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Subject: Yellow Alert: Wastewater Release In Excess of Derived Concentration Guidelines

TITLE: Yellow Alert-Wastewater Release In Excess of Derived Concentration Guidelines

IDENTIFIER: Y-2000-OR-BJCY12-0501 DATE: May 8, 2000

LESSON LEARNED STATEMENT: Failure to evaluate and verify all modifications of chemicals, processes, or equipment that are essential to facility operations can result in unexpected performance. It is necessary to verify process changes with performance data and analyze the data for the full range of expected conditions such as higher than normal concentrations of contaminants.

DISCUSSION OF ACTIVITIES: During a normal discharge of treated wastewater at the Central Pollution Control Facility (CPCF), the Derived Concentration Guidelines (DCG) values for U238 and U234 were exceeded. At the time of this event, based on excellent historical performance, analytical discharge data was not being reviewed for performance. However, the treatment of the batch was conducted with a modification to the normal operating procedures.

ANALYSIS: The direct cause of the event was attributed to Inadequate or Defective Design. Due to the failure of the lime silo, sodium hydroxide was substituted for the normal lime used to control pH in the system. The precipitation of metals such as uranium is dependent on the system pH. The pH control using NaOH was not as effective as lime for the removal of uranium from the waste prior to discharge. The removal efficiency and difficulty in controlling pH, using sodium hydroxide was not recognized prior to being substituted. This change in the process caused uranium not to be removed in sufficient quantities to meet DCG limits for uranium. The root cause of this incident has been attributed to Inadequate Administrative Control. At the time of this occurrence, discharges were not sampled and inspected prior to discharge. The change in chemical (lime to sodium hydroxide) used for treatment required monitoring effluent prior to discharge until historical data indicated the chemical process was equivalent. This monitoring was not established. When the use of sodium hydroxide was started, a special instruction was prepared to address the modification in the normal process. This special instruction did not receive the review against the Hazard Screening Analysis that would take place if an Unreviewed Safety Question screening had been performed. The Hazard Screening Analysis for the system does identify sampling before discharge as a protective measure for high concentrations of contaminants, for high or low pH materials, or for improper balance of acid-base processing chemicals. Proper consideration of the effectiveness of sodium hydroxide to achieve the acid-base balance could have led to specifying the need for sampling before discharge as specified in the Hazard Screening Analysis.

RECOMMENDED ACTIONS:

1. The process procedure will be revised to analyze wastewater contaminants that could exceed NPDES permit discharge parameters or DCG values prior to discharge until system performance can be reliably established after the lime silo is placed back in service.

2. The lime silo will be repaired for lime slurry addition for pH adjustment and metal precipitation.
3. A procedure change will require an Unreviewed Safety Question (USQ) screening of special instructions unless the subject of the special instruction has a categorical exclusion from the USQ screening process.

PRIORITY DESCRIPTOR: Yellow Alert/Caution

FUNCTIONAL CATEGORY(S) (DOE): Environmental Protection

BJC TREND CODE(S) (USER-DEFINED): EP - Environmental Protection; WM - Waste Management

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KEYWORDS: wastewater, Derived Concentration Guidelines

REFERENCES: Occurrence Report Number: ORO-BJC-Y12WASTE-2000-0002

HAZARDS: Environmental, Hazardous Materials

WORK ACTIVITY: Waste Remediation

FOLLOW-UP ACTION: Information in this report is accurate to the best of our knowledge. As means of measuring the effectiveness of this report please notify Joanne E. Schutt at (865) 483-0554, e-mail at schuttj@pwtor.com of any action taken as a result of this report or of any technical inaccuracies you find. Your feedback is important and appreciated.