



Entergy Nuclear Operations, Inc.
Palisades Nuclear Plant
27780 Blue Star Memorial Highway
Covert, MI 49043

April 26, 2007

10 CFR 50.36a
Technical Specification 5.6.3

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Palisades Nuclear Plant
Docket 50-255
License No. DPR-20

2006 Annual Radioactive Effluent Release and Waste Disposal Report

Dear Sir or Madam:

Enclosed is the Entergy Nuclear Operations, Inc. (ENO) 2006 Annual Radioactive Effluent Release and Waste Disposal Report for the Palisades Nuclear Plant (PNP). This report is submitted in accordance with 10 CFR 50.36a(a)(2) and PNP Technical Specification 5.6.3.

This report provides a summary of the quantities of radioactive liquid and gaseous effluent releases and solid radioactive waste processed during the period of January 1, 2006, through December 31, 2006.

Summary of Commitments

This letter contains no new commitments and no revisions to existing commitments.

Christopher J. Schwarz
Site Vice President
Palisades Nuclear Plant

Enclosure (1)

CC Administrator, Region III, USNRC
Project Manager, Palisades, USNRC
Resident Inspector, Palisades, USNRC

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A009

ENCLOSURE 1
2006 ANNUAL RADIOACTIVE EFFLUENT RELEASE
AND WASTE DISPOSAL REPORT
JANUARY 2006 – DECEMBER 2006

2006 Plant Operating History

Palisades Nuclear Plant (PNP) was off line on January 1, 2006, for control rod drive mechanism seal repair and was returned to service on January 6, 2006. PNP was taken off line on April 1, 2006, for refueling outage 18 and returned to service on May 10, 2006. PNP was taken offline on May 11, 2006, when a control rod was discovered uncoupled. The plant was returned to service on May 16, 2006. PNP was taken off line on November 1, 2006, due to a containment air cooler service water leak and was returned to service on November 4, 2006. PNP remained on line for the remainder of 2006.

1. Supplemental Information

A. Batch Releases

Information relating to batch release of gaseous and liquid effluents is provided in Attachment 1, "Batch Releases."

B. Abnormal Releases

None

C. The lower limits of detection (LLDs) required by the Offsite Dose Calculation Manual (ODCM) for gaseous and liquid effluents are provided in Attachment 5, "Lower Limits of Detection for Palisades Effluents."

D. Results of the 2006 Radiochemistry Cross Check Program with Analytics are shown in Attachment 6. Results were in agreement for all isotopes on all three detectors.

E. Radioactive Effluent Monitoring Instrumentation

The ODCM, Appendix A, "Relocated Technical Specifications per NRC Generic Letter 89-01 (TAC No 75060)," Revision 12, requires that any gaseous or liquid effluent monitor out-of-service event greater than 30 days be included in this effluent report.

RIA-1113, waste gas discharge monitor, was out of service at the start of 2006, due to an engineering change modification in progress to replace the original analog monitor with a digital monitor. The modification was completed and the monitor was declared operable on July 14, 2006. The monitor was declared inoperable on August 8, 2006, after failing Technical Specification surveillance test procedure MR-14, Process Monitor Function

Checks – Monthly. The procedure's acceptance criteria had not been updated to account for a change in background count rate for the new digital monitor. The procedure was revised, and the monitor was successfully tested and declared operable on October 6, 2006. The monitor was declared inoperable on November 21, 2006, due to unpredictable monitor response during waste gas decay tank releases. The monitor remains inoperable while the plant and vendor evaluate what actions are necessary to ensure reliable and predictable monitor response. ODCM-required compensatory actions are taken during waste gas decay tank releases while the monitor is inoperable.

RIA-2320, steam generator blowdown tank vent monitor, was inoperable to start 2006. The monitor was declared operable on March 6, 2006. RIA-2320 was declared inoperable on March 23, 2006, due to no meter deflection when placed in the "CAL" position. The monitor was declared operable on June 12, 2006.

RIA-0833, service water monitor, was out of service on April 4, 2006, due to water intrusion that occurred during a heavy rainstorm. The monitor was repaired and declared operable on May 5, 2006.

RIA-5211, turbine sump monitor, was declared inoperable on October 4, 2006, due to failing the function (source) check during surveillance test MR-14. The acceptance criterion was evaluated, source check range was expanded, and MR-14 was revised. The monitor was calibrated, and declared operable on November 8, 2006.

RIA-2326, normal range noble gas stack monitor was declared inoperable on August 26, 2006, due to frequent spiking. The detector was sent to the vendor for repairs, reinstalled, and calibrated. The monitor was declared operable on October 31, 2006.

A PNP self-assessment of the effluent program completed in late 2006, identified that the number and duration of process monitor outages did not meet expectations, and that a higher priority was required to address future monitor out-of-service events. An interdepartmental working group has been established to improve the timeliness of monitors being returned to service.

2. Gaseous Effluents

Attachment 2, "Gaseous Effluents – Summation of Releases," lists and summarizes all gaseous radioactive effluents released during the reporting period. The unidentified beta component was 1.01E-04% of the gaseous release (excluding tritium).

3. Liquid Effluents

Attachment 3, "Liquid Effluents – Summation of Releases," lists and summarizes all liquid radioactive effluents released during the reporting period. The unidentified beta component was 5.09% of the liquid release (excluding tritium).

4. Estimate of Uncertainty

Both the Gaseous and Liquid Summation of Release data sheets include estimates of the uncertainty associated with the measurement of radioactive effluents. These estimates are based on statistical analyses of a series of sample results as described in the ODCM, Appendix A. These results are listed in the "Est Total Error %" columns on the Gaseous and Liquid Summation Reports.

5. Solid Waste

Attachment 4, "Solid Waste," summarizes all solid radioactive waste shipped for burial in 2006, including the waste classification, sources, volume shipped, activity (curies), and principal nuclide content. Radwaste shipments were made either to Barnwell Waste Management Facility, or to Envirocare of Utah, Inc.

6. Summary of Radiological Impact on Man

Doses to individuals and populations were calculated using GASPARD and LADTAP computer program codes. The quarterly values for curies released were input for each nuclide and are summarized as follows:

- A. The offsite air doses at site boundary (0.48 miles south-south east (SSE)) due to noble gases were:

| | |
|------------------|--|
| First Quarter - | 6.35E-04 millirad beta and 1.51E-04 millirad gamma |
| Second Quarter - | 8.01E-04 millirad beta and 2.72E-04 millirad gamma |
| Third Quarter - | 7.37E-04 millirad beta and 2.48E-04 millirad gamma |
| Fourth Quarter - | 7.05E-04 millirad beta and 2.33E-04 millirad gamma |

The maximum noble gas offsite air dose to the nearest residence (0.50 miles south) occurred during the second quarter, when beta and gamma doses were estimated at 5.20E-04 millirad and 1.77E-04 millirad, respectively.

B. The most restrictive organ dose to an individual in an unrestricted area (based on identified critical receptors) from gaseous effluent releases were:

| | |
|------------------|-----------------------------------|
| First Quarter - | 2.57E-02 millirem (child thyroid) |
| Second Quarter - | 5.00E-02 millirem (child thyroid) |
| Third Quarter | 2.15E-02 millirem (child thyroid) |
| Fourth Quarter - | 2.01E-02 millirem (child thyroid) |

C. Integrated total body doses to the general population, and average doses to individuals within the population from gaseous effluent release pathways to a distance of 50 miles from the site boundary were:

| | |
|------------------|---|
| First Quarter - | 9.60E-02 person-rem and 7.27E-05 millirem |
| Second Quarter- | 1.84E-01 person-rem and 1.39E-04 millirem |
| Third Quarter - | 7.94E-02 person-rem and 6.02E-05 millirem |
| Fourth Quarter - | 7.49E-02 person-rem and 5.67E-05 millirem |

D. The maximum total body dose to an individual in unrestricted water-related exposure pathways was:

| | |
|------------------|--------------------------|
| First Quarter - | 8.41E-03 millirem (teen) |
| Second Quarter- | 6.33E-03 millirem (teen) |
| Third Quarter - | 1.09E-02 millirem (teen) |
| Fourth Quarter - | 7.68E-04 millirem (teen) |

The maximum organ dose and critical receptor organ was:

| | |
|------------------|--------------------------------|
| First Quarter - | 9.42E-03 millirem (teen liver) |
| Second Quarter- | 9.56E-03 millirem (teen liver) |
| Third Quarter - | 1.36E-02 millirem (teen liver) |
| Fourth Quarter - | 1.01E-03 millirem (teen liver) |

E. Integrated total body doses to the general population, and average doses to individuals within the population from liquid effluent release pathways to a distance of 50 miles from the site boundary were:

| | |
|------------------|---|
| First Quarter - | 1.58E-02 person-rem and 1.20E-05 millirem |
| Second Quarter- | 2.03E-02 person-rem and 1.54E-05 millirem |
| Third Quarter - | 1.62E-02 person-rem and 1.23E-05 millirem |
| Fourth Quarter - | 2.12E-03 person-rem and 1.61E-06 millirem |

7. Process Control Program

No changes were made to the process control program.

8. Offsite Dose Calculation Manual

Attachment 7 contains the ODCM, Revision 20, per the requirements of Technical Specification 5.5.1.c.3.

Historically, the 1992-1996 meteorological data has been in close comparison to more recent meteorological data. Based on this comparison no changes were made to the ODCM and the 1992-1996 meteorological data will continue to be used.

An editorial change to the ODCM, Appendix A, was made to revise the due dates for the annual radiological environmental operating report and the annual radioactive effluent release report to match the due dates required by the Technical Specifications. The changes were approved by the Plant Operating Review Committee (PORC) and became effective on August 24, 2006. An editorial change does not affect the revision number.

**ATTACHMENT 1
RADIOACTIVE EFFLUENT RELEASE REPORT
BATCH RELEASES
JANUARY – DECEMBER 2006**

TABLE HP 10.5-1

| GASEOUS | Units | 1 st Qtr | 2 nd Qtr | 3 rd Qtr | 4 th Qtr |
|----------------------|---------|---------------------|---------------------|---------------------|---------------------|
| Number of Releases | N/A | 10 | 12 | 3 | 5 |
| Total Release Time | Minutes | 1106 | 1370 | 333 | 311 |
| Maximum Release Time | Minutes | 164 | 165 | 135 | 153 |
| Average Release Time | Minutes | 110.6 | 114.2 | 111.0 | 62.0 |
| Minimum Release Time | Minutes | 58 | 65 | 70 | 3 |

| LIQUID | Units | 1 st Qtr | 2 nd Qtr | 3 rd Qtr | 4 th Qtr |
|----------------------|---------|---------------------|---------------------|---------------------|---------------------|
| Number of Releases | N/A | 8 | 3 | 2 | 1 |
| Total Release Time | Minutes | 5307 | 1323 | 1685 | 2606 |
| Maximum Release Time | Minutes | 1556 | 763 | 886 | 2606 |
| Average Release Time | Minutes | 663.4 | 441 | 842.5 | 2606 |
| Minimum Release Time | Minutes | 485 | 36 | 799 | 2606 |

**ATTACHMENT 2
RADIOACTIVE EFFLUENT RELEASE REPORT
GASEOUS EFFLUENTS – SUMMATION OF RELEASES
JANUARY – DECEMBER 2006**

| A. Fission and Activation Gases | Units | 1st Qtr | 2nd Qtr | 3rd Qtr | 4th Qtr | Est Total Error % |
|------------------------------------|---------|----------|----------|----------|----------|-------------------|
| 1. Total Release | Ci | 7.72E+00 | 1.11E+01 | 1.04E+01 | 9.87E+00 | 12.1 |
| 2. Average release rate for period | µCi/sec | 9.93E-01 | 1.41E+00 | 1.31E+00 | 1.24E+00 | |
| 3. Percent of annual average EC** | % | 4.01E-04 | 6.35E-04 | 5.61E-04 | 5.30E-04 | |

| B. Iodines * | | | | | | |
|------------------------------------|---------|----------|----------|----------|----------|------|
| 1. Total Iodine | Ci | 1.95E-04 | 5.77E-04 | 3.02E-04 | 1.54E-04 | 17.1 |
| 2. Average release rate for period | µCi/sec | 2.51E-05 | 7.34E-05 | 3.80E-05 | 1.93E-05 | |
| 3. Percent of annual average EC** | % | 1.11E-05 | 5.24E-05 | 2.22E-05 | 1.47E-05 | |

| C. Particulates | | | | | | |
|------------------------------------|---------|----------|----------|----------|----------|------|
| 1. Total Release | Ci | 1.12E-05 | 1.52E-05 | 1.15E-05 | 1.43E-05 | 22.8 |
| 2. Average release rate for period | µCi/sec | 1.44E-06 | 1.93E-06 | 1.45E-06 | 1.80E-06 | |
| 3. Percent of annual average EC** | % | 3.82E-05 | 2.79E-05 | 5.13E-05 | 6.38E-05 | |
| 4. Gross alpha radioactivity | Ci | 7.65E-07 | 1.48E-06 | 2.55E-06 | 3.70E-06 | |

| D. Tritium | | | | | | |
|------------------------------------|---------|----------|----------|----------|----------|--|
| 1. Total Release | Ci | 2.53E+01 | 4.86E+01 | 2.09E+01 | 1.97E+01 | |
| 2. Average release rate for period | µCi/sec | 3.25E+00 | 6.18E+00 | 2.63E+00 | 2.48E+00 | |
| 3. Percent of annual average EC** | % | 6.92E-03 | 1.32E-02 | 5.59E-03 | 5.27E-03 | |

| E. Whole Body Dose | | | | | | |
|--|------|----------|----------|----------|----------|--|
| 1. Beta airdose at site boundary due to noble gases (ODCM App A III.C) | mrad | 6.35E-04 | 8.01E-04 | 7.37E-04 | 7.05E-04 | |
| 2. Percent of limit | % | 6.35E-03 | 8.01E-03 | 7.37E-03 | 7.05E-03 | |
| 3. Gamma Airdose at Site boundary due to noble gasses (ODCM App A III.C) | mrad | 1.51E-04 | 2.72E-04 | 2.48E-04 | 2.33E-04 | |
| 4. Percent of Limit | % | 3.02E-03 | 5.44E-03 | 4.96E-03 | 4.66E-03 | |

| F. Organ Dose | | | | | | |
|--|------|----------|----------|----------|----------|--|
| 1. Maximum organ dose to public based on critical receptors (ODCM App A III.D) | mrem | 2.57E-02 | 5.00E-02 | 2.15E-02 | 2.01E-02 | |
| 2. Percent of Limit | % | 3.42E-01 | 6.66E-01 | 2.87E-01 | 2.69E-01 | |

* Data are reported for I-131 and I-133 only.

** EC = Effluent Concentration

**ATTACHMENT 2
RADIOACTIVE EFFLUENT RELEASE REPORT
GASEOUS EFFLUENTS
JANUARY – DECEMBER 2006**

| 1. FISSION GASES | Units | 1 st Qtr | 2 nd Qtr | 3 rd Qtr | 4 th Qtr |
|-------------------------|-----------|---------------------|---------------------|---------------------|---------------------|
| Ar-41 | Ci | <LLD | <LLD | <LLD | <LLD |
| Kr-85 | Ci | 1.44E+00 | 1.35E-01 | <LLD | 1.09E-01 |
| Kr-85m | Ci | <LLD | 2.83E-04 | 5.10E-04 | 2.43E-04 |
| Kr-87 | Ci | <LLD | <LLD | 6.43E-04 | <LLD |
| Kr-88 | Ci | <LLD | <LLD | <LLD | <LLD |
| Xe-131m | Ci | 3.45E-02 | 1.32E-02 | <LLD | 5.42E-04 |
| Xe-133 | Ci | 6.21E+00 | 1.08E+01 | 1.04E+01 | 9.75E+00 |
| Xe-133m | Ci | 2.97E-02 | 7.45E-04 | <LLD | <LLD |
| Xe-135 | Ci | 1.71E-03 | 1.12E-01 | 3.15E-03 | 3.45E-03 |
| Xe-135m | Ci | 2.76E-03 | 2.13E-03 | 3.10E-03 | 3.36E-03 |
| Xe-138 | Ci | <LLD | <LLD | <LLD | <LLD |
| Total for Period | Ci | 7.72E+00 | 1.11E+01 | 1.04E+01 | 9.87E+00 |

| 2. IODINES | Units | 1 st Qtr | 2 nd Qtr | 3 rd Qtr | 4 th Qtr |
|-------------------------|-----------|---------------------|---------------------|---------------------|---------------------|
| I-131 | Ci | 5.22E-05 | 3.40E-04 | 1.32E-04 | 9.92E-05 |
| I-132 | Ci | <LLD | 4.60E-03 | <LLD | <LLD |
| I-133 | Ci | 1.43E-04 | 2.37E-04 | 1.70E-04 | 5.43E-05 |
| I-134 | Ci | <LLD | <LLD | <LLD | <LLD |
| I-135 | Ci | <LLD | <LLD | <LLD | <LLD |
| Total for Period | Ci | 1.95E-04 | 5.18E-03 | 3.02E-04 | 1.54E-04 |

**ATTACHMENT 2
RADIOACTIVE EFFLUENT RELEASE REPORT
GASEOUS EFFLUENTS
JANUARY – DECEMBER 2006**

| 3. PARTICULATES* | Units | 1 st Qtr | 2 nd Qtr | 3 rd Qtr | 4 th Qtr |
|-----------------------|-------|---------------------|---------------------|---------------------|---------------------|
| Mn-54 | Ci | <LLD | <LLD | <LLD | <LLD |
| Co-58 | Ci | <LLD | 6.53E-06 | <LLD | <LLD |
| Fe-59 | Ci | <LLD | <LLD | <LLD | <LLD |
| Co-60 | Ci | 2.46E-06 | 2.89E-06 | <LLD | <LLD |
| Zn-65 | Ci | <LLD | <LLD | <LLD | <LLD |
| Sr-89 | Ci | <LLD | <LLD | <LLD | <LLD |
| Sr-90 | Ci | <LLD | <LLD | <LLD | <LLD |
| Cs-134 | Ci | <LLD | <LLD | <LLD | <LLD |
| Cs-137 | Ci | 7.05E-07 | <LLD | <LLD | <LLD |
| Ce-141 | Ci | <LLD | <LLD | <LLD | <LLD |
| Ce-144 | Ci | <LLD | <LLD | <LLD | <LLD |
| Net unidentified beta | Ci | 8.05E-06 | 5.79E-06 | 1.15E-05 | 1.43E-05 |
| Total | Ci | 1.12E-05 | 1.52E-05 | 1.15E-05 | 1.43E-05 |

* Particulates with half-lives > 8 days

Note: All gaseous releases from PNP are considered to be ground-level releases.

**ATTACHMENT 3
RADIOACTIVE EFFLUENT RELEASE REPORT
LIQUID EFFLUENTS – SUMMATION OF RELEASES
JANUARY – DECEMBER 2006**

| | Units | 1st Qtr | 2nd Qtr | 3rd Qtr | 4th Qtr | Est Total Error % |
|--|--------|----------|----------|----------|----------|-------------------|
| A. Fission and Activation Products | | | | | | |
| 1. Total Release (not including tritium, gasses and alpha) | Ci | 1.08E-01 | 4.33E-02 | 6.72E-02 | 9.29E-03 | 8.9 |
| 2. Average release rate for period | µCi/ml | 2.76E-09 | 1.74E-09 | 1.74E-09 | 3.05E-10 | |
| 3. Percent of EC | % | 2.32E-02 | 6.04E-02 | 3.65E-02 | 3.82E-02 | |

| | | | | | | |
|--|--------|----------|----------|----------|----------|-----|
| B. Tritium | | | | | | |
| 1. Total release | Ci | 6.63E+02 | 6.40E+01 | 6.78E+01 | 4.31E+01 | 4.0 |
| 2. Average diluted concentration during period | µCi/ml | 1.69E-05 | 2.58E-06 | 1.76E-06 | 1.41E-06 | |
| 3. Percent of EC | % | 1.69E+00 | 2.58E-01 | 1.76E-01 | 1.41E-01 | |

| | | | | | | |
|--|--------|----------|----------|----------|----------|------|
| C. Dissolved and Entrained Gasses | | | | | | |
| 1. Total release | Ci | 1.87E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 18.8 |
| 2. Average diluted concentration during period | µCi/ml | 4.77E-11 | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| 3. Percent of EC | % | 2.38E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | |

| | | | | | |
|---|----|----------|----------|----------|----------|
| D. Gross Alpha Radioactivity (Total Release) | Ci | 1.24E-05 | 3.01E-05 | 1.46E-05 | 0.00E+00 |
|---|----|----------|----------|----------|----------|

| | | | | | |
|--|--------|----------|----------|----------|----------|
| E. Volume of Waste Released (prior to dilution) | liters | 1.42E+06 | 3.49E+05 | 2.75E+05 | 1.59E+05 |
|--|--------|----------|----------|----------|----------|

| | | | | | |
|---|--------|----------|----------|----------|----------|
| F. Volume of dilution water used during period | liters | 3.92E+10 | 2.49E+10 | 3.86E+10 | 3.05E+10 |
|---|--------|----------|----------|----------|----------|

| | | | | | |
|--|------|----------|----------|----------|----------|
| G. Maximum Dose Commitment - Whole Body | mrem | 8.41E-03 | 6.33E-03 | 1.09E-02 | 7.68E-04 |
| Percent of ODCM App A III.H limit | % | 5.61E-01 | 4.22E-01 | 7.27E-01 | 5.12E-02 |

| | | | | | |
|---|------|----------|----------|----------|----------|
| H. Maximum Dose Commitment - Organ | mrem | 9.42E-03 | 9.56E-03 | 1.36E-02 | 1.01E-03 |
| Percent of ODCM App A III.H limit | % | 1.88E-01 | 1.91E-01 | 2.72E-01 | 2.02E-02 |

*EC = Effluent Concentration

**ATTACHMENT 3
RADIOACTIVE EFFLUENT RELEASE REPORT
LIQUID EFFLUENTS
JANUARY – DECEMBER 2006**

| NUCLIDES RELEASED | Units | 1 st Qtr | 2 nd Qtr | 3 rd Qtr | 4 th Qtr |
|---|-------|---------------------|---------------------|---------------------|---------------------|
| Cr-51 | Ci | 2.66E-03 | <LLD | <LLD | <LLD |
| Mn-54 | Ci | 2.18E-03 | 6.04E-03 | 2.09E-02 | 1.72E-03 |
| Co-57 | Ci | 1.25E-04 | 3.47E-06 | 6.93E-05 | <LLD |
| Co-58 | Ci | 2.39E-02 | 2.13E-02 | 1.86E-02 | 7.68E-04 |
| Fe-59 | Ci | <LLD | <LLD | <LLD | <LLD |
| Co-60 | Ci | 1.20E-02 | 4.28E-03 | 2.11E-02 | 9.52E-04 |
| Zn-65 | Ci | <LLD | 3.98E-04 | 1.14E-03 | 1.41E-04 |
| Sr-89 | Ci | 3.00E-04 | 1.33E-03 | 3.44E-04 | 4.47E-05 |
| Sr-90 | Ci | 1.21E-04 | 7.02E-04 | 7.02E-04 | 6.07E-05 |
| Mo-99 | Ci | <LLD | <LLD | <LLD | <LLD |
| Sb-125 | Ci | 6.60E-02 | 3.17E-03 | 1.56E-03 | <LLD |
| Cs-134 | Ci | <LLD | 3.49E-04 | 3.53E-04 | <LLD |
| Cs-137 | Ci | 8.18E-04 | 1.31E-03 | 1.52E-03 | 1.28E-04 |
| Ce-141 | Ci | <LLD | <LLD | <LLD | <LLD |
| Ce-144 | Ci | <LLD | <LLD | <LLD | <LLD |
| Net unidentified beta | Ci | 2.57E-04 | 4.43E-03 | 8.93E-04 | 5.48E-03 |
| Fission & Activation Product Total | Ci | 1.08E-01 | 4.33E-02 | 6.72E-02 | 9.29E-03 |
| Xe-133 | | 1.87E-03 | <LLD | <LLD | <LLD |
| Dissolved/Entrained Total | | 1.87E-03 | <LLD | <LLD | <LLD |

**ATTACHMENT 4
RADIOACTIVE EFFLUENT RELEASE REPORT
SOLID WASTE
JANUARY – DECEMBER 2006**

| Waste Class | Source of Waste | Solidification Agent | Container Type | *Volume (m ³) | **Total Curies | Principal Radionuclides |
|-------------|--|----------------------|----------------|---------------------------|----------------|---|
| AU | DAW | N/A | General Design | 636.7 | 4.81E+00 | Cm-243, Co-60, Pu-238, Am-241, Pu-239, Mn-54, Cm-242, Ni-63, Fe-55, H-3, Sb-125, Ag-110m, C-14, Zn-65, Co-58, Cs-137, Sr-90, Nb-95, Tc-99, I-129 |
| AU | Secondary system resin | N/A | General Design | 28.9 | 7.90E-04 | Cs-137, Cs-134, H-3, Sr-90, Mn-54 |
| AS | Evaporator bottoms | Wax Winder | General Design | 1.05 | 1.63E+00 | Co-60, Co-58, Mn-54, Ru-106, Sb-125, Ag-110m, Ni-63, Cm-243, Cs-137, Ce-144, C-14, Fe-55, Zr-95, H-3, Zn-65, Pu-238, Pu-241, Sn-113, Am-241, Cs-134, Pu-239, Sr-90, Co-57, Cm-242, Tc-99, I-129 |
| AU | Advanced Liquid Processing System (ALPS) Media | N/A | General Design | 3.03 | 2.43E+00 | Co-60, Pu-241, Cs-137, Ag-110m, Zn-65, Nb-95, H-3, Tc-99, Ni-59, Co-58, Sb-125, Pu-238, Ni-63, Pu-239, C-14, Co-57, Fe-55, I-129, Cm-243, Am-241, Mn-54, Cs-134, Sr-90, Cm-242, Zr-95, Cr-51 |

| Waste Class | Source of Waste | Solidification Agent | Container Type | *Volume (m ³) | **Total Curies | Principal Radionuclides |
|-------------|-----------------|----------------------|----------------|---------------------------|----------------|---|
| C | Filters | N/A | General Design | 1.59 | 5.42E+00 | Co-60, Fe-55, C-14, Pu-238, Pu-239, Cm-242, Cm-243, Am-241, Ni-63, Ag-110m, Ce-144, Co-57, Co-58, Cs-137, H-3, I-129, Mn-54, Pu-241, Ru-106, Sb-125, Sn-113, Sr-90, Tc-99, Zn-65 |
| | | | TOTAL | 674.4 | 167.3 | |

*All shipments went to waste processors and not direct to disposal. The volume presented indicates shipment volume.

**Gamma isotopes are measured quantities, all other isotopes are estimated.

**ATTACHMENT 5
RADIOACTIVE EFFLUENT RELEASE REPORT
LOWER LIMITS OF DETECTION FOR PALISADES EFFLUENTS
JANUARY – DECEMBER 2006**

| Gaseous Release Type | Type of Activity Analysis | Lower Limit of Detection (μCi/ml) |
|-----------------------------|--|--|
| Waste Gas Storage Tank | Principal Gamma Emitters | 1E-04 |
| Containment Purge | Principal Gamma Emitters | 1E-04 |
| Stack Gas Effluent | I-131, I133 | 1E-12 |
| | Principal Gamma Emitters (I-131, Others) | 1E-11 |
| | Sr-89, Sr-90, and Gross Alpha | 1E-11 |
| | Noble Gases Gross Beta or Gamma | 1E-06 |

| Liquid Release Type | Type of Activity Analysis | Lower Limit of Detection (μCi/ml) |
|----------------------------|--|--|
| Batch Waste Release Tanks | Principal Gamma Emitters | 5E-07 |
| | I-131 | 1E-06 |
| | Dissolved and Entrained Gases (Gamma Emitters) | 1E-05 |
| | H-3 | 1E-05 |
| | Gross Alpha | 1E-07 |
| Continuous Releases | Sr-89, Sr-90 | 5E-08 |
| | Principal Gamma Emitters | 5E-07 |
| | I-131 | 1E-06 |
| | Dissolved and Entrained Gases (Gamma Emitters) | 1E-05 |
| | H-3 | 1E-05 |
| | Gross Alpha | 1E-07 |
| | Sr-89, Sr-90 | 5E-08 |

ATTACHMENT 6

**RADIOACTIVE EFFLUENT RELEASE REPORT
RESULTS OF 2006 RADIOCHEMISTRY CROSS CHECK PROGRAM**

**NOTE: CROSS CHECKS ARE NOT TYPICALLY PERFORMED IN THE FIRST
QUARTER OF THE YEAR**



Eckert & Ziegler

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RESULTS OF RADIOCHEMISTRY


CROSS CHECK PROGRAM

NUCLEAR MANAGEMENT CO., LLC

PALISADES NUCLEAR PLANT

2nd QUARTER 2006

(Ref. Date 05/12/2006)

 3-23-07

Daniel M. Montgomery, QA Manager

| SAMPLE | ANALYSIS | PALISADES | ANALYTICS | RATIO | RESOLUTION | COMPARISON |
|-----------|----------|---------------------|---------------------|-------------------------|------------|------------|
| | | VALUE microCi/cc | VALUE microCi/cc | PALISADES: ANALYTICS | | |
| *****: | | | | | | |
| A20269-66 | Ce-141 | 4.97E-05 | 4.99E-05 | 1.00 | 20 | AGREEMENT |
| SOLID | Cr-51 | 8.15E-05 | 7.77E-05 | 1.05 | 20 | AGREEMENT |
| DET. 1 | Cs-134 | 1.92E-05 | 1.98E-05 | 0.97 | 20 | AGREEMENT |
| | Cs-137 | 1.89E-05 | 1.79E-05 | 1.05 | 20 | AGREEMENT |
| | Co-58 | 1.95E-05 | 1.99E-05 | 0.98 | 20 | AGREEMENT |
| | Mn-54 | 2.46E-05 | 2.37E-05 | 1.04 | 20 | AGREEMENT |
| | Fe-59 | 2.23E-05 | 2.17E-05 | 1.03 | 20 | AGREEMENT |
| | Zn-65 | 2.98E-05 | 3.05E-05 | 0.98 | 20 | AGREEMENT |
| | Co-60 | 1.97E-05 | 2.00E-05 | 0.98 | 20 | AGREEMENT |
| *****: | | | | | | |
| A20269-66 | Ce-141 | 4.87E-05 | 4.99E-05 | 0.98 | 20 | AGREEMENT |
| SOLID | Cr-51 | 7.62E-05 | 7.77E-05 | 0.98 | 20 | AGREEMENT |
| DET. 2 | Cs-134 | 1.91E-05 | 1.98E-05 | 0.96 | 20 | AGREEMENT |
| | Cs-137 | 1.95E-05 | 1.79E-05 | 1.08 | 20 | AGREEMENT |
| | Co-58 | 1.98E-05 | 1.99E-05 | 1.00 | 20 | AGREEMENT |
| | Mn-54 | 2.44E-05 | 2.37E-05 | 1.03 | 20 | AGREEMENT |
| | Fe-59 | 2.18E-05 | 2.17E-05 | 1.00 | 20 | AGREEMENT |
| | Zn-65 | 3.01E-05 | 3.05E-05 | 0.99 | 20 | AGREEMENT |
| | Co-60 | 1.92E-05 | 2.00E-05 | 0.96 | 20 | AGREEMENT |
| *****: | | | | | | |

| SAMPLE | ANALYSIS | PALISADES | ANALYTICS | RATIO | RESOLUTION | COMPARISON |
|-----------|----------|------------|------------|------------|------------|------------|
| | | VALUE | VALUE | PALISADES: | | |
| | | microCi/cc | microCi/cc | ANALYTICS | | |
| ***** | | | | | | |
| A20269-66 | Ce-141 | 5.08E-05 | 4.99E-05 | 1.02 | 20 | AGREEMENT |
| SOLID | Cr-51 | 7.70E-05 | 7.77E-05 | 0.99 | 20 | AGREEMENT |
| DET. 3 | Cs-134 | 1.96E-05 | 1.98E-05 | 0.99 | 20 | AGREEMENT |
| | Cs-137 | 1.91E-05 | 1.79E-05 | 1.06 | 20 | AGREEMENT |
| | Co-58 | 2.09E-05 | 1.99E-05 | 1.05 | 20 | AGREEMENT |
| | Mn-54 | 2.43E-05 | 2.37E-05 | 1.02 | 20 | AGREEMENT |
| | Fe-59 | 2.32E-05 | 2.17E-05 | 1.07 | 20 | AGREEMENT |
| | Zn-65 | 2.98E-05 | 3.05E-05 | 0.98 | 20 | AGREEMENT |
| | Co-60 | 1.95E-05 | 2.00E-05 | 0.97 | 20 | AGREEMENT |
| ***** | | | | | | |
| A20270-66 | Ce-141 | 4.86E-05 | 5.02E-05 | 0.97 | 20 | AGREEMENT |
| SIMULATED | Cr-51 | 7.63E-05 | 7.82E-05 | 0.98 | 20 | AGREEMENT |
| DET. 1 | Cs-134 | 1.89E-05 | 1.99E-05 | 0.95 | 20 | AGREEMENT |
| | Cs-137 | 1.79E-05 | 1.80E-05 | 0.99 | 20 | AGREEMENT |
| | Co-58 | 1.95E-05 | 2.00E-05 | 0.98 | 20 | AGREEMENT |
| | Mn-54 | 2.40E-05 | 2.38E-05 | 1.01 | 20 | AGREEMENT |
| | Fe-59 | 2.27E-05 | 2.19E-05 | 1.04 | 20 | AGREEMENT |
| | Zn-65 | 3.08E-05 | 3.07E-05 | 1.00 | 20 | AGREEMENT |
| | Co-60 | 1.93E-05 | 2.01E-05 | 0.96 | 20 | AGREEMENT |
| ***** | | | | | | |

| SAMPLE | ANALYSIS | PALISADES | ANALYTICS | RATIO | RESOLUTION | COMPARISON |
|-----------|----------|---------------------|---------------------|-------------------------|------------|------------|
| | | VALUE microCi/cc | VALUE microCi/cc | PALISADES: ANALYTICS | | |
| ***** | | | | | | |
| A20270-66 | Ce-141 | 4.75E-05 | 5.02E-05 | 0.95 | 20 | AGREEMENT |
| SIMULATED | Cr-51 | 7.76E-05 | 7.82E-05 | 0.99 | 20 | AGREEMENT |
| DET. 2 | Cs-134 | 1.92E-05 | 1.99E-05 | 0.97 | 20 | AGREEMENT |
| | Cs-137 | 1.88E-05 | 1.80E-05 | 1.04 | 20 | AGREEMENT |
| | Co-58 | 2.07E-05 | 2.00E-05 | 1.03 | 20 | AGREEMENT |
| | Mn-54 | 2.46E-05 | 2.38E-05 | 1.03 | 20 | AGREEMENT |
| | Fe-59 | 2.19E-05 | 2.19E-05 | 1.00 | 20 | AGREEMENT |
| | Zn-65 | 2.98E-05 | 3.07E-05 | 0.97 | 20 | AGREEMENT |
| | Co-60 | 1.95E-05 | 2.01E-05 | 0.97 | 20 | AGREEMENT |
| ***** | | | | | | |
| A20270-66 | Ce-141 | 5.04E-05 | 5.02E-05 | 1.00 | 20 | AGREEMENT |
| SIMULATED | Cr-51 | 7.91E-05 | 7.82E-05 | 1.01 | 20 | AGREEMENT |
| DET. 3 | Cs-134 | 1.91E-05 | 1.99E-05 | 0.96 | 20 | AGREEMENT |
| | Cs-137 | 1.88E-05 | 1.80E-05 | 1.04 | 20 | AGREEMENT |
| | Co-58 | 2.11E-05 | 2.00E-05 | 1.05 | 20 | AGREEMENT |
| | Mn-54 | 2.42E-05 | 2.38E-05 | 1.01 | 20 | AGREEMENT |
| | Fe-59 | 2.19E-05 | 2.19E-05 | 1.00 | 20 | AGREEMENT |
| | Zn-65 | 3.00E-05 | 3.07E-05 | 0.98 | 20 | AGREEMENT |
| | Co-60 | 2.01E-05 | 2.01E-05 | 1.00 | 20 | AGREEMENT |
| ***** | | | | | | |

| SAMPLE | ANALYSIS | PALISADES | ANALYTICS | RATIO | RESOLUTION | COMPARISON |
|-----------|----------|---------------------|---------------------|-------------------------|------------|------------|
| | | VALUE microCi/cc | VALUE microCi/cc | PALISADES: ANALYTICS | | |
| ***** | | | | | | |
| A20271-66 | Ce-141 | 3.70E-04 | 3.76E-04 | 0.98 | 20 | AGREEMENT |
| SOLID | Cr-51 | 5.86E-04 | 5.87E-04 | 1.00 | 20 | AGREEMENT |
| DET. 1 | Cs-134 | 1.37E-04 | 1.49E-04 | 0.92 | 20 | AGREEMENT |
| | Cs-137 | 1.43E-04 | 1.35E-04 | 1.06 | 20 | AGREEMENT |
| | Co-58 | 1.51E-04 | 1.50E-04 | 1.00 | 20 | AGREEMENT |
| | Mn-54 | 1.84E-04 | 1.79E-04 | 1.03 | 20 | AGREEMENT |
| | Fe-59 | 1.67E-04 | 1.64E-04 | 1.02 | 20 | AGREEMENT |
| | Zn-65 | 2.37E-04 | 2.30E-04 | 1.03 | 20 | AGREEMENT |
| | Co-60 | 1.50E-04 | 1.51E-04 | 1.00 | 20 | AGREEMENT |
| ***** | | | | | | |
| A20271-66 | Ce-141 | 3.33E-04 | 3.76E-04 | 0.88 | 20 | AGREEMENT |
| SOLID | Cr-51 | 5.48E-04 | 5.87E-04 | 0.93 | 20 | AGREEMENT |
| DET. 2 | Cs-134 | 1.28E-04 | 1.49E-04 | 0.86 | 20 | AGREEMENT |
| | Cs-137 | 1.29E-04 | 1.35E-04 | 0.95 | 20 | AGREEMENT |
| | Co-58 | 1.49E-04 | 1.50E-04 | 0.99 | 20 | AGREEMENT |
| | Mn-54 | 1.75E-04 | 1.79E-04 | 0.98 | 20 | AGREEMENT |
| | Fe-59 | 1.61E-04 | 1.64E-04 | 0.98 | 20 | AGREEMENT |
| | Zn-65 | 2.22E-04 | 2.30E-04 | 0.96 | 20 | AGREEMENT |
| | Co-60 | 1.36E-04 | 1.51E-04 | 0.90 | 20 | AGREEMENT |
| ***** | | | | | | |

| SAMPLE | ANALYSIS | PALISADES | ANALYTICS | RATIO | RESOLUTION | COMPARISON |
|-----------|----------|---------------------|---------------------|-------------------------|------------|------------|
| | | VALUE microCi/cc | VALUE microCi/cc | PALISADES: ANALYTICS | | |
| ***** | | | | | | |
| A20271-66 | Ce-141 | 3.72E-04 | 3.76E-04 | 0.99 | 20 | AGREEMENT |
| SOLID | Cr-51 | 6.12E-04 | 5.87E-04 | 1.04 | 20 | AGREEMENT |
| DET. 3 | Cs-134 | 1.43E-04 | 1.49E-04 | 0.96 | 20 | AGREEMENT |
| | Cs-137 | 1.48E-04 | 1.35E-04 | 1.09 | 20 | AGREEMENT |
| | Co-58 | 1.57E-04 | 1.50E-04 | 1.04 | 20 | AGREEMENT |
| | Mn-54 | 1.89E-04 | 1.79E-04 | 1.06 | 20 | AGREEMENT |
| | Fe-59 | 1.83E-04 | 1.64E-04 | 1.11 | 20 | AGREEMENT |
| | Zn-65 | 2.48E-04 | 2.30E-04 | 1.08 | 20 | AGREEMENT |
| | Co-60 | 1.52E-04 | 1.51E-04 | 1.01 | 20 | AGREEMENT |
| ***** | | | | | | |
| A20272-66 | Ce-141 | 4.84E-02 | 4.85E-02 | 1.00 | 20 | AGREEMENT |
| FILTER | Cr-51 | 7.50E-02 | 7.56E-02 | 0.99 | 20 | AGREEMENT |
| DET. 1 | Cs-134 | 1.78E-02 | 1.92E-02 | 0.93 | 20 | AGREEMENT |
| | Cs-137 | 1.86E-02 | 1.74E-02 | 1.07 | 20 | AGREEMENT |
| | Co-58 | 2.01E-02 | 1.94E-02 | 1.04 | 20 | AGREEMENT |
| | Mn-54 | 2.48E-02 | 2.30E-02 | 1.08 | 20 | AGREEMENT |
| | Fe-59 | 2.33E-02 | 2.11E-02 | 1.10 | 20 | AGREEMENT |
| | Zn-65 | 3.17E-02 | 2.97E-02 | 1.07 | 20 | AGREEMENT |
| | Co-60 | 1.91E-02 | 1.95E-02 | 0.98 | 20 | AGREEMENT |
| ***** | | | | | | |

| SAMPLE | ANALYSIS | PALISADES | ANALYTICS | RATIO | RESOLUTION | COMPARISON |
|-----------|----------|---------------------|---------------------|-------------------------|------------|------------|
| | | VALUE microCi/cc | VALUE microCi/cc | PALISADES: ANALYTICS | | |
| *****: | | | | | | |
| A20272-66 | Ce-141 | 4.64E-02 | 4.85E-02 | 0.96 | 20 | AGREEMENT |
| FILTER | Cr-51 | 7.38E-02 | 7.56E-02 | 0.98 | 20 | AGREEMENT |
| DET. 2 | Cs-134 | 1.73E-02 | 1.92E-02 | 0.90 | 20 | AGREEMENT |
| | Cs-137 | 1.90E-02 | 1.74E-02 | 1.09 | 20 | AGREEMENT |
| | Co-58 | 2.03E-02 | 1.94E-02 | 1.05 | 20 | AGREEMENT |
| | Mn-54 | 2.51E-02 | 2.30E-02 | 1.09 | 20 | AGREEMENT |
| | Fe-59 | 2.26E-02 | 2.11E-02 | 1.07 | 20 | AGREEMENT |
| | Zn-65 | 3.18E-02 | 2.97E-02 | 1.07 | 20 | AGREEMENT |
| | Co-60 | 1.86E-02 | 1.95E-02 | 0.95 | 20 | AGREEMENT |
| *****: | | | | | | |
| A20272-66 | Ce-141 | 5.22E-02 | 4.85E-02 | 1.08 | 20 | AGREEMENT |
| FILTER | Cr-51 | 8.11E-02 | 7.56E-02 | 1.07 | 20 | AGREEMENT |
| DET. 3 | Cs-134 | 1.95E-02 | 1.92E-02 | 1.01 | 20 | AGREEMENT |
| | Cs-137 | 2.01E-02 | 1.74E-02 | 1.15 | 20 | AGREEMENT |
| | Co-58 | 2.19E-02 | 1.94E-02 | 1.13 | 20 | AGREEMENT |
| | Mn-54 | 2.70E-02 | 2.30E-02 | 1.17 | 20 | AGREEMENT |
| | Fe-59 | 2.46E-02 | 2.11E-02 | 1.16 | 20 | AGREEMENT |
| | Zn-65 | 3.45E-02 | 2.97E-02 | 1.16 | 20 | AGREEMENT |
| | Co-60 | 2.10E-02 | 1.95E-02 | 1.08 | 20 | AGREEMENT |
| *****: | | | | | | |

ANALYTICS

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RESULTS OF RADIOCHEMISTRY

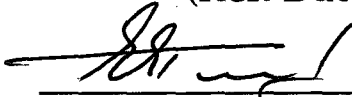
CROSS CHECK PROGRAM

NUCLEAR MANAGEMENT CO.

PALISADES NUCLEAR PLANT

3rd QUARTER 2006

(Ref. Date 08/18/2006)

 01-23-2007

Evgeny A. Taskaev, QA Manager, Alternate

| SAMPLE | ANALYSIS | PALISADES | ANALYTICS | RATIO | | COMPARISON |
|-----------|----------|-----------|-----------|------------|------------|------------|
| | | VALUE | VALUE | PALISADES: | RESOLUTION | |
| | | microCi | microCi | ANALYTICS | | |
| ***** | | | | | | |
| A20745-66 | Ce-141 | 2.99E-02 | 2.98E-02 | 1.00 | 20 | AGREEMENT |
| CARTRIDGE | Cr-51 | 1.08E-01 | 1.08E-01 | 1.00 | 20 | AGREEMENT |
| SAIC | Cs-134 | 1.62E-02 | 1.70E-02 | 0.95 | 20 | AGREEMENT |
| BG-300 | Cs-137 | 3.61E-02 | 3.43E-02 | 1.05 | 20 | AGREEMENT |
| VOL. | Co-58 | 2.89E-02 | 2.78E-02 | 1.04 | 20 | AGREEMENT |
| 1 cc | Mn-54 | 2.53E-02 | 2.33E-02 | 1.08 | 20 | AGREEMENT |
| DET. 1 | Fe-59 | 1.39E-02 | 1.30E-02 | 1.07 | 20 | AGREEMENT |
| | Zn-65 | 3.27E-02 | 3.05E-02 | 1.07 | 20 | AGREEMENT |
| | Co-60 | 2.63E-02 | 2.63E-02 | 1.00 | 20 | AGREEMENT |
| ***** | | | | | | |
| A20745-66 | Ce-141 | 2.95E-02 | 2.98E-02 | 0.99 | 20 | AGREEMENT |
| CARTRIDGE | Cr-51 | 1.07E-01 | 1.08E-01 | 0.99 | 20 | AGREEMENT |
| SAIC | Cs-134 | 1.60E-02 | 1.70E-02 | 0.94 | 20 | AGREEMENT |
| BG-300 | Cs-137 | 3.73E-02 | 3.43E-02 | 1.09 | 20 | AGREEMENT |
| VOL. | Co-58 | 2.92E-02 | 2.78E-02 | 1.05 | 20 | AGREEMENT |
| 1 cc | Mn-54 | 2.58E-02 | 2.33E-02 | 1.11 | 20 | AGREEMENT |
| DET. 2 | Fe-59 | 1.40E-02 | 1.30E-02 | 1.08 | 20 | AGREEMENT |
| | Zn-65 | 3.33E-02 | 3.05E-02 | 1.09 | 20 | AGREEMENT |
| | Co-60 | 2.58E-02 | 2.63E-02 | 0.98 | 20 | AGREEMENT |
| ***** | | | | | | |
| A20745-66 | Ce-141 | 2.78E-02 | 2.98E-02 | 0.93 | 20 | AGREEMENT |
| CARTRIDGE | Cr-51 | 1.03E-01 | 1.08E-01 | 0.95 | 20 | AGREEMENT |
| SAIC | Cs-134 | 1.55E-02 | 1.70E-02 | 0.91 | 20 | AGREEMENT |
| BG-300 | Cs-137 | 3.40E-02 | 3.43E-02 | 0.99 | 20 | AGREEMENT |
| VOL. | Co-58 | 2.73E-02 | 2.78E-02 | 0.98 | 20 | AGREEMENT |
| 1 cc | Mn-54 | 2.42E-02 | 2.33E-02 | 1.04 | 20 | AGREEMENT |
| DET. 3 | Fe-59 | 1.36E-02 | 1.30E-02 | 1.05 | 20 | AGREEMENT |
| | Zn-65 | 3.07E-02 | 3.05E-02 | 1.01 | 20 | AGREEMENT |
| | Co-60 | 2.47E-02 | 2.63E-02 | 0.94 | 20 | AGREEMENT |
| ***** | | | | | | |

| SAMPLE | ANALYSIS | PALISADES | ANALYTICS | RATIO | RESOLUTION | COMPARISON |
|------------|----------|---------------------|---------------------|-------------------------|------------|------------|
| | | VALUE microCi/cc | VALUE microCi/cc | PALISADES: ANALYTICS | | |
| ***** | | | | | | |
| A20746A-66 | Ce-141 | 5.80E-04 | 5.71E-04 | 1.02 | 20 | AGREEMENT |
| SIMULATED | Cr-51 | 2.12E-03 | 2.07E-03 | 1.03 | 20 | AGREEMENT |
| GAS | Cs-134 | 3.15E-04 | 3.26E-04 | 0.97 | 20 | AGREEMENT |
| VOL. | Cs-137 | 6.96E-04 | 6.55E-04 | 1.06 | 20 | AGREEMENT |
| 25 cc | Co-58 | 5.62E-04 | 5.32E-04 | 1.06 | 20 | AGREEMENT |
| DET. 1 | Mn-54 | 4.92E-04 | 4.46E-04 | 1.10 | 20 | AGREEMENT |
| | Fe-59 | 2.75E-04 | 2.48E-04 | 1.11 | 20 | AGREEMENT |
| | Zn-65 | 6.21E-04 | 5.84E-04 | 1.06 | 20 | AGREEMENT |
| | Co-60 | 5.09E-04 | 5.03E-04 | 1.01 | 20 | AGREEMENT |
| ***** | | | | | | |
| A20746A-66 | Ce-141 | 5.53E-04 | 5.71E-04 | 0.97 | 20 | AGREEMENT |
| SIMULATED | Cr-51 | 2.15E-03 | 2.07E-03 | 1.04 | 20 | AGREEMENT |
| GAS | Cs-134 | 3.11E-04 | 3.26E-04 | 0.96 | 20 | AGREEMENT |
| VOL. | Cs-137 | 7.15E-04 | 6.55E-04 | 1.09 | 20 | AGREEMENT |
| 25 cc | Co-58 | 5.46E-04 | 5.32E-04 | 1.03 | 20 | AGREEMENT |
| DET. 2 | Mn-54 | 4.96E-04 | 4.46E-04 | 1.11 | 20 | AGREEMENT |
| | Fe-59 | 2.60E-04 | 2.48E-04 | 1.05 | 20 | AGREEMENT |
| | Zn-65 | 6.14E-04 | 5.84E-04 | 1.05 | 20 | AGREEMENT |
| | Co-60 | 4.94E-04 | 5.03E-04 | 0.98 | 20 | AGREEMENT |
| ***** | | | | | | |
| A20746A-66 | Ce-141 | 5.39E-04 | 5.71E-04 | 0.94 | 20 | AGREEMENT |
| SIMULATED | Cr-51 | 1.94E-03 | 2.07E-03 | 0.94 | 20 | AGREEMENT |
| GAS | Cs-134 | 2.97E-04 | 3.26E-04 | 0.91 | 20 | AGREEMENT |
| VOL. | Cs-137 | 6.53E-04 | 6.55E-04 | 1.00 | 20 | AGREEMENT |
| 25 cc | Co-58 | 5.32E-04 | 5.32E-04 | 1.00 | 20 | AGREEMENT |
| DET. 3 | Mn-54 | 4.57E-04 | 4.46E-04 | 1.02 | 20 | AGREEMENT |
| | Fe-59 | 2.47E-04 | 2.48E-04 | 0.99 | 20 | AGREEMENT |
| | Zn-65 | 5.80E-04 | 5.84E-04 | 0.99 | 20 | AGREEMENT |
| | Co-60 | 4.80E-04 | 5.03E-04 | 0.95 | 20 | AGREEMENT |
| ***** | | | | | | |

| SAMPLE | ANALYSIS | PALISADES | ANALYTICS | RATIO | | COMPARISON |
|-----------|----------|------------|------------|------------|------------|------------|
| | | VALUE | VALUE | PALISADES: | RESOLUTION | |
| | | microCi/cc | microCi/cc | ANALYTICS | | |
| ***** | | | | | | |
| A20747-66 | Ce-141 | 2.69E-05 | 2.79E-05 | 0.97 | 20 | AGREEMENT |
| SAND | Cr-51 | 1.06E-04 | 1.01E-04 | 1.05 | 20 | AGREEMENT |
| 1 LITER | Cs-134 | 1.53E-05 | 1.59E-05 | 0.96 | 20 | AGREEMENT |
| DET. 1 | Cs-137 | 3.33E-05 | 3.20E-05 | 1.04 | 20 | AGREEMENT |
| | Co-58 | 2.65E-05 | 2.60E-05 | 1.02 | 20 | AGREEMENT |
| | Mn-54 | 2.28E-05 | 2.18E-05 | 1.05 | 20 | AGREEMENT |
| | Fe-59 | 1.34E-05 | 1.21E-05 | 1.11 | 20 | AGREEMENT |
| | Zn-65 | 2.84E-05 | 2.85E-05 | 1.00 | 20 | AGREEMENT |
| | Co-60 | 2.48E-05 | 2.46E-05 | 1.01 | 20 | AGREEMENT |
| ***** | | | | | | |
| A20747-66 | Ce-141 | 2.67E-05 | 2.79E-05 | 0.96 | 20 | AGREEMENT |
| SAND | Cr-51 | 9.80E-05 | 1.01E-04 | 0.97 | 20 | AGREEMENT |
| 1 LITER | Cs-134 | 1.56E-05 | 1.59E-05 | 0.98 | 20 | AGREEMENT |
| DET. 2 | Cs-137 | 3.31E-05 | 3.20E-05 | 1.04 | 20 | AGREEMENT |
| | Co-58 | 2.67E-05 | 2.60E-05 | 1.03 | 20 | AGREEMENT |
| | Mn-54 | 2.26E-05 | 2.18E-05 | 1.04 | 20 | AGREEMENT |
| | Fe-59 | 1.24E-05 | 1.21E-05 | 1.02 | 20 | AGREEMENT |
| | Zn-65 | 2.78E-05 | 2.85E-05 | 0.98 | 20 | AGREEMENT |
| | Co-60 | 2.39E-05 | 2.46E-05 | 0.97 | 20 | AGREEMENT |
| ***** | | | | | | |
| A20747-66 | Ce-141 | 2.71E-05 | 2.79E-05 | 0.97 | 20 | AGREEMENT |
| SAND | Cr-51 | 1.01E-04 | 1.01E-04 | 1.00 | 20 | AGREEMENT |
| 1 LITER | Cs-134 | 1.56E-05 | 1.59E-05 | 0.98 | 20 | AGREEMENT |
| DET. 3 | Cs-137 | 3.21E-05 | 3.20E-05 | 1.00 | 20 | AGREEMENT |
| | Co-58 | 2.59E-05 | 2.60E-05 | 1.00 | 20 | AGREEMENT |
| | Mn-54 | 2.19E-05 | 2.18E-05 | 1.01 | 20 | AGREEMENT |
| | Fe-59 | 1.19E-05 | 1.21E-05 | 0.98 | 20 | AGREEMENT |
| | Zn-65 | 2.88E-05 | 2.85E-05 | 1.01 | 20 | AGREEMENT |
| | Co-60 | 2.37E-05 | 2.46E-05 | 0.96 | 20 | AGREEMENT |
| ***** | | | | | | |

| SAMPLE | ANALYSIS | PALISADES | ANALYTICS | RATIO | RESOLUTION | COMPARISON |
|-----------|----------|------------------|------------------|-------------------------|------------|------------|
| | | VALUE microCi | VALUE microCi | PALISADES: ANALYTICS | | |
| ***** | | | | | | |
| A20748-66 | Ce-141 | 3.01E-02 | 2.86E-02 | 1.05 | 20 | AGREEMENT |
| CARTRIDGE | Cr-51 | 1.09E-01 | 1.04E-01 | 1.05 | 20 | AGREEMENT |
| LAPEL | Cs-134 | 1.59E-02 | 1.63E-02 | 0.97 | 20 | AGREEMENT |
| DE-500 | Cs-137 | 3.58E-02 | 3.29E-02 | 1.09 | 20 | AGREEMENT |
| VOL. | Co-58 | 2.86E-02 | 2.67E-02 | 1.07 | 20 | AGREEMENT |
| 1 cc | Mn-54 | 2.54E-02 | 2.24E-02 | 1.13 | 20 | AGREEMENT |
| DET. 1 | Fe-59 | 1.38E-02 | 1.25E-02 | 1.11 | 20 | AGREEMENT |
| | Zn-65 | 3.23E-02 | 2.93E-02 | 1.10 | 20 | AGREEMENT |
| | Co-60 | 2.60E-02 | 2.53E-02 | 1.03 | 20 | AGREEMENT |
| ***** | | | | | | |
| A20748-66 | Ce-141 | 2.83E-02 | 2.86E-02 | 0.99 | 20 | AGREEMENT |
| CARTRIDGE | Cr-51 | 1.03E-01 | 1.04E-01 | 0.99 | 20 | AGREEMENT |
| LAPEL | Cs-134 | 1.55E-02 | 1.63E-02 | 0.95 | 20 | AGREEMENT |
| DE-500 | Cs-137 | 3.65E-02 | 3.29E-02 | 1.11 | 20 | AGREEMENT |
| VOL. | Co-58 | 2.85E-02 | 2.67E-02 | 1.07 | 20 | AGREEMENT |
| 1 cc | Mn-54 | 2.52E-02 | 2.24E-02 | 1.13 | 20 | AGREEMENT |
| DET. 2 | Fe-59 | 1.36E-02 | 1.25E-02 | 1.09 | 20 | AGREEMENT |
| | Zn-65 | 3.22E-02 | 2.93E-02 | 1.10 | 20 | AGREEMENT |
| | Co-60 | 2.48E-02 | 2.53E-02 | 0.98 | 20 | AGREEMENT |
| ***** | | | | | | |
| A20748-66 | Ce-141 | 2.63E-02 | 2.86E-02 | 0.92 | 20 | AGREEMENT |
| CARTRIDGE | Cr-51 | 9.44E-02 | 1.04E-01 | 0.91 | 20 | AGREEMENT |
| LAPEL | Cs-134 | 1.45E-02 | 1.63E-02 | 0.89 | 20 | AGREEMENT |
| DE-500 | Cs-137 | 3.18E-02 | 3.29E-02 | 0.97 | 20 | AGREEMENT |
| VOL. | Co-58 | 2.60E-02 | 2.67E-02 | 0.97 | 20 | AGREEMENT |
| 1 cc | Mn-54 | 2.27E-02 | 2.24E-02 | 1.01 | 20 | AGREEMENT |
| DET. 3 | Fe-59 | 1.28E-02 | 1.25E-02 | 1.03 | 20 | AGREEMENT |
| | Zn-65 | 2.93E-02 | 2.93E-02 | 1.00 | 20 | AGREEMENT |
| | Co-60 | 2.35E-02 | 2.53E-02 | 0.93 | 20 | AGREEMENT |
| ***** | | | | | | |

ANALYTICS

1380 Seaboard Industrial Blvd.
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Phone (404) 352-8677
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RESULTS OF RADIOCHEMISTRY

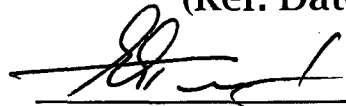
CROSS CHECK PROGRAM

NUCLEAR MANAGEMENT CO.

PALISADES NUCLEAR PLANT

4th QUARTER 2006

(Ref. Date 11/10/2006)

 01-23-2007

Evgeny A. Taskaev, QA Manager, Alternate

| SAMPLE | ANALYSIS | PALISADES | ANALYTICS | RATIO | RESOLUTION | COMPARISON |
|-----------|----------|---------------------|---------------------|-------------------------|------------|------------|
| | | VALUE microCi/cc | VALUE microCi/cc | PALISADES: ANALYTICS | | |
| ***** | | | | | | |
| A20988-66 | Ce-141 | 2.24E-03 | 2.40E-03 | 0.93 | 20 | AGREEMENT |
| SOLID | Cr-51 | 4.42E-03 | 3.91E-03 | 1.13 | 20 | AGREEMENT |
| 7.2 mL | Cs-134 | 7.31E-04 | 6.93E-04 | 1.06 | 20 | AGREEMENT |
| Bomb | Cs-137 | 1.19E-03 | 1.09E-03 | 1.09 | 20 | AGREEMENT |
| DET. 1 | Co-58 | 5.18E-04 | 5.01E-04 | 1.03 | 20 | AGREEMENT |
| | Mn-54 | 5.90E-04 | 5.40E-04 | 1.09 | 20 | AGREEMENT |
| | Fe-59 | 5.68E-04 | 5.57E-04 | 1.02 | 20 | AGREEMENT |
| | Zn-65 | 8.57E-04 | 8.12E-04 | 1.06 | 20 | AGREEMENT |
| | Co-60 | 1.29E-03 | 1.30E-03 | 0.99 | 20 | AGREEMENT |
| ***** | | | | | | |
| A20988-66 | Ce-141 | 2.20E-03 | 2.40E-03 | 0.92 | 20 | AGREEMENT |
| SOLID | Cr-51 | 3.81E-03 | 3.91E-03 | 0.97 | 20 | AGREEMENT |
| 7.2 mL | Cs-134 | 7.66E-04 | 6.93E-04 | 1.11 | 20 | AGREEMENT |
| Bomb | Cs-137 | 1.15E-03 | 1.09E-03 | 1.06 | 20 | AGREEMENT |
| DET. 2 | Co-58 | 5.37E-04 | 5.01E-04 | 1.07 | 20 | AGREEMENT |
| | Mn-54 | 5.63E-04 | 5.40E-04 | 1.04 | 20 | AGREEMENT |
| | Fe-59 | 5.94E-04 | 5.57E-04 | 1.07 | 20 | AGREEMENT |
| | Zn-65 | 8.16E-04 | 8.12E-04 | 1.00 | 20 | AGREEMENT |
| | Co-60 | 1.27E-03 | 1.30E-03 | 0.98 | 20 | AGREEMENT |
| ***** | | | | | | |
| A20988-66 | Ce-141 | 2.25E-03 | 2.40E-03 | 0.94 | 20 | AGREEMENT |
| SOLID | Cr-51 | 3.65E-03 | 3.91E-03 | 0.93 | 20 | AGREEMENT |
| 7.2 mL | Cs-134 | 7.41E-04 | 6.93E-04 | 1.07 | 20 | AGREEMENT |
| Bomb | Cs-137 | 1.14E-03 | 1.09E-03 | 1.05 | 20 | AGREEMENT |
| DET. 3 | Co-58 | 4.74E-04 | 5.01E-04 | 0.95 | 20 | AGREEMENT |
| | Mn-54 | 5.87E-04 | 5.40E-04 | 1.09 | 20 | AGREEMENT |
| | Fe-59 | 5.56E-04 | 5.57E-04 | 1.00 | 20 | AGREEMENT |
| | Zn-65 | 9.36E-04 | 8.12E-04 | 1.15 | 20 | AGREEMENT |
| | Co-60 | 1.25E-03 | 1.30E-03 | 0.96 | 20 | AGREEMENT |
| ***** | | | | | | |

| SAMPLE | ANALYSIS | PALISADES | ANALYTICS | RATIO | RESOLUTION | COMPARISON |
|-----------|----------|------------------|------------------|-------------------------|------------|------------|
| | | VALUE microCi | VALUE microCi | PALISADES: ANALYTICS | | |
| ***** | | | | | | |
| A20987-66 | Ce-141 | 1.07E-01 | 9.70E-02 | 1.10 | 20 | AGREEMENT |
| CARTRIDGE | Cr-51 | 1.72E-01 | 1.58E-01 | 1.09 | 20 | AGREEMENT |
| RGEM | Cs-134 | 2.86E-02 | 2.80E-02 | 1.02 | 20 | AGREEMENT |
| DET. 1 | Cs-137 | 5.21E-02 | 4.40E-02 | 1.18 | 20 | AGREEMENT |
| | Co-58 | 2.29E-02 | 2.02E-02 | 1.13 | 20 | AGREEMENT |
| | Mn-54 | 2.66E-02 | 2.18E-02 | 1.22 | 20 | AGREEMENT |
| | Fe-59 | 2.67E-02 | 2.25E-02 | 1.19 | 20 | AGREEMENT |
| | Zn-65 | 3.91E-02 | 3.28E-02 | 1.19 | 20 | AGREEMENT |
| | Co-60 | 5.58E-02 | 5.25E-02 | 1.06 | 20 | AGREEMENT |
| ***** | | | | | | |
| A20987-66 | Ce-141 | 9.92E-02 | 9.70E-02 | 1.02 | 20 | AGREEMENT |
| CARTRIDGE | Cr-51 | 1.66E-01 | 1.58E-01 | 1.05 | 20 | AGREEMENT |
| RGEM | Cs-134 | 2.74E-02 | 2.80E-02 | 0.98 | 20 | AGREEMENT |
| DET. 2 | Cs-137 | 5.19E-02 | 4.40E-02 | 1.18 | 20 | AGREEMENT |
| | Co-58 | 2.25E-02 | 2.02E-02 | 1.11 | 20 | AGREEMENT |
| | Mn-54 | 2.63E-02 | 2.18E-02 | 1.21 | 20 | AGREEMENT |
| | Fe-59 | 2.54E-02 | 2.25E-02 | 1.13 | 20 | AGREEMENT |
| | Zn-65 | 3.86E-02 | 3.28E-02 | 1.18 | 20 | AGREEMENT |
| | Co-60 | 5.31E-02 | 5.25E-02 | 1.01 | 20 | AGREEMENT |
| ***** | | | | | | |
| A20987-66 | Ce-141 | 8.98E-02 | 9.70E-02 | 0.93 | 20 | AGREEMENT |
| CARTRIDGE | Cr-51 | 1.50E-01 | 1.58E-01 | 0.95 | 20 | AGREEMENT |
| RGEM | Cs-134 | 2.55E-02 | 2.80E-02 | 0.91 | 20 | AGREEMENT |
| DET. 3 | Cs-137 | 4.62E-02 | 4.40E-02 | 1.05 | 20 | AGREEMENT |
| | Co-58 | 2.01E-02 | 2.02E-02 | 0.99 | 20 | AGREEMENT |
| | Mn-54 | 2.32E-02 | 2.18E-02 | 1.06 | 20 | AGREEMENT |
| | Fe-59 | 2.31E-02 | 2.25E-02 | 1.03 | 20 | AGREEMENT |
| | Zn-65 | 3.38E-02 | 3.28E-02 | 1.03 | 20 | AGREEMENT |
| | Co-60 | 5.00E-02 | 5.25E-02 | 0.95 | 20 | AGREEMENT |
| ***** | | | | | | |

| SAMPLE | ANALYSIS | PALISADES | ANALYTICS | RATIO | RESOLUTION | COMPARISON |
|-----------|----------|------------|------------|------------|------------|------------|
| | | VALUE | VALUE | PALISADES: | | |
| | | microCi/cc | microCi/cc | ANALYTICS | | |
| A20990-66 | Tritium | 7.47E-04 | 7.61E-04 | 0.98 | 12.5 | AGREEMENT |
| LIQUID | COUNT 1 | ***** | | | | |
| A20990-66 | Tritium | 7.53E-04 | 7.61E-04 | 0.99 | 12.5 | AGREEMENT |
| LIQUID | COUNT 2 | ***** | | | | |
| A20990-66 | Tritium | 7.50E-04 | 7.61E-04 | 0.98 | 12.5 | AGREEMENT |
| LIQUID | | ***** | | | | |

ATTACHMENT 7

**RADIOACTIVE EFFLUENT RELEASE REPORT
OFFSITE DOSE CALCULATION MANUAL**

170 Pages Follow