EFT-5D

2008

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-SD041708

Sample Location (Well Number): EFT-SD

1. Representative sample collected. Date/Time 4/17/08 / 0930

Sample collected by: Joy Marie Slabaugh / Joy Marie Slabaugh Date: 04/21/2008
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: J. Southward / J Southward Date: 4/21/08
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: Ross Bryant / Date: 4-22-8
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate. K.D. Lindsey

Performed by: K.D. Lindsey / K.D. Lindsey Date: 4-24-08
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-5D41708	
2 . Date Sampled	04/17/2008	
3 . Time Sampled	09:30	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	04/22/2008	
2 . Time Sample Counted	12:00	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	7.8	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	3023.2	cpm
Net Spike Count Rate (cpm)	3015.4	cpm
H3 Spike Activity (dpm on count date)	7787.0	dpm
Counter Efficiency	0.3872	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	8.1	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.3	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{(\text{Bkg cpm})}{(\text{Bkg min.})} + \frac{(\text{Bkg cpm})}{(\text{Smpl min.})}}}{\text{Efficiency} \times 2.22\text{E6 dpm/uCi} \times \text{Sample Volume}} = 1.20\text{E-06 uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency} \times 2.22\text{E6 uCi/ml} \times \text{Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 4-22-08

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-5D 41708

Sample Location (Well Number): EFT-5D

1. Representative sample collected. Date/Time 4/17/08 / 0930

Sample collected by: Jay Marc Slabach / Jay Marc Slabach Date: 04/21/2008
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: J. Southward / J Southward Date: 4/21/08
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: J. Southward / J Southward Date: 4/22/08
Fermi 2 RP Printed Name Signature

Sample number: EFT-5D41708

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
. (Note disposition of unidentified peaks in "Remarks")

Performed by: J. Southward / J Southward Date: 4/22/08
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: KD Linsley / KDL-4 Date: 4-24-08
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

DETROIT EDISON FERMI-2 POWER PLANT 22-APR-2008 00:11:14.10

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EFT-SD41708

Sample End Time: 17-APR-2008 09:30:00.00

REMARKS:

PERFORMED BY:

SIGNATURE

REVIEWED BY: Performed 4-14-08

SIGNATURE/DATE

Sample ID : EFT-5D41709 Acquisition date : 22-APR-2000 07:41:09

Fermi 2 Radiation Protection Gamma Spectroscopy Report

**********Sample Parameters**********

Sample ID Number: EFT-5D41709
Sample collection start date: 17-APR-2000 09:30:00.00
Sample collection end date : 17-APR-2000 09:30:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.000000E+03 cc
Sample geometry : M2LL Operator: JNS

**********Acquisition Parameters**********

Detector number : DET 4 Acquire date : 22-APR-2000 07:41:09.87
Preset live time : 0 00:30:00.00 Elapsed live time : 0 00:30:00.00
Elapsed real time : 0 00:30:02.61 Percent dead time : 0.16 %

**********Calibration Parameters**********

Detector number : DET 4 Yearly cal date : 20-JUN-2007 12:16:46.16
Kev/channel : 5.00169E-01 Zero offset: 1.47005E-01
Daily cal date : 22-APR-2000 06:30:50.32

**********Peak Search Parameters**********

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

**********Nuclide Identification Parameters**********

Energy tolerance : 2.00000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_M211 Efficiencies at : Peak energy

****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Fw	Cts/Sec	%Err	Fit
1	0	296.07	45	53	1.23	592.21	585	11	2.49E-02	35.3	Pb-214
2	0	352.34	62	53	1.42	704.71	697	11	3.44E-02	26.0	Pb 214
3	5	510.33	74	26	2.46	1030.55	1014	17	4.11E-02	21.7	> 9.40E-01 Annihilation
4	5	511.96	51	26	2.09	1023.01	1014	17	2.83E-02	31.5	
5	0	558.45	74	21	0.00	1116.75	1110	15	4.14E-02	18.0	Hwc
6	0	609.36	102	5	1.52	1218.53	1213	12	5.65E-02	11.0	Bi 214
7	0	1121.26	10	13	0.97	2241.09	2236	13	1.00E-02	47.5	Bi 214
8	0	1460.59	44	8	1.15	2920.22	2910	18	2.46E-02	21.7	K-40

Decay Time = 4 22:11:09.87 Acquisition Time = 22-APR-2000 07:41:03.0
?

Pouh-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	296.07	45	53	1.23	592.21	585	11	35.3		
0	352.34	62	53	1.42	704.71	697	11	26.0		
3	510.33	74	26	2.46	1020.55	1014	17	21.7	9.40E-01	
3	511.96	51	26	2.00	1023.81	1014	17	31.5		
0	558.45	74	21	0.00	1116.75	1110	15	10.0		
0	609.36	102	5	1.52	1218.53	1213	12	11.0		
0	1121.26	16	13	0.97	2241.69	2236	13	47.5		
0	1460.59	44	0	1.15	2920.22	2910	10	21.7		K-40

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.91	44	10.67*	2.5025+00	2.492E-07	2.492E-07	21.71

Flag: "*" = Keyline

Sample ID : EFT-SD41702 Acquisition Date : 22-APR-2000 07:41:09

Total number of lines in spectrum	8	
Number of unidentified lines	1	
Number of lines tentatively identified by NID	7	87.50%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+09Y	1.00	2.492E-07	2.492E-07	0.541E-07	21.71	
	Total Activity :		2.492E-07	2.492E-07			
	Grand Total Activity :		2.492E-07	2.492E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EFT-SD-1700 Acquisition date : 22-APR-2002 07:41:29

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	64.75	511.00*	193.46	3.654E+11	21.74	Decay
	% Abundances Found =			100.00			
SC-46	83.83D	0.06	142.53	68.70	---- Not Found ----		Abun.
			889.25*	99.98	---- Not Found ----		
			1120.51	99.99	9.713E-09	47.55	
	% Abundances Found =			38.07			
AS-76	26.32H	4.50	559.10*	44.70	1.200E-06	17.90	Abun.
			563.23	1.17	---- Not Found ----		
			571.30	0.14	---- Not Found ----		
			657.03	6.10	---- Not Found ----		
			665.31	0.39	---- Not Found ----		
			740.12	0.12	---- Not Found ----		
			771.76	0.12	---- Not Found ----		
	&		867.63	0.12	---- Not Found ----		
			1189.07	0.14	---- Not Found ----		
			1212.72	1.63	---- Not Found ----		
			1216.02	3.04	---- Not Found ----		
			1220.52	1.39	---- Not Found ----		
			1439.13	0.33	---- Not Found ----		
			1453.60	0.13	---- Not Found ----		
			1787.67	0.33	---- Not Found ----		
	% Abundances Found =			73.70			
RU-103	39.35D	0.13	497.08*	89.00	---- Not Found ----		Abun.
			610.33	5.60	6.577E-07	11.00	
	% Abundances Found =			5.92			
XE-135	9.11H	13.00	249.79*	89.90	---- Not Found ----		Decay,Abun.
			608.19	2.89	9.575E-03	11.00	
	% Abundances Found =			3.11			
PM-140M	41.30D	0.12	208.11	12.56	---- Not Found ----		Abun.
			414.87	18.66	---- Not Found ----		
			432.78	5.35	---- Not Found ----		
			501.26	6.75	---- Not Found ----		
			550.27*	94.90	---- Not Found ----		
			599.74	12.54	---- Not Found ----		
			611.26	5.48	6.694E-07	11.00	
			629.97	89.00	---- Not Found ----		
			725.70	32.80	---- Not Found ----		
			915.33	17.17	---- Not Found ----		
			1013.81	20.30	---- Not Found ----		
	% Abundances Found =			1.74			
BI-214	19.90M	357.09	609.31*	46.30	1.000E+35	11.00	Decay
			768.36	5.04	---- Not Found ----		
			934.06	3.21	---- Not Found ----		
			1120.29	15.10	1.000E+35	47.55	
			1238.11	5.94	---- Not Found ----		
			1377.67	4.11	---- Not Found ----		

Sample ID : EFT-SD41702 Acquisition date : 22-APR-2000 07:41:09

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
BI-214	19.90M	357.09	1764.49	15.80	---- Not Found ----		Decay
		% Abundances Found =		64.29	(Abn. Limit = 40.40%)		
PB-214	26.80M	265.16	87.30	4.67	---- Not Found ----		Decay
			241.98	7.49	---- Not Found ----		
			295.21	19.20	1.000E+35	35.25	
			351.92*	37.20	1.000E+35	25.96	
			785.91	1.10	---- Not Found ----		
		% Abundances Found =		80.96	(Abn. Limit = 37.20%)		

Flag: "*" = Keyline

Unidentified Energy Lines
Sample ID : EFT-5041706

Acquisition date : 22-APR-2000 07:41:07

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	296.07	45	53	1.03	592.21	585	11	2.49E-02	35.3	6.08E+00	T
0	352.34	62	53	1.42	704.71	697	11	3.44E-02	26.0	5.70E+00	T
5	510.32	74	26	2.46	1020.55	1014	17	4.11E-02	21.7	4.89E+00	T
5	511.96	51	26	2.09	1023.91	1014	17	2.83E-02	31.5	4.89E+00	
0	558.45	74	21	0.00	1116.75	1116	15	4.14E-02	10.0	4.69E+00	T
0	609.36	102	3	1.52	1218.53	1213	12	5.65E-02	11.0	4.52E+00	T
0	1121.26	10	13	0.97	2241.89	2236	13	1.00E-02	47.5	2.90E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 22-APR-2008 00:11:10.29

Sample ID : EF1-5041/08

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	23.	477.59	7.6443E-08
F-18	0.	511.00	Half-Life too short
NA-22	11.	1274.54	1.0031E-08
NA-24	10.	1368.53	2.4004E-06
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	13.	889.25	9.3551E-09
CR-51	25.	320.08	7.6176E-08
MN-54	7.	834.83	6.6571E-09
CO-56	17.	1238.25	1.8460E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	46.	158.38	1.3651E-08
CO-57	47.	122.06	1.0503E-08
CO-58	9.	810.76	7.2664E-09
FE-59	12.	1099.22	1.0433E-08
CO-60	9.	1332.49	9.6523E-09
CU-64	4.	1345.90	1.4410E-03
NI-65	0.	1481.84	Half-Life too short
ZN-65	17.	1115.52	2.2495E-08
ZN-69M	23.	438.63	2.9485E-06
SE-75	46.	136.00	1.4265E-08
AS-76	77.	559.10	7.0443E-07
BR-82	9.	776.49	8.1358E-08
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	41.	513.99	2.3342E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	41.	513.99	1.0049E-08
RB-86	9.	1076.63	1.1553E-07
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	4.	1836.01	8.4821E-09
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.60	Half-Life too short
KR-90	0.	1110.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	10.	1204.90	3.3062E-06
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Sample ID : EFT SD41700 Acquisition date : 22-APR-2008 07:41:09

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
SR-93	0.	590.20	Half-Life too short
Y-93	0.	266.90	Half Life too short
NB-94	17.	702.63	8.0649E-09
NB-95	14.	765.79	8.6914E-09
NB-95M	40.	235.60	7.8735E-08
ZR-95	15.	756.72	1.5354E-08
NB-97	0.	657.90	Half-Life too short
ZR-97	13.	743.36	9.0843E-07
MO-99	12.	739.58	1.9321E-07
TC-99M	0.	140.50	Half Life too short
TC-101	0.	306.81	Half Life too short
RU-103	21.	497.08	8.9490E-09
TC-104	0.	357.99	Half-Life too short
RH-105	26.	318.98	3.6342E-07
RU-105	0.	724.50	Half-Life too short
RU-106	17.	621.84	7.4650E-08
CD-109	36.	88.03	3.5180E-07
AG-110M	12.	937.48	2.6529E-08
SN-113	17.	391.69	9.5258E-09
SN-117M	45.	158.56	1.1332E-08
SB-122	26.	563.93	4.2396E-08
SB-124	13.	602.71	7.0008E-09
SB-125	20.	427.89	2.2868E-08
TE-125M	39.	109.28	3.4635E-06
TE-127	0.	417.90	Half-Life too short
TE-127M	21.	57.60	2.1089E-05
XE-127	38.	202.84	1.1550E-08
TE-129	0.	459.60	Half-Life too short
TE-129M	15.	695.88	2.4011E-07
XE-129M	51.	196.56	2.5312E-07
I-130	15.	536.09	4.9092E-06
BA-131	40.	123.80	3.7810E-08
I-131	28.	364.48	1.3682E-08
TE-131	0.	149.72	Half-Life too short
TE-131M	12.	773.67	2.9926E-07
XE-131M	58.	163.93	5.4101E-07
I-132	0.	667.69	Half-Life too short
TE-132	44.	228.16	2.5614E-08
BA-133	35.	302.84	3.6132E-08
BA-133M	33.	276.09	3.2612E-07
I-133	17.	529.87	4.0922E-07
TE-133M	0.	912.58	Half-Life too short
XE-133	29.	81.00	7.6335E-08
XE-133M	42.	233.22	3.5764E-07
CS-134	20.	604.70	7.9723E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	39.	268.24	7.4166E-07
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Sample ID : EFT-CD41702 Acquisition date : 22-MAR-2002 07:41:02

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-136	17.	818.50	1.2026E-08
I-136	0.	1313.02	Half-Life too short
CS-137	14.	661.65	8.0622E-09
XE-137	0.	455.49	Half-Life too short
CS-138	6.	1435.80	Half-Life too short
XE-138	9.	258.31	Half-Life too short
BA-139	8.	1420.50	Half-Life too short
CE-139	46.	165.85	9.0082E-09
CS-139	0.	1283.23	Half-Life too short
BA-140	10.	537.32	3.7348E-08
LA-140	3.	1596.49	5.4650E-08
BA-141	6.	190.22	Half-Life too short
CE-141	57.	145.44	1.9938E-08
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	48.	293.26	2.4541E-07
CE-144	59.	133.54	8.6849E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	31.	91.10	5.5084E-08
PM-148M	16.	550.27	7.6947E-09
EU-152	32.	344.27	2.0495E-08
EU-154	11.	1004.76	4.9172E-09
EU-156	17.	646.29	1.3043E-07
HF-181	28.	482.03	1.0719E-08
TA-182	11.	1221.42	3.7399E-08
W-187	10.	685.81	8.4748E-07
RE-189	42.	155.03	6.2136E-06
HG-203	47.	279.19	1.1736E-08
BI-207	19.	569.67	7.5350E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	55.	240.98	5.7686E-07
RA-226	52.	186.21	2.4766E-07
AC-228	31.	338.32	6.5299E-08
TH-229	42.	84.37	1.2873E-06
PA-234	0.	131.20	Half-Life too short
TH-234	34.	63.29	1.2475E-06
U-235	45.	143.76	7.5015E-08
NP-239	48.	106.13	2.0131E-07
AM-241	40.	59.54	1.9605E-07

EFT-5D

2009

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-SD031109

Sample Location (Well Number): EFT-SD

1. Representative sample collected. Date/Time 3-11-09 / 14:55

Sample collected by: Chris Ellison / [signature] Date: 3-11-09
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: [illegible] / [signature] Date: 4-17-09
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: D. Howard / [signature] Date: 4.22.09
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: R. Burgess / [signature] Date: 4-22-09
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-5D031109	
2 . Date Sampled	03/11/2009	
3 . Time Sampled	14:55	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	04/21/2009	
2 . Time Sample Counted	10:10	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	7.5	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	2991.0	cpm
Net Spike Count Rate (cpm)	2983.5	cpm
H3 Spike Activity (dpm on count date)	7361.1	dpm
Counter Efficiency	0.4053	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	8.7	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	1.2	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{(\text{Bkg cpm})}{(\text{Bkg min.})} + \frac{(\text{Bkg cpm})}{(\text{Smpl min.})}}}{\text{Efficiency} \times 2.22\text{E6 dpm/uCi} \times \text{Sample Volume}} = 1.12\text{E-06 uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency} \times 2.22\text{E6 uCi/ml} \times \text{Sample Volume}} < \textbf{MDA}$$

Technician [signature] Date 4.21.09

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-5D 031109

Sample Location (Well Number): EFT-5D

1. Representative sample collected. Date/Time 3-11-09 / 14:55

Sample collected by: Chris Ellison / [signature] Date: 3-11-09
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Proffitt / [signature] Date: 4-17-09
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: Southward / [signature] Date: 4/21/09
Fermi 2 RP Printed Name Signature

Sample number: EFT - SDO 31109

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: Southward / Southward Date: 4/21/09
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: K D Lindsey / [illegible] Date: 4-22-09
Fermi 2 Printed Name 4-17-09 GP Signature 4-17-09 GP 4-17-09 GP
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: LFT-SD0311WS

Sample End Time: 11-MAR-2009 14:53:00.00

REMARKS

PERFORMED BY:

SIGNATURE

REVIEWED BY:

4-22-09

SIGNATURE/DATE

Sample ID : EFT-SD031109 Acquisition date : 21-APR-2009 16:52:53

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********
Sample ID Number: EFT-SD031109
Sample collection start date: 11-MAR-2009 14:55:00.00
Sample collection end date : 11-MAR-2009 14:55:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.000000E+03 cc
Sample geometry : M2LL Operator: JHS

********** Acquisition Parameters **********
Detector number : DET 4 Acquire date : 21-APR-2009 16:52:53.51
Preset live time : 0 00:30:00.00 Elapsed live time : 0 00:30:00.00
Elapsed real time : 0 00:30:00.93 Percent dead time : 0.05 %

********** Calibration Parameters **********
Detector number : DET 4 Yearly cal date : 20-JUN-2008 12:00:00.00
Kev/channel : 4.99802E-01 Zero offset: 7.45979E-02
Daily cal date : 21-APR-2009 06:54:02.66

********** Peak Search Parameters **********
Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********
Energy tolerance : 2.00000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_M211 Efficiencies at : Peak energy

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	2	510.23	50	27	2.26	1020.54	1013	19	2.77E-02	30.6	6.99E-01
2	2	511.60	45	30	2.26	1023.44	1013	19	2.50E-02	34.0	
3	1	1459.37	29	4	2.24	2919.19	2915	12	1.60E-02	19.6	3.34E+00
4	1	1460.53	6	6	2.24	2921.50	2915	12	3.44E-03	130.4	

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
2	510.23	50	27	2.26	1020.54	1013	19	30.6	6.95E-01	>Ann Peak
2	511.68	45	30	2.26	1023.44	1013	19	34.0		
1	1459.37	29	4	2.24	2919.19	2915	12	19.6	3.34E+00	K-40
1	1460.53	6	6	2.24	2921.50	2915	12	130.4		K-40

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	6	10.67*	2.502E+00	3.400E-00	3.400E-00	130.43

Flag: "*" = Keyline

Sample ID : EFI-5D031129 Acquisition date : 21-APR-2009 16:52:53

Total number of lines in spectrum 4
Number of unidentified lines 1
Number of lines tentatively identified by NID 3 75.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+09Y	1.00	3.400E-00	3.400E-00	4.540E-00	133.43	
	Total Activity :		3.400E-00	3.400E-00			
	Grand Total Activity :		3.400E-00	3.400E-00			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EFT-5D031109 Acquisition date : 21-APR-2003 16:52:53

Nuclide	Half-Life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	539.21	511.00*	193.46	1.000E+35	34.01	Decay
	% Abundances Found =			100.00			
I-135	6.61H	149.20	288.45	3.09	----- Not Found -----		Decay,Abun.
			417.63	3.52	----- Not Found -----		
			526.56	13.33	----- Not Found -----		
			546.56	7.12	----- Not Found -----		
			836.80	6.67	----- Not Found -----		
			1038.76	7.90	----- Not Found -----		
			1124.00	3.60	----- Not Found -----		
			1131.51	22.50	----- Not Found -----		
			1260.41*	28.60	----- Not Found -----		
			1457.56	8.60	1.000E+35	19.63	
			1676.03	9.50	----- Not Found -----		
	0		1706.46	4.09	----- Not Found -----		
			1791.20	7.70	----- Not Found -----		
	% Abundances Found =			6.01			

Flag: "*" = Keyline

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
2	510.23	50	27	2.26	1020.54	1013	19	2.77E-02	30.6	4.08E+00	
2	511.66	45	30	2.26	1023.44	1013	19	2.50E-02	34.0	4.86E+00	T
1	1459.37	29	4	2.24	2919.19	2915	12	1.60E-02	19.3	2.50E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 21-APR-2009 17:22:59.66

Sample ID : EFT-SDd31109

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	19.	477.59	1.1293E-07
F-18	0.	511.00	Half-Life too short
NA-22	5.	1274.54	7.5169E-09
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	11.	889.25	1.1732E-08
CR-51	24.	320.08	1.0376E-07
MN-54	13.	834.83	9.3200E-09
CO-56	8.	1238.25	1.0500E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	35.	158.38	7.2961E-07
CO-57	38.	122.06	1.0609E-08
CO-58	12.	810.76	1.1949E-08
FE-59	10.	1099.22	2.9680E-08
CO-60	9.	1332.49	9.6361E-09
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	12.	1115.52	2.1804E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	36.	136.00	1.5502E-08
AS-76	0.	559.10	Half-Life too short
BR-82	0.	776.49	Half-Life too short
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	36.	513.99	2.2245E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	36.	513.99	1.4843E-08
RB-86	0.	1076.63	4.1320E-07
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	4.	1836.01	1.0257E-08
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.80	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	12.	1204.90	5.4936E-06
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Sample ID : EFT-SD031100 Acquisition date : 21-APR-2009 16:52:00

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
SR-93	0.	590.20	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	19.	702.63	8.3838E-09
NB-95	14.	765.79	1.0071E-08
NB-95M	0.	235.69	Half-Life too short
ZR-95	7.	756.72	1.6081E-08
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	0.	739.50	Half-Life too short
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	20.	497.08	1.6689E-08
TC-104	0.	357.99	Half-Life too short
RH-105	0.	319.90	Half-Life too short
RU-105	0.	724.50	Half-Life too short
RU-106	20.	621.84	8.7002E-08
CD-109	23.	88.03	3.0395E-07
AG-110M	14.	937.48	3.1176E-08
SN-113	16.	391.69	1.1377E-08
SN-117M	34.	158.56	6.3238E-08
SB-122	0.	563.93	Half-Life too short
SB-124	22.	602.71	1.3396E-08
SB-125	19.	427.89	2.2702E-08
TE-125M	33.	109.28	5.0792E-06
TE-127	0.	417.90	Half-Life too short
TE-127M	19.	57.60	2.5309E-05
XE-127	41.	202.84	2.3823E-08
TE-129	0.	459.60	Half-Life too short
TE-129M	18.	0 695.88	5.6908E-07
XE-129M	42.	196.56	3.0873E-06
I-130	0.	536.09	Half-Life too short
BA-131	40.	123.80	3.1717E-07
I-131	19.	364.48	2.6050E-07
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	46.	163.93	4.3442E-06
I-132	0.	667.69	Half-Life too short
TE-132	0.	228.16	Half-Life too short
BA-133	28.	302.84	3.8192E-08
BA-133M	0.	276.09	Half-Life too short
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	37.	81.00	1.0070E-05
XE-133M	0.	233.22	Half-Life too short
CS-134	27.	604.70	9.3985E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Sample ID : EFT-SD031109 Acquisition date : 21-APR-2009 16:52:53

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-136	22.	818.50	9.0011E-08
I-136	0.	1313.02	Half-Life too short
CS-137	16.	661.65	8.6436E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	36.	165.85	1.0406E-08
CO-139	0.	1283.23	Half-Life too short
BA-140	16.	537.32	2.4572E-07
LA-140	0.	1596.49	Half-Life too short
BA-141	0.	190.22	Half-Life too short
CE-141	32.	145.44	3.3123E-08
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	0.	293.26	Half-Life too short
CE-144	42.	133.54	8.0664E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	29.	91.10	5.2148E-07
PM-148M	11.	550.27	1.2213E-08
EU-152	17.	344.27	2.1649E-08
EU-154	9.	1004.76	4.4868E-08
EU-155	32.	105.31	4.4000E-08
EU-156	7.	646.29	4.7413E-07
HF-181	21.	482.03	1.7064E-08
TA-182	10.	1221.42	4.4788E-08
W-187	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
HG-203	42.	279.19	1.8927E-08
BI-207	10.	569.67	7.5211E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	0.	240.98	Half-Life too short
RA-226	44.	186.21	2.3065E-07
AC-228	23.	338.32	5.7194E-08
TH-228	40.	84.37	1.3041E-06
PA-234	0.	131.20	Half-Life too short
TH-234	33.	63.29	3.4027E-06
U-235	28.	143.76	6.0145E-08
NP-239	0.	106.13	Half-Life too short
AM-241	23.	59.54	1.5425E-07

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT5D9909

Sample Location (Well Number): 5D

1. Representative sample collected. Date/Time 9/9/09 / 1400

Sample collected by: T Thompson Mark Thomas Date: 9-9-09
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Southward / Southward Date: 9/21/09
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: Jonn Young / Date: 9-22-9
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert C Gray JR Robert C Gray JR Date: 10-13-09
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT5D9909	
2 . Date Sampled	09/09/2009	
3 . Time Sampled	14:00	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	09/21/2009	
2 . Time Sample Counted	14:00	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	7.7	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	2763.5	cpm
Net Spike Count Rate (cpm)	2755.8	cpm
H3 Spike Activity (dpm on count date)	7189.1	dpm
Counter Efficiency	0.3833	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	7.1	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.0	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{(\text{Bkg cpm})}{(\text{Bkg min.})} + \frac{(\text{Bkg cpm})}{(\text{Smpl min.})}}}{\text{Efficiency} \times 2.22\text{E6 dpm/uCi} \times \text{Sample Volume}} = 1.20\text{E-06 uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency} \times 2.22\text{E6 uCi/ml} \times \text{Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 9-22-9

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT 5D 9909

Sample Location (Well Number): 5D

1. Representative sample collected. Date/Time 9/9/09 / 1400

Sample collected by: Thomas Mowl Thomas Mowl Date: 9-9-09
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Southward / Southward Date: 9/24/09
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: Southward / Southward Date: 10/21/09
Fermi 2 RP Printed Name Signature

Sample number: EFT 5D9909

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: Southward, Southward Date: 10/21/09
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert Gaston 10-27-09 N/A 10-22-09
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

DETROIT EDISON FERMI-2 POWER PLANT 21-OCT-2009 11:25:47.07

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EFT5D9909

Sample End Time: 9-SEP-2009 14:00:00.00

REMARKS Record Det.

PERFORMED BY:
SIGNATURE

REVIEWED BY:
SIGNATURE/DATE 10-22-09

PAGE ____ of ____

Sample ID : EFT5D9909 Acquisition date : 21-OCT-2>09 10:55:44

****

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********

Sample ID Number: EFT5D9909
Sample collection start date: 9-SEP-2009 14:00:00.00
Sample collection end date : 9-SEP-2009 14:00:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.00000E+03 cc
Sample geometry : M2LL Operator: JNS

********** Acquisition Parameters **********

Detector number : DET 4 Acquire date : 21-OCT-2009 10:55:44.79
Preset live time : 0 00:30:00.00 Elapsed live time : 0 00:30:00.00
Elapsed real time : 0 00:30:00.86 Percent dead time : 0.05 %

********** Calibration Parameters **********

Detector number : DET 4 Yearly cal date : 3-JUN-2009 17:37:00.00
Kev/channel : 5.00043E-01 Zero offset: 7.64342E-02
Daily cal date : 21-OCT-2009 08:56:57.98

********** Peak Search Parameters **********

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********

Energy tolerance : 1.75000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	352.63	34	43	1.21	705.04	698	14	1.91E-02	44.7	
2	4	510.19	49	17	1.96	1020.12	1016	15	2.73E-02	22.8	2.50E+00
3	4	511.77	60	24	2.44	1023.27	1016	15	3.32E-02	25.8	
4	0	559.61	23	21	1.09	1118.95	1109	18	1.30E-02	51.5	
5	0	609.33	47	16	2.16	1218.38	1209	17	2.60E-02	24.9	

Sample Title : EFT5D9909 Page : 1
Decay Time = 41 20:55:44.79 Acquisition Time = 21-OCT-2009 10:55:44.79

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	352.63	34	43	1.21	705.04	698	14	44.7		Pb-214
4	510.19	49	17	1.96	1020.12	1016	15	22.8	2.50E+00	> ANN.
4	511.77	60	24	2.44	1023.27	1016	15	25.8		
0	559.61	23	21	1.09	1118.95	1109	18	51.5		Hi % error.
0	609.33	47	16	2.16	1218.38	1209	17	24.9		Bi-214

NoID Peaks 10-22-09

Nuclide Line Activity Report
Sample ID : EFT5D9909

Page : 1
Acquisition date : 21-OCT-2009 10:55:4

Flag: "*" = Keyline

Sample ID : EFT5D9909 Acquisition date : 21-OCT-2009 10:55:44

Total number of lines in spectrum	5	
Number of unidentified lines	1	
Number of lines tentatively identified by NID	4	80.00%

***** There are no nuclides meeting summary criteria *****

Flags: "K" = Keyline not found B "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EFT5D9909 Acquisition date : 21-OCT-2009 10:55:44

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	549.50	511.00*	193.46	1.000E+35	25.81	Decay
		% Abundances Found =		100.00			
AS-76	26.32H	38.19	559.10*	44.70	5.269E+03	51.48	Decay,Abun.
			563.23	1.17	----- Not Found -----		
			571.30	0.14	----- Not Found -----		
			657.03	6.10	----- Not Found -----		
			665.31	0.39	----- Not Found -----		
			740.12	0.12	----- Not Found -----		
			771.76	0.12	----- Not Found -----		
			867.63	0.12	----- Not Found -----		
			1129.07	0.14	----- Not Found -----		
			1212.72	1.63	----- Not Found -----		
			1216.02	3.84	----- Not Found -----		
			1220.52	1.39	----- Not Found -----		
			1439.13	0.33	----- Not Found -----		
			1453.60	0.13	----- Not Found -----		
			1787.67	0.33	----- Not Found -----		
		% Abundances Found =		73.70			
Y-92	3.54H	283.95	448.50	2.30	----- Not Found -----		Decay,Abun.
			561.10	2.40	1.000E+35	51.48	
			844.30	1.25	----- Not Found -----		
			934.46*	13.90	----- Not Found -----		
			1405.40	4.00	----- Not Found -----		
		% Abundances Found =		9.74			
RU-103	39.35D	1.06	497.08*	89.00	----- Not Found -----		Abun.
			610.33	5.60	5.796E-07	24.90	
		% Abundances Found =		5.92			
XE-135	9.11H	110.34	249.79*	89.90	----- Not Found -----		Decay,Abun.
			608.19	2.89	8.812E+26	24.90	
		% Abundances Found =		3.11			
BI-214	19.90M	3030.69	609.31*	46.30	1.000E+35	24.90	Decay
			768.36	5.04	----- Not Found -----		
			934.06	3.21	----- Not Found -----		
			1120.29	15.10	----- Not Found -----		
			1238.11	5.94	----- Not Found -----		
			1377.67	4.11	----- Not Found -----		
			1764.49	15.80	----- Not Found -----		
		% Abundances Found =		48.48	(Abn. Limit =	48.48%)	
PB-214	26.80M	2250.40	87.30	4.67	----- Not Found -----		Decay
			241.98	7.49	----- Not Found -----		
			295.21	19.20	----- Not Found -----		
			351.92*	37.20	1.000E+35	44.69	
			785.91	1.10	----- Not Found -----		
		% Abundances Found =		53.40	(Abn. Limit =	37.20%)	

Flag: "*" = Keyline

Sample ID : EFT5D9909 Acquisition date : 21-OCT-2009 10:55:44

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	352.63	34	43	1.21	705.04	690	14	1.91E-02	44.7	5.69E+00	T
4	510.19	49	17	1.96	1020.12	1016	15	2.73E-02	22.8	4.88E+00	
4	511.77	60	24	2.44	1023.27	1016	15	3.32E-02	25.8	4.88E+00	T
0	559.61	23	21	1.09	1118.95	1109	18	1.30E-02	51.5	4.60E+00	T
0	609.33	47	16	2.16	1218.30	1209	17	2.60E-02	24.9	4.52E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 21-OCT-2009 11:25:51.75

Sample ID : EFT5D9909

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	>	Energy (keV)	MDA (uCi/cc)
BE-7	17.		477.59	1.0679E-07
F-18	0.		511.00	Half-Life too short
NA-22	0.		1274.54	9.1260E-09
NA-24	0.		1368.53	Half-Life too short
MG-27	0.		1014.44	Half-Life too short
CL-38	0.		1642.42	Half-Life too short
K-40	47.		1460.81	1.9422E-07
AR-41	0.		1293.64	Half-Life too short
SC-46	11.		889.25	1.1800E-08
CR-51	27.		320.08	1.9827E-07
MN-54	12.		834.83	8.7290E-09
CO-56	14.		1238.25	2.3731E-08
MN-56	0.		1810.69	Half-Life too short
NI-56	35.		158.38	7.9814E-07
CO-57	36.		122.06	1.0339E-08
CO-58	12.		810.76	1.1873E-08
FE-59	9.		1099.22	2.8665E-08
CO-60	< 4.		1332.49	7.2827E-09
CU-64	0.	B	1345.90	Half-Life too short
NI-65	0.		1481.84	Half-Life too short
ZN-65	6.		1115.52	1.6198E-08
ZN-69M	0.		438.63	Half-Life too short
SE-75	35.		136.00	1.5518E-08
AS-76	0.		559.10	Half-Life too short
BR-82	0.		776.49	Half-Life too short
BR-83	0.		529.64	Half-Life too short
BR-84	0.		881.50	Half-Life too short
BR-85	0.		802.41	Half-Life too short
KR-85	39.		513.99	2.2915E-06
KR-85M	0.		151.18	Half-Life too short
SR-85	39.		513.99	1.5417E-08
RB-86	12.		1076.63	5.1575E-07
KR-87	0.		402.58	Half-Life too short
SR-87M	0.		388.40	Half-Life too short
KR-88	0.		196.32	Half-Life too short
RB-88	0.		1382.39	Half-Life too short
Y-88	5.		1836.01	1.1490E-08
KR-89	0.		220.90	Half-Life too short
RB-89	0.		1031.88	Half-Life too short
KR-90	0.		1118.69	Half-Life too short
RB-90	0.		831.69	Half-Life too short
RB-90M	0.		824.23	Half-Life too short
Y-90M	0.		202.51	Half-Life too short
SR-91	0.		1024.30	Half-Life too short
Y-91	9.		1204.90	4.9288E-06
Y-91M	0.		555.60	Half-Life too short
SR-92	0.		1383.94	Half-Life too short

Sample ID : EFTSD9909 Acquisition date : 21-OCT-2009 10:55:44

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
Y-92	0.	934.46	Half-Life too short
SR-93	0.	590.20	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	21.	702.63	8.7447E-09
NB-95	9.	765.79	1.5082E-08
NB-95M	0.	235.69	Half-Life too short
ZR-95	10.	756.72	1.9237E-08
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	0.	739.50	Half-Life too short
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	23.	497.08	1.0021E-08
TC-104	0.	357.99	Half-Life too short
RH-105	0.	318.90	Half-Life too short
RU-105	0.	724.50	Half-Life too short
RU-106	15.	621.84	7.6708E-08
CD-109	34.	88.03	3.6147E-07
AG-110M	11.	937.48	2.8170E-08
SN-113	22.	391.69	1.3193E-08
SN-117M	35.	158.56	6.6870E-08
SB-122	0.	563.93	Half-Life too short
SB-124	22.	602.71	1.3359E-08
SB-125	0 21.	427.89	2.3852E-08
TE-125M	40.	109.28	5.5826E-06
TE-127	0.	417.90	Half-Life too short
TE-127M	21.	57.60	2.6579E-05
XE-127	25.	202.84	1.9455E-08
TE-129	0.	459.60	Half-Life too short
TE-129M	10.	695.88	5.7930E-07
XE-129M	35.	196.56	3.8057E-06
I-130	0.	536.09	Half-Life too short
BA-131	30.	123.80	2.9042E-07
I-131	26.	364.48	3.2345E-07
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	35.	163.93	4.0226E-06
I-132	0.	667.69	Half-Life too short
TE-132	0.	228.16	Half-Life too short
BA-133	16.	302.84	3.0253E-08
BA-133M	0.	276.09	Half-Life too short
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	30.	81.00	1.0105E-05
XE-133M	0.	233.22	Half-Life too short
CS-134	22.	604.70	8.6543E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short

Sample ID : EFT5D9909 Acquisition date : 21-OCT-2009 10:55:44

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
XE-135M	0.	526.56	Half-Life too short
CS-136	14.	818.50	7.7027E-08
I-136	0.	1313.02	Half-Life too short
CS-137	13.	661.65	7.9105E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	33.	165.85	1.0160E-08
CS-139	0.	1203.23	Half-Life too short
BA-140	21.	537.32	2.9543E-07
LA-140	0.	1596.49	Half-Life too short
BA-141	0.	190.22	Half-Life too short
CE-141	32.	145.44	3.3711E-08
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	0.	293.26	Half-Life too short
CE-144	27.	133.54	6.6602E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	26.	91.10	5.2509E-07
PM-148M	16.	550.27	1.4374E-08
EU-152	22.	344.27	2.4355E-08
EU-154	14.	1004.76	5.5831E-08
EU-155	27.	105.31	4.0764E-08
EU-156	12.	646.29	6.1536E-07
HF-181	10.	482.03	1.6205E-08
TA-182	2.	1221.42	2.3933E-08
W-187	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
HG-203	20.	279.19	1.3702E-08
BI-207	19.	569.67	7.6031E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	0.	240.98	Half-Life too short
RA-226	45.	186.21	2.3243E-07
AC-228	26.	338.32	6.1226E-08
TH-228	39.	84.37	1.2793E-06
PA-234	0.	131.20	Half-Life too short
TH-234	20.	63.29	3.2845E-06
U-235	35.	143.76	6.6605E-08
NP-239	0.	106.13	Half-Life too short
AM-241	16.	59.54	1.3235E-07

EFT-5D

2010

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EF1-52410-5D

Sample Location (Well Number): 5D

1. Representative sample collected. Date/Time 5/24/10 / 1320

Sample collected by: Southward / Southward Date: 6/23/10
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Southward / Southward Date: 6/23/10
Printed Name / Signature

3. Sample counted in accordance with 76.000,70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: Joan M. Yokom / _____ Date: 6-25-10
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert C Kegg JR _____ Date: 6-30-10
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EF1-52410-5D	
2 . Date Sampled	05/24/2010	
3 . Time Sampled	13:20	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	06/25/2010	
2 . Time Sample Counted	08:45	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	7.3	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	2683.2	cpm
Net Spike Count Rate (cpm)	2675.9	cpm
H3 Spike Activity (dpm on count date)	6887.9	dpm
Counter Efficiency	0.3885	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	7.6	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.3	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{\text{(Bkg cpm)}}{\text{(Bkg min.)}} + \frac{\text{(Bkg cpm)}}{\text{(Smpl min.)}}}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}} = 1.16\text{E-}06 \text{ uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency x 2.22E6 uCi/ml x Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 6-25-10

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EF1-52410-5D

Sample Location (Well Number): 5D

1. Representative sample collected. Date/Time 5/24/10 / 1320

Sample collected by: Southward / Southward Date: 6/23/10
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Southward / Southward Date: 6/23/10
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: Charles Proffitt / Charles Proffitt Date: 9-15-10
Fermi 2 RP Printed Name Signature

Sample number: EF1-52410-5D

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by Charles Proffitt / Charles Proffitt Date: 9-15-10
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert C Gregg III Date: 10-5-10
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

DETROIT EDISON FERMI-2 POWER PLANT 27-SEP-2010 12:13:53.87

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EF1-52410-5D

Sample End Time: 24-MAY-2010 13:20:00.00

REMARKS

PERFORMED BY:

SIGNATURE

REVIEWED BY:

SIGNATURE/DATE

Sample ID : EF1-52410-SD Acquisition date : 27-SEP-2010 11:28:51

****

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********

Sample ID Number: EF1-52410-SD
Sample collection start date: 24-MAY-2010 13:20:00.00
Sample collection end date : 24-MAY-2010 13:20:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.000000E+03 cc
Sample geometry : M2LL Operator: CLP

********** Acquisition Parameters **********

Detector number : DET 4 Acquire date : 27-SEP-2010 11:28:51.25
Preset live time : 0 00:45:00.00 Elapsed live time : 0 00:45:00.00
Elapsed real time : 0 00:45:00.80 Percent dead time : 0.03 %

********** Calibration Parameters **********

Detector number : DET 4 Yearly cal date : 23-JUN-2010 12:28:00.00
Kev/channel : 5.00373E-01 Zero offset: 7.59464E-02
Daily cal date : 27-SEP-2010 09:48:39.90

********** Peak Search Parameters **********

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********

Energy tolerance : 1.75000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	67.05	71	121	2.16	133.84	126	14	2.61E-02	35.3	
2	0	139.74	74	56	1.48	279.11	275	8	2.76E-02	20.9	
3	0	198.02	49	114	1.00	395.60	390	12	1.80E-02	46.2	
4	0	511.39	218	82	2.17	1021.91	1014	20	8.00E-02	12.3	
5	0	558.82	95	41	1.69	1116.71	1109	15	3.51E-02	18.0	
6	0	596.33	24	27	0.97	1191.68	1184	11	9.04E-03	46.1	
7	0	1461.18	78	8	1.77	2920.38	2913	16	2.87E-02	14.0	

Sample Title : EF1-52410-5D
Decay Time = 125 22:00:51.25 Acquisition Time = 27-SEP-2010 11:20:51.2
5

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	67.05	71	121	2.16	133.84	126	14	35.3	HwC	
0	139.74	74	56	1.40	279.11	275	8	20.9	Hwc	
0	198.02	49	114	1.00	395.60	390	12	46.2	Hwc	
0	511.39	218	82	2.17	1021.91	1014	20	12.3	ANN.	
0	558.02	95	41	1.69	1116.71	1109	15	18.0	HwC	
0	596.33	24	27	0.97	1191.68	1184	11	46.1	Hwc	
0	1461.10	78	8	1.77	2920.38	2913	16	14.0		K-40

Sample ID : EF1-52410-5D Acquisition date : 27-SEP-2010 11:20:51

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	78	10.67*	2.501E+00	2.908E-07	2.908E-07	14.01

Flag: "*" = Keyline

Sample ID : EF1-52410-SD Acquisition date : 27-SEP-2010 11:20:51

Total number of lines in spectrum	7	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	7	100.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	2.900E-07	2.900E-07	0.407E-07	14.01	
	Total Activity :		2.900E-07	2.900E-07			
	Grand Total Activity :		2.900E-07	2.900E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EF1-52410-5D Acquisition date : 27-SEP-2010 11:20:51

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	1652.55	511.00*	193.46	1.000E+35	12.35	Decay
		% Abundances Found =		100.00			
SE-75	119.78D	1.05	66.05	1.02	9.628E-06	35.29	Abun.
			96.73	3.41	---- Not Found ----		
			121.12	16.70	---- Not Found ----		
			136.00*	59.20	---- Not Found ----		
			198.60	1.45	1.055E-06	46.18	
			264.65	59.80	---- Not Found ----		
			279.53	25.20	---- Not Found ----		
			303.91	1.32	---- Not Found ----		
			400.65	11.40	---- Not Found ----		
		% Abundances Found =		1.38			
AS-76	26.32H	114.84	559.10*	44.70	1.683E+27	17.98	Decay,Abun.
			563.23	1.17	---- Not Found ----		
			571.30	0.14	---- Not Found ----		
			657.03	6.10	---- Not Found ----		
			665.31	0.39	---- Not Found ----		
			740.12	0.12	---- Not Found ----		
			771.76	0.12	---- Not Found ----		
			867.63	0.12	---- Not Found ----		
			1129.07	0.14	---- Not Found ----		
			1212.72	1.63	---- Not Found ----		
			1216.02	3.04	---- Not Found ----		
			1220.52	1.39	---- Not Found ----		
			1439.13	0.33	---- Not Found ----		
			1453.60	0.13	---- Not Found ----		
			1787.67	0.33	---- Not Found ----		
		% Abundances Found =		73.70			
KR-80	2.84H	1064.27	165.98	3.10	---- Not Found ----		Decay,Abun.
			196.32*	26.00	1.000E+35	46.18	
			362.23	2.25	---- Not Found ----		
			834.83	13.00	---- Not Found ----		
			985.78	1.31	---- Not Found ----		
			1141.33	1.28	---- Not Found ----		
			1179.51	1.00	---- Not Found ----		
			1250.67	1.12	---- Not Found ----		
			1369.50	1.40	---- Not Found ----		
			1518.39	2.15	---- Not Found ----		
			1529.77	10.90	---- Not Found ----		
			2029.84	4.53	---- Not Found ----		
			2035.41	3.74	---- Not Found ----		
		% Abundances Found =		36.18			
MO-99	66.02H	45.78	140.51	3.80	1.857E+07	20.80	Decay,Abun.
			181.06	6.20	---- Not Found ----		
			366.43	1.37	---- Not Found ----		
			739.58*	12.80	---- Not Found ----		
			778.00	4.50	---- Not Found ----		
		% Abundances Found =		13.25			

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
TC-99M	6.02H	502.00	140.50*	89.07	1.000E+35	20.00	Decay
		% Abundances Found =		100.00			
XE-129M	8.89D	14.17	196.56*	4.74	2.862E-03	46.18	Decay
		% Abundances Found =		100.00			
I-134	52.60M	3447.74	135.40	3.76	---- Not Found ----		Decay,Abun.
			235.47	1.98	---- Not Found ----		
			405.45	7.30	---- Not Found ----		
			540.83	7.80	---- Not Found ----		
			595.36	11.40	1.000E+35	46.10	
			621.79	10.60	---- Not Found ----		
			677.34	8.50	---- Not Found ----		
			766.68	4.10	---- Not Found ----		
			847.03	95.41	---- Not Found ----		
			857.29	6.96	---- Not Found ----		
			884.09*	65.30	---- Not Found ----		
			947.86	4.04	---- Not Found ----		
			1072.55	15.30	---- Not Found ----		
			1136.16	9.70	---- Not Found ----		
			1613.80	4.36	---- Not Found ----		
			1806.84	5.70	---- Not Found ----		
		% Abundances Found =		4.35			
CS-136	13.16D	9.57	66.91	12.50	2.881E-04	35.29	Abun.
			86.29	6.30	---- Not Found ----		
			153.22	7.46	---- Not Found ----		
			163.89	4.61	---- Not Found ----		
			176.55	13.56	---- Not Found ----		
			273.65	12.66	---- Not Found ----		
			340.57	48.50	---- Not Found ----		
			818.50*	99.70	---- Not Found ----		
			1048.07	79.60	---- Not Found ----		
			1235.34	19.70	---- Not Found ----		
		% Abundances Found =		4.10			
CS-138	32.20M	5632.03	138.10	1.49	1.000E+35	20.00	Decay,Abun.
			227.76	1.51	---- Not Found ----		
			408.98	4.66	---- Not Found ----		
			462.79	30.70	---- Not Found ----		
			546.94	10.80	---- Not Found ----		
			871.80	5.11	---- Not Found ----		
			1009.78	29.80	---- Not Found ----		
			1147.22	1.24	---- Not Found ----		
			1343.59	1.14	---- Not Found ----		
			1435.86*	76.30	---- Not Found ----		
		% Abundances Found =		0.92			
TA-182	114.74D	1.10	67.75	42.30	2.397E-07	35.29	Abun.
			100.10	14.10	---- Not Found ----		
			1189.05	16.30	---- Not Found ----		
			1221.42*	27.10	---- Not Found ----		

Sample ID : EF1-52410-5D Acquisition date : 27-SEP-2010 11:20:51

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity 1-Sigma (uCi/cc)	%Error	Rejected by
TA-182	114.74D	1.10	1230.97	11.50	----- Not Found -----		Abun.
		% Abundances Found =		30.01			

Flag: "*" = Keyline

Sample ID : EF1-52410-5D Acquisition date : 27-SEP-2010 11:20:51

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	67.05	71	121	2.16	133.84	126	14	2.61E-02	35.3	1.49E+00	T
0	139.74	74	56	1.48	279.11	275	8	2.76E-02	20.9	6.39E+00	T
0	198.02	49	114	1.00	395.60	390	12	1.80E-02	46.2	6.60E+00	T
0	511.39	218	82	2.17	1021.91	1014	20	8.08E-02	12.3	4.08E+00	T
0	558.82	95	41	1.69	1116.71	1109	15	3.51E-02	18.0	4.68E+00	T
0	596.33	24	27	0.97	1191.68	1184	11	9.04E-03	46.1	4.56E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 27-SEP-2010 12:13:58.13

Sample ID : EF1-52410-5D

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	26.	477.59	2.5941E-07
F-18	0.	511.00	Half-Life too short
NA-22	17.	1274.54	8.7936E-09
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	20.	889.25	2.0259E-08
CR-51	47.	320.08	1.3971E-06
MN-54	14.	834.83	7.5691E-09
CO-56	16.	1238.25	3.5153E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	0.	158.38	Half-Life too short
CO-57	40.	122.06	8.9270E-09
CO-58	11.	810.76	1.7482E-08
FE-59	19.	1099.22	9.8049E-08
CO-60	16.	1332.49	8.4472E-09
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	17.	1115.52	2.1120E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	64.	136.00	2.2254E-08
AS-76	0.	559.10	Half-Life too short
BR-82	0.	776.49	Half-Life too short
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	79.	513.99	2.1520E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	79.	513.99	3.5034E-08
RB-86	18.	1076.63	9.2164E-06
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	0.	1836.01	1.6392E-08
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	17.	1204.90	1.1541E-05
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Sample ID : EF1-52410-5D Acquisition date : 27-SEP-2010 11:28:51

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
SR-93	0.	590.28	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	25.	702.63	6.3449E-09
NB-95	19.	765.79	7.4077E-08
NB-95M	0.	235.69	Half-Life too short
ZR-95	19.	756.72	4.2488E-08
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	0.	739.58	Half-Life too short
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	26.	497.08	5.5376E-08
TC-104	0.	357.99	Half-Life too short
RH-105	0.	318.90	Half-Life too short
RU-105	0.	724.50	Half-Life too short
RU-106	30.	621.84	8.1802E-08
CD-109	64.	88.03	3.6736E-07
AG-110M	14.	937.48	2.6141E-08
SN-113	47.	391.69	2.0688E-08
SN-117M	75.	158.56	4.5757E-06
SB-122	0.	563.93	Half-Life too short
SB-124	30.	602.71	2.7036E-08
SB-125	42.	427.89	2.3095E-08
TE-125M	59.	109.28	1.2142E-05
TE-127	0.	417.90	Half-Life too short
TE-127M	35.	57.60	3.7965E-05
XE-127	60.	202.84	9.5255E-08
TE-129	0.	459.60	Half-Life too short
TE-129M	23.	695.88	2.4710E-06
XE-129M	0.	196.56	Half-Life too short
I-130	0.	536.09	Half-Life too short
BA-131	0.	123.80	Half-Life too short
I-131	0.	364.48	Half-Life too short
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	0.	163.93	Half-Life too short
I-132	0.	667.69	Half-Life too short
TE-132	0.	228.16	Half-Life too short
BA-133	52.	302.84	3.4561E-08
BA-133M	0.	276.09	Half-Life too short
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	0.	81.00	Half-Life too short
XE-133M	0.	233.22	Half-Life too short
CS-134	33.	604.70	7.4529E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Sample ID : EF1-52410-5D Acquisition date : 27-SEP-2010 11:20:51

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-136	31.	818.50	6.1440E-06
I-136	0.	1313.02	Half-Life too short
CS-137	10.	661.65	6.1453E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	64.	165.85	1.3910E-08
CS-139	0.	1283.23	Half-Life too short
BA-140	32.	537.32	2.2415E-05
LA-140	0.	1596.49	Half-Life too short
BA-141	0.	190.22	Half-Life too short
CE-141	59.	145.44	1.7942E-07
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	0.	293.26	Half-Life too short
CE-144	59.	133.54	7.7509E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	0.	91.10	Half-Life too short
PM-148M	36.	550.27	5.6500E-08
EU-152	45.	344.27	2.2628E-08
EU-154	17.	1004.76	4.1384E-08
EU-155	40.	105.31	3.6491E-08
EU-156	27.	646.29	2.6881E-05
HF-181	29.	482.03	5.2874E-08
TA-182	15.	1221.42	5.9708E-08
W-187	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
HG-203	64.	279.19	5.4497E-08
BI-207	31.	569.67	6.3380E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	0.	240.98	Half-Life too short
RA-226	75.	186.21	1.9635E-07
AC-228	43.	338.32	5.2511E-08
TH-228	41.	84.37	9.4870E-07
PA-234	0.	131.20	Half-Life too short
TH-234	48.	63.29	3.1563E-05
U-235	62.	143.76	5.8049E-08
NP-239	0.	106.13	Half-Life too short
AM-241	47.	59.54	1.4198E-07

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-102010 5D

Sample Location (Well Number): 5D

1. Representative sample collected. Date/Time 11-11-10 / 13:30

Sample collected by: CProffitt / CProffitt Date: 11-11-10
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: CProffitt / CProffitt Date: 11-11-10
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: S. R. Dyer / [signature] Date: 11-12-10
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert C Huyck / [signature] Date: 11-16-10
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-102010-5D	
2 . Date Sampled	11/11/2010	
3 . Time Sampled	13:30	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	11/14/2010	
2 . Time Sample Counted	05:24	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	8.9	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	2538.6	cpm
Net Spike Count Rate (cpm)	2529.7	cpm
H3 Spike Activity (dpm on count date)	6738.5	dpm
Counter Efficiency	0.3754	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	8.2	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.0	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.2	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{\text{(Bkg cpm)}}{\text{(Bkg min.)}} + \frac{\text{(Bkg cpm)}}{\text{(Smpl min.)}}}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}} = 1.32\text{E-}06 \text{ uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency x 2.22E6 uCi/ml x Sample Volume}} < \textbf{MDA}$$

NOTE: SAMPLE DISTILLED PRIOR TO COUNT

Technician _____ Date 11-14-10

Reviewed By: _____ Date 11/15/10

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-102010-5ID

Sample Location (Well Number): 5ID

1. Representative sample collected. Date/Time 10/20/10 / 14:55

Sample collected by: Thomas Nowl / _____ Date: 11/11/10
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: C Proffitt / _____ Date: 12-9-10
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: C Proffitt / _____ Date: _____
Fermi 2 RP Printed Name Signature

Sample number: EFT 102010 SD

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: C Proffitt / C Proffitt Date: 12-9-10
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert C Gregori Date: 12-27-10
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EFT-102010-S/D

Sample End Time: 21-OCT-2010 14:55:00.00

REMARKS

PERFORMED BY:
SIGNATURE

REVIEWED BY:
SIGNATURE/DATE

Sample ID : EFT-102810 S/D Acquisition date : 9-DEC-2010 11:40:43

Fermi 2 Radiation Protection Gamma Spectroscopy Report

Sample Parameters

Sample ID Number: EFT-102810-S/D
Sample collection start date: 21-OCT-2010 14:55:00.00
Sample collection end date : 21-OCT-2010 14:55:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.00000E+03 cc
Sample geometry : MELL Operator: CLP

Acquisition Parameters

Detector number : DET 4 Acquire date : 9-DEC-2010 11:40:43.20
Preset live time : 0 00:45:00.00 Elapsed live time : 0 00:45:00.00
Elapsed real time : 0 00:45:00.59 Percent dead time : 0.03 %

Calibration Parameters

Detector number : DET 4 Yearly cal date : 23-JUN-2010 12:20:00.00
Kev/channel : 5.00152E-01 Zero offset: 9.56468E-02
Daily cal date : 9-DEC-2010 10:08:55.12

Peak Search Parameters

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

Nuclide Identification Parameters

Energy tolerance : 1.75000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : daomaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	295.03	59	79	1.20	589.75	584	13	2.18E-02	33.7	
2	0	351.88	99	43	1.40	703.14	697	14	3.67E-02	17.2	
3	0	511.42	164	56	1.87	1022.27	1013	19	6.06E-02	13.5	
4	0	609.20	123	27	1.58	1217.93	1212	15	4.56E-02	12.8	
5	0	1238.31	23	6	1.65	2475.57	2468	12	8.58E-03	29.0	
6	1	1460.83	19	25	2.76	2920.47	2908	21	7.00E-03	72.8	3.31E+00
7	1	1462.07	61	15	2.90	2922.96	2908	21	2.25E-02	19.4	

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	295.09	59	79	1.28	589.75	584	13	33.7		Pb-214
0	351.80	99	43	1.48	703.14	697	14	17.2		Pb-214
0	511.42	164	56	1.07	1022.27	1013	19	13.5		ANN Peak.
0	609.28	123	27	1.58	1217.93	1212	15	12.8		Bi-214
0	1238.31	23	6	1.65	2475.57	2460	12	39.0		Bi-214
1	1460.83	19	25	2.76	2920.47	2908	21	72.8	3.31E+00	K-40
1	1462.07	61	15	2.90	2922.96	2908	21	19.4		

12-27-10

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	19	10.67*	2.501E+00	7.006E-00	7.006E-00	72.04

Flag: "*" = Keyline

Total number of lines in spectrum	7	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	7	100.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+09Y	1.00	7.006E-00	7.006E-00	5.161E-00	72.34	
	Total Activity :		7.006E-00	7.006E-00			
	Grand Total Activity :		7.006E 00	7.006E-00			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Nuclide	Half-life	Half-Life Ratio	Energy/	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected By
F-18	109.74M	641.43	511.00*	193.46	1.000E+35	13.54	Decay
		% Abundances Found =		100.00			
CO-56	78.76D	0.62	846.75	99.96	---- Not Found ----		Abun.
			1037.82	14.03	---- Not Found ----		
			1238.25*	67.00	1.925E-08	23.01	
			1360.21	4.29	---- Not Found ----		
			1771.40	15.51	---- Not Found ----		
			2015.35	3.03	---- Not Found ----		
			2034.91	7.78	---- Not Found ----		
		% Abundances Found =		31.66			
BR-84	31.80M	2213.72	604.80	1.00	---- Not Found ----		Decay,Abun.
			736.50	1.31	---- Not Found ----		
			802.20	6.10	---- Not Found ----		
			881.50*	42.00	---- Not Found ----		
			1015.90	6.20	---- Not Found ----		
			1213.30	2.60	---- Not Found ----		
			1463.00	2.00	1.000E+35	19.36	
			1741.20	1.60	---- Not Found ----		
			1877.50	1.14	---- Not Found ----		
			1897.30	14.90	---- Not Found ----		
			2029.60	2.10	---- Not Found ----		
		% Abundances Found =		2.45			
RU-103	39.35D	1.24	497.08*	89.00	---- Not Found ----		Abun.
			610.33	5.60	1.152E-06	12.01	
		% Abundances Found =		5.92			
XE-135	9.11H	128.70	249.79*	89.90	---- Not Found ----		Decay,Abun.
			608.19	2.99	5.546E+32	12.01	
		% Abundances Found =		3.11			
BI-214	19.90M	3537.50	609.31*	46.30	1.000E+35	12.01	Decay
			768.36	5.04	---- Not Found ----		
			934.06	3.21	---- Not Found ----		
			1120.29	15.10	---- Not Found ----		
			1238.11	5.94	1.000E+35	29.01	
			1377.67	4.11	---- Not Found ----		
			1764.49	15.80	---- Not Found ----		
		% Abundances Found =		54.70	(Abn. Limit = 40.40%)		
PB-214	26.80M	2626.72	87.30	4.67	---- Not Found ----		Decay
			241.98	7.49	---- Not Found ----		
			295.21	19.20	1.000E+35	33.67	
			351.92*	37.20	1.060E+35	17.16	
			785.91	1.10	---- Not Found ----		
		% Abundances Found =		69.96	(Abn. Limit = 37.20%)		

Flag: "*" = Keyline

Sample ID : CFT 102010-5/T Acquisition date : 9-DEC-2010 11:40:43

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	295.08	59	79	1.28	589.75	584	13	2.13E-02	33.7	6.69E+00	T
0	351.00	99	43	1.48	703.14	697	14	3.67E-02	17.2	5.70E+00	T
0	511.42	164	56	1.87	1022.27	1013	19	6.06E-02	13.5	4.80E+00	T
0	609.28	123	27	1.50	1217.90	1212	15	4.56E-02	12.9	4.52E+00	T
0	1238.31	23	6	1.65	2475.57	2468	12	8.52E-03	29.0	2.74E+00	T
1	1462.07	61	15	2.90	2922.96	2900	21	2.25E-02	19.4	2.50E+00	T

Flags: "T" - Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 9-DEC-2010 12:32:40.71

Sample ID . EFT-1020010-5/D

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	24.	477.59	9.2460E-08
F-18	0.	511.00	Half-Life too short
NA-22	9.	1274.54	6.4167E-09
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.48	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	16.	889.25	9.7654E-09
CR-51	37.	320.08	1.8192E-07
MN-54	11.	834.83	5.7347E-09
CO-56	30.	1238.25	2.3558E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	57.	158.38	1.4821E-06
CO-57	30.	122.06	6.4513E-09
CO-58	16.	810.76	9.7371E-09
FE-59	17.	1099.22	2.8063E-08
CO-60	13.	1332.49	7.4735E-09
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	15.	1115.52	1.5960E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	53.	136.00	1.3003E-08
AS-76	0.	559.10	Half-Life too short
BR-82	0.	776.49	Half-Life too short
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	62.	513.99	1.8992E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	62.	513.99	1.3754E-08
RB-86	10.	1076.63	4.0443E-07
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	6.	1836.01	9.8678E-09
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.83	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	18.	1204.90	4.7493E-06
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
SR-93	0.	590.20	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	20.	702.63	5.7441E-09
NB-95	21.	765.79	1.6641E-08
NB-95M	0.	235.69	Half-Life too short
ZR-95	17.	756.72	1.7621E-08
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	0.	739.50	Half-Life too short
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	27.	497.08	1.4533E-08
TC-104	0.	357.99	Half-Life too short
RH-105	0.	318.98	Half-Life too short
RU-105	0.	724.50	Half-Life too short
RU-106	24.	621.94	6.3240E-08
CD-109	35.	88.03	2.4689E-07
AG-110M	13.	937.48	2.0465E-08
SN-113	35.	391.69	1.1440E-08
SN-117M	57.	158.56	7.9530E-08
SB-122	0.	563.93	Half-Life too short
SB-124	34.	602.71	1.1835E-08
SB-125	27.	427.89	1.7989E-08
TE-125M	50.	109.28	4.4610E-06
TE-127	0.	417.90	Half-Life too short
TE-127M	43.	57.60	2.5523E-05
XE-127	47.	202.84	1.9609E-08
TE-129	0.	459.60	Half-Life too short
TE-129M	27.	695.88	5.4056E-07
XE-129M	62.	196.56	5.6902E-06
I-130	0.	536.09	Half-Life too short
BA-131	28.	123.80	2.9319E-07
I-131	28.	364.48	4.0504E-07
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	57.	163.93	5.0383E-06
I-132	0.	667.69	Half-Life too short
TE-132	0.	228.16	Half-Life too short
BA-133	44.	302.84	3.1571E-08
BA-133M	0.	276.09	Half-Life too short
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	46.	81.00	2.0056E-05
XE-133M	0.	233.22	Half-Life too short
CS-134	25.	604.70	6.1206E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Sample ID : EFT 100310-5 2 Acquisition date : 9-DEC-2010 11:40:43

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-136	29.	818.50	1.0283E-07
I-136	0.	1313.02	Half-Life too short
CS-137	25.	661.65	7.0420E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	57.	165.85	8.9426E-09
CS-139	0.	1293.23	Half-Life too short
BA-140	21.	537.32	2.0555E-07
LA-140	0.	1596.49	Half-Life too short
BA-141	0.	190.22	Half-Life too short
CE-141	49.	145.44	3.1606E-08
LA 141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	0.	293.26	Half-Life too short
CE-144	47.	133.54	5.8097E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	40.	91.10	7.2409E-07
PM-148M	20.	550.27	1.1961E-08
EU-152	39.	344.27	2.1022E-08
EU-154	17.	1004.76	4.0534E-08
EU-155	43.	105.31	3.3796E-08
EU-156	23.	646.89	7.4059E-07
HF-181	22.	482.03	1.3086E-08
TA-182	23.	1221.42	4.4915E-09
W-187	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
HG-203	39.	279.19	1.3783E-08
SI-207	20.	569.67	5.1903E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	0.	240.98	Half-Life too short
RA-226	56.	186.21	1.7064E-07
AC-228	35.	338.32	4.6886E-08
TH-228	36.	84.37	8.3455E-07
PA-234	0.	131.20	Half-Life too short
TH-234	43.	63.29	3.2737E-06
U-235	50.	143.76	5.2571E-08
NP-239	0.	106.13	Half-Life too short
AM-241	26.	59.54	1.0730E-07

EFT-5D

2011

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-6711-5D

Sample Location (Well Number): 5D

1. Representative sample collected. Date/Time 6-7-11 / 1100

Sample collected by: C Proffitt / [signature] Date: 6-7-11
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: C Proffitt / [signature] Date: 6-9-11
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: Russ Bryant / [signature] Date: 6-10-11
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert Gray SR / [signature] Date: 6-13-11
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks [signature] 6-13-11

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-6711 5D	
2 . Date Sampled	06/07/2011	
3 . Time Sampled	11:00	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	06/10/2011	
2 . Time Sample Counted	10:59	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	5.7	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	2407.6	cpm
Net Spike Count Rate (cpm)	2401.9	cpm
H3 Spike Activity (dpm on count date)	6525.4	dpm
Counter Efficiency	0.3681	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	7.0	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	1.3	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	1.7	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{(\text{Bkg cpm})}{(\text{Bkg min.})} + \frac{(\text{Bkg cpm})}{(\text{Smpl min.})}}}{\text{Efficiency} \times 2.22\text{E6 dpm/uCi} \times \text{Sample Volume}} = 1.08\text{E-06 uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency} \times 2.22\text{E6 uCi/ml} \times \text{Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 6-10-11

Reviewed By: W Bowser Date 6-13-11

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-6711-5D

Sample Location (Well Number): 5D

1. Representative sample collected. Date/Time 6-7-11 / 11:00

Sample collected by: Thomas Mow / [signature] Date: 6-7-11
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: C Proffitt / [signature] Date: 6-9-11
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: C Proffitt / [signature] Date: 6-13-11
Fermi 2 RP Printed Name Signature

Sample number: EFT-6711-5D

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
. (Note disposition of unidentified peaks in "Remarks")

Performed by: C Proffitt / C Proffitt Date: 6-13-11
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert C Kryger / Robert C Kryger Date: 6-17-11
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks

DETROIT EDISON FERMI-2 POWER PLANT 13-JUN-2011 10:40:00.38

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EFT6711-5D

Sample End Time: 7-JUN-2011 11:00:00.00

REMARKS Natural

PERFORMED BY:

SIGNATURE

REVIEWED BY:

SIGNATURE/DATE

Sample ID : EFT6711-5D Acquisition date : 13-JUN-2011 09:55:05

****

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********

Sample ID Number: EFT6711-5D
Sample collection start date: 7-JUN-2011 11:00:00.00
Sample collection end date : 7-JUN-2011 11:00:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.00000E+03 cc
Sample geometry : MELL Operator: CLP

********** Acquisition Parameters **********

Detector number : DET 4 Acquire date : 13-JUN-2011 09:55:05.57
Preset live time : 0 00:45:00.00 Elapsed live time : 0 00:45:00.00
Elapsed real time : 0 00:45:00.61 Percent dead time : 0.03 %

********** Calibration Parameters **********

Detector number : DET 4 Yearly cal date : 23-JUN-2010 12:28:00.00
Kev/channel : 5.00022E-01 Zero offset: 1.96812E-01
Daily cal date : 13-JUN-2011 00:58:17.00

********** Peak Search Parameters **********

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********

Energy tolerance : 1.75000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	66.82	37	61	1.80	133.25	128	9	1.36E-02	42.3	
2	0	351.95	74	56	1.74	703.50	695	16	2.75E-02	24.1	
3	0	511.40	128	75	2.64	1022.41	1015	15	4.74E-02	17.2	
4	0	609.48	62	36	2.51	1218.58	1213	12	2.30E-02	23.1	
5	0	1460.93	87	17	2.01	2921.71	2913	17	3.23E-02	15.2	

Sample Title : EFT6711-5D
Decay Time = 5 22:55:05.57 Acquisition Time = 13-JUN-2011 09:55:05.57

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	66.02	37	61	1.08	133.25	128	9	42.3		Ge-N.-S cosmic
0	351.95	74	56	1.74	703.50	695	16	24.1		Pb-214
0	511.40	128	75	2.64	1022.41	1015	15	17.2		Ann. Peak
0	609.48	62	36	2.51	1218.58	1213	12	23.1		Bi-214
0	1460.93	07	17	2.01	2921.71	2913	17	15.2		K-40

f-6-13-11

Sample ID : EFT6711-5D Acquisition date : 13-JUN-2011 09:55:05

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	87	10.67*	2.501E+00	3.274E-07	3.274E-07	15.21

Flag: "*" = Keyline

Sample ID : EFT6711-5D Acquisition date : 13-JUN-2011 09:55:05

Total number of lines in spectrum	5	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	5	100.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	3.274E-07	3.274E-07	0.498E-07	15.21	
Total Activity :			3.274E-07	3.274E-07			
Grand Total Activity :			3.274E-07	3.274E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EFT6711-5D Acquisition date : 13-JUN-2011 09:55:05

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	78.35	511.00*	193.46	5.196E+15	17.19	Decay
	% Abundances Found =			100.00			
SE-75	119.78D	0.05	66.05	1.02	2.536E-06	42.27	Abun.
			96.73	3.41	----- Not Found -----		
			121.12	16.70	----- Not Found -----		
			136.00*	59.20	----- Not Found -----		
			198.60	1.45	----- Not Found -----		
			264.65	59.80	----- Not Found -----		
			279.53	25.20	----- Not Found -----		
			303.91	1.32	----- Not Found -----		
			400.65	11.40	----- Not Found -----		
	% Abundances Found =			0.57			
RU-103	39.35D	0.15	497.08*	89.00	----- Not Found -----		Abun.
			610.33	5.60	2.725E-07	23.15	
	% Abundances Found =			5.92			
XE-135	9.11H	15.73	249.79*	89.90	----- Not Found -----		Decay,Abun.
			608.19	2.89	2.581E-02	23.15	
	% Abundances Found =			3.11			
CS-136	13.16D	0.45	66.91	12.50	2.737E-07	42.27	Abun.
			86.29	6.30	----- Not Found -----		
			153.22	7.46	----- Not Found -----		
			163.89	4.61	----- Not Found -----		
			176.55	13.56	----- Not Found -----		
			273.65	12.66	----- Not Found -----		
			340.57	48.50	----- Not Found -----		
			818.50*	99.70	----- Not Found -----		
			1048.07	79.60	----- Not Found -----		
			1235.34	19.70	----- Not Found -----		
	% Abundances Found =			4.10			
TA-182	114.74D	0.05	67.75	42.30	6.124E-08	42.27	Abun.
			100.10	14.10	----- Not Found -----		
			1189.05	16.30	----- Not Found -----		
			1221.42*	27.10	----- Not Found -----		
			1230.97	11.50	----- Not Found -----		
	% Abundances Found =			38.01			
BI-214	19.90M	432.04	609.31*	46.30	1.000E+35	23.15	Decay
			768.36	5.04	----- Not Found -----		
			934.06	3.21	----- Not Found -----		
			1120.29	15.10	----- Not Found -----		
			1238.11	5.94	----- Not Found -----		
			1377.67	4.11	----- Not Found -----		
			1764.49	15.00	----- Not Found -----		
	% Abundances Found =			48.48	(Abn. Limit = 48.48%)		
PB-214	26.80M	320.81	87.30	4.67	----- Not Found -----		Decay
			241.98	7.49	----- Not Found -----		

Sample ID : EFT6711-5D Acquisition date : 13-JUN-2011 09:55:05

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
PB-214	26.80M	320.81	295.21	19.20	---- Not Found ----		Decay
			351.92*	37.20	1.000E+35	24.13	
			785.91	1.10	---- Not Found ----		
		% Abundances Found =		53.40	(Abn. Limit =	37.20%)	

Flag: "*" = Keyline

Sample ID : EFT6711-5D Acquisition date : 13-JUN-2011 09:55:05

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	66.82	37	61	1.00	133.25	128	9	1.36E-02	42.3	1.47E+00	T
0	351.95	74	56	1.74	703.50	695	16	2.75E-02	24.1	5.70E+00	T
0	511.40	128	75	2.64	1022.41	1015	15	4.74E-02	17.2	4.08E+00	T
0	609.40	62	36	2.51	1218.58	1213	12	2.30E-02	23.1	4.52E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 13-JUN-2011 10:40:12.72

Sample ID : EFT6711-5D

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	37.	477.59	6.4166E-08
F-18	0.	511.00	Half-Life too short
NA-22	10.	1274.54	6.3942E-09
NA-24	9.	1368.53	4.8308E-06
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	17.	889.25	6.9495E-09
CR-51	39.	320.08	6.3537E-08
MN-54	33.	834.83	8.5177E-09
CO-56	14.	1238.25	1.1385E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	60.	158.38	1.1600E-08
CO-57	51.	122.06	7.3657E-09
CO-58	15.	810.76	6.1377E-09
FE-59	17.	1099.22	1.4370E-08
CO-60	20.	1332.49	8.9975E-09
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	13.	1115.52	1.3490E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	50.	136.00	9.9132E-09
AS-76	40.	559.10	6.7102E-07
BR-82	17.	776.49	1.1759E-07
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	72.	513.99	2.0154E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	72.	513.99	9.2954E-09
RB-86	13.	1076.63	9.3779E-08
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	0.	1836.01	7.3502E-09
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	13.	1204.90	2.4830E-06
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Sample ID : EFT6711-5D Acquisition date : 13-JUN-2011 09:55:05

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
SR-93	0.	590.20	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	22.	702.63	5.9572E-09
NB-95	15.	765.79	6.2588E-09
NB-95M	56.	235.69	7.4352E-08
ZR-95	12.	756.72	9.4154E-09
NB-97	0.	657.90	Half-Life too short
ZR-97	24.	743.36	2.3727E-06
MO-99	16.	739.58	1.9375E-07
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	21.	497.08	6.1095E-09
TC-104	0.	357.99	Half-Life too short
RH-105	43.	318.90	4.0200E-07
RU-105	0.	724.50	Half-Life too short
RU-106	26.	621.84	6.0663E-08
CD-109	51.	88.03	2.7661E-07
AG-110M	18.	937.48	2.1198E-08
SN-113	20.	391.69	6.7724E-09
SN-117M	61.	158.56	9.1493E-09
SB-122	26.	563.93	3.7039E-08
SB-124	33.	602.71	7.0803E-09
SB-125	41.	427.89	2.1005E-08
TE-125M	36.	109.28	2.2912E-06
TE-127	0.	417.90	Half-Life too short
TE-127M	34.	57.60	1.7514E-05
XE-127	46.	202.84	8.6116E-09
TE-129	0.	459.60	Half-Life too short
TE-129M	32.	695.88	2.3780E-07
XE-129M	49.	196.56	1.7987E-07
I-130	0.	536.09	Half-Life too short
BA-131	61.	123.80	3.2502E-08
I-131	32.	364.48	1.0665E-08
TE-131	0.	149.72	Half-Life too short
TE-131M	15.	773.67	3.9540E-07
XE-131M	54.	163.93	3.9892E-07
I-132	0.	667.69	Half-Life too short
TE-132	62.	228.16	2.5069E-08
BA-133	43.	302.84	3.0981E-08
BA-133M	47.	276.09	4.0030E-07
I-133	27.	529.87	7.7482E-07
TE-133M	0.	912.58	Half-Life too short
XE-133	34.	81.00	6.2113E-08
XE-133M	45.	233.22	3.4435E-07
CS-134	28.	604.70	6.2603E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	34.	268.24	9.5263E-07
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Sample ID : EFT6711-5D Acquisition date : 13-JUN-2011 09:55:05

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-136	16.	818.50	8.3299E-09
I-136	0.	1313.02	Half-Life too short
CS-137	22.	661.65	6.5876E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	59.	165.85	7.3302E-09
CS-139	0.	1283.23	Half-Life too short
BA-140	22.	537.32	2.0220E-08
LA-140	5.	1596.49	6.8100E-08
BA-141	0.	190.22	Half-Life too short
CE-141	63.	145.44	1.4264E-08
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	53.	293.26	2.8999E-07
CE-144	45.	133.54	5.1153E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	38.	91.10	4.3306E-08
PM-148M	28.	550.27	6.7558E-09
EU-152	40.	344.27	2.1023E-08
EU-154	13.	1004.76	3.6039E-08
EU-155	44.	105.31	3.3654E-08
EU-156	16.	646.29	8.9407E-08
HF-181	32.	482.03	7.7302E-09
TA-182	9.	1221.42	2.2952E-08
W-187	23.	685.81	1.3069E-06
RE-188	45.	155.03	1.1847E-05
AU-199	60.	158.38	5.9033E-08
HG-203	50.	279.19	8.1177E-09
BI-207	28.	569.67	6.0712E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	64.	240.98	5.0076E-07
RA-226	49.	186.21	1.6054E-07
AC-228	43.	338.32	5.0355E-08
TH-228	46.	84.37	8.0833E-07
PA-234	0.	131.20	Half-Life too short
TH-234	35.	63.29	8.6942E-07
U-235	60.	143.76	5.7079E-08
NP-239	46.	106.13	1.7765E-07
AM-241	32.	59.54	1.1780E-07

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-101211-5D

Sample Location (Well Number): 5D

1. Representative sample collected. Date/Time 10-12-11 / 12:15

Sample collected by: Thomas Mowl Date: 10-12-11
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: C Brothitt / Date: 10-18-11
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: John McGowan Date: 11-1-11
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert C Bruger SR Date: 11-2-11
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks N/A

Tritium Activity Calculation

Sample Information

1 . Sample Location	5D	
2 . Date Sampled	10/12/2011	
3 . Time Sampled	12:15	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	11/01/2011	
2 . Time Sample Counted	13:30	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	8.1	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	2529.7	cpm
Net Spike Count Rate (cpm)	2521.6	cpm
H3 Spike Activity (dpm on count date)	6381.8	dpm
Counter Efficiency	0.3951	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	7.4	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.0	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.1	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{(\text{Bkg cpm})}{(\text{Bkg min.})} + \frac{(\text{Bkg cpm})}{(\text{Smpl min.})}}}{\text{Efficiency} \times 2.22\text{E6 dpm/uCi} \times \text{Sample Volume}} = 1.20\text{E-06 uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency} \times 2.22\text{E6 uCi/ml} \times \text{Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 11-1-11

Reviewed _____ Date NOV 01 2011

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT 101211-5D

Sample Location (Well Number): 5D

1. Representative sample collected. Date/Time 10-12-11 / 12:15

Sample collected by: Thomas McI [signature] Date: 10-12-11
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: C Proffitt / [signature] Date: 10-18-11
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: C Proffitt / [signature] Date: 10-28-11
Fermi 2 RP Printed Name Signature

Sample number: EFT-101211-5D

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: C Rothit / C Troffer Date: 10-28-11
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert E Grey SRI Date: 10-31-11
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks

#4

DETROIT EDISON FERMI-2 POWER PLANT 28-OCT-2011 16:27:00.23

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EFT101211-5D

Sample End Time: 12-OCT-2011 12:15:00.00

REMARKS No Plant Related Isotopes

PERFORMED BY:
Charles Ruffin
SIGNATURE

REVIEWED BY:
SIGNATURE/DATE

Sample ID : EFT101211-5D Acquisition date : 28-OCT-2011 15:41:57

****

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********

Sample ID Number: EFT101211-5D
Sample collection start date: 12-OCT-2011 12:15:00.00
Sample collection end date : 12-OCT-2011 12:15:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.00000E+03 cc
Sample geometry : M2LL Operator: CLP

********** Acquisition Parameters **********

Detector number : DET 4 Acquire date : 28-OCT-2011 15:41:57.28
Preset live time : 0 00:45:00.00 Elapsed live time : 0 00:45:00.00
Elapsed real time : 0 00:45:00.64 Percent dead time : 0.03 %

********** Calibration Parameters **********

Detector number : DET 4 Yearly cal date : 14-JUN-2011 14:50:56.41
Kev/channel : 5.00063E-01 Zero offset: -5.63736E-01
Daily cal date : 28-OCT-2011 06:54:31.91

********** Peak Search Parameters **********

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********

Energy tolerance : 1.75000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	511.40	161	63	1.62	1023.82	1015	10	5.96E-02	14.0	
2	0	1461.86	71	10	2.77	2924.63	2910	20	2.63E-02	16.1	

Sample Title : EFT101211-SD
Decay Time = 16 03:26:57.20

Acquisition Time = 28-OCT-2011 15:41:57.20

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	511.40	161	63	1.62	1023.82	1015	10	14.0		Anh Peak
0	1461.86	71	10	2.77	2924.63	2918	20	16.1		K-40

fh 10-31-11

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	71	10.67*	2.352E+00	2.832E-07	2.832E-07	16.12

Flag: "*" = Keyline

Sample ID : EFT101211-5D Acquisition date : 28-OCT-2011 15:41:57

Total number of lines in spectrum	2	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	2	100.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	2.832E-07	2.832E-07	0.456E-07	16.12	
	Total Activity :		2.832E-07	2.832E-07			
	Grand Total Activity :		2.832E-07	2.832E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EFT101211-5D Acquisition date : 29-OCT-2011 15:41:57

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	212.04	511.00*	193.46	1.000E+35	13.99	Decay

% Abundances Found = 100.00

Flag: "*" = Keyline

Sample ID : EFT101211-5D Acquisition date : 28-OCT-2011 15:41:57

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	511.40	161	63	1.62	1023.82	1015	10	5.96E-02	14.0	4.58E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 28-OCT-2011 16:27:04.23

Sample ID : EFT101211-5D

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	23.	477.59	6.3244E-08
F-18	0.	511.00	Half-Life too short
NA-22	17.	1274.54	8.6585E-09
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	22.	889.25	9.0237E-09
CR-51	39.	320.08	8.5850E-08
MN-54	26.	834.83	8.3491E-09
CO-56	14.	1238.25	1.3237E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	44.	158.38	3.3393E-08
CO-57	46.	122.06	7.6964E-09
CO-58	20.	810.76	8.0987E-09
FE-59	16.	1099.22	1.7566E-08
CO-60	9.	1332.49	6.8235E-09
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	12.	1115.52	1.4114E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	56.	136.00	1.1756E-08
AS-76	0.	559.10	Half-Life too short
BR-82	0.	776.49	Half-Life too short
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	67.	513.99	2.0804E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	67.	513.99	1.0680E-08
RB-86	13.	1076.63	1.4378E-07
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	6.	1836.01	7.2811E-09
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	14.	1204.90	3.0857E-06
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Sample ID : EFT101211-SD Acquisition date : 28-OCT-2011 15:41:57

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
SR-93	0.	590.20	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	19.	702.63	5.9724E-09
NB-95	16.	765.79	8.1199E-09
NB-95M	49.	235.69	5.1890E-07
ZR-95	19.	756.72	1.3775E-08
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	17.	739.58	2.7479E-06
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	28.	497.08	8.7291E-09
TC-104	0.	357.99	Half-Life too short
RH-105	0.	318.90	Half-Life too short
RU-105	0.	724.50	Half-Life too short
RU-106	20.	621.84	5.8984E-08
CD-109	40.	88.03	2.8473E-07
AG-110M	18.	937.48	2.2750E-08
SN-113	39.	391.69	1.0458E-08
SN-117M	43.	158.56	1.3817E-08
SB-122	30.	563.93	5.7451E-07
SB-124	38.	602.71	9.1111E-09
SB-125	35.	427.89	2.0948E-08
TE-125M	52.	109.28	3.2665E-06
TE-127	0.	417.90	Half-Life too short
TE-127M	30.	57.60	2.0436E-05
XE-127	52.	202.84	1.1532E-08
TE-129	0.	459.60	Half-Life too short
TE-129M	19.	695.88	2.4688E-07
XE-129M	63.	196.56	4.6576E-07
I-130	0.	536.09	Half-Life too short
BA-131	48.	123.80	5.6366E-08
I-131	36.	364.48	2.8603E-08
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	51.	163.93	7.3520E-07
I-132	0.	667.69	Half-Life too short
TE-132	35.	228.16	1.7555E-07
BA-133	33.	302.84	2.8892E-08
BA-133M	45.	276.09	3.1785E-05
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	40.	81.00	2.6665E-07
XE-133M	40.	233.22	8.4977E-06
CS-134	38.	604.70	7.6309E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Sample ID : EFT101211-5D Acquisition date : 28-OCT-2011 15:41:57

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-136	13.	818.50	1.3763E-08
I-136	0.	1313.02	Half-Life too short
CS-137	22.	661.65	7.0689E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	45.	165.85	7.1149E-09
CS-139	0.	1283.23	Half-Life too short
BA-140	37.	537.32	6.6165E-08
LA-140	7.	1596.49	5.7413E-06
BA-141	0.	190.22	Half-Life too short
CE-141	46.	145.44	1.6215E-08
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	0.	293.26	Half-Life too short
CE-144	53.	133.54	6.0295E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	29.	91.10	7.5282E-08
PM-148M	25.	550.27	8.0659E-09
EU-152	36.	344.27	2.1373E-08
EU-154	14.	1004.76	3.8363E-08
EU-155	36.	105.31	3.2588E-08
EU-156	19.	646.29	1.6464E-07
HF-181	25.	482.03	8.7543E-09
TA-182	10.	1221.42	2.7250E-08
W-187	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
AU-199	44.	158.38	5.0623E-07
HG-203	42.	279.19	9.0818E-09
BI-207	31.	569.67	6.7510E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	52.	240.98	3.3612E-06
RA-226	44.	186.21	1.6001E-07
AC-228	43.	338.32	5.3506E-08
TH-228	38.	84.37	8.5897E-07
PA-234	0.	131.20	Half-Life too short
TH-234	38.	63.29	1.2775E-06
U-235	44.	143.76	5.1938E-08
NP-239	42.	106.13	3.6301E-06
AM-241	30.	59.54	1.2694E-07

GEL LAB RESULTS

EFT-5D 2009

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : Detroit Edison - Fermi 1
Address : PO Box 44440
Detroit, Michigan 48244

Report Date: February 17, 2010

Contact: Mr. Tom Mow
Project: **Fermi 1 - PO# 4700246055**

Client Sample ID: EF1-5/D
Sample ID: 245517010
Matrix: Ground Water
Collect Date: 29-DEC-09 11:25
Receive Date: 25-JAN-10
Collector: Client

Project: ROIT00116
Client ID: ROIT001

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Rad Alpha Spec Analysis											
Alphaspec Pu, Liquid "As Received"											
Plutonium-238	U	0.00279	+/-0.151	0.459	1.00	pCi/L		JXD2 02/10/10	1301	949025	1
Plutonium-239/240	U	-0.0501	+/-0.148	0.425	1.00	pCi/L					
Plutonium-244		0.523	+/-0.389	0.386	1.00	pCi/L					
Alphaspec U, Liquid "As Received"											
Pct Uranium-235	U	-402				percent		MXE1 02/09/10	1349	947744	2
Uranium-233/234	U	0.0391	+/-0.158	0.376	1.00	pCi/L					
Uranium-235/236	U	0.0969	+/-0.190	0.291	1.00	pCi/L					
Uranium-238	U	-0.0188	+/-0.158	0.376	1.00	pCi/L					
Rad Gas Flow Proportional Counting											
GFPC, Gross A/B, liquid "As Received"											
Alpha	U	2.17	+/-2.37	3.68	5.00	pCi/L		DXF3 02/11/10	1942	945896	3
Beta		6.77	+/-2.29	2.65	5.00	pCi/L					
GFPC, Ra228, Liquid "As Received"											
Radium-228	U	-0.0664	+/-0.659	1.34	3.00	pCi/L		JXC5 02/01/10	0723	945895	4
GFPC, Sr89&Sr90, Liquid "As Received"											
Strontium-89	U	0.297	+/-1.07	1.99	2.00	pCi/L		JXR1 02/03/10	1029	946221	5
Strontium-90	U	-0.0921	+/-0.671	1.96	2.00	pCi/L					
Rad Radium-226											
Lucas Cell, Ra226, liquid "As Received"											
Radium-226		2.26	+/-0.467	0.306	1.00	pCi/L		KSD1 02/10/10	1440	948312	6

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	DOE EML HASL-300, Pu-11-RC Modified	
2	DOE EML HASL-300, U-02-RC Modified	
3	EPA 900.0	
4	EPA 904.0/SW846 9320 Modified	
5	EPA 905.0 Modified	
6	EPA 903.1 Modified	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Plutonium-242 Tracer	Alphaspec Pu, Liquid "As Received"			70.0	(15%-125%)

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : Detroit Edison - Fermi 1
Address : PO Box 44440
Detroit, Michigan 48244

Report Date: February 17, 2010

Contact: Mr. Tom Mow
Project: **Fermi 1 - PO# 4700246055**

Client Sample ID: EF1-5/D
Sample ID: 245517010

Project: ROIT00116
Client ID: ROIT001

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Uranium-232 Tracer		Alphaspec U, Liquid "As Received"						97.9			(15%-125%)
Barium-133 Tracer		GFPC, Ra228, Liquid "As Received"						78.9			(15%-125%)
Yttrium Carrier		GFPC, Sr89&Sr90, Liquid "As Received"						104			(25%-125%)
Strontium Carrier		GFPC, Sr89&Sr90, Liquid "As Received"						102			(25%-125%)

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : Detroit Edison - Fermi 1
Address : PO Box 44440
Detroit, Michigan 48244
Contact: Mr. Tom Mow
Project: Fermi 1 - PO# 4700246055

Report Date: December 30, 2010

Client Sample ID: EFT-102010-5/D
Sample ID: 268144005
Matrix: Water
Collect Date: 20-OCT-10 14:55
Receive Date: 06-DEC-10
Collector: Client

Project: ROIT00116
Client ID: ROIT001

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Rad Gas Flow Proportional Counting											
GFPC, Gross A/B, liquid "As Received"											
Alpha		3.53	+/-2.47	3.06	5.00	pCi/L		VXC2 12/27/10	1248	1059089	1
Beta		9.40	+/-2.71	3.67	5.00	pCi/L					

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 900.0/SW846 9310	

EFT-6D

2006

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-GD060706

Sample Location (Well Number): EFT-GD

1. Representative sample collected. Date/Time 06/07/06 / 1052

Sample collected by: Jay Slabach / Jay Main Slabach Collection Date: 06/02/06
Printed Name / Signature Signed 02/01/07

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Christopher Frilling / Christ A Frilling Date: 08/07/06
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: Russ Burgen / Date: 2-5-7
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: William V. Lipton / William V Lipton Date: 2/15/2007
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks No tritium detected. William V Lipton 8651 2/15/2007

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-6D060706	
2 . Date Sampled	06/07/2006	
3 . Time Sampled	10:52	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	02/02/2007	
2 . Time Sample Counted	10:00	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	7.4	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	3388.1	cpm
Net Spike Count Rate (cpm)	3380.7	cpm
H3 Spike Activity (dpm on count date)	8340.7	dpm
Counter Efficiency	0.4053	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	7.7	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.3	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{\text{(Bkg cpm)}}{\text{(Bkg min.)}} + \frac{\text{(Bkg cpm)}}{\text{(Smpl min.)}}}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}} = 1.12\text{E-}06 \text{ uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 2-5-7

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-6D060706

Sample Location (Well Number): EFT-6D

1. Representative sample collected. Date/Time 06/07/06 / 1052

Sample collected by: Jay Slaback / Jay Marie Slaback Collection Date: 06/07/06
Printed Name / Signature Signed 02/01/07

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Christopher Frelin / Christopher A Frelin Date: 08/02/06
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: K D KINDSY / K D Kindsy Date: 8-2-07
Fermi 2 RP Printed Name Signature

Sample number: EFT-GD060706

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
. (Note disposition of unidentified peaks in "Remarks")

Performed by: Chris Hubbard [signature] Date: 7-10-07
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: K D Lindsey / K D Lindsey Date: 11-14-07
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

DETROIT EDISON FERMI-2 POWER PLANT 10-JUL-2007 13:42:20.05

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EF1 EFT-6D060706

Sample End Time: 7-JUN-2006 10:52:00.00

REMARKS

PERFORMED BY:

SIGNATURE

REVIEWED BY:

8-21-07

SIGNATURE/DATE

Sample ID : EF1 EFT-6D060706 Acquisition date : 10-JUL-2007 13:12:14

****

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********
Sample ID Number: EF1 EFT-6D060706
Sample collection start date: 7-JUN-2006 10:52:00.00
Sample collection end date : 7-JUN-2006 10:52:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.000000E+03 CC
Sample geometry : M2LL Operator: CMH

********** Acquisition Parameters **********
Detector number : DET 4 Acquire date : 10-JUL-2007 13:12:14.74
Preset live time : 0 00:30:00.00 Elapsed live time : 0 00:30:00.00
Elapsed real time : 0 00:30:00.90 Percent dead time : 0.05 %

********** Calibration Parameters **********
Detector number : DET 4 Yearly cal date : 20-JUN-2007 12:16:46.16
Kev/channel : 4.93004E-01 Zero offset: -3.00949E-01
Daily cal date : 10-JUL-2007 07:47:29.07

********** Peak Search Parameters **********
Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********
Energy tolerance : 2.00000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	66.47	61	96	0.67	133.61	127	15	3.39E-02	36.9	Pu-240
2	0	511.28	161	36	2.00	1023.56	1015	20	8.97E-02	12.9	annihilation
3	0	558.52	80	17	1.53	1110.07	1111	14	4.42E-02	15.8	HwC
4	0	632.07	14	12	1.41	1265.21	1250	12	7.70E-03	56.2	???
5	0	1460.06	44	12	1.63	2923.30	2916	16	2.43E-02	23.3	K-40

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	66.47	61	96	0.67	133.61	127	15	36.9		
0	511.20	161	36	2.00	1023.56	1015	20	12.0		
0	558.52	00	17	1.53	1118.07	1111	14	15.0		
0	632.07	14	12	1.41	1265.21	1250	12	56.2		
0	1460.86	44	12	1.63	2923.30	2916	16	23.3		K-40

Sample ID : EF1 EFT-6D060706 Acquisition date : 10-JUL-2007 13:12:14

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/CC	Decay Corr uCi/CC	1-Sigma %Error
K-40	1460.81	44	10.67*	2.501E+00	2.464E-07	2.464E-07	23.29

Flag: "*" = Keyline

Sample ID : EF1 EFT-6D060706 Acquisition date : 10-JUL-2007 13:12:14

Total number of lines in spectrum	5	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	5	100.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/CC	Decay Corr uCi/CC	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	2.464E-07	2.464E-07	0.574E-07	23.29	
Total Activity :			2.464E-07	2.464E-07			
Grand Total Activity :			2.464E-07	2.464E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EF1 EFT-6D060706 Acquisition date : 10-JUL-2007 13:12:14

Nuclide	Half-life	>Half-Life Ratio	Energy	%Abund	Activity (uCi/CC)	1-Sigma %Error	Rejected by
F-18	109.74M	5223.94	511.00*	193.46	1.000E+35	11.95	Decay
		% Abundances Found =		100.00			
SE-75	119.78D	3.32	66.05	1.02	6.297E-05	36.90	Abun.
			96.73	3.41	----- Not Found -----		
			121.12	16.70	----- Not Found -----		
			136.00*	59.20	----- Not Found -----		
			198.60	1.45	----- Not Found -----		
			264.65	59.00	----- Not Found -----		
			279.53	25.20	----- Not Found -----		
			303.91	1.32	----- Not Found -----		
			400.65	11.40	----- Not Found -----		
		% Abundances Found =		0.57			
AS-76	26.32H	363.02	559.10*	44.70	1.000E+35	15.81	Decay,Abun.
			563.23	1.17	----- Not Found -----		
			571.30	0.14	----- Not Found -----		
			657.03	6.10	----- Not Found -----		
			665.31	0.39	----- Not Found -----		
			740.12	0.12	----- Not Found -----		
			771.76	0.12	----- Not Found -----		
			867.63	0.12	----- Not Found -----		
			1129.87	0.14	----- Not Found -----		
			1212.72	1.63	----- Not Found -----		
			1216.02	3.84	----- Not Found -----		
			1220.52	1.39	----- Not Found -----		
			1439.13	0.33	----- Not Found -----		
			1453.60	0.13	----- Not Found -----		
			1787.67	0.33	----- Not Found -----		
		% Abundances Found =		73.70			
I-132	2.30H	4154.17	505.90	5.03	----- Not Found -----		Decay,Abun.
			522.65	16.10	----- Not Found -----		
			630.22	13.70	1.000E+35	56.24	
			667.69*	98.70	----- Not Found -----		
			669.00	4.90	----- Not Found -----		
			671.60	5.20	----- Not Found -----		
			727.00	3.20	----- Not Found -----		
			772.61	76.20	----- Not Found -----		
			812.20	5.60	----- Not Found -----		
			954.55	18.10	----- Not Found -----		
			1136.03	2.96	----- Not Found -----		
			1390.57	7.10	----- Not Found -----		
		% Abundances Found =		5.34			
CS-136	13.16D	30.25	66.91	12.50	6.559E+02	36.90	Decay,Abun.
			86.29	6.30	----- Not Found -----		
			153.22	7.46	----- Not Found -----		
			163.89	4.61	----- Not Found -----		
			176.55	13.56	----- Not Found -----		
			273.65	12.66	----- Not Found -----		
			340.57	48.50	----- Not Found <-----		

Sample ID : EF1 EFT-6D060706 Acquisition date : 10-JUL-2007 13:12:14

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/CC)	1-Sigma %Error	Rejected by
CS-136	13.16D	30.25	818.50*	99.70	----- Not Found -----		Decay,Abun.
			1048.07	79.60	----- Not Found -----		
			1235.34	19.70	----- Not Found -----		
		% Abundances Found =		4.10			
TA-182	114.74D	3.47	67.75	42.30	1.600E-06	36.90	Abun.
			100.10	14.10	----- Not Found -----		
			1189.05	16.30	----- Not Found -----		
			1221.42*	27.10	----- Not Found -----		
			1230.97	11.50	----- Not Found -----		
		% Abundances Found =		30.01			
RE-188	16.98H	562.70	155.03*	15.00	----- Not Found -----		Decay,Abun.
			477.96	1.04	----- Not Found -----		
			633.10	1.26	1.000E+35	56.24	
		% Abundances Found =		7.20			

Flag: "*" = Keyline

Sample ID : EF1 EFT-6D060706 Acquisition date : 10-JUL-2007 13:12:14

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	66.47	61	96	0.67	133.61	127	15	3.39E-02	36.9	1.43E+00	T
0	511.28	161	36	2.00	1023.56	1015	20	8.97E-02	12.0	4.88E+00	T
0	558.52	80	17	1.53	1118.07	1111	14	4.42E-02	15.8	4.69E+00	T
0	632.07	14	12	1.41	1265.21	1250	12	7.70E-03	56.2	4.46E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 10-JUL-2007 13:42:23.06

Sample ID : EF1 EFT-6D060706

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/CC)
BE-7	25.	477.59	1.2976E-05
F-18	0.	511.00	Half-Life too short
NA-22	5.	1274.54	1.0050E-08
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	13.	889.25	2.3950E-07
CR-51	0.	320.08	Half-Life too short
MN-54	12.	834.83	1.9627E-08
CO-56	9.	1238.25	4.4653E-07
MN-56	0.	1810.69	Half-Life too short
NI-56	0.	158.38	Half-Life too short
CO-57	46.	122.06	2.8729E-08
CO-58	7.	810.76	3.1509E-07
FE-59	18.	1099.22	9.7615E-06
CO-60	10.	1332.49	1.1469E-08
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	8.	1115.52	4.9920E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	48.	136.00	1.4053E-07
AS-76	0.	559.10	Half-Life too short
BR-82	0.	776.49	Half-Life too short
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	52.	513.99	2.7983E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	52.	513.99	7.9656E-07
RB-86	0.	1076.63	Half-Life too short
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1392.39	Half-Life too short
Y-88	5.	1836.01	1.1934E-07
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	10.	1204.90	3.4390E-04
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Sample ID : EF1 EFT-6D060706 Acquisition date : 10-JUL-2007 13:12:14

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/CC)
SR-93	0.	590.20	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	11.	702.63	6.5449E-09
NB-95	0.	765.79	Half-Life too short
NB-95M	0.	235.69	Half-Life too short
ZR-95	10.	756.72	9.3456E-07
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	0.	739.50	Half-Life too short
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	0.	497.08	Half-Life too short
TC-104	0.	357.99	Half-Life too short
RH-105	0.	318.90	Half-Life too short
RU-105	0.	724.50	Half-Life too short
RU-106	22.	621.84	1.7710E-07
CD-109	30.	88.03	5.8317E-07
AG-110M	7.	937.49	6.3193E-08
SN-113	24.	391.69	1.1609E-07
SN-117M	0.	158.56	Half-Life too short
SB-122	0.	563.93	Half-Life too short
SB-124	20.	602.71	8.9879E-07
SB-125	24.	427.89	3.2159E-08
TE-125M	39.	109.28	3.9009E-04
TE-127	0.	417.90	Half-Life too short
TE-127M	27.	57.60	2.0652E-04
XE-127	0.	202.84	Half-Life too short
TE-129	0.	459.60	Half-Life too short
TE-129M 0	0.	695.88	Half-Life too short
XE-129M	0.	196.56	Half-Life too short
I-130	0.	536.09	Half-Life too short
BA-131	0.	123.80	Half-Life too short
I-131	0.	364.48	Half-Life too short
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	0.	163.93	Half-Life too short
I-132	0.	667.69	Half-Life too short
TE-132	0.	228.16	Half-Life too short
BA-133	29.	302.84	4.1704E-08
BA-133M	0.	276.09	Half-Life too short
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	0.	81.00	Half-Life too short
XE-133M	0.	233.22	Half-Life too short
CS-134	23.	604.70	1.2204E-08
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Sample ID : EF1 EFT-6D060706 Acquisition date : 10-JUL-2007 13:12:14

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/CC)
CS-136	0.	818.50	Half-Life too short
I-136	0.	1313.02	Half-Life too short
CS-137	10.	661.65	7.2416E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	44.	165.85	6.9579E-08
CS-139	0.	1283.23	Half-Life too short
BA-140	0.	537.32	Half-Life too short
LA-140	0.	1596.49	Half-Life too short
BA-141	0.	190.22	Half-Life too short
CE-141	0.	145.44	Half-Life too short
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	0.	293.26	Half-Life too short
CE-144	40.	133.54	2.0609E-07
PR-144	0.	1489.15	Half-Life too short
ND-147	0.	91.10	Half-Life too short
PM-148M	18.	550.27	6.0100E-06
EU-152	35.	344.27	3.1435E-08
EU-154	12.	1004.76	5.6929E-08
EU-156	0.	646.29	Half-Life too short
HF-181	20.	482.03	5.6654E-06
TA-182	0.	1221.42	3.4463E-07
W-187	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
HG-203	49.	279.19	4.1369E-06
BI-207	27.	569.67	9.0253E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	0.	240.98	Half-Life too short
RA-226	40.	186.2=	2.3969E-07
AC-228	42.	338.32	8.4227E-08
TH-228	34.	84.37	1.7233E-06
PA-234	0.	131.20	Half-Life too short
TH-234	0.	63.29	Half-Life too short
U-235	51.	143.76	7.9548E-08
NP-239	0.	106.13	Half-Life too short
AM-241	38.	59.54	1.9106E-07

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-6D060706

Sample Location (Well Number): EFT-6D

1. Representative sample collected. Date/Time 06/07/06 / 1052

Sample collected by: Jay Slaback / Jay Slaback Date: 06/07/06
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Christopher Frelling / Christopher A Frelling Date: 08/02/06
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: Abere / Andrew Abere Date: 8-5-06
Fermi 2 RP Printed Name Signature

Sample number: EFT-GD060706

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: Abere / Andrea Abere Date: 8-5-06
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: KD Lindsey / KD Lindsey Date: 2-25-08
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EF1-6D06/06 EF1

Sample End Time: 7-JUN-2006 10:52:00.00

REMARKS

PERFORMED BY:

SIGNATURE

REVIEWED BY:

SIGNATURE/DATE 2-25-08

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********
Sample ID Number: [illegible]
[illegible] 7-JUN-2006 10:[illegible]
Sample collection end date : 7-JUN-2006 10:52:00.00
Type of [illegible]
Sample quantity : 1.000000E+00 cc
Sample [illegible]

********** Acquisition Parameters **********
[illegible] number : DET 4 Acquire date : 5-AUG-2006 12:10:10.70
Preset live time : 0 00:30:00.00 Elapsed live time : 0 00:30:00.00
Elapsed real time : 0 00:30:01.09 Percent dead time : 0.05 %

********** Calibration Parameters **********
Detector number : DET 4 Yearly cal date : 26-APR-2006 11:50:00.00
Kev/channel : 5.00143E-01 Zero offset: -2.30456E-03
Daily [illegible]

********** Peak Search Parameters **********
Start [illegible] ; 1FWHM End [illegible]
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of [illegible]

********** Nuclide Identification Parameters **********
Energy [illegible] [illegible] : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : FF[illegible] Efficiencies at : Peak energy

****

Pk It: [illegible]

[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	356.43	69	42	1.07	[illegible]	[illegible]	17	1.62E-02	22.2	
4	0	1173.24	17	3	2.01	2279.91	2274	17	9.62E-03	31.1	
5	5	1459.66	36	2	2.53	2921.00	2914	17	2.00E-02	26.0	2.53E+00
6	5	1460.[illegible]	5	4	[illegible]	[illegible]	[illegible]	17	2.99E-02	9519.6	
7	5	1461.79	37	1	1.54	[illegible]	[illegible]	17	2.07E-02	24.1	

Post-MLD Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	84.86	55	77	1.46	131.20	124	14	36.1		Pb-212
0	511.14	175	35	2.63	1012.29	1013	22	11.3		Annihilation
0	[illegible]	11	22	1.37	1117.03	1110	13	20.8		Th-232
0	1139.51	17	3	2.81	2279.91	2274	12	31.1		B. 214
5	1409.66	36	2	2.53	2921.00	2914	17	36.8	2.53E+06	
5	1460.66	5	4	2.54	2923.20	2714	1[illegible]32.6			K-40
5	1461.79	37	3	1.50	2925.27	2914	17	24.1		

Nuclide type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sig. %Error
K-40	1460.81	5	10.67*	2.30AE-06	3.270E-08	3.276E-08	192.56

Flags: "*" = Keyline

Total number of line in spectrum	7	
Number of unidentified lines	2	
Number of lines positively identified by Hyp	5	71.43%

Nuclide type : natural

Nuclide	Id. Pr	Decay	Activity uCi/cc	Decay Corr. uCi/cc	Decay Corr. 1-Sigma Err	MDA uCi/cc	Flags
U 235	1.0.1+05Y	1.00	3.276E-08	3.276E-08	6.308E-08	192.5E-	
	Total Activity :		3.276E-08	3.276E-08			
	Grand Total Activity :		3.276E-08	3.276E-08			

Flags: "K" = Keyline not found
"M" = Manually accepted
"E" = Manually edited
"A" = Nuclide specific abn. limit

Nuclide	Half-life	Ratio	Energy	%Abund	C Density (uCi/cc)	1-Sigma MF	Error Rejected by
F-18	109.74m	775.44	511.00*	193.46	1.000E+35	11.33	Decay
		% Abundances Found =	100.00				
SE-75	119.78m						
			96.73	3.41	---	Not Found	---
			121.12	16.70	---	Not Found	---
			136.00*	59.20	---	Not Found	---
			198.60	1.45	---	Not Found	---
			264.65	59.80	---	Not Found	---
			279.53	25.20	---	Not Found	---
			303.91	1.32	---	Not Found	---
			400.65	11.40	---	Not Found	---
		% Abundances Found =		0.57			
AS-76	26.34H	53.86					
			559.10*	44.70	8.775E+00	28.04	Decay,Abun.
			563.23	1.17	---	Not Found	---
			571.30	0.14	---	Not Found	---
			657.03	6.10	---	Not Found	---
			665.31	0.39	---	Not Found	---
			748.12	0.12	---	Not Found	---
			771.74	0.12	---	Not Found	---
			867.63	0.12	---	Not Found	---
			1109.07	0.14	---	Not Found	---
			1212.72	1.63	---	Not Found	---
			1216.02	3.84	---	Not Found	---
			1228.52	1.39	---	Not Found	---
			1439.13	0.33	---	Not Found	---
			1453.60	0.13	---	Not Found	---
			1767.67	0.33	---	Not Found	---
		% Abundances Found =		73.70			
KR-88	2.84H	499.14					
			165.98	3.10	---	Not Found	---
			196.32*	26.00	---	Not Found	---
			362.23	2.25	---	Not Found	---
			834.83	13.00	---	Not Found	---
			985.78	1.31	---	Not Found	---
			1141.33	1.28	1.000E+35	31.00	Decay,Abun.
			1179.51	1.00	---	Not Found	---
			1250.67	1.12	---	Not Found	---
			1369.50	1.48	---	Not Found	---
			1518.39	2.15	---	Not Found	---
			1529.77	10.90	---	Not Found	---
			2029.84	4.53	---	Not Found	---
			2035.41	3.74	---	Not Found	---
		% Abundances Found =		1.78			
CS-136	13.16D	4.49					
			66.91	12.50	1.201E-05	36.15	Abun.
			86.29	6.30	---	Not Found	---
			153.22	7.46	---	Not Found	---
			163.89	4.61	---	Not Found	---
			176.55	13.56	---	Not Found	---
			273.65	12.66	---	Not Found	---

Sample ID : EF-2001-06 EM1 Acquisition date = 5-AUG-2001 12:16:1[illegible]

Nuclide	Half-life	Half Life Ratio	Energy	%Abund	Activity ± Sigma (pCi/...)	%Error	Rejected by
Cs-136	13.16d	4.19	340.57	40.[illegible]%	Not Found		Abun.
			818.50*	99.70	Not Found		
			1175.[illegible]	[illegible]	Not Found		
			1235.34	19.72	Not Found		
		% Abundances Found =		4.19			

Flags: "*" = Keyline

Unidentified Energy Lines
Sample ID : CFT-6D060700 CF1 Acquisition date : 0-AUG-2060 12:10:10

#	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	65.65	55	77	1.46	131.20	124	14	3.08E-02	36.1	1.24E+00	T
6	211.14	175	35	2.63	1022.29	1013	22	9.70E-02	11.3	4.49E+00	T
0	558.49	69	32	1.97	1117.03	1110	13	3.83E-02	20.8	4.31E+00	T
0	1139.51	17	3	2.81	2279.91	2274	12	9.62E-03	31.1	2.68E+00	T
8	1459.66	30	2	2.53	2921.00	2914	17	2.00E-02	26.8	2.31E+00	
5	1461.79	37	3	1.50	2925.27	2914	17	2.07E-02	24.1	2.31E+00	

Flags: "T" = Tentatively associated

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE 7	28.	477.59	1.8402E-07
F-18	0.	511.00	Half-Life too short
NA-22	15.	1274.54	1.3014E-08
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.12	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	15.	889.25	1.6854E-08
CR-51	39.	320.08	3.9655E-07
MN-54	8.	834.83	8.5819E-09
CO-56	17.	1238.25	3.2580E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	58.	158.38	7.7379E-06
CO-57	4[illegible]	122.06	1.3253E-08
CO-58	1[illegible]	810.76	1.7496E-08
F[illegible] 5[illegible]	[illegible].	1099.22	4.6405E-08
CO-60	12.	1332.49	1.1879E-08
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	10.	1115.52	2.8959E-08
ZN-69M	0.	438.63	Half-Life too short
[illegible] [illegible]	50.	136.00	2.2463E-08
[illegible] [illegible]	0.	559.10	Half-Life too short
BR 82	0.	776.[illegible]	Half-Life too short
[illegible] 82	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	806.[illegible]	Half-Life too short
KR 85	50.	513.99	2.9941E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	58.	513.99	6.4132E-06
RB-86	12.	1076.63	1.0681E-06
KR-87	0.	402.58	Half-Life too short
[illegible] 87M	0.	388.40	Half-Life too short
KR-88	0.	196.30	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	4.	1836.01	1.2938E-08
KR-89	0.	220.90	Half-Life too short
[illegible] 89	0.	1031.88	Half-Life too short
SR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	11.	1204.90	7.0353E-06
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Nuclide	Weighted Mean	Energy (keV)	MDA (uCi/cc)
[illegible]	0.	590.28	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	19.	702.63	9.1696E-09
NB-95	16.	765.79	3.0033E-08
NB-95M	0.	235.69	Half-Life too short
ZR-95	18.	756.72	3.3170E-08
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	0.	739.50	Half-Life too short
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	17.	497.08	2.2911E-08
TC-104	0.	357.99	Half-Life too short
RH-105	0.	318.90	Half-Life too short
RU-105	0.	724.50	Half-Life too short
RU-106	24.	621.84	1.0471E-07
CD-109	39.	88.03	4.4357E-07
AG-110M	17.	937.48	3.0738E-08
SN-113	27.	391.69	1.7697E-08
SN-117M	57.	158.56	2.1655E-07
SB-122	0.	563.93	Half-Life too short
SB-124	35.	602.71	2.1065E-08
SB-125	31.	427.89	3.1560E-08
TE-125M	28.	109.28	6.4542E-06
TE-127	0.	417.90	Half-Life too short
TE-127M	33.	57.60	3.4758E-05
XE-127	51.	202.84	4.0616E-08
TE-129	0.	459.60	Half-Life too short
TE-129M	23.	695.88	9.9941E-07
SB-129M	61.	196.96	2.0176E-05
I-130	0.	536.09	Half-Life too short
SB-131	46.	133.80	1.0743E-06
I-131	[illegible]	[illegible]	[illegible]
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	45.	163.93	1.3395E-05
I-132	0.	667.69	Half-Life too short
TE-132	0.	228.16	Half-Life too short
BA-133	59.	302.84	6.0485E-08
BA-133M	0.	276.09	Half-Life too short
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	0.	81.60	Half-Life too short
XE-133M	0.	233.22	Half-Life too short
CS-134	36.	604.70	1.1966E-08
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	[illegible]
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-136	17.	818.50	2.2912E-07
I-136	0.	1313.02	Half-Life too short
CS-137	22.	661.65	1.0045E-07
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	52.	165.85	1.4816E-08
CS-139	0.	1203.71	Half-Life too short
BA-140	28.	537.32	9.1699E-07
LA-140	0.	1596.49	Half-Life too short
BA-141	0.	190.22	Half-Life too short
CE-141	56.	145.44	6.8827E-08
LA-141	0.	1337.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	0.	293.26	Half-Life too short
CE-144	57.	133.54	1.0703E-07
PR-144	0.	1489.15	Half-Life too short
ND-147	31.	91.10	1.8925E-06
PM-148M	24.	550.27	2.4963E-08
EU-152	27.	344.27	2.9414E-08
EU-154	17.	1004.76	6.5270E-08
EU-156	16.	646.29	1.6242E-06
HF-181	24.	482.03	2.6496E-08
TA-182	13.	1221.42	5.9910E-08
W-187	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
HG-203	53.	279.19	3.8977E-08
BI-207	30.	569.67	1.0200E-08
TL-200	0.	503.14	Half-Life too short
PO-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-211	0.	351.92	Half-Life too short
RN-220	0.	549.98	Half-Life too short
PA-230	63.	106.21	2.9627E-07
AC-227	35.	338.32	7.6796E-08
TH-228	34.	84.37	1.3677E-06
PA-234	0.	131.20	Half-Life too short
TH-234	42.	63.29	6.8904E-06
U-235	75.	143.76	1.0036E-07
NP-237	0.	106.12	Half-Life too short
AM-241	27.	59.54	1.6558E-07

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-6D121306

Sample Location (Well Number): EFT-6D

1. Representative sample collected. Date/Time 12/13/06 / 1042

Sample collected by: J. Slaback / Joy Marie Slaback Date: 02/01/07
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: J. Southward / Jennifer Southward Date: 2/2/07
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: D. Howard / D Howard Date: APR 2 0 2007
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: K.J. Looby / K.J. Looby Date: 11-14-07
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-6D121306	
2 . Date Sampled	12/13/2006	
3 . Time Sampled	10:42	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	04/19/2007	
2 . Time Sample Counted	16:57	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	7.7	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	3407.6	cpm
Net Spike Count Rate (cpm)	3399.9	cpm
H3 Spike Activity (dpm on count date)	8243.8	dpm
Counter Efficiency	0.4124	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	7.1	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.0	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{\text{(Bkg cpm)}}{\text{(Bkg min.)}} + \frac{\text{(Bkg cpm)}}{\text{(Smpl min.)}}}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}} = 1.12\text{E-}06 \text{ uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency x 2.22E6 uCi/ml x Sample Volume}} < \textbf{MDA}$$

Technician JM / JWW

Date APR 20 2007

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-6D121306

Sample Location (Well Number): EFT-6D

1. Representative sample collected. Date/Time 12/13/06 / 1042

Sample collected by: J. Slaback / Jay Mark Slaback Date: 02/01/07
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: J. Southward / Jennifer Southward Date: 2/2/07
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: R.D. LINDSEY / R.D. Lindsey Date: 8.4.07
Fermi 2 RP Printed Name Signature

Sample number: EFT-6D121306

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
. (Note disposition of unidentified peaks in "Remarks")

Performed by: Chris Hubbard Chris Hubbard Date: 7-16-07
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: KD LINDSEY KD Lindsey Date: 8-8-07
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

DETROIT EDISON FERMI-2 POWER PLANT 16-JUL-2007 10:16:40.35

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EF1 EFT-6D121306

Sample End Time: 13-DEC-2006 10:42:00.00

REMARKS

PERFORMED BY:

SIGNATURE

REVIEWED BY:

8-8-07

SIGNATURE/DATE

Sample ID : EF1 EFT-6D121306 Acquisition date : 16-JUL-2007 09:46:36

****

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********

Sample ID Number: EF1 EFT-6D121306
Sample collection start date: 13-DEC-2006 10:42:00.00
Sample collection end date : 13-DEC-2006 10:42:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.00000E+03 CC
Sample geometry : M2LL Operator: CMH

********** Acquisition Parameters **********

Detector number : DET 4 Acquire date : 16-JUL-2007 09:46:36.66
Preset live time : 0 00:30:00.00 Elapsed live time : 0 00:30:00.00
Elapsed real time : 0 00:30:00.91 Percent dead time : 0.05 %

********** Calibration Parameters **********

Detector number : DET 4 Yearly cal date : 20-JUN-2007 12:16:46.16
Kev/channel : 4.99730E-01 Zero offset: -1.95000E-01
Daily cal date : 16-JUL-2007 00:37:10.01

********** Peak Search Parameters **********

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********

Energy tolerance : 2.00000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	510.91	167	42	2.28	1022.72	1014	17	9.26E-02	11.9	annihilation
2	0	558.74	30	11	0.96	1118.43	1111	15	4.00E-02	13.5	HWC
3	0	609.17	54	24	2.25	1219.33	1213	12	3.00E-02	22.7	Bi-214
4	0	1460.85	47	9	1.73	2923.44	2914	16	2.63E-02	19.8	K-40

Decay Time = 214 23:04:36.66 Acquisition Time = 16-JUL-2007 09:46:36.6
6

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	510.91	107	42	2.28	1022.72	1014	17	11.8		
0	558.74	88	11	0.96	1118.43	1111	15	13.5		
0	609.17	54	24	2.25	1219.33	1213	12	22.7		
0	1460.85	47	9	1.73	2923.44	2914	16	19.8		K-40

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/CC	Decay Corr uCi/CC	1-Sigma %Error
K-40	1460.81	47	10.67*	2.501E+00	2.663E-07	2.663E-07	19.82

Flag: "*" = Keyline

Sample ID : EF1 EFT-6D121306 Acquisition date : 16-JUL-2007 09:46:36

Total number of lines in spectrum	4	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	4	100.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/CC	Decay Corr uCi/CC	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	2.663E-07	2.663E-07	0.520E-07	19.02	
Total Activity :			2.663E-07	2.663E-07			
Grand Total Activity :			2.663E-07	2.663E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EF1 EFT-6D121306 Acquisition date : 16-JUL-2007 09:46:36

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/CC)	1-Sigma %Error	Rejected by
F-18	109.74M	2020.85	511.00*	193.46	1.000E+35	11.04	Decay
		% Abundances Found =		100.00			
AS-76	26.32H	196.02	559.10*	44.70	1.000E+35	13.54	Decay,Abun.
			563.23	1.17	---- Not Found	----	
			571.30	0.14	---- Not Found	----	
			657.03	6.10	---- Not Found	----	
			665.31	0.39	---- Not Found	----	
			740.12	0.12	---- Not Found	----	
?			771.76	0.12	---- Not Found	----	
			867.63	0.12	---- Not Found	----	
			1129.87	0.14	---- Not Found	----	
			1212.72	1.63	---- Not Found	----	
			1216.02	3.04	---- Not Found	----	
			1220.52	1.39	---- Not Found	----	
			1439.13	0.33	---- Not Found	----	
			1453.60	0.13	---- Not Found	----	
			1787.67	0.33	---- Not Found	----	
		% Abundances Found =		73.70			
RU-103	39.35D	5.46	497.08*	89.00	---- Not Found	----	Abun.
			610.33	5.60	1.413E-05	22.68	
		% Abundances Found =		5.92			
XE-135	9.11H	566.34	249.79*	89.90	---- Not Found	----	Decay,Abun.
			608.19	2.89	1.000E+35	22.68	
		% Abundances Found =		3.11			
BI-214	19.90M	15555.76	609.31*	46.30	1.000E+35	22.68	Decay
			768.36	5.04	---- Not Found	----	
			934.06	3.21	---- Not Found	----	
			1120.29	15.10	---- Not Found	----	
			1238.11	5.94	---- Not Found	----	
			1377.67	4.11	---- Not Found	----	
			1764.49	15.00	---- Not Found	----	
		% Abundances Found =		48.40	(Abn. Limit = 48.40%)		

Flag: "*" = Keyline

Sample ID : EF1 EFT-6D121306 Acquisition date : 16-JUL-2007 09:46:36

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	510.91	167	42	2.28	1022.72	1014	17	9.26E-02	11.8	4.88E+00	T
0	558.74	88	11	0.96	1118.43	1111	15	4.88E-02	13.5	4.68E+00	T
0	609.17	54	24	2.85	1219.33	1213	12	3.00E-02	22.7	4.52E+00	T

Flags: "T" = Tentatively associated

****
* Detroit Edison Fermi 2 MDA Report, Generated 16-JUL-2007 10:10:44.32 *
****
* Sample ID : EF1 EFT-6D121306 *
****

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/CC)
BE-7	13.	477.59	9.0286E-07
F-18	0.	511.00	Half-Life too short
NA-22	9.	1274.54	1.0978E-08
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	13.	889.25	5.2743E-08
CR-51	40.	320.08	1.7957E-05
MN-54	10.	834.83	1.1071E-08
CO-56	16.	1238.25	1.1537E-07
MN-56	0.	1810.69	Half-Life too short
NI-56	0.	158.38	Half-Life too short
CO-57	44.	122.06	1.7587E-08
CO-58	6.	810.76	4.7695E-08
FE-59	11.	1099.22	4.6759E-07
CO-60	7.	1332.49	9.1155E-09
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	9.	1115.52	3.1191E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	41.	136.00	4.5590E-08
AS-76	0.	559.10	Half-Life too short
BR-82	0.	776.49	Half-Life too short
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	30.	513.99	2.3298E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	30.	513.99	9.6712E-08
RB-86	0.	1076.63	Half-Life too short
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	5.	1836.01	3.5958E-08
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	7.	1204.90	3.3533E-05
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Sample ID : EF1 EFT-6D121306 Acquisition date : 16-JUL-2007 09:46:36

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/CC)
SR-93	0.	590.20	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	14.	702.63	7.4328E-09
NB-95	11.	765.79	5.0454E-07
NB-95M	0.	235.69	Half-Life too short
ZR-95	9.	756.72	1.2237E-07
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	0.	739.50	Half-Life too short
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	29.	497.08	4.1590E-07
TC-104	0.	357.99	Half-Life too short
RH-105	0.	318.90	Half-Life too short
RU-105	0.	724.50	Half-Life too short
RU-106	15.	621.84	1.0533E-07
CD-109	43.	88.03	5.2327E-07
AG-110M	10.	937.48	4.3734E-08
SN-113	34.	391.69	4.5099E-08
SN-117M	0.	150.56	Half-Life too short
SB-122	0.	563.93	Half-Life too short
SB-124	27.	602.71	1.0868E-07
SB-125	23.	427.89	2.8291E-08
TE-125M	41.	109.28	4.4469E-05
TE-127	0.	417.90	Half-Life too short
TE-127M	29.	57.60	9.1640E-05
XE-127	42.	202.84	6.5771E-07
TE-129	0.	459.60	Half-Life too short
TE-129M	14.	695.88	1.8579E-05
XE-129M	0.	196.56	Half-Life too short
I-130	0.	536.09	Half-Life too short
BA-131	0.	123.80	Half-Life too short
I-131	0.	364.48	Half-Life too short
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	0.	163.93	Half-Life too short
I-132	0.	667.69	Half-Life too short
TE-132	0.	228.16	Half-Life too short
BA-133	34.	302.84	4.3300E-08
BA-133M	0.	276.09	Half-Life too short
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	0.	81.00	Half-Life too short
XE-133M	0.	233.22	Half-Life too short
CS-134	25.	604.70	1.0701E-08
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Sample ID : EF1 EFT-6D121306 Acquisition date : 16-JUL-2007 00:46:30

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/CC)
CS-136	0.	818.50	Half-Life too short
I-136	0.	1313.02	Half-Life too short
CS-137	23.	661.65	1.0272E-08
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	41.	165.85	2.6687E-08
CS-139	0.	1283.23	Half-Life too short
BA-140	0.	537.32	Half-Life too short
LA-140	0.	1596.49	Half-Life too short
BA-141	0.	190.32	Half-Life too short
CE-141	36.	145.44	1.4310E-06
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	0.	293.26	Half-Life too short
CE-144	47.	133.54	1.3009E-07
PR-144	0.	1489.15	Half-Life too short
ND-147	0.	91.10	Half-Life too short
PM-148M	32.	550.27	3.6007E-07
EU-152	24.	344.27	2.5807E-08
EU-154	10.	1004.76	4.8708E-08
EU-156	0.	646.29	Half-Life too short
HF-181	29.	482.03	3.3590E-07
TA-182	10.	1221.42	1.2766E-07
W-187	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
HG-203	32.	279.19	2.2460E-07
BI-207	22.	569.67	8.2230E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	0.	240.98	Half-Life too short
RA-226	41.	186.21	2.2261E-07
AC-228	30.	338.32	6.8307E-08
TH-228	32.	84.37	1.3960E-06
PA-234	0.	131.20	Half-Life too short
TH-234	45.	63.29	5.9608E-04
U-235	46.	143.76	7.5550E-08
NP-239	0.	106.13	Half-Life too short
AM-241	24.	59.54	1.5692E-07

EFT-6D

2007

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-6D7507

Sample Location (Well Number): EFT-6D

1. Representative sample collected. Date/Time 7/5/07 / 1615

Sample collected by: Jay Marie Slabach / Jay Marie Slabach Date: 12/10/2007
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: J. Southward / J Southward Date: 12/10/07
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR"

Performed by: [signature] / 12/14/07 12/14/07 Date: 12/14/07
Fermi 2 Chemistry Printed Name Signature

R. Burgess

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: KD Lindsay / KD Lindsay Date: 2-26-08
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	6D	
2 . Date Sampled	07/05/2007	
3 . Time Sampled	16:15	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	12/14/2007	
2 . Time Sample Counted	08:00	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	8.2	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	3189.3	cpm
Net Spike Count Rate (cpm)	3181.1	cpm
H3 Spike Activity (dpm on count date)	7944.9	dpm
Counter Efficiency	0.4004	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	7.8	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.0	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.1	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{(\text{Bkg cpm})}{(\text{Bkg min.})} + \frac{(\text{Bkg cpm})}{(\text{Smpl min.})}}}{\text{Efficiency} \times 2.22\text{E}6 \text{ dpm/uCi} \times \text{Sample Volume}} = 1.19\text{E-}06 \text{ uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency} \times 2.22\text{E}6 \text{ uCi/ml} \times \text{Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 12/14/07

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-6D7507

Sample Location (Well Number): EFT-6D

1. Representative sample collected. Date/Time 07/05/2007 / 1615

Sample collected by: J. Slaback / Jory Marie Slaback Date: 07/16/2007
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: J. Southward / Jennifer Southward Date: 7/16/2007
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: KD Lindsay / KD Lindsay Date: 8-8-07
Fermi 2 RP Printed Name Signature

Sample number: EFT-6D7507

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: Chris Hubbard [signature] Date: 7-18-07
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: KJ Lindsey / [signature] Date: 8-8-07
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

DETROIT EDISON FERMI-2 POWER PLANT 10 JUL-2007 08:26:50.15

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EF1 EFT-6D7507

Sample End Time: 5-JUL-2007 16:15:00.00

REMARKS

PERFORMED BY:

SIGNATURE

REVIEWED BY:

SIGNATURE/DATE 8-8-07

Sample ID : EF1 EFT-6D7507 Acquisition date : 10-JUL 2007 07:56:47

****

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********

Sample ID Number: EF1 EFT-6D7507
Sample collection start date: 5-JUL-2007 16:15:00.00
Sample collection end date : 5-JUL-2007 16:15:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.00000E+03 CC
Sample geometry : M2LL Operator: CMH

********** Acquisition Parameters **********

Detector number : DET 4 Acquire date : 10-JUL-2007 07:56:47.51
Preset live time : 0 00:30:00.00 Elapsed live time : 0 00:30:00.00
Elapsed real time : 0 00:30:00.90 Percent dead time : 0.05 %

********** Calibration Parameters **********

Detector number : DET 4 Yearly cal date : 20-JUN-2007 12:16:46.16
Kev/channel : 4.99749E-01 Zero offset: -1.94251E-01
Daily cal date : 10-JUL-2007 07:51:31.39

********** Peak Search Parameters **********

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********

Energy tolerance : 2.00000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	351.88	41	36	1.47	704.40	698	13	2.28E-02	33.9	Pb-214
2	0	511.91	145	82	3.18	1024.69	1015	27	8.05E-02	19.8	annihilation
3	0	559.09	72	27	1.71	1119.09	1113	15	4.01E-02	28.1	Hw C
4	0	609.53	36	5	1.32	1220.02	1215	11	2.02E-02	20.6	Bi-214
5	0	906.07	15	3	1.35	1813.30	1807	11	8.43E-03	33.3	Bi-214
6	0	1460.59	51	0	1.96	2922.90	2910	9	2.83E-02	14.0	K-40
7	0	1763.54	20	0	1.29	3529.05	3521	15	1.11E-02	22.4	Bi-214

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	351.08	41	36	1.47	704.40	699	13	33.9		
0	511.91	145	82	3.18	1024.68	1015	27	19.8		
0	559.09	72	27	1.71	1119.09	1113	15	20.1		
0	609.53	36	5	1.32	1220.02	1215	11	20.6		
0	906.07	15	3	1.35	1813.30	1807	11	33.3		
0	1460.59	51	0	1.96	2922.90	2918	9	14.0		K-40
0	1763.54	20	0	1.29	3529.05	3521	15	22.4		

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/CC	Decay Corr uCi/CC	1-Sigma %Error
K-40	1460.81	51	10.67%	2.502E+00	2.869E-07	2.869E-07	14.00

Flag: "*" = Keyline

Sample ID : EF1 EFT-6D7507 Acquisition date : 10-JUL-2007 07:56:47

Total number of lines in spectrum	7	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	7	100.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/CC	Decay Corr uCi/CC	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+09Y	1.00	2.869E-07	2.869E-07	0.402E-07	14.00	
	Total Activity :		2.869E-07	2.869E-07			
	Grand Total Activity :		2.869E-07	2.869E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/CC)	1-Sigma %Error	Rejected by
F-18	109.74M	166.18	511.00*	193.46	1.000E+35	19.77	Decay
	% Abundances Found = 100.00						
AS-76	26.32H	11.55	559.10*	44.70	1.552E-04	20.13	Decay,Abun.
			563.23	1.17	---- Not Found ----		
			571.30	0.14	---- Not Found ----		
			657.03	6.10	---- Not Found ----		
			665.31	0.39	---- Not Found ----		
			740.12	0.12	---- Not Found ----		
			771.76	0.12	---- Not Found ----		
			867.63	0.12	---- Not Found ----		
			1129.07	0.14	---- Not Found ----		
			1212.72	1.63	---- Not Found ----		
			1216.02	3.84	---- Not Found ----		
			1228.52	1.39	---- Not Found ----		
			1439.13	0.33	---- Not Found ----		
			1453.60	0.13	---- Not Found ----		
			1787.67	0.33	---- Not Found ----		
	% Abundances Found = 73.70						
KR-89	3.16M	5771.14	220.90*	20.00	---- Not Found ----		Decay,Abun.
			497.50	6.60	---- Not Found ----		
			576.96	5.60	---- Not Found ----		
			585.00	16.60	---- Not Found ----		
			867.00	5.90	---- Not Found ----		
			904.27	7.20	1.000E+35	33.34	
			1472.76	6.90	---- Not Found ----		
			1533.60	5.10	---- Not Found ----		
	% Abundances Found = 9.74						
RU-103	39.35D	0.32	497.08*	89.00	---- Not Found ----		Abun.
			610.33	5.60	2.692E-07	20.64	
	% Abundances Found = 5.92						
XE-135	9.11H	33.36	249.79*	89.90	---- Not Found ----		Decay,Abun.
			608.19	2.89	4.613E+03	20.64	
	% Abundances Found = 3.11						
PM-148M	41.30D	0.31	200.11	12.56	---- Not Found ----		Abun.
			414.07	18.66	---- Not Found ----		
			432.78	5.35	---- Not Found ----		
			501.26	6.75	---- Not Found ----		
			550.27*	94.90	---- Not Found ----		
			599.74	12.54	---- Not Found ----		
			611.26	5.48	2.722E-07	20.64	
			629.97	89.00	---- Not Found ----		
			725.70	32.80	---- Not Found ----		
			915.33	17.17	---- Not Found ----		
			1013.81	20.30	---- Not Found ----		
	% Abundances Found = 1.74						
BI-214	19.90M	916.42	609.31*	46.30	1.000E+35	20.64	Decay

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/CC)	1-Sigma %Error	Rejected by
BI-214	19.90M	916.42	768.36	5.04	---- Not Found ----		Decay
			934.06	3.21	---- Not Found ----		
			1120.29	15.10	---- Not Found ----		
			1238.11	5.94	---- Not Found ----		
			1377.67	4.11	---- Not Found ----		
			1764.49	15.00	1.000E+35	22.36	
		% Abundances Found =		65.03	(Abn. Limit = 40.40%)		
PB-214	26.80M	680.40	87.30	4.67	---- Not Found ----		Decay
			241.98	7.49	---- Not Found ----		
			295.21	19.20	---- Not Found ----		
			351.92*	37.20	1.000E+35	33.00	
			785.91	1.10	---- Not Found ----		
		% Abundances Found =		53.40	(Abn. Limit = 37.20%)		

Flag: "*" = Keyline

Sample ID : EF1 EFT-6D7507 Acquisition date : 10-JUL-2007 07:56:47

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	351.00	41	36	1.47	704.40	698	13	2.20E-02	33.9	5.70E+00	T
0	511.91	145	82	3.19	1024.68	1015	27	8.05E-02	19.8	4.89E+00	T
0	559.09	72	27	1.71	1119.09	1113	15	4.01E-02	20.1	4.68E+00	T
0	609.53	36	5	1.32	1220.02	1215	11	2.02E-02	20.6	4.52E+00	T
0	906.07	15	3	1.35	1013.30	1007	11	8.43E-03	33.3	3.23E+00	T
0	1763.54	20	0	1.29	3529.05	3521	15	1.11E-02	22.4	2.26E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 10-JUL-2007 00:26:54.00

Sample ID : EF1 EFT 607507

Minimum Detectable Activity Report

Nuclide	Bckgnd , Sum	Energy (keV)	MDA (uCi/CC)
BE-7	27.	477.59	9.0341E-08
F-18	0.	511.00	Half-Life too short
NA-22	4.	1274.54	6.9531E-09
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	14.	889.25	1.0089E-08
CR-51	40.	320.08	1.1435E-07
MN-54	13.	834.83	8.6794E-09
CO-56	11.	1238.25	1.6546E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	44.	158.38	3.2331E-08
CO-57	38.	122.06	9.7904E-09
CO-58	10.	810.76	8.2970E-09
FE-59	12.	1099.22	2.0451E-08
CO-60	8.	1332.49	9.1003E-09
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	12.	1115.52	1.9550E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	36.	136.00	1.3347E-08
AS-76	0.	559.10	Half-Life too short
BR-82	11.	776.49	3.4334E-06
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	56.	513.99	2.7040E-06
KR-85M	0.	151.19	Half-Life too short
SR-85	56.	513.99	1.3301E-08
RB-86	16.	1076.63	1.9705E-07
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	2.	1836.01	7.3927E-09
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.98	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	11.	1204.90	3.7745E-06
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/CC)
SR-93	0.	590.20	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	20.	702.63	8.4947E-09
NB-95	9.	765.79	8.6362E-09
NB-95M	38.	235.69	3.3923E-07
ZR-95	11.	756.72	1.4517E-08
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	8.	739.50	1.1390E-06
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	19.	497.09	9.0105E-09
TC-104	0.	357.99	Half-Life too short
RH-105	35.	318.90	1.5497E-05
RU-105	0.	724.50	Half-Life too short
RU-106	16.	621.84	7.4033E-08
CD-109	39.	88.03	3.7210E-07
AG-110M	13.	937.48	2.8250E-08
SN-113	23.	391.69	1.1361E-08
SN-117M	44.	158.56	1.6596E-08
SB-122	15.	563.93	2.4129E-07
SB-124	26.	602.71	1.0206E-08
SB-125	24.	427.89	2.4665E-08
TE-125M	27.	109.28	3.2958E-06
TE-127	0.	417.90	Half-Life too short
TE-127M	39.	57.60	2.9216E-05
XE-127	40.	202.84	1.3797E-08
TE-129	0.	459.60	Half-Life too short
TE-129M	12.	695.80	2.7087E-07
XE-129M	45.	196.56	4.3738E-07
I-130	0.	536.09	Half-Life too short
BA-131	47.	123.80	6.4452E-08
I-131	29.	364.48	2.7033E-08
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	47.	163.93	8.2790E-07
I-132	0.	667.69	Half-Life too short
TE-132	43.	228.16	1.3151E-07
BA-133	26.	302.84	3.6769E-08
BA-133M	32.	276.09	8.8355E-06
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.50	Half-Life too short
XE-133	35.	81.00	2.2922E-07
XE-133M	44.	233.22	4.2570E-06
CS-134	21.	604.70	8.2405E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/CC)
CS-136	10.	818.50	1.4622E-08
I-136	0.	1313.02	Half-Life too short
CS-137	20.	661.65	9.5955E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	55.	165.85	1.0996E-08
CS-139	0.	1283.23	Half-Life too short
BA-140	20.	537.32	5.8688E-08
LA-140	4.	1596.49	1.5557E-06
BA-141	0.	190.22	Half-Life too short
CE-141	51.	145.44	2.2468E-08
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	32.	293.26	1.0058E-05
CS-144	40.	133.54	7.4355E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	44.	91.10	1.0524E-07
PM-148M	15.	550.27	8.6488E-09
EU-152	28.	344.27	2.7142E-08
EU-154	10.	1004.76	4.7403E-08
EU-156	15.	646.29	1.7731E-07
HF-181	23.	482.03	1.1167E-08
TA-182	16.	1221.42	4.6056E-08
W-187	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
HG-203	35.	279.19	1.1503E-08
BI-207	24.	569.67	8.4876E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	46.	240.98	2.3362E-06
RA-226	46.	186.21	2.3356E-07
AC-228	24.	338.32	5.8186E-08
TH-228	39.	84.37	1.2454E-06
PA-234	0.	131.20	Half-Life too short
TH-234	29.	63.29	1.4484E-06
U-235	43.	143.76	7.3240E-08
NP-239	44.	106.13	1.8821E-06
AM-241	33.	59.54	1.8144E-07

EFT-6D

2008

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-6D 41708

Sample Location (Well Number): EFT-6D

1. Representative sample collected. Date/Time 4/17/08 / 1455

Sample collected by: Jay Marie Slabaugh / Jay Marie Slabaugh Date: 04/21/2008
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: J. Southward / J Southward Date: 4/21/08
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: Ross Bugay / Date: 4-22-08
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: KD Lindsey / KD Lindsey Date: 4-28-08
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-6D41708	
2 . Date Sampled	04/17/2008	
3 . Time Sampled	14:55	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	04/22/2008	
2 . Time Sample Counted	12:00	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	7.8	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	3023.2	cpm
Net Spike Count Rate (cpm)	3015.4	cpm
H3 Spike Activity (dpm on count date)	7787.0	dpm
Counter Efficiency	0.3872	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	9.2	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	1.4	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{\text{(Bkg cpm)}}{\text{(Bkg min.)}} + \frac{\text{(Bkg cpm)}}{\text{(Smpl min.)}}}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}} = 1.20\text{E-}06 \text{ uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency x 2.22E6 uCi/ml x Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 4.22.08

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-6D4/1708

Sample Location (Well Number): EFT-6D

1. Representative sample collected. Date/Time 4/17/08 / 1455

Sample collected by: Jay Marc Slabach / Jay Marc Slabach Date: 04/17/2008
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: J. Southward / J Southward Date: 4/21/08
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: J. Southward / J Southward Date: 4/21/08
Fermi 2 RP Printed Name Signature

Sample number: EFT-6D 41708

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
. (Note disposition of unidentified peaks in "Remarks")

Performed by: J. Southward / J Southward Date: 4/21/08
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: K.D. Lindsey / K D Lindsey Date: 4.24.08
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EFT-6D41708

Sample End Time: 17-APR-2008 14:55:00.00

REMARKS

PERFORMED BY:

J. Southward
SIGNATURE

REVIEWED BY:

K D Lindsey 4-24-08
SIGNATURE/DATE

Sample ID : EFT-6041708 Acquisition date : 21-APR-2000 14:59:07

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********
Sample ID Number: EFT-6041708
Sample collection start date: 17-APR-2000 14:55:00.00
Sample collection end date : 17-APR-2000 14:55:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.000000E+03 cc
Sample geometry : MELL Operator: JNS

********** Acquisition Parameters **********
Detector number : DET 4 Acquire date : 21-APR-2000 14:59:07.16
Preset live time : 0 00:30:00.00 Elapsed live time : 0 00:30:00.00
Elapsed real time : 0 00:30:01.01 Percent dead time : 0.05 %

********** Calibration Parameters **********
Detector number : DET 4 Yearly cal date : 20-JUN-2007 12:16:46.16
Kev/channel : 5.001736-01 Zero offset: -1.412536-01
Daily cal date : 21-APR-2000 06:22:11.02

********** Peak Search Parameters **********
Start channel : 100 End channel : 4096
Height sensitivity : 5.000000 Shape sensitivity : 10.000000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********
Energy tolerance : 2.000000 Half-life ratio : 10.000000
Abundance limit : 75.000000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy
****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	352.20	74	59	1.45	704.60	699	15	4.00E-03	25.5	
2	3	510.21	66	41	2.05	1020.33	1013	17	3.67E-03	26.0	3.03E+00
3	3	512.05	62	45	1.95	1024.00	1013	17	3.42E-03	27.1	
4	0	559.38	51	30	1.39	1118.64	1111	12	2.83E-03	25.7	
5	9	609.84	57	27	2.09	1219.52	1214	13	3.19E-03	23.0	
6	0	1461.20	50	4	2.17	2921.51	2914	14	2.80E-03	16.2	

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	352.28	74	59	1.45	704.60	699	15	25.2		B. 214
3	510.21	66	41	2.05	1020.33	1013	17	26.0	3.03E+00	
3	512.05	62	45	1.85	1024.00	1013	17	27.1		~~PB-210~~ > ANN1
									4-24-09	KR-85
0	559.38	51	30	1.39	1118.64	1111	12	25.7		NEW
0	609.04	57	27	2.00	1219.52	1214	12	23.8		B.214
0	1461.20	56	4	2.17	2921.51	2914	14	16.2		K-40

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	50	10.67*	2.501E+00	2.835E-07	2.835E-07	16.16

Nuclide Type: fission gas

Nuclide	Energy?	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
KR-85	513.99	62	0.43*	4.675E+00	4.411E-06	4.414E-06	27.10

Nuclide Type: activation

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
SR-85	513.99	62	99.27*	4.675E+00	1.911E-08	1.995E-08	27.10

Flag: "*" = Keyline

Sample ID : CFT-6D-41708 Acquisition date : 21-APR-2008 14:59:07

Total number of lines in spectrum	6	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	6	100.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	2.835E-07	2.835E-07	0.458E-07	16.16	
	Total Activity :		2.835E-07	2.835E-07			

Nuclide Type : fission gas

Nuclide	Hlife @ Decay>		Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
KR-85	10.72Y	1.00	4.411E-06	4.414E-06	1.196E-06	27.10	
	Total Activity :		4.411E-06	4.414E-06			

Nuclide Type : activation

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
SR-85	64.84D	1.04	1.911E-08	1.995E-08	0.540E-08	27.10	
	Total Activity :		1.911E-08	1.995E-08			

Grand Total Activity : 4.714E-06 4.718E-06

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EFT-GD4:708 Acquisition date : 21-APR-2008 14:59:07

Nuclide	Half-Life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	52.66	511.00*	193.46	7.462E+07	25.99	Decay
		% Abundances Found =		100.00			
AS-76	26.32H	3.66	559.10*	44.70	4.620E-07	25.66	Abun.
			563.23	1.17	---- Not Found ----		
			571.30	0.14	---- Not Found ----		
			657.03	6.10	---- Not Found ----		
			665.31	0.39	---- Not Found ----		
			740.13	0.12	---- Not Found ----		
			771.76	0.12	---- Not Found ----		
			867.63	0.12	---- Not Found ----		
			1189.07	0.14	---- Not Found ----		
			1212.72	1.63	---- Not Found ----		
			1216.02	3.84	---- Not Found ----		
			1228.52	1.39	---- Not Found ----		
			1439.13	0.33	---- Not Found ----		
			1453.60	0.13	---- Not Found ----		
			1757.67	0.33	---- Not Found ----		
		% Abundances Found =		73.70			
Y-92	3.54H	27.21	448.50	2.30	---- Not Found ----		Decay,Abun.
			561.10	2.40	1.052E+02	25.66	
			844.30	1.25	---- Not Found ----		
			934.46*	13.90	---- Not Found ----		
			1405.40	4.00	---- Not Found ----		
		% Abundances Found =		9.74			
RU-103	39.35D	0.10	497.00*	89.00	---- Not Found ----		Abun.
			610.33	5.60	3.660E-07	22.95	
		% Abundances Found =		5.92			
XE-135	9.11H	10.57	249.79*	89.90	---- Not Found ----		Decay,Abun.
			608.19	2.89	1.007E-03	22.95	
		% Abundances Found =		3.11			
PM-140M	41.30D	0.10	288.11	12.56	---- Not Found ----		Abun.
			414.07	18.66	---- Not Found ----		
			432.78	5.35	---- Not Found ----		
			501.26	6.75	---- Not Found ----		
			550.27*	94.90	---- Not Found ----		
			593.74	12.54	---- Not Found ----		
			611.26	5.48	3.728E-07	22.95	
			629.97	89.00	---- Not Found ----		
			723.70	32.00	---- Not Found ----		
			915.33	17.17	---- Not Found ----		
			1013.01	20.30	---- Not Found ----		
		% Abundances Found =		1.74			
BI-214	19.90M	290.41	609.31*	46.30	1.000E+35	22.96	Decay
			768.36	5.04	---- Not Found ----		
			934.06	3.21	---- Not Found ----		
			1120.29	15.10	---- Not Found ----		

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
BI-214	19.90M	298.41	1238.11	5.94	---- Not Found ----		Decay
			1377.67	4.11	---- Not Found ----		
			1764.49	15.80	---- Not Found ----		
		% Abundances Found =		48.48	(Abn. Limit = 45.40%)		
PB-214	26.80M	215.64	87.30	4.67	---- Not Found ----		Decay
			241.98	7.49	---- Not Found ----		
			295.21	19.20	---- Not Found ----		
			351.92*	37.20	1.000E-35	28.23	
			785.91	1.10	---- Not Found ----		
		% Abundances Found =		53.40	(Abn. Limit = 37.20%)		

Flags: "*" = Keyline

Sample ID : EFT-cD41700 Acquisition date : 21-APR-2008 14:39:07

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cps/Dac	%Err	%Eff	Flags
0	352.00	74	59	1.45	704.60	699	15	4.00E-02	35.2	5.70E+00	T
3	510.21	66	41	2.05	1020.33	1013	17	3.67E-02	26.0	4.88E+00	T
0	559.38	51	30	1.30	1116.64	1111	12	2.83E-02	25.7	4.60E+00	T
0	609.04	57	27	2.09	1219.52	1214	12	3.19E-02	23.0	4.52E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 21-APR-2003 13:29:15.00

Sample ID : EFT-6D41700

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	20.	477.59	7.1506E-08
F-18	0.	511.00	Half Life too short
NA-22	5.	1274.54	7.3000E-09
NA-24	10.	1368.53	8.4770E-07
MG-27	3.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	14.	889.25	9.4017E-09
CR-51	27.	320.08	7.7264E-08
MN-54	10.	834.83	7.6770E-09
CO-58	17.	1238.25	1.0506E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	49.	158.30	1.2660E-08
CO-57	51.	122.06	1.1035E-08
CO-58	10.	810.76	9.0397E-09
FE-59	17.	1099.22	2.0900E-08
CO-60	14.	1332.49	1.1316E-08
Cu-64	11.	1345.90	6.5605E-04
NI-65	0.	1481.84	Half-Life too short
ZN-65	7.	1115.52	1.5410E-08
ZN-69M	26.	438.63	1.0254E-06
SE-75	41.	136.00	1.3373E-08
AS-76	73.	559.10	3.8405E-07
BR-82	17.	776.49	7.0005E-08
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.58	Half-Life too short
BR-85	0.	902.41	Half-Life too short
KR-85M	0.	151.18	Half-Life too short
RB-86	10.	1076.63	1.1677E-07
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.48	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	5.	1836.01	9.1693E-09
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	282.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	12.	1204.90	3.5407E-06
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short
SR-93	0.	590.25	Half-Life too short
Y-93	51.	266.90	9.3287E-05

Nuclide	Bckgnd Sum.	Energy (keV)	MDA (uCi/cc)
NB-94	18.	702.63	8.0824E-09
NB-95	16.	765.79	9.0496E-09
NB-95M	41.	235.69	6.6757E-08
ZR-95	19.	756.72	1.3132E-08
NB-97	0.	657.90	Half-Life too short
ZR-97	12.	743.36	3.8651E-07
MO-99	10.	739.50	1.4629E-07
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	26.	497.08	9.6170E-09
TC-104	0.	357.99	Half-Life too short
RH-105	36.	318.90	2.6567E-07
RU-105	0.	724.50	Half-Life too short
RU-106	17.	621.84	7.5985E-08
CD-109	38.	88.03	3.6350E-07
AG-110M	13.	937.48	2.6942E-08
SN 113	28.	391.69	1.1835E-08
SN-117M	51.	158.56	1.1452E-08
SB-122	19.	563.93	2.9349E-08
SB-124	25.	602.71	9.1850E-09
SB-125	25.	427.89	2.5158E-08
TE-125M	27.	109.28	2.9434E-06
TE-127	0.	417.90	Half-Life too short
TE-127M	26.	57.60	2.2956E-05
XE-127	46.	202.84	1.2429E-08
TE-129	0.	459.60	Half-Life too short
TE-129M	26.	695.88	3.1390E-07
XE-129M	44.	196.56	2.1946E-07
I-130	10.	536.09	1.5654E-08
BA-131	39.	123.80	3.5603E-08
I-131	29.	364.48	1.2969E-08
TE-131	0.	149.72	Half-Life too short
TE-131M	13.	773.67	1.9021E-07
XE-131M	40.	163.93	4.6115E-07
I-132	0.	667.69	Half-Life too short
TE-132	46.	228.16	2.1441E-08
BA-133	33.	302.84	4.1096E-08
BA-133M	33.	276.09	2.2022E-07
I-133	12.	529.87	1.6655E-07
TE-133M	0.	912.58	Half-Life too short
XE-133	30.	81.00	6.7919E-08
XE-133M	39.	233.22	2.5967E-07
CS-134	23.	604.70	8.4967E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	39.	268.24	4.9262E-07
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short
CS-136	17.	818.50	1.1426E-08
I-136	0.	1313.02	Half-Life too short

Sample ID : EFT 0D41708 Acquisition date : 21-APR-2000 14:59:07

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-137	10.	661.65	7.0220E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1428.50	Half-Life too short
CE 139	39.	165.85	8.9616E-09
CS-139	0.	1283.23	Half-Life too short
BA-140	16.	537.32	3.3397E-08
LA-140	10.	1596.49	6.0409E-08
BA-141	0.	100.22	Half-Life too short
CE-141	44.	145.44	1.7406E-08
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	50.	293.26	1.5799E-07
CE 144	39.	133.54	7.1695E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	47.	91.10	6.3224E-08
PM-148M	15.	550.27	7.3593E-09
EU-152	30.	344.27	2.7964E-08
EU-154	9.	1004.76	4.4585E-08
EU-156	15.	646.29	1.2067E-07
HF-181	27.	482.03	1.0346E-08
TA-182	14.	1221.42	4.1507E-08
W-187	12.	685.89	3.7062E-07
RE-188	40.	155.03	2.6770E-06
HG-203	41.	279.19	1.0826E-08
BI-207	29.	569.67	9.1000E-09
TL-208	0.	583.14	Half-Life too short
PB-212	57.	238.63	1.0690E->5
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	66.	240.98	5.2572E-07
RA-226	52.	186.21	2.4737E-07
AC-228	42.	338.32	7.5233E-08
TH-228	29.	84.37	1.0664E-06
PA-234	0.	131.20	Half-Life too short
TH-234	46.	63.29	1.3086E-06
U-235	41.	143.76	7.1699E-08
NP-239	45.	106.13	1.4896E-07
AM-241	37.	59.54	1.9012E-07

EFT-6D

2009

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-6D 03 12 09

Sample Location (Well Number): EFT-6D

1. Representative sample collected. Date/Time 3-12-09 / 10:15

Sample collected by: Chris Ellison / Chris Ellison Date: 3-12-09
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Printed Name / Signature Date: 4-17-09

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: D. Howard / Date: 4.22.09
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: R. Burgess / Date: 4-22-09
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-6D031209	
2 . Date Sampled	03/12/2009	
3 . Time Sampled	10:15	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	04/21/2009	
2 . Time Sample Counted	10:50	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	7.5	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	2991.0	cpm
Net Spike Count Rate (cpm)	2983.5	cpm
H3 Spike Activity (dpm on count date)	7361.1	dpm
Counter Efficiency	0.4053	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	7.1	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.0	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{\text{(Bkg cpm)}}{\text{(Bkg min.)}} + \frac{\text{(Bkg cpm)}}{\text{(Smpl min.)}}}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}} = 1.12\text{E-}06 \text{ uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency x 2.22E6 uCi/ml x Sample Volume}} < \textbf{MDA}$$

Technician Jan Johnson Date 4.21.09

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-6D031209

Sample Location (Well Number): EFT-6D

1. Representative sample collected. Date/Time 3-12-09 / 10:15

Sample collected by: Chris Ellison / [signature] Date: 3-12-09
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Proffitt / [signature] Date: 4-17-09
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: Proffitt / [signature] Date: 4-21-09
Fermi 2 RP Printed Name Signature

Sample number: EFT-GD031209

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: [signature] / [signature] Date: 4.21.09
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: K.J. Lindsay / K.J. [signature] Date: 4-22-09
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

DETROIT EDISON FERMI-2 POWER PLANT 21-APR-2009 15:40:20.03

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EFT-GD031209

Sample End Time: 12-MAR-2009 10:15:00.00

REMARKS K40

PERFORMED BY:
Charles Groffman
SIGNATURE

REVIEWED BY:
KJ Landsey 4-22-09
SIGNATURE DATE

Sample ID : EFT-6D031209 Acquisition date : 21-APR-2009 15:10:16

****

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********

Sample ID Number: EFT-6D031209
Sample collection start date: 12-MAR-2009 10:15:00.00
Sample collection end date : 12-MAR-2009 10:15:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.000000E+03 cc
Sample geometry : MELL Operator: CLP

********** Acquisition Parameters **********

Detector number : DET 4 Acquire date : 21-APR-2009 15:10:16.61
Preset live time : 0 00:30:00.00 Elapsed live time : 0 00:30:00.00
Elapsed real time : 0 00:30:00.94 Percent dead time : 0.05 %

********** Calibration Parameters **********

Detector number : DET 4 Yearly cal date : 20-JUN-2008 12:00:00.00
Kev/channel : 4.99882E-01 Zero offset: 7.45979E-02
Daily cal date : 21-APR-2009 06:54:02.66

********** Peak Search Parameters **********

Start channel : 100 End channel : 4096
Height sensitivity : 5.000000 Shape sensitivity : 10.000000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********

Energy tolerance : 2.000000 Half-life ratio : 10.000000
Abundance limit : 75.000000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	510.77	99	37	1.68	1021.62	1014	16	5.49E-02	16.9	
2	0	1460.45	59	4	2.96	2921.34	2915	14	3.29E-02	14.7	

Sample Title : EFT-6D031209 Page : 1
Decay Time = 40 04:55:16.61 Acquisition Time = 21-APR-2009 15:10:16.6
1

Post-NID Peak Search Report

Ib	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	510.77	99	37	1.68	1021.62	1014	16	16.9		Ann. Peak
0	1460.45	59	4	2.96	2921.34	2915	14	14.7		K-40

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	50	10.67*	2.502E+00	3.330E-07	3.330E-07	14.65

Flag: "*" = Keyline

Sample ID : EFT-GD031209 Acquisition date : 21-APR-2009 15:10:16

Total number of lines in spectrum	2	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	2	100.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+09Y	1.00	3.330E-07	3.330E-07	0.489E-07	14.65	
	Total Activity :		3.330E-07	3.330E-07			
	Grand Total Activity :		3.330E-07	3.330E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EFT-6D031209 0 Acquisition date : 21-APR-2009 15:10:16

Nuclide	Half-Life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	527.70	511.00*	193.46	1.000E+35	16.92	Decay

% Abundances Found = 100.00

Flags: "*" = Keyline

Sample ID : EFT-6D031209) Acquisition date : 21-APR-2009 15:10:16

It	Energy	Area	Bkgnd	FWHM	Channel	Left Pw	Cts/Sec	%Err	%Eff	Flags
0	510.77	99	37	1.69	1021.62	1014 16	5.49E-02	16.9	4.88E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi ▒ MDA Report, Generated 21-APR-2009 15:40:24.07

Sample ID : EFT-6D031209

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	21.	477.59	1.1585E-07
F-18	0.	511.00	Half-Life too short
NA-22	0.	1274.54	9.2706E-09
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	11.	889.25	1.1736E-08
CR-51	32.	320.08	2.0576E-07
MN-54	11.	834.83	8.6897E-09
CO-56	0.	1238.25	1.9445E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	47.	158.38	7.5871E-07
CO-57	35.	122.06	1.0126E-08
CO-58	9.	810.76	1.0395E-08
FE-59	7.	1099.22	2.5916E-08
CO-60	6.	1332.49	8.1625E-09
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	0.	1115.52	1.7793E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	34.	136.00	1.5230E-08
AS-76	0.	559.10	Half-Life too short
BR-82	0.	776.49	Half-Life too short
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	35.	513.99	2.1841E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	35.	513.99	1.4439E-08
RB-86	5.	1076.63	3.4999E-07
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	4.	1836.01	1.1114E-08
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	5.	1204.90	3.7340E-06
Y-91M	0.	555.60	Half-Life too short

Y-92	0.	934.46	Half-Life too short

Sample ID : EFT-6D031209 Acquisition date : 21-APR-2009 15:10:16

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
SR-93	0.	590.20	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	16.	702.63	7.8166E-09
NB-95	19.	765.79	2.0120E-08
NB-95M	0.	235.69	Half-Life too short
ZR-95	13.	756.72	2.1190E-08
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	0.	739.50	Half-Life too short
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	23.	497.09	1.7235E-08
TC-104	0.	357.99	Half-Life too short
RH-105	0.	318.90	Half-Life too short
RU-105	0.	724.50	Half-Life too short
RU-106	13.	621.84	7.2023E-08
CD-109	32.	88.03	3.5381E-07
AG-110M	12.	937.40	2.9308E-08
SN-113	25.	391.69	1.3088E-08
SN-117M	49.	158.56	7.1018E-08
SB-122	0.	563.93	Half-Life too short
SB-124	25.	602.71	1.3954E-08
SB-125	24.	427.89	2.5183E-08
TE-125M	43.	109.28	5.6286E-06
TE-127	0.	417.90	Half-Life too short
TE-127M	15.	57.60	2.2301E-05
XE-127	33.	202.84	2.1157E-08
TE-129	0.	459.68	Half-Life too short
TE-129M	20.	695.88	5.9138E-07
XE-129M	36.	196.56	3.3904E-06
I-130	0.	536.09	Half-Life too short
BA-131	35.	123.88	2.8282E-07
I-131	23.	364.48	2.6217E-07
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	39.	163.93	3.8082E-06
I-132	0.	667.69	Half-Life too short
TE-132	0.	228.16	Half-Life too short
BA-133	31.	362.04	4.0307E-08
BA-133M	0.	276.09	Half-Life too short
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	19.	81.00	6.7242E-06
XE-133M	0.	233.22	Half-Life too short
CS-134	22.	604.70	8.7073E-09
I-134	0.	904.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	< Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short

Sample ID : EFT-6D031209 Acquisition date : 21-APR-2009 15:10:16

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CO-136	15.	818.50	7.2964E-08
I-136	0.	1313.02	Half-Life too short
CS-137	13.	661.65	7.8757E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	33.	165.85	1.0079E-08
CS-139	0.	1203.23	Half-Life too short
BA-140	22.	537.32	2.7061E-07
LA-140	0.	1596.49	Half-Life too short
BA-141	0.	190.22	Half-Life too short
CE-141	39.	145.44	3.5014E-08
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	0.	293.26	Half-Life too short
CE-144	33.	133.54	7.2969E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	33.	91.10	5.3115E-07
PM-148M	16.	550.27	1.3983E-08
EU-152	20.	344.27	2.7134E-06
EU-154	10.	1004.76	4.7336E-08
EU-155	31.	105.31	4.3690E-08
EU-156	11.	? 646<29	5.3962E-07
HF-181	18.	482.03	1.5550E-08
TA-182	7.	1221.42	3.8370E-08
W-187	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
HG-203	30.	279.19	1.6000E-08
BI-207	22.	569.67	8.1495E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	>351.92	Half-Life too short
RA-224	0.	240.98	Half-Life too short
RA-226	41.	186.21	2.2172E-07
AC-228	34.	338.32	6.8416E-08
TH-228	22.	84.37	9.9295E-07
PA-234	0.	131.20	Half-Life too short
TH-234	30.	63.29	3.2629E-06
U-235	39.	143.76	6.9661E-08
NP-239	0.	106.13	Half-Life too short
AM-241	17.	59.54	1.3570E-07

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-6D 03#709 QC

Sample Location (Well Number): EFT-6D

1. Representative sample collected. Date/Time 3-17-09 / 8:30

Sample collected by: Chris Ellison / [signature] Date: 3-17-09
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Griffith / [signature] Date: 4-17-09
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: D. Howard / [signature] Date: 4-22-09
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: R. Burt [signature] Date: 4.22-09
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-6D031709	
2 . Date Sampled	03/17/2009	
3 . Time Sampled	08:30	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	04/21/2009	
2 . Time Sample Counted	16:00	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	7.5	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	2991.0	cpm
Net Spike Count Rate (cpm)	2983.5	cpm
H3 Spike Activity (dpm on count date)	7361.1	dpm
Counter Efficiency	0.4053	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	7.7	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.2	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{\text{(Bkg cpm)}}{\text{(Bkg min.)}} + \frac{\text{(Bkg cpm)}}{\text{(Smpl min.)}}}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}} = 1.12\text{E-}06 \text{ uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency x 2.22E6 uCi/ml x Sample Volume}} < \textbf{MDA}$$

Technician CM / [illegible] Date 4.21.09

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-6D031704 QC

Sample Location (Well Number): EFT- 6D

1. Representative sample collected. Date/Time 3-17-09 / 8:30

Sample collected by: Chris Ellison / [signature] Date: 3-17-09
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Proffitt / [signature] Date: 4-17-09
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: Proffitt / [signature] Date: 4-21-09
Fermi 2 RP Printed Name Signature

Sample number: EFT -6D 031709

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: Procht / [signature] Date: 4-21-09
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: K.D. LINDSEY / K.D. [signature] Date: 4.22.09
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

DETROIT EDISON FERMI-2 POWER PLANT 21-APR-2009 15:07:04.84

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EFT-6D031709

Sample End Time: 17-MAR-2009 08:30:00.00

REMARKS K40

PERFORMED BY:

Charles Ruffin
SIGNATURE

REVIEWED BY:

[signature] 4-22-09
SIGNATURE/DATE

Sample ID : EFT-6D031709 Acquisition date : 21-APR-2009 14:37:00

****

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********

Sample ID Number: EFT-6D031709
Sample collection start date: 17-MAR-2009 00:30:00.00
Sample collection end date : 17-MAR-2009 00:30:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.000000E+03 cc
Sample geometry : M2LL Operator: CLP

********** Acquisition Parameters **********

Detector number : DET 4 Acquire date : 21-APR-2009 14:37:00.61
Preset live time : 0 00:30:00.00 Elapsed live time : 0 00:30:00.00
Elapsed real time : 0 00:30:00.92 Percent dead time : 0.05 %

********** Calibration Parameters **********

Detector number : DET 4 0 Yearly cal date : 20-JUN-2008 12:00:00.00
Kev/channel : 4.930882E-01 Zero offset: 7.459796E-02
Daily cal date : 21-APR-2009 06:54:02.66

********** Peak Search Parameters **********

Start channel : 100 End channel : 4096
Height sensitivity : 5.000000 Shape sensitivity : 10.000000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********

Energy tolerance : 2.000000 Half-life ratio : 10.000000
Abundance limit : 75.000000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	511.25	105	54	2.00	1022.57	1013	21	5.84E-02	19.8	
2	0	966.33	12	5	1.54	1932.93	1929	9	6.67E-03	43.4	
3	0	1460.55	54	9	1.41	2921.53	2912	17	2.97E-02	10.5	

Sample Title : EFT-60031709 Page : 1
Decay Time = 35 06:07:00.61 Acquisition Time = 21-APR-2009 14:37:00.6
1

Post-HID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
										Ann. Peak
0	511.25	105	54	2.00	1022.57	1013	21	19.8		
0	966.33	12	5	1.54	1932.93	1929	9	43.4		Ac-228
0	1460.55	54	9	1.41	2921.53	2912	17	18.5		K-40

Sample ID : EFT-6D031709 Acquisition date : 21-APR-2009 14:37:00

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	54	10.67%	2.502E+00	3.010E-07	3.010E-07	10.52

Flag: "*" = Keyline

Sample ID : EFT-60031709 Acquisition date : 21-APR-2009 14:37:00

Total number of lines in spectrum	3	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	3	100.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	3.010E-07	3.010E-07	0.557E-07	18.52	
	Total Activity :		3.010E-07	3.010E-07			
	Grand Total Activity :		3.010E-07	3.010E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EFT-6D031709 Acquisition date : 21-APR-2009 14:37:00

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	462.75	511.00*	193.46	1.000E+35	19.04	Decay
		% Abundances Found =		100.00			
SB-124	60.200	0.59	602.71*	97.87	---- Not Found	----	Abun.
	D		645.85	7.26	---- Not Found	----	
			709.31	1.42	---- Not Found	----	
			713.82	3.30	---- Not Found	----	
			722.78	11.10	---- Not Found	----	
			968.20	1.92	4.490E-07	43.40	
			1045.16	1.86	---- Not Found	----	
			1325.50	1.50	---- Not Found	----	
			1353.24	1.00	---- Not Found	----	
			1368.21	2.51	---- Not Found	----	
			1436.60	1.14	---- Not Found	----	
			1691.02	49.00	---- Not Found	----	
		% Abundances Found =		1.07			
AC-228	6.13Y	0.02	129.08	2.50	---- Not Found	----	Abun.
			209.28	4.40	---- Not Found	----	
			270.23	3.60	---- Not Found	----	
			327.64	3.20	---- Not Found	----	
			338.32*	11.40	---- Not Found	----	
			409.51	2.13	---- Not Found	----	
			463.00	4.40	---- Not Found	----	
			794.70	4.60	---- Not Found	----	
			911.07	27.70	---- Not Found	----	
			964.60	5.20	1.119E-07	43.40	
			969.11	16.60	---- Not Found	----	
			1588.00	3.50	---- Not Found	----	
		% Abundances Found =		5.81			

Flag: "*" = Keyline

Unidentified Energy Lines
Sample ID : EFT-6D031709

Acquisition date : 21-APR-2009 14:37:00

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	511.25	105	54	2.00	1022.57	1013	21	5.84E-02	19.8	4.68E+00	T
0	966.33	12	5	1.54	1932.93	1929	9	6.67E-03	43.4	3.13E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 21-APR-2009 15:07:00.69

Sample ID : EFT-6D031709

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	14.	477.59	9.0385E-08
F-18	0.	511.00	Half-Life too short
NA-22	0.	1274.54	9.0553E-09
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	14.	889.25	1.2304E-08
CR-51	32.	320.08	1.8888E-07
MN-54	9.	834.83	7.7546E-09
CO-56	13.	1238.25	2.1762E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	39.	158.38	3.9274E-07
CO-57	30.	122.06	9.2869E-09
CO-58	15.	810.76	1.2305E-08
FE-59	6.	1099.22	2.3601E-09
CO-60	5.	1332.49	7.5742E-09
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	7.	1115.52	1.7331E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	33.	136.00	1.4598E-08
AS-76	0.	559.10	Half-Life too short
BR-82	0.	776.49	Half-Life too short
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.58	Half-Life too short
BR-85	0.	902.41	Half-Life too short
KR-85	33.	513.99	2.1373E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	33.	513.99	1.3413E-08
RB-86	7.	1076.63	3.2793E-07
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	7.	1836.01	1.2918E-06
KR-89	0.	220.98	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	7.	1204.90	4.1214E-06
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short

Sample ID : EFT-6D031709 Acquisition date : 21-APR-2009 14:37:00

Nuclide	Bckgnd? Sum	Energy (keV)	MDA (uCi/cc)
SR-93	0.	590.28	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	15.	702.63	7.6092E-09
NB-95	9.	765.79	1.3573E-08
NB-95M	24.	235.69	2.1227E-05
ZR-95	11.	756.72	1.9491E-08
ND-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	0.	739.50	Half-Life too short
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	14.	497.08	1.2891E-08
TC-104	0.	357.99	Half-Life too short
RH-105	0.	318.90	Half-Life too short
RU-105	0.	724.50	Half-Life too short
RU-106	26.	621.84	9.6167E-08
CD-109	36.	88.03	3.6956E-07
AG-110M	5.	937.48	2.0277E-08
SN-113	13.	391.69	1.0142E-08
SN-117M ?	36.	158.56	4.8190E-08
SB-122	0.	563.93	Half-Life too short
SB-124	20.	602.71	1.1957E-08
SB-125	16.	427.89	2.1331E-08
TE-125M	33.	109.28	4.7380E-06
TE-127	0.	417.90	Half-Life too short
TE-127M	21.	57.60	2.5577E-05
XE-127	46.	202.84	2.2402E-08
TE-129	0.	459.60	Half-Life too short
TE-129M	16.	695.88	4.8165E-07
XE-129M	41.	196.56	2.4240E-06
I-130	0.	536.09	Half-Life too short
BA-131	32.	123.80	2.0419E-07
I-131	26.	364.48	1.8074E-07
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	38.	163.93	2.8258E-06
I-132	0.	667.69	Half-Life too short
TE-132	0.	228.16	Half-Life too short
BA-133	31.	302.84	4.0231E-08
BA-133M	0.	276.09	Half-Life too short
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	24.	81.00	3.8030E-06
XE-133M	0.	233.22	Half-Life too short
CS-134	16.	604.70	7.4273E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	< Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Sample ID : EFT-60031709 Acquisition date : 21-APR-2009 14:37:00

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-136	13.	818.50	5.3328E-08
I-136	0.	1313.02	Half-Life too short
CS-137	16.	661.65	8.6477E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	30.	165.85	9.4238E-09
CS-139	0.	1283.23	Half-Life too short
BA-140	23.	537.32	2.1373E-07
LA-140	0.	1596.49	Half-Life too short
BA-141	0.	190.22	Half-Life too short
CE-141	30.	145.44	2.0583E-08
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	0.	293.26	Half-Life too short
CE-144	32.	133.54	7.0506E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	33.	91.10	3.8414E-07
PM-148M	17.	550.27	1.3371E-08
EU-152	22.	344.27	2.4166E-08
EU-154	10.	1004.76	4.7430E-08
EU-155	31.	105.31	4.3239E-08
EU-156	15.	646.29	4.8973E-07
HF-181	20.	482.03	1.5268E-08
TA-182	13.	1221.42	4.8248E-08
W-187 ? 0	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
HG-203	31.	279.19	1.5097E-08
BI-207	17.	569.67	7.2343E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	42.	240.98	1.6859E-04
RA-226	34.	186.21	2.8392E-07
AC-228	35.	338.32	6.9378E-08
TH-228	32.	84.37	1.1682E-06
PA-234	0.	131.20	Half-Life too short
TH-234	31.	63.29	2.8490E-06
U-235	26.	143.76	5.8472E-08
NP-239	0.	106.13	Half-Life too short
AM-241	21.	59.54	1.4751E-07

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT 6D 8 31 09

Sample Location (Well Number): 6D

1. Representative sample collected. Date/Time 8/31/09 / 1450

Sample collected by: Brian Jardine / [signature] Date: 8/31/09
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Southward / Southward Date: 9/21/09
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: John M. Young / [signature] Date: 9.22.9
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert C Boyle / [signature] Date: 10-13-09
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT6D83109	
2 . Date Sampled	08/31/2009	
3 . Time Sampled	14:50	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	09/21/2009	
2 . Time Sample Counted	14:00	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	7.7	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	2763.5	cpm
Net Spike Count Rate (cpm)	2755.8	cpm
H3 Spike Activity (dpm on count date)	7189.1	dpm
Counter Efficiency	0.3833	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	6.7	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.0	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \sqrt{\frac{\frac{(\text{Bkg cpm})}{(\text{Bkg min.})} + \frac{(\text{Bkg cpm})}{(\text{Smpl min.})}}{\text{Efficiency} \times 2.22\text{E6 dpm/uCi} \times \text{Sample Volume}}} = 1.20\text{E-06 uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency} \times 2.22\text{E6 uCi/ml} \times \text{Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 9-22-9

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT 6D 83109

Sample Location (Well Number): 6D

1. Representative sample collected. Date/Time 8/31/09 / 1450

Sample collected by: Brian Jardine Date: 8/31/09
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Southward / Southward Date: 9/24/09
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: Southward / Southward Date: 10/13/09
Fermi 2 RP Printed Name Signature

Sample number: EFT6D 83109

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
. (Note disposition of unidentified peaks in "Remarks")

Performed by: Southward / Southward Date: 10/13/09
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert C Gaylor Robert C Gaylor Date 10/14/09
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

DETROIT EDISON FERMI-2 POWER PLANT 13-OCT-2009 10:59:57.23

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: ~~FT~~EFT6D83109 NS 10/14/09

Sample End Time: 31-AUG-2009 14:50:00.00

REMARKS K-40

PERFORMED BY:
Southward
SIGNATURE

REVIEWED BY:
SIGNATURE/DATE

PAGE ____ of ____

Sample ID : ET6D83109 Acquisition date : 13-OCT-2009 10:29:54

****

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********

Sample ID Number: ET6D83109
Sample collection start date: 31-AUG-2009 14:50:00.00
Sample collection end date : 31-AUG-2009 14:50:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.00000E+03 cc
Sample geometry : M2LL Operator: JNS

********** Acquisition Parameters **********

Detector number : DET 4 Acquire date : 13-OCT-2009 10:29:54.36
Preset live time : 0 00:30:00.00 Elapsed live time : 0 00:30:00.00
Elapsed real time : 0 00:30:00.92 Percent dead time : 0.05 %

********** Calibration Parameters **********

Detector number : DET 4 Yearly cal date : 3-JUN-2009 17:37:00.00
Kev/channel : 4.99961E-01 Zero offset: 7.82824E-02
Daily cal date : 13-OCT-2009 06:21:56.95

********** Peak Search Parameters **********

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********

Energy tolerance : 1.75000 Half-life ratio : 10.00000
Abundance limit>: 75.0?000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	511.36	73	58	1.38	1022.61	1015	16	4.07E-02	25.7	
2	0	1460.76	61	0	2.81	2921.36	2913	18	3.39E-02	12.8	

Sample Title : ET6D83109 Page : 1
Decay Time = 42 19:39:54.36 Acquisition Time = 13-OCT-2009 10:29:54.3
6

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	511.36	73	50	1.30	1022.61	1015	16	25.7		Anni.
0	1460.76	61	0	2.01	2921.36	2913	10	12.0		K-40

JF 10-14-09

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	61	10.67*	2.501E+00	3.432E-07	3.432E-07	12.80

Flag: "*" = Keyline

Sample ID : ET6D03109 Acquisition date : 13-OCT-2009 10:29:54

Total number of lines in spectrum	2	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	2	100.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	3.432E-07	3.432E-07	0.439E-07	12.80	
Total Activity :			3.432E-07	3.432E-07			
Grand Total Activity :			3.432E-07	3.432E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : ET6D03109 Acquisition date : 13-OCT-2009 10:29:54

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	562.01	511.00*	193.46	1.000E+35	25.70	Decay

% Abundances Found = 100.00

Flag: "*" = Keyline

Sample ID : ET6D03109 Acquisition date : 13-OCT-2009 10:29:54

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	511.36	73.	58	1.38	1022.61	1015	16	4.07E-02	25.7	4.00E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 13-OCT-2009 11:00:01.31

Sample ID : ET6D83109

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	19.	477.59	1.1603E-07
F-18	0.	511.00	Half-Life too short
NA-22	6.	1274.54	8.1058E-09
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	7.	889.25	9.5063E-09
CR-51	21.	320.08	1.0226E-07
MN-54	8.	834.83	7.6324E-09
CO-56	8.	1238.25	1.0875E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	40.	158.38	9.4618E-07
CO-57	31.	122.06	9.6897E-09
CO-58	7.	810.76	9.3439E-09
FE-59	8.	1099.22	2.7827E-08
CO-60	7.	1332.49	8.9149E-09
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	10.	1115.52	2.0319E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	28.	136.00	1.4023E-08
AS-76	0.	559.10	Half-Life too short
BR-82	0.	776.49	Half-Life too short
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	39.	513.99	2.2936E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	39.	513.99	1.5585E-08
RB-86	9.	1076.63	4.6302E-07
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	6.	1836.01	1.2712E-08
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	5.	1204.90	3.9664E-06
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Sample ID : ET6D03109 Acquisition date : 13-OCT-2009 10:29:54

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
SR-93	0.	590.20	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	20.	702.63	8.5978E-09
NB-95	11.	765.79	1.6516E-08
NB-95M	0.	235.69	Half-Life too short
ZR-95	9.	756.72	1.8830E-08
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	0.	739.50	Half-Life too short
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	15.	497.08	1.5243E-08
TC-104	0.	357.99	Half-Life too short
RH-105	0.	318.90	Half-Life too short
RU-105	0.	724.50	Half-Life too short
RU-106	23.	621.84	9.2456E-08
CD-109	34.	88.03	3.6650E-07
AG-110M	5.	937.48	2.0093E-08
SN-113	25.	391.69	1.4016E-08
SN-117M	40.	158.56	7.4194E-08
SB-122	0.	563.93	Half-Life too short
SB-124	19.	602.71	1.2809E-08
SB-125	23.	427.89	2.4864E-08
TE-125M	19.	109.28	3.9896E-06
TE-127	0.	417.90	Half-Life too short
TE-127M	21.	57.60	2.6477E-05
XE-127	52.	202.84	2.7611E-08
TE-129	0.	459.60	Half-Life too short
TE-129M	16.	695.88	5.6881E-07
XE-129M	34.	196.56	4.0462E-06
I-130	0.	536.09	Half-Life too short
BA-131	26.	123.80	2.9067E-07
I-131	15.	364.48	2.7497E-07
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	33.	163.93	4.1327E-06
I-132	0.	667.69	Half-Life too short
TE-132	0.	228.16	Half-Life too short
BA-133	25.	302.84	3.6523E-08
BA-133M	0.	276.09	Half-Life too short
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	20.	81.00	9.6237E-06
XE-133M	0.	233.22	Half-Life too short
CS-134	20.	604.70	8.3223E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Sample ID : ET6D03109 Acquisition date : 13-OCT-2009 10:29:54

Nuclide	Bckgnd Sum	Energy (keV)		MDA (uCi/cc)
CS-136	10.	818.50		6.9399E-08
I-136	0.	1313.02		Half-Life too short
CS-137	13.	661.65		7.8617E-09
XE-137	0.	455.49		Half-Life too short
CS-138	0.	1435.86		Half-Life too short
XE-138	0.	258.31		Half-Life too short
BA-139	0.	1420.50		Half-Life too short
CE-139	32.	165.85		1.0063E-08
CS-139	0.	1283.23		Half-Life too short
BA-140	12.	537.32		2.3890E-07
LA-140	0.	1596.49		Half-Life too short
BA-141	0.	190.22		Half-Life too short
CE-141	33.	145.44		3.4927E-08
LA-141	0.	1354.52		Half-Life too short
BA-142	0.	255.12		Half-Life too short
LA-142	0.	641.17		Half-Life too short
CE-143	0.	293.26		Half-Life too short
CE-144	20.	133.54		6.7547E-08
PR-144	0.	1489.15		Half-Life too short
ND-147	32.	91.10		6.1036E-07
PM-148M	26.	550.27		1.8188E-08
EU-152	25.	344.27	0	2.5770E-08
EU-154	9.	1004.76		4.6155E-08
EU-155	27.	105.31		4.1085E-08
EU-156	16.	646.29		7.3060E-07
HF-181	22.	482.03		1.7845E-08
TA-182	5.	1221.42		3.5146E-08
W-187	0.	685.81		Half-Life too short
RE-188	0.	155.03		Half-Life too short
HG-203	30.	279.19		1.6664E-08
BI-207	19.	569.67		7.5463E-09
TL-208	0.	583.14		Half-Life too short
PB-212	0.	238.63		Half-Life too short
BI-214	0.	609.31		Half-Life too short
PB-214	0.	351.92		Half-Life too short
RA-224	0.	240.98		Half-Life too short
RA-226	29.	186.21		1.8858E-07
AC-228	25.	338.32		5.9804E-08
TH-228	32.	84.37		1.1737E-06
PA-234	0.	131.20		Half-Life too short
TH-234	18.	63.29		2.7893E-06
U-235	33.	143.76		6.4505E-08
NP-239	0.	106.13		Half-Life too short
AM-241	20.	59.54		1.4313E-07

EFT-6D

2010

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EF1-52410-6D

Sample Location (Well Number): 6D

1. Representative sample collected. Date/Time 06 5/24/10 1035
0830

Sample collected by: Southward / Southward Date: 6/23/10
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Southward / Southward Date: 6/23/10
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: Jon M. Yoxon / Date: 6-25-10
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert C Hoy JR / Date: 6-30-10
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EF1-52410-6D	
2 . Date Sampled	05/24/2010	
3 . Time Sampled	10:35	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	06/24/2010	
2 . Time Sample Counted	14:20	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	6.7	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	2671.8	cpm
Net Spike Count Rate (cpm)	2665.1	cpm
H3 Spike Activity (dpm on count date)	6889.0	dpm
Counter Efficiency	0.3869	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	7.7	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	1.0	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	1.9	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{(\text{Bkg cpm})}{(\text{Bkg min.})} + \frac{(\text{Bkg cpm})}{(\text{Smpl min.})}}}{\text{Efficiency} \times 2.22\text{E6 dpm/uCi} \times \text{Sample Volume}} = 1.11\text{E-06 uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency} \times 2.22\text{E6 uCi/ml} \times \text{Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 6-25-10

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EF1-52410-6D

Sample Location (Well Number): 6D

1. Representative sample collected. Date/Time 5/24/10 / 1035

Sample collected by: Southward / Southward Date: 6/23/10
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Southward / Southward Date: 6/23/10
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: Charles Proffitt / Charles Proffitt Date: 9-15-10
Fermi 2 RP Printed Name Signature

Sample number: EF1-52410-6D

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by Charles Proffitt Charles Proffitt Date: 9-15-10
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert C Greg SRI Date: 10-5-10
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

DETROIT EDISON FERMI-2 POWER PLANT 4-OCT-2010 16:16:14.03

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EF1-52410-6D

Sample End Time: 24-MAY-2010 10:35:00.00

REMARKS

PERFORMED BY:

SIGNATURE

REVIEWED BY:

SIGNATURE/DATE

Sample ID : EF1-52410-6D Acquisition date : 4-OCT-2010 15:31:12

****

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********

Sample ID Number: EF1-52410-6D
Sample collection start date: 24-MAY-2010 10:35:00.00
Sample collection end date : 24-MAY-2010 10:35:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.000000E+03 cc
Sample geometry : M2LL Operator: CLP

********** Acquisition Parameters **********

Detector number : DET 4 Acquire date : 4-OCT-2010 15:31:12.65
Preset live time : 0 00:45:00.00 Elapsed live time : 0 00:45:00.00
Elapsed real time : 0 00:45:00.79 Percent dead time : 0.03 %

********** Calibration Parameters **********

Detector number : DET 4 Yearly cal date : 23-JUN-2010 12:28:00.00
Kev/channel : 5.00274E-01 Zero offset: 1.39324E-01
Daily cal date : 4-OCT-2010 13:52:43.53

********** Peak Search Parameters **********

Start channel : 100 End channel : 4096
Height sensitivity : 5.000000 Shape sensitivity : 10.000000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********

Energy tolerance : 1.75000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	352.54	50	74	0.74	704.41	697	12	1.04E-02	37.7	
2	0	511.21	267	60	2.95	1021.57	1011	20	9.89E-02	9.4	
3	0	558.75	108	34	1.52	1116.60	1109	15	4.01E-02	15.1	
4	0	1461.18	76	4	2.92	2920.48	2912	16	2.82E-02	12.0	

Sample Title : EF1-52410-6D
Decay Time = 133 04:56:12.65

Acquisition Time = 4-OCT-2010 15:31:12.65

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	XErr	Fit	Nuclides
0	352.54	50	74	0.74	704.41	697	12	37.7		
0	511.21	267	60	2.95	1021.57	1011	20	9.4		
0	558.75	108	34	1.52	1116.60	1109	15	15.1		
0	1461.18	76	4	2.92	2920.48	2912	16	12.8		K-40

Low FWHM
ANW.
HWC

§ 10-5-10

Sample ID : EF1-52410-6D Acquisition date : 4-OCT-2010 15:31:12

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	76	10.67*	2.501E+00	2.060E-07	2.060E-07	12.05

Flag: "*" = Keyline

Sample ID : EF1-52410-6D Acquisition date : 4-OCT-2010 15:31:12

Total number of lines in spectrum	4	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	4	100.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	2.860E-07	2.860E-07	0.360E-07	12.85	
Total Activity :			2.860E-07	2.860E-07			
Grand Total Activity :			2.860E-07	2.860E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EF1-52410-6D Acquisition date : 4-OCT-2010 15:31:12

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	1740.12	511.00*	193.46	1.000E+35	9.38	Decay
	% Abundances		Found =	100.00			
AS-76	26.32H	121.48	559.10*	44.70	1.910E+29	15.13	Decay,Abun.
			563.23	1.17	----- Not Found -----		
			571.30	0.14	----- Not Found -----		
			657.03	6.10	----- Not Found -----		
			665.31	0.39	----- Not Found -----		
			740.12	0.12	----- Not Found -----		
			771.76	0.12	----- Not Found -----		
			867.63	0.12	----- Not Found -----		
			1129.87	0.14	----- Not Found -----		
			1212.72	1.63	----- Not Found -----		
			1216.02	3.04	----- Not Found -----		
			1228.52	1.39	----- Not Found -----		
			1439.13	0.33	----- Not Found -----		
			1453.60	0.13	----- Not Found -----		
			1707.67	0.33	----- Not Found -----		
	% Abundances		Found =	73.70			
PB-214	26.80M	7158.16	87.30	4.67	----- Not Found -----		Decay
			241.98	7.49	----- Not Found -----		
			295.21	19.20	----- Not Found -----		
			351.92*	37.20	1.000E+35	37.69	
			785.91	1.10	----- Not Found -----		
	% Abundances		Found =	53.40	(Abn. Limit =	37.20%)	

Flag: "*" = Keyline

Sample ID : EF1-52410-6D Acquisition date : 4-OCT-2010 15:31:12

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	352.54	50	74	0.74	704.41	697	12	1.04E-02	37.7	5.70E+00	T
0	511.21	267	60	2.95	1021.57	1011	20	9.89E-02	9.4	4.88E+00	T
0	558.75	100	34	1.52	1116.60	1109	15	4.01E-02	15.1	4.60E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 4-OCT-2010 16:16:18.07

Sample ID : EF1-52410-6D

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	42.	477.59	3.5156E-07
F-18	0.	511.00	Half-Life too short
NA-22	10.	1274.54	7.2444E-09
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	19.	889.25	2.0985E-08
CR-51	55.	320.08	1.7921E-06
MN-54	24.	834.83	9.8347E-09
CO-56	18.	1238.25	3.9175E-09
MN-56	0.	1810.69	Half-Life too short
NI-56	0.	158.38	Half-Life too short
CO-57	62.	122.06	1.1201E-08
CO-58	15.	810.76	2.1676E-08
FE-59	18.	1099.22	1.0636E-07
CO-60	12.	1332.49	7.5003E-09
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	20.	1115.52	2.3306E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	75.	136.00	2.4939E-08
AS-76	0.	559.10	Half-Life too short
BR-82	0.	776.49	Half-Life too short
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	92.	513.99	2.3155E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	92.	513.99	4.0696E-08
RB-86	14.	1076.63	1.0999E-05
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	3.	1836.01	1.1670E-08
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	20.	1204.90	1.3560E-05
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Sample ID : EF1-52410-60 Acquisition date : 4-OCT-2010 15:31:12

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
SR-93	0.	590.20	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	33.	702.63	7.1467E-09
NB-95	21.	765.79	8.0097E-08
NB-95M	0.	235.69	Half-Life too short
ZR-95	24.	756.72	5.1085E-08
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	0.	739.50	Half-Life too short
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	31.	497.08	6.8044E-08
TC-104	0.	357.99	Half-Life too short
RH-105	0.	318.90	Half-Life too short
RU-105	0.	724.50	Half-Life too short
RU-106	24.	621.84	7.4890E-08
CD-109	50.	88.03	3.3033E-07
AG-110M	20.	937.48	3.1093E-08
SN-113	39.	391.69	1.9965E-08
SN-117M	75.	158.56	6.6071E-06
SB-122	0.	563.93	Half-Life too short
SB-124	29.	602.71	2.9100E-08
SB-125	33.	427.89	2.0852E-08
TE-125M	76.	109.28	1.4913E-05
TE-127	0.	417.90	Half-Life too short
TE-127M	32.	57.60	3.7877E-05
XE-127	70.	202.84	1.1777E-07
TE-129	0.	459.60	Half-Life too short
TE-129M	19.	695.88	2.6410E-06
XE-129M	0.	196.56	Half-Life too short
I-130	0.	536.09	Half-Life too short
BA-131	0.	123.80	Half-Life too short
I-131	0.	364.48	Half-Life too short
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	0.	163.93	Half-Life too short
I-132	0.	667.69	Half-Life too short
TE-132	0.	228.16	Half-Life too short
BA-133	50.	302.84	3.4113E-08
BA-133M	0.	276.09	Half-Life too short
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.50	Half-Life too short
XE-133	0.	81.00	Half-Life too short
XE-133M	0.	233.22	Half-Life too short
CS-134	21.	604.70	6.1064E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Sample ID : EF1-52410-6D Acquisition date : 4-OCT-2010 15:31:12

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-136	0.	818.50	Half-Life too short
I-136	0.	1313.02	Half-Life too short
CS-137	28.	661.65	7.4295E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	69.	165.85	1.5036E-08
CS-139	0.	1203.23	Half-Life too short
BA-140	0.	537.32	Half-Life too short
LA-140	0.	1596.49	Half-Life too short
BA-141	0.	190.22	Half-Life too short
CE-141	62.	145.44	2.1467E-07
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	0.	293.26	Half-Life too short
CE-144	71.	133.54	8.6296E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	0.	91.10	Half-Life too short
PM-148M	22.	550.27	5.1762E-08
EU-152	47.	344.27	2.3250E-08
EU-154	11.	1004.76	3.4445E-08
EU-155	51.	105.31	3.7594E-08
EU-156	21.	646.29	3.3315E-05
HF-181	42.	482.03	7.0055E-08
TA-182	17.	1221.42	6.5459E-08
W-187	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
HG-203	54.	279.19	5.5891E-08
BI-207	20.	569.67	5.2032E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	0.	240.98	Half-Life too short
RA-226	82.	186.21	2.0479E-07
AC-228	46.	338.32	5.3937E-08
TH-228	54.	84.37	1.0888E-06
PA-234	0.	131.20	Half-Life too short
TH-234	67.	63.29	4.5397E-05
U-235	67.	143.76	6.0145E-08
NP-239	0.	106.13	Half-Life too short
AM-241	28.	59.54	1.1251E-07

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-101410-6D

Sample Location (Well Number): 6D

1. Representative sample collected. Date/Time 11-11-10 / 11:47

Sample collected by: C Proffitt / C Proffitt Date: 11-11-10
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: C Proffitt / C Proffitt Date: 11-11-10
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: S.A. Dyer / [signature] Date: 11-12-10
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert C Heyse / [signature] Date: 11-15-10
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT ~~EPT~~ 101410-6/D	
2 . Date Sampled	11/11/2010	
3 . Time Sampled	11:47	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	11/11/2010	
2 . Time Sample Counted	22:08	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	7.2	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	2546.6	cpm
Net Spike Count Rate (cpm)	2539.4	cpm
H3 Spike Activity (dpm on count date)	6741.6	dpm
Counter Efficiency	0.3767	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	5.8	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.0	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{\text{(Bkg cpm)}}{\text{(Bkg min.)}} + \frac{\text{(Bkg cpm)}}{\text{(Smpl min.)}}}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}} = 1.18\text{E-}06 \text{ uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency x 2.22E6 uCi/ml x Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 11-12-10

Reviewed By: _____ Date 11/15/10

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-101410-610

Sample Location (Well Number): 61D

1. Representative sample collected. Date/Time 10/14/10 / 09:40

Sample collected by: THOMAS MOW / [signature] Date: 11-11-10
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: C PROFFITT / [signature] Date: 11-12-10
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: C. PROFFITT / [signature] Date: 11-12-10
Fermi 2 RP Printed Name Signature

Sample number: EFT-101410-6/D

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
. (Note disposition of unidentified peaks in "Remarks")

Performed by: C Proffitt / C Proffitt Date: 11-17-10
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert C Gregg III Date: 11-22-10
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EFT-101410-6/D

Sample End Time: 14-OCT-2010 09:40:00.00

REMARKS:

PERFORMED BY:

SIGNATURE

REVIEWED BY:

SIGNATURE/DATE

Sample ID : EFT-101410 6/D Acquisition date : 22 NOV 2010 11:35:42

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********
Sample ID Number: EFT-101410-6/D
Sample collection start date: 14-OCT-2010 09:40:00.00
Sample collection end date : 14-OCT-2010 09:40:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.00000E+03 cc
Sample geometry : MOLL Operator: CLP

********** Acquisition Parameters **********
Detector number : DET 4 Acquire date : 22-NOV-2010 11:35:42.06
Preset live time : 0 00:45:00.00 Elapsed live time : 0 00:45:00.00
Elapsed real time : 0 00:45:00.59 Percent dead time : 3.03 %

********** Calibration Parameters **********
Detector number : DET 4 Yearly cal date : 23-JUN-2010 12:30:00.00
Kev/channel : 5.00110E-01 Zero offset: 1.54040E-01
Daily cal date : 22-NOV-2010 09:53:53.21

********** Peak Search Parameters **********
Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********
Energy tolerance : 1.75000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy
****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	352.37	30	37	1.94	704.27	699	9	1.10E-02	41.7	
2	2	509.92	52	55	2.20	1019.30	1013	21	1.92E-02	35.6	1.50E+00
3	2	511.95	78	40	2.12	1023.35	1013	21	2.90E-02	33.3	
4	0	1461.24	73	13	1.66	2921.56	2912	16	2.70E-02	15.9	

Post-MID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	352.37	38	37	1.94	784.27	699	9	11.7		Pb-214
2	509.92	52	52	2.20	1019.30	1013	21	35.6	1.50E+00	> ANN. Peak
2	511.90	70	40	2.12	1023.35	1013	21	22.3		
0	1461.24	73	13	1.66	2921.56	2912	16	15.9		K-40

11-22-10

Nuclide Type: natural

Nuclide	Energy	Area	%Abn.	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	73	10.67%	2.301E+00	2.736E-07	2.736E-07	15.07

Flags: "*" = Keyline

Sample ID : EFT-101410-6-D Acquisition Date : 22 NOV-2010 11:35:10

Total number of lines in spectrum	4	
Number of unidentified lines	1	
Number of lines tentatively identified by NID	3	75.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	2.73GE-07	2.73GE-07	0.43GE-07	15.8%	
	Total Activity :		2.73GE-07	2.73GE-07			
	Grand Total Activity :		2.73GE-07	2.73GE-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EFT-101410 C/D Acquisition date : 20-NOV-2010 11:35:17

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	513.01	511.00*	193.46	1.000E+35	23.34	Decay
		% Abundances Found =		100.00			
K2-214	26.80M	2100.68	87.30	4.67	---- Not Found ----		Decay
			241.98	7.43	---- Not Found ----		
			295.21	19.20	---- Not Found ----		
			351.92*	37.20	1.000E+35	41.71	
			785.91	1.10	---- Not Found ----		
		% Abundances Found =		53.40	(Abn. Limit = 37.00%)		

Flag: "*" = Keyline

Id	Energy	Area	Bkgnd	FWHM	Channel Left	Rt	Pw	Cts/Sec	%Err	%Eff	Flags
0	352.37	30	37	1.94	704.27	699	9	1.10E-02	41.7	5.70E+00	T
2	509.92	52	55	2.29	1019.50	1013	21	1.92E-02	35.6	4.00E+00	
3	511.95	79	46	2.12	1023.35	1013	21	2.90E-02	23.3	4.00E+00	T

Flags: "T" = Tentative/ associated

Detroit Edison Fermi 2 MDA Report, Generated 22-NOV-2010 12:20:51.20

Sample ID . EFT-101410-6.T

Minimum Detectable Activity Report

Nuclide	Bckgrnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	24.	477.59	8.1493E-06
F-18	0.	511.00	Half-Life too short
NA-22	13.	1274.54	7.4746E-09
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL 38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC 46	14.	889.25	8.3088E-09
CR-51	44.	320.08	1.5329E-07
MN 54	14.	834.83	6.3387E-09
CO-56	13.	1238.25	1.4799E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	53.	158.38	4.7002E-07
CO-57	39.	122.06	7.0962E-09
CO-58	14.	810.76	8.2575E-09
FE-59	10.	1099.22	1.0167E-08
CO-60	13.	1322.49	7.5143E-09
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	16.	1115.52	1.6118E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	48.	136.00	1.1707E-08
AS-76	0.	559.10	Half-Life too short
BR-82	0.	776.49	Half-Life too short
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.58	Half-Life too short
BR-85	0.	882.41	Half-Life too short
KR-85	43.	513.99	1.5977E-06
KR-85M	0.	151.18	Half-Life too short
SR-89	13.	513.99	1.0139E-08
RB 86	16.	1076.63	3.5279E-07
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	3.	1036.81	6.3202E-09
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	324.23	Half-Life too short
Y 90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y 91	12.	1204.90	3.5863E-08
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Nuclide	Background Cnts	Energy (keV)	MDA (uCi/cc)
SR-93	0.	530.20	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	10.	702.63	5.4033E-09
NB-95	16.	765.79	1.2252E-08
NB-95M	0.	235.69	Half-Life too short
ZR-95	30.	756.72	1.6931E-08
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	0.	739.50	Half-Life too short
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	24.	497.08	1.1481E-08
TC-104	0.	357.99	Half-Life too short
RH 105	0.	319.00	Half-Life too short
RU-105	0.	724.50	Half-Life too short
RU-106	14.	621.84	4.8849E-08
CD-109	45.	88.03	2.7568E-07
AG-110M	12.	937.48	1.9441E-08
SN-113	29.	391.69	9.9248E-09
SN-117M	55.	158.56	4.7106E-08
SB-122	0.	563.93	Half-Life too short
SB-124	25.	602.71	9.2015E-09
SB-125	33.	427.89	1.9579E-08
TE-125M	50.	109.28	3.9738E-06
TE-127	0.	417.90	Half-Life too short
TE-127M	16.	57.60	1.5333E-05
XE-127	49.	202.84	1.6639E-08
TE-129	0.	459.60	Half-Life too short
TE-129M	30.	695.88	4.6889E-07
XE 129M	40.	196.56	2.3395E-06
I-130	0.	536.09	Half-Life too short
BA-131	48.	123.80	2.0501E-07
I-131	28.	364.48	1.7588E-07
TE 131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	54.	163.93	2.7716E-06
I-132	0.	667.69	Half-Life too short
TE-132	0.	228.16	Half-Life too short
BA-133	37.	302.84	2.9160E-08
BA-133M	0.	276.69	Half-Life too short
I-133	0.	529.87	Half-Life too short
TE 133M	0.	912.58	Half-Life too short
XE-133	39.	81.00	5.2800E-06
XE-133M	0.	233.22	Half-Life too short
CS-134	30.	604.70	6.5265E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	3.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-136	19.	818.50	5.1406E-08
I-136	0.	1313.60	Half-Life too short
CS-137	19.	661.65	6.2297E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.80	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1469.50	Half-Life too short
CE-139	57.	165.85	0.5101E-09
CS-139	0.	1203.23	Half-Life too short
BA-140	31.	537.32	2.0110E-07
LA-140	0.	1596.49	Half-Life too short
BA-141	0.	190.22	Half-Life too short
CE-141	57.	145.44	2.7690E-08
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	0.	293.26	Half-Life too short
CE-144	52.	133.54	6.0803E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	33.	91.10	3.9276E-07
PM-148M	85.	550.27	1.1194E-08
EU-152	22.	344.27	1.6291E-08
EU-154	10.	1004.76	3.1960E-08
EU-155	47.	105.31	3.5101E-08
EU-156	20.	640.29	4.4328E-07
HF-181	34.	482.03	1.3732E-08
TA-182	19.	1221.42	3.0781E-08
W-187	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
HG-203	47.	279.19	1.2987E-08
BI-207	18.	569.67	4.9137E-09
TL 208	0.	583.14	Half-Life too short
PB-212	0.	238.62	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	0.	240.98	Half-Life too short
RA-226	60.	186.21	1.7671E-07
AC-228	36.	338.32	4.7161E-08
TH-228	41.	84.37	8.6942E-07
PA-234	0.	131.20	Half-Life too short
TH-234	33.	63.29	2.1857E-06
U-235	56.	143.76	5.5864E-08
NP-239	0.	106.13	Half-Life too short
AM-241	20.	59.54	1.1121E-07

EFT-6D

2011

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-6 7116D

Sample Location (Well Number): 6D

1. Representative sample collected. Date/Time 6-9-11 / 10:25

Sample collected by: C. Griffith / [signature] Date: 6-9-11
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: [signature] / [signature] Date: 6-9-11
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: Russ Bunge III [signature] Date: 6-10-11
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert Gaylor / [signature] Date: 6-13-11
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks [signature] 6-13-11

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-6711 6D	
2 . Date Sampled	06/09/2011	
3 . Time Sampled	10:25	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	06/10/2011	
2 . Time Sample Counted	10:59	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	5.7	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	2407.6	cpm
Net Spike Count Rate (cpm)	2401.9	cpm
H3 Spike Activity (dpm on count date)	6525.4	dpm
Counter Efficiency	0.3681	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	5.3	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.0	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	1.7	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{(\text{Bkg cpm})}{(\text{Bkg min.})} + \frac{(\text{Bkg cpm})}{(\text{Smpl min.})}}}{\text{Efficiency} \times 2.22\text{E6 dpm/uCi} \times \text{Sample Volume}} = 1.08\text{E-06 uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency} \times 2.22\text{E6 uCi/ml} \times \text{Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 6-10-11

Reviewed By: W Bowser Date 6-13-11

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-6711-6D

Sample Location (Well Number): 6D

1. Representative sample collected. Date/Time 6-7-11 / 14:35

Sample collected by: Thomas Moon / _____ Date: 6-7-11
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: C Proffitt / _____ Date: 6-9-11
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: C Proffitt / _____ Date: 6-13-11
Fermi 2 RP Printed Name Signature

Sample number: EFT-6711-6D

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: C Proffitt / C Proffitt Date: 6-13-11
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert Hoog SRI Robert Hoog Date: 6-17-11
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks N/A 6/17/11

DETROIT EDISON FERMI-2 POWER PLANT 13-JUN-2011 11:27:34.06

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EFT-6711-6D

Sample End Time: 7-JUN-2011 14:35:00.00

REMARKS Natural

PERFORMED BY:

SIGNATURE

REVIEWED BY:

SIGNATURE/DATE

Sample ID : EFT-6711-6D Acquisition date : 13-JUN-2011 10:42:29

Fermi 2 Radiation Protection Gamma Spectroscopy Report

Sample Parameters

Sample ID Number: EFT-6711-6D
Sample collection start date: 7-JUN-2011 14:35:00.00
Sample collection end date : 7-JUN-2011 14:35:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.00000E+03 cc
Sample geometry : M2LL Operator: CLP

Acquisition Parameters

Detector number : DET 4 Acquire date : 13-JUN-2011 10:42:29.94
Preset live time : 0 00:45:00.00 Elapsed live time : 0 00:45:00.00
Elapsed real time : 0 00:45:00.62 Percent dead time : 0.03 %

Calibration Parameters

Detector number : DET 4 Yearly cal date : 23-JUN-2010 12:28:00.00
Kev/channel : 5.00022E-01 Zero offset: 1.96012E-01
Daily cal date : 13-JUN-2011 08:58:17.00

Peak Search Parameters

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

Nuclide Identification Parameters

Energy tolerance : 1.75000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	66.14	63	75	1.01	131.00	126	12	2.34E-02	30.2	
2	0	352.20	91	71	1.73	703.99	694	20	3.38E-02	25.4	
3	0	511.12	191	53	3.11	1021.84	1012	21	7.06E-02	12.0	
4	0	558.87	27	23	1.30	1117.34	1113	8	9.97E-03	36.8	
5	0	609.75	38	35	1.04	1219.12	1217	8	1.42E-02	32.8	
6	5	1460.57	58	8	2.63	2921.00	2912	17	2.15E-02	18.2	1.15E+00
7	5	1462.81	18	4	1.55	2925.47	2912	17	6.68E-03	40.0	

Sample Title : EFT-6711-6D
Decay Time = 5 20:07:29.94

Acquisition Time = 13-JUN-2011 10:42:29.9
4

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	66.14	63	75	1.01	131.08	126	12	30.2		Ge-1_8 cosmic
0	352.20	91	71	1.73	703.99	694	20	25.4		Pb-214
0	511.12	191	53	3.11	1021.84	1012	21	12.0		Ann. Peak
0	558.87	27	23	1.30	1117.34	1113	8	36.8		dd-1_8 cosmic
0	609.75	38	35	1.04	1219.12	1217	8	32.8		Bi-214
5	1460.57	58	8	2.63	2921.00	2912	17	18.2	1.15E+00	K-40
5	1462.81	18	4	1.55	2925.47	2912	17	40.0		K-40

fr - 6-13-11

Sample ID : EFT-6711-6D Acquisition date : 13-JUN-2011 10:42:29

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	58	10.67*	2.502E+00	2.176E-07	2.176E-07	18.15

Flag: "*" = Keyline

Sample ID : EFT-6711-6D Acquisition date : 13-JUN-2011 10:42:29

Total number of lines in spectrum	7	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	7	100.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	2.176E-07	2.176E-07	0.395E-07	18.15	
Total Activity :			2.176E-07	2.176E-07			
Grand Total Activity :			2.176E-07	2.176E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EFT-6711-6D Acquisition date : 13-JUN-2011 10:42:29

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	76.82	511.00*	193.46	2.682E+15	11.95	Decay
	% Abundances		Found =	100.00			
SE-75	119.78D	0.05	66.05	1.02	4.598E-06	30.15	Abun.
			96.73	3.41	---- Not Found ----		
			121.12	16.70	---- Not Found ----		
			136.00*	59.20	---- Not Found ----		
			198.60	1.45	---- Not Found ----		
			264.65	59.00	---- Not Found ----		
			279.53	25.20	---- Not Found ----		
			303.91	1.32	---- Not Found ----		
			400.65	11.40	---- Not Found ----		
	% Abundances		Found =	0.57			
AS-76	26.32H	5.34	559.10*	44.70	5.206E-07	36.77	Abun.
			563.23	1.17	---- Not Found ----		
			571.30	0.14	---- Not Found ----		
			657.03	6.10	---- Not Found ----		
			665.31	0.39	---- Not Found ----		
			740.12	0.12	---- Not Found ----		
			771.76	0.12	---- Not Found ----		
			867.63	0.12	---- Not Found ----		
			1129.07	0.14	---- Not Found ----		
			1212.72	1.63	---- Not Found ----		
			1216.02	3.84	---- Not Found ----		
			1228.52	1.39	---- Not Found ----		
			1439.13	0.33	---- Not Found ----		
			1453.60	0.13	---- Not Found ----		
			1787.67	0.33	---- Not Found ----		
	% Abundances		Found =	73.70			
BR-84	31.80M	265.09	604.80	1.80	---- Not Found ----		Decay,Abun.
			736.50	1.31	---- Not Found ----		
			802.20	6.10	---- Not Found ----		
			881.50*	42.00	---- Not Found ----		
			1015.90	6.20	---- Not Found ----		
			1213.30	2.60	---- Not Found ----		
			1463.00	2.00	1.000E+35	40.01	
			1741.20	1.60	---- Not Found ----		
			1877.50	1.14	---- Not Found ----		
			1897.30	14.90	---- Not Found ----		
			2029.60	2.10	---- Not Found ----		
	% Abundances		Found =	2.45			
RU-103	39.35D	0.15	497.08*	89.00	---- Not Found ----		Abun.
			610.33	5.60	1.677E-07	32.76	
	% Abundances		Found =	5.92			
XE-135	9.11H	15.42	249.79*	89.90	---- Not Found ----		Decay,Abun.
			608.19	2.89	1.288E-02	32.76	
	% Abundances		Found =	3.11			

Sample ID : EFT-6711-6D Acquisition date : 13-JUN-2011 10:42:29

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
CS-136	13.16D	0.44	66.91	12.50	4.937E-07	30.15	Abun.
			86.29	6.30	----- Not Found -----		
			153.22	7.46	----- Not Found -----		
			163.89	4.61	----- Not Found -----		
			176.55	13.56	----- Not Found -----		
			273.65	12.66	----- Not Found -----		
			340.57	48.50	----- Not Found -----		
			818.50*	99.70	----- Not Found -----		
			1048.07	79.60	----- Not Found -----		
			1235.34	19.70	----- Not Found -----		
		% Abundances Found =		4.10			
PM-148M	41.30D	0.14	288.11	12.56	----- Not Found -----		Abun.
			414.07	18.66	----- Not Found -----		
			432.78	5.35	----- Not Found -----		
			501.26	6.75	----- Not Found -----		
			550.27*	94.90	----- Not Found -----		
			599.74	12.54	----- Not Found -----		
			611.26	5.40	1.706E-07	32.76	
			629.97	89.00	----- Not Found -----		
			725.70	32.00	----- Not Found -----		
			915.33	17.17	----- Not Found -----		
			1013.81	20.30	----- Not Found -----		
		% Abundances Found =		1.74			
TA-182	114.74D	0.05	67.75	42.30	1.110E-07	30.15	Abun.
			100.10	14.10	----- Not Found -----		
			1189.05	16.30	----- Not Found -----		
			1221.42*	27.10	----- Not Found -----		
			1230.97	11.50	----- Not Found -----		
		% Abundances Found =		38.01			
BI-214	19.90M	423.62	609.31*	46.30	1.000E+35	32.76	Decay
			768.36	5.04	----- Not Found -----		
			934.06	3.21	----- Not Found -----		
			1120.29	15.10	----- Not Found -----		
			1238.11	5.94	----- Not Found -----		
			1377.67	4.11	----- Not Found -----		
			1764.49	15.80	----- Not Found -----		
		% Abundances Found =		48.48	(Abn. Limit = 48.48%)		
PB-214	26.80M	314.55	87.30	4.67	----- Not Found -----		Decay
			241.98	7.49	----- Not Found -----		
			295.21	19.20	----- Not Found -----		
			351.92*	37.20	1.000E+35	25.40	
			785.91	1.10	----- Not Found -----		
		% Abundances Found =		53.40	(Abn. Limit = 37.20%)		

Flag: "*" = Keyline

Sample ID : EFT-6711-6D Acquisition date : 13-JUN-2011 10:42:29

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	66.14	63	75	1.01	131.88	126	12	2.34E-02	30.2	1.40E+00	T
0	352.20	91	71	1.73	703.99	694	20	3.38E-02	25.4	5.70E+00	T
0	511.12	191	53	3.11	1021.04	1012	21	7.06E-02	12.0	4.88E+00	T
0	558.87	27	23	1.30	1117.34	1113	8	9.97E-03	36.8	4.68E+00	T
0	609.75	38	35	1.04	1219.12	1217	8	1.42E-02	32.8	4.52E+00	T
5	1462.81	18	4	1.55	2925.47	2912	17	6.68E-03	40.0	2.50E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 13-JUN-2011 11:27:38.27

Sample ID : EFT-6711-6D

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	20.	477.59	5.6439E-08
F-18	0.	511.00	Half-Life too short
NA-22	8.	1274.54	5.8294E-09
NA-24	6.	1368.53	3.6591E-06
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	10.	889.25	7.1644E-09
CR-51	46.	320.08	6.8350E-08
MN-54	33.	834.83	8.5851E-09
CO-56	22.	1238.25	1.4005E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	53.	158.38	1.0704E-08
CO-57	54.	122.06	7.5768E-09
CO-58	15.	810.76	6.2450E-09
FE-59	10.	1099.22	1.1737E-08
CO-60	8.	1332.49	6.0468E-09
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	22.	1115.52	1.6994E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	54.	136.00	1.0237E-08
AS-76	49.	559.10	6.7968E-07
BR-82	17.	776.49	1.1094E-07
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	64.	513.99	1.9037E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	64.	513.99	8.7697E-09
RB-86	11.	1076.63	8.6462E-08
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	6.	1836.01	6.6793E-09
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	12.	1204.90	2.3975E-06
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Sample ID : EFT-6711-6D Acquisition date : 13-JUN-2011 10:42:29

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
SR-93	0.	590.20	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	34.	702.63	7.2107E-09
NB-95	22.	765.79	7.3357E-09
NB-95M	55.	235.69	7.2165E-08
ZR-95	10.	756.72	8.9293E-09
NB-97	0.	657.90	Half-Life too short
ZR-97	12.	743.36	1.5724E-06
MO-99	19.	739.50	2.0013E-07
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	20.	497.08	5.9641E-09
TC-104	0.	357.99	Half-Life too short
RH-105	45.	318.90	4.6751E-07
RU-105	0.	724.50	Half-Life too short
RU-106	37.	621.84	7.1611E-08
CD-109	28.	88.03	2.1010E-07
AG-110M	17.	937.48	2.0727E-08
SN-113	32.	391.69	8.4914E-09
SN-117M	56.	150.56	8.7566E-09
SB-122	25.	563.93	3.5607E-08
SB-124	28.	602.71	6.5971E-09
SB-125	25.	427.89	1.6732E-08
TE-125M	40.	109.28	2.4029E-06
TE-127	0.	417.90	Half-Life too short
TE-127M	43.	57.60	1.9452E-05
XE-127	53.	202.84	9.1237E-09
TE-129	0.	459.60	Half-Life too short
TE-129M	24.	695.88	2.0782E-07
XE-129M	47.	196.56	1.7472E-07
I-130	0.	536.09	Half-Life too short
BA-131	42.	123.80	2.7248E-08
I-131	32.	364.48	1.0507E-08
TE-131	0.	149.72	Half-Life too short
TE-131M	20.	773.67	4.2659E-07
XE-131M	50.	163.93	3.8297E-07
I-132	0.	667.69	Half-Life too short
TE-132	44.	228.16	2.0693E-08
BA-133	44.	302.84	3.1174E-08
BA-133M	43.	276.09	3.6614E-07
I-133	27.	529.87	7.0188E-07
TE-133M	0.	912.58	Half-Life too short
XE-133	41.	81.00	6.7181E-08
XE-133M	50.	233.22	3.4710E-07
CS-134	25.	604.70	5.9538E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	33.	268.24	8.7886E-07
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Sample ID : EFT-6711-6D Acquisition date : 13-JUN-2011 10:42:29

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-136	19.	818.50	8.7701E-09
I-136	0.	1313.02	Half-Life too short
CS-137	20.	661.65	6.3032E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	55.	165.85	7.1323E-09
CS-139	0.	1283.23	Half-Life too short
BA-140	26.	537.32	3.0241E-08
LA-140	13.	1596.49	9.5543E-08
BA-141	0.	190.22	Half-Life too short
CE-141	57.	145.44	1.3563E-08
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	32.	293.26	2.1604E-07
CE-144	48.	133.54	5.2687E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	44.	91.10	4.5768E-08
PM-148M	29.	550.27	6.8714E-09
EU-152	43.	344.27	2.1857E-08
EU-154	17.	1004.76	4.0124E-08
EU-155	42.	105.31	3.2821E-08
EU-156	14.	646.29	8.3619E-08
HF-181	27.	482.03	7.1293E-09
TA-182	11.	1221.42	2.4857E-08
W-187	24.	685.81	1.2241E-06
RE-188	54.	155.03	1.1481E-05
AU-199	53.	158.38	5.4166E-08
HG-203	37.	279.19	7.1004E-09
BI-207	24.	569.67	5.6495E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	73.	240.98	5.2250E-07
RA-226	54.	186.21	1.6800E-07
AC-228	38.	338.32	4.7561E-08
TH-228	45.	84.37	8.8628E-07
PA-234	0.	131.20	Half-Life too short
TH-234	39.	63.29	9.0730E-07
U-235	57.	143.76	5.5732E-08
NP-239	46.	106.13	1.7309E-07
AM-241	33.	59.54	1.2038E-07

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-10611-6D

Sample Location (Well Number): EFT-6/D

1. Representative sample collected. Date/Time 10/6/11 / 10:35

Sample collected by: Thomas Mow / _____ Date: 10/25/11
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Thomas Mow / _____ Date: 10/25/11
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: John M. Yoken / _____ Date: 11-1-11
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert Guyer / _____ Date: 11-3-11
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

w/ 4

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-6/D	
2 . Date Sampled	10/06/2011	
3 . Time Sampled	10:35	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	10/30/2011	
2 . Time Sample Counted	13:50	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	7.5	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	2548.6	cpm
Net Spike Count Rate (cpm)	2541.1	cpm
H3 Spike Activity (dpm on count date)	6383.7	dpm
Counter Efficiency	0.3981	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	7.3	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.0	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{\text{(Bkg cpm)}}{\text{(Bkg min.)}} + \frac{\text{(Bkg cpm)}}{\text{(Smpl min.)}}}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}} = 1.14\text{E-}06 \text{ uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency x 2.22E6 uCi/ml x Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 11-1-11

Reviewed _____ Date NOV 01 2011

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-10611-6D

Sample Location (Well Number): EFT-6/D

1. Representative sample collected. Date/Time 10/6/11 / 10:35

Sample collected by: Thomas Mow / [signature] Date: 10/25/11
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Thomas Mow / [signature] Date: 10/25/11
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: C Proffitt / [signature] Date: 11-2-11
Fermi 2 RP Printed Name Signature

Sample number: GFT-10611-GD

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: C Moffitt / [signature] Date: 11-2-11
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert C Hug JR / [signature] Date: 11-3-11
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks N/A

DETROIT EDISON FERMI-2 POWER PLANT 2-NOV-2011 16:36:33.65

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Numbers: EFT-10611-60

Sample End Time: 6-OCT-2011 10:35:00.00

REMARKS No Plant Related Isotopes

PERFORMED BY:

SIGNATURE

REVIEWED BY:

SIGNATURE/DATE

'Sample ID : EFT-10611-6D Acquisition date : 2-NOV-2011 15:51:30

****

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********

Sample ID Number: EFT-10611-6D
Sample collection start date: 6-OCT-2011 10:35:00.00
Sample collection end date : 6-OCT-2011 10:35:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.000000E+03 cc
Sample geometry : M2LL Operator: CLP

********** Acquisition Parameters **********

Detector number : DET 4 Acquire date : 2-NOV-2011 15:51:30.67
Preset live time : 0 00:45:00.00 Elapsed live time : 0 00:45:00.00
Elapsed real time : 0 00:45:00.63 Percent dead time : 0.03 %

********** Calibration Parameters **********

Detector number : DET 4 Yearly cal date : 14-JUN-2011 14:50:56.41
Kev/channel : 5.000536E-01 Zero offset: -5.47137E-01
Daily cal date : 2-NOV-2011 08:42:06.40

********** Peak Search Parameters **********

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********

Energy tolerance : 1.75000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_M211 Efficiencies at : Peak energy

****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	198.37	49	80	2.24	398.78	393	10	1.82E-02	36.8	
2	0	511.46	160	40	2.83	1023.93	1015	19	5.91E-02	13.0	
3	0	1460.78	66	5	1.04	2922.46	2912	19	2.44E-02	14.7	

Sample Title : EFT-10611-6D Page : 1
Decay Time = 27 05:16:30.67 Acquisition Time = 2-NOV-2011 15:51:30.67

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	198.87	49	90	2.24	398.78	393	10	36.8		Ge-n.T Ann. Peak
0	511.46	160	48	2.83	1023.93	1015	19	13.0		
0	1460.78	66	5	1.04	2922.46	2912	19	14.7		K-40

JK 11-3-11

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	66	10.67*	2.353E+00	2.630E-07	2.630E-07	14.67

Flag: "*" = Keyline

Sample ID : EFT-10611-cD Acquisition date : 2-NOV-2011 15:51:30

Total number of lines in spectrum	3	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	3	100.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	2.630E-07	2.630E-07	0.386E-07	14.67	
	Total Activity :		2.630E-07	2.630E-07			
	Grand Total Activity :		2.630E-07	2.630E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EFT-10611-6D Acquisition date : 2-NOV-2011 15:51:30

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	357.30	511.00*	193.46	1.000E+35	13.04	Decay
	% Abundances Found =			100.00			
SE-75	119.78D	0.23	66.05	1.02	---- Not Found ----		Abun.
			96.73	3.41	---- Not Found ----		
			121.12	16.70	---- Not Found ----		
			136.00*	59.20	---- Not Found ----		
			198.60	1.45	6.286E-07	36.82	
			264.65	59.80	---- Not Found ----		
			279.53	25.20	---- Not Found ----		
			303.91	1.32	---- Not Found ----		
			400.65	11.40	---- Not Found ----		
	% Abundances Found =			0.81			

Flag: "*" = Keyline

Sample ID : EFT-10611-6D Acquisition date : 2-NOV-2011 15:51:30

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	198.07	49	80	2.24	398.78	393	10	1.82E-02	36.8	6.33E+00	T
0	511.46	160	48	2.83	1023.93	1015	19	5.91E-02	13.0	4.58E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 2-NOV-2011 16:36:37.89

Sample ID : EFT-10611-6D

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	27.	477.59	7.7426E-08
F-18	0.	511.00	Half-Life too short
NA-22	11.	1274.54	7.2108E-09
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	16.	889.25	8.5799E-09
CR-51	30.	320.08	1.0094E-07
MN-54	36.	834.83	9.8353E-09
CO-56	17.	1239.25	1.6221E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	54.	158.38	1.2915E-07
CO-57	46.	122.06	7.9090E-09
CO-58	18.	810.76	8.7248E-09
FE-59	14.	1099.22	1.9634E-08
CO-60	28.	1332.49	1.1136E-08
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	17.	1115.52	1.6855E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	51.	136.00	1.2024E-08
AS-76	0.	559.10	Half-Life too short
BR-82	0.	776.49	Half-Life too short
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	69.	513.99	2.1200E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	69.	513.99	1.2229E-08
RB-86	0.	1076.63	1.7747E-07
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	5.	1836.01	7.6648E-09
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	12.	1204.90	3.2793E-06
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Sample ID : EFT-10611-6D Acquisition date : 2-NOV-2011 15:51:30

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
SR-93	0.	590.20	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	26.	702.63	6.8529E-09
NB-95	22.	765.79	1.1696E-08
NB-95M	52.	235.69	4.4850E-06
ZR-95	24.	756.72	1.7228E-08
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	11.	739.50	3.6151E-05
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	28.	497.08	1.0718E-08
TC-104	0.	357.99	Half-Life too short
RH-105	0.	318.90	Half-Life too short
RU-105	0.	724.50	Half-Life too short
RU-106	22.	621.84	6.1925E-08
CD-109	39.	88.03	2.6402E-07
AG-110M	11.	937.48	1.9209E-08
SN-113	26.	391.69	9.2647E-09
SN-117M	54.	158.56	2.6961E-08
SB-122	0.	563.93	Half-Life too short
SB-124	33.	602.71	9.6480E-09
SB-125	31.	427.89	2.0049E-08
TE-125M	35.	109.28	3.1226E-06
TE-127	0.	417.90	Half-Life too short
TE-127M	32.	57.60	2.2729E-05
XE-127	42.	202.84	1.2933E-08
TE-129	0.	459.60	Half-Life too short
TE-129M	23.	695.88	3.3795E-07
XE-129M	61.	196.56	1.0866E-06
I-130	0.	536.09	Half-Life too short
BA-131	38.	123.80	9.7578E-08
I-131	32.	364.48	7.0359E-08
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	46.	163.93	1.3427E-06
I-132	0.	667.69	Half-Life too short
TE-132	41.	228.16	1.9806E-06
BA-133	40.	302.84	3.1535E-08
BA-133M	0.	276.09	Half-Life too short
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	37.	81.00	1.1174E-06
XE-133M	0.	233.22	Half-Life too short
CS-134	28.	604.70	6.7465E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Sample ID : EFT-10611-6D Acquisition date : 2-NOV-2011 15:51:30

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-136	15.	818.50	2.6002E-08
I-136	0.	1313.02	Half-Life too short
CS-137	18.	661.65	6.4510E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	20.	165.85	6.1042E-09
CS-139	0.	1283.23	Half-Life too short
BA-140	36.	537.32	1.1885E-07
LA-140	0.	1596.49	Half-Life too short
BA-141	0.	190.22	Half-Life too short
CE-141	51.	145.44	2.1489E-08
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	0.	293.26	Half-Life too short
CE-144	39.	133.54	5.3588E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	30.	91.10	1.5583E-07
PM-148M	17.	550.27	8.1795E-09
EU-152	36.	344.27	2.1451E-08
EU-154	11.	1004.76	3.4869E-08
EU-155	44.	105.31	3.5550E-08
EU-156	28.	646.29	3.2318E-07
HF-181	21.	482.03	9.5527E-09
TA-182	17.	1221.42	3.6515E-08
W-187	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
AU-199	54.	158.38	6.4108E-06
HG-203	49.	279.19	1.1511E-08
BI-207	31.	569.67	6.7229E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	39.	240.98	2.4407E-05
RA-226	44.	186.21	1.6028E-07
AC-228	41.	338.32	5.2333E-08
TH-229	35.	84.37	8.3630E-07
PA-234	0.	131.20	Half-Life too short
TH-234	43.	63.29	1.8689E-06
U-235	50.	143.76	5.5136E-08
NP-239	0.	106.13	Half-Life too short
AM-241	29.	59.54	1.2572E-07

GEL LAB RESULTS

EFT-6D 2009

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : Detroit Edison - Fermi 1
Address : PO Box 44440
Detroit, Michigan 48244

Report Date: February 17, 2010

Contact: Mr. Tom Mow
Project: **Fermi 1 - PO# 4700246055**

Client Sample ID:	EF1-6/D	Project:	ROIT00116
Sample ID:	245517012	Client ID:	ROIT001
Matrix:	Ground Water		
Collect Date:	29-DEC-09 15:50		
Receive Date:	25-JAN-10		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Rad Alpha Spec Analysis											
Alphaspec U, Liquid "As Received"											
Pct Uranium-235	U	-1.17				percent		MXE1 02/09/10	1349	947744	1
Uranium-233/234	U	0.131	+/-0.195	0.227	1.00	pCi/L					
Uranium-235/236	U	-0.0225	+/-0.189	0.449	1.00	pCi/L					
Uranium-238		0.303	+/-0.297	0.227	1.00	pCi/L					
Rad Gas Flow Proportional Counting											
GFPC, Gross A/B, liquid "As Received"											
Alpha	U	1.00	+/-2.18	4.02	5.00	pCi/L		DXF3 02/11/10	1942	945896	2
Beta		3.61	+/-1.98	2.83	5.00	pCi/L					

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	DOE EML HASL-300, U-02-RC Modified	
2	EPA 900.0	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"			96.6	(15%-125%)

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : Detroit Edison - Fermi 1
Address : PO Box 44440
Detroit, Michigan 48244
Contact: Mr. Tom Mow
Project: Fermi 1 - PO# 4700246055

Report Date: December 30, 2010

Client Sample ID: EFT-101410-6/D
Sample ID: 268144014
Matrix: Water
Collect Date: 14-OCT-10 09:40
Receive Date: 06-DEC-10
Collector: Client

Project: ROIT00116
Client ID: ROIT001

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Rad Gas Flow Proportional Counting											
GFPC, Gross A/B, liquid "As Received"											
Alpha		7.86	+/-2.65	2.85	5.00	pCi/L		VXC2 12/27/10	1941	1059089	1
Beta		9.54	+/-3.24	5.09	5.00	pCi/L					

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 900.0/SW846 9310	

EFT-6S

2006

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-6 S 06 12 06

Sample Location (Well Number): EFT-6S

1. Representative sample collected. Date/Time 06/12/06 / 1515

Sample collected by: Jay Slaback / Jay Marie Slaback Collection Date: 06/12/06
Printed Name / Signature Signed: 02/01/07

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Christopher Frailing / Christ A Frailing Date: 08/02/06
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: Russ Byers / [signature] Date: 2-5-7
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: William V. Lipton / William V. Lipton Date: 2/15/2007
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks Tritium detected. William V. Lipton 48651 2/15/2007

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-6S061206	
2 . Date Sampled	06/12/2006	
3 . Time Sampled	15:15	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	02/02/2007	
2 . Time Sample Counted	10:00	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	7.4	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	3388.1	cpm
Net Spike Count Rate (cpm)	3380.7	cpm
H3 Spike Activity (dpm on count date)	8340.7	dpm
Counter Efficiency	0.4053	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	7.2	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.0	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \sqrt{\frac{\frac{\text{(Bkg cpm)}}{\text{(Bkg min.)}} + \frac{\text{(Bkg cpm)}}{\text{(Smpl min.)}}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}}} = 1.12\text{E-}06 \text{ uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 2-5-7

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-6S061206

Sample Location (Well Number): EFT-6S

1. Representative sample collected. Date/Time 06/12/06 / 1515

Sample collected by: Jay Slabeck / Jay Marie Slabeck Collection Date: 06/12/06
Printed Name / Signature Signed 02/01/07

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Christopher Frailing Chtfrl A Frailing Date: 08/02/06
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 11

Performed by: K D LINDSEY / K D Lindsey Date: 8-21-07
Fermi 2 RP Printed Name Signature

Sample number: EFT-6506206

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
. (Note disposition of unidentified peaks in "Remarks")

Performed by: Chris Hubbard / [signature] Date: 7-11-07
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: K Lindsay / [signature] Date: 8-21-07
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

DETROIT EDISON FERMI-2 POWER PLANT 11-JUL-2007 10:22:23.57

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EF1 EFT-6S061206

Sample End Time: 12-JUN-2006 15:15:00.00

REMARKS

PERFORMED BY:

SIGNATURE

REVIEWED BY:

SIGNATURE/DATE 8-21-07

Sample ID : EF1 EFT-6S061206 Acquisition date : 11-JUL-2007 09:52:10

****

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********

Sample ID Number: EF1 EFT-6S061206
Sample collection start date: 12-JUN-2006 15:15:00.00
Sample collection end date : 12-JUN-2006 15:15:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.000000E+03 CC
Sample geometry : M2LL Operator: CMH

********** Acquisition Parameters **********

Detector number : DET 4 Acquire date : 11-JUL-2007 09:52:10.62
Preset live time : 0 00:30:00.00 Elapsed live time : 0 00:30:00.00
Elapsed real time : 0 00:30:00.91 Percent dead time : 0.05 %

********** Calibration Parameters **********

Detector number : DET 4 Yearly cal date : 20-JUN-2007 12:16:46.16
Kev/channel : 4.99666E-01 Zero offset: -9.01942E-02
Daily cal date : 11-JUL-2007 07:21:16.11

********** Peak Search Parameters **********

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********

Energy tolerance : 2.00000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	66.36	38	55	1.01	132.90	128	9	2.09E-02	39.4	RN-222
2	5	510.03	65	28	2.34	1020.91	1016	27	3.60E-02	22.3	1.06E+00
3	5	511.79	43	41	2.54	1024.43	1016	27	2.30E-02	41.8	Annihilation
4	0	559.07	68	31	1.65	1119.04	1112	16	3.79E-02	22.1	HWC
5	0	609.52	29	34	0.54	1220.01	1211	15	1.63E-02	47.1	Bi-214
6	0	1460.73	68	0	1.26	2923.41	2913	20	3.78E-02	12.1	K-40

Deca, Time = 393 10:37:10.62 Acquisition Time = 11-JUL-2007 09:52:10.6
2

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	66.36	30	55	1.01	132.90	128	9	39.4		
5	510.03	65	28	2.34	1020.91	1016	27	22.3	1.06E+00	
5	511.79	43	41	2.54	1024.43	1016	27	41.8		
0	559.07	68	31	1.65	1119.04	1112	16	22.1		
0	609.52	29	34	0.54	1220.01	1211	15	47.1		
0	1460.73	60	0	1.26	2923.41	2913	20	12.1		K-40

Nuclide Types: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/CC	Decay Corr uCi/CC	1-Sigma %Error
K-40	1460.81	68	10.67*	2.501E+00	3.025E-07	3.025E-07	12.13

Flag: "*" = Keyline

Sample ID : EF1 EFT-63061206 Acquisition date : 11-JUL-2007 09:52:10

Total number of lines in spectrum	6	
Number of unidentified lines	1	
Number of lines tentatively identified by NID	5	83.33%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/CC	Decay Corr uCi/CC	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	3.025E-07	3.025E-07	0.464E-07	12.13	
	Total Activity :		3.025E-07	3.025E-07			
	Grand Total Activity :		3.025E-07	3.025E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EF1 EFT-66061206 Acquisition date : 11-JUL-2007 09:52:10

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/CC)	1-Sigma %Error	Rejected by
F-18	109.74M	5167.23	511.00*	193.46	1.000E+35	41.78	Decay
	% Abundances Found =			100.00			
GE-75	119.78D	3.29	66.05	1.02	3.807E-05	39.44	Abun.
			96.73	3.41	---- Not Found ----		
			121.12	16.70	---- Not Found ----		
			136.00*	59.20	---- Not Found ----		
			198.60	1.45	---- Not Found ----		
			264.65	59.80	---- Not Found ----		
			279.53	25.20	---- Not Found ----		
			303.91	1.32	---- Not Found ----		
			400.65	11.40	---- Not Found ----		
	% Abundances Found =			0.57			
AS-76	26.32H	359.08	559.10*	44.70	1.000E+35	22.10	Decay,Abun.
			563.23	1.17	---- Not Found ----		
			571.30	0.14	---- Not Found ----		
			657.03	6.10	---- Not Found ----		
			665.31	0.39	---- Not Found ----		
			740.12	0.12	---- Not Found ----		
			771.76	0.12	---- Not Found ----		
			867.63	0.12	---- Not Found ----		
			1129.07	0.14	---- Not Found ----		
			1212.72	1.63	---- Not Found ----		
			1216.02	3.04	---- Not Found ----		
			1220.52	1.39	---- Not Found ----		
			1439.13	0.33	---- Not Found ----		
			1453.60	0.13	---- Not Found ----		
			1707.67	0.33	---- Not Found ----		
	% Abundances Found =			73.70			
RU-103	39.35D	10.01	497.00*	89.00	---- Not Found ----		Decay,Abun.
			610.33	5.60	1.787E-04	47.05	
	% Abundances Found =			5.92			
XE-135	9.11H	1037.42	249.79*	89.90	---- Not Found ----		Decay,Abun.
			608.19	2.09	1.000E+35	47.05	
	% Abundances Found =			3.11			
CS-136	13.16D	29.92	66.91	12.50	3.239E+02	39.44	Decay,Abun.
			86.29	6.30	---- Not Found ----		
			153.22	7.46	---- Not Found ----		
			163.89	4.61	---- Not Found ----		
			176.55	13.56	---- Not Found ----		
			273.65	12.66	---- Not Found ----		
			340.57	40.50	---- Not Found ----		
			818.50*	99.70	---- Not Found ----		
			1048.07	79.60	---- Not Found ----		
			1235.34	19.70	---- Not Found ----		
	% Abundances Found =			4.10			
PM-148M	41.30D	9.53	288.11	12.56	---- Not Found ----		Abun.

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/CC)	1-Sigma %Error	Rejected by
PM-140M	41.30D	9.53	414.07	10.66	---- Not Found	----	Abun.
			432.70	5.35	---- Not Found	----	
			501.26	6.75	---- Not Found	----	
			550.27*	94.90	---- Not Found	----	
			599.74	12.54	---- Not Found	----	
			611.26	5.40	1.316E-04	47.05	
			629.97	09.00	---- Not Found	----	
			725.70	32.00	---- Not Found	----	
			915.33	17.17	---- Not Found	----	
			1013.01	20.30	---- Not Found	----	
		% Abundances Found =		1.74			
TA-182	114.74D	3.43	67.75	42.30	1.015E-06	39.44	Abun.
	>		100.10	14.10	---- Not Found	----	
			1189.05	16.30	---- Not Found	----	
			1221.42*	27.10	---- Not Found	----	
			1230.97	11.50	---- Not Found	----	
		% Abundances Found =		30.01			
BI-214	19.90M	20495.09	609.31*	46.30	1.000E+35	47.05	Decay
			768.36	5.04	---- Not Found	----	
			934.06	3.21	---- Not Found	----	
			1120.29	15.10	---- Not Found	----	
			1238.11	5.94	---- Not Found	----	
			1377.67	4.11	---- Not Found	----	
			1764.49	15.00	---- Not Found	----	
		% Abundances Found =		48.48	(Abn. Limit = 48.48%)		

Flags: "*" = Keyline

Sample ID : EF1 EFT-69061206 Acquisition date : 11-JUL-2007 09:52:10

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	66.36	38	55	1.01	132.90	128	9	2.09E-02	39.4	1.42E+00	T
5	510.03	65	28	2.34	1020.91	1016	27	3.60E-02	22.3	4.88E+00	
5	511.79	43	41	2.54	1024.43	1016	27	2.38E-02	41.0	4.88E+00	T
0	559.07	68	31	1.65	1119.04	1112	16	3.79E-02	22.1	4.60E+00	T
0	609.52	29	34	0.54	1220.01	1211	15	1.63E-02	47.1	4.52E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 11-JUL-2007 10:22:27.42

Sample ID : EF1 EFT-68061206

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/CC)
BE-7	14.	477.59	9.5555E-06
F-18	0.	511.00	Half-Life too short
NA-22	9.	1274.54	1.2169E-08
NA-24 <	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	7.	889.25	1.8016E-07
CR-51	0.	320.08	Half-Life too short
MN-54	17.	834.83	2.2478E-08
CO-56	8.	1238.25	4.8948E-07
MN-56	0.	1810.69	Half-Life too short
NI-56	0.	158.38	Half-Life too short
CO-57	35.	122.06	2.4963E-08
CO-58	14.	810.76	3.9691E-07
FE-59	7.	1099.22	6.1140E-06
CO-60	10.	1332.49	1.1451E-08
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	10.	1115.52	5.3444E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	36.	136.00	1.2884E-07
AS-76	0.	559.10	Half-Life too short
BR-82	0.	776.49	Half-Life too short
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	882.41	Half-Life too short
KR-85	36.	513.99	2.3675E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	36.	513.99	6.4398E-07
RB-86	0.	1076.63	Half-Life too short
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	2.	1836.01	8.2187E-08
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	7.	1204.90	2.9387E-04
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Sample ID : EF1 EFT-6S061206 Acquisition date : 11-JUL-2007 09:52:10

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/CC)
SR-93	0.	590.20	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	17.	702.63	7.9286E-09
NB-95	0.	765.79	Half-Life too short
NB-95M	0.	235.69	Half-Life too short
ZR-95	14.	756.72	1.0044E-06
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	0.	739.50	Half-Life too short
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	0.	497.08	Half-Life too short
TC-104	0.	357.99	Half-Life too short
RH-105	0.	318.90	Half-Life too short
RU-105	0.	724.50	Half-Life too short
RU-106	18.	621.84	1.6100E-07
CD-109	40.	88.03	6.6331E-07
AG-110M	11.	937.40	7.3467E-08
SN-113	25.	391.69	1.1727E-07
SN-117M	0.	158.56	Half-Life too short
SB-122	0.	563.93	Half-Life too short
SB-124	27.	602.71	8.4809E-07
SB-125	33.	427.89	3.7163E-08
TE-125M	45.	109.28	3.9294E-04
TE-127	0.	417.90	Half-Life too short
TE-127M	23.	57.60	2.6068E-04
XE-127	0.	202.84	Half-Life too short
TE-129	0.	459.60	Half-Life too short
TE-129M	0.	695.88	Half-Life too short
XE-129M	0.	196.56	Half-Life too short
I-130	0.	536.09	Half-Life too short
BA-131	0.	123.80	Half-Life too short
I-131	0.	364.48	Half-Life too short
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	0.	163.93	Half-Life too short
I-132	0.	667.69	Half-Life too short
TE-132	0.	228.16	Half-Life too short
BA-133	36.	302.84	4.6061E-08
BA-133M	0.	276.09	Half-Life too short
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	0.	81.00	Half-Life too short
XE-133M	0.	233.22	Half-Life too short
CS-134	26.	604.70	1.2806E-08
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/CC)
CS-136	0.	818.50	Half-Life too short
I-136	0.	1313.02	Half-Life too short
CS-137	11.	661.65	7.5052E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	40.	165.85	7.0303E-08
CS-139	0.	1203.23	Half-Life too short
BA-140	0.	537.32	Half-Life too short
LA-140	0.	1596.49	Half-Life too short
BA-141	0.	190.22	Half-Life too short
CE-141	0.	145.44	Half-Life too short
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	0.	293.26	Half-Life too short
CE-144	53.	133.54	2.1290E-07
PR-144	0.	1489.15	Half-Life too short
ND-147	0.	91.10	Half-Life too short
PM-148M	19.	550.27	5.7434E-06
EU-152	24.	344.27	2.6730E-08
EU-154	10.	1004.76	5.1764E-08
EU-156	0.	646.29	Half-Life too short
HF-181	23.	482.03	5.6956E-06
TA-182	13.	1221.42	4.2081E-07
W-187	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
HG-203	44.	279.19	3.6855E-06
BI-207	16.	569.67	7.1806E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	0.	240.90	Half-Life too short
RA-226	50.	186.21	2.4396E-07
AC-228	30.	338.32	8.0742E-08
TH-228	43.	84.37	1.9101E-06
PA-234	0.	131.20	Half-Life too short
TH-234	0.	63.29	Half-Life too short
U-235	48.	143.76	7.6960E-08
NP-239	0.	106.13	Half-Life too short
AM-241	41.	59.54	1.9902E-07

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-6 S 06 12 06

Sample Location (Well Number): EFT-6S

1. Representative sample collected. Date/Time 06/12/06 / 1515

Sample collected by: Joy Slaback for J Slaybach Date: 06/12/06
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Christopher Failing / Date: 08/02/06
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: Russ Burgett Date: 8-3-06
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: RD Lindsey / Date: 2-21-08
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-6S	
2 . Date Sampled	06/12/2006	
3 . Time Sampled	15:15	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	08/03/2006	
2 . Time Sample Counted	12:30	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	8.3	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	3619.6	cpm
Net Spike Count Rate (cpm)	3611.3	cpm
H3 Spike Activity (dpm on count date)	8580.4	dpm
Counter Efficiency	0.4209	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	9.5	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	1.2	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.1	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{\text{(Bkg cpm)}}{\text{(Bkg min.)}} + \frac{\text{(Bkg cpm)}}{\text{(Smpl min.)}}}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}} = 1.14\text{E-}06 \text{ uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency x 2.22E6 uCi/ml x Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 8-3-06

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-GD060706

Sample Location (Well Number): EFT-GD

1. Representative sample collected. Date/Time 06/07/06 / 1052

Sample collected by: Joy Slabaugh / Joy Slabaugh Date: 06/07/06
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Christopher Frilling / Christ A Frilling Date: 08/07/06
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: Russ Burgett Date: 8-3-06
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: KD LINDSEY / KD Lindsey Date: 1-3-12
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-6D	
2 . Date Sampled	06/07/2006	
3 . Time Sampled	10:52	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	08/03/2006	
2 . Time Sample Counted	10:00	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	7.2	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	3598.6	cpm
Net Spike Count Rate (cpm)	3591.4	cpm
H3 Spike Activity (dpm on count date)	8580.4	dpm
Counter Efficiency	0.4186	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	8.8	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	1.6	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{(\text{Bkg cpm})}{(\text{Bkg min.})} + \frac{(\text{Bkg cpm})}{(\text{Smpl min.})}}}{\text{Efficiency} \times 2.22\text{E6 dpm/uCi} \times \text{Sample Volume}} = 1.07\text{E-06 uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency} \times 2.22\text{E6 uCi/ml} \times \text{Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 8-3-06

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-6S061206

Sample Location (Well Number): EFT-6S

1. Representative sample collected. Date/Time 06/12/06 / 1515

Sample collected by: Jay Slabach Jay Slabach Date: 06/12/06
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Christopher Frailing Christopher A Frailing Date: 08/02/06
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: Abere / Andrea Abere Date: 8-5-06
Fermi 2 RP Printed Name Signature

Sample number: EFT-6S061206

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: Above / Andrew Howe Date: 8-5-06
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed 8-21-08

Performed by: KD LINDSEY / KD Lindsey Date: Signed 1-3-12
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EFT-6S061206 EF1

Sample End Time: 12-JUN-2006 15:15:00.00

REMARKS:

PERFORMED BY:

SIGNATURE

REVIEWED BY:

SIGNATURE/DATE 2-21-08

Sample ID : EFT-6S061206 EF1 Acquisition date : 5-AUG-2006 08:21:19

Fermi 2 Radiation Protection Gamma Spectroscopy Report

Sample Parameters

Sample ID Number: EFT-6S061206 EF1
Sample collection start date: 12-JUN-2006 15:15:00.00
Sample collection end date : 12-JUN-2006 15:15:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.000000E+03 cc
Sample geometry : M2LL Operator: AKG

Acquisition Parameters

Detector number : DET 4 Acquire date : 5-AUG-2006 08:21:19.52
Preset live time : 0 00:30:00.00 Elapsed live time : 0 00:30:00.00
Elapsed real time : 0 00:30:01.10 Percent dead time : 0.05 %

Calibration Parameters

Detector number : DET 4 Yearly cal date : 26-APR-2006 11:58:00.00
Kev/channel : 5.00143E-01 Zero offset: -2.30456E-03
Daily cal date : 5-AUG-2006 08:20:12.42

Peak Search Parameters

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

Nuclide Identification Parameters

Energy tolerance : 2.00000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	3	510.61	00	45	2.51	1021.24	1015	19	4.44E-02	21.0	1.83E+00
2	3	511.60	20	43	2.00	1023.30	1015	19	1.50E-02	50.6	
3	0	558.53	62	24	1.40	1117.11	1111	12	3.45E-02	20.2	
4	0	609.53	91	25	1.85	1219.16	1211	17	5.07E-02	16.4	
5	0	1461.17	84	4	2.12	2924.03	2916	17	4.67E-02	12.2	

Decay Time = 53 17:06:19.52 Acquisition Time = 5-AUG-2006 08:21:19.52

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
3	510.61	00	45	2.51	1021.24	1015	19	21.0	1.03E+00	Annihilation
3	511.60	28	43	2.08	1023.30	1015	19	50.6		
0	558.53	62	24	1.40	1117.11	1111	12	20.2		Th-232 Bi-214
0	609.53	91	25	1.85	1219.16	1211	17	16.4		
0	1461.17	04	4	2.12	2924.03	2916	17	12.2		K-40

Sample ID : EFT-66061206 EF1 Acquisition date : 5-AUG-2006 00:21:19

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	84	10.67*	2.300E+00	5.127E-07	5.127E-07	12.25

Flag: "*" = Keyline

Sample ID : EFT-6S061206 EF1 Acquisition date : 5-AUG-2006 00:21:19

Total number of lines in spectrum	5	
Number of unidentified lines	1	
Number of lines tentatively identified by NID	4	00.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	5.127E-07	5.127E-07	0.628E-07	12.25	
	Total Activity :		5.127E-07	5.127E-07			
	Grand Total Activity :		5.127E-07	5.127E-07			

Flags: "<" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EFT-6S061206 EF1 Acquisition date : 5-AUG-2006 08:21:19

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	704.95	511.00*	193.46	1.000E+35	21.01	Decay
		% Abundances Found =		100.00			
AS-76	26.32H	48.99	559.10*	44.70	2.701E+07	20.24	Decay,Abun.
			563.23	1.17	---- Not Found ----		
			571.30	0.14	---- Not Found ----		
			657.03	6.10	---- Not Found ----		
			665.31	0.39	---- Not Found ----		
			740.12	0.12	---- Not Found ----		
			771.76	0.12	---- Not Found ----		
			867.63	0.12	---- Not Found ----		
			1129.47	0.14	---- Not Found ----		
			1212.72	1.63	---- Not Found ----		
			1216.02	3.04	---- Not Found ----		
			1220.52	1.39	---- Not Found ----		
			1439.13	0.33	---- Not Found ----		
			1453.60	0.13	---- Not Found ----		
			1787.67	0.33	---- Not Found ----		
		% Abundances Found =		73.70			
RU-103	39.35D	1.37	497.08*	89.00	---- Not Found ----		Abun.
			610.33	5.60	1.515E-06	16.41	
		% Abundances Found =		5.92			
XE-135	9.11H	141.53	249.79*	89.90	---- Not Found ----		Decay,Abun.
			608.19	2.89	1.000E+35	16.41	
		% Abundances Found =		3.11			
PM-148M	41.30D	1.30	288.11	12.56	---- Not Found ----		Abun.
			414.07	18.66	---- Not Found ----		
			432.78	5.35	---- Not Found ----		
			501.26	6.75	---- Not Found ----		
			550.27*	94.90	---- Not Found ----		
			599.74	12.54	---- Not Found ----		
			611.26	5.48	1.480E-06	16.41	
			629.97	89.00	---- Not Found ----		
			725.70	32.80	---- Not Found ----		
			915.33	17.17	---- Not Found ----		
			1013.81	20.30	---- Not Found ----		
		% Abundances Found =		1.74			
BI-214	19.90M	3887.50	609.31*	46.30	1.000E+35	16.41	Decay
			768.36	5.04	---- Not Found ----		
			934.06	3.21	---- Not Found ----		
			1120.29	15.10	---- Not Found ----		
			1238.11	5.94	---- Not Found ----		
			1377.67	4.11	---- Not Found ----		
			1764.49	15.80	---- Not Found ----		
		% Abundances Found =		48.48	(Abn. Limit = 48.48%)		

Flags: "*" = Keyline

Sample ID : EFT-6506120G EF1 Acquisition date : 5-AUG-2006 08:21:19

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flag
3	510.61	80	45	2.51	1021.24	1015	19	4.44E-02	21.9	4.49E+00	T
3	511.66	28	43	2.06	1023.38	1015	19	1.50E-02	50.6	4.40E+00	
0	550.53	62	24	1.40	1117.11	1111	12	3.45E-02	20.2	4.31E+00	T
0	609.53	91	23	1.65	1219.16	1211	17	5.07E-02	16.4	4.16E+00	T

Flags: "T" = Tentatively associated

* Detroit Edison Fermi 2 MDA Report, Generated 5-AUG-2006 08:51:26.95

* Sample ID : EFT-6S061206 EF1

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	32.	477.59	1.8119E-07
F-18	0.	511.00	Half-Life too short
NA-22	14.	1274.54	1.2530E-08
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	11.	889.25	1.4235E-08
CR-51	43.	320.08	3.6487E-07
MN-54	17.	834.83	1.1503E-08
CO-56	20.	1238.25	3.8545E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	47.	158.38	3.8345E-06
CO-57	40.	122.06	1.2375E-08
CO-58	15.	810.76	1.6639E-08
FE-59	20.	1099.22	5.2522E-08
CO-60	15.	1332.49	1.3069E-08
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	17.	1115.52	2.7923E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	42.	136.00	1.9795E-08
AS-76	0.	559.10	Half-Life too short
BR-82	0.	776.49	Half-Life too short
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	40.	513.99	2.5209E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	40.	513.99	1.9269E-08
RB-86	16.	1076.63	9.8363E-07
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
SR-88	0.	1382.39	Half-Life too short
Y-88	5.	1836.01	1.3764E-08
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	17.	1204.90	7.9937E-06
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Sample ID : EFT-6S061206 EF1 Acquisition date : 5-AUG-2006 08:21:1

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
SR-93	0.	590.28	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	19.	702.63	9.1757E-09
NB-95	25.	765.79	3.2740E-08
NB-95M	0.	235.69	Half-Life too short
ZR-95	16.	756.72	2.9762E-08
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	0.	739.50	Half-Life too short
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	23.	497.08	2.3829E-08
TC-104	0.	357.99	Half-Life too short
RH-105	0.	318.90	Half-Life too short
RU-105	0.	724.50	Half-Life too short
RU-106	17.	621.84	9.0020E-08
CD-109	43.	88.03	4.6124E-07
AG-110M	16.	937.48	3.7685E-08
SN-113	39.	391.69	2.0145E-08
SN-117M	49.	158.56	1.5395E-07
SB-122	0.	563.93	Half-Life too short
SB-124	27.	602.71	1.0227E-08
SB-125	27.	427.89	2.9549E-08
TE-125M	37.	109.28	6.0370E-06
TE-127	0.	417.90	Half-Life too short
TE-127M	33.	57.60	3.3296E-05
XE-127	11.	202.84	3.9465E-08
TE-129	0.	459.60	Half-Life too short
TE-129M	15.	695.88	7.4010E-07
XE-129M	76.	196.56	1.4953E-05
I-130	0.	536.09	Half-Life too short
BA-131	54.	123.80	8.4056E-07
I-131	37.	364.48	1.1366E-06
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	41.	163.93	9.4153E-06
I-132	0.	667.69	Half-Life too short
TE-132	0.	228.16	Half-Life too short
BA-133	43.	302.84	5.2111E-08
BA-133M	0.	276.09	Half-Life too short
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	0.	81.00	Half-Life too short
XE-133M	0.	233.22	Half-Life too short
CS-134	18.	604.70	8.6155E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Sample ID : EFT-6SWG1206 EF1 Acquisition date : 5-AUG-2006 08:21:15

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-136	10.	818.50	1.3846E-07
I-136	0.	1313.02	Half-Life too short
CS-137	22.	661.65	1.0847E-08
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	39.	165.85	1.2635E-08
CS-139	0.	1283.11	Half-Life too short
BA-140	29.	537.32	7.0060E-07
LA-140	0.	1596.49	Half-Life too short
BA-141	0.	190.22	Half-Life too short
CE-141	46.	145.44	5.6145E-08
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	0.	293.26	Half-Life too short
CE-144	56.	133.54	1.0440E-07
PR-144	0.	1489.15	Half-Life too short
ND-147	31.	91.10	1.3405E-06
PM-148M	20.	550.27	2.1132E-08
EU-152	37.	344.27	3.3781E-08
EU-154	17.	1004.76	6.5382E-08
EU-156	16.	646.29	1.2799E-06
HF-181	24.	482.03	2.4079E-08
TA-182	7.	1221.42	4.3663E-08
W-187	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
HG-203	46.	279.19	2.7334E-08
BI-207	18.	569.67	8.1425E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	0.	240.98	Half-Life too short
RA-226	54.	186.21	2.7577E-07
AC-228	51.	338.32	9.1706E-08
TH-228	29.	84.37	1.2708E-06
PA-234	0.	131.20	Half-Life too short
TH-234	55.	63.29	6.7225E-06
U-235	54.	143.76	8.8846E-08
NP-239	0.	106.13	Half-Life too short
AM-241	33.	59.54	1.8168E-07

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-65121306

Sample Location (Well Number): EFT-65

1. Representative sample collected. Date/Time 12/13/06 / 1348

Sample collected by: J. Slaback / Joy Marie Slaback Date: 02/01/07
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: J. Southward / Jennifer Southward Date: 2/2/07
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: D. Howard / [signature] Date: APR 20 2007
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: KD Linsley / KD Linsley Date: 11-14-07
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-65121306	
2 . Date Sampled	12/13/2006	
3 . Time Sampled	13:48	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	04/19/2007	
2 . Time Sample Counted	17:07	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	7.7	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	3407.6	cpm
Net Spike Count Rate (cpm)	3399.9	cpm
H3 Spike Activity (dpm on count date)	8243.8	dpm
Counter Efficiency	0.4124	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	6.6	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.0	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{\text{(Bkg cpm)}}{\text{(Bkg min.)}} + \frac{\text{(Bkg cpm)}}{\text{(Smpl min.)}}}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}} = 1.12\text{E-}06 \text{ uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency x 2.22E6 uCi/ml x Sample Volume}} < \textbf{MDA}$$

Technician _____ Date APR 20 2007

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-6S121306

Sample Location (Well Number): EFT-6S

1. Representative sample collected. Date/Time 12/13/06 / 1348

Sample collected by: J. Slaback / Joy Marie Slaback Date: 02/01/07
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: J. Southward / Jennifer Southward Date: ~~2/2/07~~ 7/11/07 7/11/07
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: K D Kindy / K D Kindy Date: 8-8-07
Fermi 2 RP Printed Name Signature

Sample number: EFT-65121306

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: Chris Hubbard Date: 7-17-06
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: K D Hurley / K D Hurley Date: 8-8-07
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EF1 EFT-GC121306

Sample End Time: 13-DEC-2006 13:40:00.00

REMARKS

PERFORMED BY:

SIGNATURE

REVIEWED BY:

K O Gadsey 8-8-07

SIGNATURE/DATE

Sample ID : EF1 EFT-6S121306 Acquisition date : 17-JUL-2007 00:10:01

****

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********

Sample ID Number: EF1 EFT-6S121306
Sample collection start date: 13-DEC-2006 13:40:00.00
Sample collection end date : 13-DEC-2006 13:40:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.00000E+03 CC
Sample geometry : MELL Operator: CMM

********** Acquisition Parameters **********

Detector number : DET 4 Acquire date : 17-JUL-2007 00:10:01.77
Preset live time : 0 00:30:00.00 Elapsed live time : 0 00:30:00.00
Elapsed real time : 0 00:30:00.89 Percent dead time : 0.05 %

********** Calibration Parameters **********

Detector number : DET 4 Yearly cal date : 20-JUN-2007 12:16:46.16
Kev/channel : 4.99739E-01 Zero offset: -1.07317E-01
Daily cal date : 17-JUL-2007 00:15:42.31

********** Peak Search Parameters **********

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********

Energy tolerance : 2.00000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	511.65	143	33	2.25	1024.21	1017	16	7.95E-02	12.5	annihilation
2	0	558.61	67	15	1.64	1118.18	1113	12	3.75E-02	16.7	HWC
3	0	608.72	32	12	0.73	1218.44	1213	10	1.76E-02	27.5	Bi 214
4	0	1120.33	16	17	0.56	2242.21	2233	14	8.66E-03	62.3	Bi-214
5	0	1461.19	48	12	3.90	2924.27	2915	16	2.65E-02	21.0	K-40

Decay Time = 215 10:30:01.77 Acquisition Time = 17-JUL-2007 08:17

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclide
0	511.65	143	33	2.25	1024.21	1017	16	12.5		
0	558.61	67	15	1.64	1118.10	1113	12	16.7		
0	608.72	32	12	0.73	1218.44	1213	10	27.5		
0	1120.33	16	17	0.56	2242.21	2233	14	62.3		
0	1461.19	40	12	3.90	2924.27	2915	16	21.8		K-40

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/CC	Decay Corr uCi/CC	1-Sigma %Error
K-40	1460.81	48	10.67*	2.501E+00	2.607E-07	2.607E-07	21.76

Flag: "*" = Keyline

Sample ID : EF1 EFT-69121306 Acquisition date : 17-JUL-2007 09:10:01

Total number of lines in spectrum	5	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	5	100.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/CC	Decay Corr uCi/CC	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+09Y	1.00	2.607E-07	2.607E-07	0.565E-07	21.76	
Total Activity :			2.607E-07	2.607E-07			
Grand Total Activity :			2.607E-07	2.607E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EF1 EFT-6S121306 Acquisition date : 17-JUL-2007 08:10:01

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity 1-Sigma (uCi/CC)	%Error	Rejected by
F-18	109.74M	2831.47	511.00*	193.46	1.000E+35	12.51	Decay
	%	Abundances	Found =	100.00			
SC-46	83.83D	2.57	142.53	62.70	---- Not Found ----		Abun.
			889.25*	99.98	---- Not Found ----		
			1120.51	99.99	4.007E-00	62.27	
	%	Abundances	Found =	38.07			
AS-76	26.32H	196.76	559.10*	44.70	1.000E+35	16.71	Decay,Abun.
			563.23	1.17	---- Not Found ----		
			571.30	0.14	---- Not Found ----		
			657.03	6.10	---- Not Found ----		
			665.31	0.39	---- Not Found ----		
			740.12	0.12	---- Not Found ----		
			771.76	0.12	---- Not Found ----		
			867.63	0.12	---- Not Found ----		
			1129.07	0.14	---- Not Found ----		
			1212.72	1.63	---- Not Found ----		
			1216.02	3.84	---- Not Found ----		
		@	1228.52	1.39	---- Not Found ----		
			1439.13	0.33	---- Not Found ----		
			1453.60	0.13	---- Not Found ----		
			1707.67	0.33	---- Not Found ----		
	%	Abundances	Found =	73.70			
KR-90	32.32S	576841.06	121.82	32.00	---- Not Found ----		Decay,Abun.
			539.49	29.00	---- Not Found ----		
			1118.69*	37.00	1.000E+35	62.27	
	%	Abundances	Found =	37.76			
RU-103	39.35D	5.40	497.08*	89.00	---- Not Found ----		Abun.
			610.33	5.60	8.304E-06	27.46	
	%	Abundances	Found =	5.92			
XE-135	9.11H	568.47	249.79*	89.90	---- Not Found ----		Decay,Abun.
			608.19	2.89	1.000E+35	27.46	
	%	Abundances	Found =	3.11			
BI-214	19.90M	15614.32	609.31*	46.30	1.000E+35	27.46	Decay
			768.36	5.04	---- Not Found ----		
			934.06	3.21	---- Not Found ----		
			1120.29	15.10	1.000E+35	62.27	
			1238.11	5.94	---- Not Found ----		
			1377.67	4.11	---- Not Found ----		
			1764.49	15.00	---- Not Found ----		
	%	Abundances	Found =	64.29	(Abn. Limit = 40.40%)		

Flag: "*" = Keyline

Sample ID : EF1 EFT-6S121306 Acquisition date : 17-JUL-2007 00:10:01

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	511.65	143	33	2.25	1024.21	1017	16	7.95E-02	12.5	4.80E+00	T
0	558.61	67	15	1.64	1118.19	1113	12	3.75E-02	16.7	4.69E+00	T
0	608.72	32	12	0.73	1218.44	1213	10	1.76E-02	27.5	4.52E+00	T
0	1120.33	16	17	0.56	2242.21	2233	14	8.66E-03	62.3	2.90E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 17-JUL-2007 09:48:10.00

Sample ID : EF1 EFT-6S121306

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/CC)
BE-7	16.	477.59	9.9245E-07
F-18	0.	511.00	Half-Life too short
NA-22	11.	1274.54	1.1646E-08
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	13.	889.25	5.3911E-08
CR-51	26.	320.08	1.5153E-05
MN-54	14.	834.83	1.3825E-08
CO-56	14.	1238.25	1.1080E-07
MN-56	0.	1810.69	Half-Life too short
NI-56	0.	158.38	Half-Life too short
CO-57	41.	122.06	1.7146E-08
CO-58	10.	810.76	6.0610E-08
FE-59	12.	1099.22	4.8397E-07
CO-60	14.	1332.49	1.2410E-08
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	16.	1115.52	4.0385E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	41.	136.00	4.5504E-08
AS-76	0.	559.10	Half-Life too short
BR-82	0.	776.49	Half-Life too short
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.58	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	50.	513.99	2.6574E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	50.	513.99	1.1125E-07
RB-86	0.	1076.63	Half-Life too short
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	3.	1836.01	2.9945E-08
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	5.	1204.90	3.1376E-05
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/CC)
SR-93	0.	590.20	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	17.	702.63	8.0168E-09
NB-95	15.	765.79	5.9364E-07
NB-95M	0.	235.69	Half-Life too short
ZR-95	6.	756.72	1.0351E-07
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	0.	739.50	Half-Life too short
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	15.	497.08	3.1697E-07
TC-104	0.	357.99	Half-Life too short
RH-105	0.	318.90	Half-Life too short
RU-105	0.	724.50	Half-Life too short
RU-106	18.	621.84	1.1471E-07
CD-109	30.	88.03	4.4644E-07
AG-110M	10.	937.48	4.3082E-08
SN-113	19.	391.69	3.5157E-08
SN-117M	0.	158.56	Half-Life too short
SB-122	0.	563.93	Half-Life too short
SB-124	19.	602.71	9.2949E-08
SB-125	26.	427.89	2.9009E-08
TE-125M	31.	109.28	3.9650E-05
TE-127	0.	417.90	Half-Life too short
TE-127M	25.	57.60	8.5865E-05
XE-127	42.	202.84	6.7397E-07
TE-129	0.	459.60	Half-Life too short
TE-129M	18.	695.88	2.0029E-05
XE-129M	0.	196.56	Half-Life too short
I-130	0.	536.09	Half-Life too short
BA-131	0.	123.80	Half-Life too short
I-131	0.	364.48	Half-Life too short
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	0.	163.93	Half-Life too short
I-132	0.	667.69	Half-Life too short
TE-132	0.	228.16	Half-Life too short
BA-133	25.	302.84	3.7804E-08
BA-133M	0.	276.09	Half-Life too short
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	0.	81.00	Half-Life too short
XE-133M	0.	233.22	Half-Life too short
CS-134	17.	604.70	8.9917E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Sample ID : EF1 EFT-GS121306 Acquisition date : 17-JUL-2007 08:10:01

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/CC)
CS-136	0.	818.50	Half-Life too short
I-136	0.	1313.02	Half-Life too short
CS-137	14.	661.65	8.1559E-09
XE-137	0.	455.49	Half-Life too short
CS-139	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	39.	165.85	2.6062E-08
CS-139	0.	1293.23	Half-Life too short
BA-140	0.	537.32	Half-Life too short
LA-140	0.	1596.49	Half-Life too short
BA-141	0.	190.22	Half-Life too short
CE-141	36.	145.44	1.4521E-06
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	0.	293.26	Half-Life too short
CE-144	40.	133.54	1.3234E-07
PR-144	0.	1489.15	Half-Life too short
ND-147	0.	91.10	Half-Life too short
PM-148M	15.	550.27	2.6042E-07
EU-152	30.	344.27	2.8765E-08
EU-154	12.	1004.76	5.3717E-08
EU-156	0.	646.29	Half-Life too short
HF-181	13.	482.03	2.3922E-07
TA-182	9.	1221.42	1.2184E-07
W-187	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
HG-203	44.	279.19	2.5992E-07
BI-207	21.	569.67	8.1195E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	0.	240.98	Half-Life too short
RA-226	46.	186.21	2.3357E-07
AC-228	29.	338.32	6.9005E-08
TH-228	33.	84.37	1.4119E-06
PA-234	0.	131.20	Half-Life too short
TH-234	35.	63.29	5.4120E-04
U-235	41.	143.76	7.2071E-08
NP-239	0.	106.13	Half-Life too short
AM-241	32.	59.54	1.7685E-07

EFT-6S

2007

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-65 7507

Sample Location (Well Number): EFT-65

1. Representative sample collected. Date/Time 7/5/07 / 1510

Sample collected by: Joy Marie Slaback / Joy Marie Slaback Date: 12/10/2007
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: J. Southward / J Southward Date: 12/10/07
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: R Byers / [signature] Date: 12-14-07
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: KO Lindy / KO Lindy Date: 2-26-08
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	6S	
2 . Date Sampled	07/05/2007	
3 . Time Sampled	15:10	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	12/14/2007	
2 . Time Sample Counted	08:00	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	8.2	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	3189.3	cpm
Net Spike Count Rate (cpm)	3181.1	cpm
H3 Spike Activity (dpm on count date)	7944.9	dpm
Counter Efficiency	0.4004	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	8.5	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.3	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.1	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \sqrt{\frac{\frac{\text{(Bkg cpm)}}{\text{(Bkg min.)}} + \frac{\text{(Bkg cpm)}}{\text{(Smpl min.)}}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}}} = 1.19E\text{-}06 \text{ uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency x 2.22E6 uCi/ml x Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 12-14-07

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-6S7507

Sample Location (Well Number): EFT-6S

1. Representative sample collected. Date/Time 07/05/2007/ 1510

Sample collected by: J. Slaback / Jay Marie Slaback Date: 07/16/2007
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: J. Southward / Jennifer Southward Date: 08/08/07
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: K. Linosey / K. Linosey Date: 8-8-07
Fermi 2 RP Printed Name Signature

Sample number: EFT-657507

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: Chris Hubbard [signature] Date: 7-19-07
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: KD Lindsey / [signature] Date: 8-8-07
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

DETROIT EDISON FERMI-2 POWER PLANT 19-JUL-2007 11:53:51.55

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: CF1 EFT-657507

Sample End Time: 5-JUL-2007 15:10:00.00

REMARKS

PERFORMED BY:

SIGNATURE

REVIEWED BY:

SIGNATURE/DATE 8-8-07

Sample ID : EF1 EFT-637507 Acquisition date : 19-JUL-2007 11:23:46

****

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********

Sample ID Number: EF1 EFT-637507
Sample collection start date: 5-JUL-2007 15:10:00.00
Sample collection end date : 5-JUL-2007 15:10:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.00000E+03 cc
Sample geometry : MELL Operator: CMH

********** Acquisition Parameters **********

Detector number : DET 4 Acquire date : 19-JUL-2007 11:23:46.50
Preset live time : 0 00:30:00.00 Elapsed live time : 0 00:30:00.00
Elapsed real time : 0 00:30:00.91 Percent dead time : 0.05 %

********** Calibration Parameters **********

Detector number : DET 4 Yearly cal date : 20-JUN-2007 12:16:46.16
Kev/channel : 4.99741E-01 Zero offset: -1.77476E-01
Daily cal date : 19-JUL-2007 00:20:24.04

********** Peak Search Parameters **********

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********

Energy tolerance : 2.00000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_M211 Efficiencies at : Peak energy

****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Rw	Cts/Sec	%Err	Fit
1	0	198.46	41	39	1.32	397.47	393	8	2.06E-02	31.1	PA-238
2	0	352.29	34	39	1.52	705.29	697	12	1.90E-02	40.3	PB-214
3	0	510.83	131	49	1.80	1022.53	1013	16	7.28E-02	14.7	annihilation
4	0	559.07	55	41	1.94	1119.06	1111	14	3.04E-02	29.5	TL C
5	0	609.63	25	37	1.46	1220.22	1215	12	1.39E-02	52.3	BI 214
6	0	1460.44	59	0	2.50	2922.61	2914	17	3.28E-02	17.2	K-40

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	190.46	41	39	1.32	397.47	393	8	31.1		XE-129M
0	352.29	34	39	1.52	705.29	697	12	40.3		
0	510.83	131	48	1.00	1022.53	1013	16	14.7		
0	559.07	55	41	1.94	1119.06	1111	14	20.5		
0	609.63	25	37	1.42	1220.22	1215	12	52.3		
0	1460.44	59	0	2.50	2922.61	2914	17	17.2		K-40

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	59	10.67*	2.502E+00	3.320E-07	3.320E-07	17.21

Nuclide Type: activation

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
XE-129M	196.56	41	4.74*	6.599E+00	1.955E-07	5.757E-07	31.06

Flags: "X" = Keyline

Sample ID : EF1 EFT-667507 Acquisition date : 19-JUL-2007 11:23:46

Total number of lines in spectrum	6	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	6	100.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	3.320E-07	3.320E-07	0.571E-07	17.21	
	Total Activity :		3.320E-07	3.320E-07			

Nuclide Type : activation

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
XE-129M	0.09D	2.95	1.955E-07	5.757E-07	1.788E-07	31.06	
	Total Activity :		1.955E-07	5.757E-07			
Grand Total Activity :			5.275E-07	9.077E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	101.78	511.00*	193.46	1.000E+35	14.70	Decay
		% Abundances Found =		100.00			
SE-75	119.78D	0.12	66.05	1.02	---- Not Found ----		Abun.
			96.73	3.41	---- Not Found ----		
			121.12	16.70	---- Not Found ----		
			136.00*	59.20	---- Not Found ----		
			198.60	1.45	6.924E-07	31.06	
			264.65	59.00	---- Not Found ----		
			279.53	25.20	---- Not Found ----		
			303.91	1.32	---- Not Found ----		
			400.65	11.40	---- Not Found ----		
		% Abundances Found =		0.01			
AS-76	26.32H	12.63	559.10*	44.70	2.494E-04	28.46	Decay,Abun.
			563.23	1.17	---- Not Found ----		
			571.30	0.14	---- Not Found ----		
			657.03	6.10	---- Not Found ----		
			665.31	0.39	---- Not Found ----		
			740.12	0.12	---- Not Found ----		
			771.76	0.12	---- Not Found ----		
			867.63	0.12	---- Not Found ----		
			1129.07	0.14	---- Not Found ----		
			1212.72	1.63	---- Not Found ----		
			1216.02	3.04	---- Not Found ----		
			1220.52	1.39	---- Not Found ----		
			1439.13	0.33	---- Not Found ----		
			1453.60	0.13	---- Not Found ----		
			1787.67	0.33	---- Not Found ----		
		% Abundances Found =		73.70			
RU-103	39.35D	0.35	497.08*	89.00	---- Not Found ----		Abun.
			610.33	5.60	1.009E-07	52.29	
		% Abundances Found =		5.92			
XE-135	9.11H	36.50	249.79*	89.90	---- Not Found ----		Decay,Abun.
			608.19	2.89	2.779E+04	52.29	
		% Abundances Found =		3.11			
PM-148M	41.30D	0.34	288.11	12.56	---- Not Found ----		Abun.
			414.07	18.66	---- Not Found ----		
			432.78	5.35	---- Not Found ----		
			501.26	6.75	---- Not Found ----		
			550.27*	94.90	---- Not Found ----		
			599.74	12.54	---- Not Found ----		
			611.26	5.48	1.900E-07	52.29	
			629.97	89.00	---- Not Found ----		
			725.70	32.80	---- Not Found ----		
			915.33	17.17	---- Not Found ----		
			1013.81	20.30	---- Not Found ----		
		% Abundances Found =		1.74			

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
BI-214	19.90M	1002.45	609.31*	46.30	1.000E+35	52.29	Decay
			760.36	5.04	---- Not Found ----		
			934.06	3.21	---- Not Found ----		
			1120.29	15.10	---- Not Found ----		
			1238.11	5.94	---- Not Found ----		
			1377.67	4.11	---- Not Found ----		
			1764.49	15.80	---- Not Found ----		
		% Abundances Found =		40.40	(Abn. Limit = 40.40%)		
PB-214	26.80M	744.36	87.30	4.67	---- Not Found ----		Decay
			241.98	7.49	---- Not Found ----		
			295.21	19.20	---- Not Found ----		
			351.92*	37.20	1.000E+35	40.30	
			785.91	1.10	---- Not Found ----		
		% Abundances Found =		53.40	(Abn. Limit = 37.20%)		

Flag: "*" = Keyline

Sample ID : EF1 EFT-697507 Acquisition date : 19-JUL-2007 11:23:46

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Fw	Cts/Sec	%Err	%Eff	Flags
0	352.29	34	39	1.52	705.29	697	12	1.90E-02	40.3	5.70E+00	T
0	510.93	131	40	1.80	1022.53	1013	16	7.20E-02	14.7	4.88E+00	T
0	559.07	55	41	1.94	1119.06	1111	14	3.04E-02	28.5	4.60E+00	T
0	609.63	25	37	1.42	1220.22	1215	12	1.39E-02	52.3	4.52E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 19-JUL-2007 11:53:55.48

Sample ID : EF1 EFT-697507

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	24.	477.59	6.7906E-08
F-18	0.	511.00	Half-Life too short
NA-22	6.	1274.54	7.7428E-09
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
CO-46	15.	889.25	1.0770E-08
CR-51	37.	320.08	1.1324E-07
MN-54	18.	834.83	9.9826E-09
CO-56	13.	1238.25	1.7967E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	55.	158.38	4.0993E-08
CO-57	45.	122.06	1.0647E-08
CO-58	6.	810.76	6.8889E-09
FE-59	13.	1099.22	2.1963E-08
CO-60	4.	1332.49	7.1885E-09
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	5.	1115.52	1.3071E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	30.	136.00	1.3730E-08
AS-76	0.	559.10	Half-Life too short
BR-82	12.	776.49	6.2020E-06
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	43.	513.99	2.3898E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	43.	513.99	1.1975E-08
RB-86	10.	1076.63	1.6735E-07
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	0.	1836.01	1.1873E-08
KR-89	0.	220.98	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.38	Half-Life too short
Y-91	12.	1204.90	3.9046E-06
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
SR-93	0.	590.20	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	16.	702.63	7.0292E-09
NB-95	13.	765.79	1.0150E-08
NB-95M	33.	235.69	3.9744E-07
ZR-95	10.	756.72	1.0827E-08
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	8.	739.50	1.5911E-06
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	30.	497.08	1.2220E-08
TC-104	0.	357.99	Half-Life too short
RH-105	33.	318.90	2.6457E-05
RU-105	0.	724.50	Half-Life too short
RU-106	25.	621.84	9.0414E-08
CD-109	41.	88.03	3.8086E-07
AG-110M	15.	937.48	3.0063E-08
SN-113	27.	391.69	1.2306E-08
SN-117M	56.	158.56	1.9788E-08
SB-122	15.	563.93	3.2633E-07
SB-124	21.	602.71	9.6203E-09
SB-125	21.	427.89	2.3534E-08
TE-125M	35.	109.28	3.7587E-06
TE-127	0.	417.90	Half-Life too short
TE-127M	37.	57.60	2.8754E-05
XE-127	52.	202.84	1.5894E-08
TE-129	0.	459.68	Half-Life too short
TE-129M	11.	695.88	2.6491E-07
I-130	0.	536.09	Half-Life too short
BA-131	38.	123.80	6.2546E-08
I-131	27.	364.48	2.8986E-08
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	51.	163.93	9.1923E-07
I-132	0.	667.69	Half-Life too short
TE-132	45.	228.16	1.7324E-07
BA-133	42.	302.84	4.6251E-08
BA-133M	36.	276.09	1.5506E-05
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	47.	81.00	3.8649E-07
XE-133M	35.	233.22	5.5423E-06
CS-134	19.	604.70	7.9374E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	9.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short
CS-136	5.	818.50	1.1512E-08

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
I-136	0.	1313.02	Half-Life too short
CS-137	8.	661.65	6.5449E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	43.	165.85	9.8604E-09
CS-139	0.	1203.63	Half-Life too short
BA-140	10.	537.32	5.9374E-08
LA-140	7.	1596.49	3.0492E-06
BA-141	0.	190.22	Half-Life too short
CE-141	49.	145.44	2.2521E-08
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	0.	293.26	Half-Life too short
CE-144	45.	133.54	7.8032E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	42.	91.10	1.1111E-07
PM-148M	10.	550.27	7.4593E-09
EU-152	40.	344.27	3.1614E-08
EU-154	8.	1004.76	4.3102E-08
EU-156	19.	646.29	2.0800E-07
HF-181	21.	482.03	1.0013E-08
TA-182	6.	1221.42	3.1179E-08
W-187	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
HG-203	41.	279.19	1.2554E-08
BI-207	10.	569.67	7.4068E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	46.	240.98	2.9120E-06
RA-226	58.	186.21	2.6081E-07
AC-228	31.	338.32	6.5673E-08
TH-228	45.	84.37	1.3277E-06
PA-234	0.	131.20	Half-Life too short
TH-234	35.	63.29	1.6207E-06
U-235	39.	143.76	6.9941E-08
NP-239	53.	106.13	2.8993E-06
AM-241	28.	59.54	1.6681E-07

EFT-6S

2008

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-65 41708

Sample Location (Well Number): EFT-65

1. Representative sample collected. Date/Time 4/17/08 / 1200

Sample collected by: Jay Marie Slabaugh / Jay Marie Slabaugh Date: 04/21/2008
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: J. Southward / J Southward Date: 4/21/08
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: Russ Burgett / [signature] Date: 4-22-08
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: K.J. Linnsay / [signature] Date: 4-24-08
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-6S41708	
2 . Date Sampled	04/17/2008	
3 . Time Sampled	12:00	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	04/22/2008	
2 . Time Sample Counted	13:00	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	6.7	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	3045.7	cpm
Net Spike Count Rate (cpm)	3039.0	cpm
H3 Spike Activity (dpm on count date)	7787.0	dpm
Counter Efficiency	0.3903	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	6.7	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.0	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	1.9	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{\text{(Bkg cpm)}}{\text{(Bkg min.)}} + \frac{\text{(Bkg cpm)}}{\text{(Smpl min.)}}}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}} = 1.10\text{E-}06 \text{ uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency x 2.22E6 uCi/ml x Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 4-22-08

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-65411708

Sample Location (Well Number): EFT-65

1. Representative sample collected. Date/Time 4/17/08 / 1200

Sample collected by: Joy Marie Slabach / Joy Marie Slabach Date: 4/21/2008
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: J. Southward / J Southward Date: 4/21/08
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: J. Southward / J Southward Date: 4/22/08
Fermi 2 RP Printed Name Signature

Sample number: EFT-65 41708

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
. (Note disposition of unidentified peaks in "Remarks")

Performed by: J. Southward / J Southward Date: 4/22/08
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: K.J. LINDSEY / K.J. Lindsey Date: 4-24-08
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

DETROIT EDISON FERMI-2 POWER PLANT 22-APR-2008 09:22:20.61

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EFT-6541708 ~~EFT-6541708~~ 4/22/08

Sample End Time: 17-APR-2008 12:00:00.00

REMARKS

PERFORMED BY:
J Southward
SIGNATURE

REVIEWED BY:
D Lindsey 4-24-08
SIGNATURE/DATE

Sample ID : EFT-CD41700 Acquisition date : 22-APR-2000 00:47:02

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** ~~EFT-6561705~~ Sample Parameters ~~4/22/08~~ **********

Sample ID Number: ~~EFT-CD41700~~

Sample collection start date: 17-APR-2000 12:00:00.00
Sample collection end date : 17-APR-2000 12:00:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.000000E+03 cc
Sample geometry : MELL Operator: JNS

********** Acquisition Parameters **********

Detector number : DET 4 Acquire date : 22-APR-2000 00:47:02.09
Preset live time : 0 00:30:00.00 Elapsed live time : 0 00:30:00.00
Elapsed real time : 0 00:30:00.90 Percent dead time : 0.05 %

********** Calibration Parameters **********

Detector number : DET 4 Yearly cal date : 20-JUN-2007 12:16:46.16
Kev/channel : 5.001099E-01 Zero offset: -1.47005E-01
Daily cal date : 22-APR-2000 06:30:56.32

********** Peak Search Parameters **********

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********

Energy tolerance : 2.00000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	510.43	110	27	1.60	1020.76	1013	14	6.56E-02	13.5	
2	0	559.56	51	55	1.03	1118.97	1109	20	2.01E-02	30.6	
3	0	611.70	95	33	0.30	1223.20	1212	27	5.30E-02	19.0	
4	0	651.66	27	6	1.03	1303.09	1299	9	1.47E-02	26.2	
5	0	1460.89	55	10	1.16	2920.83	2910	20	3.06E-02	19.5	

GS41708

Sample Title : EFT-~~GS41708~~ 4628DS

Page : 1

Decay Time = 4 20:47:02.09 Acquisition Time = 22 APR 2008 08:47:02.0
9

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	510.45	110	27	1.68	1020.76	1013	14	13.5		ANN
0	559.56	51	55	1.03	1118.97	1109	22	30.6		HWC
0	611.70	95	33	0.90	1223.38	1212	27	19.0		4.2MeV E Δ 2H FWHM Hyl
0	651.66	27	6	1.03	1303.09	1299	9	26.2		B.-214
0	1460.89	55	10	1.16	2920.83	2910	20	19.5		K-40

Sample ID : EFI-~~6541708~~ 6541708 4/2/08
Acquisition date : 22-APR-2008 00:47:52

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	55	10.67*	2.501E+00	3.094E-07	3.094E-07	19.52

Flag: "*" = Keyline

Summary of Nuclide Activity Page : 3

Sample ID : EFT-~~69[illegible]~~ 6541708 4/22/08 Acquisition date : 22-APR-2008 00:47:02

Total number of lines in spectrum	5	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	5	100.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flag
K-40	1.00E+09Y	1.00	3.094E-07	3.094E-07	0.603E-07	19.50	
	Total Activity :		3.094E-07	3.094E-07			
	Grand Total Activity :		3.094E-07	3.094E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "N" = Nuclide specific adm. limit

Rejected Report
Sample ID : EFT-~~6541708~~ 6541708 4/12/2016

Acquisition date : 22-APR-2000 08:47:02

Nuclide	Half-Life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	63.99	511.00*	193.46	3.431E+11	13.53	Decay
		% Abundances Found =		100.00			
AS-76	26.32H	4.45	559.10*	44.70	7.903E-07	39.64	Abun.
			563.23	1.17	---- Not Found ----		
			571.30	0.14	---- Not Found ----		
			657.03	6.10	---- Not Found ----		
			665.31	0.39	---- Not Found ----		
			740.12	0.12	---- Not Found ----		
			771.76	0.12	---- Not Found ----		
			867.63	0.12	---- Not Found ----		
			1129.87	0.14	---- Not Found ----		
			1212.72	1.63	---- Not Found ----		
			1216.02	3.04	---- Not Found ----		
			1228.52	1.39	---- Not Found ----		
			1439.13	0.33	---- Not Found ----		
			1453.60	0.13	---- Not Found ----		
			1787.67	0.33	---- Not Found ----		
		% Abundances Found =		73.70			
SR-91	9.50H	12.32	274.70	1.00	---- Not Found ----		Decay,Abun.
			620.10	1.72	---- Not Found ----		
			652.30	2.09	1.605E-03	26.17	
			652.90	7.80	5.946E-04	26.17	
			749.80	23.00	---- Not Found ----		
			925.80	3.74	---- Not Found ----		
			1024.30*	32.50	---- Not Found ----		
		% Abundances Found =		14.71			
Y-92	3.54H	33.06	448.50	2.30	---- Not Found ----		Decay,Abun.
			561.10	2.40	6.045E+03	38.64	
			644.30	1.25	---- Not Found ----		
			934.46*	13.90	---- Not Found ----		
			1405.40	4.80	---- Not Found ----		
		% Abundances Found =		9.74			
TC-101	14.20M	404.51	127.24	2.82	---- Not Found ----		Decay,Abun.
			184.11	1.62	---- Not Found ----		
			306.81*	89.00	---- Not Found ----		
			531.49	1.02	---- Not Found ----		
			545.14	6.00	---- Not Found ----		
			649.70	1.10	1.000E+35	20.17	
		% Abundances Found =		1.09			
RU-103	39.35D	0.12	497.08*	89.00	---- Not Found ----		Abun.
			610.33	5.60	6.178E-07	19.77	
		% Abundances Found =		5.90			
PM-148M	41.30D	0.12	288.11	12.56	---- Not Found ----		Abun.
			414.07	18.66	---- Not Found ----		
			432.70	5.35	---- Not Found ----		
			501.26	6.75	---- Not Found ----		

Sample ID . EFT 6541708 Acquisition date . 22-APR-2000 08:47:02

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
PM-148M	41.30D	0.12	550.27*	94.90	----- Not Found -----		Abun.
			599.74	12.54	----- Not Found -----		
			611.36	5.40	6.288E-07	19.77	
			629.97	99.00	----- Not Found -----		
			725.70	32.80	----- Not Found -----		
			915.33	17.17	----- Not Found -----		
			1013.81	20.30	----- Not Found -----		
		% Abundances Found =		1.74			

Flag: "*" = Keyline

Unidentified Energy Lines

Sample ID : EFT-~~6241700~~ 6241708 4/22/08

Acquisition date : 22-APR-2008 08:47:02

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Fw	Cts/Sec	%Err	%Eff	Flags
0	510.43	118	27	1.00	1020.76	1013	14	6.56E-02	13.5	4.60E+00	T
0	559.56	51	55	1.03	1118.97	1109	20	2.81E-02	30.6	4.08E+00	T
0	611.70	95	33	0.39	1223.20	1212	27	5.30E-02	19.8	4.51E+00	T
0	651.66	27	6	1.03	1303.09	1299	9	1.47E-02	26.2	4.39E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 22-APR-2008 09:22:33.91

Sample ID : EFT-~~6841708~~ 4/22/08
6541708

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (KeV)	MDA (uCi/cc)
BE-7	22.	477.59	7.4297E-08
F-18	0.	511.00	Half-Life too short
NA-22	6.	1274.54	9.0792E-09
NA-24	6.	1368.53	1.0007E-08
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	11.	889.25	8.6697E-09
CR-51	39.	320.08	9.2330E-08
MN-54	8.	834.83	6.7774E-09
CO-55	11.	1238.25	1.5152E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	40.	158.38	1.2766E-08
CO-57	33.	122.06	9.0361E-09
CO-58	8.	810.76	6.9042E-09
FE-59	9.	1099.22	1.6096E-08
CO-60	9.	1332.49	9.6521E-09
CU-64	11.	1345.90	1.9566E-03
NI-65	0.	1481.84	Half-Life too short
ZN-65	11.	1115.52	1.8865E-08
ZN-69M	30.	438.63	3.1006E-06
SE-75	35.	136.00	1.2601E-08
AS-76	75.	559.10	6.7321E-07
BR-82	16.	776.49	1.0203E-07
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	44.	513.99	2.4140E-06
KR-85M	0.	151.10	Half-Life too short
SR-85	44.	513.99	1.1007E-08
RB-86	11.	1076.63	1.2325E-07
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	2.	1836.01	6.5547E-09
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	9.	1204.90	3.1972E-06
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Sample ID : EFT-~~6041708~~ 6541708 4/20/08 Acquisition date : 22-APR-2008 00:47.02

Nuclide	Bckgnd Cwn	Energy (keV)	MDA (uCi/cc)
SR-93	0.	500.28	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	21.	702.63	8.7087E-09
NB-95	7.	765.79	6.5129E-09
NB-95M	41.	235.69	7.8300E-08
ZR-95	8.	756.72	1.2029E-08
NB-97	0.	657.90	Half-Life too short
ZR-97	16.	743.36	1.0005E-06
MO-99	15.	739.50	2.0996E-07
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	17.	497.08	8.2421E-09
TC-104	0.	357.99	Half-Life too short
RH-105	39.	318.90	4.1563E-07
RU-105	0.	724.50	Half-Life too short
RU-106	17.	621.84	7.4725E-08
CD-109	37.	88.03	3.5603E-07
AG-110M	8.	937.48	2.8239E-08
SN-113	25.	391.69	1.1201E-08
SN-117M	41.	158.56	1.0841E-08
SB-122	19.	563.93	3.6501E-08
SB-124	16.	602.71	7.5719E-09
SB-125	11.	427.89	1.7455E-08
TE-125M	29.	109.28	3.0762E-06
TE-127	0.	417.90	Half-Life too short
TE-127M	36.	57.60	2.6588E-05
XE-127	45.	202.84	1.2452E-08
TE-129	0.	459.60	Half-Life too short
TE-129M	8.	695.89	1.9036E-07
XE-129M	48.	196.56	2.4427E-07
I-130	26.	536.09	5.9620E-06
BA-131	26.	123.80	3.0936E-08
I-131	26.	364.48	1.3090E-08
TE-131	0.	149.72	Half-Life too short
TE-131M	9.	773.67	2.5600E-07
XE-131M	40.	163.93	4.0978E-07
I-132	0.	667.69	Half-Life too short
TE-132	38.	228.16	2.3813E-08
BA-133	26.	302.84	3.7200E-08
BA-133M	34.	276.09	3.2391E-07
I-133	21.	529.87	4.2761E-07
TE-133M	0.	912.58	Half-Life too short
XE-133	29.	81.00	7.5696E-08
XE-133M	33.	233.22	3.1688E-07
CS-134	19.	604.70	7.7799E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	35.	268.24	7.7070E-07
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Sample ID : EFT-~~60411708~~ 6541708 4/22/08 Acquisition date : 22-APR-2008 00:47:02

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-136	0.	818.50	8.5216E-09
I-136	0.	1313.02	Half-Life too short
CS-137	13.	661.65	7.9303E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.96	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	44.	165.85	9.5783E-09
CS-139	0.	1203.23	Half-Life too short
BA-140	21.	537.32	3.9053E-08
LA-140	7.	1596.49	7.4416E-08
BA-141	0.	190.22	Half-Life too short
CE-141	43.	145.44	1.7604E-08
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	31.	293.26	1.9404E-07
CE-144	40.	133.54	7.2544E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	36.	91.10	5.9089E-08
PM-148M	15.	550.27	7.5007E-09
EU-152	34.	344.27	2.9604E-08
EU-154	9.	1004.76	4.4696E-08
EU-156	24.	646.29	1.5185E-07
HF-181	17.	482.03	8.5073E-09
TA-182	7.	1221.42	3.1204E-08
W-187	12.	685.81	6.7877E-07
RE-188	43.	155.03	5.9640E-06
HG-203	46.	279.19	1.1599E-08
BI-207	20.	569.67	7.7001E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	40.	240.98	4.9429E-07
RA-226	47.	186.21	2.3784E-07
AC-228	30.	338.32	6.4699E-08
TH-228	27.	84.37	1.0555E-06
PA-234	0.	131.20	Half-Life too short
TH-234	38.	63.29	1.3139E-06
U-235	41.	143.76	7.1065E-08
NP-239	35.	106.13	1.7198E-07
AM-241	19.	59.54	1.4250E-07

EFT-6S

2009

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-6S031209

Sample Location (Well Number): EFT-65

1. Representative sample collected. Date/Time 3-12-09 / 8:35

Sample collected by: Chris Ellison / [signature] Date: _____
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Pruitt / [signature] Date: 4-17-09
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: D. Howard / [signature] Date: 4-22-09
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: R. Burgess / [signature] Date: 4-22-09
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-6S031209	
2 . Date Sampled	03/12/2009	
3 . Time Sampled	08:35	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	04/21/2009	
2 . Time Sample Counted	11:00	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	7.5	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	2991.0	cpm
Net Spike Count Rate (cpm)	2983.5	cpm
H3 Spike Activity (dpm on count date)	7361.1	dpm
Counter Efficiency	0.4053	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	8.1	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.6	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \sqrt{\frac{\frac{\text{(Bkg cpm)}}{\text{(Bkg min.)}} + \frac{\text{(Bkg cpm)}}{\text{(Smpl min.)}}}{\text{Efficiency} \times 2.22\text{E6 dpm/uCi} \times \text{Sample Volume}}} = 1.12\text{E-06 uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency} \times 2.22\text{E6 uCi/ml} \times \text{Sample Volume}} < \textbf{MDA}$$

Technician AM Howard Date 4.21.09

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-GS031209

Sample Location (Well Number): EFT-GS~~03120~~ CE 3-17-09

1. Representative sample collected. Date/Time 3-12-09 / 8:35

Sample collected by: Chris Ellison / Chris Ellison Date: 3-12-09
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Charles Proffitt / Charles Proffitt Date: 4-17-09
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: Southward / Southward Date: 4/20/09
Fermi 2 RP Printed Name Signature

Sample number: EFT-65031209

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: Southward / Southward Date: 4/20/09
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: K D LINDSEY / K D Lindsey Date: 4-27-09
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

DETROIT EDISON FERMI-2 POWER PLANT 21-APR-2009 10:20:37.46

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EFT-650312Ø9

Sample End Time: 12-MAR-2009 00:35:00.00

REMARKS K-40

PERFORMED BY:

SIGNATURE

REVIEWED BY:

SIGNATURE/DATE 4-22-09

PAGE ____ of ____

Sample ID : EFT-6S031209 Acquisition date : 21-APR-2009 09:50:34

Fermi 2 Radiation Protection Gamma Spectroscopy Report

**********Sample Parameters**********

Sample ID Number: EFT-6S031209
Sample collection start date: 12-MAR-2009 08:35:00.00
Sample collection end date : 12-MAR-2009 08:35:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.000000E+03 cc
Sample geometry : M2LL Operator: JNS

**********Acquisition Parameters**********

Detector number : DET 4 Acquire date : 21-APR-2009 09:50:34.78
Preset live time : 0 00:30:00.00 Elapsed live time : 0 00:30:00.00
Elapsed real time : 0 00:30:00.90 Percent dead time : 0.05 %

**********Calibration Parameters**********

Detector number : DET 4 Yearly cal date : 20-JUN-2008 12:00:00.00
Kev/channel : 4.990082E-01 Zero offset: 7.459796E-02
Daily cal date : 21-APR-2009 06:54:02.66

**********Peak Search Parameters**********

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

**********Nuclide Identification Parameters**********

Energy tolerance : 2.00000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	3	510.58	37	42	2.48	1021.25	1015	21	2.03E-02	44.1	7.57E-01
2	3	511.30	46	44	2.49	1022.60	1015	21	2.54E-02	39.4	
3	0	1460.70	47	4	2.94	2922.00	2914	14	2.62E-02	16.9	

Decay Time = 40 01:23:34.70 Acquisition Time = 21-APR-2009 09:58:34.7
0

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
3	510.58	37	42	2.48	1021.25	1015	21	44.1	7.57E-01	> Ann
3	511.30	46	44	2.49	1022.68	1015	21	38.4		
0	1460.78	47	4	2.94	2922.00	2914	14	16.9		K-40

Sample ID : EFT-68031209 Acquisition date : 21-APR-2009 09:58:34

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	47	10.67*	2.501E+00	2.653E-07	2.653E-07	16.86

Flag: "*" = Keyline

Sample ID : EFT-63031209 Acquisition date : 21-APR-2009 09:58:34

Total number of lines in spectrum	3	
Number of unidentified lines	1	
Number of lines tentatively identified by NID	2	66.67%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr <1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	2.653E-07	2.653E-07	0.447E-07	16.86	
	Total Activity :		2.653E-07	2.653E-07			
	Grand Total Activity :		2.653E-07	2.653E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EFT-65031209 Acquisition date : 21-APR-2009 09:50:34

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	525.70	511.00*	193.46	1.000E+35	38.36	Decay

% Abundances Found = 100.00

Flag: "*" = Keyline

Sample ID : EFT-6S031209 Acquisition date : 21-APR-2009 09:50:34

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Fw	Cts/Sec	%Err	%Eff	Flags
3	510.50	37	42	2.48	1021.25	1015	21	2.03E-02	44.1	4.00E+00	
3	511.30	46	44	2.49	1022.60	1015	21	2.54E-02	30.4	4.00E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 21-APR-2009 10:20:41.50

Sample ID : EFT-6S031209

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	15.	477.59	1.0001E-07
F-18	0.	511.00	Half-Life too short
NA-22	0.	1274.54	0.0064E-09
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	12.	889.25	1.1039E-08
CR-51	22.	320.08	1.7175E-07
MN-54	10.	834.83	0.3565E-09
CO-56	9.	1238.25	1.9133E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	32.	158.38	6.2831E-07
CO-57	48.	122.06	1.1602E-08
CO-58	11.	810.76	1.1235E-08
FE-59	13.	1099.22	3.3437E-08
CO-60	10.	1332.49	9.9537E-09
CU-64	0.	1345.90	Hylf-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	0.	1115.52	1.7839E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75?	43.	136.00	1.6829E-08
AS-76	0.	559.10	Half-Life too short
BR-82	0.	776.49	Half-Life too short
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	35.	513.99	2.1860E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	35.	513.99	1.4429E-08
RB-86	0.	1076.63	4.0541E-07
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	1.	1836.01	7.0700E-09
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	9.	1204.90	4.0220E-06
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
SR-93	0.	590.20	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	15.	702.63	7.6027E-09
NB-95	19.	765.79	2.0223E-08
NB-95M	0.	235.69	Half-Life too short
ZR-95	9.	756.72	1.8272E-08
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	0.	739.50	Half-Life too short
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	17.	497.00	1.5063E-08
TC-104	0.	357.99	Half-Life too short
RH-105	0.	318.90	Half-Life too short
RU-105	0.	724.50	Half-Life too short
RU-106	11.	621.84	6.7934E-08
CD-109	29.	88.03	3.3596E-07
AG-110M	6.	937.48	2.2189E-08
SN-113	33.	391.69	1.5815E-08
SN-117M	32.	158.56	5.8036E-08
SB-122	0.	563.93	Half-Life too short
SB-124	22.	602.71	1.3219E-08
SB-125	15.	427.89	2.0853E-08
TE-125M	29.	109.28	4.7163E-06
TE-127	0.	417.90	Half-Life too short
TE-127M	16.	57.60	2.3404E-05
XE-127	32.	202.84	2.1024E-08
TE-129	0.	459.60	Half-Life too short
TE-129M	11.	695.88	4.5327E-07
XE-129M	37.	196.56	3.3921E-06
I-130	0.	536.09	Half-Life too short
BA-131	37.	123.80	2.0807E-07
I-131	32.	364.48	3.0294E-07
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	33.	163.93	3.5241E-06
I-132	0.	667.69	Half-Life too short
TE-132	0.	228.16	Half-Life too short
BA-133	26.	302.84	3.7075E-08
BA-133M	0.	276.09	Half-Life too short
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	20.	81.00	6.7013E-06
XE-133M	0.	233.22	Half-Life too short
CS-134	22.	604.70	8.6893E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Sample ID : EFT-65031209 Acquisition date : 21-APR-2009 09:50:34

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-136	12.	818.50	6.5855E-08
I-136	0.	1313.02	Half-Life too short
CS-137	18.	661.65	9.0845E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	33.	165.85	9.9710E-09
CS-139	0.	1283.23	Half-Life too short
BA-140	10.	537.32	1.9255E-07
LA-140	0.	1596.49	Half-Life too short
BA-141	0.	190.22	Half-Life too short
CE-141	32.	145.44	3.2423E-08
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	0.	293.26	Half-Life too short
CE-144	39.	133.54	7.8624E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	35.	91.10	5.3501E-07
PM-148M	10.	550.27	1.1377E-08
EU-152	29.	344.27	2.7714E-08
EU-154	9.	1004.76	4.5883E-08
EU-155	20.	105.31	4.1265E-08
EU-156	13.	646.29	5.8448E-07
HF-181	19.	482.03	1.6157E-08
TA-182	4.	1221.42	3.0251E-08
W-187	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
HG-203	29.	279.19	1.5086E-08
BI-207	13.	569.67	6.3615E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	0.	240.98	Half-Life too short
RA-226	35.	186.21	2.0825E-07
AC-228	29.	338.32	6.3889E-08
TH-228	32.	84.37	1.1773E-06
PA-234	0.	131.20	Half-Life too short
TH-234	35.	63.29	3.4462E-06
U-235	40.	143.76	7.0686E-08
NP-239	0.	106.13	Half-Life too short
AM-241	24.	59.54	1.5623E-07

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT 6 S 8 31 09

Sample Location (Well Number): 6 S

1. Representative sample collected. Date/Time 8/31/09 / ~~8/4~~ 9/1/09 1555

Sample collected by: Brian Jardine / [signature] Date: 8/31/09
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Southward / Southward Date: 9/21/09
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: [signature] Date: 9-22-09
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert (Bright) Root, Jr. Date: 10-13-09
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT6S83109	
2 . Date Sampled	08/31/2009	
3 . Time Sampled	15:55	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	09/21/2009	
2 . Time Sample Counted	14:00	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	7.7	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	2763.5	cpm
Net Spike Count Rate (cpm)	2755.8	cpm
H3 Spike Activity (dpm on count date)	7189.1	dpm
Counter Efficiency	0.3833	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	7.2	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.0	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{\text{(Bkg cpm)}}{\text{(Bkg min.)}} + \frac{\text{(Bkg cpm)}}{\text{(Smpl min.)}}}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}} = 1.20\text{E-}06 \text{ uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency x 2.22E6 uCi/ml x Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 9-22-9

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT 6 S 8 31 09

Sample Location (Well Number): 6S

1. Representative sample collected. Date/Time 8/31/09 / 1555

Sample collected by: Brian Jardine / [signature] Date: 8/31/09
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Southward / Southward Date: 9/24/09
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: Southward / Southward Date: 10/13/09
Fermi 2 RP Printed Name Signature

Sample number: EFT6S83109

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

performed 8/31/09

Performed by: J. Southward / J Southward Date: signed 1/3/12
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed - 10-14-09
signed - 1-3-12

Performed by: Robert C Byrd / _____ Date: _____
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

_____

_____

_____

_____

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EFT6S83109

Sample End Time: 31-AUG-2009 15:55:00.00

REMARKS

PERFORMED BY:

SIGNATURE

REVIEWED BY:

SIGNATURE/DATE

Sample ID : EFT6S83109 Acquisition date : 13-OCT-2009 12:45:30

Fermi 2 Radiation Protection Gamma Spectroscopy Report

Sample Parameters

Sample ID Number: EFT6S83109
Sample collection start date: 31-AUG-2009 15:55:00.00
Sample collection end date : 31-AUG-2009 15:55:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.00000E+03 cc
Sample geometry : MELL Operator: JNS

Acquisition Parameters

Detector number : DET 4 Acquire date : 13-OCT-2009 12:45:30.22
Preset live time : 0 00:30:00.00 Elapsed live time : 0 00:30:00.00
Elapsed real time : 0 00:30:00.98 Percent dead time : 0.05 %

Calibration Parameters

Detector number : DET 4 Yearly cal date : 3-JUN-2009 17:37:00.00
Kev/channel : 4.99961E-01 Zero offset: 7.82824E-02
Daily cal date : 13-OCT-2009 06:21:56.95

Peak Search Parameters

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

Nuclide Identification Parameters

Energy tolerance : 1.75000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	511.20	106	48	2.84	1022.29	1014	16	5.91E-02	17.5	
2	0	1461.00	44	4	1.07	2922.01	2913	16	2.43E-02	18.3	

Decay Time = 42 20:50:30.22 Acquisition Time = 13-OCT-2009 12:45:30.2
2

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	511.20	106	40	2.04	1022.29	1014	16	17.5		Ann.
0	1461.00	44	4	1.07	2922.01	2913	16	10.3		K-40

J. 10/14/09

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	44	10.67*	2.501E+00	2.459E-07	2.459E-07	18.30

Flag: "*" = Keyline

Sample ID : EFT6S83109 Acquisition date : 13-OCT-2009 12:45:30

Total number of lines in spectrum	2	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	2	100.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	2.459E-07	2.459E-07	0.450E-07	18.30	
	Total Activity :		2.459E-07	2.459E-07			
	Grand Total Activity :		2.459E-07	2.459E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EFT6S03109 Acquisition date : 13-OCT-2009 12:45:30

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	562.65	511.00*	193.46	1.000E+35	17.40	Decay

% Abundances Found = 100.00

Flag: "*" = Keyline

Sample Id : EFT6S83109 Acquisition date : 13-OCT-2009 12:45:30

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	511.20	106	40	2.84	1022.29	1014	16	5.91E-02	17.5	4.88E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 13-OCT-2009 13:15:39.34

Sample ID : EFT6S03109

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum		Energy (keV)	MDA (uCi/cc)
BE-7	15.		477.59	1.0404E-07
F-18	0.		511.00	Half-Life too short
NA-22	7.		1274.54	8.3924E-09
NA-24	0.		1368.53	Half-Life too short
MG-27	0.		1014.44	Half-Life too short
CL-38	0.		1642.42	Half-Life too short
AR-41	0.		1293.64	Half-Life too short
SC-46	13.		889.25	1.2841E-08
CR-51	11.		320.08	1.7532E-07
MN-54	11.		834.83	8.6953E-09
CO-56	14.		1238.25	2.3940E-08
MN-56	0.		1810.69	Half-Life too short
NI-56	28.		158.38	8.1549E-07
CO-57	33.		122.06	9.9787E-09
CO-58	10.	8	810.76	1.1007E-08
FE-59	7.		1099.22	2.5885E-08
CO-60	6.		1332.49	8.1703E-09
CU-64	0.		1345.90	Half-Life too short
NI-65	0.		1481.84	Half-Life too short
ZN-65	15.		1115.52	2.3885E-08
ZN-69M	0.		438.63	Half-Life too short
SE-75	31.		136.00	1.4813E-08
AS-76	0.		559.10	Half-Life too short
BR-82	0.		776.49	Half-Life too short
BR-83	0.		529.64	Half-Life too short
BR-84	0.		881.50	Half-Life too short
BR-85	0.		802.41	Half-Life too short
KR-85	53.		513.99	2.6345E-06
KR-85M	0.		151.18	Half-Life too short
SR-85	53.		513.99	1.7911E-08
RB-86	15.		1076.63	5.8137E-07
KR-87	0.		402.58	Half-Life too short
SR-87M	0.		388.40	Half-Life too short
KR-88	0.		196.32	Half-Life too short
RB-88	0.		1382.39	Half-Life too short
Y-88	2.		1836.01	8.9090E-09
KR-89	0.		220.90	Half-Life too short
RB-89	0.		1031.88	Half-Life too short
KR-90	0.		1118.69	Half-Life too short
RB-90	0.		831.69	Half-Life too short
RB-90M	?0.		824.23	Half-Life too short
Y-90M	0.		202.51	Half-Life too short
SR-91	0.		1024.30	Half-Life too short
Y-91	6.		1204.90	4.1570E-06
Y-91M	0.		555.60	Half-Life too short
SR-92	0.		1383.94	Half-Life too short
Y-92	0.		934.46	Half-Life too short

Sample ID : EFT6S83109 Acquisition date : 13-OCT-2009 12:45:30

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
SR-93	0.	590.20	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	13.	702.63	7.0616E-09
NB-95	11.	765.79	1.6760E-08
NB-95M	0.	235.69	Half-Life too short
ZR-95	8.	756.72	1.7455E-08
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	0.	739.50	Half-Life too short
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	18.	497.08	1.6180E-08
TC-104	0.	357.99	Half-Life too short
RH-105	0.	318.90	Half-Life too short
RU-105	0.	724.50	Half-Life too short
RU-106	19.	621.84	8.4724E-08
CD-109	27.	88.03	3.3003E-07
AG-110M	7.	937.48	2.3868E-08
SN-113	19.	391.69	1.2551E-08
SN-117M	29.	158.56	6.4217E-08
SB-122	0.	563.93	Half-Life too short
SB-124	31.	602.71	1.5763E-08
SB-125	19.	427.89	2.2915E-08
TE-125M	38.	109.28	5.4852E-06
TE-127	0.	417.90	Half-Life too short
TE-127M	16.	57.60	2.3463E-05
XE-127	35.	202.84	2.3052E-08
TE-129	0.	459.60	Half-Life too short
TE-129M	14.	695.88	5.3776E-07
XE-129M	41.	196.56	4.3926E-06
I-130	0.	536.09	Half-Life too short
BA-131	34.	123.80	3.2459E-07
I-131	22.	364.48	3.2281E-07
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	27.	163.93	3.7784E-06
I-132	0.	667.69	Half-Life too short
TE-132	0.	228.16	Half-Life too short
BA-133	29.	302.84	3.8925E-08
BA-133M	0.	276.09	Half-Life too short
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	27.	81.00	1.1073E-05
XE-133M	0.	233.22	Half-Life too short
CS-134	21.	604.70	8.5392E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Sample ID : EFT6S83109 Acquisition date : 13-OCT-2009 12:45:30

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-136	0.	818.50	6.3460E-08
I-136	0.	1313.02	Half-Life too short
CS-137	10.	661.65	7.0120E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	35.	165.85	1.0309E-08
CS-139	0.	1283.23	Half-Life too short
BA-140	19.	537.32	2.9419E-07
LA-140	0.	1596.49	Half-Life too short
BA-141	0.	190.22	Half-Life too short
CE-141	23.	145.44	2.9583E-08
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	0.	293.26	Half-Life too short
CE-144	32.	133.54	7.2020E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	21.	91.10	5.0572E-07
PM-148M	18.	550.27	1.5522E-08
EU-152	21.	344.27	2.3900E-08
EU-154	9.	1004.76	4.5570E-08
EU-155	39.	105.31	4.0346E-08
EU-156	16.	646.29	7.2731E-07
HF-181	15.	482.03	1.4944E-08
TA-182	10.	1221.42	4.4632E-08
W-187	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
HG-203	31.	279.19	1.6916E-08
BI-207	22.	569.67	8.1940E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	0.	240.98	Half-Life too short
RA-226	29.	186.21	1.9034E-07
AC-228	29.	338.32	6.3600E-08
TH-228	36.	84.37	1.2424E-06
PA-234	0.	131.20	Half-Life too short
TH-234	21.	63.29	2.9682E-06
U-235	29.	143.76	6.1684E-08
NP-239	0.	106.13	Half-Life too short
AM-241	27.	59.54	1.6525E-07

EFT-6S

2010

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EF1-52410-65

Sample Location (Well Number): 65

1. Representative sample collected. Date/Time 5/24/10 / 1140

Sample collected by: Southward / Southward Date: 6/23/10
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Southward / Southward Date: 6/23/10
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: Joan M. Yoder / Date: 6-25-10
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert C. Hyde Jr. Date: 6-30-10
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EF1-52410-6S	
2 . Date Sampled	05/24/2010	
3 . Time Sampled	11:40	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	06/24/2010	
2 . Time Sample Counted	15:00	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	6.7	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	2671.8	cpm
Net Spike Count Rate (cpm)	2665.1	cpm
H3 Spike Activity (dpm on count date)	6889.0	dpm
Counter Efficiency	0.3869	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	7.2	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.5	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	1.9	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{\text{(Bkg cpm)}}{\text{(Bkg min.)}} + \frac{\text{(Bkg cpm)}}{\text{(Smpl min.)}}}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}} = 1.11\text{E-}06 \text{ uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency x 2.22E6 uCi/ml x Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 6-25-10

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EF1-52410-65

Sample Location (Well Number): 65

1. Representative sample collected. Date/Time 5/24/10 / 1140

Sample collected by: Southward / Southward Date: 6/23/10
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only.

Sample sealed by: Southward / Southward Date: 6/23/10
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: Charles Proffitt Charles Proffitt Date: 9-13-10
Fermi 2 RP Printed Name Signature

Sample number: EF1-52410-65

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: Charles Probst / Charles Probst Date: 9-13-10
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert C Gray SRI / Robert C Gray Jr Date: 10-5-10
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EF1-52410-6S

Sample End Time: 24-MAY-2010 11:40:00.00

REMARKS

PERFORMED BY:

SIGNATURE

REVIEWED BY:

SIGNATURE DATE

Sample ID : EF1-52410-6S Acquisition date : 4-OCT-2010 14:42:51

****

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********

Sample ID Number: EF1-52410-6S
Sample collection start date: 24-MAY-2010 11:40:00.00
Sample collection end date : 24-MAY-2010 11:40:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.000000E+03 cc
Sample geometry : M2LL Operator: CLP

********** Acquisition Parameters **********

Detector number : DET 4 Acquire date : 4-OCT-2010 14:42:51.43
Preset live time : 0 00:45:00.00 Elapsed live time : 0 00:45:00.00
Elapsed real time : 0 00:45:00.00 Percent dead time : 0.03 %

********** Calibration Parameters **********

Detector number : DET 4 Yearly cal date : 23-JUN-2010 12:28:00.00
Kev/channel : 5.00274E-01 Zero offset: 1.39324E-01
Daily cal date : 4-OCT-2010 13:52:43.53

********** Peak Search Parameters **********

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********

Energy tolerance : 1.75000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	3	65.70	56	63	1.61	131.22	125	16	2.07E-02	32.3	1.02E+00
2	3	66.94	34	68	1.62	133.52	125	16	1.27E-02	52.4	
3	0	139.59	65	106	1.49	278.76	274	10	2.42E-02	31.9	
4	0	198.25	59	89	0.88	396.01	392	9	2.19E-02	31.5	
5	0	295.90	64	88	1.10	591.20	586	12	2.38E-02	32.0	
6	0	352.78	82	85	1.21	704.89	698	13	3.04E-02	25.3	
7	0	511.51	225	61	2.58	1022.19	1014	18	8.34E-02	10.6	
8	0	558.46	126	10	2.21	1116.02	1109	14	4.65E-02	10.5	
9	0	609.45	165	49	1.66	1217.95	1211	16	6.10E-02	12.2	
10	0	806.68	16	22	0.61	1612.19	1607	10	5.86E-03	61.3	
11	0	1121.86	35	42	1.14	2242.21	2233	24	1.31E-02	54.2	
12	2	1459.42	36	9	2.76	2916.95	2911	20	1.32E-02	30.5	3.25E+00
13	2	1461.45	65	12	2.57	2921.00	2911	20	2.42E-02	17.5	

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
3	65.70	56	63	1.61	131.22	125	16	32.3	1.02E+00	
3	66.94	34	68	1.62	133.52	125	16	52.4		High %ERROR
0	139.59	65	106	1.49	278.76	274	10	31.9		HWC
0	198.25	59	89	0.88	396.01	392	9	31.5		Low FWHM
0	295.90	64	88	1.10	591.20	586	12	32.0		Pb-214
0	352.78	82	85	1.21	704.89	698	13	25.3		Pb-214
0	511.51	225	61	2.58	1022.19	1014	18	10.6		ANN.
0	558.46	126	10	2.21	1116.02	1109	14	10.5		HWC
0	609.45	165	49	1.66	1217.95	1211	16	12.2		Bi-214
0	806.68	16	22	0.61	1612.19	1607	10	61.3		High %ERROR/Low FWHM
0	1121.86	35	42	1.14	2242.21	2233	24	54.2		High %ERROR
2	1459.42	36	9	2.76	2916.95	2911	20	30.5	3.25E+00	K-40
2	1461.45	65	12	2.57	2921.00	2911	20	17.5		K-40

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	65	10.67*	2.501E+00	2.452E-07	2.452E-07	17.53

Flag: "*" = Keyline

Sample-ID : EF1-52410-68 Acquisition date : 4-OCT-2010 14:42:51

Total number of lines in spectrum	13	
Number of unidentified lines	2	
Number of lines tentatively identified by NID	11	84.62%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	2.452E-07	2.452E-07	0.430E-07	17.53	
	Total Activity :		2.452E-07	2.452E-07			
	Grand Total Activity :		2.452E-07	2.452E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abm. limit

Sample ID : EF1-52410-6S Acquisition date : 4-OCT-2010 14:42:51

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	1747.09	511.00*	193.46	1.000E+35	10.60	Decay
	% Abundances Found =			100.00			
SC-46	83.83D	1.59	142.53	62.70	----- Not Found -----		Abun.
			889.25*	99.98	----- Not Found -----		
			1120.51	99.99	3.663E-08	54.18	
	% Abundances Found =			38.07			
SE-75	119.78D	1.11	66.05	1.02	8.721E-06	32.27	Abun.
			96.73	3.41	----- Not Found -----		
			121.12	16.70	----- Not Found -----		
			136.00*	59.20	----- Not Found -----		
			198.60	1.45	1.335E-06	31.47	
			264.65	59.80	----- Not Found -----		
			279.53	25.20	----- Not Found -----		
			303.91	1.32	----- Not Found -----		
			400.65	11.40	----- Not Found -----		
	% Abundances Found =			1.38			
AS-76	26.32H	121.41	559.10*	44.70	2.115E+29	10.47	Decay,Abun.
			563.23	1.17	----- Not Found -----		
			571.30	0.14	----- Not Found -----		
			657.03	6.10	----- Not Found -----		
			665.31	0.39	----- Not Found -----		
			740.12	0.12	----- Not Found -----		
			771.76	0.12	----- Not Found -----		
			867.63	0.12	----- Not Found -----		
			1129.87	0.14	----- Not Found -----		
			1212.72	1.63	----- Not Found -----		
			1216.02	3.84	----- Not Found -----		
			1228.52	1.39	----- Not Found -----		
			1439.13	0.33	----- Not Found -----		
			1453.60	0.13	----- Not Found -----		
			1787.67	0.33	----- Not Found -----		
	% Abundances Found =			73.70			
MO-99	66.02H	48.40	140.51	3.80	1.001E+00	31.89	Decay,Abun.
			181.06	6.20	----- Not Found -----		
			366.43	1.37	----- Not Found -----		
			739.50*	12.80	----- Not Found -----		
			778.00	4.50	----- Not Found -----		
	% Abundances Found =			13.25			
TC-99M	6.02H	530.80	140.50*	89.07	1.000E+35	31.89	Decay
	% Abundances Found =			100.00			
RU-103	39.35D	3.38	497.08*	89.00	----- Not Found -----		Abun.
			610.33	5.60	6.797E-06	12.24	
	% Abundances Found =			5.92			
XE-129M	8.89D	14.98	196.56*	4.74	6.093E-03	31.47	Decay
	% Abundances Found =			100.00			

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
XE-135	9.11H	350.76	249.79*	89.90	----- Not Found -----		Decay,Abun.
			608.19	2.89	1.000E+35	12.24	
		% Abundances Found =		3.11			
CS-136	13.16D	10.12	66.91	12.50	2.055E-04	52.37	Decay,Abun.
			86.29	6.30	----- Not Found -----		
			153.22	7.46	----- Not Found -----		
			163.89	4.61	----- Not Found -----		
			176.55	13.56	----- Not Found -----		
			273.65	12.66	----- Not Found -----		
			340.57	40.50	----- Not Found -----		
			818.50*	99.70	----- Not Found -----		
			1048.07	79.60	----- Not Found -----		
			1235.34	19.70	----- Not Found -----		
		% Abundances Found =		4.10			
CS-138	32.20M	5954.20	138.10	1.49	1.000E+35	31.89	Decay,Abun.
			227.76	1.51	----- Not Found -----		
			408.98	4.66	----- Not Found -----		
			462.79	30.70	----- Not Found -----		
			546.94	10.80	----- Not Found -----		
			871.80	5.11	----- Not Found -----		
			1009.78	29.80	----- Not Found -----		
			1147.22	1.24	----- Not Found -----		
			1343.59	1.14	----- Not Found -----		
			1435.86*	76.30	----- Not Found -----		
		% Abundances Found =		0.92			
TA-182	114.74D	1.16	67.75	42.30	1.222E-07	52.37	Abun.
			100.10	14.10	----- Not Found -----		
			1189.05	16.30	----- Not Found -----		
			1221.42*	27.10	----- Not Found -----		
			1230.97	11.50	----- Not Found -----		
		% Abundances Found =		38.01			
BI-214	19.90M	9634.44	609.31*	46.30	1.000E+35	12.24	Decay
			768.36	5.04	----- Not Found -----		
			934.06	3.21	----- Not Found -----		
			1120.29	15.10	1.000E+35	54.10	
			1238.11	5.94	----- Not Found -----		
			1377.67	4.11	----- Not Found -----		
			1764.49	15.80	----- Not Found -----		
		% Abundances Found =		64.29	(Abn. Limit = 40.48%)		
PB-214	26.80M	7153.93	87.30	4.67	----- Not Found -----		Decay
			241.98	7.49	----- Not Found -----		
			295.21	19.20	1.000E+35	32.03	
			351.92*	37.20	1.000E+35	25.20	
			785.91	1.10	----- Not Found -----		
		% Abundances Found =		80.96	(Abn. Limit = 37.20%)		

Flag: "*" = Keyline

Sample ID : EF1-52410-6S Acquisition date : 4-OCT-2010 14:42:51

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
3	65.78	56	63	1.61	131.22	125	16	2.07E-02	32.3	1.36E+00	T
3	66.94	34	68	1.62	133.52	125	16	1.27E-02	52.4	1.40E+00	T
0	139.59	65	106	1.49	278.76	274	10	2.42E-02	31.9	6.39E+00	T
0	198.25	59	89	0.88	396.01	392	9	2.19E-02	31.5	6.60E+00	T
0	295.90	64	88	1.10	591.20	586	12	2.38E-02	32.0	6.00E+00	T
0	352.78	82	85	1.21	704.89	698	13	3.04E-02	25.3	5.69E+00	T
0	511.51	225	61	2.58	1022.19	1014	18	8.34E-02	10.6	4.88E+00	T
0	558.46	126	10	2.21	1116.02	1109	14	4.65E-02	10.5	4.69E+00	T
0	609.45	165	49	1.66	1217.95	1211	16	6.10E-02	12.2	4.52E+00	T
0	806.68	16	22	0.61	1612.19	1607	10	5.86E-03	61.3	3.60E+00	
0	1121.86	35	42	1.14	2242.21	2233	24	1.31E-02	54.2	2.90E+00	T
2	1459.42	36	9	2.76	2916.95	2911	20	1.32E-02	30.5	2.50E+00	

Flags: "T" = Tentatively associated

****
* Detroit Edison Fermi 2 MDA Report, Generated 4-OCT-2010 15:27:59.48 *
****
* Sample ID : EF1-52410-6S *
****

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	42.	477.59	3.5309E-07
F-18	0.	511.00	Half-Life too short
NA-22	16.	1274.54	8.8179E-09
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	20.	889.25	2.1507E-08
CR-51	35.	320.08	1.4512E-06
MN-54	17.	834.83	8.5002E-09
CO-56	22.	1238.25	4.3023E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	0.	158.38	Half-Life too short
CO-57	70.	122.06	1.1860E-08
CO-58	19.	810.76	2.3593E-08
FE-59	22.	1099.22	1.1661E-07
CO-60	10.	1332.49	9.0017E-09
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	17.	1115.52	2.1881E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	58.	136.00	2.2190E-08
AS-76	0.	559.10	Half-Life too short
BR-82	0.	776.49	Half-Life too short
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	87.	513.99	2.2577E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	87.	513.99	3.9648E-08
RB-86	19.	1076.63	1.2441E-05
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	11.	1836.01	1.9289E-08
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	17.	1204.90	1.2764E-05
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Sample ID : EF1-52410-6S Acquisition date : 4-OCT-2010 14:42:51

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
SR-93	0.	590.20	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	31.	702.63	6.9635E-09
NB-95	22.	765.79	9.1183E-08
NB-95M	0.	235.69	Half-Life too short
ZR-95	20.	756.72	5.4651E-08
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	0.	739.50	Half-Life too short
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	29.	497.08	6.6420E-08
TC-104	0.	357.99	Half-Life too short
RH-105	0.	318.90	Half-Life too short
RU-105	0.	724.50	Half-Life too short
RU-106	33.	621.84	8.5062E-08
CD-109	62.	88.03	3.6729E-07
AG-110M	15.	937.48	2.7008E-08
SN-113	42.	391.69	2.0572E-08
SN-117M	67.	158.56	6.2676E-06
SB-122	0.	563.93	Half-Life too short
SB-124	33.	602.71	3.0911E-08
SB-125	34.	427.89	2.1134E-08
TE-125M	69.	109.28	1.4226E-05
TE-127	0.	417.90	Half-Life too short
TE-127M	44.	57.60	4.4169E-05
XE-127	79.	202.84	1.2454E-07
TE-129	0.	459.60	Half-Life too short
TE-129M	23.	695.88	2.0197E-06
XE-129M	0.	196.56	Half-Life too short
I-130	0.	536.09	Half-Life too short
BA-131	0.	123.80	Half-Life too short
I-131	0.	364.48	Half-Life too short
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	0.	163.93	Half-Life too short
I-132	0.	667.69	Half-Life too short
TE-132	0.	228.16	Half-Life too short
BA-133	54.	302.84	3.5224E-08
BA-133M	0.	276.09	Half-Life too short
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	0.	81.00	Half-Life too short
XE-133M	0.	233.22	Half-Life too short
CS-134	32.	604.70	7.3703E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Sample ID : EF1-52410-6S Acquisition date : 4-OCT-2010 14:42:51

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-136	0.	818.50	Half-Life too short
I-136	0.	1313.02	Half-Life too short
CS-137	29.	661.65	7.6057E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	75.	165.85	1.5625E-08
CS-139	0.	1283.23	Half-Life too short
BA-140	0.	537.32	Half-Life too short
LA-140	0.	1596.49	Half-Life too short
BA-141	0.	190.22	Half-Life too short
CE-141	76.	145.44	2.3483E-07
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	0.	293.26	Half-Life too short
CE-144	70.	133.54	8.5595E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	0.	91.10	Half-Life too short
PM-148M	23.	550.27	5.2409E-08
EU-152	43.	344.27	2.2146E-08
EU-154	12.	1004.76	3.5602E-08
EU-155	50.	105.31	3.7395E-08
EU-156	30.	646.29	3.9160E-05
HF-181	37.	482.03	6.5696E-08
TA-182	16.	1221.42	6.3983E-08
W-187	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
HG-203	62.	279.19	5.9711E-08
BI-207	26.	569.67	5.8854E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	0.	240.98	Half-Life too short
RA-226	71.	186.21	1.9131E-07
AC-228	52.	338.32	5.7417E-08
TH-228	47.	84.37	1.0247E-06
PA-234	0.	131.20	Half-Life too short
TH-234	41.	63.29	3.6028E-05
U-235	71.	143.76	6.1583E-08
NP-239	0.	106.13	Half-Life too short
AM-241	44.	59.54	1.3764E-07

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-102010-6/S

Sample Location (Well Number): 6 S

1. Representative sample collected. Date/Time 11-11-10 / 13:35

Sample collected by: CProffitt / CProffitt Date: 11-11-10
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: CProffitt / CProffitt Date: 11-11-10
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: J.R. Dyer / JRDyer Date: 11-12-10
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert C Bey JR / Robert C Bey Jr Date: 11-15-10
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 .	Sample Location	EFT ~~EPT~~ 102010-6/S	
2 .	Date Sampled	11/15/10 11/11/2010	
3 .	Time Sampled	13:35	
4 .	Sample Volume, (ml)	4	ml

Instrument Count Data

1 .	Date Sample Counted	11/11/2010	
2 .	Time Sample Counted	22:08	
3 .	Background Inf.:		
	Minutes Counted	10	min.
	Background Count Rate (cpm)	7.2	cpm
4 .	Efficiency Inf.: (Daily Spike Source ID # 111)		
	Gross Spike Count Rate (cpm)	2546.6	cpm
	Net Spike Count Rate (cpm)	2539.4	cpm
	H3 Spike Activity (dpm on count date)	6741.6	dpm
	Counter Efficiency	0.3767	cpm/dpm
5 .	Sample Info:		
	Sample Gross Count Rate (cpm)	7.8	cpm
	Sample Count Time (min.)	10.0	min.
	Net Sample Count Rate (cpm)	0.6	cpm
6 .	Critical Level:		
	Critical Level Count Rate (cpm)	2.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{\text{(Bkg cpm)}}{\text{(Bkg min.)}} + \frac{\text{(Bkg cpm)}}{\text{(Smpl min.)}}}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}} = 1.18\text{E-}06 \text{ uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency x 2.22E6 uCi/ml x Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 11-12-10

Reviewed By: _____ Date 11/15/10

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-102010-615

Sample Location (Well Number): 615

1. Representative sample collected. Date/Time 10/20/10 / 16:30

Sample collected by: THOMAS MOWI / Signature Date: 11-11-10
Printed Name

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by C Proffitt / Signature Date: 11-22-10
Printed Name

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: C Proffitt / Signature Date: 11-23-10
Fermi 2 RP Printed Name

Sample number: EFT-102010-6/6

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: C Roffit / [signature] Date: 11-23-10
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert C Weigel / [signature] Date: 11-24-10
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

DETROIT EDISON FERMI 2 POWER PLANT [illegible]

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EFT 102010 [illegible]

Sample End Time: 20 OCT 2010 10:25:08.00

REMARKS

PERFORMED BY:

Charles Proffitt

SIGNATURE/DATE

REVIEWED BY:

[illegible]

SIGNATURE/DATE

Fluid Probable Probable Zone Synthesis Plant

Sample Parameters

Sample ID Number	: [illegible]		
Sample Available Data	: 22 OCT 2049 15:30:00.00		
Sample Validity	: 22 OCT 2049 15:30:00.00		
Sample Validity	: [illegible]		
Sample Validity	: 4.0000E+00 sec		
Sample Quality	: Good	Synthesis 2.5	

Separation Parameters

Cubicle Number	: SEP 1	Sequence Date	: 22 OCT 2049 15:30:00.00
Fluid Mix Time	: 2.32:10:30.02	Elapsed Mix Time	: 2.32:10:30.02
Elapsed Mix Time	: 0.00:15:00.00	Percent Dead Time	: 0.00 %

Cubicle Parameters

Cubicle Number	: SEP 1	Verify Cell Date	: 22 OCT 2049 15:00:00.00
Fluid Mixed	: 5.0000E+04	Mix Effect Complete	
Sep Cell Date	: 22 OCT 2049 15:15:00.00		

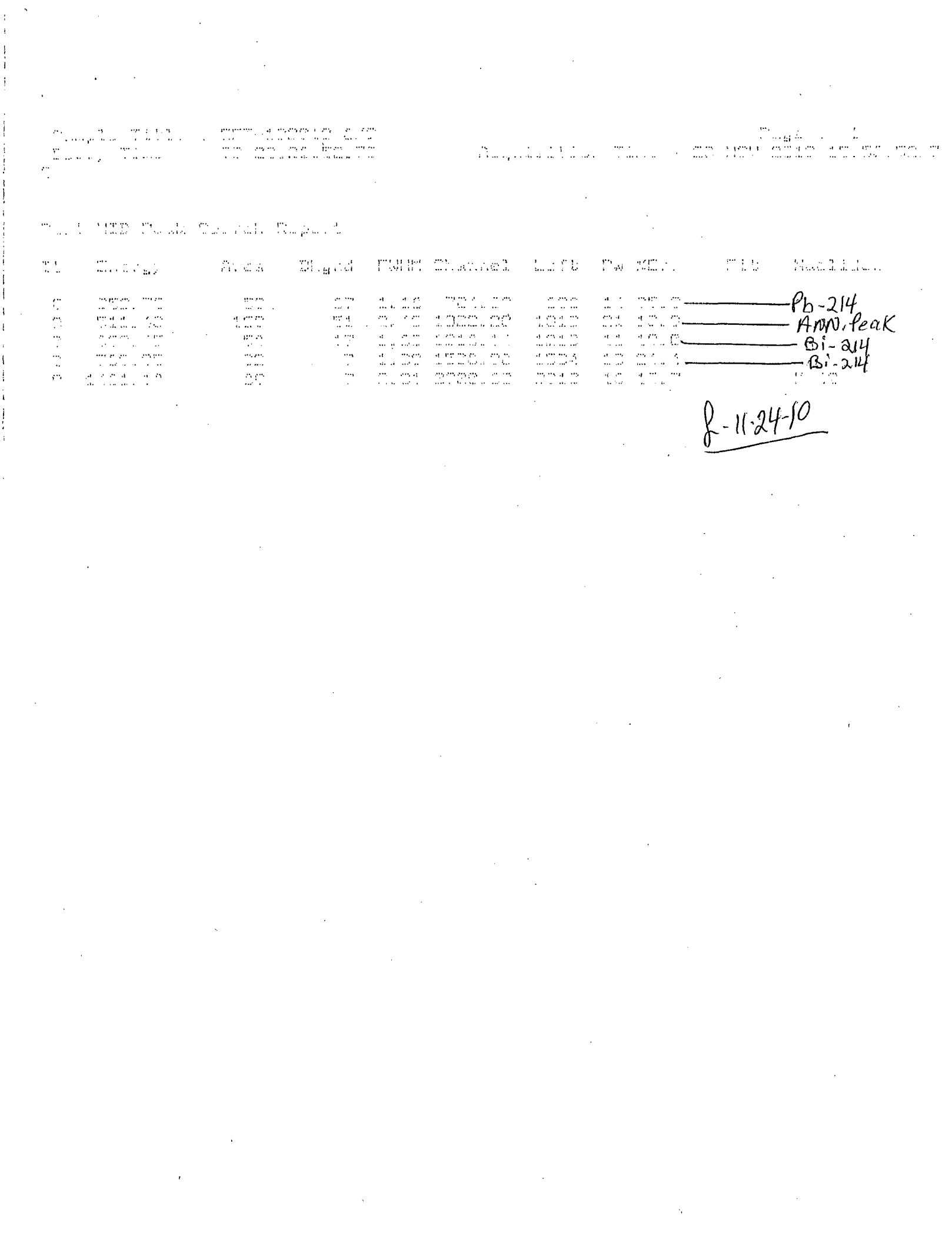
Sep Cell Parameters

Cell Channel	: 100	Cell Channel	: 200
Height Variability	: 5.0000	Shape Variability	: 10.0000
Minimum Number of Iterations to Achieve Validity	: 5		

Health Quantities Parameters

Energy Balance	: 1.7500	Half Life Ratio	: 10.0000
Maximum Yield	: 75.0000	Library	: Standard
Efficiency File	: EFF04_2011	Efficiencies ab	: Peak Energy

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1	5	[illegible]	50	27	2.12	701.33	532	1.1.0E-05	0.0
2	0	[illegible]	100	54	5.00	1000.00	1043	2.5.0E-05	0.0
3	5	[illegible]	50	27	1.23	1210.11	1554	3.3.2E-05	0.0
1	0	[illegible]	50	7	1.79	1538.98	1837	4.1.4E-05	0.0
3	3	[illegible]	50	7	5.54	2000.00	2443	1.0.0E-04	0.0



8-11-24-10

Minimum Detectable Activity Report (continued) [illegible]

[illegible]

Nuclide	[illegible]	Energy (keV)	MDA [illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	Half Life too short
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	Half Life too short
[illegible]	[illegible]	[illegible]	Half Life too short
[illegible]	[illegible]	[illegible]	Half Life too short
[illegible]	[illegible]	[illegible]	Half Life too short
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	Half Life too short
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	Half Life too short
[illegible]	[illegible]	[illegible]	Half Life too short
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	Half Life too short
[illegible]	[illegible]	[illegible]	Half Life too short
[illegible]	[illegible]	[illegible]	Half Life too short
[illegible]	[illegible]	[illegible]	Half Life too short
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	Half Life too short
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	Half Life too short
[illegible]	[illegible]	[illegible]	Half Life too short
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	Half Life too short
[illegible]	[illegible]	[illegible]	Half Life too short
[illegible]	[illegible]	[illegible]	Half Life too short
[illegible]	[illegible]	[illegible]	Half Life too short
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	Half Life too short
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	Half Life too short
[illegible]	[illegible]	[illegible]	[illegible]

EFT-6S

2011

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT 671165

Sample Location (Well Number): 65

1. Representative sample collected. Date/Time 6-7-11 / 12:00

Sample collected by: Thomas Mow / _____ Date: 6-22-11
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: C Proctor / _____ Date: 6-22-11
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: Ross Bergum / _____ Date: 6-23-11
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert C Reg SR / _____ Date: 6-24-11
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

w/ IA 6-24-11

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-6711-6S	
2 . Date Sampled	06/07/2011	
3 . Time Sampled	12:00	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	06/23/2011	
2 . Time Sample Counted	06:47	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	6.7	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	2325.6	cpm
Net Spike Count Rate (cpm)	2318.9	cpm
H3 Spike Activity (dpm on count date)	6512.3	dpm
Counter Efficiency	0.3561	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	6.6	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.0	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	1.9	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{\text{(Bkg cpm)}}{\text{(Bkg min.)}} + \frac{\text{(Bkg cpm)}}{\text{(Smpl min.)}}}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}} = 1.21\text{E-}06 \text{ uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency x 2.22E6 uCi/ml x Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 6-23-11

Reviewed _____ Date 6-23-11

DETROIT EDISON FERMI-2 POWER PLANT 21-JUN-2011 19:16:51.15

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EFT6711-6S

Sample End Time: 7-JUN-2011 12:00:00.00

REMARKS Released

PERFORMED BY:

SIGNATURE

REVIEWED BY:

SIGNATURE/DATE

Sample ID : EFT6711-6S Acquisition date : 21-JUN-2011 18:31:46

Fermi 2 Radiation Protection Gamma Spectroscopy Report

Sample Parameters

Sample ID Number: EFT6711-6S
Sample collection start date: 7-JUN-2011 12:00:00.00
Sample collection end date : 7-JUN-2011 12:00:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.00000E+03 cc
Sample geometry : M2LL Operator: CLP

Acquisition Parameters

Detector number : DET 4 Acquire date : 21-JUN-2011 18:31:46.27
Preset live time : 0 00:45:00.00 Elapsed live time : 0 00:45:00.00
Elapsed real time : 0 00:45:00.63 Percent dead time : 0.03 %

Calibration Parameters

Detector number : DET 4 Yearly cal date : 14-JUN-2011 14:50:56.41
Kev/channel : 4.99085E-01 Zero offset: 2.78302E-01
Daily cal date : 21-JUN-2011 17:43:09.97

Peak Search Parameters

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

Nuclide Identification Parameters

Energy tolerance : 1.75000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	352.62	21	48	0.98	704.84	698	10	7.95E-03	63.8	
2	0	511.05	168	48	2.80	1021.77	1014	17	6.24E-02	12.1	
3	0	1119.56	30	13	1.38	2239.02	2228	18	1.11E-02	33.9	
4	0	1461.07	88	9	1.78	2922.14	2913	16	3.27E-02	12.9	
5	0	1765.05	31	3	2.11	3530.19	3523	13	1.15E-02	21.5	

Decay Time = 14 06:31:46.27 Acquisition Time = 21-JUN-2011 18:31:46.27

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	352.62	21	48	0.90	704.84	698	10	63.8		Pb-214
0	511.05	168	48	2.00	1021.77	1014	17	12.1		Ann. Peak
0	1119.56	30	13	1.38	2239.02	2228	18	33.9		Bi-214
0	1461.07	88	9	1.78	2922.14	2913	16	12.9		K-40
0	1765.05	31	3	2.11	3530.19	3523	13	21.5		Bi-214

J 6-23-11

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	88	10.67*	2.353E+00	3.522E-07	3.522E-07	12.86

Flag: "*" = Keyline

Sample ID : EFT6711-6S Acquisition date : 21-JUN-2011 18:31:46

Total number of lines in spectrum	5	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	5	100.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	3.522E-07	3.522E-07	0.453E-07	12.86	
Total Activity :			3.522E-07	3.522E-07			
Grand Total Activity :			3.522E-07	3.522E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EFT6711-6S Acquisition date : 21-JUN-2011 18:31:46

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	187.48	511.00*	193.46	1.000E+35	12.09	Decay
	% Abundances		Found =	100.00			
SC-46	83.83D	0.17	142.53	62.70	----- Not Found -----		Abun.
			889.25*	99.98	----- Not Found -----		
			1120.51	99.99	1.233E-08	33.90	
	% Abundances		Found =	38.07			
KR-90	32.32S	38194.82	121.82	32.00	----- Not Found -----		Decay,Abun.
			539.49	29.00	----- Not Found -----		
			1118.69*	37.00	1.000E+35	33.90	
	% Abundances		Found =	37.76			
BI-214	19.90M	1033.88	609.31*	46.30	----- Not Found -----		Decay,Abun.
			768.36	5.04	----- Not Found -----		
			934.06	3.21	----- Not Found -----		
			1120.29	15.10	1.000E+35	33.90	
			1238.11	5.94	----- Not Found -----		
			1377.67	4.11	----- Not Found -----		
			1764.49	15.80	1.000E+35	21.47	
	% Abundances		Found =	32.36	(Abn. Limit = 48.48%)		
PB-214	26.80M	767.70	87.30	4.67	----- Not Found -----		Decay
			241.98	7.49	----- Not Found -----		
			295.21	19.20	----- Not Found -----		
			351.92*	37.20	1.000E+35	63.80	
			785.91	1.10	----- Not Found -----		
	% Abundances		Found =	53.40	(Abn. Limit = 37.20%)		

Flag: "*" = Keyline

Sample ID : EFT6711-6S Acquisition date : 21-JUN-2011 10:31:46

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	352.62	21	40	0.98	704.84	698	10	7.95E-03	63.8	5.38E+00	T
0	511.05	168	40	2.80	1021.77	1014	17	6.24E-02	12.1	4.59E+00	T
0	1119.56	30	13	1.38	2239.02	2228	18	1.11E-02	33.9	2.74E+00	T
0	1765.05	31	3	2.11	3530.19	3523	13	1.15E-02	21.5	2.14E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 21-JUN-2011 19:16:55.39

Sample ID : EFT6711-6S

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	33.	477.59	7.2297E-08
F-18	0.	511.00	Half-Life too short
NA-22	11.	1274.54	7.1460E-09
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	25.	889.25	9.3209E-09
CR-51	28.	320.08	7.1099E-08
MN-54	29.	834.83	8.6167E-09
CO-56	28.	1238.25	1.7896E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	45.	158.38	2.7379E-08
CO-57	51.	122.06	7.9848E-09
CO-58	18.	810.76	7.7442E-09
FE-59	13.	1099.22	1.5572E-08
CO-60	12.	1332.49	7.5525E-09
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	14.	1115.52	1.4809E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	50.	136.00	1.1037E-08
AS-76	0.	559.10	Half-Life too short
BR-82	12.	776.49	5.4560E-06
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	61.	513.99	1.9912E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	61.	513.99	1.0023E-08
RB-86	12.	1076.63	1.2936E-07
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	4.	1836.01	6.3617E-09
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	9.	1204.90	2.5509E-06
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Sample ID : EFT6711-6S Acquisition date : 21-JUN-2011 18:31:46

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
SR-93	0.	590.20	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	38.	702.63	8.1062E-09
NB-95	13.	765.79	7.3500E-09
NB-95M	50.	235.69	3.6648E-07
ZR-95	17.	756.72	1.2054E-08
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	15.	739.50	1.5973E-06
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	31.	497.08	8.9172E-09
TC-104	0.	357.99	Half-Life too short
RH-105	38.	318.90	2.4195E-05
RU-105	0.	724.50	Half-Life too short
RU-106	30.	621.84	6.9946E-08
CD-109	41.	88.03	2.6394E-07
AG-110M	19.	937.48	2.3330E-08
SN-113	31.	391.69	9.3040E-09
SN-117M	44.	158.56	1.2597E-08
SB-122	20.	563.93	3.0084E-07
SB-124	35.	602.71	8.5729E-09
SB-125	38.	427.89	2.1870E-08
TE-125M	31.	109.28	2.5055E-06
TE-127	0.	417.90	Half-Life too short
TE-127M	29.	57.60	1.9943E-05
XE-127	59.	202.84	1.1769E-08
TE-129	0.	459.60	Half-Life too short
TE-129M	23.	695.88	2.5937E-07
XE-129M	53.	196.56	3.7007E-07
I-130	0.	536.09	Half-Life too short
BA-131	46.	123.80	4.9540E-08
I-131	37.	364.48	2.4611E-08
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	50.	163.93	6.5449E-07
I-132	0.	667.69	Half-Life too short
TE-132	46.	228.16	1.3380E-07
BA-133	38.	302.84	3.0779E-08
BA-133M	40.	276.09	1.3532E-05
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	39.	81.00	2.0791E-07
XE-133M	35.	233.22	4.4723E-06
CS-134	31.	604.70	6.9525E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Sample ID : EFT6711-6S Acquisition date : 21-JUN-2011 18:31:46

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-136	18.	818.50	1.4033E-08
I-136	0.	1313.02	Half-Life too short
CS-137	19.	661.65	6.6359E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	51.	165.85	7.4651E-09
CS-139	0.	1283.23	Half-Life too short
BA-140	25.	537.32	5.0390E-08
LA-140	10.	1596.49	3.0185E-06
BA-141	0.	190.22	Half-Life too short
CE-141	59.	145.44	1.7458E-08
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	0.	293.26	Half-Life too short
CE-144	61.	133.54	6.3781E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	47.	91.10	8.3595E-08
PM-148M	26.	550.27	7.9295E-09
EU-152	34.	344.27	2.0827E-08
EU-154	17.	1004.76	4.1878E-08
EU-155	43.	105.31	3.5312E-08
EU-156	10.	646.29	1.4519E-07
HF-181	38.	482.03	1.0223E-08
TA-182	15.	1221.42	3.1586E-08
W-187	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
AU-199	45.	158.38	3.3976E-07
HG-203	46.	279.19	9.2916E-09
BI-207	30.	569.67	6.5803E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	59.	240.98	2.4920E-06
RA-226	57.	186.21	1.8018E-07
AC-228	40.	338.32	5.1558E-08
TH-228	33.	84.37	7.9905E-07
PA-234	0.	131.20	Half-Life too short
TH-234	37.	63.29	1.2071E-06
U-235	50.	143.76	5.5242E-08
NP-239	39.	106.13	2.0164E-06
AM-241	21.	59.54	1.0845E-07

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EF1102111-6S

Sample Location (Well Number): 6S

1. Representative sample collected. Date/Time 10-21-11 / 17:10

Sample collected by: Thomas Neal Tucker Date: 10-21-11
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: C Proffitt / [signature] Date: 10-18-11
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: John M. Gorum / [signature] Date: 11-1-11
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert C Reynolds / [signature] Date: 11-2-11
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks N/A

Tritium Activity Calculation

Sample Information

1 . Sample Location	6S	
2 . Date Sampled	10/21/2011	
3 . Time Sampled	17:10	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	10/30/2011	
2 . Time Sample Counted	14:30	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	7.5	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	2548.6	cpm
Net Spike Count Rate (cpm)	2541.1	cpm
H3 Spike Activity (dpm on count date)	6383.7	dpm
Counter Efficiency	0.3981	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	7.5	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.0	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{(\text{Bkg cpm})}{(\text{Bkg min.})} + \frac{(\text{Bkg cpm})}{(\text{Smpl min.})}}}{\text{Efficiency} \times 2.22\text{E6 dpm/uCi} \times \text{Sample Volume}} = 1.14\text{E-06 uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency} \times 2.22\text{E6 uCi/ml} \times \text{Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 11-1-11

Reviewed _____ Date NOV 01 2011

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EF1102111-GS

Sample Location (Well Number): GS'

1. Representative sample collected. Date/Time 10-21-11 / 17:10

Sample collected by: Thomas Moul Date: 10-21-11
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: C Proffitt / Date: 10-18-11
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: C Proffitt Date: 10-28-11
Fermi 2 RP Printed Name Signature

Sample number: EFT 102111 6S

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: C Proffitt / [signature] Date: 10-28-11
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert Colley SR / [signature] Date: 10-31-11
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

N/A

DETROIT EDISON FERMI-2 POWER PLANT 28-OCT-2011 14:05:53.60

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EFT102111 6S

Sample End Time: 21-OCT-2011 17:10:00.00

REMARKS No plant related isotopes

PERFORMED BY:

SIGNATURE

REVIEWED BY:

SIGNATURE/DATE

Sample ID : EFT102111 6S Acquisition date : 28-OCT-2011 13:20:50

****

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********
Sample ID Number: EFT102111 6S
Sample collection start date: 21-OCT-2011 17:10:00.00
Sample collection end date : 21-OCT-2011 17:10:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.000000E+03 cc
Sample geometry : M2LL Operator: CLP

********** Acquisition Parameters **********
Detector number : DET 4 Acquire date : 28-OCT-2011 13:20:50.26
Preset live time : 0 00:45:00.00 Elapsed live time : 0 00:45:00.00
Elapsed real time : 0 00:45:00.63 Percent dead time : 0.03 %

********** Calibration Parameters **********
Detector number : DET 4 Yearly cal date : 14-JUN-2011 14:50:56.41
Kev/channel : 5.00063E-01 Zero offset: -5.63736E-01
Daily cal date : 28-OCT-2011 06:54:31.91

********** Peak Search Parameters **********
Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********
Energy tolerance : 1.75000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy
****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	198.71	40	57	1.75	398.50	394	8	1.50E-02	35.7	
2	0	353.08	28	62	0.86	707.22	700	12	1.02E-02	60.5	
3	0	511.27	193	45	3.23	1023.55	1015	18	7.15E-02	10.9	
4	0	1460.83	77	4	1.79	2922.57	2915	15	2.86E-02	12.6	

Decay Time = 6 20:10:50.26 Acquisition Time = 28-OCT-2011 13:20:50.26

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	198.71	40	57	1.75	398.50	394	8	35.7		Ge-n-x
0	353.08	28	62	0.86	707.22	700	12	60.5		Too Few W/ High % Err.
0	511.27	193	45	3.23	1023.55	1015	18	10.9		And Peak
0	1460.83	77	4	1.79	2922.57	2915	15	12.6		K-40

10-31-11

Sample ID : EFT102111 6S Acquisition date : 28-OCT-2011 13:20:50

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	77	10.67*	2.353E+00	3.082E-07	3.082E-07	12.61

Flag: "*" = Keyline

Sample ID : EFT102111 6S Acquisition date : 28-OCT-2011 13:20:50

Total number of lines in spectrum	4	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	4	100.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	3.082E-07	3.082E-07	0.389E-07	12.61	
Total Activity :			3.082E-07	3.082E-07			
Grand Total Activity :			3.082E-07	3.082E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EFT102111 6S Acquisition date : 28-OCT-2011 13:20:50

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	89.97	511.00*	193.46	2.632E+19	10.87	Decay
	% Abundances Found =			100.00			
SE-75	119.78D	0.06	66.05	1.02	---- Not Found ----		Abun.
			96.73	3.41	---- Not Found ----		
			121.12	16.70	---- Not Found ----		
			136.00*	59.20	---- Not Found ----		
			198.60	1.45	4.585E-07	35.75	
			264.65	59.80	---- Not Found ----		
			279.53	25.20	---- Not Found ----		
			303.91	1.32	---- Not Found ----		
			400.65	11.40	---- Not Found ----		
	% Abundances Found =			0.81			
PB-214	26.80M	360.41	87.30	4.67	---- Not Found ----		Decay
			241.98	7.49	---- Not Found ----		
			295.21	19.20	---- Not Found ----		
			351.92*	37.20	1.000E+35	60.52	
			785.91	1.10	---- Not Found ----		
	% Abundances Found =			53.40	(Abn. Limit = 37.20%)		

Flag: "*" = Keyline

Sample ID : EFT102111 6S Acquisition date : 28-OCT-2011 13:20:50

It	Energy.	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	198.71	40	57	1.75	398.50	394	8	1.50E-02	35.7	6.34E+00	T
0	353.00	28	62	0.86	707.22	700	12	1.02E-02	60.5	5.37E+00	T
0	511.27	193	45	3.23	1023.55	1015	10	7.15E-02	10.9	4.59E+00	T

Flags: "T" = Tentatively associated

****
* Detroit Edison Fermi 2 MDA Report, Generated 28-OCT-2011 14:05:57.73 *
****
* Sample ID : EFT102111 6S *
****

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	24.	477.59	5.6293E-08
F-18	0.	511.00	Half-Life too short
NA-22	12.	1274.54	7.4010E-09
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	16.	889.25	7.1977E-09
CR-51	30.	320.08	6.0364E-08
MN-54	37.	834.83	9.5740E-09
CO-56	24.	1238.25	1.5786E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	46.	158.38	1.1840E-08
CO-57	49.	122.06	7.7349E-09
CO-58	17.	810.76	6.9565E-09
FE-59	11.	1099.22	1.2953E-08
CO-60	31.	1332.49	1.1628E-08
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	18.	1115.52	1.6495E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	55.	136.00	1.1033E-08
AS-76	55.	559.10	1.4437E-06
BR-82	13.	776.49	1.6738E-07
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	76.	513.99	2.1995E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	76.	513.99	1.0239E-08
RB-86	9.	1076.63	8.5666E-08
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	3.	1836.01	5.4043E-09
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	22.	1204.90	3.3726E-06
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Sample ID : EFT102111 6S Acquisition date : 28-OCT-2011 13:20:50

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
SR-93	0.	590.28	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	30.	702.63	7.2180E-09
NB-95	17.	765.79	7.0212E-09
NB-95M	41.	235.69	7.9710E-08
ZR-95	19.	756.72	1.2504E-08
NB-97	0.	657.90	Half-Life too short
ZR-97	17.	743.36	5.1764E-06
MO-99	20.	739.50	2.7750E-07
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	26.	497.08	7.2572E-09
TC-104	0.	357.99	Half-Life too short
RH-105	30.	318.90	6.5378E-07
RU-105	0.	724.50	Half-Life too short
RU-106	24.	621.84	6.2352E-08
CD-109	29.	88.03	2.2224E-07
AG-110M	21.	937.48	2.3963E-08
SN-113	27.	391.69	8.3576E-09
SN-117M	47.	158.56	8.9357E-09
SB-122	29.	563.93	5.2327E-08
SB-124	31.	602.71	7.4240E-09
SB-125	27.	427.89	1.8437E-08
TE-125M	38.	109.28	2.5134E-06
TE-127	0.	417.90	Half-Life too short
TE-127M	33.	57.60	2.0116E-05
XE-127	45.	202.84	9.0363E-09
TE-129	0.	459.60	Half-Life too short
TE-129M	22.	695.88	2.1922E-07
XE-129M	47.	196.56	1.9636E-07
I-130	0.	536.09	Half-Life too short
BA-131	48.	123.00	3.2890E-08
I-131	34.	364.48	1.2470E-08
TE-131	0.	149.72	Half-Life too short
TE-131M	11.	773.67	5.9163E-07
XE-131M	52.	163.93	4.2913E-07
I-132	0.	667.69	Half-Life too short
TE-132	36.	228.16	2.4575E-08
BA-133	40.	302.84	3.1207E-08
BA-133M	34.	276.09	5.2177E-07
I-133	20.	529.87	1.4610E-06
TE-133M	0.	912.58	Half-Life too short
XE-133	36.	81.00	7.4957E-08
XE-133M	46.	233.22	4.8094E-07
CS-134	27.	604.70	6.4700E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	37.	268.24	1.7289E-06
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Sample ID : EFT102111 6S Acquisition date : 28-OCT-2011 13:20:50

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-136	14.	818.50	8.6138E-09
I-136	0.	1313.02	Half-Life too short
CS-137	23.	661.65	7.1744E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	44.	165.85	6.7595E-09
CS-139	0.	1283.23	Half-Life too short
BA-140	19.	537.32	2.9877E-08
LA-140	10.	1596.49	1.3826E-07
BA-141	0.	190.22	Half-Life too short
CE-141	57.	145.44	1.4692E-08
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	34.	293.26	3.8642E-07
CE-144	48.	133.54	5.6489E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	39.	91.10	4.8176E-08
PM-148M	15.	550.27	5.5174E-09
EU-152	27.	344.27	1.8706E-08
EU-154	11.	1004.76	3.4430E-08
EU-155	37.	105.31	3.2835E-08
EU-156	13.	646.29	9.0766E-08
HF-181	26.	482.03	7.6006E-09
TA-182	15.	1221.42	3.0604E-08
W-187	19.	685.81	2.3756E-06
RE-188	56.	155.03	3.2727E-05
AU-199	46.	158.38	6.6229E-08
HG-203	42.	279.19	7.9082E-09
BI-207	24.	569.67	5.9926E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	48.	240.98	5.4284E-07
RA-226	53.	186.21	1.7428E-07
AC-228	38.	338.32	5.0559E-08
TH-228	48.	84.37	9.4411E-07
PA-234	0.	131.20	Half-Life too short
TH-234	28.	63.29	8.5654E-07
U-235	61.	143.76	6.0918E-08
NP-239	32.	106.13	2.0716E-07
AM-241	29.	59.54	1.2479E-07

GEL LAB RESULTS

EFT-6S 2009

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : Detroit Edison - Fermi 1
Address : PO Box 44440
Detroit, Michigan 48244

Report Date: February 17, 2010

Contact: Mr. Tom Mow
Project: **Fermi 1 - PO# 4700246055**

Client Sample ID:	EF1-6/S	Project:	ROIT00116
Sample ID:	245517013	Client ID:	ROIT001
Matrix:	Ground Water		
Collect Date:	29-DEC-09 15:10		
Receive Date:	25-JAN-10		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Rad Gas Flow Proportional Counting											
GFPC, Gross A/B, liquid "As Received"											
Alpha		6.22	+/-3.33	3.92	5.00	pCi/L		DXF3 02/11/10	1932	945896	1
Beta	U	2.98	+/-2.13	3.33	5.00	pCi/L					

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 900.0	

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : Detroit Edison - Fermi 1
Address : PO Box 44440
Detroit, Michigan 48244
Contact: Mr. Tom Mow
Project: Fermi 1 - PO# 4700246055

Report Date: December 30, 2010

Client Sample ID: EFT-102010-6/S
Sample ID: 268144001
Matrix: Water
Collect Date: 20-OCT-10 16:30
Receive Date: 06-DEC-10
Collector: Client

Project: ROIT00116
Client ID: ROIT001

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Rad Gas Flow Proportional Counting											
GFPC, Gross A/B, liquid "As Received"											
Alpha		4.08	+/-2.62	3.47	5.00	pCi/L		VXC2 12/27/10	1248	1059089	1
Beta		4.81	+/-2.48	3.82	5.00	pCi/L					

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 900.0/SW846 9310	

EFT-7S

2006

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-75060806

Sample Location (Well Number): EFT-7S

1. Representative sample collected. Date/Time 06/08/06 / 0917

Sample collected by: Jay Slabeck / Jay Main Slabeck Collection Date: 06/08/06
Printed Name / Signature Sign 02/01/06

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Christopher Frailing / Chitpol Affily Date: 06/07/06
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: Russ Burgett / Date: 2-5-7
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: William V. Lipton / William V. Lipton Date: 2/15/2007
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks No tritium detected William V. Lipton 7865 2/15/2007

WR EFI 04-052
pg 20f2

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-7S060806	
2 . Date Sampled	06/08/2006	
3 . Time Sampled	09:12	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	02/02/2007	
2 . Time Sample Counted	10:00	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	7.4	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	3388.1	cpm
Net Spike Count Rate (cpm)	3380.7	cpm
H3 Spike Activity (dpm on count date)	8340.7	dpm
Counter Efficiency	0.4053	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	6.0	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.0	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{\text{(Bkg cpm)}}{\text{(Bkg min.)}} + \frac{\text{(Bkg cpm)}}{\text{(Smpl min.)}}}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}} = 1.12\text{E-}06 \text{ uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 2-5-7

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-7506 0806

Sample Location (Well Number): EFT-75

1. Representative sample collected. Date/Time 06/08/06 / 0917

Sample collected by: Jay Slabach / Jay Marie Slabach (Collection) Date: 06/08/06
Printed Name / Signature Signed 02/01/07

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Christopher Frailing / Christ A Frailing Date: 08/02/06
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: KD LINDSEY / KD Lindsey Date: 8-21-07
Fermi 2 RP Printed Name Signature

Sample number: EFT-750 60806

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
. (Note disposition of unidentified peaks in "Remarks")

Performed by: Chris Hubbard CQ 2nd Date: 7-11-07
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: K D Lindsey / K D Lindsey Date: 8-21-07
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EF1 EFT-7S060006

Sample End Time: 8-JUN-2006 09:12:00.00

REMARKS

PERFORMED BY:

SIGNATURE

REVIEWED BY:

SIGNATURE/DATE 8-21-07

Sample ID : EF1 EFT-7S060006C Acquisition date : 11-JUL-2007 08:09:53

****

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********

Sample ID Number: EF1 EFT-7S060006
Sample collection start date: 8-JUN-2006 09:12:00.00
Sample collection end date : 8-JUN-2006 09:12:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.000000E+03 CC
Sample geometry : MELL Operator: CMH

********** Acquisition Parameters **********

Detector number : DET 4 Acquire date : 11-JUL-2007 08:09:53.30
Preset live time : 0 00:30:00.00 Elapsed live time : 0 00:30:00.00
Elapsed real time : 0 00:30:00.00 Percent dead time : 0.05 %

********** Calibration Parameters **********

Detector number : DET 4 Yearly cal date : 20-JUN-2007 12:16:46.16
Kev/channel : 4.996666E-01 Zero offset: -9.019427E-02
Daily cal date : 11-JUL-2007 07:21:16.11

********** Peak Search Parameters **********

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********

Energy tolerance : 2.00000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	511.40	186	25	3.32	1023.64	1014	22	1.03E-01	10.2	annihilation
2	0	558.99	70	28	1.50	1118.89	1113	14	3.89E-02	20.0	Hwc
3	0	805.13	13	10	1.70	1611.46	1608	9	7.04E-03	51.9	
4	0	1460.81	60	3	2.16	2923.57	2910	11	3.35E-02	13.9	K-40

Decay Time = 397 22:57:53.30 Acquisition Time = 11-JUL-2007 08:09:53.3
0

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	511.40	196	25	3.32	1023.64	1014	22	10.2		
0	558.99	70	20	1.50	1118.89	1113	14	20.0		
0	805.13	13	10	1.70	1611.46	1608	9	51.9		
0	1460.81	60	3	2.16	2923.57	2918	11	13.9		K-40

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/CC	Decay Corr uCi/CC	1-Sigma %Error
K-40	1460.81	60	10.67*	2.501E+00	3.391E-07	3.391E-07	13.94

Flag: "*" = Keyline

Sample ID : EF1 EFT-75060006 Acquisition date : 11-JUL-2007 00:00:53

Total number of lines in spectrum	4	
Number of unidentified lines	1	
Number of lines tentatively identified by NID	3	75.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/CC	Decay Corr uCi/CC	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	3.391E-07	3.391E-07	0.473E-07	13.94	
	Total Activity :		3.391E-07	3.391E-07			
	Grand Total Activity :		3.391E-07	3.391E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EF1 CFT-75060006 Acquisition date : 11-JUL-2007 00:09:53

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/CC)	1-Sigma %Error	Rejected by
F-18	109.74M	5222.10	511.00*	193.46	1.000E+35	10.23	Decay
		% Abundances Found =		100.00			
AS-76	26.32H	362.89	559.10*	44.70	1.000E+35	20.00	Decay, Abun.
			563.23	1.17	---- Not Found ----		
			571.30	0.14	---- Not Found ----		
			657.03	6.10	---- Not Found ----		
			665.31	0.39	---- Not Found ----		
			740.12	0.12	---- Not Found ----		
			771.76	0.12	---- Not Found ----		
			867.63	0.12	---- Not Found ----		
			1129.87	0.14	---- Not Found ----		
			1212.72	1.63	---- Not Found ----		
			1216.02	3.84	---- Not Found ----		
			1220.52	1.39	---- Not Found ----		
			1439.13	0.33	---- Not Found ----		
			1453.60	0.13	---- Not Found ----		
			1707.67	0.33	---- Not Found ----		
		% Abundances Found =		73.70			

Flag: "*" = Keyline

Sample ID : EF1 EFT-7S0C0806 Acquisition date : 11-JUL-2007 00:09:53

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	511.40	196	25	3.32	1023.64	1014	22	1.03E-01	10.2	4.00E+00	T
0	558.99	70	20	1.50	1118.89	1113	14	3.99E-02	20.0	4.60E+00	T
0	805.13	13	10	1.70	1611.46	1600	9	7.04E-03	51.9	3.61E+00	

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 11-JUL-2007 00:39:59.50

Sample ID : EF1 EFT-7S060006

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/CC)
BE-7	17.	477.59	1.0952E-05
F-18	0.	511.00	Half-Life too short
NA-22	5.	1274.54	9.7765E-09
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	0.	889.25	1.9504E-07
CR-51	0.	320.09	Half-Life too short
MN-54	12.	834.83	1.9776E-08
CO-56	6.	1238.25	3.7517E-07
MN-56	0.	1810.69	Half-Life too short
NI-56	0.	158.38	Half-Life too short
CO-57	35.	122.06	2.5207E-08
CO-58	16.	810.76	4.3571E-07
FE-59	8.	1099.22	6.8886E-06
CO-60	10.	1332.49	1.1678E-08
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	6.	1115.52	4.4354E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	41.	136.00	1.3149E-07
AS-76	0.	559.10	Half-Life too short
BR-82	0.	776.49	Half-Life too short
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	53.	513.99	2.8040E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	53.	513.99	7.9699E-07
RB-86	0.	1076.63	Half-Life too short
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	7.	1836.01	1.3657E-07
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	4.	1204.90	2.4960E-04
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Sample ID : EF1 EFT-7S060806 Acquisition date : 11-JUL-2007 08:09:53

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/CC)
SR-93	0.	590.20	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	13.	702.63	7.1892E-09
NB-95	0.	765.79	Half-Life too short
NB-95M	0.	235.69	Half-Life too short
ZR-95	15.	756.72	1.0885E-06
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	0.	739.58	Half-Life too short
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	0.	497.08	Half-Life too short
TC-104	0.	357.99	Half-Life too short
RH-105	0.	318.90	Half-Life too short
RU-105	0.	724.50	Half-Life too short
RU-106	21.	621.84	1.7207E-07
CD-109	41.	88.03	6.7284E-07
AG-110M	8.	937.48	6.6054E-08
SN-113	22.	391.69	1.1245E-07
SN-117M	0.	158.56	Half-Life too short
SB-122	0.	563.93	Half-Life too short
SB-124	21.	602.71	8.0139E-07
SB-125	23.	427.89	3.1621E-08
TE-125M	36.	109.28	3.7243E-04
TE-127	0.	417.90	Half-Life too short
TE-127M	28.	57.60	2.9091E-04
XE-127	0.	202.84	Half-Life too short
TE-129	0.	459.60	Half-Life too short
TE-129M	0.	695.88	Half-Life too short
XE-129M	0.	196.56	Half-Life too short
I-130	0.	536.09	Half-Life too short
BA-131	0.	123.80	Half-Life too short
I-131	0.	364.48	Half-Life too short
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	0.	163.93	Half-Life too short
I-132	0.	667.69	Half-Life too short
TE-132	0.	228.16	Half-Life too short
BA-133	27.	302.84	4.0232E-08
BA-133M	0.	276.09	Half-Life too short
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	0.	81.00	Half-Life too short
XE-133M	0.	233.22	Half-Life too short
CS-134	22.	604.70	1.1888E-08
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Sample ID : EF1 EFT-76060006 Acquisition date : 11-JUL-2007 08:09:53

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/CC)
CS-136	0.	818.50	Half-Life too short
I-136	0.	1313.02	Half-Life too short
CS-137	16.	661.65	8.8174E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	44.	165.85	6.8874E-08
CS-139	0.	1283.23	Half-Life too short
BA-140	0.	537.32	Half-Life too short
LA-140	0.	1596.49	Half-Life too short
BA-141	0.	190.22	Half-Life too short
CE-141	0.	145.44	Half-Life too short
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	0.	293.26	Half-Life too short
CE-144	42.	133.54	1.9430E-07
PR-144	0.	1489.15	Half-Life too short
ND-147	0.	91.10	Half-Life too short
PM-148M	23.	550.27	6.6540E-06
EU-152	30.	344.27	2.9449E-08
EU-154	15.	1004.76	6.1235E-08
EU-156	0.	646.29	Half-Life too short
HF-181	19.	482.03	5.5340E-06
TA-182	12.	1221.42	4.2235E-07
W-187	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
HG-203	29.	279.19	3.2695E-06
BI-207	17.	569.67	7.4469E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	0.	240.98	Half-Life too short
RA-226	70.	186.21	2.9963E-07
AC-228	34.	338.32	7.6385E-08
TH-228	44.	84.37	1.9336E-06
PA-234	0.	131.20	Half-Life too short
TH-234	0.	63.29	Half-Life too short
U-235	36.	143.76	6.7463E-08
NP-239	0.	106.13	Half-Life too short
AM-241	28.	59.54	1.6878E-07

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-75060806

Sample Location (Well Number): EFT-7S

1. Representative sample collected. Date/Time 06/08/06 / 0917

Sample collected by: Jay Slabachor J Slabach Date: 06/08/06
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Christopher Frailing / Chris A Frailing Date: 08/07/06
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: Ross Burge Ross Burge Date: 8-3-06
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: R D Lindsey R D Lindsey Date: 8-21-06
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-7S	
2 . Date Sampled	06/08/2006	
3 . Time Sampled	09:12	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	08/03/2006	
2 . Time Sample Counted	12:30	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	8.3	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	3619.6	cpm
Net Spike Count Rate (cpm)	3611.3	cpm
H3 Spike Activity (dpm on count date)	8580.4	dpm
Counter Efficiency	0.4209	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	8.2	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.0	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.1	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{\text{(Bkg cpm)}}{\text{(Bkg min.)}} + \frac{\text{(Bkg cpm)}}{\text{(Smpl min.)}}}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}} = 1.14\text{E-}06 \text{ uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency x 2.22E6 uCi/ml x Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 8-3-06

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-7506 0806

Sample Location (Well Number): EFT-75

1. Representative sample collected. Date/Time 06/08/06 / 0917

Sample collected by: Jay Slabach, for J Slayton / Date: 06/08/06
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Christopher Frailing / Christ A Frailing Date: 05/02/06
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: Abere / Andrew Abere Date: 8-5-06
Fermi 2 RP Printed Name Signature

Sample number: EFT-750 60806

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: Abere , Anthony Abere Date: 8-5-08
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: K) Lindsey , K) Lindsey Date: 2-21-08
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EFT-7506060006 EF1

Sample End Time: 6-JUN-2006 09:12:00.00

REMARKS

PERFORMED BY:

SIGNATURE

REVIEWED BY:

KJ Gundy 2-21-08

SIGNATURE/DATE

Sample ID : EFT-7S060006 EF1 Acquisition date : 5-AUG-2006 09:41:55

****

Fermi 2 Radiation Protection Gamma Spectroscopy Report

Sample Parameters

Sample ID Number: EFT-7S060006 EF1
Sample collection start date: 8-JUN-2006 09:12:00.00
Sample collection end date : 8-JUN-2006 09:12:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.00000E+03 cc
Sample geometry : M2LL Operator: AKG

Acquisition Parameters

Detector number : DET 4 Acquire date : 5-AUG-2006 09:41:55.03
Preset live time : 0 00:30:00.00 Elapsed live time : 0 00:30:00.00
Elapsed real time : 0 00:30:01.12 Percent dead time : 0.05 %

Calibration Parameters

Detector number : DET 4 Yearly cal date : 26-APR-2006 11:58:00.00
Kev/channel : 5.00143E-01 Zero offset: -2.30456E-03
Daily cal date : 5-AUG-2006 08:20:12.42

Peak Search Parameters

Start channel : 100 End channel : 4096
Height sensitivity : 5.00670 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

Nuclide Identification Parameters

Energy tolerance : 2.00000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_M2LL Efficiencies at : Peak energy

****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	511.45	141	44	2.69	1022.92	1014	16	7.82E-02	13.5	
2	0	559.12	56	35	1.50	1118.29	1110	14	3.11E-02	26.1	
3	0	1460.78	83	4	3.07	2923.24	2915	17	4.59E-02	12.4	

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	511.45	141	44	2.69	1022.92	1014	16	13.5		Annihilation
0	559.12	56	35	1.50	1118.29	1110	14	26.1		Hwc
0	1460.70	83	4	3.07	2923.24	2915	17	12.4		K-40

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	83	10.67*	2.300E+00	5.040E-07	5.040E-07	12.48

Flag: "*" = Keyline

Sample ID : EFT-79060806 EF1 Acquisition date : 5-AUG-2006 07:41:55

Total number of lines in spectrum	3	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	3	100.00%

Nuclide Type : natural

Nuclide	Mlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	5.040E-07	5.040E-07	0.625E-07	12.40	
	Total Activity :		5.040E-07	5.040E-07			
Grand Total Activity :			5.040E-07	5.040E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : CFT-790605b.. EF1 Acquisition date : 5-NOV-20.. 09:41:55

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	761.48	511.00*	193.46	1.000E+35	13.58	Decay
		% Abundances Found =		100.00			
As-74	26.30H	52.76	559.10*	44.70	3.706E+08	26.11	Decay,Abun..
			563.23	1.17	----- Not Found	-----	
			571.30	0.14	----- Not Found	-----	
			657.03	6.10	----- Not Found	-----	
			665.31	0.39	----- Not Found	-----	
			740.12	0.12	----- Not Found	-----	
			771.76	0.12	----- Not Found	-----	
			867.63	0.12	----- Not Found	-----	
			1129.07	0.11	----- Not Found	-----	
			1212.72	1.63	----- Not Found	-----	
			1216.02	3.84	----- Not Found	-----	
			1228.52	1.39	----- Not Found	-----	
			1439.13	0.42	----- Not Found	-----	
			1453.60	0.13	----- Not Found	-----	
			1787.67	0.11	----- Not Found	-----	
		% Abundances Found =		73.70			
Y-92	3.54H	.....	.....				
			561.10	2.40	1.000E+35	26.11	
			844.30	1.20	----- Not Found	-----	
			934.46*	13.90	----- Not Found	-----	
			1405.40	4.80	----- Not Found	-----	
		% Abundances Found =		9.74			

Flag: "*" = Keyline

Sample ID : EFT-7S060806 EF1 Acquisition date : 5-AUG-2006 09:41:55

Id	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	511.45	141	44	2.69	1022.92	1014	16	7.02E-02	13.5	4.48E+00	T
0	559.12	56	35	1.50	1118.29	1110	14	3.11E-02	26.1	4.31E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 5-AUG-2006 10:12:03.76

Sample ID : EFT-7S060006 EF1

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	29.	477.59	1.8426E-07
F-18	0.	511.00	Half-Life too short
NA-22	8.	1274.54	1.0687E-08
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	12.	889.25	1.5136E-08
CR-51	43.	320.08	4.0529E-07
MN-54	17.	834.83	1.1570E-08
CO-56	22.	1238.25	3.5612E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	63.	158.38	7.1631E-06
CO-57	52.	122.06	1.4009E-07
CO-58	15.	810.76	1.6714E-08
FE-59	10.	1099.22	4.1468E-08
CO-60	9.	1332.49	1.0635E-08
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	6.	1115.52	1.8130E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	52.	136.00	2.2468E-08
AS-76	0.	559.10	Half-Life too short
BR-82	0.	776.49	Half-Life too short
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	54.	513.99	2.9092E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	54.	513.99	2.3195E-08
RB-86	17.	1076.63	1.1785E-06
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	4.	1836.01	1.2724E-08
KR-89	0.	228.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	9.	1204.90	6.4495E-06
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Sample ID : EFT-73060006 EF1 Acquisition date : 5-AUG-2006 00:41:55

Nuclide	Background Sum	Energy (keV)	MDA (uCi/cc)
SR-89	0.	590.28	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	25.	702.63	1.0350E-08
NB-95	26.	765.79	3.5996E-08
NB-95M	0.	235.69	Half-Life too short
ZR-95	24.	756.72	3.7000E-08
NB-97	0.	658.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	0.	739.58	Half-Life too short
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	25.	497.08	2.6005E-08
TC-104	0.	357.99	Half-Life too short
RH-105	0.	318.90	Half-Life too short
RU-105	0.	724.50	Half-Life too short
RU-106	31.	621.84	1.1846E-07
CD-109	33.	88.03	4.1279E-07
AG-110M	16.	937.48	3.0089E-08
SN-113	31.	391.69	1.8556E-08
SN-117M	63.	158.56	2.1577E-07
SB-122	0.	563.93	Half-Life too short
SB-124	30.	602.71	2.0064E-08
SB-125	31.	427.89	3.1188E-08
TE-125M	29.	109.28	6.4860E-06
TE 127	0.	417.90	Half-Life too short
TE-127M	37.	57.60	3.6258E-05
XE-127	60.	202.84	4.2938E-08
TE-129	0.	459.60	Half-Life too short
TE-129M	26.	695.88	1.0306E-06
XE-129M	59.	196.56	1.8520E-05
I-130	0.	536.09	Half-Life too short
BA-131	48.	123.80	1.0284E-06
I-131	22.	364.48	1.3189E-06
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	51.	163.93	1.3358E-05
I-132	0.	667.69	Half-Life too short
TE-132	0.	228.16	Half-Life too short
BA-133	46.	302.84	5.4003E-08
BA-133M	0.	276.09	Half-Life too short
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	0.	81.00	Half-Life too short
XE-133M	0.	233.22	Half-Life too short
CS-134	22.	604.70	9.4467E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Nuclide	Bckgrd Sum	Energy (keV)	MDA (uCi/cc)
CS-136	14.	818.50	1.5562E-07
I-136	0.	1313.02	Half-Life too short
CS-137	37.	661.65	1.3710E-08
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	45.	165.85	1.3670E-08
CS-139	0.	1283.23	Half-Life too short
BA-140	22.	537.32	7.7350E-07
LA-140	0.	1596.49	Half-Life too short
BA-141	0.	190.22	Half-Life too short
CE-141	55.	145.44	6.6534E-08
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	0.	293.26	Half-Life too short
CE-144	45.	133.54	9.5402E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	40.	91.10	1.9719E-06
PM-148M	21.	550.27	2.7956E-08
EU-152	31.	344.27	3.1050E-08
EU-154	9.	1004.76	5.0479E-08
EU-156	22.	646.29	1.8023E-06
HF-181	33.	482.03	2.9057E-08
TA-182	0.	1221.42	5.1877E-08
W-187	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
HG-203	44.	279.19	2.7813E-08
BI-207	27.	569.67	9.7424E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	0.	240.98	Half-Life too short
RA-226	50.	186.21	2.6535E-07
AC-228	40.	338.32	8.2432E-08
TH-228	41.	84.37	1.4947E-06
PA-234	0.	131.20	Half-Life too short
TH-234	36.	63.29	6.2705E-06
U-235	53.	143.76	8.7870E-09
NP-239	0.	106.13	Half-Life too short
AM-241	50.	59.54	2.2899E-07

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-75 121806

Sample Location (Well Number): EFT-75

1. Representative sample collected. Date/Time 12/18/06 / 1452

Sample collected by: J-Slaback / Joy Marie Slaback Date: 02/01/07
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: J. Southward / Jennifer Southward Date: 2/2/07
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: D. Howard / [signature] Date: APR 20 2007
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: K.D. Lindsey / K.D. Lindsey Date: 11-14-07
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-7S121806	
2 . Date Sampled	12/18/2006	
3 . Time Sampled	14:52	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	04/19/2007	
2 . Time Sample Counted	18:37	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	7.7	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	3407.6	cpm
Net Spike Count Rate (cpm)	3399.9	cpm
H3 Spike Activity (dpm on count date)	8243.8	dpm
Counter Efficiency	0.4124	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	6.2	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.0	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \sqrt{\frac{\frac{\text{(Bkg cpm)}}{\text{(Bkg min.)}} + \frac{\text{(Bkg cpm)}}{\text{(Smpl min.)}}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}}} = 1.12\text{E-}06 \text{ uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency x 2.22E6 uCi/ml x Sample Volume}} < \text{MDA}$$

Technician _____ Date APR 20 2007

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-75 121806

Sample Location (Well Number): EFT-75

1. Representative sample collected. Date/Time 12/18/06 / 1452

Sample collected by: J. Slaback / Jay Marc Slaback Date: 02/01/07 02/01/07
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: J. Southward / Jennifer Southward Date: 7/11/07 7/11/07
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: K) Lindsey / K) Lindsey Date: 8-8-07
Fermi 2 RP Printed Name Signature

Sample number: EFT-75121806

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: Chris Hubbard / [signature] Date: 7-16-07
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: K D Lindsey / [signature] Date: 8-8-07
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

DETROIT EDISON FERMI-2 POWER PLANT 16-JUL-2007 12:13:31.21

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EF1 EFT-78121006

Sample End Time: 10-DEC-2006 14:52:00.00

REMARKS

PERFORMED BY:

SIGNATURE

REVIEWED BY:

8-8-07

SIGNATURE/DATE

Sample ID : EF1 EFT-79121006 Acquisition date : 16-JUL-2007 11:43:27

****

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********
Sample ID Number: EF1 EFT-79121006
Sample collection start date: 18-DEC-2006 14:52:00.00
Sample collection end date : 19-DEC-2006 14:52:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.00000E+03 CC
Sample geometry : MELL Operator: CMH

********** Acquisition Parameters **********
Detector number : DET 4 Acquire date : 16-JUL-2007 11:43:27.34
Preset live time : 0 00:30:00.00 Elapsed live time : 0 00:30:00.00
Elapsed real time : 0 00:30:00.91 Percent dead time : 0.05 %

********** Calibration Parameters **********
Detector number : DET 4 Yearly cal date : 20-JUN-2007 12:16:46.16
Kev/channel : 4.99730E-01 Zero offset: -1.95000E-01
Daily cal date : 16-JUL-2007 09:37:10.01

********** Peak Search Parameters **********
Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********
Energy tolerance : 2.00000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy
****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	511.13	175	25	2.10	1023.17	1013	21	9.72E-02	10.5	annihilation
2	0	559.33	67	19	1.58	1119.61	1111	16	3.69E-02	19.3	HUC
3	0	609.61	39	19	1.17	1220.23	1213	14	2.17E-02	29.4	Bi-214
4	0	1461.04	55	4	2.56	2923.81	2917	14	3.08E-02	15.2	K-40

Decay Time = 209 20:51:27.34 Acquisition Time = 16-JUL-2007 11:43:27.3
4

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	511.13	175	25	2.10	1023.17	1013	21	10.5		
0	559.33	67	19	1.50	1119.61	1111	16	19.3		
0	609.61	39	19	1.17	1220.23	1213	14	29.4		
0	1461.04	55	4	2.56	2923.01	2917	14	15.2		K-40

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/CC	Decay Corr uCi/CC	1-Sigma %Error
K-40	1460.81	55	10.67*	2.501E+00	3.119E-07	3.119E-07	15.23

Flag: "*" = Keyline

Sample ID : EF1 EFT-75121006 Acquisition date : 16-JUL-2007 11:43:27

Total number of lines in spectrum	4	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	4	100.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/CC	Decay Corr uCi/CC	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+09Y	1.00	3.119E-07	3.119E-07	0.475E-07	15.23	
	Total Activity :		3.119E-07	3.119E-07			
	Grand Total Activity :		3.119E-07	3.119E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/CC)	1-Sigma %Error	Rejected by
F-18	109.74M	2754.02	511.00*	193.46	1.000E+35	10.51	Decay
	% Abundances Found = 100.00						
AS-76	26.32H	191.38	559.10*	44.70	1.000E+35	19.32	Decay,Abun.
			563.23	1.17	--- Not Found ---		
			571.30	0.14	--- Not Found ---		
			657.03	6.10	--- Not Found ---		
			665.31	0.39	--- Not Found ---		
			740.12	0.12	--- Not Found ---		
			771.76	0.12	--- Not Found ---		
			867.63	0.12	--- Not Found ---		
			1129.87	0.14	--- Not Found ---		
			1212.72	1.63	--- Not Found ---		
			1216.02	3.04	--- Not Found ---		
			1220.52	1.39	--- Not Found ---		
			1439.13	0.33	--- Not Found ---		
			1453.60	0.13	--- Not Found ---		
			1707.67	0.33	--- Not Found ---		
	% Abundances Found = 73.70						
Y-92	3.54H	1422.91	448.50	2.30	--- Not Found ---		Decay,Abun.
			561.10	2.40	1.000E+35	19.32	
			844.30	1.25	--- Not Found ---		
			934.46*	13.90	--- Not Found ---		
			1405.40	4.00	--- Not Found ---		
	% Abundances Found = 9.74						
RU-103	39.35D	5.33	497.08*	89.00	--- Not Found ---		Abun.
			610.33	5.60	9.342E-06	29.38	
	% Abundances Found = 5.92						
XE-135	9.11H	552.92	249.79*	89.90	--- Not Found ---		Decay,Abun.
			608.19	2.69	1.000E+35	29.38	
	% Abundances Found = 3.11						
PM-140M	41.30D	5.00	288.11	12.56	--- Not Found ---		Abun.
			414.07	18.66	--- Not Found ---		
			432.78	5.35	--- Not Found ---		
			501.26	6.75	--- Not Found ---		
			550.27*	94.90	--- Not Found ---		
			599.74	12.54	--- Not Found ---		
			611.26	5.48	8.017E-06	29.38	
			629.97	89.00	--- Not Found ---		
			725.70	32.80	--- Not Found ---		
			915.33	17.17	--- Not Found ---		
			1013.81	20.30	--- Not Found ---		
	% Abundances Found = 1.74						
BI-214	19.90M	15107.26	609.31*	46.30	1.000E+35	29.38	Decay
			768.36	5.04	--- Not Found ---		
			934.06	3.21	--- Not Found ---		
			1196.99	15.10	--- Not Found ---		

Sample ID : EF1 EFT-79121006 Acquisition date : 16-JUL-2007 11:43:27

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/CC)	1-Sigma %Error	Rejected by
BI-214	19.90M	15107.26	1238.11	5.94	---- Not Found ----		Decay
			1377.67	4.11	---- Not Found ----		
			1764.49	15.00	---- Not Found ----		
		% Abundances Found =		40.40	(Abn. Limit = 40.40%)		

Flag: "*" = Keyline

Sample ID : EF1 EFT-7S121806 Acquisition date : 16-JUL-2007 11:43:27

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	511.13	175	25	2.10	1023.17	1013	21	9.72E-02	10.5	4.88E+00	T
0	559.33	67	19	1.58	1119.61	1111	16	3.69E-02	19.3	4.60E+00	T
0	609.61	39	19	1.17	1220.23	1213	14	2.17E-02	29.4	4.52E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 16-JUL-2007 12:13:35.02

Sample ID : EF1 EFT-73121006

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/CC)
BE-7	20.	477.59	1.0320E-06
F-18	0.	511.00	Half-Life too short
NA-22	6.	1274.54	9.1456E-09
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.48	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	17.	889.25	5.6465E-08
CR-51	28.	320.08	1.3500E-05
MN-54	10.	834.83	1.1792E-08
CO-56	15.	1238.25	1.0574E-07
MN-56	0.	1810.69	Half-Life too short
NI-56	0.	158.38	Half-Life too short
CO-57	45.	122.06	1.7537E-08
CO-58	6.	810.76	4.6664E-08
FE-59	10.	1099.22	4.1340E-07
CO-60	6.	1332.49	8.6767E-09
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	8.	1115.52	2.9714E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	35.	136.00	4.0945E-08
AS-76	0.	559.10	Half-Life too short
BR-82	0.	776.49	Half-Life too short
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	902.41	Half-Life too short
KR-85	30.	513.99	2.2925E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	36.	513.99	9.0203E-08
RB-86	0.	1076.63	Half-Life too short
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	4.	1836.01	3.3375E-08
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	802.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	10.	1204.90	3.7093E-05
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short

Sample ID : EF1 EFT-7S121806 Acquisition date : 16-JUL-2007 11:43:27

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/CC)
SR-93	0.	590.28	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	13.	702.63	7.1527E-09
NB-95	6.	765.79	4.0438E-07
NB-95M	0.	235.69	Half-Life too short
ZR-95	12.	756.72	1.2769E-07
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	0.	739.50	Half-Life too short
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	19.	497.08	3.1553E-07
TC-104	0.	357.99	Half-Life too short
RH-105	0.	318.90	Half-Life too short
RU-105	0.	724.50	Half-Life too short
RU-106	14.	621.84	1.0287E-07
CD-109	33.	88.03	84.5809E-07
AG-110M	7.	937.48	3.7052E-08
SN-113	25.	391.69	3.8803E-08
SN-117M	0.	158.56	Half-Life too short
SB-122	0.	563.93	Half-Life too short
SB-124	15.	602.71	7.0315E-08
SB-125	22.	427.89	2.7627E-08
TE-125M	34.	109.28	3.0387E-05
TE-127	0.	417.90	Half-Life too short
TE-127M	36.	57.60	9.0089E-05
XE-127	47.	202.84	6.3337E-07
TE-129	0.	459.60	Half-Life too short
TE-129M	21.	695.88	1.9903E-05
XE-129M	0.	196.56	Half-Life too short
I-130	0.	536.09	Half-Life too short
BA-131	0.	123.80	Half-Life too short
I-131	0.	364.48	Half-Life too short
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	0.	163.93	Half-Life too short
I-132	0.	667.69	Half-Life too short
TE-132	0.	228.16	Half-Life too short
BA-133	22.	302.84	3.5451E-08
BA-133M	0.	276.09	Half-Life too short
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	0.	81.00	Half-Life too short
XE-133M	0.	233.22	Half-Life too short
CS-134	20.	604.70	9.7384E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Sample ID : EF1 EFT-70121806 Acquisition date : 16-JUL-2007 11:43:27

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/CC)
CS-136	0.	818.50	Half-Life too short
I-136	0.	1313.03	Half-Life too short
CS-137	12.	661.65	7.7653E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	35.	165.85	2.4147E-08
CS-139	0.	1283.23	Half-Life too short
BA-140	0.	537.32	Half-Life too short
LA-140	0.	1596.49	Half-Life too short
BA-141	0.	190.22	Half-Life too short
CE-141	40.	145.44	1.3522E-06
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	0.	293.26	Half-Life too short
CE-144	43.	133.54	1.2312E-07
PR-144	0.	1489.15	Half-Life too short
ND-147	0.	91.10	Half-Life too short
PM-148M	16.	550.27	2.3965E-07
EU-152	20.	344.27	2.7799E-08
EU-154	9.	1004.76	4.8290E-08
EU-156	0.	646.29	Half-Life too short
HF-181	13.	482.03	2.1725E-07
TA-182	9.	1221.42	1.1855E-07
W-187	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
HG-203	48.	279.19	2.2952E-07
BI-207	18.	569.67	7.4514E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	0.	240.98	Half-Life too short
RA-226	41.	186.21	2.2265E-07
AC-228	23.	338.32	6.0451E-08
TH-228	40.	84.37	1.5295E-06
PA-234	0.	131.20	Half-Life too short
TH-234	29.	63.29	4.2018E-04
U-235	46.	143.76	7.5492E-08
NP-239	0.	106.13	Half-Life too short
AM-241	29.	59.54	1.7127E-07

EFT-7S

2007

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-7S7207

Sample Location (Well Number): EFT-7S

1. Representative sample collected. Date/Time 7/a/07 / 1650

Sample collected by: Jay Marie Slabach / Jay Marie Slabach Date: 12/10/2007
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: J. Southward / J Southward Date: 12/10/07
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: R. Bryant / [signature] Date: 12/14/07
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: K D Linsey / K D Linsey Date: 2-26-08
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	7S	
2 . Date Sampled	07/02/2007	
3 . Time Sampled	16:50	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	12/14/2007	
2 . Time Sample Counted	08:00	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	8.2	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	3189.3	cpm
Net Spike Count Rate (cpm)	3181.1	cpm
H3 Spike Activity (dpm on count date)	7944.9	dpm
Counter Efficiency	0.4004	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	8.4	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.2	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.1	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{\text{(Bkg cpm)}}{\text{(Bkg min.)}} + \frac{\text{(Bkg cpm)}}{\text{(Smpl min.)}}}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}} = 1.19\text{E-}06 \text{ uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency x 2.22E6 uCi/ml x Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 12-14-07

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-75 7207

Sample Location (Well Number): EFT-75

1. Representative sample collected. Date/Time 07/02/2007 / 1650

Sample collected by: J. Slaback / Jay Marie Slaback Date: 07/16/2007
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: J. Southward / Jennifer Southward Date: 7/16/2007
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: KD Lindsey / KD Lindsey Date: 8.8.07
Fermi 2 RP Printed Name Signature

Sample number: EFT-757207

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: Chris Hubbard CH Date: 7-18-07
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: K D INDSEY / K D Indsey Date: 8-8-07
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

DETROIT EDISON FERMI-2 POWER PLANT 18-JUL-2007 09:46:51.54

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EF1 EFT-797207

Sample End Time: 2-JUL-2007 16:50:00.00

REMARKS

PERFORMED BY:

SIGNATURE

REVIEWED BY:

SIGNATURE/DATE 8-8-07

Sample ID : EF1 EFT-787207 Acquisition date : 10-JUL-2007 09:16:46

****

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********

Sample ID Number: EF1 EFT-787207
Sample collection start date: 2-JUL-2007 16:50:00.00
Sample collection end date : 2-JUL-2007 16:50:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.00000E+03 cc
Sample geometry : MELL Operator: CMH

********** Acquisition Parameters **********

Detector number : DET 4 Acquire date : 10-JUL-2007 09:16:46.91
Preset live time : 0 00:30:00.00 Elapsed live time : 0 00:30:00.00
Elapsed real time : 0 00:30:00.09 Percent dead time : 0.05 %

********** Calibration Parameters **********

Detector number : DET 4 Yearly cal date : 20-JUN-2007 12:16:46.16
Kev/channel : 4.99749E-01 Zero offset: -1.04251E-01
Daily cal date : 10-JUL-2007 07:51:31.39

********** Peak Search Parameters **********

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********

Energy tolerance : 2.00000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	66.55	46	56	1.59	133.54	128	10	2.55E-02	34.6	RN-222
2	0	238.81	41	26	1.60	478.22	475	7	2.30E-02	25.6	PB-212
3	0	511.17	151	83	2.41	1023.20	1017	13	8.41E-02	10.4	annihilation
4	0	558.50	50	27	1.25	1117.90	1112	13	2.80E-02	25.2	HWC
5	0	609.16	50	7	1.61	1219.29	1213	13	2.80E-02	17.6	BI-214
6	0	1460.74	55	3	1.71	2923.19	2916	14	3.04E-02	15.3	K-40

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	66.55	46	56	1.59	133.54	128	10	34.6		
0	238.81	41	26	1.60	478.22	475	7	25.6		
0	511.17	151	23	2.41	1023.20	1017	13	10.4		
0	558.50	50	27	1.25	1117.90	1112	13	25.2		
0	609.16	50	7	1.61	1219.29	1213	13	17.6		
0	1460.74	55	3	1.71	2923.19	2916	14	15.3		K-40

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	55	10.67*	2.501E+00	3.076E-07	3.076E-07	15.33

Flag: "*" = Keyline

Sample ID : EF1 EFT-737207 Acquisition date : 10-JUL-2007 09:16:46

Total number of lines in spectrum	6	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	6	100.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	3.076E-07	3.076E-07	0.472E-07	15.33	
Total Activity :			3.076E-07	3.076E-07			
Grand Total Activity :			3.076E-07	3.076E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EF1 EFT-797207 Acquisition date : 10-JUL-2007 09:16:46

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	205.96	511.00*	193.46	1.000E+35	10.40	Decay
		% Abundances Found =		100.00			
SE-75	119.78D	0.13	66.05	1.02	5.147E-06	34.55	Abun.
			96.73	3.41	---- Not Found ----		
			121.12	16.70	---- Not Found ----		
			136.00*	59.20	---- Not Found ----		
			198.60	1.45	---- Not Found ----		
			264.65	59.00	---- Not Found ----		
			279.53	25.20	---- Not Found ----		
			303.91	1.32	---- Not Found ----		
			400.65	11.40	---- Not Found ----		
		% Abundances Found =		0.57			
AS-76	26.32H	14.31	559.10*	44.70	7.349E-04	25.22	Decay,Abun.
			563.23	1.17	---- Not Found ----		
			571.30	0.14	---- Not Found ----		
			657.03	6.10	---- Not Found ----		
			665.31	0.39	---- Not Found ----		
			740.12	0.12	---- Not Found ----		
			771.76	0.12	---- Not Found ----		
			867.63	0.12	---- Not Found ----		
			1129.07	0.14	---- Not Found ----		
			1212.72	1.63	---- Not Found ----		
			1216.02	3.04	---- Not Found ----		
			1220.52	1.39	---- Not Found ----		
			1439.13	0.33	---- Not Found ----		
			1453.60	0.13	---- Not Found ----		
			1707.67	0.33	---- Not Found ----		
		% Abundances Found =		73.70			
RU-103	39.35D	0.40	497.00*	89.00	---- Not Found ----		Abun.
			610.33	5.60	3.939E-07	17.55	
		% Abundances Found =		5.90			
BA-131	11.80D	1.33	70.76	0.73	---- Not Found ----		Abun.
			92.29	0.64	---- Not Found ----		
		<	123.80*	29.00	---- Not Found ----		
			133.61	2.16	---- Not Found ----		
			216.07	19.70	---- Not Found ----		
			239.62	2.40	1.031E-06	25.64	
			249.43	2.92	---- Not Found ----		
			373.24	14.00	---- Not Found ----		
			404.04	1.31	---- Not Found ----		
			480.40	0.32	---- Not Found ----		
			486.51	2.07	---- Not Found ----		
			496.31	46.00	---- Not Found ----		
			572.67	0.16	---- Not Found ----		
			585.83	1.22	---- Not Found ----		
			620.10	1.36	---- Not Found ----		
			923.85	0.73	---- Not Found ----		
			1047.57	1.17	---- Not Found ----		
		% Abundances Found =		1.90			

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity 1-Sigma (uCi/cc)	%Error	Rejected by
XE-135	9.11H	41.35	249.79*	89.90	---- Not Found ----		Decay,Abun.
			608.19	2.89	1.622E+06	17.55	
		% Abundances Found =		3.11			
CS-136	13.16D	1.19	66.91	12.50	8.767E-07	34.55	Abun.
			86.29	6.30	---- Not Found ----		
			153.22	7.46	---- Not Found ----		
			163.89	4.61	---- Not Found ----		
			176.55	13.56	---- Not Found ----		
			273.65	12.66	---- Not Found ----		
			340.57	48.50	---- Not Found ----		
			818.50*	99.70	---- Not Found ----		
			1048.07	79.60	---- Not Found ----		
			1235.34	19.70	---- Not Found ----		
		% Abundances Found =		4.10			
TA-182	114.74D	0.14	67.75	42.30	1.246E-07	34.55	Abun.
			100.10	14.10	---- Not Found ----		
			1189.05	16.30	---- Not Found ----		
			1221.42*	27.10	---- Not Found ----		
			1230.97	11.50	---- Not Found ----		
		% Abundances Found =		38.01			
PB-212	10.64H	35.39	74.81	10.70	---- Not Found ----		Decay
			77.11	18.00	---- Not Found ----		
			87.30	8.00	---- Not Found ----		
			115.19	0.60	---- Not Found ----		
			238.63*	44.60	9.963E+02	25.64	
			300.09	3.41	---- Not Found ----		
		% Abundances Found =		52.28	(Abn. Limit = 44.60%)		
BI-214	19.90M	1135.77	609.31*	46.30	1.000E+35	17.55	Decay
			768.36	5.04	---- Not Found ----		
			934.06	3.21	---- Not Found ----		
			1120.29	15.10	---- Not Found ----		
			1238.11	5.94	---- Not Found ----		
			1377.67	4.11	---- Not Found ----		
			1764.49	15.80	---- Not Found ----		
		% Abundances Found =		48.48	(Abn. Limit = 48.48%)		

Flag: "*" = Keyline

Sample ID : ET1 EFT-707207 Acquisition date : 10-JUL-2007 09:16:46

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	66.55	46	56	1.59	133.54	128	10	2.55E-02	34.6	1.44E+00	T
0	238.81	41	26	1.60	478.22	475	7	2.30E-02	25.6	6.32E+00	T
0	511.17	151	23	2.41	1023.20	1017	13	8.41E-02	10.4	4.80E+00	T
0	550.50	50	27	1.25	1117.90	1112	13	2.00E-02	25.2	4.69E+00	T
0	609.16	50	7	1.61	1219.29	1213	13	2.00E-02	17.6	4.52E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 10-JUL-2007 09:40:55.46

Sample ID : EF1 EFT-757207

Minimum Detectable Activity Report

Nuclide	Bckgnd Cum	Energy (keV)	MDA (uCi/cc)
BE-7	17.	477.59	7.6622E-08
F-18	0.	511.00	Half-Life too short
NA-22	5.	1274.54	7.4899E-09
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	3.	889.25	8.0563E-09
CR-51	30.	320.08	1.0785E-07
MN-54	15.	834.83	9.3157E-09
CO-56	0.	1238.25	1.4746E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	47.	158.38	4.6717E-08
CO-57	41.	122.06	1.0279E-08
CO-58	12.	810.76	9.2355E-09
FE-59	14.	1099.22	2.3006E-08
CO-60	0.	1332.49	9.1024E-09
CU-64	0.	1345.98	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	9.	1115.52	1.7874E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	44.	136.00	1.4756E-08
AS-76	0.	559.10	Half-Life too short
BR-82	0.	776.49	Half-Life too short
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	43.	513.99	2.3843E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	43.	513.99	1.2181E-08
RB-86	16.	1076.63	2.2063E-07
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	3.	1836.01	8.1526E-09
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	15.	1204.90	4.4193E-06
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Sample ID : EF1 EFT-797207 Acquisition date : 10-JUL-2007 09:16:46

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
SR-93	0.	590.20	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	13.	702.63	7.1503E-09
NB-95	17.	765.79	1.1042E-08
NB-95M	44.	235.69	6.5018E-07
ZR-95	7.	756.72	1.2564E-08
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	15.	739.50	3.2079E-06
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	25.	497.08	1.1696E-08
TC-104	0.	357.99	Half-Life too short
RH-105	0.	318.90	Half-Life too short
RU-105	0.	724.50	Half-Life too short
RU-106	17.	621.84	7.6196E-08
CD-109	39.	88.03	3.7052E-07
AG-110M	9.	937.49	2.3505E-08
SN-113	24.	391.69	1.1703E-08
SN-117M	47.	150.56	2.0067E-08
SB-122	0.	563.93	4.0626E-07
SB-124	22.	602.71	9.9041E-09
SB-125	37.	427.89	2.6176E-08
TE-125M	38.	109.28	3.9733E-06
TE-127	0.	417.90	Half-Life too short
TE-127M	29.	57.60	2.5854E-05
XE-127	43.	202.84	1.5866E-08
TE-129	0.	459.60	Half-Life too short
TE-129M	19.	695.99	3.4739E-07
XE-129M	41.	196.56	5.2944E-07
I-130	0.	536.09	Half-Life too short
BA-131	42.	123.80	7.3211E-08
I-131	26.	364.48	3.3309E-08
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	42.	163.93	9.4220E-07
I-132	0.	667.69	Half-Life too short
TE-132	20.	228.16	2.0656E-07
BA-133	36.	302.84	4.2025E-08
BA-133M	37.	276.09	3.4401E-05
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	21.	81.00	2.7043E-07
XE-133M	50.	233.22	1.1690E-05
CS-134	15.	604.70	7.1269E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Sample ID : EF1 EFT-787207 Acquisition date : 18-JUL-2007 09:16:40

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-136	7.	818.50	1.4784E-08
I-136	0.	1313.02	Half-Life too short
CS-137	18.	661.65	9.1347E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1428.50	Half-Life too short
CE-139	47.	165.85	1.0402E-08
CS-139	0.	1283.23	Half-Life too short
BA-140	23.	537.32	7.4074E-08
LA-140	4.	1596.49	5.2612E-06
BA-141	0.	190.22	Half-Life too short
CE-141	57.	145.44	2.5181E-08
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	0.	293.26	Half-Life too short
CE-144	42.	133.54	7.6084E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	37.	91.10	1.1763E-07
PM-148M	20.	550.27	1.0187E-08
EU-152	42.	344.27	3.2603E-08
EU-154	12.	1004.76	5.0944E-08
EU-156	10.	646.29	2.1058E-07
HF-181	17.	482.03	1.0242E-08
TA-182	5.	1221.42	2.7969E-08
W-187	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
HG-203	35.	279.19	1.2010E-08
BI-207	19.	569.67	7.5303E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	38.	240.98	3.8241E-06
RA-226	46.	186.21	2.3551E-07
AC-228	37.	338.32	7.1341E-08
TH-228	38.	84.37	1.1033E-06
PA-234	0.	131.20	Half-Life too short
TH-234	36.	63.29	1.7381E-06
U-235	59.	143.76	8.4616E-08
NP-239	34.	106.13	4.0901E-06
AM-241	38.	59.54	1.7182E-07

EFT-7S

2008

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-7512908

Sample Location (Well Number): EFT-75

1. Representative sample collected. Date/Time 1/09/08 / 1610

Sample collected by: Joy Marie Skolnik / Joy Marie Skolnik Date: 04/21/2008
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: J. Southward / JSouthward Date: 4/21/08
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: D. Howard / DHoward Date: 4.21.08
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: KD Lindsey / KD Lindsey Date: 4-28-08
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-7S	
2 . Date Sampled	01/29/2008	
3 . Time Sampled	16:10	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	04/21/2008	
2 . Time Sample Counted	13:43	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	7.2	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	3045.3	cpm
Net Spike Count Rate (cpm)	3038.1	cpm
H3 Spike Activity (dpm on count date)	7788.2	dpm
Counter Efficiency	0.3901	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	7.8	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.6	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \sqrt{\frac{\frac{\text{(Bkg cpm)}}{\text{(Bkg min.)}} + \frac{\text{(Bkg cpm)}}{\text{(Smpl min.)}}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}}} = 1.14\text{E-}06 \text{ uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency x 2.22E6 uCi/ml x Sample Volume}} < \textbf{MDA}$$

Technician Amit Tiwari Date 4.21.08

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-75 12908

Sample Location (Well Number): EFT-75

1. Representative sample collected. Date/Time 1/29/08 / 1610

Sample collected by: JayMarie Slabach / Jay Marie Slabach Date: 04/21/2008
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: J. Southward / J Southward Date: 4/21/08
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # ~~GS 2~~ 4
4/21/08

Performed by: J. Southward / J Southward Date: 4/21/08
Fermi 2 RP Printed Name Signature

Sample number: EFT-7512908

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
. (Note disposition of unidentified peaks in "Remarks")

Performed by: T. Southward / J. Southward Date: 4/21/08
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: K.J. Lindsey / [signature] Date: 4-24-08
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

DETROIT EDISON FERMI-2 POWER PLANT 21-APR-2008 10:20:09.79

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EFT-7S12900

Sample End Time: 29-JAN-2008 16:10:00.00

REMARKS

PERFORMED BY:

J Sunderland
SIGNATURE

REVIEWED BY:

RD Lindsey 4-24-08
SIGNATURE/DATE

Sample ID : EFT-7512900 Acquisition date : 21-APR-2000 09:50:06

2 Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********

Sample ID Number: EFT-7512900
Sample collection start date: 29-JAN-2000 16:10:00.00
Sample collection end date : 29-JAN-2000 16:10:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.00000E+03 cc
Sample geometry : M2LL Operator: JNS

********** Acquisition Parameters **********

Detector number : DET 4 Acquire date : 21-APR-2000 09:50:06.85
Preset live time : 0 00:30:00.00 Elapsed live time : 0 00:30:00.00
Elapsed real time : 0 00:30:00.91 Percent dead time : 0.05 %

********** Calibration Parameters **********

Detector number : DET 4 Yearly cal date : 20-JUN-2007 12:16:46.16
Kev/channel : 5.00173E-01 Zero offset: -1.41258E-01
Daily cal date : 21-APR-2000 06:22:11.02

********** Peak Search Parameters **********

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********

Energy tolerance : 2.00000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	352.72	40	45	3.34	705.47	698	14	2.21E-02	39.3	
2	4	510.09	57	42	2.33	1020.09	1015	19	3.18E-02	27.1	2.90E+00 ANNI
3	4	511.61	67	32	1.66	1023.12	1015	19	3.74E-02	23.8	
4	0	558.70	41	30	1.39	1117.20	1109	13	2.30E-02	31.1	
5	0	609.57	42	20	1.98	1218.97	1211	16	2.34E-02	28.2	
6	0	1461.29	57	10	1.21	2921.69	2911	17	3.18E-02	17.7	
7	0	1764.91	36	0	1.33	3526.86	3510	17	2.00E-02	16.7	

Decay Time = 82 17:40:06.85 Acquisition Time = 21-APR-2006 09:50:06.0
5

Post-NID Peak Search Report -

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	352.72	40	45	3.34	705.47	690	14	39.3		B. 214
4	510.09	57	42	2.33	1020.09	1015	19	27.1	2.90E+00	> ANN.
4	511.61	67	32	1.66	1023.12	1015	19	23.0		
0	558.70	41	30	1.39	1117.28	1109	13	31.1		NWC
0	609.57	42	20	1.98	1218.97	1211	16	28.2		B. 214
0	1461.29	57	10	1.21	2921.69	2911	17	17.7		K-40
0	1764.01	36	0	1.33	3526.86	3518	17	16.7		B. 214

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	57	10.67*	2.501E+00	3.224E-07	3.224E-07	17.72

Flag: "*" = Keyline

Sample ID : EFT-7S12900 Acquisition date : 21-APR-2000 09:50:06

Total number of lines in spectrum		7	
Number of unidentified lines	0	1	
Number of lines tentatively identified by NID		6	85.71%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+09Y	1.00	3.224E-07	3.224E-07	0.571E-07	17.72	
	Total Activity :		3.224E-07	3.224E-07			
Grand Total Activity :			3.224E-07	3.224E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Nuclide	Half-Life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	1085.79	511.00*	193.46	1.000E+35	23.78	Decay
		% Abundances Found =		100.00			
AS-76	26.32H	75.45	559.10*	44.70	1.538E+15	31.06	Decay,Abun.
			563.23	1.17	---- Not Found	----	
			571.30	0.14	---- Not Found	----	
			657.03	6.10	---- Not Found	----	
			665.31	0.39	---- Not Found	----	
			740.12	0.12	---- Not Found	----	
			771.76	0.12	---- Not Found	----	
			867.63	0.12	---- Not Found	----	
			1129.07	0.14	---- Not Found	----	
			1212.72	1.63	---- Not Found	----	
			1216.02	3.84	---- Not Found	----	
			1220.52	1.39	---- Not Found	----	
			1439.13	0.33	---- Not Found	----	
			1453.60	0.13	---- Not Found	----	
			1787.67	0.33	---- Not Found	----	
		% Abundances Found =		73.70			
RU-103	39.35D	2.10	497.08*	89.00	---- Not Found	----	Abun.
			610.33	5.60	1.076E-06	28.24	
		% Abundances Found =		5.92			
XE-135	9.11H	217.99	249.79*	89.90	---- Not Found	----	Decay,Abun.
			608.19	2.89	1.000E+35	20.24	
		% Abundances Found =		3.11			
PM-148M	41.30D	2.00	288.11	12.56	---- Not Found	----	Abun.
			414.07	18.66	---- Not Found	----	
			432.70	5.35	---- Not Found	----	
			501.26	6.75	---- Not Found	----	
			550.27*	94.90	---- Not Found	----	
			599.74	12.54	---- Not Found	----	
			611.26	5.48	1.026E-06	20.24	
			629.97	89.00	---- Not Found	----	
			725.70	32.00	---- Not Found	----	
			915.33	17.17	---- Not Found	----	
			1013.81	20.30	---- Not Found	----	
		% Abundances Found =		1.74			
BI-214	19.90M	5907.69	609.31*	46.30	1.000E+35	20.24	Decay
			768.36	5.04	---- Not Found	----	
			934.06	3.21	---- Not Found	----	
			1120.29	15.10	---- Not Found	----	
			1238.11	5.94	---- Not Found	----	
			1377.67	4.11	---- Not Found	----	
			1764.49	15.80	1.000E+35	16.67	
		% Abundances Found =		65.03	(Abn. Limit = 48.48%)		
PB-214	26.80M	4446.09	87.30	4.67	---- Not Found	----	Decay
			241.98	7.49	---- Not Found	----	

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
PB-214	26.80M	4446.09	295.21	19.20	----- Not Found -----		Decay
			351.92*	37.20	1.0000E+35	39.27	
			785.91	1.10	----- Not Found -----		
		% Abundances Found =		53.40	(Abn. Limit = 37.20%)		

Flag: "*" = Keyline

Sample ID : EFT-7S12908 Acquisition date : 21-APR-2008 09:50:06

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	352.72	40	45	3.34	705.47	698	14	2.21E-02	39.3	5.69E+00	T
4	510.09	57	42	2.33	1020.09	1015	19	3.10E-02	27.1	4.00E+00	
4	511.61	67	32	1.66	1023.12	1015	19	3.74E-02	23.8	4.00E+00	T
0	550.79	41	30	1.39	1117.20	1109	13	2.30E-02	31.1	4.69E+00	T
0	609.57	42	20	1.98	1218.97	1211	16	2.34E-02	29.2	4.52E+00	T
0	1764.01	36	0	1.33	3526.86	3518	17	2.00E-02	16.7	2.26E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 21-APR-2008 10:20:13.46

Sample ID : EFT-7S12900

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	10.	477.59	1.8975E-07
F-18	0.	511.00	Half-Life too short
NA-22	7.	1274.54	8.6995E-09
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	16.	889.25	1.9519E-08
CR-51	23.	320.08	5.0806E-07
MN-54	11.	834.83	9.4969E-09
CO-56	8.	1238.25	2.6819E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	0.	158.38	Half-Life too short
CO-57	31.	122.06	1.0674E-08
CO-58	7.	810.76	1.3836E-08
FE-59	7.	1099.22	4.9576E-08
CO-60	5.	1332.49	7.7048E-09
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	13.	1115.52	2.4750E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	46.	136.00	2.2221E-08
AS-76	0.	559.10	Half-Life too short
BR-82	0.	776.49	Half-Life too short
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	902.41	Half-Life too short
KR-85	49.	513.99	2.5571E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	49.	513.99	2.6437E-08
RB-86	4.	1076.63	1.5360E-06
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	7.	1836.01	1.8073E-08
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	9.	1204.90	8.1474E-06
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Sample ID : EFT-7812900 Acquisition date : 21-APR-2000 09:50:06

Nuclide	0 Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
SR-93	0.	590.20	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	15.	702.63	7.5102E-09
NB-95	13.	765.79	4.0340E-08
NB-95M	0.	235.69	Half-Life too short
ZR-95	11.	756.72	3.1191E-08
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	0.	739.50	Half-Life too short
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	13.	497.08	2.0650E-08
TC-104	0.	357.99	Half-Life too short
RH-105	0.	318.90	Half-Life too short
RU-105	0.	724.50	Half-Life too short
RU-106	15.	621.84	8.3513E-08
CD-109	31.	88.03	3.6983E-07
AG-110M	10.	937.48	3.0503E-08
SN-113	30.	391.69	1.9528E-08
SN-117M	45.	158.56	5.9746E-07
SB-122	0.	563.93	Half-Life too short
SB-124	15.	602.71	1.8035E-08
SB-125	25.	427.89	2.6699E-08
TE-125M	54.	109.28	1.0428E-05
TE-127	0.	417.90	Half-Life too short
TE-127M	36.	57.60	4.4048E-05
XE-127	45.	202.84	5.4090E-08
TE-129	0.	459.60	Half-Life too short
TE-129M	19.	695.88	1.3846E-06
XE-129M	49.	196.56	1.0603E-04
I-130	0.	536.09	Half-Life too short
BA-131	40.	123.80	3.6497E-06
I-131	0.	364.48	Half-Life too short
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	40.	163.93	4.6545E-05
I-132	0.	667.69	Half-Life too short
TE-132	0.	228.16	Half-Life too short
BA-133	33.	302.84	4.1960E-08
BA-133M	0.	276.09	Half-Life too short
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	0.	81.00	Half-Life too short
XE-133M	0.	233.22	Half-Life too short
CS-134	17.	604.70	8.0698E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Sample ID : EFT-7812900 Acquisition date : 21-APR-2000 09:50:06

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-136	10.	818.50	5.6681E-07
I-136	0.	1313.02	Half-Life too short
CS-137	17.	661.65	8.9034E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	38.	165.85	1.3166E-08
CS-139	0.	1283.23	Half-Life too short
BA-140	15.	537.32	2.3006E-06
LA-140	0.	1596.49	Half-Life too short
BA-141	0.	190.22	Half-Life too short
CE-141	37.	145.44	8.6299E-08
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	0.	293.26	Half-Life too short
CE-144	48.	133.54	9.5258E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	20.	91.10	7.1857E-06
PM-148M	24.	550.27	3.3977E-08
EU-152	32.	344.27	2.0702E-08
EU-154	9.	1004.76	4.6300E-08
EU-156	15.	646.29	4.3613E-06
HF-181	14.	482.03	2.8193E-08
TA-182	7.	1221.42	4.8292E-08
W-187	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
HG-203	36.	279.19	3.2822E-08
BI-207	22.	569.67	8.1049E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	0.	240.98	Half-Life too short
RA-226	58.	186.21	2.6073E-07
AC-228	26.	338.32	6.1525E-08
TH-228	27.	84.37	1.1281E-06
PA-234	0.	131.20	Half-Life too short
TH-234	34.	63.29	1.1661E-05
U-235	44.	143.76	7.4338E-08
NP-239	0.	106.13	Half-Life too short
AM-241	27.	59.54	1.6357E-07

EFT-7S

2009

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT 7S 91509

Sample Location (Well Number): 7S

1. Representative sample collected. Date/Time 9/15/09 / 1615

Sample collected by: Thomas Mowl Thomas / Date: 9-15-09
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Southward / Southward Date: 9/21/09
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: JOHN M. YOUNG / _____ Date: 9-22-9
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert Craig JR / _____ Date: 10-13-09
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

_____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT7S91509	
2 . Date Sampled	09/15/2009	
3 . Time Sampled	16:15	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	09/21/2009	
2 . Time Sample Counted	14:00	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	7.7	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	2763.5	cpm
Net Spike Count Rate (cpm)	2755.8	cpm
H3 Spike Activity (dpm on count date)	7189.1	dpm
Counter Efficiency	0.3833	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	6.1	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.0	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{(\text{Bkg cpm})}{(\text{Bkg min.})} + \frac{(\text{Bkg cpm})}{(\text{Smpl min.})}}}{\text{Efficiency} \times 2.22\text{E6 dpm/uCi} \times \text{Sample Volume}} = 1.20\text{E-06 uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency} \times 2.22\text{E6 uCi/ml} \times \text{Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 9-22-09

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT 7S 91509

Sample Location (Well Number): 7S

1. Representative sample collected. Date/Time 9/15/09 / 1615

Sample collected by: THOMAS MOW / Thomas Mow Date: 9-15-09
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Southward / Southward Date: 9/24/09
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: Southward / Southward Date: 10/13/09
Fermi 2 RP Printed Name Signature

Sample number: EFT 75 91509

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: Southward / Southward Date: 10/13/09
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert Gryglik Date: 10-22-09
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

DETROIT EDISON FERMI-2 POWER PLANT 12-OCT-2009 13:57:22.09

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

Sample ID Number: EFT7S91509

Acquisition Time: 12-OCT-2009 13:40:39.68

Storage file: EFT7S91509.cnf

REMARKS No Peaks

PERFORMED BY:

SIGNATURE

REVIEWED BY:

SIGNATURE

Sample ID : EFT7S91509 Acquisition date : 12-OCT-2009 13:40:39

****

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********

Sample ID Number: EFT7S91509
Sample collection start date: 15-SEP-2009 16:15:00.00
Sample collection end date : 15-SEP-2009 16:15:00.00
Type of sample : 1 Liter Marinell
Sample quantity : 1.00000E+03 ml
Sample geometry : MILL Operator: CLP

********** Acquisition Parameters **********

Detector number : DET3 Acquire date : 12-OCT-2009 13:40:39.60
Preset live time : 0 00:16:40.00 Elapsed live time : 0 00:16:40.00
Elapsed real time : 0 00:16:40.16 Percent dead time : 0.00 %

********** Calibration Parameters **********

Detector number : DET3 Yearly cal date : 26-MAY-2009 10:11:12.00
Kev/channel : 4.99948E-01 Daily cal date : 12-OCT-2009 02:40:34.75
Zero offset : 2.19477E-01

********** Peak Search Parameters **********

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********

Energy tolerance : 1.25000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : effluents.nlb
Efficiency file : EFFD3_m111 Efficiencies at : Peak energy

****

No peaks were found

DETROIT EDISON FERMI-2 POWER PLANT 21-OCT-2009 13:20:01.47

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EFT7S91509 Recount

Sample End Time: 15-SEP-2009 16:15:00.00

REMARKS

PERFORMED BY:

SIGNATURE

REVIEWED BY:

SIGNATURE/DATE

Sample ID : EFT7S91509 Acquisition date : 21-OCT-2009 12:49:55

****

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********

Sample ID Number: EFT7S91509
Sample collection start date: 15-SEP-2009 16:15:00.00
Sample collection end date : 15-SEP-2009 16:15:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.00000E+03 cc
Sample geometry : MELL Operator: JNS

********** Acquisition Parameters **********

Detector number : DET 4 Acquire date : 21-OCT-2009 12:49:55.65
Preset live time : 0 00:30:00.00 Elapsed live time : 0 00:30:00.00
Elapsed real time : 0 00:30:00.02 Percent dead time : 0.05 %

********** Calibration Parameters **********

Detector number : DET 4 Yearly cal date : 3-JUN-2009 17:37:00.00
Kev/channel : 5.00043E-01 Zero offset: 7.64342E-02
Daily cal date : 21-OCT-2009 08:56:57.98

********** Peak Search Parameters **********

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********

Energy tolerance : 1.75000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	511.14	134	14	2.40	1022.02	1013	20	7.42E-02	11.2	
2	0	1461.29	35	14	1.90	2922.03	2913	14	1.94E-02	28.3	

Sample Title : EFT7S91509 Page : 1
Decay Time = 35 20:34:55.65 Acquisition Time = 21-OCT-2009 12:49:55.6
5

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	511.14	134	14	2.40	1022.02	1013	20	11.2		ANN.
0	1461.29	35	14	1.90	2922.03	2913	14	28.3		K-40

Sample ID : EFT7991509 Acquisition date : 21-OCT-2009 12:49:55

Nuclide Type: natural

Nuclide	Energy		Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	>	35	10.67*	2.501E+00	1.969E-07	1.969E-07	28.28

Flag: "*" = Keyline

Sample ID : EFT7S91509 Acquisition date : 21-OCT-2009 12:49:55

Total number of lines in spectrum	2	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	2	100.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	1.969E-07	1.969E-07	0.557E-07	28.28	
Total Activity :			1.969E-07	1.969E-07			
Grand Total Activity :			1.969E-07	1.969E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EFT7991509 Acquisition date : 21-OCT-2009 12:49:55

Nuclide	Half-life	Half-Life Ratio	0 Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	470.66	511.00*	193.46	1.000E+35	11.18	Decay

% Abundances Found = 100.00

Flag: "*" = Keyline

Sample ID : EFT7S91509 Acquisition date : 21-OCT-2009 12:49:55

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	511.14	134	14	2.40	1022.02	1013	20	7.42E-02	11.2	4.00E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 21-OCT-2009 13:20:05.51

Sample ID : EFT7S91509

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum		Energy (keV)		MDA (uCi/cc)
BE-7	17.		477.59		9.9053E-08
F-18	0.		511.00		Half-Life too short
NA-22	5.		1274.54		7.5472E-09
NA-24	0.	<	1368.53		Half-Life too short
MG-27	0.		1014.44		Half-Life too short
CL-38	0.		1642.42		Half-Life too short
AR-41	0.		1293.64		Half-Life too short
SC-46	11.		889.25		1.1304E-08
CR-51	30.		320.08		1.7994E-07
MN-54	16.		834.83		9.8141E-09
CO-56	12.		1238.25		2.0734E-08
MN-56	0.		1810.69		Half-Life too short
NI-56	43.		158.38		4.4491E-07
CO-57	36.		122.06		1.0228E-08
CO-58	14.		810.76		1.1876E-08
FE-59	8.		1099.22		2.5110E-08
CO-60	12.		1332.49		1.1047E-08
CU-64	0.		1345.90		Half-Life too short
NI-65	0.		1481.84		Half-Life too short
ZN-65	12.		1115.52		2.1069E-08
ZN-69M	0.		438.63		Half-Life too short
SE-75	22.		136.00		1.2276E-08
AS-76	0.		559.10		Half-Life too short
BR-82	0.		776.49		Half-Life too short
BR-83	0.		529.64		Half-Life too short
BR-84	0.		881.50		Half-Life too short
BR-85	0.		802.41		Half-Life too short
KR-85	37.		513.99		2.2397E-06
KR-85M	0.		151.18		Half-Life too short
SR-85	37.		513.99		1.4145E-08
RB-86	8.		1076.63	8	3.5072E-07
KR-87	0.		402.58		Half-Life too short
SR-87M	0.		388.40		Half-Life too short
KR-88	0.		196.32		Half-Life too short
RB-88	0.		1382.39		Half-Life too short
Y-88	1.		1836.01		6.3537E-09
KR-89	0.		220.90		Half-Life too short
RB-89	0.		1031.88		Half-Life too short
KR-90	0.		1118.69		Half-Life too short
RB-90	0.		831.69		Half-Life too short
RB-90M	0.		824.23		Half-Life too short
Y-90M	0.		202.51		Half-Life too short
SR-91	0.		1024.30		Half-Life too short
Y-91	3.		1204.90		2.9529E-06
Y-91M	0.		555.60		Half-Life too short
SR-92	0.		1383.94		Half-Life too short
Y-9P	0.		934.46		Half-Life too short

Sample ID : EFT7S91509 Acquisition date : 21-OCT-2009 12:49:55

Nuclide	Bckgnd Sum	?	Energy (keV)	MDA (uCi/cc)
SR-93	0.		590.20	Half-Life too short
Y-93	0.		266.90	Half-Life too short
NB-94	13.		702.63	7.1861E-09
NB-95	13.		765.79	1.5519E-08
NB-95M	30.		235.69	2.6360E-05
ZR-95	10.		756.72	1.7884E-08
NB-97	0.		657.90	Half-Life too short
ZR-97	0.		743.36	Half-Life too short
MO-99	0.		739.58	Half-Life too short
TC-99M	0.		140.50	Half-Life too short
TC-101	0.		306.81	Half-Life too short
RU-103	20.		497.08	1.5125E-08
TC-104	0.		357.99	Half-Life too short
RH-105	0.		318.90	Half-Life too short
RU-105	0.		724.50	Half-Life too short
RU-106	12.		621.84	6.9654E-08
CD-109	22.		88.03	2.9853E-07
AG-110M	12.		937.48	2.8870E-08
SN-113	19.		391.69	1.2121E-08
SN-117M	43.		158.56	5.3926E-08
SB-122	0.		563.93	Half-Life too short
SB-124	14.		602.71	1.0409E-08
SB-125	21.		427.89	2.3627E-08
TE-125M	25.		109.28	4.2209E-06
TE-127	0.		417.90	Half-Life too short
TE-127M	14.		57.60	2.1469E-05
XE-127	29.		202.84	1.8547E-08
TE-129	0.		459.60	Half-Life too short
TE-129M	18.		695.88	5.1072E-07
XE-129M	36.		196.56	2.3985E-06
I-130	0.		536.09	Half-Life too short
BA-131	35.		123.80	2.1992E-07
I-131	24.		364.48	1.8591E-07
TE-131	0.		149.72	Half-Life too short
TE-131M	0.		773.67	Half-Life too short
XE-131M	22.		163.93	2.2097E-06
I-132	0.		667.69	Half-Life too short
TE-132	0.		228.16	Half-Life too short
BA-133	19.		302.84	3.2097E-08
BA-133M	0.		276.09	Half-Life too short
I-133	0.		529.87	Half-Life too short
TE-133M	0.		912.58	Half-Life too short
XE-133	16.		81.00	3.4447E-06
XE-133M	0.		233.22	Half-Life too short
CS-134	14.		604.70	7.1188E-09
I-134	0.		884.09	Half-Life too short
TE-134	0.		210.47	Half-Life too short
BA-135M	0.		268.24	Half-Life too short
I-135	0.		1260.41	Half-Life too short
XE-135	0.		249.79	Half-Life too short
XE-135M	0.		526.56	8 Half-Life too short

Sample ID : EFT7S91509 Acquisition date : 21-OCT-2009 12:49:55

Nuclide		Bckgnd Sum		Energy (keV)	MDA (uCi/cc)
CS-136		17.		818.50	6.1102E-08
I-136		0.		1313.02	Half-Life too short
CS-137		9.		661.65	6.6524E-09
XE-137		0.		455.49	Half-Life too short
CS-138		0.		1435.86	Half-Life too short
XE-138		0.		258.31	Half-Life too short
BA-139		0.		1420.50	Half-Life too short
CE-139		32.		165.85	9.6733E-09
CS-139		0.		1203.23	Half-Life too short
BA-140		15.		537.32	1.8134E-07
LA-140		0.		1596.49	Half-Life too short
BA-141		0.	?	1[illegible]<.22	Half-Life too short
CE-141		35.		145.44	3.1050E-08
LA-141		0.		1354.52	Half-Life too short
BA-142		0.		255.12	Half-Life too short
LA-142		0.		641.17	Half-Life too short
CE-143		0.		293.26	Half-Life too short
CE-144	<	35.		133.54	7.3500E-08
PR-144		0.		1489.15	Half-Life too short
ND-147		22.		91.10	3.3197E-07
PM-148M		13.		550.27	1.1001E-08
EU-152		25.		344.27	2.5572E-08
EU-154		11.		1004.76	4.9379E-08
EU-155		34.		105.31	4.5396E-08
EU-156		10.		646.29	4.3348E-07
HF-181		27.		482.03	1.7448E-08
TA-182		10.		1221.42	4.3180E-08
W-187		0.		685.81	Half-Life too short
RE-188		0.		155.03	Half-Life too short
HG-203		27.		279.19	1.4416E-08
BI-207		25.		569.67	8.6787E-09
TL-208		0.		583.14	Half-Life too short
PB-212		0.		238.63	Half-Life too short
BI-214		0.		609.31	Half-Life too short
PB-214		0.		351.92	Half-Life too short
RA-224		29.		240.98	1.6038E-04
RA-226		39.		186.21	2.1829E-07
AC-228		27.		338.32	6.1821E-08
TH-228		24.		84.37	1.0196E-06
PA-234		0.		131.20	Half-Life too short
TH-234		23.		63.29	2.5340E-06
U-235		34.		143.76	6.5625E-08
NP-239		0.		106.13	Half-Life too short
AM-241		24.		59.54	1.5709E-07

EFT-7S

2010

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EF1-61010-75

Sample Location (Well Number): 75

1. Representative sample collected. Date/Time 6/10/10 / 1320

Sample collected by: Southward / Southward Date: 6/23/10
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Southward / Southward Date: 6/23/10
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: JOHN M. GORDON / [signature] Date: 6-25-10
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: [signature] / [signature] Date: 6-30-10
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EF1-61010-7S	
2 . Date Sampled	06/10/2010	
3 . Time Sampled	13:20	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	06/24/2010	
2 . Time Sample Counted	14:40	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	6.7	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	2671.8	cpm
Net Spike Count Rate (cpm)	2665.1	cpm
H3 Spike Activity (dpm on count date)	6889.0	dpm
Counter Efficiency	0.3869	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	6.4	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.0	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	1.9	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{(\text{Bkg cpm})}{(\text{Bkg min.})} + \frac{(\text{Bkg cpm})}{(\text{Smpl min.})}}}{\text{Efficiency} \times 2.22\text{E6 dpm/uCi} \times \text{Sample Volume}} = 1.11\text{E-06 uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency} \times 2.22\text{E6 uCi/ml} \times \text{Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 6-25-10

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EF1-6110-75

Sample Location (Well Number): 75

1. Representative sample collected. Date/Time 6/1/10 / 1140

Sample collected by: Southward / Southward Date: 6/23/10
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Southward / Southward Date: 6/23/10
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: Charles Proffitt / Charles Proffitt Date: 9-27-10
Fermi 2 RP Printed Name Signature

Sample number: EF1-6110-75

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: Charles Prothro / Charles Prothro Date: 9-27-10
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: ~~Charles Prothro~~ 9-27-10 Robert Colby SRI Date: 10-5-10
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

DETROIT EDISON FERMI-2 POWER PLANT 27-SEP-2010 11:25:57.32

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EF1-6110-7S

Sample End Time: 1-JUN-2010 11:40:00.00

REMARKS

PERFORMED BY:

SIGNATURE

REVIEWED BY:

SIGNATURE/DATE

Sample ID : EF1-6110-7S Acquisition date : 27-SEP-2010 10:40:54

****

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********
Sample ID Number: EF1-6110-7S
Sample collection start date: 1-JUN-2010 11:40:00.00
Sample collection end date : 1-JUN-2010 11:40:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.00000E+03 cc
Sample geometry : M2LL Operator: CLP

********** Acquisition Parameters **********
Detector number : DET 4 Acquire date : 27-SEP-2010 10:40:54.09
Preset live time : 0 00:45:00.00 Elapsed live time : 0 00:45:00.00
Elapsed real time : 0 00:45:00.80 Percent dead time : 0.03 %

********** Calibration Parameters **********
Detector number : DET 4 Yearly cal date : 23-JUN-2010 12:20:00.00
Kev/channel : 5.00373E-01 Zero offset: 7.59464E-02
Daily cal date : 27-SEP-2010 09:48:39.90

********** Peak Search Parameters **********
Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********
Energy tolerance : 1.75000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	511.52	255	71	2.59	1022.17	1014	21	9.44E-02	10.5	
2	0	558.90	85	40	1.43	1116.87	1110	12	3.13E-02	19.6	
3	0	1461.28	81	27	2.79	2920.57	2913	23	3.00E-02	20.4	

Sample Title : EF1-6110-7S
Decay Time = 117 23:00:54.09 Acquisition Time = 27-SEP-2010 10:40:54.0
9

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	511.52	255	71	2.59	1022.17	1014	21	10.5	— ANN.	
0	558.90	85	48	1.43	1116.87	1110	12	19.6	— HWC	
0	1461.28	81	27	2.79	2920.57	2913	23	20.4		K-40

Sample ID : EF1-6110-7S Acquisition date : 27-SEP-2010 10:40:54

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	81	10.67*	2.501E+00	3.039E-07	3.039E-07	20.41

Flag: "*" = Keyline

Sample ID : EF1-6110-7S Acquisition date : 27-SEP-2010 10:40:54

Total number of lines in spectrum	3	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	3	100.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	3.039E-07	3.039E-07	0.620E-07	20.41	
Total Activity :			3.039E-07	3.039E-07			
Grand Total Activity :			3.039E-07	3.039E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EF1-6110-7S Acquisition date : 27-SEP-2010 10:40:54

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	1548.05	511.00*	193.46	1.000E+35	10.47	Decay
		% Abundances Found =		100.00			
AS-76	26.32H	107.58	559.10*	44.70	9.839E+24	19.55	Decay,Abun.
			563.23	1.17	----- Not Found -----		
			571.30	0.14	----- Not Found -----		
			657.03	6.10	----- Not Found -----		
			665.31	0.39	----- Not Found -----		
			740.12	0.12	----- Not Found -----		
			771.76	0.12	----- Not Found -----		
			867.63	0.12	----- Not Found -----		
			1129.87	0.14	----- Not Found -----		
			1212.72	1.63	----- Not Found -----		
			1216.02	3.84	----- Not Found -----		
			1220.52	1.39	----- Not Found -----		
			1439.13	0.33	----- Not Found -----		
			1453.60	0.13	----- Not Found -----		
			1787.67	0.33	----- Not Found -----		
		% Abundances Found =		73.70			

Flag: "*" = Keyline

Sample ID : EF1-6110-7S Acquisition date : 27-SEP-2010 10:40:54

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	511.52	255	71	2.59	1022.17	1014	21	9.44E-02	10.5	4.88E+00	T
0	558.90	85	48	1.43	1116.87	1110	12	3.15E-02	19.6	4.60E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 27-SEP-2010 11:26:01.31

Sample ID : EF1-6110-7S

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	38.	477.59	2.7570E-07
F-18	0.	511.00	Half-Life too short
NA-22	20.	1274.54	9.4576E-09
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	18.	889.25	1.8234E-08
CR-51	48.	320.09	1.1564E-06
MN-54	20.	834.83	8.7249E-09
CO-56	26.	1238.25	4.0382E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	0.	158.38	Half-Life too short
CO-57	60.	122.06	1.0606E-08
CO-58	19.	810.76	2.0486E-08
FE-59	21.	1099.22	9.0989E-08
CO-60	10.	1332.49	7.0191E-09
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	16.	1115.52	1.9940E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	48.	136.00	1.8640E-08
AS-76	0.	559.10	Half-Life too short
BR-82	0.	776.49	Half-Life too short
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	84.	513.99	2.2170E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	84.	513.99	3.3194E-08
RB-86	15.	1076.63	6.4345E-06
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	5.	1836.01	1.2872E-08
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	26.	1204.90	1.2693E-05
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Sample ID : EF1-6110-7S Acquisition date : 27-SEP-2010 10:40:54

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
SR-93	0.	590.20	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	22.	702.63	5.9971E-09
NB-95	14.	765.79	5.4109E-08
NB-95M	0.	235.69	Half-Life too short
ZR-95	26.	756.72	4.4620E-08
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	0.	739.50	Half-Life too short
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	30.	497.08	5.1365E-08
TC-104	0.	357.99	Half-Life too short
RH-105	0.	318.90	Half-Life too short
RU-105	0.	724.50	Half-Life too short
RU-106	20.	621.84	7.8225E-08
CD-109	42.	88.03	2.9867E-07
AG-110M	17.	937.48	2.8312E-08
SN-113	38.	391.69	1.7941E-08
SN-117M	55.	158.56	2.6422E-06
SB-122	0.	563.93	Half-Life too short
SB-124	21.	602.71	2.1095E-08
SB-125	29.	427.89	1.9391E-08
TE-125M	45.	109.28	9.7357E-06
TE-127	0.	417.90	Half-Life too short
TE-127M	36.	57.60	3.6410E-05
XE-127	60.	202.84	8.2047E-08
TE-129	0.	459.60	Half-Life too short
TE-129M	24.	695.88	2.1346E-06
XE-129M	0.	196.56	Half-Life too short
I-130	0.	536.09	Half-Life too short
BA-131	62.	123.80	2.3696E-05
I-131	0.	364.48	Half-Life too short
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	70.	163.93	3.1735E-04
I-132	0.	667.69	Half-Life too short
TE-132	0.	228.16	Half-Life too short
BA-133	30.	302.84	2.6832E-08
BA-133M	0.	276.09	Half-Life too short
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	0.	81.00	Half-Life too short
XE-133M	0.	233.22	Half-Life too short
CS-134	30.	604.70	7.0613E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Sample ID : EF1-6110-7S Acquisition date : 27-SEP-2010 10:40:54

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-136	28.	818.50	3.8665E-06
I-136	0.	1313.02	Half-Life too short
CS-137	31.	661.65	7.7386E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	67.	165.85	1.3675E-08
CS-139	0.	1283.23	Half-Life too short
BA-140	41.	537.32	1.6226E-05
LA-140	0.	1596.49	Half-Life too short
BA-141	0.	190.22	Half-Life too short
CE-141	60.	145.44	1.5200E-07
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	0.	293.26	Half-Life too short
CE-144	60.	133.54	7.6985E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	0.	91.10	Half-Life too short
PM-148M	44.	550.27	5.4123E-08
EU-152	43.	344.27	2.2249E-08
EU-154	21.	1004.76	4.5057E-08
EU-155	55.	105.31	3.8690E-08
EU-156	19.	646.29	1.5932E-05
HF-181	32.	482.03	4.8132E-08
TA-182	10.	1221.42	4.7439E-08
W-187	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
HG-203	64.	279.19	4.8362E-08
BI-207	30.	569.67	6.3013E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	0.	240.98	Half-Life too short
RA-226	53.	186.21	1.6700E-07
AC-228	42.	338.32	5.1779E-08
TH-228	50.	84.37	1.0314E-06
PA-234	0.	131.20	Half-Life too short
TH-234	56.	63.29	2.6864E-05
U-235	60.	143.76	5.7059E-08
NP-239	0.	106.13	Half-Life too short
AM-241	35.	59.54	1.2408E-07

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-119107/5

Sample Location (Well Number): 7/5

1. Representative sample collected. Date/Time 11-11-10 / 14:45

Sample collected by: C Proffitt / [signature] Date: 11-11-10
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: C Proffitt / [signature] Date: 11-11-10
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: L.C. Dyer / [signature] Date: 11-12-10
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert C Hagan / [signature] Date: 11-16-10
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT ~~EPT~~ 11910-7/S	
2 . Date Sampled	11/15/10 11/11/2010	
3 . Time Sampled	14:45	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	11/11/2010	
2 . Time Sample Counted	22:08	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	7.2	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	2546.6	cpm
Net Spike Count Rate (cpm)	2539.4	cpm
H3 Spike Activity (dpm on count date)	6741.6	dpm
Counter Efficiency	0.3767	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	7.7	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.5	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{\text{(Bkg cpm)}}{\text{(Bkg min.)}} + \frac{\text{(Bkg cpm)}}{\text{(Smpl min.)}}}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}} = 1.18\text{E-}06 \text{ uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency x 2.22E6 uCi/ml x Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 11-12-10

Reviewed By: _____ Date 11/15/10

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT 11910 7/5

Sample Location (Well Number): 7S

1. Representative sample collected. Date/Time 11-9-10 / 10:30

Sample collected by: T Homas Mowl Tom c — Date: 11-9-10
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: ~~T Homas~~ Charles Proffitt 11-9-10 / Charles Proffitt Date: 11-9-10
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: Charles Proffitt / Charles Proffitt Date: 11-16-10
Fermi 2 RP Printed Name Signature

Sample number: EFT 11910 7/5

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: Charles Prather / Charles Prather Date: 11-16-10
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert C. Geyer / Robert C. Geyer Date: 11-16-10
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EFT 11910 7/S WELL

Sample End Time: 9-NOV-2010 10:30:00.00

REMARKS

PERFORMED BY:

SIGNATURE

REVIEWED BY:

SIGNATURE/DATE

Sample ID : EFT 11910 7/S WE Acquisition date : 16-NOV-2010 16:54:20

Fermi 2 Radiation Protection Gamma Spectroscopy Report

Sample Parameters

Sample ID Number: EFT 11910 7/S WELL
Sample collection start date: 9-NOV-2010 10:30:00.00
Sample collection end date : 9-NOV-2010 10:30:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.00000E+03 cc
Sample geometry : M2LL Operator: CLP

Acquisition Parameters

Detector number : DET 4 Acquire date : 16-NOV-2010 16:54:20.16
Preset live time : 0 00:45:00.00 Elapsed live time : 0 00:45:00.00
Elapsed real time : 0 00:45:00.61 Percent dead time : 0.03 %

Calibration Parameters

Detector number : DET 4 Yearly cal date : 23-JUN-2010 12:28:00.00
Kev/channel : 5.00148E-01 Zero offset: 7.94603E-02
Daily cal date : 16-NOV-2010 03:04:52.41

Peak Search Parameters

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

Nuclide Identification Parameters

Energy tolerance : 1.75000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	199.50	43	124	0.70	398.80	393	14	1.59E-02	56.9	
2	0	352.16	31	57	0.96	703.95	697	12	1.16E-02	51.5	
3	1	510.41	35	34	2.04	1020.37	1015	20	1.30E-02	44.7	2.46E+00
4	1	511.23	67	33	1.85	1022.00	1015	20	2.48E-02	25.4	
5	1	512.20	44	22	1.67	1024.11	1015	20	1.62E-02	37.1	
6	0	609.46	35	10	1.70	1218.40	1214	9	1.31E-02	27.3	
7	0	1120.37	23	12	1.09	2239.96	2235	12	8.52E-03	36.6	
8	0	1461.13	86	4	1.85	2921.31	2913	16	3.18E-02	12.0	

Decay Time = 7 06:24:20.16 Acquisition Time = 16-NOV-2010 16:54:20.1
6

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	199.58	43	124	0.70	398.00	393	14	56.9	— Low FWHM / High %ERROR.	
0	352.16	31	57	0.96	703.95	697	12	51.5	— Low FWHM / High %ERROR.	
1	510.41	35	34	2.04	1020.37	1015	20	44.7	2.46E+00	
1	511.23	67	33	1.85	1022.00	1015	20	25.4		
1	512.28	44	22	1.67	1024.11	1015	20	37.1		
0	609.46	35	18	1.70	1218.40	1214	9	27.3	— Bi-214	
0	1120.37	23	12	1.09	2239.96	2235	12	36.6	Bi-214	
0	1461.13	86	4	1.85	2921.31	2913	16	12.0		K-40

SB-05 VP-05 11-17-10 Annu. Peak

11-16-10

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	86	10.67*	2.501E+00	3.224E-07	3.224E-07	11.90

Nuclide Type: fission gas

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
KR-85	513.99	44	0.43*	4.874E+00	2.093E-06	2.096E-06	37.06

Nuclide Type: activation

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
SR-85	513.99	44	99.27*	4.874E+00	9.066E-09	9.080E-09	37.06

Flag: "*" = Keyline

Sample ID : EFT 11910 7/9 WE Acquisition date : 16-NOV-2010 16:54:20

Total number of lines in spectrum	8	
Number of unidentified lines	1	
Number of lines tentatively identified by NID	7	87.50%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	3.224E-07	3.224E-07	0.386E-07	11.98	
	Total Activity :		3.224E-07	3.224E-07			

Nuclide Type : fission gas

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
KR-85	10.72Y	1.00	2.093E-06	2.096E-06	0.777E-06	37.06	
	Total Activity :		2.093E-06	2.096E-06			

Nuclide Type : activation

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
SR-85	64.84D	1.00	9.066E-09	9.800E-09	3.632E-09	37.06	
	Total Activity :		9.066E-09	9.800E-09			
Grand Total Activity :			2.424E-06	2.428E-06			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	95.56	511.00*	193.46	4.141E+20	25.37	Decay
	% Abundances Found = 100.00						
SC-46	83.83D	0.09	142.53	62.70	----- Not Found -----		Abun.
			889.25*	99.98	----- Not Found -----		
			1120.51	99.99	8.433E-09	36.64	
	% Abundances Found = 38.07						
SE-75	119.78D	0.06	66.05	1.02	----- Not Found -----		Abun.
			96.73	3.41	----- Not Found -----		
			121.12	16.70	----- Not Found -----		
			136.00*	59.20	----- Not Found -----		
			198.60	1.45	4.685E-07	56.93	
			264.65	59.00	----- Not Found -----		
			279.53	25.20	----- Not Found -----		
			303.91	1.32	----- Not Found -----		
			400.65	11.40	----- Not Found -----		
	% Abundances Found = 0.81						
KR-90	32.32S	19468.14	121.82	32.00	----- Not Found -----		Decay,Abun.
			539.49	29.00	----- Not Found -----		
			1118.69*	37.00	1.000E+35	36.64	
	% Abundances Found = 37.76						
RU-103	39.35D	0.19	497.08*	89.00	----- Not Found -----		Abun.
			610.33	5.60	1.595E-07	27.27	
	% Abundances Found = 5.92						
TE-131M	30.00H	5.83	102.96	7.90	----- Not Found -----		Abun.
			149.72	5.10	----- Not Found -----		
			200.63	7.56	4.887E-06	56.93	
			240.93	7.59	----- Not Found -----		
			334.27	9.60	----- Not Found -----		
			773.67*	38.20	----- Not Found -----		
			782.49	7.79	----- Not Found -----		
			793.75	13.90	----- Not Found -----		
			822.78	6.12	----- Not Found -----		
			852.21	20.70	----- Not Found -----		
			1125.46	11.40	----- Not Found -----		
			1206.60	9.90	----- Not Found -----		
	% Abundances Found = 5.19						
TE-134	41.80M	250.88	79.45	21.00	----- Not Found -----		Decay,Abun.
			180.89	18.00	----- Not Found -----		
			201.24	8.70	1.000E+35	56.93	
			210.47*	21.90	----- Not Found -----		
			277.95	21.30	----- Not Found -----		
			435.06	18.60	----- Not Found -----		
			461.00	10.80	----- Not Found -----		
			464.64	5.10	----- Not Found -----		
			565.99	18.90	----- Not Found -----		
			742.59	14.70	----- Not Found -----		

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
TE-134	41.80M	250.80	767.20	30.00	---- Not Found ----		Decay,Abun.
		% Abundances Found =		4.60			
XE-135	9.11H	19.19	249.79*	89.90	---- Not Found ----		Decay,Abun.
			608.19	2.89	1.621E-01	27.27	
		% Abundances Found =		3.11			
BI-214	19.90M	526.90	609.31*	46.30	1.000E+35	27.27	Decay
			768.36	5.04	---- Not Found ----		
			934.06	3.21	---- Not Found ----		
			1120.29	15.10	1.000E+35	36.64	
			1238.11	5.94	---- Not Found ----		
			1377.67	4.11	---- Not Found ----		
			1764.49	15.00	---- Not Found ----		
		% Abundances Found =		64.29	(Abn. Limit = 40.40%)		
PB-214	26.80M	391.30	87.30	4.67	---- Not Found ----		Decay
			241.98	7.49	---- Not Found ----		
			295.21	19.20	---- Not Found ----		
			351.92*	37.20	1.000E+35	51.49	
			785.91	1.10	---- Not Found ----		
		% Abundances Found =		53.40	(Abn. Limit = 37.20%)		

Flag: "*" = Keyline

Sample ID : EFT 11910 7/S WE Acquisition date : 16-NOV-2010 16:54:20

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	199.58	43	124	0.70	398.00	393	14	1.59E-02	56.9	6.59E+00	T
0	352.16	31	57	0.96	703.95	697	12	1.16E-02	51.5	5.70E+00	T
1	510.41	35	34	2.04	1020.37	1015	20	1.30E-02	44.7	4.88E+00	
1	511.23	67	33	1.85	1022.00	1015	20	2.48E-02	25.4	4.88E+00	T
0	609.46	35	10	1.70	1218.40	1214	9	1.31E-02	27.3	4.52E+00	T
0	1120.37	23	12	1.09	2239.96	2235	12	8.52E-03	36.6	2.90E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 16-NOV-2010 17:39:28.79

Sample ID : EFT 11910 7/S WELL

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	32.	477.59	6.0772E-08
F-18	0.	511.00	Half-Life too short
NA-22	0.	1274.54	5.9172E-09
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	23.	889.25	8.1154E-09
CR-51	35.	320.08	6.2356E-08
MN-54	19.	834.83	6.7173E-09
CO-56	17.	1238.25	1.2799E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	51.	158.38	1.2475E-08
CO-57	43.	122.06	6.8124E-09
CO-58	19.	810.76	6.8461E-09
FE-59	20.	1099.22	1.5756E-08
CO-60	10.	1332.49	6.5052E-09
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	19.	1115.52	1.6067E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	59.	136.00	1.0796E-08
AS-76	45.	559.10	1.6106E-06
BR-82	14.	776.49	2.0248E-07
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85M	0.	151.18	Half-Life too short
RB-86	9.	1076.63	8.5706E-08
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	7.	1836.01	7.0101E-09
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	13.	1204.90	2.5804E-06
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short
SR-93	0.	590.28	Half-Life too short
Y-93	0.	266.90	Half-Life too short

Sample ID : EFT 11910 7/8 WE Acquisition date : 16-NOV-2010 16:54:20

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
NB-94	27.	702.63	6.5368E-09
NB-95	12.	765.79	5.7259E-09
NB-95M	61.	235.69	1.0015E-07
ZR-95	13.	756.72	9.9732E-09
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	26.	739.58	3.3375E-07
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	16.	497.08	5.5531E-09
TC-104	0.	357.99	Half-Life too short
RH-105	30.	318.90	7.6501E-07
RU-105	0.	724.50	Half-Life too short
RU-106	33.	621.84	6.7495E-08
CD-109	28.	88.03	2.0953E-07
AG-110M	22.	937.48	2.3206E-08
SN-113	24.	391.69	7.4305E-09
SN-117M	49.	158.56	8.8472E-09
SB-122	22.	563.93	4.7868E-08
SB-124	33.	602.71	7.1929E-09
SB-125	32.	427.89	1.8786E-08
TE-125M	48.	109.28	2.6706E-06
TE-127	0.	417.90	Half-Life too short
TE-127M	27.	57.60	1.5905E-05
XE-127	57.	202.84	9.7272E-09
TE-129	0.	459.60	Half-Life too short
TE-129M	20.	695.88	2.0133E-07
XE-129M	66.	196.56	2.2739E-07
I-130	0.	536.09	Half-Life too short
BA-131	54.	123.80	3.3204E-08
I-131	42.	364.48	1.3533E-08
TE-131	0.	149.72	Half-Life too short
TE-131M	11.	773.67	7.2091E-07
XE-131M	37.	163.93	3.6322E-07
I-132	0.	667.69	Half-Life too short
TE-132	51.	228.16	3.0042E-08
BA-133	49.	302.84	3.2887E-08
BA-133M	41.	276.09	6.5954E-07
I-133	19.	529.87	1.8951E-06
TE-133M	0.	912.58	Half-Life too short
XE-133	48.	81.00	9.6632E-08
XE-133M	49.	233.22	5.4256E-07
CS-134	26.	604.70	6.0259E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	44.	268.24	2.3055E-06
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short
CS-136	15.	818.50	8.5682E-09
I-136	0.	1313.02	Half-Life too short

Sample ID : EFT 11910 7/S WE Acquisition date : 16-NOV-2010 16:54:20

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-137	27.	661.65	7.2305E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	47.	165.85	6.6832E-09
CS-139	0.	1283.23	Half-Life too short
BA-140	22.	537.32	3.0549E-08
LA-140	11.	1596.49	1.6308E-07
BA-141	0.	190.22	Half-Life too short
CE-141	59.	145.44	1.4252E-08
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	46.	293.26	5.2405E-07
CE-144	51.	133.54	5.4437E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	36.	91.10	4.5819E-08
PM-148M	17.	550.27	5.5865E-09
EU-152	48.	344.27	2.3007E-08
EU-154	18.	1004.76	4.0728E-08
EU-155	48.	105.31	3.4911E-08
EU-156	25.	646.29	1.1489E-07
HF-181	28.	482.03	7.4747E-09
TA-182	11.	1221.42	2.5298E-08
W-187	17.	685.81	2.0552E-06
RE-188	0.	155.03	Half-Life too short
HG-203	42.	279.19	7.6590E-09
BI-207	36.	569.67	6.7423E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	54.	240.98	5.9617E-07
RA-226	44.	186.21	1.5362E-07
AC-228	33.	338.32	4.4633E-08
TH-228	43.	84.37	8.6154E-07
PA-234	0.	131.20	Half-Life too short
TH-234	44.	63.29	1.0033E-06
U-235	62.	143.76	5.7930E-08
NP-239	50.	106.13	2.7377E-07
AM-241	33.	59.54	1.2046E-07

EFT-7S

2011

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-6111-75

Sample Location (Well Number): 75

1. Representative sample collected. Date/Time 6-9-11 / 09:45

Sample collected by: C Proffitt / [signature] Date: 6-9-11
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: [signature] / C Proffitt Date: 6-9-11
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: Russ Bogatt [signature] Date: 6-10-11
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert C Berg JR / [signature] Date: 6-13-11
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks W/A 6-13-11

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-6711 7S	
2 . Date Sampled	06/09/2011	
3 . Time Sampled	09:45	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	06/10/2011	
2 . Time Sample Counted	10:59	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	5.7	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	2407.6	cpm
Net Spike Count Rate (cpm)	2401.9	cpm
H3 Spike Activity (dpm on count date)	6525.4	dpm
Counter Efficiency	0.3681	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	6.0	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.3	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	1.7	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{\text{(Bkg cpm)}}{\text{(Bkg min.)}} + \frac{\text{(Bkg cpm)}}{\text{(Smpl min.)}}}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}} = 1.08\text{E-}06 \text{ uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency x 2.22E6 uCi/ml x Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 6-10-11

Reviewed By: W Bowser Date 6-13-11

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-6111-75

Sample Location (Well Number): 75

1. Representative sample collected. Date/Time 6-1-11 / 0940

Sample collected by: Thomas Mow / _____ Date: 6-1-11
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: C Proffitt / _____ Date: 6-7-11
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: C Proffitt / _____ Date: 6-13-11
Fermi 2 RP Printed Name Signature

Sample number: EFT-6111-7S

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: C Proffitt / [signature] Date: 6.13.11
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: Roberto Hegyi [signature] Date: 6/17/11
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks [signature] 6-17-11

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EFT-6111-79

Sample End Time: 1-JUN-2011 09:40:00.00

REMARKS Retreat

PERFORMED BY:

Charles Dunphy
SIGNATURE

REVIEWED BY:

SIGNATURE/DATE

Sample ID : EFT-6111-7S Acquisition date : 14-JUN-2011 08:39:03

Fermi 2 Radiation Protection Gamma Spectroscopy Report

Sample Parameters

Sample ID Number: EFT-6111-7S
Sample collection start date: 1-JUN-2011 09:40:00.00
Sample collection end date : 1-JUN-2011 09:40:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.00000E+03 cc
Sample geometry : M2LL Operator: CLP

Acquisition Parameters

Detector number : DET 4 Acquire date : 14-JUN-2011 08:39:03.47
Preset live time : 0 00:45:00.00 Elapsed live time : 0 00:45:00.00
Elapsed real time : 0 00:45:00.59 Percent dead time : 0.03 %

Calibration Parameters

Detector number : DET 4 Yearly cal date : 23-JUN-2010 12:28:00.00
Kev/channel : 5.00056E-01 Zero offset: 1.87166E-01
Daily cal date : 14-JUN-2011 08:35:44.28

Peak Search Parameters

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

Nuclide Identification Parameters

Energy tolerance : 1.75000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	139.93	50	52	1.61	279.45	275	9	1.87E-02	29.3	
2	0	198.94	44	91	1.60	397.47	389	13	1.64E-02	47.3	
3	0	511.14	133	56	1.52	1021.08	1014	16	4.93E-02	15.3	
4	0	559.32	33	35	1.61	1118.26	1109	14	1.23E-02	41.7	
5	0	610.30	21	38	0.85	1220.21	1212	11	7.60E-03	62.6	
6	0	1461.17	71	9	1.56	2922.35	2913	20	2.64E-02	16.0	

Decay Time = 12 22:59:03.47 Acquisition Time = 14-JUN-2011 08:39:03.4
7

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	139.93	50	52	1.61	279.45	275	9	29.3		Ge-n_ γ cosmic
0	198.94	44	91	1.60	397.47	389	13	47.3		Ge n – γ cosmic
0	511.14	133	56	1.52	1021.88	1014	16	15.3		Ann. Peak
0	559.32	33	35	1.61	1118.26	1109	14	41.7		Cd- n– γ cosmic
0	610.30	21	30	0.85	1220.21	1212	11	62.6		Low FWHM/Hgl. % 6/1/05
0	1461.17	71	9	1.56	2922.35	2913	20	16.0		K-40

jr - 6-15-11

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	71	10.67*	2.501E+00	2.670E-07	2.670E-07	16.02

Flag: "*" = Keyline

Sample ID : EFT-6111-7S Acquisition date : 14-JUN-2011 00:39:03

Total number of lines in spectrum	6	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	6	100.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	2.670E-07	2.670E-07	0.428E-07	16.02	
Total Activity :			2.670E-07	2.670E-07			
Grand Total Activity :			2.670E-07	2.670E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EFT-6111-7S Acquisition date : 14-JUN-2011 08:39:03

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	170.23	511.00*	193.46	1.000E+35	15.28	Decay
		% Abundances Found =		100.00			
SE-75	119.78D	0.11	66.05	1.02	----- Not Found -----		Abun.
			96.73	3.41	----- Not Found -----		
			121.12	16.70	----- Not Found -----		
			136.00*	59.20	----- Not Found -----		
			198.60	1.45	5.008E-07	47.33	
			264.65	59.80	----- Not Found -----		
			279.53	25.20	----- Not Found -----		
			303.91	1.32	----- Not Found -----		
			400.65	11.40	----- Not Found -----		
		% Abundances Found =		0.81			
AS-76	26.32H	11.83	559.10*	44.70	5.762E-05	41.69	Decay,Abun.
			563.23	1.17	----- Not Found -----		
			571.30	0.14	----- Not Found -----		
			657.03	6.10	----- Not Found -----		
			665.31	0.39	----- Not Found -----		
			740.12	0.12	----- Not Found -----		
			771.76	0.12	----- Not Found -----		
			867.63	0.12	----- Not Found -----		
			1129.07	0.14	----- Not Found -----		
			1212.72	1.63	----- Not Found -----		
			1216.02	3.84	----- Not Found -----		
			1228.52	1.39	----- Not Found -----		
			1439.13	0.33	----- Not Found -----		
			1453.60	0.13	----- Not Found -----		
			1787.67	0.33	----- Not Found -----		
		% Abundances Found =		73.70			
MO-99	66.02H	4.72	140.51	3.80	5.463E-06	29.29	Abun.
			181.06	6.20	----- Not Found -----		
			366.43	1.37	----- Not Found -----		
			739.50*	12.80	----- Not Found -----		
			778.00	4.50	----- Not Found -----		
		% Abundances Found =		13.25			
TC-99M	6.02H	51.72	140.50*	89.07	3.290E+07	29.29	Decay
		% Abundances Found =		100.00			
RU-103	39.35D	0.33	497.08*	89.00	----- Not Found -----		Abun.
			610.33	5.60	1.020E-07	62.61	
		% Abundances Found =		5.92			
TE-131M	30.00H	10.38	102.06	7.90	----- Not Found -----		Decay,Abun.
			149.72	5.10	----- Not Found -----		
			200.63	7.56	1.106E-04	47.33	
			240.93	7.59	----- Not Found -----		
			334.27	9.60	----- Not Found -----		
			773.67*	38.20	----- Not Found -----		
			782.49	7.79	----- Not Found -----		

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
TE-131M	30.00H	10.38	793.75	13.90	----- Not Found -----		Decay,Abun.
			822.78	6.12	----- Not Found -----		
			852.21	20.70	----- Not Found -----		
			1125.46	11.40	----- Not Found -----		
			1206.60	9.80	----- Not Found -----		
		% Abundances Found =		5.19			
PM-148M	41.30D	0.31	280.11	12.56	----- Not Found -----		Abun.
			414.07	18.66	----- Not Found -----		
			432.78	5.35	----- Not Found -----		
			501.26	6.75	----- Not Found -----		
			550.27*	94.90	----- Not Found -----		
			599.74	12.54	----- Not Found -----		
			611.26	5.48	1.031E-07	62.61	
			629.97	89.00	----- Not Found -----		
			725.70	32.80	----- Not Found -----		
			915.33	17.17	----- Not Found -----		
			1013.81	20.30	----- Not Found -----		
		% Abundances Found =		1.74			
BI-214	19.90M	938.77	609.31*	46.30	1.000E+35	62.61	Decay
			768.36	5.04	----- Not Found -----		
			934.06	3.21	----- Not Found -----		
			1120.29	15.10	----- Not Found -----		
			1238.11	5.94	----- Not Found -----		
			1377.67	4.11	----- Not Found -----		
			1764.49	15.80	----- Not Found -----		
		% Abundances Found =		48.48	(Abn. Limit = 48.48%)		

Flag: "*" = Keyline

Sample ID : EFT-6111-7S Acquisition date : 14-JUN-2011 00:39:03

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	139.93	50	52	1.61	279.45	275	9	1.87E-02	29.3	6.40E+00	T
0	198.94	44	91	1.60	397.47	389	13	1.64E-02	47.3	6.60E+00	T
0	511.14	133	56	1.52	1021.88	1014	16	4.93E-02	15.3	4.88E+00	T
0	559.32	33	35	1.61	1118.26	1109	14	1.23E-02	41.7	4.68E+00	T
0	610.30	21	38	0.85	1220.21	1212	11	7.60E-03	62.6	4.52E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 14-JUN-2011 09:24:12.91

Sample ID : EFT-6111-7S

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	25.	477.59	5.8329E-08
F-18	0.	511.00	Half-Life too short
NA-22	7.	1274.54	5.6935E-09
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	17.	889.25	7.3850E-09
CR-51	43.	320.08	7.9231E-08
MN-54	26.	834.83	7.7699E-09
CO-56	21.	1238.25	1.4619E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	47.	158.38	2.2911E-08
CO-57	45.	122.06	7.0732E-09
CO-58	19.	810.76	7.2601E-09
FE-59	11.	1099.22	1.3175E-08
CO-60	20.	1332.49	8.9351E-09
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	19.	1115.52	1.6192E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	51.	136.00	1.0422E-08
AS-76	0.	559.10	Half-Life too short
BR-82	15.	776.49	3.0223E-06
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	60.	513.99	1.8493E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	60.	513.99	9.1813E-09
RB-86	11.	1076.63	1.1145E-07
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	5.	1836.01	6.2958E-09
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	14.	1204.90	2.8109E-06
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Sample ID : EFT-6111-7S Acquisition date : 14-JUN-2011 08:39:03

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
SR-93	0.	590.28	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	25.	702.63	6.2676E-09
NB-95	16.	765.79	7.3991E-09
NB-95M	42.	235.69	2.5211E-07
ZR-95	20.	756.72	1.2893E-08
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	17.	739.50	1.1585E-06
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	22.	497.08	7.0574E-09
TC-104	0.	357.99	Half-Life too short
RH-105	39.	318.90	1.2441E-05
RU-105	0.	724.50	Half-Life too short
RU-106	23.	621.84	5.8669E-08
CD-109	35.	88.03	2.3422E-07
AG-110M	12.	937.48	1.7890E-08
SN-113	26.	391.69	7.9481E-09
SN-117M	47.	158.56	1.1570E-08
SB-122	26.	563.93	2.2287E-07
SB-124	25.	602.71	6.7841E-09
SB-125	34.	427.89	1.9502E-08
TE-125M	34.	109.28	2.4285E-06
TE-127	0.	417.90	Half-Life too short
TE-127M	20.	57.60	1.4319E-05
XE-127	57.	202.84	1.0819E-08
TE-129	0.	459.60	Half-Life too short
TE-129M	15.	695.88	1.9922E-07
XE-129M	60.	196.56	3.3985E-07
I-130	0.	536.09	Half-Life too short
BA-131	33.	123.80	3.7299E-08
I-131	33.	364.48	1.9714E-08
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	50.	163.93	5.7810E-07
I-132	0.	667.69	Half-Life too short
TE-132	45.	228.16	9.5811E-08
BA-133	43.	302.84	3.1129E-08
BA-133M	44.	276.09	7.7675E-06
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	36.	81.00	1.6156E-07
XE-133M	43.	233.22	3.0809E-06
CS-134	29.	604.70	6.3724E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Sample ID : EFT-6111-7S Acquisition date : 14-JUN-2011 00:39:03

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-136	17.	818.50	1.2364E-08
I-136	0.	1313.02	Half-Life too short
CS-137	16.	661.65	5.7667E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	45.	165.85	6.7441E-09
CS-139	0.	1283.23	Half-Life too short
BA-140	16.	537.32	3.6234E-08
LA-140	5.	1596.49	1.2333E-06
BA-141	0.	190.22	Half-Life too short
CE-141	53.	145.44	1.5327E-08
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	39.	293.26	8.5683E-06
CE-144	53.	133.54	5.6179E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	28.	91.10	5.0969E-08
PM-148M	13.	550.27	5.3020E-09
EU-152	51.	344.27	2.3729E-08
EU-154	18.	1004.76	4.0734E-08
EU-155	34.	105.31	2.9836E-08
EU-156	22.	646.29	1.4199E-07
HF-181	27.	482.03	8.0748E-09
TA-182	13.	1221.42	2.8472E-08
W-187	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
AU-199	47.	158.38	2.4690E-07
HG-203	48.	279.19	8.8506E-09
BI-207	28.	569.67	5.9985E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	61.	240.98	1.8718E-06
RA-226	71.	186.21	1.9159E-07
AC-228	42.	338.32	5.0182E-08
TH-228	44.	84.37	8.7568E-07
PA-234	0.	131.20	Half-Life too short
TH-234	39.	63.29	1.1113E-06
U-235	61.	143.76	5.7331E-08
NP-239	43.	106.13	1.3574E-06
AM-241	34.	59.54	1.2139E-07

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-102411-75

Sample Location (Well Number): EFT-7/S

1. Representative sample collected. Date/Time 10/24/11 / 16:00

Sample collected by: Thomas Mow / [signature] Date: 10/24/11
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Thomas Mow / [signature] Date: 10/25/11
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: John M. Yoko / [signature] Date: 11-1-11
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert Clay SF1 [signature] Date: 11-3-11
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks NV 14

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-7/S	
2 . Date Sampled	10/24/2011	
3 . Time Sampled	16:00	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	10/30/2011	
2 . Time Sample Counted	13:00	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	7.5	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	2548.6	cpm
Net Spike Count Rate (cpm)	2541.1	cpm
H3 Spike Activity (dpm on count date)	6383.7	dpm
Counter Efficiency	0.3981	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	9.4	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	1.9	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{\text{(Bkg cpm)}}{\text{(Bkg min.)}} + \frac{\text{(Bkg cpm)}}{\text{(Smpl min.)}}}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}} = 1.14\text{E-}06 \text{ uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency x 2.22E6 uCi/ml x Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 11-1-11

Reviewed _____ Date NOV 01 2011

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-102411-75

Sample Location (Well Number): EFT-7/5

1. Representative sample collected. Date/Time 10/24/11 / 16:00

Sample collected by: Thomas Mow / [signature] Date: 10/24/11
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Thomas Mow / [signature] Date: 10/25/11
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: C Prothro / [signature] Date: 11-1-11
Fermi 2 RP Printed Name Signature

Sample number: EFT 102411-7S

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: C Prothro / [signature] Date: 11-1-11
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert Greg JR-1 [signature] Date: 11-3-11
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

DETROIT EDISON FERMI-2 POWER PLANT 3-NOV-2011 17:19:35.56

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EFT-102411-7S

Sample End Time: 24-OCT-2011 16:00:00.00

REMARKS No plant Related Isotopes

PERFORMED BY:

SIGNATURE

REVIEWED BY:

SIGNATURE/DATE

Sample ID : EFT-102411-7S Acquisition date : 3-NOV-2011 16:34:31

****

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********

Sample ID Number: EFT-102411-7S
Sample collection start date: 24-OCT-2011 16:00:00.00
Sample collection end date : 24-OCT-2011 16:00:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.000000E+03 cc
Sample geometry : M2LL Operator: CLP

********** Acquisition Parameters **********

Detector number : DET 4 Acquire date : 3-NOV-2011 16:34:31.10
Preset live time : 0 00:45:00.00 Elapsed live time : 0 00:45:00.00
Elapsed real time : 0 00:45:00.63 Percent dead time : 0.03 %

********** Calibration Parameters **********

Detector number : DET 4 Yearly cal date : 14-JUN-2011 14:50:56.41
Kev/channel : 5.000626E-01 Zero offset: -5.96451E-01
Daily cal date : 3-NOV-2011 15:40:04.38

********** Peak Search Parameters **********

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********

Energy tolerance : 1.75000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	66.36	39	43	1.52	133.89	131	7	1.43E-02	32.9	
2	0	198.73	43	91	0.76	398.61	394	10	1.61E-02	43.6	
3	0	510.88	183	56	2.22	1022.81	1013	22	6.78E-02	12.7	
4	0	610.27	39	41	1.95	1221.57	1214	18	1.44E-02	41.7	
5	4	1459.61	17	5	2.90	2920.00	2917	13	6.32E-03	29.1	3.60E+00
6	4	1461.67	45	7	2.85	2924.12	2917	13	1.65E-02	19.7	
7	0	1766.18	19	13	1.18	3533.03	3518	19	6.96E-03	43.9	

Decay Time = 10 00:34:31.10 Acquisition Time = 3-NOV-2011 16:34:31.10

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	66.36	39	43	1.52	133.09	131	7	32.9		Ge.n.γ
0	198.73	43	91	0.76	398.61	394	10	43.6		Ge n.γ
0	510.88	183	56	2.22	1022.81	1013	22	12.7		Ann Peak
0	610.27	39	41	1.95	1221.57	1214	10	41.7		Bi-214
4	1459.61	17	5	2.90	2920.00	2917	13	29.1	3.60E+00	K-40
4	1461.67	45	7	2.85	2924.12	2917	13	19.7		K-40
0	1766.18	19	13	1.18	3533.03	3518	10	43.9		Bi-214

f-11-3-11

Sample ID : EFT-102411-7S Acquisition date : 3-NOV-2011 16:34:31

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	45	10.67*	2.352E+00	1.781E-07	1.781E-07	19.73

Flag: "*" = Keyline

Sample ID : EFT-102411-7S Acquisition date : 3-NOV-2011 16:34:31

Total number of lines in spectrum	7	
Number of unidentified lines	1	
Number of lines tentatively identified by NID	6	85.71%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	1.781E-07	1.781E-07	0.352E-07	19.73	
Total Activity :			1.781E-07	1.781E-07			
Grand Total Activity :			1.781E-07	1.781E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EFT-102411-7S Acquisition date : 3-NOV-2011 16:34:31

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	131.74	511.00*	193.46	9.357E+31	12.70	Decay
	% Abundances Found =			100.00			
SE-75	119.78D	0.08	66.05	1.02	2.979E-06	32.89	Abun.
			96.73	3.41	---- Not Found ----		
			121.12	16.70	---- Not Found ----		
			136.00*	59.20	---- Not Found ----		
			198.60	1.45	5.023E-07	43.56	
			264.65	59.80	---- Not Found ----		
			279.53	25.20	---- Not Found ----		
			303.91	1.32	---- Not Found ----		
			400.65	11.40	---- Not Found ----		
	% Abundances Found =			1.38			
RU-103	39.35D	0.26	497.08*	89.00	---- Not Found ----		Abun.
			610.33	5.60	1.950E-07	41.72	
	% Abundances Found =			5.92			
CS-136	13.16D	0.76	66.91	12.50	3.892E-07	32.89	Abun.
			86.29	6.30	---- Not Found ----		
			153.22	7.46	---- Not Found ----		
			163.89	4.61	---- Not Found ----		
			176.55	13.56	---- Not Found ----		
			273.65	12.66	---- Not Found ----		
			340.57	48.50	---- Not Found ----		
			818.50*	99.70	---- Not Found ----		
			1049.07	79.60	---- Not Found ----		
			1235.34	19.70	---- Not Found ----		
	% Abundances Found =			4.10			
PM-148M	41.30D	0.24	288.11	12.56	---- Not Found ----		Abun.
			414.07	18.66	---- Not Found ----		
			432.78	5.35	---- Not Found ----		
			501.26	6.75	---- Not Found ----		
			550.27*	94.90	---- Not Found ----		
			599.74	12.54	---- Not Found ----		
			611.26	5.48	1.976E-07	41.72	
			629.97	89.00	---- Not Found ----		
			725.70	32.80	---- Not Found ----		
			915.33	17.17	---- Not Found ----		
			1013.81	20.30	---- Not Found ----		
	% Abundances Found =			1.74			
TA-182	114.74D	0.09	67.75	42.30	7.201E-08	32.89	Abun.
			100.10	14.10	---- Not Found ----		
			1189.05	16.30	---- Not Found ----		
			1221.42*	27.10	---- Not Found ----		
			1230.97	11.50	---- Not Found ----		
	% Abundances Found =			38.01			
BI-214	19.90M	726.48	609.31*	46.30	1.000E+35	41.72	Decay
			768.36	5.04	---- Not Found ----		

Sample ID : EFT-102411-7S Acquisition date : 3-NOV-2011 16:34:31

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
BI-214	19.90M	726.48	934.06	3.21	---- Not Found ----		Decay
			1120.29	15.10	---- Not Found ----		
			1238.11	5.94	---- Not Found ----		
			1377.67	4.11	---- Not Found ----		
			1764.49	15.00	1.000E+35	43.00	
		% Abundances Found =		65.03	(Abn. Limit = 40.40%)		

Flag: "*" = Keyline

Sample ID : EFT-102411-7S Acquisition date : 3-NOV-2011 16:34:31

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	66.36	39	43	1.52	133.89	131	7	1.43E-02	32.9	1.35E+00	T
0	198.73	43	91	0.76	398.61	394	10	1.61E-02	43.6	6.34E+00	T
0	510.80	183	56	2.22	1022.81	1013	22	6.78E-02	12.7	4.59E+00	T
0	610.27	39	41	1.95	1221.57	1214	18	1.44E-02	41.7	4.25E+00	T
4	1459.61	17	5	2.90	2920.00	2917	13	6.32E-03	29.1	2.35E+00	
0	1766.18	19	13	1.18	3533.03	3518	18	6.96E-03	43.9	2.14E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 3-NOV-2011 17:19:39.63

Sample ID : EFT-102411-7S

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	18.	477.59	5.2107E-08
F-18	0.	511.00	Half-Life too short
NA-22	15.	1274.54	8.2467E-09
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	11.	889.25	6.4462E-09
CR-51	39.	320.08	7.3687E-08
MN-54	22.	834.83	7.5892E-09
CO-56	26.	1238.25	1.6643E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	48.	158.38	1.7369E-08
CO-57	36.	122.06	6.7496E-09
CO-58	21.	810.76	7.8970E-09
FE-59	12.	1099.22	1.4260E-08
CO-60	16.	1332.49	8.5895E-09
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	15.	1115.52	1.5473E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	51.	136.00	1.0873E-08
AS-76	53.	559.10	1.0614E-05
BR-82	21.	776.49	9.1806E-07
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	60.	513.99	1.9695E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	60.	513.99	9.4810E-09
RB-86	13.	1076.63	1.1366E-07
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	5.	1836.01	6.6728E-09
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	18.	1204.90	3.1851E-06
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
SR-93	0.	590.20	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	21.	702.63	6.2417E-09
NB-95	18.	765.79	7.5880E-09
NB-95M	44.	235.69	1.5271E-07
ZR-95	18.	756.72	1.2446E-08
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	14.	739.58	5.4304E-07
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	28.	497.09	7.9187E-09
TC-104	0.	357.99	Half-Life too short
RH-105	38.	318.90	3.2702E-06
RU-105	0.	724.50	Half-Life too short
RU-106	29.	621.84	6.7451E-08
CD-109	34.	88.03	2.3942E-07
AG-110M	19.	937.48	2.3015E-08
SN-113	21.	391.69	7.5913E-09
SN-117M	48.	158.56	1.0605E-08
SB-122	22.	563.93	1.0478E-07
SB-124	36.	602.71	8.2743E-09
SB-125	27.	427.89	1.8495E-08
TE-125M	37.	109.28	2.5772E-06
TE-127	0.	417.90	Half-Life too short
TE-127M	39.	57.60	2.2206E-05
XE-127	48.	202.84	9.8334E-09
TE-129	0.	459.60	Half-Life too short
TE-129M	26.	695.88	2.5361E-07
XE-129M	60.	196.56	2.8165E-07
I-130	0.	536.09	Half-Life too short
BA-131	34.	123.80	3.3787E-08
I-131	28.	364.48	1.5132E-08
TE-131	0.	149.72	Half-Life too short
TE-131M	17.	773.67	4.2123E-06
XE-131M	65.	163.93	5.7633E-07
I-132	0.	667.69	Half-Life too short
TE-132	46.	228.16	5.3769E-08
BA-133	43.	302.84	3.2292E-08
BA-133M	34.	276.09	2.0530E-06
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	31.	81.00	1.0692E-07
XE-133M	51.	233.22	1.3764E-06
CS-134	33.	604.70	7.1767E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	50.	268.24	1.2603E-05
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Sample ID : EFT-102411-7S Acquisition date : 3-NOV-2011 16:34:31

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-136	19.	818.50	1.1494E-08
I-136	0.	1313.02	Half-Life too short
CS-137	22.	661.65	7.0387E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	51.	165.85	7.3500E-09
CS-139	0.	1283.23	Half-Life too short
BA-140	27.	537.32	4.1086E-08
LA-140	9.	1596.49	4.8432E-07
BA-141	0.	190.22	Half-Life too short
CE-141	50.	145.44	1.4853E-08
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	40.	293.26	2.0620E-06
CE-144	57.	133.54	6.1404E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	39.	91.10	5.8817E-08
PM-148M	24.	550.27	7.1791E-09
EU-152	35.	344.27	2.1096E-08
EU-154	12.	1004.76	3.6219E-08
EU-155	36.	105.31	3.2157E-08
EU-156	24.	646.29	1.3669E-07
HF-181	20.	482.03	7.1440E-09
TA-182	14.	1221.42	3.0083E-08
W-187	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
AU-199	48.	158.38	1.3669E-07
HG-203	47.	279.19	8.8120E-09
BI-207	34.	569.67	7.0328E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	63.	240.98	1.1317E-06
RA-226	56.	186.21	1.7780E-07
AC-228	34.	338.32	4.7954E-08
TH-228	44.	84.37	9.1118E-07
PA-234	0.	131.20	Half-Life too short
TH-234	40.	63.29	1.0960E-06
U-235	49.	143.76	5.4748E-08
NP-239	40.	106.13	5.8752E-07
AM-241	32.	59.54	1.3193E-07

EFT-7S

2010

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : Detroit Edison - Fermi 1
Address : PO Box 44440
Detroit, Michigan 48244

Report Date: February 17, 2010

Contact: Mr. Tom Mow
Project: **Fermi 1 - PO# 4700246055**

Client Sample ID:	EF1-7/S	Project:	ROIT00116
Sample ID:	245517014	Client ID:	ROIT001
Matrix:	Ground Water		
Collect Date:	04-JAN-10 10:00		
Receive Date:	25-JAN-10		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Rad Gas Flow Proportional Counting											
GFPC, Gross A/B, liquid "As Received"											
Alpha	U	2.87	+/-2.93	4.60	5.00	pCi/L		DXF3 02/11/10	1932	945896	1
Beta	U	1.84	+/-2.43	4.10	5.00	pCi/L					

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 900.0	

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : Detroit Edison - Fermi 1
Address : PO Box 44440
Detroit, Michigan 48244
Contact: Mr. Tom Mow
Project: Fermi 1 - PO# 4700246055

Report Date: December 30, 2010

Client Sample ID: EFT-11110-7/S
Sample ID: 268144016
Matrix: Water
Collect Date: 01-NOV-10 11:05
Receive Date: 06-DEC-10
Collector: Client

Project: ROIT00116
Client ID: ROIT001

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Rad Gas Flow Proportional Counting											
GFPC, Gross A/B, liquid "As Received"											
Alpha		2.82	+/-2.05	2.56	5.00	pCi/L		VXC2 12/27/10	1939	1059089	1
Beta		4.84	+/-2.79	4.36	5.00	pCi/L					

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 900.0/SW846 9310	

EFT-8S

2006

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-85121206

Sample Location (Well Number): EFT-85

1. Representative sample collected. Date/Time 12/12/06 / 1448

Sample collected by: J. Slabach / [signature] Date: 02/01/07
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: J. Southward / [signature] Date: 2/2/07
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: D. Howard / [signature] Date: APR 20 2007
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: [signature] / [signature] Date: 11-14-07
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-85121206	
2 . Date Sampled	12/12/2006	
3 . Time Sampled	14:48	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	04/19/2007	
2 . Time Sample Counted	16:47	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	7.7	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	3407.6	cpm
Net Spike Count Rate (cpm)	3399.9	cpm
H3 Spike Activity (dpm on count date)	8243.8	dpm
Counter Efficiency	0.4124	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	7.0	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.0	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{\text{(Bkg cpm)}}{\text{(Bkg min.)}} + \frac{\text{(Bkg cpm)}}{\text{(Smpl min.)}}}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}} = 1.12\text{E-}06 \text{ uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency x 2.22E6 uCi/ml x Sample Volume}} < \textbf{MDA}$$

Technician JM / Jmuano

APR 20 2007

Date _____

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-85 121206

Sample Location (Well Number): EFT-85

1. Representative sample collected. Date/Time 12/12/06 / 1448

Sample collected by: J. Slaback / Jay Marc Slaback Date: 02/01/07
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: J. Southward / Jennifer Southward Date: 2/2/07 7/11/07
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: K.J. Lindsey / K. Lindsey Date: 8-8-07
Fermi 2 RP Printed Name Signature

Sample number: EFT-85 121206

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: Chris Hubbard/ [signature] Date: 7-17-07
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: KD Landsey / [signature] Date: 8-8-07
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

DETROIT EDISON FERMI-2 POWER PLANT 17-JUL-2007 09:10:50.50

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EF1 EFT-8S121206

Sample End Time: 12-DEC-2006 14:40:00.00

REMARKS:

PERFORMED BY:

SIGNATURE

REVIEWED BY:

KO Lindsey 8-8-07

SIGNATURE/DATE

Sample ID : CF1 EFT-03121206 Acquisition date : 17-JUL-2007 00:40:54

****

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********
Sample ID Number: CF1 EFT-03121206
Sample collection start date: 12-DEC-2006 14:40:00.00
Sample collection end date : 12-DEC-2006 14:40:00.00
Type of sample :S 1 L Mari. Liquid
Sample quantity : 1.00000E+03 CC
Sample geometry : M2LL Operator: CMH

********** Acquisition Parameters **********
Detector number : DET 4 Acquire date : 17-JUL-2007 00:40:54.00
Preset live time : 0 00:30:00.00 Elapsed live time : 0 00:30:00.00
Elapsed real time : 0 00:30:00.91 Percent dead time : 0.05 %

********** Calibration Parameters **********
Detector number : DET 4 Yearly cal date : 20-JUN-2007 12:16:46.16
Kev/channel : 4.99739E-01 Zero offset: -1.87317E-01
Daily cal date : 17-JUL-2007 00:15:42.31

********** Peak Search Parameters **********
Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********
Energy tolerance : 2.00000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_M211 Efficiencies at : Peak energy
****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	140.57	26	65	1.49	281.66	276	9	1.44E-02	59.4	750% error
2	0	199.44	46	74	0.95	399.47	396	10	2.56E-02	37.6	PA 238
3	0	511.61	177	27	2.15	1024.13	1016	19	9.83E-02	10.4	annihilation
4	0	>550.97	71	10	1.02	1110.89	1114	10	3.96E-02	14.4	HwC
5	0	1461.17	38	13	1.31	2924.24	2917	13	2.11E-02	25.4	K-40

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	140.57	26	65	1.49	281.66	276	9	59.4		
0	199.44	46	74	0.95	399.47	396	10	37.6		
0	511.61	177	27	2.15	1024.13	1016	19	10.4		
0	558.97	71	10	1.02	1118.89	1114	10	14.4		
0	1461.17	30	13	1.31	2924.24	2917	13	25.4		K-40

Sample ID : EF1 EFT-09121306 Acquisition date : 17-JUL-2007 00:40:54

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/CC	Decay Corr uCi/CC	1-Sigma %Error
K-40	1460.81	30	10.67*	2.501E+00	2.130E-07	2.130E-07	25.41

Flag: "*" = Keyline

Sample ID : EF1 EFT-08121206 Acquisition date : 17-JUL-2007 00:40:54

Total number of lines in spectrum	5	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	5	100.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/CC	Decay Corr uCi/CC	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+09Y	1.00	2.13E-07	2.13E-07	0.543E-07	25.41	
	Total Activity :		2.13E-07	2.13E-07			
	Grand Total Activity :		2.13E-07	2.13E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/CC)	1-Sigma %Error	Rejected by
F-18	109.74M	2044.32	511.00*	193.46	1.000E+35	10.41	Decay
	% Abundances		Found =	100.00			
SC-46	83.83D	2.59	142.53	62.70	5.823E-00	59.39	Abun.
			889.25*	99.98	---- Not Found ----		
			1120.51	99.99	---- Not Found ----		
	% Abundances		Found =	23.87			
SE-75	119.78D	1.81	66.05	1.02	---- Not Found ----		Abun.
			96.73	3.41	---- Not Found ----		
			121.12	16.70	---- Not Found ----		
			136.00*	59.20	---- Not Found ----		
			198.60	1.45	2.540E-06	37.64	
			264.65	59.00	---- Not Found ----		
			279.53	25.20	---- Not Found ----		
			303.91	1.32	---- Not Found ----		
			400.65	11.40	---- Not Found ----		
	% Abundances		Found =	0.91			
AS-76	26.32H	197.65	559.10*	44.70	1.000E+35	14.43	Decay,Abun.
			563.23	1.17	---- Not Found ----		
			571.30	0.14	---- Not Found ----		
			657.03	6.10	---- Not Found ----		
			665.31	0.39	---- Not Found ----		
			740.12	0.12	---- Not Found ----		
			771.76	0.12	---- Not Found ----		
			867.63	0.12	---- Not Found ----		
	0		1129.07	0.14	---- Not Found ----		
			1212.72	1.63	---- Not Found ----		
			1216.02	3.04	---- Not Found ----		
			1228.52	1.39	---- Not Found ----		
			1439.13	0.33	---- Not Found ----		
			1453.60	0.13	---- Not Found ----		
			1787.67	0.33	---- Not Found ----		
	% Abundances		Found =	73.70			
MO-99	66.02H	70.00	140.51	3.00	8.412E+16	59.39	Decay,Abun.
			181.06	6.20	---- Not Found ----		
			366.43	1.37	---- Not Found ----		
			739.50*	12.00	---- Not Found ----		
			778.00	4.50	---- Not Found ----		
	% Abundances		Found =	13.25			
TC-99M	6.02H	864.16	140.50*	89.07	1.000E+35	59.39	Decay
	% Abundances		Found =	100.00			
TE-131M	30.00H	173.41	102.06	7.90	---- Not Found ----		Decay,Abun.
			149.72	5.10	---- Not Found ----		
			200.63	7.56	1.000E+35	37.64	
			240.93	7.59	---- Not Found ----		
			334.27	9.60	---- Not Found ----		
			773.67*	38.20	---- Not Found ----		

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/CC)	1-Sigma %Error	Rejected by
TE-131M	30.00M	173.41	702.49	7.79	---- Not Found	----	Decay,Abun.
			793.75	13.90	---- Not Found	----	
			822.78	6.12	---- Not Found	----	
			852.21	20.70	---- Not Found	----	
			1125.46	11.40	---- Not Found	----	
			1206.60	9.80	---- Not Found	----	
		% Abundances Found =		5.19			
TE-134	41.80M	7467.37	79.45	21.00	---- Not Found	----	Decay,Abun.
			180.89	10.00	---- Not Found	----	
			201.24	8.70	1.000E+35	37.64	
			210.47*	21.90	---- Not Found	----	
			277.95	21.30	---- Not Found	----	
			435.06	10.60	---- Not Found	----	
			461.00	10.90	---- Not Found	----	
			464.64	5.10	---- Not Found	----	
			565.99	10.90	---- Not Found	----	
			742.59	14.70	---- Not Found	----	
			767.20	30.00	---- Not Found	----	
		% Abundances Found =		4.60			

Flag: "*" = Keyline

Sample ID : EF1 EFT-0S121206 Acquisition date : 17-JUL-2007 00:40:54

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	140.57	26	65	1.49	281.66	276	9	1.44E-02	59.4	6.41E+00	T
0	199.44	46	74	0.95	399.47	396	10	2.56E-02	37.6	6.59E+00	T
0	511.61	177	27	2.15	1024.13	1016	19	9.83E-02	10.4	4.80E+00	T
0	558.97	71	10	1.02	1118.89	1114	10	3.96E-02	14.4	4.68E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 17-JUL-2007 09:19:02.56

Sample ID : EF1 EFT-08121206

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/CC)
BE-7	29.	477.59	1.3151E-06
F-18	0.	511.00	Half-Life too short
NA-22	10.	1274.54	1.1224E-08
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	9.	889.25	4.6069E-08
CR-51	27.	320.08	1.5669E-05
MN-54	15.	834.83	1.4367E-08
CO-56	11.	1238.25	9.8770E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	0.	158.38	Half-Life too short
CO-57	44.	122.06	1.7002E-08
CO-58	9.	810.76	5.7235E-08
FE-59	13.	1099.22	5.1174E-07
CO-60	11.	1332.49	1.1204E-08
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	12.	1115.52	3.5063E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	39.	136.00	4.4718E-08
AS-76	0.	559.10	Half-Life too short
BR-82	0.	776.49	Half-Life too short
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	52.	513.99	2.6966E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	52.	513.99	1.1406E-07
RB-86	0.	1076.63	Half-Life too short
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	3.	1836.01	3.0748E-08
KR-89	0.	220.98	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	6.	1204.90	3.2451E-05
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Sample ID : EF1 EFT-05121206 Acquisition date : 17-JUL-2007 08:40:54

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/CC)
SR-93	0.	590.20	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	22.	702.63	8.0540E-09
NB-95	6.	765.79	4.0704E-07
NB-95M	0.	235.69	Half-Life too short
ZR-95	14.	756.72	1.4000E-07
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	0.	739.58	Half-Life too short
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	20.	497.08	3.6406E-07
TC-104	0.	357.99	Half-Life too short
RH-105	0.	310.90	Half-Life too short
RU-105	0.	724.50	Half-Life too short
RU-106	15.	621.84	1.0720E-07
CD-109	31.	88.03	4.5538E-07
AG-110M	15.	937.48	5.2143E-08
SN-113	17.	391.69	3.4232E-08
SN-117M	0.	158.56	Half-Life too short
SB-122	0.	563.93	Half-Life too short
SB-124	23.	602.71	1.0268E-07
SB-125	25.	427.89	2.9170E-08
TE-125M	29.	109.28	3.8940E-05
TE-127	0.	417.90	Half-Life too short
TE-127M	32.	57.60	9.7587E-05
XE-127	42.	202.84	6.8384E-07
TE-129	0.	459.68	Half-Life too short
TE-129M	21.	695.88	2.3136E-05
XE-129M	0.	196.56	Half-Life too short
I-130	0.	536.09	Half-Life too short
BA-131	0.	123.80	Half-Life too short
I-131	0.	364.48	Half-Life too short
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	0.	163.93	Half-Life too short
I-132	0.	667.69	Half-Life too short
TE-132	0.	228.16	Half-Life too short
BA-133	33.	302.84	4.2656E-08
BA-133M	0.	276.09	Half-Life too short
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	0.	81.00	Half-Life too short
XE-133M	0.	233.22	Half-Life too short
CS-134	24.	604.70	1.0617E-08
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Sample ID : ET1 EFT-03121206 Acquisition date : 17-JUL-2007 00:49:54

Nuclide	Bckgnd Sum		Energy (keV)	MDA (uCi/CC)
CS-136	0	0.	818.50	Half-Life too short
I-136		0.	1313.02	Half-Life too short
CS-137		11.	661.65	7.4546E-09
XE-137		0.	455.49	Half-Life too short
CS-138		0.	1435.86	Half-Life too short
XE-138		0.	258.31	Half-Life too short
BA-139		0.	1420.50	Half-Life too short
CE-139		34.	165.85	2.4561E-08
CS-139		0.	1283.23	Half-Life too short
BA-140		0.	537.32	Half-Life too short
LA-140		0.	1596.49	Half-Life too short
BA-141		0.	190.22	Half-Life too short
CE-141		46.	145.44	1.6559E-06
LA-141		0.	1354.52	Half-Life too short
BA-142		0.	255.12	Half-Life too short
LA-142		0.	641.17	Half-Life too short
CE-143		0.	293.26	Half-Life too short
CE-144		59.	133.54	1.4369E-07
PR-144		0.	1489.15	Half-Life too short
ND-147		0.	91.10	Half-Life too short
PM-148M		17.	550.27	2.7935E-07
EU-152		37.	344.27	3.1626E-08
EU-154		6.	1004.76	3.9845E-08
EU-156		0.	646.29	Half-Life too short
HF-181		22.	482.03	3.0762E-07
TA-182		9.	1221.42	1.2457E-07
W-187		0.	685.81	Half-Life too short
RE-188		0.	155.03	Half-Life too short
HG-203		35.	279.19	2.3864E-07
BI-207		19.	569.67	7.7689E-09
TL-208		0.	583.14	Half-Life too short
PB-212		0.	238.63	Half-Life too short
BI-214		0.	609.31	Half-Life too short
PB-214		0.	351.92	Half-Life too short
RA-224		0.	240.98	Half-Life too short
RA-226		54.	186.21	2.5236E-07
AC-228		25.	338.32	6.2950E-08
TH-228		28.	84.37	1.3165E-06
PA-234		0.	131.20	Half-Life too short
TH-234		30.	63.29	5.7701E-04
U-235		45.	143.76	7.4502E-08
NP-239		0.	106.13	Half-Life too short
AM-241		24.	59.54	1.5759E-07

EFT-8S

2007

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-85 7507

Sample Location (Well Number): EFT-85

1. Representative sample collected. Date/Time 7/5/07 / 1127

Sample collected by: Jay Marie Slabach / Jay Marie Slabach Date: 12/10/2007
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: J. Southward / J Southward Date: 12/10/07
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: R. Bryan Date: 12-14-07
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: K D LINDSEY / K D Lindsey Date: 12-26-08
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	8S	
2 . Date Sampled	07/05/2007	
3 . Time Sampled	11:27	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	12/14/2007	
2 . Time Sample Counted	08:00	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	8.2	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	3189.3	cpm
Net Spike Count Rate (cpm)	3181.1	cpm
H3 Spike Activity (dpm on count date)	7944.9	dpm
Counter Efficiency	0.4004	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	8.6	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.4	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.1	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{(\text{Bkg cpm})}{(\text{Bkg min.})} + \frac{(\text{Bkg cpm})}{(\text{Smpl min.})}}}{\text{Efficiency} \times 2.22\text{E6 dpm/uCi} \times \text{Sample Volume}} = 1.19\text{E-06 uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency} \times 2.22\text{E6 uCi/ml} \times \text{Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 12-14-07

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-8S7507

Sample Location (Well Number): EFT-8S

1. Representative sample collected. Date/Time 07/05/2007 / 1127

Sample collected by: J. Slaback / Amy Marie Slaback Date: 07/10/2007
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: J. Southward / Jennifer Southward Date: 08/08/07
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: KD LINDSEY / Date: 8-8-07
Fermi 2 RP Printed Name Signature

Sample number: EFT- 857507

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: Chris Hubbard Date: 7-19-07
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: KD LINDSEY Date: 8-8-07
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

DETROIT EDISON FERMI-2 POWER PLANT 19-JUL-2007 09:52:10.72

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EF1 EFT-057507

Sample End Time: 5-JUL-2007 11:27:00.00

REMARKS

PERFORMED BY:

SIGNATURE

REVIEWED BY:

8-8-07

SIGNATURE/DATE

Sample ID : EF1 EFT-857507 Acquisition date : 19-JUL-2007 09:22:07

****

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********
Sample ID Number: EF1 EFT-857507
Sample collection start date: 5-JUL-2007 11:27:00.00
Sample collection end date : 5-JUL-2007 11:27:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.00000E+03 cc
Sample geometry : MELL Operator: CMH

********** Acquisition Parameters **********
Detector number : DET 4 Acquire date : 19-JUL-2007 09:22:07.60
Preset live time : 0 00:30:00.00 Elapsed live time : 0 00:30:00.00
Elapsed real time : 0 00:30:00.92 Percent dead time : 0.05 %

********** Calibration Parameters **********
Detector number : DET 4 Yearly cal date : 20-JUN-2007 12:16:46.16
Kev/channel : 4.99741E-01 Zero offset: -1.77476E-01
Daily cal date : 19-JUL-2007 00:20:24.04

********** Peak Search Parameters **********
Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********
Energy tolerance : 2.00000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_M211 Efficiencies at : Peak energy

****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	65.86	91	51	1.32	132.14	125	14	5.03E-02	19.7	RN-222
2	3	510.73	85	36	2.14	1022.32	1017	20	4.72E-02	18.9	2.25E+00
3	3	512.36	61	34	2.41	1025.60	1017	20	3.41E-02	23.7	annihilation
4	0	558.84	74	26	2.01	1119.60	1111	13	4.09E-02	18.5	HWC
5	0	609.56	24	39	0.95	1220.00	1211	13	1.33E-02	57.4	Bi-214
6	0	1220.99	13	6	1.00	2443.50	2436	11	7.31E-03	44.4	PA-234
7	0	1461.01	62	9	2.90	2923.76	2915	16	3.44E-02	12.7	K-40

Sample Title : EF1 EFT-0S7507 Page : 1
Decay Time = 13 21:53:07.60 Acquisition Time = 19-JUL-2007 09:22:07.6
0

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	65.06	91	51	1.32	132.14	125	14	19.7		
3	510.73	85	36	2.14	1022.32	1017	20	10.9	2.25E+00	
3	512.36	61	34	2.41	1025.60	1017	20	29.7		SR-85
										KR-85
0	550.04	74	26	2.01	1110.60	1111	13	10.5		
0	609.56	24	39	0.85	1220.00	1211	13	57.4		
0	1220.99	13	6	1.00	2443.50	2436	11	44.4		
0	1461.01	62	0	2.00	2923.76	2915	16	12.7		K-40

Sample ID : EF1 EFT-057507 Acquisition date : 10-JUL-2007 09:22:07

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	62	10.67*	2.501E+00	3.408E-07	3.405E-07	12.70

Nuclide Type: fission gas

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
KR-85	513.99	61	0.43*	4.074E+00	4.395E-06	4.406E-06	29.74

Nuclide Type: activation

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
SR-85	513.99	61	99.27*	4.074E+00	1.904E-08	2.209E-08	29.74

Flag: "*" = Keyline

Sample ID : EF1 EFT-007507 Acquisition date : 19-JUL-2007 09:22:07

Total number of lines in spectrum	7	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	7	100.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+09Y	1.00	3.488E-07	3.498E-07	0.443E-07	12.70	
	Total Activity :		3.488E-07	3.488E-07			

Nuclide Type : fission gas

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
KR-85	10.72Y	1.00	4.395E-06	4.406E-06	1.310E-06	29.74	
	Total Activity :		4.395E-06	4.406E-06			

Nuclide Type : activation

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
SR-85	64.84D	1.16	1.904E-00	2.209E-00	0.657E-00	29.74	
	Total Activity :		1.904E-00	2.209E-00			
	Grand Total Activity :		4.763E-06	4.777E-06			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EF1 EFT-837507 Acquisition date : 19-JUL-2007 09:22:07

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	102.71	511.00*	193.46	1.000E+35	18.09	Decay
		% Abundances Found =		100.00			
SE-75	119.78D	0.12	66.05	1.02	1.060E-05	19.74	Abun.
			96.73	3.41	---- Not Found ----		
			121.12	16.70	---- Not Found ----		
			136.00*	59.20	---- Not Found ----		
			198.60	1.45	---- Not Found ----		
			264.65	59.00	---- Not Found ----		
			279.53	25.20	---- Not Found ----		
			303.91	1.32	---- Not Found ----		
			400.65	11.40	---- Not Found ----		
		% Abundances Found =		0.57			
AS-76	26.32H	12.70	559.10*	44.70	3.503E-04	18.46	Decay,Abun.
			563.23	1.17	---- Not Found ----		
			571.30	0.14	---- Not Found ----		
			657.03	6.10	---- Not Found ----		
			665.31	0.39	---- Not Found ----		
			740.12	0.12	---- Not Found ----		
			771.76	0.12	---- Not Found ----		
			867.63	0.12	---- Not Found ----		
			1129.87	0.14	---- Not Found ----		
			1212.72	1.63	---- Not Found ----		
			1216.02	3.04	---- Not Found ----		
			1220.52	1.39	---- Not Found ----		
			1439.13	0.33	---- Not Found ----		
			1453.60	0.13	---- Not Found ----		
			1707.67	0.33	---- Not Found ----		
		% Abundances Found =		73.70			
RU-103	39.35D	0.35	497.08*	89.00	---- Not Found ----		Abun.
			610.33	5.60	1.020E-07	57.40	
		% Abundances Found =		5.92			
XE-135	9.11H	36.60	249.79*	89.90	---- Not Found ----		Decay,Abun.
			608.19	2.89	3.041E+04	57.40	
		% Abundances Found =		3.11			
CS-136	13.16D	1.06	66.91	12.50	1.675E-06	19.74	Abun.
			86.29	6.39	---- Not Found ----		
			153.22	7.46	---- Not Found ----		
			163.89	4.61	---- Not Found ----		
			176.55	13.56	---- Not Found ----		
			273.65	12.66	---- Not Found ----		
			340.57	49.50	---- Not Found ----		
			818.50*	99.70	---- Not Found ----		
			1048.07	79.60	---- Not Found ----		
			1235.34	19.70	---- Not Found ----		
		% Abundances Found =		4.10			
PM-148M	41.30D	0.34	288.11	12.56	---- Not Found ----		Abun.

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
PM-148M	41.30D	0.34	414.07	18.66	---- Not Found ----		Abun.
			432.70	5.35	---- Not Found ----		
			501.26	6.75	---- Not Found ----		
			550.27*	94.90	---- Not Found ----		
			599.74	12.54	---- Not Found ----		
			611.26	5.40	1.839E-07	57.40	
			629.97	89.00	---- Not Found ----		
			725.70	32.00	---- Not Found ----		
			915.33	17.17	---- Not Found ----		
			1013.01	20.30	---- Not Found ----		
		% Abundances Found =		1.74			
TA-182	114.74D	0.12	67.75	42.30	2.586E-07	19.74	Abun.
			100.10	14.10	---- Not Found ----		
			1189.05	16.30	---- Not Found ----		
			1221.42*	27.10	2.066E-08	44.40	
			1230.97	11.50	---- Not Found ----		
		% Abundances Found =		62.35			
BI-214	19.90M	1007.54	609.31*	46.30	1.000E+35	57.40	Decay
			768.36	5.04	---- Not Found ----		
			934.06	3.21	---- Not Found ----		
			1120.29	15.10	---- Not Found ----		
			1238.11	5.94	---- Not Found ----		
			1377.67	4.11	---- Not Found ----		
			1764.49	15.00	---- Not Found ----		
		% Abundances Found =		48.48	(Abn. Limit = 48.48%)		

Flag: "*" = Keyline

Sample ID : EF1 EFT-937507 Acquisition date : 19-JUL-2007 09:22:07

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	65.06	91	51	1.32	132.14	125	14	5.00E-02	19.7	1.37E+00	T
3	510.73	85	36	2.14	1022.32	1017	20	4.72E-02	10.9	4.99E+00	T
0	550.84	74	26	2.01	1110.60	1111	13	4.09E-02	10.5	4.60E+00	T
0	609.56	24	39	0.85	1220.00	1211	13	1.33E-02	57.4	4.52E+00	T
0	1220.99	13	6	1.00	2443.50	2436	11	7.31E-03	44.4	2.77E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 19-JUL-2007 09:52:14.72

Sample ID : EF1 EFT-0S7507

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	17.	477.59	7.5482E-08
F-18	0.	511.00	Half-Life too short
NA-22	12.	1274.54	1.0725E-08
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	11.	889.25	9.1442E-09
CR-51	34.	320.08	1.0917E-07
MN-54	13.	834.83	8.6279E-09
CO-56	11.	1238.25	1.6699E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	45.	158.38	3.7645E-08
CO-57	45.	122.06	1.0676E-08
CO-58	12.	810.76	9.0263E-09
FE-59	11.	1099.22	2.0392E-08
CO-60	9.	1332.49	9.3730E-09
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	6.	1115.52	1.4561E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	47.	136.00	1.5162E-08
AS-76	0.	559.10	Half-Life too short
BR-82	12.	776.49	6.3870E-06
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85M	0.	151.18	Half-Life too short
RB-86	10.	1076.63	1.7202E-07
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	4.	1836.01	9.3685E-09
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	7.	1204.90	3.0819E-06
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short
SR-93	0.	590.28	Half-Life too short

Sample ID : EF1 EFT-8S7507 Acquisition date : 19-JUL-2007 09:22:07

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
ND-94	13.	702.63	7.0771E-09
NB-95	14.	765.79	1.0579E-08
NB-95M	39.	235.69	4.3737E-07
ZR-95	11.	756.72	1.4907E-08
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	15.	739.50	2.0901E-06
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	17.	497.08	9.4849E-09
TC-104	0.	357.99	Half-Life too short
RH-105	33.	318.90	2.7073E-05
RU-105	0.	724.50	Half-Life too short
RU-106	15.	621.84	7.2675E-08
CD-109	39.	88.03	3.7023E-07
AG-110M	3.	937.48	1.6008E-08
SN-113	27.	391.69	1.2235E-08
SN-117M	45.	158.56	1.7933E-08
SB-122	14.	563.93	3.2015E-07
SB-124	21.	602.71	9.4474E-09
SB-125	22.	427.89	2.4134E-08
TE-125M	33.	109.28	3.6259E-06
TE-127	0.	417.90	Half-Life too short
TE-127M	30.	57.60	2.6178E-05
XE-127	44.	202.84	1.4681E-08
TE-129	0.	459.60	Half-Life too short
TE-129M	16.	695.98	3.1079E-07
XE-129M	51.	196.56	5.0780E-07
I-130	0.	536.09	Half-Life too short
BA-131	37.	123.80	6.1727E-08
I-131	27.	364.48	2.9287E-08
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	46.	163.93	8.0501E-07
I-132	0.	667.69	Half-Life too short
TE-132	40.	228.16	1.6652E-07
BA-133	27.	302.84	3.7600E-08
BA-133M	37.	276.09	1.6009E-05
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	22.	81.00	2.1965E-07
XE-133M	40.	233.22	6.0311E-06
CS-134	24.	604.70	8.6076E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short
CS-136	15.	818.50	1.8100E-08
I-136	0.	1313.02	Half-Life too short

Sample ID : EF1 EFT-887507 Acquisition date : 19-JUL-2007 09:22:07

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-137	18.	661.65	9.0125E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	46.	165.85	1.0222E-08
CS-139	0.	1283.23	Half-Life too short
BA-140	12.	537.32	5.0119E-08
LA-140	5.	1596.49	2.8426E-06
BA-141	0.	190.22	Half-Life too short
CE-141	45.	145.44	2.1788E-08
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	0.	293.26	Half-Life too short
CE-144	46.	133.54	7.9468E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	44.	91.10	1.1465E-07
PM-148M	17.	550.27	9.3743E-09
EU-152	31.	344.27	2.8369E-08
EU-154	11.	1004.76	4.9192E-08
EU-156	14.	646.29	1.0066E-07
HF-181	25.	482.03	1.1716E-08
TA-182	19.	1221.42	5.0321E-08
W-187	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
HG-203	48.	279.19	1.3467E-08
BI-207	21.	569.67	7.9956E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.62	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PO-214	0.	351.92	Half-Life too short
RA-224	50.	240.98	3.0765E-06
RA-226	42.	186.21	2.2511E-07
AC-228	37.	338.32	7.1275E-08
TH-228	32.	84.37	1.1344E-06
PA-234	0.	131.20	Half-Life too short
TH-234	42.	63.29	1.7754E-06
U-235	51.	143.76	7.9513E-08
NP-239	44.	106.13	8.7210E-06
AM-241	31.	59.54	1.7415E-07

EFT-8S

2008

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-85 4/16 08

Sample Location (Well Number): EFT-85

1. Representative sample collected. Date/Time 4/16/08 / 1115

Sample collected by: Joy Marie Slaback / Joy Marie Slaback Date: 04/21/2008
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: J. Southward / J Southward Date: 4/21/08
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: Russ Bengert / [signature] Date: 4-22-8
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: KD Linosey / KD Linosey Date: 4.24.08
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-8S41608	
2 . Date Sampled	04/16/2008	
3 . Time Sampled	11:15	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	04/22/2008	
2 . Time Sample Counted	12:00	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	7.8	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	3023.2	cpm
Net Spike Count Rate (cpm)	3015.4	cpm
H3 Spike Activity (dpm on count date)	7787.0	dpm
Counter Efficiency	0.3872	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	9.7	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	1.9	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{\text{(Bkg cpm)}}{\text{(Bkg min.)}} + \frac{\text{(Bkg cpm)}}{\text{(Smpl min.)}}}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}} = 1.20\text{E-}06 \text{ uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency x 2.22E6 uCi/ml x Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 4-22-08

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319:02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-85 4/16 08

Sample Location (Well Number): EFT-85

1. Representative sample collected. Date/Time 4/16/08 / 1115

Sample collected by: Jay Marie Slaback / Jay Marie Slaback Date: 04/21/2008
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: J. Southward / J Southward Date: 4/21/08
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: J. Southward / J Southward Date: 4/22/08
Fermi 2 RP Printed Name Signature

Sample number: EFT-85411608

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
. (Note disposition of unidentified peaks in "Remarks")

Performed by: J. Southward / J. Southward Date: 4/22/08
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: R.J. LINDSEY / R. Lindsey Date: 4-24-08
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: CP1 06-1202

Sample End Time: 15-APR-2008 11:15:00.00

REMARKS

PERFORMED BY:

SIGNATURE

REVIEWED BY:

SIGNATURE/DATE 4-24-08

PAGE ___ of ___

Sample ID : EFT-00-1600 Acquisition date : 22-APR-2000 14:30:45

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********
Sample ID Number: EFT-00-1600
Sample collection start date: 16-APR-2000 11:15:00.00
Sample collection end date : 16-APR-2000 11:15:00.00
Type of sample : 1 L Mari.Liquid
Sample quantity : 1.000000E+03 cc
Sample geometry : MELL Operator: JHZ

********** Acquisition Parameters **********
Detector number : DET 4 Acquire date : 22-APR-2000 14:30:45.14
Preset live time : 0 00:30:00.00 Elapsed live time : 0 00:30:00.00
Elapsed real time : 0 00:30:00.96 Percent dead time : 2.05 %

********** Calibration Parameters **********
Detector number : DET 4 Yearly cal date : 20-JUN-2000 12:16:46.16
KeV/Channel : 5.001395E-01 Zero offset: -1.478035E-01
Daily cal date : 22-APR-2000 00:30:00.32

********** Peak Search Parameters **********
Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********
Energy tolerance : 5.00000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : decmaster.nlb
Efficiency file : EFFD4_m211: Efficiencies at : Peak energy

Pk	Id	Energy	Q	Area	Bkgnd	FWHM	Channel	Left	Rw	Cts/Sec	MDA	Flg
1	0	65.99		39	66	1.08	134.22	126	11	2.15E-02	10.7	
2	0	352.96		48	35	1.02	705.71	703	9	2.30E-02	33.6	
3	0	511.17		147	74	1.95	1022.03	1013	20	8.19E-02	16.2	
4	0	559.12		58	56	2.31	1118.09	1110	19	3.25E-02	32.3	
5	0	777.99		14	12	2.81	1559.54	1554	12	7.78E-03	56.2	

Sample Title : CF1-8C11L3B

Date, Time : 6-03-[illegible]

Acquisition Time : 22 hrs 0 mins 1 [illegible]

Page 1

Full MCB Peak Search Report

Id	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	66.99	39	66	1.93	131.22	122	11	43.7		Ra-226
6	352.06	40	25	1.82	705.94	703	9	22.6		Pb-214
9	511.17	147	74	1.95	1022.33	1013	20	11.2		Annih.
8	609.12	53	56	2.31	1119.09	1110	18	32.3		Bi-214
5	772.99	11	12	2.91	1559.64	1554	12	2[illegible]		High error

Flags "90" - Keylines

Summary of Nuclide Activity
Sample ID : LF7 0711660

Page : 2
Acquisition date : 20-APR-2000 14:09:15

Total number of lines in spectrum	5	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	5	100.00%

**** There are no nuclides meeting summary criteria ****

Flags: "K" = Keyline not found
"E" = Manually edited
"M" = Manually accepted
"A" = Nuclide specific abs. limit

Sample ID : CIT 0941500 Acquisition date : 22 SEP 2006 14:59:45

Nuclide	Half-life	Half-Life Ratio	Energy	Nbund	Activity (uCi/gm)	1-Sigma %Error	Rejected by
F-18	109.77M	80.92	511.00*	193.46	5.343E-15	16.21	Decay
	% Abundances Found =			100.00			
SE-75	119.78D	0.85	66.05	1.02	3.900E-06	43.68	Abun.
			96.73	3.41	Not Found		
			121.12	16.79	Not Found		
			136.00*	59.20	Not Found		
			198.60	1.45	Not Found		
			264.65	59.60	Not Found		
			279.52	25.20	Not Found		
			303.91	1.32	Not Found		
			400.65	11.40	Not Found		
	% Abundances Found =			0.57			
SR-76	26.32H	5.63	509.10*	44.70	1.063E-05	36.34	Abun.
			563.23	1.17	Not Found		
			571.30	0.14	Not Found		
			657.03	6.10	Not Found		
			665.31	0.39	Not Found		
			748.12	8.12	Not Found		
			771.76	0.12	Not Found		
			867.63	0.12	Not Found		
			1129.07	0.14	Not Found		
			1212.72	1.03	Not Found		
			1216.02	3.84	Not Found		
			1220.52	1.39	Not Found		
			1409.13	0.33	Not Found		
			1152.60	0.13	Not Found		
			1707.67	0.33	Not Found		
	% Abundances Found =			73.70			
Y-92	3.54H	41.81	448.50	2.30	Not Found		Decay,Abun.
			561.10	2.40	3.001E+06	72.34	
			841.30	1.25	Not Found		
			934.46*	13.90	Not Found		
			1405.40	1.30	Not Found		
	% Abundances Found =			9.74			
MO-99	66.02H	2.24	140.51	3.00	Not Found		Abun.
			181.06	6.20	Not Found		
			366.43	1.37	Not Found		
			739.50*	12.00	Not Found		
			778.00	4.50	5.941E-07	56.24	
	% Abundances Found =			15.70			
CD-136	14.10D	0.47	66.91	13.50	4.307E-07	13.69	Abun.
			96.20	6.50	Not Found		
			153.22	7.46	Not Found		
			163.65	4.51	Not Found		
			175.58	13.56	Not Found		
			273.65	12.66	Not Found		
			340.57	48.50	Not Found		

Nuclide	Half Life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected By
CS-136	13.16D	0.47	818.50*	99.70	----- Not Found	---	Abun.
			1048.07	79.60	-- Not Found		
			1235.34	19.70	--- Not Found	----	
		% Abundances Found =		1.10			
EU-152	13.00Y	0.00	121.78	28.40	- Not Found	----	Abun.
			244.69	7.49	---- Not Found	-	
	0		344.27*	26.50	---- Not Found	----	
			778.89	12.71	4.441E-08	56.24	
			867.38	4.16	----- Not Found	----	
			964.01	14.40	----- Not Found	----	
			1085.78	10.00	------ Not Found	-----	
			1112.02	13.30	---- Not Found	----	
			1407.95	20.70	---- Not Found	----	
		% Abundances Found =		9.25			
TB-160	114.74D	0.05	67.75	42.30	9.613E-08	42.60	Abun.
			100.10	14.10	--- Not Found	--	
			1100.95	16.30	----- Not Found	-----	
			1221.42*	27.10	----- Not Found	----	
			1230.97	11.50	----- Not Found	---	
		% Abundances Found =		38.01			
PB-214	26.80M	331.32	87.30	4.37	---- Not Found	---	Decay
			241.98	7.49	----- Not Found	---	
			295.21	19.20	------ Not Found	------	
			351.92*	37.20	1.080E-05	3y.56	
			785.91	1.10	--- Not Found	------	
		% Abundances Found =		69.46	(Abn. Limit =	37.26%)	

Flags "*" = Keyline

Sample ID : CRT 0231C09 Acquisition date : 22-APR-2020 14:55:45

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Rw	Cts/Sec	%Err	%Eff	Flags
0	66.90	39	66	1.00	134.02	132	11	2.15E-02	43.7	1.49E+09	T
0	352.96	48	35	1.02	705.94	703	9	2.20E-02	33.6	5.29E+00	T
0	511.17	147	74	1.05	1022.33	1013	20	5.15E-02	16.5	4.05E+06	T
0	609.11	58	56	1.01	1110.09	1110	10	3.25E-02	26.2	4.69E+08	T
0	779.97	14	12	0.81	1559.64	1554	12	7.70E-03	54.2	3.72E+09	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 23-APR-2003 15:29:02.03

Sample ID = LTY-CL41SW0

Minimum Detectable Activity Report

Nuclide	Bckgnd Cnt		Energy (keV)	MDA (uCi/cc)
BE-7	21.		477.59	7.5221E-08
F-18	0.		511.00	Half-Life too short
NA-22	2.		1274.54	7.5504E-09
NA-24	13.		1368.53	1.0658E-08
MG-27	0.		1014.44	Half-Life too short
CL-38	0.		1642.42	Half-Life too short
K-40	49.		1460.81	1.9740E-07
AR-41	0.		1293.64	Half-Life too short
SC-46	14.		889.25	9.6048E-09
CR-51	29.		320.08	8.3370E-08
MN-54	14.		834.83	8.7953E-09
CO-58	7.		1838.25	1.3016E-08
MN-56	0.		1810.69	Half-Life too short
NI-56	42.		158.38	1.5110E-08
CO-57	41.		122.06	1.0047E-08
CO-60	16.		810.76	9.6311E-09
FE-59	20.		1099.22	2.3329E-08
CO-58	5.		1332.49	9.5269E-09
CU-64	0.		1345.90	Half-Life too short
NI-65	0.	@	1481.84	Half-Life too short
ZN-65	11.		1115.52	1.8532E-08
ZN-69M	0.		438.63	Half-Life too short
SE-75	51.		136.00	1.5010E-08
NB-76	83.		559.10	1.5963E-08
BR-82	13.	@	772.49	1.7101E-07
BR-83	0.		529.84	Half-Life too short
BR-84	0.		881.58	Half-Life too short
BR-85	0.		802.41	Half-Life too short
KR-85	43.		513.99	2.3726E-08
KR-85M	0.		151.10	Half-Life too short
SR-85	43.		513.99	1.0365E-08
RB-86	11.		1076.63	1.3217E-07
KR-87	0.		402.58	Half-Life too short
SR-87M	0.		388.49	Half-Life too short
KR-88	0.		196.30	Half-Life too short
RB-88	0.		1382.39	Half-Life too short
Y-88	2.		1836.01	6.0039E-09
SR-89	0.		909.99	Half-Life too short
RB-89	0.		1031.88	Half-Life too short
KR-90	0.		1110.69	Half-Life too short
SR-90	0.		501.69	Half-Life too short
RB-90M	0.		834.82	Half-Life too short
Y-90M	0.		202.51	Half-Life too short
SR-91	0.		1024.30	Half-Life too short
Y-91	12.		1204.90	3.6590E-08
Y-91M	0.		555.60	Half-Life too short
SR-92	0.		1383.94	Half-Life too short

Nuclide	Background Sum	Energy (keV)		MDA (uCi/cc)
Y-92	0.	934.46		Half-Life too short
SR-93	0.	690.20		Half-Life too short
Y-93	0.	266.90		Half-Life too short
NB-94	21.	702.63		9.707-E 05
MO-95	19.	765.79		1.0223E-08
NB-95M	11.	235.69		1.001-E-07
ZR-95	7.	756.72	S	1.1651E-08
NB-97	0.	657.90		Half-Life too short
ZR-97	15.	743.36		2.5195E-06
MO-99	7.	739.50		2.0701E-07
TC-99M	0.	140.50		Half-Life too short
TC-101	0.	306.81		Half-Life too short
RU-103	10.	497.08		8.1716E-09
TC-104	0.	357.99		Half Life too short
RH-105	29.	318.98		6.6226E-07
RU-105	0.	724.58		Half-Life too short
RU-106	18.	621.84		7.8230E-08
CD 109	30.	88.03		3.2671E-07
AG-110M	10.	937.48		1.1748E-08
CD 115	10.	941.69		9.7963E-09
SN-117M	48.	158.56		1.1693E-08
SB-122	20.	563.93		6.2856E-06
SB-124	23.	602.71		9.8501E-09
SB-125	19.	427.89		2.2233E-08
TE-125M	43.	180.20		3.7398E-06
TE-127	0.	417.98		Half Life too short
TE 127M	38.	57.58		2.4893E-05
XE 127	43.	202.84		1.2558E-06
TE-129	0.	459.60		Half-Life too short
TE-129M	22.	695.38		3.0201E-07
XE 129M	38.	196.56		2.4213E-07
I-130	0.	536.09		Half-Life too short
SN 131	44.	123.80		4.2744E-08
I-131	26.	364.49		1.1776E-08
TE-131	0.	149.72		Half-Life too short
TE-131M	10.	773.67		5.4778E-07
XE-131M	56.	163.93		6.1404E-07
I-132	0.	667.69		Half-Life too short
TE-132	33.	228.16		2.9376E-08
SN 132	27.	382.84		3.7905E-08
SB-133M	46.	276.09		6.4244E-07
I-133	28.	529.87		1.1716E-06
TE 133M	0.	912.50		Half-Life too short
XE 133	26.	81.00		6.5731E-08
XE-133M	33.	233.22		4.7479E-07
CS-134	23.	604.70		8.4566E-09
I-134	3.	884.09		Half-Life too short
TE-134	0.	210.47		Half-Life too short
BA-135M	45.	268.24		1.0305E-06
I 135	0.	1260.41		Half-Life too short
XE-135	0.	249.79		Half-Life too short

Nuclide	Delgnd Sum	Energy (keV)	MDA (uCi/cc)
XE-135M	0.	526.56	Half-Life too short
CS-136	11.	818.50	1.0701E-08
I-130	0.	1313.02	Half-Life too short
CS-137	9.	661.65	6.6022E-09
XE-137	< 0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1438.28	Half-Life too short
CE-139	41.	165.85	9.2892E-09
CS-139	0.	1203.87	Half-Life too short
BA-140	21.	537.32	4.2429E-08
LA-140	3.	1596.72	8.0446E-09
BA-141	0.	190.22	Half-Life too short
CE-141	58.	145.44	1.9308E-08
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	48.	293.26	4.2319E-07
CE-144	42.	133.54	7.4555E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	30.	91.10	6.5621E-08
PM-148M	11.	550.27	6.6150E-09
EU-152	20.	344.27	2.7092E-08
EU-154	7.	1004.70	4.1908E-08
EU-156	18.	646.20	1.4304E-07
HF-181	16.	482.03	8.5772E-09
TA-182	2.	1221.42	6.7534E-08
W-187	13.	685.81	1.7627E-06
RE-188	41.	155.03	2.0553E-05
MO-20.5	41.	279.10	1.1210E-08
BI-207	20.	569.67	7.6909E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half Life too short
BI-214	0.	609.31	Half-Life too short
PO-214	0.	351.92	Half Life too short
RN-221	36.	218.03	6.2536E-07
RA-223	33.	186.21	2.0284E-07
AC-228	28.	338.32	6.0825E-08
TH-229	35.	84.37	1.1866E-06
PA-231	5.	131.20	Half-Life too short
TH-234	39.	63.29	1.3734E-06
U-235	42.	143.76	7.7511E-08
NP-239	35.	106.13	2.5054E-07
AM-241	20.	59.54	1.4445E-07

EFT-8S

2009

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-8S 031609

Sample Location (Well Number): EFT-8S

1. Representative sample collected. Date/Time 3-16-09 / 8:25

Sample collected by: Chris Ellison / [signature] Date: 3-16-09
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Prattin / [signature] Date: 4-17-09
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: D. Howard / [signature] Date: 4.22.09
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: Russ Bywater / [signature] Date: 4-22-09
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-8S031609	
2 . Date Sampled	03/16/2009	
3 . Time Sampled	08:25	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	04/21/2009	
2 . Time Sample Counted	11:10	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	7.5	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	2991.0	cpm
Net Spike Count Rate (cpm)	2983.5	cpm
H3 Spike Activity (dpm on count date)	7361.1	dpm
Counter Efficiency	0.4053	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	8.6	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	1.1	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{\text{(Bkg cpm)}}{\text{(Bkg min.)}} + \frac{\text{(Bkg cpm)}}{\text{(Smpl min.)}}}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}} = 1.12\text{E-}06 \text{ uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency x 2.22E6 uCi/ml x Sample Volume}} < \textbf{MDA}$$

Technician [signature] Date 4.21.09

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-8S031609

Sample Location (Well Number): EFT-8S

1. Representative sample collected. Date/Time 3-16-09 / 8:25

Sample collected by: Chris Ellison / [signature] Date: 3-16-09
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: [illegible] / [signature] Date: 4-17-09
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: Southward / Southward Date: 4/20/09
Fermi 2 RP Printed Name Signature

Sample number: EFT-83031609

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: Southward / Southward Date: 4/20/09
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: K D LINDSEY K D Lindsey Date: 4-27-09
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EFT-0S031609

Sample End Time: 16-MAR-2009 00:25:00.00

REMARKS K-40

PERFORMED BY:

SIGNATURE

REVIEWED BY:

SIGNATURE/DATE 4-22-09

Sample ID : EFT-8S031609 Acquisition date : 21-APR-2009 09:22:24

****

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********

Sample ID Number: EFT-8S031609
Sample collection start date: 16-MAR-2009 08:25:00.00
Sample collection end date : 16-MAR-2009 08:25:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.00000E+03 cc
Sample geometry : M2LL Operator: JNS

********** Acquisition Parameters **********

Detector number : DET 4 Acquire date : 21-APR-2009 09:22:24.55
Preset live time : 0 00:30:00.00 Elapsed live time : 0 00:30:00.00
Elapsed real time : 0 00:30:00.06 Percent dead time : 0.05 %

********** Calibration Parameters **********

Detector number : DET 4 Yearly cal date : 20-JUN-2008 12:00:00.00
Kev/channel : 4.99882E-01 Zero offset: 7.45979E-02
Daily cal date : 21-APR-2009 06:54:02.66

********** Peak Search Parameters **********

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********

Energy tolerance : 2.00000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	511.19	95	39	0.86	1022.46	1016	14	5.25E-02	17.3	
2	0	1119.29	21	0	0.68	2238.90	2231	14	1.17E-02	21.8	
3	0	1460.75	47	3	2.14	2921.95	2915	13	2.59E-02	16.7	

Sample Title : EFT-0S031609 Page : 1
Decay Time = 36 00:57:24.55 Acquisition Time = 21-APR-2009 09:22:24.5
5

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	511.19	95	39	0.06	1022.46	1016	14	17.3		Anni
0	1119.29	21	0	0.60	2238.90	2231	14	21.8		Bi-214
0	1460.75	47	3	2.14	2921.95	2915	13	16.7		K-40

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	47	10.67*	2.501E+00	2.624E-07	2.624E-07	16.68

Flag: "*" = Keyline

Sample ID : EFT-93031609 Acquisition date : 21-APR-2009 09:22:24

Total number of lines in spectrum	3	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	3	100.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	2.624E-07	2.624E-07	0.438E-07	16.68	
Total Activity :			2.624E-07	2.624E-07			
Grand Total Activity :			2.624E-07	2.624E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EFT-00031609 Acquisition date : 21-APR-2009 09:22:24

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	473.05	511.00*	193.46	1.000E+35	17.34	Decay
		% Abundances	Found =	100.00			
SC-46	83.83D	0.43	142.53	68.70	----- Not Found -----		Abun.
			889.25*	99.98	----- Not Found -----		
			1120.51	99.99	1.464E-08	21.82	
		% Abundances	Found =	38.07			
KR-90	32.32S	96372.06	121.82	32.00	----- Not Found -----		Decay,Abun.
			539.49	29.00	----- Not Found -----		
			1118.69*	37.00	1.000E+35	21.82	
		% Abundances	Found =	37.76			
BI-214	19.90M	2600.66	609.31*	46.30	----- Not Found -----		Decay,Abun.
			768.36	5.04	----- Not Found -----		
			934.06	3.21	----- Not Found -----		
			1120.29	15.10	1.000E+35	21.82	
			1230.11	5.94	----- Not Found -----		
			1377.67	4.11	----- Not Found -----		
			1764.49	15.80	----- Not Found -----		
		% Abundances	Found =	15.81	(Abn. Limit = 40.48%)		

Flag: "*" = Keyline

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	511.19	95	39	0.86	1022.46	1016	14	5.25E-02	17.3	4.88E+00	T
0	1119.29	21	0	0.68	2238.90	2231	14	1.17E-02	21.8	2.90E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 21-APR-2009 09:52:30.37

Sample ID : EFT-08031609

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	16.	477.59	9.7586E-08
F-18	0.	511.00	Half-Life too short
NA-22	7.	1274.54	8.4483E-09
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	6.	889.25	8.4262E-09
CR-51	30.	320.08	1.7905E-07
MN-54	13.	834.83	8.9640E-09
CO-56	13.	1238.25	2.2108E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	38.	158.38	4.3153E-07
CO-57	37.	122.06	1.0319E-08
CO-58	6.	810.76	8.6851E-09
FE-59	7.	1099.22	2.3840E-08
CO-60	9.	1332.49	9.6307E-09
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	7.	1115.52	1.7370E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	35.	136.00	1.5085E-08
AS-76	0.	559.10	Half-Life too short
BR-82	0.	776.49	Half-Life too short
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	42.	513.99	2.3829E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	42.	513.99	1.5078E-08
RB-86	0.	1076.63	3.4920E-07
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	7.	1836.01	1.3192E-08
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	12.	1204.90	5.1851E-06
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Sample ID : EFT-SS031609 Acquisition date : 21-APR-2009 09:22:24

Nuclide	Bckgnd Sum	Energy (keV)		MDA (uCi/cc)
SR-93	0.	590.20		Half-Life too short
Y-93	0.	266.90		Half-Life too short
NB-94	17.	702.63		7.9511E-09
NB-95	14.	765.79		1.6326E-08
NB-95M	26.	235.69		2.5600E-05
ZR-95	12.	756.72		1.9916E-08
NB-97	0.	657.90		Half-Life too short
ZR-97	0.	743.36		Half-Life too short
MO-99	0.	739.50		Half-Life too short
TC-99M	0.	140.50		Half-Life too short
TC-101	0.	306.81		Half-Life too short
RU-103	15.	497.08		1.3290E-08
TC-104	0.	357.99		Half-Life too short
RH-105	0.	318.90		Half-Life too short
RU-105?	0.	724.50		Half-Life too short
RU-106	11.	621.84		6.5271E-08
CD-109	36.	88.03		3.6999E-07
AG-110M	10.	937.48		2.6622E-08
SN-113	20.	391.69		1.2197E-08
SN-117M	38.	158.56		5.1533E-08
SB-122	0.	563.93		Half-Life too short
SB-124	22.	602.71		1.2605E-08
SB-125	12.	427.89		1.0502E-08
TE-125M	41.	109.28		5.2565E-06
TE-127	0.	417.90		Half-Life too short
TE-127M	30.	57.60		3.0095E-05
XE-127	33.	202.84		1.9494E-08
TE-129	0.	459.60		Half-Life too short
TE-129M	15.	695.88		4.7462E-07
XE-129M	44.	196.56		2.6700E-06
I-130	0.	536.09		Half-Life too short
BA-131	39.	123.80		2.3316E-07
I-131	29.	364.48		2.0297E-07
TE-131	0.	149.72		Half-Life too short
TE-131M	0.	773.67		Half-Life too short
XE-131M	45.	163.93		3.2063E-06
I-132	0.	667.69		Half-Life too short
TE-132	0.	228.16		Half-Life too short
BA-133	31.	302.84		4.0452E-08
BA-133M	0.	276.09		Half-Life too short
I-133	0.	529.87		Half-Life too short
TE-133M	0.	912.58		Half-Life too short
XE-133	34.	81.00		4.9090E-06
XE-133M	0.	233.22		Half-Life too short
CS-134	23.	604.70		8.8290E-09
I-134	0.	884.09		Half-Life too short
TE-134	0.	210.47		Half-Life too short
BA-135M	0.	268.24		Half-Life too short
I-135	0.	1260.41	0	Half-Life too short
XE-135	0.	249.79		Half-Life too short
XE-135M	0.	526.56		Half-Life too short

Sample ID : EFT-0S031609 Acquisition date : 21-APR-2009 09:22:24

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-136	11.	818.50	5.0965E-08
I-136	0.	1313.02	Half-Life too short
CS-137	15.	661.65	0 8.3972E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	39.	165.85	1.0538E-08
CS-139	0.	1203.23	Half-Life too short
BA-140	17.	537.32	1.9483E-07
LA-140	0.	1596.49	Half-Life too short
BA-141	0.	190.22	Half-Life too short
CE-141	41.	145.44	3.3486E-08
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	0.	293.26	Half-Life too short
CE-144	43.	133.54	8.0541E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	33.	91.10	4.0522E-07
PM-148M	12.	550.27	1.1363E-08
EU-152	27.	344.27	2.6759E-08
EU-154	3.	1004.76	3.0810E-08
EU-155	31.	105.31	4.3157E-08
EU-156	10.	646.29	4.3100E-07
HF-181	23.	482.03	1.6244E-08
TA-182	12.	1221.42	4.6885E-08
W-187	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
HG-203	33.	279.19	1.5830E-08
BI-207	17.	569.67	7.3370E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	26.	240.98	1.5705E-04
RA-226	51.	186.21	2.4706E-07
AC-228	24.	338.32	5.8858E-08
TH-228	27.	84.37	1.0757E-06
PA-234	0.	131.20	Half-Life too short
TH-234	39.	63.29	3.2389E-06
U-235	36.	143.76	6.7275E-08
NP-239	0.	106.13	Half-Life too short
AM-241	27.	59.54	1.6606E-07

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT 8091009

Sample Location (Well Number): 8 old

1. Representative sample collected. Date/Time 9/10/09 / 0910

Sample collected by: Thomas Mowl Thomas Date: 9/10/09
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Southward / Southward Date: 9/21/09
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: John M. Yoxem / _____ Date: 9-22-9
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert C Gaylor Robert C Gaylor, Jr Date: 10-13-09
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT8O91009	
2 . Date Sampled	09/10/2009	
3 . Time Sampled	09:10	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	09/21/2009	
2 . Time Sample Counted	14:00	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	7.7	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	2763.5	cpm
Net Spike Count Rate (cpm)	2755.8	cpm
H3 Spike Activity (dpm on count date)	7189.1	dpm
Counter Efficiency	0.3833	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	6.7	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.0	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{(\text{Bkg cpm})}{(\text{Bkg min.})} + \frac{(\text{Bkg cpm})}{(\text{Smpl min.})}}}{\text{Efficiency} \times 2.22\text{E6 dpm/uCi} \times \text{Sample Volume}} = 1.20\text{E-06 uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency} \times 2.22\text{E6 uCi/ml} \times \text{Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 9-22-9

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT8091009

Sample Location (Well Number): 8old

1. Representative sample collected. Date/Time 9/10/09 / 0910

Sample collected by: Thomas Monl Thomas Date: 9-10-09
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Southward / Southward Date: 9/24/09
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: Southward / Southward Date: 10/13/09
Fermi 2 RP Printed Name Signature

Sample number: ~~EFT80915099~~ EFT 80 9 10 09
9/17/09

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: Southward I Southward Date: 10/13/09
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert C Gray JR Date: 10-14-09
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

DETROIT EDISON FERMI-2 POWER PLANT 13-OCT-2009 13:48:31.66

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EFT8091009

Sample End Time: 10-SEP-2009 09:10:00.00

REMARKS E-40, ANI.

PERFORMED BY:

SIGNATURE

REVIEWED BY:

SIGNATURE/DATE

Sample ID : EFT0091009 Acquisition date : 13-OCT-2009 13:10:20

****

Fermi 2 Radiation Protection Gamma Spectroscopy Report

Sample Parameters

Sample ID Number: EFT0091009
Sample collection start date: 10-SEP-2009 09:10:00.00
Sample collection end date : 10-SEP-2009 09:10:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.000000E+03 cc
Sample geometry : M2LL Operator: JNS

Acquisition Parameters

Detector number : DET 4 Acquire date : 13-OCT-2009 13:10:20.33
Preset live time : 0 00:30:00.00 Elapsed live time : 0 00:30:00.00
Elapsed real time : 0 00:30:01.06 Percent dead time : 0.05 %

Calibration Parameters

Detector number : DET 4 Yearly cal date : 3-JUN-2009 17:37:00.00
Kev/channel : 4.99961E-01 Zero offset: 7.020824E-02
Daily cal date : 13-OCT-2009 06:21:56.95

Peak Search Parameters

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

Nuclide Identification Parameters

Energy tolerance : 1.75000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	511.27	110	36	2.28	1022.45	1015	10	6.11E-02	16.0	
2	0	1460.94	30	12	1.99	2921.73	2915	12	1.67E-02	29.4	

Decay Time = 33 04:08:28.33 Acquisition Time = 13-OCT-2009 13:18:28.3
3

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	511.27	110	36	2.28	1022.45	1015	18	16.0		ANN.
0	1460.94	30	12	1.99	2921.73	2915	12	29.4		K-40

10-14-09

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	30	10.67*	2.501E+00	1.690E-07	1.690E-07	29.39

Flag: "*" = Keyline

Sample ID : EFT8091009 Acquisition date : 13-OCT-2009 13:18:28

Total number of lines in spectrum	2	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	2	100.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	1.690E-07	1.690E-07	0.497E-07	29.39	
	?						
	Total Activity :		1.690E-07	1.690E-07			
Grand Total Activity :			1.690E-07	1.690E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EFT0091009 Acquisition date : 13-OCT-2009 13:10:20

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	435.42	511.00*	193.46	1.000E+35	15.95	Decay

% Abundances Found = 100.00

Flag: "*" = Keyline

Sample ID : EFT8091009 Acquisition date : 13-OCT-2009 13:10:20

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	511.27	110	36	2.20	1022.45	1015	10	6.11E-02	16.0	4.00E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 13-OCT-2009 13:40:35.03

Sample ID : EFT8091009

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	21.	477.59	1.0609E-07
F-18	0.	511.00	Half-Life too short
NA-22	6.	1274.54	8.1074E-09
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	10.	889.25	1.0269E-08
CR-51	22.	320.08	1.4493E-07
MN-54	14.	834.83	9.4449E-09
CO-56	4.	1238.25	1.3126E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	52.	158.38	3.5646E-07
CO-57	37.	< 122.06	1.0227E-08
CO-58	10.	810.76	1.0257E-08
FE-59	9.	1099.22	2.5175E-08
CO-60	9.	1332.49	9.6939E-09
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	7.	1115.52	1.6888E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	29.	136.00	1.3580E-08
AS-76	0.	559.10	Half-Life too short
BR-82	0.	776.49	Half-Life too short
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	45.	513.99	2.4499E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	45.	513.99	1.5042E-08
RB-86	11.	1076.63	3.6185E-07
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	3.	1836.01	9.1343E-09
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	3.	1204.90	2.8605E-06
Y-91M	0.	555.60	Half-Life too short

I-132	0.	934.46	Half-Life too short

Nuclides	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
SR-93	0.	590.28	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	12.	702.63	6.8994E-09
NB-95	10.	< 765.79	1.3578E-08
NB-95M	29.	235.69	1.5318E-05
ZR-95	13.	756.72	1.9822E-08
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	0.	739.58	Half-Life too short
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	16.	497.08	1.3218E-08
TC-104	0.	357.99	Half-Life too short
RH-105	>.	318.90	Half-Life too short
RU-105	0.	724.50	Half-Life too short
RU-106	9.	621.84	6.0966E-08
CD-109	30.	88.03	3.4093E-07
AG-110M	10.	937.48	2.6710E-08
SN-113	18.	391.69	1.1427E-08
SN-117M	50.	158.56	5.0287E-08
SB-122	0.	563.93	Half-Life too short
SB-124	20.	602.71	1.1536E-08
SB-125	15.	427.89	2.0652E-08
TE-125M	33.	109.28	4.6135E-06
TE-127	0.	417.90	Half-Life too short
TE-127M	29.	57.60	2.8778E-05
XE-127	33.	202.84	1.8591E-08
TE-129	0.	459.60	Half-Life too short
TE-129M	24.	695.88	5.4886E-07
XE-129M	41.	196.56	2.0635E-06
I-130	0.	536.09	Half-Life too short
BA-131	33.	123.80	1.8340E-07
I-131	22.	364.48	1.4199E-07
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	40.	163.93	2.5530E-06
I-132	0.	.0 667.69	Half-Life too short
TE-132	0.	228.16	Half-Life too short
BA-133	29.	302.84	3.8875E-08
BA-133M	0.	276.09	Half-Life too short
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	17.	81.00	2.4747E-06
XE-133M	0.	233.22	Half-Life too short
CS-134	23.	604.70	8.6752E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short

Sample ID : EFT8091009 Acquisition date : 13-OCT-2009 13:18:20

Nuclide		Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-136		10.	818.50	4.1753E-08
I-136		0.	1313.02	Half-Life too short
CS-137		14.	661.65	8.1659E-09
XE-137		0.	455.49	Half-Life too short
CS-138		0.	1435.86	Half-Life too short
XE-138		0.	258.31	Half-Life too short
BA-139		0.	1420.50	Half-Life too short
CE-139		40.	165.85	1.0500E-08
CS-139		0.	1283.23	Half-Life too short
BA-140		15.	537.32	1.5752E-07
LA-140		0.	1596.49	Half-Life too short
BA-141		0.	190.22	Half-Life too short
CE-141		27.	145.44	2.5785E-08
LA-141		0.	1354.52	Half-Life too short
BA-142		0.	255.12	Half-Life too short
LA-142		0.	641.17	Half-Life too short
CE-143		0.	293.26	Half-Life too short
CE-144		30.	133.54	6.0255E-08
PR-144		0.	1489.15	Half-Life too short
ND-147		35.	91.10	3.4842E-07
PM-148M		13.	550.27	1.1533E-08
EU-152		25.	344.27	2.5894E-08
EU-154?	A	9.	1004.76	4.5815E-08
EU-155		23.	105.31	3.0160E-08
EU-156		12.	646.29	4.1007E-07
HF-181		14.	482.03	1.2639E-08
TA-182		5.	1221.42	3.3156E-08
W-187		0.	685.81	Half-Life too short
RE-188		0.	155.03	Half-Life too short
HG-203		34.	279.19	1.5375E-08
BI-207		17.	569.67	7.1945E-09
TL-208		0.	583.14	Half-Life too short
PB-212		0.	238.63	Half-Life too short
BI-214		0.	609.31	Half-Life too short
PB-214		0.	351.92	Half-Life too short
RA-224		24.	240.98	8.0021E-05
RA-226		34.	186.21	2.0391E-07
AC-228		25.	338.32	6.0250E-08
TH-228		22.	84.37	9.7509E-07
PA-234		0.	131.20	Half-Life too short
TH-234		31.	63.29	2.7070E-06
U-235		24.	143.76	5.6203E-08
NP-239		0.	106.13	Half-Life too short
AM-241		24.	59.54	1.5750E-07

EFT-8S

2010

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EF1-6110-85 old

Sample Location (Well Number): 85 old

1. Representative sample collected. Date/Time 6/1/10 / 1345

Sample collected by: Southward / Southward Date: 6/23/10
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Southward / Southward Date: 6/23/10
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: John M. Yoscum / _____ Date: 6-25-10
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert Coffey JR _____ Date: 6-30-10
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

_____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EF1-6110-8S (OLD)	
2 . Date Sampled	06/01/2010	
3 . Time Sampled	13:45	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	06/24/2010	
2 . Time Sample Counted	14:50	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	6.7	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	2671.8	cpm
Net Spike Count Rate (cpm)	2665.1	cpm
H3 Spike Activity (dpm on count date)	6889.0	dpm
Counter Efficiency	0.3869	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	7.9	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	1.2	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	1.9	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{(\text{Bkg cpm})}{(\text{Bkg min.})} + \frac{(\text{Bkg cpm})}{(\text{Smpl min.})}}}{\text{Efficiency} \times 2.22\text{E6 dpm/uCi} \times \text{Sample Volume}} = 1.11\text{E-06 uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency} \times 2.22\text{E6 uCi/ml} \times \text{Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 6-25-10

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EF1-6110-8Sold

Sample Location (Well Number): 8S old

1. Representative sample collected. Date/Time 6/1/10 / 1345

Sample collected by: Southward / Southward Date: 6/23/10
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Southward / Southward Date: 6/23/10
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: Charles Proffitt / Charles Proffitt Date: 9-14-10
Fermi 2 RP Printed Name Signature

Sample number: EF1-6110-85 old

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: Charles Proffitt / Charles Proffitt Date: 9-14-10
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert C Greger / Robert C Greger Date: 10-5-10
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

DETROIT EDISON FERMI-2 POWER PLANT 14-SEP-2010 09:51:55.90

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EF1-6110-8S OLD

Sample End Time: 1-JUN-2010 13:45:00.00

REMARKS

PERFORMED BY:

SIGNATURE

REVIEWED BY:

SIGNATURE/DATE

Sample ID : EF1-6110-8S OLD Acquisition date : 14-SEP-2010 09:06:52

****

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********

Sample ID Number: EF1-6110-8S OLD
Sample collection start date: 1-JUN-2010 13:45:00.00
Sample collection end date : 1-JUN-2010 13:45:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.000000E+03 cc
Sample geometry : M2LL Operator: CLP

********** Acquisition Parameters **********

Detector number : DET 4 Acquire date : 14-SEP-2010 09:06:52.77
Preset live time : 0 00:45:00.00 Elapsed live time : 0 00:45:00.00
Elapsed real time : 0 00:45:00.87 Percent dead time : 0.03 %

********** Calibration Parameters **********

Detector number : DET 4 Yearly cal date : 23-JUN-2010 12:20:00.00
Kev/channel : 5.00041E-01 Zero offset: 0.46290E-02
Daily cal date : 14-SEP-2010 06:21:27.75

********** Peak Search Parameters **********

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********

Energy tolerance : 1.75000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	66.19	61	78	1.43	132.19	128	8	2.27E-02	20.0	
2	0	351.83	87	82	1.20	703.43	697	13	3.23E-02	23.9	
3	0	511.12	248	56	2.58	1022.01	1013	19	9.17E-02	9.7	
4	0	558.67	110	14	1.32	1117.11	1113	10	4.07E-02	11.6	
5	0	610.35	72	69	2.11	1220.47	1211	14	2.65E-02	27.4	
6	0	1120.04	28	3	2.18	2239.85	2234	11	1.05E-02	22.0	
7	1	1460.36	60	26	2.81	2920.51	2913	16	2.23E-02	22.6	1.40E+00
8	1	1461.36	14	22	2.64	2922.51	2913	16	5.06E-03	88.5	

Decay Time = 104 19:21:52.77 Acquisition Time = 14-SEP-2010 09:06:52.7
7

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	66.19	61	78	1.43	132.19	128	8	28.0	— HWC	
0	351.83	87	82	1.20	703.43	697	13	23.9	— Pb-214	
0	511.12	248	56	2.58	1022.01	1013	19	9.7	— ANN.	
0	558.67	110	14	1.32	1117.11	1113	10	11.6	— HWC	
0	610.35	72	69	2.11	1220.47	1211	14	27.4	— Bi-214	
0	1120.04	28	3	2.18	2239.85	2234	11	22.0	— Bi-214	
1	1460.36	60	26	2.81	2920.51	2913	16	22.6	1.48E+00	K-40
1	1461.36	14	22	2.64	2922.51	2913	16	99.5	— High %Error	

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	60	10.67*	2.502E+00	2.257E-07	2.257E-07	22.62

Flag: "*" = Keyline

Sample ID : EF1-6110-8S OLD Acquisition date : 14-SEP-2010 09:06:52

Total number of lines in spectrum	8	
Number of unidentified lines	1	
Number of lines tentatively identified by NID	7	87.50%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	2.257E-07	2.257E-07	0.511E-07	22.62	
	Total Activity :		2.257E-07	2.257E-07			
	Grand Total Activity :		2.257E-07	2.257E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	1375.47	511.00*	193.46	1.000E+35	9.60	Decay
	% Abundances		Found =	100.00			
SC-46	83.83D	1.25	142.53	62.70	---- Not Found ----		Abun.
			889.25*	99.98	---- Not Found ----		
			1120.51	99.99	2.319E-08	21.99	
	% Abundances		Found =	38.07			
SE-75	119.78D	0.88	66.05	1.02	7.891E-06	27.98	Abun.
			96.73	3.41	---- Not Found ----		
			121.12	16.70	---- Not Found ----		
			136.00*	59.20	---- Not Found ----		
			198.60	1.45	---- Not Found ----		
			264.65	59.00	---- Not Found ----		
			279.53	25.20	---- Not Found ----		
			303.91	1.32	---- Not Found ----		
			400.65	11.40	---- Not Found ----		
	% Abundances		Found =	0.57			
AS-76	26.32H	95.58	559.10*	44.70	3.120E+21	11.55	Decay,Abun.
			563.23	1.17	---- Not Found ----		
			571.30	0.14	---- Not Found ----		
			657.03	6.10	---- Not Found ----		
			665.31	0.39	---- Not Found ----		
			740.12	0.12	---- Not Found ----		
			771.76	0.12	---- Not Found ----		
			867.63	0.12	---- Not Found ----		
			1129.07	0.14	---- Not Found ----		
			1212.72	1.63	---- Not Found ----		
			1216.02	3.04	---- Not Found ----		
			1228.52	1.39	---- Not Found ----		
			1439.13	0.33	---- Not Found ----		
			1453.60	0.13	---- Not Found ----		
			1787.67	0.33	---- Not Found ----		
	% Abundances		Found =	73.70			
KR-90	32.32S	280210.53	121.82	32.00	---- Not Found ----		Decay,Abun.
			539.49	29.00	---- Not Found ----		
			1118.69*	37.00	1.000E+35	21.99	
	% Abundances		Found =	37.76			
RU-103	39.35D	2.66	497.08*	89.00	---- Not Found ----		Abun.
			610.33	5.60	1.797E-06	27.43	
	% Abundances		Found =	5.92			
CS-136	13.16D	7.97	66.91	12.50	8.773E-05	27.98	Abun.
			86.29	6.30	---- Not Found ----		
			153.22	7.46	---- Not Found ----		
			163.89	4.61	---- Not Found ----		
			176.55	13.56	---- Not Found ----		
			273.65	12.66	---- Not Found ----		
			340.57	48.50	---- Not Found ----		

Nuclide	Half-Life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
CS-136	13.16D	7.97	818.50*	99.70	----- Not Found -----		Abun.
			1048.07	79.60	----- Not Found -----		
			1235.34	19.70	----- Not Found -----		
		% Abundances Found =		4.10			
PM-148M	41.30D	2.54	288.11	12.56	----- Not Found -----		Abun.
			414.07	18.66	----- Not Found -----		
			432.78	5.35	----- Not Found -----		
			501.26	6.75	----- Not Found -----		
			550.27*	94.90	----- Not Found -----		
			599.74	12.54	----- Not Found -----		
			611.26	5.40	1.603E-06	27.43	
			629.97	89.00	----- Not Found -----		
			725.70	32.80	----- Not Found -----		
			915.33	17.17	----- Not Found -----		
			1013.81	20.30	----- Not Found -----		
		% Abundances Found =		1.74			
TA-182	114.74D	0.91	67.75	42.30	1.954E-07	27.98	Abun.
			100.10	14.10	----- Not Found -----		
			1189.05	16.30	----- Not Found -----		
			1221.42*	27.10	----- Not Found -----		
			1230.97	11.50	----- Not Found -----		
		% Abundances Found =		38.01			
BI-214	19.90M	7505.15	609.31*	46.30	1.000E+35	27.43	Decay
			768.36	5.04	----- Not Found -----		
			934.06	3.21	----- Not Found -----		
			1120.29	15.10	1.000E+35	21.99	
			1238.11	5.94	----- Not Found -----		
			1377.67	4.11	----- Not Found -----		
			1764.49	15.80	----- Not Found -----		
		% Abundances Found =		64.29	(Abn. Limit = 40.40%)		
PB-214	26.80M	5632.25	87.30	4.67	----- Not Found -----		Decay
			241.99	7.49	----- Not Found -----		
			295.21	19.20	----- Not Found -----		
			351.92*	37.20	1.000E+35	23.85	
			785.91	1.10	----- Not Found -----		
		% Abundances Found =		53.40	(Abn. Limit = 37.20%)		

Flag: "*" = Keyline

Sample ID : EF1-6110-8S OLD Acquisition date : 14-SEP-2010 09:06:52

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	66.19	61	78	1.43	132.19	128	8	2.27E-02	28.0	1.40E+00	T
0	351.83	87	82	1.20	703.43	697	13	3.23E-02	23.9	5.70E+00	T
0	511.12	248	56	2.50	1022.01	1013	19	9.17E-02	9.7	4.88E+00	T
0	558.67	110	14	1.32	1117.11	1113	10	4.07E-02	11.6	4.69E+00	T
0	610.35	72	69	2.11	1220.47	1211	14	2.65E-02	27.4	4.52E+00	T
0	1120.04	28	3	2.18	2239.85	2234	11	1.05E-02	22.0	2.90E+00	T
1	1461.36	14	22	2.64	2922.51	2913	16	5.06E-03	88.5	2.50E+00	

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 14-SEP-2010 09:51:59.96

Sample ID : EF1-6110-8S OLD

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	39.	477.59	2.3530E-07
F-18	0.	511.00	Half-Life too short
NA-22	17.	1274.54	0.7166E-09
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	19.	889.25	1.6702E-08
CR-51	40.	320.08	7.6084E-07
MN-54	21.	834.83	0.6605E-09
CO-56	28.	1238.25	3.7535E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	0.	158.38	Half-Life too short
CO-57	59.	122.06	1.0174E-08
CO-58	14.	810.76	1.5773E-08
FE-59	18.	1099.22	6.9792E-08
CO-60	3.	1332.49	4.4704E-09
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	15.	1115.52	1.8795E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	74.	136.00	2.1027E-08
AS-76	0.	559.10	Half-Life too short
BR-82	0.	776.49	Half-Life too short
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	72.	513.99	2.0585E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	72.	513.99	2.6841E-08
RB-86	17.	1076.63	4.1842E-06
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	13.	1836.01	1.7496E-08
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.98	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	14.	1204.90	0.2932E-06
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Sample ID : EF1-6110-0S OLD Acquisition date : 14-SEP-2010 09:06:52

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
SR-93	0.	590.20	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	25.	702.63	6.2906E-09
NB-95	18.	765.79	4.7106E-00
NB-95M	0.	235.69	Half-Life too short
ZR-95	19.	756.72	3.3897E-00
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	0.	739.50	Half-Life too short
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	41.	497.00	4.6922E-00
TC-104	0.	357.99	Half-Life too short
RH-105	0.	318.90	Half-Life too short
RU-105	0.	724.50	Half-Life too short
RU-106	33.	621.84	8.1991E-00
CD-109	66.	88.03	3.6231E-07
AG-110M	20.	937.48	2.9144E-00
SN-113	39.	391.69	1.6749E-00
SN-117M	67.	158.56	1.4806E-06
SB-122	0.	563.93	Half-Life too short
SB-124	30.	602.71	2.1004E-00
SB-125	35.	427.89	2.0039E-00
TE-125M	65.	109.28	9.0353E-06
TE-127	0.	417.90	Half-Life too short
TE-127M	43.	57.60	3.6593E-05
XE-127	74.	202.84	7.0225E-00
TE-129	0.	459.60	Half-Life too short
TE-129M	21.	695.88	1.5344E-06
XE-129M	0.	196.56	Half-Life too short
I-130	0.	536.09	Half-Life too short
BA-131	60.	123.80	1.0723E-05
I-131	0.	364.48	Half-Life too short
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	52.	163.93	1.2754E-04
I-132	0.	667.69	Half-Life too short
TE-132	0.	228.16	Half-Life too short
BA-133	52.	302.84	3.4428E-00
BA-133M	0.	276.09	Half-Life too short
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	0.	81.00	Half-Life too short
XE-133M	0.	233.22	Half-Life too short
CS-134	35.	604.70	7.5010E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Sample ID : EF1-6110-SS OLD Acquisition date : 14-SEP-2010 09:06:52

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-136	10.	818.50	1.5671E-06
I-136	0.	1313.02	Half-Life too short
CS-137	29.	661.65	7.5802E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.06	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	58.	165.85	1.1971E-08
CS-139	0.	1283.23	Half-Life too short
BA-140	33.	537.32	7.2141E-06
LA-140	0.	1596.49	Half-Life too short
BA-141	0.	190.22	Half-Life too short
CE-141	58.	145.44	1.1330E-07
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	0.	293.26	Half-Life too short
CE-144	78.	133.54	8.4349E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	57.	91.10	2.6703E-05
PM-148M	34.	550.27	3.8744E-08
EU-152	46.	344.27	2.2831E-08
EU-154	10.	1004.76	3.2425E-08
EU-155	56.	105.31	3.8795E-08
EU-156	25.	646.29	9.8472E-06
HF-181	30.	482.03	3.7909E-08
TA-182	12.	1221.42	4.7821E-08
W-187	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
HG-203	68.	279.19	4.0951E-08
BI-207	33.	569.67	6.5142E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	0.	240.98	Half-Life too short
RA-226	68.	186.21	1.0690E-07
AC-228	56.	338.32	5.9056E-08
TH-228	58.	84.37	1.0919E-06
PA-234	0.	131.20	Half-Life too short
TH-234	55.	63.29	1.8336E-05
U-235	81.	143.76	6.5549E-08
NP-239	0.	106.13	Half-Life too short
AM-241	41.	59.54	1.3210E-07

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-102510 85R New

Sample Location (Well Number): 85R New

1. Representative sample collected. Date/Time 11-11-10 / 13:45

Sample collected by: C Proffitt / C Proffitt Date: 11-11-10
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: C Proffitt / C Proffitt Date: 11-11-10
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: J. R. Dyer / [signature] Date: 11-12-10
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert C Hyde / [signature] Date: 11-15-10
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-102510 85R NEW	
2 . Date Sampled	11/11/2010	
3 . Time Sampled	13:45	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	11/12/2010	
2 . Time Sample Counted	15:50	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	7.1	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	2556.5	cpm
Net Spike Count Rate (cpm)	2549.4	cpm
H3 Spike Activity (dpm on count date)	6740.5	dpm
Counter Efficiency	0.3782	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	8.7	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	1.6	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	1.9	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{(\text{Bkg cpm})}{(\text{Bkg min.})} + \frac{(\text{Bkg cpm})}{(\text{Smpl min.})}}}{\text{Efficiency} \times 2.22\text{E6 dpm/uCi} \times \text{Sample Volume}} = 1.17\text{E-06 uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency} \times 2.22\text{E6 uCi/ml} \times \text{Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 11-12-10

Reviewed By: _____ Date 11/15/10

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-102510-8SR NEW

Sample Location (Well Number): 8SR NEW

1. Representative sample collected. Date/Time 10/25/10 / 13:50

Sample collected by: THOMAS MOW / [signature] Date: 11-11-10
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: C PROFFITT / [signature] Date: 11-22-10
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: C Proffitt / [signature] Date: 11-23-10
Fermi 2 RP Printed Name Signature

Sample number: EFT-102510-85R New

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: C Proffitt / C Proffitt Date: 11-23-10
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert C Gray JR / Robert Gray Date: 11-23-10
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: CTT-100510-99R NEW

Sample End Time: 05 OCT 2010 12:50:00.00

REMARKS

PERFORMED BY:

SIGNATURE

REVIEWED BY:

SIGNATURE/DATE

Sample ID : EFT-102510 SSP NEW Acquisition date : 23-NOV-2010 11:29:17

Fermi 2 Radiation Protection Gamma Spectroscopy Report

Sample Parameters

Sample ID Number : EFT-102510 SSP NEW
Sample collection start date: 25-OCT-2010 13:50:00.00
Sample collection end date : 25 OCT 2010 13:50:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.000000E+00 ea
Sample geometry : MSLL Operator: SLP

Acquisition Parameters

Detector number : DET 4 Acquire date : 23-NOV-2010 11:29:17.30
Preset live time : 0 03:45:00.00 Elapsed live time : 0 03:45:03.00
Elapsed real time : 0 03:47:36.61 Percent dead time : 0.32 %

Calibration Parameters

Detector number : DET 4 Yearly cal date : 23-JUN-2010 10:20:30.00
Kev/channel : 5.000264E-01 Zero offset: 5.277942E-02
Daily cal date : 23-NOV-2010 10:40:05.00

Peak Search Parameters

Start channel : 100 End channel : 4000
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

Nuclide Identification Parameters

Energy tolerance : 1.75000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : gammaspec.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

Pk	Id	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	C	511.21	165	71	2.39	1021.21	1011	24	6.11E-02	15.1	
2	C	610.27	58	33	2.43	1220.57	1213	17	2.15E-02	26.4	
3	C	1460.82	73	19	2.36	2923.77	2913	11	2.70E-02	17.2	

Sample Title : [illegible]
Data Time : [illegible]

Page : 1
Acquisition Time : [illegible]

Peak MCA Peak Search Report

TY	Energy	Area	Sigma	FWHM	Channel	Left	Peak	Fit	Nuclides
B	511.31	165	76	2.39	1921.74	1511	24	25.1	ANN. Peak
B	610.67	52	32	2.42	1920.57	1513	17	26.4	Bi-214
B	1460.83	72	13	2.36	2932.27	3513	11	15.8	K-40

11-23-10

Sample ID - EFT 130210 038 U Acquisition Date - 23 FEB 2013 11:27:17

Total number of lines in spectrum 3
Number of unidentified lines 0
Number of lines tentatively identified by NID 3 100.00%

Nuclide Type - Natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K 40	1.00E+09Y	1.00	2.682E-07	2.682E-07	0.409E-07	15.24	
	Total Activity =		2.682E-07	2.682E 07			
	Grand Total Activity =		2.682E 07	2.682E 07			

Flags: "X" = Keyline not found "M" = Manually assigned
"E" = Manually edited "G" = Nuclide specific abn. limit

Nuclide	Half Life	Half Life Ratio	Energy	%Abund	Activity ± 2Sigma	%2Sigma	Rejected by
F 18	109.74M	379.46	511.00*	193.46	1.3000E-05	16.12	Both
		% Abundances Found =		100.00			
RU 103	39.25D	9.73	497.09*	89.00	--- Not Found ---		Abun.
			610.33	5.86	3.8732E-07	26.39	
		% Abundances Found =		5.92			
PM 146M	11.33Y	0.70	280.11	13.56	Not Found		Abun.
			453.87	10.24	Not Found		
			736.78	5.35	Not Found		
			821.85	6.75	Not Found		
			550.27*	94.70	Not Found		
			599.74	12.54	Not Found		
			811.86	5.16	3.0035E-07	26.39	
			829.97	87.00	--- Not Found ---		
			725.70	32.98	Not Found		
			915.32	17.17	Not Found		
			1213.91	23.33	Not Found		
		% Abundances Found =		1.74			
EU 21	12.93H	2935.56	609.31*	46.32	1.0005E-05	26.39	Both
			768.36	5.04	--- Not Found ---		
			931.06	3.21	Not Found		
			1120.29	15.10	--- Not Found ---		
			1238.11	5.94	--- Not Found ---		
			1377.67	4.11	--- Not Found ---		
			1764.49	15.30	--- Not Found ---		
		% Abundances Found =		40.40	(Abn. Limit = 40.40%)		

Flag: "*" = Keyline

Unidentified Energy Lines

ID	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	?Diff	Flags
C	511.31	138	76	2.32	1021.94	1011	21	6.11E-02	10.1	1.00E+00	T
B	510.67	58	29	3.42	1220.57	1213	17	2.15E-02	26.4	4.52E-08	T

Flags: "T" = Tentative, unidentified

[illegible]

[illegible] Nuclear Fuels & MSA Property Corporation [illegible]

[illegible] Sample ID : CFT 122510 020 HCN

[illegible]

Minimum Detectable Activity Report

Nuclide	Value (pCi)	Error (1σ)	MDA (uCi/cc)
TE 7	13.	177.59	6.3750E 03
F 18	0.	511.09	Half Life too short
NA 22	5.	1271.51	5.0109E 02
NA 24	0.	1360.52	Half Life too short
MG 27	3.	1014.14	Half Life too short
CL 38	0.	1612.42	Half Life too short
AR 41	3.	1293.24	Half Life too short
SC 46	17.	669.35	6.1205E 07
CR 51	16.	329.38	1.2221E 07
MN 54	13.	671.63	7.0221E 06
CO 56	12.	1275.09	1.2239E 02
MN 56	0.	1010.69	Half Life too short
NI 56	33.	153.39	1.5457E 07
CO 57	12.	102.86	7.1572E 06
CO 58	13.	810.75	7.3261E 09
FE 59	16.	1079.82	3.0807E 08
CO 60	2.	1332.19	6.4163E 09
CU 64	0.	1346.00	Half Life too short
NI 65	0.	1401.04	Half Life too short
ZN 65	21.	1115.52	1.7585E 08
ZN-65M	0.	438.63	Half Life too short
SE 75	53.	130.80	1.1209E 02
AS 76	0.	559.19	Half Life too short
BR 82	0.	776.49	Half Life too short
BR-80	0.	529.64	Half Life too short
RB 84	0.	881.58	Half Life too short
RB 85	0.	802.41	Half Life too short
KR-85	52.	513.09	1.7383E 00
KR-85M	0.	151.19	Half Life too short
SR 85	52.	513.09	1.0284E 02
SR 89	15.	1076.62	2.3425E 07
SR 91	0.	492.58	Half Life too short
SR-87M	3.	288.43	Half Life too short
SR 88	0.	198.78	Half Life too short
Y 88	3.	1302.39	Half Life too short
Y 90	7.	1031.31	3.1555E 05
SR 90	0.	220.90	Half Life too short
ZR 95	0.	1031.88	Half Life too short
NB-95	0.	1119.89	Half Life too short
ZR 97	0.	631.39	Half Life too short
RU 98M	0.	864.83	Half Life too short
Y 90M	0.	282.51	Half Life too short
SB 91	0.	1024.30	Half Life too short
Y 91	13.	1024.30	2.0392E 05
Y 91M	2.	877.29	Half Life too short
SB 92	0.	1383.24	Half Life too short
Y 92	0.	924.46	Half Life too short

Nuclide	Yield (%fn)	Energy (keV)	MDA (uCi/cc)
SR-93	0.	529.30	Half Life too short
Y-93	0.	366.90	Half Life too short
NB-91	29.	732.53	1.4527E-09
NB-95	18.	765.79	1.8424E-09
NB-95M	43.	235.99	5.4175E-08
ZR-95	2.	756.73	1.2947E-08
NB-97	5.	657.93	Half Life too short
MO-99	6.	740.32	Half Life too short
TC-99	9.	739.58	Half-Life too short
TC-99M	9.	140.50	Half-Life too short
TC-101	8.	306.81	Half Life too short
RU-103	20.	497.08	8.8404E-09
TC-104	2.	358.99	Half-Life too short
RH-105	6.	319.90	Half Life too short
RU-105	3.	724.50	Half Life too short
RU-106	20.	621.84	6.6451E-08
CE-109	30.	90.03	2.2478E-07
AG-110M	12.	937.48	2.2745E-08
CD-113	30.	331.69	9.7191E-09
CD-117M	20.	159.56	2.0673E-06
SB-122	3.	563.93	Half-Life too short
SB-124	28.	602.74	2.5333E-09
SB-125	31.	427.89	1.0932E-08
TE-125M	26.	109.28	3.3856E-06
TE-127	3.	417.90	Half Life too short
TE-127M	23.	87.36	1.6866E-05
XE-127	54.	202.84	1.3359E-06
TE-129	0.	459.68	Half Life too short
TE-129M	27.	695.98	3.5387E-07
XE-129M	5.	196.81	1.1255E-06
I-130	9.	536.90	Half-Life too short
SN-131	44.	183.20	1.8453E-07
I-131	90.	364.49	9.3984E-08
TE-131	0.	452.72	Half-Life too short
TE-131M	0.	773.67	Half Life too short
XE-131M	1.	163.93	1.2589E-06
I-132	0.	667.69	Half-Life too short
TE-132	10.	228.16	7.6782E-08
SN-133	12.	300.94	2.1823E-08
SN-133M	0.	275.39	Half Life too short
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.56	Half-Life too short
XE-133	3.	81.00	1.2684E-06
XE-133M	0.	233.22	Half-Life too short
CS-134	27.	604.70	6.0087E-09
I-134	0.	884.09	Half Life too short
TE-134	0.	210.47	Half Life too short
SN-135M	0.	262.91	Half Life too short
I-135	0.	1260.41	Half Life too short
XE-135	0.	249.79	Half Life too short
XE-135M	0.	526.56	Half-Life too short

Nuclide	Bckgnd Cnt.	Energy (keV)	MDA (uCi/cc)
CO 136	12.	818.50	2.42633E-08
I 137	0.	1313.00	Half Life too short
CO 137	51.	551.65	8.47935E-09
XE 137	0.	455.10	Half Life too short
CS 138	0.	1435.96	Half-Life too short
XE 138	0.	258.31	Half-Life too short
CS 139	0.	1409.50	Half-Life too short
CE 139	53.	165.85	7.61633E-09
CS 139	0.	1232.03	Half-Life too short
BA 140	21.	537.32	1.08834E 07
LA 140	0.	1596.49	Half-Life too short
BA 141	0.	130.23	Half-Life too short
CE 141	53.	145.43	2.45577E 09
LA 141	0.	1354.52	Half Life too short
BA 142	0.	255.18	Half-Life too short
LA 142	0.	641.17	Half Life too short
CE 143	0.	293.33	Half-Life too short
CE 144	51.	133.54	5.7315E-08
PR 144	0.	1489.15	Half-Life too short
ND 147	32.	91.10	1.7186E 07
PM 148M	26.	550.27	9.53332E-09
EU 152	11.	344.27	2.1552E 08
EU 154	19.	1004.76	4.11251E-08
EU 155	11.	105.31	3.30651E 08
EU 156	12.	646.20	9.27755E-07
HF 181	21.	482.83	1.01145E 08
TA 182	12.	1221.42	2.05444E-08
W 187	0.	685.81	Half-Life too short
RE 188	0.	155.03	Half-Life too short
HG 203	42.	279.19	1.06027E-08
PB 207	34.	569.67	5.57285E-09
TL 208	0.	583.14	Half Life too short
PB 212	0.	238.63	Half-Life too short
BI 214	0.	609.31	Half-Life too short
PB 214	0.	351.92	Half-Life too short
RA 224	49.	240.98	2.5420E 08
RA 226	63.	186.21	1.7692E-07
AC 228	31.	338.32	4.3700E 08
TH 229	40.	84.37	9.5647E-07
PA 234	0.	131.30	Half Life too short
TH 234	32.	63.29	1.53935E-06
U 235	12.	143.76	4.7720E 08
NP 237	0.	106.13	Half Life too short
AM 241	23.	59.54	1.13355E 07

EFT-8S

2011

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT 62011-8 New

Sample Location (Well Number): 8 New

1. Representative sample collected. Date/Time 6-20-11 / 8:20

Sample collected by: Thomas Mau / Thomas Mau Date: 6-22-11
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: C Proffitt / C Proffitt Date: 6-22-11
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: Ross Burgett / Ross Burgett Date: 6-23-11
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert Colvig JR / Robert Colvig JR Date: 6-24-11
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks N/A 6-24-11

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-62011-8NEW	
2 . Date Sampled	06/20/2011	
3 . Time Sampled	08:20	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	06/23/2011	
2 . Time Sample Counted	06:47	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	6.7	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	2325.6	cpm
Net Spike Count Rate (cpm)	2318.9	cpm
H3 Spike Activity (dpm on count date)	6512.3	dpm
Counter Efficiency	0.3561	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	7.4	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.7	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	1.9	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{\text{(Bkg cpm)}}{\text{(Bkg min.)}} + \frac{\text{(Bkg cpm)}}{\text{(Smpl min.)}}}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}} = 1.21\text{E-}06 \text{ uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency x 2.22E6 uCi/ml x Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 6-28-11

Reviewed _____ Date 6-23-11

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-6201-8New

Sample Location (Well Number): 8New

1. Representative sample collected. Date/Time 6-20-11 / 8:20

Sample collected by: Thomas Mow / [signature] Date: 6-22-11
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: C Proffitt / [signature] Date: 6-22-11
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: C Proffitt / [signature] Date: 6-22-11
Fermi 2 RP Printed Name Signature

Sample number: EFT-62011-8New

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: C Pruitt / [signature] Date: 6-22-11
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: Roberto Hegg JR / [signature] Date: 6-23-11
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks [signature] 6-23-11

DETROIT EDISON FERMI-2 POWER PLANT 22-JUN-2011 10:33:06.42

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EFT-62011-8NEW

Sample End Time: 20-JUN-2011 08:20:00.00

REMARKS Natural

PERFORMED BY:

Charles Prokuski

SIGNATURE

REVIEWED BY:

SIGNATURE/DATE

PAGE ____ of ____

Sample ID : EFT-62011-8NEW Acquisition date : 22-JUN-2011 17:48:01

Fermi 2 Radiation Protection Gamma Spectroscopy Report

Sample Parameters

Sample ID Number: EFT-62011-8NEW
Sample collection start date: 20-JUN-2011 00:20:00.00
Sample collection end date : 20-JUN-2011 00:20:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.00000E+03 cc
Sample geometry : MELL Operator: CLP

Acquisition Parameters

Detector number : DET 4 Acquire date : 22-JUN-2011 17:48:01.38
Preset live time : 0 00:45:00.00 Elapsed live time : 0 00:45:00.00
Elapsed real time : 0 00:45:00.64 Percent dead time : 0.03 %

Calibration Parameters

Detector number : DET 4 Yearly cal date : 14-JUN-2011 14:50:56.41
Kev/channel : 4.99804E-01 Zero offset: 2.83532E-01
Daily cal date : 22-JUN-2011 14:32:40.38

Peak Search Parameters

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

Nuclide Identification Parameters

Energy tolerance : 1.75000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	67.18	40	101	1.82	133.82	128	11	1.47E-02	51.7	
2	0	296.35	50	79	1.74	592.26	586	12	1.84E-02	39.8	
3	0	352.39	108	42	1.29	704.37	699	12	3.99E-02	15.9	
4	0	510.99	174	43	2.74	1021.64	1011	19	6.44E-02	11.8	
5	0	609.57	106	38	1.79	1218.86	1213	12	3.92E-02	15.3	
6	0	1460.91	70	11	2.78	2921.90	2910	22	2.59E-02	17.0	
7	0	1764.03	35	0	4.24	3528.26	3521	15	1.30E-02	16.9	

Decay Time = 2 09:28:01.38 Acquisition Time = 22-JUN-2011 17:48:01.3
8

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	67.18	40	101	1.82	133.82	128	11	51.7		High Error.
0	296.35	50	79	1.74	592.26	586	12	39.8		Pb-214
0	352.39	108	42	1.29	704.37	699	12	15.9		Pb-214
0	510.99	174	43	2.74	1021.64	1011	19	11.8		Ann. Peak
0	609.57	106	38	1.79	1218.86	1213	12	15.3		Bi-214
0	1460.91	70	11	2.70	2921.90	2910	22	17.0		K-40
0	1764.03	35	0	4.24	3528.26	3521	15	16.9		Bi-214

6-23-11

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	70	10.67*	2.353E+00	2.791E-07	2.791E-07	16.99

Flag: "*" = Keyline

Sample ID : EFT-62011-8NEW Acquisition date : 22-JUN-2011 17:40:01

Total number of lines in spectrum	7	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	7	100.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	2.791E-07	2.791E-07	0.474E-07	16.99	
Total Activity :			2.791E-07	2.791E-07			
Grand Total Activity :			2.791E-07	2.791E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	31.63	511.00*	193.46	6.479E+01	11.78	Decay
	% Abundances Found =			100.00			
SE-75	119.78D	0.02	66.05	1.02	2.751E-06	51.69	Abun.
			96.73	3.41	---- Not Found ----		
			121.12	16.70	---- Not Found ----		
			136.00*	59.20	---- Not Found ----		
			198.60	1.45	---- Not Found ----		
			264.65	59.80	---- Not Found ----		
			279.53	25.20	---- Not Found ----		
			303.91	1.32	---- Not Found ----		
			400.65	11.40	---- Not Found ----		
	% Abundances Found =			0.57			
RU-103	39.35D	0.06	497.08*	89.00	---- Not Found ----		Abun.
			610.33	5.60	4.644E-07	15.27	
	% Abundances Found =			5.92			
XE-135	9.11H	6.35	249.79*	89.90	---- Not Found ----		Abun.
			608.19	2.89	7.030E-05	15.27	
	% Abundances Found =			3.11			
CS-136	13.16D	0.18	66.91	12.50	2.514E-07	51.69	Abun.
			86.29	6.30	---- Not Found ----		
			153.22	7.46	---- Not Found ----		
			163.89	4.61	---- Not Found ----		
			176.55	13.56	---- Not Found ----		
			273.65	12.66	---- Not Found ----		
			340.57	48.50	---- Not Found ----		
			818.50*	99.70	---- Not Found ----		
			1048.07	79.60	---- Not Found ----		
			1235.34	19.70	---- Not Found ----		
	% Abundances Found =			4.10			
PM-148M	41.30D	0.06	288.11	12.56	---- Not Found ----		Abun.
			414.07	18.66	---- Not Found ----		
			432.78	5.35	---- Not Found ----		
			501.26	6.75	---- Not Found ----		
			550.27*	94.90	---- Not Found ----		
			599.74	12.54	---- Not Found ----		
			611.26	5.48	4.736E-07	15.27	
			629.97	89.00	---- Not Found ----		
			725.70	32.80	---- Not Found ----		
			915.33	17.17	---- Not Found ----		
			1013.81	20.30	---- Not Found ----		
	% Abundances Found =			1.74			
TA-182	114.74D	0.02	67.75	42.30	6.638E-08	51.69	Abun.
			100.10	14.10	---- Not Found ----		
			1189.05	16.30	---- Not Found ----		
			1221.42*	27.10	---- Not Found ----		
			1230.97	11.50	---- Not Found ----		
	% Abundances Found =			38.01			

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
BI-214	19.90M	174.40	609.31*	46.30	1.000E+35	15.27	Decay
			768.36	5.04	---- Not Found ----		
			934.06	3.21	---- Not Found ----		
			1120.29	15.10	---- Not Found ----		
			1238.11	5.94	---- Not Found ----		
			1377.67	4.11	---- Not Found ----		
			1764.49	15.80	1.000E+35	16.90	
		% Abundances Found =		65.03	(Abn. Limit =	40.48%)	
PB-214	26.80M	129.50	87.30	4.67	---- Not Found ----		Decay
			241.98	7.49	---- Not Found ----		
			295.21	19.20	4.045E+31	39.77	
			351.92*	37.20	4.890E+31	15.94	
			785.91	1.10	---- Not Found ----		
		% Abundances Found =		80.96	(Abn. Limit =	37.20%)	

Flag: "*" = Keyline

Sample ID : EFT-62011-8NEW Acquisition date : 22-JUN-2011 17:48:01

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	67.10	40	101	1.82	133.82	128	11	1.47E-02	51.7	1.44E+00	T
0	296.35	50	79	1.74	592.26	586	12	1.84E-02	39.8	5.81E+00	T
0	352.39	108	42	1.29	704.37	699	12	3.99E-02	15.9	5.38E+00	T
0	510.99	174	43	2.74	1021.64	1011	19	6.44E-02	11.8	4.59E+00	T
0	609.57	106	38	1.79	1218.86	1213	12	3.92E-02	15.3	4.25E+00	T
0	1764.03	35	0	4.24	3528.26	3521	15	1.30E-02	16.9	2.14E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 22-JUN-2011 10:33:10.64

Sample ID : EFT-62011-0NEW

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	20.	477.59	4.9092E-08
F-18	0.	511.00	Half-Life too short
NA-22	15.	1274.54	8.2887E-09
NA-24	14.	1368.53	1.1987E-07
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	25.	889.25	8.4542E-09
CR-51	51.	320.08	6.8787E-08
MN-54	26.	834.83	8.0286E-09
CO-56	21.	1238.25	1.4212E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	55.	158.38	7.7967E-09
CO-57	49.	122.06	7.6102E-09
CO-58	13.	810.76	5.9875E-09
FE-59	16.	1099.22	1.4300E-08
CO-60	11.	1332.49	7.2277E-09
CU-64	11.	1345.90	5.5303E-05
NI-65	0.	1481.84	Half-Life too short
ZN-65	16.	1115.52	1.5555E-08
ZN-69M	23.	438.63	9.9821E-08
SE-75	59.	136.00	1.1072E-08
AS-76	42.	559.10	7.6335E-08
BR-82	16.	776.49	2.2376E-08
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	52.	513.99	1.8434E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	52.	513.99	8.1897E-09
RB-86	10.	1076.63	7.5872E-08
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	6.	1836.01	6.9937E-09
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	17.	1024.30	1.5891E-06
Y-91	12.	1204.90	2.4312E-06
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Sample ID : EFT-62011-8NEW Acquisition date : 22-JUN-2011 17:40:01

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
SR-93	0.	590.20	Half-Life too short
Y-93	45.	266.90	4.3558E-06
NB-94	31.	702.63	7.3957E-09
NB-95	20.	765.79	6.8805E-09
NB-95M	52.	235.69	3.7973E-08
ZR-95	25.	756.72	1.3326E-08
NB-97	0.	657.90	Half-Life too short
ZR-97	25.	743.36	7.6982E-08
MO-99	18.	739.58	8.6658E-08
TC-99M	73.	140.50	6.1703E-06
TC-101	0.	306.81	Half-Life too short
RU-103	24.	497.08	6.5009E-09
TC-104	0.	357.99	Half-Life too short
RH-105	48.	318.90	1.0005E-07
RU-105	0.	724.50	Half-Life too short
RU-106	25.	621.84	6.3182E-08
CD-109	47.	88.03	2.7482E-07
AG-110M	21.	937.48	2.3280E-08
SN-113	34.	391.69	9.0517E-09
SN-117M	57.	158.56	7.8024E-09
SB-122	15.	563.93	1.2490E-08
SB-124	29.	602.71	6.8536E-09
SB-125	41.	427.89	2.2239E-08
TE-125M	43.	109.28	2.5288E-06
TE-127	40.	417.90	4.6860E-05
TE-127M	28.	57.60	1.8238E-05
XE-127	52.	202.84	8.8850E-09
TE-129	0.	459.60	Half-Life too short
TE-129M	27.	695.88	2.1726E-07
XE-129M	53.	196.56	1.4608E-07
I-130	32.	536.09	1.6701E-07
BA-131	48.	123.80	2.5155E-08
I-131	32.	364.48	8.3147E-09
TE-131	0.	149.72	Half-Life too short
TE-131M	15.	773.67	5.9804E-08
XE-131M	57.	163.93	3.4716E-07
I-132	0.	667.69	Half-Life too short
TE-132	42.	228.16	1.0239E-08
BA-133	35.	302.84	2.9636E-08
BA-133M	35.	276.09	7.9261E-08
I-133	25.	529.87	4.5527E-08
TE-133M	0.	912.58	Half-Life too short
XE-133	36.	81.00	4.1277E-08
XE-133M	46.	233.22	1.1717E-07
CS-134	34.	604.70	7.2374E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	36.	268.24	1.2895E-07
I-135	10.	1260.41	1.0355E-05
XE-135	51.	249.79	5.4051E-07
XE-135M	0.	526.56	Half-Life too short

Sample ID : EFT-62011-0NEW Acquisition date : 22-JUN-2011 17:40:01

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-136	17.	818.50	7.4408E-09
I-136	0.	1313.02	Half-Life too short
CS-137	14.	661.65	5.7340E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	55.	165.85	7.2887E-09
CS-139	0.	1283.23	Half-Life too short
BA-140	30.	537.32	2.0708E-08
LA-140	9.	1596.49	2.1166E-08
BA-141	0.	190.22	Half-Life too short
CE-141	46.	145.44	1.2133E-08
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	55.	293.26	5.1380E-08
CE-144	40.	133.54	5.5365E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	33.	91.10	3.3794E-08
PM-148M	23.	550.27	6.1658E-09
EU-152	37.	344.27	2.1400E-08
EU-154	12.	1004.76	3.6116E-08
EU-155	42.	105.31	3.4629E-08
EU-156	19.	646.29	8.7795E-08
HF-181	32.	482.03	7.7106E-09
TA-182	12.	1221.42	2.7358E-08
W-187	19.	685.81	1.0587E-07
RE-188	45.	155.03	3.7761E-07
AU-199	55.	158.38	2.7084E-08
HG-203	49.	279.19	7.9978E-09
BI-207	26.	569.67	6.2056E-09
TL-208	0.	583.14	Half-Life too short
PB-212	61.	238.63	6.2553E-07
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	76.	240.98	2.8753E-07
RA-226	57.	186.21	1.8004E-07
AC-228	53.	338.32	5.8522E-08
TH-228	40.	84.37	8.6689E-07
PA-234	45.	131.20	1.1372E-05
TH-234	43.	63.29	9.1819E-07
U-235	53.	143.76	5.6942E-08
NP-239	44.	106.13	6.4640E-08
AM-241	34.	59.54	1.3495E-07

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-10211-8New

Sample Location (Well Number): EFT-8New

1. Representative sample collected. Date/Time 10/24/11 / 14:50

Sample collected by: Thomas Mow / [signature] Date: 10/24/11
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Thomas Mow / [signature] Date: 10/25/11
Printed Name / Signature

3. Sample counted in accordance with 76,000,70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: John M. Yoncon / [signature] Date: 11-1-11
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert C Wegner / [signature] Date: 11-3-11
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Ra[illegible] Engineer

Remarks _____

N

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-8NEW	
2 . Date Sampled	10/24/2011	
3 . Time Sampled	14:50	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	10/30/2011	
2 . Time Sample Counted	13:20	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	7.5	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	2548.6	cpm
Net Spike Count Rate (cpm)	2541.1	cpm
H3 Spike Activity (dpm on count date)	6383.7	dpm
Counter Efficiency	0.3981	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	9.3	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	1.8	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{\text{(Bkg cpm)}}{\text{(Bkg min.)}} + \frac{\text{(Bkg cpm)}}{\text{(Smpl min.)}}}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}} = 1.14\text{E-}06 \text{ uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency x 2.22E6 uCi/ml x Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 11-1-11

Reviewed _____ Date NOV 01 2011

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-102411-8New

Sample Location (Well Number): EFT-8New

1. Representative sample collected. Date/Time 10/24/11 / 14:50

Sample collected by: Thomas Mew / [signature] Date: 10/24/11
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Thomas Mew / [signature] Date: 10/25/11
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: C Prothit / [signature] Date: 11-2-11
Fermi 2 RP Printed Name Signature

Sample number: EFT-10241-8 New

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: C Pruitt / S Ruffin Date: 11-2-11
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert C Gregg II Date: 11-3-11
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks n/a

DETROIT EDISON FERMI-2 POWER PLANT 2-NOV-2011 14:03:49.02

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EFT-102411-8NEW

Sample End Time: 24-OCT-2011 14:50:00.00

REMARKS No plant Related Isotopes

PERFORMED BY:

Charles Ruppe
SIGNATURE

REVIEWED BY:

SIGNATURE/DATE

Sample ID : EFT-102411-0NEW Acquisition date : 2-NOV-2011 13:18:48

****

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********
Sample ID Number: EFT-102411-0NEW
Sample collection start date: 24-OCT-2011 14:50:00.00
Sample collection end date : 24-OCT-2011 14:50:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.000000E+03 cc
Sample geometry : MELL Operator: CLP

********** Acquisition Parameters **********
Detector number : DET 4 Acquire date : 2-NOV-2011 13:18:48.13
Preset live time : 0 00:45:00.00 Elapsed live time : 0 00:45:00.00
Elapsed real time : 0 00:45:00.62 Percent dead time : 0.03 %

********** Calibration Parameters **********
Detector number : DET 4 Yearly cal date : 14-JUN-2011 14:50:56.41
Kev/channel : 5.00053E-01 Zero offset: -5.47137E-01
Daily cal date : 2-NOV-2011 00:42:06.40

********** Peak Search Parameters **********
Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********
Energy tolerance : 1.75000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Fw	Cts/Sec	%Err	Fit
1	0	239.17	24	44	0.72	479.38	476	7	9.07E-03	49.6	
2	0	511.21	175	66	3.30	1023.41	1011	24	6.48E-02	14.4	
3	0	1461.39	66	5	2.58	2923.66	2913	21	2.44E-02	15.1	

Decay Time = 0 22:28:48.13
Acquisition Time = 2-NOV-2011 13:10:48.13

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	239.17	24	44	0.72	479.38	476	7	49.6		Pb-212 ann. Peak
0	511.21	175	66	3.30	1023.41	1011	24	14.4		
0	1461.39	66	5	2.58	2923.66	2913	21	15.1		K-40

11-3-11

Sample ID : EFT-102411-8NEW Acquisition date : 2-NOV-2011 13:18:40

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	66	10.67%	2.353E+00	2.626E-07	2.626E-07	15.07

Flag: "*" = Keyline

Sample ID : EFT-102411-BNEW Acquisition date : 2-NOV-2011 13:16:40

Total number of lines in spectrum	3	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	3	100.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+09Y	1.00	2.626E-07	2.626E-07	0.396E-07	15.07	
Total Activity :			2.626E-07	2.626E-07			
Grand Total Activity :			2.626E-07	2.626E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EFT-102411-8NEW Acquisition date : 2-NOV-2011 13:18:48

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	117.47	511.00*	193.46	4.534E+27	14.42	Decay
	% Abundances Found = 100.00						
BA-131	11.80D	0.76	78.76	0.73	---- Not Found ----		Abun.
			92.29	0.64	---- Not Found ----		
			123.80*	29.00	---- Not Found ----		
			133.61	2.16	---- Not Found ----		
			216.07	19.70	---- Not Found ----		
			239.62	2.40	2.854E-07	49.62	
			249.43	2.82	---- Not Found ----		
			373.24	14.00	---- Not Found ----		
			404.04	1.31	---- Not Found ----		
			480.40	0.32	---- Not Found ----		
			486.51	2.07	---- Not Found ----		
			496.31	46.00	---- Not Found ----		
			572.67	0.16	---- Not Found ----		
			585.03	1.22	---- Not Found ----		
			620.10	1.36	---- Not Found ----		
			923.85	0.73	---- Not Found ----		
			1047.57	1.17	---- Not Found ----		
	% Abundances Found =			1.90			
PB-212	10.64H	20.19	74.81	10.70	---- Not Found ----		Decay
			77.11	18.00	---- Not Found ----		
			87.30	8.00	---- Not Found ----		
			115.19	0.60	---- Not Found ----		
			238.63*	44.60	1.084E-02	49.62	
			300.09	3.41	---- Not Found ----		
	% Abundances Found =			52.20	(Abn. Limit = 44.60%)		

Flag: "*" = Keyline

Sample ID : EFT-102411-0NEW Acquisition date : 2-NOV-2011 13:10:40

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	239.17	24	44	0.72	479.38	476	7	9.07E-03	49.6	6.05E+00	T
0	511.21	175	66	3.30	1023.41	1011	24	6.48E-02	14.4	4.59E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 2-NOV-2011 14:03:54.22

'Sample ID : EFT-102411-8NEW

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	25.	477.59	5.8837E-08
F-18	0.	511.00	Half-Life too short
NA-22	10.	1274.54	6.9225E-09
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	13.	889.25	6.7429E-09
CR-51	36.	320.08	6.9054E-08
MN-54	26.	834.83	8.1766E-09
CO-56	10.	1238.25	1.0766E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	41.	158.38	1.4321E-08
CO-57	47.	122.06	7.6514E-09
CO-58	22.	810.76	7.9736E-09
FE-59	14.	1099.22	1.4670E-08
CO-60	18.	1332.49	9.1138E-09
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	11.	1115.52	1.3181E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	38.	136.00	9.3674E-09
AS-76	41.	559.10	4.7552E-06
BR-82	17.	776.49	5.0483E-07
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	65.	513.99	2.0550E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	65.	513.99	9.7797E-09
RB-86	9.	1076.63	9.3314E-08
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	7.	1836.01	7.5210E-09
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	15.	1204.90	2.9571E-06
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Sample ID : EFT-102411-8NEW Acquisition date : 2-NOV-2011 13:18:48

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
SR-93	0.	590.28	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	20.	702.63	6.0377E-09
NB-95	16.	765.79	7.1103E-09
NB-95M	53.	235.69	1.3515E-07
ZR-95	17.	756.72	1.2138E-08
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	20.	739.50	4.7154E-07
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	37.	497.08	8.8172E-09
TC-104	0.	357.99	Half-Life too short
RH-105	38.	318.90	1.9570E-06
RU-105	0.	724.50	Half-Life too short
RU-106	16.	621.84	5.1854E-08
CD-109	28.	88.03	2.1968E-07
AG-110M	23.	937.48	2.4790E-08
SN-113	31.	391.69	9.0000E-09
SN-117M	43.	158.56	9.4922E-09
SB-122	21.	563.93	7.6827E-08
SB-124	27.	602.71	7.1164E-09
SB-125	30.	427.89	1.9549E-08
TE-125M	33.	109.28	2.4420E-06
TE-127	0.	417.90	Half-Life too short
TE-127M	26.	57.60	1.8315E-05
XE-127	49.	202.84	9.7823E-09
TE-129	0.	459.60	Half-Life too short
TE-129M	20.	695.88	2.2026E-07
XE-129M	47.	196.56	2.3202E-07
I-130	0.	536.09	Half-Life too short
BA-131	56.	123.80	3.9758E-08
I-131	27.	364.48	1.3497E-08
TE-131	0.	149.72	Half-Life too short
TE-131M	22.	773.67	2.5924E-06
XE-131M	53.	163.93	4.9122E-07
I-132	0.	667.69	Half-Life too short
TE-132	55.	228.16	4.6540E-08
BA-133	38.	302.84	3.0732E-08
BA-133M	37.	276.09	1.3287E-06
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	27.	81.00	8.7135E-08
XE-133M	50.	233.22	9.6541E-07
CS-134	32.	604.70	7.0047E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	35.	268.24	5.6803E-06
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Sample ID : EFT-102411-8NEW Acquisition date : 2-NOV-2011 13:18:40

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-136	21.	818.50	1.1547E-08
I-136	0.	1313.02	Half-Life too short
CS-137	23.	661.65	7.2597E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	43.	165.85	6.7470E-09
CS-139	0.	1283.23	Half-Life too short
BA-140	28.	537.32	3.9359E-08
LA-140	10.	1596.49	3.2899E-07
BA-141	0.	190.22	Half-Life too short
CE-141	57.	145.44	1.5345E-08
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	41.	293.26	1.2134E-06
CE-144	46.	133.54	5.5213E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	29.	91.10	4.8051E-08
PM-148M	24.	550.27	7.0316E-09
EU-152	34.	344.27	2.0622E-08
EU-154	16.	1004.76	4.1017E-08
EU-155	47.	105.31	3.6399E-08
EU-156	20.	646.29	1.2031E-07
HF-181	29.	482.03	8.2178E-09
TA-182	10.	1221.42	2.6015E-08
W-187	13.	685.81	8.8083E-06
RE-188	0.	155.03	Half-Life too short
AU-199	41.	158.38	1.0027E-07
HG-203	45.	279.19	8.4965E-09
BI-207	22.	569.67	5.7053E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	42.	240.98	7.6565E-07
RA-226	47.	186.21	1.6363E-07
AC-228	34.	338.32	4.8215E-08
TH-228	49.	84.37	9.5648E-07
PA-234	0.	131.20	Half-Life too short
TH-234	38.	63.29	1.0378E-06
U-235	52.	143.76	5.6482E-08
NP-239	51.	106.13	4.7363E-07
AM-241	40.	59.54	1.4546E-07

EFT-8S

2010

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : Detroit Edison - Fermi 1
Address : PO Box 44440
Detroit, Michigan 48244

Report Date: February 17, 2010

Contact: Mr. Tom Mow
Project: **Fermi 1 - PO# 4700246055**

Client Sample ID:	EF1-8/S	Project:	ROIT00116
Sample ID:	245517015	Client ID:	ROIT001
Matrix:	Ground Water		
Collect Date:	04-JAN-10 10:30		
Receive Date:	25-JAN-10		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Rad Gas Flow Proportional Counting											
GFPC, Gross A/B, liquid "As Received"											
Alpha	U	1.55	+/-2.53	4.38	5.00	pCi/L		DXF3 02/11/10	1932	945896	1
Beta		15.5	+/-3.27	3.45	5.00	pCi/L					

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 900.0	

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : Detroit Edison - Fermi 1
Address : PO Box 44440
Detroit, Michigan 48244
Contact: Mr. Tom Mow
Project: Fermi 1 - PO# 4700246055

Report Date: December 30, 2010

Client Sample ID: EFT-102510-8SR NEW
Sample ID: 268144012
Matrix: Water
Collect Date: 25-OCT-10 13:50
Receive Date: 06-DEC-10
Collector: Client

Project: ROIT00116
Client ID: ROIT001

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Rad Gas Flow Proportional Counting											
GFPC, Gross A/B, liquid "As Received"											
Alpha		3.96	+/-2.69	3.46	5.00	pCi/L		VXC2 12/27/10	1939	1059089	1
Beta		9.77	+/-3.43	4.88	5.00	pCi/L					

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 900.0/SW846 9310	

EFT-9S

2006

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-9S060706

Sample Location (Well Number): EFT-9S

1. Representative sample collected. Date/Time 06/07/06 / 0842

Sample collected by: Jay Slobeck / Jay Slobeck Collection Date: 06/07/06
Printed Name / Signature Signed: 02/01/07

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Christopher Frilling / Christ AFrilling Date: 08/07/06
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: Russ Bangert Date: 2-5-7
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: William V. Lipton / William V. Lipton Date: 2/15/2007
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks No tritium detected. William V. Lipton 4866 2/15/2007

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-9S060706	
2 . Date Sampled	06/07/2006	
3 . Time Sampled	08:42	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	02/02/2007	
2 . Time Sample Counted	10:00	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	7.4	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	3388.1	cpm
Net Spike Count Rate (cpm)	3380.7	cpm
H3 Spike Activity (dpm on count date)	8340.7	dpm
Counter Efficiency	0.4053	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	6.1	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.0	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{\text{(Bkg cpm)}}{\text{(Bkg min.)}} + \frac{\text{(Bkg cpm)}}{\text{(Smpl min.)}}}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}} = 1.12\text{E-}06 \text{ uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 2-5-7

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-95060706

Sample Location (Well Number): EFT-95

1. Representative sample collected. Date/Time 06/07/06 / 0842

Sample collected by: Joy Slaback / Joy Marie Slaback Collection Date: 06/07/06
Printed Name / Signature Signed 02/01/07

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Christopher Frailing / Christ A Frailing Date: 06/07/06
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: KS/1N0509 / KO Date: 8-17-07
Fermi 2 RP Printed Name Signature

Sample number: EFT-95060706

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: Chris Hubbard [signature] Date: 7-2-07
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: KD LINDSEY [signature] Date: 7-17-07
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EF1 EFT-9S060706

Sample End Time: 7-JUN-2006 00:42:00.00

REMARKS

PERFORMED BY:

SIGNATURE

REVIEWED BY:

SIGNATURE/DATE 7-17-07

Sample ID : EF1 EFT-9S060706 Acquisition date : 2-JUL-2007 11:37:03

****

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********

Sample ID Number: EF1 EFT-9S060706
Sample collection start date: 7-JUN-2006 08:42:00.00
Sample collection end date : 7-JUN-2006 08:42:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.00000E+03 CC
Sample geometry : M2LL Operator: CMH

********** Acquisition Parameters **********

Detector number : DET 4 Acquire date : 2-JUL-2007 11:37:03.76
Preset live time : 0 00:30:00.00 Elapsed live time : 0 00:30:00.00
Elapsed real time : 0 00:30:00.90 Percent dead time : 0.05 %

********** Calibration Parameters **********

Detector number : DET 4 Yearly cal date : 20-JUN-2007 12:16:46.16
Kev/channel : 4.99646E-01 Zero offset: 5.21199E-02
Daily cal date : 2-JUL-2007 10:33:40.50

********** Peak Search Parameters **********

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********

Energy tolerance : 2.00000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	190.50	32	31	0.88	397.10	394	7	1.78E-02	34.0	
2	0	351.94	33	36	1.05	704.27	699	11	1.82E-02	39.4	Pb-214
3	3	510.70	83	35	2.34	1021.98	1013	22	4.61E-02	20.9	8.16E-01
4	3	512.29	42	35	2.33	1025.17	1013	22	2.31E-02	41.3	annihilatio
5	0	559.74	45	41	2.10	1120.12	1112	18	2.40E-02	38.1	H-C
6	0	659.46	17	7	0.87	1319.69	1314	10	9.19E-03	39.5	
7	0	1236.29	12	2	1.55	2474.04	2470	8	6.75E-03	34.9	Bi-214
8	0	1461.13	52	6	2.22	2923.96	2910	13	2.91E-02	17.0	K-40

04-12-07

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	190.50	32	31	0.08	397.10	394	7	34.0		
0	351.94	33	36	1.05	704.27	699	11	39.4		
3	510.70	83	35	2.34	1021.98	1013	22	20.9	8.16E-01	
3	512.29	42	35	2.33	1025.17	1013	22	41.3		SR-85
										KR-85
0	559.74	45	41	2.18	1120.12	1112	10	30.1		
0	659.46	17	7	0.87	1319.69	1314	10	39.5		
0	1236.29	12	2	1.55	2474.04	2470	8	34.9		
0	1461.13	52	6	2.22	2923.96	2910	13	17.0		K-40

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/CC	Decay Corr uCi/CC	1-Sigma %Error
K-40	1460.81	52	10.67*	2.501E+00	2.945E-07	2.945E-07	16.99

Nuclide Type: fission gas

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/CC	Decay Corr uCi/CC	1-Sigma %Error
KR-85	513.99	42	0.43*	4.874E+00	2.981E-06	3.194E-06	41.32

Nuclide Type: activation

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/CC	Decay Corr uCi/CC	1-Sigma %Error
SR-85	513.99	42	99.27*	4.874E+00	1.291E-08	8.361E-07	41.32

Flag: "*" = Keyline

Sample ID : EF1 EFT-95060706 Acquisition date : 2-JUL-2007 11:37:03

Total number of lines in spectrum	8	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	8	100.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/CC	Decay Corr uCi/CC	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	2.945E-07	2.945E-07	0.500E-07	16.99	
	Total Activity :		2.945E-07	2.945E-07			

Nuclide Type : fission gas

Nuclide	Hlife	Decay	Uncorrected uCi/CC	Decay Corr uCi/CC	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
KR-85	10.72Y	1.07	2.981E-06	3.194E-06	1.320E-06	41.32	
	Total Activity :		2.981E-06	3.194E-06			

Nuclide Type : activation

Nuclide	Hlife	Decay	Uncorrected uCi/CC	Decay Corr uCi/CC	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
SR-85	64.84D	64.8	1.291E-08	8.361E-07	3.454E-07	41.32	
	Total Activity :		1.291E-08	8.361E-07			
Grand Total Activity :			3.280E-06	4.325E-06			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EF1 EFT-960060706 Acquisition date : 2-JUL-2007 11:37:03

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/CC)	1-Sigma %Error	Rejected by
F-18	109.74M	5119.20	511.00*	193.46	1.000E+35	20.92	Decay
		% Abundances Found =		100.00			
CO-56	78.76D	4.95	846.75	99.96	---- Not Found ----		Abun.
			1037.82	14.03	---- Not Found ----		
			1238.25*	67.00	3.069E-07	34.94	
			1360.21	4.29	---- Not Found ----		
			1771.40	15.51	---- Not Found ----		
			2015.35	3.03	---- Not Found ----		
			2034.91	7.78	---- Not Found ----		
		% Abundances Found =		31.66			
SE-75	119.78D	3.26	66.05	1.02	---- Not Found ----		Abun.
			96.73	3.41	---- Not Found ----		
			121.12	16.70	---- Not Found ----		
			136.00*	59.20	---- Not Found ----		
			198.60	1.45	4.799E-06	33.90	
			264.65	59.00	---- Not Found ----		
			279.53	25.20	---- Not Found ----		
			303.91	1.32	---- Not Found ----		
			400.65	11.40	---- Not Found ----		
		% Abundances Found =		0.01			
AS-76	26.32H	355.74	559.10*	44.70	1.000E+35	38.00	Decay,Abun.
			563.23	1.17	---- Not Found ----		
			571.30	0.14	---- Not Found ----		
			657.03	6.10	---- Not Found ----		
			665.31	0.39	---- Not Found ----		
			740.12	0.12	---- Not Found ----		
			771.76	0.12	---- Not Found ----		
			867.63	0.12	---- Not Found ----		
			1129.07	0.14	---- Not Found ----		
			1212.72	1.63	---- Not Found ----		
			1216.02	3.04	---- Not Found ----		
			1228.52	1.39	---- Not Found ----		
			1439.13	0.33	---- Not Found ----		
			1453.60	0.13	---- Not Found ----		
			1707.67	0.33	---- Not Found ----		
		% Abundances Found =		73.70			
RB-89	15.44M	36385.37	272.45	1.42	---- Not Found ----		Decay,Abun.
			657.71	10.00	1.000E+35	39.53	
			947.69	9.20	---- Not Found ----		
			1031.88*	58.00	---- Not Found ----		
			1248.10	42.00	---- Not Found ----		
			1538.08	2.60	---- Not Found ----		
			2007.54	2.40	---- Not Found ----		
		% Abundances Found =		7.96			
Y-92	3.54H	2644.96	448.50	2.30	---- Not Found ----		Decay,Abun.
			561.10	2.40	1.000E+35	38.00	
			844.30	1.25	---- Not Found ----		

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/CC)	1-Sigma %Error	Rejected by
Y-92	3.54H	2644.96	934.46*	13.90	----- Not Found -----		Decay,Abun.
			1405.40	4.80	----- Not Found -----		
		% Abundances Found =		9.74			
NB-97	72.10M	7791.82	657.90*	98.09	1.000E+35	39.53	Decay
			1024.50	1.00	----- Not Found -----		
		% Abundances Found =		98.91			
AG-110M	249.85D	1.56	657.75	94.40	1.702E-00	39.53	Abun.
			677.61	10.60	----- Not Found -----		
			686.99	6.47	----- Not Found -----		
			706.67	16.68	----- Not Found -----		
			763.93	22.28	----- Not Found -----		
			818.02	7.30	----- Not Found -----		
			884.67	72.60	----- Not Found -----		
			937.48*	34.20	----- Not Found -----		
			1384.27	24.26	----- Not Found -----		
			1505.00	13.06	----- Not Found -----		
		% Abundances Found =		31.27			
XE-129M	8.89D	43.88	196.56*	4.74	2.493E+06	33.90	Decay
		% Abundances Found =		100.00			
I-133	20.80H	450.15	529.87*	86.30	----- Not Found -----		Decay,Abun.
			706.50	1.49	----- Not Found -----		
			856.20	1.23	----- Not Found -----		
			875.33	4.47	----- Not Found -----		
			1236.41	1.49	1.000E+35	34.94	
			1298.22	2.33	----- Not Found -----		
		% Abundances Found =		1.53			
CS-136	13.16D	29.65	66.91	12.50	----- Not Found -----		Decay,Abun.
			86.29	6.30	----- Not Found -----		
			153.22	7.46	----- Not Found -----		
			163.89	4.61	----- Not Found -----		
			176.55	13.56	----- Not Found -----		
			273.65	12.66	----- Not Found -----		
			340.57	48.50	----- Not Found -----		
			818.50*	99.70	----- Not Found -----		
			1048.07	79.60	----- Not Found -----		
			1235.34	19.70	2.829E+01	34.94	
		% Abundances Found =		6.47			
BI-214	19.90M	28230.66	609.31*	46.30	----- Not Found -----		Decay,Abun.
			768.36	5.04	----- Not Found -----		
			934.06	3.21	----- Not Found -----		
			1120.29	15.10	----- Not Found -----		
			1238.11	5.94	1.000E+35	34.94	
			1377.67	4.11	----- Not Found -----		
			1764.49	15.80	----- Not Found -----		
		% Abundances Found =		6.22	(Abn. Limit = 40.40%)		

Sample ID : EF1 EFT-95060706 Acquisition date : 2-JUL-2007 11:37:03

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/CC)	1-Sigma %Error	Rejected by
PB-214	26.80M	20962.32	87.30	4.67	----- Not Found -----		Decay
			241.98	7.49	----- Not Found -----		
			295.21	19.20	----- Not Found -----		
			351.92*	37.20	1.000E+35	39.30	
			785.91	1.10	----- Not Found -----		
		% Abundances Found =		53.40	(Abn. Limit = 37.20%)		

Flag: "*" = Keyline

Sample ID : EF1 EFT-930600706 Acquisition date : 2-JUL-2007 11:37:03

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	190.50	32	31	0.88	397.10	394	7	1.70E-02	34.0	6.60E+00	T
0	351.94	33	36	1.05	704.27	699	11	1.02E-02	39.4	5.70E+00	T
3	510.70	83	35	2.34	1021.98	1013	22	4.61E-02	20.9	4.80E+00	T
0	559.74	45	41	2.10	1120.12	1112	10	2.40E-02	30.1	4.60E+00	T
0	659.46	17	7	0.87	1319.69	1314	10	9.19E-03	39.5	4.36E+00	T
0	1236.29	12	2	1.55	2474.04	2470	8	6.75E-03	34.9	2.75E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 2-JUL-2007 12:07:13.00

Sample ID : EF1 EFT-9S060706

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/CC)
BE-7	29.	477.59	1.2561E-05
F-18	0.	511.00	Half-Life too short
NA-22	0.	1274.54	1.1618E-08
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	7.	889.25	1.7249E-07
CR-51	0.	320.08	Half-Life too short
MN-54	7.	834.83	1.5336E-08
CO-56	14.	1238.25	5.0301E-07
MN-56	0.	1810.69	Half-Life too short
NI-56	0.	158.38	Half-Life too short
CO-57	41.	122.06	2.6858E-08
CO-58	16.	810.76	4.0478E-07
FE-59	10.	1099.22	6.8899E-06
CO-60	10.	1332.49	1.1436E-08
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	7.	1115.52	4.6498E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	32.	136.00	1.1244E-07
AS-76	0.	559.10	Half-Life too short
BR-82	0.	776.49	Half-Life too short
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85M	0.	151.18	Half-Life too short
RB-86	0.	1076.63	Half-Life too short
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	3.	1836.01	8.7669E-08
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	11.	1204.90	3.2659E-04
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short
SR-93	0.	590.28	Half-Life too short
Y-93	0.	266.90	Half-Life too short

Sample ID : EF1 EFT-95060706 Acquisition date : 2-JUL-2007 11:37:03

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/CC)
NB-94	24.	702.63	9.2530E-09
NB-95	0.	765.79	Half-Life too short
NB-95M	0.	235.69	Half-Life too short
ZR-95	0.	756.72	7.7186E-07
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	0.	739.50	Half-Life too short
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	22.	497.08	8.0503E-06
TC-104	0.	357.99	Half-Life too short
RH-105	0.	318.90	Half-Life too short
RU-105	0.	724.50	Half-Life too short
RU-106	17.	621.94	1.5749E-07
CD-109	40.	88.03	6.5611E-07
AG-110M	3.	937.48	4.4606E-08
SN-113	33.	391.69	1.2911E-07
SN-117M	0.	158.56	Half-Life too short
SB-122	0.	563.93	Half-Life too short
SB-124	21.	602.71	7.1948E-07
SB-125	20.	427.89	2.9609E-08
TE-125M	25.	109.28	2.8966E-04
TE-127	0.	417.90	Half-Life too short
TE-127M	28.	57.60	2.7485E-04
XE-127	0.	202.84	Half-Life too short
TE-129	0.	459.60	Half-Life too short
TE-129M	0.	695.88	Half-Life too short
XE-129M	0.	196.56	Half-Life too short
I-130	0.	536.09	Half-Life too short
BA-131	0.	123.80	Half-Life too short
I-131	0.	364.48	Half-Life too short
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	0.	163.93	Half-Life too short
I-132	0.	667.69	Half-Life too short
TE-132	0.	228.16	Half-Life too short
BA-133	33.	302.84	4.4348E-08
BA-133M	0.	276.09	Half-Life too short
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	0.	81.00	Half-Life too short
XE-133M	0.	233.22	Half-Life too short
CS-134	19.	604.70	1.1230E-08
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short
CS-136	0.	818.50	Half-Life too short
I-136	0.	1313.02	Half-Life too short

Sample ID : EF1 EFT-9S060706 Acquisition date : 2-JUL-2007 11:37:03

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/CC)
CS-137	16.	661.65	0.9681E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	54.	165.85	7.2859E-08
CS-139	0.	1283.23	Half-Life too short
BA-140	0.	537.32	Half-Life too short
LA-140	0.	1596.49	Half-Life too short
BA-141	0.	190.22	Half-Life too short
CE-141	0.	145.44	Half-Life too short
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	0.	293.26	Half-Life too short
CE-144	42.	133.54	1.9084E-07
PR-144	0.	1489.15	Half-Life too short
ND-147	0.	91.10	Half-Life too short
PM-148M	19.	550.27	5.4118E-06
EU-152	30.	344.27	2.9557E-08
EU-154	9.	1004.76	5.0098E-08
EU-156	0.	646.29	Half-Life too short
HF-181	20.	482.03	5.0486E-06
TA-182	15.	1221.42	4.3966E-07
W-187	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
HG-203	43.	279.19	3.4515E-06
BI-207	10.	569.67	7.6264E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	0.	240.98	Half-Life too short
RA-226	50.	186.21	2.4432E-07
AC-228	31.	338.32	7.3637E-08
TH-228	28.	84.37	1.5570E-06
PA-234	0.	131.20	Half-Life too short
TH-234	0.	63.29	Half-Life too short
U-235	52.	143.76	7.9719E-08
NP-239	0.	106.13	Half-Life too short
AM-241	29.	59.54	1.7148E-07

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-9S060706

Sample Location (Well Number): EFT-9S

1. Representative sample collected. Date/Time 06/07/06 / 0842

Sample collected by: Jay Slebach for T Seaghdha [signature] Date: 06/07/06
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Christopher Frilling / Chris AFrilling Date: 06/07/06
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: Russ Bunger [signature] Date: 8-3-06
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: K O LINDSEY K O Lindsey Date: 7-21-06
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-9S	
2 . Date Sampled	06/07/2006	
3 . Time Sampled	08:42	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	08/03/2006	
2 . Time Sample Counted	12:30	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	8.3	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	3619.6	cpm
Net Spike Count Rate (cpm)	3611.3	cpm
H3 Spike Activity (dpm on count date)	8580.4	dpm
Counter Efficiency	0.4209	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	10.2	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	1.9	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.1	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{\text{(Bkg cpm)}}{\text{(Bkg min.)}} + \frac{\text{(Bkg cpm)}}{\text{(Smpl min.)}}}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}} = 1.14\text{E-}06 \text{ uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency x 2.22E6 uCi/ml x Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 8-3-06

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-9506070C

Sample Location (Well Number): EFT-9S

1. Representative sample collected. Date/Time 06/07/06 / 0842

Sample collected by: Jay Slabach / Jay Slabach Date: 06/07/06
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Christopher Frailing / Christopher A Frailing Date: 06/07/06
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: Abere / Andrew Abere Date: 8-5-06
Fermi 2 RP Printed Name Signature

Sample number: EFT-95060706

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
. (Note disposition of unidentified peaks in "Remarks")

Performed by: Abere / Andrea Abere Date: 8-5-06
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: KD LINDSEY / KD Lindsey Date: 2-21-08
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

DETROIT EDISON FERMI-2 POWER PLANT 5-AUG-2006 16:20:03.10

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EFT-9606070706 EF1

Sample End Time: 7-JUN-2006 00:42:00.00

REMARKS

PERFORMED BY:

SIGNATURE

REVIEWED BY:

SIGNATURE/DATE 2-21-07

PAGE ____ of ____

Sample ID: EFT-2506070706 EF1 Acquisition date: 5-AUG-2006 15:49:50

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********
Sample ID Number: EFT-2506070706 EF1
Sample collection start date: 7-JUN-2006 00:42:00.00
Sample collection end date : 7-JUN-2006 00:42:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.000000E+03 cc
Sample geometry : MAR1 Operator: DFD

********** Acquisition Parameters **********
Detector ID : DET 4 Acquire date : 5-AUG-2006 15:49:50.21
Preset live time : 0 00:30:00.00 Elapsed live time : 0 00:30:00.00
Elapsed real time : 0 00:30:01.01 Percent dead time : 0.00 %

********** Calibration Parameters **********
Detector number : DET 4 Yearly cal date : 26-APR-2006 11:50:00.00
Kev/channel : 5.001438E-01 Zero offset : -3.566E-02
Daily cal date : 5-AUG-2006 07:47:37

********** Peak Search Parameters **********
Start channel : 100 End channel : 4096
Peak sensitivity : 5.00000 Shape sensitivity : 1.000000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********
Energy tolerance : 2.00000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_MAR1 Efficiencies at : Peak energy

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	66.11	52	26	1.91	132.40	129	7	3.21E-02	19.2	
2	0	511.30	149	67	2.02	1022.62	1012	22	8.29E-02	16.1	
3	0	558.56	66	32	2.33	1117.18	1109	14	3.70E-02	21.3	
4	0	611.28	38	33	1.73	1222.66	1217	16	2.12E-02	38.4	
5	0	1461.15	75	4	2.05	2923.98	2916	14	4.17E-02	12.7	

Sample Title : [illegible]
Peak Time Calibration Acquisition Time - 5-AUG-[illegible]

Peak Search Report

ID	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	66.21	50	26	1.91	132.40	129	7	19.9		Pb-212
0	511.36	149	61	[illegible]	1012	99	16.1			Annihilation
0	558.56	68	32	2.33	1117.10	1109	14	21.3		TlKα
0	611.28	38	33	1.73	1222.66	1217	16	38.4		Bi-214
0	1461.15	75	4	2.85	2923.90	2916	14	12.7		K-40

Nuclide Type: natural

Nuclide	Energy	Area	Abn	MDA	Uncorrected Density (Bq/g)	Density (uCi/gm)	T-Cupe% Error
K-40	1460.81	75	10.67%	2.308E+00	4.503E-07	4.504E-07	12.72

Flags: "<" = Keyline

Acquisition date : 5-Aug-2006 15:49:58

Total number of lines in spectrum 5
Number of unidentified lines 0
Number of lines in nuclide ID quality [illegible] 5 10%(1σ)

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1 Sigma %Error	Flags
K-40	1.28E+09Y	1.00	4.580E-07	4.580E-07	0.582E-07	12.72	
	Total Activity :		1.540E-07	1.540E-07			
Grand Total Activity :			4.580E-07	4.58[illegible]-07			

Flags: "K" = Keyline not found
"E" = Manually edited
"M" = Manually accepted
"G" = Nuclide specific abn. limit

Nuclide	Half life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
I-128	24.99M	779.25	511.00*	19.16	1.000E-00	16.13	Unk.
		% Abundances Found =		100.00			
CE-75	13.7	0.50	66.05	1.02	1.260E-00	15.93	Abun.
			76.73	3.41	Not Found		
			121.12	16.70	Not Found		
			136.00*	59.20	Not Found		
			198.60	1.45	Not Found		
			264.65	59.80	Not Found		
			279.53	25.20	Not Found		
			303.91	1.32	Not Found		
			400.65	11.40	Not Found		
		% Abundances Found =		0.57			
AS-76	26.32H	54.00	559.10*	44.70	1.010E+00	21.20	Decay,Abun.
			563.23	1.17	Not Found		
			571.30	0.14	Not Found		
			657.03	6.10	Not Found		
			665.11	0.11	Not Found		
			776.52	0.12	Not Found		
			783.76	0.10	Not Found		
			867.63	0.12	Not Found		
			1129.07	0.14	Not Found		
			1212.72	1.63	Not Found		
			1216.02	3.84	Not Found		
			1228.52	1.39	Not Found		
			1439.13	0.33	Not Found		
			1453.60	0.13	Not Found		
			1707.67	0.33	Not Found		
		% Abundances Found =		73.70			
RU-103	39.35D	1.51	497.08*	89.00	Not Found		Abun.
			610.33	5.60	7.001E-07	38.39	
		% Abundances Found =		5.92			
CS-136	13.16D	4.51	66.91	12.50	1.230E-05	19.93	Abun.
			86.54	6.34	Not Found		
			153.22	7.46	Not Found		
			163.89	4.61	Not Found		
			176.55	13.50	Not Found		
			273.65	12.60	Not Found		
			340.57	44.50	Not Found		
			818.50*	99.70	Not Found		
			1048.07	79.60	Not Found		
			1235.34	19.70	Not Found		
		% Abundances Found =		4.10			
PM-146M	41.30D	1.44	288.11	12.56	Not Found		Abun.
			414.07	18.66	Not Found		
			430.72	5.35	Not Found		
			501.82	6.75	Not Found		
			550.27*	94.90	Not Found		

Sample ID : EFT-95060706 EF1 Acquisition date : 5-AUG-2006 10:49:58

Nuclide	Half-life	Half-life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
Tl-210	1.30m	2.34	300.09	82.50	Not Found		Abun.
			611.86	5.48	6.610E-07	38.39	
			629.97	49.00	Not Found		
			725.78	32.60	Not Found		
			915.35	17.17	Not Found		
			1013.81	20.30	Not Found		
		% Abundances Found =		1.74			
Tl-182	114.74D	0.52	67.75	42.30	2.000E-07	19.93	Abun.
			100.19	14.10	Not Found		
			1189.05	16.30	Not Found		
			1221.42*	27.10	Not Found		
			1230.97	11.50	Not Found		
		% Abundances Found =		38.01			
Bi-214	19.90m	291.61	609.31*	46.30	1.000E+35	38.39	Decay
			768.36	5.04	Not Found		
			934.06	3.21	Not Found		
			1120.29	15.10	Not Found		
			1238.11	5.94	Not Found		
			1377.67	4.11	Not Found		
			1764.49	15.80	Not Found		
		% Abundances Found =		48.48	(Abn. Limit = 48.48%)		

Flag: "*" = Keyline

Ib	Energy	Area	Bkgnd	FWHM	Chan	Width	Cts	Area	Bkgnd	Flag
0	86.21	58	26	1.91	132.40	1.59	7	3.81E-02	13.7	1.30E+00	T
0	511.30	149	67	2.02	1022.62	1012	22	8.29E-02	16.1	4.48E+00	T
0	550.56	60	32	2.33	1117.10	1109	14	3.78E-02	21.3	4.31E+00	T
0	611.05	30	33	1.73	1222.66	1217	16	2.12E-02	38.4	5.16E+00	T

Flags: "T" = Tentatively associated

[illegible] MDA Report, Sample 5 JUL 2006 16:20:06.96

[illegible] f-93A(7)2, CT1

[illegible] Detectable Activity Report

Nuclide	Background Sum	Energy (keV)	MDA (uCi/cc)
BE-7	25.	477.59	1.0791E-07
F-18	0.	511.00	Half-Life too short
[illegible]-22	9.	1274.54	1.0374E-08
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
CA-47	11.	489.25	1.4678E-08
CR-51	45.	320.08	3.9824E-07
MN-54	12.	834.83	1.0230E-08
CO-56	13.	1238.25	2.9198E-08
MN-56	0.	1810.69	Half-Life too short
NI-57	60.	158.38	8.1176E-06
CO-57	46.	122.06	1.3283E-08
CO-58	16.	810.76	1.7445E-08
FE-59	14.	1099.22	4.7563E-08
CO-60	14.	1332.49	1.2798E-08
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	16.	1115.52	2.7301E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	50.	136.00	2.5114E-08
AS-76	0.	559.10	Half-Life too short
BR-77	0.	776.49	Half-Life too short
B[illegible]	0.	554.33	[illegible]
BR-84	0.	881.50	Half-Life too short
BR-83	0.	802.41	Half-Life too short
KR-85	53.	513.99	2.8872E-06
KR-85M	0.	151.19	Half-Life too short
SR-85	53.	513.99	2.3330E-08
RB-86	14.	1076.63	1.1514E-08
KR-87	0.	402.59	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	3.	1836.01	1.1720E-08
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
SR-90	0.	1118.69	Half-Life too short
Y-90	0.	631.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	8.	1204.90	6.2378E-06
[illegible]	0.	551.64	Half-Life too short
[illegible]	0.	1836.04	Half-Life too short
Y-92	0.	934.46	[illegible]

Nuclide	Weighted Sum	Energy (keV)	MDA (uCi/cc)
[illegible]	0.	5[illegible]	Half-Life too short
[illegible]	6.	266.90	Half-Life too short
[illegible]	26.	7[illegible]	1.0[illegible]E-08
NB-95	16.	765.79	2.9683E-08
[illegible]	0.	2[illegible]	Half-Life too short
ZR-95	14.	756.72	2.9384E-08
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	0.	739.50	Half-Life too short
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	18.	497.08	2.3967E-08
TC-104	0.	357.99	Half-Life too short
RH-105	0.	318.90	Half-Life too short
RU-105	0.	724.50	Half-Life too short
RU-106	25.	621.84	1.0695E-07
CD-109	36.	88.03	4.2[illegible]E-07
SB-116M	7.	937.48	2.6512E-08
SN-113	32.	391.69	1.9100E-08
SN-117M	61.	158.56	2.[illegible]37E-07
SB-[illegible]	0.	563.93	Half-Life too short
SB-124	34.	602.71	2.1749E-08
SB-125	36.	427.89	3.3613E-[illegible]
TE-125M	47.	109.28	8.1500E-06
TE-127	0.	417.90	Half-Life too short
TE-127M	36.	57.60	3.5935E-05
XE-127	46.	202.84	3.[illegible]4[illegible]E-[illegible]
TE-129	0.	459.60	Half-Life too short
TE-129M	20.	695.88	9.3913E-07
XE-129M	51.	196.56	1.9146E-05
I-130	0.	536.09	Half-Life too short
BA-131	31.	123.80	1.1359E-06
I-131	37.	364.48	1.0467E-[illegible]
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	63.	163.93	1.5784E-05
I-132	0.	667.69	Half-Life too short
TE-132	0.	228.16	Half-Life too short
BA-133	33.	302.84	4.6312E-08
BA-133M	0.	276.09	Half-Life too short
I-133	0.	529.87	Half-Life too short
[illegible]-133M	0.	912.58	Half-Life too short
XE-133	0.	81.00	Half-Life too short
XE-133M	0.	233.22	Half-Life too short
CS-134	30.	604.70	1.0[illegible]E-07
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Nuclide	Y Signal Sum	Energy (keV)	MDA (uCi/cc)
CS-136	11.	818.50	1.9104E-07
I-136	0.	1313.02	Half-Life too short
CS-137	19.	661.65	1.0174E-07
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.80	Half-Life too short
[illegible]	0.	250.31	Half-Life too short
BA-139	0.	1777.00	Half-Life too short
CE-139	65	165.85	1.5143E-09
CS-140	0.	1204.20	Half-Life too short
BA-140	20.	537.32	8.0552E-07
[illegible]	0.	1596.45	Half-Life too short
BA-141	0.	190.22	Half-Life too short
CE-141	59.	145.44	7.1020E-08
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
[illegible]143	0.	293.26	Half-Life too short
[illegible]	58.	133.54	1.0752E-07
PR-143	0.	1489.15	Half-Life too short
ND-147	42.	91.10	2.1947E-06
SM-147M	24.	550.27	2.4235E-08
EU-152	39.	344.27	3.4853E-08
EU-154	15.	1004.76	6.1759E-08
EU-155	14.	646.29	1.5771E-06
HF-181	25.	482.03	2.7143E-08
TA-182	12.	1221.42	5.7979E-08
W-187	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
HG-203	36.	279.19	2.5980E-08
BI-207	23.	569.67	9.0283E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	5.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	0.	240.98	Half-Life too short
RA-226	47.	186.21	2.5738E-07
AC-228	38.	338.32	8.0571E-08
TH-228	43.	84.37	1.5176E-06
PA-234	0.	131.30	Half-Life too short
TH-234	42.	63.29	6.9949E-06
U-235	44.	143.76	8.1079E-08
NP-239	0.	106.13	Half-Life too short
PU-241	52.	59.54	2.3051E-07

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-95121206

Sample Location (Well Number): EFT-95

1. Representative sample collected. Date/Time 12/12/06 / 11:10

Sample collected by: ~~J. Slaybaek~~ J. Slaback 2nd 02/01/07 / Mary Marie Slaback Date: 02/01/07
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: J. Southward / Jennifer Southward Date: 2/2/07
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: D. Howard / D Howard Date: APR 20 2007
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: K.J. Kingsley / K J Kingsley Date: 11-14-07
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-95121206	
2 . Date Sampled	12/12/2006	
3 . Time Sampled	11:10	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	04/19/2007	
2 . Time Sample Counted	16:27	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	7.7	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	3407.6	cpm
Net Spike Count Rate (cpm)	3399.9	cpm
H3 Spike Activity (dpm on count date)	8243.8	dpm
Counter Efficiency	0.4124	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	7.6	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.0	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{(\text{Bkg cpm})}{(\text{Bkg min.})} + \frac{(\text{Bkg cpm})}{(\text{Smpl min.})}}}{\text{Efficiency} \times 2.22\text{E6 dpm/uCi} \times \text{Sample Volume}} = 1.12\text{E-06 uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency} \times 2.22\text{E6 uCi/ml} \times \text{Sample Volume}} < \textbf{MDA}$$

Technician _____ Date APR 20 2007

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-95 121206

Sample Location (Well Number): EFT-95

1. Representative sample collected. Date/Time 12/12/06 / 1110

Sample collected by: J. Slaback / Jeri Marie Slaback Date: 02/01/06
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: J. Southward / Jennifer Southward Date: 2/2/07
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: KD Lindsey / KD Lindsey Date: 8-8-07
Fermi 2 RP Printed Name / Signature

Sample number: EFT - 95 121206

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
. (Note disposition of unidentified peaks in "Remarks")

Performed by: Chris Hubbard [signature] Date: 7-16-07
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: K J Lindsay [signature] Date: 8-8-07
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

DETROIT EDISON FERMI-2 POWER PLANT 16-JUL-2007 02:10:54.07

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EF1 EFT-95121206

Sample End Time: 12-DEC-2006 11:10:00.00

REMARKS

PERFORMED BY:

SIGNATURE

REVIEWED BY:

8-8-07

SIGNATURE/DATE

Sample ID : EF1 EFT-96121206 Acquisition date : 16-JUL-2007 00:40:50

****

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********

Sample ID Number: EF1 EFT-96121206
Sample collection start date: 12-DEC-2006 11:10:00.00
Sample collection end date : 12-DEC-2006 11:10:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.00000E+03 CC
Sample geometry : M2LL Operator: CMH

********** Acquisition Parameters **********

Detector number : DET 4 Acquire date : 16-JUL-2007 00:40:50.05
Preset live time : 0 00:30:00.00 Elapsed live time : 0 00:30:00.00
Elapsed real time : 0 00:30:00.92 Percent dead time : 0.05 %

********** Calibration Parameters **********

Detector number : DET 4 Yearly cal date : 20-JUN-2007 12:16:46.16
Kev/channel : 4.99730E-01 Zero offset: -1.95000E-01
Daily cal date : 16-JUL-2007 00:37:10.01

********** Peak Search Parameters **********

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********

Energy tolerance : 2.00000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	140.55	46	105	0.80	281.64	275	14	2.56E-02	49.5	High error low FWHM
2	0	352.01	44	46	0.74	706.37	701	12	2.43E-02	35.0	PB-214
3	0	511.26	112	72	2.00	1023.43	1013	18	6.21E-02	20.2	annihilation
4	0	558.84	64	28	1.87	1118.63	1113	12	3.55E-02	21.1	Hwc
5	0	609.52	33	30	0.96	1220.03	1215	10	1.83E-02	35.6	BI-214
6	0	962.02	12	11	0.94	1925.37	1916	15	6.74E-03	66.6	High error (>50%) low FWHM
7	0	1461.00	53	0	2.61	2923.74	2917	15	2.94E-02	13.7	K-40

Decay Time = 215 21:30:50.05 Acquisition Time = 16-JUL-2007 08:40:50.0
5

Post-NID Peak Search Report

It	Energy		Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	140.55		46	105	0.00	281.64	275	14	49.5		
0	352.01	0	44	46	0.74	706.37	701	12	35.0		
0	511.26		112	72	2.00	1023.43	1013	18	20.2		
0	558.84		64	28	1.87	1118.63	1113	12	21.1		
0	609.52		33	30	0.96	1220.03	1215	10	35.6		
0	962.02		12	11	0.94	1925.37	1916	15	66.6		
0	1461.00		53	0	2.61	2923.74	2917	15	13.7		K-40

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/CC	Decay Corr uCi/CC	1-Sigma %Error
K-40	1460.81	53	10.67%	2.501E+00	2.982E-07	2.982E-07	13.74

Flag: "%" = Keyline

Sample ID : EF1 EFT-95121206 Acquisition date : 16-JUL-2007 08:40:50

Total number of lines in spectrum 7
Number of unidentified lines 0
Number of lines tentatively identified by NID 7 100.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/CC	Decay Corr uCi/CC	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	2.902E-07	2.902E-07	0.410E-07	13.74	
	Total Activity :		2.902E-07	2.902E-07			
	Grand Total Activity :		2.902E-07	2.902E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EF1 EFT-99121206 Acquisition date : 16-JUL-2007 08:40:50

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/CC)	1-Sigma %Error	Rejected by
F-18	109.74M	2833.11	511.00*	193.46	1.000E+35	20.18	Decay
	% Abundances Found =			100.00			
SC-46	83.83D	2.58	142.53	62.70	1.024E-07	49.50	Abun.
			889.25*	99.98	---- Not Found ----		
			1120.51	99.99	---- Not Found ----		
	% Abundances Found =			23.87			
AS-76	26.32H	196.88	559.10*	44.70	1.000E+35	21.13	Decay,Abun.
			563.23	1.17	---- Not Found ----		
			571.30	0.14	---- Not Found ----		
			657.03	6.10	---- Not Found ----		
			665.31	0.39	---- Not Found ----		
			740.12	0.12	---- Not Found ----		
			771.76	0.12	---- Not Found ----		
			867.63	0.12	---- Not Found ----		
			1129.87	0.14	---- Not Found ----		
			1212.72	1.63	---- Not Found ----		
			1216.02	3.04	---- Not Found ----		
			1228.52	1.39	---- Not Found ----		
			1439.13	0.33	---- Not Found ----		
			1453.60	0.13	---- Not Found ----		
			1787.67	0.33	---- Not Found ----		
	% Abundances Found =			73.70			
MO-99	66.02H	78.49	140.51	3.80	1.202E+17	49.50	Decay,Abun.
			181.06	6.20	---- Not Found ----		
			366.43	1.37	---- Not Found ----		
			739.50*	12.80	---- Not Found ----		
			778.00	4.50	---- Not Found ----		
	% Abundances Found =			13.25			
TC-99M	6.02H	860.76	140.50*	89.07	1.000E+35	49.50	Decay
	% Abundances Found =			100.00			
RU-103	39.35D	5.49	497.08*	89.00	---- Not Found ----		Abun.
			610.33	5.60	8.701E-06	35.60	
	% Abundances Found =			5.92			
XE-135	9.11H	568.80	249.79*	89.90	---- Not Found ----		Decay,Abun.
			608.19	2.89	1.000E+35	35.60	
	% Abundances Found =			3.11			
PM-148M	41.30D	5.23	288.11	12.56	---- Not Found ----		Abun.
			414.07	18.66	---- Not Found ----		
			432.78	5.35	---- Not Found ----		
			501.26	6.75	---- Not Found ----		
			550.27*	94.90	---- Not Found ----		
			599.74	12.54	---- Not Found ----		
			611.26	5.48	7.499E-06	35.60	
			629.97	89.00	---- Not Found ----		
			725.70	32.80	---- Not Found ----		

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/CC)	1-Sigma %Error	Rejected by
PM-148M	41.30D	5.23	915.33	17.17	---- Not Found ----		Abun.
			1013.81	20.30	---- Not Found ----		
		% Abundances	Found =	1.74			
EU-152	13.60Y	0.04	121.78	28.40	---- Not Found ----		Abun.
			244.69	7.49	---- Not Found ----		
			344.27*	26.50	---- Not Found ----		
			778.89	12.74	---- Not Found ----		
			867.32	4.16	---- Not Found ----		
			964.01	14.40	4.155E-08	66.56	
			1085.78	10.00	---- Not Found ----		
			1112.02	13.30	---- Not Found ----		
			1407.95	20.70	---- Not Found ----		
		% Abundances	Found =	10.46			
BI-214	19.90M	15623.41	609.31*	46.30	1.000E+35	35.60	Decay
			768.36	5.04	---- Not Found ----		
			934.06	3.21	---- Not Found ----		
			1120.29	15.10	---- Not Found ----		
			1238.11	5.94	---- Not Found ----		
			1377.67	4.11	---- Not Found ----		
			1764.49	15.00	---- Not Found ----		
		% Abundances	Found =	48.40	(Abn. Limit = 48.40%)		
PB-214	26.80M	11600.96	87.30	4.67	---- Not Found ----		Decay
			241.98	7.49	---- Not Found ----		
			295.21	19.20	---- Not Found ----		
			351.92*	37.20	1.000E+35	35.00	
			785.91	1.10	---- Not Found ----		
		% Abundances	Found =	53.40	(Abn. Limit = 37.20%)		

Flag: "*" = Keyline

Sample ID : EF1 EFT-95121206 Acquisition date : 16-JUL-2007 08:40:50

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	140.55	46	105	0.00	281.64	275	14	2.56E-02	49.5	6.41E+00	T
0	352.01	44	46	0.74	706.37	701	12	2.43E-02	35.0	5.69E+00	T
0	511.26	112	72	2.30	1023.43	1013	18	6.21E-02	20.2	4.80E+00	T
0	558.04	64	20	1.07	1118.63	1113	12	3.55E-02	21.1	4.60E+00	T
0	609.52	33	30	0.96	1220.03	1215	10	1.83E-02	35.6	4.52E+00	T
0	962.02	12	11	0.94	1925.37	1916	15	6.74E-03	66.6	3.14E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 16-JUL-2007 09:10:50.03

Sample ID : EF1 EFT-93121206

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/CC)
BE-7	24.	477.59	1.2120E-06
F-18	0.	511.00	Half-Life too short
NA-22	5.	1274.54	8.4420E-09
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	13.	889.25	5.3169E-09
CR-51	46.	320.08	1.9697E-05
MN-54	16.	834.83	1.4950E-08
CO-56	16.	1238.25	1.1600E-07
MN-56	0.	1810.69	Half-Life too short
NI-56	0.	158.38	Half-Life too short
CO-57	33.	122.06	1.5520E-08
CO-58	8.	810.76	5.5308E-08
FE-59	10.	1099.22	4.4921E-07
CO-60	5.	1332.49	8.8032E-09
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	5.	1115.52	2.5097E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	48.	136.00	4.9029E-08
AS-76	0.	559.10	Half-Life too>short
BR-82	0.	776.49	Half-Life too short
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	38.	513.99	2.3314E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	38.	513.99	9.7735E-08
RB-86	0.	1076.63	Half-Life too short
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	4.	1836.01	3.3441E-08
KR-89	0.	220.98	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	7.	1204.90	3.4177E-05
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Sample ID : EF1 EFT-9S121206 Acquisition date : 16-JUL-2007 00:40:50

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/CC)
SR-93	0.	590.20	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	14.	702.63	7.3958E-09
NB-95	15.	765.79	5.9093E-07
NB-95M	0.	235.69	Half-Life too short
ZR-95	7.	756.72	1.1315E-07
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	0.	739.50	Half-Life too short
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	15.	497.08	3.1292E-07
TC-104	0.	357.99	Half-Life too short
RH-105	0.	310.90	Half-Life too short
RU-105	0.	724.50	Half-Life too short
RU-106	21.	621.84	1.2255E-07
CD-109	38.	88.03	4.9615E-07
AG-110M	11.	937.48	4.5875E-08
SN-113	30.	391.69	4.3475E-08
SN-117M	0.	158.56	Half-Life too short
SB-122	0.	563.93	Half-Life too short
SB-124	17.	602.71	8.8760E-08
SB-125	21.	427.89	2.6658E-08
TE-125M	42.	109.28	4.5731E-05
TE-127	0.	417.90	Half-Life too short
TE-127M	20.	57.60	7.8687E-05
XE-127	41.	202.84	6.6472E-07
TE-129	0.	459.60	Half-Life too short
TE-129M	10.	695.88	2.1164E-05
XE-129M	0.	196.56	Half-Life too short
I-130	0.	536.09	Half-Life too short
BA-131	0.	123.80	Half-Life too short
I-131	0.	364.48	Half-Life too short
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	0.	163.93	Half-Life too short
I-132	0.	667.69	Half-Life too short
TE-132	0.	228.16	Half-Life too short
BA-133	35.	302.84	4.3967E-08
BA-133M	0.	276.09	Half-Life too short
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	0.	81.00	Half-Life too short
XE-133M	0.	233.22	Half-Life too short
CS-134	21.	604.70	9.8967E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Sample ID : EF1 EFT-95121206 Acquisition date : 16-JUL-2007 00:40:50

Nuclide	Bckgnd Sum		Energy (keV)	MDA (uCi/CC)
CS-136	0.		818.50	Half-Life too short
I-136	0.		1313.02	Half-Life too short
CS-137	15.		661.65	8.5120E-09
XE-137	0.		455.49	Half-Life too short
CS-138	0.		1435.86	Half-Life too short
XE-138	0.		258.31	Half-Life too short
BA-139	0.		1420.50	Half-Life too short
CE-139	53.		165.85	3.0114E-08
CS-139	0.		1283.23	Half-Life too short
BA-140	0.		537.32	Half-Life too short
LA-140	0.		1596.49	Half-Life too short
BA-141	0.		190.22	Half-Life too short
CE-141	46.		145.44	1.6336E-06
LA-141	0.		1354.52	Half-Life too short
BA-142	0.		255.12	Half-Life too short
LA-142	0.		641.17	Half-Life too short
CE-143	0.		293.26	Half-Life too short
CE-144	52.		133.54	1.3686E-07
PR-144	0.		1489.15	Half-Life too short
ND-147	0.		91.10	Half-Life too short
PM-148M	20.		550.27	2.9279E-07
EU-152	35.		344.27	3.0822E-08
EU-154	10.		1004.76	4.9892E-08
EU-156	0.		646.29	Half-Life too short
HF-181	24.		482.03	3.1659E-07
TA-182	11.		1221.42	1.3301E-07
W-187	0.		685.81	Half-Life too short
RE-188	0.		155.03	Half-Life too short
HG-203	40.		279.19	2.4994E-07
BI-207	21.		569.67	8.0903E-09
TL-208	0.		583.14	Half-Life too short
PB-212	0.		238.63	Half-Life too short
BI-214	0.		609.31	Half-Life too short
PB-214	0.		351.92	Half-Life too short
RA-224	0.		240.98	Half-Life too short
RA-226	60.	B	186.21	2.6617E-07
AC-228	30.		338.32	6.9150E-08
TH-228	39.		84.37	1.5297E-06
PA-234	0.		131.20	Half-Life too short
TH-234	34.		63.29	5.3770E-04
U-235	43.		143.76	7.3114E-08
NP-239	0.		106.13	Half-Life too short
AM-241	26.		59.54	1.6137E-07

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT - 95121206D

Sample Location (Well Number): EFT- 95

1. Representative sample collected. Date/Time 12/12/06 / 11:47

Sample collected by: J. Slaback 12/12/07 / Amy Marie Slaback Date: 02/01/07
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: J. Southward / Jennifer Southward Date: 2/2/07
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: D. Howard / [signature] Date: APR 20 2007
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: K. Lowery / K. Lowery Date: 11-14-07
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-95121206D	
2 . Date Sampled	12/12/2006	
3 . Time Sampled	11:47	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	04/19/2007	
2 . Time Sample Counted	16:37	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	7.7	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	3407.6	cpm
Net Spike Count Rate (cpm)	3399.9	cpm
H3 Spike Activity (dpm on count date)	8243.8	dpm
Counter Efficiency	0.4124	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	6.0	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.0	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{(\text{Bkg cpm})}{(\text{Bkg min.})} + \frac{(\text{Bkg cpm})}{(\text{Smpl min.})}}}{\text{Efficiency} \times 2.22\text{E6 dpm/uCi} \times \text{Sample Volume}} = 1.12\text{E-06 uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency} \times 2.22\text{E6 uCi/ml} \times \text{Sample Volume}} < \textbf{MDA}$$

Technician _____ Date APR 20 2007

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-95 121206D

Sample Location (Well Number): EFT-95

1. Representative sample collected. Date/Time 12/12/06 / 1147

Sample collected by: J. Slaback / Joy Marie Slaback Date: 02/01/07
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: J. Southward / Jennifer Southward Date: 2/2/07
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: K.D. Linosky / K.D. Linosky Date: 2-6-07
Fermi 2 RP Printed Name Signature

Sample number: EFT-95121206D

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
. (Note disposition of unidentified peaks in "Remarks")

Performed by: Chris Hobbard / [signature] Date: 7-16-07
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: KD Lindsey / [signature] Date: 8-9-07
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

DETROIT EDISON FERMI-2 POWER PLANT 16-JUL-2007 09:42:10.11

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: _____-05 EFT-95121206D

Sample End Time: 1-JAN-1994 12:00:00.00

REMARKS Wrong DATE/Time entered, Actual was 12-12-06 / 1147.
No plant related gamma lines identified, does not
affect results. KD Ridley 1-3-12

PERFORMED BY:

SIGNATURE

REVIEWED BY:

KD Ridley 8-8-07

SIGNATURE/DATE

PAGE _____ of _____

Sample ID : Acquisition date : 16-JUL-2007 09:12:06

****

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********

Sample ID Number: _____-05
Sample collection start date: 1-JAN-1994 12:00:00.00
Sample collection end date : 1-JAN-1994 12:00:00.00
Type of sample : LIQUID
Sample quantity : 1.000000E+03 cc
Sample geometry : M2LL Operator: XXX

********** Acquisition Parameters **********

Detector number : DET 4 Acquire date : 16-JUL-2007 09:12:06.64
Preset live time : 0 00:30:00.00 Elapsed live time : 0 00:30:00.00
Elapsed real time : 0 00:30:00.90 Percent dead time : 0.05 %

********** Calibration Parameters **********

Detector number : DET 4 Yearly cal date : 20-JUN-2007 12:16:46.16
Kev/channel : 4.99730E-01 Zero offset: -1.95000E-01
Daily cal date : 16-JUL-2007 08:37:10.01

********** Peak Search Parameters **********

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********

Energy tolerance : 2.00000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : NUCLIB.HOT
Efficiency file : EFFD1.M1LL Efficiencies at : Peak energy

****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	510.95	144	34	1.66	1022.81	1015	17	8.00E-02	12.5	annihilatio
2	0	558.09	71	9	1.31	1117.13	1111	12	3.94E-02	14.6	Hg C
3	0	609.95	52	37	1.09	1220.90	1212	19	2.91E-02	31.4	Bi-214
4	0	1461.01	58	6	2.68	2923.76	2917	14	3.20E-02	16.3	K-40

Sample Title : _____-05 Page : 1
Decay Time = 4943 21:12:06.64 Acquisition Time = 16-JUL-2007 09:12:06.6
4

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	510.95	144	34	1.66	1022.01	1015	17	12.5		
0	558.09	71	9	1.31	1117.13	1111	12	14.6		
0	609.95	52	37	1.89	1220.90	1212	19	31.4		
0	1461.01	58	6	2.60	2923.76	2917	14	16.3		K-40

Sample ID : Acquisition date : 16-JUL-2007 09:12:06

Nuclide Type: natural

Nuclide	Energy	< Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	58	10.67*	2.501E+00	3.240E-07	3.241E-07	16.33

Flag: "*" = Keyline

Sample ID : Acquisition date : 16-JUL-2007 09:12:06

Total number of lines in spectrum	4	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	4	100.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	3.240E-07	3.241E-07	0.529E-07	16.33	
	Total Activity :		3.240E-07	3.241E-07			
	Grand Total Activity :		3.240E-07	3.241E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : Acquisition date : 16-JUL-2007 09:12:06

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	64873.40	511.00*	193.46	1.000E+35	12.47	Decay
		% Abundances Found =		100.00			
AS-76	26.32H	4500.11	559.10*	44.70	1.000E+35	14.57	Decay,Abun.
			563.23	1.17	---- Not Found	----	
			571.30	0.14	---- Not Found	----	
			657.03	6.10	---- Not Found	----	
			665.31	0.39	---- Not Found	----	
			740.12	0.12	---- Not Found	----	
			771.76	0.12	---- Not Found	----	
			867.63	0.12	---- Not Found	----	
			1129.07	0.14	---- Not Found	----	
			1212.72	1.63	---- Not Found	----	
			1216.02	3.84	---- Not Found	----	
			1220.52	1.39	---- Not Found	----	
			1439.13	0.33	---- Not Found	----	
			1453.60	0.13	---- Not Found	----	
			1787.67	0.33	---- Not Found	----	
		% Abundances Found =		73.70			
RU-103	39.35D	125.64	497.08*	89.00	---- Not Found	----	Decay,Abun.
			) 610.33	5.60	2.057E+31	31.30	
		% Abundances Found =		5.92			
XE-135	9.11H	13024.53	249.79*	89.90	---- Not Found	----	Decay,Abun.
			608.19	2.09	1.000E+35	31.30	
		% Abundances Found =		3.11			
PM-140M	41.30D	119.71	208.11	12.56	---- Not Found	----	Decay,Abun.
			414.07	18.66	---- Not Found	----	
			432.70	5.35	---- Not Found	----	
			501.26	6.75	---- Not Found	----	
			550.27*	94.90	---- Not Found	----	
			599.74	12.54	---- Not Found	----	
			611.26	5.40	3.442E+29	31.30	
			629.97	89.00	---- Not Found	----	
			725.70	32.80	---- Not Found	----	
			915.33	17.17	---- Not Found	----	
			1013.81	20.30	---- Not Found	----	
		% Abundances Found =		1.74			
BI-214	19.90M	357749.09	609.31*	46.30	1.000E+35	31.30	Decay
			768.36	5.04	---- Not Found	----	
			934.06	3.21	---- Not Found	----	
			1120.29	15.10	---- Not Found	----	
			1238.11	5.94	---- Not Found	----	
			1377.67	4.11	---- Not Found	----	
			1764.49	15.80	---- Not Found	----	
		% Abundances Found =		40.40	(Abn. Limit = 40.40%)		

Flag: "*" = Keyline

Sample ID : Acquisition date : 16-JUL-2007 09:12:06

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	510.95	144	34	1.66	1022.01	1015	17	0.00E-02	12.5	4.00E+00	T
0	558.09	71	9	1.31	1117.13	1111	12	3.94E-02	14.6	4.69E+00	T
0	609.95	52	37	1.09	1220.90	1212	19	2.91E-02	31.4	4.52E+00	T

Flags: "T" = Tentatively associated

****
* Detroit Edison Fermi 2 MDA Report, Generated 16-JUL-2007 09:42:13.75 *
****
* Sample ID : _____-05 *
****

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	0.	477.59	Half-Life too short
F-18	0.	511.00	Half-Life too short
NA-22	7.	1274.54	3.0243E-07
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	0.	889.25	Half-Life too short
CR-51	0.	320.08	Half-Life too short
MN-54	0.	834.83	Half-Life too short
CO-56	0.	1238.25	Half-Life too short
MN-56	0.	1810.69	Half-Life too short
NI-56	0.	158.38	Half-Life too short
CO-57	0.	122.06	Half-Life too short
CO-58	0.	810.76	Half-Life too short
FE-59	0.	1099.22	Half-Life too short
CO-60	10.	1332.49	7.6620E-08
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	0.	1115.52	Half-Life too short
ZN-69M	0.	438.63	Half-Life too short
SE-75	0.	136.00	Half-Life too short
AS-76	0.	559.10	Half-Life too short
BR-82	0.	776.49	Half-Life too short
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	902.41	Half-Life too short
KR-85	34.	513.99	5.1209E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	0.	513.99	Half-Life too short
RB-86	0.	1076.63	Half-Life too short
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	0.	1836.01	Half-Life too short
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	0.	1204.90	Half-Life too short
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Sample ID : Acquisition date : 16-JUL-2007 09:12:06

Nuclide		Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
SR-93		0.	590.28	Half-Life too short
Y-93		0.	266.90	Half-Life too short
NB-94		10.	702.63	6.3470E-09
NB-95		0.	765.79	Half-Life too short
NB-95M		0.	235.69	Half-Life too short
ZR-95		0.	756.72	Half-Life too short
NB-97		0.	657.90	Half-Life too short
ZR-97		0.	743.36	Half-Life too short
MO-99		0.	739.58	Half-Life too short
TC-99M	0	0.	140.50	Half-Life too short
TC-101		0.	306.81	Half-Life too short
RU-103		0.	497.08	Half-Life too short
TC-104		0.	357.99	Half-Life too short
RH-105		0.	318.90	Half-Life too short
RU-105		0.	724.50	Half-Life too short
RU-106		0.	621.84	Half-Life too short
CD-109		0.	88.03	Half-Life too short
AG-110M		0.	937.48	Half-Life too short
SN-113		0.	391.69	Half-Life too short
SN-117M		0.	158.56	Half-Life too short
SB-122		0.	563.93	Half-Life too short
SB-124		0.	602.71	Half-Life too short
SB-125		21.	427.89	6.8961E-07
TE-125M		0.	109.28	Half-Life too short
TE-127		0.	417.90	Half-Life too short
TE-127M		0.	57.60	Half-Life too short
XE-127		0.	202.84	Half-Life too short
TE-129		0.	459.60	Half-Life too short
TE-129M		0.	695.88	Half-Life too short
XE-129M		0.	196.56	Half-Life too short
I-130		0.	536.09	Half-Life too short
BA-131		0.	123.80	Half-Life too short
I-131		0.	364.48	Half-Life too short
TE-131		0.	149.72	Half-Life too short
TE-131M		0.	773.67	Half-Life too short
XE-131M		0.	163.93	Half-Life too short
I-132		0.	667.69	Half-Life too short
TE-132		0.	228.16	Half-Life too short
BA-133		30.	302.84	9.6389E-08
BA-133M		0.	276.09	Half-Life too short
I-133		0.	529.87	Half-Life too short
TE-133M		0.	912.58	Half-Life too short
XE-133		0.	81.00	Half-Life too short
XE-133M		0.	233.22	Half-Life too short
CS-134		16.	604.70	6.8903E-07
I-134		0.	884.09	Half-Life too short
TE-134		0.	210.47	Half-Life too short
BA-135M		0.	268.24	Half-Life too short
I-135		0.	1260.41	Half-Life too short
XE-135		0.	249.79	Half-Life too short
XE-135M		0.	526.56	Half-Life too short

Sample ID : Acquisition date : 16-JUL-2007 09:12:06

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-136	0.	818.50	Half-Life too short
I-136	0.	1313.02	Half-Life too short
CS-137	16.	661.65	1.1698E-08
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	0.	165.85	Half-Life too short
CS-139	0.	1203.23	Half-Life too short
BA-140	0.	537.32	Half-Life too short
LA-140	0.	1596.49	Half-Life too short
BA-141	0.	190.22	Halv-Life too short
CE-141	0.	145.44	Half-Life too short
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	0.	293.26	Half-Life too short
CE-144	0.	133.54	Half-Life too short
PR-144	0.	1489.15	Half-Life too short
ND-147	0.	91.10	Half-Life too short
PM-148M	0.	550.27	Half-Life too short
EU-152	35.	344.27	5.9714E-08
EU-154	10.	1004.76	1.3052E-07
EU-156	0.	646.29	Half-Life too short
HF-181	0.	482.03	Half-Life too short
TA-182	0.	1221.42	Half-Life too short
W-187	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
HG-203	0.	279.19	Half-Life too short
BI-207	20.	569.67	1.0404E-08
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	0.	240.98	Half-Life too short
RA-226	38.	186.21	2.1715E-07
AC-228	23.	338.32	2.6354E-07
TH-228	30.	84.37	1.4767E-04
PA-234	0.	131.20	Half-Life too short
TH-234	0.	63.29	Half-Life too short
U-235	40.	143.76	7.1260E-08
NP-239	0.	106.13	Half-Life too short
AM-241	30.	59.54	1.7618E-07

EFT-9S

2007

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-95 7507

Sample Location (Well Number): EFT-95

1. Representative sample collected. Date/Time 7/5/07 / 1022

Sample collected by: Joy Marie Slaback / Joy Marie Slaback Date: 12/10/2007
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: J. Southward / J Southward Date: 12/10/07
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: Ross Bright Date: 12-14-07
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: D Lindsey / Date: 2-26-08
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	9S	
2 . Date Sampled	07/05/2007	
3 . Time Sampled	10:22	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	12/14/2007	
2 . Time Sample Counted	08:00	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	8.2	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	3189.3	cpm
Net Spike Count Rate (cpm)	3181.1	cpm
H3 Spike Activity (dpm on count date)	7944.9	dpm
Counter Efficiency	0.4004	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	8.2	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.0	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.1	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{(\text{Bkg cpm})}{(\text{Bkg min.})} + \frac{(\text{Bkg cpm})}{(\text{Smpl min.})}}}{\text{Efficiency} \times 2.22\text{E6 dpm/uCi} \times \text{Sample Volume}} = 1.19\text{E-06 uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency} \times 2.22\text{E6 uCi/ml} \times \text{Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 12-14-07

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-957507

Sample Location (Well Number): EFT-95

1. Representative sample collected. Date/Time 07/05/2007 / 1022

Sample collected by: J. Slaback / JoyMarie Slaback Date: 07/16/2007
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: J. Southward Jennifer Southward Date: 08/08/07
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: KD Lindsey / KD Lindsey Date: 8-8-07
Fermi 2 RP Printed Name Signature

Sample number: EFT - 957507

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: Chris Hubbard / [signature] Date: 7-19-07
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: K.D. LINDSEY / K.D. Lindsey Date: 8-8-07
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

DETROIT EDISON FERMI-2 POWER PLANT 19-JUL-2007 09:21:33.94

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EF1 EFT-957507

Sample End Time: 5-JUL-2007 10:22:00.00

REMARKS

PERFORMED BY:

SIGNATURE

REVIEWED BY:

SIGNATURE/DATE 8-8-07

Sample ID : EF1 EFT-937507 Acquisition date : 19-JUL-2007 00:51:30

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********

Sample ID Number: EF1 EFT-937507
Sample collection start date: 5-JUL-2007 10:22:00.00
Sample collection end date : 5-JUL-2007 10:22:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.00000E+03 cc
Sample geometry : M2LL Operator: CMH

********** Acquisition Parameters **********

Detector number : DET 4 Acquire date : 19-JUL-2007 00:51:30.21
Preset live time : 0 00:30:00.00 Elapsed live time : 0 00:30:00.00
Elapsed real time : 0 00:30:00.91 Percent dead time : 0.05 %

********** Calibration Parameters **********

Detector number : DET 4 Yearly cal date : 20-JUN-2007 12:16:46.16
Kev/channel : 4.99741E-01 Zero offset: -1.77476E-01
Daily cal date : 19-JUL-2007 00:20:24.04

********** Peak Search Parameters **********

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********

Energy tolerance : 2.00000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	352.21	32	29	1.04	705.12	701	10	1.77E-02	37.5	PB-214
2	0	511.54	135	72	2.13	1023.94	1015	21	7.52E-02	18.4	annihilation
3	0	559.42	54	39	2.01	1119.76	1111	14	3.02E-02	27.7	HWC
4	0	609.65	42	27	1.52	1220.26	1214	12	2.34E-02	29.1	BI-214
5	0	1460.98	67	5	2.62	2923.69	2917	16	3.75E-02	13.9	K-40

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	352.21	32	29	1.04	705.12	701	10	37.5		
0	511.54	135	72	2.13	1023.94	1015	21	10.4		
0	559.42	54	39	2.01	1119.76	1111	14	27.7		
0	609.65	42	27	1.52	1220.26	1214	12	29.1		
0	1460.99	67	5	2.62	2923.69	2917	16	13.9		K-40

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	67	10.67*	2.501E+00	3.793E-07	3.793E-07	13.91

Flag: "*" = Keyline

Sample ID : EF1 EFT-907507 Acquisition date : 19-JUL-2007 00:51:30

Total number of lines in spectrum	5	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	5	100.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc @	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	3.793E-07	3.793E-07	0.528E-07	13.91	
Total Activity :			3.793E-07	3.793E-07			
Grand Total Activity :			3.793E-07	3.793E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EF1 EFT-957507 Acquisition date : 19-JUL-2007 00:51:30

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	103.02	511.00*	193.46	1.000E+35	18.40	Decay
	% Abundances Found =			100.00			
AS-76	26.32H	12.72	559.10*	44.70	2.631E-04	27.72	Decay,Abun.
			563.23	1.17	---- Not Found	----	
			571.30	0.14	---- Not Found	----	
			657.03	6.10	---- Not Found	----	
			665.31	0.39	---- Not Found	----	
			740.12	0.12	---- Not Found	----	
			771.76	0.12	---- Not Found	----	
			867.63	0.12	---- Not Found	----	
			1129.07	0.14	---- Not Found	----	
			1212.72	1.63	---- Not Found	----	
			1216.02	3.04	---- Not Found	----	
			1220.52	1.39	---- Not Found	----	
			1439.13	0.33	---- Not Found	----	
			1453.60	0.13	---- Not Found	----	
			1787.67	0.33	---- Not Found	----	
	% Abundances Found =			73.70			
Y-92	3.54H	94.56	448.50	2.30	---- Not Found	----	Decay,Abun.
			561.10	2.40	2.123E+22	27.72	
			844.30	1.25	---- Not Found	----	
			934.46*	13.90	---- Not Found	----	
			1405.40	4.00	---- Not Found	----	
	% Abundances Found =			9.74			
RU-103	39.35D	0.35	497.00*	89.00	---- Not Found	----	Abun.
			610.33	5.60	3.190E-07	29.06	
	% Abundances Found =			5.92			
XE-135	9.11H	36.74	249.79*	89.90	---- Not Found	----	Decay,Abun.
			608.19	2.09	5.580E+04	29.06	
	% Abundances Found =			3.11			
PM-140M	41.30D	0.34	288.11	12.56	---- Not Found	----	Abun.
			414.07	10.66	---- Not Found	----	
			432.70	5.35	---- Not Found	----	
			501.26	6.75	---- Not Found	----	
			550.27*	94.90	---- Not Found	----	
			590.74	12.54	---- Not Found	----	
			611.26	5.48	3.231E-07	29.06	
			629.97	89.00	---- Not Found	----	
			725.70	32.00	---- Not Found	----	
			915.33	17.17	---- Not Found	----	
			1013.01	20.30	---- Not Found	----	
	% Abundances Found =			1.74			
BI-214	19.90M	1009.27	609.31*	46.30	1.000E+35	29.06	Decay
			768.36	5.04	---- Not Found	----	
			934.06	3.21	---- Not Found	----	
			1120.29	15.10	---- Not Found	----	

Sample ID : EF1 EFT-937507 Acquisition date : 19-JUL-2007 00:51:30

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
BI-214	19.90M	1009.27	1238.11	5.94	---- Not Found ----		Decay
			1377.67	4.11	---- Not Found ----		
			1764.49	15.80	---- Not Found ----		
		% Abundances Found =		48.48	(Abn. Limit = 48.48%)		
PB-214	26.80M	749.42	87.30	4.67	---- Not Found ----		Decay
			241.98	7.49	---- Not Found ----		
			295.21	19.20	---- Not Found ----		
			351.92*	37.20	1.000E+35	37.53	
			785.91	1.10	---- Not Found ----		
		% Abundances Found =		53.40	(Abn. Limit = 37.20%)		

Flags: "*" = Keyline

Sample ID : EF1 EFT-937507 Acquisition date : 19-JUL-2007 00:51:30

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	352.21	32	29	1.04	705.12	701	10	1.77E-02	37.5	5.70E+00	T
0	511.54	135	72	2.13	1023.94	1015	21	7.52E-02	10.4	4.00E+00	T
0	559.42	54	39	2.01	1119.76	1111	14	3.02E-02	27.7	4.60E+00	T
0	609.65	42	27	1.52	1220.26	1214	12	2.34E-02	29.1	4.52E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 19-JUL-2007 09:21:37.85

Sample ID : EF1 EFT-987507

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	18.	477.59	7.7372E-08
F-18	0.	511.00	Half-Life too short
NA-22	10.	1274.54	9.7922E-09
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	8.	889.25	8.2398E-09
CR-51	34.	320.08	1.0089E-07
MN-54	13.	834.83	8.7667E-09
CO-56	12.	1238.25	1.7345E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	53.	158.38	4.0760E-08
CO-57	43.	122.06	1.0408E-08
CO-58	11.	810.76	8.8738E-09
FE-59	6.	1099.22	1.6286E-08
CO-60	11.	1332.49	1.0399E-08
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	10.	1115.52	1.8436E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	43.	136.00	1.4446E-08
AS-76	0.	559.10	Half-Life too short
BR-82	16.	776.49	7.4153E-06
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	47.	513.99	2.4017E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	47.	513.99	1.2448E-08
RB-86	8.	1076.63	1.5302E-07
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	5.	1836.01	1.0155E-08
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	14.	1204.90	4.2891E-06
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0	934.46	Half-Life too short

Sample ID : EF1 EFT-967507 Acquisition date : 19-JUL-2007 00:51:30

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
SR-93	0.	590.20	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	15.	702.63	7.6157E-09
NB-95	15.	765.79	1.0994E-08
NB-95M	41.	235.69	4.5049E-07
ZR-95	13.	756.72	1.5931E-08
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	11.	739.50	1.0554E-06
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	20.	497.08	1.0105E-08
TC-104	0.	357.99	Half-Life too short
RH-105	32.	318.90	2.7098E-05
RU-105	0.	724.50	Half-Life too short
RU-106	10.	621.84	6.0910E-08
CD-109	36.	88.03	3.5711E-07
AG-110M	7.	937.48	2.1961E-08
SN-113	17.	391.69	1.0083E-08
SN-117M	55.	158.56	1.9749E-08
SB-122	22.	563.93	3.9783E-07
SB-124	24.	602.71	1.0205E-08
SB-125	29.	427.89	2.7074E-08
TE-125M	36.	109.28	3.8102E-06
TE-127	0.	417.90	Half-Life too short
TE-127M	26.	57.60	2.4372E-05
XE-127	51.	202.84	1.5786E-08
TE-129	0.	459.60	Half-Life too short
TE-129M	10.	695.88	3.2771E-07
XE-129M	42.	196.56	4.6409E-07
I-130	0.	536.09	Half-Life too short
BA-131	40.	123.90	6.4496E-08
I-131	30.	364.48	3.0985E-08
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	47.	163.93	8.9147E-07
I-132	0.	667.69	Half-Life too short
TE-132	36.	228.16	1.5846E-07
BA-133	32.	302.84	4.0819E-08
BA-133M	32.	276.09	1.5226E-05
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	41.	81.00	2.9093E-07
XE-133M	46.	233.22	6.5238E-06
CS-134	26.	604.70	9.1439E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Sample ID : EF1 EFT-967507 Acquisition date : 19-JUL-2007 00:51:30

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-136	9.	818.50	1.4954E-08
I-130	0.	1313.02	Half-Life too short
CS-137	10.	661.65	9.1120E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	45.	165.85	1.0142E-08
CS-139	0.	1283.23	Half-Life too short
BA-140	19.	537.32	6.1127E-08
LA-140	10.	1596.49	3.6972E-06
BA-141	0.	190.22	Half-Life too short
CE-141	42.	145.44	2.1066E-08
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	0.	293.26	Half-Life too short
CE-144	43.	133.54	7.6535E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	36.	91.10	1.0512E-07
PM-148M	18.	550.27	9.3982E-09
EU-152	40.	344.27	3.1562E-08
EU-154	12.	1004.76	5.0080E-08
EU-156	17.	646.20	1.9825E-07
HF-181	17.	482.03	9.0379E-09
TA-182	10.	1221.42	3.0438E-08
W-187	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
HG-203	46.	279.19	1.3190E-08
BI-207	15.	569.67	6.9232E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	45.	240.98	2.9423E-06
RA-226	40.	186.21	2.3920E-07
AC-228	35.	338.32	6.8735E-08
TH-228	24.	84.37	1.0041E-06
PA-234	0.	131.20	Half-Life too short
TH-234	46.	63.29	1.8443E-06
U-235	37.	143.76	6.8655E-08
NP-239	42.	106.13	2.6790E-06
AM-241	31.	59.54	1.7621E-07

EFT-9S

2008

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-954116 08

Sample Location (Well Number): EFT-95

1. Representative sample collected. Date/Time 4/16/08 / 1000

Sample collected by: Joy Marie Slabach / Joy Marie Slabach Date: 04/21/2008
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: J. Southward / J Southward Date: 4/21/08
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: Russ Burgess Date: 4-22-08
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: RJ Lindsey / RJ Lindsey Date: 4-24-08
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

_____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-9S41608	
2 . Date Sampled	04/16/2008	
3 . Time Sampled	10:00	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	04/21/2008	
2 . Time Sample Counted	21:00	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	7.8	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	3020.9	cpm
Net Spike Count Rate (cpm)	3013.1	cpm
H3 Spike Activity (dpm on count date)	7788.2	dpm
Counter Efficiency	0.3869	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	8.9	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	1.1	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{\text{(Bkg cpm)}}{\text{(Bkg min.)}} + \frac{\text{(Bkg cpm)}}{\text{(Smpl min.)}}}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}} = 1.20\text{E-}06 \text{ uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency x 2.22E6 uCi/ml x Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 4-22-08

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-95 4/16 08

Sample Location (Well Number): EFT-95

1. Representative sample collected. Date/Time 4/16/08 / 1000

Sample collected by: Joy Marie Slabacki / Joy Marie Slabacki Date: 04/21/2008
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: J. Southward / J Southward Date: 4/21/08
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: J. Southward / J Southward Date: 4/22/08
Fermi 2 RP Printed Name Signature

Sample number: EFT-95411608

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: J Southward J Southward Date: 4/24/08
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: K D Lindsey / K D Lindsey Date: 4-24-08
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

DETROIT EDISON: FERMI-2 POWER PLANT 22-APR-2008 14:57:23.51

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: CFT-0541000

Sample End Time: 10-APR-2008 10:00:00.00

REMARKS

PERFORMED BY:

J Southmayd
SIGNATURE

REVIEWED BY:

RC Lindsey 4-24-08
SIGNATURE/DATE

Sample ID : CFT-GA1600 Acquisition date : 22 APR 2000 11:27:24

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********
Sample ID Number: CFT-GA1600
Sample collection start date: 16-APR-2000 10:00:00.00
Sample collection end date : 16-APR-2000 10:00:00.00
Type of sample : 1 L Mari. liquid
Sample quantity : 1.000000E+03 cc
Sample geometry : MELL Operator: JHS

********** Acquisition Parameters **********
Detector number : DET 1 Acquire date : 22 APR 2000 11:27:24.54
Preset live time : 0 00:30:00.00 Elapsed live time : 0 00:30:00.00
Elapsed real time : 0 00:30:01.03 Percent dead time : 0.05 %

********** Calibration Parameters **********
Detector number : DET 4 Yearly cal date : 29-JUN-1977 12:10:46.16
Kev/channel : 5.021932E-01 Zero offset: -1.470635E-01
Daily cal date : 22-APR-2000 06:30:50.32

********** Peak Search Parameters **********
Start channel : 100 End channel : 4096
Height sensitivity : 3.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplet : 5

********** Nuclide Identification Parameters **********
Energy tolerance : 0.030000 Half-life ratio : 10.000000
Abundance limit : 75.000000 Library : dacmaster.nlb
Efficiency file : EFFDA_m211 Efficiencies at : Peak energy
****

Pk	It	Energy 0	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	511.00	149	67	2.31	1020.62	1013	12	5.29E-02	15.5	
2	0	558.67	63	19	1.55	1117.26	1111	13	3.51E-02	19.1	
3	0	1461.30	42	14	3.27	2921.64	2912	14	2.33E-02	24.4	

Sample Title : LIT-0541603 Page : 1

Data Time : 6-Oct-2004 13:24:51 Acquisition Time : 22-Nov-2003 14:07:21.5

Post ITP Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pe	%Err	Fit	Nuclides
0	511.00	140	67	2.31	1022.06	1013	12	15.5		Annihilation
0	559.67	63	19	1.55	1117.20	1111	13	19.1		Hwe
0	1461.30	42	14	2.27	2921.64	2912	14	24.4		K-40

Nuclide Types: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1 Sigma %Error
K-40	1460.81	42	10.67%	2.5301E-00	2.363E-07	2.363E-07	24.40

Flags: "c" = Calibrn.

Total number of lines in spectrum	3	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	3	100.00%

Nuclide Type : natural

Nuclide	Nlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.39E+09Y	1.00	2.36JE-07	2.363E-07	0.577E-07	24.40	
	Total Activity :		2.3e3E-07	2.e6Ce-07			
Grand Total Activity :			2.363E-07	2.363E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "N" = Nuclide specific abn. limit

Nuclide	Half-life	Half Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.77M	01.31	511.00*	193.40	7.076E-16	15.46	Peak/
		% Abundances Found =		100.00			
68-76	26.32H	5.65	550.10*	44.79	2.272E-06	19.11	Abun.
			563.22	1.17	Not Found		
			571.30	0.14	Not Found		
			657.52	6.10	Not Found		
			665.31	9.39	Not Found		
			740.12	0.13	Not Found		
			771.76	0.18	Not Found		
			867.63	6.12	Not Found		
			1129.67	8.14	Not Found		
			1212.72	1.63	Not Found		
			1216.82	3.84	Not Found		
			1228.52	1.39	Not Found		
			1439.13	0.33	Not Found		
			1453.60	0.13	Not Found		
			1787.67	0.33	Not Found		
		% Abundances Found =		73.70			

Flag: "*" = Keyline

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	511.00	149	67	2.31	1022.96	1013	19	8.29E-02	15.5	4.03E+00	T
0	550.67	63	19	1.95	1117.20	1111	13	3.51E-02	19.1	4.69E+00	T

Flags: "T" = Tentatively associated

Solid Edition Formi 2 MDC Report, Generated 22 OCT-2003 11:57:22.04

Sample ID : ETT-0541008

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	21.	477.59	7.5304E-08
F-18	0.	511.00	Half-Life too short
NA-22	5.	1274.54	6.3607E-09
NA-24	2.	1368.53	5.1054E-06
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
CA-47	7.	489.25	0 7.3258E-09
CR-51	22.	320.09	8.5827E-08
MN-54	22.	834.83	1.0647E-08
CO-56	17.	1238.25	1.8678E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	58.	158.38	1.6333E-06
CO-57	46.	122.06	1.0543E-06
CO-58	9.	810.76	7.3924E-09
FE-59	11.	1099.22	1.7709E-08
CO-60	15.	1332.49	1.0762E-08
CU-64	0.	1345.80	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	5.	1115.52	1.3925E-08
ZN-69M	0.	438.63	Half-Life too short
GE-75	38.	136.00	1.3147E-09
AS-76	76.	559.10	1.4986E-06
BR-82	6.	776.45	1.4538E-07
BR-83	0.	529.84	Half-Life too short
BR-84	0.	881.50	Half-Life too short
RB-85	0.	802.41	Half-Life too short
KR-85	53.	513.99	2.6106E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	52.	513.99	1.2106E-08
SR-89	13.	1076.63	1.4852E-07
SR-87	3.	402.59	Half-Life too short
SR-87M	0.	388.48	Half-Life too short
SR-89	0.	190.32	Half-Life too short
SR-90	0.	1382.39	Half-Life too short
Y-90	2.	1936.01	6.0330E-09
KR-89	0.	220.90	Half-Life too short
ZR-95	6.	1001.09	Half-Life too short
NB-90	0.	1118.69	Half-Life too short
NB-95	0.	831.89	Half-Life too short
NB-95M	0.	804.23	Half Life too short
Y-95M	0.	892.51	Half Life too short
ZR-97	0.	1024.39	Half Life too short
Y-91	6.	1231.90	3.2952E-08
Y-91M	0.	555.60	Half-Life too short
ZR-95	0.	1332.74	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Nuclide	Background Sum	Energy (keV)	MDA (uCi/cc)
SR-89	0.	909.20	Half-Life too short
Y-91	0.	1046.90	Half-Life too short
NB-94	16.	702.63	7.7046E-09
NB-95	10.	765.79	7.9127E-09
NB-95M	42.	235.69	1.0103E-07
ZR-95	14.	756.72	1.5327E-05
MO-97	2.	657.90	Half Life too short
ZR-97	0.	743.36	2.9725E-06
MO-99	17.	739.58	3.1545E-07
TC-99M	6.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	10.	497.08	8.4913E-09
TC-104	2.	307.99	Half-Life too short
RH-105	27.	318.90	6.5461E-07
RU-105	0.	724.50	Half-Life too short
PD-109	21.	681.61	9.3425E-08
CD-109	20.	88.03	3.6321E-07
AG-110M	12.	937.48	2.6191E-08
SN-113	23.	391.69	1.0892E-08
SN-117M	58.	158.56	1.2700E-09
SB-122	9.	563.93	3.7976E-08
SB-124	28.	602.71	8.4902E-09
SB-125	15.	427.89	2.0331E-08
TE-125M	40.	109.28	3.6990E-06
TE-127	3.	417.96	Half-Life too short
TE-127M	21.	57.60	2.5135E-05
XE-127	27.	202.84	1.1747E-08
TE-129	0.	459.68	Half-Life too short
TE-129M	23.	695.98	5.3923E-07
XE-129M	52.	196.56	2.0750E-07
I-130	0.	536.09	Half-Life too short
SN-131	41.	120.80	4.1304E-08
I-131	22.	364.48	1.3700E-09
TE-131	0.	149.72	Half-Life too short
TE-131M	14.	773.67	6.4513E-07
XE-131M	52.	163.93	6.1603E-07
I-132	0.	667.69	Half-Life too short
TE-132	15.	228.16	3.4602E-08
BA-133	37.	302.84	4.4596E-08
MN-133M	41.	276.09	6.1676E-07
I-133	21.	529.87	1.2324E-06
TE-133M	0.	913.50	Half-Life too short
XE-133	31.	81.00	9.2130E-08
XE-133M	10.	233.22	5.7168E-07
CS-134	20.	604.70	7.9816E-07
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	27.	240.24	1.0507E-06
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Sample ID : EFT 0011503 Acquisition date : 22 APR 2003 11:27:0

Nuclide	Bckgrnd Cts	Energy (keV)	MDA (uCi/cc)
SB 125	11.	910.50	1.3541E-08
I-136	0.	1317.02	Half Life too short
CS-137	65.	661.65	1.0501E-08
XE-137	3.	455.49	Half Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA 139	0.	1420.50	Half-Life too short
CE 139	56.	165.85	1.0773E-08
CS 139	0.	1203.23	Half-Life too short
PR 140	20.	537.30	4.1663E 08
LA 140	3.	1596.49	3.5299E 08
PR-141	0.	190.22	Half Life too short
CE-141	27.	145.44	1.6786E 08
LA-141	0.	1354.52	Half-Life too short
PR-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	33.	293.26	3.9130E-07
CE-144	37.	133.54	7.0300E-08
PR-144	0.	1489.15	Half Life too short
ND 147	43.	91.10	6.9640E 08
PM-148M	15.	550.27	7.0035E-09
EU 152	35.	344.27	8.9676E 08
EU-154	10.	1004.76	4.8407E-08
EU 156	0.	646.29	1.0000E-07
HF-181	20.	482.03	3.4768E-09
TA-182	12.	1221.42	3.9419E-09
W 187	30.	685.81	2.5637E-08
RE 188	37.	155.03	2.0005E-05
HG-203	38.	279.19	1.0812E-08
TI-207	11.	569.67	5.9913E-09
TL-208	0.	583.14	Half-Life too short
PB 212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half Life too short
PB-214	0.	351.92	Half-Life too short
RA 224	39.	240.99	6.2203E-07
RA 226	50.	186.21	2.4370E-07
AC 228	25.	338.32	5.9437E-08
TH 229	30.	84.37	1.1030E-06
PA-231	0.	131.28	Half-Life too short
TH-234	40.	63.29	1.3977E-06
U-235	49.	143.76	7.7437E-08
NP-239	30.	106.13	2.6030E-07
AM-241	26.	59.54	1.7371E-07

EFT-9S

2009

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-9S 031609

Sample Location (Well Number): EFT-9S

1. Representative sample collected. Date/Time 3-16-09 / 16:30

Sample collected by: Chris Ellison / [signature] Date: 3-16-09
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: [illegible] / [signature] Date: 4-17-09
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: D. Howard / [signature] Date: 4-22-09
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: R. Burgett / [signature] Date: 4-22-09
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-9S031609	
2 . Date Sampled	03/16/2009	
3 . Time Sampled	10:30	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	04/21/2009	
2 . Time Sample Counted	11:20	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	7.5	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	2991.0	cpm
Net Spike Count Rate (cpm)	2983.5	cpm
H3 Spike Activity (dpm on count date)	7361.1	dpm
Counter Efficiency	0.4053	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	7.9	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.4	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{\text{(Bkg cpm)}}{\text{(Bkg min.)}} + \frac{\text{(Bkg cpm)}}{\text{(Smpl min.)}}}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}} = 1.12\text{E-}06 \text{ uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency x 2.22E6 uCi/ml x Sample Volume}} < \textbf{MDA}$$

Technician [signature] Date 4.21.09

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-9S 031609

Sample Location (Well Number): EFT-9S

1. Representative sample collected. Date/Time 3-16-09 / 10:30

Sample collected by: Chris Ellison / [signature] Date: 3-16-09
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Prothro / [signature] Date: 4-17-09
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: Southward / Southward Date: 4/20/09
Fermi 2 RP Printed Name Signature

Sample number: EF1 - 95031609

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: T. Southward / J Southward Date: 4/21/09
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: K.D Lindsey / K D Lindsey Date: 4-27-09
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

DETROIT EDISON FERMI-2 POWER PLANT 21-APR-2009 11:04:30.25

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EFT-9S031609

Sample End Time: 16-MAR-2009 10:30:00.00

REMARKS K-40

PERFORMED BY:

SIGNATURE

REVIEWED BY:

4.22-09

SIGNATURE/DATE

Sample ID : EFT-90031609 Acquisition date : 21-APR-2009 10:34:35

****

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********

Sample ID Number: EFT-90031609
Sample collection start date: 16-MAR-2009 10:30:00.00
Sample collection end date : 16-MAR-2009 10:30:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.000000E+03 cc
Sample geometry : M2LL Operator: JNS

********** Acquisition Parameters **********

Detector number : DET 4 Acquire date : 21-APR-2009 10:34:35.03
Preset live time : 0 00:30:00.00 Elapsed live time : 0 00:30:00.00
Elapsed real time : 0 00:30:00.07 Percent dead time : 0.05 %

********** Calibration Parameters **********

Detector number : DET 4 > Yearly cal date : 20-JUN-2008 12:00:00.00
Kev/channel : 4.990826E-01 Zero offset: 7.459796E-02
Daily cal date : 21-APR-2009 06:54:02.66

********** Peak Search Parameters **********

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********

Energy tolerance : 2.00000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	3	510.13	54	14	2.12	1020.33	1014	19	3.00E-02	24.9	1.27E+00
2	3	511.96	75	10	1.87	1024.00	1014	19	4.15E-02	17.0	
3	4	1460.20	32	18	2.49	2921.00	2914	15	1.78E-02	35.3	1.12E+00
4	4	1462.41	13	11	1.74	2925.27	2914	15	7.12E-03	62.4	

Sample Title : EFT-99031609 Page : 1
Decay Time = 36 00:04:35.03 Acquisition Time = 21-APR-2009 10:34:35.
3

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
3	510.13	54	14	2.12	1020.33	1014	19	24.9	1.27E+00	ANNI
3	511.96	75	10	1.87	1024.00	1014	19	17.0		
4	1460.28	32	10	2.49	2921.00	2914	15	35.3	1.12E+00	K-40
4	1462.41	13	11	1.74	2925.27	2914	15	62.4		K-40

Acquisition date : 21-APR-2009 10:34:35

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	32	10.67*	2.502E+00	1.800E-07	1.800E-07	35.26

Flag: "*" = Keyline

Sample ID : EFT-95031609 Acquisition date : 21-APR-2009 10:34:35

Total number of lines in spectrum	4	
Number of unidentified lines	1	
Number of lines tentatively identified by NID	3	75.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+09Y	1.00	1.000E-07	1.000E-07	0.635E-07	35.26	
	Total Activity :		1.000E-07	1.000E-07			
	Grand Total Activity :		1.000E-07	1.000E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EFT-99031609 Acquisition date : 21-APR-2009 10:34:35

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	472.57	511.00*	193.46	1.000E+35	24.91	Decay
	% Abundances Found =			100.00			
BR-84	31.80M	1630.80	604.80	1.80	------ Not Found ------		Decay,Abun.
			736.50	1.31	------ Not Found ------		
			802.20	6.10	------ Not Found ------		
			881.50*	42.00	------ Not Found ------		
			1015.90	6.20	------ Not Found ------		
	40		1213.30	2.60	------ Not Found ------		
			1463.80	2.00	1.000E+35	62.41	
			1741.20	1.60	------ Not Found ------		
			1877.50	1.14	------ Not Found ------		
			1897.30	14.90	------ Not Found ------		
			2029.60	2.10	------ Not Found ------		
	% Abundances Found =			2.45			

Flag: "*" = Keyline

Sample ID : EFT-96031609 Acquisition date : 21-APR-2009 10:34:35

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
3	510.13	54	14	2.12	1020.33	1014	19	3.00E-02	24.9	4.00E+00	T
3	511.96	75	10	1.87	1024.00	1014	19	4.15E-02	17.0	4.00E+00	
4	1462.41	13	11	1.74	2925.27	2914	15	7.12E-03	62.4	2.50E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 21-APR-2009 11:04:42.33

Sample ID : EFT-95031609

Minimum Detectable Activity Report

Nuclide		Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7		20.	477.59	1.0774E-07
F-18		0.	511.00	Half-Life too short
NA-22		9.	1274.54	9.5197E-09
NA-24		0.	1368.53	Half-Life too short
MG-27		0.	1014.44	Half-Life too short
CL-38		0.	1642.42	Half-Life too short
AR-41		0.	1293.64	Half-Life too short
SC-46		10.	889.25	1.0531E-08
CR-51		25.	320.08	1.6405E-07
MN-54		13.	834.83	9.1480E-09
CO-56		10.	1238.25	1.9606E-08
MN-56		0.	1810.69	Half-Life too short
NI-56		36.	158.38	4.1469E-07
CO-57		33.	122.06	9.8261E-09
CO-58		17.	810.76	1.3027E-08
FE-59		7.?	1099.22	2.3595E-08
CO-60		8.	1332.49	9.1692E-09
CU-64		0.	1345.90	Half-Life too short
NI-65		0.	1481.84	Half-Life too short
ZN-65		12.	1115.52	2.1209E-08
ZN-69M		0.	438.63	Half-Life too short
SE-75		40.	136.00	1.5935E-08
AS-76	0	0.	559.10	Half-Life too short
BR-82		0.	776.49	Half-Life too short
BR-83		0.	529.64	Half-Life too short
BR-84		0.	881.50	Half-Life too short
BR-85		0.	802.41	Half-Life too short
KR-85		31.	513.99	2.0516E-06
KR-85M		0.	151.18	Half-Life too short
SR-85		31.	513.99	1.2977E-08
RB-86		7.	1076.63	3.3973E-07
KR-87		0.	402.58	Half-Life too short
SR-87M		0.	388.40	Half-Life too short
KR-88		0.	196.32	Half-Life too short
RB-88		0.	1382.39	Half-Life too short
Y-88		2.	1836.01	8.0257E-09
KR-89		0.	220.90	Half-Life too short
RB-89		0.	1031.88	Half-Life too short
KR-90		0.	1118.69	Half-Life too short
RB-90		0.	831.69	Half-Life too short
RB-90M		0.	824.23	Half-Life too short
Y-90M		0.	202.51	Half-Life too short
SR-91		0.	1024.30	Half-Life too short
Y-91		6.	1204.90	3.8810E-08
Y-91M		0.	555.60	Half-Life too short
SR-92		0.	1383.94	Half-Life too short
Y-92		0.	934.46	Half-Life too short

Sample ID : EFT-99031609 Acquisition date : 21-APR-2009 10:34:35

Nuclide		Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
SR-93		0.	590.28	Half-Life too short
Y-93		0.	266.90	Half-Life too short
NB-94		18.	702.63	8.2319E-09
NB-95		13.	765.79	1.6013E-08
NB-95M		42.	235.69	3.1303E-05
ZR-95		16.	756.72	2.2514E-08
NB-97		0.	657.90	Half-Life too short
ZR-97		0.	743.36	Half-Life too short
MO-99		0.	739.58	Half-Life too short
TC-99M		0.	140.50	Half-Life too short
TC-101		0.	306.81	Half-Life too short
RU-103		15.	497.08	1.3495E-08
TC-104		0.	357.99	Half-Life too short
RH-105		0.	318.90	Half-Life too short
RU-105		0.	724.50	Half-Life too short
RU-106		20.	621.84	8.5310E-08
CD-109		27.	88.03	3.2392E-07
AG-110MA		17.	937.48	3.3608E-08
SN-113		21.	391.69	1.2576E-08
SN-117M		36.	158.56	4.9866E-08
SB-122		0.	563.93	Half-Life too short
SB-124		23.	602.71	1.2903E-08
SB-125		19.	427.89	2.2550E-08
TE-125M		34.	109.28	4.8139E-06
TE-127		0.	417.90	Half-Life too short
TE-127M		17.	57.60	2.3508E-05
XE-127		34.	202.84	1.9982E-08
TE-129		0.	459.60	Half-Life too short
TE-129M		19.	695.88	5.3021E-07
XE-129M		44.	196.56	2.6698E-06
I-130		0.	536.09	Half-Life too short
BA-131		30.	123.80	2.0760E-07
I-131	0	27.	364.48	1.9563E-07
TE-131		0.	149.72	Half-Life too short
TE-131M		0.	773.67	Half-Life too short
XE-131M		35.	163.93	2.0328E-06
I-132		0.	667.69	Half-Life too short
TE-132		0.	228.16	Half-Life too short
BA-133		20.	302.84	3.2856E-08
BA-133M		0.	276.09	Half-Life too short
I-133		0.	529.87	Half-Life too short
TE-133M		0.	912.58	Half-Life too short
XE-133		21.	81.00	3.9877E-06
XE-133M		0.	233.22	Half-Life too short
CS-134		23.	604.70	8.8295E-09
I-134		0.	884.09	Half-Life too short
TE-134		0.	210.47	Half-Life too short
BA-135M		0.	268.24	Half-Life too short
I-135		0.	1260.41	Half-Life too short
XE-135		0.	249.79	Half-Life too short
XE-135M		0.	526.56	Half-Life too short

Sample ID : EFT-90031609 Acquisition date : 21-APR-2009 10:34:35

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-136	17.	818.50	6.2447E-08
I-136	0.	1313.02	Half-Life too short
CS-137	13.	661.65	7.9167E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	29.	165.85	9.2675E-09
CS-139	0.	1283.23	Half-Life too short
BA-140	15.	537.32	1.8128E-07
LA-140	0.	1596.49	Half-Life too short
BA-141	0.	190.22	Half-Life too short
CE-141	38.	145.44	3.2218E-08
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	0.	293.26	Half-Life too short
CE-144	43.	133.54	8.0000E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	25.	91.10	3.5605E-07
PM-148M	13.	550.27	1.2139E-08
EU-152	32.	344.27	2.8907E-08
EU-154	9.	1004.76	4.5043E-08
EU-155	34.	105.31	4.5440E-08
EU-156	21.	646.29	5.9264E-07
HF-181	19.	482.03	1.5052E-08
TA-182	6.	1221.42	3.5084E-08
W-187	0.	685.91	Half-Life too short
RE-188	0.	155.03	Half-Life too short
HG-203	31.	279.19	1.5412E-08
BI-207	25.	569.67	8.6068E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	42.	240.98	1.9491E-04
RA-226	39.	186.21	2.1742E-07
AC-228	23.	338.32	5.7479E-08
TH-228	36.	84.37	1.2289E-06
PA-234	0.	131.20	Half-Life too short
TH-234	28.	63.29	2.7700E-06
U-235	39.	143.76	6.9661E-08
NP-239	0.	106.13	Half-Life too short
AM-241	25.	59.54	1.5984E-07

EFT-9S

2010

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EF1-6110-95

Sample Location (Well Number): 95

1. Representative sample collected. Date/Time 6/1/10 / 1515

Sample collected by: Southward / Southward Date: 6/23/10
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Southward / Southward Date: 6/23/10
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: John M. Yoxon / Date: 6-25-10
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert C Higgs / Date: 6/30/10
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EF1-6110-9S	
2 . Date Sampled	06/01/2010	
3 . Time Sampled	15:15	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	06/25/2010	
2 . Time Sample Counted	09:05	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	7.3	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	2683.2	cpm
Net Spike Count Rate (cpm)	2675.9	cpm
H3 Spike Activity (dpm on count date)	6887.9	dpm
Counter Efficiency	0.3885	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	7.4	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.1	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{(\text{Bkg cpm})}{(\text{Bkg min.})} + \frac{(\text{Bkg cpm})}{(\text{Smpl min.})}}}{\text{Efficiency} \times 2.22\text{E6 dpm/uCi} \times \text{Sample Volume}} = 1.16\text{E-06 uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency} \times 2.22\text{E6 uCi/ml} \times \text{Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 6-25-10

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EF1-6110-95

Sample Location (Well Number): 95

1. Representative sample collected. Date/Time 6/1/10 / 1515

Sample collected by: Southward / Southward Date: 6/23/10
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Southward / Southward Date: 6/23/10
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: Charles Proffitt / Charles Proffitt Date: 9-13-10
Fermi 2 RP Printed Name Signature

Sample number: EF1-6110-95

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: Charles Proffitt / Charles Proffitt Date: 9-13-10
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert C Beyer / Robert C Beyer Date: 10-5-10
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

DETROIT EDISON FERMI-2 POWER PLANT 13-SEP-2010 14:41:26.41

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EF1-6110-9S

Sample End Time: 1-JUN-2010 15:15:00.00

REMARKS

PERFORMED BY:

SIGNATURE

REVIEWED BY:

SIGNATURE/DATE

Sample ID : EF1-6110-9S Acquisition date : 13-SEP-2010 13:56:23

****

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********

Sample ID Number: EF1-6110-9S
Sample collection start date: 1-JUN-2010 15:15:00.00
Sample collection end date : 1-JUN-2010 15:15:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.00000E+03 cc
Sample geometry : M2LL Operator: CLP

********** Acquisition Parameters **********

Detector number : DET 4 Acquire date : 13-SEP-2010 13:56:23.61
Preset live time : 0 00:45:00.00 Elapsed live time : 0 00:45:00.00
Elapsed real time : 0 00:45:00.85 Percent dead time : 0.03 %

********** Calibration Parameters **********

Detector number : DET 4 Yearly cal date : 23-JUN-2010 12:28:00.00
Kev/channel : 5.00035E-01 Zero offset: 1.90339E-01
Daily cal date : 13-SEP-2010 10:15:31.59

********** Peak Search Parameters **********

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********

Energy tolerance : 1.75000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	190.54	61	61	1.54	396.68	393	7	2.26E-02	24.9	
2	3	510.33	104	41	1.81	1020.23	1012	21	3.87E-02	18.5	2.00E+00
3	3	512.06	139	42	2.44	1023.67	1012	21	5.13E-02	16.0	
4	0	558.49	106	45	1.99	1116.54	1100	15	3.93E-02	16.1	
5	1	1460.50	80	0	2.00	2920.51	2911	20	2.97E-02	13.1	3.23E+00
6	1	1462.52	54	0	2.00	2924.53	2911	20	2.01E-02	18.0	

Sample Title : EF1-6110-9S
Decay Time = 103 22:41:23.61 Acquisition Time = 13-SEP-2010 13:56:23.6
1

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	XErr	Fit	Nuclides
0	196.54	61	61	1.54	396.68	393	7	24.9	— HWC	
3	510.33	104	41	1.81	1020.23	1012	21	18.5	2.00E+00	> Ann.
3	512.06	139	42	2.44	1023.67	1012	21	16.0		
0	558.49	106	45	1.99	1116.54	1100	15	16.1	— HWC	
1	1460.50	80	0	2.00	2920.51	2911	20	13.1	3.23E+00	K-40
1	1462.52	54	0	2.00	2924.53	2911	20	10.8	— K-40	

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	00	10.67*	2.502E+00	3.000E-07	3.000E-07	13.13

Flag: "*" = Keyline

Sample ID : EF1-6110-9S Acquisition date : 13-SEP-2010 13:56:23

Total number of lines in spectrum	6	
Number of unidentified lines	1	
Number of lines tentatively identified by NID	5	83.33%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	3.009E-07	3.008E-07	0.395E-07	13.13	
	Total Activity :		3.008E-07	3.008E-07			
	Grand Total Activity :		3.008E-07	3.008E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EF1-6110-9S Acquisition date : 13-SEP-2010 13:56:23

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	1364.17	511.00*	193.46	1.000E+35	18.47	Decay
		% Abundances Found =		100.00			
SE-75	119.78D	0.87	66.05	1.02	----- Not Found -----		Abun.
			96.73	3.41	----- Not Found -----		
			121.12	16.70	----- Not Found -----		
			136.00*	59.20	----- Not Found -----		
			190.60	1.45	1.163E-06	24.86	
			264.65	59.00	----- Not Found -----		
			279.53	25.20	----- Not Found -----		
			303.91	1.32	----- Not Found -----		
			400.65	11.40	----- Not Found -----		
		% Abundances Found =		0.01			
AS-76	26.32H	94.80	559.10*	44.70	1.744E+21	16.11	Decay,Abun.
			563.23	1.17	----- Not Found -----		
			571.30	0.14	----- Not Found -----		
			657.03	6.10	----- Not Found -----		
			665.31	0.39	----- Not Found -----		
			740.12	0.12	----- Not Found -----		
			771.76	0.12	----- Not Found -----		
			867.63	0.12	----- Not Found -----		
			1129.87	0.14	----- Not Found -----		
			1212.72	1.63	----- Not Found -----		
			1216.02	3.04	----- Not Found -----		
			1228.52	1.39	----- Not Found -----		
			1439.13	0.33	----- Not Found -----		
			1453.60	0.13	----- Not Found -----		
			1787.67	0.33	----- Not Found -----		
		% Abundances Found =		73.70			
BR-84	31.80M	4707.67	604.80	1.80	----- Not Found -----		Decay,Abun.
			736.50	1.31	----- Not Found -----		
			802.20	6.10	----- Not Found -----		
			881.50*	42.00	----- Not Found -----		
			1015.90	6.20	----- Not Found -----		
			1213.30	2.60	----- Not Found -----		
			1463.80	2.00	1.000E+35	18.81	
			1741.20	1.60	----- Not Found -----		
			1877.50	1.14	----- Not Found -----		
			1897.30	14.90	----- Not Found -----		
			2029.60	2.10	----- Not Found -----		
		% Abundances Found =		2.45			

Flag: "*" = Keyline

Sample ID : EF1-6110-96 Acquisition date : 13-SEP-2010 13:56:23

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Fw	Cts/Sec	%Err	%Eff	Flags
0	190.54	61	61	1.54	396.60	393	7	2.26E-02	24.9	6.60E+00	T
3	510.33	104	41	1.81	1020.23	1012	21	3.87E-02	18.5	4.88E+00	T
3	512.06	139	42	2.44	1023.67	1012	21	5.13E-02	16.0	4.87E+00	
0	558.49	106	45	1.99	1116.54	1100	15	3.93E-02	16.1	4.69E+00	T
1	1462.52	54	0	2.80	2924.53	2911	20	2.01E-02	19.8	2.50E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 13-SEP-2010 14:41:30.50

Sample ID : EF1-6110-98

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	39.	477.59	2.3402E-07
F-18	0.	511.00	Half-Life too short
NA-22	12.	1274.54	7.6004E-09
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	11.	889.25	1.2910E-08
CR-51	58.	320.08	8.8763E-07
MN-54	25.	834.83	9.4374E-09
CO-56	25.	1238.25	3.5182E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	0.	158.38	Half-Life too short
CO-57	76.	122.06	1.1404E-08
CO-58	21.	810.76	1.8728E-08
FE-59	17.	1099.22	6.5951E-08
CO-60	24.	1332.49	1.0021E-08
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	21.	1115.52	2.1745E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	49.	136.00	1.7308E-08
AS-76	0.	559.10	Half-Life too short
BR-82	0.	776.49	Half-Life too short
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	99.	513.99	2.3907E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	99.	513.99	3.0892E-08
RB-86	18.	1076.63	4.1364E-06
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	0.	1836.01	1.3861E-08
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	17.	1204.90	8.9839E-06
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Sample ID : EF1-6110-9S Acquisition date : 13-SEP-2010 13:56:23

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
SR-93	0.	590.20	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	13.	702.63	4.0006E-09
NB-95	23.	765.79	5.1570E-08
NB-95M	0.	235.69	Half-Life too short
ZR-95	13.	756.72	2.0700E-08
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	0.	739.50	Half-Life too short
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	37.	497.08	4.4100E-08
TC-104	0.	357.99	Half-Life too short
RH-105	0.	318.90	Half-Life too short
RU-105	0.	724.50	Half-Life too short
RU-106	34.	621.84	8.2717E-08
CD-109	52.	88.03	3.2478E-07
AG-110M	17.	937.48	2.6632E-08
SN-113	41.	391.69	1.6966E-08
SN-117M	76.	158.56	1.4990E-06
SB-122	0.	563.93	Half-Life too short
SB-124	33.	602.71	2.1892E-08
SB-125	35.	427.89	2.0819E-08
TE-125M	48.	109.28	8.4359E-06
TE-127	0.	417.90	Half-Life too short
TE-127M	43.	57.60	3.6109E-05
XE-127	52.	202.84	5.8935E-08
TE-129	0.	459.60	Half-Life too short
TE-129M	24.	695.88	1.5828E-06
XE-129M	0.	196.56	Half-Life too short
I-130	0.	536.09	Half-Life too short
BA-131	56.	123.80	9.9090E-06
I-131	0.	364.48	Half-Life too short
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	55.	163.93	1.2469E-04
I-132	0.	667.69	Half-Life too short
TE-132	0.	228.16	Half-Life too short
BA-133	49.	302.84	3.3522E-08
BA-133M	0.	276.09	Half-Life too short
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	0.	81.00	Half-Life too short
XE-133M	0.	233.22	Half-Life too short
CS-134	34.	604.70	7.4743E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Sample ID : EF1-6110-9S Acquisition date : 13-SEP-2010 13:56:23

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-136	10.	818.50	1.5095E-06
I-136	0.	1313.02	Half-Life too short
CS-137	27.	661.65	7.3131E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	66.	165.85	1.2683E-08
CS-139	0.	1283.23	Half-Life too short
BA-140	38.	537.32	7.3404E-06
LA-140	0.	1596.49	Half-Life too short
BA-141	0.	190.22	Half-Life too short
CE-141	67.	145.44	1.1849E-07
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	0.	293.26	Half-Life too short
CE-144	63.	133.54	7.6288E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	52.	91.10	2.4176E-05
PM-148M	26.	550.27	3.3588E-08
EU-152	47.	344.27	2.3114E-08
EU-154	12.	1004.76	3.5110E-08
EU-155	56.	105.31	3.9020E-08
EU-156	21.	646.29	8.8923E-06
HF-181	26.	482.03	3.4831E-08
TA-182	18.	1221.42	5.5535E-08
W-187	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
HG-203	67.	279.19	4.0127E-08
BI-207	29.	569.67	6.1839E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	0.	240.98	Half-Life too short
RA-226	73.	186.21	1.9422E-07
AC-228	48.	338.32	5.4999E-08
TH-228	56.	84.37	1.0762E-06
PA-234	0.	131.20	Half-Life too short
TH-234	42.	63.29	1.5850E-05
U-235	79.	143.76	6.4783E-08
NP-239	0.	106.13	Half-Life too short
AM-241	46.	59.54	1.4052E-07

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-101410-GS

Sample Location (Well Number): GS

1. Representative sample collected. Date/Time 11-11-10 / 13:17

Sample collected by: CProffitt / CProffitt Date: 11-11-10
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: CProffitt / CProffitt Date: 11-11-10
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: S.A.Dyer / SADyer Date: 11-12-10
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert C Grey JR1 / Robert C Grey JR Date: 11-15-10
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 .	Sample Location	EFT ~~ERT~~ 101410-9S	
2 .	Date Sampled	11/11/2010	
3 .	Time Sampled	13:17	
4 .	Sample Volume, (ml)	4	ml

Instrument Count Data

1 .	Date Sample Counted	11/11/2010	
2 .	Time Sample Counted	22:08	
3 .	Background Inf.:		
	Minutes Counted	10	min.
	Background Count Rate (cpm)	7.2	cpm
4 .	Efficiency Inf.: (Daily Spike Source ID # 111)		
	Gross Spike Count Rate (cpm)	2546.6	cpm
	Net Spike Count Rate (cpm)	2539.4	cpm
	H3 Spike Activity (dpm on count date)	6741.6	dpm
	Counter Efficiency	0.3767	cpm/dpm
5 .	Sample Info:		
	Sample Gross Count Rate (cpm)	9.0	cpm
	Sample Count Time (min.)	10.0	min.
	Net Sample Count Rate (cpm)	1.8	cpm
6 .	Critical Level:		
	Critical Level Count Rate (cpm)	2.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{\text{(Bkg cpm)}}{\text{(Bkg min.)}} + \frac{\text{(Bkg cpm)}}{\text{(Smpl min.)}}}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}} = 1.18\text{E-}06 \text{ uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency x 2.22E6 uCi/ml x Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 11-12-10

Reviewed By: _____ Date 11/15/10

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-101410-9/S

Sample Location (Well Number): 9/S

1. Representative sample collected. Date/Time 10/14/10 / 11:55

Sample collected by: T. Thomas Moon / [signature] Date: 11/11/10
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: C. Proffitt / [signature] Date: 11-30-10
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: C. Proffitt / [signature] Date: 11-30-10
Fermi 2 RP Printed Name Signature

Sample number: EFT 101410-9S

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: C Prather / C Prather Date: 11-30-10
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert C Krey JR / Robert C Krey JR Date: 12-1-10
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

DETROIT EDISON FERMI-2 POWER PLANT 30-NOV-2010 16:50:23.47

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EFT-101410-9/S

Sample End Time: 14-OCT-2010 11:55:00.00

REMARKS:

PERFORMED BY:

SIGNATURE

REVIEWED BY:

SIGNATURE/DATE

Sample ID : EFT-101410-9/S Acquisition date : 30-NOV-2010 16:05:10

Fermi 2 Radiation Protection Gamma Spectroscopy Report

Sample Parameters

Sample ID Number: EFT-101410-9/S
Sample collection start date: 14-OCT-2010 11:55:00.00
Sample collection end date : 14-OCT-2010 11:55:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.00000E+03 cc
Sample geometry : M2LL Operator: CLP

Acquisition Parameters

Detector number : DET 4 Acquire date : 30-NOV-2010 16:05:10.40
Preset live time : 0 00:45:00.00 Elapsed live time : 0 00:45:00.00
Elapsed real time : 0 00:45:00.58 Percent dead time : 0.03 %

Calibration Parameters

Detector number : DET 4 Yearly cal date : 23-JUN-2010 12:28:00.00
Kev/channel : 5.00188E-01 Zero offset: 7.82181E-02
Daily cal date : 30-NOV-2010 12:56:20.21

Peak Search Parameters

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

Nuclide Identification Parameters

Energy tolerance : 1.75000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	511.60	153	86	3.21	1022.66	1012	27	5.65E-02	18.9	
2	3	1460.12	42	23	3.11	2919.01	2912	15	1.57E-02	29.0	3.10E+00
3	3	1461.42	30	18	2.39	2921.60	2912	15	1.11E-02	36.3	

Sample Title : EFT-101410-9/S Page : 1
Decay Time = .47 04:10:10.40 Acquisition Time = 30-NOV-2010 16:05:10.4
0

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	511.60	153	86	3.21	1022.66	1012	27	18.9		ANN, Peak
3	1460.12	42	23	3.11	2919.01	2912	15	29.0	3.10E+00	K-40
3	1461.42	30	18	2.39	2921.60	2912	15	36.3		K-40

12-1-10

Sample ID : EFT-101410-9/S Acquisition date : 30-NOV-2010 16:05:10

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	30	10.67*	2.501E+00	1.128E-07	1.128E-07	36.29

Flag: "*" = Keyline

Sample ID : EFT-101410-9/S Acquisition date : 30-NOV-2010 16:05:10

Total number of lines in spectrum	3	
Number of unidentified lines	1	
Number of lines tentatively identified by NID	2	66.67%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	1.128E-07	1.128E-07	0.409E-07	36.29	
	Total Activity :		1.128E-07	1.128E-07			
	Grand Total Activity :		1.128E-07	1.128E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EFT-101410-9/S Acquisition date : 30-NOV-2010 16:05:10

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	619.22	511.00*193.46		1.000E+35	18.89	Decay

% Abundances Found = 100.00

Flag: "*" = Keyline

Sample ID : EFT-101410-9/S Acquisition date : 30-NOV-2010 16:05:18

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	511.60	153	86	3.21	1022.66	1012	27	5.65E-02	18.9	4.88E+00	T
3	1460.12	42	23	3.11	2919.01	2912	15	1.57E-02	29.0	2.50E+00	

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 30-NOV-2010 16:50:27.42

Sample ID : EFT-101410-9/S

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	27.	477.59	9.5309E-08
F-18	0.	511.00	Half-Life too short
NA-22	8.	1274.54	6.2251E-09
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	18.	889.25	1.0142E-08
CR-51	32.	320.08	1.6202E-07
MN-54	21.	834.83	7.7116E-09
CO-56	17.	1238.25	1.7947E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	56.	158.38	1.2152E-06
CO-57	45.	122.06	7.6941E-09
CO-58	16.	810.76	9.4773E-09
FE-59	11.	1099.22	2.2492E-08
CO-60	19.	1332.49	8.8170E-09
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	12.	1115.52	1.4407E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	54.	136.00	1.2996E-08
AS-76	0.	559.10	Half-Life too short
BR-82	0.	776.49	Half-Life too short
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	57.	513.99	1.8188E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	57.	513.99	1.2938E-08
RB-86	14.	1076.63	4.4545E-07
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	7.	1836.01	9.3048E-09
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	14.	1204.90	4.1587E-06
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Sample ID : EFT-101410-9/S Acquisition date : 30-NOV-2010 16:05:10

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
SR-93	0.	590.28	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	15.	702.63	5.0029E-09
NB-95	25.	765.79	1.7547E-08
NB-95M	0.	235.69	Half-Life too short
ZR-95	22.	756.72	1.9412E-08
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	0.	739.58	Half-Life too short
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	31.	497.08	1.4858E-08
TC-104	0.	357.99	Half-Life too short
RH-105	0.	318.90	Half-Life too short
RU-105	0.	724.50	Half-Life too short
RU-106	19.	621.84	5.7208E-08
CD-109	37.	88.03	2.5355E-07
AG-110M	21.	937.48	2.5121E-08
SN-113	33.	391.69	1.0991E-08
SN-117M	58.	158.56	7.3193E-08
SB-122	0.	563.93	Half-Life too short
SB-124	36.	602.71	1.1950E-08
SB-125	43.	427.89	2.2015E-08
TE-125M	57.	109.28	4.6387E-06
TE-127	0.	417.90	Half-Life too short
TE-127M	34.	57.60	2.2636E-05
XE-127	64.	202.84	2.1929E-08
TE-129	0.	459.60	Half-Life too short
TE-129M	28.	695.88	5.2696E-07
XE-129M	53.	196.56	4.6349E-06
I-130	0.	536.09	Half-Life too short
BA-131	52.	123.80	3.4063E-07
I-131	36.	364.48	3.9293E-07
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	51.	163.93	4.3306E-06
I-132	0.	667.69	Half-Life too short
TE-132	0.	228.16	Half-Life too short
BA-133	43.	302.84	3.1339E-08
BA-133M	0.	276.09	Half-Life too short
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	33.	81.00	1.4250E-05
XE-133M	0.	233.22	Half-Life too short
CS-134	38.	604.70	7.4491E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Sample ID : EFT-101410-9/S Acquisition date : 30-NOV-2010 16:05:10

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-136	13.	818.50	6.4934E-08
I-136	0.	1313.02	Half-Life too short
CS-137	10.	661.65	6.0579E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	51.	165.85	8.4122E-09
CS-139	0.	1283.23	Half-Life too short
BA-140	29.	537.32	2.9831E-07
LA-140	0.	1596.49	Half-Life too short
BA-141	0.	190.22	Half-Life too short
CE-141	49.	145.44	3.0640E-08
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	0.	293.26	Half-Life too short
CE-144	52.	133.54	6.0000E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	47.	91.10	6.4203E-07
PM-148M	19.	550.27	1.1357E-08
EU-152	35.	344.27	2.0108E-08
EU-154	16.	1004.76	3.8905E-08
EU-155	42.	105.31	3.3473E-08
EU-156	24.	646.29	6.9619E-07
HF-181	27.	482.03	1.4120E-08
TA-182	13.	1221.42	3.4195E-08
W-187	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
HG-203	50.	279.19	1.5040E-08
BI-207	23.	569.67	5.5077E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	0.	240.98	Half-Life too short
RA-226	73.	186.21	1.9388E-07
AC-228	41.	338.32	5.0123E-08
TH-228	38.	84.37	8.5179E-07
PA-234	0.	131.20	Half-Life too short
TH-234	31.	63.29	2.6876E-06
U-235	48.	143.76	5.1360E-08
NP-239	0.	106.13	Half-Life too short
AM-241	36.	59.54	1.2460E-07

EFT-9S

2011

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT 62011-9

Sample Location (Well Number): EFT-9

1. Representative sample collected. Date/Time 6-20-11 / 10:10

Sample collected by: Thomas Monl _____ Date: 6-22-11
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: C Proffitt / C Proffitt Date: 6-22-11
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: Smith / _____ Date: 6-23-11
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert C Frey JR / _____ Date: 6-24-11
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

_____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-62011-9	
2 . Date Sampled	06/20/2011	
3 . Time Sampled	10:10	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	06/23/2011	
2 . Time Sample Counted	03:13	
3 . Background Inf.:		
Minutes Counted	30	min.
Background Count Rate (cpm)	5.6	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	2291.3	cpm
Net Spike Count Rate (cpm)	2285.7	cpm
H3 Spike Activity (dpm on count date)	6512.3	dpm
Counter Efficiency	0.3510	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	5.9	cpm
Sample Count Time (min.)	30.0	min.
Net Sample Count Rate (cpm)	0.3	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	1.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{(\text{Bkg cpm})}{(\text{Bkg min.})} + \frac{(\text{Bkg cpm})}{(\text{Smpl min.})}}}{\text{Efficiency} \times 2.22\text{E6 dpm/uCi} \times \text{Sample Volume}} = 6.47\text{E-07 uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency} \times 2.22\text{E6 uCi/ml} \times \text{Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 6-23-11

Reviewed _____ Date 6-23-11

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-62011-9

Sample Location (Well Number): EFT-9

1. Representative sample collected. Date/Time 6-20-11 / 10:10

Sample collected by: Thomas Mow / [signature] Date: 6-22-11
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: C Proffitt / [signature] Date: 6-22-11
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: C Proffitt / [signature] Date: 6.22.11
Fermi 2 RP Printed Name Signature

Sample number: GFT-62011-9

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: C Proffitt / [signature] Date: 6.22.11
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert C Hegg JR / [signature] Date: 6-23-11
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

N/A 6-23-11

DETROIT EDISON FERMI-2 POWER PLANT 22-JUN-2011 16:06:58.90

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EFT-62011-9

Sample End Time: 20-JUN-2011 10:10:00.00

REMARKS Natural

PERFORMED BY:

SIGNATURE

REVIEWED BY:

SIGNATURE/DATE

Sample ID : EFT-62011-9 Acquisition date : 22-JUN-2011 15:21:57

Fermi 2 Radiation Protection Gamma Spectroscopy Report

Sample Parameters

Sample ID Number: EFT-62011-9
Sample collection start date: 20-JUN-2011 10:10:00.00
Sample collection end date : 20-JUN-2011 10:10:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.00000E+03 cc
Sample geometry : M2LL Operator: CLP

Acquisition Parameters

Detector number : DET 4 Acquire date : 22-JUN-2011 15:21:57.60
Preset live time : 0 00:45:00.00 Elapsed live time : 0 00:45:00.00
Elapsed real time : 0 00:45:00.64 Percent dead time : 0.03 %

Calibration Parameters

Detector number : DET 4 Yearly cal date : 14-JUN-2011 14:50:56.41
Kev/channel : 4.99884E-01 Zero offset: 2.83532E-01
Daily cal date : 22-JUN-2011 14:32:40.30

Peak Search Parameters

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

Nuclide Identification Parameters

Energy tolerance : 1.75000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	2	66.04	37	53	1.32	131.54	126	11	1.37E-02	40.4	2.13E+00
2	2	67.04	26	38	1.32	133.54	126	11	9.48E-03	47.2	
3	0	296.04	58	74	1.31	591.64	586	12	2.16E-02	32.9	
4	0	352.38	83	38	1.27	704.36	698	11	3.06E-02	18.3	
5	0	512.05	135	109	2.59	1023.77	1015	23	4.99E-02	23.1	
6	0	609.69	95	45	1.73	1219.09	1210	17	3.50E-02	19.5	
7	0	1461.36	52	13	3.28	2922.00	2917	14	1.94E-02	20.3	

Sample Title : EFT-62011-9 Page : 1
Decay Time = 2 05:11:57.60 Acquisition Time = 22-JUN-2011 15:21:57.6
0

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
2	66.04	37	53	1.32	131.54	126	11	40.4	2.13E+00	> Ge-n-γ coinc
2	67.04	26	38	1.32	133.54	126	11	47.2		
0	296.04	58	74	1.31	591.64	586	12	32.9		Pb-214
0	352.38	83	38	1.27	704.36	698	11	18.3		Pb-214
0	512.05	135	109	2.59	1023.77	1015	23	23.1		Ann. Peak
0	609.69	95	45	1.73	1219.09	1210	17	19.5		Bi-214
0	1461.36	52	13	3.28	2922.80	2917	14	20.3		K-40

fr 6-23-11

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	52	10.67*	2.353E+00	2.093E-07	2.093E-07	20.35

Flag: "*" = Keyline

Sample ID : EFT-62011-9 Acquisition date : 22-JUN-2011 15:21:57

Total number of lines in spectrum	7	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	7	100.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	2.093E-07	2.093E-07	0.426E-07	20.35	
Total Activity :			2.093E-07	2.093E-07			
Grand Total Activity :			2.093E-07	2.093E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EFT-62011-9 Acquisition date : 22-JUN-2011 15:21:57

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	29.29	511.00*	193.46	9.967E+00	23.13	Decay
		% Abundances Found =		100.00			
SE-75	119.78D	0.02	66.05	1.02	2.798E-06	40.40	Abun.
			96.73	3.41	---- Not Found ----		
			121.12	16.70	---- Not Found ----		
			136.00*	59.20	---- Not Found ----		
			198.60	1.45	---- Not Found ----		
			264.65	59.00	---- Not Found ----		
			279.53	25.20	---- Not Found ----		
			303.91	1.32	---- Not Found ----		
			400.65	11.40	---- Not Found ----		
		% Abundances Found =		0.57			
RU-103	39.35D	0.06	497.08*	89.00	---- Not Found ----		Abun.
			610.33	5.60	4.140E-07	19.46	
		% Abundances Found =		5.92			
XE-135	9.11H	5.88	249.79*	89.90	---- Not Found ----		Abun.
			608.19	2.89	4.544E-05	19.46	
		% Abundances Found =		3.11			
CS-136	13.16D	0.17	66.91	12.50	1.622E-07	47.18	Abun.
			86.29	6.30	---- Not Found ----		
			153.22	7.46	---- Not Found ----		
			163.89	4.61	---- Not Found ----		
			176.55	13.56	---- Not Found ----		
			273.65	12.66	---- Not Found ----		
			340.57	48.50	---- Not Found ----		
			818.50*	99.70	---- Not Found ----		
			1048.07	79.60	---- Not Found ----		
			1235.34	19.70	---- Not Found ----		
		% Abundances Found =		4.10			
PM-148M	41.30D	0.05	288.11	12.56	---- Not Found ----		Abun.
			414.07	18.66	---- Not Found ----		
			432.70	5.35	---- Not Found ----		
			501.26	6.75	---- Not Found ----		
			550.27*	94.90	---- Not Found ----		
			599.74	12.54	---- Not Found ----		
			611.26	5.48	4.223E-07	19.46	
			629.97	89.00	---- Not Found ----		
			725.70	32.00	---- Not Found ----		
			915.33	17.17	---- Not Found ----		
			1013.81	20.30	---- Not Found ----		
		% Abundances Found =		1.74			
TA-182	114.74D	0.02	67.75	42.30	4.319E-08	47.18	Abun.
			100.10	14.10	---- Not Found ----		
			1189.05	16.30	---- Not Found ----		
			1221.42*	27.10	---- Not Found ----		
			1230.97	11.50	---- Not Found ----		
		% Abundances Found =		38.01			

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
BI-214	19.90M	161.53	609.31*	46.30	1.000E+35	19.46	Decay
			768.36	5.04	---- Not Found ----		
			934.06	3.21	---- Not Found ----		
			1120.29	15.10	---- Not Found ----		
			1238.11	5.94	---- Not Found ----		
			1377.67	4.11	---- Not Found ----		
			1764.49	15.80	---- Not Found ----		
		% Abundances Found =		48.40	(Abn. Limit = 48.48%)		
PB-214	26.80M	119.94	87.30	4.67	---- Not Found ----		Decay
			241.98	7.49	---- Not Found ----		
			295.21	19.20	6.303E+28	32.86	
			351.92*	37.20	4.987E+28	18.25	
			785.91	1.10	---- Not Found ----		
		% Abundances Found =		80.96	(Abn. Limit = 37.20%)		

Flag: "*" = Keyline

Sample ID : EFT-62011-9 Acquisition date : 22-JUN-2011 15:21:57

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
2	66.04	37	53	1.32	131.54	126	11	1.37E-02	40.4	1.32E+00	T
2	67.04	26	38	1.32	133.54	126	11	9.48E-03	47.2	1.42E+00	T
0	296.04	58	74	1.31	591.64	586	12	2.16E-02	32.9	5.82E+00	T
0	352.38	83	38	1.27	704.36	698	11	3.06E-02	18.3	5.38E+00	T
0	512.05	135	109	2.59	1023.77	1015	23	4.99E-02	23.1	4.58E+00	T
0	609.69	95	45	1.73	1219.09	1210	17	3.50E-02	19.5	4.25E+00	T

Flags: "T" = Tentatively associated

'Detroit Edison Fermi 2 MDA Report, Generated 22-JUN-2011 16:07:03.13

Sample ID : EFT-62011-9

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	20.	477.59	4.9011E-08
F-18	0.	511.00	Half-Life too short
NA-22	10.	1274.54	6.7775E-09
NA-24	12.	1368.53	9.0475E-08
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	14.	889.25	6.5818E-09
CR-51	22.	320.08	4.7023E-08
MN-54	37.	834.83	9.4039E-09
CO-56	21.	1238.25	1.4190E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	34.	158.38	6.1177E-09
CO-57	51.	122.06	7.7556E-09
CO-58	16.	810.76	6.5258E-09
FE-59	12.	1099.22	1.2452E-08
CO-60	22.	1332.49	1.0044E-08
CU-64	15.	1345.90	5.0610E-05
NI-65	0.	1481.84	Half-Life too short
ZN-65	18.	1115.52	1.6227E-08
ZN-69M	32.	438.63	9.2313E-08
SE-75	54.	136.00	1.0690E-08
AS-76	49.	559.10	7.3652E-08
BR-82	16.	776.49	2.0775E-08
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	66.	513.99	2.0654E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	66.	513.99	9.1592E-09
RB-86	15.	1076.63	9.2578E-08
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	2.	1836.01	4.5237E-09
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	4.	1024.30	6.2190E-07
Y-91	8.	1204.90	2.0485E-06
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Sample ID : EFT-62011-9 Acquisition date : 22-JUN-2011 15:21:57

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
SR-93	0.	590.20	Half-Life too short
Y-93	38.	266.90	3.0153E-06
NB-94	29.	702.63	7.1595E-09
NB-95	23.	765.79	7.3900E-09
NB-95M	49.	235.69	3.5596E-08
ZR-95	23.	756.72	1.2724E-08
NB-97	0.	657.90	Half-Life too short
ZR-97	18.	743.36	5.6327E-08
MO-99	17.	739.58	8.1848E-08
TC-99M	70.	140.50	3.6986E-06
TC-101	0.	306.81	Half-Life too short
RU-103	34.	497.08	7.4748E-09
TC-104	0.	357.99	Half-Life too short
RH-105	31.	318.90	7.5774E-08
RU-105	0.	724.50	Half-Life too short
RU-106	24.	621.84	6.1933E-08
CD-109	40.	88.03	2.5675E-07
AG-110M	18.	937.48	2.1960E-08
SN-113	30.	391.69	8.5809E-09
SN-117M	37.	158.56	6.2829E-09
SB-122	26.	563.93	1.5078E-08
SB-124	26.	602.71	6.5186E-09
SB-125	29.	427.89	1.9190E-08
TE-125M	43.	109.28	2.5201E-06
TE-127	30.	417.90	3.0190E-05
TE-127M	31.	57.60	1.8951E-05
XE-127	44.	202.84	8.1434E-09
TE-129	0.	459.60	Half-Life too short
TE-129M	22.	695.88	2.0027E-07
XE-129M	60.	196.56	1.5372E-07
I-130	26.	536.09	1.1964E-07
BA-131	56.	123.80	2.6781E-08
I-131	40.	364.48	9.0235E-09
TE-131	0.	149.72	Half-Life too short
TE-131M	17.	773.67	5.6117E-08
XE-131M	50.	163.93	3.2174E-07
I-132	0.	667.69	Half-Life too short
TE-132	45.	228.16	1.0146E-08
BA-133	52.	302.84	3.5305E-08
BA-133M	48.	276.09	8.4659E-08
I-133	19.	529.87	3.5466E-08
TE-133M	0.	912.58	Half-Life too short
XE-133	20.	81.00	3.1205E-08
XE-133M	42.	233.22	1.0610E-07
CS-134	28.	604.70	6.6073E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	46.	268.24	1.3070E-07
I-135	8.	1260.41	5.9216E-06
XE-135	47.	249.79	3.7662E-07
XE-135M	0.	526.56	Half-Life too short

Sample ID : EFT-62011-9 Acquisition date : 22-JUN-2011 15:21:57

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-136	10.	818.50	5.8557E-09
I-136	0.	1313.02	Half-Life too short
CS-137	18.	661.65	6.4367E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	52.	165.85	7.1309E-09
CS-139	0.	1283.23	Half-Life too short
BA-140	25.	537.32	2.6354E-08
LA-140	5.	1596.49	1.5368E-08
BA-141	0.	190.22	Half-Life too short
CE-141	49.	145.44	1.2459E-08
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	49.	293.26	4.4328E-08
CE-144	45.	133.54	5.4126E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	42.	91.10	3.7317E-08
PM-148M	19.	550.27	5.6873E-09
EU-152	33.	344.27	2.0330E-08
EU-154	11.	1004.76	3.5077E-08
EU-155	30.	105.31	2.9799E-08
EU-156	34.	646.29	1.1153E-07
HF-181	23.	482.03	6.7076E-09
TA-182	15.	1221.42	2.9288E-08
W-187	26.	685.81	1.0856E-07
RE-188	40.	155.03	3.0254E-07
AU-199	34.	158.38	2.0842E-08
HG-203	44.	279.19	7.5443E-09
BI-207	23.	569.67	5.8966E-09
TL-208	0.	583.14	Half-Life too short
PB-212	67.	238.63	4.9509E-07
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	65.	240.98	2.5873E-07
RA-226	62.	186.21	1.8624E-07
AC-228	53.	338.32	5.8800E-08
TH-229	31.	84.37	7.7523E-07
PA-234	38.	131.20	6.7676E-06
TH-234	37.	63.29	8.4785E-07
U-235	50.	143.76	5.5321E-08
NP-239	29.	106.13	5.0454E-08
AM-241	43.	59.54	1.5043E-07

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-102411-9S

Sample Location (Well Number): EFT-9/S

1. Representative sample collected. Date/Time 10/24/11 / 12:45

Sample collected by: Thomas Mow / [signature] Date: 10/24/11
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Thomas Mow / [signature] Date: 10/25/11
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: John Myoron / [signature] Date: 11-1-11
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert C Bray JR / [signature] Date: 11-2-11
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks N/A

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-9/S	
2 . Date Sampled	10/24/2011	
3 . Time Sampled	12:45	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	10/30/2011	
2 . Time Sample Counted	17:10	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	7.5	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	2548.6	cpm
Net Spike Count Rate (cpm)	2541.1	cpm
H3 Spike Activity (dpm on count date)	6383.7	dpm
Counter Efficiency	0.3981	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	8.0	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.5	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{(\text{Bkg cpm})}{(\text{Bkg min.})} + \frac{(\text{Bkg cpm})}{(\text{Smpl min.})}}}{\text{Efficiency} \times 2.22\text{E6 dpm/uCi} \times \text{Sample Volume}} = 1.14\text{E-06 uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency} \times 2.22\text{E6 uCi/ml} \times \text{Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 11-1-11

Reviewed _____ Date NOV 01 2011

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-102411-95

Sample Location (Well Number): EFT-9/5

1. Representative sample collected. Date/Time 10/24/11 / 12:45

Sample collected by: Thomas Mow / [signature] Date: 10/24/11
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Thomas Mow / [signature] Date: 10/25/11
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: C Proffitt / [signature] Date: 11-1-11
Fermi 2 RP Printed Name Signature

Sample number: EFT-10241-95

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: C Proffitt / [signature] Date: 11-1-11
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert Clegg SR / [signature] Date: 11-1-11
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks N/A

DETROIT EDISON FERMI-2 POWER PLANT 1-NOV-2011 17:01:27.45

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EFT-102411-9S

Sample End Time: 24-OCT-2011 12:45:00.00

REMARKS No Plant Related Isotopes

PERFORMED BY:

SIGNATURE

REVIEWED BY:

SIGNATURE/DATE

PAGE_____ of _____

Sample ID : EFT-102411-9S Acquisition date : 1-NOV-2011 16:16:23

****

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********
Sample ID Number: EFT-102411-9S
Sample collection start date: 24-OCT-2011 12:45:00.00
Sample collection end date : 24-OCT-2011 12:45:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.000000E+03 cc
Sample geometry : MELL Operator: CLP

********** Acquisition Parameters **********
Detector number : DET 4 Acquire date : 1-NOV-2011 16:16:23.94
Preset live time : 0 00:45:00.00 Elapsed live time : 0 00:45:00.00
Elapsed real time : 0 00:45:00.63 Percent dead time : 0.03 %

********** Calibration Parameters **********
Detector number : DET 4 Yearly cal date : 14-JUN-2011 14:50:56.41
Kev/channel : 5.000032E-01 Zero offset: -5.54949E-01
Daily cal date : 1-NOV-2011 07:48:09.27

********** Peak Search Parameters **********
Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********
Energy tolerance : 1.75000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy
****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	511.35	119	67	2.39	1023.75	1015	18	4.40E-02	18.6	
2	0	559.86	34	30	3.32	1120.77	1110	16	1.26E-02	40.7	
3	0	609.38	55	28	2.02	1219.80	1211	16	2.04E-02	25.4	

Decay Time = 8 03:31:23.94 Acquisition Time = 1-NOV-2011 16:16:23.94

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	511.35	119	67	2.39	1023.75	1015	18	18.6		Ann. Peak
0	559.06	34	30	3.32	1120.77	1110	16	40.7		Cd-111
0	609.38	55	28	2.02	1219.00	1211	16	25.4		Bi-214

J. 11-1-11

Flag: "*" = Keyline

Sample ID : EFT-102411-9S Acquisition date : 1-NOV-2011 16:16:23

Total number of lines in spectrum	3	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	3	100.00%

**** There are no nuclides meeting summary criteria ****

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EFT-102411-99 Acquisition date : 1-NOV-2011 16:16:23

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	107.11	511.00*	193.46	2.335E+24	18.63	Decay
	% Abundances Found =			100.00			
AS-76	26.32H	7.44	559.10*	44.70	3.016E-06	40.68	Abun.
			563.23	1.17	---- Not Found ----		
			571.30	0.14	---- Not Found ----		
			657.03	6.10	---- Not Found ----		
			665.31	0.39	---- Not Found ----		
			740.12	0.12	---- Not Found ----		
			771.76	0.12	---- Not Found ----		
			867.63	0.12	---- Not Found ----		
			1129.07	0.14	---- Not Found ----		
			1212.72	1.63	---- Not Found ----		
			1216.02	3.84	---- Not Found ----		
			1220.52	1.39	---- Not Found ----		
			1439.13	0.33	---- Not Found ----		
			1453.60	0.13	---- Not Found ----		
			1787.67	0.33	---- Not Found ----		
	% Abundances Found =			73.70			
Y-92	3.54H	55.34	448.50	2.30	---- Not Found ----		Decay,Abun.
			561.10	2.40	1.470E+10	40.68	
			844.30	1.25	---- Not Found ----		
			934.46*	13.90	---- Not Found ----		
			1405.40	4.80	---- Not Found ----		
	% Abundances Found =			9.74			
RU-103	39.35D	0.21	497.08*	89.00	---- Not Found ----		Abun.
			610.33	5.60	2.673E-07	25.38	
	% Abundances Found =			5.92			
XE-135	9.11H	21.50	249.79*	89.90	---- Not Found ----		Decay,Abun.
			608.19	2.89	1.334E+00	25.38	
	% Abundances Found =			3.11			
BI-214	19.90M	590.65	609.31*	46.30	1.000E+35	25.38	Decay
			768.36	5.04	---- Not Found ----		
			934.06	3.21	---- Not Found ----		
			1120.29	15.10	---- Not Found ----		
			1238.11	5.94	---- Not Found ----		
			1377.67	4.11	---- Not Found ----		
			1764.49	15.80	---- Not Found ----		
	% Abundances Found =			48.48	(Abn. Limit = 48.48%)		

Flag: "*" = Keyline

Sample ID : EFT-102411-9S Acquisition date : 1-NOV-2011 16:16:23

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	511.35	119	67	2.39	1023.75	1015	10	4.40E-02	18.6	4.50E+00	T
0	559.86	34	30	3.32	1120.77	1110	16	1.26E-02	40.7	4.40E+00	T
0	609.30	55	20	2.02	1219.00	1211	16	2.04E-02	25.4	4.25E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 1-NOV-2011 17:01:31.61

Sample ID : EFT-102411-9S

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	38.	477.59	7.1106E-08
F-18	0.	511.00	Half-Life too short
NA-22	12.	1274.54	7.4098E-09
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
K-40	60.	1460.81	1.5447E-07
AR-41	0.	1293.64	Half-Life too short
SC-46	19.	889.25	7.9810E-09
CR-51	40.	320.08	7.1688E-08
MN-54	29.	834.83	8.6175E-09
CO-56	23.	1238.25	1.5507E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	54.	158.38	1.4863E-08
CO-57	42.	122.06	7.1910E-09
CO-58	15.	810.76	6.6209E-09
FE-59	15.	1099.22	1.5120E-08
CO-60	11.	1332.49	7.3607E-09
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	14.	1115.52	1.4977E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	43.	136.00	9.9609E-09
AS-76	47.	559.10	3.0557E-06
BR-82	16.	776.49	3.3908E-07
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	58.	513.99	1.9376E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	58.	513.99	9.1448E-09
RB-86	11.	1076.63	1.0139E-07
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	7.	1836.01	7.4749E-09
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	10.	1204.90	2.4468E-06
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short

Sample ID : EFT-102411-9S Acquisition date : 1-NOV-2011 16:16:23

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
Y-92	0.	934.46	Half-Life too short
SR-93	0.	590.20	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	17.	702.63	5.5800E-09
NB-95	12.	765.79	6.0936E-09
NB-95M	57.	235.69	1.1970E-07
ZR-95	8.	756.72	8.8653E-09
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	10.	739.58	2.9326E-07
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	25.	497.08	7.2903E-09
TC-104	0.	357.99	Half-Life too short
RH-105	34.	318.90	1.2877E-06
RU-105	0.	724.50	Half-Life too short
RU-106	24.	621.84	6.2978E-08
CD-109	40.	88.03	2.5740E-07
AG-110M	18.	937.48	2.2413E-08
SN-113	25.	391.69	8.1641E-09
SN-117M	56.	158.56	1.0375E-08
SB-122	18.	563.93	5.8740E-08
SB-124	35.	602.71	8.0043E-09
SB-125	31.	427.89	1.9683E-08
TE-125M	42.	109.28	2.6993E-06
TE-127	0.	417.90	Half-Life too short
TE-127M	32.	57.60	2.0013E-05
XE-127	41.	202.84	8.8040E-09
TE-129	0.	459.60	Half-Life too short
TE-129M	22.	695.88	2.2622E-07
XE-129M	63.	196.56	2.4904E-07
I-130	0.	536.09	Half-Life too short
BA-131	41.	123.80	3.2875E-08
I-131	41.	364.48	1.5223E-08
TE-131	0.	149.72	Half-Life too short
TE-131M	16.	773.67	1.4554E-06
XE-131M	53.	163.93	4.6970E-07
I-132	0.	667.69	Half-Life too short
TE-132	44.	228.16	3.5543E-08
BA-133	52.	302.84	3.5268E-08
BA-133M	47.	276.09	1.0630E-06
I-133	22.	529.87	4.2898E-06
TE-133M	0.	912.58	Half-Life too short
XE-133	47.	81.00	1.0004E-07
XE-133M	58.	233.22	8.0713E-07
CS-134	31.	604.70	6.9644E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	37.	268.24	3.6953E-06
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short

Sample ID : EFT-102411-9S Acquisition date : 1-NOV-2011 16:16:23

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
XE-135M	0.	526.56	Half-Life too short
CS-136	18.	818.50	1.0286E-08
I-136	0.	1313.02	Half-Life too short
CS-137	24.	661.65	7.2738E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	59.	165.85	7.7733E-09
CS-139	0.	1283.23	Half-Life too short
BA-140	26.	537.32	3.6459E-08
LA-140	10.	1596.49	2.4142E-07
BA-141	0.	190.22	Half-Life too short
CE-141	55.	145.44	1.4801E-08
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	46.	293.26	8.5688E-07
CE-144	44.	133.54	5.4388E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	41.	91.10	5.3848E-08
PM-148M	18.	550.27	6.1263E-09
EU-152	40.	344.27	2.2284E-08
EU-154	15.	1004.76	3.9747E-08
EU-155	51.	105.31	3.8076E-08
EU-156	25.	646.29	1.2913E-07
HF-181	33.	482.03	8.6697E-09
TA-182	13.	1221.42	2.8551E-08
W-187	23.	685.81	6.4561E-06
RE-188	0.	155.03	Half-Life too short
AU-199	54.	158.38	9.5610E-08
HG-203	48.	279.19	8.5797E-09
BI-207	30.	569.67	6.6116E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	48.	240.98	6.9975E-07
RA-226	62.	186.21	1.8678E-07
AC-228	29.	338.32	4.4574E-08
TH-228	51.	84.37	9.7462E-07
PA-234	0.	131.20	Half-Life too short
TH-234	51.	63.29	1.1647E-06
U-235	62.	143.76	6.1376E-08
NP-239	51.	106.13	3.7867E-07
AM-241	31.	59.54	1.2834E-07

GEL LAB RESULTS

EFT-9S 2010

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : Detroit Edison - Fermi 1
Address : PO Box 44440
Detroit, Michigan 48244

Report Date: February 17, 2010

Contact: Mr. Tom Mow
Project: **Fermi 1 - PO# 4700246055**

Client Sample ID: EF1-9/S
Sample ID: 245517016
Matrix: Ground Water
Collect Date: 04-JAN-10 14:45
Receive Date: 25-JAN-10
Collector: Client

Project: ROIT00116
Client ID: ROIT001

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Rad Alpha Spec Analysis											
Alphaspec U, Liquid "As Received"											
Pct Uranium-235	U	0.985				percent		MXE1 02/09/10	1349	947744	1
Uranium-233/234		11.2	+/-1.80	0.361	1.00	pCi/L					
Uranium-235/236	U	0.443	+/-0.410	0.446	1.00	pCi/L					
Uranium-238		6.93	+/-1.42	0.226	1.00	pCi/L					
Rad Gas Flow Proportional Counting											
GFPC, Gross A/B, liquid "As Received"											
Alpha		12.0	+/-4.16	4.76	5.00	pCi/L		DXF3 02/11/10	1933	945896	2
Beta		10.2	+/-3.09	4.43	5.00	pCi/L					

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	DOE EML HASL-300, U-02-RC Modified	
2	EPA 900.0	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery %	Acceptable Limits
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"			101	(15%-125%)

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : Detroit Edison - Fermi 1
Address : PO Box 44440
Detroit, Michigan 48244
Contact: Mr. Tom Mow
Project: Fermi 1 - PO# 4700246055

Report Date: December 30, 2010

Client Sample ID: EFT-101410-9/S
Sample ID: 268144011
Matrix: Water
Collect Date: 14-OCT-10 11:55
Receive Date: 06-DEC-10
Collector: Client

Project: ROIT00116
Client ID: ROIT001

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Rad Gas Flow Proportional Counting											
GFPC, Gross A/B, liquid "As Received"											
Alpha	U	1.15	+/-2.63	4.71	5.00	pCi/L		VXC2 12/27/10	1948	1059089	1
Beta	U	3.69	+/-3.51	5.86	5.00	pCi/L					

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 900.0/SW846 9310	

EFT-10S

2006

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-1S 06 0806

Sample Location (Well Number): EFT-1S

1. Representative sample collected. Date/Time 06/08/06 / 1032

Sample collected by: Joy Slabach / Joy Marie Slabach Collection Date: 06/08/06
Printed Name / Signature Signed 02/01/07

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Christopher Frailing / Christopher A Frailing Date: 08/02/06
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: Ross Rutgers / Date: 2-5-7
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: William Clipston / William Clipston Date: 2/15/2007
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks No tritium detected William Clipston 48667 2/15/2007

WR EFT 04-052
Pg 2 of 3

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-10S060806	
2 . Date Sampled	06/08/2006	
3 . Time Sampled	10:32	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	02/02/2007	
2 . Time Sample Counted	10:00	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	7.4	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	3388.1	cpm
Net Spike Count Rate (cpm)	3380.7	cpm
H3 Spike Activity (dpm on count date)	8340.7	dpm
Counter Efficiency	0.4053	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	7.5	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.1	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{\text{(Bkg cpm)}}{\text{(Bkg min.)}} + \frac{\text{(Bkg cpm)}}{\text{(Smpl min.)}}}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}} = 1.12\text{E-}06 \text{ uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 2-5-7

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-105060806

Sample Location (Well Number): EFT-105

1. Representative sample collected. Date/Time 06/08/06 / 1032

Sample collected by: Jay Slabach / Jay Marie Slabach Date: 06/08/06
Printed Name / Signature Signed 02/01/07

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Christopher Freiling / Christopher A Freiling Date: 08/02/06
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: K D Lindsey / K D Lindsey Date: 8-21-07
Fermi 2 RP Printed Name Signature

Sample number: EFT-10506080G

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: Chris Hubbard / [signature] Date: 7-10-07
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: K D Linds07 / [signature] Date: 8-21-07
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

DETROIT EDISON FERMI-2 POWER PLANT 10-JUL-2007 14:53:03.95

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EF1 EFT-10S060006

Sample End Time: 6-JUN-2006 10:32:00.00

REMARKS

PERFORMED BY:

SIGNATURE

REVIEWED BY:

8-21-07

SIGNATURE/DATE

Sample ID : EF1 EFT-10S060000 Acquisition date : 10-JUL-2007 14:22:50

****

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********

Sample ID Number: EF1 EFT-10S060000
Sample collection start date: 0-JUN-2006 10:32:00.00
Sample collection end date : 9-JUN-2006 10:32:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.00000E+03 CC
Sample geometry : M2LL Operator: CMH

********** Acquisition Parameters **********

Detector number : DET 4 Acquire date : 10-JUL-2007 14:22:50.45
Preset live time : 0 00:30:00.00 Elapsed live time : 0 00:30:00.00
Elapsed real time : 0 00:30:00.90 Percent dead time : 0.05 %

********** Calibration Parameters **********

Detector number : DET 4 Yearly cal date : 20-JUN-2007 12:16:46.16
Kev/channel : 4.99004E-01 Zero offset: -3.00949E-01
Daily cal date : 10-JUL-2007 07:47:29.07

********** Peak Search Parameters **********

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********

Energy tolerance : 2.00000 Half-life ratio : 10.00000
Abundance limit : 75.00000 0 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	511.34	115	51	1.52	1023.60	1017	12	6.42E-02	15.5	annihilation
2	0	558.98	62	14	2.01	1118.99	1113	11	3.45E-02	17.2	Hwc
3	0	1461.90	51	13	2.50	2925.38	2916	20	2.86E-02	22.9	K-40

Sample Title : EF1 EFT-1090608006 Page : 1
Decay Time = 397 03:50:58.45 Acquisition Time = 10-JUL-2007 14:22:50.4
5

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	511.34	115	51	1.52	1023.60	1017	12	15.5		
0	550.98	62	14	2.01	1110.99	1913	11	>17.2		
0	1461.90	51	13	2.50	2925.30	2916	20	22.9		K-40

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/CC	Decay Corr uCi/CC	1-Sigma %Error
K-40	1460.81	51	10.67*	2.500E+00	2.896E-07	2.896E-07	22.91

Flag: "*" = Keyline

Sample ID : EF1 EFT-10S06000 Acquisition date : 10-JUL-2007 14:22:50

Total number of lines in spectrum	3	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	3	100.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/CC	Decay Corr uCi/CC	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	2.096E-07	2.096E-07	0.664E-07	22.91	
	Total Activity :		2.096E-07	2.096E-07			
	Grand Total Activity :		2.096E-07	2.096E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EF1 EFT-10906000 Acquisition date : 10-JUL-2007 14:22:50

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/CC)	1-Sigma %Error	Rejected by
F-18	109.74M	5211.65	511.00*	193.46	1.000E+35	15.47	Decay
		% Abundances Found =		100.00			
AS-76	26.32H	362.16	559.10*	44.70	1.000E+35	17.17	Decay,Abun.
			563.23	1.17	---- Not Found	----	
			571.30	0.14	---- Not Found	----	
			657.03	6.10	---- Not Found	----	
			665.31	0.39	---- Not Found	----	
			740.12	0.12	---- Not Found	----	
			771.76	0.12	---- Not Found	----	
			867.63	0.12	---- Not Found	----	
			1129.87	0.14	---- Not Found	----	
			1212.72	1.63	---- Not Found	----	
			1216.02	3.04	---- Not Found	----	
			1220.52	1.39	---- Not Found	----	
			1439.13	0.33	---- Not Found	----	
			1453.60	0.13	---- Not Found	----	
			1787.67	0.33	---- Not Found	----	
		% Abundances Found =		73.70			
BR-84	31.80M	17985.09	604.80	1.80	---- Not Found	----	Decay,Abun.
			736.50	1.31	---- Not Found	----	
			802.20	6.10	---- Not Found	----	
			881.50*	42.00	---- Not Found	----	
			1015.90	6.20	---- Not Found	----	
			1213.30	2.60	---- Not Found	----	
			1463.80	2.00	1.000E+35	22.91	
			1741.20	1.60	---- Not Found	----	
			1877.50	1.14	---- Not Found	----	
			1897.30	14.90	---- Not Found	----	
			2029.60	2.10	---- Not Found	----	
		% Abundances Found =		2.45			

Flag: "*" = Keyline

Sample ID : EF1 EFT-10506000 Acquisition date : 10-JUL-2007 14:22:50

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	511.34	115	51	1.52	1023.68	1017	12	6.42E-02	15.5	4.08E+00	T
0	558.96	62	14	2.01	1118.99	1113	11	3.45E-02	17.2	4.59E+00	T

Flags: "T" = Tentatively associated

****
* Detroit Edison Fermi 2 MDA Report, Generated 10-JUL-2007 14:53:07.79 *
****
* Sample ID : EF1 EFT-10S060006 *
****

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/CC)
BE-7	27.	477.59	1.3315E-05
F-18	0.	511.00	Half-Life too short
NA-22	10.	1274.54	1.2680E-08
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	11.	889.250	2.1966E-07
CR-51	0.	320.08	Half-Life too short
MN-54	9.	834.83	1.6999E-08
CO-56	10.	1238.25	4.6346E-07
MN-56	0.	1810.69	Half-Life too short
NI-56	0.	158.38	Half-Life too short
CO-57	48.	122.06	2.9136E-08
CO-58	15.	810.76	4.2252E-07
FE-59	11.	1099.22	7.7263E-06
CO-60	12.	1332.49	1.2400E-08
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	6.	1115.52	4.3098E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	40.	136.00	1.3962E-07
AS-76	0.	559.10	Half-Life too short
BR-82	0.	776.49	Half-Life too short
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	50.	513.99	2.7417E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	50.	513.99	7.7280E-07
RB-86	0.	1076.63	Half-Life too short
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	3.	1836.01	9.7398E-08
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90 0	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	12.	1204.90	3.7029E-04
Y-91M	0.	555.60	Half-Life too short

Sample ID : EF1 EFT-10S06030 Acquisition date : 10-JUL-2007 14:22:50

Nuclide		Bckgnd Sum	Energy (keV)	MDA (uCi/CC)
SR-93		0.	590.28	Half-Life too short
Y-93		0.	266.90	Half-Life too short
NB-94		11.	702.63	6.7343E-09
NB-95		0.	765.79	Half-Life too short
NB-95M		0.	235.69	Half-Life too short
ZR-95		10.	756.72	9.2815E-07
NB-97		0.	657.90	Half-Life too short
ZR-97		0.	743.36	Half-Life too short
MO-99		0.	739.50	Half-Life too short
TC-99M	<	0.	140.50	Half-Life too short
TC-101		0.	306.81	Half-Life too short
RU-103		0.	497.08	Half-Life too short
TC-104		0.	357.99	Half-Life too short
RH-105		0.	318.90	Half-Life too short
RU-105		0.	724.50	Half-Life too short
RU-106		20.	621.84	1.6953E-07
CD-109		40.	88.03	6.6295E-07
AG-110M		12.	937.48	7.6933E-08
SN-113		25.	391.69	1.1880E-07
SN-117M		0.	158.56	Half-Life too short
SB-122		0.	563.93	Half-Life too short
SB-124		22.	602.71	8.0173E-07
SB-125		19.	427.89	2.9472E-08
TE-125M		29.	109.28	3.3629E-04
TE-127		0.	417.90	Half-Life too short
TE-127M		32.	57.60	3.0658E-04
XE-127		0.	202.84	Half-Life too short
TE-129		0.	459.60	Half-Life too short
TE-129M		0.	695.88	Half-Life too short
XE-129M		0.	196.56	Half-Life too short
I-130		0.	536.09	Half-Life too short
BA-131		0.	123.80	Half-Life too short
I-131		0.	364.48	Half-Life too short
TE-131		0.	149.72	Half-Life too short
TE-131M		0.	773.67	Half-Life too short
XE-131M		0.	163.93	Half-Life too short
I-132		0.	667.69	Half-Life too short
TE-132		0.	228.16	Half-Life too short
BA-133		32.	302.84	4.3698E-08
BA-133M		0.	276.09	Half-Life too short
I-133		0.	529.87	Half-Life too short
TE-133M		0.	912.50	Half-Life too short
XE-133		0.	81.00	Half-Life too short
XE-133M		0.	233.22	Half-Life too short
CS-134		15.	604.70	1.0175E-08
I-134		0.	884.09	Half-Life too short
TE-134		0.	210.47	Half-Life too short
BA-135M		0.	268.24	Half-Life too short
I-135		0.	1260.41	Half-Life too short
XE-135		0.	249.79	Half-Life too short
XE-135M		0.	526.56	Half-Life too short

Sample ID : EF1 EFT-10906000 Acquisition date : 10-JUL-2007 14:22:50

Nuclide		Bckgnd Sum	Energy (keV)	MDA (uCi/CC)
CS-136		0.	818.50	Half-Life too short
I-136		0.	1313.02	Half-Life too short
CS-137		80.	661.65	9.8627E-09
XE-137		0.	455.49	Half-Life too short
CS-138		0.	1435.86	Half-Life too short
XE-138		0.	258.31	Half-Life too short
BA-139		0.	1420.50	Half-Life too short
CE-139		34.	165.85	6.0939E-08
CS-139		0.	1283.23	Half-Life too short
BA-140		0.	537.32	Half-Life too short
LA-140		0.	1596.49	Half-Life too short
BA-141		0.	190.22	Half-Life too short
CE-141		0.	145.44	Half-Life too short
LA-141		0.	1354.52	Half-Life too short
BA-142		0.	255.12	Half-Life too short
LA-142		0.	641.17	Half-Life too short
CE-143		0.	293.26	Half-Life too short
CE-144		40.	133.54	1.0032E-07
PR-144		0.	1489.15	Half-Life too short
ND-147		0.	91.10	Half-Life too short
PM-148M		24.	550.27	6.6488E-06
EU-152		24.	344.27	2.6613E-08
EU-154		11.	1004.76	5.4918E-08
EU-156		0.	646.29	Half-Life too short
HF-181		26.	482.03	6.3546E-06
TA-182		6.	1221.42	3.0710E-07
W-187		0.	685.81	Half-Life too short
RE-188		0.	155.03	Half-Life too short
HG-203		36.	279.19	3.5356E-06
BI-207		11.	569.67	6.1155E-09
TL-208		0.	583.14	Half-Life too short
PB-212		0.	238.63	Half-Life too short
BI-214		0.	609.31	Half-Life too short
PB-214		0.	351.92	Half-Life too short
RA-224	?	0.	240.98	Half-Life too short
RA-226		49.	186.21	2.4131E-07
AC-228		34.	338.32	7.6392E-08
TH-228		33.	84.37	1.6983E-06
PA-234		0.	131.20	Half-Life too short
TH-234		0.	63.29	Half-Life too short
U-235		38.	143.76	6.9283E-08
NP-239		0.	106.13	Half-Life too short
AM-241		40.	59.54	1.9703E-07

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-1S 06 0806

Sample Location (Well Number): EFT-1S

1. Representative sample collected. Date/Time 06/08/06 / 1032

Sample collected by: Jay Shubrooks / J Blanchard Date: 06/08/06
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Christopher Failing / Christopher A Failing Date: 08/02/06
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: Russ Burgett Date: 8-3-06
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: K D LINDSEY Date: 2-25-08
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-10S	
2 . Date Sampled	06/08/2006	
3 . Time Sampled	10:32	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	08/03/2006	
2 . Time Sample Counted	10:00	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	7.2	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	3598.6	cpm
Net Spike Count Rate (cpm)	3591.4	cpm
H3 Spike Activity (dpm on count date)	8580.4	dpm
Counter Efficiency	0.4186	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	8.0	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.8	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{\text{(Bkg cpm)}}{\text{(Bkg min.)}} + \frac{\text{(Bkg cpm)}}{\text{(Smpl min.)}}}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}} = 1.07E\text{-}06 \text{ uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency x 2.22E6 uCi/ml x Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 8-3-06

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-10S060806

Sample Location (Well Number): EFT-10S

1. Representative sample collected. Date/Time 06/08/06 / 1032

Sample collected by: Jay Slabach Jr J Slabach Date: 06/08/06
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Christopher Frailing / Christopher A Frailing Date: 08/02/06
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: Above Andrew Kee Date: 8-11-06
Fermi 2 RP Printed Name Signature

Sample number: EFT-10506080G

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: Abere / Andrea Abere Date: 3-11-08
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: K D LINDSEY / K D Lindsey Date: Performed 2-25-08 Signed 3-3-12
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EFT-10S060806 EF1

Sample End Time: 8-JUN-2006 10:32:00.00

REMARKS

PERFORMED BY:

SIGNATURE

REVIEWED BY:

2-25-08

SIGNATURE/DATE

Sample ID : EFT-10S060806 EF Acquisition date : 11-AUG-2006 09:01:37

Fermi 2 Radiation Protection Gamma Spectroscopy Report

Sample Parameters

Sample ID Number: EFT-10S060806 EF1
Sample collection start date: 8-JUN-2006 10:32:00.00
Sample collection end date : 8-JUN-2006 10:32:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.00000E+03 cc
Sample geometry : M2LL Operator: AKG

Acquisition Parameters

Detector number : DET 4 Acquire date : 11-AUG-2006 09:01:37.61
Preset live time : 0 00:30:00.00 Elapsed live time : 0 00:30:00.00
Elapsed real time : 0 00:30:01.12 Percent dead time : 0.05 %

Calibration Parameters

Detector number : DET 4 Yearly cal date : 26-APR-2006 11:50:00.00
Kev/channel : 5.00474E-01 Zero offset: -1.15160E-02
Daily cal date : 11-AUG-2006 02:32:49.12

Peak Search Parameters

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

Nuclide Identification Parameters

Energy tolerance : 2.00000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	511.15	149	44	0.83	1021.66	1014	16	8.29E-02	12.9	A
2	0	558.04	63	24	1.54	1115.41	1110	11	3.47E-02	19.9	
3	0	609.67	72	39	2.09	1218.65	1212	12	4.02E-02	20.9	
4	0	911.50	35	4	3.20	1822.29	1815	16	1.93E-02	21.4	
5	0	1460.97	85	17	2.42	2921.76	2912	17	4.72E-02	15.5	
6	0	1764.26	27	2	2.13	3528.94	3524	11	1.48E-02	22.7	

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	511.15	149	44	0.83	1021.66	1014	16	12.9		Annihilation Pair
0	558.04	63	24	1.54	1115.41	1110	11	19.9		B_i-214
0	609.67	72	39	2.09	1218.65	1212	12	20.9		B_i-214
0	911.50	35	4	3.20	1822.29	1815	16	21.4		Ac-228
0	1460.97	85	17	2.42	2921.76	2912	17	15.5		K-40
0	1764.26	27	2	2.13	3528.94	3524	11	22.7		B_i-214

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	85	10.67*	2.300E+00	5.183E-07	5.183E-07	15.53

Flag: "*" = Keyline

Sample ID : EFT-10S060006 EF Acquisition date : 11-AUG-2006 09:01:37

Total number of lines in spectrum	6	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	6	100.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	5.183E-07	5.183E-07	0.805E-07	15.53	
Total Activity :			5.183E-07	5.183E-07			
Grand Total Activity :			5.183E-07	5.183E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EFT-10S060806 EF Acquisition date : 11-AUG-2006 09:01:37

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	839.12	511.00*	193.46	1.000E+35	12.87	Decay
		% Abundances Found =		100.00			
AS-76	26.32H	58.31	559.10*	44.70	1.741E+10	19.92	Decay,Abun.
			563.23	1.17	----- Not Found -----		
			571.30	0.14	----- Not Found -----		
			657.03	6.10	----- Not Found -----		
			665.31	0.39	----- Not Found -----		
			740.12	0.12	----- Not Found -----		
			771.76	0.12	----- Not Found -----		
			867.63	0.12	----- Not Found -----		
			1129.07	0.14	----- Not Found -----		
			1212.72	1.63	----- Not Found -----		
			1216.02	3.84	----- Not Found -----		
			1228.52	1.39	----- Not Found -----		
			1439.13	0.33	----- Not Found -----		
			1453.60	0.13	----- Not Found -----		
			1787.67	0.33	----- Not Found -----		
		% Abundances Found =		73.70			
RU-103	39.35D	1.63	497.08*	89.00	----- Not Found -----		Abun.
			610.33	5.60	1.436E-06	20.89	
		% Abundances Found =		5.92			
TE-133M	55.40M	1662.18	168.87	11.50	----- Not Found -----		Decay,Abun.
			261.55	15.70	----- Not Found -----		
			334.14	5.40	----- Not Found -----		
			647.40	29.30	----- Not Found -----		
			863.91	19.50	----- Not Found -----		
			912.58*	87.00	1.000E+35	21.38	
			914.72	16.50	----- Not Found -----		
			978.19	9.50	----- Not Found -----		
		% Abundances Found =		44.75			
XE-135	9.11H	168.47	249.79*	89.90	----- Not Found -----		Decay,Abun.
			608.19	2.89	1.000E+35	20.89	
		% Abundances Found =		3.11			
PM-148M	41.30D	1.55	288.11	12.56	----- Not Found -----		Abun.
			414.07	18.66	----- Not Found -----		
			432.78	5.35	----- Not Found -----		
			501.26	6.75	----- Not Found -----		
			550.27*	94.90	----- Not Found -----		
			599.74	12.54	----- Not Found -----		
			611.26	5.48	1.392E-06	20.89	
			629.97	89.00	----- Not Found -----		
			725.70	32.80	----- Not Found -----		
			915.33	17.17	----- Not Found -----		
			1013.81	20.30	----- Not Found -----		
		% Abundances Found =		1.74			
BI-214	19.90M	4627.37	609.31*	46.30	1.000E+35	20.89	Decay

Sample ID : EFT-10S060806 EF Acquisition date : 11-AUG-2006 09:01:37

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
BI-214	19.90M	4627.37	768.36	5.04	----- Not Found -----		Decay
			934.06	3.21	----- Not Found -----		
			1120.29	15.10	----- Not Found -----		
			1238.11	5.94	----- Not Found -----		
			1377.67	4.11	----- Not Found -----		
			1764.49	15.80	1.000E+35	22.70	
		% Abundances Found =		65.03	(Abn. Limit = 48.48%)		
AC-228	6.13Y	0.03	129.08	2.80	----- Not Found -----		Abun.
			209.28	4.40	----- Not Found -----		
			270.23	3.60	----- Not Found -----		
			327.64	3.20	----- Not Found -----		
			338.32*	11.40	----- Not Found -----		
			409.51	2.13	----- Not Found -----		
			463.00	4.40	----- Not Found -----		
			794.70	4.60	----- Not Found -----		
			911.07	27.70	6.509E-08	21.38	
			964.60	5.20	----- Not Found -----		
			969.11	16.60	----- Not Found -----		
			1588.00	3.50	----- Not Found -----		
		% Abundances Found =		30.94			

Flag: "*" = Keyline

Sample ID : EFT-10S060806 EF Acquisition date : 11-AUG-2006 09:01:37

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	511.15	149	44	0.83	1021.66	1014	16	8.29E-02	12.9	4.49E+00	T
0	558.04	63	24	1.54	1115.41	1110	11	3.47E-02	19.9	4.31E+00	T
0	609.67	72	39	2.09	1218.65	1212	12	4.02E-02	20.9	4.16E+00	T
0	911.50	35	4	3.20	1822.29	1815	16	1.93E-02	21.4	2.95E+00	T
0	1764.26	27	2	2.13	3528.94	3524	11	1.48E-02	22.7	2.08E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 11-AUG-2006 09:31:45.05

Sample ID : EFT-10S060806 EF1

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	34.	477.59	2.1434E-07
F-18	0.	511.00	Half-Life too short
NA-22	9.	1274.54	1.0498E-08
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	13.	889.25	1.6282E-08
CR-51	49.	320.08	5.0113E-07
MN-54	15.	834.83	1.1220E-08
CO-56	23.	1238.25	3.8363E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	0.	158.38	Half-Life too short
CO-57	35.	122.06	1.1820E-08
CO-58	15.	810.76	1.7831E-08
FE-59	10.	1099.22	4.5874E-08
CO-60	19.	1332.49	1.4549E-08
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	11.	1115.52	2.4118E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	49.	136.00	2.2470E-08
AS-76	0.	559.10	Half-Life too short
BR-82	0.	776.49	Half-Life too short
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	54.	513.99	2.9123E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	54.	513.99	2.4709E-08
RB-86	12.	1076.63	1.2608E-06
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	1.	1836.01	9.1128E-09
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	14.	1204.90	8.1517E-06
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Sample ID : EFT-10S060006 EF Acquisition date : 11-AUG-2006 09:01:37

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
SR-93	0.	590.20	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	17.	702.63	8.7510E-09
NB-95	14.	765.79	3.0497E-08
NB-95M	0.	235.69	Half-Life too short
ZR-95	13.	756.72	2.9847E-08
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	0.	739.58	Half-Life too short
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	27.	497.08	3.0833E-08
TC-104	0.	357.99	Half-Life too short
RH-105	0.	318.90	Half-Life too short
RU-105	0.	724.50	Half-Life too short
RU-106	22.	621.84	1.0165E-07
CD-109	33.	88.03	4.1513E-07
AG-110M	14.	937.48	3.5751E-08
SN-113	23.	391.69	1.6965E-08
SN-117M	62.	158.56	2.9034E-07
SB-122	0.	563.93	Half-Life too short
SB-124	35.	602.71	2.3067E-08
SB-125	25.	427.89	2.8400E-08
TE-125M	49.	109.28	8.7849E-06
TE-127	0.	417.90	Half-Life too short
TE-127M	32.	57.60	3.4933E-05
XE-127	58.	202.84	4.7229E-08
TE-129	0.	459.60	Half-Life too short
TE-129M	28.	695.88	1.2053E-06
XE-129M	71.	196.56	3.2044E-05
I-130	0.	536.09	Half-Life too short
BA-131	41.	123.80	1.3524E-06
I-131	42.	364.48	2.9237E-06
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	64.	163.93	2.1004E-05
I-132	0.	667.69	Half-Life too short
TE-132	0.	228.16	Half-Life too short
BA-133	27.	302.84	4.2004E-08
BA-133M	0.	276.09	Half-Life too short
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	0.	81.00	Half-Life too short
XE-133M	0.	233.22	Half-Life too short
CS-134	36.	604.70	1.2021E-08
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Sample ID : EFT-10S060006 EF Acquisition date : 11-AUG-2006 09:01:37

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-136	13.	818.50	2.6203E-07
I-136	0.	1313.02	Half-Life too short
CS-137	21.	661.65	1.0687E-08
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	40.	165.85	1.4589E-08
CS-139	0.	1283.23	Half-Life too short
BA-140	32.	537.32	1.2666E-06
LA-140	0.	1596.49	Half-Life too short
BA-141	0.	190.22	Half-Life too short
CE-141	50.	145.44	7.2090E-08
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	0.	293.26	Half-Life too short
CE-144	52.	133.54	1.0348E-07
PR-144	0.	1489.15	Half-Life too short
ND-147	38.	91.10	2.8043E-06
PM-148M	27.	550.27	2.8635E-08
EU-152	30.	344.27	3.0971E-08
EU-154	9.	1004.76	5.0516E-08
EU-156	15.	646.29	2.0168E-06
HF-181	29.	482.03	3.1273E-08
TA-182	23.	1221.42	7.8913E-08
W-187	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
HG-203	56.	279.19	3.3978E-08
BI-207	32.	569.67	1.0395E-08
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	0.	240.98	Half-Life too short
RA-226	60.	186.21	2.8924E-07
AC-228	44.	338.32	8.5588E-08
TH-228	53.	84.37	1.6922E-06
PA-234	0.	131.20	Half-Life too short
TH-234	46.	63.29	8.3109E-06
U-235	58.	143.76	9.1700E-08
NP-239	0.	106.13	Half-Life too short
AM-241	35.	59.54	1.8725E-07

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-105121506

Sample Location (Well Number): EFT-105

1. Representative sample collected. Date/Time 12/15/06 / 1432

Sample collected by: J. Slaback / Joy Marie Slaback Date: 02/01/07
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: J. Southward / Jennifer Southward Date: 2/2/07
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: D. Howard / D M Howard Date: APR 20 2007
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: RD Pawsey / RD Pawsey Date: 11-4-07
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-10S121506	
2 . Date Sampled	12/15/2006	
3 . Time Sampled	14:32	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	04/19/2007	
2 . Time Sample Counted	18:17	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	7.7	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	3407.6	cpm
Net Spike Count Rate (cpm)	3399.9	cpm
H3 Spike Activity (dpm on count date)	8243.8	dpm
Counter Efficiency	0.4124	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	6.6	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.0	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{\text{(Bkg cpm)}}{\text{(Bkg min.)}} + \frac{\text{(Bkg cpm)}}{\text{(Smpl min.)}}}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}} = 1.12\text{E-}06 \text{ uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency x 2.22E6 uCi/ml x Sample Volume}} < \textbf{MDA}$$

Technician AM Johnson Date APR 20 2007

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-105 121506

Sample Location (Well Number): EFT-105

1. Representative sample collected. Date/Time 12/15/06 / 1432

Sample collected by: J. Slaback / Jay Marie Slaback Date: 02/01/07
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: J Southward / Jennifer Southward Date: 7/11/07 2/2/07 7/11/07
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: KD LINDSEY / KD Lindsey Date: 8-8-07
Fermi 2 RP Printed Name Signature

Sample number: EFT-105 121506

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
. (Note disposition of unidentified peaks in "Remarks")

Performed by: Chris Hubbard / [signature] Date: 7-16-07
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: K D Linsey / [signature] Date: 8-8-07
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

DETROIT EDISON FERMI-2 POWER PLANT 16-JUL-2007 11:42:49.37

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EF1 EFT-10S121506

Sample End Time: 15-DEC-2006 14:32:00.00

REMARKS

PERFORMED BY:

SIGNATURE

REVIEWED BY:

SIGNATURE/DATE 8-8-07

Sample ID : EF1 EFT-10S12150 Acquisition date : 16-JUL-2007 11:12:46

****

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********
Sample ID Number: EF1 EFT-10S121506
Sample collection start date: 15-DEC-2006 14:32:00.00
Sample collection end date : 15-DEC-2006 14:32:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.000000E+03 CC
Sample geometry : M2LL Operator: CMH

********** Acquisition Parameters **********
Detector number : DET 4 Acquire date : 16-JUL-2007 11:12:46.69
Preset live time : 0 00:30:00.00 Elapsed live time : 0 00:30:00.00
Elapsed real time : 0 00:30:00.90 Percent dead time : 0.05 %

********** Calibration Parameters **********
Detector number : DET 4 Yearly cal date : 20-JUN-2007 12:16:46.16
Kev/channel : 4.99738E-01 Zero offset: -1.95800E-01
Daily cal date : 16-JUL-2007 00:37:10.01

********** Peak Search Parameters **********
Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********
Energy tolerance : 2.00000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

****

Pk	Ib	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit	
1	1	510.54	40	34	1.91	1021.90	1016	13	2.69E-02	33.5	3.22E+00	Annihilation
2	1	511.52	67	34	1.92	1023.94	1016	13	3.74E-02	23.1		
3	0	558.65	61	19	1.46	1118.26	1112	11	3.37E-02	19.0	HWC	
4	0	610.86	63	39	1.78	1222.73	1214	19	3.51E-02	27.7	Bi-214	
5	0	1461.43	35	21	1.46	2924.59	2917	16	1.96E-02	33.1	K-40	

Decay Time = 212 20:40:46.69 Acquisition Time = 16-JUL-2007 11:12:46.6
9

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
1	510.54	40	34	1.91	1021.90	1016	13	33.5	3.22E+00	
1	511.52	67	34	1.92	1023.94	1016	13	23.1		
0	558.65	61	19	1.46	1118.26	1112	11	19.0		
0	610.86	63	39	1.78	1222.73	1214	19	27.7		
0	1461.43	35	21	1.46	2924.59	2917	16	33.1		K-40

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/CC	Decay Corr uCi/CC	1-Sigma %Error
K-40	1460.81	35	10.67*	2.501E+00	1.981E-07	1.981E-07	33.13

Flag: "*" = Keyline

Sample ID : EF1 EFT-10312150 Acquisition date : 16-JUL-2007 11:10:46

Total number of lines in spectrum	5	
Number of unidentified lines	1	
Number of lines tentatively identified by NID	4	80.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/CC	Decay Corr uCi/CC	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	1.981E-07	1.981E-07	0.656E-07	33.13	
Total Activity :			1.981E-07	1.981E-07			
Grand Total Activity :			1.981E-07	1.981E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EF1 EFT-10312150 Acquisition date : 16-JUL-2007 11:12:46

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/CC)	1-Sigma %Error	Rejected by
F-18	109.74M	2793.29	511.00*	193.46	1.000E+35	33.50	Decay
	% Abundances Found =			100.00			
AS-76	26.32H	194.11	559.10*	44.70	1.000E+35	19.01	Decay,Abun.
			563.23	1.17	---- Not Found ----		
			571.30	0.14	---- Not Found ----		
			657.03	6.10	---- Not Found ----		
			665.31	0.39	---- Not Found ----		
			740.12	0.12	---- Not Found ----		
			771.76	0.12	---- Not Found ----		
			867.63	0.12	---- Not Found ----		
			1129.87	0.14	---- Not Found ----		
			1212.72	1.63	---- Not Found ----		
			1216.02	3.84	---- Not Found ----		
			1220.52	1.39	---- Not Found ----		
			1439.13	0.33	---- Not Found ----		
			1453.60	0.13	---- Not Found ----		
			1787.67	0.33	---- Not Found ----		
	% Abundances Found =			73.70			
RU-103	39.35D	5.41	497.08*	89.00	---- Not Found ----		Abun.
			610.33	5.60	1.594E-05	27.66	
	% Abundances Found =			5.92			
PM-140M	41.30D	5.15	208.11	12.56	---- Not Found ----		Abun.
			414.07	18.66	---- Not Found ----		
			432.70	5.35	---- Not Found ----		
			501.26	6.75	---- Not Found ----		
			550.27*	94.90	---- Not Found ----		
			599.74	12.54	---- Not Found ----		
			611.26	5.40	1.365E-05	27.66	
			629.97	89.00	---- Not Found ----		
			725.70	32.80	---- Not Found ----		
			915.33	17.17	---- Not Found ----		
			1013.01	20.30	---- Not Found ----		
	% Abundances Found =			1.74			
BI-214	19.90M	15403.01	609.31*	46.30	1.000E+35	27.66	Decay
			768.36	5.04	---- Not Found ----		
			934.06	3.21	---- Not Found ----		
			1120.29	15.10	---- Not Found ----		
			1238.11	5.94	---- Not Found ----		
			1377.67	4.11	---- Not Found ----		
			1764.49	15.90	---- Not Found ----		
	% Abundances Found =			40.40	(Abn. Limit = 40.40%)		

Flag: "*" = Keyline

Sample ID : EF1 EFT-10S12150 Acquisition date : 16-JUL-2007 11:12:46

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	510.54	40	34	1.91	1021.90	1016	13	2.69E-02	33.5	4.88E+00	T
1	511.52	67	34	1.92	1023.94	1016	13	3.74E-02	23.1	4.88E+00	
0	558.65	61	19	1.46	1118.26	1112	11	3.37E-02	19.0	4.69E+00	T
0	610.86	63	39	1.78	1222.73	1214	19	3.51E-02	27.7	4.51E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 16-JUL-2007 11:42:53.10

Sample ID : EF1 EFT-10S121506

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/CC)
BE-7	23.	477.59	1.1275E-06
F-18	0.	511.00	Half-Life too short
NA-22	3.	1274.54	6.9959E-09
NA-24	0.	1369.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	7.	889.25	3.9368E-08
CR-51	27.	320.09	1.4217E-05
MN-54	16.	834.83	1.4548E-08
CO-56	9.	1238.25	8.7429E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	0.	158.38	Half-Life too short
CO-57	43.	122.06	1.7413E-08
CO-58	16.	810.76	7.1940E-08
FE-59	11.	1099.22	4.4641E-07
CO-60	7.	1332.49	9.2342E-09
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	11.	1115.52	3.4879E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	34.	136.00	4.1435E-08
AS-76	0.	559.10	Half-Life too short
BR-82	0.	776.49	Half-Life too short
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	46.	513.99	2.5564E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	46.	513.99	1.0380E-07
RB-86	0.	1076.63	Half-Life too short
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	3.	1836.01	3.1107E-08
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	9.	1204.90	3.6719E-05
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Sample ID : EF1 EFT-10S12150 Acquisition date : 16-JUL-2007 11:12:40

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/CC)
SR-93	0.	590.20	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	14.	702.63	7.2426E-09
NB-95	13.	765.79	5.1567E-07
NB-95M	0.	235.69	Half-Life too short
ZR-95	7.	756.72	1.0377E-07
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	0.	739.50	Half-Life too short
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	20.	497.00	3.4106E-07
TC-104	0.	357.99	Half-Life too short
RH-105	0.	318.90	Half-Life too short
RU-105	0.	724.50	Half-Life too short
RU-106	12.	621.84	9.4053E-08
CD-109	34.	88.03	4.7122E-07
AG-110M	15.	937.48	5.1332E-08
SN-113	20.	391.69	3.5485E-08
SN-117M	0.	158.56	Half-Life too short
SB-122	0.	563.93	Half-Life too short
SB-124	24.	602.71	9.9624E-08
SB-125	23.	427.89	2.7779E-08
TE-125M	42.	109.28	4.3852E-05
TE-127	0.	417.90	Half-Life too short
TE-127M	27.	57.60	8.8209E-05
XE-127	43.	202.84	6.3902E-07
TE-129	0.	459.60	Half-Life too short
TE-129M	22.	695.88	2.1744E-05
XE-129M	0.	196.56	Half-Life too short
I-130	0.	536.09	Half-Life too short
BA-131	0.	123.80	Half-Life too short
I-131	0.	364.48	Half-Life too short
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	0.	163.93	Half-Life too short
I-132	0.	667.69	Half-Life too short
TE-132	0.	228.16	Half-Life too short
BA-133	45.	302.84	4.9152E-08
BA-133M	0.	276.09	Half-Life too short
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	0.	81.00	Half-Life too short
XE-133M	0.	233.22	Half-Life too short
CS-134	28.	604.70	1.1215E-08
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Sample ID : EF1 EFT-10S12150 Acquisition date : 16-JUL-2007 11:12:46

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/CC)
CS-136	0.	818.50	Half-Life too short
I-136	0.	1313.02	Half-Life too short
CS-137	16.	661.65	8.6467E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	49.	165.85	2.8631E-08
CS-139	0.	1283.23	Half-Life too short
BA-140	0.	537.32	Half-Life too short
LA-140	0.	1596.49	Half-Life too short
BA-141	0.	190.22	Half-Life too short
CE-141	50.	145.44	1.5926E-06
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	0.	293.26	Half-Life too short
CE-144	46.	133.54	1.2903E-07
PR-144	0.	1489.15	Half-Life too short
ND-147	0.	91.10	Half-Life too short
PM-148M	12.	550.27	2.2538E-07
EU-152	32.	344.27	2.9448E-08
EU-154	6.	1004.76	3.9654E-08
EU-156	0.	646.29	Half-Life too short
HF-181	25.	482.03	3.0744E-07
TA-182	10.	1221.42	1.2076E-07
W-187	0.	685.81	Half-Life too short
RE-189	0.	155.03	Half-Life too short
HG-203	45.	279.19	2.5324E-07
BI-207	15.	569.67	7.0160E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	0.	240.98	Half-Life too short
RA-226	43.	186.21	2.2037E-07
AC-228	40.	338.32	7.7037E-08
TH-228	44.	84.37	1.6057E-06
PA-234	0.	131.20	Half-Life too short
TH-234	41.	63.29	5.3086E-04
U-235	41.	143.76	7.1407E-08
NP-239	0.	106.13	Half-Life too short
AM-241	22.	59.54	1.5024E-07

EFT-10S

2007

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-105 7207

Sample Location (Well Number): EFT-105

1. Representative sample collected. Date/Time 07/02/07 / 1555

Sample collected by: Jay Marie Slabach / Jay Marie Slabach Date: 12/10/2007
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: J. Southward / J Southward Date: 12/10/07
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: R. Burgett / [signature] Date: 12-14-07
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: KD LINDSEY / KD Lindsey Date: 2-26-08
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	10S	
2 . Date Sampled	07/02/2007	
3 . Time Sampled	15:55	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	12/14/2007	
2 . Time Sample Counted	08:00	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	8.2	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	3189.3	cpm
Net Spike Count Rate (cpm)	3181.1	cpm
H3 Spike Activity (dpm on count date)	7944.9	dpm
Counter Efficiency	0.4004	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	9.3	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	1.1	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.1	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{\text{(Bkg cpm)}}{\text{(Bkg min.)}} + \frac{\text{(Bkg cpm)}}{\text{(Smpl min.)}}}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}} = 1.19\text{E-}06 \text{ uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency x 2.22E6 uCi/ml x Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 12-14-07

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-105207

Sample Location (Well Number): EFT-105

1. Representative sample collected. Date/Time 07/02/2007/ 1555

Sample collected by: J. Slaback / Jay Marie Slaback Date: 07/16/2007
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: J. Southward / Jimmy Southward Date: 7/16/2007
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: KD Lindsey / KD Lindsey Date: 8-8-07
Fermi 2 RP Printed Name Signature

Sample number: EFT-1057207

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: Chris Hubbard / [signature] Date: 7-18-07
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: KD LINDSEY / [signature] Date: 8-8-07
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

DETROIT EDISON FERMI-2 POWER PLANT 10-JUL-2007 09:05:39.13

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EF1 EFT-1007207

Sample End Time: 2-JUL-2007 15:55:00.00

REMARKS

PERFORMED BY:

SIGNATURE

REVIEWED BY:

SIGNATURE/DATE 7.9.07

Sample ID : EF1 EFT-1057207 Acquisition date : 18-JUL-2007 08:35:35

****

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********

Sample ID Number: EF1 EFT-1057207
Sample collection start date: 2-JUL-2007 15:55:00.00
Sample collection end date : 2-JUL-2007 15:55:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.00000E+03 cc
Sample geometry : M2LL Operator: CMH

********** Acquisition Parameters **********

Detector number : DET 4 Acquire date : 18-JUL-2007 08:35:35.38
Preset live time : 0 00:30:00.00 Elapsed live time : 0 00:30:00.00
Elapsed real time : 0 00:30:00.09 Percent dead time : 0.05 %

********** Calibration Parameters **********

Detector number : DET 4 Yearly cal date : 20-JUN-2007 12:16:46.16
Kev/channel : 4.99749E-01 Zero offset: -1.84251E-01
Daily cal date : 18-JUL-2007 07:51:31.39

********** Peak Search Parameters **********

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********

Energy tolerance : 2.00000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	511.40	132	47	2.42	1023.84	1017	15	7.31E-02	14.7	annihilation
2	0	558.34	43	40	0.98	1117.60	1112	12	2.42E-02	32.5	Hwc
3	0	941.69	14	0	0.99	1884.64	1878	11	7.78E-03	26.7	Bi 202
4	0	1461.04	53	6	1.72	2923.80	2917	12	2.94E-02	16.6	K-40
5	0	1765.50	13	3	0.64	3532.96	3529	8	7.01E-03	39.8	Bi 214

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	511.40	132	47	2.42	1023.04	1017	15	14.7		
0	558.34	43	40	0.98	1117.60	1112	12	32.5		
0	941.69	14	0	0.99	1884.64	1878	11	26.7		
0	1461.04	53	6	1.79	2923.00	2917	12	16.6		K-40
0	1765.50	13	3	0.64	3532.96	3529	8	30.8	?	

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	53	10.67*	2.501E+00	2.902E-07	2.902E-07	16.56

Flag: "*" = Kayline

Sample ID : EF1 EFT-1007207 Acquisition date : 10-JUL-2007 00:35:35

Total number of lines in spectrum	5	
Number of unidentified lines	1	
Number of lines tentatively identified by NID	4	80.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	2.982E-07	2.982E-07	0.494E-07	16.56	
Total Activity :			2.982E-07	2.982E-07			
Grand Total Activity :			2.982E-07	2.982E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	206.00	511.00*	193.46	1.000E+35	14.73	Decay
	% Abundances Found =			100.00			
AS-76	26.32H	14.32	559.10*	44.70	6.377E-04	32.53	Decay,Abun.
			563.23	1.17	---- Not Found	----	
			571.30	0.14	---- Not Found	----	
			657.03	6.10	---- Not Found	----	
			665.31	0.39	---- Not Found	----	
			740.12	0.12	---- Not Found	----	
			771.76	0.12	---- Not Found	----	
			867.63	0.12	---- Not Found	----	
			1129.07	0.14	---- Not Found	----	
			1212.72	1.63	---- Not Found	----	
			1216.02	3.04	---- Not Found	----	
			1228.52	1.39	---- Not Found	----	
			1439.13	0.33	---- Not Found	----	
			1453.60	0.13	---- Not Found	----	
			1787.67	0.33	---- Not Found	----	
	% Abundances Found =			73.70			
BI-214	19.90M	1136.46	609.31*	46.30	---- Not Found	----	Decay,Abun.
			768.36	5.04	---- Not Found	----	
			934.06	3.21	---- Not Found	----	
			1120.29	15.10	---- Not Found	----	
			1238.11	5.94	---- Not Found	----	
			1377.67	4.11	---- Not Found	----	
			1764.49	15.00	1.000E+35	38.00	
	% Abundances Found =			16.54	(Abn. Limit =	40.40%)	

Flag: "*" = Keyline

Sample ID : EF1 EFT-10S7207 Acquisition date : 10-JUL-2007 00:35:35

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	511.40	132	47	2.42	1023.84	1017	15	7.31E-02	14.7	4.88E+00	T
0	558.34	43	40	0.98	1117.60	1112	12	2.42E-02	32.5	4.69E+00	T
0	941.69	14	0	0.99	1884.64	1878	11	7.70E-03	26.7	3.17E+00	
0	1765.50	< 13	3	0.64	3532.96	3529	8	7.01E-03	38.6	2.26E+00	T

Flags: "T" = Tentatively associated

****
* Detroit Edison Fermi 2 MDA Report, Generated 10-JUL-2007 09:05:42.96 *
****
* Sample ID : EF1 EFT-10S7207 *
****

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	16.	477.59	7.4463E-08
F-18	0.	511.00	Half-Life too short
NA-22	6.	1274.54	7.9379E-09
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	12.	889.25	9.8666E-09
CR-51	31.	320.08	1.0998E-07
MN-54	12.	834.83	8.4623E-09
CO-56	13.	1238.25	1.8255E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	44.	158.38	4.5448E-08
CO-57	38.	122.06	9.0814E-09
CO-58	17.	810.76	1.0742E-08
FE-59	13.	1099.22	2.2914E-08
CO-60	15.	1332.49	1.1914E-08
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	9.	1115.52	1.7933E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	55.	136.00	1.6360E-08
AS-76	0.	559.10	Half-Life too short
BR-82	0.	776.49	Half-Life too short
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	41.	513.99	2.3437E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	41.	513.99	1.1974E-08
RB-86	5.	1076.63	1.3270E-07
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1392.39	Half-Life too short
Y-88	3.	1836.01	9.5940E-09
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	12.	1204.90	4.0561E-06
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Sample ID : EF1 EFT-1057207 Acquisition date : 10-JUL-2007 00:35:35

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
SR-93	0.	590.20	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	16.	702.63	7.6850E-09
NB-95	16.	765.79	1.1439E-08
NB-95M	46.	235.69	6.6078E-07
ZR-95	10.	756.72	1.9039E-08
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	20.	739.50	3.6744E-06
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	18.	497.08	1.0115E-08
TC-104	0.	357.99	Half-Life too short
RH-105	0.	318.90	Half-Life too short
RU-105	0.	724.50	Half-Life too short
RU-106	16.	621.94	7.4030E-08
CD-109	39.	88.03	3.7024E-07
AG-110M	2.	937.48	1.3412E-08
SN-113	21.	391.69	1.1174E-08
SN-117M	43.	158.56	1.9301E-08
SB-122	11.	563.93	4.6141E-07
SB-124	20.	602.71	9.5102E-09
SB-125	16.	427.89	2.1075E-08
TE-125M	27.	109.28	3.4101E-06
TE-127	0.	417.90	Half-Life too short
TE-127M	22.	57.60	2.3109E-05
XE-127	43.	202.84	1.5098E-08
TE-129	0.	459.60	Half-Life too short
TE-129M	16.	695.88	3.2118E-07
XE-129M	44.	196.56	5.4948E-07
I-130	0.	536.09	Half-Life too short
BA-131	42.	123.80	7.2908E-08
I-131	20.	364.48	3.4536E-08
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	48.	163.93	9.9733E-07
I-132	0.	667.69	Half-Life too short
TE-132	44.	228.16	2.5344E-07
BA-133	30.	302.84	3.9407E-08
BA-133M	26.	276.09	2.9500E-05
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	34.	81.00	3.3839E-07
XE-133M	38.	233.22	1.0407E-05
CS-134	23.	604.70	8.6204E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Sample ID : EF1 EFT-10S7207 Acquisition date : 10-JUL-2007 08:35:35

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-136	9.	818.50	1.5834E-08
I-136	0.	1313.02	Half-Life too short
CS-137	17.	661.65	8.7939E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	46.	165.85	1.0334E-08
CS-139	0.	1283.23	Half-Life too short
BA-140	20.	537.32	7.0023E-08
LA-140	3.	1596.49	4.7020E-06
BA-141	0.	190.22	Half-Life too short
CE-141	52.	145.44	2.4159E-08
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	0.	293.26	Half-Life too short
CE-144	53.	133.54	8.5046E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	39.	91.10	1.2163E-07
PM-148M	17.	550.27	9.4293E-09
EU-152	31.	344.27	2.8416E-08
EU-154	8.	1004.76	4.2702E-08
EU-156	11.	646.29	1.7071E-07
HF-181	22.	482.03	1.1423E-08
TA-182	13.	1221.42	4.2234E-08
W-187	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
HG-203	44.	279.19	1.3371E-08
BI-207	26.	569.67	8.6881E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	32.	240.98	3.5408E-06
RA-226	54.	186.21	2.5260E-07
AC-228	38.	338.32	7.2107E-08
TH-228	38.	84.37	1.2345E-06
PA-234	0.	131.20	Half-Life too short
TH-234	32.	63.29	1.6459E-06
U-235	47.	143.76	7.6244E-08
NP-239	41.	106.13	4.4399E-06
AM-241	36.	59.54	1.0656E-07

EFT-10S

2008

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-10512908

Sample Location (Well Number): EFT 10S

1. Representative sample collected. Date/Time 1/29/08 / 1455

Sample collected by: Jay Marie Stovall / Jay Marie Stovall Date: 04/21/2008
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: J. Southward / J Southward Date: 4/21/08
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: D. Howard / D Howard Date: 4-21-08
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: KD Lindsay / KD Lindsay Date: 4-28-08
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

_____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-10S	
2 . Date Sampled	01/29/2008	
3 . Time Sampled	14:55	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	04/21/2008	
2 . Time Sample Counted	13:23	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	7.2	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	3045.3	cpm
Net Spike Count Rate (cpm)	3038.1	cpm
H3 Spike Activity (dpm on count date)	7788.2	dpm
Counter Efficiency	0.3901	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	8.1	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.9	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{\text{(Bkg cpm)}}{\text{(Bkg min.)}} + \frac{\text{(Bkg cpm)}}{\text{(Smpl min.)}}}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}} = 1.14\text{E-}06 \text{ uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency x 2.22E6 uCi/ml x Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 4.21.08

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-10512908

Sample Location (Well Number): EFT-105

1. Representative sample collected. Date/Time 1/29/08 / 1455

Sample collected by: Joy Marie Slabaugh / Joy Marie Slabaugh Date: 04/21/2008
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: J. Southward / J Southward Date: 4/21/08
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4 4/21/08

Performed by: J. Southward / J Southward Date: 4/21/08
Fermi 2 RP Printed Name Signature

Sample number: EFT-105129 08

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
. (Note disposition of unidentified peaks in "Remarks")

Performed by: J. Southward / J Southward Date: 4/21/08
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: K.J. Linsley / Date: 4-24-08
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

DETROIT EDISON FERMI-2 POWER PLANT 21-APR-2000 10:51:40.97

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EFT-10S12900

Sample End Time: 29-JAN-2000 14:55:00.00

REMARKS

PERFORMED BY:

SIGNATURE

REVIEWED BY:

4.24.08

SIGNATURE/DATE

Sample ID : EFT-10S12900 Acquisition date : 21-APR-2000 10:21:37

****

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********
Sample ID Number: EFT-10S12900
Sample collection start date: 29-JAN-2000 14:55:00.00
Sample collection end date : 29-JAN-2000 14:55:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.000000E+03 cc
Sample geometry : M2LL Operator: JNS

********** Acquisition Parameters **********
Detector number : DET 4 Acquire date : 21-APR-2000 10:21:37.00
Preset live time : 0 00:30:00.00 Elapsed live time : 0 00:30:00.00
Elapsed real time : 0 00:30:00.97 Percent dead time : 0.05 %

********** Calibration Parameters **********
Detector number : DET 4 Yearly cal date : 20-JUN-2007 12:16:46.16
Kev/channel : 5.00173E-01 Zero offset: -1.41259E-01
Daily cal date : 21-APR-2000 06:22:11.02

********** Peak Search Parameters **********
Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********
Energy tolerance : 2.00000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	66.65	28	62	1.40	133.53	129	9	1.54E-02	55.0	
2	4	510.23	24	21	1.81	1020.38	1014	20	1.31E-02	63.7	2.90E+00
3	4	511.66	99	14	2.03	1023.63	1014	20	5.40E-02	15.6	
4	0	558.66	38	13	1.88	1117.19	1112	10	2.13E-02	23.6	
5	0	609.03	34	25	1.17	1217.90	1212	10	1.90E-02	32.2	
6	0	1460.89	31	19	2.76	2920.89	2911	15	1.71E-02	35.6	

Sample Title : EFT-10S12900 Page : 1
Decay Time = 02 19:26:37.00 Acquisition Time = 21-APR-2000 10:21:37.0
0

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	66.65	28	62	1.48	133.53	129	9	55.0		Pb-214
4	510.23	24	21	1.01	1020.38	1014	20	63.7	2.90E+00	7 Annh
4	511.06	99	14	2.03	1023.63	1014	20	15.6		
0	558.66	38	13	1.08	1117.19	1112	10	23.6		Ann C
0	609.03	34	25	1.17	1217.90	1212	10	32.2		Bi-214
0	1460.89	31	19	2.76	2920.89	2911	15	35.6		K-40

Sample ID : EFT-10512900 Acquisition date : 21-APR-2000 10:21:37

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	31	10.67*	2.501E+00	1.739E-07	1.731E-07	35.65

Flag: "*" = Keyline

Sample ID : EFT-10S12908 Acquisition date : 21-APR-2008 10:21:37

Total number of lines in spectrum	6	
Number of unidentified lines	1	
Number of lines tentatively identified by NID	5	83.33%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	1.731E-07	1.731E-07	0.617E-07	35.65	
	Total Activity :		1.731E-07	1.731E-07			
	Grand Total Activity :		1.731E-07	1.731E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	1006.77	511.00*	193.46	1.000E+35	63.66	Decay
	% Abundances Found =			100.00			
SE-75	119.78D	0.69	66.05	1.02	4.539E-06	55.02	Abun.
			96.73	3.41	---- Not Found ----		
			121.12	16.70	---- Not Found ----		
			136.00*	59.20	---- Not Found ----		
			198.60	1.45	---- Not Found ----		
			264.65	59.00	---- Not Found ----		
			279.53	25.20	---- Not Found ----		
			303.91	1.32	---- Not Found ----		
			400.65	11.40	---- Not Found ----		
	% Abundances Found =			0.57			
AS-76	26.32H	75.52	559.10*	44.70	1.491E+15	23.63	Decay, Abun.
			563.23	1.17	---- Not Found ----		
			571.30	0.14	---- Not Found ----		
			657.03	6.10	---- Not Found ----		
			665.31	0.39	---- Not Found ----		
			740.12	0.12	---- Not Found ----		
			771.76	0.12	---- Not Found ----		
			867.63	0.12	---- Not Found ----		
			1129.07	0.14	---- Not Found ----		
			1212.72	1.63	---- Not Found ----		
			1216.02	3.04	---- Not Found ----		
			1228.52	1.39	---- Not Found ----		
			1439.13	0.33	---- Not Found ----		
			1453.60	0.13	---- Not Found ----		
			1787.67	0.33	---- Not Found ----		
	% Abundances Found =			73.70			
RU-103	39.35D	2.10	497.08*	89.00	---- Not Found ----		Abun.
			610.33	5.60	8.727E-07	32.23	
	% Abundances Found =			5.92			
XE-135	9.11H	218.19	249.79*	89.90	---- Not Found ----		Decay, Abun.
			608.19	2.89	1.000E+35	32.23	
	% Abundances Found =			3.11			
CS-136	13.16D A	6.29	66.91	12.50	1.799E-05	55.02	Abun.
			86.29	6.30	---- Not Found ----		
			153.22	7.46	---- Not Found ----		
			163.89	4.61	---- Not Found ----		
			176.55	13.56	---- Not Found ----		
			273.65	12.66	---- Not Found ----		
			340.57	48.50	---- Not Found ----		
			818.50*	99.70	---- Not Found ----		
			1048.07	79.60	---- Not Found ----		
			1235.34	19.70	---- Not Found ----		
	% Abundances Found =			4.10			
TA-182	114.74D	0.72	67.75	42.30	1.110E-07	55.02	Abun.

Nuclide	Half-Life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
TA-182	114.74D	0.72	100.10	14.10	----- Not Found -----		Abun.
			1189.05	16.30	----- Not Found -----		
			1221.42*	27.10	----- Not Found -----		
			1230.97	11.50	----- Not Found -----		
		% Abundances Found =		38.01			
BI-214	19.90M0	5993.05	609.31*	46.30	1.000E+35	32.23	Decay
			768.36	5.04	----- Not Found -----		
			934.06	3.21	----- Not Found -----		
			1120.29	15.10	----- Not Found -----		
			1238.11	5.94	----- Not Found -----		
			1377.67	4.11	----- Not Found -----		
			1764.49	15.80	----- Not Found -----		
		% Abundances Found =		48.48	(Abn. Limit = 40.40%)		

Flag: "*" = Keyline

Sample ID : EFT-10S12900 Acquisition date : 21-APR-2000 10:21:37

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	66.65	28	62	1.40	133.53	129	9	1.54E-02	55.0	1.45E+00	T
4	510.23	24	21	1.81	1020.38	1014	20	1.31E-02	63.7	4.80E+00	T
4	511.06	99	14	2.03	1023.63	1014	20	5.40E-02	15.6	4.80E+00	
0	558.66	30	13	1.80	1117.19	1112	10	2.13E-02	23.6	4.69E+00	T
0	609.03	34	25	1.17	1217.90	1212	10	1.90E-02	32.2	4.52E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 21-APR-2000 10:51:44.71

Sample ID : EFT-10S12900

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	15.	477.59	1.7277E-07
F-18	0.	511.00	Half-Life too short
NA-22	0.	1274.54	9.1591E-09
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	11.	889.25	1.6371E-08
CR-51	28.	320.08	5.5047E-07
MN-54	16.	834.83	1.1007E-08
CO-56	14.	1238.25	3.4025E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	0.	158.38	Half-Life too short
CO-57	47.	122.06	1.2956E-08
CO-58	12.	810.76	1.8034E-08
FE-59	9.	1099.22	5.5011E-08
CO-60	8.	1332.49	9.2914E-09
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	6.	1115.52	1.7594E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	53.	136.00	2.3722E-08
AS-76	0.	559.10	Half-Life too short
BR-82	0.	776.49	Half-Life too short
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	56.	513.99	2.7287E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	56.	513.99	2.8232E-08
RB-86	15.	1076.63	2.5756E-06
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	6.	1836.01	1.6526E-08
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1110.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	12.	1204.90	0.9982E-06
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Sample ID : EFT-10S12908 Acquisition date : 21-APR-2008 10:21:37

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
SR-93	0.	590.20	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	16.	702.63	7.8510E-09
NB-95	18.	765.79	4.6202E-08
NB-95M	0.	235.69	Half-Life too short
ZR-95	12.	756.72	3.2257E-08
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	0.	739.50	Half-Life too short
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	19.	497.08	3.3808E-08
TC-104	0.	357.99	Half-Life too short
RH-105	0.	318.90	Half-Life too short
RU-105	0.	724.50	Half-Life too short
RU-106	19.	621.84	9.2735E-08
CD-109	43.	88.03	4.2979E-07
AG-110M	8.	937.48	2.7129E-08
SN-113	37.	391.69	2.1468E-08
SN-117M	40.	158.56	5.6999E-07
SB-122	0.	563.93	Half-Life too short
SB-124	24.	602.71	2.2248E-08
SB-125	18.	427.89	2.3016E-08
TE-125M	30.	109.28	7.9902E-06
TE-127	0.	417.90	Half-Life too short
TE-127M	29.	57.60	3.9999E-05
XE-127	38.	202.84	5.0931E-08
TE-129	0.	459.60	Half-Life too short
TE-129M	14.	695.88	1.2085E-06
XE-129M	38.	196.56	9.5767E-05
I-130	0.	536.09	Half-Life too short
BA-131	59.	123.80	4.4071E-06
I-131	0.	364.48	Half-Life too short
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	40.	163.93	4.6920E-05
I-132	0.	667.69	Half-Life too short
TE-132	0.	228.16	Half-Life too short
BA-133	49.	302.84	4.9932E-08
BA-133M	0.	276.09	Half-Life too short
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	0.	81.00	Half-Life too short
XE-133M	0.	233.22	Half-Life too short
CS-134	26.	604.70	9.7074E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Sample ID : EFT-10S12900 Acquisition date : 21-APR-2000 10:21:37

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-136	10.	818.50	5.6902E-07
I-136	0.	1313.02	Half-Life too short
CS-137	11.	661.65	7.4487E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.06	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	47.	165.85	1.4603E-08
CS-139	0.	1283.23	Half-Life too short
BA-140	19.	537.32	2.5957e-06
LA-140	0.	1596.49	Half-Life too short
BA-141	0.	190.22	Half-Life too short
CE-141	44.	145.44	9.3592E-08
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	0.	293.26	Half-Life too short
CE-144	47.	133.54	9.4370E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	48.	91.10	9.2023E-06
PM-148M	11.	550.27	2.4125E-08
EU-152	36.	344.27	3.0541E-08
EU-154	9.	1004.76	4.5991E-08
EU-156	11.	646.29	3.8057E-06
HF-181	25.	482.03	3.6413E-08
TA-182	6.	1221.42	4.6446E-08
W-187	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
HG-203	30.	279.19	3.0399E-08
BI-207	10.	569.67	7.4029E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	0.	240.98	Half-Life too short
RA-226	40.	186.21	2.2039E-07
AC-228	22.	338.32	5.7174E-08
TH-228	27.	84.37	1.1320E-06
PA-234	0.	131.20	Half-Life too short
TH-234	31.	63.29	1.1172E-05
U-235	39.	143.76	7.0241E-08
NP-239	0.	106.13	Half-Life too short
AM-241	26.	59.54	1.6327E-07

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-105 / 29081D

Sample Location (Well Number): EFT-105

1. Representative sample collected. Date/Time 1/29/08 / 1515

Sample collected by: Jay Marie Slabach / Jay Marie Slabach Date: 04/21/2008
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: J. Southward / J Southward Date: 4/21/08
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: D. Howard / D Howard Date: 4.21.08
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: KS Lindsay / K Lindsay Date: 4-24-08
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-10S 129081D	EFT-10S	
2 . Date Sampled		01/29/2008	
3 . Time Sampled		15:15	
4 . Sample Volume, (ml)		4	ml

Instrument Count Data

1 . Date Sample Counted	04/21/2008	
2 . Time Sample Counted	13:33	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	7.2	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	3045.3	cpm
Net Spike Count Rate (cpm)	3038.1	cpm
H3 Spike Activity (dpm on count date)	7788.2	dpm
Counter Efficiency	0.3901	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	9.1	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	1.9	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{\text{(Bkg cpm)}}{\text{(Bkg min.)}} + \frac{\text{(Bkg cpm)}}{\text{(Smpl min.)}}}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}} = 1.14\text{E-}06 \text{ uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency x 2.22E6 uCi/ml x Sample Volume}} < \textbf{MDA}$$

Technician GM Howard Date 4.21.08

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-10 5 1 2908D

Sample Location (Well Number): EFT-10 5

1. Representative sample collected. Date/Time 1/29/08 / 1515

Sample collected by: JayMarie Slabach / JayMarie Slabach Date: 04/21/2008
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: J. Southward / J Southward Date: 4/21/08
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: J-Southward / J Southward Date: 4/21/08
Fermi 2 RP Printed Name Signature

Sample number: EFT-105129085D

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: J. Southward / J Southward Date: 4/22/08
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: K.D. Lindsey / K D Lindsey Date: 4-29-08
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

DETROIT EDISON FERMI-2 POWER PLANT 24-APR-2008 15:13:31.11

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EFT-10C12900

Sample End Time: 29-JAN-2008 14:55:00.00

REMARKS

PERFORMED BY:
J Southward
SIGNATURE

REVIEWED BY:
4-28-08
SIGNATURE/DATE

Sample ID : EFT-10S12900 Acquisition date : 24-APR-2000 14:37:42

****

! Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********

Sample ID Number: EFT-10S12900
Sample collection start date: 29-JAN-2000 14:55:00.00
Sample collection end date : 29-JAN-2000 14:55:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.000000E+03 cc
Sample geometry : M2LL Operator: JNS

********** Acquisition Parameters **********

Detector number : DET 4 Acquire date : 24-APR-2000 14:37:42.31
Preset live time : 0 00:30:00.00 Elapsed live time : 0 00:30:00.00
Elapsed real time : 0 00:30:02.00 Percent dead time : 0.16 %

********** Calibration Parameters **********

Detector number : DET 4 Yearly cal date : 20-JUN-2000 12:16:46.16
Kev/channel : 5.001944E-01 Zero offset: -1.860890E-01
Daily cal date : 24-APR-2000 06:17:06.67

********** Peak Search Parameters **********

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********

Energy tolerance : 2.00000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : gacmaster.nlb
Efficiency file : EFFD4_m211 " Efficiencies at : Peak energy

****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	353.57	30	40	0.90	795.23	790	10	1.67E-02	43.5	
2	0	510.89	125	45	2.05	1021.75	1014	14	6.93E-02	14.6	
3	0	558.73	52	57	1.04	1117.40	1111	12	2.89E-02	24.4	
4	0	1120.11	18	2	2.38	2239.70	2235	9	9.98E-03	28.1	
5	0	1460.72	59	0	1.83	2920.64	2913	14	3.28E-02	13.0	

Sample Title : EFT-10512909 Page : 1
Decay Time = 00 23:12:42.31 Acquisition Time = 24-MAR-2008 11:37:42.3
1

Post-NID Peak Search Report

Ib	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	352.57	30	40	0.90	705.23	699	10	43.5		Pb-214
0	510.09	125	45	3.00	1021.75	1014	-14	14.6		ANNI
0<	550.73	52	27	1.84	1117.40	1111	12	24.4		HWC
0	1120.11	18	2	2.20	2239.70	2233	9	28.1		Bi-214
0	1460.72	59	0	1.83	2920.64	2913	14	13.0		K-40

Nuclide Line Activity Report
Sample ID : EFT-16012008

Page : 2
Acquisition date : 24-APR-2008 14:37:42

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	59	10.67*	2.501E+00	3.319E-07	3.319E-07	13.02

Flag: "*" = Keyline

Summary of Nuclide Activity
Sample ID : LFT-10S12908 Acquisition date : 24-APR-2008 14:37:40

Total number of lines in spectrum	5	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	5	100.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	0 1.00?	3.319E-07	3.319E-07	0.432E-07	13.02	
	Total Activity :		3.319E-07	3.319E-07			
	Grand Total Activity :		3.319E-07	3.319E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abs. limit

Sample ID : EFT-10012000 Acquisition Date : 04-APR-2000 14:37:42

Nuclide	Half-Life	Half-Life Ratio	Energy	%Abund	Activity (uCi/gc)	1-Sigma %Error	Rejected by
F-18	109.74M	1120.46	511.00*	193.46	1.000E+35	14.5%	Decay
		% Abundances Found =		193.46			
SC-46	83.82D	1.03	142.53	68.70	---- Not Found ----		Abun.
			889.25*	99.98	---- Not Found ----		
			1120.51	99.99	1.079E-00	28.09	
		% Abundances Found =		99.97			
AG-76	26.32H	70.42	559.10*	44.70	1.504E+16	24.3%	Decay,Abun.
			563.23	1.17	---- Not Found ----		
			571.30	0.14	---- Not Found		
			657.03	6.10	---- Not Found ----		
			665.31	0.39	---- Not Found ----		
			740.12	0.12	---- Not Found ----		
			771.76	0.12	---- Not Found ----		
			867.63	0.12	---- Not Found ----		
			1129.07	0.14	---- Not Found ----		
			1212.72	1.63	---- Not Found ----		
			1216.02	3.84	---- Not Found ----		
			1228.52	1.39	---- Not Found ----		
			1439.13	0.33	---- Not Found ----		
			1453.60	0.13	---- Not Found ----		
			1787.67	0.33	---- Not Found ----		
		% Abundances Found =		73.70			
KR-90	32.32S	229096.78	121.82	32.00	---- Not Found ----		Decay,Abun.
			539.49	20.00	---- Not Found ----		
			1110.69*	37.00	1.000E+35	28.09	
		% Abundances Found =		37.76			
BI-214	19.90M	6223.00	609.31*	46.30	---- Not Found ----		Decay,Abun.
			768.36	5.04	---- Not Found ----		
			934.06	3.21	---- Not Found ----		
			1120.29	15.10	1.000E+35	28.09	
			1238.11	5.94	---- Not Found ----		
			1377.67	4.11	---- Not Found ----		
			1764.49	15.00	---- Not Found ----		
		% Abundances Found =		15.81	(Abn. Limit = 40.40%)		
PB-214	26.80M	4628.81	87.30	4.67	---- Not Found ----		Decay
			241.99	7.47	---- Not Found ----		
			295.21	19.20	---- Not Found ----		
			351.92*	37.20	1.000E+35	43.06	
			785.91	1.10	---- Not Found ----		
		% Abundances Found =		53.40	(Abn. Limit = 37.00%)		

Flags: "D" = Keyline

Unidentified Energy Lines
Sample ID : LIT-10512909 Acquisition date : 24-APR-2003 14:37:42

Lc	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	352.57	30	40	0.90	705.23	699	10	1.67E-02	42.5	5.70E+00	T
0	516.89	125	45	3.03	1021.75	1014	14	6.93E-02	14.6	4.80E+00	T
0	556.73	52	27	1.04	1117.40	1111	12	2.89E-02	24.4	4.60E+00	T
0	1120.11	18	2	2.28	2239.70	2235	9	9.98E-03	28.1	2.90E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 24-Mar-2000 15:11:34.79

Sample ID : EFT-10312900

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum		Energy (keV)	MDA (uCi/cc)
BE-7	19.		477.59	2.0080E-07
F-18	0.	&	511.00	Half-Life too short
NA-22	0.		1274.54	9.4187E-09
NA-24	0.		1368.53	Half-Life too short
MG-27	0.		1014.44	Half-Life too short
CL-38	0.		1642.42	Half-Life too short
AR-41	0.		1293.64	Half-Life too short
SC-46	11.		889.25	1.6903E-08
CR-51	24.		320.08	5.6377E-07
MN-54	12.		834.83	9.0263E-09
CO-56	13.		1238.25	3.3830E-08
MN-56	0.		1810.69	Half-Life too short
NI-56	0.		158.38	Half-Life too short
CO-57	46.		122.06	1.2915E-08
CO-58	12.		810.76	1.8060E-08
FE-59	2.		1099.22	3.0686E-08
CO-60	6.		1332.49	8.4915E-09
CU-64	0.		1345.90	Half-Life too short
NI-65	0.		1481.84	Half-Life too short
ZN-65	10.		1115.52	2.2925E-08
ZN-69M	0.		438.63	Half-Life too short
SE-75	45.		136.00	2.2577E-08
AS-76	0.		559.10	Half-Life too short
BR-82	0.		776.49	Half-Life too short
BR-83	0.		529.64	Half-Life too short
BR-84	0.		881.50	Half-Life too short
BR-85	0.		802.41	Half-Life too short
KR-85	40.		513.99	2.3331E-06
KR-85M	0.		151.18	Half-Life too short
SR-85	40.		513.99	2.4359E-08
RB-86	10.		1076.63	2.4110E-06
KR-87	0.	<	402.58	Half-Life too short
SR-87M	0.		388.40	Half-Life too short
KR-88	0.		196.32	Half-Life too short
RB-88	0.		1392.39	Half-Life too short
Y-88	5.		1836.01	1.5603E-08
KR-89	0.		220.90	Half-Life too short
RB-89	0.		1031.88	Half-Life too short
KR-90	0.		1118.69	Half-Life too short
RB-90	0.		831.69	Half-Life too short
RB-90M	0.		824.83	Half-Life too short
Y-90M	0.		202.51	Half-Life too short
SR-91	0.		1024.30	Half-Life too short
Y-91	11.		1204.90	9.0639E-06
Y-91M	0.		555.60	Half-Life too short
SR-92	0.		1383.94	Half-Life too short
Y-92	0.		934.46	Half-Life too short

Sample ID : EFT-1003129000 Acquisition date : 24-APR-2000 14:37:42

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
SR-93	0.	590.20	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	13.	702.63	7.0032E-09
NB-95	17.	765.79	4.7662E-08
NB-95M	0.	235.69	Half-Life too short
ZR-95	15.	756.72	3.7664E-08
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	0.	739.50	Half-Life too short
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	25.	497.09	4.0360E-08
TC-104	0.	357.99	Half-Life too short
RH-105	0.	318.90	Half-Life too short
RU-105	0.	724.50	Half-Life too short
RU-106	12.	621.84	7.6178E-08
CD-109	37.	88.03	4.0560E-07
AG-110M	20.	937.48	4.1108E-09
SN-113	22.	391.69	1.7405E-08
SN-117M	41.	158.56	6.7912E-07
SB-122	0.	563.93	Half-Life too short
SB-124	10.	602.71	2.0654E-08
SB-125	21.	427.89	2.4439E-08
TE-125M	39.	109.28	9.3333E-06
TE-127	0.	417.90	Half-Life too short
TE-127M	31.	57.60	4.1591E-05
XE-127	48.	202.84	6.0251E-08
TE-129	0.	459.60	Half-Life too short
TE-129M	16.	695.98	1.3767E-06
XE-129M	54.	196.56	1.4401E-04
I-130	0.	536.09	Half-Life too short
BA-131	36.	123.80	4.2126E-06
I-131	0.	364.48	Half-Life too short
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	49.	163.93	6.1006E-0C
I-132	0.	667.69	Half-Life too short
TE-132	0.	228.16	Half-Life too short
BA-133	32.	302.84	4.1370E-08
BA-133M	0.	276.09	Half-Life too short
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	0.	81.00	Half-Life too short
XE-133M	0.	233.22	Half-Life too short
CS-134	10.	604.70	8.3373E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Sample ID : EFT-10S12903 Acquisition date : 24-APR-2008 14:37:42

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-136	11.	818.50	7.1972E-07
I-136	0.	1313.02	Half-Life too short
CS-137	10.	661.65	7.1346E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.21	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	56.	165.85	1.5204E-08
CS-139	0.	1283.23	Half-Life too short
BA-140	25.	537.32	3.4354E-06
LA-140	0.	1596.49	Half-Life too short
BA-141	5.	190.22	Half-Life too short
CE-141	53.	145.44	1.0905E-07
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	0.	293.26	Half-Life too short
CE-144	46.	133.54	9.4069E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	32.	91.10	9.3601E-06
PM-148M	18.	550.27	3.1584E-08
EU-152	32.	344.27	2.0847E-08
EU-154	14.	1004.76	5.5786E-08
EU-156	10.	646.29	5.3900E-06
HF-181	10.	482.03	3.3250E-08
TA-182	7.	1221.42	5.1098E-08
W-187	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
HG-203	42.	279.19	3.6947E-08
BI-207	25.	569.67	8.6426E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	0.	240.98	Half-Life too short
RA-226	48.	186.21	2.3901E-07
AC-228	26.	338.32	6.2288E-08
TH-228	39.	84.37	1.1873E-06
PA-234	0.	131.20	Half-Life too short
TH-234	33.	63.29	1.2663E-05
U-235	35.	143.76	6.6870E-08
NP-239	0.	106.13	Half-Life too short
AM-241	29.	59.54	1.7048E-07

EFT-10S

2009

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-105 031609

Sample Location (Well Number): EFT-105

1. Representative sample collected. Date/Time 3-16-09 / 14:30

Sample collected by: Chas Ellison / [signature] Date: 3-16-09
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: [illegible] / [signature] Date: 4-17-09
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: D. Howard / [signature] Date: 4-22-09
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: R. Burger / [signature] Date: 4-22-09
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-10S031609	
2 . Date Sampled	03/16/2009	
3 . Time Sampled	14:30	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	04/21/2009	
2 . Time Sample Counted	16:20	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	7.5	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	2991.0	cpm
Net Spike Count Rate (cpm)	2983.5	cpm
H3 Spike Activity (dpm on count date)	7361.1	dpm
Counter Efficiency	0.4053	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	8.0	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.5	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{\text{(Bkg cpm)}}{\text{(Bkg min.)}} + \frac{\text{(Bkg cpm)}}{\text{(Smpl min.)}}}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}} = 1.12\text{E-}06 \text{ uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency x 2.22E6 uCi/ml x Sample Volume}} < \textbf{MDA}$$

Technician [signature] Date 4-21-09

Count Room

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-10S 03/609

Sample Location (Well Number): EFT- 10S

1. Representative sample collected. Date/Time 3-16-09 / 14:30

Sample collected by: Chris Ellison / [signature] Date: 3-16-09
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Proffitt / [signature] Date: 4-17-09
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: Proffitt / [signature] Date: 4-21-09
Fermi 2 RP Printed Name Signature

Sample number: EFT-10503160 9

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: Prabhjit / Prabhjit Date: 4/21/09
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: K.J. Lindsey / K.J. Lindsey Date: 4-22-09
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

DETROIT EDISON FERMI-2 POWER PLANT 21-APR-2009 15:29:26.19

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EFT-10S031609

Sample End Time: 16-MAR-2009 14:30:00.00

REMARKS

PERFORMED BY:

SIGNATURE

REVIEWED BY:

SIGNATURE/DATE

PAGE_____of_____

Sample ID : EFT-10S031609 Acquisition date : 21-APR-2009 17:59:22

****

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********

Sample ID Number: EFT-10S031609
Sample collection start date: 16-MAR-2009 14:30:00.00
Sample collection end date : 16-MAR-2009 14:30:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.000000E+03 cc
Sample geometry : M2LL Operator: CLP

********** Acquisition Parameters **********

Detector number : DET 4 Acquire date : 21-APR-2009 17:59:22.00
Preset live time : 0 00:30:00.00 Elapsed live time : 0 00:30:00.00
Elapsed real time : 0 00:30:00.00 Percent dead time : 0.05 %

********** Calibration Parameters **********

Detector number : DET 4 Yearly cal date : 20-JUN-2000 12:00:00.00
Kev/channel : 4.99882E-01 Zero offset: 7.45979E-02
Daily cal date : 21-APR-2009 06:54:02.66

********** Peak Search Parameters **********

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********

Energy tolerance : 2.00000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_M211 Efficiencies at : Peak energy

****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	190.00	40	69	0.00	397.71	389	15	2.25E-02	47.9	
2	0	511.23	93	24	2.00	1022.55	1016	12	5.16E-02	14.0	
3	0	609.42	31	27	1.51	1218.96	1212	12	1.72E-02	30.1	
4	0	1460.30	46	11	2.07	2921.03	2911	18	2.54E-02	23.0	

Sample Title : EFT-10S031609 Page : 1
Decay Time = 36 03:29:22.80 Acquisition Time = 21-APR-2009 17:59:22.0
0

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	190.00	40	69	0.00	397.71	389	15	47.9		HWE Ann. Peak
0	511.23	93	24	2.36	1022.55	1016	12	14.8		
0	609.42	31	27	1.51	1218.96	1212	12	38.1		B.-214
0	1460.30	46	11	2.87	2921.03	2911	18	23.8		K-40

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	46	10.67*	2.502E+00	2.570E-07	2.570E-07	23.75

Flag: "*" = Keyline

Sample ID : EFT-10S031609 Acquisition date : 21-APR-2009 17:59:22

Total number of lines in spectrum	4	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	4	100.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	2.570E-07	2.570E-07	0.610E-07	23.75	
Total Activity :			2.570E-07	2.570E-07			
Grand Total Activity :			2.570E-07	2.570E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EFT-100031609 Acquisition date : 21-APR-2009 17:59:22

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	474.43	511.00*	193.46	1.000E+35	14.81	Decay
		% Abundances Found =		100.00			
SE-75	119.78D	0.30	66.05	1.02	----- Not Found -----		Abun.
			96.73	3.41	----- Not Found -----		
			121.12	16.70	----- Not Found -----		
			136.00*	59.20	----- Not Found -----		
			198.60	1.45	7.837E-07	47.90	
			264.65	59.80	----- Not Found -----		
			279.53	25.20	----- Not Found -----		
			303.91	1.32	----- Not Found -----		
			400.65	11.40	----- Not Found -----		
		% Abundances Found =		0.81			
RU-103	39.35D	0.92	497.08*	89.00	----- Not Found -----		Abun.
			610.33	5.60	3.473E-07	38.00	
		% Abundances Found =		5.92			
TE-131M	30.00H	28.92	102.06	7.90	----- Not Found -----		Decay,Abun.
			149.72	5.10	----- Not Found -----		
			200.63	7.56	6.214E+01	47.90	
			240.93	7.59	----- Not Found -----		
			334.27	9.60	----- Not Found -----		
			773.67*	38.20	----- Not Found -----		
			782.49	7.79	----- Not Found -----		
			793.75	13.90	----- Not Found -----		
			822.70	6.12	----- Not Found -----		
			852.21	20.70	----- Not Found -----		
			1125.46	11.40	----- Not Found -----		
			1206.60	9.80	----- Not Found -----		
		% Abundances Found =		5.19			
XE-135	9.11H	95.25	249.79*	89.90	----- Not Found -----		Decay,Abun.
			608.19	2.89	1.678E+22	38.00	
		% Abundances Found =		3.11			
PM-140M	41.30D	0.88	288.11	12.56	----- Not Found -----		Abun.
			414.07	18.66	----- Not Found -----		
			432.78	5.35	----- Not Found -----		
			501.26	6.75	----- Not Found -----		
			550.27*	94.90	----- Not Found -----		
			599.74	12.54	----- Not Found -----		
			611.26	5.40	3.444E-07	38.00	
			629.97	89.00	----- Not Found -----		
			725.70	32.00	----- Not Found -----		

		% Abundances Found =		1.74			
BI-214	19.90M	2616.30	609.31*	46.30	1.000E+35	38.00	Decay
			768.36	5.04	----- Not Found -----		
			934.06	3.21	----- Not Found -----		

Sample ID : EFT-105031609 Acquisition date : 21-APR-2009 17:59:22

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
BI-214	19.90M	2616.30	1120.29	15.10	----- Not Found -----		Decay
			1238.11	5.94	----- Not Found -----		
			1377.67	4.11	----- Not Found -----		
			1764.49	15.30	----- Not Found -----		
		% Abundances Found =		40.40	(Abn. Limit = 40.40%)		

Flag: "*" = Keyline

Sample ID : EFT-1005031609 Acquisition date : 21-APR-2009 17:59:22

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	198.88	40	69	0.88	397.71	389	15	2.25E-02	47.9	6.60E+00	T
0	511.23	93	24	2.88	1022.55	1016	12	5.16E-02	14.8	4.98E+00	T
0	609.42	31	27	1.51	1218.96	1212	12	1.72E-02	30.1	4.52E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 21-APR-2009 10:29:30.21

Sample ID.: EFT-10S031609

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	12.	477.59	8.5021E-08
F-18	0.	511.00	Half-Life too short
NA-22	5.	1274.54	7.4898E-09
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	9.	889.25	1.0144E-08
CR-51	26.	320.08	1.6737E-07
MN-54	13.	834.83	9.0342E-09
CO-56	9.	1238.25	1.9114E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	37.	158.38	4.2662E-07
CO-57	33.	122.06	9.7324E-09
CO-58	11.	810.76	1.1037E-08
FE-59	11.	1099.22	2.9306E-08
CO-60	9.	1332.49	9.8334E-09
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	10.	1115.52	1.9635E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	28.	136.00	1.3525E-08
AS-76	0.	559.10	Half-Life too short
BR-82	0.	776.49	Half-Life too short
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	39.	513.99	2.2790E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	39.	513.99	1.4437E-08
RB-86	11.	1076.63	4.0493E-07
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	2.	1836.01	8.0331E-09
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short

Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	15.	1204.90	5.7643E-06
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
SR-93	0.	590.28	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	12.	702.63	6.0525E-09
NB-95	8.	765.79	1.3036E-08
NB-95M	0.	235.69	Half-Life too short
ZR-95	15.	756.72	2.1760E-08
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	0.	739.50	Half-Life too short
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	20.	497.08	1.5245E-08
TC-104	0.	357.99	Half-Life too short
RH-105	0.	318.90	Half-Life too short
RU-105	0.	724.50	Half-Life too short
RU-106	14.	621.84	7.3660E-08
CD-109	27.	88.03	3.2496E-07
AG-110M	13.	937.48	2.9703E-08
SN-113	15.	391.69	1.0716E-08
SN-117M	39.	158.56	5.2180E-08
SB-122	0.	563.93	Half-Life too short
SB-124	17.	602.71	1.1089E-08
SB-125	19.	427.89	2.2812E-08
TE-125M	25.	109.28	4.2091E-06
TE-127	0.	417.90	Half-Life too short
TE-127M	30.	57.60	2.9705E-05
XE-127	32.	202.84	1.9326E-08
TE-129	0.	459.68	Half-Life too short
TE-129M	16.	695.88	4.9150E-07
XE-129M	43.	196.56	2.6714E-06
I-130	0.	536.09	Half-Life too short
BA-131	23.	123.88	1.8618E-07
I-131	15.	364.48	1.5237E-07
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	35.	163.93	2.8699E-06
I-132	0.	667.69	Half-Life too short
TE-132	0.	228.16	Half-Life too short
BA-133	36.	302.84	4.2888E-08
BA-133M	0.	276.09	Half-Life too short
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	33.	81.00	4.9571E-06
XE-133M	0.	233.22	Half-Life too short

TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-136	12.	818.50	5.3550E-08
I-136	0.	1313.02	Half-Life too short
CS-137	14.	661.65	8.1403E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	36.	165.85	1.0184E-08
CS-139	0.	1283.23	Half-Life too short
BA-140	15.	537.32	1.0328E-07
LA-140	0.	1596.49	Half-Life too short
BA-141	0.	198.22	Half-Life too short
CE-141	27.	145.44	2.7447E-08
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	0.	293.26	Half-Life too short
CE-144	31.	133.54	6.9911E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	29.	91.10	3.8675E-07
PM-148M	18.	550.27	1.3891E-08
EU-152	26.	344.27	2.6068E-08
EU-154	14.	1004.76	5.5218E-08
EU-155 0	21.	105.31	3.6658E-08
EU-156	14.	646.29	4.9665E-07
HF-181	18.	482.03	1.4819E-08
TA-182	12.	1221.42	4.7573E-08
W-187	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
HG-203	43.	279.19	1.7927E-08
BI-207	13.	569.67	6.3842E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	39.	240.98	1.9476E-04
RA-226	44.	186.21	2.3047E-07
AC-228	19.	338.32	5.2422E-08
TH-228	36.	84.37	1.2259E-06
PA-234	0.	131.20	Half-Life too short
TH-234	27.	63.29	2.7518E-06
U-235	29.	143.76	6.1464E-08
NP-239	0.	106.13	Half-Life too short
AM-241	28.	59.54	1.6874E-07

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT 105 91509

Sample Location (Well Number): 105

1. Representative sample collected. Date/Time 9/15/09 / 1545

Sample collected by: Thomas Mou / [signature] Date: 9/15/09
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Southward / Southward Date: 9/21/09
Printed Name / Signature

3. Sample counted in accordance with 76.000/70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: Tom M. Yocum / [signature] Date: 9.22.1
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert C Hegstad / [signature] Date: 10-13-09
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT10S91509	
2 . Date Sampled	09/15/2009	
3 . Time Sampled	15:45	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	09/21/2009	
2 . Time Sample Counted	14:00	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	7.7	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	2763.5	cpm
Net Spike Count Rate (cpm)	2755.8	cpm
H3 Spike Activity (dpm on count date)	7189.1	dpm
Counter Efficiency	0.3833	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	7.9	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	0.2	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.0	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \sqrt{\frac{\frac{(\text{Bkg cpm})}{(\text{Bkg min.})} + \frac{(\text{Bkg cpm})}{(\text{Smpl min.})}}{\text{Efficiency} \times 2.22\text{E6 dpm/uCi} \times \text{Sample Volume}}} = 1.20\text{E-06 uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency} \times 2.22\text{E6 uCi/ml} \times \text{Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 9-22-A

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT 105 91509

Sample Location (Well Number): 105

1. Representative sample collected. Date/Time 9/15/09 / 1545

Sample collected by: THOMAS MOUL Thomas Moul Date: 9-15-09
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Southward / Southward Date: 9/24/09
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: Southward / Southward Date: 10/13/09
Fermi 2 RP Printed Name Signature

Sample number: EFT 105 9/509

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: Southward / Southward Date: 10/13/09
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert C Bryan Date: 10-22-09
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

DETROIT EDISON FERMI-2 POWER PLANT 12-OCT-2009 15:26:16.84

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

Sample ID Number: EFT10S91509

Acquisition Time: 12-OCT-2009 15:09:27.72

Storage file: EFT10S91509.cnf

REMARKS No Duct >

PERFORMED BY:

SIGNATURE

REVIEWED BY:

SIGNATURE

Sample ID : EFT10S91509 Acquisition date : 12-OCT-2009 15:09:27

****

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********

Sample ID Number: EFT10S91509
Sample collection start date: 15-SEP-2009 15:45:00.00
Sample collection end date : 15-SEP-2009 15:45:00.00
Type of sample : 1 Liter Marinell
Sample quantity : 1.00000E+03 ml
Sample geometry : MILL Operator: CLP

********** Acquisition Parameters **********

Detector number : DET2 Acquire date : 12-OCT-2009 15:09:27.72
Preset live time : 0 00:16:40.00 Elapsed live time : 0 00:16:40.00
Elapsed real time : 0 00:16:46.78 Percent dead time : 0.69 %

********** Calibration Parameters **********

Detector number : DET2 Yearly cal date : 2-MAR-2009 12:18:57.00
Kev/channel : 5.00112E-01 Daily cal date : 12-OCT-2009 02:19:31.10
Zero offset : 2.97503E-02

********** Peak Search Parameters **********

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********

Energy tolerance : 1.25000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : effluents.nlb
Efficiency file : EFFD2_m111 Efficiencies at : Peak energy

****

No peaks were found

DETROIT EDISON FERMI-2 POWER PLANT 21-OCT-2009 13:56:30.15

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EFT10691509 Recount

Sample End Time: 15-SEP-2009 15:45:00.00

REMARKS

PERFORMED BY:
Southward
SIGNATURE

REVIEWED BY:
SIGNATURE/DATE

Sample ID : EFT10S91509 Acquisition date : 21-OCT-2009 13:26:26

Fermi 2 Radiation Protection Gamma Spectroscopy Report

Sample Parameters

Sample ID Number: EFT10S91509
Sample collection start date: 15-SEP-2009 15:45:00.00
Sample collection end date : 15-SEP-2009 15:45:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.00000E+03 cc
Sample geometry : M2LL Operator: JNS

Acquisition Parameters

Detector number : DET 4 Acquire date : 21-OCT-2009 13:26:26.15
Preset live time : 0 00:30:00.00 Elapsed live time : 0 00:30:00.00
Elapsed real time : 0 00:30:01.27 Percent dead time : 0.05 %

Calibration Parameters

Detector number : DET 4 Yearly cal date : 3-JUN-2009 17:37:00.00
Kev/channel : 5.00043E-01 Zero offset: 7.64342E-02
Daily cal date : 21-OCT-2009 00:56:57.98

Peak Search Parameters

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

Nuclide Identification Parameters

Energy tolerance : 1.75000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Fw	Cts/Sec	%Err	Fit
1	0	511.25	106	39	2.96	1022.24	1012	22	5.06E-02	17.9	
2	0	1461.14	63	0	2.50	2921.73	2912	19	3.50E-02	12.6	

Sample Title : EFT10091509 Page : 1
Decay Time = 35 21:41:26.15 Acquisition Time = 21-OCT-2009 13:26:26.15

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	511.25	106	39	2.96	1022.24	1012	22	17.9		AMP.
0	1461.14	63	0	2.50	2921.73	2912	19	12.6		K-40

10-22-09

Sample ID : EFT10691509 Acquisition date :.21-OCT-2009 13:26:26

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	63	10.67*	2.501E+00	3.545E-07	3.545E-07	12.60

Flag: "*" = Keyline

Sample ID : EFT10591509 Acquisition date : 21-OCT-2009 13:26:26

Total number of lines in spectrum	2	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	2	100.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	3.545E-07	3.545E-07	0.447E-07	12.60	
Total Activity :			3.545E-07	3.545E-07			
Grand Total Activity :			3.545E-07	3.545E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EFT10691509 Acquisition date : 21-OCT-2009 13:26:26

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	471.26	511.00*	193.46	1.000E+35	17.90	Decay
	% Abundances Found = 100.00						

Flag: "*" = Keyline

Sample ID : EFT10591509 Acquisition date : 21-OCT-2009 13:26:26

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Fw	Cts/Sec	%Err	%Eff	Flags
0	511.25	106	39	2.96	1022.24	1012	22	5.86E-02	17.9	4.88E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 21-OCT-2009 13:56:34.00

Sample ID : EFT10S91509

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	12.	477.59	8.5766E-08
F-18	0.	511.00	Half-Life too short
NA-22	5.	1274.54	7.1921E-09
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	16.	889.25	1.3189E-08
CR-51	17.	320.08	1.3815E-07
MN-54	9.	834.83	7.7430E-09
CO-56	10.	1238.25	1.9178E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	33.	158.38	3.9800E-07
CO-57	28.	122.06	9.1098E-09
CO-58	8.	810.76	9.4887E-09
FE-59	11.	1099.22	2.8735E-08
CO-60	11.	1332.49	1.0402E-08
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	8.	1115.52	1.7710E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	38.	136.00	1.5467E-08
AS-76	0.	559.10	Half-Life too short
BR-82	0.	776.49	Half-Life too short
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	39.	513.99	2.2820E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	39.	513.99	1.4419E-08
RB-86	9.	1076.63	3.5703E-07
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	4.	1836.01	1.0021E-08
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	4.	1204.90	3.4262E-06
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short

Sample ID : EFT10S91509 Acquisition date : 21-OCT-2009 13:26:26

Nuclide		Bckgnd Sum	Energy (keV)		MDA (uCi/cc)
SR-93	<	0.	590.28		Half-Life too short
Y-93		0.	266.90		Half-Life too short
NB-94		16.	702.63		7.6874E-09
NB-95		17.	765.79		1.7883E-08
NB-95M		33.	235.69		2.7648E-05
ZR-95		13.	756.72		2.0096E-08
NB-97		0.	657.90		Half-Life too short
ZR-97		0.	743.36		Half-Life too short
MO-99		0.	739.50		Half-Life too short
TC-99M		0.	140.50		Half-Life too short
TC-101		0.	306.81		Half-Life too short
RU-103		13.	497.08		1.2491E-08
TC-104		0.	357.99		Half-Life too short
RH-105		0.	318.90		Half-Life too short
RU-105		0.	724.50		Half-Life too short
RU-106		13.	621.84		7.0921E-08
CD-109		35.	8).03	?	3.6641E-07
AG-110M		11.	937.48		2.7229E-08
SN-113		33.	391.69		1.5477E-08
SN-117M		34.	158.56		4.8310E-08
SB-122		0.	563.93		Half-Life too short
SB-124		22.	602.71		1.2410E-08
SB-125		18.	427.89		2.2038E-08
TE-125M		21.	109.28		3.8871E-06
TE-127		0.	417.90		Half-Life too short
TE-127M		20.	57.60		2.4819E-05
XE-127		33.	202.84		1.9652E-08
TE-129		0.	459.60		Half-Life too short
TE-129M		17.	695.88		5.0436E-07
XE-129M		32.	196.56		2.2767E-06
I-130		0.	536.09		Half-Life too short
BA-131		33.	123.80		2.1343E-07
I-131		23.	364.48		1.7990E-07
TE-131		0.	149.72		Half-Life too short
TE-131M		0.	773.67		Half-Life too short
XE-131M		28.	163.93		2.5490E-06
I-132		0.	667.69		Half-Life too short
TE-132		0.	228.16		Half-Life too short
BA-133		22.	302.84		3.4636E-08
BA-133M		0.	276.09		Half-Life too short
I-133		0.	529.87		Half-Life too short
TE-133M		0.	912.58		Half-Life too short
XE-133		26.	91.00		4.3016E-06
XE-133M		0.	233.22		Half-Life too short
CS-134		25.	604.70		9.0656E-09
I-134		0.	884.09		Half-Life too short
TE-134		0.	210.47		Half-Life too short
BA-135M		0.	268.24		Half-Life too short
I-135		0.	1260.41		Half-Life too short
XE-135		0.	249.79		Half-Life too short
XE-135M		0.	526.56		Half-Life too short

Sample ID : EFT10S91509 Acquisition date : 21-OCT-2009 13:26:26

Nuclide		Bckgnd Sum		Energy (keV)	MDA (uCi/cc)
CS-136		13.		818.50	5.4308E-08
I-136		0.		1313.02	Half-Life too short
CS-137		9.		661.65	6.8591E-09
XE-137		0.		455.49	Half-Life too short
CS-138		0.		1435.86	Half-Life too short
XE-138		0.		258.31	Half-Life too short
BA-139		0.		1420.50	Half-Life too short
CE-139		33.		165.85	9.8069E-09
CS-139		0.		1283.23	Half-Life too short
BA-140		16.		537.32	1.9003E-07
LA-140		0.		1596.49	Half-Life too short
BA-141		0.		190.22	Half-Life too short
CE-141		27.		145.44	2.7302E-08
LA-141		0.		1354.52	Half-Life too short
BA-142		0.		255.12	Half-Life too short
LA-142		0.		641.17	Half-Life too short
CE-143		0.		293.26	Half-Life too short
CE-144		34.		133.54	7.2938E-08
PR-144		0.		1489.15	Half-Life too shorw
ND-147		17.		91.10	3.0288E-07
PM-148M		12.		550.27	1.1470E-08
EU-152		34.		344.27	2.9648E-08
EU-154		10.		1004.76	4.8419E-08
EU-155		32.		105.31	4.4266E-08
EU-156		11.		646.29	4.5341E-07
HF-181		11.		482.03	1.1780E-08
TA-182		11.		1221.42	4.5216E-08
W-187		0.		685.81	Half-Life too short
RE-188		0.		155.03	Half-Life too short
HG-203		32.		279.19	1.5635E-08
BI-207		19.		569.67	7.5968E-09
TL-208		0.		583.14	Half-Life too short
PB-212		0.		238.63	Half-Life too short
BI-214		0.		609.31	Half-Life too short
PB-214		0.		351.92	Half-Life too short
RA-224		40.		240.98	1.0830E-04
RA-226		26.		186.21	1.8123E-07
AC-228		24.		338.32	5.8509E-08
TH-228		20.		84.37	9.5432E-07
PA-234		0.		131.20	Half-Life too short
TH-234	A	26.	A	63.29	2.6855E-06
U-235		23.		143.76	5.5311E-08
NP-239		0.		106.13	Half-Life too short
AM-241	>	20.		59.54	1.6646E-07

EFT-10S

2010

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EF1-061010-105

Sample Location (Well Number): 105

1. Representative sample collected. Date/Time 6/10/10 / 1545

Sample collected by: Southward / Southward Date: 6/23/10
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Southward / Southward Date: 6/23/10
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: John M. Yoko / Date: 6-25-10
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert C Hug JR / Date: 6-30-10
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EF1-61010-10S	
2 . Date Sampled	06/10/2010	
3 . Time Sampled	15:45	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	06/24/2010	
2 . Time Sample Counted	13:20	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	6.7	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	2671.8	cpm
Net Spike Count Rate (cpm)	2665.1	cpm
H3 Spike Activity (dpm on count date)	6889.0	dpm
Counter Efficiency	0.3869	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	8.1	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	1.4	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	1.9	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{(\text{Bkg cpm})}{(\text{Bkg min.})} + \frac{(\text{Bkg cpm})}{(\text{Smpl min.})}}}{\text{Efficiency} \times 2.22\text{E6 dpm/uCi} \times \text{Sample Volume}} = 1.11\text{E-06 uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency} \times 2.22\text{E6 uCi/ml} \times \text{Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 6-25-10

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EF1-61010-105

Sample Location (Well Number): 105

1. Representative sample collected. Date/Time 6/10/10 / 1545

Sample collected by: Southward / Southward Date: 6/23/10
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Southward / Southward Date: 6/23/10
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: Charles Proffitt / Charles Proffitt Date: 9-27-10
Fermi 2 RP Printed Name Signature

Sample number: EF1-61010-105

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: Charles Proffitt / Charles Proffitt Date: 9-27-10
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert C Gregg II / Robert C Gregg II Date: 10-5-10
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EF1-61010-10S

Sample End Time: 10-JUN-2010 15:45:00.00

REMARKS

PERFORMED BY:

Charles Proffitt
SIGNATURE

REVIEWED BY:

SIGNATURE/DATE

Sample ID : EF1-61010-10S Acquisition date : 27-SEP-2010 09:53:06

****

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********

Sample ID Number: EF1-61010-10S
Sample collection start date: 10-JUN-2010 15:45:00.00
Sample collection end date : 10-JUN-2010 15:45:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.00000E+03 cc
Sample geometry : M2LL Operator: CLP

********** Acquisition Parameters **********

Detector number : DET 4 Acquire date : 27-SEP-2010 09:53:06.94
Preset live time : 0 00:45:00.00 Elapsed live time : 0 00:45:00.00
Elapsed real time : 0 00:45:00.79 Percent dead time : 0.03 %

********** Calibration Parameters **********

Detector number : DET 4 Yearly cal date : 23-JUN-2010 12:20:00.00
Kev/channel : 5.00373E-01 Zero offset: 7.59464E-02
Daily cal date : 27-SEP-2010 09:40:39.90

********** Peak Search Parameters **********

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********

Energy tolerance : 1.75000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_M211 Efficiencies at : Peak energy

****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	66.66	48	68	1.38	133.06	129	8	1.76E-02	33.7	
2	0	198.49	83	103	2.02	396.54	391	12	3.09E-02	26.6	
3	3	510.60	90	81	1.90	1020.34	1016	23	3.63E-02	19.4	1.73E+00
4	3	512.01	64	91	1.75	1023.14	1016	23	2.35E-02	36.4	
5	0	558.65	98	31	1.16	1116.37	1110	12	3.64E-02	15.3	
6	0	652.53	22	28	1.65	1304.01	1295	11	0.29E-03	50.1	
7	3	1460.50	29	15	2.40	2919.17	2914	13	1.06E-02	38.1	4.00E+00
8	3	1460.99	59	18	2.61	2920.00	2914	13	2.17E-02	20.0	

Decay Time = 100 18:08:06.94 Acquisition Time = 27-SEP-2010 09:53:06.94

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	66.66	48	68	1.38	133.06	129	8	33.7	— HWC	
0	198.49	83	103	2.02	396.54	391	12	26.6	— HWC	
3	510.60	98	81	1.98	1020.34	1016	23	19.4	1.73E+00	> ANN.
3	512.01	64	91	1.75	1023.14	1016	23	36.4	—	
0	558.65	98	31	1.16	1116.37	1110	12	15.3	— HWC	
0	652.53	22	28	1.65	1304.01	1295	11	50.1	— High %dfd	
3	1460.58	29	15	2.40	2919.17	2914	13	38.1	4.80E+00	> K-40
3	1460.99	59	18	2.61	2920.00	2914	13	20.0		> K-40

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	59	10.67*	2.501E+00	2.201E-07	2.201E-07	20.02

Flag: "*" = Keyline

Sample ID : EF1-61010-10S Acquisition date : 27-SEP-2010 09:53:06

Total number of lines in spectrum	8	
Number of unidentified lines	2	
Number of lines tentatively identified by NID	6	75.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	2.201E-07	2.201E-07	0.441E-07	20.02	
	Total Activity :		2.201E-07	2.201E-07			
	Grand Total Activity :		2.201E-07	2.201E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	1427.29	511.00*	193.46	1.000E+35	19.38	Decay
	% Abundances Found =			100.00			
SE-75	119.78D	0.91	66.05	1.02	6.037E-06	33.66	Abun.
			96.73	3.41	----- Not Found -----		
			121.12	16.70	----- Not Found -----		
			136.00*	59.20	----- Not Found -----		
			198.60	1.45	1.630E-06	26.58	
			264.65	59.00	----- Not Found -----		
			279.53	25.20	----- Not Found -----		
			303.91	1.32	----- Not Found -----		
			400.65	11.40	----- Not Found -----		
	% Abundances Found =			1.38			
AS-76	26.32H	99.10	559.10*	44.70	3.304E+22	15.35	Decay,Abun.
			563.23	1.17	----- Not Found -----		
			571.30	0.14	----- Not Found -----		
			657.03	6.10	----- Not Found -----		
			665.31	0.39	----- Not Found -----		
			740.12	0.12	----- Not Found -----		
			771.76	0.12	----- Not Found -----		
			867.63	0.12	----- Not Found -----		
			1129.87	0.14	----- Not Found -----		
			1212.72	1.63	----- Not Found -----		
			1216.02	3.84	----- Not Found -----		
			1220.52	1.39	----- Not Found -----		
			1439.13	0.33	----- Not Found -----		
			1453.60	0.13	----- Not Found -----		
			1787.67	0.33	----- Not Found -----		
	% Abundances Found =			73.70			
SR-91	9.50H	274.79	274.70	1.00	----- Not Found -----		Decay,Abun.
			620.10	1.72	----- Not Found -----		
			652.30	2.89	1.000E+35	50.00	
			652.90	7.80	1.000E+35	50.00	
			749.80	23.00	----- Not Found -----		
			925.80	3.74	----- Not Found -----		
			1024.30*	32.50	----- Not Found -----		
	% Abundances Found =			14.71			
TE-131	25.00M	6265.22	149.72*	68.90	----- Not Found -----		Decay,Abun.
			452.32	18.22	----- Not Found -----		
			492.66	4.84	----- Not Found -----		
			602.04	4.20	----- Not Found -----		
			654.26	1.53	1.000E+35	50.00	
			948.54	2.26	----- Not Found -----		
			997.25	3.34	----- Not Found -----		
			1146.96	4.96	----- Not Found -----		
	% Abundances Found =			1.41			
CS-136	13.16D	8.27	66.91	12.50	8.077E-05	33.66	Abun.
			86.29	6.30	----- Not Found -----		

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
CS-136	13.16D	0.27	153.22	7.46	----- Not Found -----		Abun.
			163.89	4.61	----- Not Found -----		
			176.55	13.56	----- Not Found -----		
			273.65	12.66	----- Not Found -----		
			340.57	48.50	----- Not Found -----		
			818.50*	99.70	----- Not Found -----		
			1048.07	79.60	----- Not Found -----		
			1235.34	19.70	----- Not Found -----		
		% Abundances Found =		4.10			
TA-182	114.74D	0.95	67.75	42.30	1.497E-07	33.66	Abun.
			100.10	14.10	----- Not Found -----		
			1189.05	16.30	----- Not Found -----		
			1221.42*	27.10	----- Not Found -----		
			1230.97	11.50	----- Not Found -----		
		% Abundances Found =		30.01			

Flag: "*" = Keyline

Sample ID : EF1-61010-10S Acquisition date : 27-SEP-2010 09:53:06

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	66.66	40	60	1.30	133.06	129	8	1.76E-02	33.7	1.45E+00	T
0	198.49	83	103	2.02	396.54	391	12	3.09E-02	26.6	6.60E+00	T
3	510.60	98	81	1.98	1020.34	1016	23	3.63E-02	19.4	4.80E+00	T
3	512.01	64	91	1.75	1023.14	1016	23	2.35E-02	36.4	4.80E+00	
0	558.65	98	31	1.16	1116.37	1110	12	3.64E-02	15.3	4.69E+00	T
0	652.53	22	28	1.65	1304.01	1295	11	8.29E-03	50.1	4.39E+00	T
3	1460.58	29	15	2.40	2919.17	2914	13	1.06E-02	38.1	2.50E+00	

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 27-SEP-2010 10:38:13.00

Sample ID : EF1-61010-10S

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	27.	477.59	2.1174E-07
F-18	0.	511.00	Half-Life too short
NA-22	19.	1274.54	9.2706E-09
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	23.	889.25	1.0802E-08
CR-51	50.	320.08	9.2938E-07
MN-54	17.	834.83	8.0797E-09
CO-56	23.	1238.25	3.5122E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	0.	158.38	Half-Life too short
CO-57	54.	122.06	9.8282E-09
CO-58	21.	810.76	1.9360E-08
FE-59	13.	1099.22	6.3735E-08
CO-60	11.	1332.49	7.2894E-09
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	17.	1115.52	2.0285E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	59.	136.00	1.9382E-08
AS-76	0.	559.10	Half-Life too short
BR-82	0.	776.49	Half-Life too short
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	79.	513.99	2.1442E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	79.	513.99	2.9143E-08
RB-86	15.	1076.63	4.5057E-06
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	10.	1836.01	1.6340E-08
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	20.	1204.90	1.0275E-05
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Sample ID : EF1-61010-10S Acquisition date : 27-SEP-2010 09:53:06

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
SR-93	0.	590.20	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	28.	702.63	6.6314E-09
NB-95	24.	765.79	5.7704E-08
NB-95M	0.	235.69	Half-Life too short
ZR-95	20.	756.72	3.6224E-08
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	0.	739.50	Half-Life too short
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	39.	497.08	4.8995E-08
TC-104	0.	357.99	Half-Life too short
RH-105	0.	318.90	Half-Life too short
RU-105	0.	724.50	Half-Life too short
RU-106	23.	621.84	6.9588E-08
CD-109	42.	88.03	2.9399E-07
AG-110M	24.	937.48	3.1764E-08
SN-113	39.	391.69	1.7125E-08
SN-117M	72.	158.56	1.8686E-06
SB-122	0.	563.93	Half-Life too short
SB-124	26.	602.71	2.0787E-08
SB-125	29.	427.89	1.9309E-08
TE-125M	51.	109.28	9.2138E-06
TE-127	0.	417.90	Half-Life too short
TE-127M	33.	57.60	3.3320E-05
XE-127	55.	202.84	6.6195E-08
TE-129	0.	459.60	Half-Life too short
TE-129M	31.	695.88	1.9584E-06
XE-129M	0.	196.56	Half-Life too short
I-130	0.	536.09	Half-Life too short
BA-131	71.	123.80	1.4689E-05
I-131	0.	364.48	Half-Life too short
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	73.	163.93	1.8876E-04
I-132	0.	667.69	Half-Life too short
TE-132	0.	228.16	Half-Life too short
BA-133	35.	302.84	2.8603E-08
BA-133M	0.	276.09	Half-Life too short
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	0.	81.00	Half-Life too short
XE-133M	0.	233.22	Half-Life too short
CS-134	29.	604.70	6.9735E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Sample ID : EF1-61010-10S Acquisition date : 27-SEP-2010 09:53:06

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-136	11.	818.50	1.5481E-06
I-136	0.	1313.02	Half-Life too short
CS-137	31.	661.65	7.8097E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	66.	165.85	1.2940E-08
CS-139	0.	1203.23	Half-Life too short
BA-140	17.	537.32	6.7546E-06
LA-140	0.	1596.49	Half-Life too short
BA-141	0.	190.22	Half-Life too short
CE-141	55.	145.44	1.2022E-07
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	0.	293.26	Half-Life too short
CE-144	51.	133.54	6.9915E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	40.	91.10	2.9212E-05
PM-148M	25.	550.27	3.6018E-08
EU-152	47.	344.27	2.3095E-08
EU-154	12.	1004.76	3.5421E-08
EU-155	37.	105.31	3.2252E-08
EU-156	20.	646.29	1.0736E-05
HF-181	32.	482.03	4.1674E-08
TA-182	12.	1221.42	4.7721E-08
W-187	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
HG-203	56.	279.19	3.9703E-08
BI-207	38.	569.67	6.9481E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	0.	240.98	Half-Life too short
RA-226	67.	186.21	1.8633E-07
AC-228	40.	338.32	5.0738E-08
TH-228	49.	84.37	1.0100E-06
PA-234	0.	131.20	Half-Life too short
TH-234	48.	63.29	1.9261E-05
U-235	51.	143.76	5.2962E-08
NP-239	0.	106.13	Half-Life too short
AM-241	45.	59.54	1.3866E-07

EFT-10S

2011

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-6711-105

Sample Location (Well Number): 105

1. Representative sample collected. Date/Time 6-8-11 / 10:00

Sample collected by: C Proffitt / [signature] Date: 6-8-11
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: C Proffitt / [signature] Date: 6-8-11
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: Russ Bugert / [signature] Date: 6-10-11
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert C Beg JR / [signature] Date: 6-13-11
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks N/A 6-13-11

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-6611-10S	
2 . Date Sampled	06/08/2011	
3 . Time Sampled	10:00	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	06/09/2011	
2 . Time Sample Counted	14:55	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	5.8	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	2424.5	cpm
Net Spike Count Rate (cpm)	2418.7	cpm
H3 Spike Activity (dpm on count date)	6526.4	dpm
Counter Efficiency	0.3706	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	6.8	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	1.0	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	1.8	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{\text{(Bkg cpm)}}{\text{(Bkg min.)}} + \frac{\text{(Bkg cpm)}}{\text{(Smpl min.)}}}}{\text{Efficiency x 2.22E6 dpm/uCi x Sample Volume}} = 1.08\text{E-}06 \text{ uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency x 2.22E6 uCi/ml x Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 6-10-11

Reviewed By: W Bowman Date 6-13-11

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-6711-105

Sample Location (Well Number): 105

1. Representative sample collected. Date/Time 6-7-11 / 11:45

Sample collected by: Thomas Mow / [signature] Date: 6-7-11
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: C Proffitt / [signature] Date: 6-8-11
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: C Proffitt / [signature] Date: 6-13-11
Fermi 2 RP Printed Name Signature

Sample number: EFT-6711-10S

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: C Proffitt / [signature] Date: 6-13-11
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: Roberto Reyes / [signature] Date: 6-17-11
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks

VM [signature] 6-11-11

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EFT-6111-10S

Sample End Time: 6-JUN-2011 11:45:00.00

REMARKS Natural

PERFORMED BY:

SIGNATURE

REVIEWED BY:

SIGNATURE/DATE

Sample ID : EFT-6111-10S Acquisition date : 13-JUN-2011 14:56:36

Fermi 2 Radiation Protection Gamma Spectroscopy Report

Sample Parameters

Sample ID Number: EFT-6111-10S
Sample collection start date: 6-JUN-2011 11:45:00.00
Sample collection end date : 6-JUN-2011 11:45:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.00000E+03 cc
Sample geometry : M2LL Operator: CLP

Acquisition Parameters

Detector number : DET 4 Acquire date : 13-JUN-2011 14:56:36.39
Preset live time : 0 00:45:00.00 Elapsed live time : 0 00:45:00.00
Elapsed real time : 0 00:45:00.61 Percent dead time : 0.03 %

Calibration Parameters

Detector number : DET 4 Yearly cal date : 23-JUN-2010 12:28:00.00
Kev/channel : 5.00022E-01 Zero offset: 1.96812E-01
Daily cal date : 13-JUN-2011 00:58:17.00

Peak Search Parameters

Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

Nuclide Identification Parameters

Energy tolerance : 1.75000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	66.29	51	52	2.11	132.17	128	9	1.89E-02	29.0	
2	0	352.29	45	49	1.90	704.17	698	10	1.66E-02	33.1	
3	0	511.31	166	34	2.77	1022.22	1015	17	6.15E-02	11.2	
4	0	610.81	36	55	1.01	1221.23	1210	15	1.34E-02	48.0	
5	0	1121.03	15	15	1.50	2241.78	2236	10	5.49E-03	57.9	
6	1	1460.84	53	9	2.89	2921.53	2912	18	1.95E-02	19.4	1.16E+00
7	1	1462.64	17	2	2.73	2925.14	2912	18	6.41E-03	47.4	

Decay Time = 7 03:11:36.39 Acquisition Time = 13-JUN-2011 14:56:36.39

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	66.29	51	52	2.11	132.17	128	9	29.0		Ge-n-γ comic
0	352.29	45	49	1.90	704.17	698	10	33.1		Pb-214
0	511.31	166	34	2.77	1022.22	1015	17	11.2		Ann. Peak
0	610.81	36	55	1.01	1221.23	1210	15	48.0		Bi-214
0	1121.03	15	15	1.50	2241.78	2236	10	57.9		Bi-214
1	1460.84	53	9	2.89	2921.53	2912	18	19.4	1.16E+00	K-40
1	1462.64	17	2	2.73	2925.14	2912	18	47.4		K-40

JL-6-13-11

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	53	10.67*	2.501E+00	1.973E-07	1.973E-07	19.40

Flag: "*" = Keyline

Sample ID : EFT-6111-10S Acquisition date : 13-JUN-2011 14:56:36

Total number of lines in spectrum	7	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	7	100.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+05Y	1.00	1.973E-07	1.973E-07	0.383E-07	19.40	
Total Activity :			1.973E-07	1.973E-07			
Grand Total Activity :			1.973E-07	1.973E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	93.80	511.00*	193.46	3.036E+20	11.18	Decay
	% Abundances Found = 100.00						
SC-46	83.83D	0.09	142.53	62.70	----- Not Found -----		Abun.
			889.25*	99.98	----- Not Found -----		
			1120.51	99.99	5.434E-09	57.90	
	% Abundances Found = 38.07						
SE-75	119.78D	0.06	66.05	1.02	3.699E-06	29.03	Abun.
			96.73	3.41	----- Not Found -----		
			121.12	16.70	----- Not Found -----		
			136.00*	59.20	----- Not Found -----		
			198.60	1.45	----- Not Found -----		
			264.65	59.00	----- Not Found -----		
			279.53	25.20	----- Not Found -----		
			303.91	1.32	----- Not Found -----		
			400.65	11.40	----- Not Found -----		
	% Abundances Found = 0.57						
BR-84	31.80M	323.71	604.80	1.80	----- Not Found -----		Decay,Abun.
			736.50	1.31	----- Not Found -----		
			802.20	6.10	----- Not Found -----		
			881.50*	42.00	----- Not Found -----		
			1015.90	6.20	----- Not Found -----		
			1213.30	2.60	----- Not Found -----		
			1463.80	2.00	1.000E+35	47.45	
			1741.20	1.60	----- Not Found -----		
			1877.50	1.14	----- Not Found -----		
			1897.30	14.90	----- Not Found -----		
			2029.60	2.10	----- Not Found -----		
	% Abundances Found = 2.45						
RU-103	39.35D	0.18	497.08*	89.00	----- Not Found -----		Abun.
			610.33	5.60	1.627E-07	47.96	
	% Abundances Found = 5.92						
CS-136	13.16D	0.54	66.91	12.50	4.220E-07	29.03	Abun.
			86.29	6.30	----- Not Found -----		
			153.22	7.46	----- Not Found -----		
			163.89	4.61	----- Not Found -----		
			176.55	13.56	----- Not Found -----		
			273.65	12.66	----- Not Found -----		
			340.57	48.50	----- Not Found -----		
			818.50*	99.70	----- Not Found -----		
			1048.07	79.60	----- Not Found -----		
			1235.34	19.70	----- Not Found -----		
	% Abundances Found = 4.10						
PM-148M	41.30D	0.17	288.11	12.56	----- Not Found -----		Abun.
			414.07	18.66	----- Not Found -----		
			432.78	5.35	----- Not Found -----		
			501.26	6.75	----- Not Found -----		

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
PM-148M	41.30D	0.17	550.27*	94.90	----- Not Found -----		Abun.
			599.74	12.54	----- Not Found -----		
			611.26	5.48	1.653E-07	47.96	
			629.97	89.00	----- Not Found -----		
			725.70	32.00	----- Not Found -----		
			915.33	17.17	----- Not Found -----		
			1013.01	20.30	----- Not Found -----		
		% Abundances Found =		1.74			
TA-182	114.74D	0.06	67.75	42.30	8.935E-08	29.03	Abun.
			100.10	14.10	----- Not Found -----		
			1189.05	16.30	----- Not Found -----		
			1221.42*	27.10	----- Not Found -----		
			1230.97	11.50	----- Not Found -----		
		% Abundances Found =		38.01			
BI-214	19.90M	517.29	609.31*	46.30	1.000E+35	47.96	Decay
			768.36	5.04	----- Not Found -----		
			934.06	3.21	----- Not Found -----		
			1120.29	15.10	1.000E+35	57.90	
			1238.11	5.94	----- Not Found -----		
			1377.67	4.11	----- Not Found -----		
			1764.49	15.80	----- Not Found -----		
		% Abundances Found =		64.29	(Abn. Limit = 48.48%)		
PB-214	26.80M	384.11	87.30	4.67	----- Not Found -----		Decay
			241.98	7.49	----- Not Found -----		
			295.21	19.20	----- Not Found -----		
			351.92*	37.20	1.000E+35	33.06	
			785.91	1.10	----- Not Found -----		
		% Abundances Found =		53.40	(Abn. Limit = 37.20%)		

Flag: "*" = Keyline

Sample ID : EFT-6111-10S Acquisition date : 13-JUN-2011 14:56:36

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	66.29	51	52	2.11	132.17	128	9	1.89E-02	29.0	1.41E+00	T
0	352.29	45	49	1.90	704.17	698	10	1.66E-02	33.1	5.70E+00	T
0	511.31	166	34	2.77	1022.22	1015	17	6.15E-02	11.2	4.80E+00	T
0	610.81	36	55	1.01	1221.23	1210	15	1.34E-02	48.0	4.51E+00	T
0	1121.03	15	15	1.50	2241.78	2236	10	5.49E-03	57.9	2.90E+00	T
1	1462.64	17	2	2.73	2925.14	2912	18	6.41E-03	47.4	2.50E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 13-JUN-2011 15:41:44.84

Sample ID : EFT-6111-10S

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
BE-7	33.	477.59	6.1741E-08
F-18	0.	511.00	Half-Life too short
NA-22	10.	1274.54	6.4054E-09
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	12.	889.25	6.0421E-09
CR-51	44.	320.08	6.9160E-08
MN-54	24.	834.83	7.4822E-09
CO-56	20.	1238.25	1.3599E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	40.	158.38	1.0990E-08
CO-57	49.	122.06	7.2668E-09
CO-58	16.	810.76	6.4581E-09
FE-59	11.	1099.22	1.2423E-08
CO-60	15.	1332.49	7.8594E-09
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	15.	1115.52	1.4163E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	48.	136.00	9.7849E-09
AS-76	42.	559.10	1.4391E-06
BR-82	16.	776.49	1.9883E-07
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	59.	513.99	1.8435E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	59.	513.99	8.6087E-09
RB-86	7.	1076.63	7.6266E-08
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	4.	1836.01	5.9969E-09
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	17.	1204.90	2.8336E-06
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Sample ID : EFT-6111-10S Acquisition date : 13-JUN-2011 14:56:36

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
SR-93	0.	590.20	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	16.	702.63	5.2072E-09
NB-95	8.	765.79	4.9218E-09
NB-95M	37.	235.69	7.6898E-08
ZR-95	9.	756.72	8.5922E-09
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	20.	739.58	2.8630E-07
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	23.	497.08	6.4674E-09
TC-104	0.	357.99	Half-Life too short
RH-105	30.	318.90	7.9359E-07
RU-105	0.	724.50	Half-Life too short
RU-106	21.	621.84	5.5307E-08
CD-109	48.	88.03	2.6921E-07
AG-110M	14.	937.48	1.8729E-08
SN-113	23.	391.69	7.3733E-09
SN-117M	41.	158.56	8.1268E-09
SB-122	20.	563.93	4.4745E-08
SB-124	32.	602.71	7.0934E-09
SB-125	16.	427.89	1.3718E-08
TE-125M	39.	109.28	2.4316E-06
TE-127	0.	417.90	Half-Life too short
TE-127M	43.	57.60	1.9547E-05
XE-127	43.	202.84	8.4896E-09
TE-129	0.	459.60	Half-Life too short
TE-129M	13.	695.88	1.6536E-07
XE-129M	47.	196.56	1.9299E-07
I-130	0.	536.09	Half-Life too short
BA-131	53.	123.80	3.2770E-08
I-131	31.	364.48	1.1651E-08
TE-131	0.	149.72	Half-Life too short
TE-131M	19.	773.67	8.5540E-07
XE-131M	69.	163.93	4.7940E-07
I-132	0.	667.69	Half-Life too short
TE-132	38.	228.16	2.5706E-08
BA-133	42.	302.84	3.0643E-08
BA-133M	40.	276.09	6.1100E-07
I-133	23.	529.87	1.8291E-06
TE-133M	0.	912.58	Half-Life too short
XE-133	39.	81.00	7.7270E-08
XE-133M	44.	233.22	4.9562E-07
CS-134	39.	604.70	7.1999E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	45.	268.24	2.1365E-06
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Sample ID : EFT-6111-10S Acquisition date : 13-JUN-2011 14:56:36

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-136	14.	818.50	8.2189E-09
I-136	0.	1313.02	Half-Life too short
CS-137	24.	661.65	6.8514E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	62.	165.85	7.5559E-09
CS-139	0.	1283.23	Half-Life too short
BA-140	20.	537.32	2.0767E-08
LA-140	7.	1596.49	1.2698E-07
BA-141	0.	190.22	Half-Life too short
CE-141	40.	145.44	1.1865E-08
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	41.	293.26	4.6394E-07
CE-144	54.	133.54	5.6020E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	37.	91.10	4.5938E-08
PM-148M	24.	550.27	6.4202E-09
EU-152	28.	344.27	1.8110E-08
EU-154	14.	1004.76	3.6924E-08
EU-155	47.	105.31	3.4658E-08
EU-156	17.	646.29	9.8121E-08
HF-181	24.	482.03	6.9126E-09
TA-182	15.	1221.42	2.8963E-08
W-187	23.	685.81	2.9949E-06
RE-188	0.	155.03	Half-Life too short
AU-199	40.	158.38	6.3431E-08
HG-203	44.	279.19	7.8357E-09
BI-207	34.	569.67	6.5746E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	66.	240.98	6.4021E-07
RA-226	65.	186.21	1.8334E-07
AC-228	24.	338.32	3.9130E-08
TH-228	44.	84.37	8.7606E-07
PA-234	0.	131.20	Half-Life too short
TH-234	32.	63.29	8.6601E-07
U-235	46.	143.76	5.0356E-08
NP-239	50.	106.13	2.6181E-07
AM-241	35.	59.54	1.2275E-07

FERMI 1 GROUND WATER MONITORING TRITIUM ANALYSIS CHECKLIST

Sample number: EFT-12511-10s

Sample Location (Well Number): 10s

1. Representative sample collected. Date/Time 12/5/11 / 12:55

Sample collected by: Thomas Mow / [signature] Date: 12/16/11
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Prepare sample ≥ 50 milliliters. Seal sample adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Thomas Mow / [signature] Date: 12/16/11
Printed Name / Signature

3. Sample counted in accordance with 76.000.70 or 79 "Operation of the Packard TRICARB 1000 or 2100TR".

Performed by: Tom M. Yocom [signature] Date: 12-19-11
Fermi 2 Chemistry Printed Name Signature

4. Tritium analysis printout reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert A. Gregg SR / [signature] Date: 1-3-12
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, analysis printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

Tritium Activity Calculation

Sample Information

1 . Sample Location	EFT-12511-10S	
2 . Date Sampled	12/05/2011	
3 . Time Sampled	12:55	
4 . Sample Volume, (ml)	4	ml

Instrument Count Data

1 . Date Sample Counted	12/19/2011	
2 . Time Sample Counted	12:00	
3 . Background Inf.:		
Minutes Counted	10	min.
Background Count Rate (cpm)	8.2	cpm
4 . Efficiency Inf.: (Daily Spike Source ID # 111)		
Gross Spike Count Rate (cpm)	2483.5	cpm
Net Spike Count Rate (cpm)	2475.3	cpm
H3 Spike Activity (dpm on count date)	6334.6	dpm
Counter Efficiency	0.3908	cpm/dpm
5 . Sample Info:		
Sample Gross Count Rate (cpm)	9.7	cpm
Sample Count Time (min.)	10.0	min.
Net Sample Count Rate (cpm)	1.5	cpm
6 . Critical Level:		
Critical Level Count Rate (cpm)	2.1	cpm

Minimum Detectable Activity

$$\text{Minimum Detectable Activity (uCi/ml)} = 3.3 \times \frac{\sqrt{\frac{(\text{Bkg cpm})}{(\text{Bkg min.})} + \frac{(\text{Bkg cpm})}{(\text{Smpl min.})}}}{\text{Efficiency} \times 2.22\text{E6 dpm/uCi} \times \text{Sample Volume}} = 1.22\text{E-06 uCi/ml}$$

Sample Activity

$$\text{Sample Activity (uCi/ml)} = \frac{\text{Sample Net cpm}}{\text{Efficiency} \times 2.22\text{E6 uCi/ml} \times \text{Sample Volume}} < \textbf{MDA}$$

Technician _____ Date 12-19-11

Reviewed _____ Date 12-20-11

Form 76.000.39 Att 1 P1/1 DTC: TGCHEM File: 1319.02

FERMI 1 GROUND WATER MONITORING GAMMA ISOTOPIC ANALYSIS CHECKLIST

Sample number: EFT-12511-10S

Sample Location (Well Number): 10S

1. Representative sample collected. Date/Time 12/5/11 / 12:55

Sample collected by: Thomas Mow / [signature] Date: 12/15/11
Printed Name / Signature

Note: Qualified Fermi 1 Personnel or other qualified individual will obtain samples

2. Sample container sealed adequately to resist tampering.
Note: Use new sample containers only

Sample sealed by: Thomas Mow / [signature] Date: 12/16/11
Printed Name / Signature

Note: Sample containers may simply be sealed with red duct tape and initialed by the individual performing the function

3. LLD validation

LLD and Critical Level determinations within 30 days of gamma spectrometry assay; acceptable LLDs shown for radionuclides detected by gamma spectrometry.

Fermi 2 RP Gamma Scintillation Detector # 4

Performed by: C Prothit / [signature] Date: 12-30-11
Fermi 2 RP Printed Name Signature

Sample number: EFT-12511-10S

4. Sample counted in accordance with 65.000.115 "Operation of the Gamma Spectroscopy System".
(Note disposition of unidentified peaks in "Remarks")

Performed by: C Proffitt / C Proffitt Date: 12-30-11
Fermi 2 RP Printed Name Signature

* Note: Samples may be counted on Chemistry's Gamma Spectroscopy System. If so, verify the critical levels and LLDs and count sample in accordance with the applicable procedure.

5. Gamma spectrometry evaluation reviewed by Radiation Protection Supervision or delegate.

Performed by: Robert C Craig JR / Date: 1-3-12
Fermi 2 Printed Name Signature
Radiation Protection Supervision/Delegate

Note: Return sample, intrinsic printout, and completed form to Fermi 1 Radiological Engineer

Remarks _____

DETROIT EDISON FERMI-2 POWER PLANT 30-DEC-2011 12:04:38.14

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

HIGH EFFICIENCY DETECTOR

Sample ID Number: EFT-12511-100

Sample End Time: 5-DEC-2011 12:55:00.00

REMARKS No Plant Related Material

PERFORMED BY:

Charles Ruffatt
SIGNATURE

REVIEWED BY:

SIGNATURE/DATE

Sample ID : EFT-12511-10S Acquisition date : 30-DEC-2011 11:19:35

****

Fermi 2 Radiation Protection Gamma Spectroscopy Report

********** Sample Parameters **********
Sample ID Number: EFT-12511-10S
Sample collection start date: 5-DEC-2011 12:55:00.00
Sample collection end date : 5-DEC-2011 12:55:00.00
Type of sample : 1 L Mari. Liquid
Sample quantity : 1.000000E+03 cc
Sample geometry : MELL Operator: CLP

********** Acquisition Parameters **********
Detector number : DET 4 Acquire date : 30-DEC-2011 11:19:35.46
Preset live time : 0 00:45:00.00 Elapsed live time : 0 00:45:00.00
Elapsed real time : 0 00:45:00.61 Percent dead time : 0.03 %

********** Calibration Parameters **********
Detector number : DET 4 Yearly cal date : 14-JUN-2011 14:50:56.41
Kev/channel : 5.00189E-01 Zero offset: 5.20365E-02
Daily cal date : 30-DEC-2011 09:41:25.86

********** Peak Search Parameters **********
Start channel : 100 End channel : 4096
Height sensitivity : 5.00000 Shape sensitivity : 10.00000
Maximum number of iterations to resolve multiplets : 5

********** Nuclide Identification Parameters **********
Energy tolerance : 1.75000 Half-life ratio : 10.00000
Abundance limit : 75.00000 Library : dacmaster.nlb
Efficiency file : EFFD4_m211 Efficiencies at : Peak energy
****

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	352.02	52	63	2.11	703.60	696	15	1.91E-02	36.5	
2	0	511.65	190	69	3.34	1022.81	1012	29	7.03E-02	14.8	
3	0	558.89	32	30	1.85	1117.27	1112	12	1.19E-02	30.5	
4	0	610.00	73	44	2.69	1219.61	1213	15	2.71E-02	23.7	
5	0	1460.67	31	6	2.84	2920.20	2909	23	3.38E-02	12.5	

Sample Title : EFT-12511-105 Page : 1
Decay Time = 24 22:24:35.46 Acquisition Time = 30-DEC-2011 11:19:35.46

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	352.02	52	63	2.11	703.68	696	15	36.5		Pb-214 Ann. Peak
0	511.65	190	69	3.34	1022.01	1012	29	14.0		Cd-A-β
0	558.89	32	30	1.95	1117.27	1112	12	30.5		Bi-214
0	610.00	73	44	2.69	1219.61	1213	15	23.7		
0	1460.67	91	6	2.24	2920.20	2909	23	12.5		K-40

f-1-3-12

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected uCi/cc	Decay Corr uCi/cc	1-Sigma %Error
K-40	1460.81	91	10.67*	2.353E+00	3.635E-07	3.635E-07	12.51

Flag: "*" = Keyline

Sample ID : EFT-12511-10S Acquisition date : 30-DEC-2011 11:19:09

Total number of lines in spectrum	5	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	5	100.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/cc	Decay Corr uCi/cc	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.00E+09Y	1.00	3.635E-07	3.635E-07	0.455E-07	12.51	
	Total Activity :		3.635E-07	3.635E-07			
	Grand Total Activity :		3.635E-07	3.635E-07			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : EFT-12511-10S Acquisition date : 30-DEC-2011 11:19.35

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity (uCi/cc)	1-Sigma %Error	Rejected by
F-18	109.74M	327.38	511.00*	193.46	1.000E+35	14.75	Decay
		% Abundances Found =		100.00			
AS-76	26.32H	22.75	559.10*	44.70	1.140E-01	38.53	Decay,Abun.
			563.23	1.17	---- Not Found ----		
			571.30	0.14	---- Not Found ----		
			657.03	6.10	---- Not Found ----		
			665.31	0.39	---- Not Found ----		
			740.12	0.12	---- Not Found ----		
			771.76	0.12	---- Not Found ----		
			867.63	0.12	---- Not Found ----		
			1129.07	0.14	---- Not Found ----		
			1212.72	1.63	---- Not Found ----		
			1216.02	3.84	---- Not Found ----		
			1228.52	1.39	---- Not Found ----		
			1439.13	0.33	---- Not Found ----		
			1453.60	0.13	---- Not Found ----		
			1707.67	0.33	---- Not Found ----		
		% Abundances Found =		73.70			
RU-103	39.35D	0.63	497.08*	89.00	---- Not Found ----		Abun.
			610.33	5.60	4.782E-07	23.65	
		% Abundances Found =		5.92			
PM-148M	41.30D	0.60	288.11	12.56	---- Not Found ----		Abun.
			414.07	18.66	---- Not Found ----		
			432.78	5.35	---- Not Found ----		
			501.26	6.75	---- Not Found ----		
			550.27*	94.90	---- Not Found ----		
			599.74	12.54	---- Not Found ----		
			611.26	5.48	4.786E-07	23.65	
			629.97	89.00	---- Not Found ----		
			725.70	32.80	---- Not Found ----		
			915.33	17.17	---- Not Found ----		
			1013.81	28.30	---- Not Found ----		
		% Abundances Found =		1.74			
BI-214	19.90M	1005.38	609.31*	46.30	1.000E+35	23.65	Decay
			768.36	5.04	---- Not Found ----		
			934.06	3.21	---- Not Found ----		
			1120.29	15.10	---- Not Found ----		
			1238.11	5.94	---- Not Found ----		
			1377.67	4.11	---- Not Found ----		
			1764.49	15.80	---- Not Found ----		
		% Abundances Found =		40.40	(Abn. Limit = 40.40%)		
PB-214	26.80M	1340.56	87.30	4.67	---- Not Found ----		Decay
			241.98	7.49	---- Not Found ----		
			295.21	19.20	---- Not Found ----		
			351.92*	37.20	1.000E+35	36.46	
			785.91	1.10	---- Not Found ----		
		% Abundances Found =		53.40	(Abn. Limit = 37.20%)		

Flag: "s" = Keyline

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	352.02	52	63	2.11	703.68	696	15	1.91E-02	36.5	5.38E+00	T
0	511.65	190	69	3.34	1022.01	1012	29	7.03E-02	14.8	4.58E+00	T
0	558.99	32	30	1.85	1117.27	1112	12	1.19E-02	38.5	4.40E+00	T
0	610.08	73	44	2.69	1219.61	1213	15	2.71E-02	23.7	4.25E+00	T

Flags: "T" = Tentatively associated

Detroit Edison Fermi 2 MDA Report, Generated 30-DEC-2011 12:04:42.40

Sample ID : EFT-12511-109

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
ZE-7	33.	477.59	8.2095E-08
F-18	0.	511.00	Half-Life too short
NA-22	16.	1274.54	8.5871E-09
NA-24	0.	1368.53	Half-Life too short
MG-27	0.	1014.44	Half-Life too short
CL-38	0.	1642.42	Half-Life too short
AR-41	0.	1293.64	Half-Life too short
SC-46	25.	889.25	1.0350E-08
CR-51	37.	320.08	1.0520E-07
MN-54	27.	834.83	8.5477E-09
CO-56	20.	1238.25	1.7048E-08
MN-56	0.	1810.69	Half-Life too short
NI-56	56.	158.38	1.0198E-07
CO-57	42.	122.06	7.5402E-09
CO-58	15.	810.76	7.8437E-09
FE-59	8.	1099.22	1.5144E-08
CO-60	13.	1332.49	8.0322E-09
CU-64	0.	1345.90	Half-Life too short
NI-65	0.	1481.84	Half-Life too short
ZN-65	16.	1115.52	1.6583E-08
ZN-69M	0.	438.63	Half-Life too short
SE-75	53.	136.00	1.2004E-08
AS-76	0.	559.10	Half-Life too short
BR-82	0.	776.49	Half-Life too short
BR-83	0.	529.64	Half-Life too short
BR-84	0.	881.50	Half-Life too short
BR-85	0.	802.41	Half-Life too short
KR-85	73.	513.99	2.1750E-06
KR-85M	0.	151.18	Half-Life too short
SR-85	73.	513.99	1.2247E-08
RB-86	11.	1076.63	1.8906E-07
KR-87	0.	402.58	Half-Life too short
SR-87M	0.	388.40	Half-Life too short
KR-88	0.	196.32	Half-Life too short
RB-88	0.	1382.39	Half-Life too short
Y-88	5.	1836.01	7.4035E-09
KR-89	0.	220.90	Half-Life too short
RB-89	0.	1031.88	Half-Life too short
KR-90	0.	1118.69	Half-Life too short
RB-90	0.	831.69	Half-Life too short
RB-90M	0.	824.23	Half-Life too short
Y-90M	0.	202.51	Half-Life too short
SR-91	0.	1024.30	Half-Life too short
Y-91	16.	1204.90	3.6015E-06
Y-91M	0.	555.60	Half-Life too short
SR-92	0.	1383.94	Half-Life too short
Y-92	0.	934.46	Half-Life too short

Sample ID : EFT-12511-103 Acquisition date : 30-DEC-2011 11:19:35

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
SR-93	0.	590.20	Half-Life too short
Y-93	0.	266.90	Half-Life too short
NB-94	23.	702.63	6.4757E-09
NB-95	18.	765.79	1.0377E-08
NB-95M	67.	235.69	3.2552E-06
ZR-95	20.	756.72	1.3560E-08
NB-97	0.	657.90	Half-Life too short
ZR-97	0.	743.36	Half-Life too short
MO-99	21.	739.50	2.7079E-05
TC-99M	0.	140.50	Half-Life too short
TC-101	0.	306.81	Half-Life too short
RU-103	30.	497.08	1.0638E-08
TC-104	0.	357.99	Half-Life too short
RH-105	0.	318.90	Half-Life too short
RU-105	0.	724.50	Half-Life too short
RU-106	35.	621.84	7.7131E-08
CD-109	37.	88.03	2.5576E-07
AG-110M	17.	937.48	2.2760E-08
SN-113	31.	391.69	1.0001E-08
SN-117M	55.	158.56	2.4199E-08
SB-122	26.	563.93	5.2094E-06
SB-124	33.	602.71	9.3977E-09
SB-125	35.	427.89	2.1229E-08
TE-125M	39.	109.28	3.1563E-06
TE-127	0.	417.90	Half-Life too short
TE-127M	26.	57.60	2.0196E-05
XE-127	56.	202.84	1.4035E-08
TE-129	0.	459.60	Half-Life too short
TE-129M	31.	695.88	3.7066E-07
XE-129M	49.	196.56	8.2023E-07
I-130	0.	536.09	Half-Life too short
BA-131	46.	123.80	9.3330E-08
I-131	39.	364.48	6.3394E-08
TE-131	0.	149.72	Half-Life too short
TE-131M	0.	773.67	Half-Life too short
XE-131M	42.	163.93	1.1213E-06
I-132	0.	667.69	Half-Life too short
TE-132	56.	228.16	1.4090E-06
BA-133	45.	302.84	3.3288E-08
BA-133M	0.	276.09	Half-Life too short
I-133	0.	529.87	Half-Life too short
TE-133M	0.	912.58	Half-Life too short
XE-133	38.	81.00	8.3285E-07
XE-133M	0.	233.22	Half-Life too short
CS-134	32.	604.70	7.1670E-09
I-134	0.	884.09	Half-Life too short
TE-134	0.	210.47	Half-Life too short
BA-135M	0.	268.24	Half-Life too short
I-135	0.	1260.41	Half-Life too short
XE-135	0.	249.79	Half-Life too short
XE-135M	0.	526.56	Half-Life too short

Sample ID : EFT-12511-10S Acquisition date : 30-DEC-2011 11:19:35

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/cc)
CS-136	20.	818.50	2.5670E-08
I-136	0.	1313.02	Half-Life too short
CS-137	19.	661.65	6.5573E-09
XE-137	0.	455.49	Half-Life too short
CS-138	0.	1435.86	Half-Life too short
XE-138	0.	258.31	Half-Life too short
BA-139	0.	1420.50	Half-Life too short
CE-139	64.	165.85	8.7885E-09
CS-139	0.	1203.23	Half-Life too short
BA-140	36.	537.32	1.0521E-07
LA-140	0.	1596.49	Half-Life too short
BA-141	0.	190.22	Half-Life too short
CE-141	41.	145.44	1.8632E-08
LA-141	0.	1354.52	Half-Life too short
BA-142	0.	255.12	Half-Life too short
LA-142	0.	641.17	Half-Life too short
CE-143	0.	293.26	Half-Life too short
CE-144	44.	133.54	5.6629E-08
PR-144	0.	1489.15	Half-Life too short
ND-147	27.	91.10	1.2079E-07
PM-148M	22.	550.27	8.8593E-09
EU-152	38.	344.27	2.1961E-08
EU-154	13.	1004.76	3.8035E-08
EU-155	41.	105.31	3.4326E-08
EU-156	39.	646.29	3.3863E-07
HF-181	22.	482.03	9.5357E-09
TA-182	17.	1221.42	3.6168E-08
W-187	0.	685.81	Half-Life too short
RE-188	0.	155.03	Half-Life too short
AU-199	56.	158.38	3.9644E-06
HG-203	47.	279.19	1.0915E-08
BI-207	27.	569.67	6.3613E-09
TL-208	0.	583.14	Half-Life too short
PB-212	0.	238.63	Half-Life too short
BI-214	0.	609.31	Half-Life too short
PB-214	0.	351.92	Half-Life too short
RA-224	57.	240.98	1.0892E-05
RA-226	51.	186.21	1.7077E-07
AC-228	47.	338.32	5.5696E-08
TH-228	51.	84.37	9.9050E-07
PA-234	0.	131.20	Half-Life too short
TH-234	37.	63.29	1.6373E-06
U-235	41.	143.76	5.0381E-08
NP-239	0.	106.13	Half-Life too short
AM-241	30.	59.54	1.2713E-07

GEL LAB RESULTS

EFT-10S 2009

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : Detroit Edison - Fermi 1
Address : PO Box 44440
Detroit, Michigan 48244

Report Date: February 17, 2010

Contact: Mr. Tom Mow
Project: **Fermi 1 - PO# 4700246055**

Client Sample ID:	EF1-10/S	Project:	ROIT00116
Sample ID:	245517017	Client ID:	ROIT001
Matrix:	Ground Water		
Collect Date:	30-DEC-09 09:15		
Receive Date:	25-JAN-10		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Rad Alpha Spec Analysis											
Alphaspec U, Liquid "As Received"											
Pct Uranium-235	U	1.11				percent		MXE1 02/15/10	1156	947744	1
Uranium-233/234		1.26	+/-0.622	0.240	1.00	pCi/L					
Uranium-235/236	U	0.0751	+/-0.199	0.474	1.00	pCi/L					
Uranium-238		1.04	+/-0.565	0.240	1.00	pCi/L					
Rad Gas Flow Proportional Counting											
GFPC, Gross A/B, liquid "As Received"											
Alpha	U	3.62	+/-2.89	4.17	5.00	pCi/L		DXF3 02/11/10	1933	945896	2
Beta		5.59	+/-2.48	3.47	5.00	pCi/L					

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	DOE EML HASL-300, U-02-RC Modified	
2	EPA 900.0	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery %	Acceptable Limits
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"			94.9	(15%-125%)