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Table (1): Abbreviations and acronyms

COP	Code of Practice
DWSU	Drinking Water and Sanitation Unit
GoS	Government of Sudan
HAC	Humanitarian Aid Commission
IDP	Internally Displaced Persons
I-PRSP	Interim Poverty Reduction Strategic Paper
JMP	Joint Monitoring Programme
INGO	International Non Governmental Organisation
MDG	Millennium Development Goals
NGO	Non Governmental Organisation
SWL	Static Water level
TDS	Total Dissolved Solids
UNAMID	United Nations Mission in Darfur
UNEP	United Nations Environmental Programme
UNICEF	United Nations International Children's Fund
WES	Water and Environmental Sanitation
WASH	Water, Sanitation and Hygiene
PVC	Polyvinyl Chloride
TETCO	Texas Eastern Transmission Corporation
AWWA	American Water Works Association
ITZC	Inter-tropical Convergence Zone
WRM	Water Resources Management
SWC	State Water Corporation
SEDC	Sudanese Electricity Distribution Company
L/C/day	Litre per Capita per day

Abstract:

The project is named Nyala Water Project, the design capacity of this project is 40,000 cubic meters of water per day , it was designed by the Public Water Corporation of the Ministry of Irrigation and Water Resources in November of the year 2000, and that the proposal is based to drill 20 wells in the area of Gareida assuming that the productivity of these wells are equal and equal to 2,000 cubic meters per day , and that the water is disinfected with chlorine according to World Health Organization standards (WHO). And then will be pumped by a number of pumping stations to the city of Nyala, a distance of 85 kilometers in the north. Since the basic design of the project (hydraulic design) is based on pumping water through the pumping stages, the first in the field, and the second after 26 kilometers, and the third a distance of 18 kilometers from the second and fourth 28 kilometers of the third and discharges water into two tanks with a capacity of 4000 Cubic meters each, and then to the distribution network of the city. After reviewing the existing design work and analysis of the basic components of the project, it was found that the project can be re- designed to reduce the number of pumping stations, thus reducing operating and maintenance costs. Steps have been clarified in the new hydraulic design in chapter four, as well as the work tables to compare the operating costs in the case of the old and the new situation. And also found that the operation of this project by electricity can reduce costs of operation and maintenance to a very large, and the research has made the comparison between them and the old design, and also between them and the new design.

ملخص:

يسمي هذا المشروع بمشروع مياه نيالا ، والطاقة التصميمية لهذا المشروع حوالي 40,000 **متر مكعب من** الماء في اليوم , تم تصميم المشروع من قبل الهيئة العامة للمياه التابعة لوزارة الري والموارد المائية في **نوفمبر من العام** 2000 م وأن المقترح يستند إلي حفر عدد 20 بئر في منطقة قريضة بإفتراض أن إنتاجية هذه الأبار متساوية وتساوي 2000متر مكعب في اليوم، و أن الماء يتم تطهيره بالكلور وفق معايير منظمة الصحة العالمية، ومن ثم يتم الضخ بواسطة عدد من محطات الضخ إلي مدينة نيالا بمسافة 85 كيلومتر في الناحية الشمالية. بما أن التصميم الأساسي لهذا المشروع (التصميم الهيدروليكي) يستند علي ضخ الماء عن طريق أربعة مراحل ضخ، الأولي في الحقل والثانية علي بعد 26 كيلو **متر، والثالثة علي بعد** 18 كيلومتر من الثانية والرابعة علي بعد 28 كيلومتر من الثالثة ويتم تفريغ المياه في خزانين سعة كل واحد حوالي 4000 متر مكعب ومن ثم يتم التوزيع لشبكة المدينة. بعد مراجعة التصميم الموجود وعمل تحليل للمكونات الأساسية للمشروع وجد أن هذا المشروع يمكن إعادة تصميمه لتقليل عدد محطات الضخ وبالتالي تقليل تكاليف التشغيل والصيانة. وقد تم توضيح خطوات التصميم الهيدروليكي الجديد في الباب الرابع وكذلك تم عمل جداول للمقارنة بين تكاليف التشغيل في الحالة القديمة والحالة الجديدة. وأيضاً وجد أن تشغيل هذا المشروع بالكهرباء سيقلل من تكاليف التشغيل والصيانة بنسبة كبيرة جداً وتمت المقارنة بينها والتصميم القديم وأيضاً بينها والتصميم الجديد.

Summary of the Study:

The study focuses its attention on the hydraulic design of the project. The study begins by an introduction which is described the country political and administrative structure, relief and drainage, climate, and vegetation of the study area. Also in the introduction the study was focused on project site, problem definition, and objectives of the study, and then followed by methodology of the study. In chapter two, the study gives a brief history of pipelines, and the major existing pipelines, and their types. In chapter three the study explains the research investigation, site location and access, water resources, and also describes the project components. In chapter four the study focuses on the hydraulic design of the project, which is including the deign parameters such as design flow, design pressure, design velocity, concept of water hammer, hydraulic calculations and power requirements by different scenarios. Chapter five of this study explains the results and discussions of the scenarios. Finally the recommendations and conclusion of the study was given on chapter six.