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Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

05-AMCP-0378

AUG 3 2005

Mr. Ron Kreizenbeck
Acting Regional Administrator
U.S. Environmental Protection Agency
Region 10
1200 Sixth Avenue
Seattle, Washington 98101

RECEIVED
AUG 19 2005

EDMC

Dear Mr. Kreizenbeck:

REQUEST FOR APPROVAL OF ALTERNATE REUSE PRACTICES FOR THE 200 AREA
EFFLUENT TREATMENT FACILITY (ETF) TREATED EFFLUENT

The U.S. Department of Energy, Richland Operations Office and Fluor Hanford, Inc. request that the U.S. Environmental Protection Agency (EPA) approve the attached request to allow continued reuse of treated effluent at the 200 Area ETF. This request is submitted under the terms of Condition 7 of the Final Delisting Exclusion to demonstrate that the risks and potential human health or environmental exposures from existing and proposed 200 Area ETF treated effluent reuse practices do not warrant retaining the waste as a hazardous waste.

To avoid disruption of operations, EPA's approval of reuse of the treated effluent is requested no later than September 1, 2005.

If you have any questions, please contact me, or your staff may contact Matt McCormick, Assistant Manager for the Central Plateau, on (509) 373-9971.

Sincerely,

Keith A. Klein
Manager

AMCP:RDH

Attachment

cc w/attach:

D. Bartus, EPA
G. Bohnee, NPT
N. Ceto, EPA
D. Flyckt, DFSH
L. Fritz, FHI
S. Harris, CTUIR

J. Hyatt, FHI
R. Jim, YN
E. Murphy-Fitch, FHI
R. Szelmezcza, FHI
M. Wilson, Ecology
R. Szelmezcza, FHI
Administrative Record
Environmental Portal, LMSI

REQUEST FOR U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA) APPROVAL

Alternate Reuse Practices for the 200 Area Effluent Treatment Facility (ETF) Treated Effluent Prior to Disposal to the State-Approved Land Disposal Site

PURPOSE. This request is submitted under the terms of Condition 7 of the Final Delisting Exclusion to demonstrate that the risks and potential human health or environmental exposures from existing and proposed 200 Area ETF treated effluent reuse practices do not warrant retaining the waste as a hazardous waste. EPA's written approval of these treated effluent reuse practices is requested in advance of Final Delisting Exclusion effective date.

BACKGROUND. The ETF was designed with the intent of reusing/recycling treated effluent to provide demineralized service water for various applications within the ETF process while minimizing the quantities of fresh water needed. The treated effluent has been reused for beneficial purposes since ETF operations began in 1995. Such reuse has been cited in the following permits and permit applications:

- Liquid Effluent Retention Facility/Effluent Treatment Facility (LERF/ETF) Dangerous Waste Permit, Sections 4.2.3 and 4.2.5.5 (Ecology 1999).
- The original ETF Delisting Petition submitted in 1993, Appendix E, Section 5.1.1.11 (DOE 1992).
- The 1998 ETF Delisting Modification, Section 3.2.2 (DOE 1998).
- The 2001 ETF Delisting Modification, Section 2.1 (DOE 2001).

Treated effluent is used primarily within the LERF/ETF wastewater management system to reduce the consumption of raw water. It is used as makeup water for preparing chemical solutions, for flushing equipment, and to conduct hydrotesting of wastewater tankers within the ETF load-in station. All of these proposed uses ultimately result in treated effluent disposal to the State-Approved Land Disposal Site (SALDS). In addition, treated effluent is proposed for use in the ETF solidification treatment unit and ultimate disposal in the Hanford Site burial grounds. Each of these applications and associated effluent management practices are discussed in further detail in the following paragraphs.

USES RESULTING IN TREATED EFFLUENT DISPOSAL TO THE SALDS

Use within the LERF/ETF Wastewater Management System Boundary. Treated effluent is used primarily as demineralized water for operating, maintaining, and testing LERF/ETF process equipment. To minimize the amount of fresh water used in the ETF process, treated effluent is used to flush, purge, wash, sanitize, regenerate, and charge several unit operations within the ETF main treatment train (MTT) and secondary treatment train (STT) including:

- the thin film dryer, feed pipe, and spray condenser
- ion exchange columns
- evaporator
- waste lines, instruments, and sensors

Flushing and purging of process pumps, vessels, tanks, piping, and equipment with treated effluent is typically performed prior to maintenance and inspections. Treated effluent can also be used to purge the ETF process piping/equipment and LERF basins between campaigns and as needed to prevent commingling of incompatible wastes. After purging, treated effluent is retained in several parts of the ETF process to lay up equipment and piping between campaigns.

Treated effluent is also used when hydrotesting tanks and piping within the ETF process, and as process wastewater when conducting performance and optimization tests of the ETF process. Treated effluent provides makeup water to the evaporator boiler, where the treated effluent is heated to steam and subsequently combined with the evaporator distillate, which is routed to the surge tank and reprocessed through the MTT. As makeup water to the thin film dryer boiler, the treated effluent is passed through the thin film dryer heat exchanger as steam. The resulting condensate is routed to the sump and recycled back to the process. Finally, treated effluent is used for a variety of sump uses, including washdown, foam suppression, and bearing cooling.

For each of these treated effluent reuses within the LERF/ETF wastewater management system boundary, the treated effluent is confined by LERF's and ETF's wastewater processing equipment, piping, and containment systems. The annual volumes associated with such treated effluent reuse practices are summarized in Table 1.

Uses Beyond the LERF/ETF Wastewater Management System Boundary. Two current reuses of treated effluent are conducted outside the LERF/ETF wastewater management system boundary but ultimately result in effluent disposal at the SALDS. Annually, approximately 40,000 gallons of treated effluent are routed to tankers in the ETF load-in facility via a temporary transfer line for conducting tanker hydrotesting. At the conclusion of hydrotesting, the effluent is managed as a new wastewater feed to the LERF/ETF. In addition, approximately 120,000 gallons per year of treated effluent are used to makeup dilute acid and caustic solutions from concentrated acid and caustic. The resulting dilute solutions are used throughout the ETF process for pH adjustment and other purposes. These acid and caustic solutions are commingled with wastewater and retreated in the ETF process.

Treated effluent is also proposed as a flush for the peroxide injection pump and to supply seal water to waste transfer pumps. Both of these applications are currently supplied by raw water and are also outside the LERF/ETF wastewater management system boundary. Minor facility modifications will be required to replace the raw water supply with treated effluent. As seal water, the treated effluent is routed back into the ETF process. As a peroxide injection pump flush, the treated effluent will also be commingled with and managed as wastewater.

USES RESULTING IN TREATED EFFLUENT DISPOSAL TO THE HANFORD SITE BURIAL GROUNDS

The Solidification Treatment Unit Project proposes to add a solidification process to stabilize ETF concentrated wastes to meet Land Disposal Restrictions and long-term performance assessment requirements. Treated effluent will be used as flush water to remove residual material from the solidification treatment unit, thus preventing the brine/solidification formulation mixture from setting up within the equipment whenever the process shuts down. This flushing process requires approximately 200,000 gallons per year of treated effluent which will likely be recycled to the brine feed tank for subsequent treatment in the solidification treatment unit and disposal at the Hanford Site burial grounds.

CONTROLS

For each of the beneficial uses summarized in Table 1, the reused treated effluent eventually is returned to the LERF/ETF wastewater management system. As such, the treated effluent is commingled with wastewater and wastewater residues, reprocessed through ETF, and verified prior to disposal at SALDS. An evaluation was conducted and there are no impacts to human health or the environment from the reuse of treated effluent at LERF/ETF or disposal as a solidified waste form at the burial grounds, for example: (1) the LERF/ETF dangerous waste permit (Ecology 1999) requires controls for release prevention, emergency response, contingency planning, and worker training; (2) the Hanford Site Air Operating Permit (Ecology 2001) specifies controls required to mitigate airborne emissions; (3) wastewater treated through the solidification treatment unit will be solidified before transport to the Hanford Site burial grounds; and (4) any leachate generated in the burial grounds is typically routed via tanker to the LERF/ETF for treatment. Due to the closed loop nature of the wastewater management system, there is no need for further evaluation of the impacts to human health or the environment from the reuse of treated effluent at LERF/ETF or disposal as a solidified waste form at the burial grounds.

Table 1. Beneficial Uses and Associated Volumes for ETF Treated Effluent that Result in Final Disposal to the State-Approved Land Disposal Site.	
Current Use Capabilities	Estimated Volume (gallons/year)
Uses Within the LERF/ETF Wastewater Management System Boundary	
Purging, flushing, washing, and charging filters	50,000
Flushing, cleaning, and sanitizing reverse osmosis membranes	250,000
Flushing thin film dryer, feed pipe, and spray condenser	35,000
Regenerating and rinsing ion exchange columns	150,000
Replacing ion exchange column resin	50,000
Flushing waste lines and instruments/sensors	50,000
Flushing pumps, vessels, and lines prior to maintenance	80,000
Flushing tanks prior to inspection	100,000
Flushing tanks after RCRA campaigns	50,000
Purging the main treatment train after campaigns	100,000
Flushing LERF basins (per basin)	1,000,000
Lay-up solution for vessels and lines	60,000
Hydrotesting tanks, piping, etc.	10,000
Testing process performance/optimization	50,000
Makeup water to evaporator/thin film dryer boilers	80,000
Sump uses (washdown/foam suppression/bearing cooling)	10,000
Uses Beyond the LERF/ETF Wastewater Management System Boundary	
Hydrotesting tankers	40,000
Makeup water for 4% acid and caustic	120,000
Makeup water to seal water tank	40,000
Flush for peroxide injection pump	1,000
TOTAL	~2,326,000

ETF = 200 Area Effluent Treatment

LERF = Liquid Effluent Retention Facility

SALDS = State-Approved Land Disposal Site

REFERENCES

DOE, 1992, 242-A Evaporator/PUREX Plant Condensate Treatment Facility Delisting Petition, DOE/RL-92-72, Revision 0, U.S. Department of Energy, Richland, Washington.

DOE, 1998, Request for Modification of 200 Area Effluent Treatment Facility Final Delisting, DOE/RL-98-62, Revision 0, U.S. Department of Energy, Richland, Washington.

DOE, 2001, 200 Area Effluent Treatment Facility Delisting Modification, DOE/RL-98-62, Revision 1, U.S. Department of Energy, Richland, Washington.

Ecology, 1999, Dangerous Waste Portion of the Resource Conservation and Recovery Act Permit for the Treatment, Storage, and Disposal of Dangerous Waste at the Hanford Facility, Permit Number WA7890008967, Attachment 34, Appendix 3A, Washington State Department of Ecology, Kennewick, Washington.

Ecology, 2001, *Hanford Site Air Operating Permit*, Ecology Publication 00-05-006, Washington State Department of Ecology, Kennewick, Washington.