



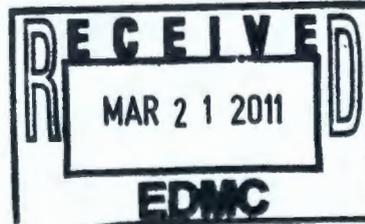
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11-AMCP-0121

MAR 16 2011

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Addressees:

**ANNUAL LETTER REPORT FOR TRITIUM TREATMENT TECHNOLOGY  
DEVELOPMENTS - MARCH 2011**

This letter transmits the Annual Letter Report for Tritium Treatment Technology Developments for March 2011 which provides an update on the development of tritium treatment technology that would be pertinent to the cleanup and management of tritiated wastewater (e.g., the 242-A Evaporator, process condensate, liquid effluent) and tritium contaminated groundwater at the Hanford Site.

Tri-Party Agreement Milestone **M-026-07C** requires the submittal of a formal evaluation of the development status of tritium treatment technology every five years. The next formal tritium technology evaluation report is due on March 31, 2014. As part of the milestone commitment, where a formal report is not due, an annual letter report is to be submitted to the regulators. The attached table summarizes the technologies discussed in past reports, indicates technology maturity, and defines technology applicability.

Tritium technology reports developed to date concluded that tritium removal technologies were not economically viable for the large volumes of Hanford wastewaters and groundwater with relatively low tritium concentrations (less than 1.0E-05 Ci/L). A review of the literature produced since the last 2010 letter report did not identify any information that would change this conclusion.

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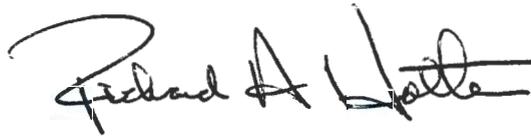
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MAR 16 2011

The majority of tritium removal technology has been conducted with wastewaters containing tritium at higher levels than expected in the Hanford wastewaters or observed in Hanford groundwater. However, as can be seen on the table, several (designated with an l) are designated as being applicable to wastewaters having less than 1.0E-05 Ci/L of tritium. Of these, both soil column discharge and barrier formation concepts have been implemented via use of State-approved land disposal structure for treated effluent disposal. Other technologies cannot reasonably be applied on the scale required to address Hanford groundwater tritium contamination.

If you have any questions, please contact me, or your staff may contact Larry Romine, of my staff, on (509) 376-4747.

Sincerely,



Richard A. Holten, Acting Assistant Manager  
for the Central Plateau

AMCP:SKM

Attachment

cc w/attach:

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Administrative Record

Environmental Portal

**TABLE**  
**Summary of Tritium Removal and Mitigation Technologies**

Technology	Year Report Prepared						
	1994	1995	1997	1999	2001	2004	2009
Distillation	D, h		D, h				
Gaseous diffusion	D, h						
Laser isotope separation	T, h	T, h	T, h				
Electrolysis	D, h	D, h	D, h				
Combined electrolysis and catalytic exchange (CECE)	D, h	D, h T, l					
Combined electrolysis catalytic exchange with vapor phase catalytic exchange					D, h		
Membrane separation process	T, l	T, l	T, l				
Cryogenic distillation	D, h	D, h	D, h	D, h	D, h		
Bithermal catalytic exchange		D, h T, l		D, h T, l	D, h T, l	D, h T, l	D, h T, l
Isotopic exchange, air sparge		T, l					
Finely divided nickel catalyst		O					
Separation by Metanetix Inc.		O					
Substituted naphthalene		O					
Crown Ether Complexes		O					
Girdler-sulfide Process			D, h				
Palladium Membrane Reactor							D, h
GE Integrated Systems							D, h
Liquid phase catalytic exchange with solid oxide electrolyte			D, h	D, h T, l	D, h T, l		
Liquid phase catalytic exchange with high-temperature steam electrolysis (Hot Elly)			D, h				
Sulfur resin ion exchange			O				
Metal hydride exchange			T, h				
Soil column discharge	D, l, h		D, l, h				
Barrier formation			O	D, l, h	D, l, h	D, l, h	D, l, h
Air sparging			T, l				
Dual-temperature liquid-phase catalytic exchange				D, h			
Tritium resin separation process				T, l	T, l	T, l	T, l
Kinetic-isotope effect for concentrating tritium				T, l	T, l		
Pumping and recharging				D, l	D, l	D, l	D, l
Phytoremediation					D, l	D, l	D, l
Evaporation						D, l	D, l

**Maturity:**

D = Demonstrated or developed technology that has been successfully applied in the field

T = Testing or theoretical stage of development

O = Observation indicates a potential process needing funding to continue

**Applicability:**

l = Technology is applicable to larger wastewater volumes having lower levels of tritium (less than 1.0E-05 Ci/L)

h = Technology is applicable to smaller wastewater volumes having higher levels of tritium (greater than 1.0E-05 Ci/L)