

## Introduction

The generally accepted criteria for filter pack material suitable for use in gravel envelope water wells is for it to be composed of well-rounded, water-worn siliceous rock washed free of deleterious matter. Many designers specify that the midsize of the pack material should be about 4 to 6 times larger than the midsize of the aquifer. Filter packs that meet such criteria are herein referred to as "select". Select filter pack materials are readily available in the U.S. from commercial aggregate suppliers who typically offer a variety blended materials to meet specific size parameters. However, the fact is that select materials are not always available. For instance, well drilling contractors working in rural areas or overseas seldom use select filter pack materials. They have no recourse but to use locally available aggregate that is angular, calcareous, randomly sorted, and rife with deleterious matter. Such was the case in the Republic of the Philippines where a score of gravel envelope wells were installed.

This memorandum presents a narrative describing a major ground water development project that relied upon the performance of louvered well screen to overcome the inherent negative characteristics of non-select filter pack materials.

## The Program

The Metropolitan Water Works and Sewage System (MWSS), the principal water utility for metropolitan Manila, meets a large portion of its daily water demand by pumping ground water from a network of deep wells located throughout Metro Manila and the Marikina Valley. As the population of Metro Manila increased, MWSS had to increase its water supply. It began by upgrading the well system. MWSS funded a two-part program that consisted of 1) rehabilitating existing wells and 2) drilling new wells. MWSS embarked upon a major ground water development program and drilled 25 high-capacity production wells in the span of about 30 months.

## Part 1 - Redeveloping Existing Wells

MWSS had a large system of production wells that had been poorly maintained. Therefore, the initial effort was to rehabilitate approximately 60 existing wells. Many existing wells dated back to the end of WWII, had been drilled by cable-tool rigs, and were completed with mill's knife perforations. In general, they were generally no longer serviceable. Approximately 60 wells less than 20 years old had been drilled by mud-rotary rigs and were completed with mill-slotted casing. Those wells were scheduled for rehabilitation.

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