WORCESTER POLYTECHNIC INSTITUTE HEALTH PHYSICS PROCEDURE HP-07 POOL WATER AND HOLDUP TANK WATER ANALYSIS

1. PURPOSE:

To ensure that the levels of radioactive materials in the waste tank contents are within the 10 CFR 20 limit for disposal into the sanitary sewerage system.

2. FREQUENCY:

This procedure shall be performed prior to releasing the contents of the waste tank to the sanitary sewerage system.

3. MATERIALS, TOOLS, AND EQUIPMENT:

- 3.1. Form(s):
 - 3.1.1. WPI Nuclear Reactor Facility Disposal By Release Into Sanitary Sewerage System (HPF_12)
- 3.2. Pole or similar object for stirring the waste tank
- 3.3. Beaker
- 3.4. 0.1N HNO₃ solution
- 3.5. Hot plate
- 3.6. Heat lamp
- 3.7. Gas-flow proportional counter or equivalent detection equipment
- 3.8. Multi-channel analyzer (if required)

4. <u>PRECAUTIONS</u>:

- 4.1. Ensure that all appropriate health physics practices are followed throughout the procedure.
- 4.2. Take all necessary precautions to avoid the spread of possible contamination.
- 4.3. Perform an operability check on all instrumentation used. Ensure that the instrumentation has been calibrated within the proper time limit.

5. <u>INSTRUCTIONS</u>:

- 5.1. Gather a sample.
 - 5.1.1. Stir the contents of the waste tank.
 - 5.1.2. Collect a sample into a beaker.
 - 5.1.3. Record the sample volume on the form.
- 5.2. Evaporate the sample.
 - 5.2.1. Place the sample on a hot plate (do not evaporate completely, allow some liquid to remain at the bottom of the beaker).

NOTE: Do not allow the sample to boil.

- 5.2.2. Transfer the remainder of the sample into one or more planchet(s). Use a 0.1N HNO₃ solution to remove any residue from the sides or from the bottom of the beaker.
- 5.2.3. Place the planchet(s) under a heat lamp until the sample is completely evaporated.
- 5.3. Analyze the sample
 - 5.3.1. Count the planchet using either a gas-flow proportional counting system or equivalent detection equipment. Prior to counting:
 - 5.3.1.1. Use alpha and beta calibrated sources to calibrate the equipment.
 - 5.3.1.2. Take a background count.
 - 5.3.2. Count the planchet using a multi-channel analyzer if significant beta activity is detected (10 cpm above background).
 - 5.3.2.1. Count the filter paper for a minimum of 2 hours.
 - 5.3.2.2. Compare the resulting spectrum to a background count.
 - 5.3.2.3. Identify by energy all peaks not present in the background sample.

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- 5.3.2.4. Save the spectrum. If desired, print the spectrum and the background count on the same paper.
- 5.3.3. Record the appropriate information.
- 6. <u>RESTORATION</u>:

None

- 7. <u>REFERENCES</u>:
 - 7.1. University of Massachusetts Lowell "Preparation of Liquid Solutions"

HP_07