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ENVIRONMENTAL CALCULATION COVER PAGE

Section 1: Completed by the Responsible Manager

Project: Soil and Groundwater Remediation Project

Date: 5/17/2017

Calculation Title & Description: Evaluate 216-A-37-1 Dangerous Waste Designation

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Section 2: Completed by Preparer

Calculation No.: ECF-200E-17-0003 **Revision No.:** 1

Revision History

Revision No.	Description	Date	Affected Pages ADD ROW
1	Modified results/conclusions to include an additional underlying constituent and instructions to drop 4 dangerous waste		
	codes	5/17/2017	Page 3 ☒

Section 3: Completed by the Responsible Manager

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Section 4: Document Review & Approval

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REV. 1
5/22/2017

Purpose: Evaluate the designation of 216-A-37-1 Crib as a Treatment, Storage, and Disposal Unit and identify the applicable dangerous waste numbers.

Background: A RCRA Part A permit application was submitted to the Washington Department of Ecology on February 26, 1990 as a protective filing recognizing that the applicability of RCRA on the Hanford Site was in dispute. The basis for this filing was that the 242-A Evaporator process condensate (influent to the crib) contained dangerous waste regulated under WAC 173-303 due to the toxicity of ammonia and the presence of F003 constituents. Subsequent revisions to the Part A permit application indicated that the 242-A Evaporator process condensate was regulated as a mixed waste because the waste was derived from a waste containing spent halogenated and non-halogenated solvents (F001, F002, F003, F004, and F005), and for the toxicity of ammonia (WT02, toxic state-only).

Methodology: The waste management unit designation evaluation was performed by first determining whether or not the waste was discharged on or after the effective date for mixed waste regulation in Washington. The next step was to determine if the discharged material was a solid waste. If the material was deemed to be a solid waste it was then evaluated to determine whether or not it was a Dangerous Waste (DW) or an Extremely Hazardous Waste (EHW) according to the procedures provided in WAC 173-303-070. The process for making this determination is identified in the steps below.

1. RCRA Applicability Determination
    - Determine what (if any) waste was discharged to the ditch on or after the effective date of the RCRA regulation (November 19, 1980).
2. Mixed Waste Applicability Determination
    - Determine what (if any) radioactive waste was discharged to the crib on or after the effective date of the mixed waste regulation in Washington (August 19, 1987). If the waste is radioactive and received prior to August 19, 1987 exit the process here.
3. Solid Waste Determination
    - Determine whether the material was a solid waste according to WAC 173-303-016. If the material is not considered a solid waste exit the process here, otherwise proceed to step 4.
4. Federal Hazardous Waste Determination
    - First, determine if the waste is a listed discarded chemical product, WAC 173-303-081;
    - Second, determine if the waste is a listed dangerous waste source, WAC 173-303-082;
    - Third, if the waste is not listed in WAC 173-303-081 or 173-082, or for purposes of compliance with the federal land disposal restrictions as adopted by reference in WAC 173-303-140, determine if the waste exhibits any dangerous waste characteristic, WAC 173-303-090; and
    - Stop here if one of the previous steps determined that the material should be designated as a dangerous waste. Otherwise proceed to step 5.
5. State-only Dangerous Waste Determination
    - Fourth, if the waste is not listed in WAC 173-303-81 or 173-303-090, determine if the waste meets any dangerous waste criteria, WAC 173-303-100.

Assumptions and Inputs: The history of the waste management unit is presented below. It includes a list of the waste streams and dates discharged to the unit. The influent to the unit is evaluated according to the steps in the methodology section above. The findings are summarized and presented with the waste management unit designation in the results/conclusion section.

Software Applications: None

Calculations:

A) Waste Management Unit History

The 216-A-37-1 Crib began receiving process condensate waste from the 242-A Evaporator in March 1977 (RHO-CD-673 Vol. III). There are seven contributors to the waste stream (WHC-EP-0342 Addendum 15):

1. Primary condenser
2. Inter-condenser
3. After-condenser
4. Vessel vent seal pot
5. Sample return line
6. Decontamination solution
7. Flex return line

The 242-A Evaporator used evaporative concentration followed by crystallization and precipitation of salts to reduce the volume of wastes that are stored and treated in underground, double-shell tanks. The process condensate stream was discharged from 242-A to the 207-A South Retention Basin. If laboratory analysis showed the process condensate basin material was below set discharge limits for radionuclide concentration, it was discharged to the 216-A-37-1 Crib. Radiation readings above a specified amount in the retention basins resulted in pumping the process condensate back to the feed tank for eventual reprocessing in the evaporator (WHC-EP-0342 Addendum 15).

Discharge of the 242-A Evaporator process condensate to the 216-A-37-1 Crib was terminated on April 12, 1989, when it was determined that the 242-A Evaporator process condensate contained or could have contained mixed waste regulated under WAC 173-303.

B) Assumptions: The waste designation evaluation performed in 1990 (Section 5.0 of WHC-EP-0342 Addendum 15) is applicable to all of the waste discharged to the 216-A-37-1 Crib since August 19, 1987. It was based on 34 samples of evaporator feed material collected between August 25, 1985 and March 22, 1989.

The evaluation determined that the 242-A Evaporator process condensate should be designated as a F003 and F005 dangerous waste due to the presence of Acetone, Methyl isobutyl Ketone (Hexone) and 2-Butanone in samples of the waste and the knowledge that upstream processes used the chemicals for their solvent properties.

C) RCRA Applicability Determination

1) The 216-A-37-1 Crib continued to receive 242-A Evaporator process condensate until April 12, 1989.

D) Mixed Waste Applicability Determination

1) The waste stream was radioactively contaminated.
2) The mixed waste regulations apply to the waste.
3) The 216-A-37-1 Crib continued to receive 242-A Evaporator process condensate until April 12, 1989.

E) Solid Waste Determination

1) The material is a solid waste since it was discarded and was not excluded by WAC 173-303-017(2).

F) Federal Hazardous Waste Determination

1) The material does not satisfy the definition of a commercial chemical product per WAC 173-303-040.
2) The waste contains spent non-halogenated solvents (F003 and F005) based on a waste designation evaluation performed in 1990 (Section 5.0 WHC-EP-0342 Addendum 15).
3) The 1990 evaluation also determined that the waste did not exhibit a dangerous waste characteristic under WAC 173-303-090.

Results/Conclusions:

The 242-A Evaporator process condensate was discharged to 216-A-37-1 beyond the effective date of the mixed waste regulations (August 19, 1987). Subsequent waste designations have demonstrated that the material is a dangerous waste.

The 216-A-37-1 Crib should therefore remain designated as a TSD unit. The applicable dangerous waste codes for 216-A-37-1 are F003 and F005. The constituents underlying the dangerous waste codes were Acetone, Methyl isobutyl Ketone (Hexone), and 2-Butanone. The previous waste designation was overly conservative and should not have applied the dangerous waste codes F001, F002, F004 and WT02.

References:

1. RHO-CD-673 Vol. III, 1979, 200 Area Waste Sites, Rockwell Hanford Operations, Richland, Washington. Available at: http://pdw.hanford.gov/arpir/index.cfm/viewDoc?accession=D196039029
2. WAC 173-303, "Dangerous Waste Regulations," *Washington Administrative Code*, Olympia Washington.
3. WHC-EP-0342 Addendum 15, 1990, *242-A Evaporator Process Condensate Stream-Specific Report*, Westinghouse Hanford Company, Richland, Washington. Available at: http://pdw.hanford.gov/arpir/index.cfm/viewDoc?accession=D196021610