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DRAFT REPORT <sup>1/</sup>

VISIT TO THE NATIONAL TANNING FACTORY, ADEN  
PEOPLE'S DEMOCRATIC REPUBLIC OF YEMEN

RP/PDY/78/004

by

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SUMMARY

The operations and conditions obtaining at the National Tanning Factory in Aden, People's Democratic Republic of Yemen, has been studied for a period of two weeks.

The finished leather, produced from cattle hides and goat and sheep skins, must be regarded as below normally acceptable standard. Modern, consistent and proper processing methods must be introduced and the staff trained in these during a prolonged period. This should be done in the factory by bringing in outside expertise for the necessary time and a technical assistance programme for this purpose is proposed.

The conclusions and recommendations in the earlier UNIDO/UNDP reports technical were found in the main still to be valid. It is recommended, that Phase I and II, contained in one of these reports, "Expansion and Modernization of the National Tanning Factory", slightly amended, are carried out. For the implementation it is recommended, that a technical assistance project is initiated soonest possible.

As much as the time allowed, technical advice on processes and work methods was provided to management and staff at the factory.

## INTRODUCTION

The National Tanning Factory (NTF) of Democratic Yemen was established in the Sheikh Othman area as a private enterprise in 1960. The production at that time was insignificant and the tannery closed down in 1962. In the middle of 1972 the government, after having repaired the existing machinery and equipment and added a few more, reopened the tannery under its present name as a state-owned factory.

From 1972, during a period of 18 months, the tannery received technical assistance through the Industrial Development Centre for Arab States (IDCAS), who provided a tannery expert and technicians to introduce suitable processes and practices and to train local workers and supervisors, the last ones also through 4 months fellowships to a tannery in Egypt.

Later the government, wishing to improve the efficiency in the tannery and increase the output, especially to meet the demand from the Training and Demonstration Centre for Leather Footwear and Leather Goods, requested assistance from UNIDO/UNDP. The project, Assistance in Leather Production and Marketing (IS/PDY/75/006), was subsequently carried out in 1976 and early 1977, resulting in two technical reports, "Expansion and Modernization of the National Tanning Factory" (based on work of T S Krishnan) and "Potential of Raw Hides and Skins and Leather for Domestic and Export Marketing" (based on work of J Gosh).

The government being aware that for several reasons

the recommendations contained in these reports have only to a limited extent been implemented, that complaints of deficiencies, both as to quantities and qualities, in the deliveries of the tannery, especially to the Production and Training Centre for Leather Shoes and Leather Goods, grown out of the earlier mentioned Training and Demonstration Centre and that changed conditions could have an influence on the decisions to be taken, requested UNIDO/UNDP to send an expert in Leather Production to review the whole situation.

The expert, who arrived in Aden the 1st and left the 14th of February 1978, was mainly required to

- 1/ Study available reports and assess tannery requirements
- 2/ Advise on capacities of tanning and finishing sections
- 3/ Prepare detailed list of plant and machinery and evaluate infrastructural facilities required for efficient tannery operation, indicating foreign exchange and local components
- 4/ Examine present supply and formulate recommendations on measures necessary to ensure adequate and speedy supply of suitable materials for utilization by Leather Centre.

The present report is the outcome of this short but intensive study.

## FINDINGS

### Earlier reports.

The findings and conclusions of the earlier reports were found in the main still to be valid. The recommendations made were well founded, but the implementation has been slow or not at all forthcoming.

Of the machines and equipment required for the implementation of "Phase I", for example, only 3 drums and the brushing machine were financed by the ministry and duly purchased and installed. The remaining tools and equipments had to be purchased, if at all, out of the already rather limited working capital of the tannery. Thus some equipment - primarily a much needed replacement for the spraying unit, including spare parts, and some laboratory and measuring equipment - was ordered from Germany in December 1977, but has of course not yet arrived. Unfortunately several hand tools and other accessories, which perhaps were still more needed than some of the equipment ordered, were not included and this should be corrected soonest possible. These tools etc. will be specifically mentioned in the list of equipment, that should be acquired promptly.

Similarly much of the repair and maintenance work mentioned in the report has not been carried out.

In the short time allowed for this study it has been impossible to go too much in detail. Instead of referring

again and again to the earlier reports, it has therefore been thought better to state present conditions in a summarized form, followed by the recommendations of how to correct them.

General comment.

The management and staff at the factory show an evident ambition to do their best and to improve matters as much as they know how. Unfortunately, conditions at the tannery are not very favourable for obtaining good results. In almost all respects, as to equipment, know-how, supply, and so on, there can be found serious deficiencies, detrimental to the output of the factory.

The Leather Products.

In rough figures the following main products were produced in 1977:

Cow and Cow Calf Leathers

Corrected grain	63 000 ft <sup>2</sup>	or about	3 000	hides
Hunting (coarse suède)	62 000 "	"	3 000	"
Sole	9 000 lbs	"	1 000	"
	<u>Total</u>	"	<u>7 000</u>	"

Camel Leathers

Sole	2 500 lbs	or about	250	hides
Lining	1 800 ft <sup>2</sup>	"	100	"
	<u>Total</u>	"	<u>350</u>	"



Local Sheep and Goat Leathers

Suède	6 000 ft <sup>2</sup> or about	2 000 skins
Finished lining, TR	13 000 " " "	4 000 "
Lining, natural	105 000 " " "	36 000 "
Chamois	1 000 " " "	300 "
Total		42 000 "

Australian Sheep, locally slaughtered

Pickled	about	24 000 skins
Raw, dry-salted	"	335 000 "
Lining, natural	"	10 000 "
Total	about	<u>359 000</u> "

Looking first at the quality of the leathers it must be recognized that they are below normally acceptable standards. The shoe factory's complaints are in that respect justified. The cow upper leathers are very hard and stiff, but the most harmful defects are the uneven thicknesses and, in the corrected grain, the pronounced looseness of the grain layer. Also other grain defects of different kinds are frequent, resulting in very poor selections. In the sheep and goat leathers it is again the uneven thicknesses that are objectionable, but very often also the low tear strength. The papery feel and dull appearance are other undesirable characteristics.

Some of these defects can be attributed to low quality raw hides and skins. Against these the tannery cannot do much, besides repeatedly arguing for better flaying and curing and trying to effect best possible purchases. Most of the imperfections could, however, be corrected through better processing in the tannery.

For 1978 the tannery was planned to process

7 500 cattle and camel hides, locally available  
15 000 cattle hides imported from North Yemen and  
36 000 sheep and goatskins from local stock.

This programme agrees more or less with the demands of the national shoe factory and other local manufacturers under present conditions of deliveries from the tannery.

The 300 - 400 000 sheepskins of Australian stock are really not suitable for any other product than fur skins. It is a wise decision not to tan them, but to export them raw.

A much greater part of the approximately 300 000 skins available of local stock, could have been used, but that would be contingent to far better quality and additional products, such as glazed kid or similar, and this is today impossible for the tannery to achieve.

The importation of cattle hides from North Yemen is probably only a stop-gap measure. Most countries, and it is unlikely that North Yemen would be an exception, will want sooner or later to process their own raw materials. However, it seems that for some years to come it would be possible to import these hides and in the meantime the tannery should be able to improve its processing techniques etc. to a standard, that would allow full utilization of the locally available hides and skins. Under these new conditions the existence of the tannery must be regarded as justified.

Finding a substitute for the Australian sheep, which would, besides satisfactory meat, also give useful skins for the tannery, is an important task for those concerned. Unfortunately no suggestion as to a solution to this problem is to be found in this report. It is evident, however, that an additional 3-400 000 skins a year of acceptable quality would aid the tannery tremendously.

Know-how.

The technical management and supervisory staff suffer from a lack of proper knowledge, - quite understandable given the short time of their education and training in tannery operations and practices. Many unsuitable, or at instances right out bad methods are employed. The importance of keeping correct and consistent processing conditions, such as weights, volumes, temperatures and times, is not sufficiently recognized. Some corrections which can be carried out immediately or at short notice are listed separately (Annex) - it is self-evident that comprehensive corrections can only be carried out during a longer period and under proper supervision.

For the tannery to succeed in its aspirations as to product quality and production efficiency is it absolutely necessary that outside experts are brought in to introduce sound processes and to train the local staff further. This must be regarded as a first priority, before for example, any acquisition of machinery, which will improve the tannery output only if used correctly and efficiently.

Machinery and equipment.

With the addition of the three new drums the machine capacity as such is enough for the production now envisaged. As pointed out earlier some hand-tools and other equipment, however, must be acquired for the tannery to be able to cope with the quantities of leather to be processed, even if most of these additions are motivated by the need for quality improvements.

Contingent on the early presence of a leather processing expert and in close cooperation with him, the machines and other equipment as proposed for Phase II should be acquired and necessary follow-up action in regard to factory space, lay-out etc. should be taken.

Realizing, however, the importance of some of the machinery and equipment already for the present production these should be purchased, if at all possible, even before the rest are acquired.

Taking into account prevailing outside temperatures and the comparatively small production, it is thought that a boiler for producing steam is not necessary. For drying purposes only fans to move the air, be it inside cabinettes or in a fairly large room, would be sufficient at least for Phase I and II. A water heater to supply needed hot water for bating and dyeing purposes should be enough.

On the other hand, it is believed that the quality of the leathers and the working conditions could be improved considerably by a small, say 40-50 frame toggle

unit and this is suggested as an addition.

The revised list of machinery and equipment with prices of foreign machines including spare parts, CF Aden and charges would then read as follows:

	<u>Estimated cost</u>	
	<u>US \$</u>	<u>YD</u>
<u>To be made locally:</u>		
2 Platform wagons		
6 Wooden horses		
8 Wooden platforms		
25 Big, wooden nailing frames		
25 Small " " "		800
 <u>Handtools and equipment</u>		
<u>urgently needed:</u>		
4 Trimming knives		
6 Nailing tongs, flat type		
4 " " round "		
2 Thickness gauges		
4 Finishing brushes		
1 Set of weights		
2 Lifting trolleys		
2 Funnels		
2 <u>Balances, platform type</u>	3 500	
 <u>Amended Phase II machinery:</u>		
1 Hydraulic Samming machine	39 000 +)	
1 Oil Heater for water	5 000 +)	
1 Splitting machine	28 000	
1 Hydraulic, Setting-out m/c	38 000	
1 Toggle unit	30 000	
1 Vibratory Staking m/c	32 000	
1 Hand-setting m/c	3 000	
1 Hydraulic Press	35 000	
8 Plates for above press	8 000	
Miscellaneous tools etc.		200
In total	<u>222 000 US \$</u>	<u>1 000 YD</u>

+ ) To be acquired soonest possible.

Other considerations.

The water supply to the tannery is very poor. With the low in-take pressure changes inside the factory, as larger pipes and/or rubber hoses up to or from the tap points would not help. The most simple remedy would of course be to get the water supply authorities to increase the pressure for the area by installing a booster pump as suggested, but if that is not possible a water tank (Water tower), which can accumulate water during the night, must be considered. The volume should in that case cover about half a day's normal consumption. The cost is not possible to estimate here, but should be included in any investment plan.

The effluent is a problem, especially considering the proximity to the salt pans. Much could, however, be done by conveying the used water to the ground opposite the present one and there make the tanks for seeping and evaporation. A coarse filter before the first tank to remove large solid matters.

The location has not been discussed enough in detail to enable any certain conclusions to be drawn. If the effluent is the reason for a proposed move, its effect at the new site, even for the future, must be studied carefully. The acceptable grade of purification, if any, must in any case be stated by the local authorities for each site under consideration.

The addition of the tools and equipment that can be obtained quickly will not as such increase the need for more factory space. On the contrary, with their proper

use and some rearrangement of equipment and planning of the work, it should be possible to alleviate the situation to some extent. The lay-out is not the best, but it must also be noted that the factory is congested and would benefit from more space. With the arrival of the suggested new machines more space will of course be an absolute necessity. Before that time it should be decided if a new factory is to be built or only an addition to the present one. The possibility of using prefabricated, wide sheds over a concrete floor should be studied - it might be that building a completely new factory in this way would be cheaper than the addition of a conventional small building to the existing tannery. At present, however, the suggested additional 576 m<sup>2</sup> at a cost of 25 920 Rp seem reasonable and adequate.

Other activities - technical assistance.

As much as the time permitted during the study of the factory, the opportunity was used to show proper processing methods to the management and supervisory staff. Many inferior practices were pointed out and better ones suggested. In a couple of talks on general tanning methods the fundamental operations were discussed and explained to a very interested group of people.

RECOMMENDATIONS

Based on the foregoing findings and considerations it is recommended that

- 1/ A proficient leather processing expert is employed soonest possible to introduce modern and proper methods in the tannery and to begin the training of the local staff, all in order to effect the necessary improvement of the finished leathers.

It might be possible to obtain the services of an UNIDO/UNDP SIS expert in which case his stay should not be less than 6 months.

- 2/ Phases I and II of the earlier UNIDO/UNDP report, slightly amended as shown, are implemented, the Phases III and IV to be reviewed at a later, appropriate time.

A first step would be the purchase without delay of the immediately necessary tools and equipments outlined in the list under machinery and equipment.

Further acquisitions should be organized in cooperation with the expert. If the financing is obtained by or through UNIDO/UNDP a complete project should be drawn up to include also the technical assistance mentioned below.

- 3/ A technical assistance project is carried out by a team of experts as a continuation of the work of the expert above.

If possible and convenient, the first expert



should for the sake of continuity and conformity work out the details of the project and later serve as teamleader. Tentatively, another expert, either in tanning or in finishing, depending on the teamleader's preference, and a tannery machines repair/maintenance expert are envisaged as members of the team. The duration should be 2-3 years which repeatedly has been shown to be the minimum time required to train local staff to an acceptable level.

Although perhaps slightly beyond the limits of this study it is also suggested that an expert in flaying and curing of hides and skins is added to the team or else that a special project in this field is carried out. The need is felt very much.

- 4/ The action programme outlined in the Annex is carried out at the factory.

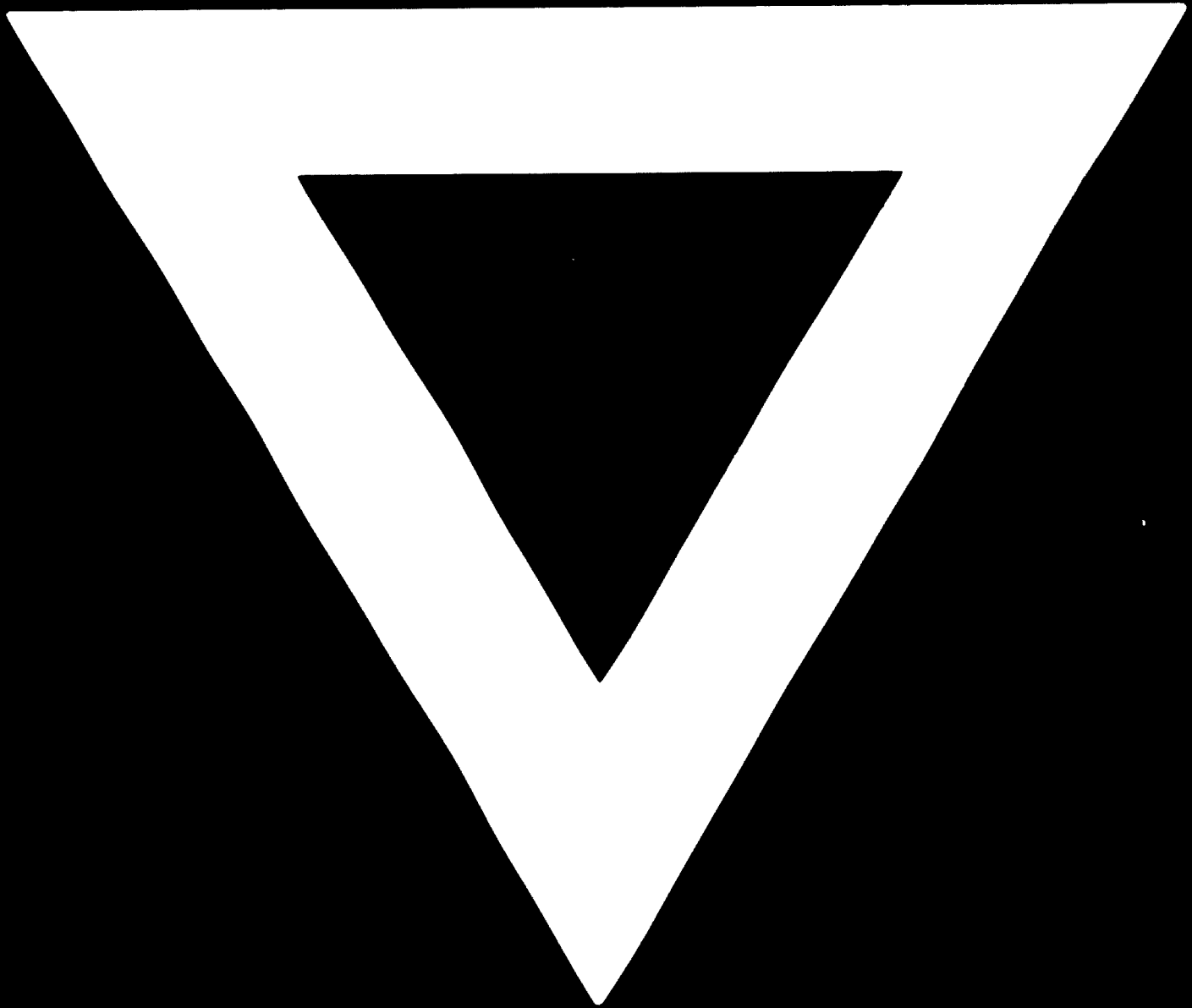
Some actions suggested to be taken in the  
National Tanning Factory

1. The hides and skins in the curing department should be sorted as to weights before further processing.
2. Curing in direct sunlight should be avoided.
3. Green hides should, if at all possible, be processed directly without curing.
4. Trim the skins already from the beginning to optimal sizes. Later trimming is to be avoided.
5. Avoid as much as possible pit soaking and liming. Use drums (2-3 rpm) or possibly paddles for the skins.
6. When the large fleshing machine is out of order, flesh the cattle hides twice in one of the smaller machines using first a lower pressure, preferable after the soaking, and then full pressure needed. Even otherwise flesh twice when so indicated.
7. Bore as near the inner surface as possible 3 holes approximately 2 inches in diameter through the wooden crossbars in the drums to allow liquids to pass from one section to another.
8. Weigh up all chemicals in buckets or similar in a special room and keep a record there.
9. Construct a support for the funnels to keep them in place when serving the drums.
10. Using the powder system with very low floats in delimiting to tanning, turn the drums at 6-8 rpm only, thereby also making higher loads possible.
11. In the absence of a much needed sammying machine hang the sides without wrinkles and keep them apart to allow as uniform drying as possible before shaving.
12. Check often the shaving to keep the thickness of the leather inside required tolerances. Check that the shaving knives are ground regularly and as often as needed.
13. Provide each of the shavers with a thickness gauge, the maintenance of which should be their responsibility.
14. In drum and raddle operations check regularly indicated weights, volumes, temperatures, pm and times and keep a record of each batch of hides and skins.
15. In the drying of the hides and skins hang them without wrinkles and regularly spaced. Select a new method among those discussed or a better one for the hanging of the light skins.
16. Adjust the jaw staking machine for less pull in the jaw, so as to allow staking of all the different kinds of skins without damages.

17. In the buffing machines adjust the papers carefully - the least bubble or upstanding part from a cut will immediately damage the leather. Provide guiding bars to the large machine to allow buffing of light leathers.
18. In the colour mixing room provide all pigment and resin containers with an individual cup to pour with when weighing.
19. Check regularly the weights of the balance against a new and correct set.
20. Apply much less finishing materials in padding and spraying. Check the spray-guns for leaks and damages to the needle. Heavy coats often produce loose grain.
21. Clean the hot water channels in the plating press and repair the hot water generator in order to obtain a uniformly heated plate and this in an acceptable time. Also repair the brakes in order to obtain normal operating conditions.
22. Clean and adjust the pin-wheel measuring machine.

We regret that some of the pages in the microfiche copy of this report may not be up to the proper legibility standards, even though the best possible copy was used for preparing the master fiche

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