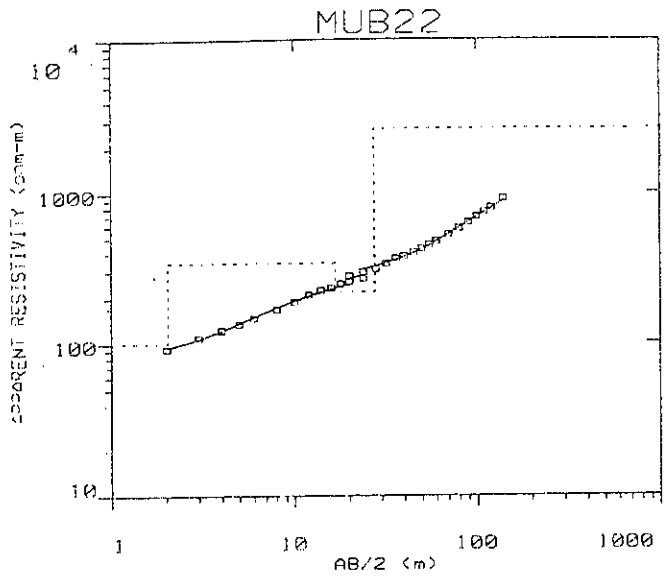

MUB10
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
10
0.1
1
10
100
1000
AB/2 (m)

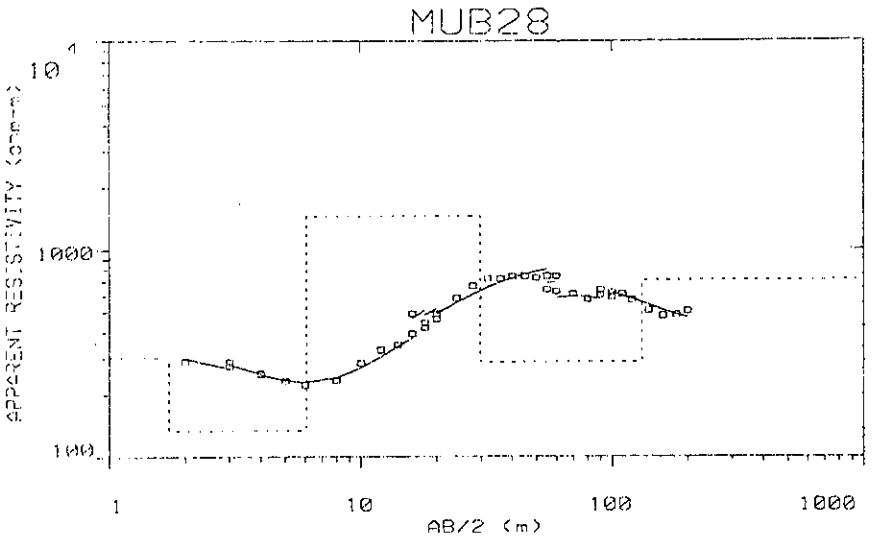

MUB-16
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
1
10
100
1000
AB/2 (m)

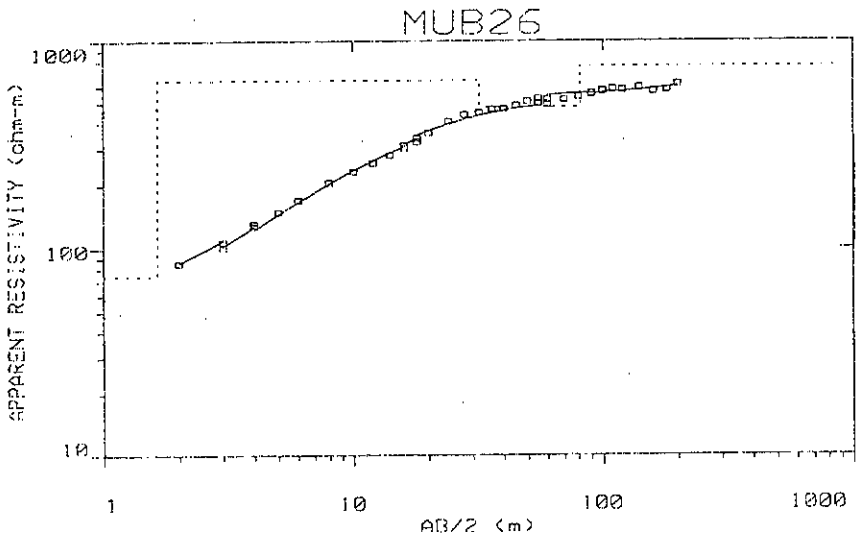

MUB19
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
10
1
10
100
1000
AB/2 (m)

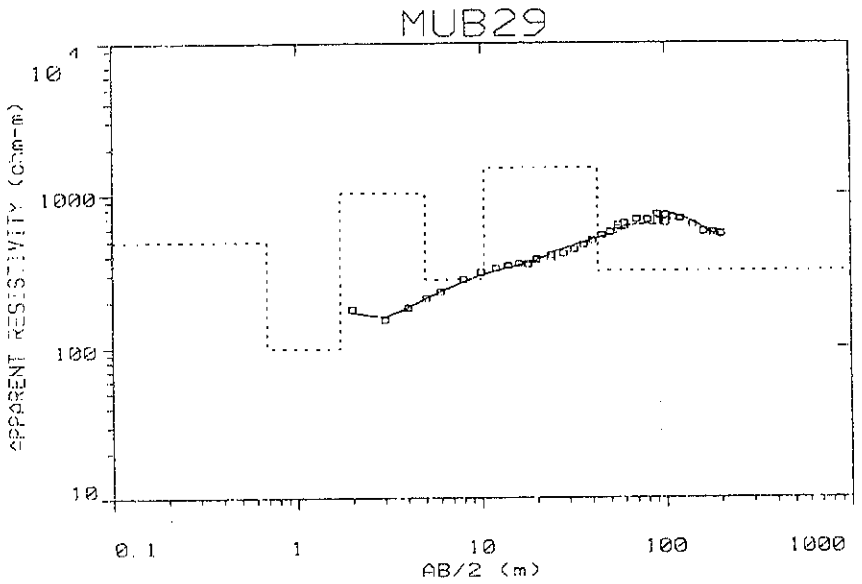

MUB-17
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
0 1
1
10
100
1000
AB/2 (m)

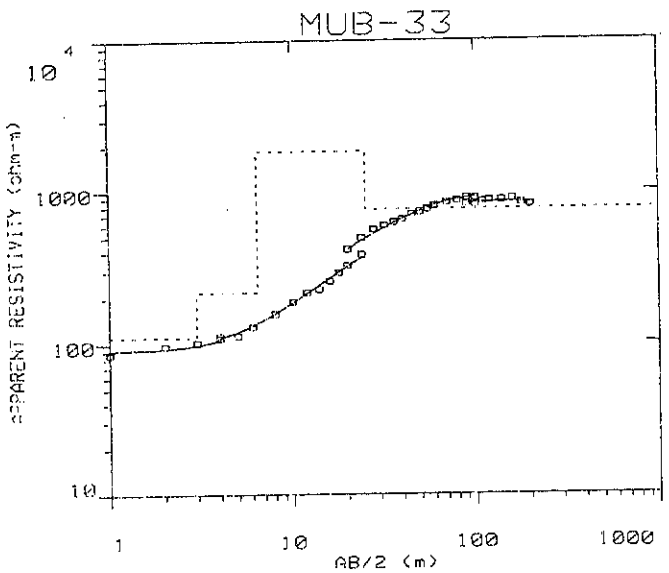

MUB21
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
10
1
10
100
1000
AB/2 (m)

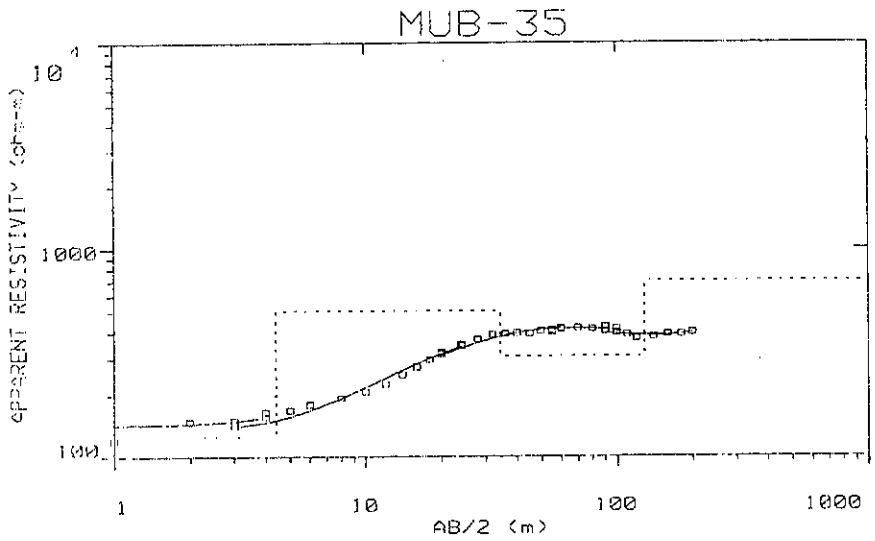

MUB22
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
10
1
10
100
1000
AB/2 (m)

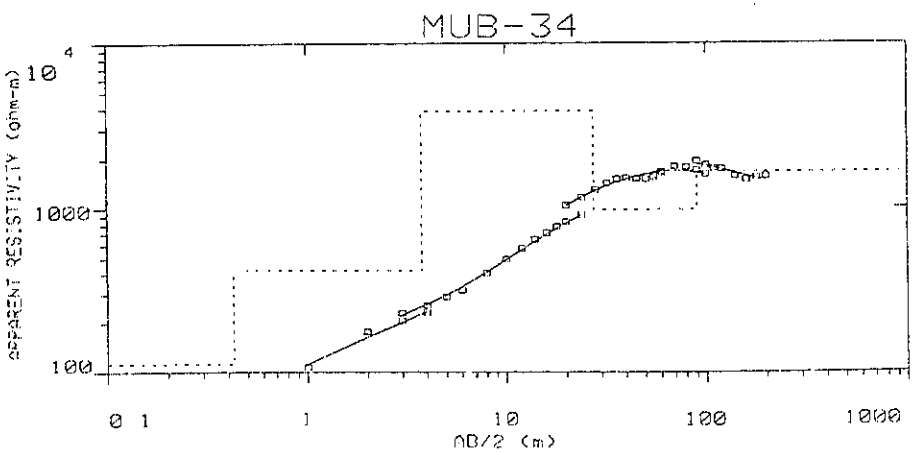

MUB28
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
1
10
100
1000
AB/2 (m)

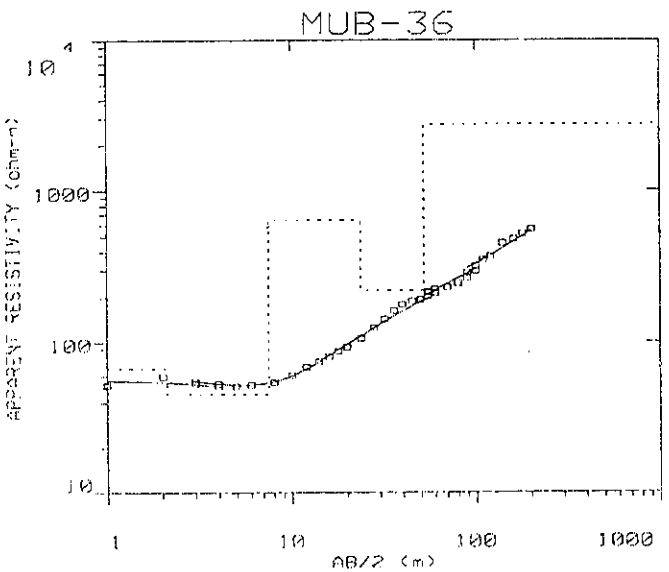

MUB26
APPARENT RESISTIVITY (ohm-m)
1000
100
10
1
10
100
1000
AB/2 (m)

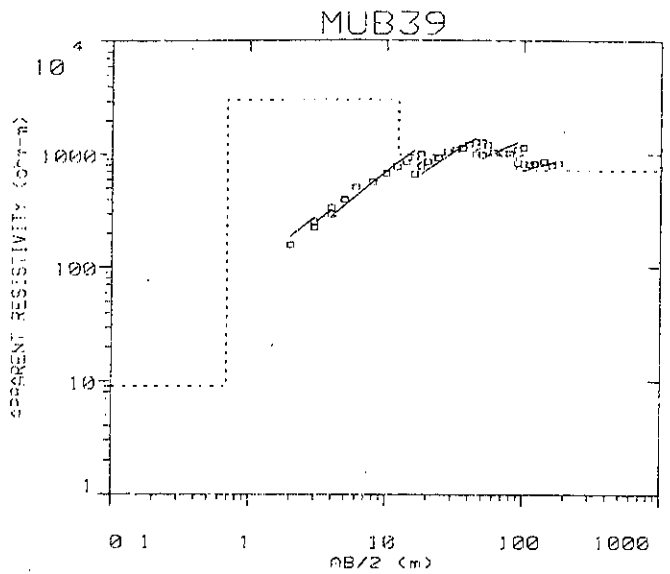

MUB29
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
10
0.1
1
10
100
1000
AB/2 (m)

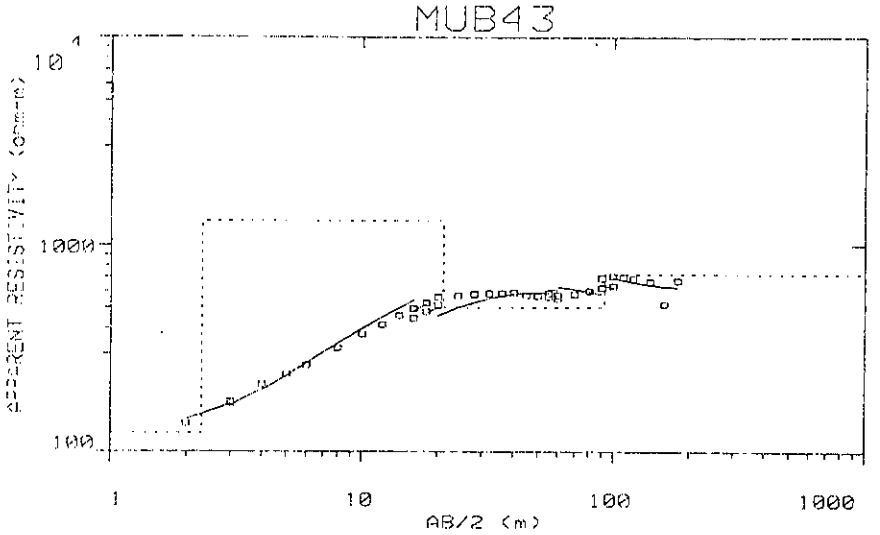

MUB-33
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
10
1
10
100
1000
AB/2 (m)

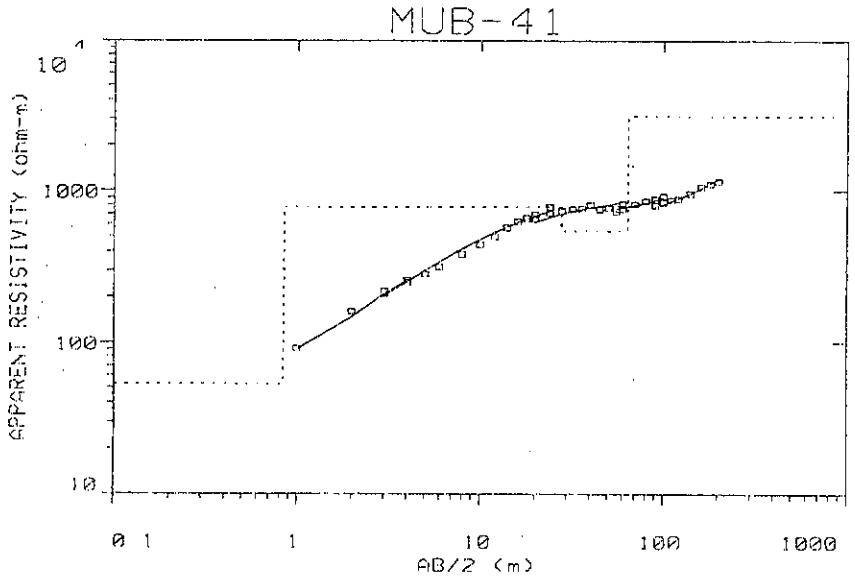

MUB-35
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
1
10
100
1000
AB/2 (m)

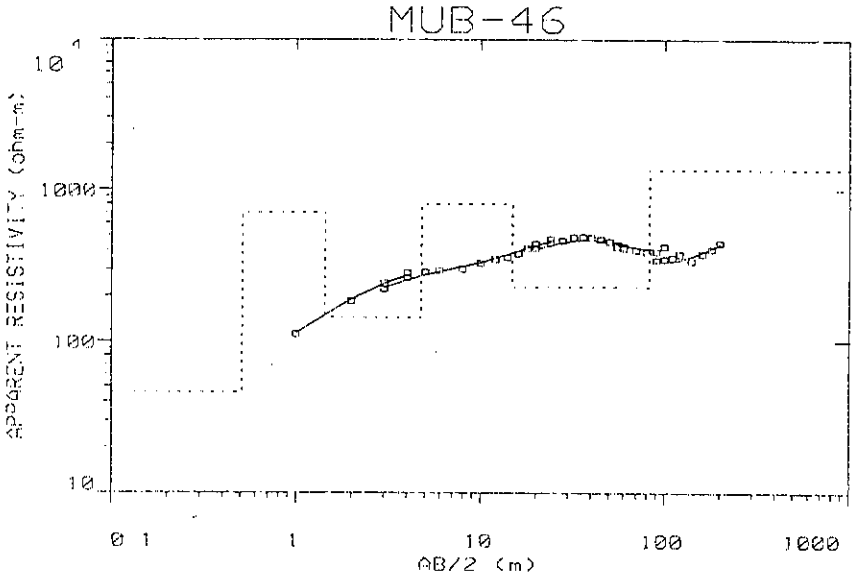

MUB-34
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
0 1
1
10
100
1000
AB/2 (m)

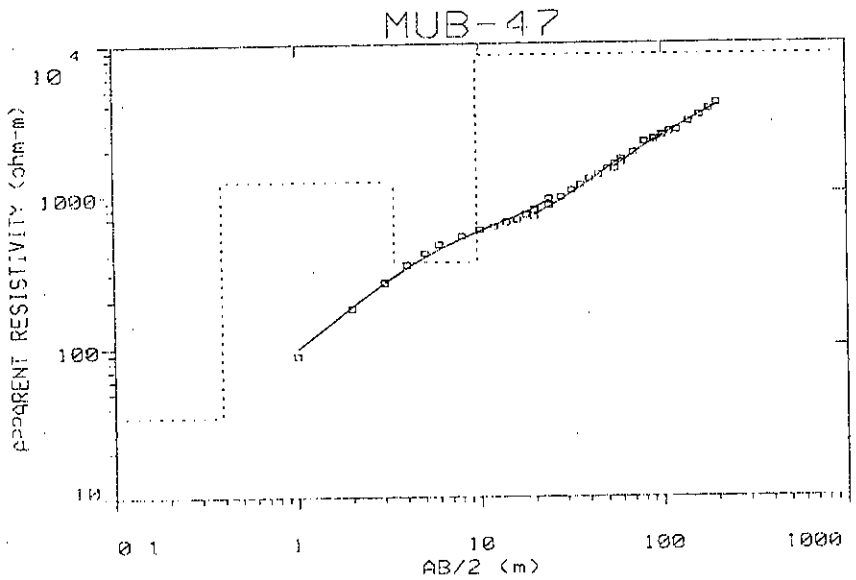

MUB-36
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
10
1
10
100
1000
AB/2 (m)

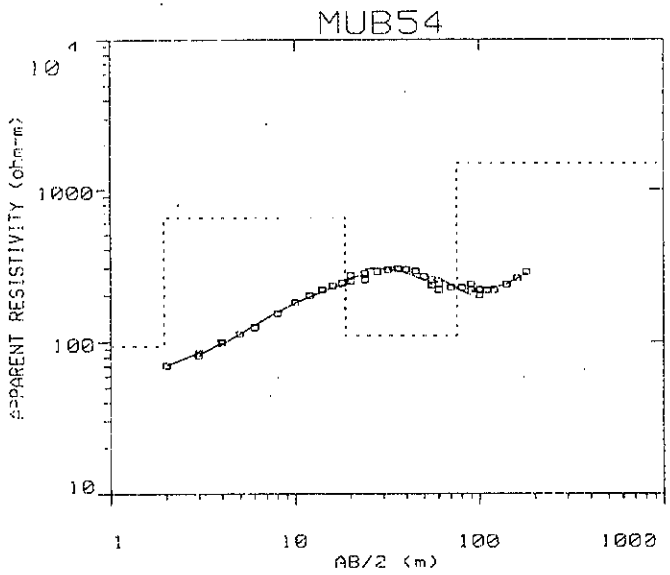

MUB39
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
10
1
0 1
1
10
100
1000
AB/2 (m)

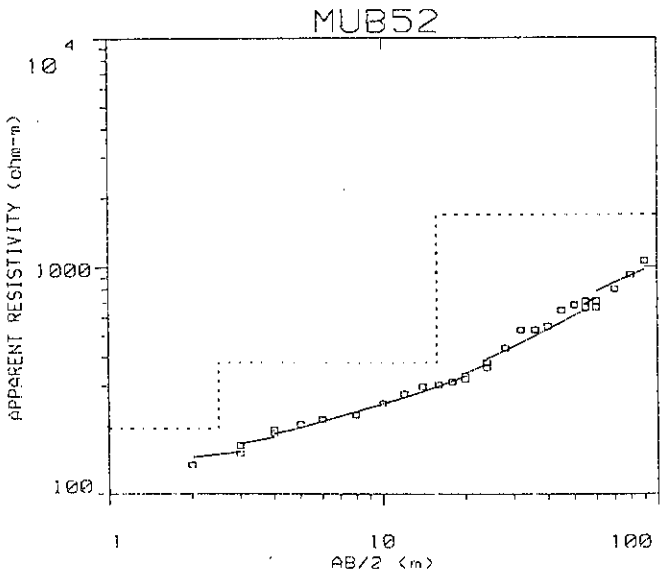

MUB43
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
1
10
100
1000
AB/2 (m)

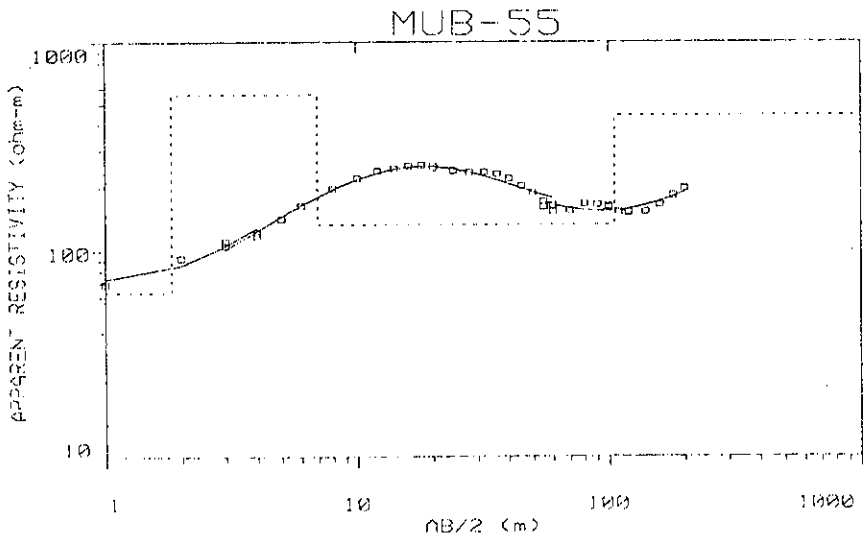

MUB-41
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
10
0 1
1
10
100
1000
AB/2 (m)

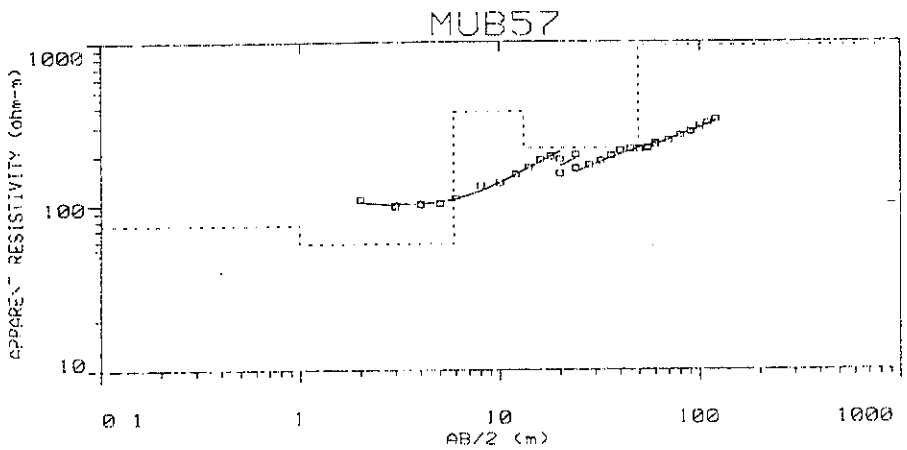

MUB-46
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
10
0 1
1
10
100
1000
AB/2 (m)

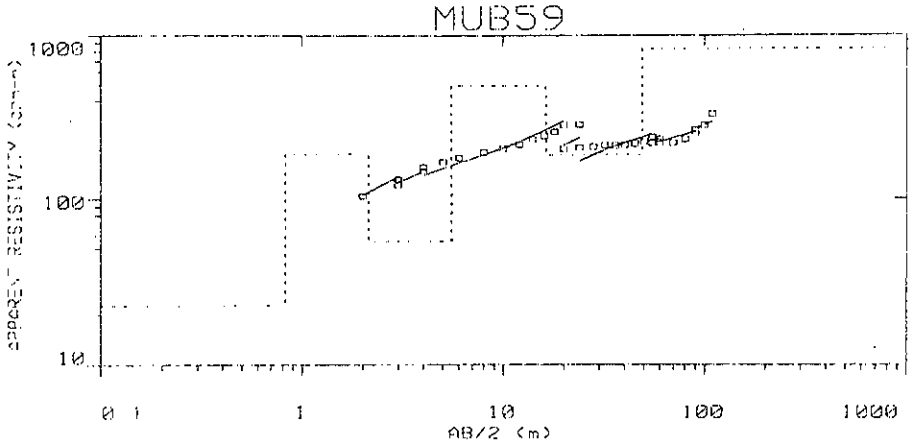

MUB-47
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
10
0.1
1
10
100
1000
AB/2 (m)

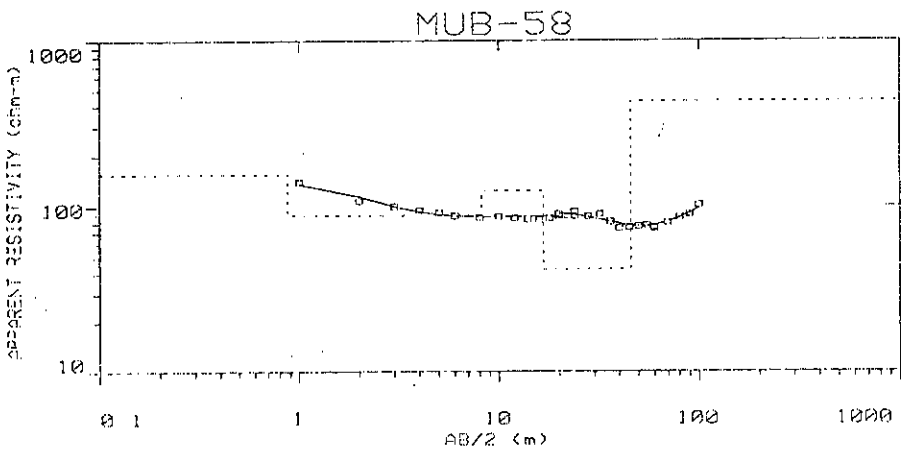

MUB54
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
10
1
10
100
1000
AB/2 (m)

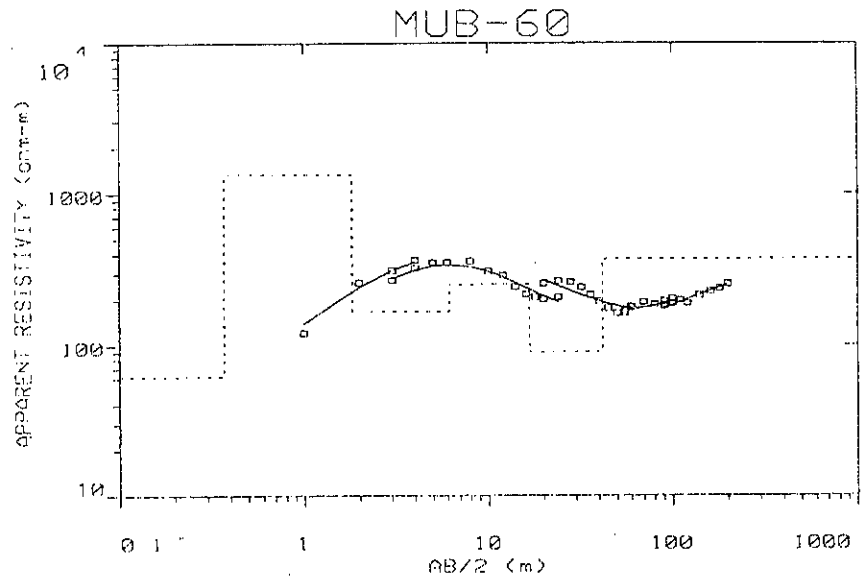

MUB52
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
1
10
100
AB/2 (m)

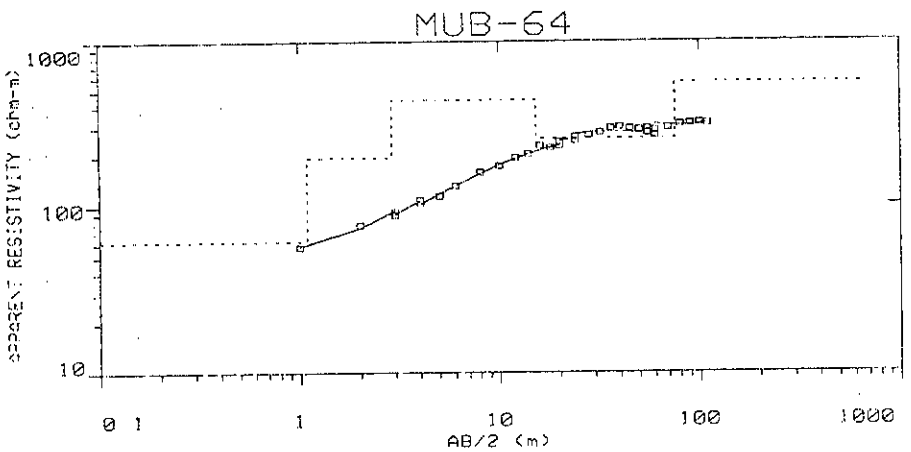

MUB-55
APPARENT RESISTIVITY (ohm-m)
1000
100
10
1
10
100
1000
AB/2 (m)

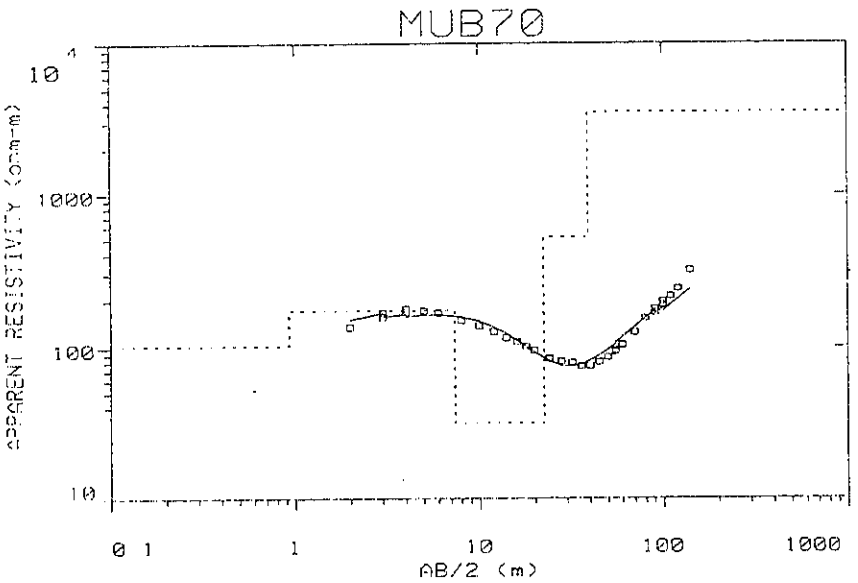

MUB57
APPARENT RESISTIVITY (ohm-m)
1000
100
10
0 1
1
10
100
1000
AB/2 (m)

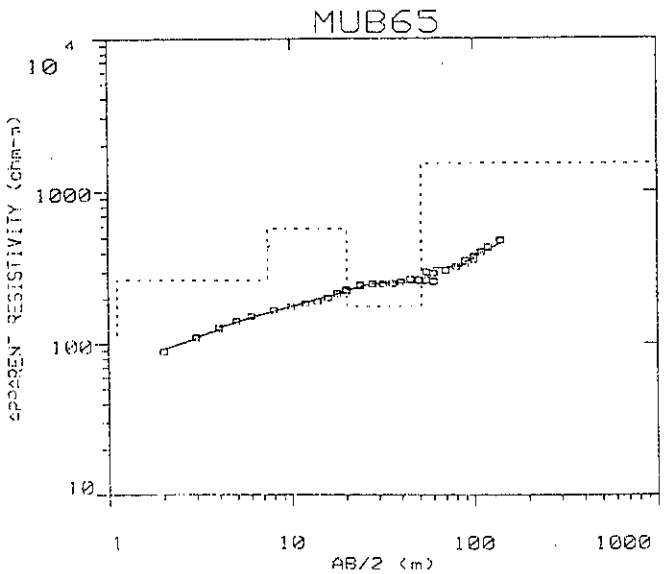

MUB59
1000
100
10
0 1
1
10
100
1000
AB/2 (m)

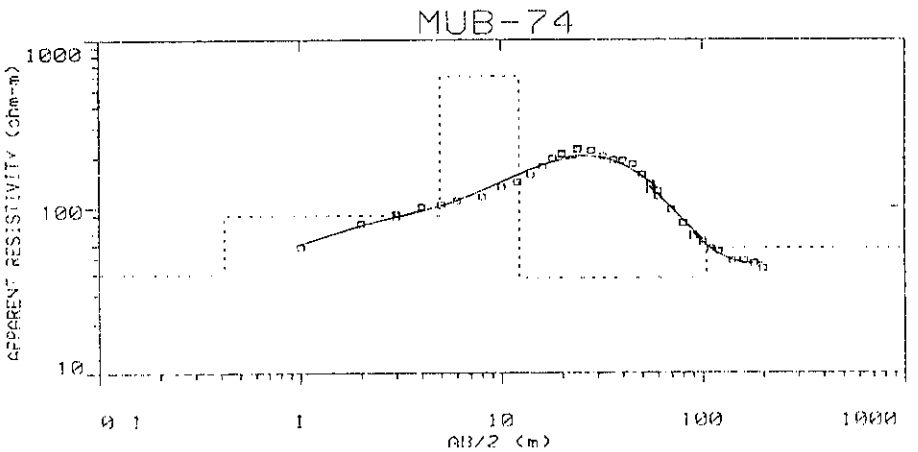

MUB-58
APPARENT RESISTIVITY (ohm-m)
1000
100
10
0 1
1
10
100
1000
AB/2 (m)

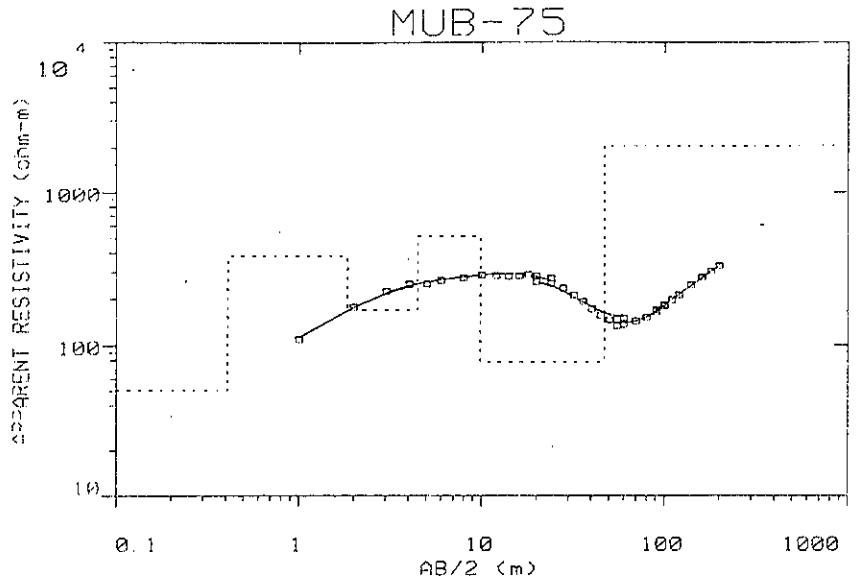

MUB-60
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
10
0 1
1
10
100
1000
AB/2 (m)

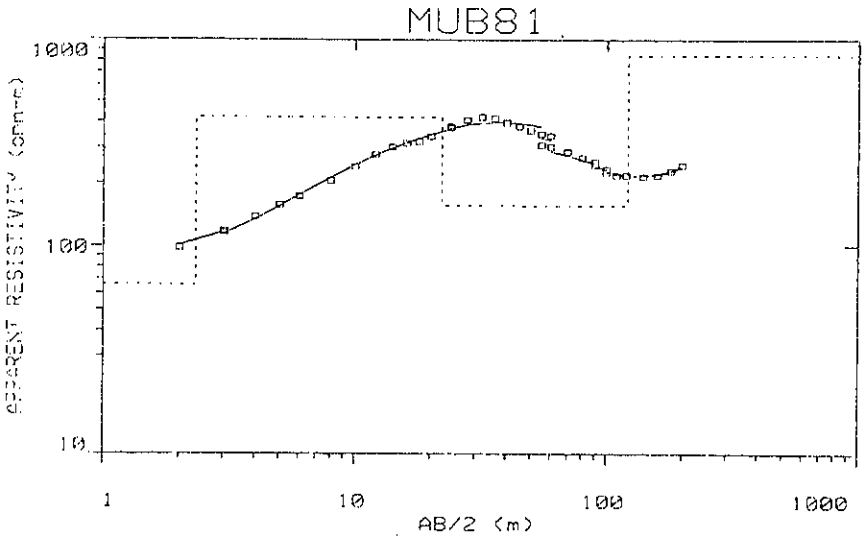

MUB-64
APPARENT RESISTIVITY (ohm-m)
1000
100
10
0 1
1
10
100
1000
AB/2 (m)


MUB70
APPARENT RESISTIVITY (ohm-m)
10 4
1000
100
10
0 1
1
10
100
1000
AB/2 (m)


MUB65
APPARENT RESISTIVITY (ohm-m)
10 4
1000
100
10
1
10
100
1000
AB/2 (m)


MUB-74
APPARENT RESISTIVITY (ohm-m)
1000
100
10
0 1
1
10
100
1000
AB/2 (m)


MUB-75
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
10
0.1
1
10
100
1000
AB/2 (m)


MUB81
APPARENT RESISTIVITY (ohm-m)
1000
100
10
1
10
100
1000
AB/2 (m)

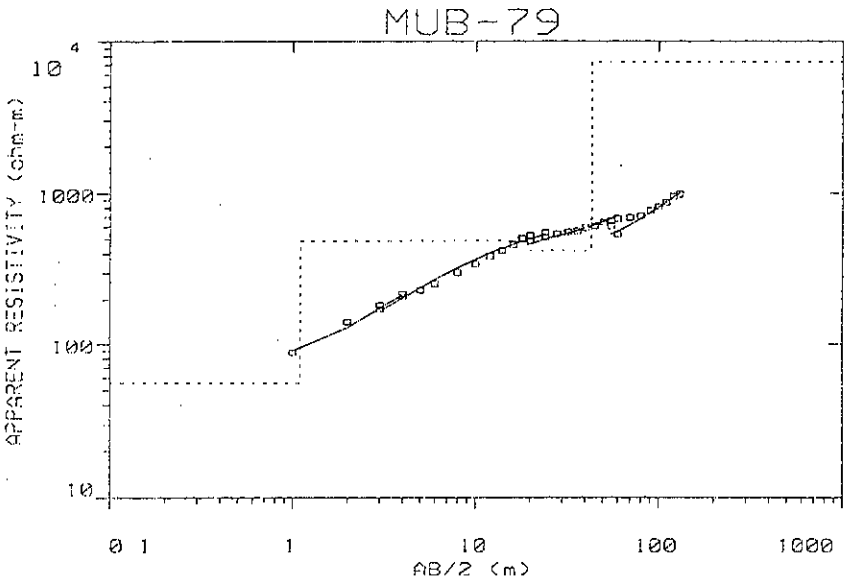
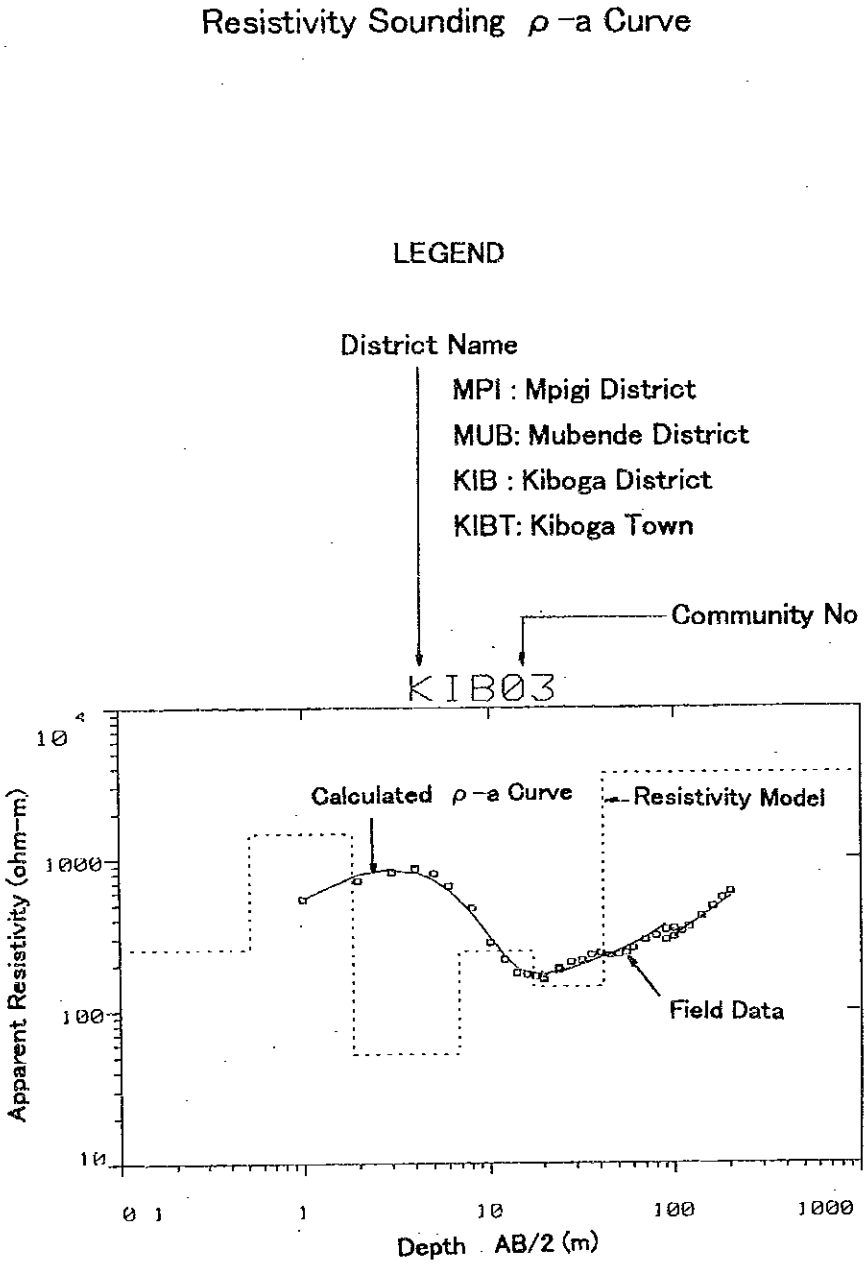
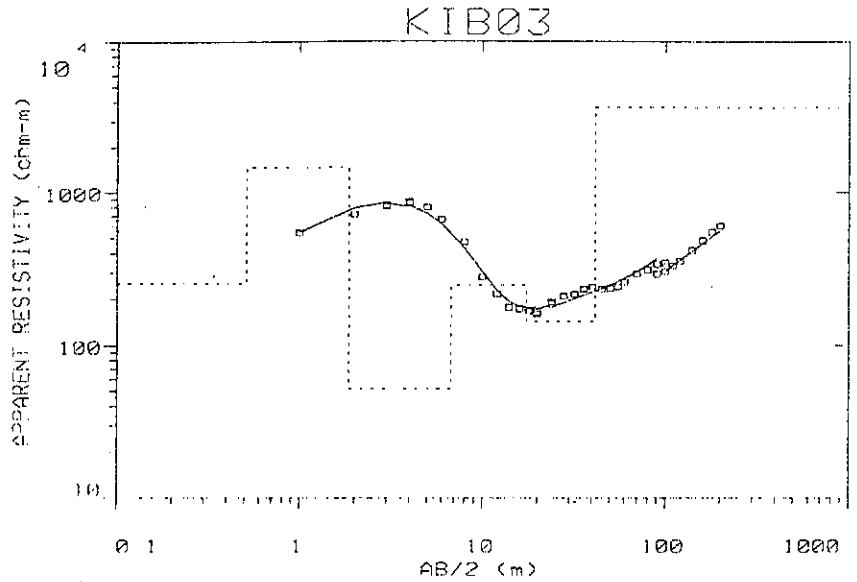
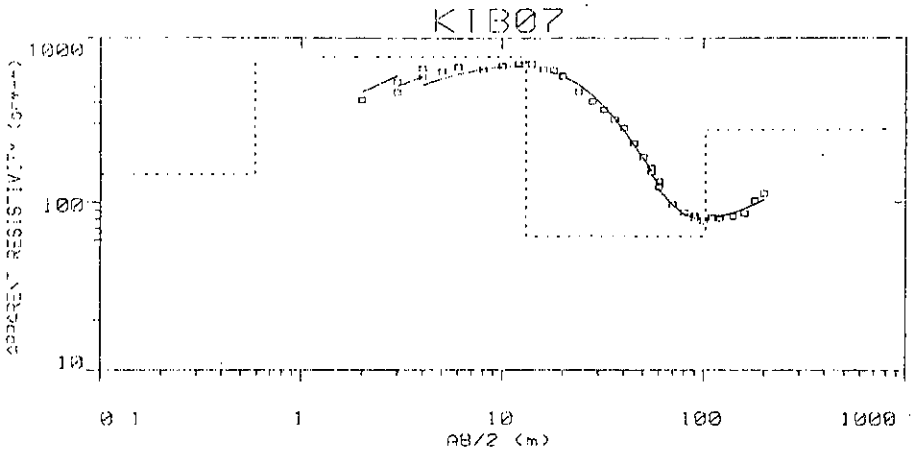
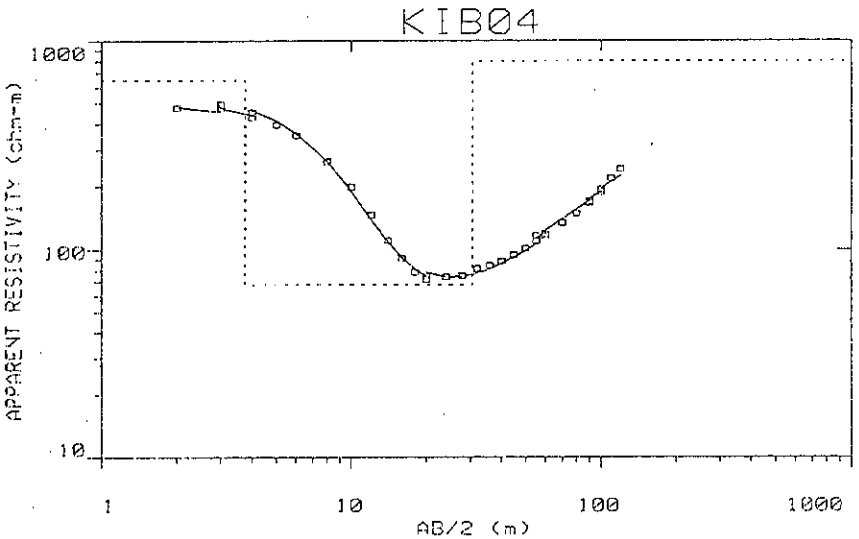

MUB-79
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
10
0.1
1
10
100
1000
AB/2 (m)

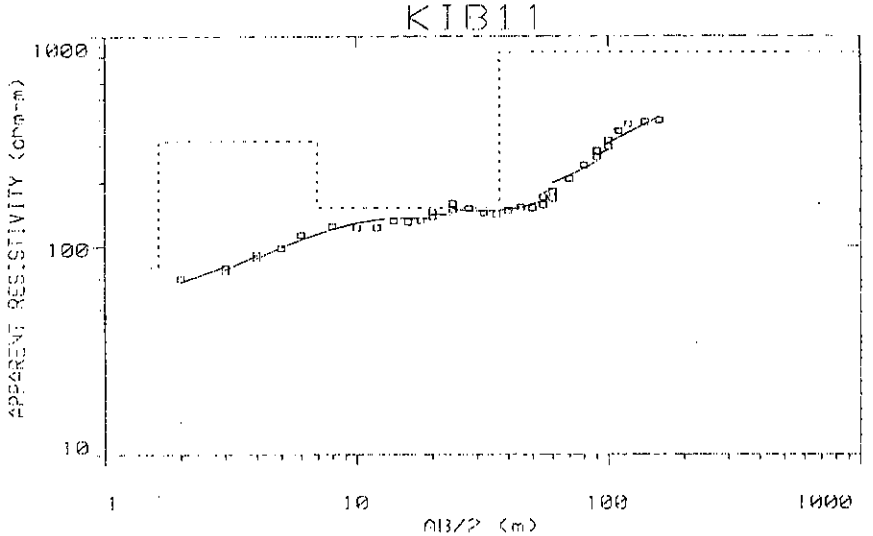
Figure-6 Resistivity Sounding ρ -a Curve (Kiboga District)

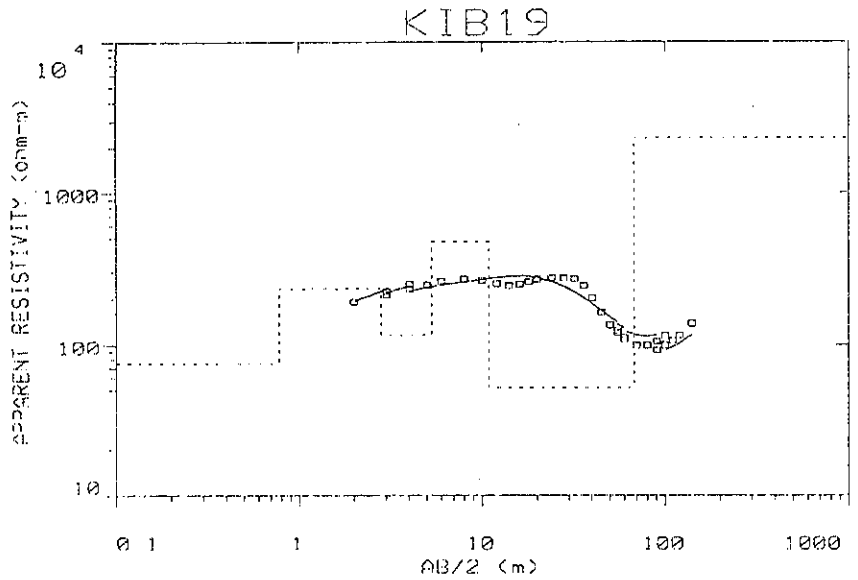


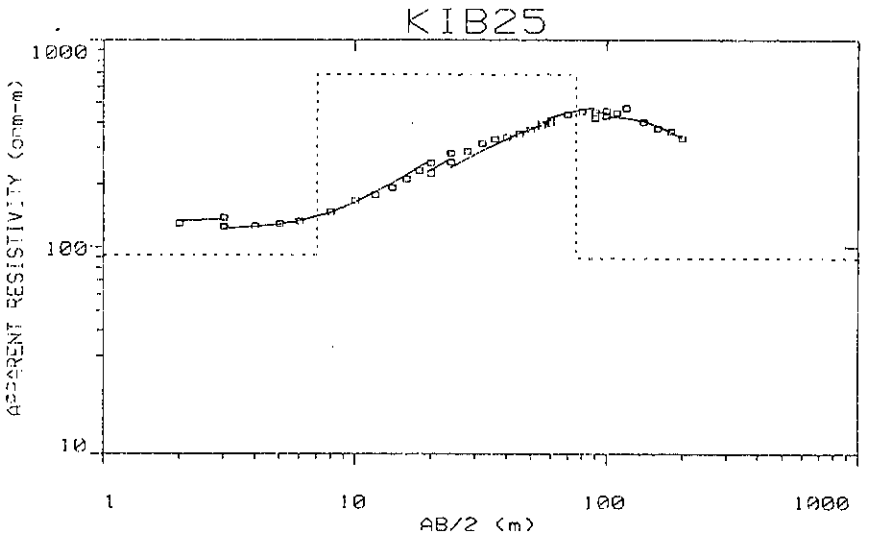

KIB03
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
10
0.1
1
10
100
1000
AB/2 (m)

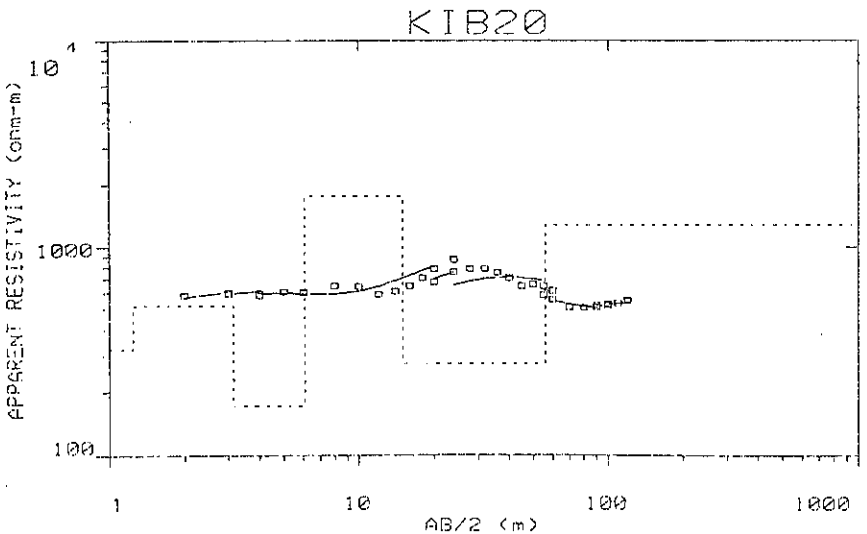

KIB07
APPARENT RESISTIVITY (ohm-m)
1000
100
10
0.1
1
10
100
1000
AB/2 (m)

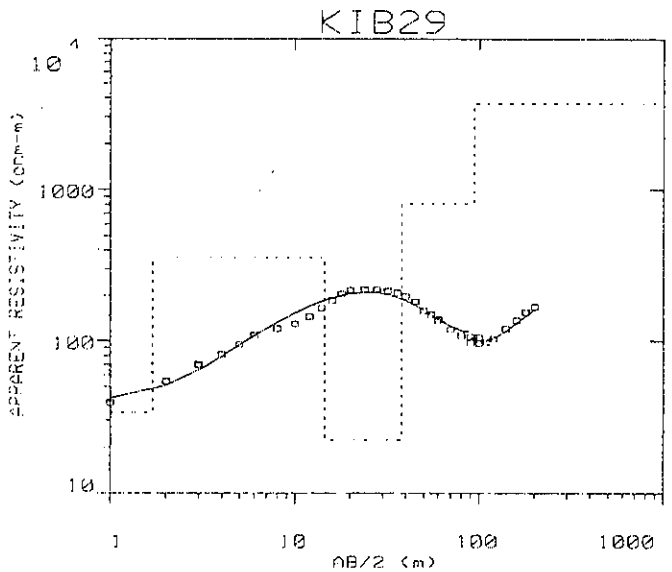

KIB04
APPARENT RESISTIVITY (ohm-m)
1000
100
10
1
10
100
1000
AB/2 (m)

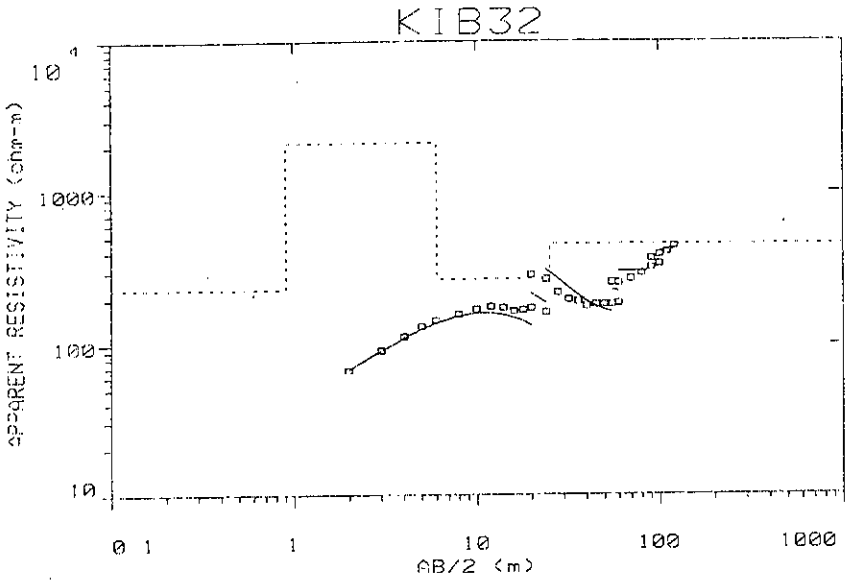

KIB11
APPARENT RESISTIVITY (ohm-m)
1000
100
10
1
10
100
1000
AB/2 (m)

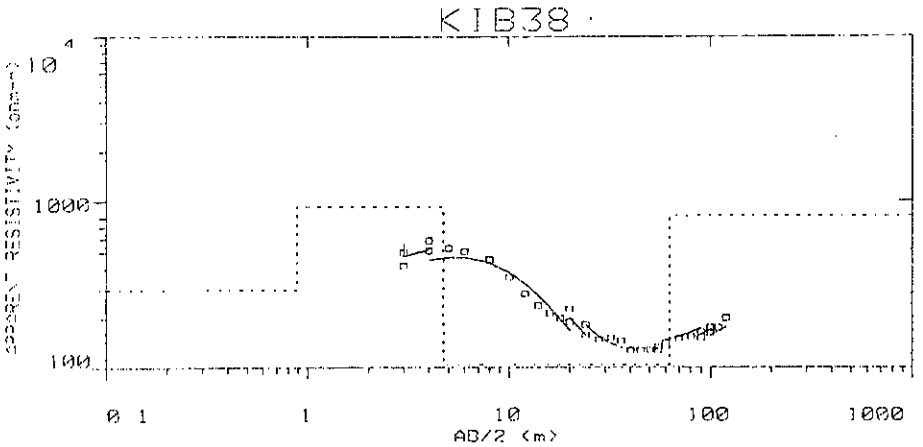

KIB19
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
10
0.1
1
10
100
1000
AB/2 (m)

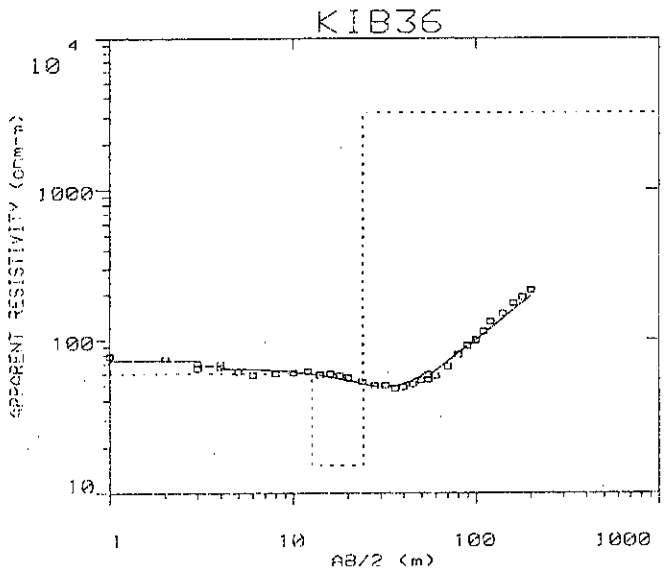

KIB25
APPARENT RESISTIVITY (ohm-m)
1000
100
10
1
10
100
1000
AB/2 (m)

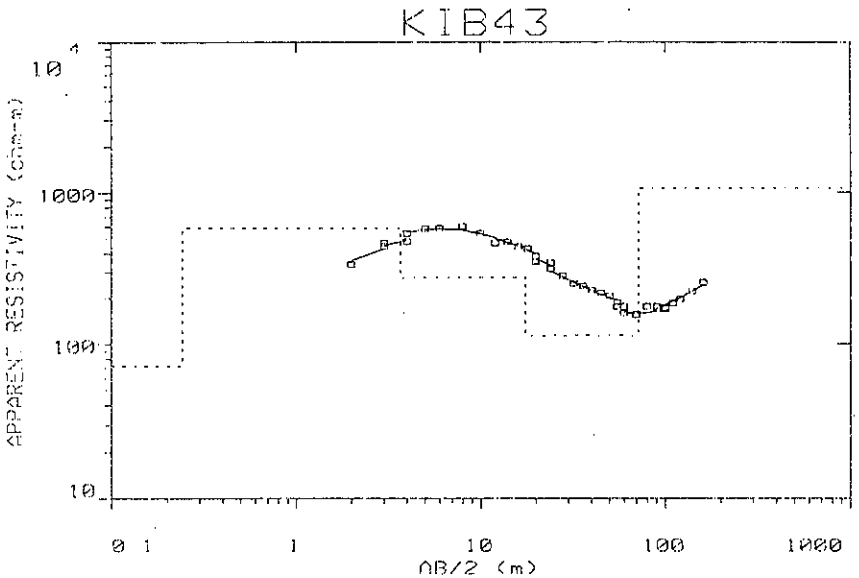

KIB20
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
1
10
100
1000
AB/2 (m)

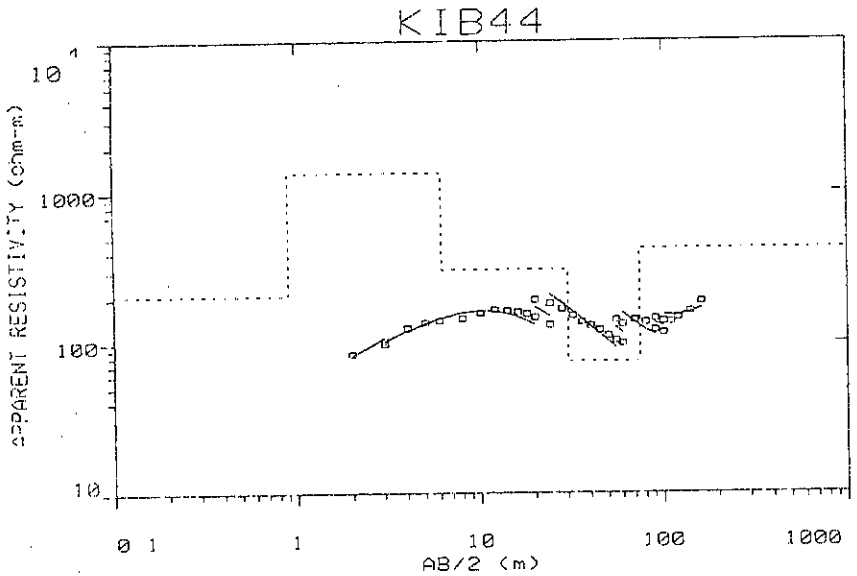

KIB29
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
10
1
10
100
1000
AB/2 (m)

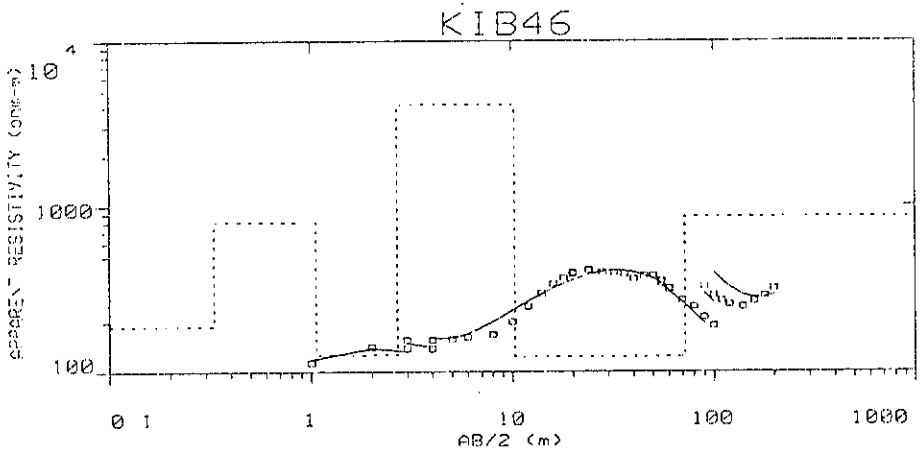

KIB32
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
10
0 1
1
10
100
1000
AB/2 (m)

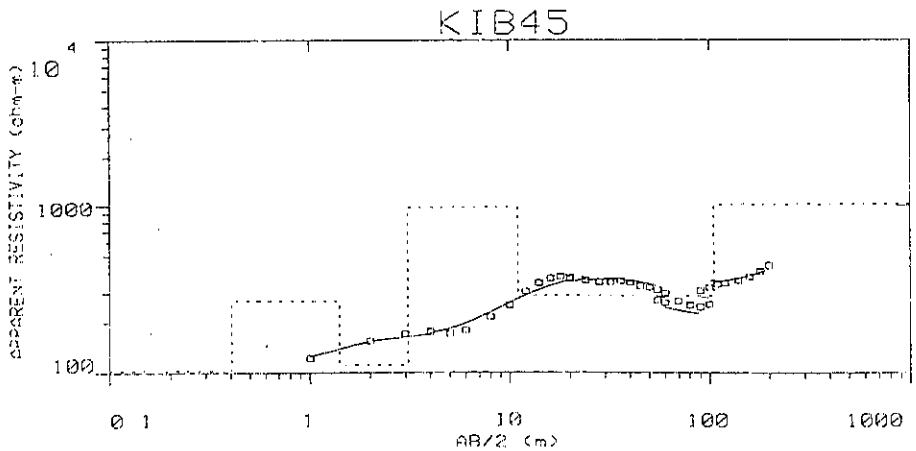

KIB38
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
0 1
1
10
100
1000
AB/2 (m)

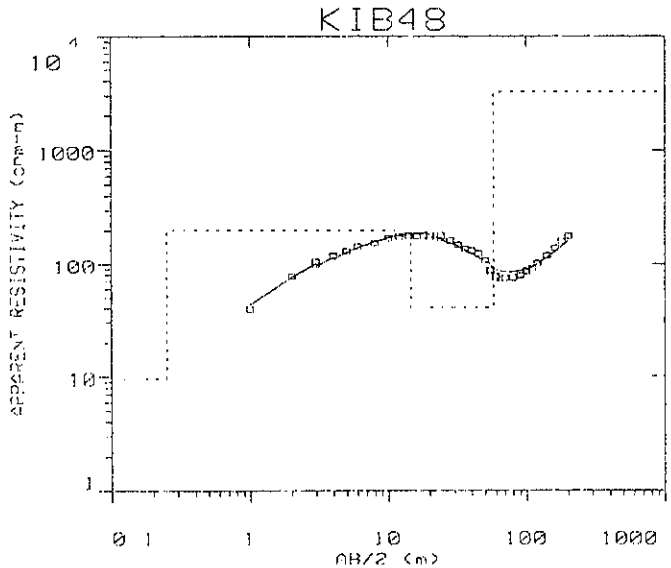

KIB36
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
10
1
10
100
1000
AB/2 (m)

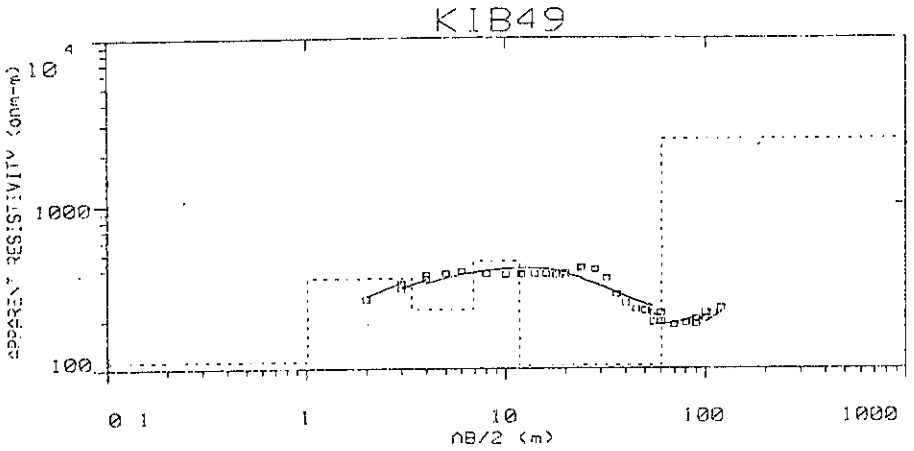

KIB43
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
10
0 1
1
10
100
1000
AB/2 (m)

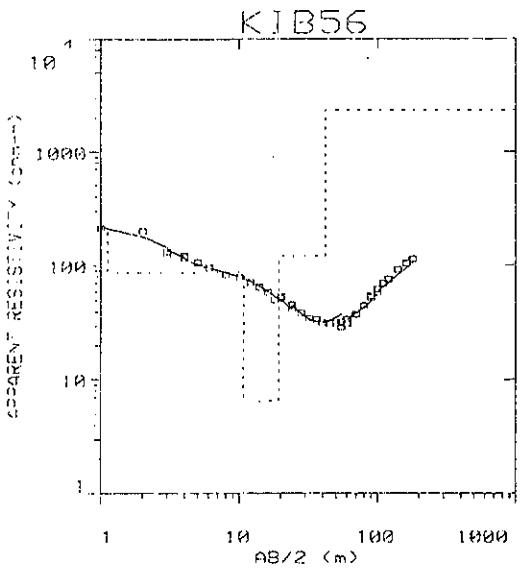

KIB44
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
10
0 1
1
10
100
1000
AB/2 (m)

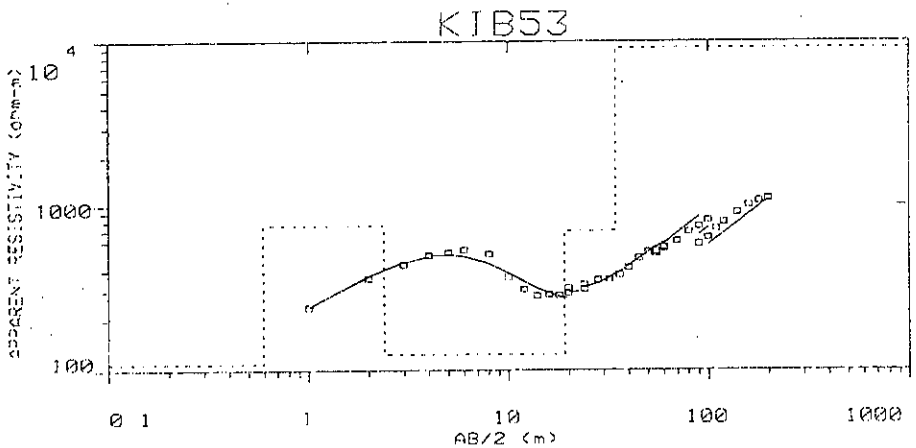

KIB46
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
0 1
1
10
100
1000
AB/2 (m)

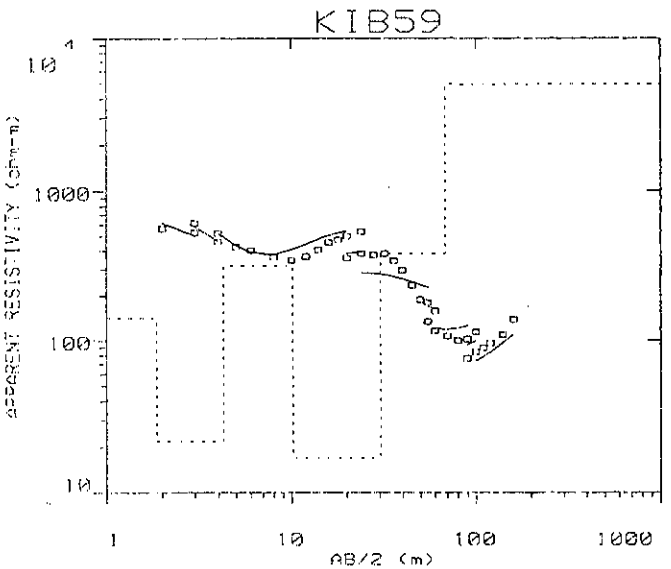

KIB45
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
0 1
1
10
100
1000
AB/2 (m)

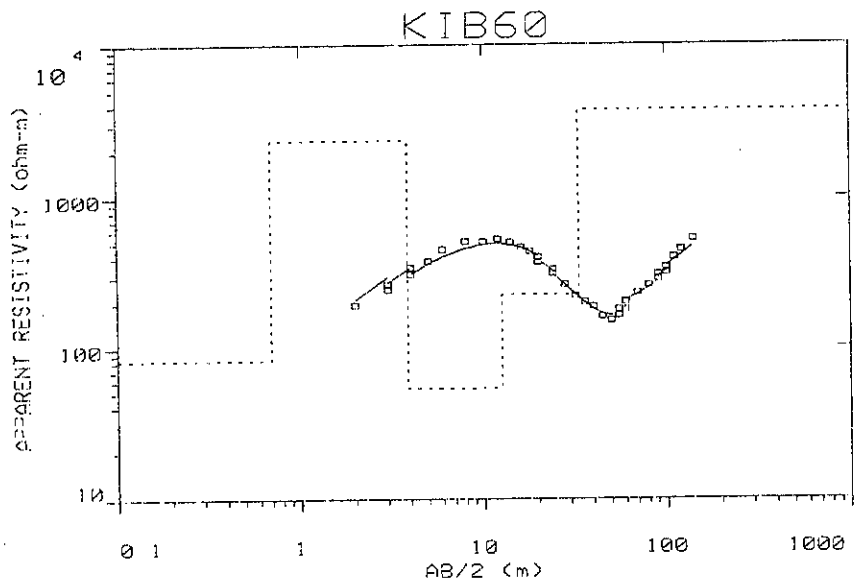

KIB48
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
10
1
0 1
1
10
100
1000
AB/2 (m)

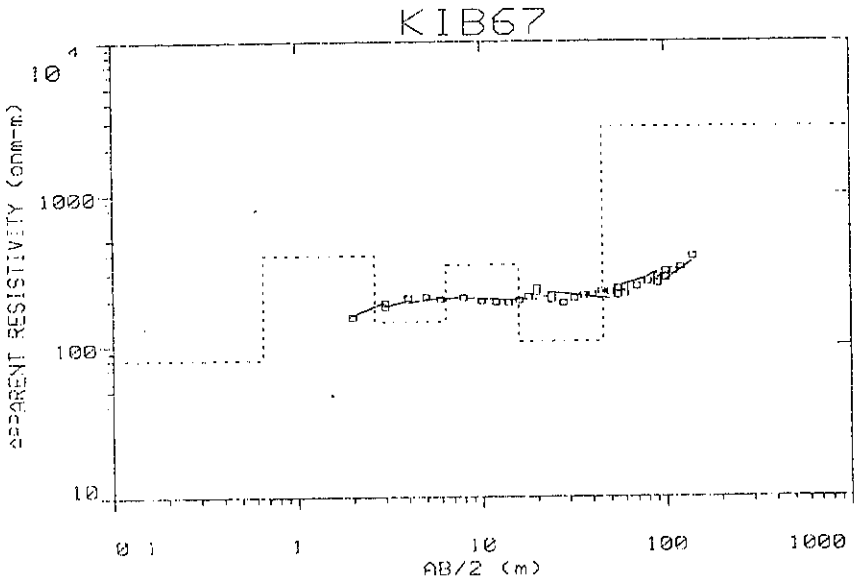

KIB49
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
0 1
1
10
100
1000
AB/2 (m)

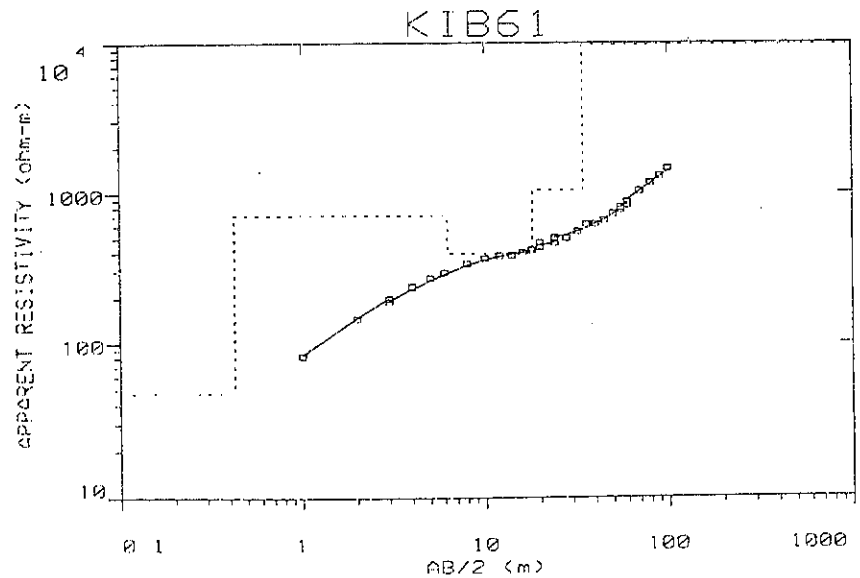

KIB56
10^4
1000
100
10
1
1
10
100
1000
AB/2 (m)

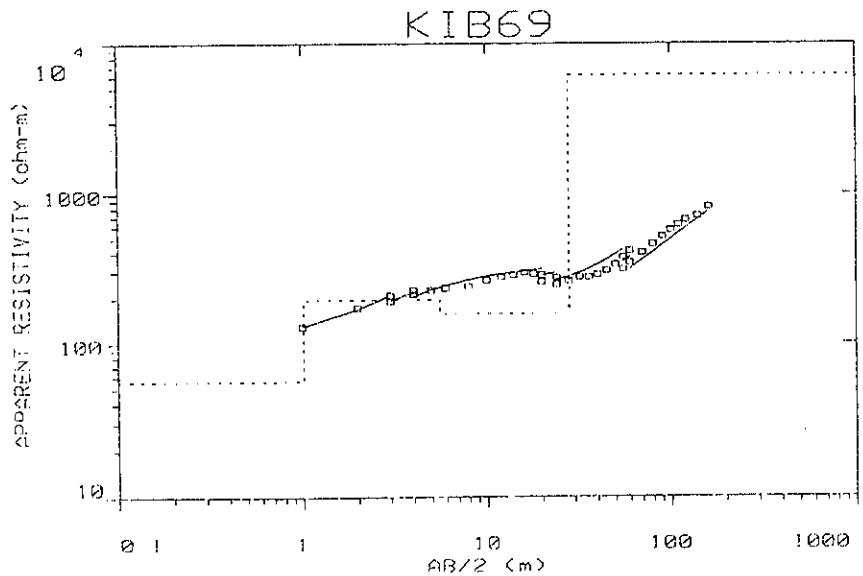

KIB53
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
0 1
1
10
100
1000
AB/2 (m)


KIB59
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
10
1
10
100
1000
AB/2 (m)


KIB60
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
10
0.1
1
10
100
1000
AB/2 (m)

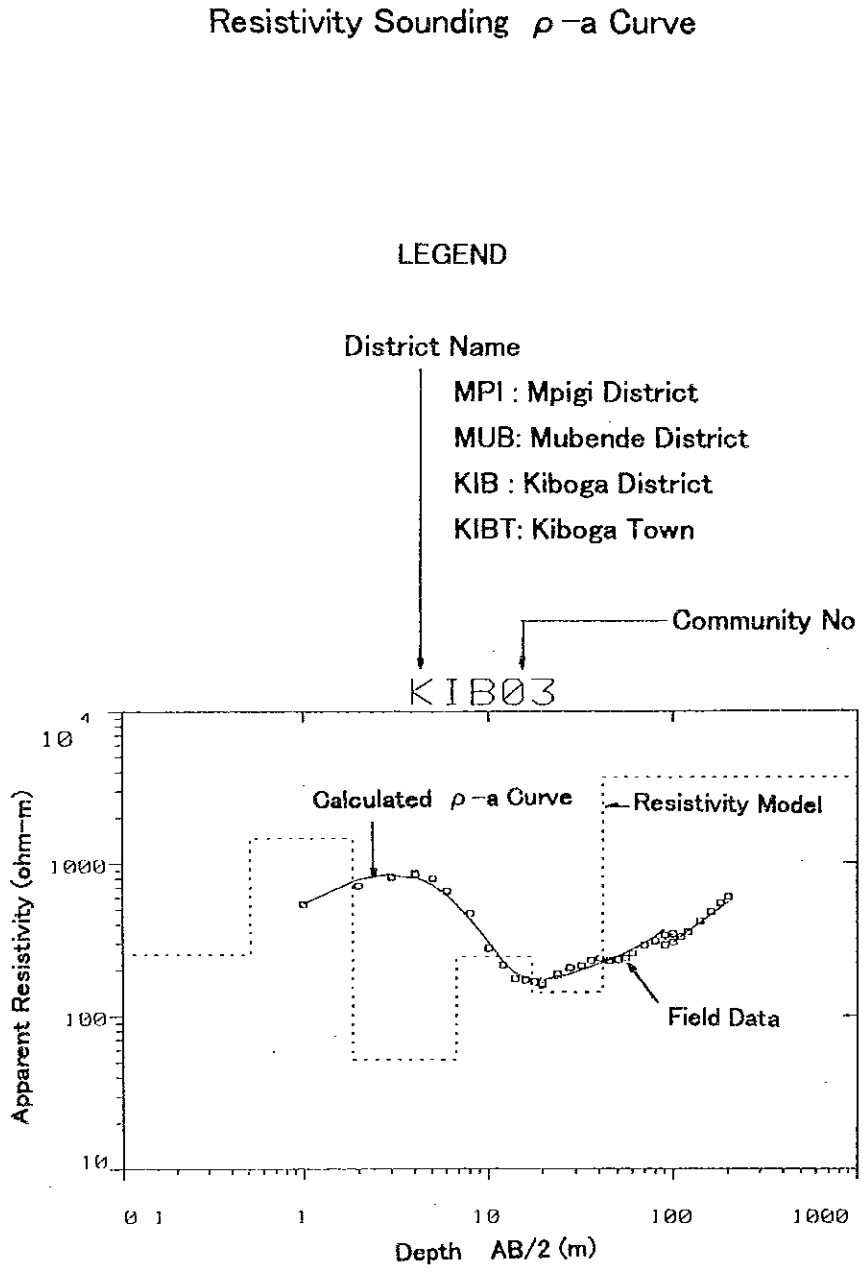

KIB67
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
10
0.1
1
10
100
1000
AB/2 (m)

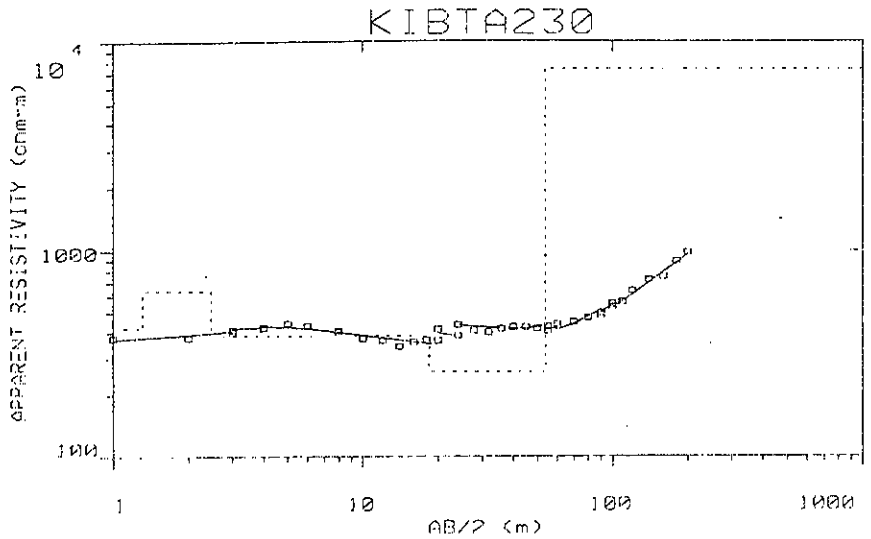

KIB61
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
10
0.1
1
10
100
1000
AB/2 (m)

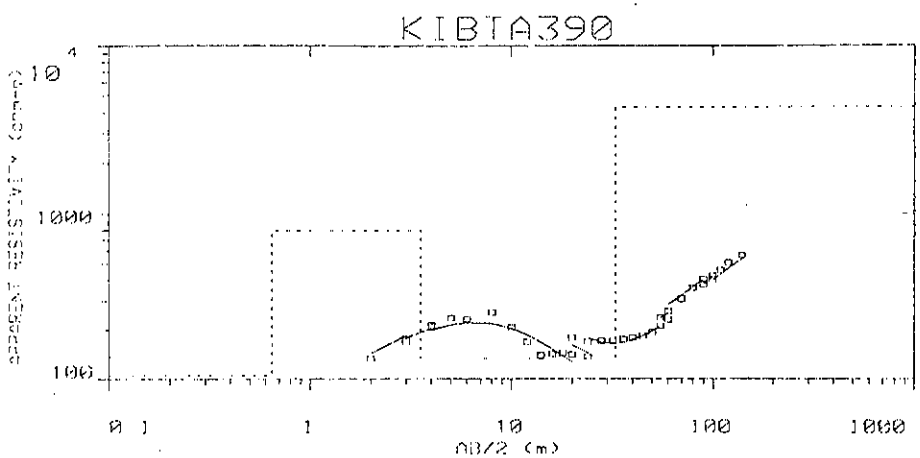

KIB69
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
10
0.1
1
10
100
1000
AB/2 (m)

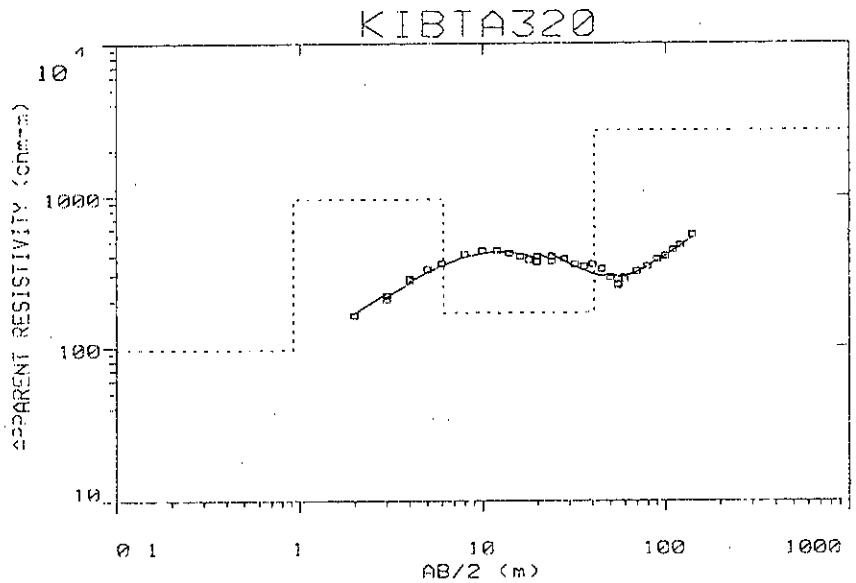
KIB73
APPARENT RESISTIVITY (ohm-m)
10000
1000
100
10
0.1
1
10
100
1000
AB/2 (m)

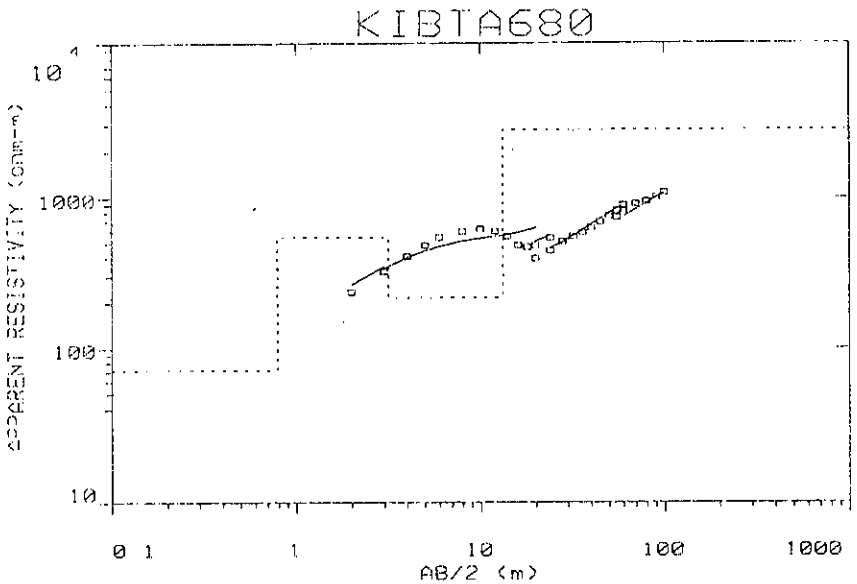
Figure-7 Resistivity Sounding ρ-a Curve (Kiboga Town)

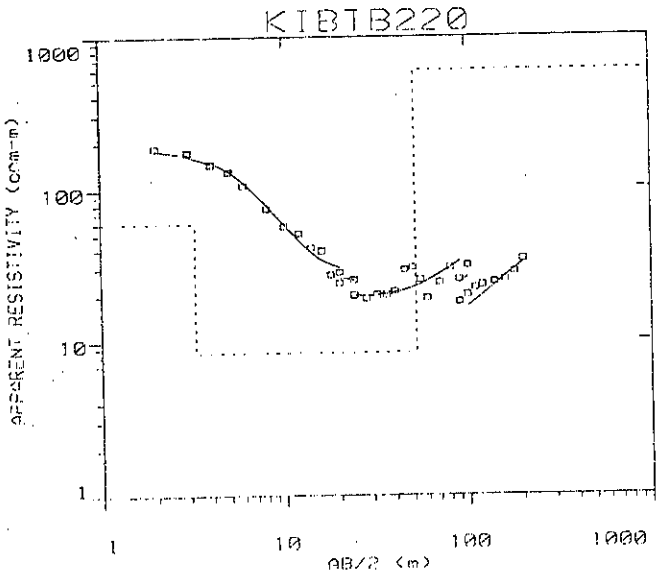


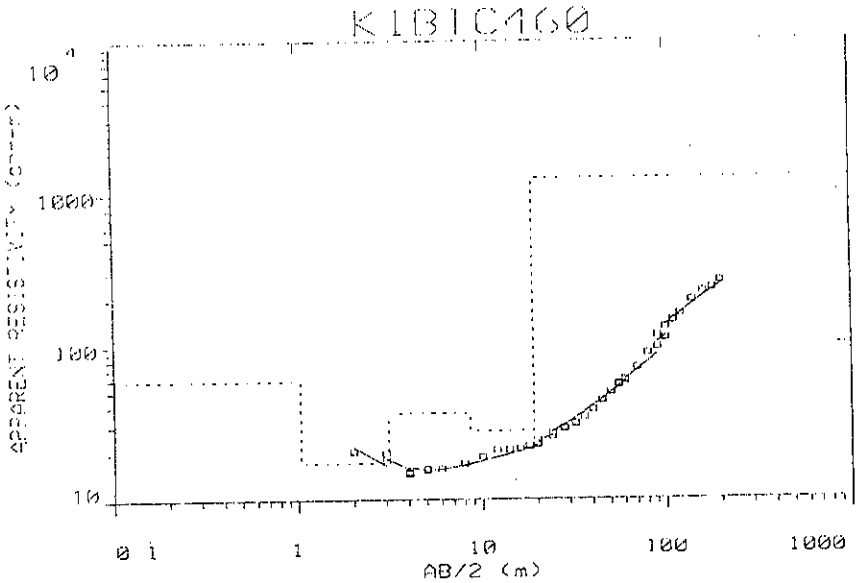

KIBTA230
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
1
10
100
1000
AB/2 (m)

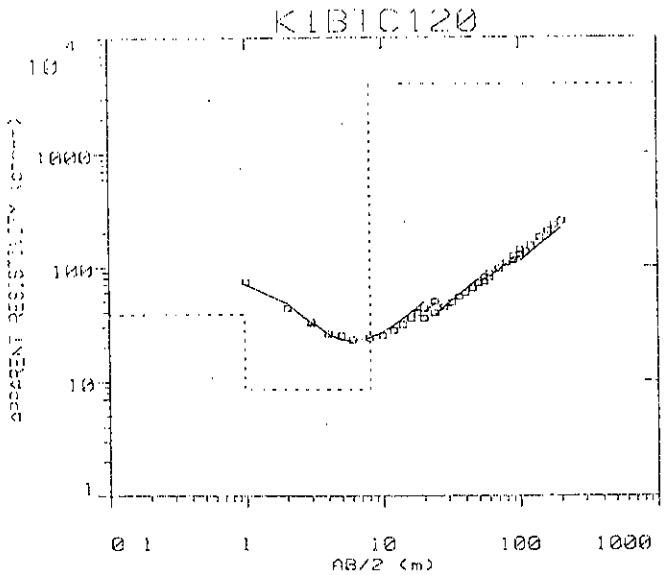

KIBTA390
1000
100
0 1
1
10
100
1000
AB/2 (m)

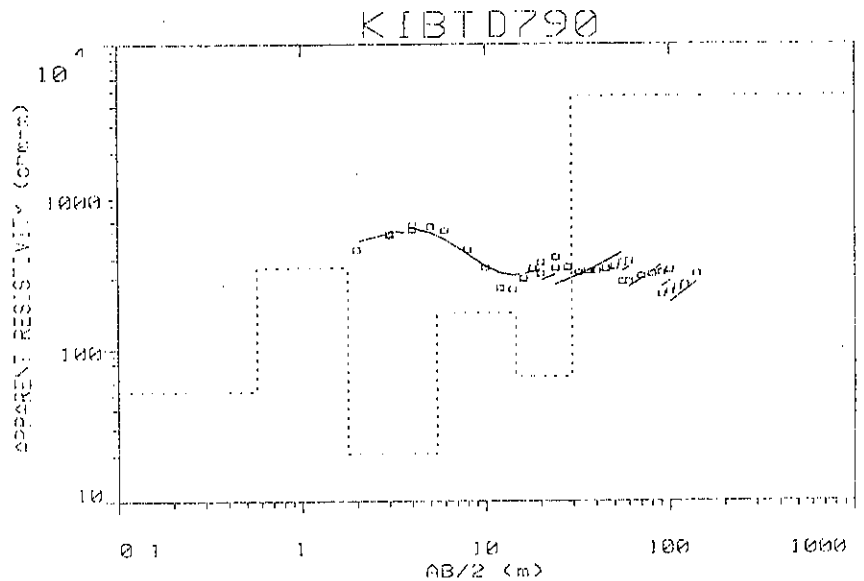

KIBTA320
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
10
0 1
1
10
100
1000
AB/2 (m)

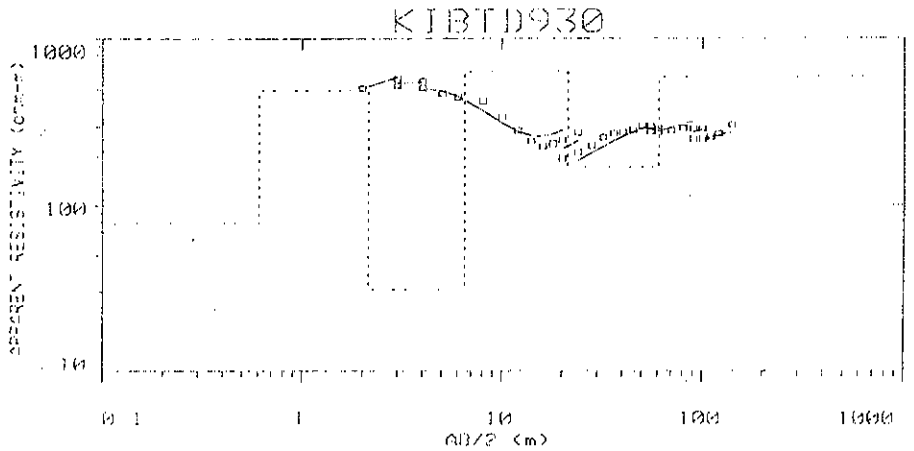

KIBTA680
APPARENT RESISTIVITY (ohm-m)
10^4
1000
100
10
0 1
1
10
100
1000
AB/2 (m)

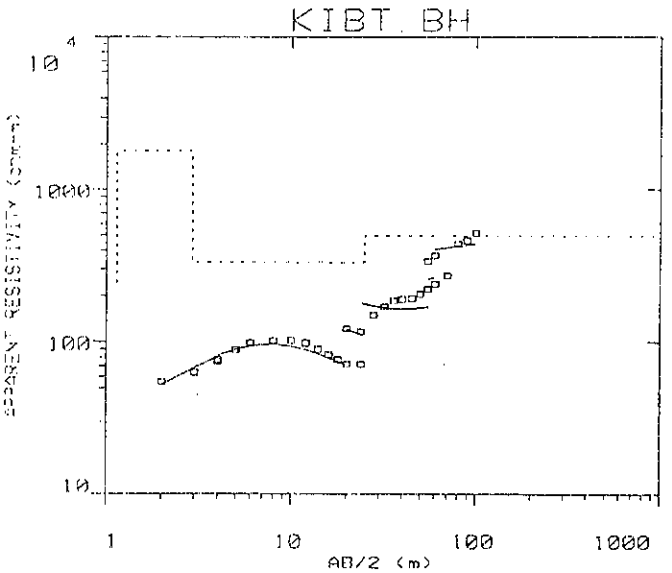

KIBTB220
APPARENT RESISTIVITY (ohm-m)
1000
100
10
1
1
10
100
1000
AB/2 (m)

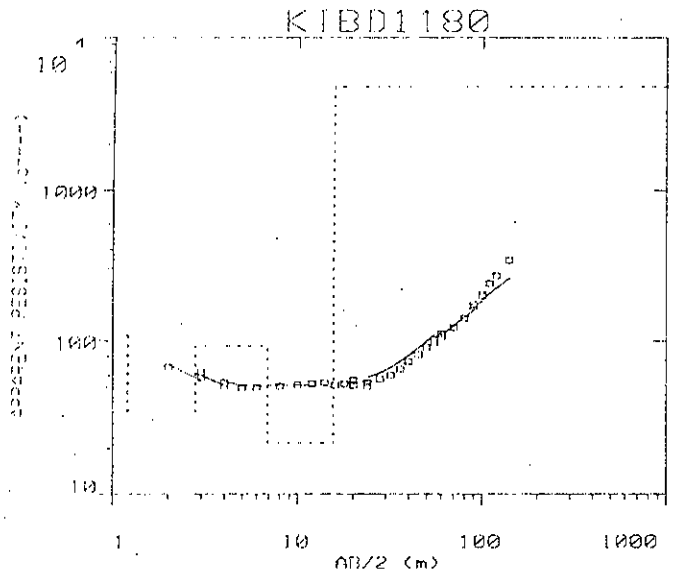

KIBIC160
10
1000
100
10
0 1
1
10
100
1000
AB/2 (m)


KIBIC120
10
1000
100
10
1
0 1
1
10
100
1000
AB/2 (m)


KIBTD790
10
1000
100
10
0 1
1
10
100
1000
AB/2 (m)


KIBTD930
1000
100
10
0.1
1
10
100
1000
AB/2 (m)


KIBT_BH
10^4
1000
100
10
1
10
100
1000
AB/2 (m)


KIBD1180
10^4
1000
100
10
1
10
100
1000
AB/2 (m)