UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
2443 WARRENVILLE ROAD, SUITE 210
LISLE, IL 60532-4352

August 29, 2013

Mr. Anthony Vitale
Vice President, Operations
Entergy Nuclear Operations, Inc.
Palisades Nuclear Plant
27780 Blue Star Memorial Highway
Covert, MI 49043-9530

SUBJECT: ADDENDUM TO THE RESULTS OF INDEPENDENT SAMPLES COLLECTED BY THE NRC AT PALISADES NUCLEAR PLANT STORM DRAIN OUTFALL

Dear Mr. Vitale:

On May 30, 2013, the NRC collected independent sand samples in the vicinity of the pipe outlet of a storm drain system on the beach along Lake Michigan and inside of Entergy property. The samples were collected during the timeframe you were collecting samples and at the same locations that you obtained samples near the pipe outlet.

On August 6, 2013, we provided you with the results of our analysis of the four sand samples we independently collected. The NRC recently learned that a report of the analyses, provided by our independent third party laboratory, did not document all of the gamma emitting radionuclides detected in the samples. As a result, the laboratory provided a revised Laboratory Analysis Report that identified an additional radionuclide, antimony 125 (Sb-125), attributed to activities at Palisades. We have determined that the presence of the additional radionuclide is a likely result of the recent leak from the safety injection refueling water tank that occurred on May 4, 2013. The concentration of Sb-125 was measured to be 56.323 pico Curies (pCi) per kilogram (kg) of sand.

The presence and amount of this additional radionuclide does not change our original conclusions. Our original conclusions, reiterated below, were that the analytical results and radionuclide concentrations:

- were expected given the dose calculation/evaluations performed by the Palisades' staff and rainfall that occurred before the samples were collected;
- were low; compared to the EPA's safe drinking water standard;
- did not exceed any NRC limit or design objective;
- were too small to be expected to have any health impact to the individuals located at the pipe outlet and other members of the licensee's workforce or the public.

We understand that your staff is evaluating whether additional corrective actions will be taken due to the indication that licensed radioactive material may have been inadvertently released into the environment. Please continue to keep the NRC Resident Inspectors and the NRC Regional Health Physics inspector, assigned to your site, informed of the results of this evaluation. As we indicated earlier, the NRC will assess the results of your evaluation of this information during a baseline inspection of this program later this year.

The revised Laboratory Analysis Report from our independent laboratory is included as Enclosure 1.

If you have any questions regarding this correspondence, please contact me at (630) 829-9827.

Sincerely,

/RA/

Billy C. Dickson, Chief
Health Physics and Incident Response Branch
Division of Reactor Safety

Docket No. 50-255
License No. DPR-20

Enclosure:
1. Revised American Radiation Services, LLC. Laboratory Results

cc w/encl: Distribution via ListServ™

We understand that your staff is evaluating whether additional corrective actions will be taken due to the indication that licensed radioactive material may have been inadvertently released into the environment. Please continue to keep the NRC Resident Inspectors and the NRC Regional Health Physics inspector, assigned to your site, informed of the results of this evaluation. As we indicated earlier, the NRC will assess the results of your evaluation of this information during a baseline inspection of this program later this year.

The revised Laboratory Analysis Report from our independent laboratory is included as Enclosure 1.

If you have any questions regarding this correspondence, please contact me at (630) 829-9827.

Sincerely,

/RA/

Billy C. Dickson, Chief
Health Physics and Incident Response Branch
Division of Reactor Safety

Docket No. 50-255
License No. DPR-20

Enclosure:
1. Revised American Radiation Services, LLC. Laboratory Results

cc w/encl: Distribution via ListServ™

DISTRIBUTION w/encl:
Vivian Campbell
RidsNrrPMPalisades Resource
RidsNrrDorlLpl3-1 Resource
RidsNrrDirsIrib Resource
Cynthia Pederson
Anne Boland
Steven Orth
Allan Barker
Carole Ariano
Linda Linn
DRPIII
DRSIII
Patricia Buckley
Tammy Tomczak
ROPreports.Resource@nrc.gov

DOCUMENT NAME: Ltr 082913 Palisades Results of Independent Samples Addendum.docx
☒ Publicly Available ☐ Non-Publicly Available ☐ Sensitive ☒ Non-Sensitive
To receive a copy of this document, indicate in the concurrence box "C" = Copy without attach/encl "E" = Copy with attach/encl "N" = No copy

OFFICE	RIII	RIII	RIII	
NAME	BDickson for JCassidy	JBenjamin	BDickson:cs	
DATE	08/29/13	08/29/13	08/29/13	

OFFICIAL RECORD COPY

2609 North River Road, Port Allen, Louisiana 70767

(800) 401-4277 -- FAX (225) 381-2996

AMRAD
AMERICAN RADIATION SERVICES, LLC

American Radiation Services, LLC

Laboratory Analysis Report

ARS1-13-01107

Prepared for:

Nuclear Regulatory Commission (NRC)

Richard Conatser
11555 Rockville Pike
Rockville, MD 20852

richard.conatser@nrc.gov

Phone: 301-415-4039

Project Manager Review

Management Review

Contact Person: Questions regarding this analytical report should be addressed to:

Project Manager

ProjectManagers@amrad.com

Phone: 225.381.2991
Fax: 225.381.2996

ACLASS ACCREDITED DoD ELAP

LELAP Cert# 01949

Enclosure 1

AMRAD
AMERICAN RADIATION SERVICES, LLC

2609 North River Road, Port Allen, Louisiana 70767
1 (800) 401-4277 FAX (225) 381-2996

ARS Sample Delivery Group: ARS1-13-01107
Client Sample ID: PAL-01
Sample Collection Date: 05/30/20
Sample Matrix: Soil/Solid/Sludge

Request or PO Number: NA
ARS Sample ID: ARS1-13-01107-001
Date Received: 06/04/13
Report Date: 06/10/13

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
MN-54	2.812	2.171	3.530	1.765	U	pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:18	BZF	NA
CO-58	-0.074	1.931	3.230	1.615	U	pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:18	BZF	NA
FE-59	-0.182	7.418	8.000	4.000	U	pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:18	BZF	NA
CO-60	-1.006	3.134	5.300	2.650	U	pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:18	BZF	NA
ZN-65	-0.702	9.018	9.130	4.565	U	pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:18	BZF	NA
NB-95	-0.341	1.970	3.320	1.660	U	pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:18	BZF	NA
ZR-95	-0.236	2.999	5.020	2.510	U	pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:18	BZF	NA
I-131	0.570	1.733	2.880	1.440	U	pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:18	BZF	NA
CS-134	2.086	2.383	3.630	1.815	U	pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:18	BZF	NA
CS-137	7.878	1.831	2.730	1.365		pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:18	BZF	NA
BA-140	-0.984	7.995	13.500	6.750	U	pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:18	BZF	NA
LA-140	3.686	1.157	4.170	2.085	U	pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:18	BZF	NA
BE-7	237.790	32.715	25.700	12.850		pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:18	BZF	NA
K-40	7372.800	488.130	35.300	17.650		pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:18	BZF	NA
SC-46	0.578	2.051	3.420	1.710	U	pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:18	BZF	NA
TL-208	61.283	5.354	2.920	1.460		pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:18	BZF	NA
PB-210	237.920	61.697	69.100	34.550		pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:18	BZF	NA
BI-212	122.420	20.508	21.500	10.750		pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:18	BZF	NA
BI-214	150.680	11.858	6.150	3.075		pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:18	BZF	NA
PB-214	178.020	16.509	6.990	3.495		pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:18	BZF	NA
RA-226	370.880	59.102	62.000	31.000		pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:18	BZF	NA
RA-228	184.460	14.066	12.400	6.200		pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:18	BZF	NA
TH-228	206.950	14.218	4.610	2.305		pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:18	BZF	NA
U-235	0.994	11.702	19.500	9.750	U	pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:18	BZF	NA
Total Gamma	12572.345	NA	NA	NA		pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:19	BZF	NA
H-3	357.588	137.205	218.976	108.828		pCi/kg	ARS-055/EPA 906.0M	06/11/13 17:00	BJS	NA
NI-63	-130.060	124.490	204.560	101.910	U	pCi/kg	ARS-022/Eichrom NiW01	06/14/13 21:17	BJS	94%
FE-55	329.080	40.548	286.932	143.466		pCi/kg	ARS-131	07/04/13 03:51	BJS	95%
SR-89	-19.727	23.167	NA	NA	U	pCi/kg	ARS-032/Eichrom SRW-01	06/14/13 15:02	BJS	94%
SR-90	-20.193	35.117	61.907	30.950	U	pCi/kg	ARS-032/Eichrom SRW-01	06/20/13 19:27	BJS	94%

NOTES: LCS recovery for Fe-55 is biased high and Fe-55 method blank did not pass QC criteria; after management review, data is being released as qualified.

Project Manager Review

LELAP Certificate # 01949

Enclosure 1

AMRAD
AMERICAN RADIATION SERVICES, LLC

2609 North River Road, Port Allen, Louisiana 70767
1 (800) 401-4277 FAX (225) 381-2996

ARS Sample Delivery Group: ARS1-13-01107
Client Sample ID: PAL-02
Sample Collection Date: 05/30/20
Sample Matrix: Soil/Solid/Sludge

Request or PO Number: NA
ARS Sample ID: ARS1-13-01107-002
Date Received: 06/04/13
Report Date: 06/10/13

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
MN-54	2.375	2.625	4.310	2.155	U	pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:19	BZF	NA
CO-58	1.111	2.363	3.920	1.960	U	pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:19	BZF	NA
FE-59	0.423	5.693	9.540	4.770	U	pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:19	BZF	NA
CO-60	-0.053	3.685	5.720	2.860	U	pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:19	BZF	NA
ZN-65	-13.293	9.257	12.600	6.300	U	pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:19	BZF	NA
NB-95	-0.790	27.020	4.260	2.130	U	pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:19	BZF	NA
ZR-95	-0.379	4.186	7.010	3.505	U	pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:19	BZF	NA
I-131	-1.342	3.755	3.520	1.760	U	pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:19	BZF	NA
CS-134	5.148	2.961	15.786	8.054	U	pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:19	BZF	NA
CS-137	10.239	2.337	2.940	1.470		pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:19	BZF	NA
BA-140	-5.660	25.184	15.600	7.800	U	pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:19	BZF	NA
LA-140	-1.239	1.452	4.750	2.375	U	pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:19	BZF	NA
BE-7	86.109	22.195	24.500	12.250		pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:19	BZF	NA
K-40	7354.200	487.520	42.100	21.050		pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:19	BZF	NA
SC-46	0.753	2.362	3.940	1.970	U	pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:19	BZF	NA
TL-208	68.472	5.874	3.820	1.910		pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:19	BZF	NA
PB-210	216.390	65.684	80.300	40.150		pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:19	BZF	NA
BI-212	122.090	24.833	27.900	13.950		pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:19	BZF	NA
BI-214	201.340	14.896	8.170	4.085		pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:19	BZF	NA
PB-214	219.090	20.093	8.270	4.135		pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:19	BZF	NA
RA-226	414.630	70.618	76.800	38.400		pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:19	BZF	NA
RA-228	221.580	20.727	14.800	7.400		pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:19	BZF	NA
Th-228	228.580	15.959	5.620	2.810		pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:19	BZF	NA
U-235	13.838	13.577	22.400	11.200	U	pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:19	BZF	NA
Total Gamma	13344.54	NA	NA	NA		pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:19	BZF	NA
H-3	68.932	160.001	269.099	133.739	U	pCi/kg	ARS-055/EPA 906.0M	06/14/13 19:25	BJS	NA
NI-63	235.120	131.350	200.060	99.668		pCi/kg	ARS-022/Eichrom NiW01	06/14/13 21:17	BJS	96%
FE-55	-303.621	37.455	299.264	149.632	U	pCi/kg	ARS-131	07/05/13 04:39	BJS	95%
SR-89	36.898	28.071	NA	NA	U	pCi/kg	ARS-032/Eichrom SRW-01	06/14/13 15:02	BJS	94%
SR-90	-30.599	43.576	76.693	38.347	U	pCi/kg	ARS-032/Eichrom SRW-01	06/20/13 19:27	BJS	94%

NOTES: LCS recovery for Fe-55 is biased high and Fe-55 method blank did not pass QC criteria; after management review, data is being released as qualified.

Project Manager Review

LELAP Certificate# 01949

Enclosure 1

AMRAD
AMERICAN RADIATION SERVICES, LLC

2609 North River Road, Port Allen, Louisiana 70767
1 (800) 401-4277 FAX (225) 381-2996

ARS Sample Delivery Group: ARS1-13-01107
Client Sample ID: PAL-03
Sample Collection Date: 05/30/20
Sample Matrix: Soil/Solid/Sludge

Request or PO Number: NA
ARS Sample ID: ARS1-13-01107-003
Date Received: 06/04/13
Report Date: 08/08/13

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
SB-125	56.323	9.486	9.480	4.740		pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:20	BZF	NA
MN-54	-0.662	2.295	3.820	1.910	U	pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:20	BZF	NA
CO-58	0.186	2.222	3.730	1.865	U	pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:20	BZF	NA
FE-59	2.085	5.006	8.320	4.160	U	pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:20	BZF	NA
CO-60	2.400	3.288	5.440	2.720	U	pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:20	BZF	NA
ZN-65	-6.053	6.140	10.100	5.050	U	pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:20	BZF	NA
NB-95	-0.030	2.378	3.980	1.990	U	pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:20	BZF	NA
ZR-95	3.911	3.803	6.230	3.115	U	pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:20	BZF	NA
I-131	0.600	2.483	3.310	1.655	U	pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:20	BZF	NA
CS-134	1.845	2.677	4.140	2.070	U	pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:20	BZF	NA
CS-137	13.211	2.612	2.750	1.375		pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:20	BZF	NA
BA-140	1.216	9.218	15.400	7.700	U	pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:20	BZF	NA
LA-140	-1.125	1.412	4.180	2.090	U	pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:20	BZF	NA
BE-7	155.550	22.475	23.200	11.600		pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:20	BZF	NA
K-40	6004.700	401.650	31.900	15.950		pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:20	BZF	NA
SC-46	0.010	2.227	3.740	1.870	U	pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:20	BZF	NA
TL-208	63.566	5.633	3.740	1.870		pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:20	BZF	NA
PB-210	240.760	66.726	76.400	38.200		pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:20	BZF	NA
BI-212	128.700	18.359	23.100	11.550		pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:20	BZF	NA
BI-214	170.230	13.521	7.820	3.910		pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:20	BZF	NA
PB-214	196.170	17.975	7.380	3.690		pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:20	BZF	NA
RA-226	455.050	69.472	71.500	35.750		pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:20	BZF	NA
RA-228	196.780	17.250	13.700	6.850		pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:20	BZF	NA
TH-228	219.500	15.198	5.480	2.740		pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:20	BZF	NA
U-235	21.674	13.712	22.200	11.100	U	pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:20	BZF	NA
Total Gamma	11399.353	NA	NA	NA		pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:19	BZF	NA
H-3	1161.157	220.510	299.702	148.948		pCi/kg	ARS-055/EPA 906.0M	06/14/13 19:25	BJS	NA
NI-63	-145.520	131.760	215.790	107.510	U	pCi/kg	ARS-022/Eichrom NiW01	06/14/13 21:17	BJS	90%
FE-55	-1171.324	143.491	323.827	161.914	U	pCi/kg	ARS-131	07/06/13 05:27	BJS	95%
SR-89	-171.895	29.974	NA	NA	U	pCi/kg	ARS-032/Eichrom SRW-01	06/14/13 15:02	BJS	100%
SR-90	125.704	46.867	67.304	33.652		pCi/kg	ARS-032/Eichrom SRW-01	06/20/13 19:27	BJS	100%

NOTES: LCS recovery for Fe-55 is biased high and Fe-55 method blank did not pass QC criteria; after management review, data is being released as qualified.

Project Manager Review

LELAP Certificate# 01949

Enclosure 1

AMRAD
AMERICAN RADIATION SERVICES, LLC

2609 North River Road, Port Allen, Louisiana 70767
1 (800) 401-4277 FAX (225) 381-2996

ARS Sample Delivery Group: ARS1-13-01107
Client Sample ID: PAL-04
Sample Collection Date: 05/30/20
Sample Matrix: Soil/Solid/Sludge

Request or PO Number: NA
ARS Sample ID: ARS1-13-01107-004
Date Received: 06/04/13
Report Date: 06/10/13

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
MN-54	0.479	2.805	4.680	2.340	U	pCi/kg	ARS-007/EPA 901.1M	06/06/13 14:49	BZF	NA
CO-58	0.027	2.397	4.020	2.010	U	pCi/kg	ARS-007/EPA 901.1M	06/06/13 14:49	BZF	NA
FE-59	-2.876	6.750	10.100	5.050	U	pCi/kg	ARS-007/EPA 901.1M	06/06/13 14:49	BZF	NA
CO-60	1.064	3.711	6.220	3.110	U	pCi/kg	ARS-007/EPA 901.1M	06/06/13 14:49	BZF	NA
ZN-65	0.140	14.565	24.200	12.100	U	pCi/kg	ARS-007/EPA 901.1M	06/06/13 14:49	BZF	NA
NB-95	-3.326	4.304	4.820	2.410	U	pCi/kg	ARS-007/EPA 901.1M	06/06/13 14:49	BZF	NA
ZR-95	3.495	1.550	7.350	3.675	U	pCi/kg	ARS-007/EPA 901.1M	06/06/13 14:49	BZF	NA
I-131	-0.972	4.506	3.400	1.700	U	pCi/kg	ARS-007/EPA 901.1M	06/06/13 14:49	BZF	NA
CS-134	3.127	2.946	4.430	2.215	U	pCi/kg	ARS-007/EPA 901.1M	06/06/13 14:49	BZF	NA
CS-137	10.574	3.421	3.950	1.975		pCi/kg	ARS-007/EPA 901.1M	06/06/13 14:49	BZF	NA
BA-140	-2.917	9.899	16.700	8.350	U	pCi/kg	ARS-007/EPA 901.1M	06/06/13 14:49	BZF	NA
LA-140	4.559	1.203	5.050	2.525	U	pCi/kg	ARS-007/EPA 901.1M	06/06/13 14:49	BZF	NA
BE-7	119.890	26.550	27.200	13.600		pCi/kg	ARS-007/EPA 901.1M	06/06/13 14:49	BZF	NA
K-40	7807.800	516.390	38.200	19.100		pCi/kg	ARS-007/EPA 901.1M	06/06/13 14:49	BZF	NA
SC-46	-0.968	2.560	4.260	2.130	U	pCi/kg	ARS-007/EPA 901.1M	06/06/13 14:49	BZF	NA
TL-208	85.909	6.993	3.590	1.795		pCi/kg	ARS-007/EPA 901.1M	06/06/13 14:49	BZF	NA
PB-210	248.280	59.971	74.500	37.250		pCi/kg	ARS-007/EPA 901.1M	06/06/13 14:49	BZF	NA
BI-212	184.920	26.745	25.100	12.550		pCi/kg	ARS-007/EPA 901.1M	06/06/13 14:49	BZF	NA
BI-214	226.940	16.266	8.230	4.115		pCi/kg	ARS-007/EPA 901.1M	06/06/13 14:49	BZF	NA
PB-214	251.750	22.238	8.070	4.035		pCi/kg	ARS-007/EPA 901.1M	06/06/13 14:49	BZF	NA
RA-226	473.160	70.190	76.600	38.300		pCi/kg	ARS-007/EPA 901.1M	06/06/13 14:49	BZF	NA
RA-228	253.150	21.221	13.300	6.650		pCi/kg	ARS-007/EPA 901.1M	06/06/13 14:49	BZF	NA
TH-228	283.300	19.452	5.650	2.825		pCi/kg	ARS-007/EPA 901.1M	06/06/13 14:49	BZF	NA
U-235	17.046	14.211	23.300	11.650	U	pCi/kg	ARS-007/EPA 901.1M	06/06/13 14:49	BZF	NA
Total Gamma	13928.169	NA	NA	NA		pCi/kg	ARS-007/EPA 901.1M	06/05/13 15:19	BZF	NA
H-3	337.806	228.179	376.784	187.257	U	pCi/kg	ARS-055/EPA 906.0M	06/14/13 19:25	BJS	NA
NI-63	300.150	145.310	213.410	106.320		pCi/kg	ARS-022/Eichrom NiW01	06/14/13 21:17	BJS	94%
FE-55	-1071.566	131.265	285.792	142.896	U	pCi/kg	ARS-131	07/07/13 06:15	BJS	95%
SR-89	-158.249	29.306	NA	NA	U	pCi/kg	ARS-032/Eichrom SRW-01	06/14/13 15:02	BJS	100%
SR-90	148.446	46.167	62.139	31.069		pCi/kg	ARS-032/Eichrom SRW-01	06/20/13 19:27	BJS	100%

NOTES: LCS recovery for Fe-55 is biased high and Fe-55 method blank did not pass QC criteria; after management review, data is being released as qualified.

Project Manager Review

LELAP Certificate# 01949

Enclosure 1

ARS INTERNATIONAL
2609 North River Road, Port Allen, Louisiana 70767
1 (800) 401-4277 FAX (225) 381-2996

QC Results Report

Sample Delivery Group: ARS1-13-01107
Date Received: 6/4/2013

Laboratory Control Sample Evaluation

Analysis Batch	QC Type	Analyte	Analysis Results	CSU 1 (2 s)	MDC	Expected Value	Qual	Report Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Percent Recovery (%)	LCS Acceptance Range
ARS1-B13-01308	LCS	Fe-55	9936.000	1217.000	540.000	7013.000		pCi/kg	ARS-022	7/1/13 1:27	BJS	142	75%-125%

Blank Evaluation

Analysis Batch	QC Type	Analyte	Analysis Results	CSU 1 (2 s)	MDC	Expected Value	Qual	Report Units	Analysis Test Method	Analysis Date/Time	Analysis Technician
ARS1-B13-01308	MBL	Fe-55	5008.000	613.000	582.000	NA		pCi/kg	ARS-022	7/1/13 1:27	BJS

RER Duplicate Evaluation

Analysis Batch	QC Type	Analysis Description	Result 1	CSU 1 (2 s)	Result 2	CSU 2 (2s)	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	RER	RER AcceptanceRange
ARS1-B13-01308	LCSD	Fe-55	9936.000	1217.000	12811.000	1569.000		pCi/kg	ARS-022	7/1/13 1:27	BJS	1.03	< 1

DER Duplicate Evaluation

Analysis Batch	QC Type	Analysis Description	Result 1	CSU 1 (2 s)	Result 2	CSU 2 (2s)	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	DER	DER AcceptanceRange
ARS1-B13-01308	LCSD	Fe-55	9936.000	1217.000	12811.000	1569.000		pCi/kg	ARS-022	7/1/13 1:27	BJS	2.90	< 3

Project Manager Review

LELAP Certificate# 01949 NELAP Certificate # E87558

Enclosure 1

2609 North River Road, Port Allen, Louisiana 70767
1 (800) 401-4277 FAX (225) 381-2996

QC Results Report

Sample Delivery Group: ARS1-13-01107
Date Received: 6/4/2013

Laboratory Control Sample Evaluation

Analysis Batch	QC Type	Analyte	Analysis Results	CSU 1 (2s)	MDC	Expected Value	Qual	Report Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Percent Recovery (%)	LCS Acceptance Range
ARS1-B13-01118	LCS	H3	12134	1281	392	13171		pCi/kg	ARS-055	6/8/13 14:35	BJS	92	75%-125%

Blank Evaluation

Analysis Batch	QC Type	Analyte	Analysis Results	CSU 1 (2s)	MDC	Expected Value	Qual	Report Units	Analysis Test Method	Analysis Date/Time	Analysis Technician
ARS1-B13-01118	MBL	H3	-315	242	410	N/A	U	pCi/kg	ARS-055	6/8/13 14:35	BJS

RER Duplicate Evaluation

Analysis Batch	QC Type	Analysis Description	Result 1	CSU 1 (2s)	Result 2	CSU 2 (2s)	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	RER	RER AcceptanceRange
ARS1-B13-01118	DUP	H3	12134	1281	12960	1363		pCi/kg	ARS-055	6/8/13 14:35	BJS	0.31	< 1

DER Duplicate Evaluation

Analysis Batch	QC Type	Analysis Description	Result 1	CSU 1 (2s)	Result 2	CSU 2 (2s)	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	DER	DER AcceptanceRange
ARS1-B13-01118	DUP	H3	12134	1281	12960	1363		pCi/kg	ARS-055	6/8/13 14:35	BJS	0.88	< 3

Project Manager Review

LELAP Certificate# 01949 NELAP Certificate # E87558

Enclosure 1

ARS INTERNATIONAL

2609 North River Road, Port Allen, Louisiana 70767

1 (800) 401-4277 FAX (225) 381-2996

QC Results Report

Sample Delivery Group: ARS1-13-01107

Date Received: 06/04/13

Laboratory Control Sample Evaluation

Analysis Batch	QC Type	Analyte	Analysis Results	CSU 1 (2s)	MDC	Expected Value	Qual	Report Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Percent Recovery (%)	LCS Acceptance Range
ARS1-B13-01119	LCS	Sr-90	19740.438	2919.361	274.864	20172		pCi/kg	ARS-032/EPA 905.0	6/14/13 19:32	BJS	98	75%-125%

Blank Evaluation

Analysis Batch	QC Type	Analyte	Analysis Results	CSU 1 (2s)	MDC	Expected Value	Qual	Report Units	Analysis Test Method	Analysis Date/Time	Analysis Technician
ARS1-B13-01119	MBL	Sr-90	-30.562	134.041	233.357	NA	U	pCi/kg	ARS-032/EPA 905.0	6/14/13 19:32	BJS

RER Duplicate Evaluation

Analysis Batch	QC Type	Analysis Description	Result 1	CSU 1 (2s)	Result 2	CSU 2 (2s)	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	RER	RER AcceptanceRange
ARS1-B13-01119	LCSD	Sr-90	19740.438	2919.361	20628.329	3045.373		pCi/kg	ARS-032/EPA 905.0	6/14/13 19:32	BJS	0.15	< 1

DER Duplicate Evaluation

Analysis Batch	QC Type	Analysis Description	Result 1	CSU 1 (2s)	Result 2	CSU 2 (2s)	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	DER	DER AcceptanceRange
ARS1-B13-01119	LCSD	Sr-90	19740.438	2919.361	20628.329	3045.373		pCi/kg	ARS-032/EPA 905.0	6/14/13 19:32	BJS	0.42	< 3

Project Manager Review

LELAP Certificate# 30658 NELAP Certificate # E87558

Enclosure 1

ARS INTERNATIONAL
2609 North River Road, Port Allen, Louisiana 70767
1 (800) 401-4277 FAX (225) 381-2996

QC Results Report

Sample Delivery Group: ARS1-13-01107
Date Received: 6/4/2013

Laboratory Control Sample Evaluation

Analysis Batch	QC Type	Analyte	Analysis Results	CSU 1 (2 s)	MDC	Expected Value	Qual	Report Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Percent Recovery (%)	LCS Acceptance Range
ARS1-B13-01120	LCS	Ni-63	24909	5722	404	19976		pCi/kg	ARS-022	6/19/13 9:49	BJS	125	75%-125%

Blank Evaluation

Analysis Batch	QC Type	Analyte	Analysis Results	CSU 1 (2s)	MDC	Expected Value	Qual	Report Units	Analysis Test Method	Analysis Date/Time	Analysis Technician
ARS1-B13-01120	MBL	Ni-63	237	243	397	NA	U	pCi/kg	ARS-022	6/19/13 9:49	BJS

RER Duplicate Evaluation

Analysis Batch	QC Type	Analysis Description	Result 1	CSU 1 (2 s)	Result 2	CSU 2 (2s)	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	RER	RER AcceptanceRange
ARS1-B13-01120	LCSD	Ni-63	24909	5722	24502	5629		pCi/kg	ARS-022	6/19/13 9:49	BJS	0.04	< 1

DER Duplicate Evaluation

Analysis Batch	QC Type	Analysis Description	Result 1	CSU 1 (2s)	Result 2	CSU 2 (2s)	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	DER	DER AcceptanceRange
ARS1-B13-01120	LCSD	Ni-63	24909	5722	24502	5629		pCi/kg	ARS-022	6/19/13 9:49	BJS	0.10	< 3

Project Manager Review

LELAP Certificate# 01949 NELAP Certificate # E87558

Enclosure 1

AMRAD
AMERICAN RADIATION SERVICES, LLC

QC Results per Analytical Batch

Analytical Batch	ARS1-B13-01130
SDG	ARS1-13-01107
Analysis	Gamma Spec (Solid)
Analysis Test Method	ARS-007/EPA 901.1M
Analysis Code	GAM-A-020
Report Units	pCi/kg

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges		
Laboratory Control Sample	Recovery (%):	> 75	< 125
Matrix Spike	Recovery (%):	> 60	< 140
Duplicate	Replicate Error Ratio (RER):		< 1
	Duplicate Error Ratio (DER):		< 3
	Relative Percent Difference (RPD %):		≤ 25

Laboratory Control Sample

Analysis Date: 06/05/13 14:44 | Analysis Technician: BZF

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	Expected Value	LCS Rec (%)	MDC
ARS1-B13-01130-01	LCS	AM-241	42600.0	3200.0	40378.4	106	560.00
ARS1-B13-01130-01	LCS	CO-60	68200.0	2700.0	68486.5	100	540.00
ARS1-B13-01130-01	LCS	CS-137	59100.0	2500.0	58378.4	101	290.00

Duplicate RER/DER/RPD

Analysis Date: 06/05/13 14:59 | Analysis Technician: BZF

Analyte	Result LCS	CSU LCS (2s)	Results LCSD	CSU LCSD (2s)	RER	DER	RPD
AM-241	42600.0	3232.6	40700.0	2995.5	0.31	0.87	4.6
CO-60	68200.0	2659.0	67900.0	2573.7	0.06	0.16	0.4
CS-137	59100.0	2492.1	58800.0	2409.4	0.06	0.17	0.5

Method Blank

Analysis Date: 06/05/13 15:16 | Analysis Technician: BZF

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	MDC	Qual
ARS1-B13-01130-03	MBL	AM-241	-900.0000	8700.0000	2900.0000	U
ARS1-B13-01130-03	MBL	CO-60	60.00000	960.00000	1700.0000	U
ARS1-B13-01130-03	MBL	CS-137	100.0000	1000.0000	1800.0000	U

LELAP Certificate# 01949

Enclosure 1

ARS INTERNATIONAL

2609 North River Road • Port Allen, Louisiana 70767
1 (800) 401-4277 • Fax (225) 381-2996

Notes:

Comments:

1.0) Soil and Sludge analysis are reported on a wet basis or an as received basis unless otherwise indicated.

2.0) Data in this report are within the limits of uncertainty specified in the reference method unless otherwise specified.

3.0) Modified analysis procedures are procedures that are modified to meet the certain specifications. An example may be the use of a water method to analyze a solid matrix due to the lack of an officially recognized procedure for the analysis of the solid matrix. Modified analyses are indicated by the subsequent addition of "m" to the procedure number (i.e. 900.0M).

4.0) Derived Air Concentrations and Effluent Release Concentrations are obtained from 10 CFR 20 Appendix B.

5.0) **Total activity** is actually total gamma activity and is determined utilizing the prominent gamma emitters from the naturally occurring radioactive decay chains and other prominent radioactive nuclides. Total activity may be lower than the actual total activity due to the extent of secular equilibrium achieved in the various decay chains at the time of analysis. The total activity is not representative of nuclides that emit solely alpha or beta particles.

6.0) Ra-228 is determined via secular equilibrium with its daughter, Actinium 228 (Gamma Spectroscopy only).

7.0) U-238 is determined via secular equilibrium with its daughter, Thorium 234 (Gamma Spectroscopy only).

8.0) All gamma spectroscopy was performed utilizing high purity germanium detectors (**HPGe**).

9.0) ARS makes every attempt to match sample density to calibrated density; however, in some cases, it is not practical or possible to do so and data results may be affected (Gamma Spectroscopy only).

10.0) Gamma spectroscopy results are calculated values based on the **ORTEC**® GammaVision ENV32 Analysis Engine.

Method References:

1.0) **EPA 600/4-80-032**; Prescribed Procedures for the Measurements of Radioactivity in Drinking Water, August 1980.

2.0) Standard Methods for Examination of Water and Waste Water, 18th, 1992.

3.0) **EPA SW-846**; Test Methods for Evaluating Solid Waste, Third Edition, (9/86). (Updated through 1995).

4.0) **EPA 600/4/79-020**; Methods for Chemical Analysis of Water and Waste, March 1983.

5.0) HASL 300

6.0) **ARS-040**; An LCSD is not reported with this process. The criteria for the LCS/LCSD analysis for reproducibility have not been established for Low Level Tritium analysis. A prepared standard for Low Level Tritium has not been developed. As a result, the standard we use is based on the dilution of a verified conventional tritium standard. The volume required for Low Level Tritium analysis, in addition to the lack of an available Low Level Tritium standard, introduce variability into the LCS/LCSD analysis that does not represent the actual sample analysis. The preferred measure for reproducibility is to run a duplicate analysis of a sample.

Definitions:

1.0)	**ND**	Not detected above the detection limit (non-detect).
2.0)	**MDC**	(Minimum Detectable Concentration) minimum concentration of the analyte that ARS can detect utilizing the specific analysis
3.0)	**MBL**	Method Blank
4.0)	**DO**	Duplicate Original
5.0)	**DUP**	Method Duplicate
6.0)	**MS/MSD**	Matrix Spike/Matrix Spike Duplicate
7.0)	**S**	Spike
8.0)	**RS**	Reference Spike
9.0)	***SC**	Subcontracted out to another qualified laboratory
10.0)	**NR**	Not Referenced
11.0)	**N/A**	Not Applicable
12.0)	**	False Positive due to interference from _____
13.0)	**U**	Activity is below the MDC
14.0)	**LCS/LCSD**	Laboratory Control Standard/Laboratory Control Standard Duplicate
15.0)	**DLC**	Decision Level Concentration (ANSI N42.23) or critical level

LELAP Cert# 01949

NRC FORM 303 (4-2004) — U.S. NUCLEAR REGULATORY COMMISSION

REQUEST FOR ANALYSIS AND CHAIN OF CUSTODY

LABORATORY -- ORISE

LABORATORY USE ONLY

CONTROL NUMBER

SAMPLE LOCATION (LICENSEE): Palisades Nuclear Plant

LICENSE NO.: DPR-20

DOCKET NO.: 50-255

SAMPLE SUBMITTED

# TOTAL	TYPE	VOLUME	WEIGHT
4	Sand		

DATE SAMPLES SUBMITTED: 06/03/2013

PRIORITY: ☐ ROUTINE ☒ URGENT

SAMPLE COLLECTION INTERVAL

	MONTH	DAY	YEAR	TIME
START				
STOP				

INSPECTOR RESPONSIBLE: Valerie Myers

TELEPHONE NUMBER: 630-829-9736

ANALYSIS TO BE PERFORMED	LIST DESIRED LLD (Optional)	OTHER TYPE OF ANALYSIS (Specify)	LIST DESIRED LLD (Optional)
☐ GROSS ALPHA (GA)		☒ Sr-89/90	50 pCi/kg
☐ GROSS BETA (GB)		☒ Fe-55	150 pCi/kg
☒ GAMMA SPEC (GS)	See Note 1	☒ Ni-63	150 pCi/kg
☒ TRITIUM (H3)	100 pCi/kg	☐	
☐ CARBON-14 (C14)		☐	
☐ IODINE-125 (I125)		☐	

RELINQUISHED BY	RECEIVED BY	DATE	TIME	REASON FOR CHANGE OF CUSTODY
Valerie Myers	Susan Leese	06/03/2013		Mailed to Lab 06/03 via overnight delivery
	Susan Leese	6-4-13		
		10:30		

FEE RECOVERABLE ☒ NO ☐ YES IF YES TAC NUMBER _____

REMARKS

Note 1: LLD of 150 pCi/kg for Cs-134, 180 pCi/kg for Cs-137, report all other nuclides

Please send results to Richard Conatser (richard.conatser@nrc.gov) and Valerie Myers (valerie.myers@nrc.gov).

Return shipping label is included for return of empty shipping case.

NOTE: SAMPLES WILL BE DISCARDED AFTER ANALYSIS UNLESS REASONS ARE NOTED IN REMARKS ABOVE.

Enclosure 1

NRC FORM 303 (4-2004) U.S. NUCLEAR REGULATORY COMMISSION

LABORATORY USE ONLY
CONTROL NUMBER

SAMPLE RECORD -- (Continued)
LABORATORY -- ORISE

SAMPLE NUMBER	SAMPLE NAME AND DESCRIPTION	COLLECTION DATE/TIME	REMARKS, PRESERVATIVE ANALYSIS REQUESTED, ETC.
PAL-01	Background sand sample taken outside of outfall flow path.	05/30/2013 2:40 PM	Times are EST
PAL-02	Sand sample at midpoint of flow path from pipe	05/30/2013 2:47 PM	
PAL-03	Sand sample at pipe outlet	05/30/2013 3:05 PM	
PAL-04	Sand sample furthest from pipe outlet	05/30/2013 3:10 PM	

NRC FORM 303 (4-2004) PRINTED ON RECYCLED PAPER

Enclosure 1