

April 19, 1994

NOTE FOR: John Grobe, Acting Chief
 Reactor Support Projects Branch

FROM: Steven Orth, Radiation Specialist
 Radiological Programs Section 1

SUBJECT: ANALYSIS OF FIRST FERMI CST DISCHARGE

The first release of water from the Fermi 2 CST was analyzed both by Region III and by the Radiological and Environmental Sciences Laboratory (RESL), US DOE. The results were in excellent agreement, as tabulated below.

Nuclide	NRC Value (uCi/ml)	NRC 1s Error (uCi/ml)	RESL Value (uCi/ml)	RESL 1s Error (uCi/ml)
Cr-51	2.76E-7	9.24E-8	< MDA	
Co-58	6.47E-8	1.29E-8	< MDA	
Co-60	4.26E-7	2.36E-8	4.3E-7	6E-8
I-131	3.02E-8	1.08E-8	< MDA	
Cs-134	1.47E-7	1.69E-8	1.0E-7	4E-8
Cs-137	1.68E-7	1.69E-8	2.1E-7	4E-8
H-3	4.75E-4	5.9E-6	4.81E-4	6E-6
Gross BETA	1.2E-6	6E-8	1.1E-6	9E-8
Gross ALPHA	< MDA		9E-9	1.1E-8
Fe-55			2.9E-7	4E-8
Sr-89			5.6E-8	9E-9
Sr-90			6E-9	4E-9

As this sample was counted some 22 days after collection, certain short lived gamma emitting nuclides, i.e. Cr-51, Co-58, and I-131, were below RESL's MDA.

Analyses for Fe-55, Sr-89, and Sr-90 were not performed by Region III. In the NRC dose calculation, all beta activity was attributed to Sr-89.


 Steven K. Orth
 Radiation Specialist

D-21

Routine Inplant Urgent

NRC Mod # 84750 Environ.

Non Routine Date Needed 4/6/94

UNITED STATES DEPARTMENT OF ENERGY
 IDAHO OPERATIONS OFFICE
 RADIOLOGICAL AND ENVIRONMENTAL SCIENCES LABORATORY
SAMPLE RECORD SHEET

Onsite _____
 Offsite _____

Serial No. 15627

Sample From: FERMI
 Collected By: ORTH Date Sent: 3/9/94
 Organization: US NRC, REGION 3

Samples Received: 3/14/94
 Analysis Completed: _____
 Notified: _____ Date: _____

Analyzed By: _____
 Approved By: [Signature]

Sample			Sample Description	Anal. for	Inst. used	Quant. used	Date cntd.	Count time	Gross count	Bkgd.	Net count	Result ± 1 σ*
No.	Date	Hour										
<u>94-02</u> <u>A</u>	<u>3/4/94</u>	<u>12:50 (EST)</u>	<u>CST WATER</u> <u>ANALYZE FOR:</u> <u>GLASS CC & B</u> <u>γ SCAN</u> <u>Fe-55 / Sr-89 / Sr-90</u> <u>(ACIDIFIED TO ~1% HCl)</u>	<u>SP</u> <u>SP</u> <u>γ</u> <u>FCS</u> <u>SP</u> <u>SP</u> <u>SP</u> <u>90</u>								
<u>B</u>			<u>ANALYZE CONTENTS OF</u> <u>GLASS JAR FOR</u> <u>H-3</u> <u>(NOT ACIDIFIED)</u>	<u>H³</u>								
			PLEASE RETURN SAMPLES TO REGION 3!!									

*Random uncertainties reported are 1 standard deviation, i.e. small negative and other results ≤ 2σ are interpreted by RESL as including "zero" or as not detected. If appropriate, estimates of possible systematic errors are reported in parentheses.

UNITED STATES DEPARTMENT OF ENERGY
IDAHO OPERATIONS OFFICE
RADIOLOGICAL AND ENVIRONMENTAL SCIENCES LABORATORY

SAMPLE RECORD SHEET

SERIAL NO. 15627A

NRC3

* NRC MOD NO. 84750 *
* INPLANT *

URGENT
DATE NEEDED 06-APR-1994
ROUTINE

SAMPLE DATE 24-FEB-1994 SAMPLE SENT 09-MAR-1994 ANALYZED BY: G.MARLETTE, S.GIMPEL
SAMPLE HOUR 1252 MST SAMPLE RECEIVED 14-MAR-1994
ORGANIZATION NRC3 HARDCOPY PRINTOUT 15-APR-1994 ELECTRONICALLY APPROVED BY: R.L. WILLIAMS

COMMENTS:

NRC3, COLLECTED BY ORTH, LIQUID SAMPLE FROM FERMI, CST WATER, 94-042,
PLASTIC BOTTLES (2) SAME SAMPLE, NO PAPER PULP ADDED RESULTS ARE SUSPECT

COLLECTION DATE: 24-FEB-1994 ANALYSIS DATE: 17-MAR-1994 DECAY TIME 22.0 DAYS*
COUNT TIME 60 MIN. DETECTOR NUMBER 1 SAMPLE SIZE 3.96E+02 ml

TOTAL COUNT	GROSS COUNT C/M	BKGD COUNT C/M	MINOR COUNT C/M	NET COUNT C/M	ISOTOPE	RESULTS +/- 1S;0** uCi/ml
90	1.50			1.50	Co 60	(4.3 +/- 0.6;0.6)E -7
38	0.63			0.63	Cs 134	(1.0 +/- 0.4;0.4)E -7
64	1.07			1.07	CsD137	(2.1 +/- 0.4;0.4)E -7

* DECAY CORRECTION OF NATURAL CHAIN DAUGHTERS PER LONGEST LIVED PARENT
** ESTIMATED RANDOM UNCERTAINTY REPORTED IS ONE STANDARD DEVIATION, 1S. SMALL NEGATIVE AND OTHER RESULTS LESS THAN OR EQUAL TO 2S ARE INTERPRETED BY RESL AS INCLUDING "ZERO" OR AS NOT DETECTED. FOR RESULTS GREATER THAN 2S BUT LESS THAN OR EQUAL TO 3S, DETECTION IS QUESTIONABLE. RESULTS GREATER THAN 3S INDICATE DETECTION. O IS THE ESTIMATED OVERALL UNCERTAINTY.

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SAMPLE RECORD SHEET

SERIAL NO. 15627A

NRC3

* NRC MOD NO. 84750 *
* INPLANT *

URGENT
DATE NEEDED 06-APR-1994
ROUTINE

SAMPLE DATE 24-FEB-1994 SAMPLE SENT 09-MAR-1994 ANALYZED BY: DGP,GMH,RBR,
SAMPLE HOUR 1252 MST SAMPLE RECEIVED 14-MAR-1994
ORGANIZATION NRC3 HARDCOPY PRINTOUT 15-APR-1994 ELECTRONICALLY APPROVED BY: R.L. WILLIAMS

COMMENTS:

NRC3, COLLECTED BY ORTH, LIQUID SAMPLE FROM FERMI, CST WATER, 94-042,
PLASTIC BOTTLES (2) SAME SAMPLE, NO PAPER PULP ADDED RESULTS ARE SUSPECT

ANALYZE FOR	INST. USED	QUANTITY USED	DATE COUNTED	COUNT TIME	GROSS COUNTS	BKGD COUNTS	RESULTS +/- 1S;0*	UNITS
FE55	LS	50 ML	31-MAR-1994	20	382	157	(2.9 +/- 0.4;0.4)E -7	UCI/ML
GROSS A	A8	5 ML	18-MAR-1994	60	2	0	(0.9 +/- 1.1;1.1)E -8	UCI/ML
GROSS B	T1	10 ML	17-MAR-1994	20	266	38	(1.10 +/- 0.09;0.10)E -6	UCI/ML
SR89	T2	198 mL	29-MAR-1994	20	171	47	(5.6 +/- 0.9;0.9)E -8	UCI/ML
SR90	T2	198 mL	06-APR-1994	20	61	47	(6 +/- 4; 4)E -9	UCI/ML

* ESTIMATED RANDOM UNCERTAINTY REPORTED IS ONE STANDARD DEVIATION, 1S. SMALL NEGATIVE AND OTHER RESULTS LESS THAN OR EQUAL TO 2S ARE INTERPRETED BY RESL AS INCLUDING "ZERO" OR AS NOT DETECTED. FOR RESULTS GREATER THAN 2S BUT LESS THAN OR EQUAL TO 3S, DETECTION IS QUESTIONABLE. RESULTS GREATER THAN 3S INDICATE DETECTION. 0 IS THE ESTIMATED OVERALL UNCERTAINTY.

UNITED STATES DEPARTMENT OF ENERGY
IDAHO OPERATIONS OFFICE
RADIOLOGICAL AND ENVIRONMENTAL SCIENCES LABORATORY

SAMPLE RECORD SHEET

SERIAL NO. 15627B

NRC3

* NRC MOD NO. 84750 *
* INPLANT *

URGENT
DATE NEEDED 06-APR-1994
ROUTINE

SAMPLE DATE 24-FEB-1994 SAMPLE SENT 09-MAR-1994 ANALYZED BY: RBR,
SAMPLE HOUR 1252 MST SAMPLE RECEIVED 14-MAR-1994
ORGANIZATION NRC3 HARDCOPY PRINTOUT 6-APR-1994 ELECTRONICALLY APPROVED BY: R.L. WILLIAMS

COMMENTS:
NRC3, COLLECTED BY ORTH, LIQUID SAMPLE FROM FERMI,
CST WATER, 94-042, GLASS BOTTLE NO ACID

ANALYZE FOR	INST. USED	QUANTITY USED	DATE COUNTED	COUNT TIME	GROSS COUNTS	BKGD COUNTS	RESULTS +/- 1S;0*	UNITS
H-3	LS	10 ML	27-MAR-1994	20	40682	96	(4.81 +/- 0.06;0.16)E -4	UCI/ML

* ESTIMATED RANDOM UNCERTAINTY REPORTED IS ONE STANDARD DEVIATION, 1S. SMALL NEGATIVE AND OTHER RESULTS LESS THAN OR EQUAL TO 2S ARE INTERPRETED BY RESL AS INCLUDING "ZERO" OR AS NOT DETECTED. FOR RESULTS GREATER THAN 2S BUT LESS THAN OR EQUAL TO 3S, DETECTION IS QUESTIONABLE. RESULTS GREATER THAN 3S INDICATE DETECTION. 0 IS THE ESTIMATED OVERALL UNCERTAINTY.