BRADWELL SITE

EFFLUENT SAMPLING (AE A2 OT1)

BRAD/EN/REP/196

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EFFLUENT SAMPLING (AE A2 OT1)

1. Purpose

This document is in response to the Environment Agency's request to provide an operating technique to meet condition 2.3 *"A2 OT1 (Effluent Sampling Frequency)"* for the Mixed Effluent permit PR2TS/E10760C. This operating technique describes how the site will sample treated radioactive effluent and specification of frequency of analysis for specified metals, to ensure they are reasonably spread across the year and representative of discharge effluent.

2. Effluent collection Frequency and Analysis

Treated radioactive effluent is transferred to final delay monitoring tank 1 (FMDT 1) where it is sampled prior to discharge to the Blackwater Estuary. As the site approaches Care and Maintenance and structures are over-clad, radioactive effluent arising from decommissioning related works and rainfall continues to decrease. Consequently, there may be periods where there will be no treated radioactive effluent to discharge. To ensure best endeavours to comply with the requirement to carry out analysis for specified metals (in addition to routine pre-discharge analysis) on a minimum of 12 samples, every discharge shall be analysed for the first 12 discharges of the year. Then to ensure an even spread across the year, metals analysis shall be carried out every month (on the first discharge of the month where practicable) for the remaining period of the year. If there are less than 12 discharges in the year, there will be less than 12 sets of metals analysis, however, every discharge will have been analysed for the specified metals.

The frequency of sampling shall be reviewed 12 months from the first discharge via route A2 in accordance with the description of this operating technique in Table S1.2 of the Mixed Effluent permit PR2TS/E10760C.

3. Process for Collection

Once there is a suitable volume of treated effluent within FMDT 1 for discharge, the tank is recirculated to homogenise the content. The length of recirculation is dependent on the volume in the tank and the minimum recirculation time for any volume is specified in a written operating instruction.

A Castell Key interlock system is employed to ensure the effluent in the FMDT 1 is adequately recirculated and to prevent inadvertent discharge of the effluent to the estuary.

Following recirculation of the tank, a representative pre-discharge sample ('A' sample) is taken for analysis. The sample of treated radioactive effluent is analysed as follows:

To ensure compliance with Mixed Effluents permit PR2TS/E10760C:

- Visible oil or grease by visual inspection
- pH measured using a benchtop pH meter

To ensure compliance with Radioactive Substances Regulations Environmental Permit EPR/ZP3493SQ:

- Gross beta using liquid scintillation counting
- Caesium-137, Cobalt-60 and Americium-241 using gamma spectrometry
- Turbidity using benchtop turbidity meter
- Total organic carbon using a portable total organic carbon analyser

For a minimum of 12 samples, taken as specified in section 2 above, the specified metals shall be analysed in accordance with written laboratory operating instructions. The analytical technique is described in the operating technique A2 OT3 as required by the Mixed Effluent permit PR2TS/E10760C.

All of the verified results obtained are reviewed, by an Appointed Suitably Qualified and Experienced Person (ASQEP) for supervision of disposals of aqueous waste. If acceptable, the discharge will be authorised. The Castell key system (as described in A2 OT2 for FED effluent) will then be used to release the discharge key. The system will also have ensured that no further effluent was added to the tank following sampling.

All of the operations above are documented within site instructions.

In addition to the above, a representative sample of every discharge of radioactive effluent will be taken using a flow proportional sampler, stabilised by addition of acid and retained for 6 months. Metals analysis may alternatively be carried out on this sample following production of suitable site instructions.