



香港特別行政區政府

The Government of the Hong Kong Special Administrative Region

渠務署

Drainage Services Department

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26 May 2021

(Urgent by email: wyjan@legco.gov.hk)

Public Accounts Committee
 Legislative Council Complex
 1 Legislative Council Road,
 Central, Hong Kong
 (Attn.: Ms. Wendy JAN)

Dear Ms. JAN,

Public Accounts Committee**Consideration of Chapter 7 of the Director of Audit's Report No. 76****Upgrading and operation of Pillar Point Sewage Treatment Works**

Thanks for your letter dated 18 May 2021 regarding the captioned.

I attach an Appendix stating our response for your attention please.

Yours sincerely

(LEUNG Wing-yuen)
 for Director of Drainage Services

Encl.

c.c. Secretary for the Environment (email: sen@enb.gov.hk)
 Secretary for Financial Services and the Treasury (email: sfst@fstb.gov.hk)
 Director of Audit (email: john_nc_chu@aud.gov.hk)

Director of Audit's Report No. 76 – Chapter 7

" Upgrading and Operation of Pillar Point Sewage Treatment Works"

DSD's Response to Enquiries

Part 2: Upgrading works of Pillar Point Sewage Treatment Works

- 1) According to paragraphs 2.7 and 2.8 of the Director of Audit's Report No. 76 ("Audit Report"), a polyurea-based coating was applied by the Contractor on the concrete surfaces of the newly constructed structures, but the protective coating had been found deteriorated since Dec 2013. Please advise if the protective coating was a suitable material to be used? Was there any fault encountered in application procedure? Or whether the deterioration was resulted from defective workmanship?

DSD's Response :

Deterioration of concrete protective coating is a common maintenance issue in sewage treatment works. Its maintenance normally requires the Department to shut down of part of the treatment units to facilitate the coating repair works, and would inevitably cause some disruptions to the sewage treatment operations. Therefore, the Department has been conducting researches and tests on different types of durable protective coating materials, with an aim to reducing the disturbance on the sewage treatment operations. At the planning stage of the Pillar Point Sewage Treatment Works upgrading project, the project team explicitly specified in the contract requirement the use of a more effective new concrete protective coating material. Pursuant to the contract requirement, Contractor A proposed a polyurea-based coating material, which has been proven to perform satisfactory in other countries and the Department's other sewage treatment facilities. After due consideration, Consultant X then approved the proposed coating material. The coating material application on the proposed concrete protective coating works had been carried out by the specialist sub-contractor designated by the material supplier and its acceptance tests were constantly supervised by the resident site staff. No irregularity had been observed during the application process, and thus the protective coating deterioration should be irrelevant to the defective workmanship.

- 2) According to paragraph 2.8 of the Audit Report, the deterioration of protective coating was identified in Dec 2013, and the situation had not been improved over two years (about 30 months). Significant portions of the protective coating were found peeling off in Jul 2016, resulting in some structures being exposed and corroded. Please advise why the situation had been deteriorating, and what remedial measures had been taken by the Department?

DSD's Response :

Some of the concrete protective coatings in Pillar Point Sewage Treatment Works were found locally peeling off during the testing period in Dec 2013, and Consultant X had instructed Contractor A to carry out the defect rectification. However, after completing the defect rectification in 2015, the peeling off issue persisted and the deterioration had been extended since then. Upon initial assessment, Consultant X perceived that the protective coating peeling off issue might have been caused by some foreign substance in the sewage. Having deliberated by the project team, Contractor A agreed to conduct an investigation and appointed an expert from the Mainland (Sun Yat-sen University) and an overseas expert (from the United States) in March and May 2017 respectively to carry out the investigation. Findings of the investigation revealed that peeling off of the concrete protective coating could be possibly due to either acidic vapour, chemical or industrial oil substance (not commonly found in domestic sewage) attack. Apart from receiving sewage from the sewerage system in Tuen Mun area, the Pillar Point Sewage Treatment Works also receives septic waste delivered to the plant by tankers, which makes the sewage characteristic different from that in other sewage treatment plants. Moreover, Contractor A had been sourcing and carrying out testing on different replacement materials since Sep 2016. The testing results were found in general satisfactory. Once the experts completed the investigations, Contractor A started the repair works immediately using the successfully tested replacement materials. As the Pillar Point Sewage treatment Works was already in full operation, the sewage treatment operations had to be partially suspended to facilitate the repair. With a view to minimizing the disruption to the sewage treatment service, the repair works could only be conducted in phases during the dry seasons in the following 3 years (during wet seasons, the amount of influent could have a sudden surge due to adverse weather conditions, and the plant had been maintained in full operation mode to cope with such sudden changes.). The concrete protective coating repair works were finally completed in Mar 2020 before the onset of the coming wet season.

The Department has been actively monitoring and investigating on the performance of concrete protective coatings in Pillar Point Sewage Treatment Works. Contractor A also commissioned an independent engineer in May 2019 to conduct a comprehensive structural condition survey in Pillar Point Sewage Treatment Works as required under the Contract. Indications from the survey results were that the structural condition and the performance of the new concrete protective coating were satisfactory. In order to further investigate the cause of deterioration of the original concrete protective coating, the Department commissioned a local university in Nov 2020 to conduct an investigation study as well as reviewing the condition and performance of the new coating repair works. The investigation is anticipated for completion in Nov 2021.

- 3) As mentioned in paragraphs 2.17 and 2.18 of the Audit Report about the non-compliance of the material used in fine screens, please advise whether the Department had reviewed the incidents and implemented new guidelines on equipment/material procurement to prevent similar occurrence in the future? The incident involved the use of Grade 304 stainless steel chain in the fine screens, which was at variance with the required Grade 316 stainless steel. The two stainless steel materials are not differed solely in price or durability, the Grade 304 is also responsive to magnetic fields. Please advise whether the use of Grade 304 stainless steel was one of the causes of the mechanical malfunction?

Response from Department :

Regarding the issue of non-compliance of material used in fine screens in Pillar Point Sewage Treatment Works project, the project team had implemented additional measures to require Contractor to provide a full list of compliance check before installation of facilities, to include listing and declaring the proposed equipment and components fulfilling the contract requirements as well as complying with the General Specification for Electrical and Mechanical Sewerage Facility Installations. The Department might conduct random checking on components of the equipment or carry out materials testing when required. If any non-compliance was identified, the Contractors should carry out the replacement works promptly and would possibly be held responsible for giving inaccurate information or making false statements, so as to enhancing the deterrence.

The durability of corrosion resistance was one of the main considerations in determining the grade of stainless steel to be used in the fine screens. Grade 316 stainless steel performs better than Grade 304 in the long-term resistance to sewage corrosion. As far

as the short-term corrosion resistance was concerned, both grades of materials possess similar performance. Moreover, Grade 304 stainless steel although is slightly responsive to magnetic fields, its mechanical properties are not affected. Even though the use of Grade 304 stainless steel did not comply with the contract requirements, it was not considered a cause of the mechanical failure incident in Aug 2014.

- 4) As mentioned in paragraphs 2.29 and 2.30 of the Audit Report, Contractor A completed the defect rectification 6 months after the expiry of the defects correction period. Please advise whether the Department would increase the penalties or strengthen the regulatory mechanism, in order to ensure early completion of the defect rectification works? The report mentioned that Consultant X found Contractor A did not provide adequate resources, and took lengthy coordination between construction and operation teams for the rectification. Please advise whether such performance would be recorded and to be referred as one of the criteria in assessing the contractor when they tendered for Government projects in the future?

DSD's Response :

The project team had been monitoring the progress of defects rectification. However, the operation of sewage treatment works would be inevitably affected during the course of rectification works, which might hinder the progress of the rectification works on time and its completion within the specified time limits.

In order to ensure timely completion of the defects rectification, the project team had been regularly reviewing the progress with Contractor A and urged them to deploy adequate resources as necessary. Regarding the performance of Contractor A on the lack of adequate resources in dealing with the defects rectification and lengthy coordination work, these had been duly recorded and reflected in the quarterly contractor performance reports, which would be referred as one of the criteria in assessing the technical competency of the contractor when they tender for Government projects in the future. The Contract had stipulated that in case Contractor A could not complete the defects rectification within the specified time, the Department would withhold the release of retention money. The Department would also appoint other contractors to complete the works at Contractor A's expenses in case the rectification could not be completed within a reasonable period of time under further instruction.

Part 3: Monitoring of operation of upgraded pillar point sewage treatment works

- 5) According to paragraph 3.8 (b) (c) and Table 4 of the Audit Report, the Contractor failed to comply with some Key Performance Indicators (KPIs), such as matters relating to consistent minor breaches and late reporting. Relying solely on penalties appeared not an effective mean to improve the situation. Please advise whether the Department would review and follow up on other means to address the issues.

Response from Department :

According to the Department's record on supervision, the performance of Contractor A was improved. During the nearly 7-year operation period of the Pillar Point Sewage Treatment Works (from May 2014 to March 2021), the Department conducted 83 comprehensive monthly inspections and a total of 1,079 reviews of various KPIs assessment. In between, there were 8 cases mentioned in the Audit Report failing to fully meet the KPIs requirement, accounting for about 0.7% of the overall number of reviews. The Department had also conducted surprise checks to test the E coli concentration in treated effluent from Pillar Point Sewage Treatment Works, to ensure the effluent quality achieving the discharge license's requirement. For cases involving minor violations and delayed reporting, other than making payment deductions in accordance with the contract provisions, the Department would closely monitor the performance of Contractor A. The Department would keep using the KPIs evaluation system to continuously monitor the performance of Contractor A, which will be assessed, duly recorded and reflected in the quarterly contractor performance reports.

- 6) As mentioned in paragraphs 3.13 of the Audit Report about Contract A, what were the main considerations of the Government in formulating the demerit point and payment deduction mechanism? In particular, the reason of the deduction can only be made once in each month at maximum? For serious incidents, such as the "unauthorized emergency bypass" event, is it necessary to specify the deduction point in the Contract?

Response from Department :

The KPIs and demerit point mechanism established in Pillar Point Sewage Treatment Works contract are mainly used to evaluate the operation efficiency and the treatment process, so as to ensure the sewage treatment operations in compliance with the relevant

environmental protection regulations and discharge standards of the treated effluent. The maximum payment deduction set in the mechanism was about the overhead and profit margin of the contractor in running the plant in each month. The remaining amount of payment would be the basic operating cost in maintaining the sewage treatment operation. As the Pillar Point Sewage Treatment Works upgrading project was the first project in the Department using the "Design, Build and Operate" mode, the performance monitoring and demerit point mechanism in the Contract was firstly adopted. The effectiveness will be reviewed regularly by the Department for future reference and improvement.

In the monthly assessment of demerit point mechanism, "unauthorized emergency bypass" is considered a "major incident" and the demerit point of such incident has been specified under the Contract. In addition to the payment deduction, the Department had already reflected the "unauthorized emergency bypass" incident in the quarterly contractor performance report, giving Contractor A an overall quarterly performance as "very poor". The Department attaches great importance to the smooth operation of sewage treatment works, from the past experience, although the "unauthorized emergency bypass" is a major incident, it is an uncommon event and the chance of it being occurred more than once a month is slim. Therefore, the original contract terms did not make further categorization on the monthly assessment and payment deduction arrangement for the "unauthorized emergency bypass" item. After due consideration, apart from increasing the demerit points and payment deduction, the demerit points and payment deduction were also linked to the duration and number of unauthorized emergency bypass in the new DBO contract in order to intensify the level of deterrence as well as the penalties. According to the terms of contract, if Contractor A failed to perform duly in the operation, such as making repetitive unauthorized emergency bypass incidents, the Department may terminate its operation contract in accordance with the contract provisions.

- 7) According to paragraphs 3.17 and 3.18 of the Audit Report, the Department conducted 161 days of surprise check at PPSTW on the E. Coli concentration in effluent, and there were 23 days with high concentration. The Contractor required time for investigation and there were 3 cases which investigations took more than 1 year to complete. Please advise the cause of delay? How the investigation mechanism works? Whether the Contractor has been asked to complete the investigation within certain timeframe?

DSD's Response :

So far as the 3 cases which had taken exceptionally long period for investigation are concerned, it was not conclusive yet despite repetitive investigations due to the varying nature of the E. Coli tests. The Department could only extend the observation to ensure no further failure of similar nature, to conclude the completion of the investigation. Such approach had increased the time required for completing the investigation. The Department will continue to follow up with Contractor A immediately on every surprise check's results, carry out site inspection on relevant facilities and systems, and conduct meetings and investigations, with an aim to find out the causes as soon as possible to ensure smooth operation of the sewage treatment process. At the end of investigations, Contractor A would formally submit an investigation report for record.

- 8) According to paragraph 3.22 of the Audit Report, the body of a worker was found in a manhole 1 month after the incident. Please advise whether the Department had notified the incident to other departments and followed up immediately? As the incident is related to occupational safety, were there any loopholes on Contractor's safety management? How to improve and strengthen the supervision? Besides penalties, any other measures could be implemented to improve the concerned issues more effectively?

Response from Department :

Immediately after the discovery of the incident, the Department had informed relevant government departments and strived to search for the missing worker, followed by a series of internal investigation. Upon the completion of investigation by the independent safety consultant, the Department urged Contractor A to improve their safety management. The Department also instructed Contractor A to carry out various enhancement measures, such as strengthening the staff training, installation of safety devices, avoid working alone and installation of CCTV for safety monitoring, etc. Apart from the payment deduction, the Department would conduct site safety surprise checks and meetings to monitor the safety performance of Contractor A, in order to uplift the safety awareness of Contractor A and provide safe working environment at the Pillar Point Sewage Treatment Works. Also, the Department would regulate the safety performance of Contractor A by giving recommendations, warning and conducting performance appraisal.

- 9) For the inconsistencies and loss of data in SCADA System mentioned in paragraph 3.32 and 3.33 of the Audit Report, the Department advised that the data inconsistencies had been rectified about 1.5 years after identification of the problem, but the problem of loss of data was yet to be fully resolved. What follow up actions had been taken by the Department? The Department had issued at least six letters about data inconsistencies and data loss in SCADA system to Contractor A, however there was still no significant improvement. Would there be any problem in monitoring the site operation? Could the backup storage be increased?

Response from Department :

Loss of data involves numerous electronic devices, software incompatibility and data communication (through internet service provider). Contractor A had hired professionals to investigate and to establish feasible solution. Since the concerned data was for backup only, it would not affect the monitoring of plant operation. Moreover, the Department had requested Contractor A to take measures to increase the backup storage to ensure that all data in the terminals would be properly recorded in the hard disks.

- 10) According to paragraph 3.38(b) and 3.40(a) of Audit Report, the Contractor did not timely complete some preventive maintenance tasks and some maintenance records were kept manually. Please advise the feasibility of using computerized system to capture all maintenance records. If manual recording is required, how could the Department carry out necessary supervision to improve the effectiveness and efficiency of storage of maintenance record?

Response from Department :

The Department had reviewed the case and requested Contractor A to upgrade the computerized maintenance management (CMM) system, including preventive maintenance function, alert system and tracking of maintenance record, etc., to tie in with the latest maintenance strategy in order to ensure timely completion and proper recording in the CMM System. Meanwhile, the Department has required Contractor A to regularly submit the summaries of CMM System maintenance record to facilitate checking of the timely implementation of preventive maintenance.

- 11) According to paragraph 3.43 of the Audit Report, with no serious defect found during the structural condition survey, all the rectification works should be completed within 60 days after issuance of the report or other extended period as agreed with the Department. However, for the rectification works could not be completed by Contractor A within 60 days, there was no record indicating that the Department had agreed to extend the rectification period. Please explain why the defects could not be timely rectified and why there was no record showing the relevant situation?

Response from Department :

The daily operation of the sewage treatment works would be inevitably affected when the defects rectification works were carried out simultaneously. Therefore, it would be difficult to complete all the rectification works within the specified time limit, and often, the progress of rectification works would also be delayed due to adverse weather. The Department has been keeping close monitoring on the progress of the rectification works, and also regularly reviewed the programme and progress of works with Contractor A as well as requesting Contractor A to increase resources to ensure timely completion of the rectification works. In order to ensure the rectification works to be completed on time, the progress will be reviewed and reported in the monthly operation meetings, and the Department has requested Contractor A to provide a list of all the defect correction items with agreed completion date as a proper record.