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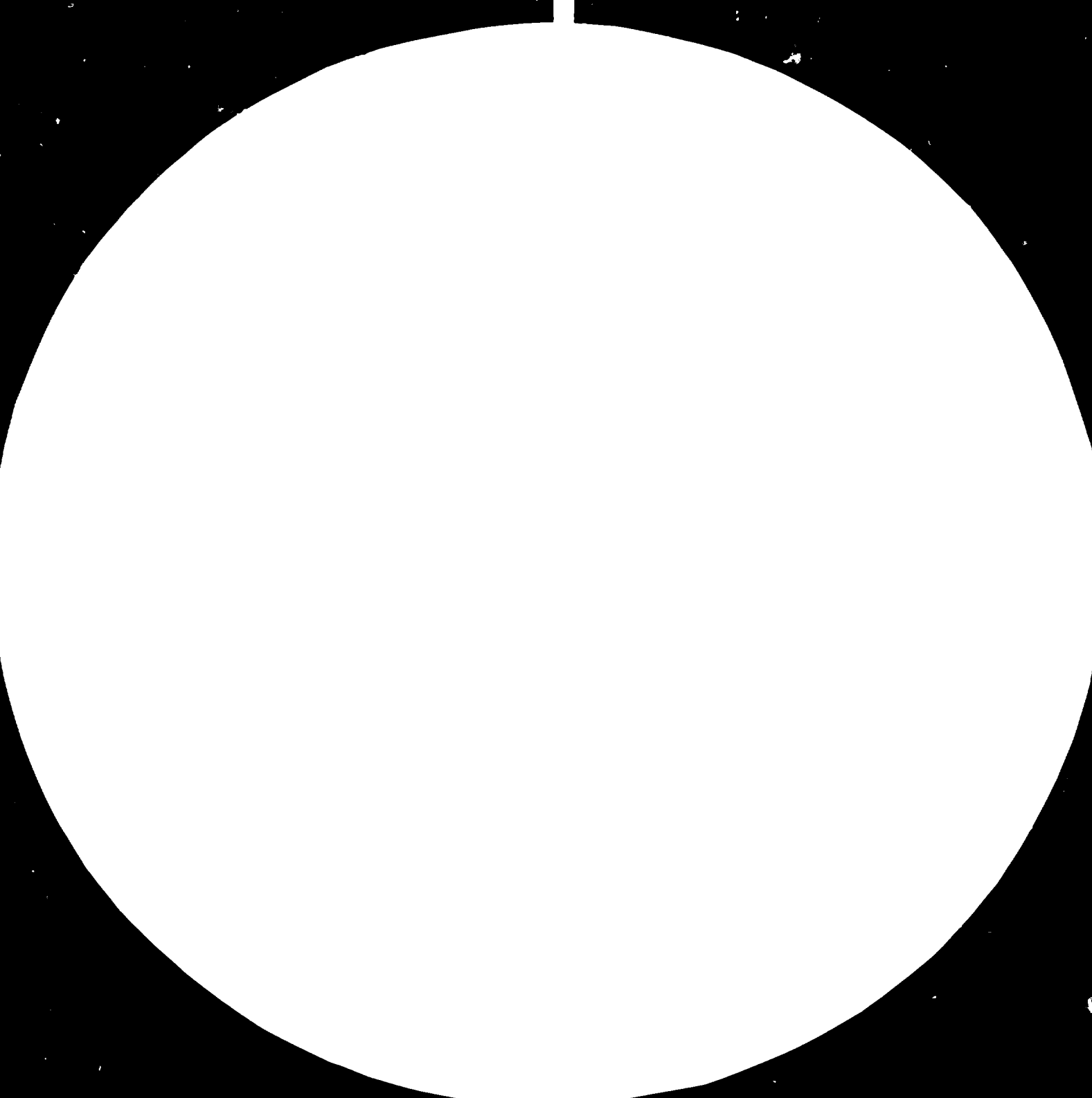
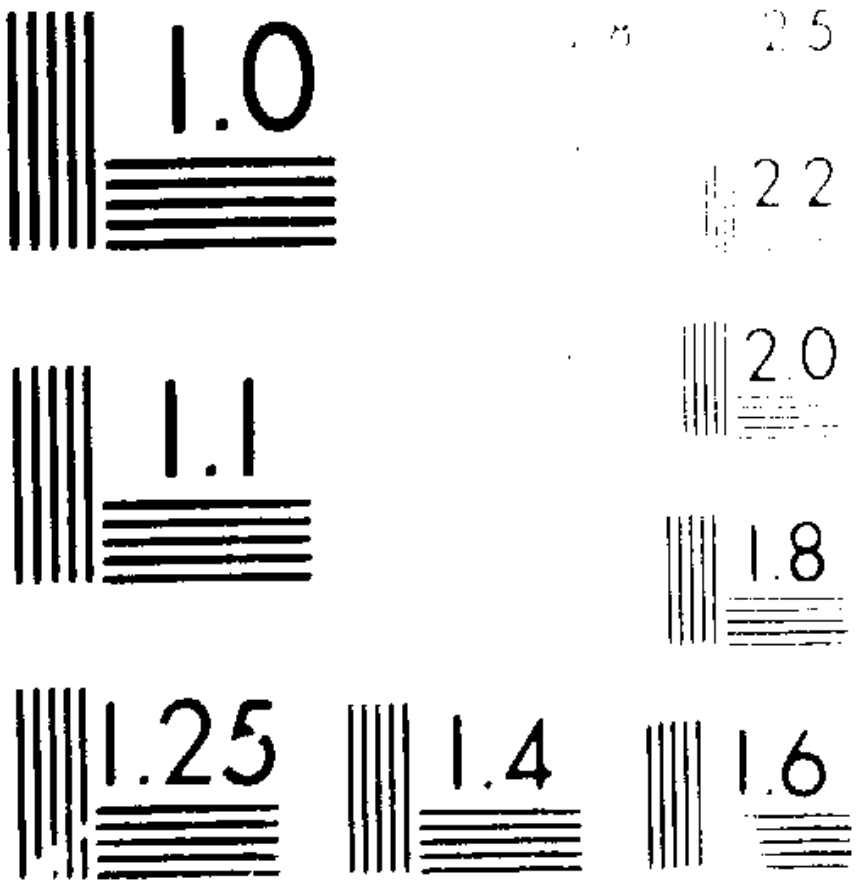
UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org

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DP/MAU/80/009

MAURETANIA

FINAL REPORT

Warsaw, 1982

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

PROJECT MAU 80/009

Mauritania.

Drilling Campaign and Collection of Samples in connexion with a Feasibility Study on the Extraction of Gold and Silver from Torco Tailings of Akjoujt in Mauretania

F I N A L R E P O R T.

DP/MAU/80/009

by

Ryszard Strzelecki and Dobrosław Klimczyk

Foreign Trade Enterprise Polservice, Poland

Chałubińskiego 8

Warsaw

Warsaw, February 1982

TABLE OF CONTENTS

INTRODUCTION

According to the Contract signed by UNIDO, Vienna, and POLSERVICE Foreign Trade Enterprise, the latter sent a geologist and a drilling engineer to direct and execute the programme of drilling and sampling established for the project. POLSERVICE furnished a drill and drilling equipment.

The terms of reference provided for approximately 600 samples, one per metre of drilling. This figure was not achieved since the thickness of the steriles did not even attain half the value anticipated.

The samples were to be reduced according to a standard process of quartering and placed into containers to be supplied by the Mauritanian Government's counterpart organisation.

The geologist was charged with:

- formulating the programme and instructions for the sampling;
- directing the sampling programme and the packaging of the samples;
- preparing the final report.

The drilling engineer was charged with:

- formulating the instructions for the execution of 70-80 boreholes of a depth of 8 m on average and 20 m as a maximum;
- direct and survey the drilling work executed by Mauritanian personnel;
- resolving any technical problems that might be encountered during the course of the drilling process, and to provide all necessary information to the geologist for the final report.

The POLSERVICE team was composed of:

Mr. Ryszard STRZELECKI, Head of Project, Geologist,

Mr. Dobrosław KLIMCZYK, Drilling Engineer.

For the work, two drill-assistants and a driver-mechanic were hired from the SNIM by UNDP Nouakchott - Mauritania.

For travel, a Peugeot 504 station wagon and a truck, first a UNIMOG from June 17th to August 13th, finally a Mercedes 911, were put at the project's disposal by UNDP Nouakchott - Mauritania.

SCHEDULE AND PROGRESS OF WORK

In order to complete the project programme, 7,5 man-months were planned: 4 for the geologist and 3,5 for the drill engineer.

In accordance to the work schedule, the POLSERVICE team arrived in Nouakchott at the end of April, and was to begin the drilling at Akjoujt on May 18th, 1981. The drilling material sent by ship from Szczecin, Poland, did not, however arrive at Noua-kchott via Dakar until the 15th of May.

The drilling thus commenced on June 18th, the day when, in the place of the official counterpart, the UNDP was first able to put at the disposal of the POLSERVICE team the personnel and truck stipulated in UNIDO contract 80/150 Ref. 3.01.

Six boreholes were executed in June, 35 in July and 29 in August giving a total of 70. The sampling was done at the same time.

The work at Akjoujt was finished on August 31th, 1981. During the month of September, a final report was drawn, and the samples were deposited at the UNDP Office in Nouakchott. The latter has sent the samples to the subcontractor for Phase II.

The Polish team experienced very harsh and primitive working and living conditions. The level of working and living conditions as stipulated in the contract was not attained. During an entire month the team lived in one small room, in the building for single men that belonged to the former mine. At the worksite at the mine, no shelter was provided as stated for in the contract ref. 3.04 In addition, the climatic conditions were exceptionally hard due to intense heat and sand-storms.

DRILL-WORK

A hydraulic drill, type UWSP-100 of Polish manufacture, mounted on a two-wheel trailer and permitting different drilling methods /rotary with mud or dry, percussion, drilling with or without core/ was employed.

The method most suited to the project was the dry rotary system, with spoon drill, with a rotation speed of 40-50 rpm, and an on-tool weight ranging from 800 kg to 1000 kg.

The length of each drill pass was 0.5 m which corresponded to the stroke of the hydraulic head. Two drill-spoons of different diametre were used: 100 mm and 152 mm.

Drilling was performed on 9 parallel profiles at an azimuth of 310° degree. The distances between profiles were 70 m and 100 m borehole spacing was 70 m /see figure/.

Each borehole traversed the mine residues entirely. The thickness of the residues variad between 0,5 and 9,0 m. Seventy boreholes out the 70-80 orginally forecast in the terms of reference were actually completed.

SAMPLING

Samples were taken meter by meter from the surface until the underlying yellow-coloured desert sand deposits were reached. The thickness of the last /bottom/ sample varied between 0.5 and 1.5 m. The samples, dry at the time of drilling, were reduced immediately after having been taken out of the spoon, by a quartering method. One quarter of each sample taken was kept and placed in a paper ba. The weight of the samples varied between 2.5 and 3.0 kg. In the terms of reference it had been stated that the sampling should take place, at least in part, in the presence of a representative of the eventual subcontractor chosen for the Phasse II laboratory study of nhe samples. Due to the fact that the time of work no sub contractor had yet been designated it was not possible to meet thi stipulation.

Upon the recommendation of UNIDO expert Mr. BALKAY, each samples was divided in two. one of the halvesis to be a "witness" sample: the second to be delivered to the eventual subcontractor for Phase II. The samples were deposited in containers to be store at the UNDP Office, Nouakchott.

Each sample was identifield in the following way:

Akjoujt steriles

sondage numero /voir figure/ /drill number, see figure/

profendeur - de .... a .... /depth-from .... to ...

TONNAGE OF THE RESIDUE

On the recommendation of UNIDO expert Mr.BALKAY, a calculation of the tonnage of the residue was carried out. In order to achiev

this, the bulk density of the steriles was first calculated. In calculating the volume, the moving sands which cover the steriles from place to place were not taken into account, nor were they sampled. The bulk density was calculated on the basis of 10 samples from two boreholes, numbers 17 and 40. The average bulk density obtained in this way 1.96 t/m^3.

In order to calculate the volume of the steriles, isopachs /equal thickness curves/ were and the area included between each pair of curves was determined. This area was then multiplied by the arithmetic average thickness of the two boundary contours. Finally the volume elements were added together.

The results are follows:

0.0 - 1.0	-	94633,2 m^2 x 0,5 m	=	47316,6 m^3
1.0 - 2.0	-	93172,6 m^2 x 1,5 m	=	139758,8 m^3
2.0 - 3.0	-	66297,6 m^2 x 2,5 m	=	165744,0 m^3
3.0 - 4.0	-	54755,4 m^2 x 3,5 m	=	191643,9 m^3
4.0 - 5.0	-	50808,4 m^2 x 4,5 m	=	228637,8 m^2
5.0 - 6.0	-	42928,0 m^2 x 5.5 m	=	236104,0 m^3
6.0 - 7.0	-	23125,0 m^2 x 6,5 m	=	150312,5 m^3
7.0 - 8.0	-	9001,4 m^2 x 7,5 m	=	67510,5 m^3
8.0 - 9.0	-	6576,1 m^2 x 8,5 m	=	55896,9 m^3

Total surface 441297.7 m^2; total volume 1232925.0 m^3; total tonnage for a bulk density of 1.96, 2514533 tonnes.

In order to verify these figures, a second method of tonnage calculation was untertaken considering the arithmetic thickness, which is 3.28 m.

Therefore the volume would be:

$$441\ 297.7\ m^2 \times 3.28\ m = 1\ 447\ 745.6\ m^3$$

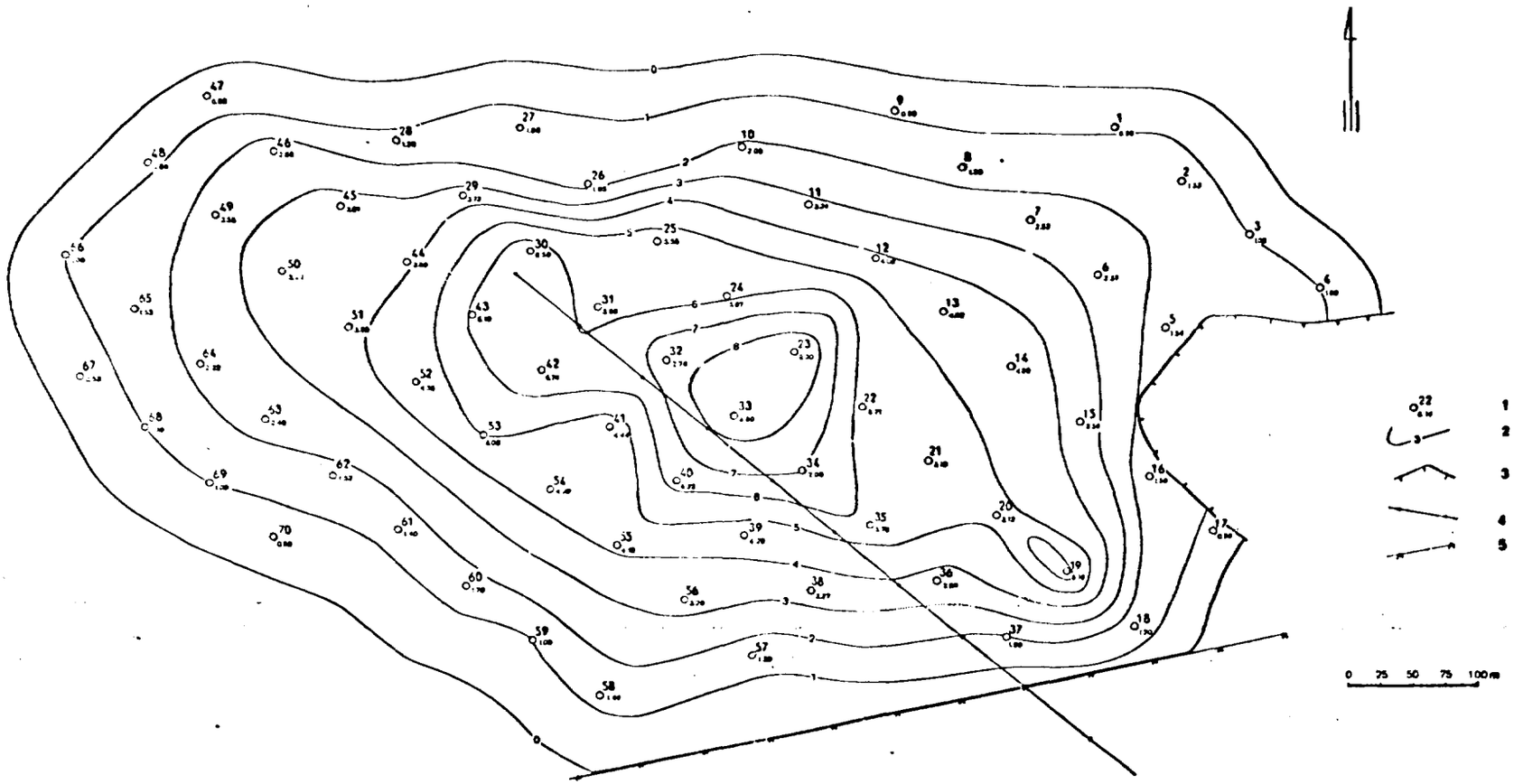
and the tonnage:

$$1\ 447\ 745.6\ m^3 \times 1.96\ t/m^3 = 2\ 837\ 014 \text{ tonnes}$$

FIGURE 1.

Map of Borehole sites and thickness of steriles

1. Number of boreholes and thickness of the residue
2. Isopachs
3. Part of residue previously removed
4. Pipe-line
5. Fence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