Drainage Services Department
Harbour Area Treatment Scheme Stage 2A – Advance Disinfection Facilities (ADF) at Stonecutters Island Sewage Treatment Works

Chemical Supply Contract Arrangements, Procedural Control on Chemical Deliveries within SCISTW, Security of Loading Points and Unloading Operation as well as Means to Ensure Quality of Chemical Suppliers

1. Introduction

1.1 Background

In accordance with Condition 3.9 of the Environmental Permit no. EP-295/2007/A, the chemical supply contract arrangements, procedural control on chemical deliveries within SCISTW, security of loading points and unloading operation as well as means to ensure quality of chemical suppliers are required to be presented to the Director of Environmental Protection.

Chlorination using sodium hypochlorite solution followed by dechlorination using sodium bisulphite solution is adopted for disinfection of chemically enhanced primary treated (CEPT) effluent at Stonecutters Island sewage treatment works (SCISTW). The two chemicals will be purchased and delivered to SCISTW, and be unloaded to the designated storage compounds.

Ferric chloride, which is a chemical used at SCISTW to enhance sedimentation is also stored at SCISTW. Ferric chloride is incompatible with sodium hypochlorite or sodium bisulphite as hazardous gas would be generated if sodium hypochlorite or sodium bisulphite accidentally mixes with ferric chloride. Precautionary measures are required to be implemented in the chemical delivery and unloading operation to avoid accidental mixing of ferric chloride with sodium hypochlorite or sodium bisulphite.

1.2 Objective

This paper outlines the chemical supply contract arrangements, procedural control on chemical deliveries within SCISTW, security of loading points and unloading operation as well as means to ensure quality of chemical suppliers.

2 Chemical Delivery Arrangement

2.1 Sodium Hypochlorite Delivery Arrangement

Sodium hypochlorite solution will be delivered to SCISTW by sea or by road. For the initial years of ADF operation, sodium hypochlorite will be delivered to SCISTW by road tankers only. Designated road tankers will be used for delivery of sodium hypochlorite solution to SCISTW and the chemical will be unloaded to the storage tanks at the sodium hypochlorite storage compound located at the southern corner of SCISTW main compound which is located some 200 metres away from the ferric chloride storage tanks.

Road tankers delivering sodium hypochlorite will enter SCISTW via the side entrance located at southern part of SCISTW and travel along the road around the Northwest Kowloon Pumping Station to the sodium hypochlorite storage tank farm.

For sea transport, a purposely-designed barge will deliver the sodium hypochlorite solution to the berth on the north side of SCISTW and the sodium hypochlorite solution will be pumped to the storage compound through a feeding pipe placed in an enclosed pipe trench.

2.2 Sodium Bisulphite Delivery Arrangement

Sodium bisulphite solution will be delivered to SCISTW by road. It will be delivered by designated road tanker and unloaded to the storage tanks at the sodium bisulphite storage compound next to Chamber 15, which is outside the SCISTW main compound. Road tanker delivering sodium bisulphite will travel to the dechlorination plant direct via Ngong Shuen Road and will not enter the SCISTW main compound.

2.3 Ferric Chloride Delivery Arrangement

Ferric chloride solution is delivered to SCISTW by road using designated road tanker and unloaded to the storage tanks at the ferric chloride storage compound located at the eastern corner of SCISTW main compound, about 200 metres from the sodium hypochlorite storage compound. Road tanker delivering ferric chloride now enters the SCISTW main compound via the main entrance located at northeast corner of SCISTW main compound and travels along the sea frontage to the ferric chloride tank farm.

2.4 A general layout plan showing the locations of storage compounds for sodium hypochlorite, sodium bisulphite and ferric chlorite solutions, together with their respective road tanker transport routes is at Annex A.

3 Chemical Supply Contract Arrangements

The following chemical supply contract arrangements are in place:

- Separate chemical supply contracts are to be awarded for the three chemicals supplied to SCISTW.

- Each chemical supplier is required to use dedicated road tankers for delivery of each chemical and the dedicated tankers shall be different in colour and marked with the name of the chemical.

- Each chemical supplier is required to use hose and coupler specifically designed for unloading of each chemical. The hose for each particular chemical should be different in colour and size, and labelled with the name of chemical for which the hose is to be used. The couplers for unloading operations for different chemicals are of different shapes/sizes such that it is not possible to connect to the hose other than the right one.

- An additional measure is also introduced to make a difference in unloading the ferric chloride and sodium hypochlorite solutions at SCISTW: unloading of the ferric chloride from the road tankers will be done through the discharge valve located on the top of the tankers whilst a bottom discharge valve will be used for unloading the sodium hypochlorite solution from the road tanker.

4. Procedural Control on Chemical Deliveries within SCISTW

The following procedural controls on chemical deliveries within SCISTW are in place:

- The chemical suppliers are required to develop a chain-of-custody documentation system to ensure that the identify of the chemical is checked before the chemical departs from the manufacturing plant and before unloading at SCISTW.

- Clear signage / labels to indicate the identity of each chemical storage compound and associated equipment.

- Specific road tanker transport route is assigned for each chemical.

- No chemical delivery when there are public events taking place at SCISTW.

5. Security of Loading Points and Unloading Operation

The following measures on security of loading points and unloading operation are in place:

- Loading points for ferric chloride, sodium hypochlorite and sodium bisulphite storage are locked when they are not in use and the keys will be kept by the plant operator.

- The pumps for unloading of the chemicals will be operated by the plant operator.

- The chemical unloading operation cannot start without the presence of the plant operator to open the locks and activate the pump.

- The chemical suppliers shall submit the information of the road tankers, including the driver identification, the vehicle registration no., etc., to the plant operator before the tankers arrive at SCISTW.

- The chemical tanker driver shall register with the plant operator upon entering SCISTW.

- The plant operator or representative from the independent accredited laboratory will check the road tanker labels and the road tanker's information, including the transport documents carried by the road tanker driver, and confirm the identity of the chemical delivered through chemical tests before the plant operator could authorize the unloading of the chemical.

- Unloading operation will not be allowed to proceed if the coupler of the road tanker does not match the coupler of the loading point.

6. Means to Ensure Quality of Chemical Suppliers

The following measures to ensure quality of chemical suppliers are in place:

- The chemical suppliers are required under the respective contracts to supply chemicals produced by manufacturers whose quality management systems have been certified for compliance with ISO 9001:2000.

- The chemical suppliers are required to only supply chemicals produced in designated chemical production plants and delivered directly from designated locations to SCISTW.

7. Conclusions

Adequate precautionary measures are put in place for the delivery and unloading of the three chemicals (sodium hypochlorite, sodium bisulphite and ferric chloride solutions) to SCISTW so as to avoid accidental mixing of ferric chloride with sodium hypochlorite or sodium bisulphite at SCISTW due to wrong doings in the delivery and unloading operations.

Drainage Services Department
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