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

9413148-373

OCT 05 1993

Mr. A. W. Conklin, Head
Air Emissions and Defense Waste Section
Division of Radiation Protection
State of Washington Department of Health
Airdustrial Park Building 5, LE-13
Olympia, Washington 98504-0095

Mr. J. McCormick, Director
Air and Toxics Division
U.S. Environmental Protection Agency
Region 10
1200 Sixth Avenue
Seattle, Washington 98101

Dear Messrs. Conklin and McCormick:

NOTICE OF CONSTRUCTION FOR BUILDING 304, CONCRETION FACILITY MODIFICATION

Enclosed is the Notice of Construction (NOC) for the modification of the operation at Building 304, Concretion Facility. The facility was used last in 1988, and since then has been in the process of closure. Facility personnel have removed some of the old mixing equipment used in the past for open air mixing of concrete and waste sludge. The facility is requesting NOC approval to modify the process by using a portable drum rotator to mix contaminated fines and sludge with concrete as a final batch operation. This modification is in support of the facility's Resource Conservation and Recovery Act Closure Plan.

The enclosed NOC is being submitted in accordance with Washington Administrative Code 246-247 and 40 Code of Federal Regulations 61, Subpart H. The NOC requests approval for 30 days operation sometime in late 1993 or early 1994. The estimated dose to the maximally exposed individual is 9.4 E-3 mrem/year.

Should you have any questions, please contact me or Mr. S. D. Stites of my staff on (509) 376-8566.

Sincerely,

James E. Rasmussen

Robert G. Holt, Acting Program Manager
Office of Environmental Assurance,
Permits, and Policy

EAP:SDS

Enclosure:
Building 304 NOC

cc: D. L. Duncan, EPA, w/encl.
S. E. McKinney, Ecology, w/encl.
R. W. Oldham, WHC, w/o encl.
F. A. Ruck III, WHC, w/o encl.

Enclosure
9355841D

Notice of Construction for Building 304, Concretion Facility Modification

Introduction

i. Notification Requirement and Guidance

This document serves as both a Notice of Construction (NOC), pursuant to the requirements of Washington Administrative Code (WAC) 246-247-070, and an Application for Approval of Construction, pursuant to the requirements of 40 Code of Federal Regulations (CFR) 61.07 for the modification of Building 304, Concretion Facility.

This document has been developed in accordance with guidance provided in a letter, A. W. Conklin, State of Washington Department of Health (DOH), to E. A. Bracken, U.S. Department of Energy, Richland Operations Office (RL), dated September 26, 1991, and in accordance with guidance provided in a letter, Jerry Leitch, U.S. Environmental Protection Agency (EPA), to J. D. Bauer, RL, dated January 20, 1993.

The September 26, 1991 letter, states that WAC 246-247 is currently under revision to include submittal requirements for sources of radionuclide air emissions that could result in an unabated committed effective dose equivalent (CEDE) of less than 0.1 mrem per year to the maximally exposed individual (MEI). As discussed in Section 7.0 below, the projected unabated CEDE to the MEI from Building 304 is approximately 9.4 E-03 mrem per year. This document, then, serves as a notification, pursuant to WAC 246-247-070(2) and the September 26, 1991 guidance, for the modification of Building 304.

The January 20, 1993 EPA letter, states that "...any construction or modification of a radionuclide emission source at the Hanford Site requires an application for approval to EPA, even if the emissions are estimated to be less than the 0.1 mrem per year criterion previously used for exemption." The EPA also stated that the information currently provided to DOH would provide sufficient basis for review of previously exempt sources, pursuant to 40 CFR 61.07. This document, then, serves as a notification, pursuant to the guidance provided in the September 26, 1991 and January 20, 1993 letters, for modification of Building 304.

i.i. Proposed facility Background Information

Building 304, is a concretion facility being closed under the Resource Conservation and Recovery Act (RCRA). The facility was last operated in September 1988. It is proposed that the facility modify its operation procedure to perform one final batch operation. The proposed modification consists of using a portable drum rotator to mix concrete with contaminated fines and sludge. The following information explains the operation and characterizes the release of radionuclides from the facility during a proposed 30 day operation period.

1. **Describe the chemical and physical process related to the emission unit.**

   The closure of Building 304 requires the clean up and concretion of uranium and technetium contaminated fines and sludges. The facility was previously used for concretion operations, and a cyclone precipitator was used to control emissions of dust and particulates.

   The proposed concretion operation is scheduled to begin in late 1993 or early 1994 and last 30 days. The last concretion operation occurred in 1988. Subsequently, the facility has been placed into a clean up and maintenance phase of operation.

   The proposed concretion process is performed by combining masonry cement and water with up to 31.5 pounds of the contaminated matrix (fines and sludges) in 30 gallon drums. The drums are then sealed and mixed by rotating them on their side using a portable mixer (see Attachment A) for approximately 20 minutes. After mixing, the drums are removed from the portable mixer and placed in an upright position for curing. The drums are cured for approximately 16 hours with the drum lids in place. After curing for 16 hours, the drum lids are removed (the drums are unsealed) and curing is continued for a total curing time of seven days. The drums are then resealed and overpacked into 55 gallon drums and are disposed of in accordance with waste handling and disposal regulations.

   Historical concretion operations at Building 304 were performed using an open air mixer. However, the open air mixer was packaged and removed from the facility in April 1993. As described above, the concretion mixture will be mixed inside sealed drums, therefore it is anticipated that the generation of airborne dust and particulate matter will be reduced in comparison with historical operations.

2. **Describe the source. Describe the physical form of each radionuclide used (or created) during the process.**

   Table One lists the isotopic mass and annual isotopic activity of the contaminated matrix (fines and sludges) to be processed at Building 304. This information is based on laboratory analysis of the contaminated material. The annual isotopic activity was calculated by multiplying the isotopic mass by the specific activity per radionuclide expected to be handled in the operation.

TABLE ONE: ISOTOPIC MASS AND RADIONUCLIDE INVENTORY OF THE CONTAMINATED MATRIX (FINES AND SLUDGES) TO BE PROCESSED AT BUILDING 304

RADIONUCLIDE	ISOTOPIC MASS (g)	SPECIFIC ACTIVITIES (Ci/g)	ISOTOPIC ACTIVITY/ANNUAL INVENTORY (Ci/yr)
U-234	14.14	6.25E-3	0.0884
U-235	1557.8	2.16E-6	0.00336
U-236	83.88	6.47E-5	0.00542
U-238	171306	3.36E-7	0.0576
Tc-99	1.496	1.70E-2	0.0254

3. **Provide drawings of the emission unit from the point of origin of the source to the emission to the environment.**

   See Attachment A. The attachment contains the facility diagram showing location of the emission unit, point of emission and a brief description of the portable drum rotator.

4. **Describe the radionuclide control equipment: The efficiency of each piece of radionuclide control equipment for each radionuclide that could contribute ten percent or more of the CEDE of the MEI.**

   The facility is equipped with a cyclone precipitator for controlling emissions of dust and particulate matter. This is the original ventilation control equipment which was used in the past when the facility was in full operation. Additional pollution control equipment is unnecessary since there will be no increase in emissions based on calculations of historical samples (Attachment B) of 1980 to 1982. The proposed concretion operations minimize the generation of airborne dust and particulate matter by mixing contaminated materials inside sealed drums verses an open air mixer used in the past (see Section 1.0).

5. **Provide expected annual emissions with radionuclide control equipment in place, or using 40 CFR 61 Appendix D methodology, for each radionuclide that could contribute ten percent or more of the CEDE of the MEI.**

   Table Two lists the unabated annual release for the proposed operations at the 304 Concretion Facility The unabated annual release was calculated by multiplying the annual isotope activity by the appropriate resuspension factor for particulates as specified in 40 CFR 61, Appendix D.

   Attachment B provides historical emission calculations based on sample data. The sample data consisted of analyses of waste that were processed in the past and were similar to present day waste. Air emissions calculations were then developed from the sample data.

TABLE TWO: UNABATED RELEASE RATE DATA FOR EACH RADIONUCLIDE, BASED ON 40 CFR 61, APPENDIX D RESUSPENSION FACTORS

RADIONUCLIDE	ISOTOPIC ACTIVITY (Ci)	MULTIPLIED BY THE RESUSPENSION FACTOR FOR PARTICULATES	UNABATED RELEASE (Ci/yr)
U-234	.0884	.001	8.84E-5
U-235	.00336	.001	3.36E-6
U-236	.00542	.001	5.42E-6
U-238	.0576	.001	5.76E-5
Tc-99	.0254	.001	2.54E-5

6. **Describe the monitoring equipment. Describe the minimum detectable concentration for each radionuclide that could contribute ten percent or more of the CEDE to the MEI.**

   In accordance with 40 CFR 61.93 and WHC-CM-7-5, Section 2.5.4(4), periodic confirmatory measurements of the 304 Facility airborne emissions shall be performed, however, continuous airborne emissions monitoring and or continuous record sampling are not required. Periodic confirmatory record sampling at the 304 Facility shall be performed by withdrawing airborne particulate samples from the facility exhaust at a point downstream from the cyclone precipitator. These samples shall be collected on a particulate filter and submitted for laboratory analysis.

7. **Provide projected dose to the MEI using approved code or method.**

   Table Three lists the unabated annual dose to the offsite MEI. The annual unabated dose to the offsite MEI was calculated by multiplying the unabated release by the CAP-88 unit dose factors supplied by Ms. Kathy Rhoads of PNL and recorded in WHC-EP-0498. Table Three shows projected dose to the MEI for the project.

   Attachment B provides historical air emissions calculations and the resultant dose for the facility. As discussed in Section 5.0, the historical calculations are based on laboratory analyses of waste that was processed in the facility. The sample data was then used to calculate the air emissions and resultant dose.

TABLE THREE: PROJECTED DOSE TO THE MEI USING EPA APPROVED CODE OR METHOD

RADIONUCLIDE	UNABATED RELEASE (Ci/yr)	MULTIPLIED BY THE CAP-88 DOSE FACTOR (mrem/Ci)	UNABATED DOSE TO THE OFFSITE MEI (mrem/yr)
U-234	8.84E-5	63.6	5.62E-3
U-235	3.36E-6	59.0	1.99E-4
U-236	5.42E-6	60.1	3.26E-4
U-238	5.76E-5	56.6	3.26E-3
Tc-99	2.54E-5	0.0216	5.50E-7
			TOTAL = 9.4E-3

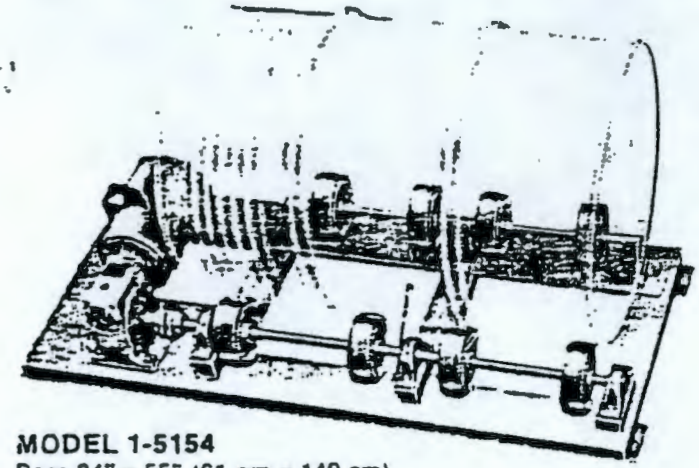
Summary

Building 304, Concretion Facility is in the process of a RCRA closure and must perform one final batch operation. The old mixing equipment has already been removed as part of the closure plan. The proposed portable drum rotator is environmentally more efficient in reducing air emissions, which could occur during the process.

The MEI for Building 304 is located 1,400 meters to the northeast of the Site Boundary. "The unabated dose projected for this operation is below the historical dose of 0.89 MREM/yr." The historical data is provided in Attachment B and was calculated using the same methodology contained in the NOC. The projected dose is below the ten mrem per year standard as well as the 0.1 mrem per year standard that requires continuous measurement of emissions as outlined in 40 CFR 61, Subpart H.

STATIONARY DRUM ROTATORS

MIX, BLEND, OR TUMBLE MATERIAL INSIDE CLOSED DRUMS



MODEL 1-5154
Base 24" x 55" (61 cm x 140 cm)

CLOSED DRUMS MEAN LESS HAZARDS. Using a MORSE Rotator eliminates spillage, splashing of dangerous contents on workers, and the risk of contamination. New uses of MORSE Drum Rotators are being discovered all the time. There's a good chance that a MORSE Rotator could be the solution to a problem in your plant.

SAVE TIME, LABOR AND MONEY BY ELIMINATING TRANSFER, CLEAN-UP, SPECIAL VESSELS AND APPARATUS. INSURES HOMOGENEITY.

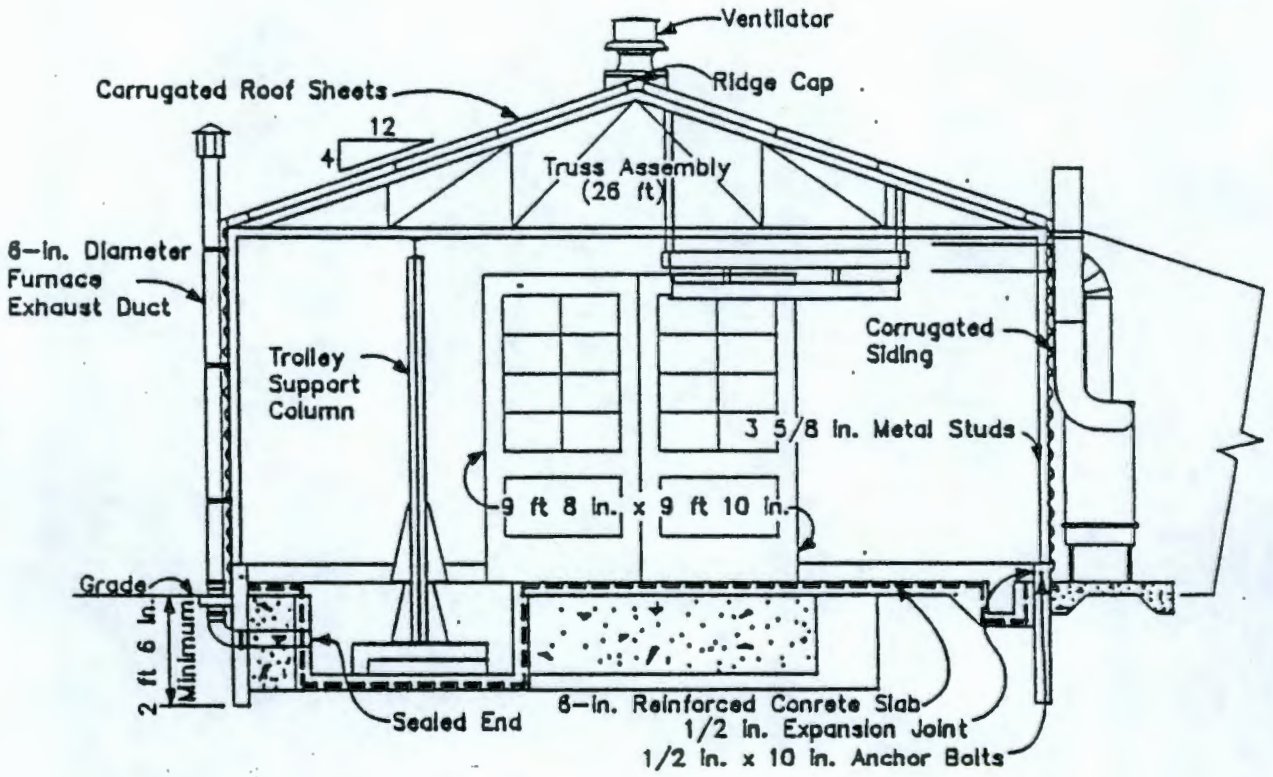
MORSE MODEL 1-5154 DRUM ROTATOR The powerful 1/2 hp motor drives an efficient worm gear reducer connected to a solid 1" (2.54 cm) dia. shaft to turn four 6" (15 cm) dia. Neoprene drive wheels. The four idler wheels turn freely on roller bearings. Factory fixed drum speed choices are 10, 20, 30 or 40 rpm. Drum rolling speed of 20 rpm is good for most liquids. 20 rpm will be furnished unless otherwise specified.

MODEL 2-5154 DOUBLE DRUM — TWICE THE CAPACITY The heavy-duty 1 hp motor drives an efficient gear reducer connected to a 1" (2.54 cm) dia. shaft operating eight 6" (15.2 cm) dia. Neoprene drive wheels. There are four roller bearing idler wheels for each drum position. Approx. Shipping Wt. 465 lbs. (211 kg). Speed choices same as for 1-5154 above.

MODEL 1-5154 VS AND 2-5154 VS HAVE VARIABLE SPEED Designed to rotate drums at any speed from 10 to 40 rpm. The speed is regulated easily by turning a knob. The powerful motor with variable speed gear reduction will handle the same loads per drum as the fixed speed models.

MODEL NO.	STD MOTOR HP	SPEED CHOICES DRUM RPM*	LOAD CAPACITY PER DRUM LIQUID	DRY	AT	RPM	DRUM DIA.	SIZE RANGE LENGTH	LBS. SHPG. WGT.	ACCEPT 1-5 Gal. IDLER
1-5154	1/2	10,20,30,40**	1,000	400		10	6"-28"	Max 40"	263	Yes
				300		20				
				250		30				
				200		40				
1-5154VS	1/2	Variable 10 to 40	1,000	Same	As	Above	6"-28"	Max 40"	303	Yes
2-5154	1	10,20,30,40**	1,000/D	Same	As	Above	6"-28"	Max 36"	445	Yes
2-5154VS	1	Variable 10 to 40	1,000/D	Same	As	Above	6"-28"	Max 36"	495	Yes
455	½ ½	See 1-5154	1000	Same as 1-5154			6"-22"	Max 40"	600	Yes

* based on 22½" dia. 55 gallon drum ** Factory set, fixed speed. 20RPM furnished unless otherwise specified on order



Section B-B

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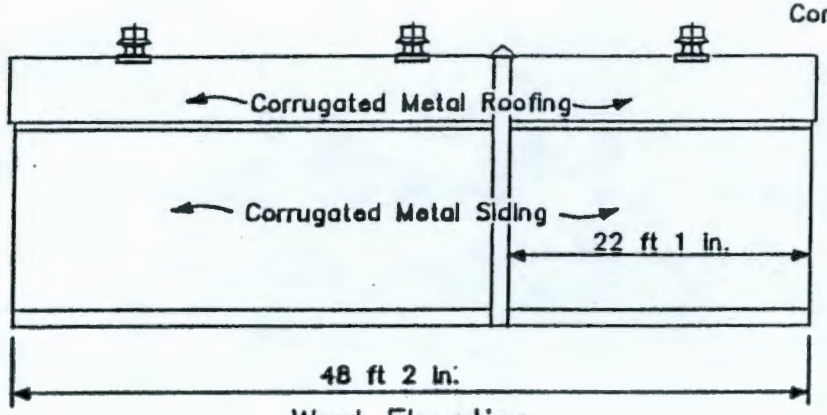
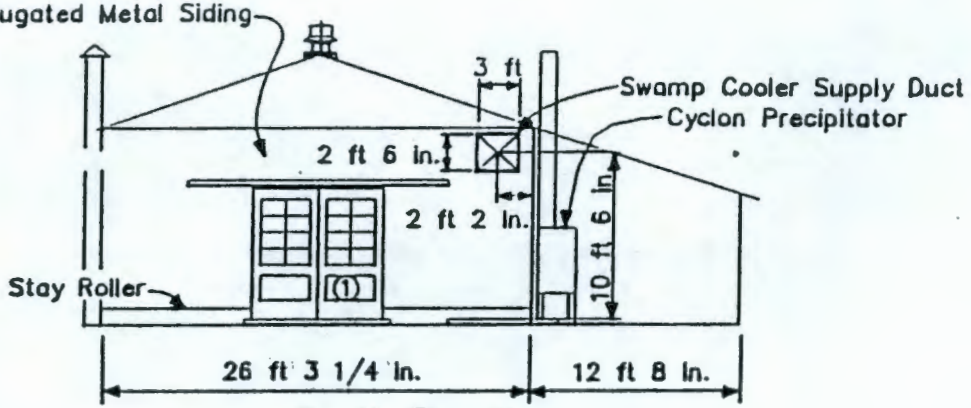
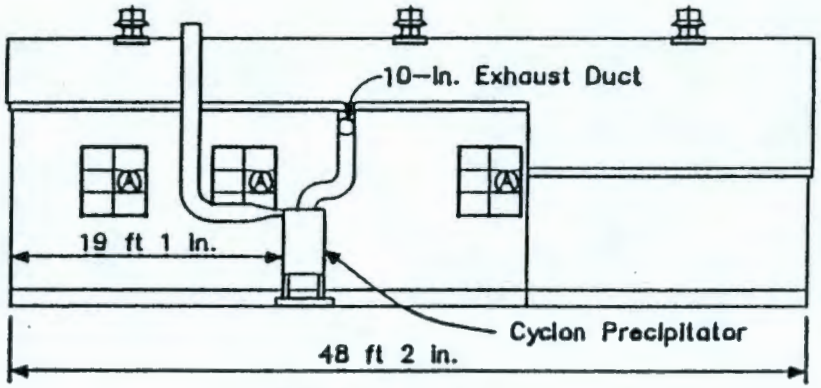
A Section View of Trusses and the Floor at the 304 Facility.



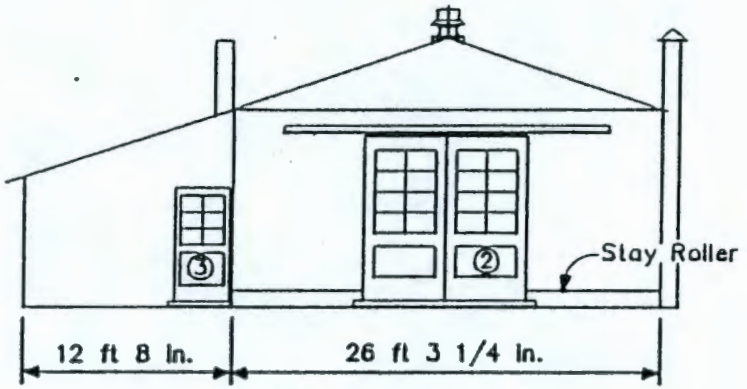
West Elevation



South Elevation



East Elevation



North Elevation

Door Schedule	
Mark	Size
1	8 ft x 8 ft x 1 3/4 in.
2	10 ft x 10 ft x 1 3/4 in.
3	3 ft 4 in. x 7 ft x 1 3/4 in.
Window Schedule	
A	3 ft 8 7/8 in. x 4 ft 1 in.

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1 The 304 Facility Elevation Plan.

Assumptions

- Stack flow rate = 1500 cfm

- Total isotopic mass of uranium processed between September 1980 and April 1982:

  U-234 = 2358 g
  U-235 = 209,824 g
  U-238 = 23,363,524 g

- Specific activity:

  U-234 = 6.25E-3 Ci/g
  U-235 = 2.16E-6 Ci/g
  U-238 = 3.36E-7 Ci/g

Annual Isotopic Activity

(grams of Uranium)(specific activity)(1/number of years) = (activity)

number of years = 1.5833

U-234 = 9.31 Ci/yr
U-235 = .28 Ci/yr
U-238 = 4.96 Ci/yr

Unabated Annual Release

In accordance with 40 Code of Federal Regulations 61, Appendix D, a release factor of 0.001 is used and no reductions are assumed for pollution control.

U-234 = (9.31 Ci/yr)(0.001) = 9.31E-3 Ci/yr
U-235 = (.28 Ci/yr)(0.001) = 2.8E-4 Ci/yr
U-238 = (4.96 Ci/yr)(0.001) = 4.96E-3 Ci/yr

Unabated Stack Concentration (annual average)

(annual release)(1/stack flow rate) = stack concentration

U-234 = 4.2E-10 uCi/cc
U-235 = 1.3E-11 uCi/cc
U-238 = 2.2E-10 uCi/cc

Unabated Annual Dose

The effective dose equivalent (EDE) is calculated by using the CAP-88 unit dose factors supplied by Ms. Kathy Rhoads of PNL and recorded in WHC-EP-0498.

(annual release)(dose factor) = EDE

U-234 = (9.31E-3 Ci/yr)(63.6 mrem/Ci) = 5.92E-1 mrem
U-235 = (2.8E-4 Ci/yr)(59.0 mrem/Ci) = .02 mrem
U-238 = (4.96E-3 Ci/yr)(56.6 mrem/Ci) = .28 mrem

TOTAL = .89 mrem

CORRESPONDENCE DISTRIBUTION COVERSHEET

Author	Addressee	Correspondence No.
R. G. Holt, RL (M. J. Silvia, WHC)	A. W. Conklin, DOH J. McCormick, EPA	Incoming:9307025 XRef:9355841D

Subject: NOTICE OF CONSTRUCTION FOR BUILDING 304, CONCRETION FACILITY MODIFICATION

INTERNAL DISTRIBUTION

Approval	Date	Name	Location	w/att
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		J. A. Bates	H6-22	
		R. J. Boom	T1-30	
		L. P. Diediker	T1-30	
		B. G. Erlandson	H6-20	
		G. W. Jackson, Assignee	H6-21	
		R. J. Landon	H6-21	
		J. J. Luke	H6-25	
		J. M. Nickels	H6-22	
		P. J. Mackey	B3-15	
		H. E. McGuire, Level 1	B3-63	
		R. W. Oldham	H6-25	
		J. K. Perry	H6-20	
		F. A. Ruck III	H6-23	
		J. J. Schumacher	L6-26	
		M. J. Silvia	H6-25	
		S. P. Thomas	T1-30	
		EPIC	H6-08	
		MJS/File/LB	H6-25	