TA-50

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Refer to: RRES-WQH: 03-332

Mr. Curt Frischkorn
Ground Water Pollution Prevention Section
Ground Water Quality Bureau
New Mexico Environment Department
P.O. Box 26110
Santa Fe, New Mexico 87502

**SUBJECT: TA-50 RADIOACTIVE LIQUID WASTE TREATMENT FACILITY, GROUND WATER DISCHARGE PLAN (DP-1132), REQUEST FOR ADDITIONAL INFORMATION**

Dear Mr. Frischkorn:

On November 10, 2003, at your request, staff from Los Alamos National Laboratory presented information pertaining to the TA-50 Radioactive Liquid Waste Treatment Facility (RLWTF) Groundwater Discharge Plan (DP-1132) to representatives from the following organizations: NMED Groundwater Quality and Hazardous Waste Bureaus, Concerned Citizens for Nuclear Safety (CCNS), Tewa Women United, and Peace Action New Mexico. During the Laboratory's presentation a number of questions were asked that could not be immediately answered by Laboratory staff. On November 20, 2003, we discussed these questions and identified eight that the Laboratory would formally address. Below, these eight questions are presented and answered.

1) **Question by Peggy Prince, Peace Action New Mexico**
During discussions about the 1999 nitrate moratorium, Peggy Prince asked, *Where are the heavy hitters (term used by Pete Worland) located and where is their nitrogen waste sent for treatment and disposal?*

**LANL Response**
One of the more significant generators of nitric acid waste was the analytical laboratory conducting urinalysis studies. Nitric acid waste generated during urinalysis was initially sent offsite to a hazardous waste treatment and disposal facility because it has a very low pH. Presently, this waste is neutralized onsite and is sent to the Laboratory's TA-46 Sanitary Wastewater Systems (SWWS) Facility where the nitrates are treated by biological denitrification.

Another generator of nitric acid waste is the TA-55 facility. Since 1999 nitric acid waste generated at the TA-55 facility has been treated separately at the RLWTF from non-TA-55 liquid wastewater. This nitrate containing wastewater is first neutralized and then filtered to remove alpha emitting radionuclides. The effluent water from this process is then evaporated. The concentrated "bottoms" from the evaporator are solidified with cement and disposed of as low-level waste at the TA-54 radioactive solid waste landfill. The distillate from the evaporation process is processed through the RLWTF and discharged to the environment via NPDES Permitted Outfall 051 in Mortandad Canyon.

2) **Question by John Young, NMED**
*Are NARS waste streams that go to Room 60 at the RLWTF permitted under NPDES or RCRA?*

**LANL Response**
Liquid waste from NARS is permitted under the Laboratory's NPDES Permit No. NM0028355. The Nitric Acid Recovery System (NARS) located at TA-55, PF-4, is a distillation column that reclaims the nitric acid generated during TA-55 plutonium processing operations. When NARS is operating, the bottom of the distillation column produces 12 M nitric acid. All nitric acid produced by NARS is then transferred to the product storage tank for reuse in TA-55 operations. The distillate extracted from the condenser at the top of the distillation column consists of water and approximately 45 ppm nitric acid. This liquid waste is discharged by TA-55 to Room 60 at the RLWTF via the RLW Collection System's "Acid" waste line (See RLWTF Flow Schematic). Radioactive liquid wastewater discharged to Room 60 is pre-treated then sent to the volume reduction evaporator. Distillate from the volume reduction evaporator is discharged through NPDES Permitted Outfall 051 to Mortandad Canyon.

A RCRA permit is not required for the NARS distillate piped to Room 60 at the RLWTF because it is subject to regulation under the NPDES permit as allowed by the wastewater treatment unit specific permit exclusion at 20.4.1.900 NMAC, incorporating 40 CFR 270.1(c)(2)(v). Further processing of the distillate in Room 60 through cementation is subject to regulation by 20.4.1.300 NMAC, incorporating 40 CFR 262.34(a), as a RCRA <90 day storage area (LANL Site ID #1778) rather than by permit. The bottom material (12 M nitric acid) produced by the NARS process is not RCRA regulated as it is re-used in the TA-55 plutonium processing operations and is excluded as a RCRA solid waste through closed loop recycling by reclamation exemption at 20.4.1.200 NMAC, incorporating 40 CFR 261.4(a)(8).

3) **Question by Curt Frischkorn, NMED**
*Is NARS a pre-treatment unit for the TA-50 RLWTF?*

**LANL Response**
NARS is not a pre-treatment unit for the TA-50 RLWTF. NARS is a process unit owned and operated by the Nuclear Materials Technology Division (NMT) for the intended purpose of reclaiming nitric acid for reuse in PF-4 operations.

4) **Question by Curt Frischkorn, NMED**
*Does the Laboratory have any explanation for the elevated chromium in MCOBT-4.4?*

**LANL Response**
The dissolved concentration of chromium in MCOBT-4.4 is approximately 0.050 mg/L which is also the NMWQCC groundwater standard for Cr. Possible sources of Cr at MCOBT-4.4 include natural and/or Laboratory releases. Analytical results from surveillance monitoring of alluvial groundwater in Mortandad Canyon show concentrations of Cr typically less than 0.020 mg/L. Chemically-altered portions of the Cerros del Rio basalt may contain natural Cr(III) that can be oxidized to Cr(VI). Under oxidizing conditions, Cr(VI) is stable as CrO4-2 and under alkaline pH conditions this anion is semi-adsorbing. The perched intermediate depth groundwater at MCOBT-4.4 is both oxidizing and has an alkaline pH, so some Cr dissolved in the groundwater would be expected under these conditions. The source of Cr at MCOBT-4.4 will be evaluated further during preparation of the final geochemistry report (which will be published in CY04).

Four quarterly sampling events have been completed at MCOBT-4.4 with the last event conducted in May, 2003. Analytical results from these sampling events were reported to the NMED in the Laboratory's Groundwater Protection Program Quarterly Reports.

No future sampling at MCOBT-4.4 is planned at this time. MCOBT-4.4 will be plugged and abandoned due to suspected leakage and replaced with another intermediate well (I-4) as one of the activities in the Mortandad Canyon Groundwater Investigation Work Plan. Further information on the replacement of MCOBT-4.4 can be found in the attached Mortandad Canyon Groundwater Investigation Work Plan (see page 28).

5) **Question by Curt Frischkorn, NMED**
*Does the Laboratory have any explanation for the 'rebound' effect that is occurring in the Permeable Reactive Barrier (Sr-90 and ClO4 concentrations drop, then recover)?*

**LANL Response**
Low flow rates in the alluvium probably have resulted in incomplete flow throughout the Permeable Reactive Barrier (PRB), especially in the limestone cell. More sampling and tracer testing at the PRB are required to test this hypothesis.

6) **Question by Joni Arends, CCNS**
Following Pete Worland's discussion regarding the low concentrations of Sr-90 and Cs-137 presently in the RLWTF's influent (and effluent), Joni Arends asked, *What were the historical concentrations of Sr-90 and Cs-137 discharged to Mortandad Canyon?*

**LANL Response**
Regarding Strontium-90 discharges from the RLWTF:
From 1980 through 2002, Sr-90 concentrations in the RLWTF effluent were typically less than 100 pCi/L. During this 22-year period, only four monthly composite samples were greater than 5 nCi/L (5,000 pCi/L). The highest monthly composite sample was 39 nCi/L (39,000 pCi/L) and occurred in early 1991. Sr-90 is regulated under DOE Order 450.1 by the U.S. Department of Energy. The TA-50 RLWTF's effluent has met the DOE Derived Concentration Guidelines (DCGs) since December 1999.

Regarding Cesium-137 discharges:
From 1980 through 1990, Cs-137 concentrations in the RLWTF effluent were typically less than 5 nCi/L (5,000 pCi/L). From 1991 through 2002, Cs-137 in the RLWTF effluent has trended downward from less than 500 pCi/L to less than 10 pCi/L. During this 22-year period, three monthly composite samples were greater than 10 nCi/L (10,000 pCi/L). The highest monthly composite sample was 24 nCi/L (24,000 pCi/L) and occurred in early 1991 during the same month as the highest Sr-90 discharge that was mentioned previously. Cs-137 is regulated under DOE Order 450.1 by the U.S. Department of Energy

7) **Question by Curt Frischkorn, NMED**
*Can I have a copy of the draft Mortandad Canyon Workplan addendum?*

**LANL Response**
A copy is attached.

8) **Question by Kathy Sanchez, Tewa Women United**
*What caused the tritium spike in RLWTF's effluent in July, 2000?*

**LANL Response**
The tritium concentrations in the July, August and September, 2000, monthly composite effluent samples were 200, 120 and 130 nCi/L, respectively. The 20 months prior to those three months had averaged less than 30 nCi/L tritium. The 39 months since those three months have averaged less than 20 nCi/L tritium. The "spike" in tritium in the RLWTF effluent during those three months was due to receiving some more highly concentrated tritiated wastewater from a specific facility. This highly tritiated water is now segregated from the other RLWTF influent wastewater and treated through the plant so as to maintain effluent tritium concentrations at less than 20 nCi/L (the federal drinking water standard for tritium is 20 nCi/L).

Please contact me at (505) 667-7969 if you would like additional details regarding this information.

Sincerely,

Bob Beers
Water Quality & Hydrology Group

BB/tml

Attachment: a/s

Cy: J. Young, NMED/HWB, Santa Fe, NM, w/att.
C. Will, NMED/HWB, Santa Fe, NM, w/att.
M. Leavitt, NMED/SWQB, Santa Fe, NM, w/att.
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J. Vozella, DOE/OLASO, w/o att., MS A316
G. Turner, DOE/OLASO, w/o att., MS A316
J. Holt, ADO, w/o att., MS A104
T. Stanford, FWO-DO, w/o att., MS K492
D. Mclain, FWO-WFM, w/o att., MS J593
R. Alexander, FWO-WFM, w/o att., MS E518
D. Moss, FWO-WFM, w/o att., MS E518
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RRES-WQH File, w/att., MS K497
IM-5, w/att., MS A150

# RLWTF Flow Schematic (CY 2002 basis)