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Technical Report

Departement van Waterwese
Department of Water Affairs

"NYLVALLEI — KUNSMATIGE AMIUULLING"

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WATER FOR THE GROWING NEEDS OF SPRINGBOK FLATS ADJACENT TO THE NYL RIVER VALLEY ARTIFICIAL GROUNDWATER RECHARGE PROJECT

An evaluation of the water resources of the Springbok Flats and the adjacent western area of the Nyl River flood plain will become necessary on account of the rapid growth of the developing mining and industrial complexes.

Knowledge of Nyl River Valley water resources will be a major factor in planning new water supplies and expanding existing ones. The information needed for these alternative developments can be obtained through a study of the hydrological system.

The investigation of the groundwater potential of the Nyl River Valley is intended to serve as a guide for water supply developers and managers in the Springbok Flats area.

By informing them as to where the water is, how much is there, what is the quality, and the effect of its development. The report contributes to wise and efficient use of the resources. At present these informations are urgently needed as industrial development moves farther into the adjacent area.

The scope of the investigation and report involved stream flows and basin analysis, aquifer hydrolics, water quality and the effects of changes imposed on the hydrological regime.

Artificial recharge experiments have been conducted at five cross sections of the river flood plain and two places in the Northern Springbok Flats using the water that collects in the flood plain of Nyl River and in dams in Springbok Flats during periods of high rainfall. The method of recharge has been by injection through boreholes or wells drilled into the flood plain i.e. near the dams.

GAUGING STATIONS FOR ARTIFICIAL RECHARGE IN NYL RIVER VALLEY

Section	No. of observa- tion gauging stations	Number of surface water gauging station	Gauge plates	Recharge chambers	Remarks
I. Vogelfontein	A6N027 ● (Red) <i>2428 DA 8</i>	A6M-17 ● (Black)	1	1	Out of order
II. De Toits Kraal	A6N017 ● <i>2428 DE 7</i> A6N023 ● <i>DB 1</i>	A6M-13 ● "	4	2	Out of order
III. Olifantsklip	A6N022 ● " A6N023	<i>BD 2</i> A6M-14 ● "	1	1	Out of order
IV. De Hoop	A6N021 ● " <i>BD 1</i>	A6M-15 ● "	2	1	In order
V. Vaalkop	A6N026 ● " <i>BD 3</i>	A6M-16 ● "	1	1	Out of order

Red
● Groundwater gauging station

Black
● Surface water gauging station

2./.....

The following measuring stations have been erected in Nyl River Valley.

A. EVAPORATION STATION A6E05

A Symons tank is situated with daily rain gauge in the bed of the Nyl River. The tank is situated + 6,5 kms along the road from Naboomspruit towards Roedtan. The owner of the farm Du Toitskraal is E.A. Galpin who is also our official observer. The installation and recording system are in order.

B. SURFACE AND GROUNDWATER LEVEL GAUGING STATIONS

Measurements of the surface and groundwater levels were achieved at five sections across the vlei.

- I. Vogelsfontein A6M17 - This station includes a 0-2,0m gauge plate, and a surface water recorder. A feed borehole has been drilled here with which is more or less at the zero mark of gauge plate A6M17. Another borehole has been drilled for groundwater level measurement - A6N027.
- II. Du Toitskraal A6M12. This station is split into three parts - the entire distribution of measuring points excludes along 2 kms of the Nyl River Valley and includes four 0-2,0 gauge plates and a surface water recorder. Three boreholes have been drilled, one for groundwater record purposes A6N023, the other two for feeding and an existing borehole is used also for groundwater level measuring A6N017.
- III. Olifantsklip A6M14. This consists of a gauge plate situated approximately at the confluence of the Tobias Spruit and Nyl River. Two boreholes have been drilled here, one for groundwater record purposes A6N022, the other for feeding. At present this station is neglected, the groundwater recorder chart was not changed for more than a year and the feeding chamber has been destroyed.
- IV. De Hoop A6M15. This station combines two 0-0,2 gauge plates and a surface water level recorder, situated upstream of a road crossing. Apart from the surface recorder, another recorder was erected on one of two new boreholes drilled for measuring the groundwater level A6N021, and another is to be the feed borehole. The entire complex was fenced off. The above mentioned measuring points, except the feed borehole are at present in an operative condition.

V. Vaalkop A6M6. This is a 0-2,0m gauge plate, situated in the middle of the Nyl River coarse. The measuring point also includes a surface water recorder, and another recorder was erected on one of two new boreholes drilled A6N026. The other new borehole is to be the feed borehole. At present the whole construction, except the groundwater gauging station, has been completely destroyed.

N.B. MEASUREMENT OF GROUNDWATER RECHARGE

This operation used to be successful at all five sections (see above). Measurement was achieved at each station by passing the water through a sharp edged orifice equipped with one water level recorder. The size of the orifice was dictated by the original pump test at each borehole and an anticipated head of the surface water of $\pm 0,6\text{m}$ above the orifice. Each orifice was installed in a concrete chamber $\pm 1,8\text{m}$ high with a reinforced concrete floor constructed around the feed borehole, the collar elevation being level with the floor. Exact figures of recharge and groundwater level response are included in the associated report by Dr. Porszasz.

During the last two years the Nyl River Project was not supervised satisfactory. Up to 1976 I had to check it myself regularly as W. Erasmus, local tech. Assist (Nylstroom), worked only part time for Water Research Institute.

At present all control over the project has practically ceased even though W. Erasmus still forwards the applications for drilling and extraction permits. The fact remains that he is unable to pay attention to this matters on account of his duties elsewhere. Meanwhile the unauthorised drilling of boreholes continues, boreholes are being used illegally for irrigation, and even those drilled by Government are used for private purposes.

Owing to the frequency of farms changing hands and neglect of the seller to inform the buyer of groundwater restrictions, these are unknown to the buyer with the result of infringement of the law.

During my last visit (3.8.78) to the area I observed many illegal procedures.

For above reasons I regard it as necessary to have the area re-surveyed without any further delay.

The project was conceived to supply the anticipated industrial and mining enterprises with water as a result the more important part of the Nyl River and vicinity came under control. However, subsequently and without my previous advice and approval, the Water Research Institute advocated the deproclamation of the area to the south of Roedtan.

Naboomspruit road on the grounds that this part of the project is not suitable for more intensive agricultural development.

Unfortunately the official responsible for this proposal did not foresee subsequent circumstances, such as the fact that at present intensive prospecting for coal and other minerals is being undertaken and it is anticipated that with increasing usage of coal, industrial development in the area is inevitable.

It appears then, that it is inexcusable that I who started and planned the project originally and who has been connected with it in all details, should be left out from the deliberations from or the taking of decision, especially when I had already worked out sound policies for the future of this area.

Conclusions

Seeing that the future importance of the area is indicated by present trends and developments.

I consider that it is essential

1. To have the area resurveyed at once.
2. To withdraw permits which were issued on erroneous assumptions.
3. To cancel the proposition of the deproclamation of the southern part of the project.
4. To proclaim the surface water right.

K. P. ...
14/8/78