

**CONTRACT NO. SPW 21/2013**

**Hydraulic Filter Press Pilot Test  
for  
Relocation of Sha Tin Sewage Treatment Works to  
Caverns  
- Feasibility Study**

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## **Executive Summary**

The objectives of the pilot test were to assess the hydraulic filter press' feasibility and its dewatering capability to achieve 30% DS under different conditions for the future relocated Shatin Sewage Treatment Works (STSTW) and for other Sewage Treatment Works (STWs) in Hong Kong. As part of the pilot test, various aspects were investigated as follows:

- Different designed sludge mixtures ratio for the future relocated STSTW
- Different biological sludge from other STWs
- Chemical type and consumption
- Operational conditions e.g. cycle time
- Filtrate quality
- Operational requirements

A pilot unit using the technology of Degremont's "Dehydris Twist" based on the BUCHER Unipektin hydraulic filter press was used for the pilot test at both the locations of STSTW and Stanley STW. The pilot unit was a BUCHER model HPS 207, comprised mainly (a) a hydraulic driven piston; (b) a fixed outer cylinder; (c) multiple flexible filtration elements; and (d) automatic monitoring and control system.

For the STSTW tests, various types of sludge from STSTW were collected and prepared into mixtures of different proposed ratio as feed sludge for the pilot test. For the Stanley STW tests, Stanley's SAS<sup>1</sup>, various types of sludge to be transported by tankers from Shek Wu Hui (SWH) STW and Lo Wu Correctional Institution (LWCI) STP were used as feed sludge for the pilot test.

A total of 75 and 39 test trials were conducted in STSTW and Stanley STW respectively within the period of the pilot test. Summary table of the test trials was shown below:

STSTW		Stanley STW	
Feed Sludge	No. of test trials	Feed Sludge	No. of test trials
CPS <sup>2</sup>	21	Stanley STW SAS	21
CPS + Thickened SAS mixtures	12	SWHSTW DGS	3
PS <sup>3</sup> + Thickened SAS mixtures	36	SWHSTW SAS from	6
DGS <sup>4</sup>	6	LWCI STP MBR <sup>5</sup> Sludge	9
Total	75	Total	39

Based on the pilot tests results, it could be concluded that there should be no major technical difficulty to achieve the required 30%DS for sludge mixtures of STSTW with the appropriate polymer type and flocculants used, with achievement of solid recovery of more than 95%.

Due to the limitation of time and budget, the pilot test could only provide a preliminary indication of the technology's mechanical performance and reliability. The consistency of its performance over time and the effectiveness of addition of FeCl<sub>3</sub> (in particular) and H<sub>2</sub>O<sub>2</sub> could not be fully reflected or verified.

It was recommended that more extensive trials and longer term assessment could be considered using a full-scale industrial hydraulic filter press unit to enable a more, realistic in-depth assessment on its robustness, operation, maintenance, performance, recurrent cost and power consumption. All these information obtained would be beneficial for the final assessment and confirmation of this facility as a feasible choice for the STSTW cavern project.

1- SAS refers to surplus activated sludge

2- CPS refers to co-settled primary sludge

3- PS refers to primary sludge

4- DGS refer to digested sludge

5- MBR refers to membrane bioreactor