

CALORIMETRY EXCHANGE PROGRAM

ANNUAL REPORT



JANUARY-DECEMBER 2007

B. Srinivasan, Joseph Waggoner, Kattathu Mathew,
Stefan Buerger, Usha Narayanan and Jon Neuhoff



**NBL- ME 2008
CALEX PROGRAM ANNUAL REPORT**

U. S. DEPARTMENT OF ENERGY

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TABLE OF CONTENTS

NBL: HISTORY AND MISSION	v
ACKNOWLEDGEMENTS	vii
ABSTRACT	ix
A. INTRODUCTION	1
B. WORKING REFERENCE MATERIAL STANDARDS	2
B.1 CALEX I	2
B.2 CALEX II	5
C. CY 2007 CALEX PROGRAM PARTICIPANTS	5
D. CY 2007 RESULTS: EVALUATION, REPORTS AND CONCLUSIONS	6
D.1 STATISTICAL EVALUATION METHODS	6
D.2 REPORTS	7
D.3 CONCLUSIONS	9
E. SMES DATABASE DEVELOPMENT	12
F. PLANS FOR CY 2008 - 2009	12
G. PLUTONIUM MASS: TABLES AND GRAPHS	15
H. CALORIMETRIC POWER MEASUREMENTS: TABLES AND GRAPHS	29
I. P_{eff} VALUES: TABLES AND GRAPHS	53
J. ^{238}Pu ISOTOPE ABUNDANCE: TABLES AND GRAPHS	81
K. ^{239}Pu ISOTOPE ABUNDANCE: TABLES AND GRAPHS	109
L. ^{240}Pu ISOTOPE ABUNDANCE: TABLES AND GRAPHS	137
M. ^{241}Pu ISOTOPE ABUNDANCE: TABLES AND GRAPHS	165
N. ^{241}Am ISOTOPE ABUNDANCE: TABLES AND GRAPHS	193

TABLE OF CONTENTS (Cont.)

APPENDIX A: REPORT OF ANALYSIS: CALEX I WORKING REFERENCE MATERIAL	221
APPENDIX B: CALEX I WORKING REFERENCE MATERIAL: RE-EVALUATION OF PLUTONIUM CONCENTRATION, PLUTONIUM ISOTOPIC ABUNDANCES, AND ^{241}AM ABUNDANCE	223
APPENDIX C: CALEX I WORKING REFERENCE MATERIAL: RE-EVALUATION OF THE INITIAL AM-241 AND PU-238 CONTENT	241

NBL: HISTORY AND MISSION

The New Brunswick Laboratory (NBL) is owned and operated by the United States Department of Energy through the Office of Science (SC). NBL was established in 1949 as an analytical chemistry laboratory in New Brunswick, New Jersey to provide support to the United States Atomic Energy Commission. At that time, it was staffed by scientists from the National Bureau of Standards who had contributed significantly to nuclear material measurement programs in the Manhattan Project. At NBL, they provided the technical expertise and skills to solve problems related to quantitative analyses of uranium-bearing materials. Over the years, these scientists and others following them have expanded the capabilities of the laboratory to include chemical and mass spectrometric analyses of plutonium and other actinide elements, research and development activities in chemical analyses techniques, preparation of certified reference materials, and operation of the nuclear safeguards measurement evaluation program. In 1977, the laboratory moved from New Jersey to its present location at the Argonne National Laboratory site in Illinois.

NBL's major mission is to provide technical assistance to the Department of Energy in the following areas: measurement evaluation program operation, certified (nuclear) reference materials preparation, measurement techniques development, and measurement services to domestic and international customers. In addition to fulfilling these tasks, the laboratory helps the Department in three other areas: conducting technical audits, resolving shipper/receiver differences in material transfers, and assisting in nuclear nonproliferation programs.

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ACKNOWLEDGEMENTS

The Safeguards Measurement Evaluation Program is administered by the United States Department of Energy, Office of Science (SC). The authors of this annual report thank the following individuals for their contributions to the CY 2007 CALEX Program: Richard Palczynski of DOE-CH, Ron Kuziel, Kevin Atto, Joel M. Catausan, Miguelito Domingo, Mark Jilek and Stephen E. Smith (all from Chickasaw Nation Industries), Irene Spalleto (retired NBL employee), Thomas E. Sampson (LANL), and Gary Sowell, Alma Stiffin (both from NBL).

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ABSTRACT

The New Brunswick Laboratory conducts a measurement evaluation program for the United States Department of Energy Office of Science, evaluating performance in nuclear material accountability measurements. The nuclear safeguards measurement laboratories of the U.S. Department of Energy and Nuclear Regulatory Commission participate in the program. The program is also open to international laboratories. The program has two parts: the Safeguards Measurement Evaluation (SME) program for evaluating results from destructive methods of analyses, and the Calorimetry Exchange (CALEX) program for non-destructive analyses results. This report describes the CALEX program activities in calendar year (CY) 2007. A separate report has been prepared and issued for the SME program.

Participants: Three DOE laboratories, Fluor-Hanford, Lawrence Livermore National Laboratory (LLNL), and Los Alamos National Laboratory (LANL) participated in the CY 2007 program. LANL rejoined this year after a three year absence.

Working reference material standards: Two working reference material standards, Calex I and Calex II were used in the 2007 program. Both standards were characterized for the mass of plutonium oxide contained in the standards, the elemental plutonium concentration of the oxide, the abundances of plutonium isotopes and ^{241}Am . All characterization values except plutonium oxide mass stemmed from destructive analyses of the material. Plutonium oxide mass was determined by weighing.

Characterized values from destructive analyses: Calex I and Calex II materials were characterized several years ago using destructive methods of analyses: coulometry for plutonium concentration, thermal ionization mass spectrometry and alpha-spectrometry for plutonium isotopes, and gamma spectrometry for ^{241}Am . Formal certificates reporting the characterized values were not issued at that time. This deficiency was corrected recently. Working reference material certificates were issued in April 2007 for Calex II and in January 2008 for Calex I. The Calex I certificate is shown in the appendix of this annual report. See the CY 2006 CALEX Program Annual Report (NBL-ME-2007-CALEX) for the Calex II certificate.

The characterization values for the various parameters shown in the Calex I certificate are essentially the same as those currently in use, except for ^{238}Pu ; its abundance is revised

downward by about 2 % in the certificate. A paper describing the re-evaluation of initial ^{238}Pu and also ^{241}Am abundances has been prepared and is included in the appendix to this annual report.

Measurement schedule: The participants made quarterly measurements of calorimetric power and isotope abundances (plutonium isotopes and ^{241}Am) using calorimetry and gamma spectrometry, respectively. These measurements were carried out as a part of routine nuclear accountability measurements. Plutonium mass and the effective specific power were calculated from the measurement results. All measurement results including the two calculated quantities were evaluated against the respective characterized values after correcting the latter for radioactive decay to measurement dates.

Safeguards Measurement Evaluation System (SMES): The calorimetry and gamma spectrometry results were evaluated using the new SMES, a database as well as a statistical evaluation software system. The SMES development work started two years ago and a major portion of the work was completed in 2007. The new system when fully developed will allow participant laboratories to enter their own measurement results and retrieve their performance evaluation reports.

Performance evaluation reports: Two types of performance evaluation reports are shown in this annual report: quarterly reports evaluating the measurement results for that quarter, and an annual report that evaluated the measurement results of all four quarters put together.

A. INTRODUCTION

The New Brunswick Laboratory (NBL) is a nuclear material measurement laboratory of the U.S. Department of Energy (DOE) in the Office of Science (SC). An important aspect of NBL's mission is to conduct the measurement evaluation program, a program designed to provide independent verification of internal analytical quality control practices in nuclear material accountability measurements at the DOE facilities.

The measurement evaluation program consists of two parts: the Safeguards Measurement Evaluation (SME) Program for evaluating destructive analyses results (e.g., titration, mass spectrometry), and the Calorimetry Exchange (CALEX) Program for evaluating results from non-destructive analyses techniques. In the CALEX program, the participants measure the heat output of the standards and also the isotopic abundances (plutonium isotopes and ^{241}Am) using calorimetry and gamma ray spectrometry, respectively. Both are non-destructive analyses methods. In this report they will be referred to collectively as cal/gamma measurements. NBL evaluates the cal/gamma measurement results, and also two other quantities calculated from the measurement results (plutonium mass and effective specific power) for bias and precision thereby providing verification of the internal quality control practices.

The main goals and objectives of the CALEX Program are as follows:

1. Maintain a permanent data base of the cal/gamma measurement results. The effective specific power (P_{eff}) calculated from the isotope measurement results is also included in the data base.
2. Provide feedback to participants through performance evaluation reports. The purpose of the report is to evaluate bias and precision in nuclear accountability measurements and to validate internal quality control practices.
3. Evaluate measurement evaluation program needs for new working reference material standards, and coordinate the work in preparing them. The standards are fabricated in collaboration with DOE national laboratories.
4. Certify/characterize the material in the standards and issue certificates reporting the certified/characterized values.
5. Extend the CALEX program to provide evaluation of measurement results from other non-destructive methods of analyses. Examples are active well coincidence measurements for uranium, and passive neutron techniques for plutonium.

6. Conduct the measurement evaluation program annual meeting to facilitate exchange of technical information.

B. WORKING REFERENCE MATERIAL STANDARDS

Two working reference material standards, Calex I and Calex II were used in the 2007 CALEX program. Both standards contain accurately weighed amounts of high purity plutonium oxide material. The plutonium concentration, plutonium isotopic compositions and ^{241}Am contents in Calex I are different from those in Calex II. The materials were characterized by destructive analyses; coulometry for plutonium concentration, thermal ionization mass spectrometry for plutonium isotopes, and gamma spectrometry for ^{241}Am . Plutonium mass in the standard is calculated as the product of plutonium oxide mass and plutonium concentration.

B.1. Calex I

Fabrication and characterization: Rocky Flats Plant made six identical units of Calex I standards in 1979. The plutonium oxide material in the standard was characterized through destructive analyses of the material at Rocky Flats, Mound, Hanford and NBL during 1979 to 1982. A few years later, in 1987, NBL and LLNL verified the plutonium isotopes and ^{241}Am abundance values again through destructive analyses. The characterized values from the 1979-1982 experiments results were used to evaluate the cal/gamma measurement results, since the first time Calex I was used as a working reference material standard. However, a formal certificate reporting the characterized values was not prepared and issued until January 2008.

Working reference material standard certificate: During 2007-2008, the 1979-1982 initial characterization results and the 1987 verification results were reviewed. Based on this review, a working reference material certificate was prepared and issued in January 2008 with expanded uncertainty statements. The certificate is shown in Appendix A of this report. The characterization and verification analyses results from these experiments are given in Appendix B. There are no significant differences between the certificate values (appendix A) and those in current use, except for ^{238}Pu abundance. See Table 1 below for the currently used values.

Currently used reference values: The CY 2007 measurement results are evaluated using the reference values shown in Table 1. These are the same values that are in use since the

inception of the CALEX program. As stated earlier, these values are not different from the certificate values except for ^{238}Pu ; the currently used value is about 2 % higher than that in the certificate. The reference values in Table 1 are corrected for radioactive decay to cal/gamma measurements dates, using half-lives in Table 2. The effective specific power is calculated using isotopic specific powers given in Table 2.

Table 1. Characterized values for Calex I working reference material standard as of 05/29/1979

Parameter	Values
PuO ₂ mass	454.60 g
Pu concentration	87.8191 wt %
Pu mass*	399.23 g
$^{238}\text{Pu}^{**}$	0.0102 wt %
$^{239}\text{Pu}^{**}$	93.7336 wt %
$^{240}\text{Pu}^{**}$	5.8560 wt %
$^{241}\text{Pu}^{**}$	0.3712 wt %
$^{242}\text{Pu}^{**}$	0.0290 wt %
$^{241}\text{Am}^{\#}$	0.0061 wt %
P_{eff}^{\dagger}	2.3012 mW/g
Calorimetric power ^{††}	918.71 mW

*The Pu mass in the standards is calculated as the product of PuO₂ mass and Pu concentration.

**Pu isotopic abundance in wt %, i.e., 100 X (g Pu isotope / g Pu).

^{241}Am concentration in wt %, i.e., 100 X (g ^{241}Am / g Pu)

P_{eff} values in mW/g Pu are calculated as a sum of products of isotopic abundance and respective specific power, the latter given in Table 2. ^{241}Am contribution is included.

††The calorimetric power is calculated as a product of Pu mass and P_{eff} .

Table 2. Radioactive decay half-lives for plutonium isotopes and ^{241}Am , and effective specific power of each isotope.

Isotope	Half life / years	Specific power / mW/g
^{238}Pu	87.74	567.57
^{239}Pu	24119	1.9288
^{240}Pu	6564	7.0824
^{241}Pu	14.348	3.412
^{242}Pu	376300	0.1159
^{241}Am	433.6	114.2

Initial ^{238}Pu and ^{241}Am abundances: The initial ^{238}Pu certified value in Appendix A is about 2 % lower than the currently used abundance given in Table 1. Also, the initial ^{241}Am value currently used (Table 1) appears to be somewhat higher as seen in the re-evaluation of 1987 verification experiment results. Further support for a lower initial ^{241}Am abundance and also a lower ^{238}Pu abundance come from an examination of several years of cal/gamma measurement results from Hanford and LLNL. These re-evaluations lead to the following initial abundances:

$$\begin{array}{ll} ^{238}\text{Pu} & (0.00999 \pm 0.00046) \text{ wt \%}, \text{ and} \\ ^{241}\text{Am} & (53 \pm 19) \text{ ppm}. \end{array}$$

A manuscript reporting the results of these re-evaluation studies is included in Appendix C to this annual report. This paper will be presented at the 2008 Measurement Evaluation Program Meeting (Nashville, TN). The recommendations of calorimetry experts from Hanford, LLNL, LANL and SRS will be sought for adopting the certified values and the expanded uncertainty statements in Appendix A into the CY 2008-2009 CALEX program.

B.2. Calex II

Los Alamos National Laboratory made ten identical units of Calex II working reference material standards in 1995. The plutonium oxide material in the standard was characterized during the period 1995-2000. The Calex II certificate was issued in April 2007 with expanded uncertainty statements; see Appendix A and Appendix B in the CALEX Program CY 2006 Annual Report (NBL-ME-2007-CALEX, September 2007). The reference values shown in the certificate (without the uncertainties) are reproduced in Table 3. The LLNL Calex II results were evaluated with reference to characterized values in Table 3.

Table 3. Characterized values for Calex II working reference material standard as of 07/24/1995

Parameter	Values
PuO ₂ mass	2000.0 g
Pu concentration	87.62 wt %
Pu mass*	1752.4 g
²³⁸ Pu**	0.08032 wt %
²³⁹ Pu**	86.5366 wt %
²⁴⁰ Pu**	12.1689 wt %
²⁴¹ Pu**	1.0074 wt %
²⁴² Pu**	0.20673 wt %
²⁴¹ Am [#]	0.4753 wt %
P _{eff} [†]	3.5642 mW/g
Calorimetric power ^{††}	6245.9 mW

*The Pu mass in the standards is calculated as the product of PuO₂ mass and Pu concentration.

**Pu isotopic abundance in wt %, i.e., 100 X (g Pu isotope / g Pu).

²⁴¹Am concentration in wt %, i.e., 100 X (g ²⁴¹Am / g Pu)

[†]P_{eff} values in mW/g Pu are calculated as a sum of products of isotopic abundance and respective specific power, the latter given in Table 2. ²⁴¹Am contribution is included.

^{††}The calorimetric power is calculated as a product of Pu mass and P_{eff}.

C. CY 2007 CALEX PROGRAM PARTICIPANTS

Hanford, LLNL, and LANL participated in the CY 2007 CALEX program. Hanford reported 55 isotopic measurements and 27 calorimetric power measurements for CY 2007. LLNL reported

130 isotopic measurements and 92 calorimetric power measurements for CY 2007. LANL reported 40 isotopic measurements for CY 2007, but did not report calorimetric power measurements.

The three facilities followed their own established procedures in making calorimetric power and gamma spectrometry isotope abundance measurements. Certain differences exist in the experimental procedures as practiced in the three laboratories (e.g., measurement duration, measurement frequency, calibration procedures, data processing, uncertainty statements). Since a comprehensive evaluation of laboratory-specific procedures was not done, it is not possible to use these results for an inter-laboratory comparison study.

D. CY 2007 RESULTS: EVALUATION , REPORTS AND CONCLUSIONS

The statistical methods used in evaluating measurement results, the formats for presenting the evaluation results, and the conclusions regarding performance are described in this section.

D.1. Statistical evaluation methods

- The participants reported measurement results of calorimetric power and isotopic abundances (^{238}Pu , ^{239}Pu , ^{240}Pu , ^{241}Pu , ^{242}Pu and ^{241}Am). They also reported effective specific power (P_{eff}), a calculated quantity from isotope abundance measurements.
- The measurement results, except ^{242}Pu abundance, were entered into the SMES and checked for correctness in data entry. The ^{242}Pu abundance results were ignored since it is a minor isotope and contributes very little to heat output. Ignoring ^{242}Pu will not result in significant error in the evaluation of the measurement results of Calex I and Calex II or alter the conclusions obtained from these evaluations.
- Calorimetric power and P_{eff} data were checked for statistical outliers. Potential outliers flagged at $> 99\%$ level of significance were removed only after a thorough review.
- The plutonium mass was calculated from the measurement results using the following equation:

$$Pu_{\text{mass}} = \text{Calorimetric Power}/P_{\text{eff}}$$

- The measured values of plutonium mass, calorimetric power (P_{eff}) and isotope abundances (plutonium isotopes and ^{241}Am) were compared against accepted reference values (Tables 1 and 3) with appropriate corrections for radioactive decay to measurement dates using half lives in Table 2.
- The measurement results were evaluated in terms of M/A, M-A and % RD where M stands for measured and A for accepted values. Note that A refers to decay corrected reference values. The % RD (percent relative difference) was calculated using the following equation:

$$\% \text{ RD} = 100 \times (M - A) / A$$

The mean for each of the three quantities (M/A, M-A, and % RD), the standard deviation (σ), and the standard deviation of the mean (σ/\sqrt{n} where n refers to the number of measurements) were calculated for each calendar quarter and for the whole-year data also. The whole year data is a combination of all quarterly data. The standard uncertainty of the mean (σ/\sqrt{n}) is commonly referred to as the standard uncertainty. The ISO-VIM guide refers to it as “experimental standard deviation of the mean”. It is noted here that this standard uncertainty includes only the random component of the uncertainty; no attempt was made to evaluate the systematic component.

D.2. Reports

The evaluation results in sections G-N are presented for Calex I and Calex II in three different types of tables and graphs in the following order:

1. Quarterly summary tables: These tables summarize the results of evaluation of calorimetric power, P_{eff} and isotopic abundance measurements made in every calendar quarter. The quarterly means of M-A ('mean error') and % RD (mean error %') are reported, along with respective standard deviations and standard uncertainties ('uncertainty in the mean'). In addition, the tables contain a comparison of results from

the present quarter with those from the immediately preceding quarter. Note that plutonium mass (Section G) results were not evaluated quarterly; annual evaluation only was done.

2. Quarterly graphs: Quarterly graphs are presented for calorimetric power, P_{eff} and isotopic abundance measurements. These figures show the variation of M/A values from quarter to quarter. The uncertainties reported by the facilities are shown as vertical lines for each M/A. The quarterly means of M/A values and the calculated uncertainties in the quarterly means are shown as horizontal lines. The middle line represents the mean M/A, and the envelopes represent the calculated uncertainties. M/A of 1 means no difference between measured and accepted values; M/A > 1 denotes overestimation and M/A < 1 denotes underestimation. The laboratory reported uncertainties ('error bars') and NBL-calculated uncertainty limits on the graphs are twice the standard deviation (2σ). Lack of 'error bars' on individual measurements indicates that the participant laboratory did not report measurement uncertainties.
3. Annual summary tables: The quarterly data are combined to produce the annual data tables. These tables show the results of evaluation of plutonium mass, calorimetric power, P_{eff} and isotopic abundances for the entire year. The annual mean of M-A ('mean error') and % RD ('mean error %') are reported along with standard deviations and standard uncertainties ('uncertainty in the mean'). The tables also show a comparison of results for the current year with those from the immediately preceding year.
4. Annual graphs: In these graphs, % RDs with 95 % confidence intervals (approximately twice the standard uncertainty) are displayed for each facility. These graphs are not meant to be used as inter-laboratory comparison graphs for reasons mentioned earlier. The 95 % confidence intervals are calculated by multiplying the standard uncertainty of the mean (σ/\sqrt{n}) by the coverage factor, k ; (for example, $k \approx 2.0$ for $n = 55$, $k \approx 2.13$ for $n = 16$, etc.). The modern terminology will refer to 95 % confidence intervals as level of confidence at 95 %.
5. Annual graphs for each facility: These figures show annual variation of M/A values and were constructed in a manner similar to quarterly graphs.

6. Whole year data tables for each facility: These tables contain the original data submitted by the facility - measurement date, instrument used, measured values (M), and the uncertainties in the measured values as provided by the facilities. These tables also contain accepted values (A), ratios (M/A), differences (M-A), and percent relative deviations (% RD).

D.3. Conclusions

Three DOE facilities (Hanford, LLNL and LANL) participated in the 2007 CALEX program. Performance evaluations are shown in Table 4 for Calex I measurements and in Table 5 for Calex II measurements. These evaluations are presented in terms of mean relative deviations (% RD) from the respective accepted values; uncertainties as 95 % confidence intervals are also shown. If the % RD together with the corresponding uncertainty overlaps with zero, then it indicates no difference between measured (M) and accepted (A) values. If the overlap remains on the positive side, then it indicates positive bias in measurements. If the overlap remains on the negative side, then it indicates negative bias in measurements. The uncertainty of the certified value was not included in the assessment of bias.

Table 4. Performance evaluation of Calex I measurement results from Hanford, LLNL and LANL in 2007. The % RDs are shown along with uncertainties as 95 % confidence intervals (i.e., the standard uncertainty multiplied by the coverage factor, k).

Calex I Measured Quantity	% RD		
	Hanford	LLNL	LANL
Pu mass	0.11 ± 0.15	0.20 ± 0.06	N A
Calorimetric Power	- 0.05 ± 0.18	0.07 ± 0.09	N A
P_{eff}	- 0.14 ± 0.04	- 0.13 ± 0.02	0.17 ± 0.10
^{238}Pu	- 5.72 ± 1.45	- 1.91 ± 0.68	- 1.66 ± 4.29
^{239}Pu	- 0.04 ± 0.01	0.00 ± 0.01	- 0.10 ± 0.05
^{240}Pu	0.65 ± 0.17	- 0.02 ± 0.07	1.60 ± 0.83
^{241}Pu	0.35 ± 0.18	- 0.08 ± 0.08	0.12 ± 0.19
^{241}Am	- 0.99 ± 0.09	- 0.78 ± 0.06	0.11 ± 0.60

Table 5. Performance evaluation of Calex II measurement results for LLNL in 2007. The % RDs are shown along with uncertainties as 95 % confidence intervals (i.e., the standard uncertainty multiplied by the coverage factor, k).

Calex II Measured Quantity	% RD LLNL
Pu mass	0.09 \pm 0.23
Calorimetric Power	- 0.37 \pm 0.20
P_{eff}	- 0.31 \pm 0.07
^{238}Pu	0.48 \pm 0.36
^{239}Pu	-0.03 \pm 0.01
^{240}Pu	0.20 \pm 0.11
^{241}Pu	0.08 \pm 0.19
^{241}Am	- 1.52 \pm 0.14

The following conclusions emerge from an examination of results in Tables 4 and 5 :

Calex I

- Hanford was able to measure the plutonium mass within a % RD of 0.11 % and demonstrated no bias. LLNL measurements are within 0.20 % RD with a small positive bias.. For comparison, in CY 2006, Hanford measurements showed a negative bias and LLNL measurements showed a positive bias.
- Both Hanford and LLNL showed no bias in calorimetric power measurements. For comparison, in CY 2006, Hanford measurements showed a negative bias and LLNL measurements showed a positive bias.
- P_{eff} values from both Hanford and LLNL show a small negative bias; LANL results show a positive bias. The 2006 results showed negative bias in both Hanford and LLNL measurements. LANL demonstrated bias-free P_{eff} measurements the last time they participated in the CALEX program in CY 2002. Note that P_{eff} evaluation is equivalent to collective evaluation of all isotope abundance measurement results.

Calex II

- LLNL was able to measure Pu mass within a % RD of 0.09 % and without bias.
- LLNL calorimetric power measurements show a negative bias.
- P_{eff} values for LLNL show a small negative bias.

E. SMES DATABASE DEVELOPMENT

In 2007, computer professionals from Chickasaw Nation Industries (under DOE-CH contract) continued to work on the development of the new Safeguards Measurement Evaluation System (SMES). Quality assurance tests were performed, and coding errors found during quality control tests were corrected. Data from previous years stored in the FoxPro system were migrated to SMES.

The new SMES was used in evaluating CY 2007 CALEX program results. Data was entered manually by NBL staff.

In the second half of 2008, the SMES will be ready for data entry by participants themselves and for report retrievals. NBL will provide instructions and hands-on training for gaining access to SMES, data entry, and report retrieval. A user manual is under preparation.

F. PLANS FOR CY 2008 - 2009

- The CALEX II measurement results made by DOE facilities so far will be evaluated and a separate report will be issued in the second half of CY 2008.
- Special effort will be made to obtain cal/gamma measurement results hitherto not submitted by SRS (Savannah River Site) and LANL.
- The CALEX program will be extended to include measurement evaluation of other non-destructive techniques (especially those based on neutron measurements).
- Amendments to Calex I certificate will be made (if necessary) based on discussions at the 2008 Measurement Evaluation Program Meeting, Nashville, TN. Specifically, the

calorimetry practitioners will be asked to provide input on the suggested downward revision of initial ^{238}Pu and ^{241}Am abundances.

- Evaluation letters will be sent to CALEX program participants on a quarterly basis upon receipt of measurement results
- A user manual for SMES will be prepared. Instructions to access the SMES through the internet, data entry into the SMES and report retrieval from SMES will be provided.
- Facilitate participation of AWE calorimetry laboratory in CY 2009 CALEX program.

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G. PLUTONIUM MASS: TABLES AND GRAPHS

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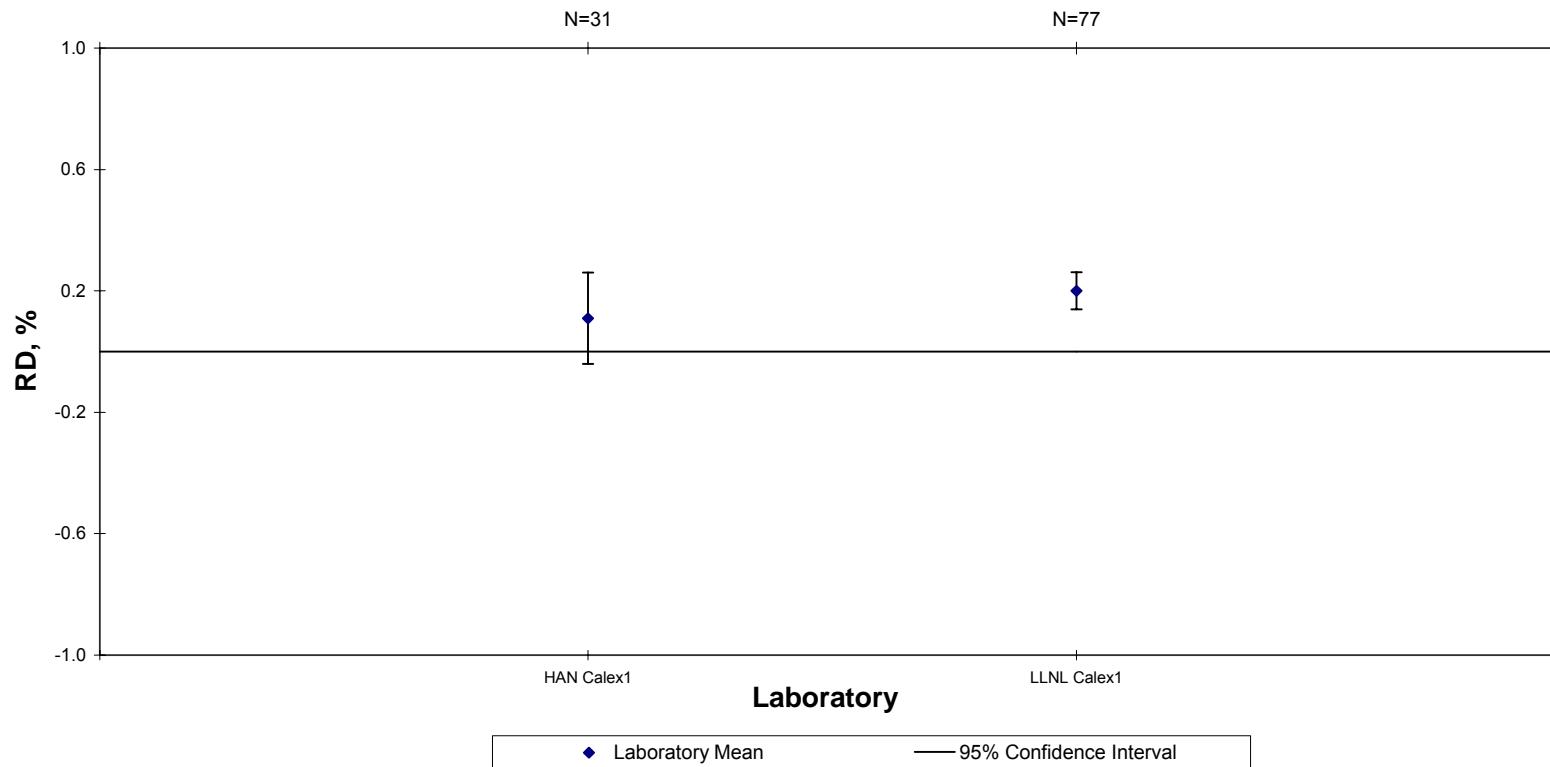
RESULTS OF ANALYSIS OF MASS - CALEX I
2007

	HAN	LANL	LLNL
Mean Error (g)	0.429	***	0.798
Standard Deviation (g)	1.645	***	1.059
Uncertainty in Mean (g)	0.296	***	0.121
Mean Error (%)	0.11%	***	0.20%
Standard Deviation (%)	0.41%	***	0.27%
Uncertainty in the Mean (%)	0.07%	***	0.03%
Number of Data Points	31	***	77
Number of Outliers	0	***	1

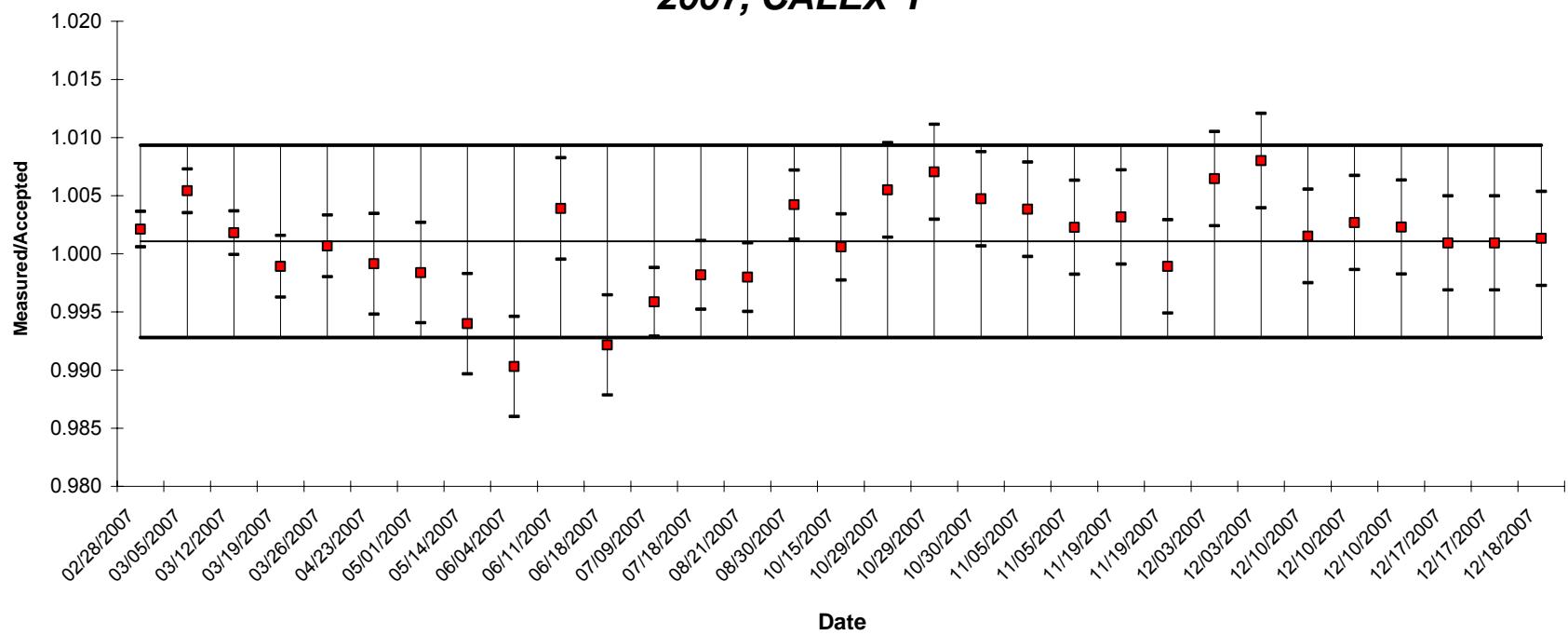
Difference from Last Year in:

Mean Error (g)	2.116	***	-0.075
Standard Deviation (g)	-0.084	***	0.468
Uncertainty in Mean (g)	-0.315	***	0.020
Mean Error (%)	0.53%	***	-0.02%
Standard Deviation (%)	-0.02%	***	0.12%
Uncertainty in the Mean (%)	-0.08%	***	0.00%
Number of Data Points	23	***	43
Number of Outliers	-1	***	-3

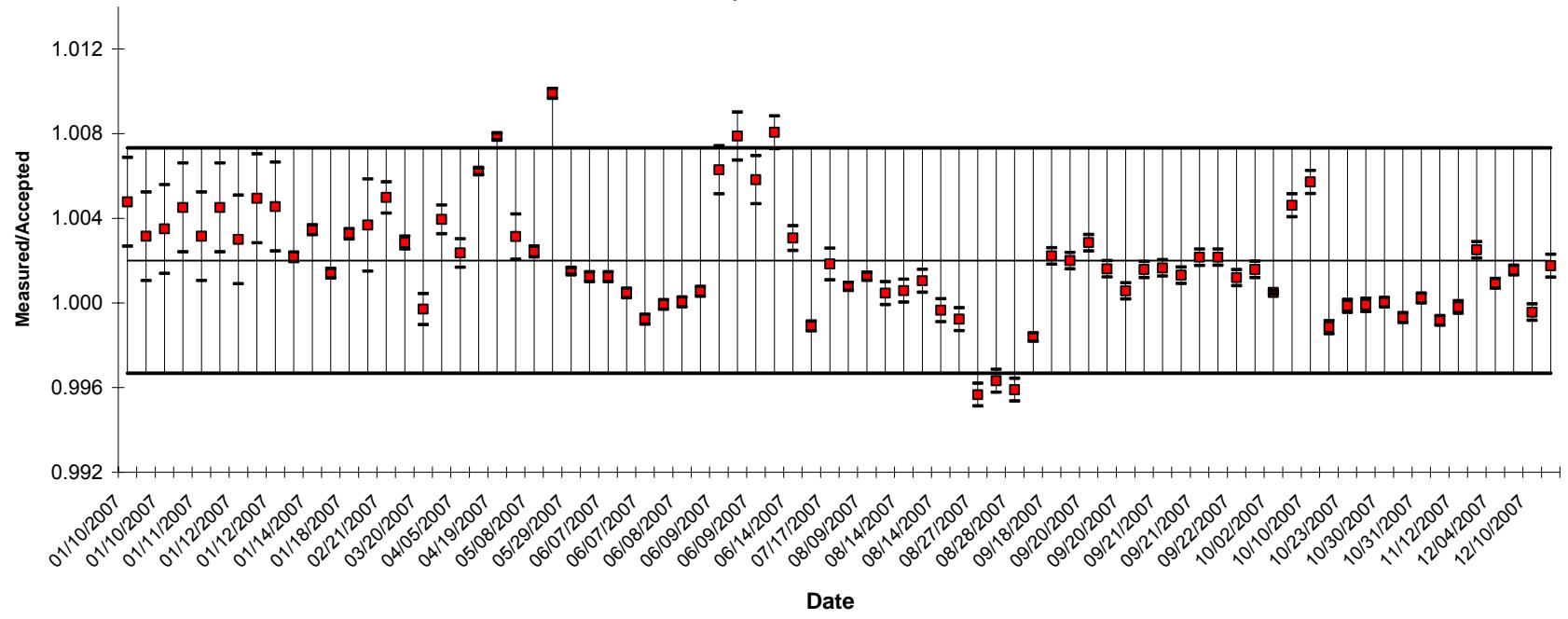
**New Brunswick Laboratory Calorimetry Exchange Program
Pu Mass, 2007 - CALEX I**



HAN
MASS DATA
2007, CALEX I



LLNL
MASS DATA
2007, CALEX I



Pu Mass DATA
Calendar Year 2007

HAN: Calex I

#	Date Measured	Instr. ID	Measured Pu-Mass (g)	Uncert. 1 STD	Accepted Pu-Mass (g)	Ratio M/A	Grams Error	Percent Error
1	02/28/2007	2740	398.60	0.08%	397.76	1.0021	0.84	0.21%
2	03/05/2007	2740	399.91	0.09%	397.76	1.0054	2.16	0.54%
3	03/12/2007	2740	398.48	0.09%	397.76	1.0018	0.72	0.18%
4	03/19/2007	2740	397.33	0.13%	397.76	0.9989	-0.43	-0.11%
5	03/26/2007	2740	398.03	0.13%	397.76	1.0007	0.27	0.07%
6	04/23/2007	2740	397.41	0.22%	397.75	0.9991	-0.34	-0.09%
7	05/01/2007	2740	397.11	0.22%	397.75	0.9984	-0.64	-0.16%
8	05/14/2007	2740	395.36	0.22%	397.75	0.9940	-2.39	-0.60%
9	06/04/2007	2740	393.89	0.22%	397.75	0.9903	-3.86	-0.97%
10	06/11/2007	2740	399.30	0.22%	397.75	1.0039	1.55	0.39%
11	06/18/2007	2740	394.63	0.22%	397.75	0.9922	-3.12	-0.78%
12	07/09/2007	2740	396.10	0.15%	397.75	0.9959	-1.65	-0.41%
13	07/18/2007	2740	397.02	0.15%	397.74	0.9982	-0.72	-0.18%
14	08/21/2007	2740	396.95	0.15%	397.74	0.9980	-0.80	-0.20%
15	08/30/2007	2740	399.42	0.15%	397.74	1.0042	1.68	0.42%
16	10/15/2007	2740	397.98	0.14%	397.74	1.0006	0.24	0.06%
17	10/29/2007	2740	399.92	0.20%	397.74	1.0055	2.19	0.55%
18	10/29/2007	8302	400.54	0.20%	397.74	1.0071	2.80	0.71%
19	10/30/2007	90225	399.61	0.20%	397.74	1.0047	1.88	0.47%
20	11/05/2007	90225	399.26	0.20%	397.74	1.0038	1.53	0.38%
21	11/05/2007	8302	398.65	0.20%	397.74	1.0023	0.91	0.23%
22	11/19/2007	90225	398.99	0.20%	397.74	1.0032	1.26	0.32%
23	11/19/2007	8302	397.30	0.20%	397.74	0.9989	-0.43	-0.11%
24	12/03/2007	90225	400.93	0.20%	397.74	1.0080	3.19	0.80%
25	12/03/2007	8302	400.31	0.20%	397.74	1.0065	2.57	0.65%
26	12/10/2007	2740	398.34	0.20%	397.73	1.0015	0.61	0.15%
27	12/10/2007	90225	398.80	0.20%	397.73	1.0027	1.07	0.27%
28	12/10/2007	8302	398.65	0.20%	397.73	1.0023	0.92	0.23%
29	12/17/2007	8302	398.11	0.20%	397.73	1.0009	0.37	0.09%
30	12/17/2007	90225	398.11	0.20%	397.73	1.0009	0.37	0.09%
31	12/18/2007	2740	398.26	0.20%	397.73	1.0013	0.53	0.13%
Mean:					1.0011	0.429	0.11%	
Standard Deviation:					0.0041	1.645	0.41%	
Standard Uncertainty:					0.0007	0.296	0.07%	

Statistical outliers are in bold and are not included in graphs and tables.

Pu Mass DATA
Calendar Year 2007

LLNL: Calex I

#	Date Measured	Instr. ID	Measured Pu-Mass (g)	Uncert. 1 STD	Accepted Pu-Mass (g)	Ratio M/A	Grams Error	Percent Error
1	01/10/2007	I	399.01	0.10%	397.76	1.0031	1.25	0.31%
2	01/10/2007	I	399.15	0.10%	397.76	1.0035	1.39	0.35%
3	01/10/2007	I	399.66	0.10%	397.76	1.0048	1.90	0.48%
4	01/11/2007	I	399.55	0.10%	397.76	1.0045	1.79	0.45%
5	01/11/2007	III	399.55	0.10%	397.76	1.0045	1.79	0.45%
6	01/11/2007	I	399.01	0.10%	397.76	1.0032	1.25	0.32%
7	01/12/2007	III	398.95	0.10%	397.76	1.0030	1.19	0.30%
8	01/12/2007	III	399.57	0.10%	397.76	1.0046	1.81	0.46%
9	01/12/2007	III	399.72	0.10%	397.76	1.0049	1.97	0.49%
10	01/14/2007	III	398.63	0.01%	397.77	1.0022	0.87	0.22%
11	01/14/2007	III	398.32	0.01%	397.77	1.0014	0.56	0.14%
12	01/14/2007	III	399.14	0.01%	397.77	1.0035	1.37	0.35%
13	01/18/2007	I	399.06	0.01%	397.76	1.0033	1.30	0.33%
14	02/14/2007	II	399.23	0.11%	397.76	1.0037	1.46	0.37%
15	02/21/2007	I	399.74	0.04%	397.76	1.0050	1.98	0.50%
16	02/27/2007	III	398.89	0.02%	397.76	1.0029	1.13	0.29%
17	03/20/2007	I	397.64	0.04%	397.76	0.9997	-0.12	-0.03%
18	04/03/2007	III	399.32	0.03%	397.76	1.0039	1.57	0.39%
19	04/05/2007	I	398.69	0.03%	397.75	1.0024	0.94	0.24%
20	04/18/2007	I	400.22	0.01%	397.75	1.0062	2.48	0.62%
21	04/19/2007	III	400.87	0.01%	397.75	1.0079	3.13	0.79%
22	04/30/2007	I	399.00	0.05%	397.76	1.0031	1.25	0.31%
23	05/08/2007	III	398.72	0.01%	397.75	1.0024	0.97	0.24%
24	05/17/2007	III	401.68	0.01%	397.75	1.0099	3.94	0.99%
25	05/29/2007	II	398.35	0.01%	397.75	1.0015	0.60	0.15%
26	06/06/2007	III	398.24	0.01%	397.75	1.0012	0.49	0.12%
27	06/07/2007	III	397.44	0.01%	397.74	0.9992	-0.31	-0.08%
28	06/07/2007	III	397.93	0.01%	397.74	1.0005	0.19	0.05%
29	06/07/2007	III	398.24	0.01%	397.74	1.0012	0.49	0.12%
30	06/07/2007	III	397.71	0.01%	397.74	0.9999	-0.03	-0.01%
31	06/08/2007	III	397.96	0.01%	397.74	1.0005	0.22	0.05%
32	06/08/2007	III	397.76	0.01%	397.74	1.0000	0.02	0.00%
33	06/09/2007	III	400.26	0.06%	397.75	1.0063	2.50	0.63%
34	06/09/2007	III	400.89	0.06%	397.75	1.0079	3.14	0.79%
35	06/09/2007	III	400.07	0.06%	397.75	1.0058	2.32	0.58%
36	06/10/2007	III	400.96	0.04%	397.75	1.0081	3.21	0.81%
37	06/14/2007	I	398.97	0.03%	397.75	1.0031	1.22	0.31%
38	07/02/2007	I	397.32	0.01%	397.75	0.9989	-0.43	-0.11%
39	07/17/2007	I	398.48	0.04%	397.74	1.0018	0.73	0.18%
40	08/06/2007	I	398.06	0.01%	397.75	1.0008	0.31	0.08%
41	08/09/2007	II	398.24	0.01%	397.74	1.0013	0.50	0.13%
42	08/13/2007	I	397.93	0.03%	397.75	1.0005	0.18	0.05%
43	08/14/2007	III	397.61	0.03%	397.75	0.9997	-0.14	-0.03%
44	08/14/2007	III	398.16	0.03%	397.75	1.0010	0.41	0.10%
45	08/14/2007	III	397.98	0.03%	397.75	1.0006	0.23	0.06%
46	08/15/2007	III	397.44	0.03%	397.74	0.9992	-0.31	-0.08%
47	08/27/2007	III	396.02	0.03%	397.75	0.9957	-1.72	-0.43%
48	08/27/2007	III	396.28	0.03%	397.75	0.9963	-1.46	-0.37%
49	08/28/2007	III	396.11	0.03%	397.74	0.9959	-1.63	-0.41%
50	09/06/2007	I	397.10	0.01%	397.74	0.9984	-0.64	-0.16%
51	09/18/2007	III	398.63	0.02%	397.74	1.0022	0.88	0.22%
52	09/20/2007	II	398.87	0.02%	397.74	1.0028	1.13	0.28%
53	09/20/2007	I	398.53	0.02%	397.74	1.0020	0.79	0.20%
54	09/20/2007	II	398.38	0.02%	397.74	1.0016	0.64	0.16%
55	09/20/2007	II	397.97	0.02%	397.74	1.0006	0.23	0.06%
56	09/21/2007	II	398.39	0.02%	397.74	1.0017	0.66	0.17%
57	09/21/2007	II	398.26	0.02%	397.74	1.0013	0.52	0.13%
58	09/21/2007	II	398.59	0.02%	397.74	1.0022	0.86	0.22%
59	09/21/2007	II	398.36	0.02%	397.74	1.0016	0.63	0.16%
60	09/22/2007	II	398.59	0.02%	397.74	1.0022	0.86	0.22%
61	09/22/2007	II	398.21	0.02%	397.74	1.0012	0.48	0.12%
62	09/22/2007	II	398.36	0.02%	397.74	1.0016	0.63	0.16%

Pu Mass DATA
Calendar Year 2007

LLNL: Calex I

#	Date Measured	Instr. ID	Measured Pu-Mass (g)	Uncert. 1 STD	Accepted Pu-Mass (g)	Ratio M/A	Grams Error	Percent Error
63	10/02/2007	I	397.94	0.00%	397.74	1.0005	0.20	0.05%
64	10/08/2007	II	399.58	0.03%	397.74	1.0046	1.84	0.46%
65	10/10/2007	I	400.01	0.03%	397.74	1.0057	2.27	0.57%
66	10/22/2007	II	397.28	0.02%	397.74	0.9989	-0.46	-0.11%
67	10/23/2007	I	397.68	0.02%	397.74	0.9999	-0.06	-0.01%
68	10/25/2007	III	397.70	0.02%	397.74	0.9999	-0.04	-0.01%
69	10/30/2007	I	397.75	0.01%	397.74	1.0000	0.01	0.00%
70	10/31/2007	III	397.83	0.01%	397.74	1.0002	0.09	0.02%
71	10/31/2007	II	397.46	0.01%	397.74	0.9993	-0.28	-0.07%
72	11/05/2007	I	397.40	0.01%	397.73	0.9992	-0.33	-0.08%
73	11/12/2007	II	397.66	0.01%	397.74	0.9998	-0.08	-0.02%
74	11/26/2007	I	398.73	0.02%	397.74	1.0025	1.00	0.25%
75	12/04/2007	II	398.10	0.01%	397.73	1.0009	0.37	0.09%
76	12/06/2007	I	398.35	0.01%	397.73	1.0016	0.62	0.16%
77	12/10/2007	III	397.56	0.02%	397.74	0.9996	-0.17	-0.04%
78	12/27/2007	I	398.43	0.03%	397.73	1.0018	0.70	0.18%
Mean:						1.0020	0.798	0.20%
Standard Deviation:						0.0027	1.059	0.27%
Standard Uncertainty:						0.0003	0.121	0.03%

Statistical outliers are in bold and are not included in graphs and tables.

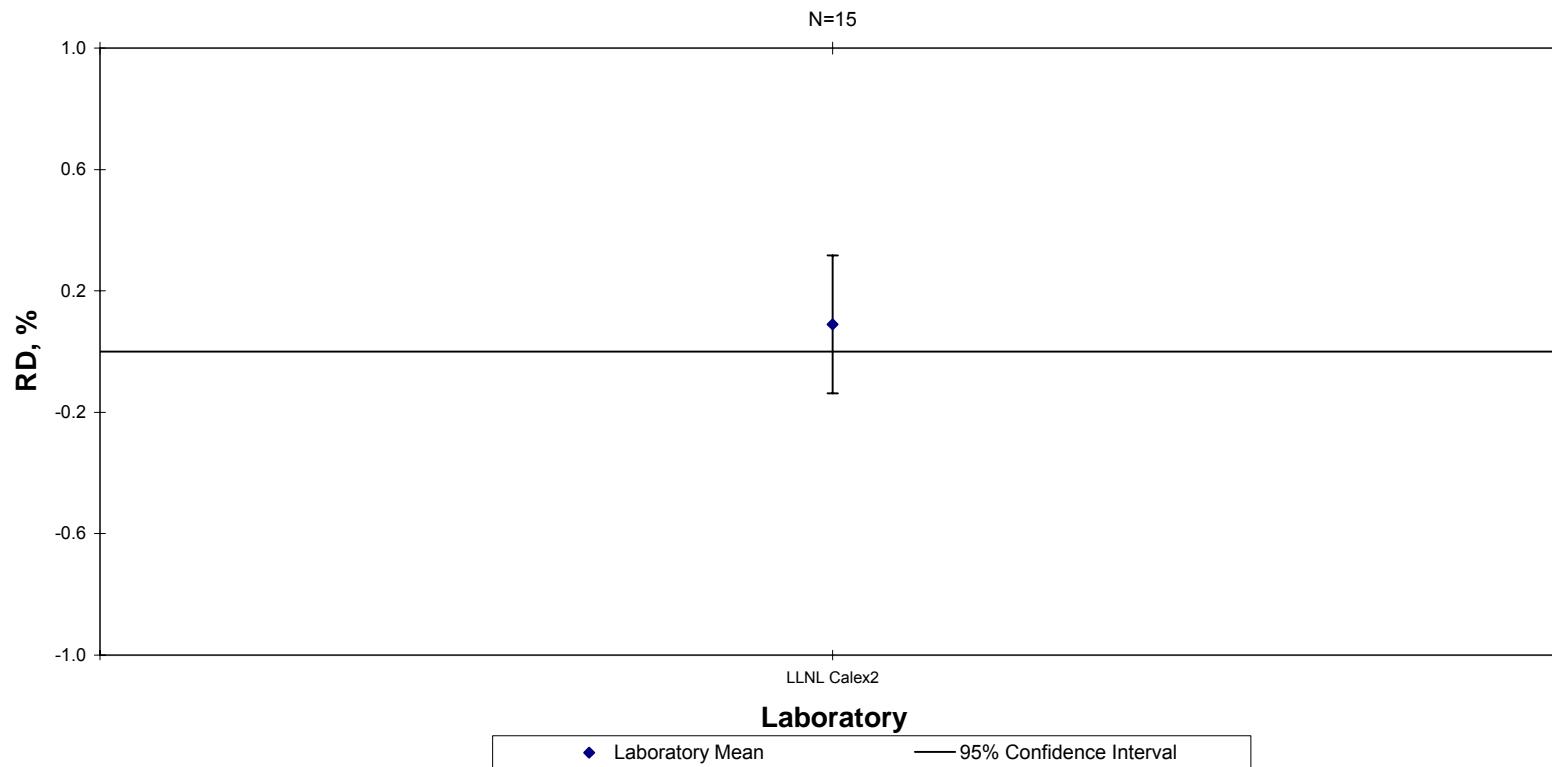
RESULTS OF ANALYSIS OF MASS - CALEX II 2007

	LLNL
Mean Error (g)	1.648
Standard Deviation (g)	7.233
Uncertainty in Mean (g)	1.868
Mean Error (%)	0.09%
Standard Deviation (%)	0.41%
Uncertainty in the Mean (%)	0.11%
Number of Data Points	15
Number of Outliers	0

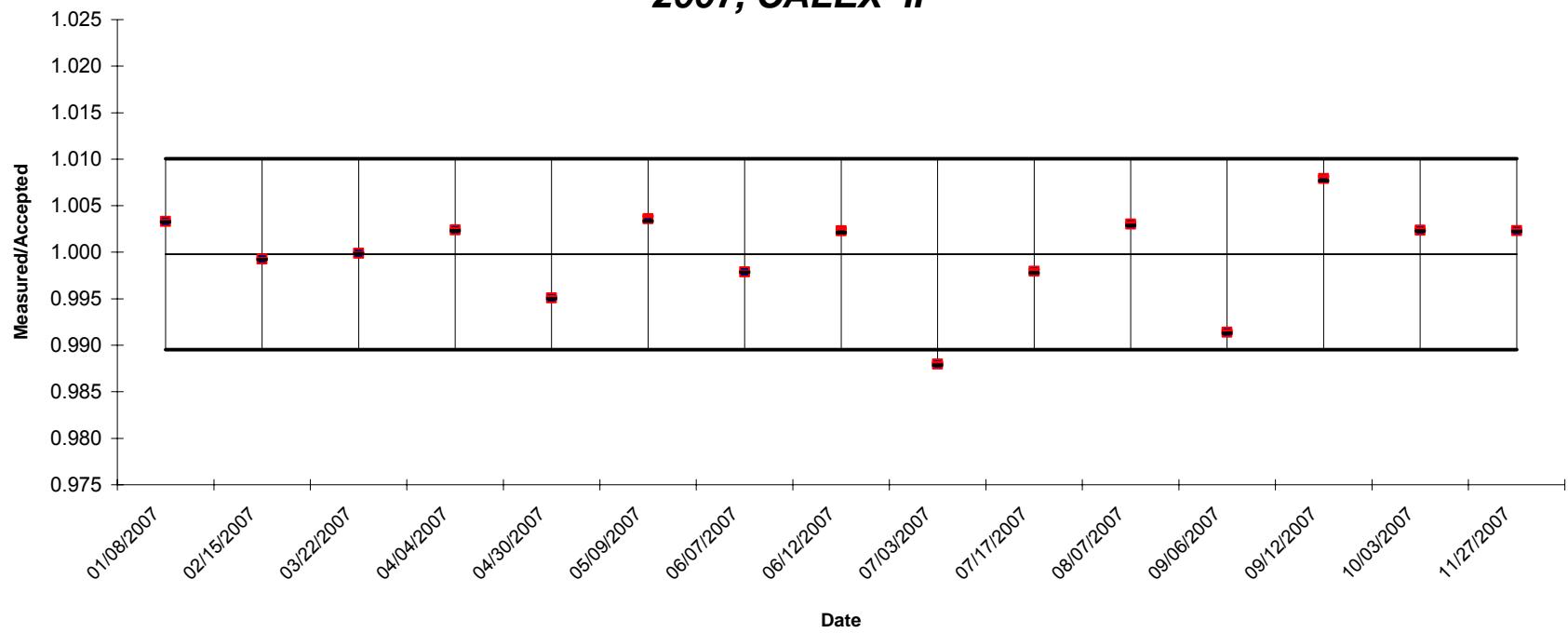
Difference from Last Year in:

Mean Error (g)	****
Standard Deviation (g)	****
Uncertainty in Mean (g)	****
Mean Error (%)	****
Standard Deviation (%)	****
Uncertainty in the Mean (%)	****
Number of Data Points	15
Number of Outliers	0

New Brunswick Laboratory Calorimetry Exchange Program
Pu Mass, 2007 - CALEX II



LLNL
MASS DATA
2007, CALEX II



Pu Mass DATA

Calendar Year 2007

LLNL: Calex II

#	Date Measured	Instr. ID	Measured Pu-Mass (g)	Uncert. 1 STD	Accepted Pu-Mass (g)	Ratio M/A	Grams Error	Percent Error
1	01/08/2007	III	1749.83	0.00%	1744.05	1.0033	5.78	0.33%
2	02/15/2007	III	1742.69	0.00%	1743.97	0.9993	-1.28	-0.07%
3	03/22/2007	III	1743.68	0.00%	1743.87	0.9999	-0.19	-0.01%
4	04/04/2007	III	1748.06	0.01%	1743.87	1.0024	4.20	0.24%
5	04/30/2007	III	1735.36	0.01%	1743.91	0.9951	-8.56	-0.49%
6	05/09/2007	III	1750.11	0.01%	1743.83	1.0036	6.28	0.36%
7	06/07/2007	II	1740.11	0.00%	1743.78	0.9979	-3.68	-0.21%
8	06/12/2007	III	1747.78	0.01%	1743.75	1.0023	4.03	0.23%
9	07/03/2007	III	1753.14	0.00%	1743.74	1.0054	9.39	0.54%
10	07/17/2007	III	1740.14	0.01%	1743.71	0.9980	-3.57	-0.20%
11	08/07/2007	III	1748.97	0.01%	1743.69	1.0030	5.28	0.30%
12	09/06/2007	III	1728.62	0.01%	1743.62	0.9914	-14.99	-0.86%
13	09/12/2007	III	1757.43	0.01%	1743.62	1.0079	13.81	0.79%
14	10/03/2007	III	1747.77	0.00%	1743.62	1.0024	4.15	0.24%
15	11/27/2007	III	1747.62	0.00%	1743.55	1.0023	4.07	0.23%
Mean:						1.0009	1.648	0.09%
Standard Deviation:						0.0041	7.233	0.41%
Standard Uncertainty:						0.0011	1.868	0.11%

Statistical outliers are in bold and are not included in graphs and tables.

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H. CALORIMETRIC POWER MEASUREMENTS: TABLES AND GRAPHS

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RESULTS OF ANALYSIS OF POWER - CALEX I
1st QUARTER 2007

	HAN	LANL	LLNL
Mean Error (mW)	1.738	****	1.525
Standard Deviation (mW)	3.435	****	2.171
Uncertainty in Mean (mW)	1.214	****	0.580
Mean Error (%)	0.17%	****	0.15%
Standard Deviation (%)	0.33%	****	0.21%
Uncertainty in the Mean (%)	0.12%	****	0.06%
Number of Data Points	8	****	14
Number of Outliers	0	****	2

Difference from Last Quarter in:

Mean Error (mW)	6.710	****	0.338
Standard Deviation (mW)	-1.559	****	-0.022
Uncertainty in Mean (mW)	-1.283	****	0.032
Mean Error (%)	0.65%	****	0.03%
Standard Deviation (%)	-0.15%	****	0.00%
Uncertainty in the Mean (%)	-0.12%	****	0.01%
Number of Data Points	4	****	-2
Number of Outliers	0	****	2

RESULTS OF ANALYSIS OF POWER - CALEX I
2nd QUARTER 2007

	HAN	LANL	LLNL
Mean Error (mW)	-4.626	****	1.987
Standard Deviation (mW)	5.613	****	3.736
Uncertainty in Mean (mW)	2.292	****	0.881
Mean Error (%)	-0.45%	****	0.19%
Standard Deviation (%)	0.54%	****	0.36%
Uncertainty in the Mean (%)	0.22%	****	0.09%
Number of Data Points	6	****	18
Number of Outliers	0	****	0

Difference from Last Quarter in:

Mean Error (mW)	-6.364	****	0.462
Standard Deviation (mW)	2.178	****	1.565
Uncertainty in Mean (mW)	1.078	****	0.301
Mean Error (%)	-0.62%	****	0.04%
Standard Deviation (%)	0.21%	****	0.15%
Uncertainty in the Mean (%)	0.10%	****	0.03%
Number of Data Points	-2	****	4
Number of Outliers	0	****	-2

RESULTS OF ANALYSIS OF POWER - CALEX I
3rd QUARTER 2007

	HAN	LANL	LLNL
Mean Error (mW)	-2.507	****	-0.706
Standard Deviation (mW)	3.803	****	3.484
Uncertainty in Mean (mW)	1.901	****	0.931
Mean Error (%)	-0.24%	****	-0.07%
Standard Deviation (%)	0.37%	****	0.34%
Uncertainty in the Mean (%)	0.18%	****	0.09%
Number of Data Points	4	****	14
Number of Outliers	0	****	0

Difference from Last Quarter in:

Mean Error (mW)	2.119	****	-2.693
Standard Deviation (mW)	-1.810	****	-0.252
Uncertainty in Mean (mW)	-0.391	****	0.050
Mean Error (%)	0.21%	****	-0.26%
Standard Deviation (%)	-0.17%	****	-0.02%
Uncertainty in the Mean (%)	-0.04%	****	0.00%
Number of Data Points	-2	****	-4
Number of Outliers	0	****	0

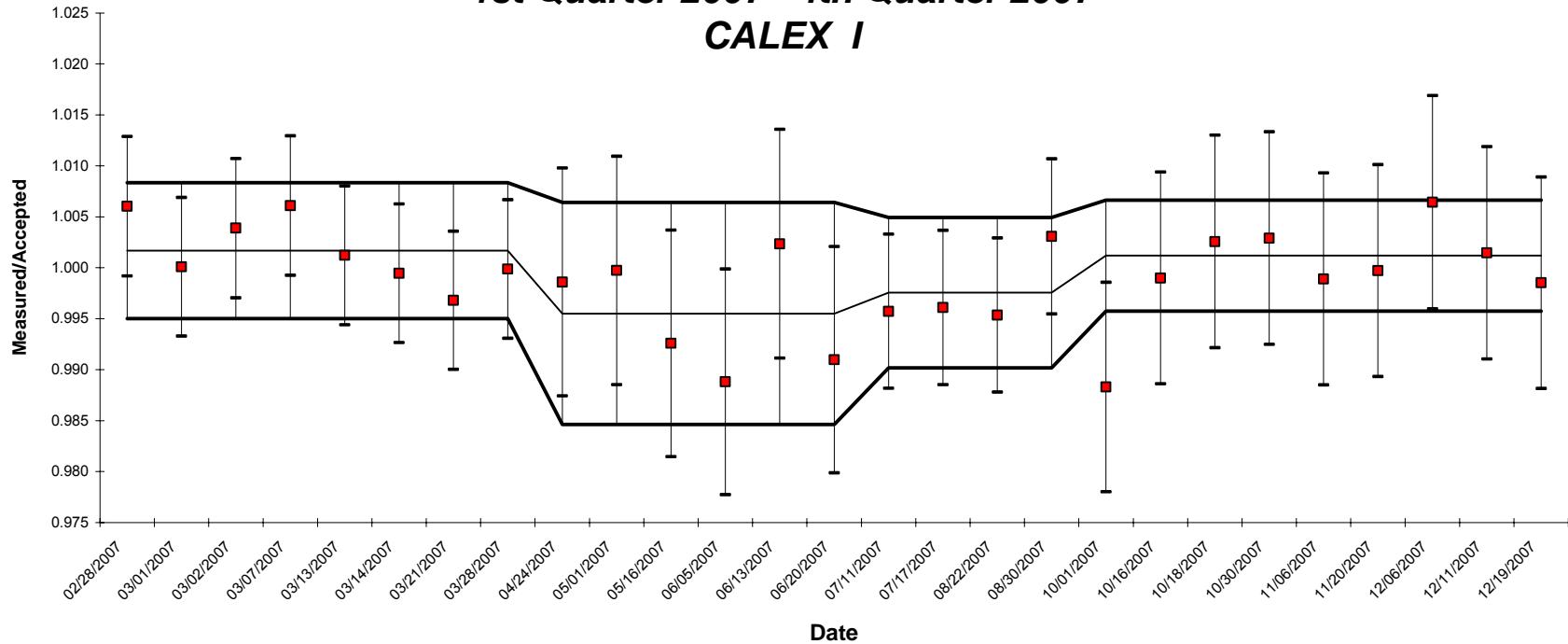
RESULTS OF ANALYSIS OF POWER - CALEX I
4th QUARTER 2007

	HAN	LANL	LLNL
Mean Error (mW)	1.233	****	-0.599
Standard Deviation (mW)	2.805	****	2.496
Uncertainty in Mean (mW)	0.992	****	0.789
Mean Error (%)	0.12%	****	-0.06%
Standard Deviation (%)	0.27%	****	0.24%
Uncertainty in the Mean (%)	0.10%	****	0.08%
Number of Data Points	8	****	10
Number of Outliers	1	****	0

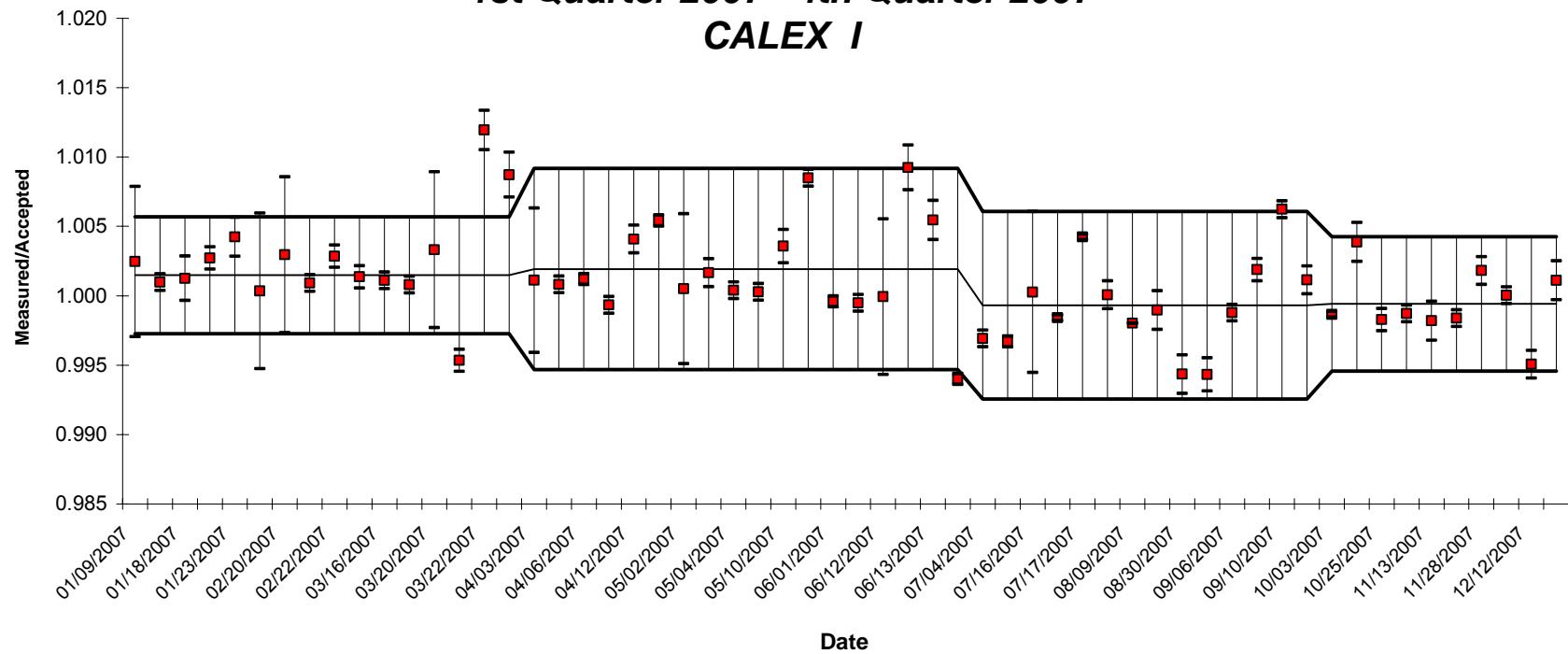
Difference from Last Quarter in:

Mean Error (mW)	3.740	****	0.107
Standard Deviation (mW)	-0.998	****	-0.988
Uncertainty in Mean (mW)	-0.909	****	-0.142
Mean Error (%)	0.36%	****	0.01%
Standard Deviation (%)	-0.10%	****	-0.10%
Uncertainty in the Mean (%)	-0.08%	****	-0.01%
Number of Data Points	4	****	-4
Number of Outliers	1	****	0

HAN
POWER DATA
1st Quarter 2007 - 4th Quarter 2007
CALEX I



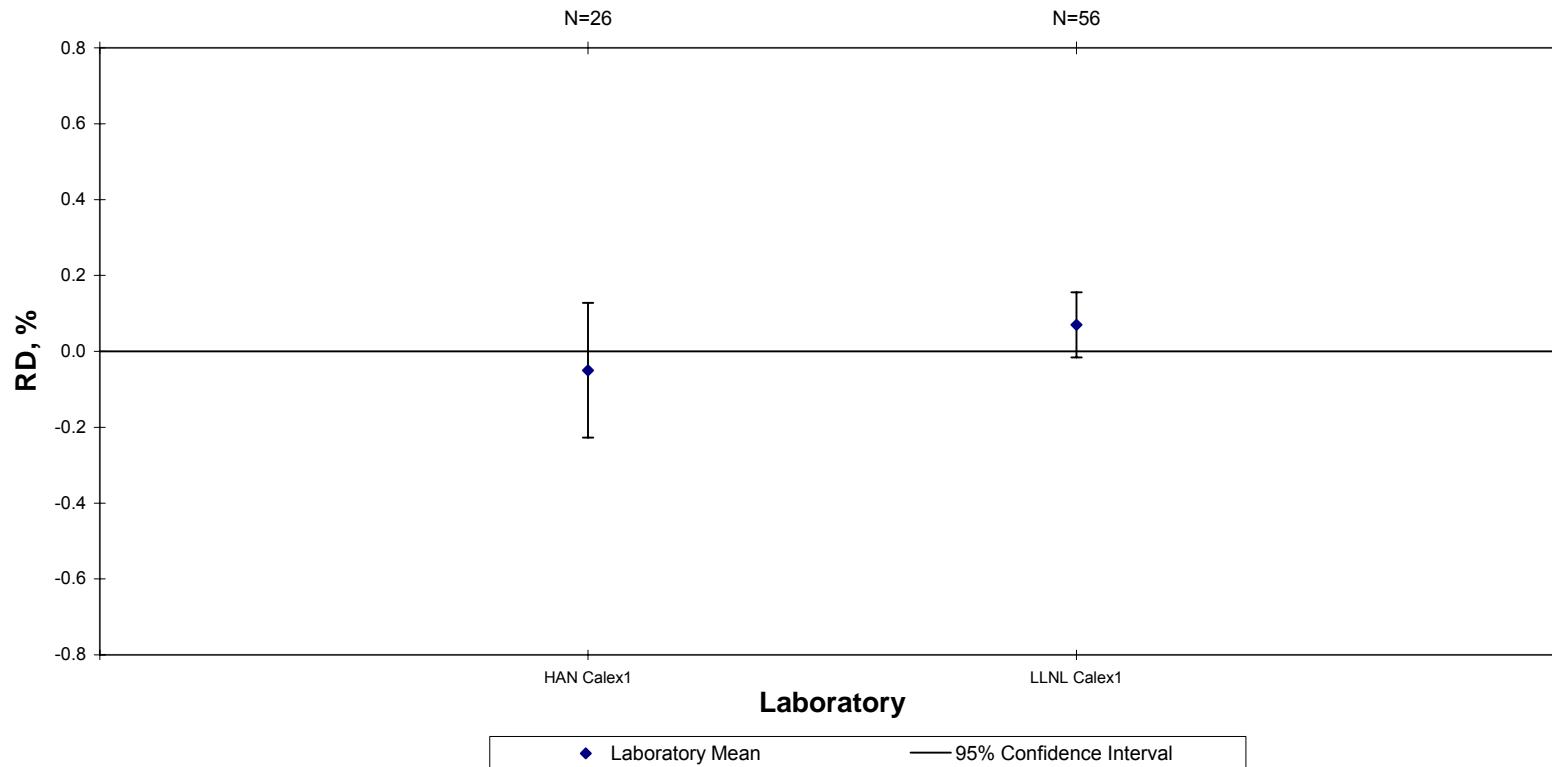
LLNL
POWER DATA
1st Quarter 2007 - 4th Quarter 2007
CALEX I



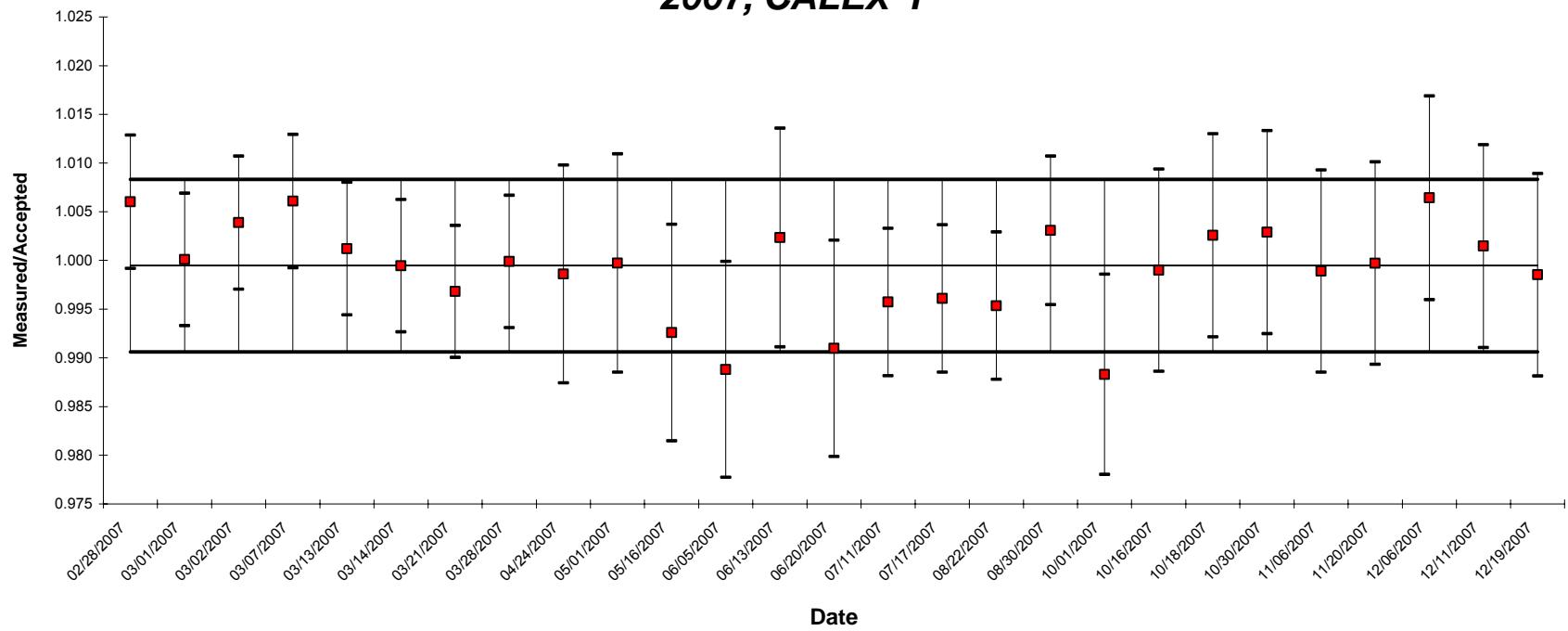
**RESULTS OF ANALYSIS OF POWER - CALEX I
2007**

	HAN	LANL	LLNL
Mean Error (mW)	-0.539	****	0.736
Standard Deviation (mW)	4.565	****	3.292
Uncertainty in Mean (mW)	0.895	****	0.440
Mean Error (%)	-0.05%	****	0.07%
Standard Deviation (%)	0.44%	****	0.32%
Uncertainty in the Mean (%)	0.09%	****	0.04%
Number of Data Points	26	****	56
Number of Outliers	1	****	2
Difference from Last Year in:			
Mean Error (mW)	5.062	****	-0.243
Standard Deviation (mW)	1.126	****	1.018
Uncertainty in Mean (mW)	-0.024	****	0.149
Mean Error (%)	0.49%	****	-0.03%
Standard Deviation (%)	0.11%	****	0.10%
Uncertainty in the Mean (%)	0.00%	****	0.01%
Number of Data Points	12	****	-5
Number of Outliers	1	****	1

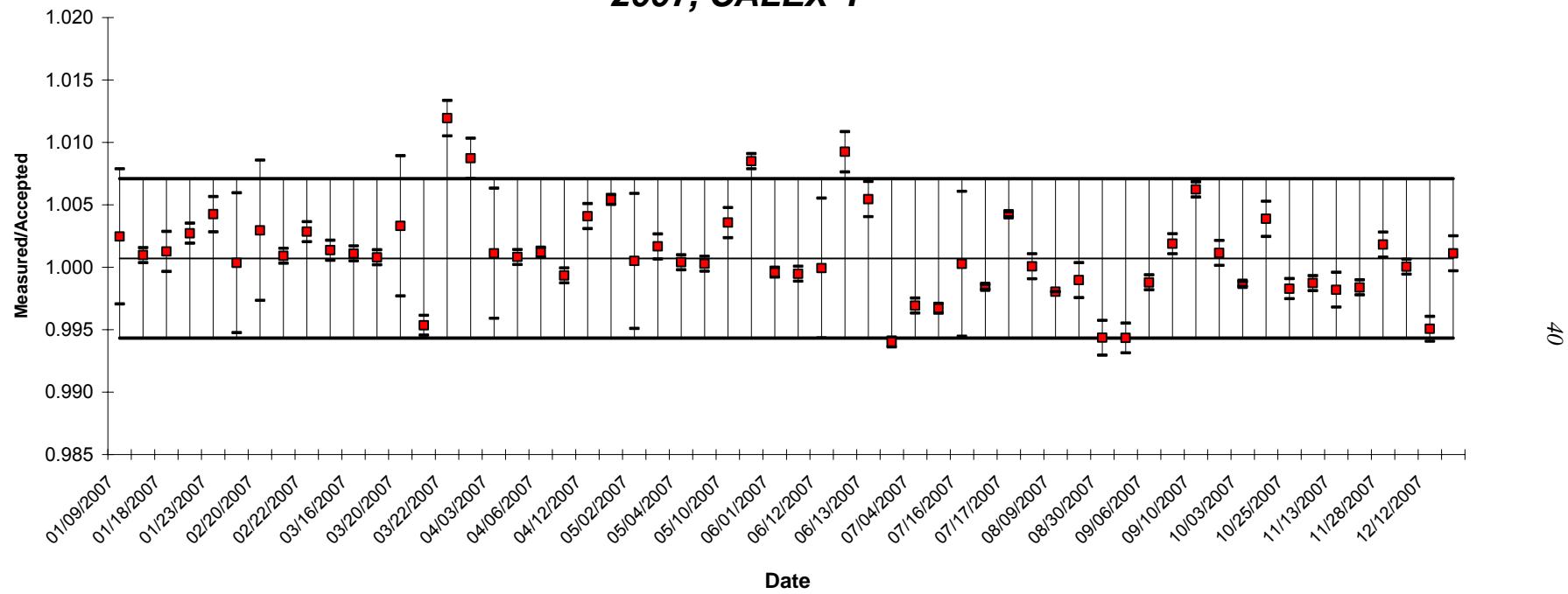
**New Brunswick Laboratory Calorimetry Exchange Program
Power, 2007 - CALEX I**



HAN
POWER DATA
2007, CALEX I



LLNL
POWER DATA
2007, CALEX I



Power DATA
Calendar Year 2007

HAN: Calex I

#	Date Measured	Instr. ID	Measured mW	Uncert. 1 STD	Accepted mW	Ratio M/A	mW Error	Percent Error
1	02/28/2007	10	1036.7000	0.34%	1030.4870	1.0060	6.2130	0.60%
2	03/01/2007	8	1030.6000	0.34%	1030.4916	1.0001	0.1084	0.01%
3	03/02/2007	7	1034.5000	0.34%	1030.4963	1.0039	4.0037	0.39%
4	03/07/2007	9	1036.8000	0.34%	1030.5194	1.0061	6.2806	0.61%
5	03/13/2007	9	1031.8000	0.34%	1030.5470	1.0012	1.2530	0.12%
6	03/14/2007	7	1030.0000	0.34%	1030.5516	0.9995	-0.5516	-0.05%
7	03/21/2007	8	1027.3000	0.34%	1030.5839	0.9968	-3.2839	-0.32%
8	03/28/2007	10	1030.5000	0.34%	1030.6162	0.9999	-0.1162	-0.01%
9	04/24/2007	9	1029.3000	0.56%	1030.7404	0.9986	-1.4404	-0.14%
10	05/01/2007	7	1030.5000	0.56%	1030.7725	0.9997	-0.2725	-0.03%
11	05/16/2007	8	1023.2000	0.56%	1030.8412	0.9926	-7.6412	-0.74%
12	06/05/2007	7	1019.4000	0.56%	1030.9325	0.9888	-11.5325	-1.12%
13	06/13/2007	9	1033.4000	0.56%	1030.9689	1.0024	2.4311	0.24%
14	06/20/2007	8	1021.7000	0.56%	1031.0008	0.9910	-9.3008	-0.90%
15	07/11/2007	7	1026.7000	0.38%	1031.0961	0.9957	-4.3961	-0.43%
16	07/17/2007	8	1027.1000	0.38%	1031.1233	0.9961	-4.0233	-0.39%
17	08/22/2007	8	1026.5000	0.38%	1031.2857	0.9954	-4.7857	-0.46%
18	08/30/2007	9	1034.5000	0.38%	1031.3217	1.0031	3.1783	0.31%
19	10/01/2007	7	1019.4000	0.52%	1031.4651	0.9883	-12.0651	-1.17%
20	10/16/2007	7	1030.5000	0.52%	1031.5320	0.9990	-1.0320	-0.10%
21	10/18/2007	8	1034.2000	0.52%	1031.5409	1.0026	2.6591	0.26%
22	10/30/2007	9	1034.6000	0.52%	1031.5944	1.0029	3.0056	0.29%
23	11/06/2007	7	1030.5000	0.52%	1031.6257	0.9989	-1.1257	-0.11%
24	11/20/2007	10	1031.4000	0.52%	1031.6878	0.9997	-0.2878	-0.03%
25	12/06/2007	9	1038.4000	0.52%	1031.7586	1.0064	6.6414	0.64%
26	12/11/2007	9	1033.3000	0.52%	1031.7807	1.0015	1.5193	0.15%
27	12/19/2007	8	1030.3000	0.52%	1031.8160	0.9985	-1.5160	-0.15%
Mean:						0.9995	-0.5389	-0.05%
Standard Deviation:						0.0044	4.5647	0.44%
Standard Uncertainty:						0.0009	0.8952	0.09%

Statistical outliers are in bold and are not included in graphs and tables.

Power DATA

Calendar Year 2007

LLNL: Calex I

#	Date Measured	Instr. ID	Measured mW	Uncert. 1 STD	Accepted mW	Ratio M/A	mW Error	Percent Error
1	01/09/2007	33	1032.8000	0.27%	1030.2545	1.0025	2.5455	0.25%
2	01/17/2007	32	1031.3000	0.03%	1030.2918	1.0010	1.0082	0.10%
3	01/18/2007	18	1031.6000	0.08%	1030.2965	1.0013	1.3035	0.13%
4	01/18/2007	30	1033.1000	0.04%	1030.2965	1.0027	2.8035	0.27%
5	01/23/2007	18	1034.7000	0.07%	1030.3198	1.0043	4.3802	0.43%
6	02/16/2007	33	1030.8000	0.28%	1030.4314	1.0004	0.3686	0.04%
7	02/20/2007	33	1033.5000	0.28%	1030.4499	1.0030	3.0501	0.30%
8	02/21/2007	32	1031.4000	0.03%	1030.4546	1.0009	0.9454	0.09%
9	02/22/2007	18	1033.4000	0.04%	1030.4592	1.0029	2.9408	0.29%
10	03/01/2007	30	1031.9000	0.04%	1030.4916	1.0014	1.4084	0.14%
11	03/16/2007	32	1031.7000	0.03%	1030.5608	1.0011	1.1392	0.11%
12	03/19/2007	32	1031.4000	0.03%	1030.5747	1.0008	0.8253	0.08%
13	03/20/2007	33	1034.0000	0.28%	1030.5793	1.0033	3.4207	0.33%
14	03/22/2007	30	1025.8000	0.04%	1030.5885	0.9954	-4.7885	-0.46%
15	03/22/2007	18	1042.9000	0.07%	1030.5885	1.0119	12.3115	1.19%
16	03/26/2007	18	1039.6000	0.08%	1030.6070	1.0087	8.9930	0.87%
17	04/03/2007	33	1031.8000	0.26%	1030.6438	1.0011	1.1562	0.11%
18	04/05/2007	30	1031.5000	0.03%	1030.6531	1.0008	0.8469	0.08%
19	04/06/2007	32	1031.9000	0.02%	1030.6577	1.0012	1.2423	0.12%
20	04/10/2007	32	1030.0000	0.03%	1030.6761	0.9993	-0.6761	-0.07%
21	04/12/2007	18	1034.9000	0.05%	1030.6853	1.0041	4.2147	0.41%
22	04/16/2007	18	1036.3000	0.02%	1030.7037	1.0054	5.5963	0.54%
23	05/02/2007	33	1031.3000	0.27%	1030.7771	1.0005	0.5229	0.05%
24	05/03/2007	30	1032.5000	0.05%	1030.7817	1.0017	1.7183	0.17%
25	05/04/2007	32	1031.2000	0.03%	1030.7863	1.0004	0.4137	0.04%
26	05/08/2007	32	1031.1000	0.03%	1030.8046	1.0003	0.2954	0.03%
27	05/10/2007	18	1034.5000	0.06%	1030.8137	1.0036	3.6863	0.36%
28	05/15/2007	18	1039.6000	0.03%	1030.8366	1.0085	8.7634	0.85%
29	06/01/2007	32	1030.5000	0.02%	1030.9143	0.9996	-0.4143	-0.04%
30	06/05/2007	32	1030.4000	0.03%	1030.9325	0.9995	-0.5325	-0.05%
31	06/12/2007	33	1030.9000	0.28%	1030.9644	0.9999	-0.0644	-0.01%
32	06/12/2007	18	1040.5000	0.08%	1030.9644	1.0092	9.5356	0.92%
33	06/13/2007	18	1036.6000	0.07%	1030.9689	1.0055	5.6311	0.55%
34	06/15/2007	30	1024.8000	0.02%	1030.9780	0.9940	-6.1780	-0.60%
35	07/04/2007	30	1027.9000	0.03%	1031.0643	0.9969	-3.1643	-0.31%
36	07/10/2007	30	1027.7000	0.02%	1031.0916	0.9967	-3.3916	-0.33%
37	07/16/2007	33	1031.4000	0.29%	1031.1187	1.0003	0.2813	0.03%
38	07/17/2007	32	1029.5000	0.01%	1031.1233	0.9984	-1.6233	-0.16%
39	07/17/2007	18	1035.5000	0.01%	1031.1233	1.0042	4.3767	0.42%
40	08/08/2007	30	1031.3000	0.05%	1031.2226	1.0001	0.0774	0.01%
41	08/09/2007	32	1029.2000	0.00%	1031.2272	0.9980	-2.0272	-0.20%
42	08/16/2007	18	1030.2000	0.07%	1031.2587	0.9990	-1.0587	-0.10%
43	08/30/2007	18	1025.5000	0.07%	1031.3217	0.9944	-5.8217	-0.56%
44	09/04/2007	18	1025.5000	0.06%	1031.3441	0.9943	-5.8441	-0.57%
45	09/06/2007	32	1030.1000	0.03%	1031.3531	0.9988	-1.2531	-0.12%
46	09/06/2007	18	1033.3000	0.04%	1031.3531	1.0019	1.9469	0.19%
47	09/10/2007	18	1037.8000	0.03%	1031.3711	1.0062	6.4289	0.62%
48	09/20/2007	30	1032.6000	0.05%	1031.4159	1.0011	1.1841	0.11%
49	10/03/2007	32	1030.1000	0.01%	1031.4740	0.9987	-1.3740	-0.13%
50	10/09/2007	18	1035.5000	0.07%	1031.5008	1.0039	3.9992	0.39%
51	10/25/2007	30	1029.8000	0.04%	1031.5721	0.9983	-1.7721	-0.17%
52	11/02/2007	32	1030.3000	0.03%	1031.6077	0.9987	-1.3077	-0.13%
53	11/13/2007	18	1029.8000	0.07%	1031.6568	0.9982	-1.8568	-0.18%
54	11/15/2007	32	1030.0000	0.03%	1031.6656	0.9984	-1.6656	-0.16%
55	11/28/2007	30	1033.6000	0.05%	1031.7232	1.0018	1.8768	0.18%
56	12/05/2007	32	1031.8000	0.03%	1031.7542	1.0000	0.0458	0.00%
57	12/12/2007	30	1026.7000	0.05%	1031.7851	0.9951	-5.0851	-0.49%
58	12/26/2007	18	1033.0000	0.07%	1031.8469	1.0011	1.1531	0.11%
Mean:						1.0007	0.7363	0.07%
Standard Deviation:						0.0032	3.2923	0.32%
Standard Uncertainty:						0.0004	0.4400	0.04%

Statistical outliers are in bold and are not included in graphs and tables.

RESULTS OF ANALYSIS OF POWER - CALEX II

1st QUARTER 2007

	LLNL
Mean Error (mW)	-16.190
Standard Deviation (mW)	9.606
Uncertainty in Mean (mW)	3.922
Mean Error (%)	-0.23%
Standard Deviation (%)	0.14%
Uncertainty in the Mean (%)	0.06%
Number of Data Points	6
Number of Outliers	0

Difference from Last Quarter in:

Mean Error (mW)	****
Standard Deviation (mW)	****
Uncertainty in Mean (mW)	****
Mean Error (%)	****
Standard Deviation (%)	****
Uncertainty in the Mean (%)	****
Number of Data Points	6
Number of Outliers	0

RESULTS OF ANALYSIS OF POWER - CALEX II
2nd QUARTER 2007

	LLNL
Mean Error (mW)	-20.545
Standard Deviation (mW)	40.345
Uncertainty in Mean (mW)	12.758
Mean Error (%)	-0.29%
Standard Deviation (%)	0.58%
Uncertainty in the Mean (%)	0.18%
Number of Data Points	10
Number of Outliers	0

Difference from Last Quarter in:

Mean Error (mW)	-4.355
Standard Deviation (mW)	30.739
Uncertainty in Mean (mW)	8.836
Mean Error (%)	-0.06%
Standard Deviation (%)	0.44%
Uncertainty in the Mean (%)	0.12%
Number of Data Points	4
Number of Outliers	0

RESULTS OF ANALYSIS OF POWER - CALEX II
3rd QUARTER 2007

	LLNL
Mean Error (mW)	-39.659
Standard Deviation (mW)	47.815
Uncertainty in Mean (mW)	13.803
Mean Error (%)	-0.57%
Standard Deviation (%)	0.68%
Uncertainty in the Mean (%)	0.20%
Number of Data Points	12
Number of Outliers	1

Difference from Last Quarter in:

Mean Error (mW)	-19.114
Standard Deviation (mW)	7.470
Uncertainty in Mean (mW)	1.045
Mean Error (%)	-0.28%
Standard Deviation (%)	0.10%
Uncertainty in the Mean (%)	0.02%
Number of Data Points	2
Number of Outliers	1

RESULTS OF ANALYSIS OF POWER - CALEX II

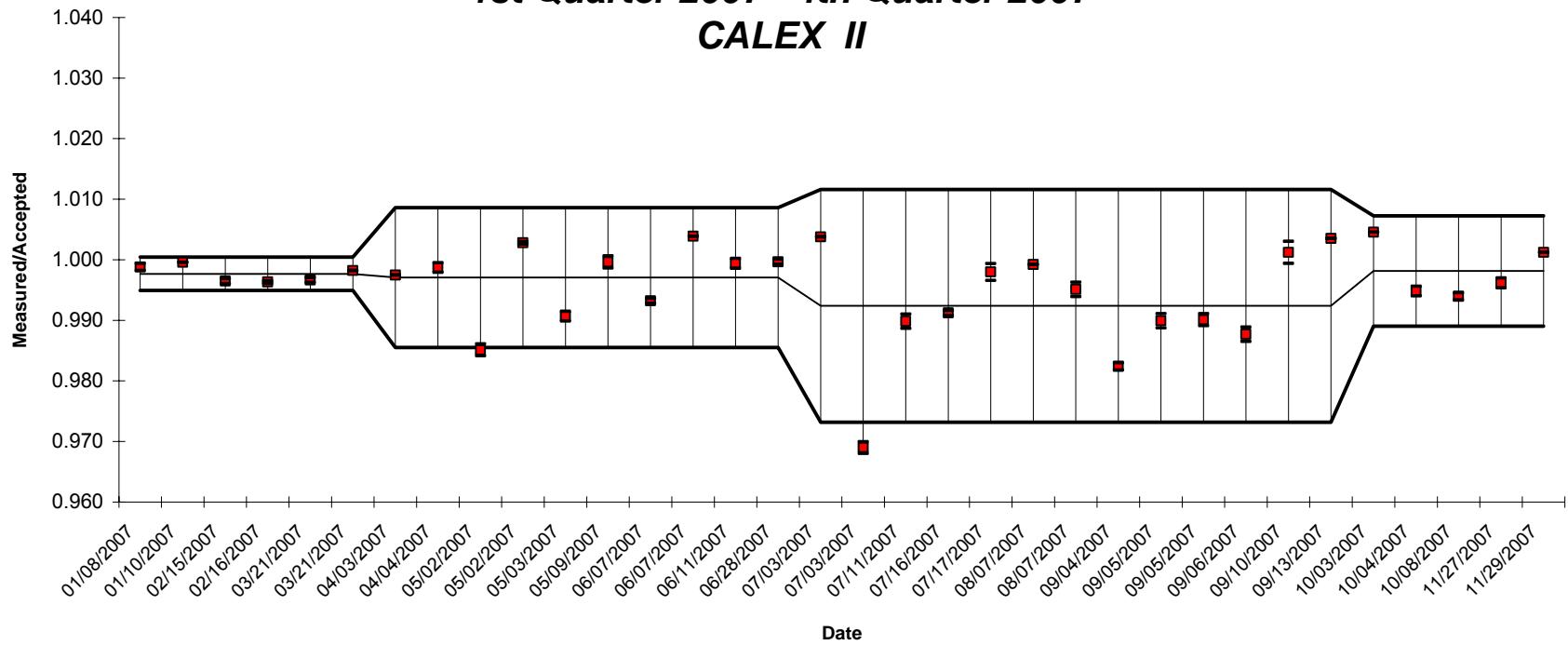
4th QUARTER 2007

	LLNL
Mean Error (mW)	-12.987
Standard Deviation (mW)	31.938
Uncertainty in Mean (mW)	14.283
Mean Error (%)	-0.19%
Standard Deviation (%)	0.46%
Uncertainty in the Mean (%)	0.20%
Number of Data Points	5
Number of Outliers	0

Difference from Last Quarter in:

Mean Error (mW)	26.672
Standard Deviation (mW)	-15.877
Uncertainty in Mean (mW)	0.480
Mean Error (%)	0.38%
Standard Deviation (%)	-0.22%
Uncertainty in the Mean (%)	0.00%
Number of Data Points	-7
Number of Outliers	-1

LLNL
POWER DATA
1st Quarter 2007 - 4th Quarter 2007
CALEX II



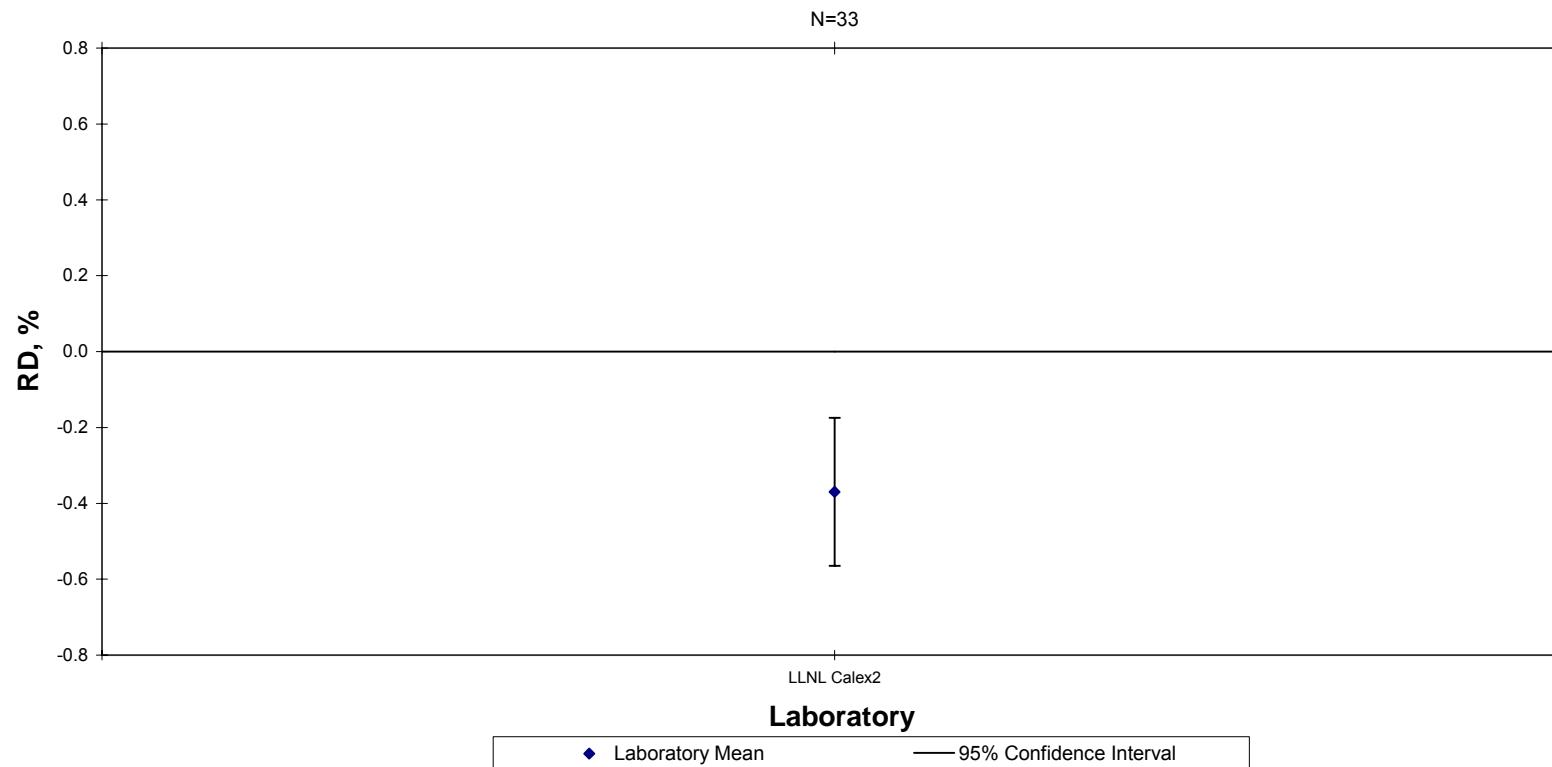
RESULTS OF ANALYSIS OF POWER - CALEX II 2007

	LLNL
Mean Error (mW)	-25.559
Standard Deviation (mW)	38.848
Uncertainty in Mean (mW)	6.763
Mean Error (%)	-0.37%
Standard Deviation (%)	0.55%
Uncertainty in the Mean (%)	0.10%
Number of Data Points	33
Number of Outliers	1

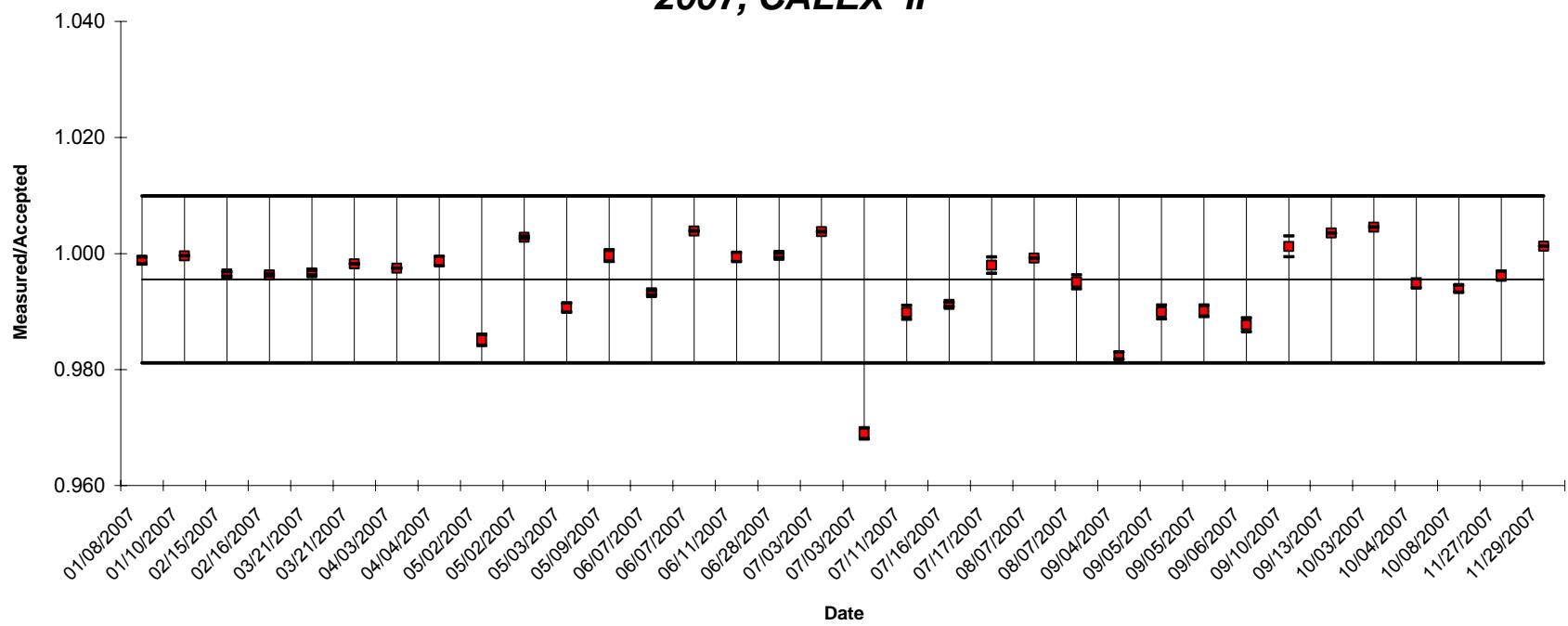
Difference from Last Year in:

Mean Error (mW)	****
Standard Deviation (mW)	****
Uncertainty in Mean (mW)	****
Mean Error (%)	****
Standard Deviation (%)	****
Uncertainty in the Mean (%)	****
Number of Data Points	33
Number of Outliers	1

**New Brunswick Laboratory Calorimetry Exchange Program
Power, 2007 - CALEX II**



LLNL
POWER DATA
2007, CALEX II



Power DATA
Calendar Year 2007

LLNL: Calex II

#	Date Measured	Instr. ID	Measured mW	Uncert. 1 STD	Accepted mW	Ratio M/A	mW Error	Percent Error
1	01/08/2007	29	6971.5000	0.03%	6979.8045	0.9988	-8.3045	-0.12%
2	01/10/2007	30	6977.1000	0.00%	6980.0534	0.9996	-2.9534	-0.04%
3	02/15/2007	29	6959.9000	0.02%	6984.5193	0.9965	-24.6193	-0.35%
4	02/16/2007	30	6959.0000	0.01%	6984.6430	0.9963	-25.6430	-0.37%
5	03/21/2007	29	6965.5000	0.02%	6988.7084	0.9967	-23.2084	-0.33%
6	03/21/2007	30	6976.3000	0.00%	6988.7084	0.9982	-12.4084	-0.18%
7	04/03/2007	30	6972.7000	0.00%	6990.3060	0.9975	-17.6060	-0.25%
8	04/04/2007	29	6981.4000	0.04%	6990.4288	0.9987	-9.0288	-0.13%
9	05/02/2007	29	6889.8000	0.05%	6993.8579	0.9851	-104.0579	-1.49%
10	05/02/2007	30	7013.5000	0.01%	6993.8579	1.0028	19.6421	0.28%
11	05/03/2007	29	6928.8000	0.04%	6993.9801	0.9907	-65.1801	-0.93%
12	05/09/2007	29	6992.2000	0.05%	6994.7128	0.9996	-2.5128	-0.04%
13	06/07/2007	29	6950.8000	0.02%	6998.2442	0.9932	-47.4442	-0.68%
14	06/07/2007	30	7025.4000	0.00%	6998.2442	1.0039	27.1558	0.39%
15	06/11/2007	29	6994.6000	0.04%	6998.7300	0.9994	-4.1300	-0.06%
16	06/28/2007	29	6998.5000	0.02%	7000.7912	0.9997	-2.2912	-0.03%
17	07/03/2007	30	7027.8000	0.00%	7001.3963	1.0038	26.4037	0.38%
18	07/03/2007	29	6784.4000	0.05%	7001.3963	0.9690	-216.9963	-3.10%
19	07/11/2007	29	6931.4000	0.06%	7002.3635	0.9899	-70.9635	-1.01%
20	07/16/2007	29	6941.5000	0.02%	7002.9674	0.9912	-61.4674	-0.88%
21	07/17/2007	29	6989.0000	0.07%	7003.0881	0.9980	-14.0881	-0.20%
22	08/07/2007	30	7000.1000	0.00%	7005.6187	0.9992	-5.5187	-0.08%
23	08/07/2007	29	6971.4000	0.06%	7005.6187	0.9951	-34.2187	-0.49%
24	09/04/2007	29	6885.6000	0.03%	7008.9795	0.9824	-123.3795	-1.76%
25	09/05/2007	29	6938.5000	0.06%	7009.0993	0.9899	-70.5993	-1.01%
26	09/05/2007	29	6939.8000	0.05%	7009.0993	0.9901	-69.2993	-0.99%
27	09/06/2007	29	6923.1000	0.06%	7009.2190	0.9877	-86.1190	-1.23%
28	09/10/2007	29	7018.3000	0.09%	7009.6977	1.0012	8.6023	0.12%
29	09/13/2007	30	7034.8000	0.00%	7010.0566	1.0035	24.7434	0.35%
30	10/03/2007	30	7044.3000	0.00%	7012.4444	1.0045	31.8556	0.45%
31	10/04/2007	29	6976.3000	0.04%	7012.5636	0.9948	-36.2636	-0.52%
32	10/08/2007	29	6970.6000	0.03%	7013.0401	0.9939	-42.4401	-0.61%
33	11/27/2007	29	6992.2000	0.04%	7018.9761	0.9962	-26.7761	-0.38%
34	11/29/2007	30	7027.9000	0.00%	7019.2124	1.0012	8.6876	0.12%
Mean:						0.9963	-25.5585	-0.37%
Standard Deviation:						0.0055	38.8484	0.55%
Standard Uncertainty:						0.0010	6.7626	0.10%

Statistical outliers are in bold and are not included in graphs and tables.

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I. P_{eff} VALUES: TABLES AND GRAPHS

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RESULTS OF ANALYSIS OF P_EFFECTIVE - CALEX I
1st QUARTER 2007

	HAN	LANL	LLNL
Mean Error ($\mu\text{W/g}$)	-1.859	2.674	-4.209
Standard Deviation ($\mu\text{W/g}$)	3.262	10.472	2.583
Uncertainty in Mean ($\mu\text{W/g}$)	1.459	2.704	0.488
Mean Error (%)	-0.07%	0.10%	-0.16%
Standard Deviation (%)	0.13%	0.40%	0.10%
Uncertainty in the Mean (%)	0.06%	0.10%	0.02%
Number of Data Points	5	15	28
Number of Outliers	0	0	0

Difference from Last Quarter in:

Mean Error ($\mu\text{W/g}$)	-0.125	****	****
Standard Deviation ($\mu\text{W/g}$)	0.158	****	****
Uncertainty in Mean ($\mu\text{W/g}$)	0.071	****	****
Mean Error (%)	0.00%	****	****
Standard Deviation (%)	0.01%	****	****
Uncertainty in the Mean (%)	0.01%	****	****
Number of Data Points	0	15	28
Number of Outliers	0	0	0

RESULTS OF ANALYSIS OF P_EFFECTIVE - CALEX I
2nd QUARTER 2007

	HAN	LANL	LLNL
Mean Error ($\mu\text{W/g}$)	-2.148	6.958	-3.712
Standard Deviation ($\mu\text{W/g}$)	3.585	6.293	2.389
Uncertainty in Mean ($\mu\text{W/g}$)	1.081	1.990	0.488
Mean Error (%)	-0.08%	0.27%	-0.14%
Standard Deviation (%)	0.14%	0.24%	0.09%
Uncertainty in the Mean (%)	0.04%	0.08%	0.02%
Number of Data Points	11	10	24
Number of Outliers	0	0	0

Difference from Last Quarter in:

Mean Error ($\mu\text{W/g}$)	-0.289	4.284	0.497
Standard Deviation ($\mu\text{W/g}$)	0.323	-4.179	-0.194
Uncertainty in Mean ($\mu\text{W/g}$)	-0.378	-0.714	0.000
Mean Error (%)	-0.01%	0.17%	0.02%
Standard Deviation (%)	0.01%	-0.16%	-0.01%
Uncertainty in the Mean (%)	-0.02%	-0.02%	0.00%
Number of Data Points	6	-5	-4
Number of Outliers	0	0	0

RESULTS OF ANALYSIS OF P_EFFECTIVE - CALEX I
3rd QUARTER 2007

	HAN	LANL	LLNL
Mean Error ($\mu\text{W/g}$)	-3.218	4.114	-2.853
Standard Deviation ($\mu\text{W/g}$)	2.119	7.726	1.796
Uncertainty in Mean ($\mu\text{W/g}$)	0.612	2.575	0.284
Mean Error (%)	-0.12%	0.16%	-0.11%
Standard Deviation (%)	0.08%	0.30%	0.07%
Uncertainty in the Mean (%)	0.02%	0.10%	0.01%
Number of Data Points	12	9	40
Number of Outliers	0	0	0

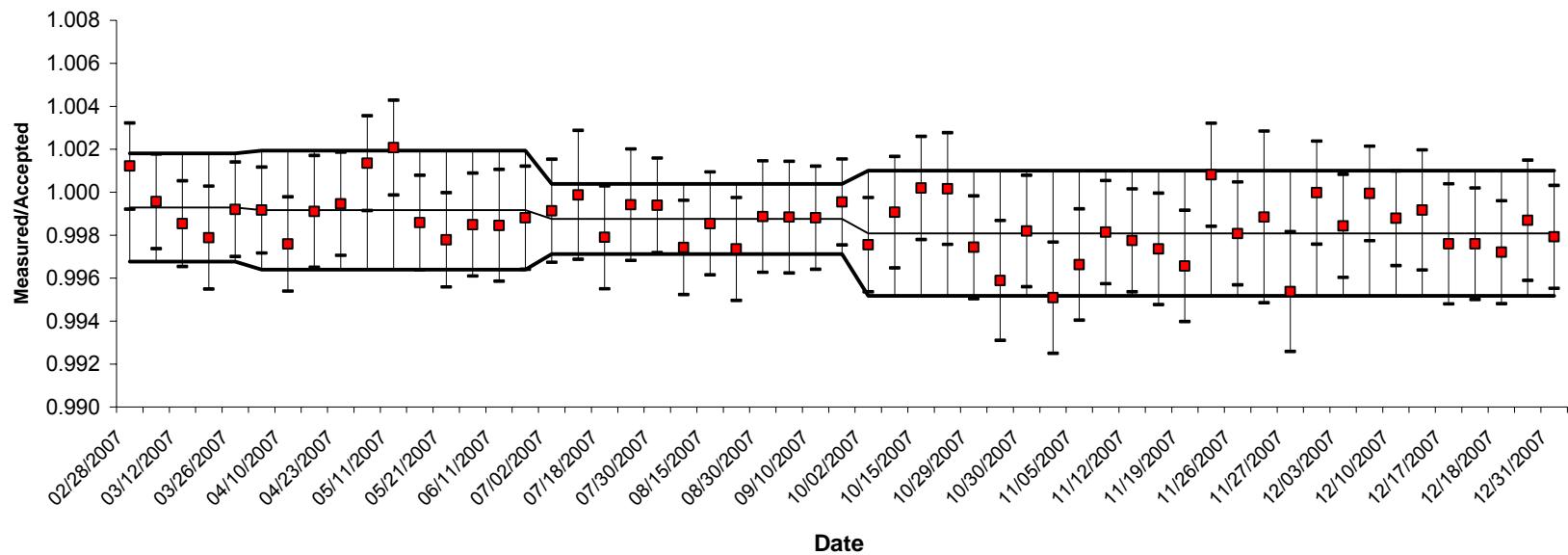
Difference from Last Quarter in:

Mean Error ($\mu\text{W/g}$)	-1.070	-2.844	0.859
Standard Deviation ($\mu\text{W/g}$)	-1.466	1.433	-0.593
Uncertainty in Mean ($\mu\text{W/g}$)	-0.469	0.585	-0.204
Mean Error (%)	-0.04%	-0.11%	0.03%
Standard Deviation (%)	-0.06%	0.06%	-0.02%
Uncertainty in the Mean (%)	-0.02%	0.02%	-0.01%
Number of Data Points	1	-1	16
Number of Outliers	0	0	0

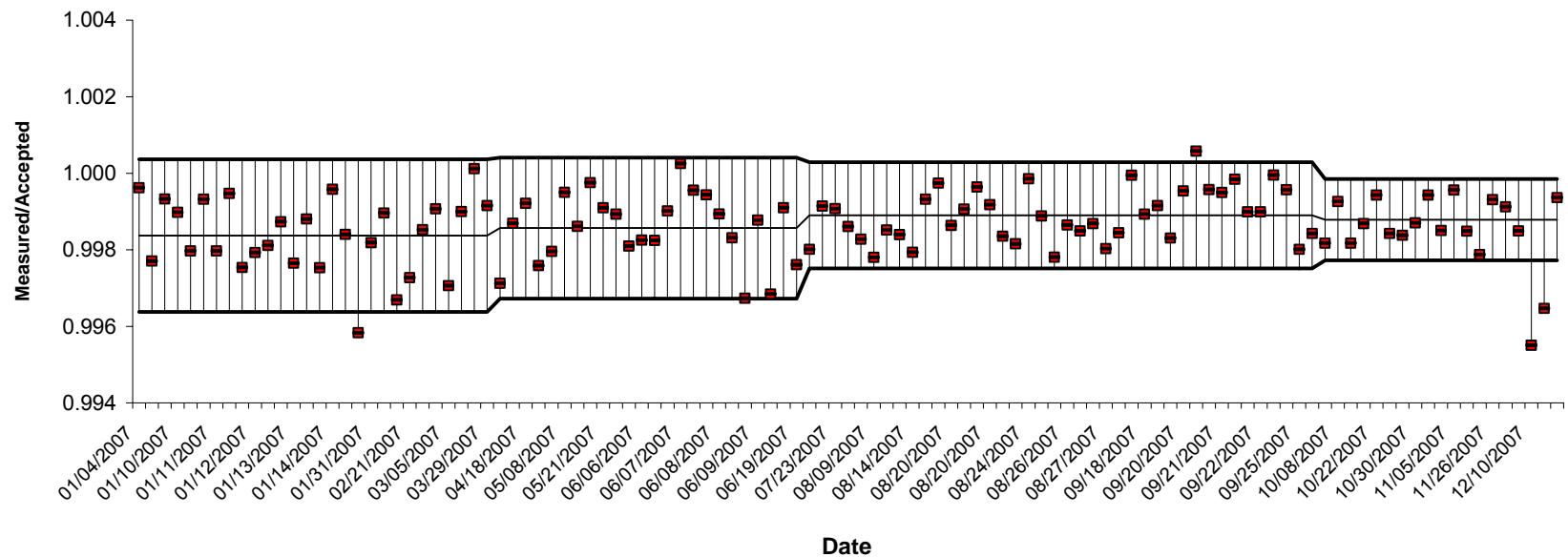
RESULTS OF ANALYSIS OF P_EFFECTIVE - CALEX I
4th QUARTER 2007

	HAN	LANL	LLNL
Mean Error ($\mu\text{W/g}$)	-4.950	4.767	-3.148
Standard Deviation ($\mu\text{W/g}$)	3.776	5.553	1.380
Uncertainty in Mean ($\mu\text{W/g}$)	0.727	2.267	0.335
Mean Error (%)	-0.19%	0.18%	-0.12%
Standard Deviation (%)	0.15%	0.21%	0.05%
Uncertainty in the Mean (%)	0.03%	0.09%	0.01%
Number of Data Points	27	6	17
Number of Outliers	0	0	2
Difference from Last Quarter in:			
Mean Error ($\mu\text{W/g}$)	-1.732	0.653	-0.295
Standard Deviation ($\mu\text{W/g}$)	1.657	-2.173	-0.416
Uncertainty in Mean ($\mu\text{W/g}$)	0.115	-0.308	0.051
Mean Error (%)	-0.07%	0.02%	-0.01%
Standard Deviation (%)	0.07%	-0.09%	-0.02%
Uncertainty in the Mean (%)	0.01%	-0.01%	0.00%
Number of Data Points	15	-3	-23
Number of Outliers	0	0	2

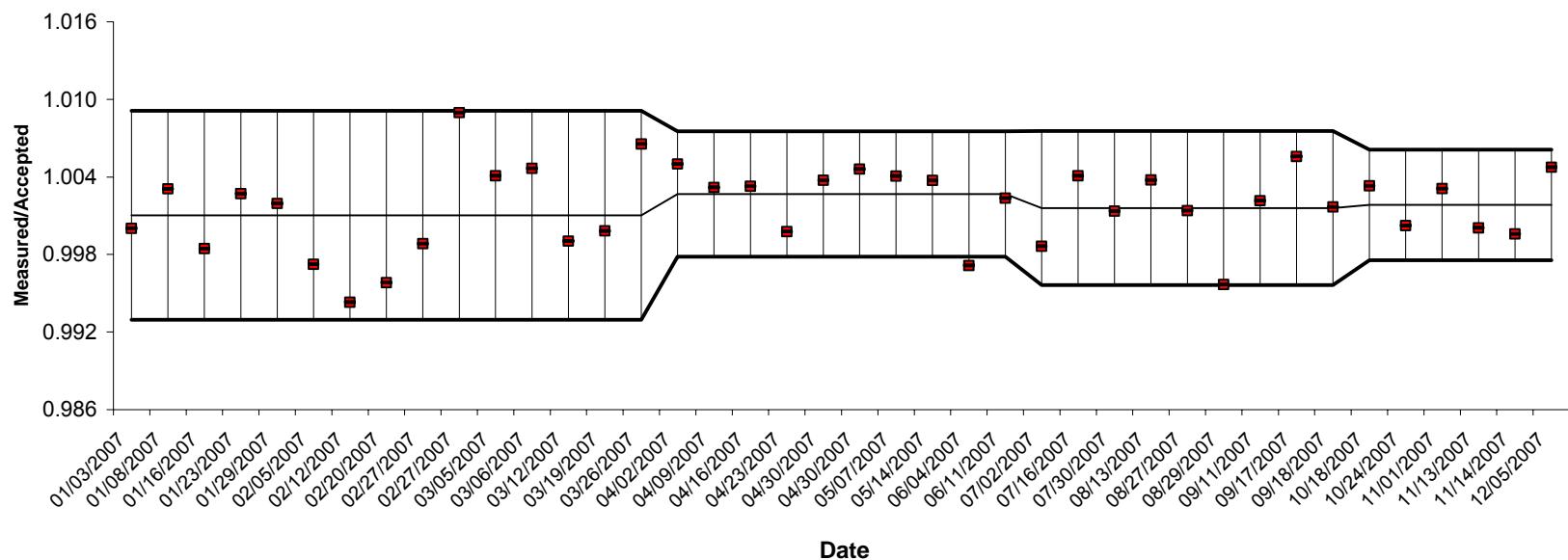
HAN
P-EFFECTIVE
1st Quarter 2007 - 4th Quarter 2007
CALEX I



LLNL
P-EFFECTIVE
1st Quarter 2007 - 4th Quarter 2007
CALEX I



LANL
P-EFFECTIVE
1st Quarter 2007 - 4th Quarter 2007
CALEX I



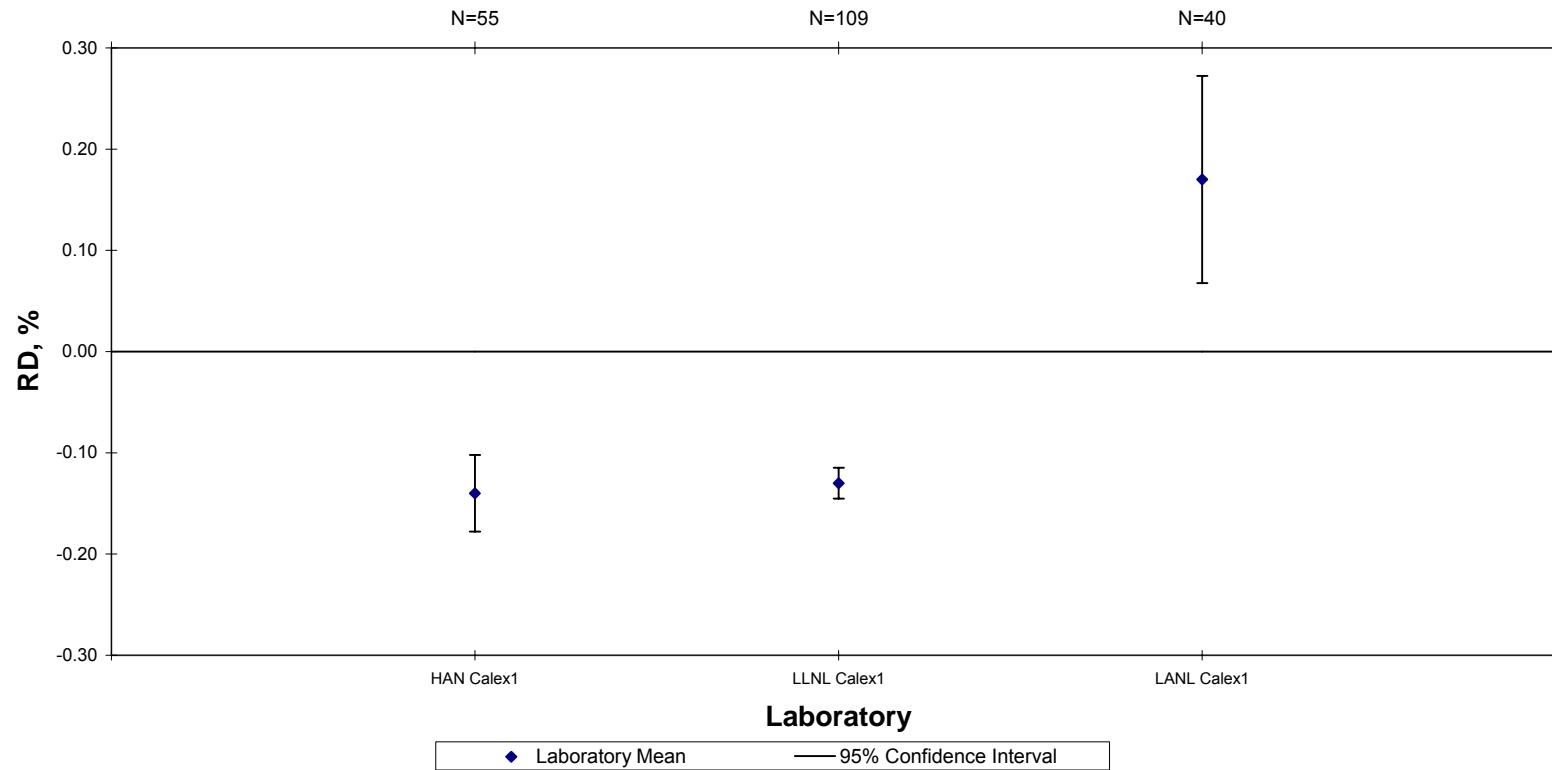
**RESULTS OF ANALYSIS OF P_EFFECTIVE - CALEX I
2007**

	HAN	LANL	LLNL
Mean Error ($\mu\text{W/g}$)	-3.731	4.383	-3.436
Standard Deviation ($\mu\text{W/g}$)	3.547	8.220	2.154
Uncertainty in Mean ($\mu\text{W/g}$)	0.478	1.300	0.206
Mean Error (%)	-0.14%	0.17%	-0.13%
Standard Deviation (%)	0.14%	0.32%	0.08%
Uncertainty in the Mean (%)	0.02%	0.05%	0.01%
Number of Data Points	55	40	109
Number of Outliers	0	0	2

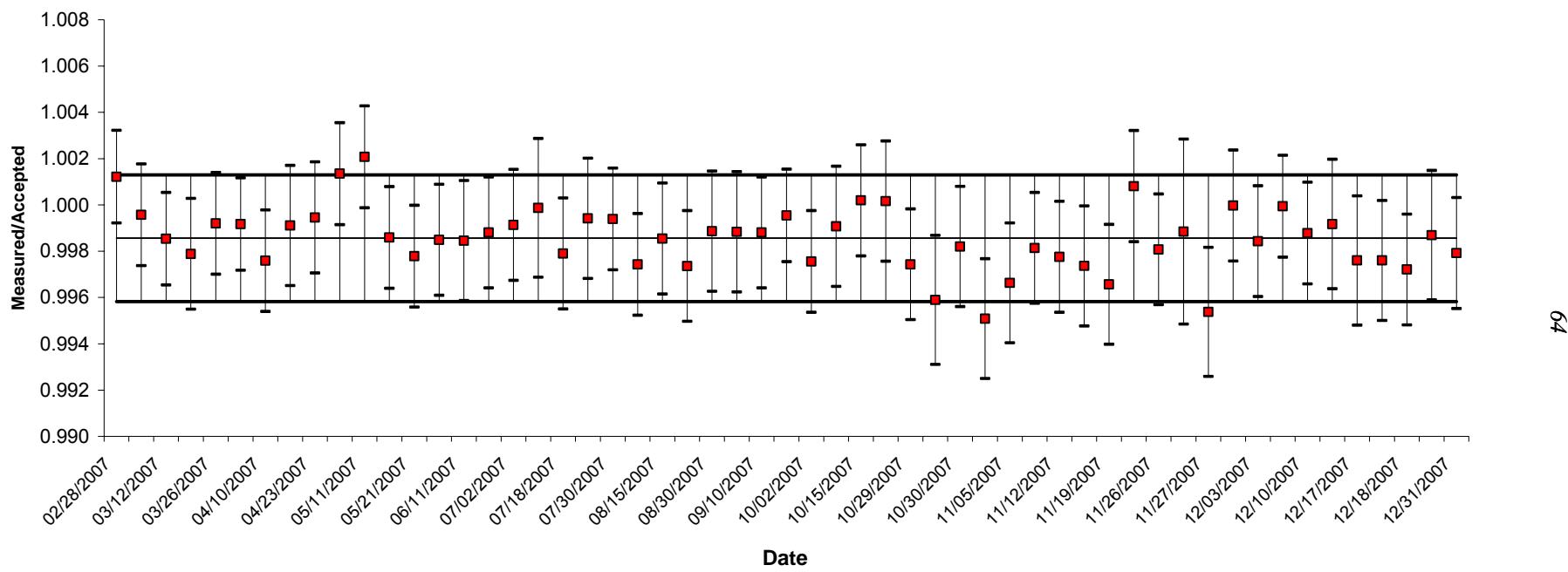
Difference from Last Year in:

Mean Error ($\mu\text{W/g}$)	0.328	****	0.011
Standard Deviation ($\mu\text{W/g}$)	0.395	****	0.473
Uncertainty in Mean ($\mu\text{W/g}$)	-0.310	****	-0.021
Mean Error (%)	0.02%	****	0.00%
Standard Deviation (%)	0.02%	****	0.02%
Uncertainty in the Mean (%)	-0.01%	****	0.00%
Number of Data Points	39	40	54
Number of Outliers	-1	0	-5

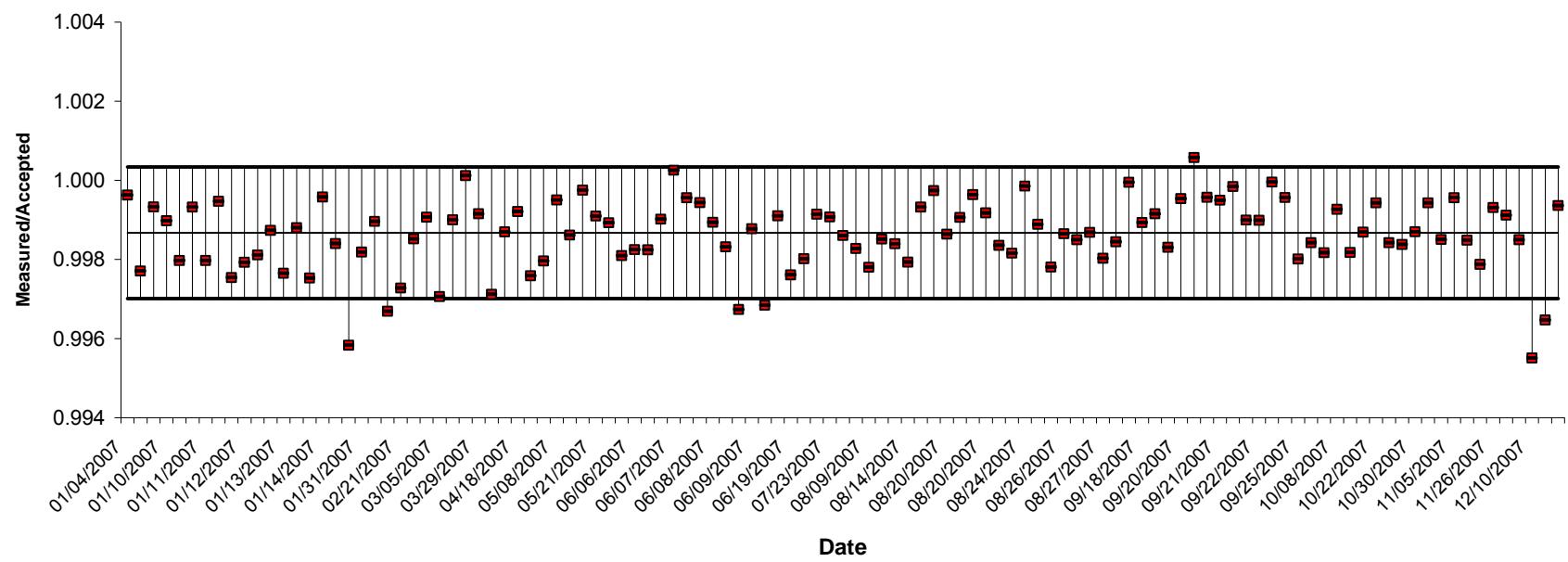
**New Brunswick Laboratory Calorimetry Exchange Program
 P_{eff} , 2007 - CALEX I**



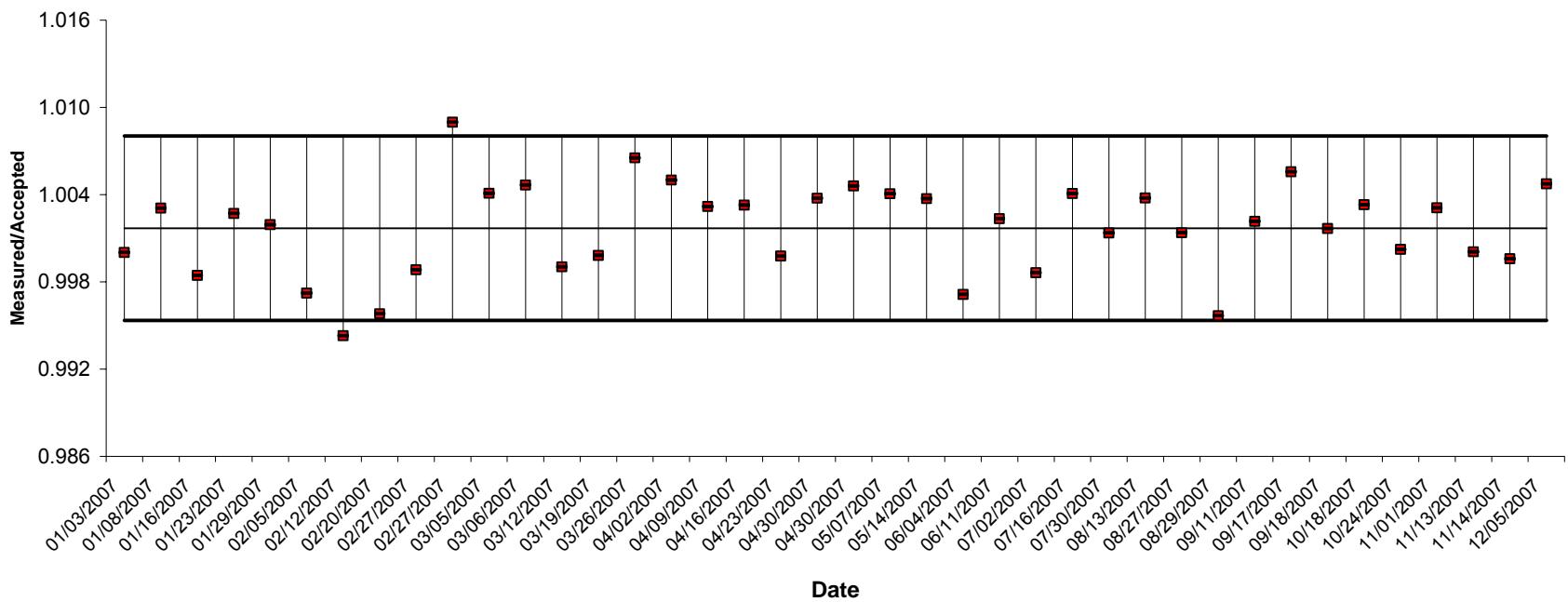
HAN
P-EFFECTIVE
2007, CALEX I



LLNL
P-EFFECTIVE
2007
CALEX I



LANL
P-EFFECTIVE
2007, CALEX I



P_Effective DATA

Calendar Year 2007

HAN: Calex I

#	Date Measured	Instr. ID	Measured P-eff (μW/g)	Uncert. 1 STD	Accepted P-eff (μW/g)	Ratio M/A	μW/g Error	Percent Error
1	02/28/2007	2740	2593.9000	0.10%	2590.7476	1.0012	3.1524	0.12%
2	03/05/2007	2740	2589.7000	0.11%	2590.8086	0.9996	-1.1086	-0.04%
3	03/12/2007	2740	2587.1000	0.10%	2590.8935	0.9985	-3.7935	-0.15%
4	03/19/2007	2740	2585.5000	0.12%	2590.9788	0.9979	-5.4788	-0.21%
5	03/26/2007	2740	2589.0000	0.11%	2591.0641	0.9992	-2.0641	-0.08%
6	04/02/2007	2740	2589.0000	0.10%	2591.1492	0.9992	-2.1492	-0.08%
7	04/10/2007	2740	2585.0000	0.11%	2591.2464	0.9976	-6.2464	-0.24%
8	04/16/2007	2740	2589.0000	0.13%	2591.3192	0.9991	-2.3192	-0.09%
9	04/23/2007	2740	2590.0000	0.12%	2591.4040	0.9995	-1.4040	-0.05%
10	05/01/2007	2740	2595.0000	0.11%	2591.5008	1.0014	3.4992	0.14%
11	05/11/2007	2740	2597.0000	0.11%	2591.6217	1.0021	5.3783	0.21%
12	05/14/2007	2740	2588.0000	0.11%	2591.6579	0.9986	-3.6579	-0.14%
13	05/21/2007	2740	2586.0000	0.11%	2591.7424	0.9978	-5.7424	-0.22%
14	06/04/2007	2740	2588.0000	0.12%	2591.9110	0.9985	-3.9110	-0.15%
15	06/11/2007	2740	2588.0000	0.13%	2591.9952	0.9985	-3.9952	-0.15%
16	06/18/2007	2740	2589.0000	0.12%	2592.0793	0.9988	-3.0793	-0.12%
17	07/02/2007	2740	2590.0000	0.12%	2592.2471	0.9991	-2.2471	-0.09%
18	07/09/2007	2740	2592.0000	0.15%	2592.3309	0.9999	-0.3309	-0.01%
19	07/18/2007	2740	2587.0000	0.12%	2592.4385	0.9979	-5.4385	-0.21%
20	07/24/2007	2740	2591.0000	0.13%	2592.5101	0.9994	-1.5101	-0.06%
21	07/30/2007	2740	2591.0000	0.11%	2592.5817	0.9994	-1.5817	-0.06%
22	08/06/2007	2740	2586.0000	0.11%	2592.6651	0.9974	-6.6651	-0.26%
23	08/15/2007	2740	2589.0000	0.12%	2592.7722	0.9985	-3.7722	-0.15%
24	08/21/2007	2740	2586.0000	0.12%	2592.8436	0.9974	-6.8436	-0.26%
25	08/30/2007	2740	2590.0000	0.13%	2592.9504	0.9989	-2.9504	-0.11%
26	09/04/2007	2740	2590.0000	0.13%	2593.0097	0.9988	-3.0097	-0.12%
27	09/10/2007	2740	2590.0000	0.12%	2593.0808	0.9988	-3.0808	-0.12%
28	09/19/2007	2740	2592.0000	0.10%	2593.1873	0.9995	-1.1873	-0.05%
29	10/02/2007	2740	2587.0000	0.11%	2593.3409	0.9976	-6.3409	-0.24%
30	10/08/2007	2740	2591.0000	0.13%	2593.4116	0.9991	-2.4116	-0.09%
31	10/15/2007	2740	2594.0000	0.12%	2593.4941	1.0002	0.5059	0.02%
32	10/22/2007	2740	2594.0000	0.13%	2593.5765	1.0002	0.4235	0.02%
33	10/29/2007	2740	2587.0000	0.12%	2593.6588	0.9974	-6.6588	-0.26%
34	10/29/2007	8302	2583.0000	0.14%	2593.6588	0.9959	-10.6588	-0.41%
35	10/30/2007	90225	2589.0000	0.13%	2593.6705	0.9982	-4.6705	-0.18%
36	11/05/2007	90225	2581.0000	0.13%	2593.7415	0.9951	-12.7415	-0.49%
37	11/05/2007	8302	2585.0000	0.13%	2593.7415	0.9966	-8.7415	-0.34%
38	11/12/2007	2740	2589.0000	0.12%	2593.8236	0.9981	-4.8236	-0.19%
39	11/12/2007	90225	2588.0000	0.12%	2593.8236	0.9978	-5.8236	-0.22%
40	11/13/2007	8302	2587.0000	0.13%	2593.8353	0.9974	-6.8353	-0.26%
41	11/19/2007	90225	2585.0000	0.13%	2593.9056	0.9966	-8.9056	-0.34%
42	11/19/2007	8302	2596.0000	0.12%	2593.9056	1.0008	2.0944	0.08%
43	11/26/2007	90225	2589.0000	0.12%	2593.9875	0.9981	-4.9875	-0.19%
44	11/26/2007	2740	2591.0000	0.20%	2593.9875	0.9988	-2.9875	-0.12%
45	11/27/2007	8302	2582.0000	0.14%	2593.9992	0.9954	-11.9992	-0.46%
46	12/03/2007	8302	2594.0000	0.12%	2594.0693	1.0000	-0.0693	-0.00%
47	12/03/2007	90225	2590.0000	0.12%	2594.0693	0.9984	-4.0693	-0.16%
48	12/10/2007	2740	2594.0000	0.11%	2594.1510	0.9999	-0.1510	-0.01%
49	12/10/2007	90225	2591.0000	0.11%	2594.1510	0.9988	-3.1510	-0.12%
50	12/10/2007	8302	2592.0000	0.14%	2594.1510	0.9992	-2.1510	-0.08%
51	12/17/2007	90225	2588.0000	0.14%	2594.2327	0.9976	-6.2327	-0.24%
52	12/17/2007	8302	2588.0000	0.13%	2594.2327	0.9976	-6.2327	-0.24%
53	12/18/2007	2740	2587.0000	0.12%	2594.2443	0.9972	-7.2443	-0.28%
54	12/31/2007	2740	2591.0000	0.14%	2594.3957	0.9987	-3.3957	-0.13%
55	12/31/2007	90225	2589.0000	0.12%	2594.3957	0.9979	-5.3957	-0.21%
Mean:						0.9986	-3.7308	-0.14%
Standard Deviation:						0.0014	3.5474	0.14%
Standard Uncertainty:						0.0002	0.4783	0.02%

Statistical outliers are in bold and are not included in graphs and tables.

P_Effective DATA

Calendar Year 2007

LLNL: Calex I

#	Date Measured	Instr. ID	Measured P-eff (μW/g)	Uncert. 1 STD	Accepted P-eff (μW/g)	Ratio M/A	μW/g Error	Percent Error
1	01/04/2007	II	2589.1000	0.00%	2590.0726	0.9996	-0.9726	-0.04%
2	01/10/2007	I	2584.2000	0.00%	2590.1465	0.9977	-5.9465	-0.23%
3	01/10/2007	I	2588.4000	0.00%	2590.1465	0.9993	-1.7465	-0.07%
4	01/10/2007	I	2587.5000	0.00%	2590.1465	0.9990	-2.6465	-0.10%
5	01/11/2007	I	2584.9000	0.00%	2590.1588	0.9980	-5.2588	-0.20%
6	01/11/2007	I	2588.4000	0.00%	2590.1588	0.9993	-1.7588	-0.07%
7	01/11/2007	III	2584.9000	0.00%	2590.1588	0.9980	-5.2588	-0.20%
8	01/12/2007	III	2588.8000	0.00%	2590.1711	0.9995	-1.3711	-0.05%
9	01/12/2007	III	2583.8000	0.00%	2590.1711	0.9975	-6.3711	-0.25%
10	01/12/2007	III	2584.8000	0.00%	2590.1711	0.9979	-5.3711	-0.21%
11	01/13/2007	III	2585.3000	0.00%	2590.1834	0.9981	-4.8834	-0.19%
12	01/13/2007	III	2586.9000	0.00%	2590.1834	0.9987	-3.2834	-0.13%
13	01/13/2007	III	2584.1000	0.00%	2590.1834	0.9977	-6.0834	-0.23%
14	01/14/2007	III	2587.1000	0.00%	2590.1957	0.9988	-3.0957	-0.12%
15	01/14/2007	III	2583.8000	0.00%	2590.1957	0.9975	-6.3957	-0.25%
16	01/14/2007	III	2589.1000	0.00%	2590.1957	0.9996	-1.0957	-0.04%
17	01/18/2007	I	2586.1000	0.00%	2590.2449	0.9984	-4.1449	-0.16%
18	01/31/2007	III	2579.6000	0.00%	2590.4047	0.9958	-10.8047	-0.42%
19	01/31/2007	II	2585.7000	0.00%	2590.4047	0.9982	-4.7047	-0.18%
20	02/07/2007	I	2587.8000	0.00%	2590.4905	0.9990	-2.6905	-0.10%
21	02/14/2007	II	2582.0000	0.00%	2590.5763	0.9967	-8.5763	-0.33%
22	02/21/2007	I	2583.6000	0.00%	2590.6620	0.9973	-7.0620	-0.27%
23	02/27/2007	III	2586.9000	0.00%	2590.7353	0.9985	-3.8353	-0.15%
24	03/05/2007	I	2588.4000	0.00%	2590.8086	0.9991	-2.4086	-0.09%
25	03/05/2007	III	2583.2000	0.00%	2590.8086	0.9971	-7.6086	-0.29%
26	03/12/2007	II	2588.3000	0.00%	2590.8935	0.9990	-2.5935	-0.10%
27	03/20/2007	I	2591.3000	0.00%	2590.9910	1.0001	0.3090	0.01%
28	03/29/2007	I	2588.9000	0.00%	2591.1006	0.9992	-2.2006	-0.08%
29	04/03/2007	III	2583.7000	0.00%	2591.1613	0.9971	-7.4613	-0.29%
30	04/05/2007	I	2587.8000	0.00%	2591.1856	0.9987	-3.3856	-0.13%
31	04/18/2007	I	2589.3000	0.00%	2591.3434	0.9992	-2.0434	-0.08%
32	04/19/2007	III	2585.1000	0.00%	2591.3555	0.9976	-6.2555	-0.24%
33	04/30/2007	I	2586.2000	0.00%	2591.4887	0.9980	-5.2887	-0.20%
34	05/08/2007	III	2590.3000	0.00%	2591.5855	0.9995	-1.2855	-0.05%
35	05/17/2007	III	2588.1000	0.00%	2591.6941	0.9986	-3.5941	-0.14%
36	05/21/2007	I	2591.1000	0.00%	2591.7424	0.9998	-0.6424	-0.02%
37	05/21/2007	III	2589.4000	0.00%	2591.7424	0.9991	-2.3424	-0.09%
38	05/24/2007	III	2589.0000	0.00%	2591.7786	0.9989	-2.7786	-0.11%
39	05/29/2007	II	2586.9000	0.00%	2591.8388	0.9981	-4.9388	-0.19%
40	06/06/2007	III	2587.4000	0.00%	2591.9351	0.9983	-4.5351	-0.17%
41	06/07/2007	III	2587.4000	0.00%	2591.9471	0.9982	-4.5471	-0.18%
42	06/07/2007	III	2589.4000	0.00%	2591.9471	0.9990	-2.5471	-0.10%
43	06/07/2007	III	2592.6000	0.00%	2591.9471	1.0003	0.6529	0.03%
44	06/07/2007	III	2590.8000	0.00%	2591.9471	0.9996	-1.1471	-0.04%
45	06/08/2007	III	2590.5000	0.00%	2591.9591	0.9994	-1.4591	-0.06%
46	06/08/2007	III	2589.2000	0.00%	2591.9591	0.9989	-2.7591	-0.11%
47	06/09/2007	III	2587.6000	0.00%	2591.9711	0.9983	-4.3711	-0.17%
48	06/09/2007	III	2583.5000	0.00%	2591.9711	0.9967	-8.4711	-0.33%
49	06/09/2007	III	2588.8000	0.00%	2591.9711	0.9988	-3.1711	-0.12%
50	06/10/2007	III	2583.8000	0.00%	2591.9832	0.9968	-8.1832	-0.32%
51	06/14/2007	I	2589.7000	0.00%	2592.0312	0.9991	-2.3312	-0.09%
52	06/19/2007	III	2585.9000	0.00%	2592.0913	0.9976	-6.1913	-0.24%
53	07/02/2007	I	2587.1000	0.00%	2592.2471	0.9980	-5.1471	-0.20%
54	07/17/2007	I	2590.2000	0.00%	2592.4266	0.9991	-2.2266	-0.09%
55	07/23/2007	III	2590.1000	0.00%	2592.4982	0.9991	-2.3982	-0.09%
56	08/02/2007	III	2589.0000	0.00%	2592.6175	0.9986	-3.6175	-0.14%
57	08/06/2007	I	2588.2000	0.00%	2592.6651	0.9983	-4.4651	-0.17%
58	08/09/2007	II	2587.0000	0.00%	2592.7009	0.9978	-5.7009	-0.22%
59	08/13/2007	I	2588.9000	0.00%	2592.7485	0.9985	-3.8485	-0.15%
60	08/14/2007	III	2588.6000	0.00%	2592.7603	0.9984	-4.1603	-0.16%
61	08/14/2007	III	2587.4000	0.00%	2592.7603	0.9979	-5.3603	-0.21%
62	08/14/2007	III	2591.0000	0.00%	2592.7603	0.9993	-1.7603	-0.07%

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#	Date Measured	Instr. ID	Measured P-eff (μW/g)	Uncert. 1 STD	Accepted P-eff (μW/g)	Ratio M/A	μW/g Error	Percent Error
63	08/15/2007	III	2592.1000	0.00%	2592.7722	0.9997	-0.6722	-0.03%
64	08/20/2007	III	2589.3000	0.00%	2592.8317	0.9986	-3.5317	-0.14%
65	08/20/2007	III	2590.4000	0.00%	2592.8317	0.9991	-2.4317	-0.09%
66	08/20/2007	III	2591.9000	0.00%	2592.8317	0.9996	-0.9317	-0.04%
67	08/20/2007	I	2590.7000	0.00%	2592.8317	0.9992	-2.1317	-0.08%
68	08/23/2007	III	2588.6000	0.00%	2592.8673	0.9984	-4.2673	-0.16%
69	08/24/2007	III	2588.1000	0.00%	2592.8792	0.9982	-4.7792	-0.18%
70	08/24/2007	III	2592.5000	0.00%	2592.8792	0.9999	-0.3792	-0.01%
71	08/25/2007	III	2590.0000	0.00%	2592.8911	0.9989	-2.8911	-0.11%
72	08/25/2007	III	2587.2000	0.00%	2592.8911	0.9978	-5.6911	-0.22%
73	08/26/2007	III	2589.4000	0.00%	2592.9029	0.9986	-3.5029	-0.14%
74	08/26/2007	III	2589.0000	0.00%	2592.9029	0.9985	-3.9029	-0.15%
75	08/27/2007	III	2589.5000	0.00%	2592.9148	0.9987	-3.4148	-0.13%
76	08/27/2007	III	2587.8000	0.00%	2592.9148	0.9980	-5.1148	-0.20%
77	08/28/2007	III	2588.9000	0.00%	2592.9267	0.9984	-4.0267	-0.16%
78	09/06/2007	I	2592.9000	0.00%	2593.0334	0.9999	-0.1334	-0.01%
79	09/18/2007	III	2590.4000	0.00%	2593.1755	0.9989	-2.7755	-0.11%
80	09/20/2007	I	2591.0000	0.00%	2593.1991	0.9992	-2.1991	-0.08%
81	09/20/2007	II	2588.8000	0.00%	2593.1991	0.9983	-4.3991	-0.17%
82	09/20/2007	II	2592.0000	0.00%	2593.1991	0.9995	-1.1991	-0.05%
83	09/20/2007	II	2594.7000	0.00%	2593.1991	1.0006	1.5009	0.06%
84	09/21/2007	II	2592.1000	0.00%	2593.2109	0.9996	-1.1109	-0.04%
85	09/21/2007	II	2591.9000	0.00%	2593.2109	0.9995	-1.3109	-0.05%
86	09/21/2007	II	2592.8000	0.00%	2593.2109	0.9998	-0.4109	-0.02%
87	09/21/2007	II	2590.6000	0.00%	2593.2109	0.9990	-2.6109	-0.10%
88	09/22/2007	II	2590.6000	0.00%	2593.2228	0.9990	-2.6228	-0.10%
89	09/22/2007	II	2593.1000	0.00%	2593.2228	1.0000	-0.1228	-0.00%
90	09/22/2007	II	2592.1000	0.00%	2593.2228	0.9996	-1.1228	-0.04%
91	09/25/2007	III	2588.1000	0.00%	2593.2582	0.9980	-5.1582	-0.20%
92	09/27/2007	I	2589.2000	0.00%	2593.2818	0.9984	-4.0818	-0.16%
93	10/02/2007	I	2588.6000	0.00%	2593.3409	0.9982	-4.7409	-0.18%
94	10/08/2007	II	2591.5000	0.00%	2593.4116	0.9993	-1.9116	-0.07%
95	10/10/2007	I	2588.7000	0.00%	2593.4352	0.9982	-4.7352	-0.18%
96	10/16/2007	III	2590.1000	0.00%	2593.5059	0.9987	-3.4059	-0.13%
97	10/22/2007	II	2592.1000	0.00%	2593.5765	0.9994	-1.4765	-0.06%
98	10/23/2007	I	2589.5000	0.00%	2593.5882	0.9984	-4.0882	-0.16%
99	10/25/2007	III	2589.4000	0.00%	2593.6118	0.9984	-4.2118	-0.16%
100	10/30/2007	I	2590.3000	0.00%	2593.6705	0.9987	-3.3705	-0.13%
101	10/31/2007	II	2592.2000	0.00%	2593.6823	0.9994	-1.4823	-0.06%
102	10/31/2007	III	2589.8000	0.00%	2593.6823	0.9985	-3.8823	-0.15%
103	11/05/2007	I	2592.6000	0.00%	2593.7415	0.9996	-1.1415	-0.04%
104	11/12/2007	II	2589.9000	0.00%	2593.8236	0.9985	-3.9236	-0.15%
105	11/20/2007	II	2588.4000	0.00%	2593.9173	0.9979	-5.5173	-0.21%
106	11/26/2007	I	2592.2000	0.00%	2593.9875	0.9993	-1.7875	-0.07%
107	12/04/2007	II	2591.8000	0.00%	2594.0810	0.9991	-2.2810	-0.09%
108	12/06/2007	I	2590.2000	0.00%	2594.1043	0.9985	-3.9043	-0.15%
109	12/10/2007	III	2582.5000	0.00%	2594.1510	0.9955	-11.6510	-0.45%
110	12/19/2007	I	2585.1000	0.00%	2594.2560	0.9965	-9.1560	-0.35%
111	12/27/2007	I	2592.7000	0.00%	2594.3491	0.9994	-1.6491	-0.06%
Mean:						0.9987	-3.4363	-0.13%
Standard Deviation:						0.0008	2.1543	0.08%
Standard Uncertainty:						0.0001	0.2063	0.01%

Statistical outliers are in bold and are not included in graphs and tables.

P_Effective DATA

Calendar Year 2007

LANL: Calex I

#	Date Measured	Instr. ID	Measured P-eff (μW/g)	Uncert. 1 STD	Accepted P-eff (μW/g)	Ratio M/A	μW/g Error	Percent Error
1	01/03/2007	F5	2590.1000	0.00%	2590.0602	1.0000	0.0398	0.00%
2	01/08/2007	F9	2598.1000	0.00%	2590.1218	1.0031	7.9782	0.31%
3	01/16/2007	F5	2586.2000	0.00%	2590.2203	0.9984	-4.0203	-0.16%
4	01/23/2007	F9	2597.3000	0.00%	2590.3064	1.0027	6.9936	0.27%
5	01/29/2007	F5	2595.4000	0.00%	2590.3801	1.0019	5.0199	0.19%
6	02/05/2007	F9	2583.3000	0.00%	2590.4660	0.9972	-7.1660	-0.28%
7	02/12/2007	F5	2575.8000	0.00%	2590.5518	0.9943	-14.7518	-0.57%
8	02/20/2007	F9	2579.8000	0.00%	2590.6497	0.9958	-10.8497	-0.42%
9	02/27/2007	F5	2587.7000	0.00%	2590.7353	0.9988	-3.0353	-0.12%
10	02/27/2007	F5	2614.0000	0.00%	2590.7353	1.0090	23.2647	0.90%
11	03/05/2007	F5	2601.4000	0.00%	2590.8086	1.0041	10.5914	0.41%
12	03/06/2007	F9	2602.9000	0.00%	2590.8208	1.0047	12.0792	0.47%
13	03/12/2007	F9	2588.4000	0.00%	2590.8935	0.9990	-2.4935	-0.10%
14	03/19/2007	F5	2590.5000	0.00%	2590.9788	0.9998	-0.4788	-0.02%
15	03/26/2007	F9	2608.0000	0.00%	2591.0641	1.0065	16.9359	0.65%
16	04/02/2007	F5	2604.1000	0.00%	2591.1492	1.0050	12.9508	0.50%
17	04/09/2007	F9	2599.5000	0.00%	2591.2342	1.0032	8.2658	0.32%
18	04/16/2007	F5	2599.8000	0.00%	2591.3192	1.0033	8.4808	0.33%
19	04/23/2007	F9	2590.8000	0.00%	2591.4040	0.9998	-0.6040	-0.02%
20	04/30/2007	F5	2601.2000	0.00%	2591.4887	1.0037	9.7113	0.37%
21	04/30/2007	F9	2603.4000	0.00%	2591.4887	1.0046	11.9113	0.46%
22	05/07/2007	F9	2602.1000	0.00%	2591.5734	1.0041	10.5266	0.41%
23	05/14/2007	F5	2601.3000	0.00%	2591.6579	1.0037	9.6421	0.37%
24	06/04/2007	F9	2584.5000	0.00%	2591.9110	0.9971	-7.4110	-0.29%
25	06/11/2007	F5	2598.1000	0.00%	2591.9952	1.0024	6.1048	0.24%
26	07/02/2007	F5	2588.7000	0.00%	2592.2471	0.9986	-3.5471	-0.14%
27	07/16/2007	F5	2603.0000	0.00%	2592.4146	1.0041	10.5854	0.41%
28	07/30/2007	F5	2596.1000	0.00%	2592.5817	1.0014	3.5183	0.14%
29	08/13/2007	F5	2602.5000	0.00%	2592.7485	1.0038	9.7515	0.38%
30	08/27/2007	F5	2596.5000	0.00%	2592.9148	1.0014	3.5852	0.14%
31	08/29/2007	F9	2581.7000	0.00%	2592.9385	0.9957	-11.2385	-0.43%
32	09/11/2007	F5	2598.7000	0.00%	2593.0926	1.0022	5.6074	0.22%
33	09/17/2007	F9	2607.6000	0.00%	2593.1636	1.0056	14.4364	0.56%
34	09/18/2007	F9	2597.5000	0.00%	2593.1755	1.0017	4.3245	0.17%
35	10/18/2007	F9	2602.1000	0.00%	2593.5294	1.0033	8.5706	0.33%
36	10/24/2007	F9	2594.2000	0.00%	2593.6000	1.0002	0.6000	0.02%
37	11/01/2007	F9	2601.7000	0.00%	2593.6940	1.0031	8.0060	0.31%
38	11/13/2007	F9	2594.0000	0.00%	2593.8353	1.0001	0.1647	0.01%
39	11/14/2007	F9	2592.8000	0.00%	2593.8470	0.9996	-1.0470	-0.04%
40	12/05/2007	F9	2606.4000	0.00%	2594.0927	1.0047	12.3073	0.47%
Mean:						1.0017	4.3828	0.17%
Standard Deviation:						0.0032	8.2196	0.32%
Standard Uncertainty:						0.0005	1.2996	0.05%

Statistical outliers are in bold and are not included in graphs and tables.

RESULTS OF ANALYSIS OF P_EFFECTIVE - CALEX II
1st QUARTER 2007

	LLNL
Mean Error ($\mu\text{W/g}$)	-12.572
Standard Deviation ($\mu\text{W/g}$)	3.463
Uncertainty in Mean ($\mu\text{W/g}$)	1.999
Mean Error (%)	-0.31%
Standard Deviation (%)	0.09%
Uncertainty in the Mean (%)	0.05%
Number of Data Points	3
Number of Outliers	0

Difference from Last Quarter in:

Mean Error ($\mu\text{W/g}$)	****
Standard Deviation ($\mu\text{W/g}$)	****
Uncertainty in Mean ($\mu\text{W/g}$)	****
Mean Error (%)	****
Standard Deviation (%)	****
Uncertainty in the Mean (%)	****
Number of Data Points	3
Number of Outliers	0

**RESULTS OF ANALYSIS OF P_EFFECTIVE - CALEX II
2nd QUARTER 2007**

	LLNL
Mean Error ($\mu\text{W/g}$)	-10.199
Standard Deviation ($\mu\text{W/g}$)	7.904
Uncertainty in Mean ($\mu\text{W/g}$)	3.535
Mean Error (%)	-0.25%
Standard Deviation (%)	0.20%
Uncertainty in the Mean (%)	0.09%
Number of Data Points	5
Number of Outliers	0

Difference from Last Quarter in:

Mean Error ($\mu\text{W/g}$)	2.373
Standard Deviation ($\mu\text{W/g}$)	4.441
Uncertainty in Mean ($\mu\text{W/g}$)	1.536
Mean Error (%)	0.06%
Standard Deviation (%)	0.11%
Uncertainty in the Mean (%)	0.04%
Number of Data Points	2
Number of Outliers	0

RESULTS OF ANALYSIS OF P_EFFECTIVE - CALEX II
3rd QUARTER 2007

	LLNL
Mean Error ($\mu\text{W/g}$)	-16.234
Standard Deviation ($\mu\text{W/g}$)	6.906
Uncertainty in Mean ($\mu\text{W/g}$)	3.088
Mean Error (%)	-0.40%
Standard Deviation (%)	0.17%
Uncertainty in the Mean (%)	0.08%
Number of Data Points	5
Number of Outliers	0

Difference from Last Quarter in:

Mean Error ($\mu\text{W/g}$)	-6.035
Standard Deviation ($\mu\text{W/g}$)	-0.998
Uncertainty in Mean ($\mu\text{W/g}$)	-0.447
Mean Error (%)	-0.15%
Standard Deviation (%)	-0.03%
Uncertainty in the Mean (%)	-0.01%
Number of Data Points	0
Number of Outliers	0

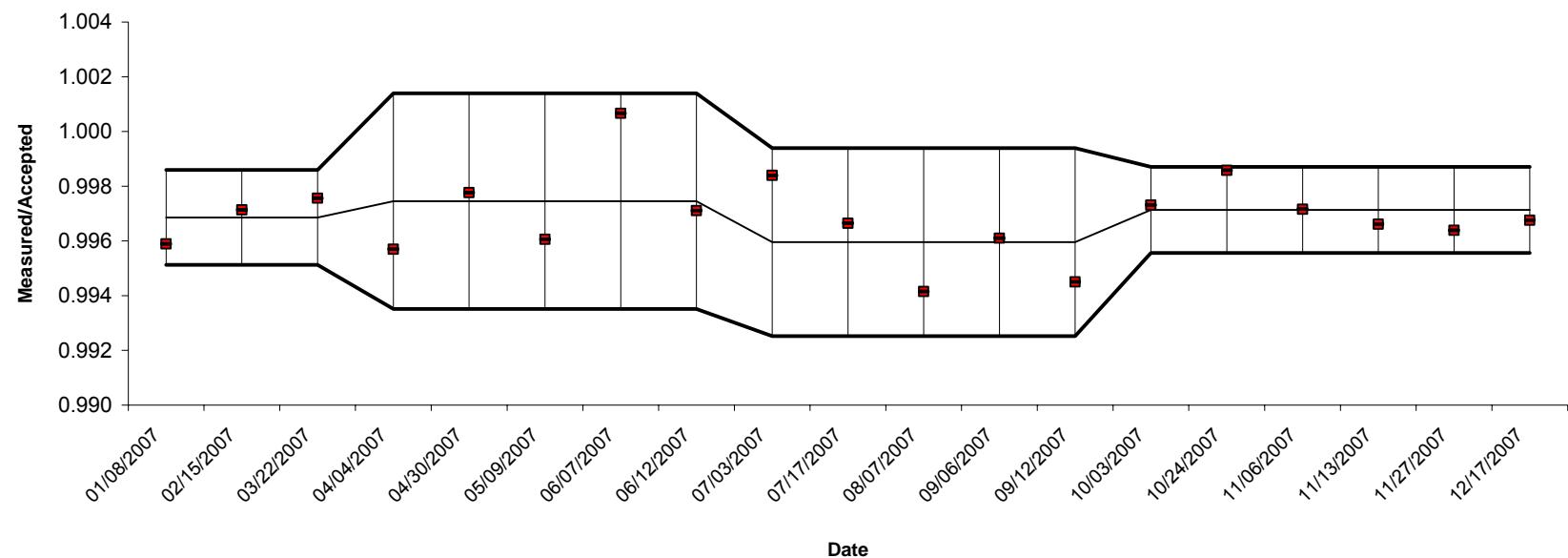
**RESULTS OF ANALYSIS OF P_EFFECTIVE - CALEX II
4th QUARTER 2007**

	LLNL
Mean Error ($\mu\text{W/g}$)	-11.536
Standard Deviation ($\mu\text{W/g}$)	3.171
Uncertainty in Mean ($\mu\text{W/g}$)	1.295
Mean Error (%)	-0.29%
Standard Deviation (%)	0.08%
Uncertainty in the Mean (%)	0.03%
Number of Data Points	6
Number of Outliers	0

Difference from Last Quarter in:

Mean Error ($\mu\text{W/g}$)	4.698
Standard Deviation ($\mu\text{W/g}$)	-3.735
Uncertainty in Mean ($\mu\text{W/g}$)	-1.793
Mean Error (%)	0.11%
Standard Deviation (%)	-0.09%
Uncertainty in the Mean (%)	-0.05%
Number of Data Points	1
Number of Outliers	0

LLNL
P-EFFECTIVE
1st Quarter 2007 - 4th Quarter 2007
CALEX II



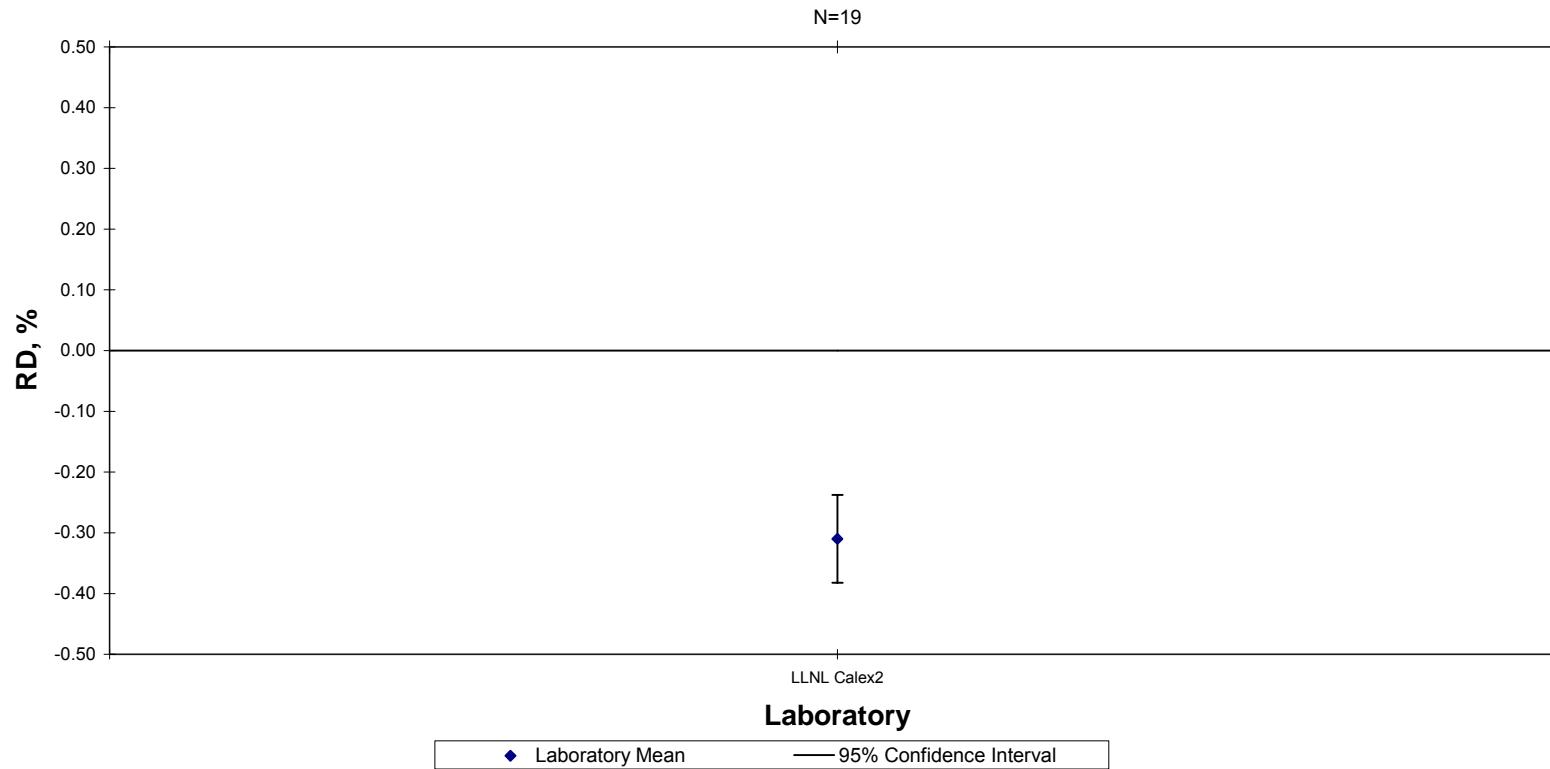
RESULTS OF ANALYSIS OF P_EFFECTIVE - CALEX II 2007

	LLNL
Mean Error ($\mu\text{W/g}$)	-12.584
Standard Deviation ($\mu\text{W/g}$)	5.853
Uncertainty in Mean ($\mu\text{W/g}$)	1.343
Mean Error (%)	-0.31%
Standard Deviation (%)	0.15%
Uncertainty in the Mean (%)	0.03%
Number of Data Points	19
Number of Outliers	0

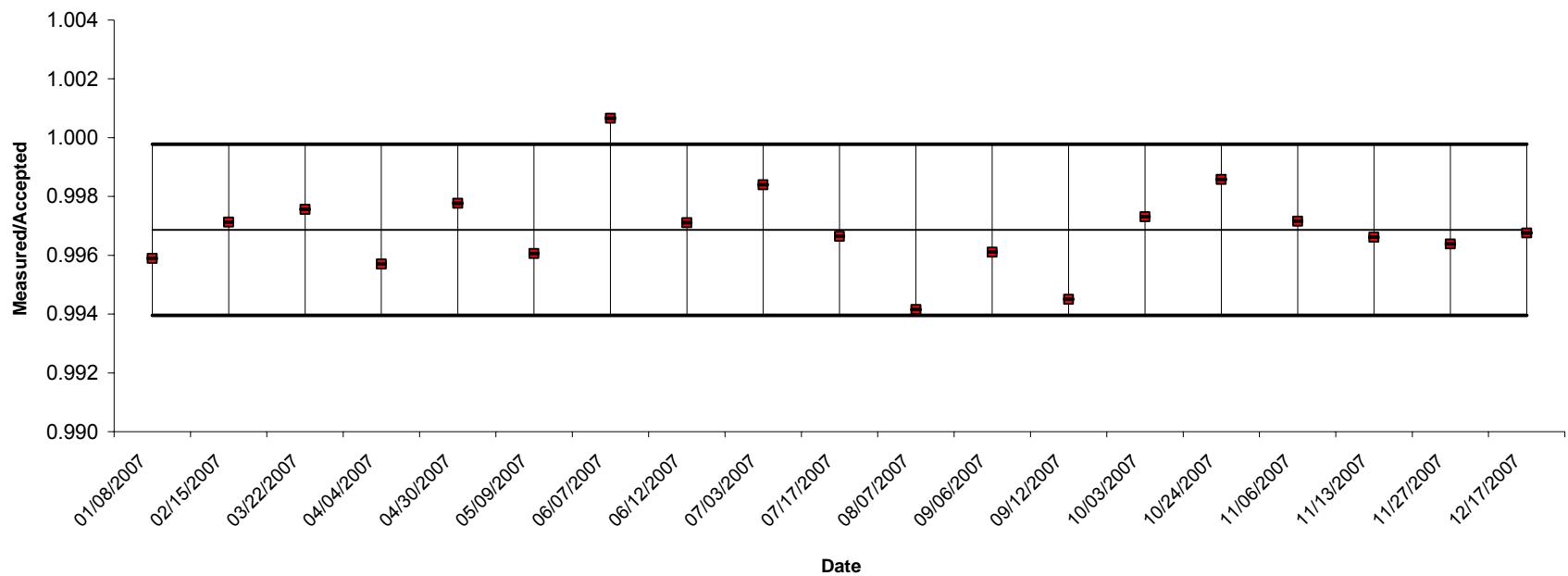
Difference from Last Year in:

Mean Error ($\mu\text{W/g}$)	1.374
Standard Deviation ($\mu\text{W/g}$)	1.548
Uncertainty in Mean ($\mu\text{W/g}$)	-0.809
Mean Error (%)	0.04%
Standard Deviation (%)	0.04%
Uncertainty in the Mean (%)	-0.02%
Number of Data Points	15
Number of Outliers	0

New Brunswick Laboratory Calorimetry Exchange Program
P_{eff}, 2007 - CALEX II



LLNL
P-EFFECTIVE
2007, CALEX II



P_Effective DATA

Calendar Year 2007

LLNL: Calex II

#	Date Measured	Instr. ID	Measured P-eff (μW/g)	Uncert. 1 STD	Accepted P-eff (μW/g)	Ratio M/A	μW/g Error	Percent Error
1	01/08/2007	III	3985.7000	0.00%	4002.1472	0.9959	-16.4472	-0.41%
2	02/15/2007	III	3993.5000	0.00%	4004.9856	0.9971	-11.4856	-0.29%
3	03/22/2007	III	3997.8000	0.00%	4007.5820	0.9976	-9.7820	-0.24%
4	04/04/2007	III	3991.3000	0.00%	4008.5439	0.9957	-17.2439	-0.43%
5	04/30/2007	III	4001.5000	0.00%	4010.4618	0.9978	-8.9618	-0.22%
6	05/09/2007	III	3995.3000	0.00%	4011.1239	0.9961	-15.8239	-0.39%
7	06/07/2007	II	4015.9000	0.00%	4013.2509	1.0007	2.6491	0.07%
8	06/12/2007	III	4002.0000	0.00%	4013.6167	0.9971	-11.6167	-0.29%
9	07/03/2007	III	4008.7000	0.00%	4015.1497	0.9984	-6.4497	-0.16%
10	07/17/2007	III	4002.7000	0.00%	4016.1689	0.9966	-13.4689	-0.34%
11	08/07/2007	III	3994.2000	0.00%	4017.6934	0.9942	-23.4934	-0.58%
12	09/06/2007	III	4004.2000	0.00%	4019.8627	0.9961	-15.6627	-0.39%
13	09/12/2007	III	3998.2000	0.00%	4020.2953	0.9945	-22.0953	-0.55%
14	10/03/2007	III	4011.0000	0.00%	4021.8063	0.9973	-10.8063	-0.27%
15	10/24/2007	II	4017.6000	0.00%	4023.3123	0.9986	-5.7123	-0.14%
16	11/06/2007	III	4012.8000	0.00%	4024.2450	0.9972	-11.4450	-0.28%
17	11/13/2007	III	4011.1000	0.00%	4024.7449	0.9966	-13.6449	-0.34%
18	11/27/2007	III	4011.2000	0.00%	4025.7430	0.9964	-14.5430	-0.36%
19	12/17/2007	III	4014.1000	0.00%	4027.1649	0.9968	-13.0649	-0.32%
				Mean:	0.9969	-12.5841	-0.31%	
				Standard Deviation:	0.0015	5.8525	0.15%	
				Standard Uncertainty:	0.0003	1.3427	0.03%	

Statistical outliers are in bold and are not included in graphs and tables.

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J. **^{238}Pu ISOTOPE ABUNDANCE: TABLES AND GRAPHS**

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RESULTS OF ANALYSIS OF PU238 - CALEX I
1st QUARTER 2007

	HAN	LANL	LLNL
Mean Error (weight%)	-0.0003%	-0.0004%	-0.0003%
Standard Deviation (weight%)	0.0004%	0.0014%	0.0003%
Uncertainty in the Mean (weight%)	0.0002%	0.0003%	0.0001%
Mean Error (%)	-4.14%	-4.92%	-3.07%
Standard Deviation (%)	4.48%	16.42%	3.96%
Uncertainty in the Mean (%)	2.01%	4.24%	0.75%
Number of Data Points	5	15	28
Number of Outliers	0	0	0

Difference from Last Quarter in:

Mean Error (weight%)	-0.0001%	****	****
Standard Deviation (weight%)	0.0000%	****	****
Uncertainty in the Mean (weight%)	0.0000%	****	****
Mean Error (%)	-1.41%	****	****
Standard Deviation (%)	0.18%	****	****
Uncertainty in the Mean (%)	0.09%	****	****
Number of Data Points	0	15	28
Number of Outliers	0	0	0

RESULTS OF ANALYSIS OF PU238 - CALEX I
2nd QUARTER 2007

	HAN	LANL	LLNL
Mean Error (weight%)	-0.0002%	0.0001%	-0.0002%
Standard Deviation (weight%)	0.0003%	0.0012%	0.0003%
Uncertainty in the Mean (weight%)	0.0001%	0.0004%	0.0001%
Mean Error (%)	-2.89%	1.58%	-2.52%
Standard Deviation (%)	3.30%	14.80%	3.64%
Uncertainty in the Mean (%)	0.99%	4.68%	0.74%
Number of Data Points	11	10	24
Number of Outliers	0	0	0

Difference from Last Quarter in:

Mean Error (weight%)	0.0001%	0.0005%	0.0001%
Standard Deviation (weight%)	-0.0001%	-0.0002%	0.0000%
Uncertainty in the Mean (weight%)	-0.0001%	0.0001%	0.0000%
Mean Error (%)	1.25%	6.50%	0.55%
Standard Deviation (%)	-1.18%	-1.62%	-0.32%
Uncertainty in the Mean (%)	-1.02%	0.44%	-0.01%
Number of Data Points	6	-5	-4
Number of Outliers	0	0	0

RESULTS OF ANALYSIS OF PU238 - CALEX I
3rd QUARTER 2007

	HAN	LANL	LLNL
Mean Error (weight%)	-0.0004%	-0.0004%	-0.0001%
Standard Deviation (weight%)	0.0003%	0.0006%	0.0003%
Uncertainty in the Mean (weight%)	0.0001%	0.0002%	0.0000%
Mean Error (%)	-5.21%	-4.39%	-1.15%
Standard Deviation (%)	3.09%	7.34%	3.22%
Uncertainty in the Mean (%)	0.89%	2.45%	0.51%
Number of Data Points	12	9	40
Number of Outliers	0	0	0

Difference from Last Quarter in:

Mean Error (weight%)	-0.0002%	-0.0005%	0.0001%
Standard Deviation (weight%)	0.0000%	-0.0006%	0.0000%
Uncertainty in the Mean (weight%)	0.0000%	-0.0002%	-0.0001%
Mean Error (%)	-2.32%	-5.97%	1.37%
Standard Deviation (%)	-0.21%	-7.46%	-0.42%
Uncertainty in the Mean (%)	-0.10%	-2.23%	-0.23%
Number of Data Points	1	-1	16
Number of Outliers	0	0	0

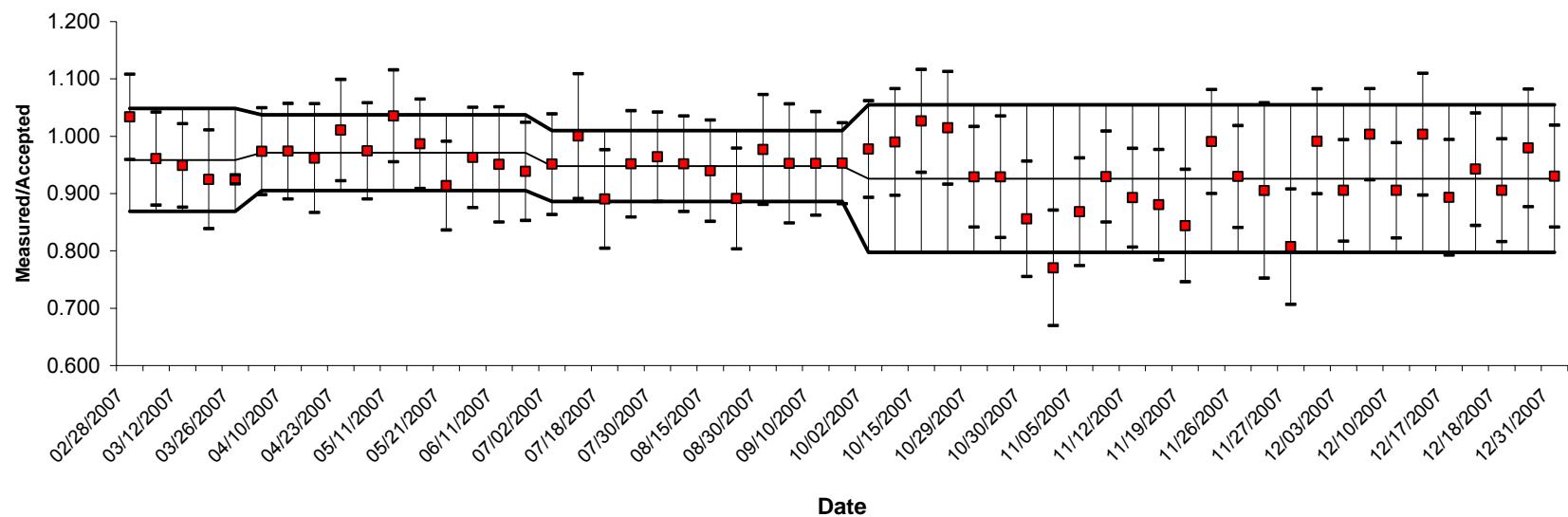
RESULTS OF ANALYSIS OF PU238 - CALEX I
4th QUARTER 2007

	HAN	LANL	LLNL
Mean Error (weight%)	-0.0006%	0.0004%	-0.0001%
Standard Deviation (weight%)	0.0005%	0.0006%	0.0003%
Uncertainty in the Mean (weight%)	0.0001%	0.0002%	0.0001%
Mean Error (%)	-7.40%	5.16%	-0.91%
Standard Deviation (%)	6.43%	6.81%	3.09%
Uncertainty in the Mean (%)	1.24%	2.78%	0.75%
Number of Data Points	27	6	17
Number of Outliers	0	0	2

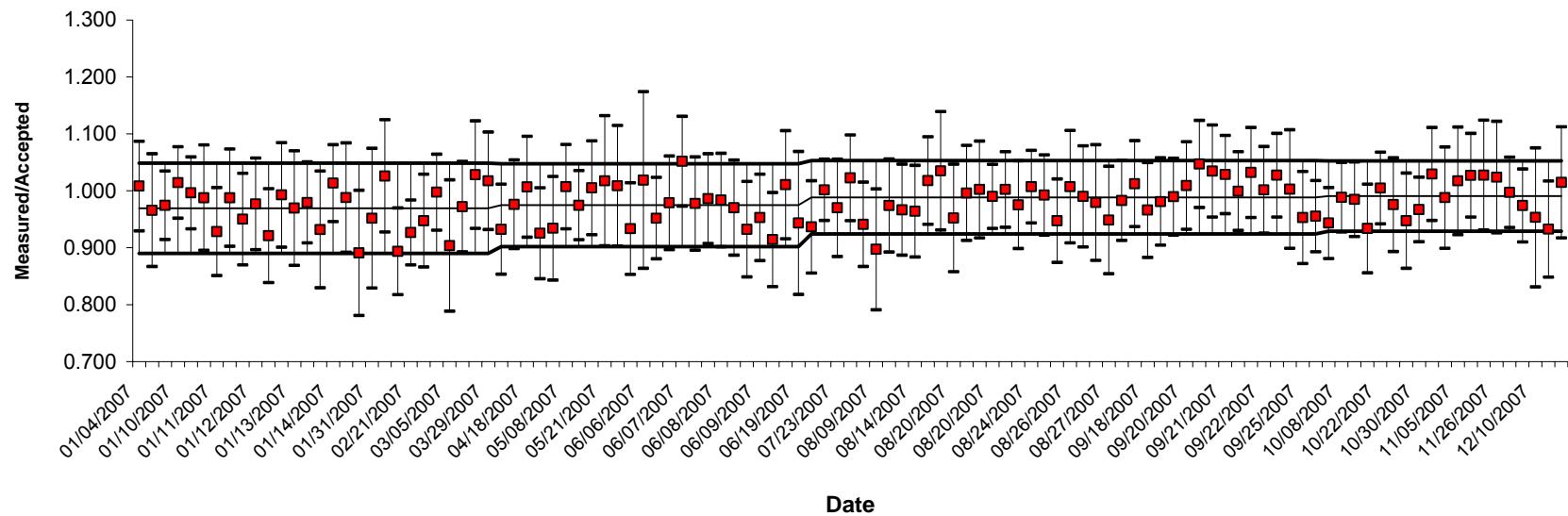
Difference from Last Quarter in:

Mean Error (weight%)	-0.0002%	0.0008%	0.0000%
Standard Deviation (weight%)	0.0002%	0.0000%	0.0000%
Uncertainty in the Mean (weight%)	0.0000%	0.0000%	0.0001%
Mean Error (%)	-2.19%	9.55%	0.24%
Standard Deviation (%)	3.34%	-0.53%	-0.13%
Uncertainty in the Mean (%)	0.35%	0.33%	0.24%
Number of Data Points	15	-3	-23
Number of Outliers	0	0	2

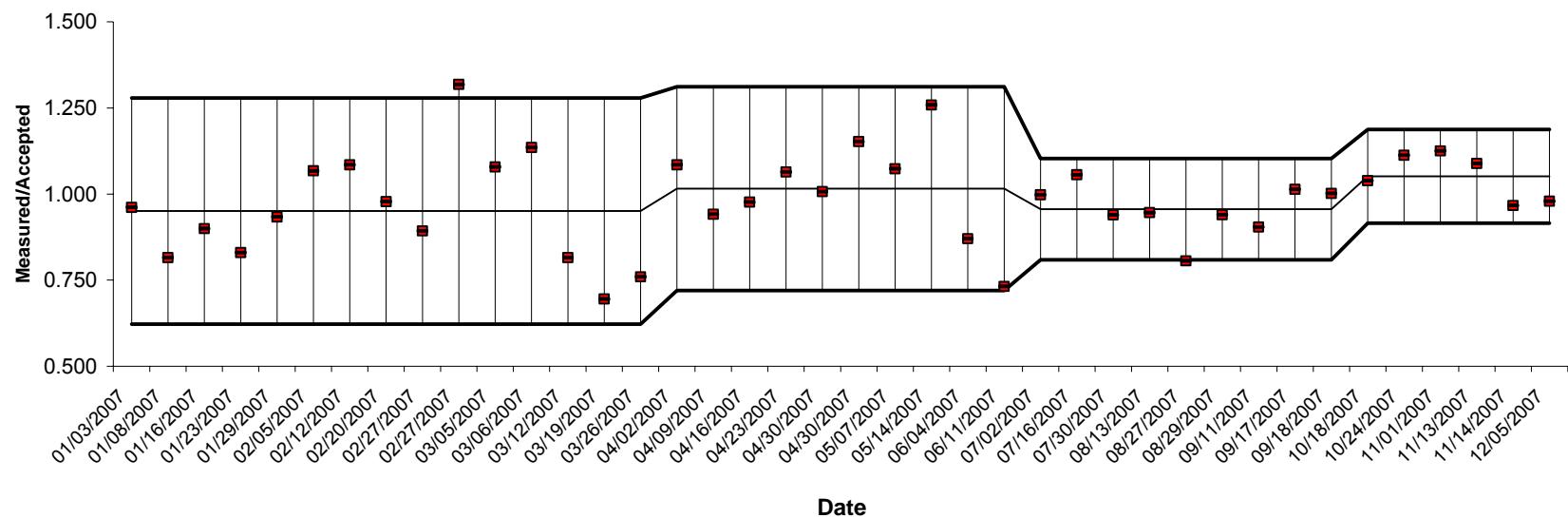
HAN
238-Pu
1st Quarter 2007 - 4th Quarter 2007
CALEX I



LLNL
238-Pu
1st Quarter 2007 - 4th Quarter 2007
CALEX I



LANL
238-Pu
1st Quarter 2007 - 4th Quarter 2007
CALEX I

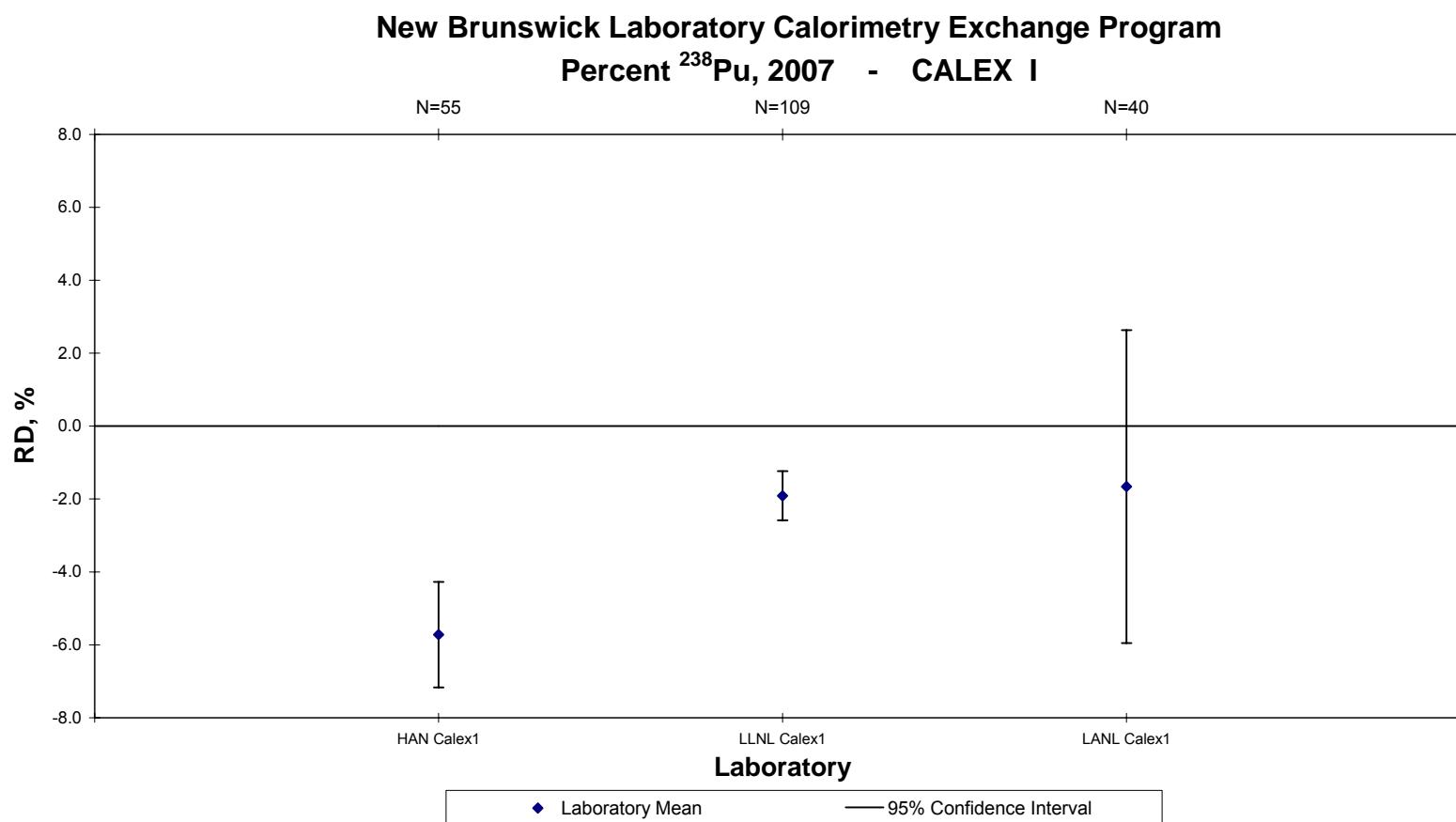


**RESULTS OF ANALYSIS OF PU238 - CALEX I
2007**

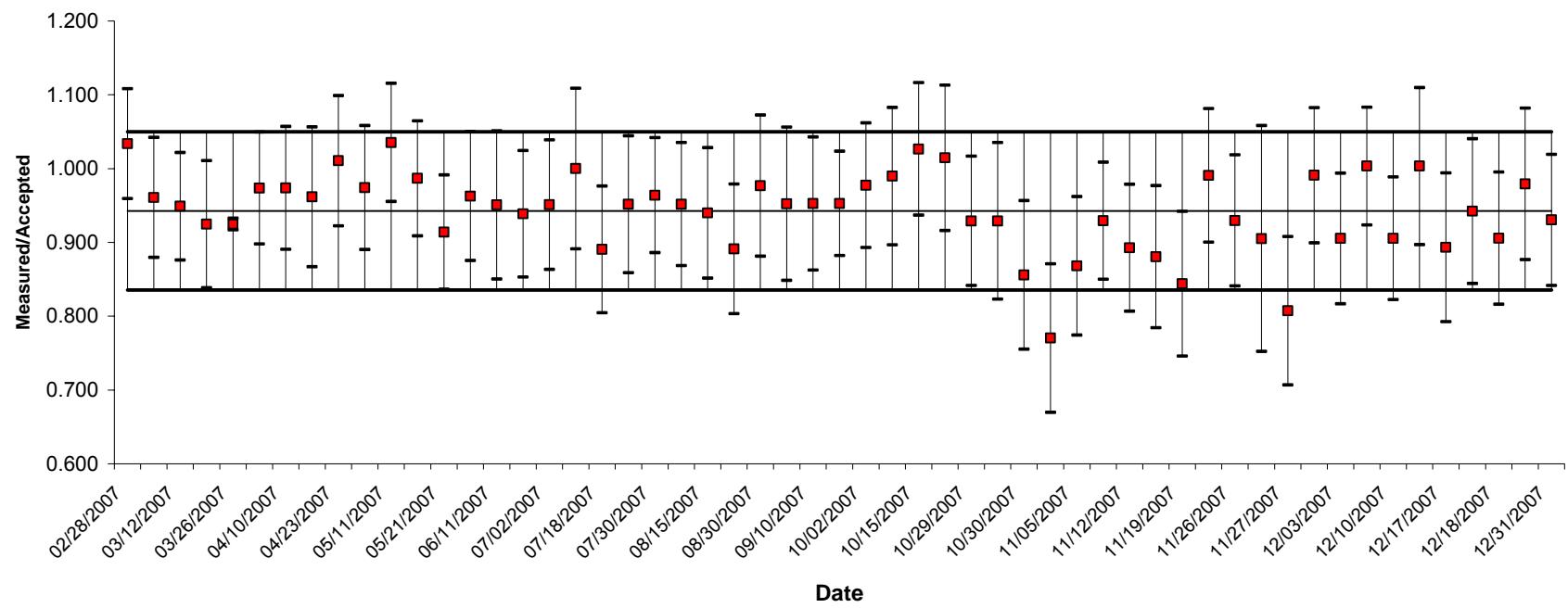
	HAN	LANL	LLNL
Mean Error (weight%)	-0.0005%	-0.0001%	-0.0002%
Standard Deviation (weight%)	0.0004%	0.0011%	0.0003%
Uncertainty in the Mean (weight%)	0.0001%	0.0002%	0.0000%
Mean Error (%)	-5.72%	-1.66%	-1.91%
Standard Deviation (%)	5.36%	13.42%	3.56%
Uncertainty in the Mean (%)	0.72%	2.12%	0.34%
Number of Data Points	55	40	109
Number of Outliers	0	0	2

Difference from Last Year in:

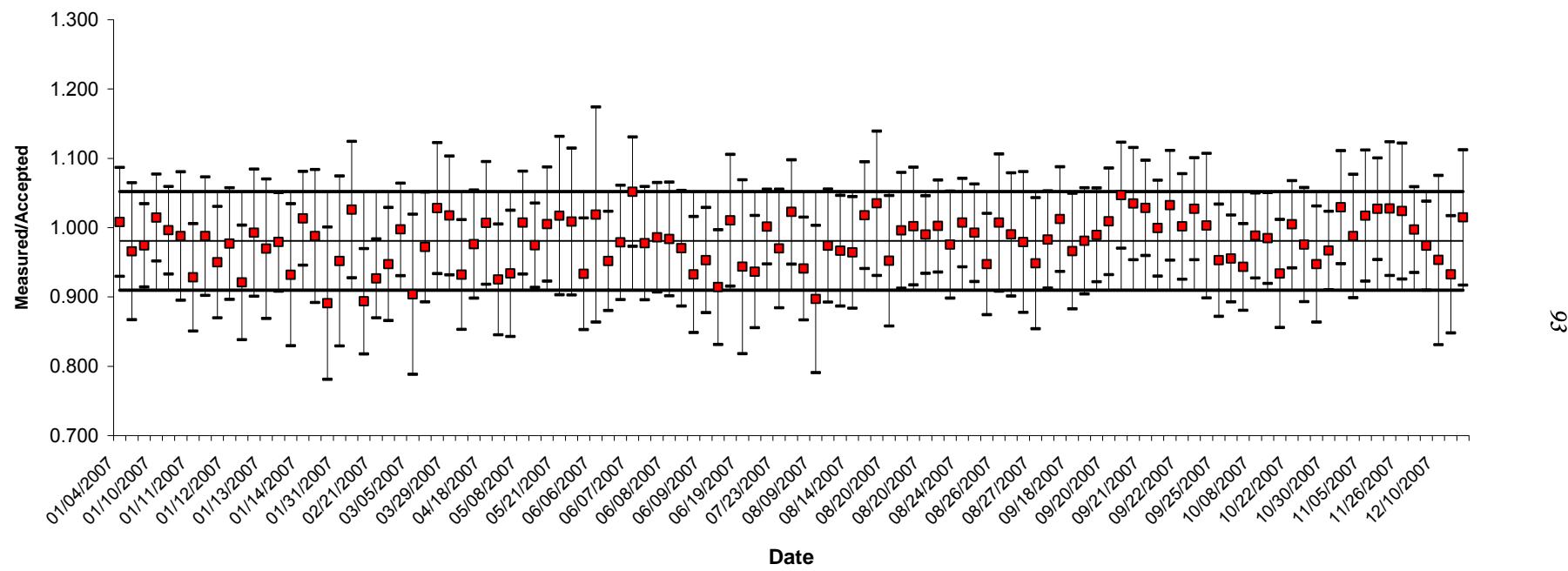
Mean Error (weight%)	-0.0001%	****	0.0000%
Standard Deviation (weight%)	0.0000%	****	0.0000%
Uncertainty in the Mean (weight%)	0.0000%	****	0.0000%
Mean Error (%)	-0.91%	****	0.16%
Standard Deviation (%)	0.93%	****	0.39%
Uncertainty in the Mean (%)	-0.39%	****	-0.09%
Number of Data Points	39	40	54
Number of Outliers	-1	0	-5



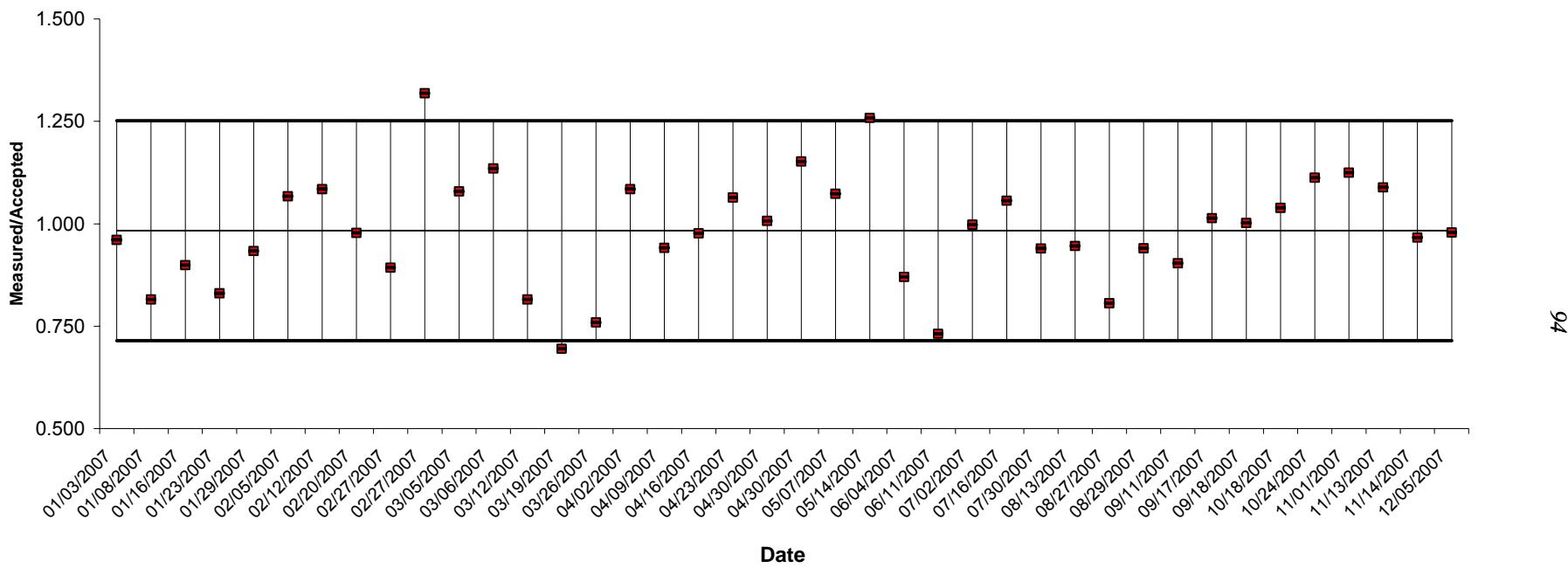
HAN
238-Pu
2007, CALEX I



LLNL
238-Pu
2007, CALEX I



LANL
238-Pu
2007, CALEX I



WEIGHT PERCENT Pu238 DATA

Calendar Year 2007

HAN: Calex I

#	Date Measured	Instr. ID	Measured Pu238	Uncert. 1 STD	Accepted Weight%	Ratio M/A	Weight% Error	Percent Error
1	02/28/2007	2740	0.0085%	3.60%	0.0082%	1.0338	0.0003%	3.38%
2	03/05/2007	2740	0.0079%	4.23%	0.0082%	0.9609	-0.0003%	-3.91%
3	03/12/2007	2740	0.0078%	3.84%	0.0082%	0.9489	-0.0004%	-5.11%
4	03/19/2007	2740	0.0076%	4.66%	0.0082%	0.9247	-0.0006%	-7.53%
5	03/26/2007	2740	0.0076%	0.43%	0.0082%	0.9249	-0.0006%	-7.51%
6	04/02/2007	2740	0.0080%	3.89%	0.0082%	0.9737	-0.0002%	-2.63%
7	04/10/2007	2740	0.0080%	4.28%	0.0082%	0.9739	-0.0002%	-2.61%
8	04/16/2007	2740	0.0079%	4.93%	0.0082%	0.9618	-0.0003%	-3.82%
9	04/23/2007	2740	0.0083%	4.37%	0.0082%	1.0107	0.0001%	1.07%
10	05/01/2007	2740	0.0080%	4.31%	0.0082%	0.9743	-0.0002%	-2.57%
11	05/11/2007	2740	0.0085%	3.87%	0.0082%	1.0354	0.0003%	3.54%
12	05/14/2007	2740	0.0081%	3.95%	0.0082%	0.9867	-0.0001%	-1.33%
13	05/21/2007	2740	0.0075%	4.24%	0.0082%	0.9138	-0.0007%	-8.62%
14	06/04/2007	2740	0.0079%	4.54%	0.0082%	0.9628	-0.0003%	-3.72%
15	06/11/2007	2740	0.0078%	5.28%	0.0082%	0.9508	-0.0004%	-4.92%
16	06/18/2007	2740	0.0077%	4.56%	0.0082%	0.9387	-0.0005%	-6.13%
17	07/02/2007	2740	0.0078%	4.61%	0.0082%	0.9512	-0.0004%	-4.88%
18	07/09/2007	2740	0.0082%	5.44%	0.0082%	1.0001	0.0000%	0.01%
19	07/18/2007	2740	0.0073%	4.82%	0.0082%	0.8905	-0.0009%	-10.95%
20	07/24/2007	2740	0.0078%	4.87%	0.0082%	0.9516	-0.0004%	-4.84%
21	07/30/2007	2740	0.0079%	4.04%	0.0082%	0.9640	-0.0003%	-3.60%
22	08/06/2007	2740	0.0078%	4.38%	0.0082%	0.9519	-0.0004%	-4.81%
23	08/15/2007	2740	0.0077%	4.70%	0.0082%	0.9399	-0.0005%	-6.01%
24	08/21/2007	2740	0.0073%	4.93%	0.0082%	0.8912	-0.0009%	-10.88%
25	08/30/2007	2740	0.0080%	4.90%	0.0082%	0.9768	-0.0002%	-2.32%
26	09/04/2007	2740	0.0078%	5.45%	0.0082%	0.9525	-0.0004%	-4.75%
27	09/10/2007	2740	0.0078%	4.74%	0.0082%	0.9526	-0.0004%	-4.74%
28	09/19/2007	2740	0.0078%	3.71%	0.0082%	0.9528	-0.0004%	-4.72%
29	10/02/2007	2740	0.0080%	4.32%	0.0082%	0.9775	-0.0002%	-2.25%
30	10/08/2007	2740	0.0081%	4.70%	0.0082%	0.9899	-0.0001%	-1.01%
31	10/15/2007	2740	0.0084%	4.37%	0.0082%	1.0267	0.0002%	2.67%
32	10/22/2007	2740	0.0083%	4.85%	0.0082%	1.0146	0.0001%	1.46%
33	10/29/2007	2740	0.0076%	4.72%	0.0082%	0.9292	-0.0006%	-7.08%
34	10/29/2007	8302	0.0076%	5.71%	0.0082%	0.9292	-0.0006%	-7.08%
35	10/30/2007	90225	0.0070%	5.88%	0.0082%	0.8558	-0.0012%	-14.42%
36	11/05/2007	90225	0.0063%	6.53%	0.0082%	0.7703	-0.0019%	-22.97%
37	11/05/2007	8302	0.0071%	5.41%	0.0082%	0.8682	-0.0011%	-13.18%
38	11/12/2007	2740	0.0076%	4.27%	0.0082%	0.9294	-0.0006%	-7.06%
39	11/12/2007	90225	0.0073%	4.82%	0.0082%	0.8928	-0.0009%	-10.72%
40	11/13/2007	8302	0.0072%	5.47%	0.0082%	0.8805	-0.0010%	-11.95%
41	11/19/2007	90225	0.0069%	5.81%	0.0082%	0.8440	-0.0013%	-15.60%
42	11/19/2007	8302	0.0081%	4.57%	0.0082%	0.9907	-0.0001%	-0.93%
43	11/26/2007	90225	0.0076%	4.78%	0.0082%	0.9297	-0.0006%	-7.03%
44	11/26/2007	2740	0.0074%	8.45%	0.0082%	0.9053	-0.0008%	-9.47%
45	11/27/2007	8302	0.0066%	6.23%	0.0082%	0.8074	-0.0016%	-19.26%
46	12/03/2007	8302	0.0081%	4.62%	0.0082%	0.9910	-0.0001%	-0.90%
47	12/03/2007	90225	0.0074%	4.89%	0.0082%	0.9054	-0.0008%	-9.46%
48	12/10/2007	2740	0.0082%	3.97%	0.0082%	1.0034	0.0000%	0.34%
49	12/10/2007	90225	0.0074%	4.59%	0.0082%	0.9055	-0.0008%	-9.45%
50	12/10/2007	8302	0.0082%	5.30%	0.0082%	1.0034	0.0000%	0.34%
51	12/17/2007	90225	0.0073%	5.64%	0.0082%	0.8934	-0.0009%	-10.66%
52	12/17/2007	8302	0.0077%	5.21%	0.0082%	0.9424	-0.0005%	-5.76%
53	12/18/2007	2740	0.0074%	4.95%	0.0082%	0.9057	-0.0008%	-9.43%
54	12/31/2007	2740	0.0080%	5.24%	0.0082%	0.9794	-0.0002%	-2.06%
55	12/31/2007	90225	0.0076%	4.78%	0.0082%	0.9304	-0.0006%	-6.96%

Mean: 0.9428
 Standard Deviation: 0.0536
 Standard Uncertainty: 0.0072

Statistical outliers are in bold and are not included in graphs and tables.

WEIGHT PERCENT Pu238 DATA

Calendar Year 2007

LLNL: Calex I

#	Date Measured	Instr. ID	Measured Pu238	Uncert. 1 STD	Accepted Weight%	Ratio M/A	Weight% Error	Percent Error
1	01/04/2007	II	0.0083%	3.90%	0.0082%	1.0083	0.0001%	0.83%
2	01/10/2007	I	0.0080%	5.12%	0.0082%	0.9659	-0.0003%	-3.41%
3	01/10/2007	I	0.0080%	3.09%	0.0082%	0.9744	-0.0002%	-2.56%
4	01/10/2007	I	0.0084%	3.09%	0.0082%	1.0145	0.0001%	1.45%
5	01/11/2007	I	0.0082%	3.17%	0.0082%	0.9963	-0.0000%	-0.37%
6	01/11/2007	I	0.0081%	4.69%	0.0082%	0.9878	-0.0001%	-1.22%
7	01/11/2007	III	0.0076%	4.17%	0.0082%	0.9283	-0.0006%	-7.17%
8	01/12/2007	III	0.0081%	4.33%	0.0082%	0.9878	-0.0001%	-1.22%
9	01/12/2007	III	0.0078%	4.23%	0.0082%	0.9501	-0.0004%	-4.99%
10	01/12/2007	III	0.0080%	4.12%	0.0082%	0.9769	-0.0002%	-2.31%
11	01/13/2007	III	0.0076%	4.48%	0.0082%	0.9210	-0.0007%	-7.90%
12	01/13/2007	III	0.0082%	4.62%	0.0082%	0.9927	-0.0001%	-0.73%
13	01/13/2007	III	0.0080%	5.19%	0.0082%	0.9696	-0.0003%	-3.04%
14	01/14/2007	III	0.0081%	3.63%	0.0082%	0.9794	-0.0002%	-2.06%
15	01/14/2007	III	0.0077%	5.50%	0.0082%	0.9320	-0.0006%	-6.80%
16	01/14/2007	III	0.0083%	3.34%	0.0082%	1.0134	0.0001%	1.34%
17	01/18/2007	I	0.0081%	4.86%	0.0082%	0.9879	-0.0001%	-1.21%
18	01/31/2007	III	0.0073%	6.17%	0.0082%	0.8910	-0.0009%	-10.90%
19	01/31/2007	II	0.0078%	6.44%	0.0082%	0.9518	-0.0004%	-4.82%
20	02/07/2007	I	0.0084%	4.80%	0.0082%	1.0261	0.0002%	2.61%
21	02/14/2007	II	0.0074%	4.25%	0.0082%	0.8937	-0.0009%	-10.63%
22	02/21/2007	I	0.0076%	3.07%	0.0082%	0.9266	-0.0006%	-7.34%
23	02/27/2007	III	0.0078%	4.30%	0.0082%	0.9474	-0.0004%	-5.26%
24	03/05/2007	I	0.0082%	3.35%	0.0082%	0.9974	-0.0000%	-0.26%
25	03/05/2007	III	0.0074%	6.39%	0.0082%	0.9038	-0.0008%	-9.62%
26	03/12/2007	II	0.0080%	4.08%	0.0082%	0.9720	-0.0002%	-2.80%
27	03/20/2007	I	0.0084%	4.59%	0.0082%	1.0282	0.0002%	2.82%
28	03/29/2007	I	0.0084%	4.21%	0.0082%	1.0174	0.0001%	1.74%
29	04/03/2007	III	0.0077%	4.24%	0.0082%	0.9323	-0.0006%	-6.77%
30	04/05/2007	I	0.0080%	3.99%	0.0082%	0.9762	-0.0002%	-2.38%
31	04/18/2007	I	0.0083%	4.40%	0.0082%	1.0069	0.0001%	0.69%
32	04/19/2007	III	0.0076%	4.32%	0.0082%	0.9253	-0.0006%	-7.47%
33	04/30/2007	I	0.0077%	4.88%	0.0082%	0.9341	-0.0005%	-6.59%
34	05/08/2007	III	0.0083%	3.68%	0.0082%	1.0073	0.0001%	0.73%
35	05/17/2007	III	0.0080%	3.12%	0.0082%	0.9746	-0.0002%	-2.54%
36	05/21/2007	I	0.0082%	4.10%	0.0082%	1.0052	0.0000%	0.52%
37	05/21/2007	III	0.0084%	5.62%	0.0082%	1.0174	0.0001%	1.74%
38	05/24/2007	III	0.0083%	5.25%	0.0082%	1.0089	0.0001%	0.89%
39	05/29/2007	II	0.0077%	4.31%	0.0082%	0.9334	-0.0005%	-6.66%
40	06/06/2007	III	0.0084%	7.62%	0.0082%	1.0189	0.0002%	1.89%
41	06/07/2007	III	0.0078%	3.76%	0.0082%	0.9519	-0.0004%	-4.81%
42	06/07/2007	III	0.0080%	4.21%	0.0082%	0.9787	-0.0002%	-2.13%
43	06/07/2007	III	0.0086%	3.75%	0.0082%	1.0518	0.0004%	5.18%
44	06/07/2007	III	0.0080%	4.18%	0.0082%	0.9775	-0.0002%	-2.25%
45	06/08/2007	III	0.0081%	4.00%	0.0082%	0.9861	-0.0001%	-1.39%
46	06/08/2007	III	0.0081%	4.17%	0.0082%	0.9836	-0.0001%	-1.64%
47	06/09/2007	III	0.0080%	4.30%	0.0082%	0.9702	-0.0002%	-2.98%
48	06/09/2007	III	0.0077%	4.49%	0.0082%	0.9324	-0.0006%	-6.76%
49	06/09/2007	III	0.0078%	3.98%	0.0082%	0.9532	-0.0004%	-4.68%
50	06/10/2007	III	0.0075%	4.53%	0.0082%	0.9142	-0.0007%	-8.58%
51	06/14/2007	I	0.0083%	4.70%	0.0082%	1.0106	0.0001%	1.06%
52	06/19/2007	III	0.0077%	6.65%	0.0082%	0.9436	-0.0005%	-5.64%
53	07/02/2007	I	0.0077%	4.33%	0.0082%	0.9366	-0.0005%	-6.34%
54	07/17/2007	I	0.0082%	2.69%	0.0082%	1.0015	0.0000%	0.15%
55	07/23/2007	III	0.0080%	4.41%	0.0082%	0.9699	-0.0002%	-3.01%
56	08/02/2007	III	0.0084%	3.68%	0.0082%	1.0226	0.0002%	2.26%
57	08/06/2007	I	0.0077%	3.94%	0.0082%	0.9409	-0.0005%	-5.91%
58	08/09/2007	II	0.0074%	5.92%	0.0082%	0.8970	-0.0008%	-10.30%
59	08/13/2007	I	0.0080%	4.19%	0.0082%	0.9740	-0.0002%	-2.60%
60	08/14/2007	III	0.0079%	4.14%	0.0082%	0.9667	-0.0003%	-3.33%
61	08/14/2007	III	0.0079%	4.17%	0.0082%	0.9643	-0.0003%	-3.57%
62	08/14/2007	III	0.0083%	3.78%	0.0082%	1.0180	0.0001%	1.80%

WEIGHT PERCENT Pu238 DATA

Calendar Year 2007

LLNL: Calex I

#	Date Measured	Instr. ID	Measured Pu238	Uncert. 1 STD	Accepted Weight%	Ratio M/A	Weight% Error	Percent Error
63	08/15/2007	III	0.0085%	5.03%	0.0082%	1.0351	0.0003%	3.51%
64	08/20/2007	III	0.0078%	4.95%	0.0082%	0.9522	-0.0004%	-4.78%
65	08/20/2007	III	0.0082%	4.19%	0.0082%	0.9961	-0.0000%	-0.39%
66	08/20/2007	III	0.0082%	4.24%	0.0082%	1.0022	0.0000%	0.22%
67	08/20/2007	I	0.0081%	2.83%	0.0082%	0.9900	-0.0001%	-1.00%
68	08/23/2007	III	0.0082%	3.31%	0.0082%	1.0023	0.0000%	0.23%
69	08/24/2007	III	0.0080%	3.96%	0.0082%	0.9755	-0.0002%	-2.45%
70	08/24/2007	III	0.0082%	3.17%	0.0082%	1.0072	0.0001%	0.72%
71	08/25/2007	III	0.0081%	3.55%	0.0082%	0.9926	-0.0001%	-0.74%
72	08/25/2007	III	0.0078%	3.86%	0.0082%	0.9474	-0.0004%	-5.26%
73	08/26/2007	III	0.0082%	4.91%	0.0082%	1.0073	0.0001%	0.73%
74	08/26/2007	III	0.0081%	4.49%	0.0082%	0.9902	-0.0001%	-0.98%
75	08/27/2007	III	0.0080%	5.19%	0.0082%	0.9792	-0.0002%	-2.08%
76	08/27/2007	III	0.0078%	4.98%	0.0082%	0.9487	-0.0004%	-5.13%
77	08/28/2007	III	0.0080%	3.56%	0.0082%	0.9829	-0.0001%	-1.71%
78	09/06/2007	I	0.0083%	3.73%	0.0082%	1.0124	0.0001%	1.24%
79	09/18/2007	III	0.0079%	4.31%	0.0082%	0.9662	-0.0003%	-3.38%
80	09/20/2007	I	0.0080%	3.91%	0.0082%	0.9809	-0.0002%	-1.91%
81	09/20/2007	II	0.0081%	3.42%	0.0082%	0.9895	-0.0001%	-1.05%
82	09/20/2007	II	0.0083%	3.81%	0.0082%	1.0090	0.0001%	0.90%
83	09/20/2007	II	0.0086%	3.65%	0.0082%	1.0469	0.0004%	4.69%
84	09/21/2007	II	0.0085%	3.91%	0.0082%	1.0347	0.0003%	3.47%
85	09/21/2007	II	0.0084%	3.34%	0.0082%	1.0286	0.0002%	2.86%
86	09/21/2007	II	0.0082%	3.46%	0.0082%	0.9993	-0.0000%	-0.07%
87	09/21/2007	II	0.0084%	3.83%	0.0082%	1.0322	0.0003%	3.22%
88	09/22/2007	II	0.0082%	3.80%	0.0082%	1.0017	0.0000%	0.17%
89	09/22/2007	II	0.0084%	3.58%	0.0082%	1.0274	0.0002%	2.74%
90	09/22/2007	II	0.0082%	5.20%	0.0082%	1.0030	0.0000%	0.30%
91	09/25/2007	III	0.0078%	4.25%	0.0082%	0.9529	-0.0004%	-4.71%
92	09/27/2007	I	0.0078%	3.28%	0.0082%	0.9554	-0.0004%	-4.46%
93	10/02/2007	I	0.0077%	3.31%	0.0082%	0.9433	-0.0005%	-5.67%
94	10/08/2007	II	0.0081%	3.10%	0.0082%	0.9886	-0.0001%	-1.14%
95	10/10/2007	I	0.0081%	3.33%	0.0082%	0.9850	-0.0001%	-1.50%
96	10/16/2007	III	0.0076%	4.17%	0.0082%	0.9338	-0.0005%	-6.62%
97	10/22/2007	II	0.0082%	3.13%	0.0082%	1.0048	0.0000%	0.48%
98	10/23/2007	I	0.0080%	4.22%	0.0082%	0.9755	-0.0002%	-2.45%
99	10/25/2007	III	0.0078%	4.42%	0.0082%	0.9474	-0.0004%	-5.26%
100	10/30/2007	I	0.0079%	2.93%	0.0082%	0.9671	-0.0003%	-3.29%
101	10/31/2007	II	0.0084%	3.96%	0.0082%	1.0295	0.0002%	2.95%
102	10/31/2007	III	0.0081%	4.51%	0.0082%	0.9879	-0.0001%	-1.21%
103	11/05/2007	I	0.0083%	4.65%	0.0082%	1.0173	0.0001%	1.73%
104	11/12/2007	II	0.0084%	3.57%	0.0082%	1.0273	0.0002%	2.73%
105	11/20/2007	II	0.0084%	4.69%	0.0082%	1.0275	0.0002%	2.75%
106	11/26/2007	I	0.0084%	4.79%	0.0082%	1.0239	0.0002%	2.39%
107	12/04/2007	II	0.0082%	3.10%	0.0082%	0.9972	-0.0000%	-0.28%
108	12/06/2007	I	0.0080%	3.29%	0.0082%	0.9740	-0.0002%	-2.60%
109	12/10/2007	III	0.0078%	6.41%	0.0082%	0.9533	-0.0004%	-4.67%
110	12/19/2007	I	0.0076%	4.53%	0.0082%	0.9326	-0.0006%	-6.74%
111	12/27/2007	I	0.0083%	4.81%	0.0082%	1.0148	0.0001%	1.48%
Mean:						0.9809	-0.0002%	-1.91%
Standard Deviation:						0.0356	0.0003%	3.56%
Standard Uncertainty:						0.0034	0.0000%	0.34%

Statistical outliers are in bold and are not included in graphs and tables.

WEIGHT PERCENT Pu238 DATA

Calendar Year 2007

LANL: Calex I

#	Date Measured	Instr. ID	Measured Pu238	Uncert. 1 STD	Accepted Weight%	Ratio M/A	Weight% Error	Percent Error
1	01/03/2007	F5	0.0079%	0.00%	0.0082%	0.9609	-0.0003%	-3.91%
2	01/08/2007	F9	0.0067%	0.00%	0.0082%	0.8152	-0.0015%	-18.48%
3	01/16/2007	F5	0.0074%	0.00%	0.0082%	0.8992	-0.0008%	-10.08%
4	01/23/2007	F9	0.0068%	0.00%	0.0082%	0.8301	-0.0014%	-16.99%
5	01/29/2007	F5	0.0077%	0.00%	0.0082%	0.9335	-0.0005%	-6.65%
6	02/05/2007	F9	0.0088%	0.00%	0.0082%	1.0673	0.0006%	6.73%
7	02/12/2007	F5	0.0089%	0.00%	0.0082%	1.0845	0.0007%	8.45%
8	02/20/2007	F9	0.0080%	0.00%	0.0082%	0.9777	-0.0002%	-2.23%
9	02/27/2007	F5	0.0073%	0.00%	0.0082%	0.8927	-0.0009%	-10.73%
10	02/27/2007	F5	0.0108%	0.00%	0.0082%	1.3184	0.0026%	31.84%
11	03/05/2007	F5	0.0089%	0.00%	0.0082%	1.0789	0.0006%	7.89%
12	03/06/2007	F9	0.0093%	0.00%	0.0082%	1.1349	0.0011%	13.49%
13	03/12/2007	F9	0.0067%	0.00%	0.0082%	0.8151	-0.0015%	-18.49%
14	03/19/2007	F5	0.0057%	0.00%	0.0082%	0.6948	-0.0025%	-30.52%
15	03/26/2007	F9	0.0062%	0.00%	0.0082%	0.7594	-0.0020%	-24.06%
16	04/02/2007	F5	0.0089%	0.00%	0.0082%	1.0844	0.0007%	8.44%
17	04/09/2007	F9	0.0077%	0.00%	0.0082%	0.9410	-0.0005%	-5.90%
18	04/16/2007	F5	0.0080%	0.00%	0.0082%	0.9764	-0.0002%	-2.36%
19	04/23/2007	F9	0.0087%	0.00%	0.0082%	1.0642	0.0005%	6.42%
20	04/30/2007	F5	0.0083%	0.00%	0.0082%	1.0072	0.0001%	0.72%
21	04/30/2007	F9	0.0095%	0.00%	0.0082%	1.1521	0.0012%	15.21%
22	05/07/2007	F9	0.0088%	0.00%	0.0082%	1.0731	0.0006%	7.31%
23	05/14/2007	F5	0.0103%	0.00%	0.0082%	1.2584	0.0021%	25.84%
24	06/04/2007	F9	0.0071%	0.00%	0.0082%	0.8702	-0.0011%	-12.98%
25	06/11/2007	F5	0.0060%	0.00%	0.0082%	0.7314	-0.0022%	-26.86%
26	07/02/2007	F5	0.0082%	0.00%	0.0082%	0.9975	-0.0000%	-0.25%
27	07/16/2007	F5	0.0087%	0.00%	0.0082%	1.0564	0.0005%	5.64%
28	07/30/2007	F5	0.0077%	0.00%	0.0082%	0.9396	-0.0005%	-6.04%
29	08/13/2007	F5	0.0078%	0.00%	0.0082%	0.9459	-0.0004%	-5.41%
30	08/27/2007	F5	0.0066%	0.00%	0.0082%	0.8058	-0.0016%	-19.42%
31	08/29/2007	F9	0.0077%	0.00%	0.0082%	0.9402	-0.0005%	-5.98%
32	09/11/2007	F5	0.0074%	0.00%	0.0082%	0.9038	-0.0008%	-9.62%
33	09/17/2007	F9	0.0083%	0.00%	0.0082%	1.0138	0.0001%	1.38%
34	09/18/2007	F9	0.0082%	0.00%	0.0082%	1.0016	0.0000%	0.16%
35	10/18/2007	F9	0.0085%	0.00%	0.0082%	1.0390	0.0003%	3.90%
36	10/24/2007	F9	0.0091%	0.00%	0.0082%	1.1124	0.0009%	11.24%
37	11/01/2007	F9	0.0092%	0.00%	0.0082%	1.1249	0.0010%	12.49%
38	11/13/2007	F9	0.0089%	0.00%	0.0082%	1.0885	0.0007%	8.85%
39	11/14/2007	F9	0.0079%	0.00%	0.0082%	0.9662	-0.0003%	-3.38%
40	12/05/2007	F9	0.0080%	0.00%	0.0082%	0.9788	-0.0002%	-2.12%
Mean:						0.9834	-0.0001%	-1.66%
Standard Deviation:						0.1342	0.0011%	13.42%
Standard Uncertainty:						0.0212	0.0002%	2.12%

Statistical outliers are in bold and are not included in graphs and tables.

RESULTS OF ANALYSIS OF PU238 - CALEX II
1st QUARTER 2007

	LLNL
Mean Error (weight%)	0.0003%
Standard Deviation (weight%)	0.0001%
Uncertainty in the Mean (weight%)	0.0000%
Mean Error (%)	0.43%
Standard Deviation (%)	0.11%
Uncertainty in the Mean (%)	0.06%
Number of Data Points	3
Number of Outliers	0

Difference from Last Quarter in:

Mean Error (weight%)	****
Standard Deviation (weight%)	****
Uncertainty in the Mean (weight%)	****
Mean Error (%)	****
Standard Deviation (%)	****
Uncertainty in the Mean (%)	****
Number of Data Points	3
Number of Outliers	0

RESULTS OF ANALYSIS OF PU238 - CALEX II
2nd QUARTER 2007

	LLNL
Mean Error (weight%)	0.0005%
Standard Deviation (weight%)	0.0008%
Uncertainty in the Mean (weight%)	0.0004%
Mean Error (%)	0.69%
Standard Deviation (%)	1.10%
Uncertainty in the Mean (%)	0.49%
Number of Data Points	5
Number of Outliers	0

Difference from Last Quarter in:

Mean Error (weight%)	0.0002%
Standard Deviation (weight%)	0.0007%
Uncertainty in the Mean (weight%)	0.0004%
Mean Error (%)	0.26%
Standard Deviation (%)	0.99%
Uncertainty in the Mean (%)	0.43%
Number of Data Points	2
Number of Outliers	0

RESULTS OF ANALYSIS OF PU238 - CALEX II
3rd QUARTER 2007

	LLNL
Mean Error (weight%)	0.0002%
Standard Deviation (weight%)	0.0006%
Uncertainty in the Mean (weight%)	0.0003%
Mean Error (%)	0.21%
Standard Deviation (%)	0.78%
Uncertainty in the Mean (%)	0.35%
Number of Data Points	5
Number of Outliers	0

Difference from Last Quarter in:

Mean Error (weight%)	-0.0003%
Standard Deviation (weight%)	-0.0002%
Uncertainty in the Mean (weight%)	-0.0001%
Mean Error (%)	-0.48%
Standard Deviation (%)	-0.32%
Uncertainty in the Mean (%)	-0.14%
Number of Data Points	0
Number of Outliers	0

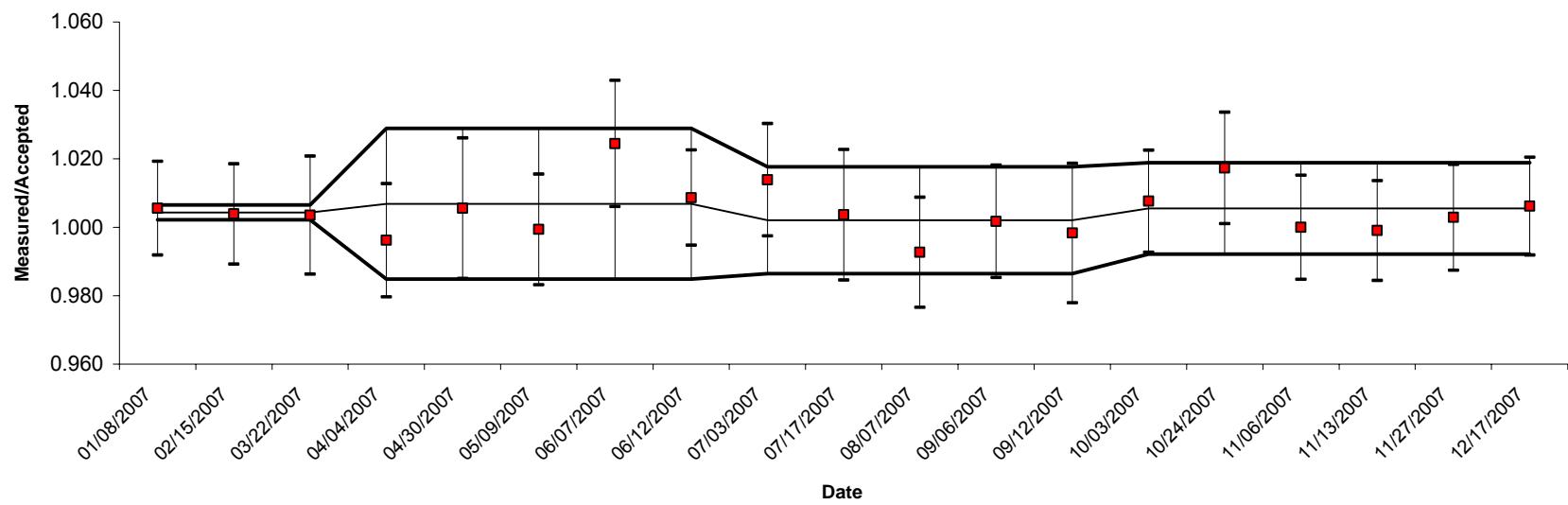
RESULTS OF ANALYSIS OF PU238 - CALEX II
4th QUARTER 2007

	LLNL
Mean Error (weight%)	0.0004%
Standard Deviation (weight%)	0.0005%
Uncertainty in the Mean (weight%)	0.0002%
Mean Error (%)	0.55%
Standard Deviation (%)	0.67%
Uncertainty in the Mean (%)	0.27%
Number of Data Points	6
Number of Outliers	0

Difference from Last Quarter in:

Mean Error (weight%)	0.0002%
Standard Deviation (weight%)	-0.0001%
Uncertainty in the Mean (weight%)	-0.0001%
Mean Error (%)	0.34%
Standard Deviation (%)	-0.11%
Uncertainty in the Mean (%)	-0.08%
Number of Data Points	1
Number of Outliers	0

LLNL
238-Pu
1st Quarter 2007 - 4th Quarter 2007
CALEX II



RESULTS OF ANALYSIS OF PU238 - CALEX II 2007

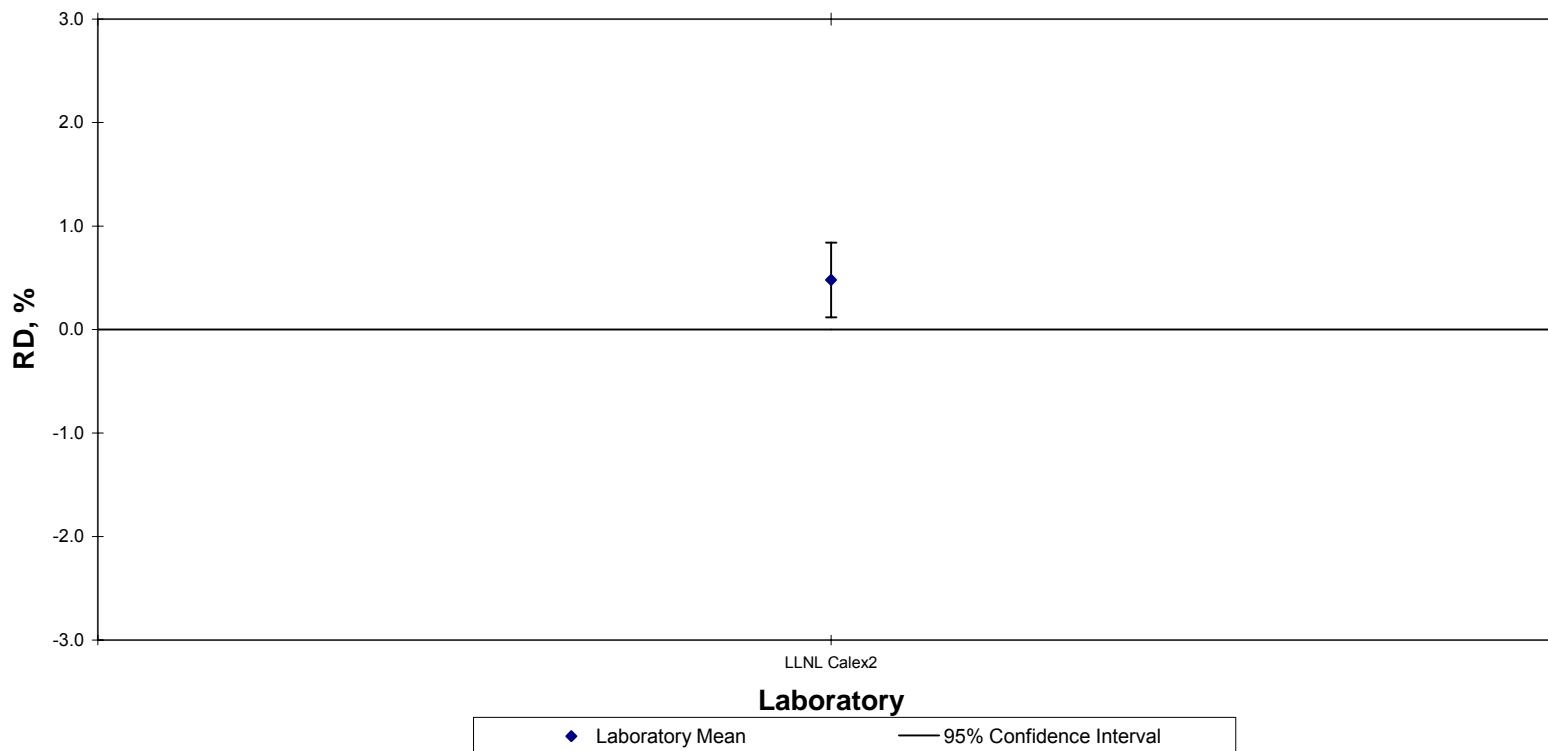
	LLNL
Mean Error (weight%)	0.0004%
Standard Deviation (weight%)	0.0006%
Uncertainty in the Mean (weight%)	0.0001%
Mean Error (%)	0.48%
Standard Deviation (%)	0.75%
Uncertainty in the Mean (%)	0.17%
Number of Data Points	19
Number of Outliers	0

Difference from Last Year in:

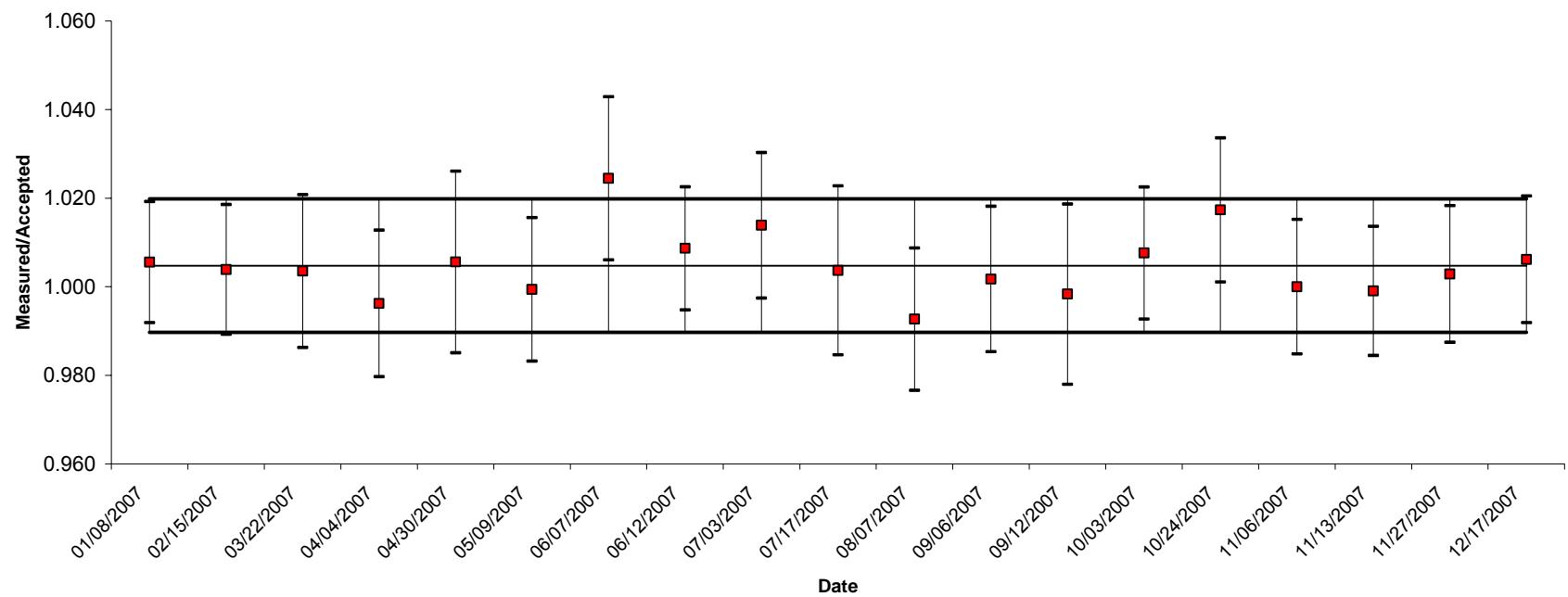
Mean Error (weight%)	0.0004%
Standard Deviation (weight%)	0.0004%
Uncertainty in the Mean (weight%)	0.0000%
Mean Error (%)	0.49%
Standard Deviation (%)	0.53%
Uncertainty in the Mean (%)	0.06%
Number of Data Points	15
Number of Outliers	0

New Brunswick Laboratory Calorimetry Exchange Program**Percent ^{238}Pu , 2007 - CALEX II**

N=19



LLNL
238-Pu
2007, CALEX II



WEIGHT PERCENT Pu238 DATA

Calendar Year 2007

LLNL: Calex II

#	Date Measured	Instr. ID	Measured Pu238	Uncert. 1 STD	Accepted Weight%	Ratio M/A	Weight% Error	Percent Error
1	01/08/2007	III	0.0741%	0.68%	0.0737%	1.0056	0.0004%	0.56%
2	02/15/2007	III	0.0740%	0.73%	0.0737%	1.0039	0.0003%	0.39%
3	03/22/2007	III	0.0739%	0.86%	0.0736%	1.0036	0.0003%	0.36%
4	04/04/2007	III	0.0733%	0.83%	0.0736%	0.9962	-0.0003%	-0.38%
5	04/30/2007	III	0.0740%	1.02%	0.0735%	1.0056	0.0004%	0.56%
6	05/09/2007	III	0.0735%	0.81%	0.0735%	0.9994	-0.0000%	-0.06%
7	06/07/2007	II	0.0753%	0.90%	0.0735%	1.0245	0.0018%	2.45%
8	06/12/2007	III	0.0741%	0.69%	0.0735%	1.0087	0.0006%	0.87%
9	07/03/2007	III	0.0745%	0.81%	0.0735%	1.0139	0.0010%	1.39%
10	07/17/2007	III	0.0737%	0.95%	0.0734%	1.0037	0.0003%	0.37%
11	08/07/2007	III	0.0729%	0.81%	0.0734%	0.9927	-0.0005%	-0.73%
12	09/06/2007	III	0.0735%	0.82%	0.0734%	1.0017	0.0001%	0.17%
13	09/12/2007	III	0.0732%	1.02%	0.0733%	0.9983	-0.0001%	-0.17%
14	10/03/2007	III	0.0739%	0.74%	0.0733%	1.0076	0.0006%	0.76%
15	10/24/2007	II	0.0746%	0.80%	0.0733%	1.0173	0.0013%	1.73%
16	11/06/2007	III	0.0733%	0.76%	0.0733%	1.0000	0.0000%	0.00%
17	11/13/2007	III	0.0732%	0.73%	0.0732%	0.9991	-0.0001%	-0.09%
18	11/27/2007	III	0.0734%	0.77%	0.0732%	1.0029	0.0002%	0.29%
19	12/17/2007	III	0.0736%	0.71%	0.0732%	1.0062	0.0005%	0.62%
Mean:						1.0048	0.0004%	0.48%
Standard Deviation:						0.0075	0.0006%	0.75%
Standard Uncertainty:						0.0017	0.0001%	0.17%

Statistical outliers are in bold and are not included in graphs and tables.

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K. **^{239}Pu ISOTOPE ABUNDANCE: TABLES AND GRAPHS**

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RESULTS OF ANALYSIS OF PU239 - CALEX I
1st QUARTER 2007

	HAN	LANL	LLNL
Mean Error (weight%)	-0.0563%	-0.0693%	0.0068%
Standard Deviation (weight%)	0.0199%	0.1773%	0.0416%
Uncertainty in the Mean (weight%)	0.0089%	0.0458%	0.0079%
Mean Error (%)	-0.06%	-0.07%	0.01%
Standard Deviation (%)	0.02%	0.19%	0.04%
Uncertainty in the Mean (%)	0.01%	0.05%	0.01%
Number of Data Points	5	15	28
Number of Outliers	0	0	0

Difference from Last Quarter in:

Mean Error (weight%)	-0.0102%	****	****
Standard Deviation (weight%)	0.0084%	****	****
Uncertainty in the Mean (weight%)	0.0038%	****	****
Mean Error (%)	-0.01%	****	****
Standard Deviation (%)	0.01%	****	****
Uncertainty in the Mean (%)	0.00%	****	****
Number of Data Points	0	15	28
Number of Outliers	0	0	0

RESULTS OF ANALYSIS OF PU239 - CALEX I
2nd QUARTER 2007

	HAN	LANL	LLNL
Mean Error (weight%)	-0.0467%	-0.0619%	-0.0037%
Standard Deviation (weight%)	0.0336%	0.1068%	0.0212%
Uncertainty in the Mean (weight%)	0.0101%	0.0338%	0.0043%
Mean Error (%)	-0.05%	-0.07%	-0.00%
Standard Deviation (%)	0.04%	0.11%	0.02%
Uncertainty in the Mean (%)	0.01%	0.04%	0.00%
Number of Data Points	11	10	24
Number of Outliers	0	0	0

Difference from Last Quarter in:

Mean Error (weight%)	0.0096%	0.0074%	-0.0105%
Standard Deviation (weight%)	0.0137%	-0.0705%	-0.0204%
Uncertainty in the Mean (weight%)	0.0012%	-0.0120%	-0.0036%
Mean Error (%)	0.01%	0.00%	-0.01%
Standard Deviation (%)	0.02%	-0.08%	-0.02%
Uncertainty in the Mean (%)	0.00%	-0.01%	-0.01%
Number of Data Points	6	-5	-4
Number of Outliers	0	0	0

RESULTS OF ANALYSIS OF PU239 - CALEX I
3rd QUARTER 2007

	HAN	LANL	LLNL
Mean Error (weight%)	-0.0365%	-0.1271%	-0.0024%
Standard Deviation (weight%)	0.0253%	0.1700%	0.0215%
Uncertainty in the Mean (weight%)	0.0073%	0.0567%	0.0034%
Mean Error (%)	-0.04%	-0.14%	-0.00%
Standard Deviation (%)	0.03%	0.18%	0.02%
Uncertainty in the Mean (%)	0.01%	0.06%	0.00%
Number of Data Points	12	9	40
Number of Outliers	0	0	0

Difference from Last Quarter in:

Mean Error (weight%)	0.0102%	-0.0652%	0.0013%
Standard Deviation (weight%)	-0.0083%	0.0632%	0.0003%
Uncertainty in the Mean (weight%)	-0.0028%	0.0229%	-0.0009%
Mean Error (%)	0.01%	-0.07%	0.00%
Standard Deviation (%)	-0.01%	0.07%	0.00%
Uncertainty in the Mean (%)	0.00%	0.02%	0.00%
Number of Data Points	1	-1	16
Number of Outliers	0	0	0

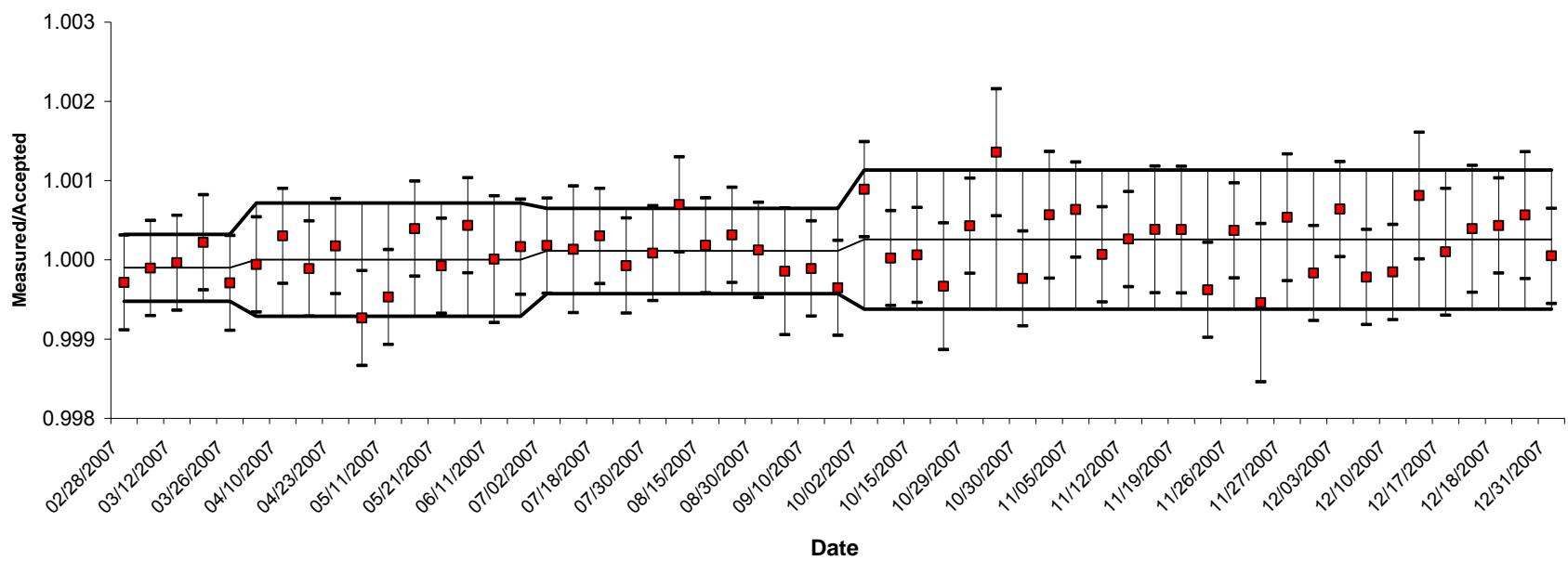
RESULTS OF ANALYSIS OF PU239 - CALEX I
4th QUARTER 2007

	HAN	LANL	LLNL
Mean Error (weight%)	-0.0229%	-0.1485%	0.0078%
Standard Deviation (weight%)	0.0412%	0.1263%	0.0241%
Uncertainty in the Mean (weight%)	0.0079%	0.0515%	0.0058%
Mean Error (%)	-0.02%	-0.16%	0.01%
Standard Deviation (%)	0.04%	0.13%	0.03%
Uncertainty in the Mean (%)	0.01%	0.05%	0.01%
Number of Data Points	27	6	17
Number of Outliers	0	0	2

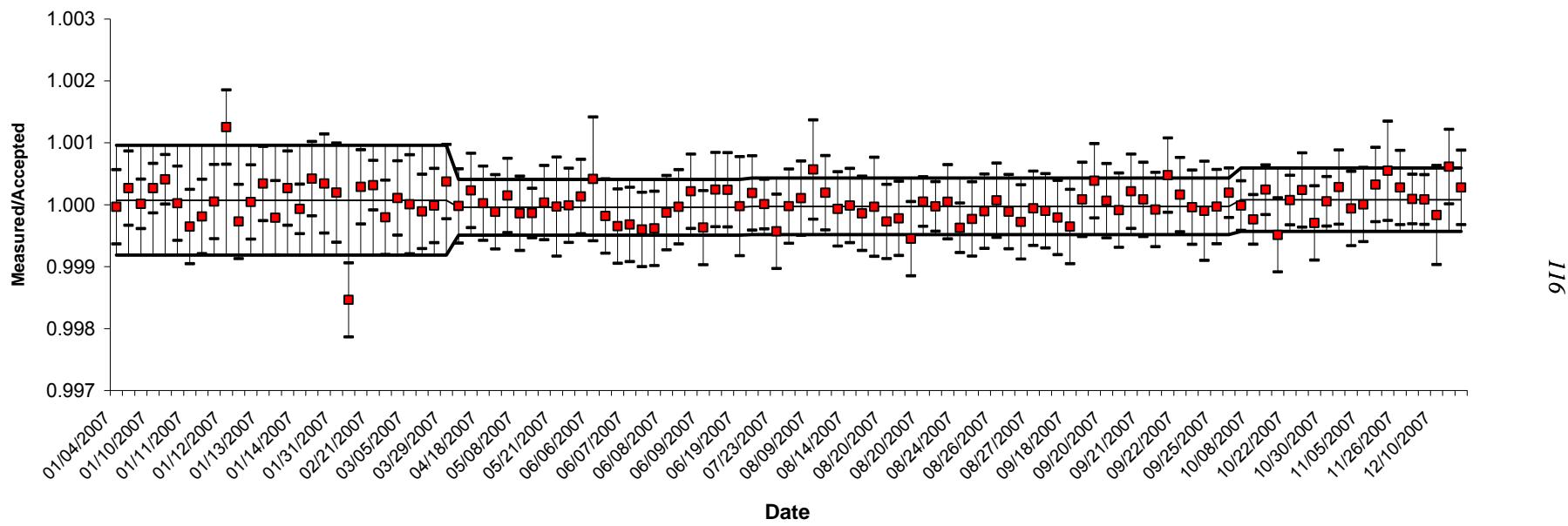
Difference from Last Quarter in:

Mean Error (weight%)	0.0136%	-0.0214%	0.0102%
Standard Deviation (weight%)	0.0159%	-0.0437%	0.0026%
Uncertainty in the Mean (weight%)	0.0006%	-0.0052%	0.0024%
Mean Error (%)	0.02%	-0.02%	0.01%
Standard Deviation (%)	0.01%	-0.05%	0.01%
Uncertainty in the Mean (%)	0.00%	-0.01%	0.01%
Number of Data Points	15	-3	-23
Number of Outliers	0	0	2

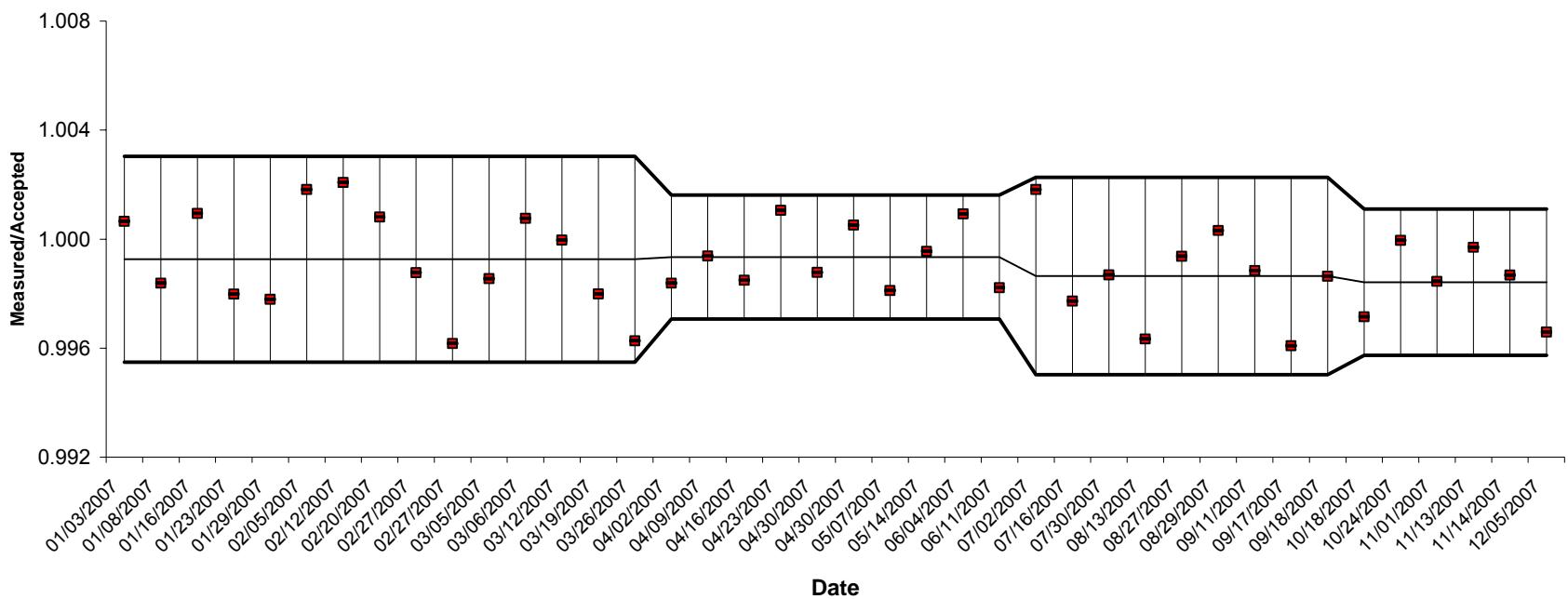
HAN
239-Pu
1st Quarter 2007 - 4th Quarter 2007
CALEX I



LLNL
239-Pu
1st Quarter 2007 - 4th Quarter 2007
CALEX I



LANL
239-Pu
1st Quarter 2007 - 4th Quarter 2007
CALEX I



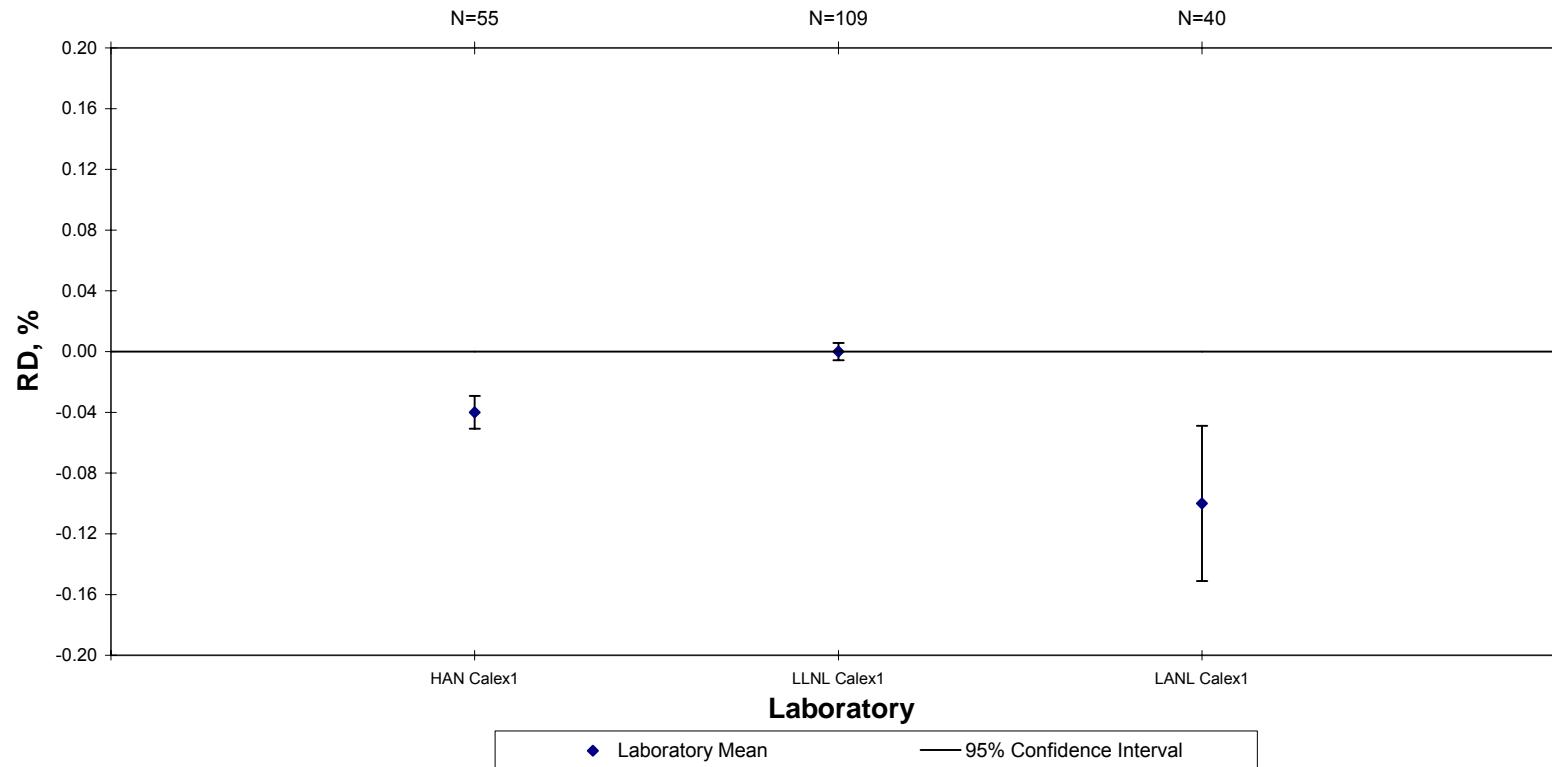
**RESULTS OF ANALYSIS OF PU239 - CALEX I
2007**

	HAN	LANL	LLNL
Mean Error (weight%)	-0.0336%	-0.0924%	0.0012%
Standard Deviation (weight%)	0.0365%	0.1520%	0.0284%
Uncertainty in the Mean (weight%)	0.0049%	0.0240%	0.0027%
Mean Error (%)	-0.04%	-0.10%	0.00%
Standard Deviation (%)	0.04%	0.16%	0.03%
Uncertainty in the Mean (%)	0.01%	0.03%	0.00%
Number of Data Points	55	40	109
Number of Outliers	0	0	2

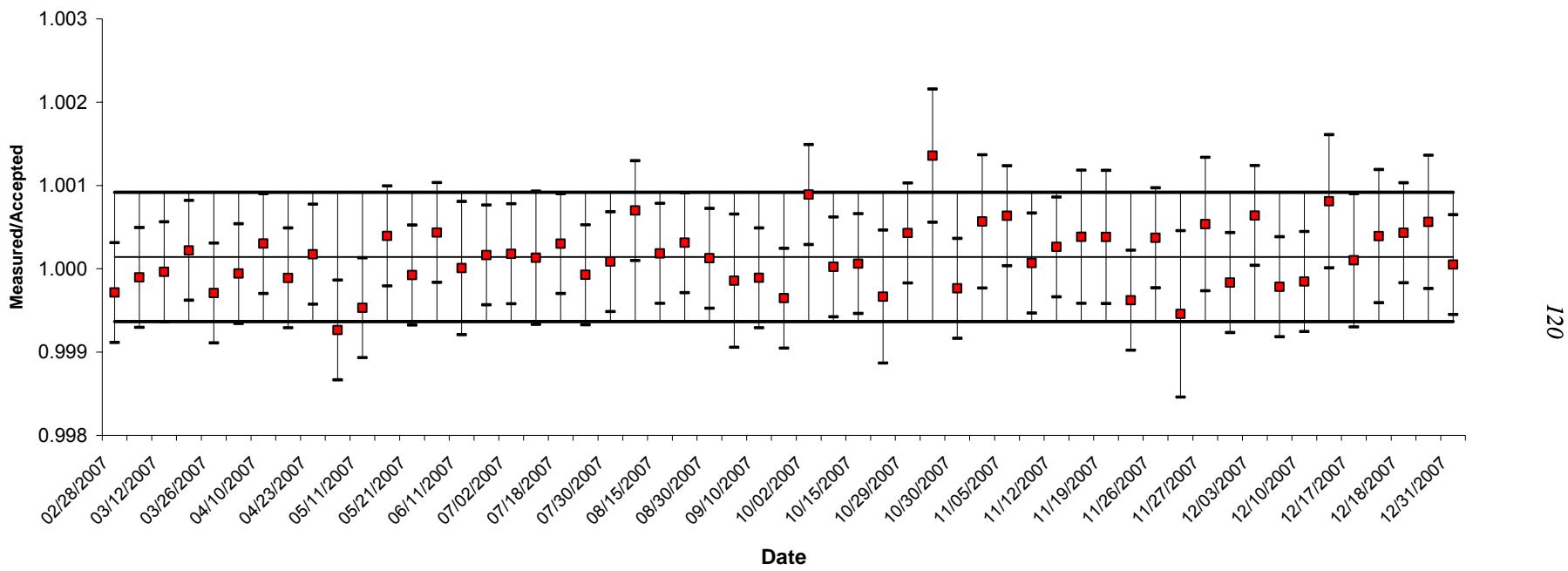
Difference from Last Year in:

Mean Error (weight%)	-0.0043%	****	-0.0074%
Standard Deviation (weight%)	0.0177%	****	0.0035%
Uncertainty in the Mean (weight%)	0.0002%	****	-0.0007%
Mean Error (%)	-0.01%	****	-0.01%
Standard Deviation (%)	0.02%	****	0.00%
Uncertainty in the Mean (%)	0.00%	****	0.00%
Number of Data Points	39	40	54
Number of Outliers	-1	0	-5

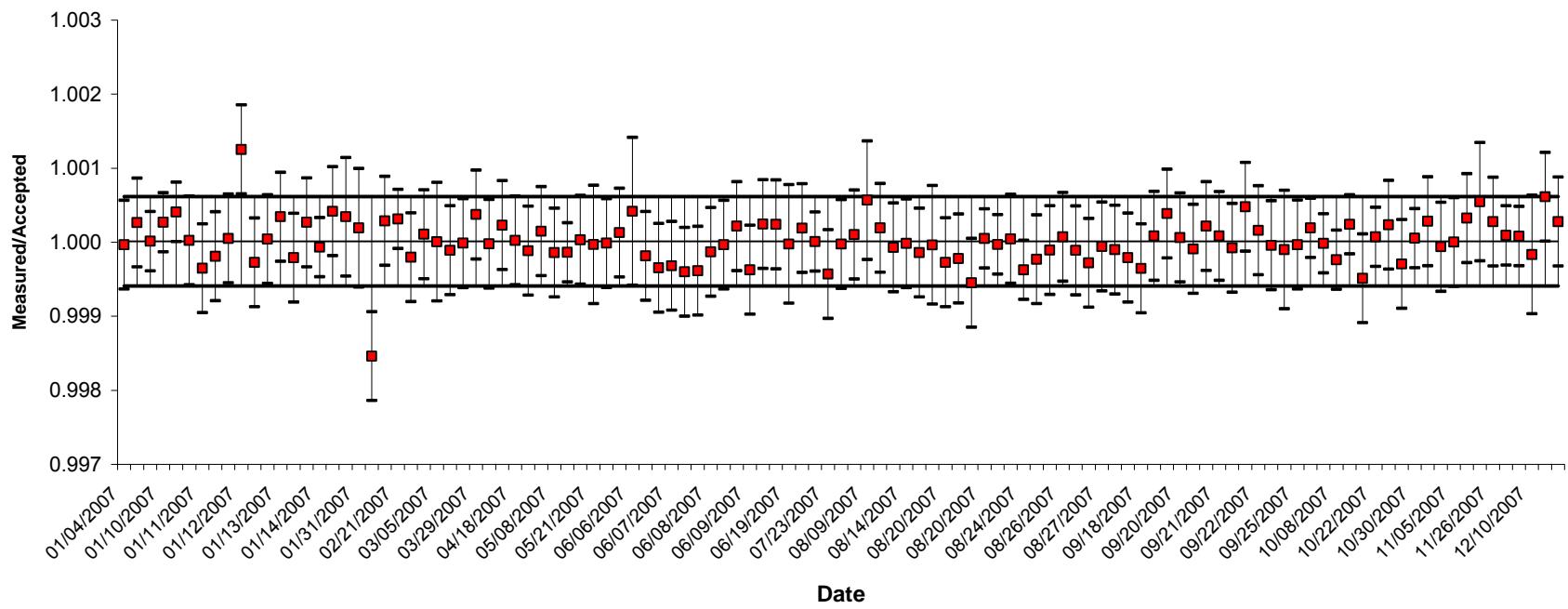
New Brunswick Laboratory Calorimetry Exchange Program
Percent ^{239}Pu , 2007 - CALEX I



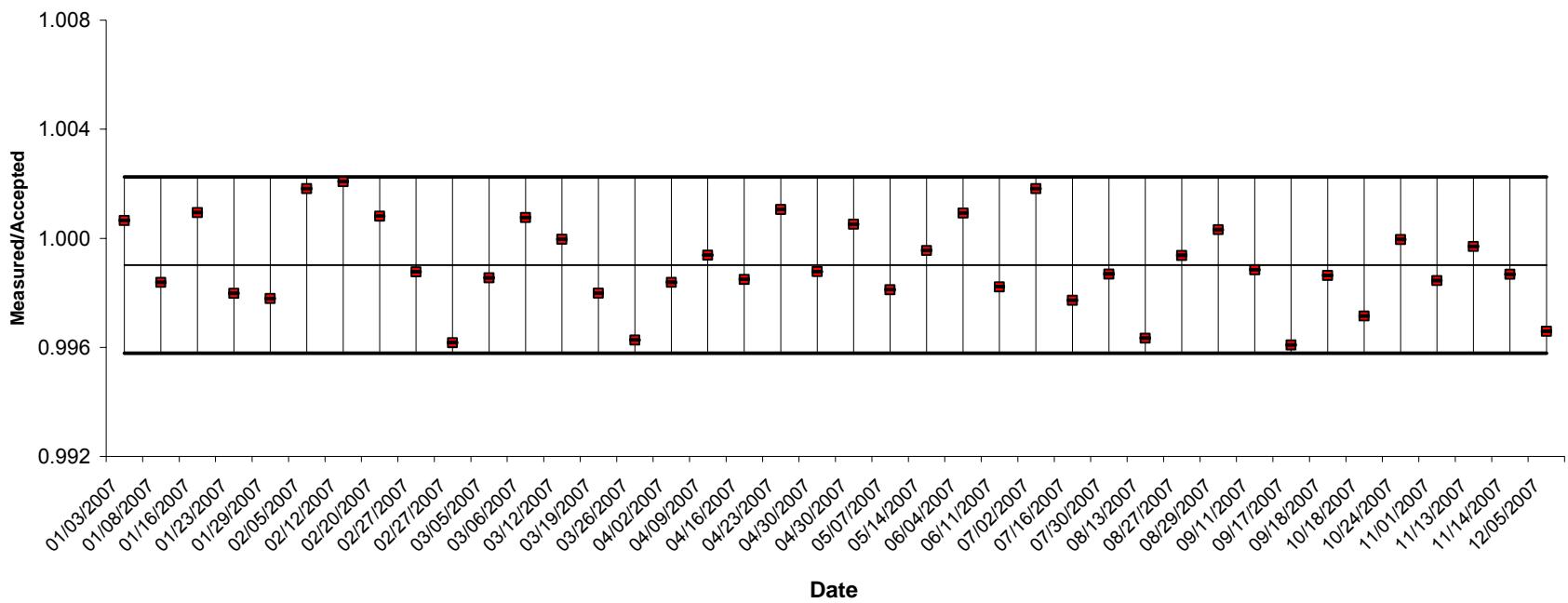
HAN
239-Pu
2007, CALEX I



LLNL
239-Pu
2007, CALEX I



LANL
239-Pu
2007, CALEX I



WEIGHT PERCENT Pu239 DATA

Calendar Year 2007

HAN: Calex I

#	Date Measured	Instr. ID	Measured Pu239	Uncert. 1 STD	Accepted Weight%	Ratio M/A	Weight% Error	Percent Error
1	02/28/2007	2740	93.9309%	0.03%	94.0048%	0.9992	-0.0739%	-0.08%
2	03/05/2007	2740	93.9481%	0.03%	94.0048%	0.9994	-0.0567%	-0.06%
3	03/12/2007	2740	93.9545%	0.03%	94.0049%	0.9995	-0.0504%	-0.05%
4	03/19/2007	2740	93.9788%	0.03%	94.0050%	0.9997	-0.0262%	-0.03%
5	03/26/2007	2740	93.9307%	0.03%	94.0051%	0.9992	-0.0744%	-0.08%
6	04/02/2007	2740	93.9527%	0.03%	94.0052%	0.9994	-0.0525%	-0.06%
7	04/10/2007	2740	93.9867%	0.03%	94.0053%	0.9998	-0.0186%	-0.02%
8	04/16/2007	2740	93.9481%	0.03%	94.0054%	0.9994	-0.0573%	-0.06%
9	04/23/2007	2740	93.9749%	0.03%	94.0055%	0.9997	-0.0306%	-0.03%
10	05/01/2007	2740	93.8895%	0.03%	94.0056%	0.9988	-0.1161%	-0.12%
11	05/11/2007	2740	93.9147%	0.03%	94.0057%	0.9990	-0.0910%	-0.10%
12	05/14/2007	2740	93.9958%	0.03%	94.0058%	0.9999	-0.0100%	-0.01%
13	05/21/2007	2740	93.9518%	0.03%	94.0059%	0.9994	-0.0541%	-0.06%
14	06/04/2007	2740	94.0000%	0.03%	94.0060%	0.9999	-0.0060%	-0.01%
15	06/11/2007	2740	93.9600%	0.04%	94.0061%	0.9995	-0.0461%	-0.05%
16	06/18/2007	2740	93.9748%	0.03%	94.0062%	0.9997	-0.0314%	-0.03%
17	07/02/2007	2740	93.9763%	0.03%	94.0064%	0.9997	-0.0301%	-0.03%
18	07/09/2007	2740	93.9720%	0.04%	94.0065%	0.9996	-0.0345%	-0.04%
19	07/18/2007	2740	93.9880%	0.03%	94.0066%	0.9998	-0.0186%	-0.02%
20	07/24/2007	2740	93.9529%	0.03%	94.0067%	0.9994	-0.0538%	-0.06%
21	07/30/2007	2740	93.9678%	0.03%	94.0068%	0.9996	-0.0390%	-0.04%
22	08/06/2007	2740	94.0255%	0.03%	94.0069%	1.0002	0.0186%	0.02%
23	08/15/2007	2740	93.9773%	0.03%	94.0070%	0.9997	-0.0297%	-0.03%
24	08/21/2007	2740	93.9896%	0.03%	94.0071%	0.9998	-0.0175%	-0.02%
25	08/30/2007	2740	93.9720%	0.03%	94.0072%	0.9996	-0.0352%	-0.04%
26	09/04/2007	2740	93.9467%	0.04%	94.0073%	0.9994	-0.0606%	-0.06%
27	09/10/2007	2740	93.9501%	0.03%	94.0073%	0.9994	-0.0572%	-0.06%
28	09/19/2007	2740	93.9272%	0.03%	94.0075%	0.9991	-0.0803%	-0.09%
29	10/02/2007	2740	94.0444%	0.03%	94.0076%	1.0004	0.0368%	0.04%
30	10/08/2007	2740	93.9628%	0.03%	94.0077%	0.9995	-0.0449%	-0.05%
31	10/15/2007	2740	93.9666%	0.03%	94.0078%	0.9996	-0.0412%	-0.04%
32	10/22/2007	2740	93.9295%	0.04%	94.0079%	0.9992	-0.0784%	-0.08%
33	10/29/2007	2740	94.0014%	0.03%	94.0080%	0.9999	-0.0066%	-0.01%
34	10/29/2007	8302	94.0886%	0.04%	94.0080%	1.0009	0.0806%	0.09%
35	10/30/2007	90225	93.9389%	0.03%	94.0080%	0.9993	-0.0691%	-0.07%
36	11/05/2007	90225	94.0145%	0.04%	94.0081%	1.0001	0.0064%	0.01%
37	11/05/2007	8302	94.0208%	0.03%	94.0081%	1.0001	0.0127%	0.01%
38	11/12/2007	2740	93.9676%	0.03%	94.0082%	0.9996	-0.0406%	-0.04%
39	11/12/2007	90225	93.9858%	0.03%	94.0082%	0.9998	-0.0224%	-0.02%
40	11/13/2007	8302	93.9973%	0.04%	94.0082%	0.9999	-0.0109%	-0.01%
41	11/19/2007	90225	93.9971%	0.04%	94.0083%	0.9999	-0.0112%	-0.01%
42	11/19/2007	8302	93.9257%	0.03%	94.0083%	0.9991	-0.0826%	-0.09%
43	11/26/2007	90225	93.9962%	0.03%	94.0084%	0.9999	-0.0122%	-0.01%
44	11/26/2007	2740	93.9105%	0.05%	94.0084%	0.9990	-0.0979%	-0.10%
45	11/27/2007	8302	94.0118%	0.04%	94.0084%	1.0000	0.0034%	0.00%
46	12/03/2007	8302	93.9458%	0.03%	94.0084%	0.9993	-0.0626%	-0.07%
47	12/03/2007	90225	94.0216%	0.03%	94.0084%	1.0001	0.0132%	0.01%
48	12/10/2007	2740	93.9412%	0.03%	94.0085%	0.9993	-0.0673%	-0.07%
49	12/10/2007	90225	93.9471%	0.03%	94.0085%	0.9993	-0.0614%	-0.07%
50	12/10/2007	8302	94.0377%	0.04%	94.0085%	1.0003	0.0292%	0.03%
51	12/17/2007	90225	93.9712%	0.04%	94.0086%	0.9996	-0.0374%	-0.04%
52	12/17/2007	8302	93.9984%	0.04%	94.0086%	0.9999	-0.0102%	-0.01%
53	12/18/2007	2740	94.0023%	0.03%	94.0086%	0.9999	-0.0063%	-0.01%
54	12/31/2007	2740	94.0148%	0.04%	94.0088%	1.0001	0.0060%	0.01%
55	12/31/2007	90225	93.9665%	0.03%	94.0088%	0.9995	-0.0423%	-0.05%

Mean: 0.9996 -0.0336% -0.04%
 Standard Deviation: 0.0004 0.0365% 0.04%
 Standard Uncertainty: 0.0001 0.0049% 0.01%

Statistical outliers are in bold and are not included in graphs and tables.

WEIGHT PERCENT Pu239 DATA

Calendar Year 2007

LLNL: Calex I

#	Date Measured	Instr. ID	Measured Pu239	Uncert. 1 STD	Accepted Weight%	Ratio M/A	Weight% Error	Percent Error
1	01/04/2007	II	94.0009%	0.03%	94.0040%	1.0000	-0.0032%	-0.00%
2	01/10/2007	I	94.0292%	0.03%	94.0041%	1.0003	0.0251%	0.03%
3	01/10/2007	I	94.0054%	0.02%	94.0041%	1.0000	0.0013%	0.00%
4	01/10/2007	I	94.0294%	0.02%	94.0041%	1.0003	0.0253%	0.03%
5	01/11/2007	I	94.0426%	0.02%	94.0041%	1.0004	0.0385%	0.04%
6	01/11/2007	I	94.0064%	0.03%	94.0041%	1.0000	0.0023%	0.00%
7	01/11/2007	III	93.9711%	0.03%	94.0041%	0.9996	-0.0330%	-0.04%
8	01/12/2007	III	93.9863%	0.03%	94.0041%	0.9998	-0.0178%	-0.02%
9	01/12/2007	III	94.0090%	0.03%	94.0041%	1.0001	0.0049%	0.01%
10	01/12/2007	III	94.1220%	0.03%	94.0041%	1.0013	0.1179%	0.13%
11	01/13/2007	III	93.9786%	0.03%	94.0041%	0.9997	-0.0256%	-0.03%
12	01/13/2007	III	94.0081%	0.03%	94.0041%	1.0000	0.0040%	0.00%
13	01/13/2007	III	94.0364%	0.03%	94.0041%	1.0003	0.0323%	0.03%
14	01/14/2007	III	93.9845%	0.03%	94.0042%	0.9998	-0.0196%	-0.02%
15	01/14/2007	III	94.0294%	0.03%	94.0042%	1.0003	0.0252%	0.03%
16	01/14/2007	III	93.9979%	0.02%	94.0042%	0.9999	-0.0062%	-0.01%
17	01/18/2007	I	94.0436%	0.03%	94.0042%	1.0004	0.0394%	0.04%
18	01/31/2007	III	94.0367%	0.04%	94.0044%	1.0003	0.0323%	0.03%
19	01/31/2007	II	94.0227%	0.04%	94.0044%	1.0002	0.0183%	0.02%
20	02/07/2007	I	93.8600%	0.03%	94.0045%	0.9985	-0.1445%	-0.15%
21	02/14/2007	II	94.0317%	0.03%	94.0046%	1.0003	0.0271%	0.03%
22	02/21/2007	I	94.0344%	0.02%	94.0047%	1.0003	0.0297%	0.03%
23	02/27/2007	III	93.9857%	0.03%	94.0048%	0.9998	-0.0191%	-0.02%
24	03/05/2007	I	94.0150%	0.03%	94.0048%	1.0001	0.0101%	0.01%
25	03/05/2007	III	94.0055%	0.04%	94.0048%	1.0000	0.0007%	0.00%
26	03/12/2007	II	93.9948%	0.03%	94.0049%	0.9999	-0.0101%	-0.01%
27	03/20/2007	I	94.0038%	0.03%	94.0050%	1.0000	-0.0012%	-0.00%
28	03/29/2007	I	94.0403%	0.03%	94.0052%	1.0004	0.0352%	0.04%
29	04/03/2007	III	94.0032%	0.03%	94.0052%	1.0000	-0.0020%	-0.00%
30	04/05/2007	I	94.0270%	0.03%	94.0052%	1.0002	0.0217%	0.02%
31	04/18/2007	I	94.0077%	0.03%	94.0054%	1.0000	0.0023%	0.00%
32	04/19/2007	III	93.9947%	0.03%	94.0054%	0.9999	-0.0107%	-0.01%
33	04/30/2007	I	94.0196%	0.03%	94.0056%	1.0001	0.0141%	0.01%
34	05/08/2007	III	93.9926%	0.03%	94.0057%	0.9999	-0.0131%	-0.01%
35	05/17/2007	III	93.9930%	0.02%	94.0058%	0.9999	-0.0128%	-0.01%
36	05/21/2007	I	94.0089%	0.03%	94.0059%	1.0000	0.0030%	0.00%
37	05/21/2007	III	94.0031%	0.04%	94.0059%	1.0000	-0.0028%	-0.00%
38	05/24/2007	III	94.0048%	0.03%	94.0059%	1.0000	-0.0011%	-0.00%
39	05/29/2007	II	94.0182%	0.03%	94.0060%	1.0001	0.0123%	0.01%
40	06/06/2007	III	94.0454%	0.05%	94.0061%	1.0004	0.0393%	0.04%
41	06/07/2007	III	93.9888%	0.03%	94.0061%	0.9998	-0.0173%	-0.02%
42	06/07/2007	III	93.9736%	0.03%	94.0061%	0.9997	-0.0325%	-0.03%
43	06/07/2007	III	93.9763%	0.03%	94.0061%	0.9997	-0.0298%	-0.03%
44	06/07/2007	III	93.9685%	0.03%	94.0061%	0.9996	-0.0376%	-0.04%
45	06/08/2007	III	93.9701%	0.03%	94.0061%	0.9996	-0.0360%	-0.04%
46	06/08/2007	III	93.9939%	0.03%	94.0061%	0.9999	-0.0122%	-0.01%
47	06/09/2007	III	94.0030%	0.03%	94.0061%	1.0000	-0.0031%	-0.00%
48	06/09/2007	III	94.0265%	0.03%	94.0061%	1.0002	0.0204%	0.02%
49	06/09/2007	III	93.9712%	0.03%	94.0061%	0.9996	-0.0349%	-0.04%
50	06/10/2007	III	94.0292%	0.03%	94.0061%	1.0002	0.0231%	0.02%
51	06/14/2007	I	94.0288%	0.03%	94.0062%	1.0002	0.0227%	0.02%
52	06/19/2007	III	94.0040%	0.04%	94.0062%	1.0000	-0.0022%	-0.00%
53	07/02/2007	I	94.0243%	0.03%	94.0064%	1.0002	0.0179%	0.02%
54	07/17/2007	I	94.0076%	0.02%	94.0066%	1.0000	0.0009%	0.00%
55	07/23/2007	III	93.9663%	0.03%	94.0067%	0.9996	-0.0404%	-0.04%
56	08/02/2007	III	94.0045%	0.03%	94.0068%	1.0000	-0.0023%	-0.00%
57	08/06/2007	I	94.0167%	0.03%	94.0069%	1.0001	0.0098%	0.01%
58	08/09/2007	II	94.0603%	0.04%	94.0069%	1.0006	0.0534%	0.06%
59	08/13/2007	I	94.0252%	0.03%	94.0070%	1.0002	0.0182%	0.02%
60	08/14/2007	III	94.0005%	0.03%	94.0070%	0.9999	-0.0065%	-0.01%
61	08/14/2007	III	94.0056%	0.03%	94.0070%	1.0000	-0.0014%	-0.00%
62	08/14/2007	III	93.9939%	0.03%	94.0070%	0.9999	-0.0131%	-0.01%

WEIGHT PERCENT Pu239 DATA

Calendar Year 2007

LLNL: Calex I

#	Date Measured	Instr. ID	Measured Pu239	Uncert. 1 STD	Accepted Weight%	Ratio M/A	Weight% Error	Percent Error
63	08/15/2007	III	94.0037%	0.04%	94.0070%	1.0000	-0.0033%	-0.00%
64	08/20/2007	III	93.9816%	0.03%	94.0071%	0.9997	-0.0255%	-0.03%
65	08/20/2007	III	93.9864%	0.03%	94.0071%	0.9998	-0.0207%	-0.02%
66	08/20/2007	III	93.9555%	0.03%	94.0071%	0.9995	-0.0516%	-0.05%
67	08/20/2007	I	94.0119%	0.02%	94.0071%	1.0001	0.0048%	0.01%
68	08/23/2007	III	94.0044%	0.02%	94.0071%	1.0000	-0.0027%	-0.00%
69	08/24/2007	III	94.0115%	0.03%	94.0071%	1.0000	0.0044%	0.00%
70	08/24/2007	III	93.9720%	0.02%	94.0071%	0.9996	-0.0351%	-0.04%
71	08/25/2007	III	93.9855%	0.03%	94.0071%	0.9998	-0.0216%	-0.02%
72	08/25/2007	III	93.9971%	0.03%	94.0071%	0.9999	-0.0100%	-0.01%
73	08/26/2007	III	94.0140%	0.03%	94.0071%	1.0001	0.0068%	0.01%
74	08/26/2007	III	93.9968%	0.03%	94.0071%	0.9999	-0.0104%	-0.01%
75	08/27/2007	III	93.9811%	0.03%	94.0072%	0.9997	-0.0261%	-0.03%
76	08/27/2007	III	94.0018%	0.03%	94.0072%	0.9999	-0.0054%	-0.01%
77	08/28/2007	III	93.9978%	0.03%	94.0072%	0.9999	-0.0094%	-0.01%
78	09/06/2007	I	93.9878%	0.03%	94.0073%	0.9998	-0.0195%	-0.02%
79	09/18/2007	III	93.9743%	0.03%	94.0074%	0.9996	-0.0332%	-0.04%
80	09/20/2007	I	94.0155%	0.03%	94.0075%	1.0001	0.0081%	0.01%
81	09/20/2007	II	94.0439%	0.03%	94.0075%	1.0004	0.0364%	0.04%
82	09/20/2007	II	94.0135%	0.03%	94.0075%	1.0001	0.0061%	0.01%
83	09/20/2007	II	93.9990%	0.03%	94.0075%	0.9999	-0.0084%	-0.01%
84	09/21/2007	II	94.0280%	0.03%	94.0075%	1.0002	0.0205%	0.02%
85	09/21/2007	II	94.0155%	0.03%	94.0075%	1.0001	0.0080%	0.01%
86	09/21/2007	II	94.0003%	0.03%	94.0075%	0.9999	-0.0072%	-0.01%
87	09/21/2007	II	94.0525%	0.03%	94.0075%	1.0005	0.0450%	0.05%
88	09/22/2007	II	94.0227%	0.03%	94.0075%	1.0002	0.0152%	0.02%
89	09/22/2007	II	94.0036%	0.03%	94.0075%	1.0000	-0.0039%	-0.00%
90	09/22/2007	II	93.9982%	0.04%	94.0075%	0.9999	-0.0093%	-0.01%
91	09/25/2007	III	94.0045%	0.03%	94.0075%	1.0000	-0.0030%	-0.00%
92	09/27/2007	I	94.0258%	0.02%	94.0076%	1.0002	0.0182%	0.02%
93	10/02/2007	I	94.0063%	0.02%	94.0076%	1.0000	-0.0013%	-0.00%
94	10/08/2007	II	93.9854%	0.02%	94.0077%	0.9998	-0.0223%	-0.02%
95	10/10/2007	I	94.0305%	0.02%	94.0077%	1.0002	0.0228%	0.02%
96	10/16/2007	III	93.9621%	0.03%	94.0078%	0.9995	-0.0457%	-0.05%
97	10/22/2007	II	94.0148%	0.02%	94.0079%	1.0001	0.0069%	0.01%
98	10/23/2007	I	94.0301%	0.03%	94.0079%	1.0002	0.0222%	0.02%
99	10/25/2007	III	93.9803%	0.03%	94.0079%	0.9997	-0.0277%	-0.03%
100	10/30/2007	I	94.0131%	0.02%	94.0080%	1.0001	0.0051%	0.01%
101	10/31/2007	II	94.0347%	0.03%	94.0080%	1.0003	0.0267%	0.03%
102	10/31/2007	III	94.0022%	0.03%	94.0080%	0.9999	-0.0058%	-0.01%
103	11/05/2007	I	94.0084%	0.03%	94.0081%	1.0000	0.0003%	0.00%
104	11/12/2007	II	94.0388%	0.03%	94.0082%	1.0003	0.0306%	0.03%
105	11/20/2007	II	94.0598%	0.04%	94.0083%	1.0005	0.0515%	0.05%
106	11/26/2007	I	94.0345%	0.03%	94.0084%	1.0003	0.0262%	0.03%
107	12/04/2007	II	94.0171%	0.02%	94.0085%	1.0001	0.0087%	0.01%
108	12/06/2007	I	94.0163%	0.02%	94.0085%	1.0001	0.0078%	0.01%
109	12/10/2007	III	93.9930%	0.04%	94.0085%	0.9998	-0.0155%	-0.02%
110	12/19/2007	I	94.0665%	0.03%	94.0086%	1.0006	0.0578%	0.06%
111	12/27/2007	I	94.0350%	0.03%	94.0088%	1.0003	0.0263%	0.03%
Mean:						1.0000	0.0012%	0.00%
Standard Deviation:						0.0003	0.0284%	0.03%
Standard Uncertainty:						0.0000	0.0027%	0.00%

Statistical outliers are in bold and are not included in graphs and tables.

WEIGHT PERCENT Pu239 DATA

Calendar Year 2007

LANL: Calex I

#	Date Measured	Instr. ID	Measured Pu239	Uncert. 1 STD	Accepted Weight%	Ratio M/A	Weight% Error	Percent Error
1	01/03/2007	F5	94.0654%	0.00%	94.0040%	1.0007	0.0614%	0.07%
2	01/08/2007	F9	93.8525%	0.00%	94.0041%	0.9984	-0.1516%	-0.16%
3	01/16/2007	F5	94.0930%	0.00%	94.0042%	1.0009	0.0888%	0.09%
4	01/23/2007	F9	93.8144%	0.00%	94.0043%	0.9980	-0.1898%	-0.20%
5	01/29/2007	F5	93.7964%	0.00%	94.0044%	0.9978	-0.2080%	-0.22%
6	02/05/2007	F9	94.1757%	0.00%	94.0045%	1.0018	0.1713%	0.18%
7	02/12/2007	F5	94.1997%	0.00%	94.0046%	1.0021	0.1951%	0.21%
8	02/20/2007	F9	94.0807%	0.00%	94.0047%	1.0008	0.0760%	0.08%
9	02/27/2007	F5	93.8892%	0.00%	94.0048%	0.9988	-0.1156%	-0.12%
10	02/27/2007	F5	93.6448%	0.00%	94.0048%	0.9962	-0.3600%	-0.38%
11	03/05/2007	F5	93.8687%	0.00%	94.0048%	0.9986	-0.1362%	-0.14%
12	03/06/2007	F9	94.0767%	0.00%	94.0048%	1.0008	0.0719%	0.08%
13	03/12/2007	F9	94.0013%	0.00%	94.0049%	1.0000	-0.0036%	-0.00%
14	03/19/2007	F5	93.8158%	0.00%	94.0050%	0.9980	-0.1892%	-0.20%
15	03/26/2007	F9	93.6546%	0.00%	94.0051%	0.9963	-0.3505%	-0.37%
16	04/02/2007	F5	93.8534%	0.00%	94.0052%	0.9984	-0.1518%	-0.16%
17	04/09/2007	F9	93.9471%	0.00%	94.0053%	0.9994	-0.0582%	-0.06%
18	04/16/2007	F5	93.8633%	0.00%	94.0054%	0.9985	-0.1421%	-0.15%
19	04/23/2007	F9	94.1049%	0.00%	94.0055%	1.0011	0.0994%	0.11%
20	04/30/2007	F5	93.8908%	0.00%	94.0056%	0.9988	-0.1147%	-0.12%
21	04/30/2007	F9	94.0540%	0.00%	94.0056%	1.0005	0.0484%	0.05%
22	05/07/2007	F9	93.8280%	0.00%	94.0057%	0.9981	-0.1777%	-0.19%
23	05/14/2007	F5	93.9638%	0.00%	94.0058%	0.9996	-0.0420%	-0.04%
24	06/04/2007	F9	94.0932%	0.00%	94.0060%	1.0009	0.0871%	0.09%
25	06/11/2007	F5	93.8385%	0.00%	94.0061%	0.9982	-0.1676%	-0.18%
26	07/02/2007	F5	94.1781%	0.00%	94.0064%	1.0018	0.1717%	0.18%
27	07/16/2007	F5	93.7928%	0.00%	94.0066%	0.9977	-0.2138%	-0.23%
28	07/30/2007	F5	93.8834%	0.00%	94.0068%	0.9987	-0.1234%	-0.13%
29	08/13/2007	F5	93.6627%	0.00%	94.0070%	0.9963	-0.3443%	-0.37%
30	08/27/2007	F5	93.9481%	0.00%	94.0072%	0.9994	-0.0591%	-0.06%
31	08/29/2007	F9	94.0367%	0.00%	94.0072%	1.0003	0.0295%	0.03%
32	09/11/2007	F5	93.8988%	0.00%	94.0074%	0.9988	-0.1086%	-0.12%
33	09/17/2007	F9	93.6398%	0.00%	94.0074%	0.9961	-0.3676%	-0.39%
34	09/18/2007	F9	93.8793%	0.00%	94.0074%	0.9986	-0.1281%	-0.14%
35	10/18/2007	F9	93.7397%	0.00%	94.0078%	0.9971	-0.2681%	-0.29%
36	10/24/2007	F9	94.0037%	0.00%	94.0079%	1.0000	-0.0042%	-0.00%
37	11/01/2007	F9	93.8619%	0.00%	94.0080%	0.9984	-0.1461%	-0.16%
38	11/13/2007	F9	93.9800%	0.00%	94.0082%	0.9997	-0.0282%	-0.03%
39	11/14/2007	F9	93.8839%	0.00%	94.0082%	0.9987	-0.1243%	-0.13%
40	12/05/2007	F9	93.6882%	0.00%	94.0085%	0.9966	-0.3203%	-0.34%
Mean:						0.9990	-0.0924%	-0.10%
Standard Deviation:						0.0016	0.1520%	0.16%
Standard Uncertainty:						0.0003	0.0240%	0.03%

Statistical outliers are in bold and are not included in graphs and tables.

RESULTS OF ANALYSIS OF PU239 - CALEX II
1st QUARTER 2007

	LLNL
Mean Error (weight%)	-0.0315%
Standard Deviation (weight%)	0.0090%
Uncertainty in the Mean (weight%)	0.0052%
Mean Error (%)	-0.04%
Standard Deviation (%)	0.01%
Uncertainty in the Mean (%)	0.01%
Number of Data Points	3
Number of Outliers	0

Difference from Last Quarter in:

Mean Error (weight%)	****
Standard Deviation (weight%)	****
Uncertainty in the Mean (weight%)	****
Mean Error (%)	****
Standard Deviation (%)	****
Uncertainty in the Mean (%)	****
Number of Data Points	3
Number of Outliers	0

RESULTS OF ANALYSIS OF PU239 - CALEX II
2nd QUARTER 2007

	LLNL
Mean Error (weight%)	-0.0288%
Standard Deviation (weight%)	0.0279%
Uncertainty in the Mean (weight%)	0.0125%
Mean Error (%)	-0.03%
Standard Deviation (%)	0.03%
Uncertainty in the Mean (%)	0.01%
Number of Data Points	5
Number of Outliers	0

Difference from Last Quarter in:

Mean Error (weight%)	0.0027%
Standard Deviation (weight%)	0.0189%
Uncertainty in the Mean (weight%)	0.0073%
Mean Error (%)	0.01%
Standard Deviation (%)	0.02%
Uncertainty in the Mean (%)	0.00%
Number of Data Points	2
Number of Outliers	0

RESULTS OF ANALYSIS OF PU239 - CALEX II
3rd QUARTER 2007

	LLNL
Mean Error (weight%)	0.0046%
Standard Deviation (weight%)	0.0226%
Uncertainty in the Mean (weight%)	0.0101%
Mean Error (%)	0.01%
Standard Deviation (%)	0.03%
Uncertainty in the Mean (%)	0.01%
Number of Data Points	5
Number of Outliers	0

Difference from Last Quarter in:

Mean Error (weight%)	0.0334%
Standard Deviation (weight%)	-0.0053%
Uncertainty in the Mean (weight%)	-0.0024%
Mean Error (%)	0.04%
Standard Deviation (%)	0.00%
Uncertainty in the Mean (%)	0.00%
Number of Data Points	0
Number of Outliers	0

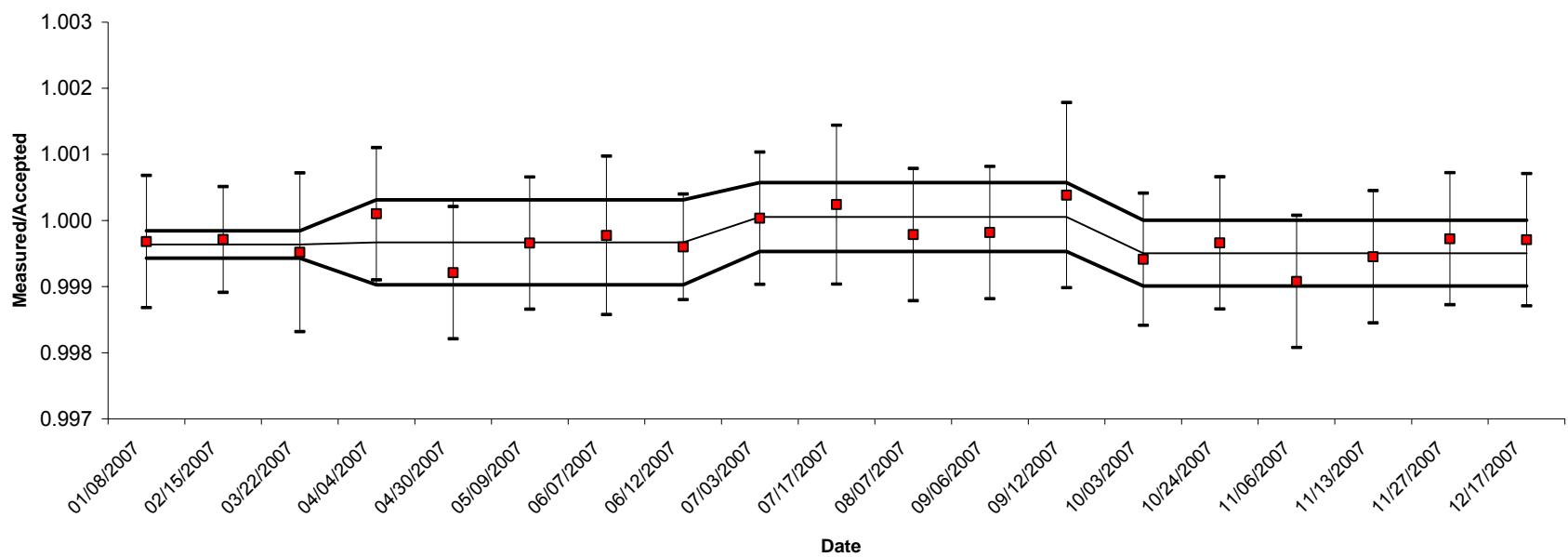
RESULTS OF ANALYSIS OF PU239 - CALEX II
4th QUARTER 2007

	LLNL
Mean Error (weight%)	-0.0429%
Standard Deviation (weight%)	0.0216%
Uncertainty in the Mean (weight%)	0.0088%
Mean Error (%)	-0.05%
Standard Deviation (%)	0.02%
Uncertainty in the Mean (%)	0.01%
Number of Data Points	6
Number of Outliers	0

Difference from Last Quarter in:

Mean Error (weight%)	-0.0475%
Standard Deviation (weight%)	-0.0010%
Uncertainty in the Mean (weight%)	-0.0013%
Mean Error (%)	-0.06%
Standard Deviation (%)	-0.01%
Uncertainty in the Mean (%)	0.00%
Number of Data Points	1
Number of Outliers	0

LLNL
239-Pu
1st Quarter 2007 - 4th Quarter 2007
CALEX II



RESULTS OF ANALYSIS OF PU239 - CALEX II 2007

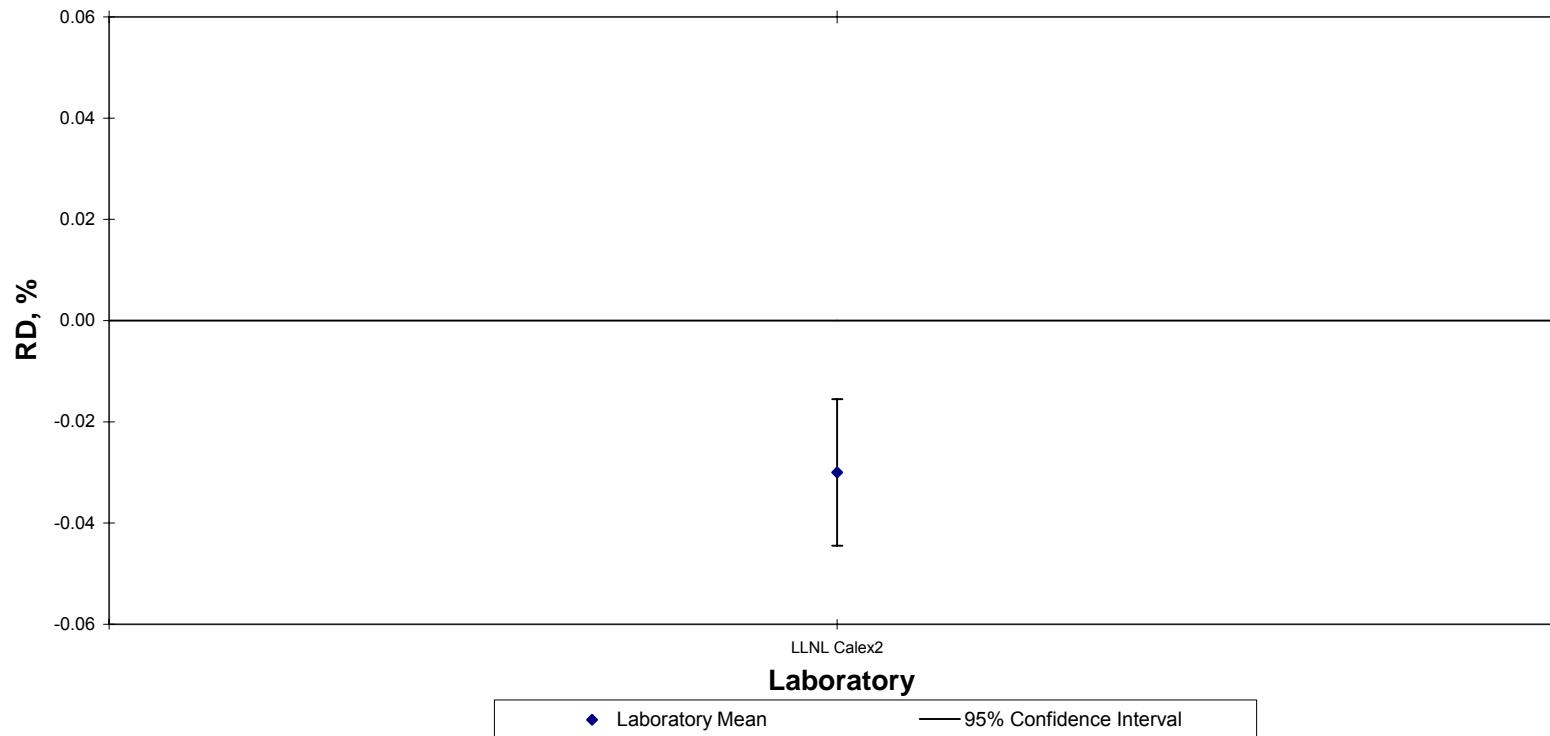
	LLNL
Mean Error (weight%)	-0.0249%
Standard Deviation (weight%)	0.0280%
Uncertainty in the Mean (weight%)	0.0064%
Mean Error (%)	-0.03%
Standard Deviation (%)	0.03%
Uncertainty in the Mean (%)	0.01%
Number of Data Points	19
Number of Outliers	0

Difference from Last Year in:

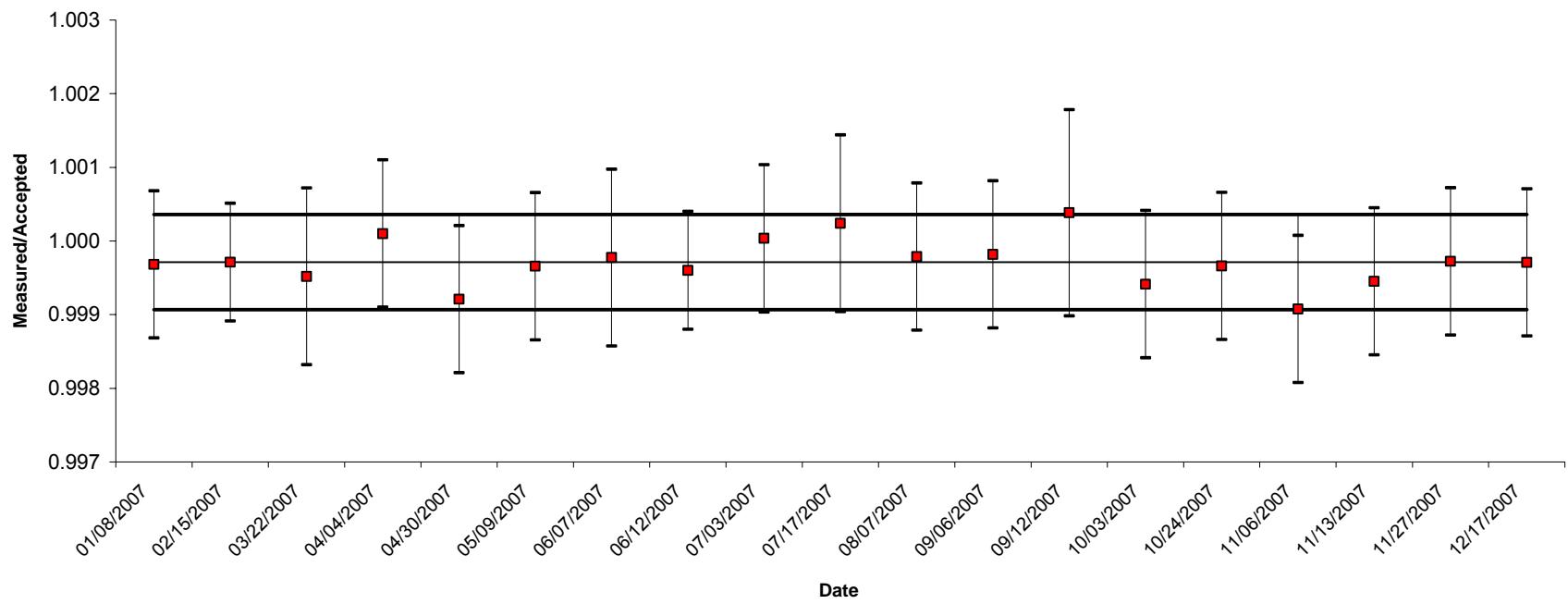
Mean Error (weight%)	0.0100%
Standard Deviation (weight%)	0.0051%
Uncertainty in the Mean (weight%)	-0.0050%
Mean Error (%)	0.01%
Standard Deviation (%)	0.00%
Uncertainty in the Mean (%)	0.00%
Number of Data Points	15
Number of Outliers	0

New Brunswick Laboratory Calorimetry Exchange Program
Percent ^{239}Pu , 2007 - CALEX II

N=19



LLNL
239-Pu
2007, CALEX II



WEIGHT PERCENT Pu239 DATA

Calendar Year 2007

LLNL: Calex II

#	Date Measured	Instr. ID	Measured Pu239	Uncert. 1 STD	Accepted Weight%	Ratio M/A	Weight% Error	Percent Error
1	01/08/2007	III	86.8964%	0.05%	86.9241%	0.9997	-0.0277%	-0.03%
2	02/15/2007	III	86.9018%	0.04%	86.9267%	0.9997	-0.0250%	-0.03%
3	03/22/2007	III	86.8874%	0.06%	86.9292%	0.9995	-0.0418%	-0.05%
4	04/04/2007	III	86.9388%	0.05%	86.9301%	1.0001	0.0088%	0.01%
5	04/30/2007	III	86.8632%	0.05%	86.9319%	0.9992	-0.0687%	-0.08%
6	05/09/2007	III	86.9027%	0.05%	86.9325%	0.9997	-0.0298%	-0.03%
7	06/07/2007	II	86.9149%	0.06%	86.9345%	0.9998	-0.0196%	-0.02%
8	06/12/2007	III	86.9002%	0.04%	86.9349%	0.9996	-0.0346%	-0.04%
9	07/03/2007	III	86.9394%	0.05%	86.9363%	1.0000	0.0031%	0.00%
10	07/17/2007	III	86.9581%	0.06%	86.9373%	1.0002	0.0208%	0.02%
11	08/07/2007	III	86.9203%	0.05%	86.9387%	0.9998	-0.0185%	-0.02%
12	09/06/2007	III	86.9250%	0.05%	86.9408%	0.9998	-0.0158%	-0.02%
13	09/12/2007	III	86.9746%	0.07%	86.9412%	1.0004	0.0334%	0.04%
14	10/03/2007	III	86.8917%	0.05%	86.9426%	0.9994	-0.0509%	-0.06%
15	10/24/2007	II	86.9146%	0.05%	86.9441%	0.9997	-0.0294%	-0.03%
16	11/06/2007	III	86.8647%	0.05%	86.9450%	0.9991	-0.0802%	-0.09%
17	11/13/2007	III	86.8977%	0.05%	86.9454%	0.9995	-0.0477%	-0.05%
18	11/27/2007	III	86.9224%	0.05%	86.9464%	0.9997	-0.0240%	-0.03%
19	12/17/2007	III	86.9225%	0.05%	86.9477%	0.9997	-0.0252%	-0.03%
Mean:						0.9997	-0.0249%	-0.03%
Standard Deviation:						0.0003	0.0280%	0.03%
Standard Uncertainty:						0.0001	0.0064%	0.01%

Statistical outliers are in bold and are not included in graphs and tables.

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L. **^{240}Pu ISOTOPE ABUNDANCE: TABLES AND GRAPHS**

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RESULTS OF ANALYSIS OF PU240 - CALEX I
1st QUARTER 2007

	HAN	LANL	LLNL
Mean Error (weight%)	0.0602%	0.0715%	-0.0072%
Standard Deviation (weight%)	0.0195%	0.1751%	0.0208%
Uncertainty in the Mean (weight%)	0.0087%	0.0452%	0.0039%
Mean Error (%)	1.03%	1.22%	-0.12%
Standard Deviation (%)	0.33%	2.99%	0.36%
Uncertainty in the Mean (%)	0.15%	0.77%	0.07%
Number of Data Points	5	15	28
Number of Outliers	0	0	0

Difference from Last Quarter in:

Mean Error (weight%)	0.0103%	****	****
Standard Deviation (weight%)	0.0076%	****	****
Uncertainty in the Mean (weight%)	0.0034 %	****	****
Mean Error (%)	0.18%	****	****
Standard Deviation (%)	0.13%	****	****
Uncertainty in the Mean (%)	0.06%	****	****
Number of Data Points	0	15	28
Number of Outliers	0	0	0

RESULTS OF ANALYSIS OF PU240 - CALEX I
2nd QUARTER 2007

	HAN	LANL	LLNL
Mean Error (weight%)	0.0508%	0.0625%	0.0040%
Standard Deviation (weight%)	0.0332%	0.1082%	0.0212%
Uncertainty in the Mean (weight%)	0.0100%	0.0342%	0.0043%
Mean Error (%)	0.87%	1.07%	0.07%
Standard Deviation (%)	0.57%	1.85%	0.36%
Uncertainty in the Mean (%)	0.17%	0.58%	0.07%
Number of Data Points	11	10	24
Number of Outliers	0	0	0

Difference from Last Quarter in:

Mean Error (weight%)	-0.0094%	-0.0090%	0.0112%
Standard Deviation (weight%)	0.0137%	-0.0669%	0.0004%
Uncertainty in the Mean (weight%)	0.0013%	-0.0110%	0.0004%
Mean Error (%)	-0.16%	-0.15%	0.19%
Standard Deviation (%)	0.24%	-1.14%	0.00%
Uncertainty in the Mean (%)	0.02%	-0.19%	0.00%
Number of Data Points	6	-5	-4
Number of Outliers	0	0	0

RESULTS OF ANALYSIS OF PU240 - CALEX I
3rd QUARTER 2007

	HAN	LANL	LLNL
Mean Error (weight%)	0.0408%	0.1281%	0.0025%
Standard Deviation (weight%)	0.0253%	0.1693%	0.0217%
Uncertainty in the Mean (weight%)	0.0073%	0.0564%	0.0034%
Mean Error (%)	0.70%	2.19%	0.04%
Standard Deviation (%)	0.43%	2.89%	0.37%
Uncertainty in the Mean (%)	0.12%	0.96%	0.06%
Number of Data Points	12	9	40
Number of Outliers	0	0	0

Difference from Last Quarter in:

Mean Error (weight%)	-0.0100%	0.0656%	-0.0015%
Standard Deviation (weight%)	-0.0079%	0.0611%	0.0005%
Uncertainty in the Mean (weight%)	-0.0027%	0.0222%	-0.0009%
Mean Error (%)	-0.17%	1.12%	-0.03%
Standard Deviation (%)	-0.14%	1.04%	0.01%
Uncertainty in the Mean (%)	-0.05%	0.38%	-0.01%
Number of Data Points	1	-1	16
Number of Outliers	0	0	0

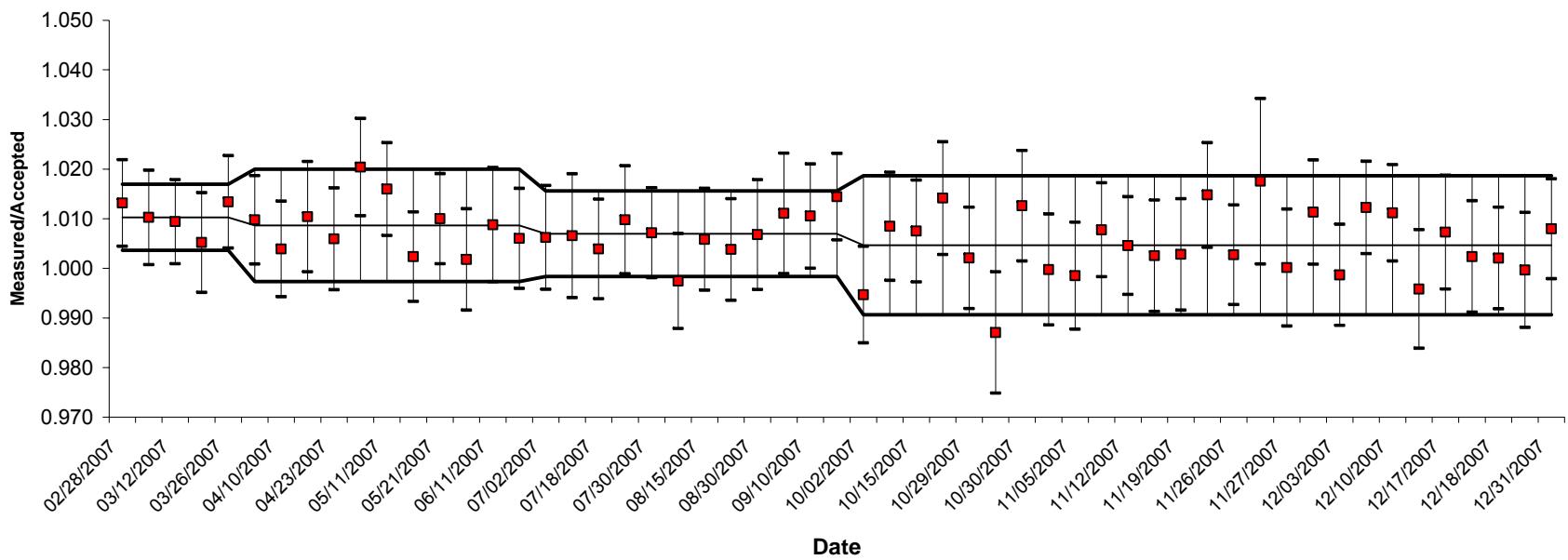
RESULTS OF ANALYSIS OF PU240 - CALEX I
4th QUARTER 2007

	HAN	LANL	LLNL
Mean Error (weight%)	0.0274%	0.1481%	-0.0075%
Standard Deviation (weight%)	0.0411%	0.1269%	0.0242%
Uncertainty in the Mean (weight%)	0.0079%	0.0518%	0.0059%
Mean Error (%)	0.47%	2.53%	-0.13%
Standard Deviation (%)	0.70%	2.17%	0.41%
Uncertainty in the Mean (%)	0.13%	0.88%	0.10%
Number of Data Points	27	6	17
Number of Outliers	0	0	2

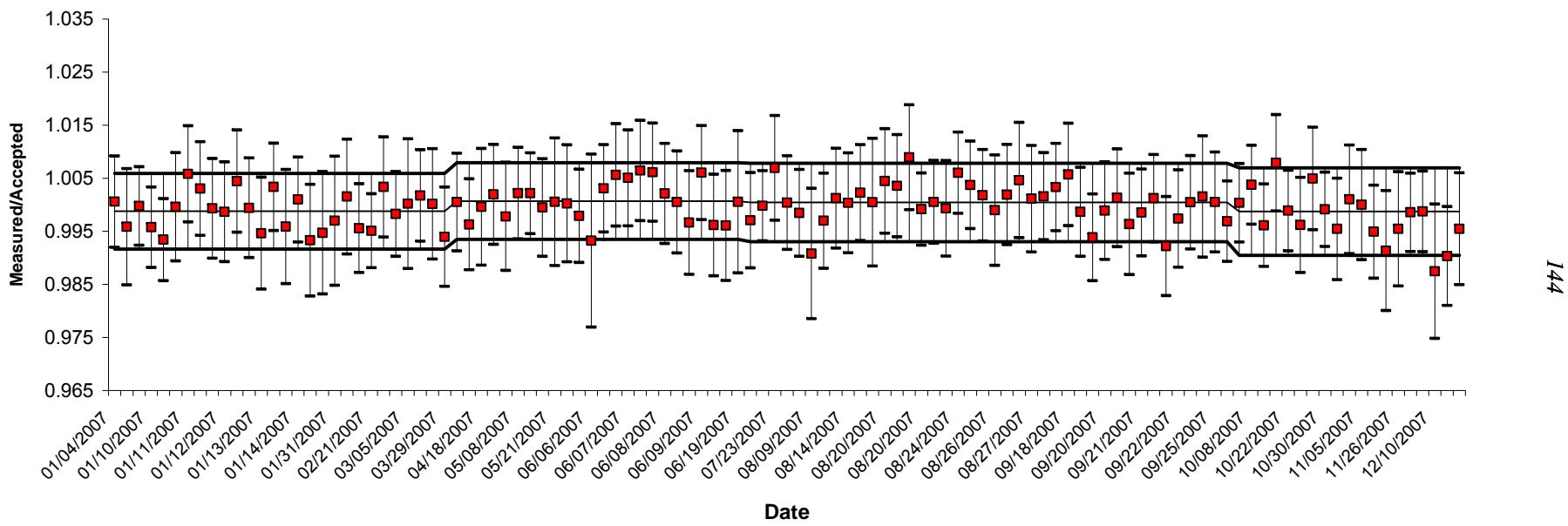
Difference from Last Quarter in:

Mean Error (weight%)	-0.0134%	0.0200%	-0.0100%
Standard Deviation (weight%)	0.0158%	-0.0424%	0.0025%
Uncertainty in the Mean (weight%)	0.0006%	-0.0046%	0.0025%
Mean Error (%)	-0.23%	0.34%	-0.17%
Standard Deviation (%)	0.27%	-0.72%	0.04%
Uncertainty in the Mean (%)	0.01%	-0.08%	0.04%
Number of Data Points	15	-3	-23
Number of Outliers	0	0	2

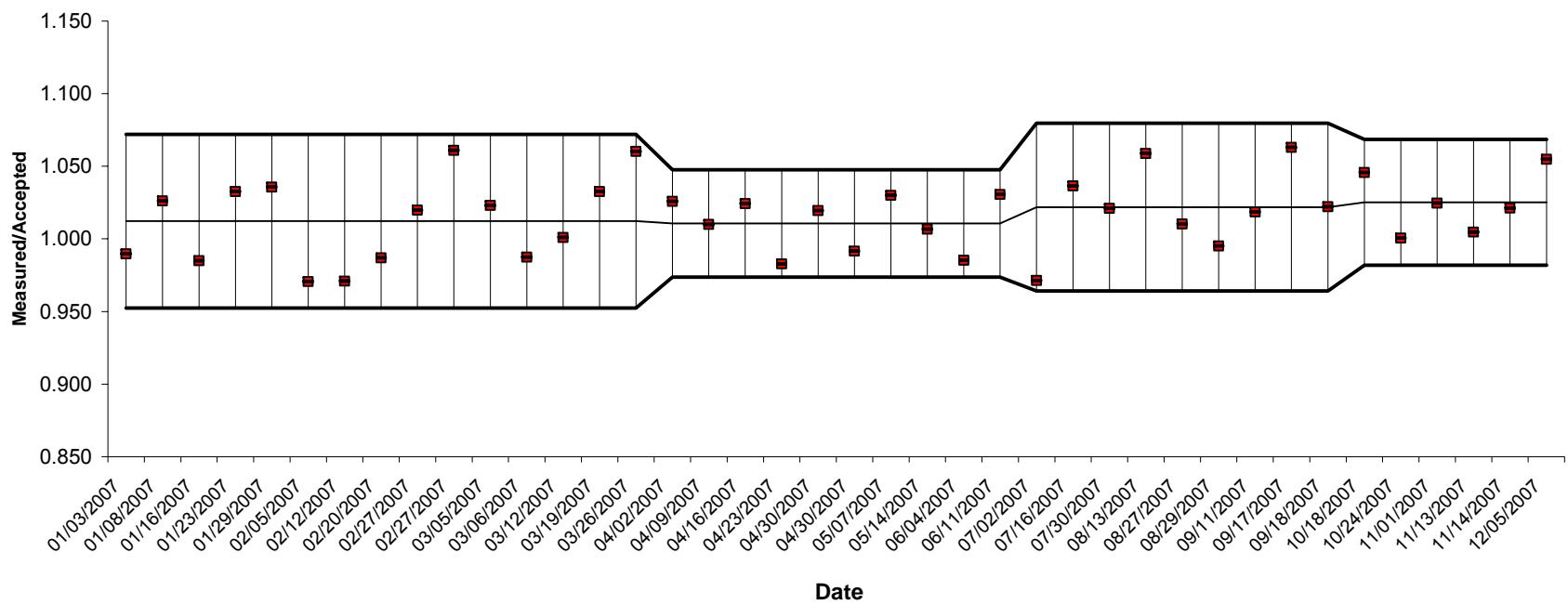
HAN
240-Pu
1st Quarter 2007 - 4th Quarter 2007
CALEX I



LLNL
240-Pu
1st Quarter 2007 - 4th Quarter 2007
CALEX I



LANL
240-Pu
1st Quarter 2007 - 4th Quarter 2007
CALEX I



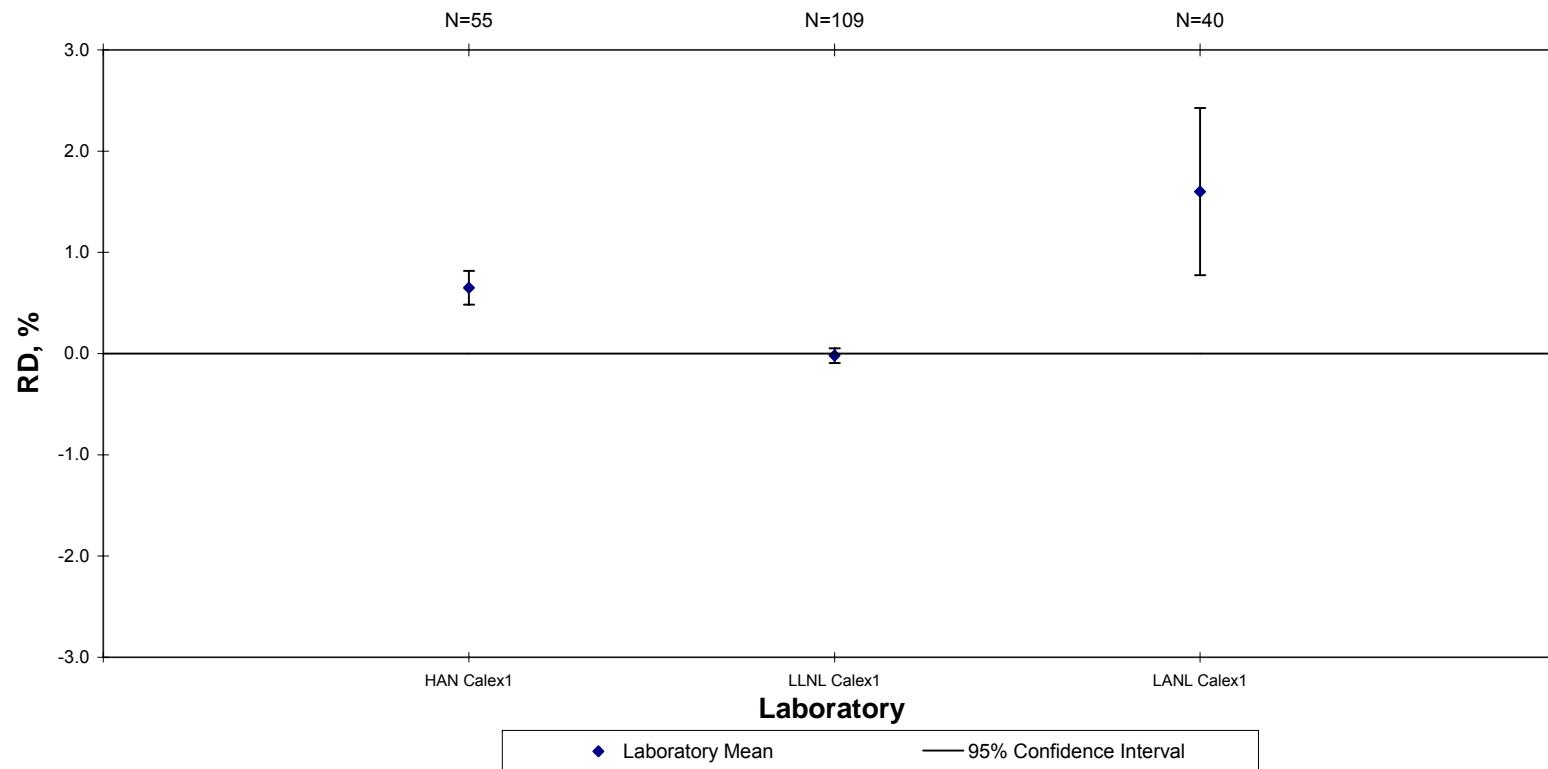
**RESULTS OF ANALYSIS OF PU240 - CALEX I
2007**

	HAN	LANL	LLNL
Mean Error (weight%)	0.0380%	0.0935%	-0.0012%
Standard Deviation (weight%)	0.0362%	0.1511%	0.0221%
Uncertainty in the Mean (weight%)	0.0049%	0.0239%	0.0021%
Mean Error (%)	0.65%	1.60%	-0.02%
Standard Deviation (%)	0.62%	2.58%	0.38%
Uncertainty in the Mean (%)	0.08%	0.41%	0.04%
Number of Data Points	55	40	109
Number of Outliers	0	0	2

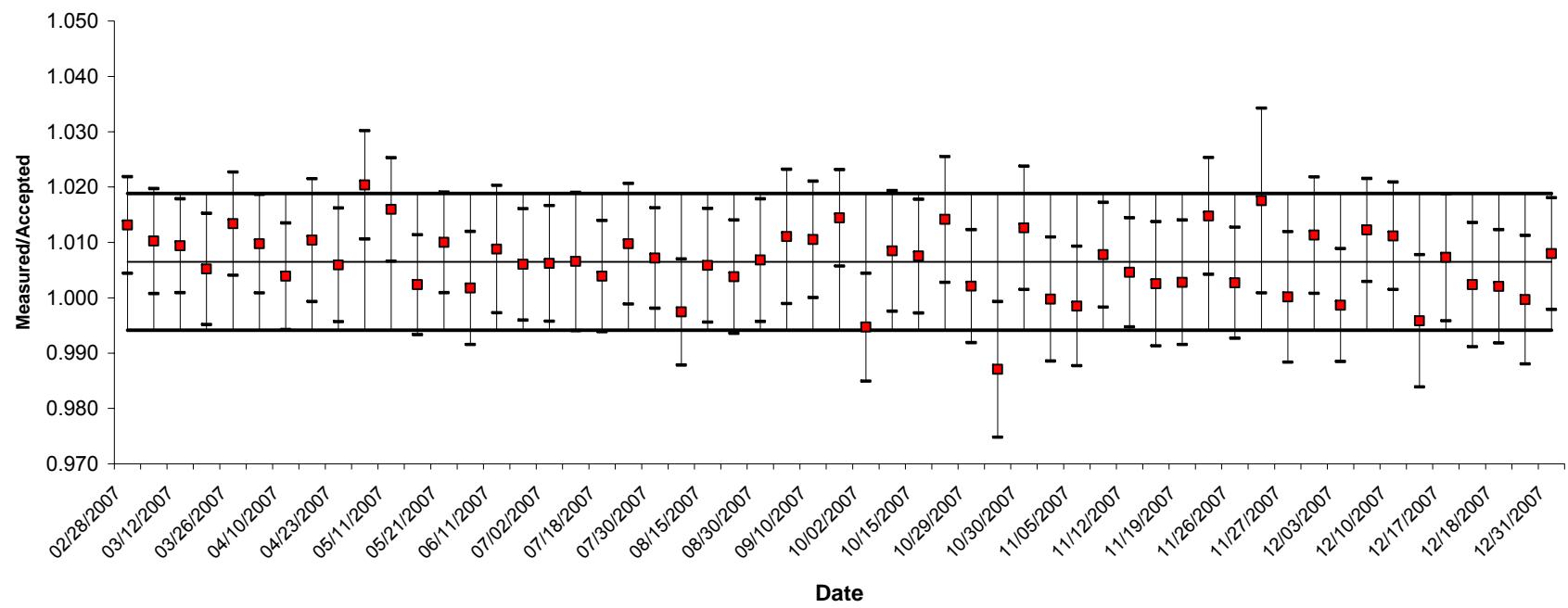
Difference from Last Year in:

Mean Error (weight%)	0.0044%	****	0.0061%
Standard Deviation (weight%)	0.0178%	****	-0.0028%
Uncertainty in the Mean (weight%)	0.0003%	****	-0.0013%
Mean Error (%)	0.08%	****	0.10%
Standard Deviation (%)	0.31%	****	-0.04%
Uncertainty in the Mean (%)	0.00%	****	-0.02%
Number of Data Points	39	40	54
Number of Outliers	-1	0	-5

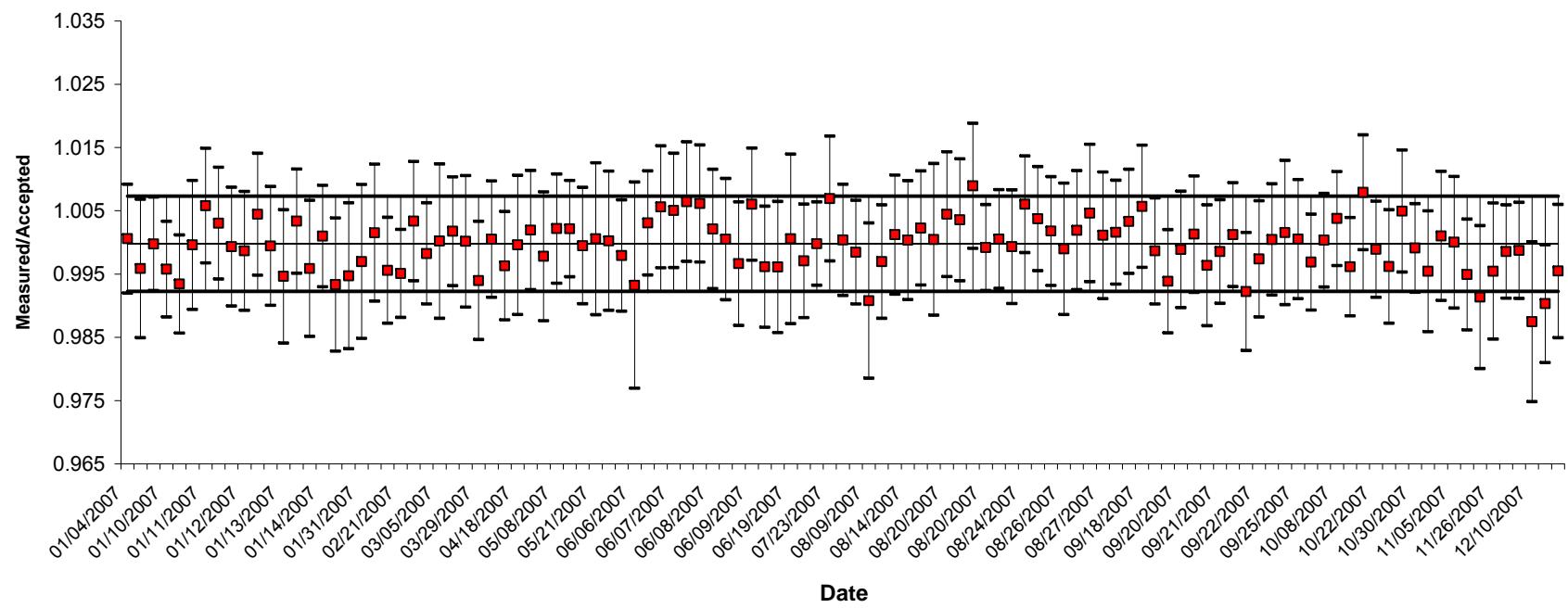
New Brunswick Laboratory Calorimetry Exchange Program
Percent ^{240}Pu , 2007 - CALEX I



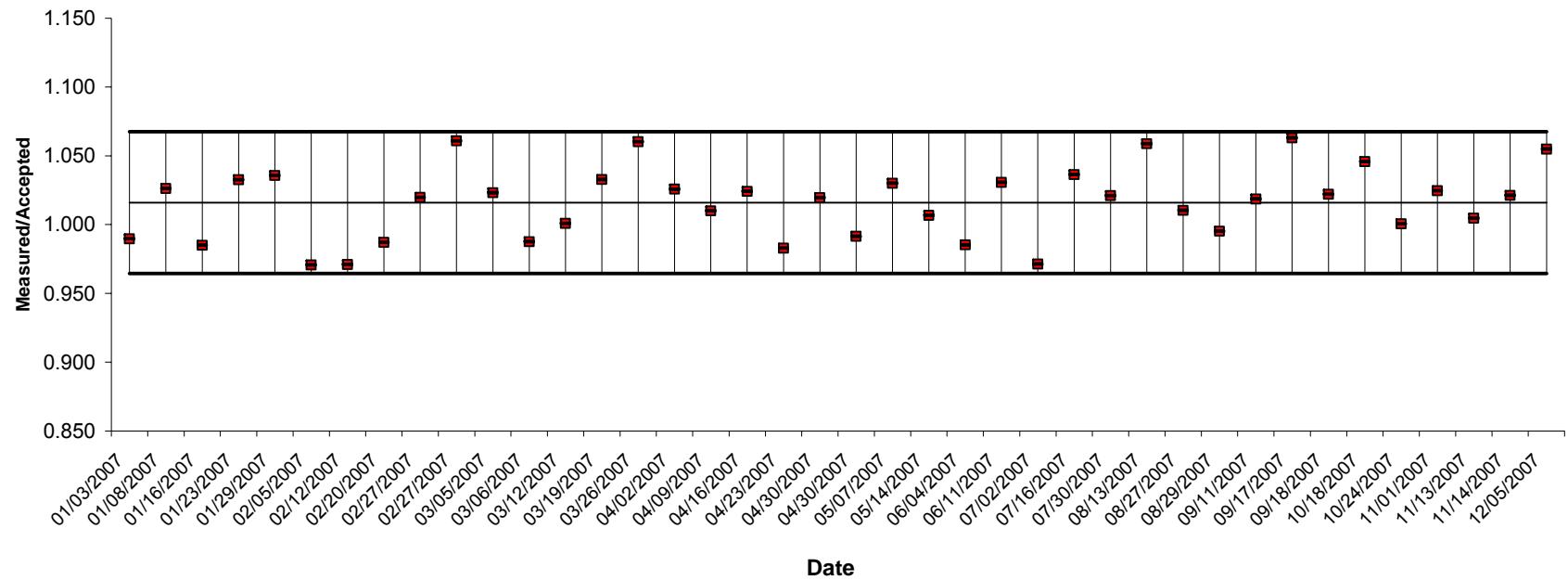
HAN
240-Pu
2007, CALEX I



LLNL
240-Pu
2007, CALEX I



LANL
240-Pu
2007, CALEX I



150

WEIGHT PERCENT Pu240 DATA

Calendar Year 2007

HAN: Calex I

#	Date Measured	Instr. ID	Measured Pu240	Uncert. 1 STD	Accepted Weight%	Ratio M/A	Weight% Error	Percent Error
1	02/28/2007	2740	5.9375%	0.43%	5.8604%	1.0132	0.0771%	1.32%
2	03/05/2007	2740	5.9205%	0.47%	5.8604%	1.0103	0.0601%	1.03%
3	03/12/2007	2740	5.9155%	0.42%	5.8604%	1.0094	0.0551%	0.94%
4	03/19/2007	2740	5.8909%	0.50%	5.8604%	1.0052	0.0305%	0.52%
5	03/26/2007	2740	5.9389%	0.46%	5.8604%	1.0134	0.0785%	1.34%
6	04/02/2007	2740	5.9177%	0.44%	5.8604%	1.0098	0.0573%	0.98%
7	04/10/2007	2740	5.8832%	0.48%	5.8604%	1.0039	0.0228%	0.39%
8	04/16/2007	2740	5.9214%	0.55%	5.8604%	1.0104	0.0610%	1.04%
9	04/23/2007	2740	5.8952%	0.51%	5.8604%	1.0059	0.0348%	0.59%
10	05/01/2007	2740	5.9799%	0.48%	5.8604%	1.0204	0.1195%	2.04%
11	05/11/2007	2740	5.9539%	0.46%	5.8604%	1.0160	0.0935%	1.60%
12	05/14/2007	2740	5.8742%	0.45%	5.8604%	1.0024	0.0138%	0.24%
13	05/21/2007	2740	5.9190%	0.45%	5.8604%	1.0100	0.0586%	1.00%
14	06/04/2007	2740	5.8707%	0.51%	5.8604%	1.0018	0.0103%	0.18%
15	06/11/2007	2740	5.9119%	0.57%	5.8604%	1.0088	0.0515%	0.88%
16	06/18/2007	2740	5.8957%	0.50%	5.8604%	1.0060	0.0353%	0.60%
17	07/02/2007	2740	5.8968%	0.52%	5.8604%	1.0062	0.0364%	0.62%
18	07/09/2007	2740	5.8988%	0.62%	5.8604%	1.0066	0.0384%	0.66%
19	07/18/2007	2740	5.8833%	0.50%	5.8604%	1.0039	0.0229%	0.39%
20	07/24/2007	2740	5.9176%	0.54%	5.8604%	1.0098	0.0572%	0.98%
21	07/30/2007	2740	5.9024%	0.45%	5.8604%	1.0072	0.0420%	0.72%
22	08/06/2007	2740	5.8453%	0.48%	5.8604%	0.9974	-0.0151%	-0.26%
23	08/15/2007	2740	5.8947%	0.51%	5.8604%	1.0059	0.0343%	0.59%
24	08/21/2007	2740	5.8826%	0.51%	5.8604%	1.0038	0.0222%	0.38%
25	08/30/2007	2740	5.9002%	0.55%	5.8604%	1.0068	0.0398%	0.68%
26	09/04/2007	2740	5.9252%	0.60%	5.8604%	1.0111	0.0648%	1.11%
27	09/10/2007	2740	5.9221%	0.52%	5.8603%	1.0105	0.0618%	1.05%
28	09/19/2007	2740	5.9449%	0.43%	5.8603%	1.0144	0.0846%	1.44%
29	10/02/2007	2740	5.8292%	0.49%	5.8603%	0.9947	-0.0311%	-0.53%
30	10/08/2007	2740	5.9099%	0.54%	5.8603%	1.0085	0.0496%	0.85%
31	10/15/2007	2740	5.9044%	0.51%	5.8603%	1.0075	0.0441%	0.75%
32	10/22/2007	2740	5.9432%	0.56%	5.8603%	1.0141	0.0829%	1.41%
33	10/29/2007	2740	5.8726%	0.51%	5.8603%	1.0021	0.0123%	0.21%
34	10/29/2007	8302	5.7845%	0.62%	5.8603%	0.9871	-0.0758%	-1.29%
35	10/30/2007	90225	5.9342%	0.55%	5.8603%	1.0126	0.0739%	1.26%
36	11/05/2007	90225	5.8589%	0.56%	5.8603%	0.9998	-0.0014%	-0.02%
37	11/05/2007	8302	5.8516%	0.54%	5.8603%	0.9985	-0.0087%	-0.15%
38	11/12/2007	2740	5.9058%	0.47%	5.8603%	1.0078	0.0455%	0.78%
39	11/12/2007	90225	5.8872%	0.49%	5.8603%	1.0046	0.0269%	0.46%
40	11/13/2007	8302	5.8751%	0.56%	5.8603%	1.0025	0.0148%	0.25%
41	11/19/2007	90225	5.8767%	0.56%	5.8603%	1.0028	0.0164%	0.28%
42	11/19/2007	8302	5.9469%	0.52%	5.8603%	1.0148	0.0866%	1.48%
43	11/26/2007	90225	5.8762%	0.50%	5.8603%	1.0027	0.0159%	0.27%
44	11/26/2007	2740	5.9632%	0.82%	5.8603%	1.0176	0.1029%	1.76%
45	11/27/2007	8302	5.8612%	0.59%	5.8603%	1.0002	0.0009%	0.02%
46	12/03/2007	8302	5.9267%	0.52%	5.8603%	1.0113	0.0664%	1.13%
47	12/03/2007	90225	5.8525%	0.51%	5.8603%	0.9987	-0.0078%	-0.13%
48	12/10/2007	2740	5.9321%	0.46%	5.8603%	1.0123	0.0718%	1.23%
49	12/10/2007	90225	5.9258%	0.48%	5.8603%	1.0112	0.0655%	1.12%
50	12/10/2007	8302	5.8358%	0.60%	5.8603%	0.9958	-0.0245%	-0.42%
51	12/17/2007	90225	5.9031%	0.57%	5.8603%	1.0073	0.0428%	0.73%
52	12/17/2007	8302	5.8742%	0.56%	5.8603%	1.0024	0.0139%	0.24%
53	12/18/2007	2740	5.8724%	0.51%	5.8603%	1.0021	0.0121%	0.21%
54	12/31/2007	2740	5.8583%	0.58%	5.8603%	0.9997	-0.0020%	-0.03%
55	12/31/2007	90225	5.9071%	0.50%	5.8603%	1.0080	0.0468%	0.80%

Mean: 1.0065 0.0380% 0.65%
 Standard Deviation: 0.0062 0.0362% 0.62%
 Standard Uncertainty: 0.0008 0.0049% 0.08%

Statistical outliers are in bold and are not included in graphs and tables.

WEIGHT PERCENT Pu240 DATA

Calendar Year 2007

LLNL: Calex I

#	Date Measured	Instr. ID	Measured Pu240	Uncert. 1 STD	Accepted Weight%	Ratio M/A	Weight% Error	Percent Error
1	01/04/2007	II	5.8639%	0.43%	5.8604%	1.0006	0.0034%	0.06%
2	01/10/2007	I	5.8362%	0.55%	5.8604%	0.9959	-0.0242%	-0.41%
3	01/10/2007	I	5.8591%	0.37%	5.8604%	0.9998	-0.0014%	-0.02%
4	01/10/2007	I	5.8356%	0.38%	5.8604%	0.9958	-0.0248%	-0.42%
5	01/11/2007	I	5.8219%	0.39%	5.8604%	0.9934	-0.0386%	-0.66%
6	01/11/2007	I	5.8581%	0.51%	5.8604%	0.9996	-0.0023%	-0.04%
7	01/11/2007	III	5.8944%	0.45%	5.8604%	1.0058	0.0340%	0.58%
8	01/12/2007	III	5.8782%	0.44%	5.8604%	1.0030	0.0178%	0.30%
9	01/12/2007	III	5.8564%	0.47%	5.8604%	0.9993	-0.0040%	-0.07%
10	01/12/2007	III	5.8526%	0.47%	5.8604%	0.9987	-0.0078%	-0.13%
11	01/13/2007	III	5.8865%	0.48%	5.8604%	1.0044	0.0261%	0.44%
12	01/13/2007	III	5.8570%	0.47%	5.8604%	0.9994	-0.0034%	-0.06%
13	01/13/2007	III	5.8290%	0.53%	5.8604%	0.9946	-0.0315%	-0.54%
14	01/14/2007	III	5.8802%	0.41%	5.8604%	1.0034	0.0197%	0.34%
15	01/14/2007	III	5.8363%	0.54%	5.8604%	0.9959	-0.0242%	-0.41%
16	01/14/2007	III	5.8662%	0.40%	5.8604%	1.0010	0.0058%	0.10%
17	01/18/2007	I	5.8213%	0.53%	5.8604%	0.9933	-0.0392%	-0.67%
18	01/31/2007	III	5.8295%	0.58%	5.8604%	0.9947	-0.0310%	-0.53%
19	01/31/2007	II	5.8427%	0.61%	5.8604%	0.9970	-0.0177%	-0.30%
20	02/07/2007	I	5.8694%	0.54%	5.8604%	1.0015	0.0090%	0.15%
21	02/14/2007	II	5.8346%	0.42%	5.8604%	0.9956	-0.0259%	-0.44%
22	02/21/2007	I	5.8316%	0.35%	5.8604%	0.9951	-0.0288%	-0.49%
23	02/27/2007	III	5.8800%	0.47%	5.8604%	1.0033	0.0196%	0.33%
24	03/05/2007	I	5.8502%	0.40%	5.8604%	0.9982	-0.0103%	-0.18%
25	03/05/2007	III	5.8616%	0.61%	5.8604%	1.0002	0.0012%	0.02%
26	03/12/2007	II	5.8707%	0.43%	5.8604%	1.0018	0.0103%	0.18%
27	03/20/2007	I	5.8614%	0.52%	5.8604%	1.0002	0.0010%	0.02%
28	03/29/2007	I	5.8250%	0.47%	5.8604%	0.9940	-0.0354%	-0.60%
29	04/03/2007	III	5.8634%	0.46%	5.8604%	1.0005	0.0029%	0.05%
30	04/05/2007	I	5.8387%	0.43%	5.8604%	0.9963	-0.0217%	-0.37%
31	04/18/2007	I	5.8581%	0.55%	5.8604%	0.9996	-0.0023%	-0.04%
32	04/19/2007	III	5.8718%	0.47%	5.8604%	1.0019	0.0114%	0.19%
33	04/30/2007	I	5.8475%	0.51%	5.8604%	0.9978	-0.0129%	-0.22%
34	05/08/2007	III	5.8731%	0.43%	5.8604%	1.0022	0.0127%	0.22%
35	05/17/2007	III	5.8731%	0.38%	5.8604%	1.0022	0.0127%	0.22%
36	05/21/2007	I	5.8573%	0.46%	5.8604%	0.9995	-0.0031%	-0.05%
37	05/21/2007	III	5.8636%	0.60%	5.8604%	1.0006	0.0032%	0.06%
38	05/24/2007	III	5.8619%	0.55%	5.8604%	1.0003	0.0015%	0.03%
39	05/29/2007	II	5.8482%	0.44%	5.8604%	0.9979	-0.0122%	-0.21%
40	06/06/2007	III	5.8208%	0.82%	5.8604%	0.9932	-0.0396%	-0.68%
41	06/07/2007	III	5.8784%	0.41%	5.8604%	1.0031	0.0180%	0.31%
42	06/07/2007	III	5.8933%	0.48%	5.8604%	1.0056	0.0329%	0.56%
43	06/07/2007	III	5.8900%	0.45%	5.8604%	1.0051	0.0296%	0.51%
44	06/07/2007	III	5.8982%	0.47%	5.8604%	1.0064	0.0378%	0.64%
45	06/08/2007	III	5.8964%	0.46%	5.8604%	1.0061	0.0360%	0.61%
46	06/08/2007	III	5.8728%	0.47%	5.8604%	1.0021	0.0124%	0.21%
47	06/09/2007	III	5.8634%	0.48%	5.8604%	1.0005	0.0030%	0.05%
48	06/09/2007	III	5.8407%	0.49%	5.8604%	0.9966	-0.0197%	-0.34%
49	06/09/2007	III	5.8958%	0.44%	5.8604%	1.0060	0.0354%	0.60%
50	06/10/2007	III	5.8379%	0.48%	5.8604%	0.9962	-0.0225%	-0.38%
51	06/14/2007	I	5.8375%	0.52%	5.8604%	0.9961	-0.0229%	-0.39%
52	06/19/2007	III	5.8636%	0.67%	5.8604%	1.0006	0.0032%	0.06%
53	07/02/2007	I	5.8432%	0.45%	5.8604%	0.9971	-0.0172%	-0.29%
54	07/17/2007	I	5.8592%	0.33%	5.8604%	0.9998	-0.0012%	-0.02%
55	07/23/2007	III	5.9010%	0.49%	5.8604%	1.0069	0.0406%	0.69%
56	08/02/2007	III	5.8627%	0.44%	5.8604%	1.0004	0.0023%	0.04%
57	08/06/2007	I	5.8512%	0.41%	5.8604%	0.9984	-0.0091%	-0.16%
58	08/09/2007	II	5.8064%	0.62%	5.8604%	0.9908	-0.0539%	-0.92%
59	08/13/2007	I	5.8426%	0.45%	5.8604%	0.9970	-0.0177%	-0.30%
60	08/14/2007	III	5.8675%	0.47%	5.8604%	1.0012	0.0072%	0.12%
61	08/14/2007	III	5.8624%	0.47%	5.8604%	1.0004	0.0021%	0.04%
62	08/14/2007	III	5.8737%	0.45%	5.8604%	1.0023	0.0133%	0.23%

WEIGHT PERCENT Pu240 DATA

Calendar Year 2007

LLNL: Calex I

#	Date Measured	Instr. ID	Measured Pu240	Uncert. 1 STD	Accepted Weight%	Ratio M/A	Weight% Error	Percent Error
63	08/15/2007	III	5.8631%	0.60%	5.8604%	1.0005	0.0028%	0.05%
64	08/20/2007	III	5.8865%	0.49%	5.8604%	1.0045	0.0261%	0.45%
65	08/20/2007	III	5.8813%	0.48%	5.8604%	1.0036	0.0210%	0.36%
66	08/20/2007	III	5.9128%	0.49%	5.8604%	1.0089	0.0524%	0.89%
67	08/20/2007	I	5.8555%	0.34%	5.8604%	0.9992	-0.0048%	-0.08%
68	08/23/2007	III	5.8635%	0.39%	5.8604%	1.0005	0.0031%	0.05%
69	08/24/2007	III	5.8564%	0.45%	5.8604%	0.9993	-0.0040%	-0.07%
70	08/24/2007	III	5.8956%	0.38%	5.8604%	1.0060	0.0353%	0.60%
71	08/25/2007	III	5.8822%	0.41%	5.8604%	1.0037	0.0219%	0.37%
72	08/25/2007	III	5.8708%	0.43%	5.8604%	1.0018	0.0105%	0.18%
73	08/26/2007	III	5.8544%	0.52%	5.8604%	0.9990	-0.0060%	-0.10%
74	08/26/2007	III	5.8716%	0.47%	5.8604%	1.0019	0.0112%	0.19%
75	08/27/2007	III	5.8876%	0.54%	5.8604%	1.0046	0.0272%	0.46%
76	08/27/2007	III	5.8670%	0.50%	5.8604%	1.0011	0.0066%	0.11%
77	08/28/2007	III	5.8697%	0.41%	5.8604%	1.0016	0.0094%	0.16%
78	09/06/2007	I	5.8798%	0.41%	5.8604%	1.0033	0.0195%	0.33%
79	09/18/2007	III	5.8938%	0.48%	5.8603%	1.0057	0.0334%	0.57%
80	09/20/2007	I	5.8525%	0.42%	5.8603%	0.9987	-0.0079%	-0.13%
81	09/20/2007	II	5.8243%	0.41%	5.8603%	0.9939	-0.0360%	-0.61%
82	09/20/2007	II	5.8538%	0.46%	5.8603%	0.9989	-0.0065%	-0.11%
83	09/20/2007	II	5.8679%	0.46%	5.8603%	1.0013	0.0076%	0.13%
84	09/21/2007	II	5.8391%	0.48%	5.8603%	0.9964	-0.0212%	-0.36%
85	09/21/2007	II	5.8519%	0.41%	5.8603%	0.9986	-0.0085%	-0.14%
86	09/21/2007	II	5.8675%	0.41%	5.8603%	1.0012	0.0072%	0.12%
87	09/21/2007	II	5.8147%	0.47%	5.8603%	0.9922	-0.0456%	-0.78%
88	09/22/2007	II	5.8450%	0.46%	5.8603%	0.9974	-0.0154%	-0.26%
89	09/22/2007	II	5.8630%	0.44%	5.8603%	1.0005	0.0027%	0.05%
90	09/22/2007	II	5.8694%	0.57%	5.8603%	1.0015	0.0091%	0.15%
91	09/25/2007	III	5.8634%	0.47%	5.8603%	1.0005	0.0031%	0.05%
92	09/27/2007	I	5.8421%	0.38%	5.8603%	0.9969	-0.0182%	-0.31%
93	10/02/2007	I	5.8624%	0.37%	5.8603%	1.0003	0.0020%	0.03%
94	10/08/2007	II	5.8824%	0.37%	5.8603%	1.0038	0.0221%	0.38%
95	10/10/2007	I	5.8377%	0.39%	5.8603%	0.9961	-0.0226%	-0.39%
96	10/16/2007	III	5.9066%	0.45%	5.8603%	1.0079	0.0463%	0.79%
97	10/22/2007	II	5.8538%	0.38%	5.8603%	0.9989	-0.0065%	-0.11%
98	10/23/2007	I	5.8380%	0.45%	5.8603%	0.9962	-0.0223%	-0.38%
99	10/25/2007	III	5.8893%	0.48%	5.8603%	1.0049	0.0290%	0.49%
100	10/30/2007	I	5.8552%	0.35%	5.8603%	0.9991	-0.0051%	-0.09%
101	10/31/2007	II	5.8336%	0.48%	5.8603%	0.9954	-0.0267%	-0.46%
102	10/31/2007	III	5.8662%	0.51%	5.8603%	1.0010	0.0059%	0.10%
103	11/05/2007	I	5.8604%	0.52%	5.8603%	1.0000	0.0001%	0.00%
104	11/12/2007	II	5.8306%	0.44%	5.8603%	0.9949	-0.0297%	-0.51%
105	11/20/2007	II	5.8096%	0.57%	5.8603%	0.9914	-0.0507%	-0.86%
106	11/26/2007	I	5.8336%	0.54%	5.8603%	0.9954	-0.0267%	-0.46%
107	12/04/2007	II	5.8519%	0.37%	5.8603%	0.9986	-0.0084%	-0.14%
108	12/06/2007	I	5.8529%	0.38%	5.8603%	0.9987	-0.0074%	-0.13%
109	12/10/2007	III	5.7868%	0.64%	5.8603%	0.9875	-0.0735%	-1.25%
110	12/19/2007	I	5.8036%	0.47%	5.8603%	0.9903	-0.0567%	-0.97%
111	12/27/2007	I	5.8337%	0.53%	5.8603%	0.9955	-0.0266%	-0.45%
Mean:						0.9998	-0.0012%	-0.02%
Standard Deviation:						0.0038	0.0221%	0.38%
Standard Uncertainty:						0.0004	0.0021%	0.04%

Statistical outliers are in bold and are not included in graphs and tables.

WEIGHT PERCENT Pu240 DATA

Calendar Year 2007

LANL: Calex I

#	Date Measured	Instr. ID	Measured Pu240	Uncert. 1 STD	Accepted Weight%	Ratio M/A	Weight% Error	Percent Error
1	01/03/2007	F5	5.8000%	0.00%	5.8604%	0.9897	-0.0604%	-1.03%
2	01/08/2007	F9	6.0140%	0.00%	5.8604%	1.0262	0.1535%	2.62%
3	01/16/2007	F5	5.7724%	0.00%	5.8604%	0.9850	-0.0881%	-1.50%
4	01/23/2007	F9	6.0516%	0.00%	5.8604%	1.0326	0.1912%	3.26%
5	01/29/2007	F5	6.0699%	0.00%	5.8604%	1.0357	0.2095%	3.57%
6	02/05/2007	F9	5.6884%	0.00%	5.8604%	0.9706	-0.1721%	-2.94%
7	02/12/2007	F5	5.6900%	0.00%	5.8604%	0.9709	-0.1705%	-2.91%
8	02/20/2007	F9	5.7844%	0.00%	5.8604%	0.9870	-0.0760%	-1.30%
9	02/27/2007	F5	5.9765%	0.00%	5.8604%	1.0198	0.1161%	1.98%
10	02/27/2007	F5	6.2177%	0.00%	5.8604%	1.0610	0.3572%	6.10%
11	03/05/2007	F5	5.9958%	0.00%	5.8604%	1.0231	0.1354%	2.31%
12	03/06/2007	F9	5.7872%	0.00%	5.8604%	0.9875	-0.0733%	-1.25%
13	03/12/2007	F9	5.8659%	0.00%	5.8604%	1.0009	0.0055%	0.09%
14	03/19/2007	F5	6.0520%	0.00%	5.8604%	1.0327	0.1915%	3.27%
15	03/26/2007	F9	6.2134%	0.00%	5.8604%	1.0602	0.3530%	6.02%
16	04/02/2007	F5	6.0118%	0.00%	5.8604%	1.0258	0.1514%	2.58%
17	04/09/2007	F9	5.9190%	0.00%	5.8604%	1.0100	0.0586%	1.00%
18	04/16/2007	F5	6.0024%	0.00%	5.8604%	1.0242	0.1420%	2.42%
19	04/23/2007	F9	5.7599%	0.00%	5.8604%	0.9829	-0.1005%	-1.71%
20	04/30/2007	F5	5.9750%	0.00%	5.8604%	1.0196	0.1146%	1.96%
21	04/30/2007	F9	5.8107%	0.00%	5.8604%	0.9915	-0.0497%	-0.85%
22	05/07/2007	F9	6.0365%	0.00%	5.8604%	1.0301	0.1761%	3.01%
23	05/14/2007	F5	5.9000%	0.00%	5.8604%	1.0068	0.0396%	0.68%
24	06/04/2007	F9	5.7739%	0.00%	5.8604%	0.9852	-0.0865%	-1.48%
25	06/11/2007	F5	6.0397%	0.00%	5.8604%	1.0306	0.1793%	3.06%
26	07/02/2007	F5	5.6923%	0.00%	5.8604%	0.9713	-0.1680%	-2.87%
27	07/16/2007	F5	6.0738%	0.00%	5.8604%	1.0364	0.2134%	3.64%
28	07/30/2007	F5	5.9840%	0.00%	5.8604%	1.0211	0.1236%	2.11%
29	08/13/2007	F5	6.2049%	0.00%	5.8604%	1.0588	0.3445%	5.88%
30	08/27/2007	F5	5.9208%	0.00%	5.8604%	1.0103	0.0605%	1.03%
31	08/29/2007	F9	5.8321%	0.00%	5.8604%	0.9952	-0.0283%	-0.48%
32	09/11/2007	F5	5.9690%	0.00%	5.8603%	1.0185	0.1086%	1.85%
33	09/17/2007	F9	6.2297%	0.00%	5.8603%	1.0630	0.3694%	6.30%
34	09/18/2007	F9	5.9897%	0.00%	5.8603%	1.0221	0.1294%	2.21%
35	10/18/2007	F9	6.1283%	0.00%	5.8603%	1.0457	0.2680%	4.57%
36	10/24/2007	F9	5.8633%	0.00%	5.8603%	1.0005	0.0030%	0.05%
37	11/01/2007	F9	6.0047%	0.00%	5.8603%	1.0246	0.1444%	2.46%
38	11/13/2007	F9	5.8876%	0.00%	5.8603%	1.0047	0.0273%	0.47%
39	11/14/2007	F9	5.9850%	0.00%	5.8603%	1.0213	0.1247%	2.13%
40	12/05/2007	F9	6.1815%	0.00%	5.8603%	1.0548	0.3212%	5.48%
Mean:						1.0160	0.0935%	1.60%
Standard Deviation:						0.0258	0.1511%	2.58%
Standard Uncertainty:						0.0041	0.0239%	0.41%

Statistical outliers are in bold and are not included in graphs and tables.

RESULTS OF ANALYSIS OF PU240 - CALEX II
1st QUARTER 2007

	LLNL
Mean Error (weight%)	0.0305%
Standard Deviation (weight%)	0.0089%
Uncertainty in the Mean (weight%)	0.0051%
Mean Error (%)	0.25%
Standard Deviation (%)	0.07%
Uncertainty in the Mean (%)	0.04%
Number of Data Points	3
Number of Outliers	0

Difference from Last Quarter in:

Mean Error (weight%)	****
Standard Deviation (weight%)	****
Uncertainty in the Mean (weight%)	****
Mean Error (%)	****
Standard Deviation (%)	****
Uncertainty in the Mean (%)	****
Number of Data Points	3
Number of Outliers	0

RESULTS OF ANALYSIS OF PU240 - CALEX II
2nd QUARTER 2007

	LLNL
Mean Error (weight%)	0.0261%
Standard Deviation (weight%)	0.0276%
Uncertainty in the Mean (weight%)	0.0123%
Mean Error (%)	0.21%
Standard Deviation (%)	0.23%
Uncertainty in the Mean (%)	0.10%
Number of Data Points	5
Number of Outliers	0

Difference from Last Quarter in:

Mean Error (weight%)	-0.0044%
Standard Deviation (weight%)	0.0187%
Uncertainty in the Mean (weight%)	0.0072%
Mean Error (%)	-0.04%
Standard Deviation (%)	0.16%
Uncertainty in the Mean (%)	0.06%
Number of Data Points	2
Number of Outliers	0

RESULTS OF ANALYSIS OF PU240 - CALEX II
3rd QUARTER 2007

	LLNL
Mean Error (weight%)	-0.0048%
Standard Deviation (weight%)	0.0241%
Uncertainty in the Mean (weight%)	0.0108%
Mean Error (%)	-0.04%
Standard Deviation (%)	0.20%
Uncertainty in the Mean (%)	0.09%
Number of Data Points	5
Number of Outliers	0

Difference from Last Quarter in:

Mean Error (weight%)	-0.0309%
Standard Deviation (weight%)	-0.0035%
Uncertainty in the Mean (weight%)	-0.0015%
Mean Error (%)	-0.25%
Standard Deviation (%)	-0.03%
Uncertainty in the Mean (%)	-0.01%
Number of Data Points	0
Number of Outliers	0

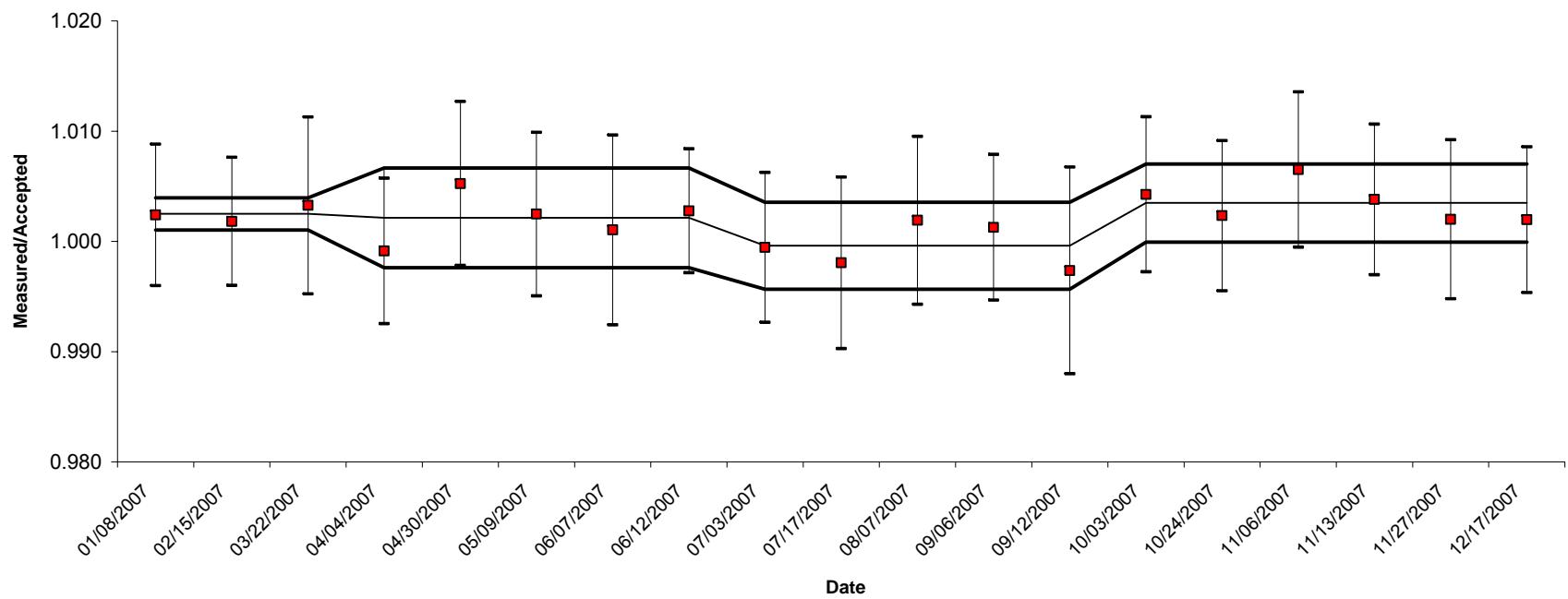
RESULTS OF ANALYSIS OF PU240 - CALEX II
4th QUARTER 2007

	LLNL
Mean Error (weight%)	0.0425%
Standard Deviation (weight%)	0.0217%
Uncertainty in the Mean (weight%)	0.0088%
Mean Error (%)	0.35%
Standard Deviation (%)	0.18%
Uncertainty in the Mean (%)	0.07%
Number of Data Points	6
Number of Outliers	0

Difference from Last Quarter in:

Mean Error (weight%)	0.0473%
Standard Deviation (weight%)	-0.0024%
Uncertainty in the Mean (weight%)	-0.0020%
Mean Error (%)	0.39%
Standard Deviation (%)	-0.02%
Uncertainty in the Mean (%)	-0.02%
Number of Data Points	1
Number of Outliers	0

LLNL
240-Pu
1st Quarter 2007 - 4th Quarter 2007
CALEX II



RESULTS OF ANALYSIS OF PU240 - CALEX II 2007

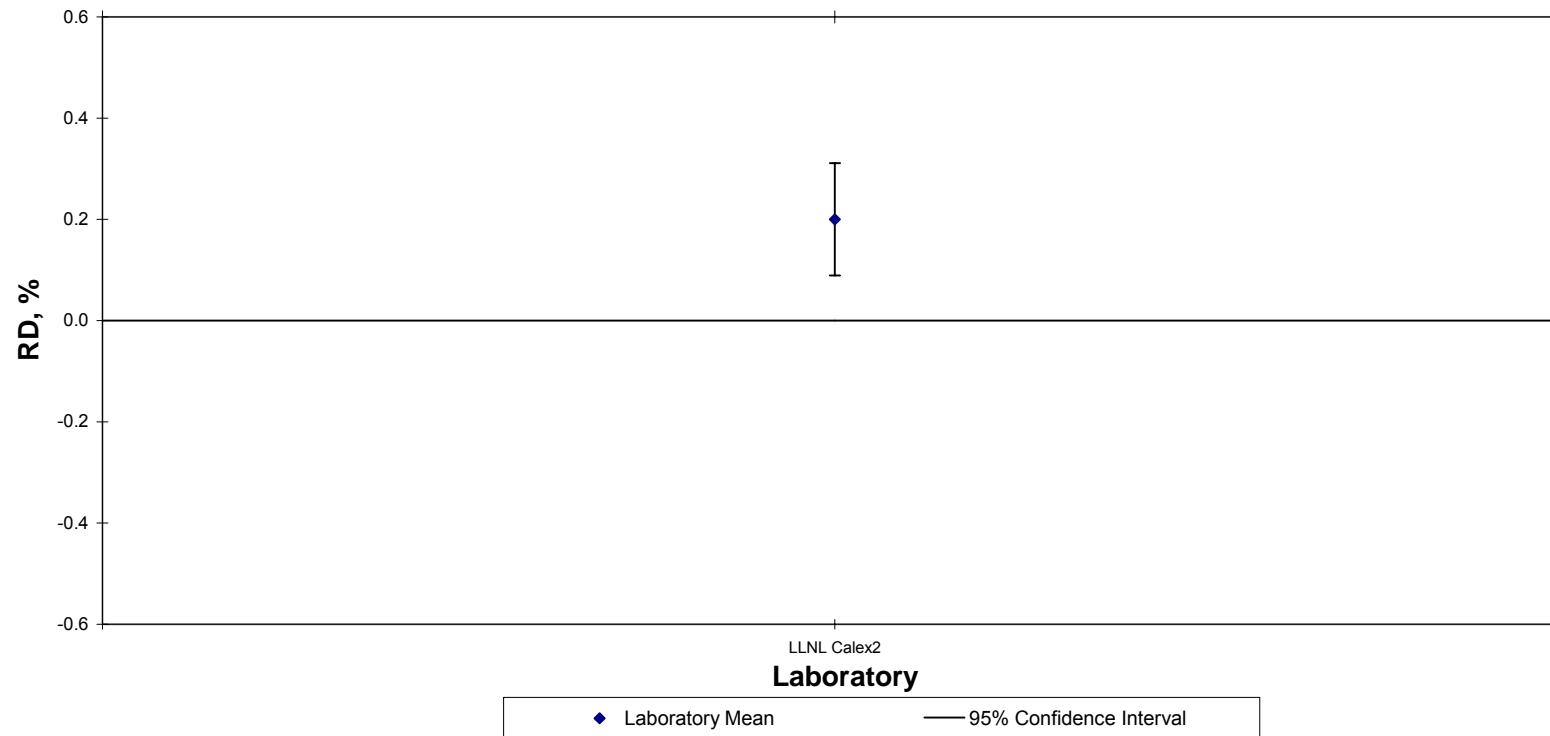
	LLNL
Mean Error (weight%)	0.0239%
Standard Deviation (weight%)	0.0281%
Uncertainty in the Mean (weight%)	0.0064%
Mean Error (%)	0.20%
Standard Deviation (%)	0.23%
Uncertainty in the Mean (%)	0.05%
Number of Data Points	19
Number of Outliers	0

Difference from Last Year in:

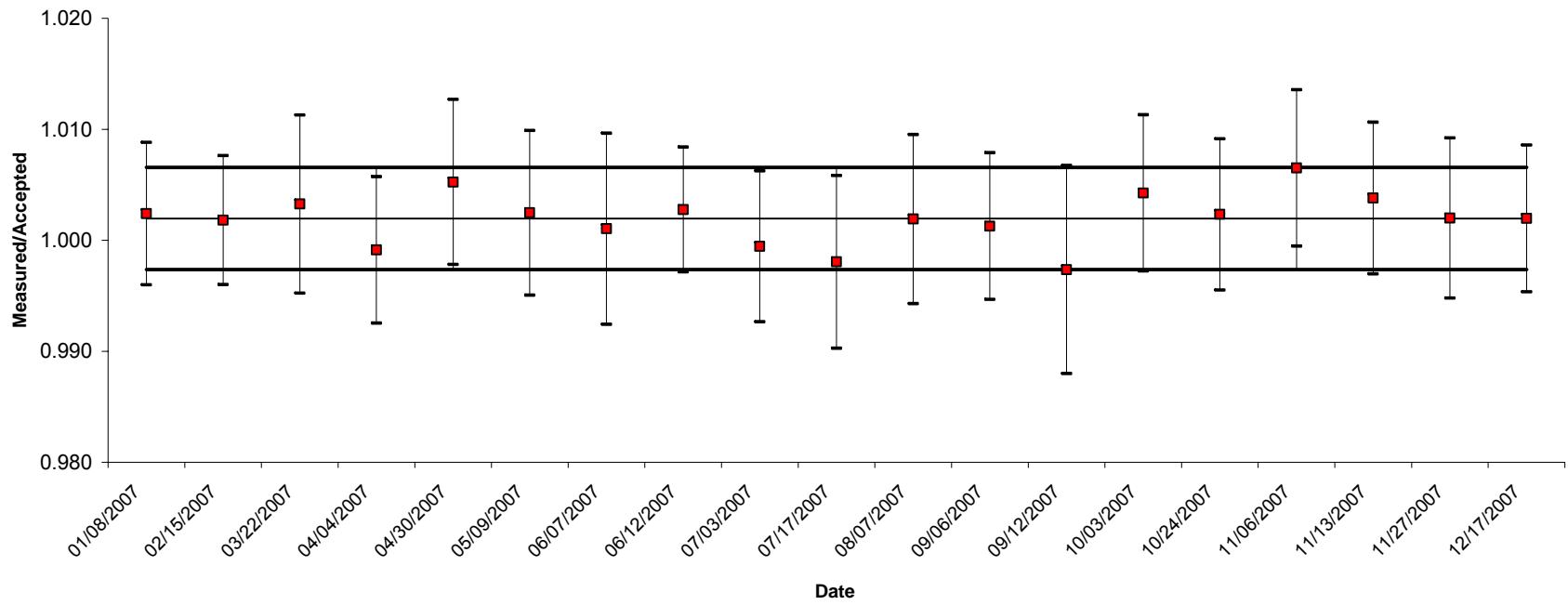
Mean Error (weight%)	-0.0096%
Standard Deviation (weight%)	0.0064%
Uncertainty in the Mean (weight%)	-0.0045%
Mean Error (%)	-0.07%
Standard Deviation (%)	0.05%
Uncertainty in the Mean (%)	-0.04%
Number of Data Points	15
Number of Outliers	0

New Brunswick Laboratory Calorimetry Exchange Program
Percent ^{240}Pu , 2007 - CALEX II

N=19



LLNL
240-Pu
2007, CALEX II



WEIGHT PERCENT Pu240 DATA

Calendar Year 2007

LLNL: Calex II

#	Date Measured	Instr. ID	Measured Pu240	Uncert. 1 STD	Accepted Weight%	Ratio M/A	Weight% Error	Percent Error
1	01/08/2007	III	12.2420%	0.32%	12.2126%	1.0024	0.0294%	0.24%
2	02/15/2007	III	12.2351%	0.29%	12.2129%	1.0018	0.0222%	0.18%
3	03/22/2007	III	12.2530%	0.40%	12.2132%	1.0033	0.0398%	0.33%
4	04/04/2007	III	12.2027%	0.33%	12.2132%	0.9991	-0.0106%	-0.09%
5	04/30/2007	III	12.2776%	0.37%	12.2134%	1.0053	0.0642%	0.53%
6	05/09/2007	III	12.2437%	0.37%	12.2135%	1.0025	0.0302%	0.25%
7	06/07/2007	II	12.2265%	0.43%	12.2137%	1.0010	0.0128%	0.10%
8	06/12/2007	III	12.2476%	0.28%	12.2137%	1.0028	0.0339%	0.28%
9	07/03/2007	III	12.2072%	0.34%	12.2139%	0.9995	-0.0067%	-0.05%
10	07/17/2007	III	12.1902%	0.39%	12.2140%	0.9981	-0.0238%	-0.19%
11	08/07/2007	III	12.2375%	0.38%	12.2141%	1.0019	0.0233%	0.19%
12	09/06/2007	III	12.2300%	0.33%	12.2144%	1.0013	0.0156%	0.13%
13	09/12/2007	III	12.1822%	0.47%	12.2144%	0.9974	-0.0322%	-0.26%
14	10/03/2007	III	12.2666%	0.35%	12.2145%	1.0043	0.0521%	0.43%
15	10/24/2007	II	12.2432%	0.34%	12.2147%	1.0023	0.0285%	0.23%
16	11/06/2007	III	12.2944%	0.35%	12.2148%	1.0065	0.0797%	0.65%
17	11/13/2007	III	12.2613%	0.34%	12.2148%	1.0038	0.0465%	0.38%
18	11/27/2007	III	12.2394%	0.36%	12.2149%	1.0020	0.0245%	0.20%
19	12/17/2007	III	12.2391%	0.33%	12.2151%	1.0020	0.0240%	0.20%
Mean:						1.0020	0.0239%	0.20%
Standard Deviation:						0.0023	0.0281%	0.23%
Standard Uncertainty:						0.0005	0.0064%	0.05%

Statistical outliers are in bold and are not included in graphs and tables.

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M. ^{241}Pu ISOTOPE ABUNDANCE: TABLES AND GRAPHS

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RESULTS OF ANALYSIS OF PU241 - CALEX I
1st QUARTER 2007

	HAN	LANL	LLNL
Mean Error (weight%)	0.0004%	0.0001%	-0.0002%
Standard Deviation (weight%)	0.0004%	0.0004%	0.0003%
Uncertainty in the Mean (weight%)	0.0002%	0.0001%	0.0001%
Mean Error (%)	0.45%	0.14%	-0.16%
Standard Deviation (%)	0.37%	0.39%	0.35%
Uncertainty in the Mean (%)	0.17%	0.10%	0.07%
Number of Data Points	5	15	28
Number of Outliers	0	0	0

Difference from Last Quarter in:

Mean Error (weight%)	-0.0001%	****	****
Standard Deviation (weight%)	-0.0003%	****	****
Uncertainty in the Mean (weight%)	-0.0001%	****	****
Mean Error (%)	-0.02%	****	****
Standard Deviation (%)	-0.31%	****	****
Uncertainty in the Mean (%)	-0.14%	****	****
Number of Data Points	0	15	28
Number of Outliers	0	0	0

RESULTS OF ANALYSIS OF PU241 - CALEX I
2nd QUARTER 2007

	HAN	LANL	LLNL
Mean Error (weight%)	0.0003%	0.0003%	-0.0000%
Standard Deviation (weight%)	0.0006%	0.0004%	0.0003%
Uncertainty in the Mean (weight%)	0.0002%	0.0001%	0.0001%
Mean Error (%)	0.27%	0.31%	-0.02%
Standard Deviation (%)	0.58%	0.42%	0.32%
Uncertainty in the Mean (%)	0.18%	0.13%	0.07%
Number of Data Points	11	10	24
Number of Outliers	0	0	0

Difference from Last Quarter in:

Mean Error (weight%)	-0.0001%	0.0002%	0.0002%
Standard Deviation (weight%)	0.0002%	0.0000%	0.0000%
Uncertainty in the Mean (weight%)	0.0000%	0.0000%	0.0000%
Mean Error (%)	-0.18%	0.17%	0.14%
Standard Deviation (%)	0.21%	0.03%	-0.03%
Uncertainty in the Mean (%)	0.01%	0.03%	0.00%
Number of Data Points	6	-5	-4
Number of Outliers	0	0	0

RESULTS OF ANALYSIS OF PU241 - CALEX I
3rd QUARTER 2007

	HAN	LANL	LLNL
Mean Error (weight%)	0.0005%	-0.0001%	-0.0000%
Standard Deviation (weight%)	0.0005%	0.0009%	0.0004%
Uncertainty in the Mean (weight%)	0.0002%	0.0003%	0.0001%
Mean Error (%)	0.51%	-0.16%	-0.02%
Standard Deviation (%)	0.57%	0.95%	0.44%
Uncertainty in the Mean (%)	0.16%	0.32%	0.07%
Number of Data Points	12	9	40
Number of Outliers	0	0	0

Difference from Last Quarter in:

Mean Error (weight%)	0.0002%	-0.0004%	0.0000%
Standard Deviation (weight%)	-0.0001%	0.0005%	0.0001%
Uncertainty in the Mean (weight%)	0.0000%	0.0002%	0.0000%
Mean Error (%)	0.24%	-0.47%	0.00%
Standard Deviation (%)	-0.01%	0.53%	0.12%
Uncertainty in the Mean (%)	-0.02%	0.19%	0.00%
Number of Data Points	1	-1	16
Number of Outliers	0	0	0

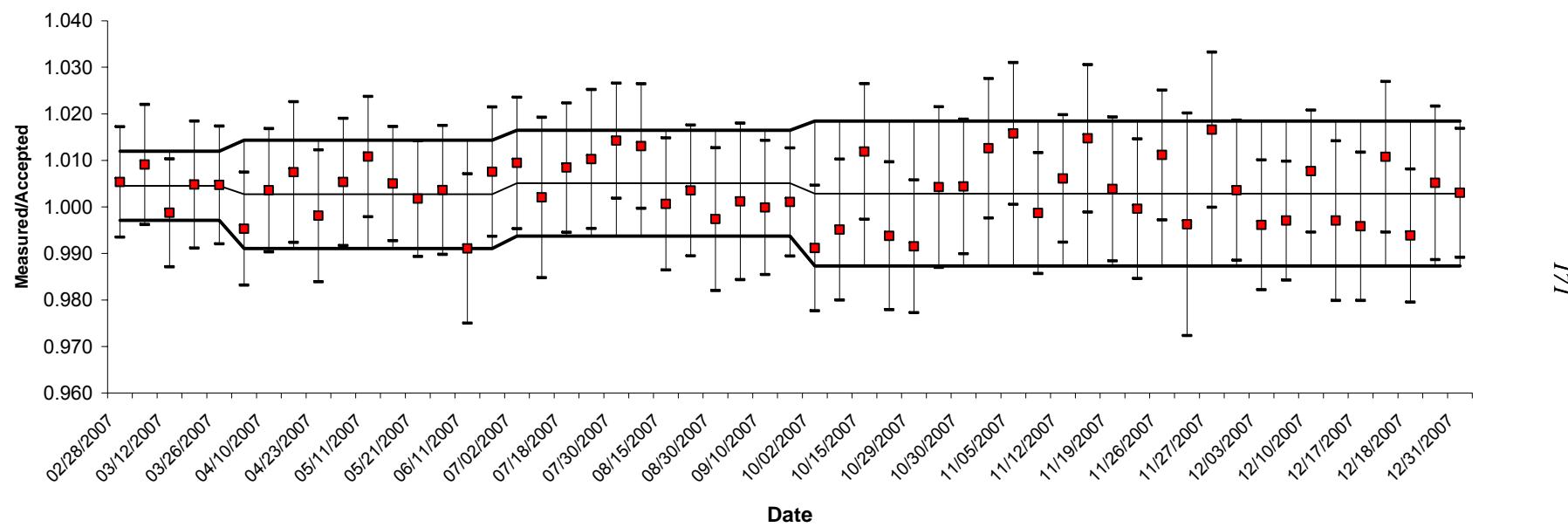
RESULTS OF ANALYSIS OF PU241 - CALEX I
4th QUARTER 2007

	HAN	LANL	LLNL
Mean Error (weight%)	0.0003%	0.0002%	-0.0002%
Standard Deviation (weight%)	0.0007%	0.0005%	0.0005%
Uncertainty in the Mean (weight%)	0.0001%	0.0002%	0.0001%
Mean Error (%)	0.29%	0.17%	-0.17%
Standard Deviation (%)	0.78%	0.48%	0.49%
Uncertainty in the Mean (%)	0.15%	0.20%	0.12%
Number of Data Points	27	6	17
Number of Outliers	0	0	2

Difference from Last Quarter in:

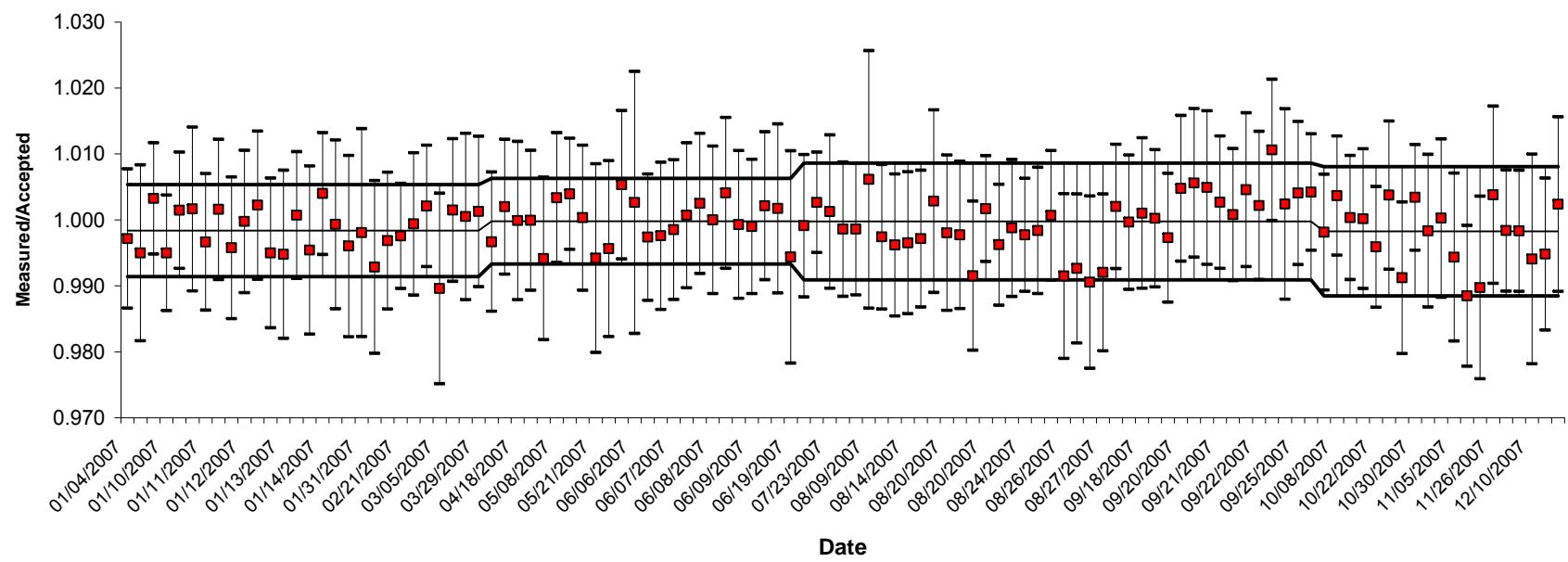
Mean Error (weight%)	-0.0002%	0.0003%	-0.0002%
Standard Deviation (weight%)	0.0002%	-0.0004%	0.0001%
Uncertainty in the Mean (weight%)	-0.0001%	-0.0001%	0.0000%
Mean Error (%)	-0.22%	0.33%	-0.15%
Standard Deviation (%)	0.21%	-0.47%	0.05%
Uncertainty in the Mean (%)	-0.01%	-0.12%	0.05%
Number of Data Points	15	-3	-23
Number of Outliers	0	0	2

HAN
241-Pu
1st Quarter 2007 - 4th Quarter 2007
CALEX I

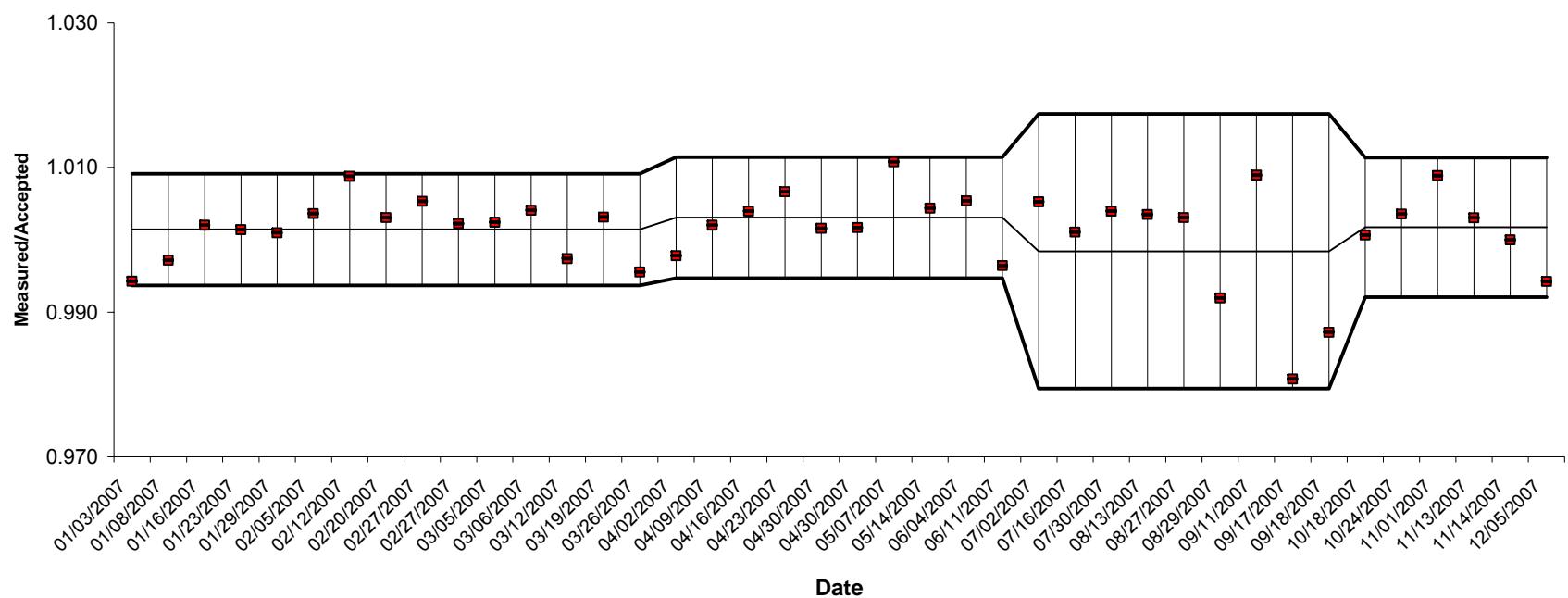


171

LLNL
241-Pu
1st Quarter 2007 - 4th Quarter 2007
CALEX I



LANL
241-Pu
1st Quarter 2007 - 4th Quarter 2007
CALEX I



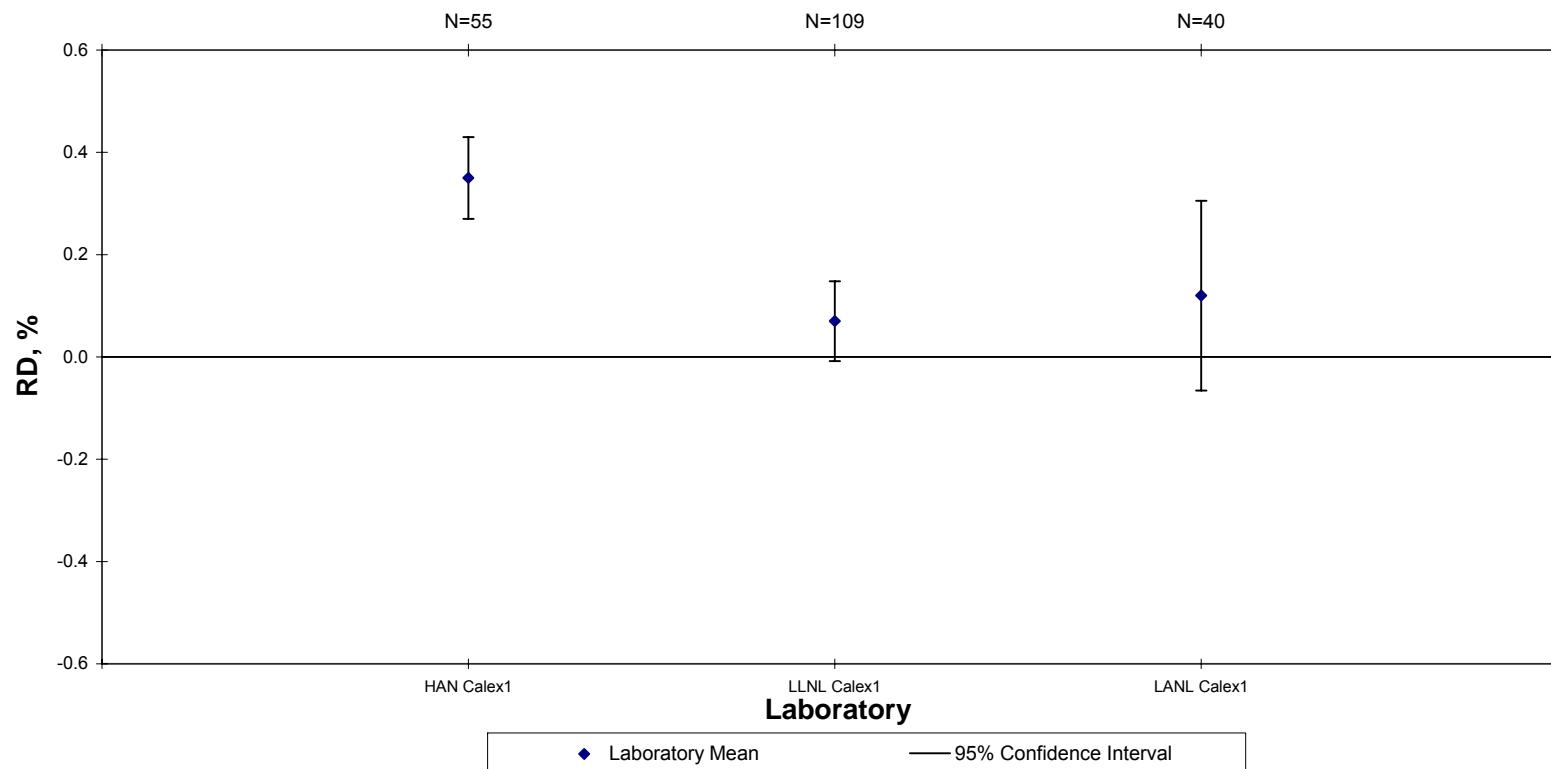
**RESULTS OF ANALYSIS OF PU241 - CALEX I
2007**

	HAN	LANL	LLNL
Mean Error (weight%)	0.0003%	0.0001%	-0.0001%
Standard Deviation (weight%)	0.0006%	0.0006%	0.0004%
Uncertainty in the Mean (weight%)	0.0001%	0.0001%	0.0000%
Mean Error (%)	0.35%	0.12%	-0.08%
Standard Deviation (%)	0.66%	0.58%	0.41%
Uncertainty in the Mean (%)	0.09%	0.09%	0.04%
Number of Data Points	55	40	109
Number of Outliers	0	0	2

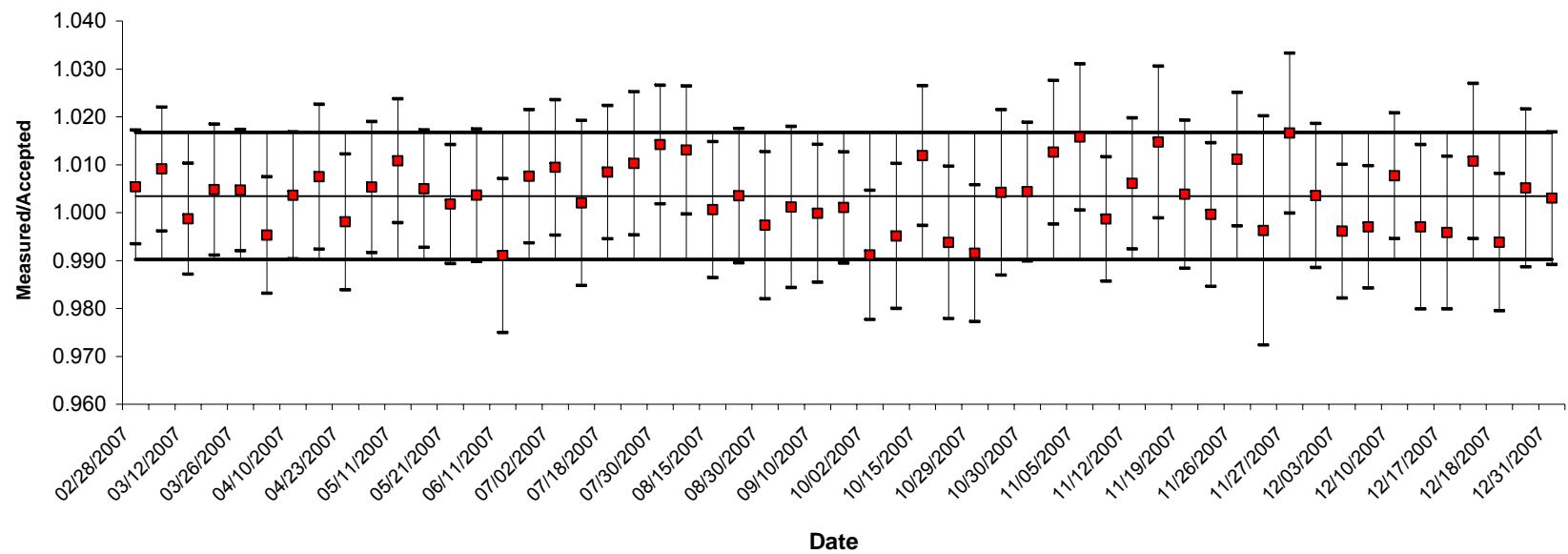
Difference from Last Year in:

Mean Error (weight%)	0.0001%	****	-0.0002%
Standard Deviation (weight%)	0.0000%	****	-0.0001%
Uncertainty in the Mean (weight%)	0.0000%	****	-0.0001%
Mean Error (%)	0.12%	****	-0.15%
Standard Deviation (%)	0.10%	****	-0.08%
Uncertainty in the Mean (%)	-0.05%	****	-0.03%
Number of Data Points	39	40	54
Number of Outliers	-1	0	-5

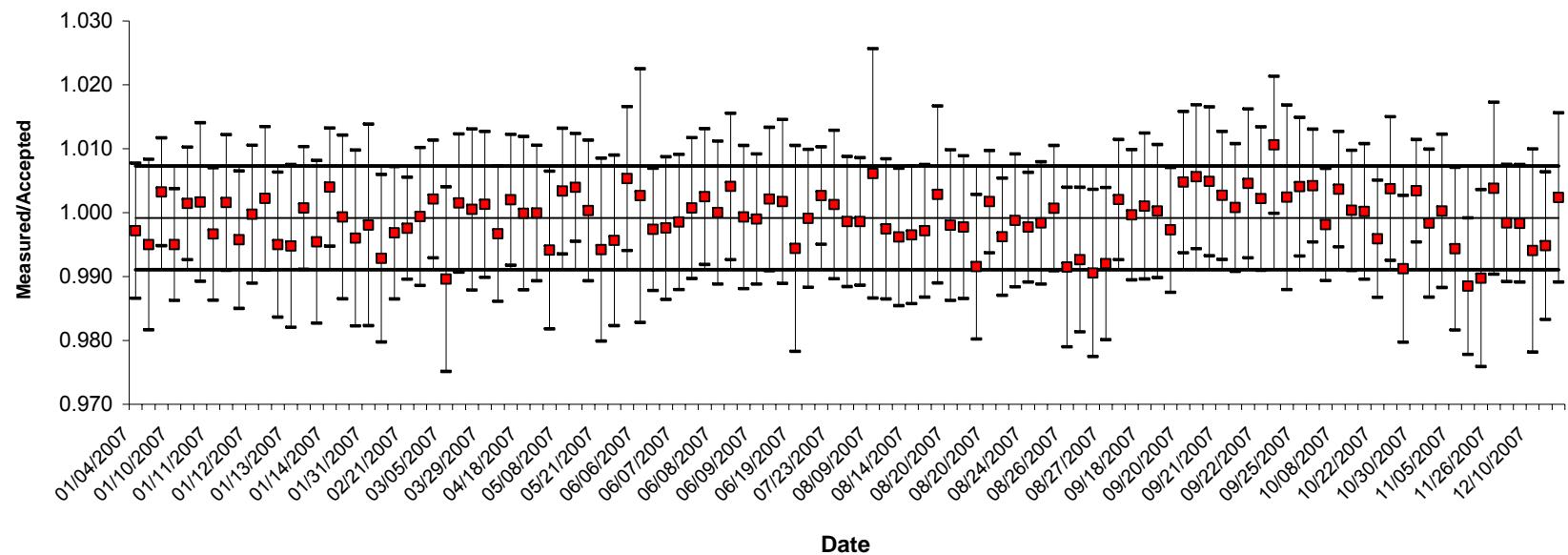
New Brunswick Laboratory Calorimetry Exchange Program
Percent ^{241}Pu , 2007 - CALEX I



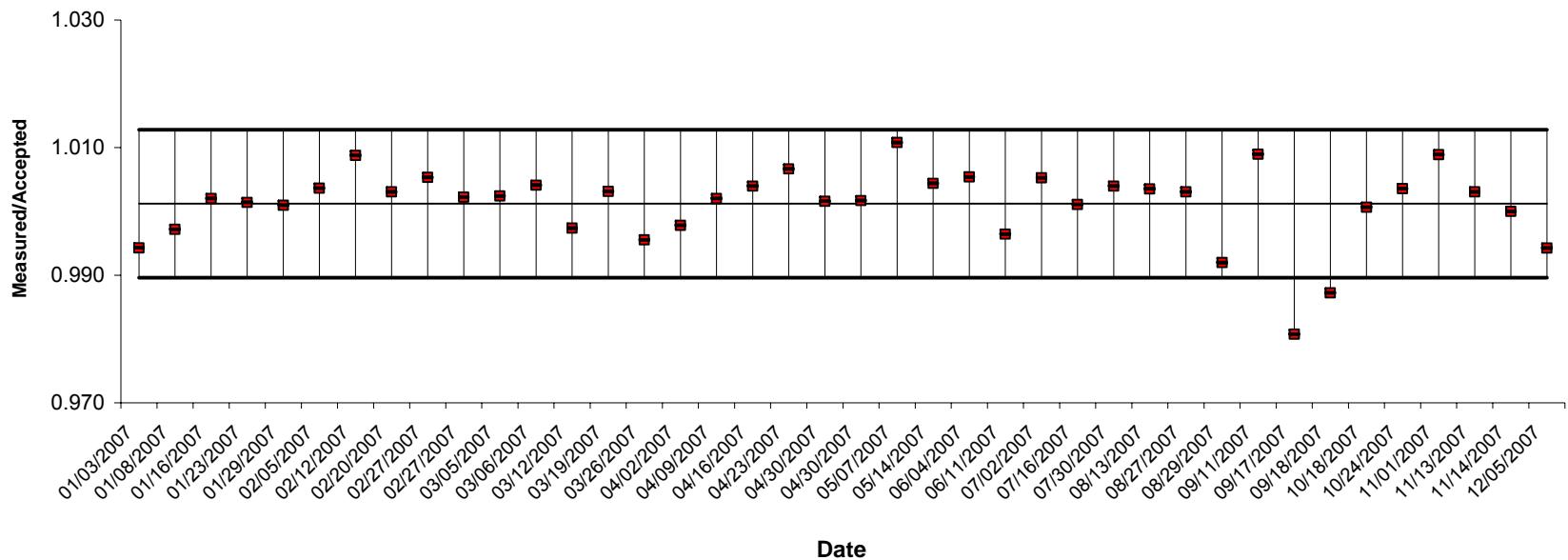
HAN
241-Pu
2007, CALEX I



LLNL
241-Pu
2007, CALEX I



LANL
241-Pu
2007, CALEX I



WEIGHT PERCENT Pu241 DATA

Calendar Year 2007

HAN: Calex I

#	Date Measured	Instr. ID	Measured Pu241	Uncert. 1 STD	Accepted Weight%	Ratio M/A	Weight% Error	Percent Error
1	02/28/2007	2740	0.0980%	0.59%	0.0975%	1.0054	0.0005%	0.54%
2	03/05/2007	2740	0.0983%	0.64%	0.0974%	1.0091	0.0009%	0.91%
3	03/12/2007	2740	0.0972%	0.58%	0.0973%	0.9987	-0.0001%	-0.13%
4	03/19/2007	2740	0.0977%	0.68%	0.0972%	1.0048	0.0005%	0.48%
5	03/26/2007	2740	0.0976%	0.63%	0.0971%	1.0047	0.0005%	0.47%
6	04/02/2007	2740	0.0966%	0.61%	0.0971%	0.9953	-0.0005%	-0.47%
7	04/10/2007	2740	0.0973%	0.66%	0.0970%	1.0036	0.0003%	0.36%
8	04/16/2007	2740	0.0976%	0.75%	0.0969%	1.0075	0.0007%	0.75%
9	04/23/2007	2740	0.0966%	0.71%	0.0968%	0.9981	-0.0002%	-0.19%
10	05/01/2007	2740	0.0972%	0.68%	0.0967%	1.0053	0.0005%	0.53%
11	05/11/2007	2740	0.0976%	0.64%	0.0966%	1.0108	0.0010%	1.08%
12	05/14/2007	2740	0.0970%	0.61%	0.0965%	1.0050	0.0005%	0.50%
13	05/21/2007	2740	0.0966%	0.62%	0.0964%	1.0018	0.0002%	0.18%
14	06/04/2007	2740	0.0966%	0.69%	0.0963%	1.0036	0.0003%	0.36%
15	06/11/2007	2740	0.0953%	0.81%	0.0962%	0.9910	-0.0009%	-0.90%
16	06/18/2007	2740	0.0968%	0.69%	0.0961%	1.0076	0.0007%	0.76%
17	07/02/2007	2740	0.0968%	0.70%	0.0959%	1.0094	0.0009%	0.94%
18	07/09/2007	2740	0.0960%	0.86%	0.0958%	1.0020	0.0002%	0.20%
19	07/18/2007	2740	0.0965%	0.69%	0.0957%	1.0084	0.0008%	0.84%
20	07/24/2007	2740	0.0966%	0.74%	0.0956%	1.0103	0.0010%	1.03%
21	07/30/2007	2740	0.0969%	0.61%	0.0955%	1.0142	0.0014%	1.42%
22	08/06/2007	2740	0.0967%	0.66%	0.0955%	1.0131	0.0012%	1.31%
23	08/15/2007	2740	0.0954%	0.71%	0.0953%	1.0006	0.0001%	0.06%
24	08/21/2007	2740	0.0956%	0.70%	0.0953%	1.0035	0.0003%	0.35%
25	08/30/2007	2740	0.0949%	0.77%	0.0952%	0.9974	-0.0003%	-0.26%
26	09/04/2007	2740	0.0952%	0.84%	0.0951%	1.0012	0.0001%	0.12%
27	09/10/2007	2740	0.0950%	0.72%	0.0950%	0.9999	-0.0000%	-0.01%
28	09/19/2007	2740	0.0950%	0.58%	0.0949%	1.0011	0.0001%	0.11%
29	10/02/2007	2740	0.0939%	0.68%	0.0947%	0.9912	-0.0008%	-0.88%
30	10/08/2007	2740	0.0942%	0.76%	0.0947%	0.9951	-0.0005%	-0.49%
31	10/15/2007	2740	0.0957%	0.72%	0.0946%	1.0119	0.0011%	1.19%
32	10/22/2007	2740	0.0939%	0.80%	0.0945%	0.9938	-0.0006%	-0.62%
33	10/29/2007	2740	0.0936%	0.72%	0.0944%	0.9915	-0.0008%	-0.85%
34	10/29/2007	8302	0.0948%	0.86%	0.0944%	1.0042	0.0004%	0.42%
35	10/30/2007	90225	0.0948%	0.72%	0.0944%	1.0044	0.0004%	0.44%
36	11/05/2007	90225	0.0955%	0.74%	0.0943%	1.0126	0.0012%	1.26%
37	11/05/2007	8302	0.0958%	0.75%	0.0943%	1.0158	0.0015%	1.58%
38	11/12/2007	2740	0.0941%	0.65%	0.0942%	0.9987	-0.0001%	-0.13%
39	11/12/2007	90225	0.0948%	0.68%	0.0942%	1.0061	0.0006%	0.61%
40	11/13/2007	8302	0.0956%	0.78%	0.0942%	1.0147	0.0014%	1.47%
41	11/19/2007	90225	0.0945%	0.77%	0.0941%	1.0038	0.0004%	0.38%
42	11/19/2007	8302	0.0941%	0.75%	0.0941%	0.9996	-0.0000%	-0.04%
43	11/26/2007	90225	0.0951%	0.69%	0.0941%	1.0111	0.0010%	1.11%
44	11/26/2007	2740	0.0937%	1.20%	0.0941%	0.9963	-0.0004%	-0.37%
45	11/27/2007	8302	0.0956%	0.82%	0.0940%	1.0166	0.0016%	1.66%
46	12/03/2007	8302	0.0943%	0.75%	0.0940%	1.0036	0.0003%	0.36%
47	12/03/2007	90225	0.0936%	0.70%	0.0940%	0.9961	-0.0004%	-0.39%
48	12/10/2007	2740	0.0936%	0.64%	0.0939%	0.9970	-0.0003%	-0.30%
49	12/10/2007	90225	0.0946%	0.65%	0.0939%	1.0077	0.0007%	0.77%
50	12/10/2007	8302	0.0936%	0.86%	0.0939%	0.9970	-0.0003%	-0.30%
51	12/17/2007	90225	0.0934%	0.80%	0.0938%	0.9958	-0.0004%	-0.42%
52	12/17/2007	8302	0.0948%	0.80%	0.0938%	1.0108	0.0010%	1.08%
53	12/18/2007	2740	0.0932%	0.72%	0.0938%	0.9938	-0.0006%	-0.62%
54	12/31/2007	2740	0.0941%	0.82%	0.0936%	1.0052	0.0005%	0.52%
55	12/31/2007	90225	0.0939%	0.69%	0.0936%	1.0030	0.0003%	0.30%

Mean: 1.0035
 Standard Deviation: 0.0066
 Standard Uncertainty: 0.0009

Statistical outliers are in bold and are not included in graphs and tables.

WEIGHT PERCENT Pu241 DATA

Calendar Year 2007

LLNL: Calex I

#	Date Measured	Instr. ID	Measured Pu241	Uncert. 1 STD	Accepted Weight%	Ratio M/A	Weight% Error	Percent Error
1	01/04/2007	II	0.0979%	0.53%	0.0982%	0.9972	-0.0003%	-0.28%
2	01/10/2007	I	0.0976%	0.67%	0.0981%	0.9950	-0.0005%	-0.50%
3	01/10/2007	I	0.0984%	0.42%	0.0981%	1.0033	0.0003%	0.33%
4	01/10/2007	I	0.0976%	0.44%	0.0981%	0.9950	-0.0005%	-0.50%
5	01/11/2007	I	0.0982%	0.44%	0.0981%	1.0015	0.0001%	0.15%
6	01/11/2007	I	0.0983%	0.62%	0.0981%	1.0017	0.0002%	0.17%
7	01/11/2007	III	0.0978%	0.52%	0.0981%	0.9967	-0.0003%	-0.33%
8	01/12/2007	III	0.0982%	0.53%	0.0981%	1.0016	0.0002%	0.16%
9	01/12/2007	III	0.0977%	0.54%	0.0981%	0.9958	-0.0004%	-0.42%
10	01/12/2007	III	0.0981%	0.54%	0.0981%	0.9997	-0.0000%	-0.03%
11	01/13/2007	III	0.0983%	0.56%	0.0981%	1.0022	0.0002%	0.22%
12	01/13/2007	III	0.0976%	0.57%	0.0981%	0.9950	-0.0005%	-0.50%
13	01/13/2007	III	0.0976%	0.64%	0.0981%	0.9948	-0.0005%	-0.52%
14	01/14/2007	III	0.0981%	0.48%	0.0981%	1.0007	0.0001%	0.07%
15	01/14/2007	III	0.0976%	0.64%	0.0981%	0.9954	-0.0004%	-0.46%
16	01/14/2007	III	0.0984%	0.46%	0.0981%	1.0040	0.0004%	0.40%
17	01/18/2007	I	0.0979%	0.64%	0.0980%	0.9993	-0.0001%	-0.07%
18	01/31/2007	III	0.0974%	0.69%	0.0978%	0.9960	-0.0004%	-0.40%
19	01/31/2007	II	0.0976%	0.79%	0.0978%	0.9981	-0.0002%	-0.19%
20	02/07/2007	I	0.0970%	0.66%	0.0977%	0.9929	-0.0007%	-0.71%
21	02/14/2007	II	0.0974%	0.52%	0.0977%	0.9968	-0.0003%	-0.32%
22	02/21/2007	I	0.0973%	0.40%	0.0976%	0.9976	-0.0002%	-0.24%
23	02/27/2007	III	0.0974%	0.54%	0.0975%	0.9994	-0.0001%	-0.06%
24	03/05/2007	I	0.0976%	0.46%	0.0974%	1.0021	0.0002%	0.21%
25	03/05/2007	III	0.0964%	0.73%	0.0974%	0.9896	-0.0010%	-1.04%
26	03/12/2007	II	0.0975%	0.54%	0.0973%	1.0015	0.0001%	0.15%
27	03/20/2007	I	0.0973%	0.63%	0.0972%	1.0005	0.0000%	0.05%
28	03/29/2007	I	0.0972%	0.57%	0.0971%	1.0013	0.0001%	0.13%
29	04/03/2007	III	0.0967%	0.53%	0.0970%	0.9967	-0.0003%	-0.33%
30	04/05/2007	I	0.0972%	0.51%	0.0970%	1.0020	0.0002%	0.20%
31	04/18/2007	I	0.0968%	0.60%	0.0968%	0.9999	-0.0000%	-0.01%
32	04/19/2007	III	0.0968%	0.53%	0.0968%	0.9999	-0.0000%	-0.01%
33	04/30/2007	I	0.0961%	0.62%	0.0967%	0.9941	-0.0006%	-0.59%
34	05/08/2007	III	0.0969%	0.49%	0.0966%	1.0034	0.0003%	0.34%
35	05/17/2007	III	0.0969%	0.42%	0.0965%	1.0039	0.0004%	0.39%
36	05/21/2007	I	0.0965%	0.55%	0.0964%	1.0003	0.0000%	0.03%
37	05/21/2007	III	0.0959%	0.72%	0.0964%	0.9942	-0.0006%	-0.58%
38	05/24/2007	III	0.0960%	0.67%	0.0964%	0.9956	-0.0004%	-0.44%
39	05/29/2007	II	0.0968%	0.56%	0.0963%	1.0053	0.0005%	0.53%
40	06/06/2007	III	0.0965%	0.99%	0.0962%	1.0026	0.0003%	0.26%
41	06/07/2007	III	0.0960%	0.48%	0.0962%	0.9974	-0.0003%	-0.26%
42	06/07/2007	III	0.0960%	0.56%	0.0962%	0.9976	-0.0002%	-0.24%
43	06/07/2007	III	0.0961%	0.53%	0.0962%	0.9985	-0.0001%	-0.15%
44	06/07/2007	III	0.0963%	0.55%	0.0962%	1.0007	0.0001%	0.07%
45	06/08/2007	III	0.0964%	0.53%	0.0962%	1.0025	0.0002%	0.25%
46	06/08/2007	III	0.0962%	0.56%	0.0962%	1.0000	0.0000%	0.00%
47	06/09/2007	III	0.0966%	0.57%	0.0962%	1.0041	0.0004%	0.41%
48	06/09/2007	III	0.0961%	0.56%	0.0962%	0.9993	-0.0001%	-0.07%
49	06/09/2007	III	0.0961%	0.51%	0.0962%	0.9990	-0.0001%	-0.10%
50	06/10/2007	III	0.0964%	0.56%	0.0962%	1.0021	0.0002%	0.21%
51	06/14/2007	I	0.0963%	0.64%	0.0961%	1.0017	0.0002%	0.17%
52	06/19/2007	III	0.0955%	0.81%	0.0961%	0.9944	-0.0005%	-0.56%
53	07/02/2007	I	0.0958%	0.54%	0.0959%	0.9991	-0.0001%	-0.09%
54	07/17/2007	I	0.0960%	0.38%	0.0957%	1.0027	0.0003%	0.27%
55	07/23/2007	III	0.0958%	0.58%	0.0956%	1.0013	0.0001%	0.13%
56	08/02/2007	III	0.0954%	0.51%	0.0955%	0.9986	-0.0001%	-0.14%
57	08/06/2007	I	0.0953%	0.50%	0.0955%	0.9986	-0.0001%	-0.14%
58	08/09/2007	II	0.0960%	0.97%	0.0954%	1.0061	0.0006%	0.61%
59	08/13/2007	I	0.0951%	0.55%	0.0954%	0.9974	-0.0002%	-0.26%
60	08/14/2007	III	0.0950%	0.54%	0.0954%	0.9962	-0.0004%	-0.38%
61	08/14/2007	III	0.0950%	0.54%	0.0954%	0.9965	-0.0003%	-0.35%
62	08/14/2007	III	0.0951%	0.52%	0.0954%	0.9971	-0.0003%	-0.29%

WEIGHT PERCENT Pu241 DATA

Calendar Year 2007

LLNL: Calex I

#	Date Measured	Instr. ID	Measured Pu241	Uncert. 1 STD	Accepted Weight%	Ratio M/A	Weight% Error	Percent Error
63	08/15/2007	III	0.0956%	0.69%	0.0953%	1.0028	0.0003%	0.28%
64	08/20/2007	III	0.0951%	0.59%	0.0953%	0.9980	-0.0002%	-0.20%
65	08/20/2007	III	0.0951%	0.56%	0.0953%	0.9977	-0.0002%	-0.23%
66	08/20/2007	III	0.0945%	0.57%	0.0953%	0.9915	-0.0008%	-0.85%
67	08/20/2007	I	0.0954%	0.40%	0.0953%	1.0017	0.0002%	0.17%
68	08/23/2007	III	0.0949%	0.46%	0.0952%	0.9962	-0.0004%	-0.38%
69	08/24/2007	III	0.0951%	0.52%	0.0952%	0.9988	-0.0001%	-0.12%
70	08/24/2007	III	0.0950%	0.43%	0.0952%	0.9977	-0.0002%	-0.23%
71	08/25/2007	III	0.0951%	0.48%	0.0952%	0.9984	-0.0002%	-0.16%
72	08/25/2007	III	0.0953%	0.49%	0.0952%	1.0007	0.0001%	0.07%
73	08/26/2007	III	0.0944%	0.63%	0.0952%	0.9915	-0.0008%	-0.85%
74	08/26/2007	III	0.0945%	0.57%	0.0952%	0.9926	-0.0007%	-0.74%
75	08/27/2007	III	0.0943%	0.66%	0.0952%	0.9906	-0.0009%	-0.94%
76	08/27/2007	III	0.0944%	0.60%	0.0952%	0.9920	-0.0008%	-0.80%
77	08/28/2007	III	0.0954%	0.47%	0.0952%	1.0020	0.0002%	0.20%
78	09/06/2007	I	0.0950%	0.51%	0.0951%	0.9996	-0.0000%	-0.04%
79	09/18/2007	III	0.0950%	0.57%	0.0949%	1.0010	0.0001%	0.10%
80	09/20/2007	I	0.0949%	0.52%	0.0949%	1.0002	0.0000%	0.02%
81	09/20/2007	II	0.0946%	0.49%	0.0949%	0.9973	-0.0003%	-0.27%
82	09/20/2007	II	0.0953%	0.55%	0.0949%	1.0048	0.0005%	0.48%
83	09/20/2007	II	0.0954%	0.56%	0.0949%	1.0056	0.0005%	0.56%
84	09/21/2007	II	0.0953%	0.58%	0.0949%	1.0049	0.0005%	0.49%
85	09/21/2007	II	0.0951%	0.50%	0.0949%	1.0027	0.0003%	0.27%
86	09/21/2007	II	0.0950%	0.50%	0.0949%	1.0008	0.0001%	0.08%
87	09/21/2007	II	0.0953%	0.58%	0.0949%	1.0046	0.0004%	0.46%
88	09/22/2007	II	0.0951%	0.56%	0.0949%	1.0022	0.0002%	0.22%
89	09/22/2007	II	0.0959%	0.53%	0.0949%	1.0106	0.0010%	1.06%
90	09/22/2007	II	0.0951%	0.72%	0.0949%	1.0024	0.0002%	0.24%
91	09/25/2007	III	0.0952%	0.54%	0.0948%	1.0041	0.0004%	0.41%
92	09/27/2007	I	0.0952%	0.44%	0.0948%	1.0042	0.0004%	0.42%
93	10/02/2007	I	0.0946%	0.44%	0.0947%	0.9981	-0.0002%	-0.19%
94	10/08/2007	II	0.0950%	0.45%	0.0947%	1.0037	0.0003%	0.37%
95	10/10/2007	I	0.0947%	0.47%	0.0946%	1.0003	0.0000%	0.03%
96	10/16/2007	III	0.0946%	0.53%	0.0946%	1.0002	0.0000%	0.02%
97	10/22/2007	II	0.0941%	0.46%	0.0945%	0.9959	-0.0004%	-0.41%
98	10/23/2007	I	0.0948%	0.56%	0.0945%	1.0038	0.0004%	0.38%
99	10/25/2007	III	0.0936%	0.58%	0.0945%	0.9912	-0.0008%	-0.88%
100	10/30/2007	I	0.0947%	0.40%	0.0944%	1.0034	0.0003%	0.34%
101	10/31/2007	II	0.0942%	0.58%	0.0944%	0.9984	-0.0002%	-0.16%
102	10/31/2007	III	0.0944%	0.60%	0.0944%	1.0003	0.0000%	0.03%
103	11/05/2007	I	0.0938%	0.64%	0.0943%	0.9944	-0.0005%	-0.56%
104	11/12/2007	II	0.0931%	0.54%	0.0942%	0.9885	-0.0011%	-1.15%
105	11/20/2007	II	0.0932%	0.70%	0.0941%	0.9897	-0.0010%	-1.03%
106	11/26/2007	I	0.0944%	0.67%	0.0941%	1.0038	0.0004%	0.38%
107	12/04/2007	II	0.0938%	0.46%	0.0940%	0.9984	-0.0002%	-0.16%
108	12/06/2007	I	0.0938%	0.46%	0.0939%	0.9983	-0.0002%	-0.17%
109	12/10/2007	III	0.0933%	0.80%	0.0939%	0.9941	-0.0006%	-0.59%
110	12/19/2007	I	0.0933%	0.58%	0.0938%	0.9948	-0.0005%	-0.52%
111	12/27/2007	I	0.0939%	0.66%	0.0937%	1.0024	0.0002%	0.24%
Mean:						0.9992	-0.0001%	-0.08%
Standard Deviation:						0.0041	0.0004%	0.41%
Standard Uncertainty:						0.0004	0.0000%	0.04%

Statistical outliers are in bold and are not included in graphs and tables.

WEIGHT PERCENT Pu241 DATA

Calendar Year 2007

LANL: Calex I

#	Date Measured	Instr. ID	Measured Pu241	Uncert. 1 STD	Accepted Weight%	Ratio M/A	Weight% Error	Percent Error
1	01/03/2007	F5	0.0976%	0.00%	0.0982%	0.9943	-0.0006%	-0.57%
2	01/08/2007	F9	0.0979%	0.00%	0.0981%	0.9972	-0.0003%	-0.28%
3	01/16/2007	F5	0.0982%	0.00%	0.0980%	1.0020	0.0002%	0.20%
4	01/23/2007	F9	0.0981%	0.00%	0.0979%	1.0014	0.0001%	0.14%
5	01/29/2007	F5	0.0980%	0.00%	0.0979%	1.0010	0.0001%	0.10%
6	02/05/2007	F9	0.0981%	0.00%	0.0978%	1.0036	0.0004%	0.36%
7	02/12/2007	F5	0.0985%	0.00%	0.0977%	1.0088	0.0009%	0.88%
8	02/20/2007	F9	0.0979%	0.00%	0.0976%	1.0031	0.0003%	0.31%
9	02/27/2007	F5	0.0980%	0.00%	0.0975%	1.0053	0.0005%	0.53%
10	02/27/2007	F5	0.0977%	0.00%	0.0975%	1.0022	0.0002%	0.22%
11	03/05/2007	F5	0.0976%	0.00%	0.0974%	1.0024	0.0002%	0.24%
12	03/06/2007	F9	0.0978%	0.00%	0.0974%	1.0041	0.0004%	0.41%
13	03/12/2007	F9	0.0971%	0.00%	0.0973%	0.9974	-0.0003%	-0.26%
14	03/19/2007	F5	0.0975%	0.00%	0.0972%	1.0031	0.0003%	0.31%
15	03/26/2007	F9	0.0967%	0.00%	0.0971%	0.9955	-0.0004%	-0.45%
16	04/02/2007	F5	0.0968%	0.00%	0.0971%	0.9978	-0.0002%	-0.22%
17	04/09/2007	F9	0.0972%	0.00%	0.0970%	1.0020	0.0002%	0.20%
18	04/16/2007	F5	0.0973%	0.00%	0.0969%	1.0040	0.0004%	0.40%
19	04/23/2007	F9	0.0974%	0.00%	0.0968%	1.0067	0.0006%	0.67%
20	04/30/2007	F5	0.0968%	0.00%	0.0967%	1.0016	0.0002%	0.16%
21	04/30/2007	F9	0.0969%	0.00%	0.0967%	1.0017	0.0002%	0.17%
22	05/07/2007	F9	0.0976%	0.00%	0.0966%	1.0108	0.0010%	1.08%
23	05/14/2007	F5	0.0969%	0.00%	0.0965%	1.0044	0.0004%	0.44%
24	06/04/2007	F9	0.0968%	0.00%	0.0963%	1.0054	0.0005%	0.54%
25	06/11/2007	F5	0.0958%	0.00%	0.0962%	0.9964	-0.0003%	-0.36%
26	07/02/2007	F5	0.0964%	0.00%	0.0959%	1.0053	0.0005%	0.53%
27	07/16/2007	F5	0.0958%	0.00%	0.0957%	1.0011	0.0001%	0.11%
28	07/30/2007	F5	0.0959%	0.00%	0.0955%	1.0040	0.0004%	0.40%
29	08/13/2007	F5	0.0957%	0.00%	0.0954%	1.0035	0.0003%	0.35%
30	08/27/2007	F5	0.0955%	0.00%	0.0952%	1.0031	0.0003%	0.31%
31	08/29/2007	F9	0.0944%	0.00%	0.0952%	0.9920	-0.0008%	-0.80%
32	09/11/2007	F5	0.0958%	0.00%	0.0950%	1.0089	0.0008%	0.89%
33	09/17/2007	F9	0.0931%	0.00%	0.0949%	0.9808	-0.0018%	-1.92%
34	09/18/2007	F9	0.0937%	0.00%	0.0949%	0.9872	-0.0012%	-1.28%
35	10/18/2007	F9	0.0946%	0.00%	0.0945%	1.0007	0.0001%	0.07%
36	10/24/2007	F9	0.0948%	0.00%	0.0945%	1.0036	0.0003%	0.36%
37	11/01/2007	F9	0.0952%	0.00%	0.0944%	1.0089	0.0008%	0.89%
38	11/13/2007	F9	0.0945%	0.00%	0.0942%	1.0030	0.0003%	0.30%
39	11/14/2007	F9	0.0942%	0.00%	0.0942%	1.0000	-0.0000%	-0.00%
40	12/05/2007	F9	0.0934%	0.00%	0.0939%	0.9943	-0.0005%	-0.57%
Mean:						1.0012	0.0001%	0.12%
Standard Deviation:						0.0058	0.0006%	0.58%
Standard Uncertainty:						0.0009	0.0001%	0.09%

Statistical outliers are in bold and are not included in graphs and tables.

RESULTS OF ANALYSIS OF PU241 - CALEX II
1st QUARTER 2007

	LLNL
Mean Error (weight%)	0.0004%
Standard Deviation (weight%)	0.0025%
Uncertainty in the Mean (weight%)	0.0014%
Mean Error (%)	0.08%
Standard Deviation (%)	0.43%
Uncertainty in the Mean (%)	0.25%
Number of Data Points	3
Number of Outliers	0

Difference from Last Quarter in:

Mean Error (weight%)	****
Standard Deviation (weight%)	****
Uncertainty in the Mean (weight%)	****
Mean Error (%)	****
Standard Deviation (%)	****
Uncertainty in the Mean (%)	****
Number of Data Points	3
Number of Outliers	0

RESULTS OF ANALYSIS OF PU241 - CALEX II
2nd QUARTER 2007

	LLNL
Mean Error (weight%)	0.0020%
Standard Deviation (weight%)	0.0024%
Uncertainty in the Mean (weight%)	0.0011%
Mean Error (%)	0.34%
Standard Deviation (%)	0.41%
Uncertainty in the Mean (%)	0.19%
Number of Data Points	5
Number of Outliers	0

Difference from Last Quarter in:

Mean Error (weight%)	0.0016%
Standard Deviation (weight%)	-0.0001%
Uncertainty in the Mean (weight%)	-0.0003%
Mean Error (%)	0.26%
Standard Deviation (%)	-0.02%
Uncertainty in the Mean (%)	-0.06%
Number of Data Points	2
Number of Outliers	0

RESULTS OF ANALYSIS OF PU241 - CALEX II
3rd QUARTER 2007

	LLNL
Mean Error (weight%)	-0.0002%
Standard Deviation (weight%)	0.0029%
Uncertainty in the Mean (weight%)	0.0013%
Mean Error (%)	-0.04%
Standard Deviation (%)	0.51%
Uncertainty in the Mean (%)	0.23%
Number of Data Points	5
Number of Outliers	0

Difference from Last Quarter in:

Mean Error (weight%)	-0.0022%
Standard Deviation (weight%)	0.0005%
Uncertainty in the Mean (weight%)	0.0002%
Mean Error (%)	-0.38%
Standard Deviation (%)	0.10%
Uncertainty in the Mean (%)	0.04%
Number of Data Points	0
Number of Outliers	0

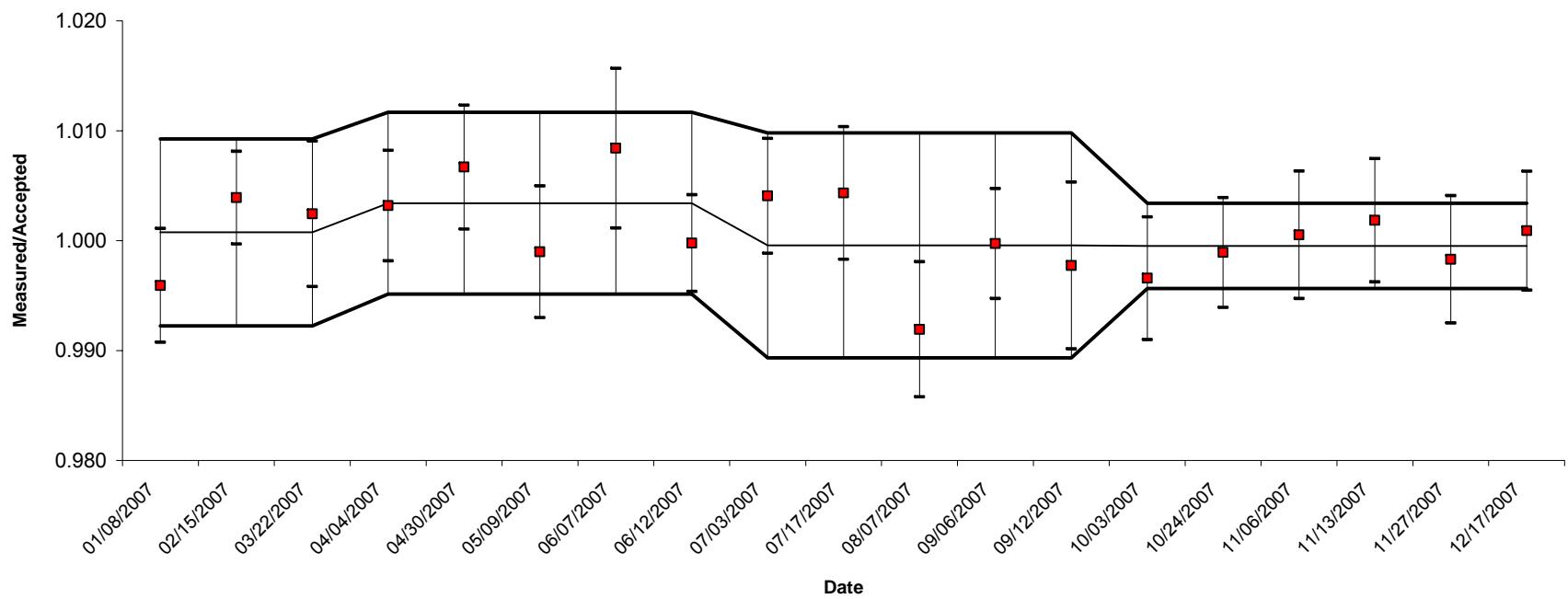
RESULTS OF ANALYSIS OF PU241 - CALEX II
4th QUARTER 2007

	LLNL
Mean Error (weight%)	-0.0003%
Standard Deviation (weight%)	0.0011%
Uncertainty in the Mean (weight%)	0.0004%
Mean Error (%)	-0.05%
Standard Deviation (%)	0.19%
Uncertainty in the Mean (%)	0.08%
Number of Data Points	6
Number of Outliers	0

Difference from Last Quarter in:

Mean Error (weight%)	-0.0001%
Standard Deviation (weight%)	-0.0018%
Uncertainty in the Mean (weight%)	-0.0009%
Mean Error (%)	-0.01%
Standard Deviation (%)	-0.32%
Uncertainty in the Mean (%)	-0.15%
Number of Data Points	1
Number of Outliers	0

LLNL
241-Pu
1st Quarter 2007 - 4th Quarter 2007
CALEX II



RESULTS OF ANALYSIS OF PU241 - CALEX II 2007

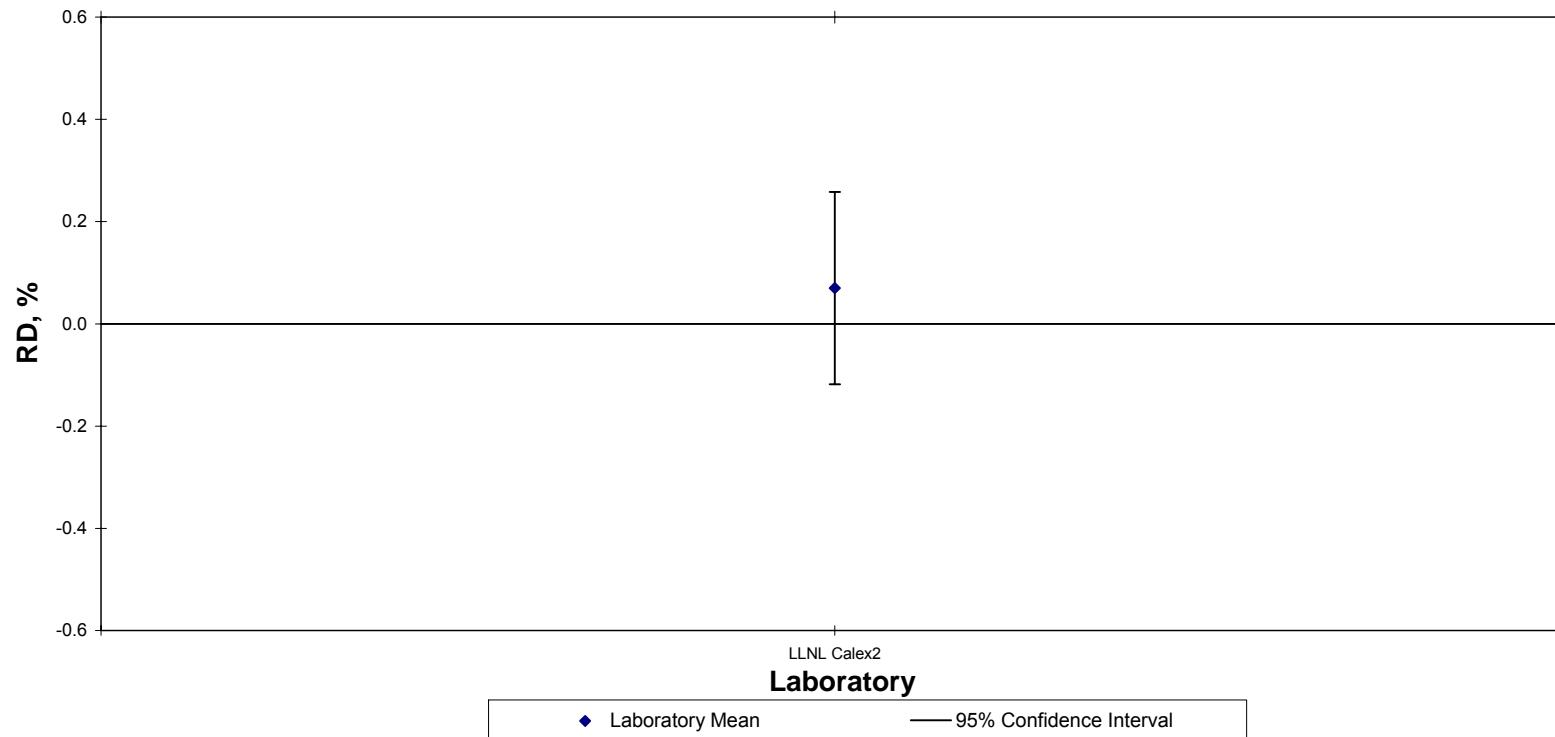
	LLNL
Mean Error (weight%)	0.0004%
Standard Deviation (weight%)	0.0022%
Uncertainty in the Mean (weight%)	0.0005%
Mean Error (%)	0.08%
Standard Deviation (%)	0.39%
Uncertainty in the Mean (%)	0.09%
Number of Data Points	19
Number of Outliers	0

Difference from Last Year in:

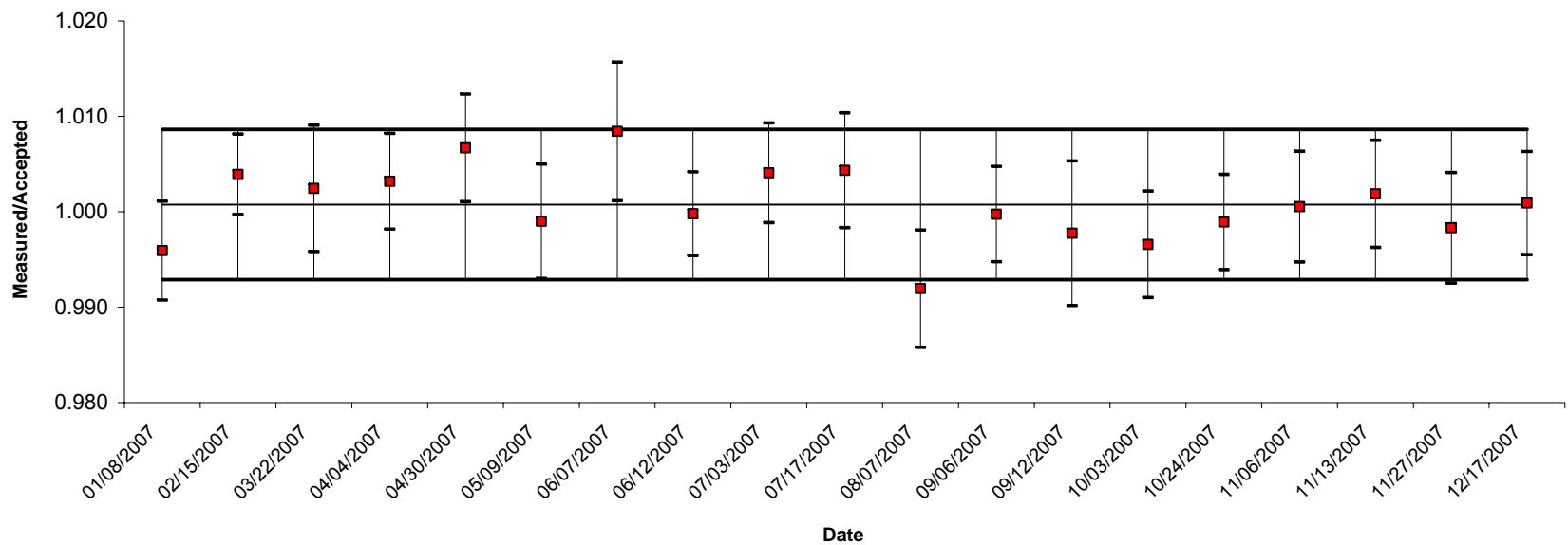
Mean Error (weight%)	-0.0008%
Standard Deviation (weight%)	0.0011%
Uncertainty in the Mean (weight%)	-0.0001%
Mean Error (%)	-0.11%
Standard Deviation (%)	0.20%
Uncertainty in the Mean (%)	0.00%
Number of Data Points	15
Number of Outliers	0

New Brunswick Laboratory Calorimetry Exchange Program
Percent ^{241}Pu , 2007 - CALEX II

N=19



LLNL
241-Pu
2007, CALEX II



WEIGHT PERCENT Pu241 DATA

Calendar Year 2007

LLNL: Calex II

#	Date Measured	Instr. ID	Measured Pu241	Uncert. 1 STD	Accepted Weight%	Ratio M/A	Weight% Error	Percent Error
1	01/08/2007	III	0.5795%	0.26%	0.5819%	0.9959	-0.0024%	-0.41%
2	02/15/2007	III	0.5812%	0.21%	0.5790%	1.0039	0.0023%	0.39%
3	03/22/2007	III	0.5777%	0.33%	0.5763%	1.0024	0.0014%	0.24%
4	04/04/2007	III	0.5772%	0.25%	0.5753%	1.0032	0.0018%	0.32%
5	04/30/2007	III	0.5772%	0.28%	0.5734%	1.0067	0.0038%	0.67%
6	05/09/2007	III	0.5721%	0.30%	0.5727%	0.9990	-0.0006%	-0.10%
7	06/07/2007	II	0.5753%	0.36%	0.5705%	1.0084	0.0048%	0.84%
8	06/12/2007	III	0.5700%	0.22%	0.5701%	0.9998	-0.0001%	-0.02%
9	07/03/2007	III	0.5709%	0.26%	0.5686%	1.0041	0.0023%	0.41%
10	07/17/2007	III	0.5700%	0.30%	0.5675%	1.0043	0.0025%	0.43%
11	08/07/2007	III	0.5614%	0.31%	0.5660%	0.9919	-0.0046%	-0.81%
12	09/06/2007	III	0.5636%	0.25%	0.5637%	0.9997	-0.0001%	-0.03%
13	09/12/2007	III	0.5620%	0.38%	0.5633%	0.9977	-0.0013%	-0.23%
14	10/03/2007	III	0.5598%	0.28%	0.5617%	0.9966	-0.0019%	-0.34%
15	10/24/2007	II	0.5596%	0.25%	0.5602%	0.9989	-0.0006%	-0.11%
16	11/06/2007	III	0.5595%	0.29%	0.5592%	1.0005	0.0003%	0.05%
17	11/13/2007	III	0.5598%	0.28%	0.5587%	1.0019	0.0010%	0.19%
18	11/27/2007	III	0.5568%	0.29%	0.5577%	0.9983	-0.0009%	-0.17%
19	12/17/2007	III	0.5567%	0.27%	0.5562%	1.0009	0.0005%	0.09%
Mean:						1.0008	0.0004%	0.08%
Standard Deviation:						0.0039	0.0022%	0.39%
Standard Uncertainty:						0.0009	0.0005%	0.09%

Statistical outliers are in bold and are not included in graphs and tables.

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N. **^{241}Am ISOTOPE ABUNDANCE: TABLES AND GRAPHS**

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RESULTS OF ANALYSIS OF AM241 - CALEX I
1st QUARTER 2007

	HAN	LANL	LLNL
Mean Error (weight%)	-0.0027%	0.0011%	-0.0020%
Standard Deviation (weight%)	0.0007%	0.0059%	0.0008%
Uncertainty in the Mean (weight%)	0.0003%	0.0015%	0.0002%
Mean Error (%)	-1.00%	0.40%	-0.74%
Standard Deviation (%)	0.26%	2.16%	0.30%
Uncertainty in the Mean (%)	0.12%	0.56%	0.06%
Number of Data Points	5	15	28
Number of Outliers	0	0	0

Difference from Last Quarter in:

Mean Error (weight%)	0.0001%	****	****
Standard Deviation (weight%)	-0.0006%	****	****
Uncertainty in the Mean (weight%)	-0.0003%	****	****
Mean Error (%)	0.02%	****	****
Standard Deviation (%)	-0.23%	****	****
Uncertainty in the Mean (%)	-0.10%	****	****
Number of Data Points	0	15	28
Number of Outliers	0	0	0

RESULTS OF ANALYSIS OF AM241 - CALEX I
2nd QUARTER 2007

	HAN	LANL	LLNL
Mean Error (weight%)	-0.0031%	0.0026%	-0.0024%
Standard Deviation (weight%)	0.0012%	0.0037%	0.0008%
Uncertainty in the Mean (weight%)	0.0004%	0.0012%	0.0002%
Mean Error (%)	-1.11%	0.96%	-0.88%
Standard Deviation (%)	0.42%	1.36%	0.31%
Uncertainty in the Mean (%)	0.13%	0.43%	0.06%
Number of Data Points	11	10	24
Number of Outliers	0	0	0

Difference from Last Quarter in:

Mean Error (weight%)	-0.0004%	0.0015%	-0.0004%
Standard Deviation (weight%)	0.0005%	-0.0022%	0.0000%
Uncertainty in the Mean (weight%)	0.0001%	-0.0003%	0.0000%
Mean Error (%)	-0.11%	0.56%	-0.14%
Standard Deviation (%)	0.16%	-0.80%	0.01%
Uncertainty in the Mean (%)	0.01%	-0.13%	0.00%
Number of Data Points	6	-5	-4
Number of Outliers	0	0	0

RESULTS OF ANALYSIS OF AM241 - CALEX I
3rd QUARTER 2007

	HAN	LANL	LLNL
Mean Error (weight%)	-0.0026%	-0.0004%	-0.0021%
Standard Deviation (weight%)	0.0008%	0.0050%	0.0011%
Uncertainty in the Mean (weight%)	0.0002%	0.0017%	0.0002%
Mean Error (%)	-0.95%	-0.14%	-0.78%
Standard Deviation (%)	0.29%	1.80%	0.41%
Uncertainty in the Mean (%)	0.08%	0.60%	0.06%
Number of Data Points	12	9	40
Number of Outliers	0	0	0

Difference from Last Quarter in:

Mean Error (weight%)	0.0005%	-0.0030%	0.0003%
Standard Deviation (weight%)	-0.0004%	0.0013%	0.0003%
Uncertainty in the Mean (weight%)	-0.0002%	0.0005%	0.0000%
Mean Error (%)	0.16%	-1.10%	0.10%
Standard Deviation (%)	-0.13%	0.44%	0.10%
Uncertainty in the Mean (%)	-0.05%	0.17%	0.00%
Number of Data Points	1	-1	16
Number of Outliers	0	0	0

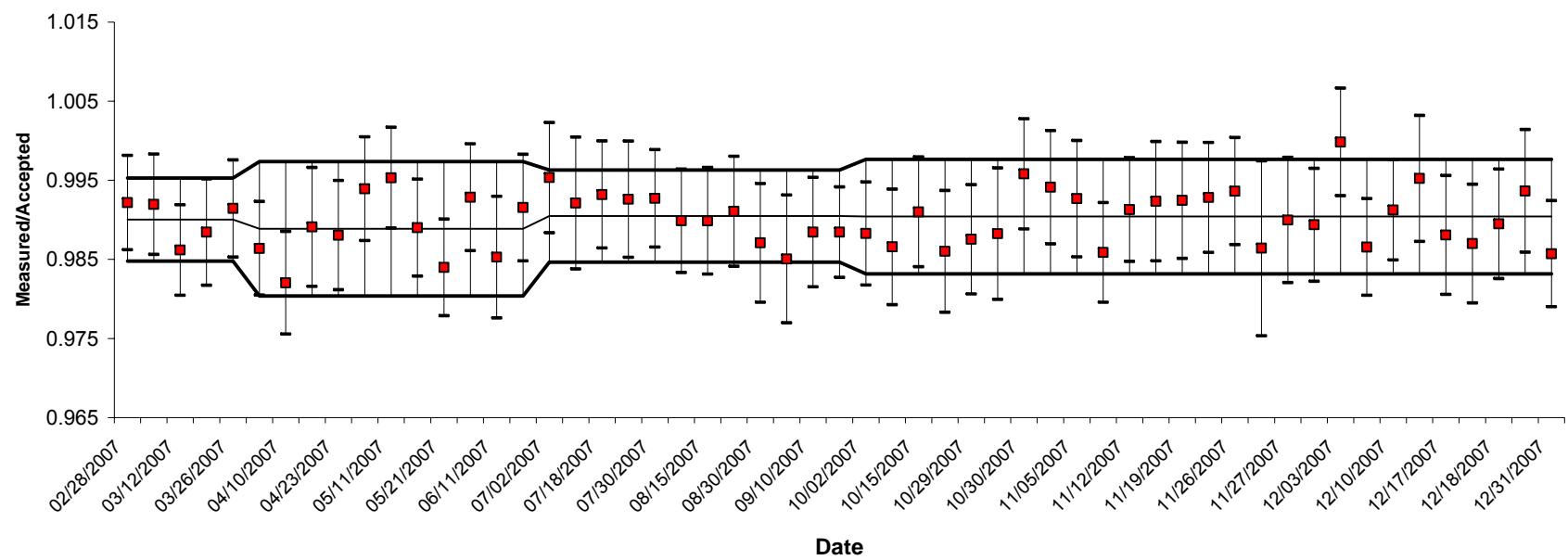
RESULTS OF ANALYSIS OF AM241 - CALEX I
4th QUARTER 2007

	HAN	LANL	LLNL
Mean Error (weight%)	-0.0027%	-0.0046%	-0.0020%
Standard Deviation (weight%)	0.0010%	0.0011%	0.0008%
Uncertainty in the Mean (weight%)	0.0002%	0.0004%	0.0002%
Mean Error (%)	-0.96%	-1.66%	-0.74%
Standard Deviation (%)	0.36%	0.39%	0.29%
Uncertainty in the Mean (%)	0.07%	0.16%	0.07%
Number of Data Points	27	6	17
Number of Outliers	0	0	2

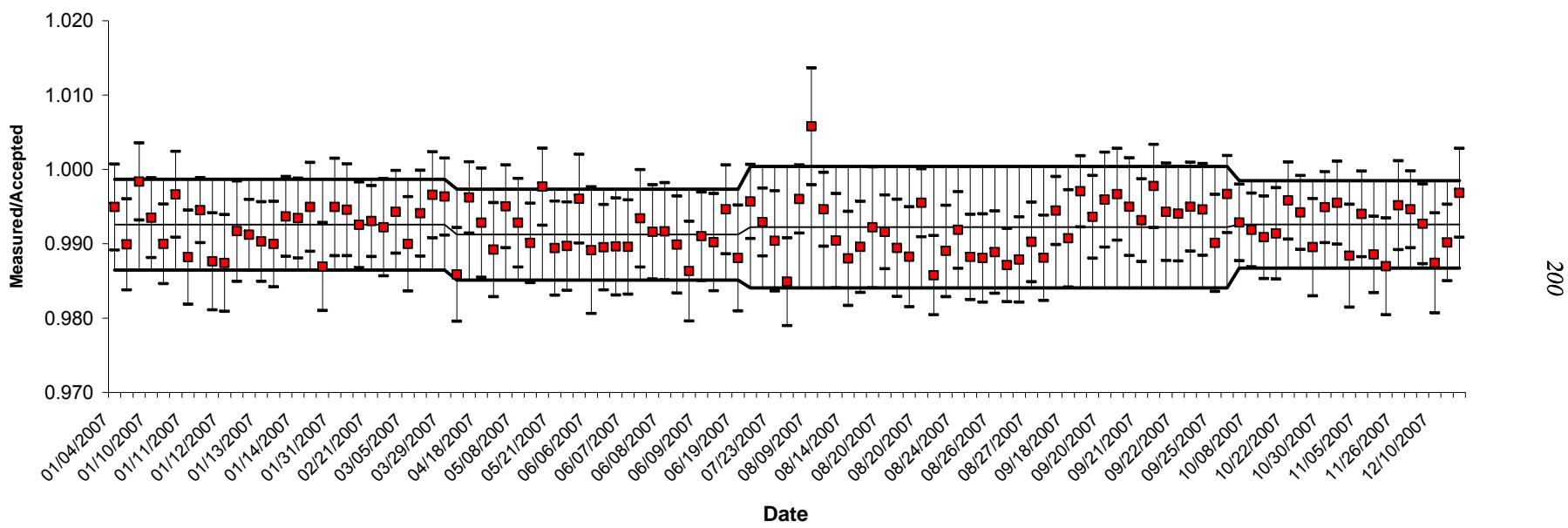
Difference from Last Quarter in:

Mean Error (weight%)	-0.0001%	-0.0042%	0.0001%
Standard Deviation (weight%)	0.0002%	-0.0039%	-0.0003%
Uncertainty in the Mean (weight%)	0.0000%	-0.0013%	0.0000%
Mean Error (%)	-0.01%	-1.52%	0.04%
Standard Deviation (%)	0.07%	-1.41%	-0.12%
Uncertainty in the Mean (%)	-0.01%	-0.44%	0.01%
Number of Data Points	15	-3	-23
Number of Outliers	0	0	2

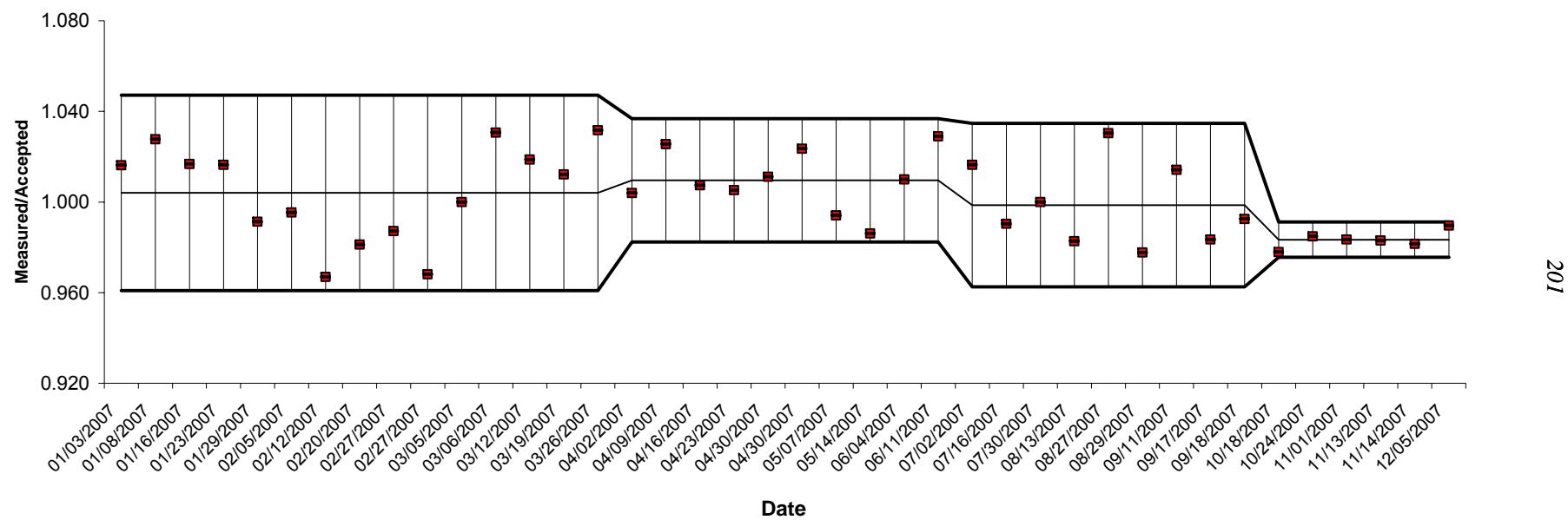
HAN
241-Am
1st Quarter 2007 - 4th Quarter 2007
CALEX I



LLNL
241-Am
1st Quarter 2007 - 4th Quarter 2007
CALEX I



LANL
241-Am
1st Quarter 2007 - 4th Quarter 2007
CALEX I



201

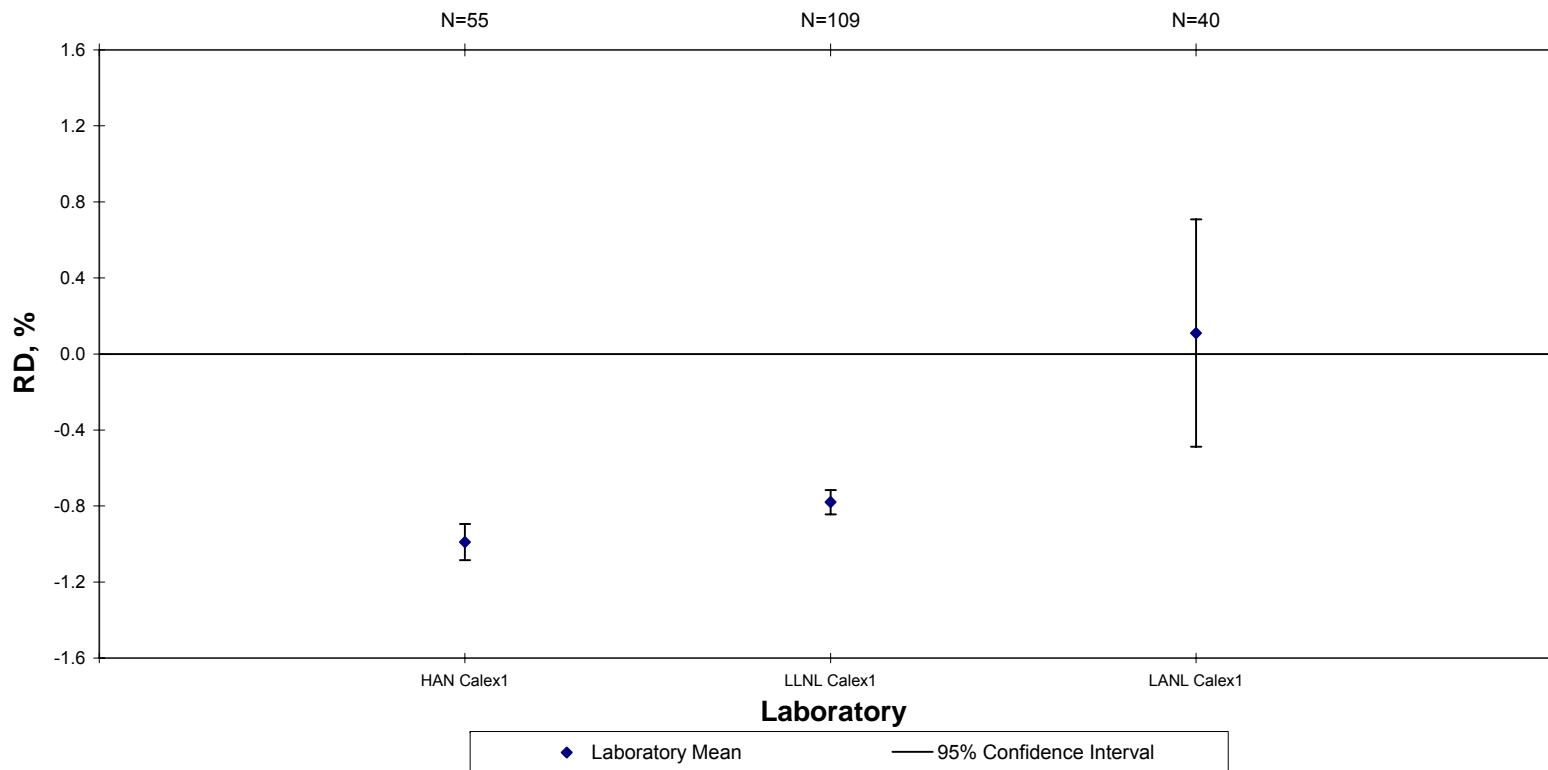
**RESULTS OF ANALYSIS OF AM241 - CALEX I
2007**

	HAN	LANL	LLNL
Mean Error (weight%)	-0.0027%	0.0003%	-0.0022%
Standard Deviation (weight%)	0.0010%	0.0051%	0.0009%
Uncertainty in the Mean (weight%)	0.0001%	0.0008%	0.0001%
Mean Error (%)	-0.99%	0.11%	-0.78%
Standard Deviation (%)	0.35%	1.87%	0.34%
Uncertainty in the Mean (%)	0.05%	0.30%	0.03%
Number of Data Points	55	40	109
Number of Outliers	0	0	2

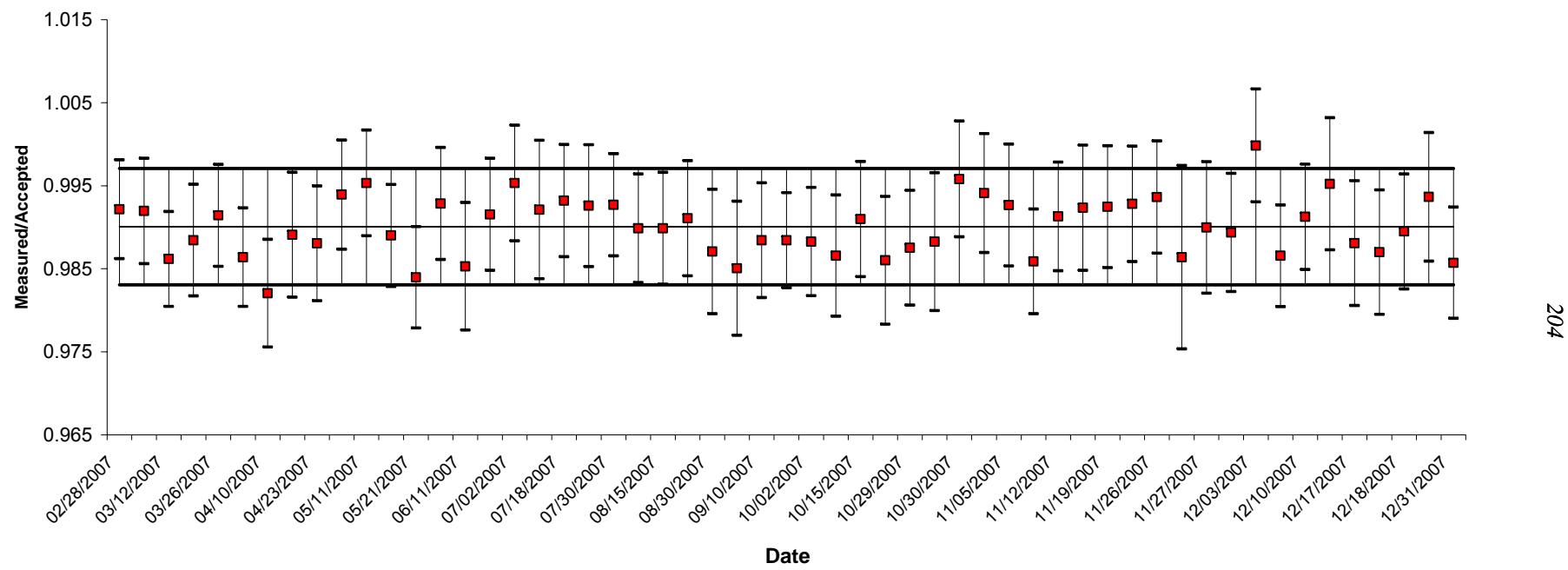
Difference from Last Year in:

Mean Error (weight%)	0.0005%	****	-0.0003%
Standard Deviation (weight%)	0.0000%	****	-0.0002%
Uncertainty in the Mean (weight%)	-0.0001%	****	0.0000%
Mean Error (%)	0.19%	****	-0.09%
Standard Deviation (%)	-0.01%	****	-0.05%
Uncertainty in the Mean (%)	-0.04%	****	-0.02%
Number of Data Points	39	40	54
Number of Outliers	-1	0	-5

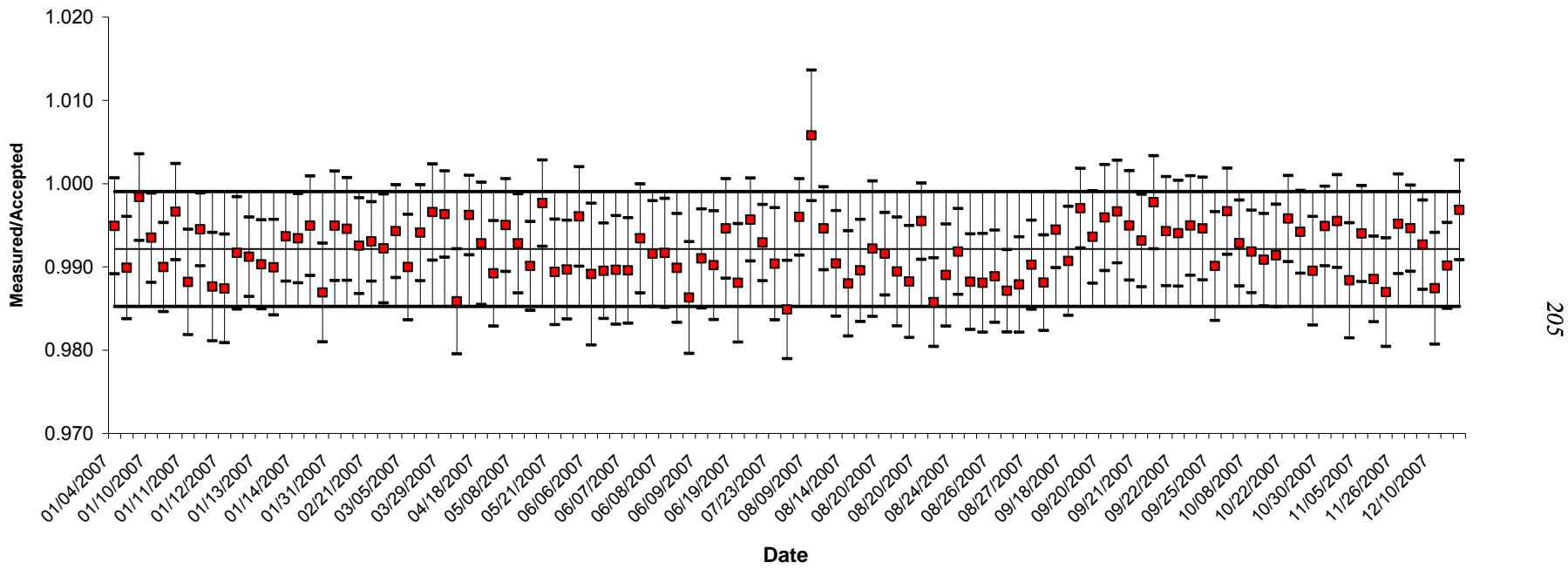
New Brunswick Laboratory Calorimetry Exchange Program
Percent ^{241}Am , 2007 - CALEX I



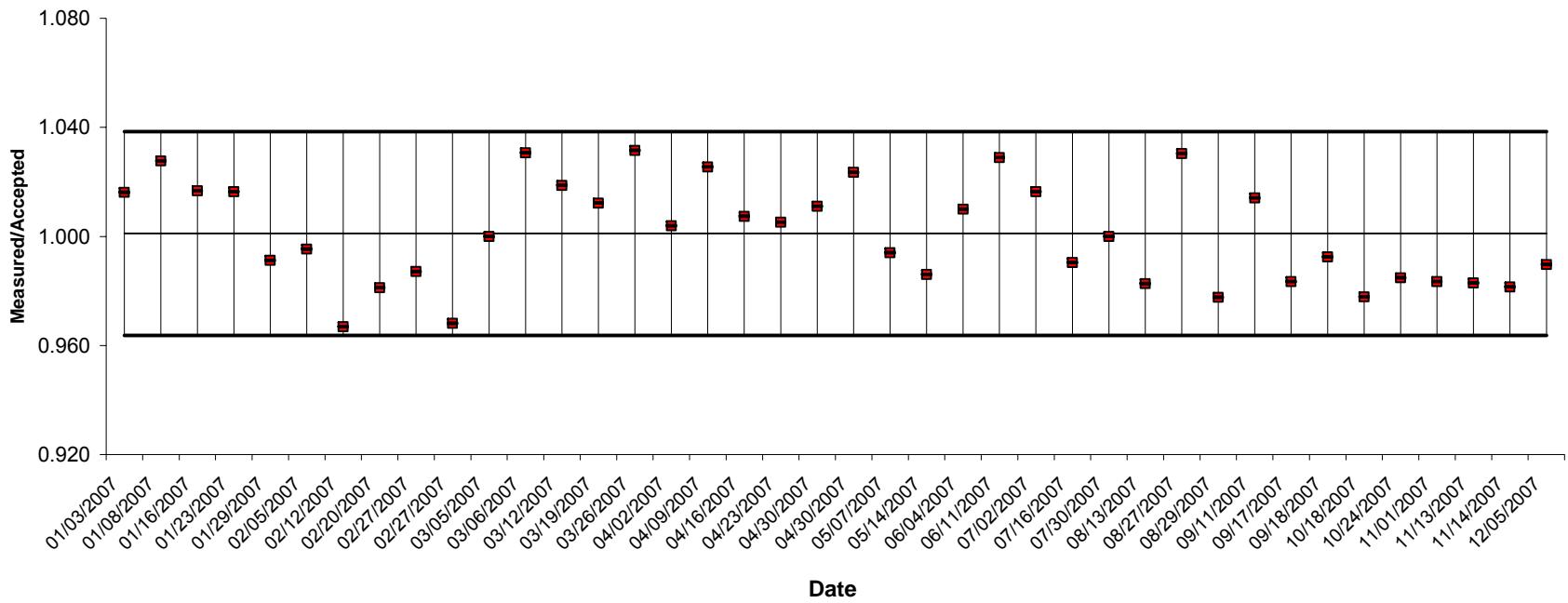
HAN
241-Am
2007, CALEX I



LLNL
241-Am
2007, CALEX I



LANL
241-Am
2007, CALEX I



206

WEIGHT PERCENT Am241 DATA

Calendar Year 2007

HAN: Calex I

#	Date Measured	Instr. ID	Measured Am241	Uncert. 1 STD	Accepted Weight%	Ratio M/A	Weight% Error	Percent Error
1	02/28/2007	2740	0.2715%	0.30%	0.2736%	0.9922	-0.0021%	-0.78%
2	03/05/2007	2740	0.2715%	0.32%	0.2737%	0.9920	-0.0022%	-0.80%
3	03/12/2007	2740	0.2700%	0.29%	0.2738%	0.9862	-0.0038%	-1.38%
4	03/19/2007	2740	0.2707%	0.34%	0.2739%	0.9884	-0.0032%	-1.16%
5	03/26/2007	2740	0.2716%	0.31%	0.2739%	0.9914	-0.0023%	-0.86%
6	04/02/2007	2740	0.2703%	0.30%	0.2740%	0.9864	-0.0037%	-1.36%
7	04/10/2007	2740	0.2692%	0.33%	0.2741%	0.9820	-0.0049%	-1.80%
8	04/16/2007	2740	0.2712%	0.38%	0.2742%	0.9891	-0.0030%	-1.09%
9	04/23/2007	2740	0.2710%	0.35%	0.2743%	0.9881	-0.0033%	-1.19%
10	05/01/2007	2740	0.2727%	0.33%	0.2744%	0.9939	-0.0017%	-0.61%
11	05/11/2007	2740	0.2732%	0.32%	0.2745%	0.9953	-0.0013%	-0.47%
12	05/14/2007	2740	0.2715%	0.31%	0.2745%	0.9890	-0.0030%	-1.10%
13	05/21/2007	2740	0.2702%	0.31%	0.2746%	0.9840	-0.0044%	-1.60%
14	06/04/2007	2740	0.2728%	0.34%	0.2748%	0.9929	-0.0020%	-0.71%
15	06/11/2007	2740	0.2708%	0.39%	0.2748%	0.9853	-0.0040%	-1.47%
16	06/18/2007	2740	0.2726%	0.34%	0.2749%	0.9915	-0.0023%	-0.85%
17	07/02/2007	2740	0.2738%	0.35%	0.2751%	0.9953	-0.0013%	-0.47%
18	07/09/2007	2740	0.2730%	0.42%	0.2752%	0.9921	-0.0022%	-0.79%
19	07/18/2007	2740	0.2734%	0.34%	0.2753%	0.9932	-0.0019%	-0.68%
20	07/24/2007	2740	0.2733%	0.37%	0.2753%	0.9926	-0.0020%	-0.74%
21	07/30/2007	2740	0.2734%	0.31%	0.2754%	0.9927	-0.0020%	-0.73%
22	08/06/2007	2740	0.2727%	0.33%	0.2755%	0.9899	-0.0028%	-1.01%
23	08/15/2007	2740	0.2728%	0.34%	0.2756%	0.9899	-0.0028%	-1.01%
24	08/21/2007	2740	0.2732%	0.35%	0.2757%	0.9911	-0.0025%	-0.89%
25	08/30/2007	2740	0.2722%	0.38%	0.2758%	0.9871	-0.0036%	-1.29%
26	09/04/2007	2740	0.2717%	0.41%	0.2758%	0.9851	-0.0041%	-1.49%
27	09/10/2007	2740	0.2727%	0.35%	0.2759%	0.9884	-0.0032%	-1.16%
28	09/19/2007	2740	0.2728%	0.29%	0.2760%	0.9884	-0.0032%	-1.16%
29	10/02/2007	2740	0.2729%	0.33%	0.2761%	0.9883	-0.0032%	-1.17%
30	10/08/2007	2740	0.2725%	0.37%	0.2762%	0.9866	-0.0037%	-1.34%
31	10/15/2007	2740	0.2738%	0.35%	0.2763%	0.9910	-0.0025%	-0.90%
32	10/22/2007	2740	0.2725%	0.39%	0.2764%	0.9860	-0.0039%	-1.40%
33	10/29/2007	2740	0.2730%	0.35%	0.2764%	0.9875	-0.0034%	-1.25%
34	10/29/2007	8302	0.2732%	0.42%	0.2764%	0.9883	-0.0032%	-1.17%
35	10/30/2007	90225	0.2753%	0.35%	0.2765%	0.9958	-0.0012%	-0.42%
36	11/05/2007	90225	0.2749%	0.36%	0.2765%	0.9941	-0.0016%	-0.59%
37	11/05/2007	8302	0.2745%	0.37%	0.2765%	0.9927	-0.0020%	-0.73%
38	11/12/2007	2740	0.2727%	0.32%	0.2766%	0.9859	-0.0039%	-1.41%
39	11/12/2007	90225	0.2742%	0.33%	0.2766%	0.9913	-0.0024%	-0.87%
40	11/13/2007	8302	0.2745%	0.38%	0.2766%	0.9923	-0.0021%	-0.77%
41	11/19/2007	90225	0.2746%	0.37%	0.2767%	0.9925	-0.0021%	-0.75%
42	11/19/2007	8302	0.2747%	0.35%	0.2767%	0.9928	-0.0020%	-0.72%
43	11/26/2007	90225	0.2750%	0.34%	0.2768%	0.9936	-0.0018%	-0.64%
44	11/26/2007	2740	0.2730%	0.56%	0.2768%	0.9864	-0.0038%	-1.36%
45	11/27/2007	8302	0.2740%	0.40%	0.2768%	0.9900	-0.0028%	-1.00%
46	12/03/2007	8302	0.2739%	0.36%	0.2768%	0.9894	-0.0029%	-1.06%
47	12/03/2007	90225	0.2768%	0.34%	0.2768%	0.9998	-0.0000%	-0.02%
48	12/10/2007	2740	0.2732%	0.31%	0.2769%	0.9866	-0.0037%	-1.34%
49	12/10/2007	90225	0.2745%	0.32%	0.2769%	0.9913	-0.0024%	-0.87%
50	12/10/2007	8302	0.2756%	0.40%	0.2769%	0.9952	-0.0013%	-0.48%
51	12/17/2007	90225	0.2737%	0.38%	0.2770%	0.9881	-0.0033%	-1.19%
52	12/17/2007	8302	0.2734%	0.38%	0.2770%	0.9870	-0.0036%	-1.30%
53	12/18/2007	2740	0.2741%	0.35%	0.2770%	0.9895	-0.0029%	-1.05%
54	12/31/2007	2740	0.2754%	0.39%	0.2772%	0.9937	-0.0018%	-0.63%
55	12/31/2007	90225	0.2732%	0.34%	0.2772%	0.9857	-0.0040%	-1.43%

Mean: 0.9901 -0.0027% -0.99%
 Standard Deviation: 0.0035 0.0010% 0.35%
 Standard Uncertainty: 0.0005 0.0001% 0.05%

Statistical outliers are in bold and are not included in graphs and tables.

WEIGHT PERCENT Am241 DATA

Calendar Year 2007

LLNL: Calex I

#	Date Measured	Instr. ID	Measured Am241	Uncert. 1 STD	Accepted Weight%	Ratio M/A	Weight% Error	Percent Error
1	01/04/2007	II	0.2716%	0.29%	0.2730%	0.9949	-0.0014%	-0.51%
2	01/10/2007	I	0.2703%	0.31%	0.2731%	0.9899	-0.0028%	-1.01%
3	01/10/2007	I	0.2726%	0.26%	0.2731%	0.9984	-0.0004%	-0.16%
4	01/10/2007	I	0.2713%	0.27%	0.2731%	0.9935	-0.0018%	-0.65%
5	01/11/2007	I	0.2703%	0.27%	0.2731%	0.9900	-0.0027%	-1.00%
6	01/11/2007	I	0.2722%	0.29%	0.2731%	0.9966	-0.0009%	-0.34%
7	01/11/2007	III	0.2698%	0.32%	0.2731%	0.9882	-0.0032%	-1.18%
8	01/12/2007	III	0.2716%	0.22%	0.2731%	0.9945	-0.0015%	-0.55%
9	01/12/2007	III	0.2697%	0.33%	0.2731%	0.9876	-0.0034%	-1.24%
10	01/12/2007	III	0.2696%	0.33%	0.2731%	0.9874	-0.0034%	-1.26%
11	01/13/2007	III	0.2708%	0.34%	0.2731%	0.9917	-0.0023%	-0.83%
12	01/13/2007	III	0.2707%	0.24%	0.2731%	0.9912	-0.0024%	-0.88%
13	01/13/2007	III	0.2704%	0.27%	0.2731%	0.9903	-0.0026%	-0.97%
14	01/14/2007	III	0.2704%	0.29%	0.2731%	0.9900	-0.0027%	-1.00%
15	01/14/2007	III	0.2714%	0.27%	0.2731%	0.9937	-0.0017%	-0.63%
16	01/14/2007	III	0.2713%	0.27%	0.2731%	0.9934	-0.0018%	-0.66%
17	01/18/2007	I	0.2718%	0.30%	0.2732%	0.9950	-0.0014%	-0.50%
18	01/31/2007	III	0.2697%	0.30%	0.2733%	0.9869	-0.0036%	-1.31%
19	01/31/2007	II	0.2719%	0.33%	0.2733%	0.9949	-0.0014%	-0.51%
20	02/07/2007	I	0.2719%	0.31%	0.2734%	0.9946	-0.0015%	-0.54%
21	02/14/2007	II	0.2714%	0.29%	0.2735%	0.9926	-0.0020%	-0.74%
22	02/21/2007	I	0.2717%	0.24%	0.2736%	0.9931	-0.0019%	-0.69%
23	02/27/2007	III	0.2715%	0.33%	0.2736%	0.9922	-0.0021%	-0.78%
24	03/05/2007	I	0.2721%	0.28%	0.2737%	0.9943	-0.0016%	-0.57%
25	03/05/2007	III	0.2710%	0.32%	0.2737%	0.9900	-0.0027%	-1.00%
26	03/12/2007	II	0.2722%	0.29%	0.2738%	0.9941	-0.0016%	-0.59%
27	03/20/2007	I	0.2729%	0.29%	0.2739%	0.9966	-0.0009%	-0.34%
28	03/29/2007	I	0.2730%	0.26%	0.2740%	0.9963	-0.0010%	-0.37%
29	04/03/2007	III	0.2702%	0.32%	0.2740%	0.9859	-0.0039%	-1.41%
30	04/05/2007	I	0.2730%	0.24%	0.2741%	0.9962	-0.0010%	-0.38%
31	04/18/2007	I	0.2722%	0.37%	0.2742%	0.9928	-0.0020%	-0.72%
32	04/19/2007	III	0.2713%	0.32%	0.2742%	0.9892	-0.0030%	-1.08%
33	04/30/2007	I	0.2730%	0.28%	0.2744%	0.9950	-0.0014%	-0.50%
34	05/08/2007	III	0.2725%	0.30%	0.2744%	0.9928	-0.0020%	-0.72%
35	05/17/2007	III	0.2718%	0.27%	0.2746%	0.9901	-0.0027%	-0.99%
36	05/21/2007	I	0.2740%	0.26%	0.2746%	0.9977	-0.0006%	-0.23%
37	05/21/2007	III	0.2717%	0.32%	0.2746%	0.9894	-0.0029%	-1.06%
38	05/24/2007	III	0.2718%	0.30%	0.2746%	0.9897	-0.0028%	-1.03%
39	05/29/2007	II	0.2736%	0.30%	0.2747%	0.9961	-0.0011%	-0.39%
40	06/06/2007	III	0.2718%	0.43%	0.2748%	0.9891	-0.0030%	-1.09%
41	06/07/2007	III	0.2719%	0.29%	0.2748%	0.9895	-0.0029%	-1.05%
42	06/07/2007	III	0.2720%	0.33%	0.2748%	0.9896	-0.0028%	-1.04%
43	06/07/2007	III	0.2719%	0.32%	0.2748%	0.9896	-0.0029%	-1.04%
44	06/07/2007	III	0.2730%	0.33%	0.2748%	0.9934	-0.0018%	-0.66%
45	06/08/2007	III	0.2725%	0.32%	0.2748%	0.9916	-0.0023%	-0.84%
46	06/08/2007	III	0.2725%	0.33%	0.2748%	0.9917	-0.0023%	-0.83%
47	06/09/2007	III	0.2720%	0.33%	0.2748%	0.9899	-0.0028%	-1.01%
48	06/09/2007	III	0.2711%	0.34%	0.2748%	0.9863	-0.0038%	-1.37%
49	06/09/2007	III	0.2724%	0.30%	0.2748%	0.9910	-0.0025%	-0.90%
50	06/10/2007	III	0.2721%	0.33%	0.2748%	0.9902	-0.0027%	-0.98%
51	06/14/2007	I	0.2734%	0.30%	0.2749%	0.9946	-0.0015%	-0.54%
52	06/19/2007	III	0.2717%	0.36%	0.2749%	0.9881	-0.0033%	-1.19%
53	07/02/2007	I	0.2739%	0.25%	0.2751%	0.9957	-0.0012%	-0.43%
54	07/17/2007	I	0.2733%	0.23%	0.2753%	0.9929	-0.0019%	-0.71%
55	07/23/2007	III	0.2727%	0.34%	0.2753%	0.9904	-0.0026%	-0.96%
56	08/02/2007	III	0.2713%	0.30%	0.2754%	0.9849	-0.0042%	-1.51%
57	08/06/2007	I	0.2744%	0.23%	0.2755%	0.9960	-0.0011%	-0.40%
58	08/09/2007	II	0.2771%	0.39%	0.2755%	1.0058	0.0016%	0.58%
59	08/13/2007	I	0.2741%	0.25%	0.2756%	0.9946	-0.0015%	-0.54%
60	08/14/2007	III	0.2729%	0.32%	0.2756%	0.9904	-0.0026%	-0.96%
61	08/14/2007	III	0.2723%	0.32%	0.2756%	0.9880	-0.0033%	-1.20%
62	08/14/2007	III	0.2727%	0.31%	0.2756%	0.9896	-0.0029%	-1.04%

WEIGHT PERCENT Am241 DATA

Calendar Year 2007

LLNL: Calex I

#	Date Measured	Instr. ID	Measured Am241	Uncert. 1 STD	Accepted Weight%	Ratio M/A	Weight% Error	Percent Error
63	08/15/2007	III	0.2734%	0.41%	0.2756%	0.9922	-0.0022%	-0.78%
64	08/20/2007	III	0.2733%	0.25%	0.2756%	0.9916	-0.0023%	-0.84%
65	08/20/2007	III	0.2727%	0.33%	0.2756%	0.9894	-0.0029%	-1.06%
66	08/20/2007	III	0.2724%	0.34%	0.2756%	0.9882	-0.0032%	-1.18%
67	08/20/2007	I	0.2744%	0.23%	0.2756%	0.9955	-0.0012%	-0.45%
68	08/23/2007	III	0.2718%	0.27%	0.2757%	0.9858	-0.0039%	-1.42%
69	08/24/2007	III	0.2727%	0.31%	0.2757%	0.9890	-0.0030%	-1.10%
70	08/24/2007	III	0.2734%	0.26%	0.2757%	0.9919	-0.0022%	-0.81%
71	08/25/2007	III	0.2725%	0.29%	0.2757%	0.9882	-0.0032%	-1.18%
72	08/25/2007	III	0.2724%	0.30%	0.2757%	0.9881	-0.0033%	-1.19%
73	08/26/2007	III	0.2726%	0.28%	0.2757%	0.9889	-0.0031%	-1.11%
74	08/26/2007	III	0.2722%	0.25%	0.2757%	0.9871	-0.0035%	-1.29%
75	08/27/2007	III	0.2724%	0.29%	0.2757%	0.9879	-0.0033%	-1.21%
76	08/27/2007	III	0.2730%	0.27%	0.2757%	0.9902	-0.0027%	-0.98%
77	08/28/2007	III	0.2725%	0.29%	0.2757%	0.9881	-0.0033%	-1.19%
78	09/06/2007	I	0.2743%	0.23%	0.2758%	0.9945	-0.0015%	-0.55%
79	09/18/2007	III	0.2734%	0.33%	0.2760%	0.9907	-0.0026%	-0.93%
80	09/20/2007	I	0.2752%	0.24%	0.2760%	0.9971	-0.0008%	-0.29%
81	09/20/2007	II	0.2742%	0.28%	0.2760%	0.9936	-0.0018%	-0.64%
82	09/20/2007	II	0.2749%	0.32%	0.2760%	0.9959	-0.0011%	-0.41%
83	09/20/2007	II	0.2751%	0.31%	0.2760%	0.9967	-0.0009%	-0.33%
84	09/21/2007	II	0.2746%	0.33%	0.2760%	0.9950	-0.0014%	-0.50%
85	09/21/2007	II	0.2741%	0.28%	0.2760%	0.9932	-0.0019%	-0.68%
86	09/21/2007	II	0.2754%	0.28%	0.2760%	0.9978	-0.0006%	-0.22%
87	09/21/2007	II	0.2744%	0.33%	0.2760%	0.9943	-0.0016%	-0.57%
88	09/22/2007	II	0.2744%	0.32%	0.2760%	0.9940	-0.0016%	-0.60%
89	09/22/2007	II	0.2746%	0.30%	0.2760%	0.9950	-0.0014%	-0.50%
90	09/22/2007	II	0.2745%	0.31%	0.2760%	0.9946	-0.0015%	-0.54%
91	09/25/2007	III	0.2733%	0.33%	0.2761%	0.9901	-0.0027%	-0.99%
92	09/27/2007	I	0.2752%	0.26%	0.2761%	0.9967	-0.0009%	-0.33%
93	10/02/2007	I	0.2742%	0.26%	0.2761%	0.9929	-0.0020%	-0.71%
94	10/08/2007	II	0.2740%	0.25%	0.2762%	0.9919	-0.0022%	-0.81%
95	10/10/2007	I	0.2737%	0.28%	0.2762%	0.9909	-0.0025%	-0.91%
96	10/16/2007	III	0.2739%	0.31%	0.2763%	0.9914	-0.0024%	-0.86%
97	10/22/2007	II	0.2752%	0.26%	0.2764%	0.9958	-0.0012%	-0.42%
98	10/23/2007	I	0.2748%	0.25%	0.2764%	0.9942	-0.0016%	-0.58%
99	10/25/2007	III	0.2735%	0.33%	0.2764%	0.9895	-0.0029%	-1.05%
100	10/30/2007	I	0.2750%	0.24%	0.2765%	0.9949	-0.0014%	-0.51%
101	10/31/2007	II	0.2752%	0.28%	0.2765%	0.9955	-0.0012%	-0.45%
102	10/31/2007	III	0.2733%	0.35%	0.2765%	0.9884	-0.0032%	-1.16%
103	11/05/2007	I	0.2749%	0.29%	0.2765%	0.9940	-0.0017%	-0.60%
104	11/12/2007	II	0.2734%	0.26%	0.2766%	0.9886	-0.0032%	-1.14%
105	11/20/2007	II	0.2731%	0.33%	0.2767%	0.9870	-0.0036%	-1.30%
106	11/26/2007	I	0.2754%	0.30%	0.2768%	0.9952	-0.0013%	-0.48%
107	12/04/2007	II	0.2754%	0.26%	0.2769%	0.9946	-0.0015%	-0.54%
108	12/06/2007	I	0.2748%	0.27%	0.2769%	0.9927	-0.0020%	-0.73%
109	12/10/2007	III	0.2734%	0.34%	0.2769%	0.9874	-0.0035%	-1.26%
110	12/19/2007	I	0.2743%	0.26%	0.2770%	0.9902	-0.0027%	-0.98%
111	12/27/2007	I	0.2762%	0.30%	0.2771%	0.9968	-0.0009%	-0.32%
Mean:						0.9922	-0.0022%	-0.78%
Standard Deviation:						0.0034	0.0009%	0.34%
Standard Uncertainty:						0.0003	0.0001%	0.03%

Statistical outliers are in bold and are not included in graphs and tables.

WEIGHT PERCENT Am241 DATA

Calendar Year 2007

LANL: Calex I

#	Date Measured	Instr. ID	Measured Am241	Uncert. 1 STD	Accepted Weight%	Ratio M/A	Weight% Error	Percent Error
1	01/03/2007	F5	0.2774%	0.00%	0.2730%	1.0162	0.0044%	1.62%
2	01/08/2007	F9	0.2806%	0.00%	0.2730%	1.0277	0.0076%	2.77%
3	01/16/2007	F5	0.2777%	0.00%	0.2731%	1.0167	0.0046%	1.67%
4	01/23/2007	F9	0.2777%	0.00%	0.2732%	1.0164	0.0045%	1.64%
5	01/29/2007	F5	0.2709%	0.00%	0.2733%	0.9913	-0.0024%	-0.87%
6	02/05/2007	F9	0.2721%	0.00%	0.2734%	0.9953	-0.0013%	-0.47%
7	02/12/2007	F5	0.2644%	0.00%	0.2735%	0.9669	-0.0091%	-3.31%
8	02/20/2007	F9	0.2684%	0.00%	0.2735%	0.9812	-0.0051%	-1.88%
9	02/27/2007	F5	0.2701%	0.00%	0.2736%	0.9871	-0.0035%	-1.29%
10	02/27/2007	F5	0.2649%	0.00%	0.2736%	0.9681	-0.0087%	-3.19%
11	03/05/2007	F5	0.2737%	0.00%	0.2737%	1.0000	-0.0000%	-0.00%
12	03/06/2007	F9	0.2821%	0.00%	0.2737%	1.0306	0.0084%	3.06%
13	03/12/2007	F9	0.2789%	0.00%	0.2738%	1.0187	0.0051%	1.87%
14	03/19/2007	F5	0.2772%	0.00%	0.2739%	1.0122	0.0033%	1.22%
15	03/26/2007	F9	0.2826%	0.00%	0.2739%	1.0316	0.0087%	3.16%
16	04/02/2007	F5	0.2751%	0.00%	0.2740%	1.0039	0.0011%	0.39%
17	04/09/2007	F9	0.2811%	0.00%	0.2741%	1.0255	0.0070%	2.55%
18	04/16/2007	F5	0.2762%	0.00%	0.2742%	1.0073	0.0020%	0.73%
19	04/23/2007	F9	0.2757%	0.00%	0.2743%	1.0052	0.0014%	0.52%
20	04/30/2007	F5	0.2774%	0.00%	0.2744%	1.0111	0.0030%	1.11%
21	04/30/2007	F9	0.2808%	0.00%	0.2744%	1.0235	0.0064%	2.35%
22	05/07/2007	F9	0.2728%	0.00%	0.2744%	0.9940	-0.0016%	-0.60%
23	05/14/2007	F5	0.2707%	0.00%	0.2745%	0.9861	-0.0038%	-1.39%
24	06/04/2007	F9	0.2775%	0.00%	0.2748%	1.0100	0.0027%	1.00%
25	06/11/2007	F5	0.2828%	0.00%	0.2748%	1.0290	0.0080%	2.90%
26	07/02/2007	F5	0.2796%	0.00%	0.2751%	1.0164	0.0045%	1.64%
27	07/16/2007	F5	0.2726%	0.00%	0.2752%	0.9904	-0.0026%	-0.96%
28	07/30/2007	F5	0.2754%	0.00%	0.2754%	1.0000	-0.0000%	-0.00%
29	08/13/2007	F5	0.2708%	0.00%	0.2756%	0.9827	-0.0048%	-1.73%
30	08/27/2007	F5	0.2841%	0.00%	0.2757%	1.0304	0.0084%	3.04%
31	08/29/2007	F9	0.2696%	0.00%	0.2758%	0.9777	-0.0062%	-2.23%
32	09/11/2007	F5	0.2798%	0.00%	0.2759%	1.0141	0.0039%	1.41%
33	09/17/2007	F9	0.2714%	0.00%	0.2760%	0.9834	-0.0046%	-1.66%
34	09/18/2007	F9	0.2739%	0.00%	0.2760%	0.9925	-0.0021%	-0.75%
35	10/18/2007	F9	0.2702%	0.00%	0.2763%	0.9778	-0.0061%	-2.22%
36	10/24/2007	F9	0.2722%	0.00%	0.2764%	0.9848	-0.0042%	-1.52%
37	11/01/2007	F9	0.2719%	0.00%	0.2765%	0.9834	-0.0046%	-1.66%
38	11/13/2007	F9	0.2719%	0.00%	0.2766%	0.9829	-0.0047%	-1.71%
39	11/14/2007	F9	0.2715%	0.00%	0.2766%	0.9815	-0.0051%	-1.85%
40	12/05/2007	F9	0.2740%	0.00%	0.2769%	0.9896	-0.0029%	-1.04%
Mean:						1.0011	0.0003%	0.11%
Standard Deviation:						0.0187	0.0051%	1.87%
Standard Uncertainty:						0.0030	0.0008%	0.30%

Statistical outliers are in bold and are not included in graphs and tables.

RESULTS OF ANALYSIS OF AM241 - CALEX II
1st QUARTER 2007

	LLNL
Mean Error (weight%)	-0.0139%
Standard Deviation (weight%)	0.0033%
Uncertainty in the Mean (weight%)	0.0019%
Mean Error (%)	-1.55%
Standard Deviation (%)	0.37%
Uncertainty in the Mean (%)	0.21%
Number of Data Points	3
Number of Outliers	0

Difference from Last Quarter in:

Mean Error (weight%)	****
Standard Deviation (weight%)	****
Uncertainty in the Mean (weight%)	****
Mean Error (%)	****
Standard Deviation (%)	****
Uncertainty in the Mean (%)	****
Number of Data Points	3
Number of Outliers	0

RESULTS OF ANALYSIS OF AM241 - CALEX II
2nd QUARTER 2007

	LLNL
Mean Error (weight%)	-0.0126%
Standard Deviation (weight%)	0.0032%
Uncertainty in the Mean (weight%)	0.0014%
Mean Error (%)	-1.40%
Standard Deviation (%)	0.35%
Uncertainty in the Mean (%)	0.16%
Number of Data Points	5
Number of Outliers	0

Difference from Last Quarter in:

Mean Error (weight%)	0.0013%
Standard Deviation (weight%)	-0.0001%
Uncertainty in the Mean (weight%)	-0.0005%
Mean Error (%)	0.15%
Standard Deviation (%)	-0.02%
Uncertainty in the Mean (%)	-0.05%
Number of Data Points	2
Number of Outliers	0

RESULTS OF ANALYSIS OF AM241 - CALEX II
3rd QUARTER 2007

	LLNL
Mean Error (weight%)	-0.0147%
Standard Deviation (weight%)	0.0035%
Uncertainty in the Mean (weight%)	0.0016%
Mean Error (%)	-1.62%
Standard Deviation (%)	0.38%
Uncertainty in the Mean (%)	0.17%
Number of Data Points	5
Number of Outliers	0

Difference from Last Quarter in:

Mean Error (weight%)	-0.0021%
Standard Deviation (weight%)	0.0003%
Uncertainty in the Mean (weight%)	0.0002%
Mean Error (%)	-0.22%
Standard Deviation (%)	0.03%
Uncertainty in the Mean (%)	0.01%
Number of Data Points	0
Number of Outliers	0

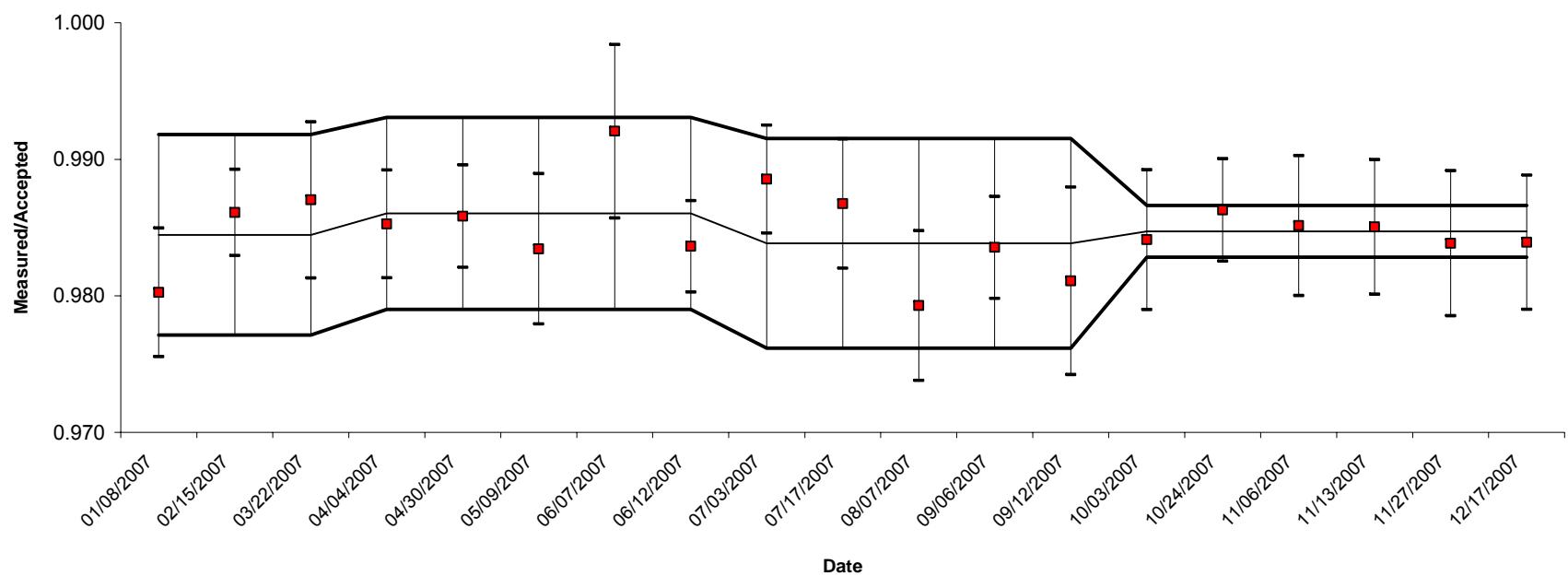
RESULTS OF ANALYSIS OF AM241 - CALEX II
4th QUARTER 2007

	LLNL
Mean Error (weight%)	-0.0140%
Standard Deviation (weight%)	0.0009%
Uncertainty in the Mean (weight%)	0.0004%
Mean Error (%)	-1.53%
Standard Deviation (%)	0.09%
Uncertainty in the Mean (%)	0.04%
Number of Data Points	6
Number of Outliers	0

Difference from Last Quarter in:

Mean Error (weight%)	0.0007%
Standard Deviation (weight%)	-0.0026%
Uncertainty in the Mean (weight%)	-0.0012%
Mean Error (%)	0.09%
Standard Deviation (%)	-0.29%
Uncertainty in the Mean (%)	-0.13%
Number of Data Points	1
Number of Outliers	0

LLNL
241-Am
1st Quarter 2007 - 4th Quarter 2007
CALEX II



RESULTS OF ANALYSIS OF AM241 - CALEX II 2007

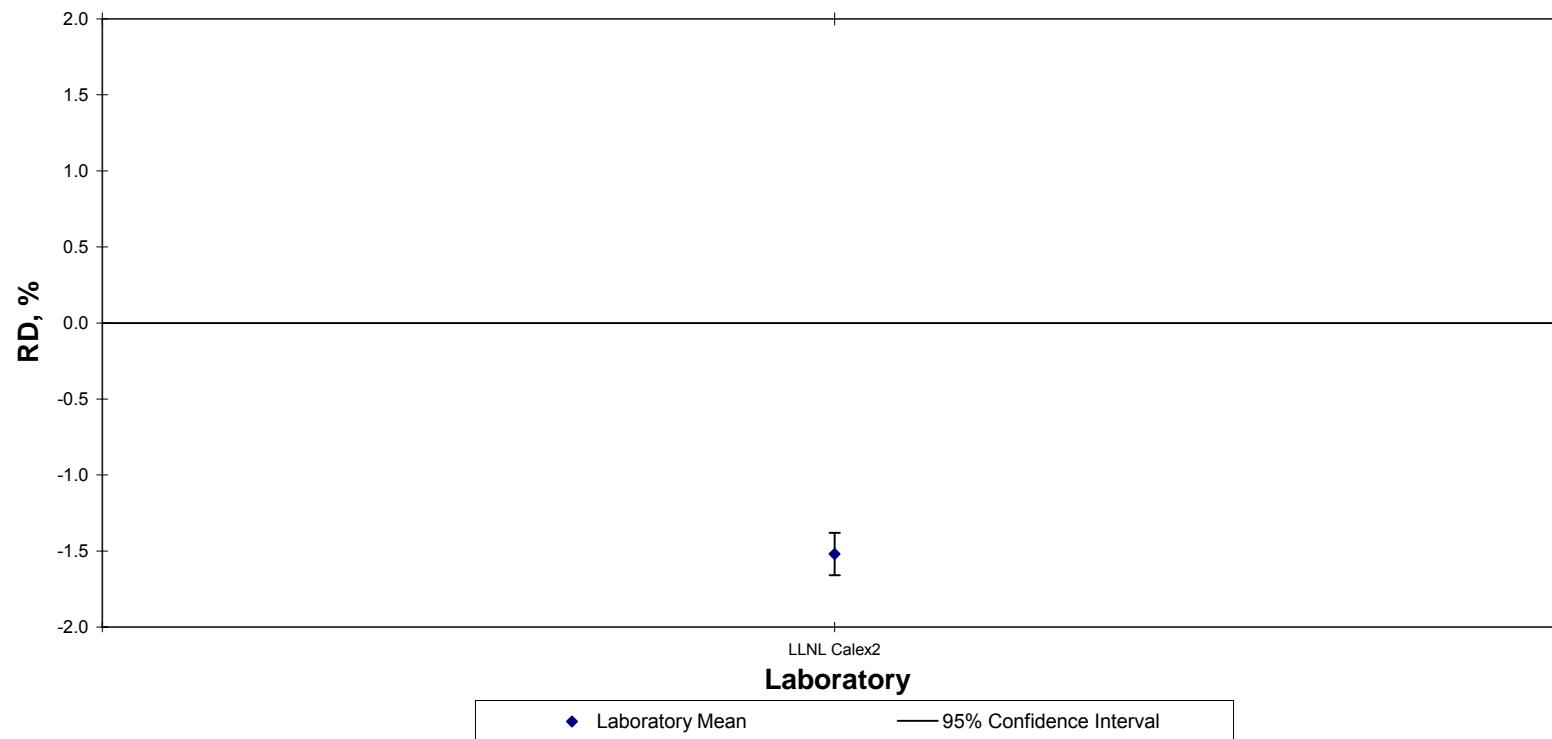
	LLNL
Mean Error (weight%)	-0.0138%
Standard Deviation (weight%)	0.0026%
Uncertainty in the Mean (weight%)	0.0006%
Mean Error (%)	-1.52%
Standard Deviation (%)	0.29%
Uncertainty in the Mean (%)	0.07%
Number of Data Points	19
Number of Outliers	0

Difference from Last Year in:

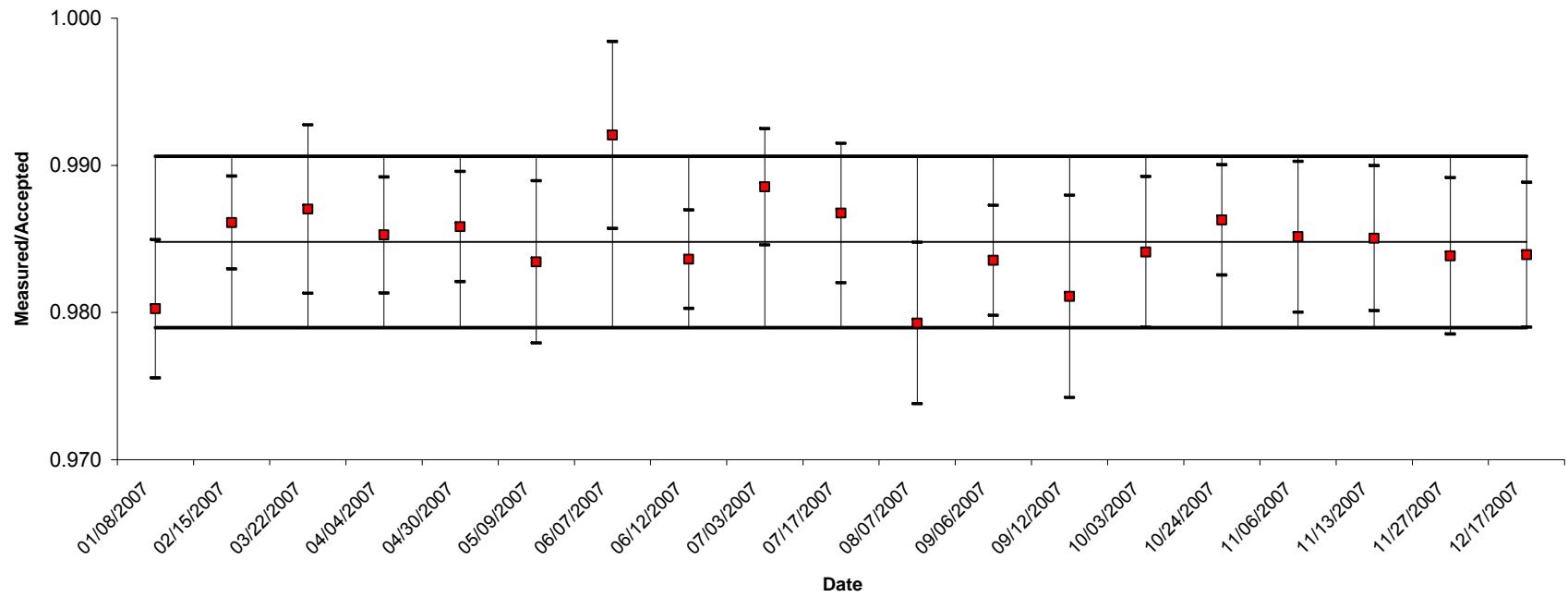
Mean Error (weight%)	-0.0001%
Standard Deviation (weight%)	0.0000%
Uncertainty in the Mean (weight%)	-0.0007%
Mean Error (%)	0.06%
Standard Deviation (%)	-0.01%
Uncertainty in the Mean (%)	-0.08%
Number of Data Points	15
Number of Outliers	0

New Brunswick Laboratory Calorimetry Exchange Program
Percent ^{241}Am , 2007 - CALEX II

N=19



LLNL
241-Am
2007, CALEX II



WEIGHT PERCENT Am241 DATA

Calendar Year 2007

LLNL: Calex II

#	Date Measured	Instr. ID	Measured Am241	Uncert. 1 STD	Accepted Weight%	Ratio M/A	Weight% Error	Percent Error
1	01/08/2007	III	0.8773%	0.24%	0.8950%	0.9803	-0.0177%	-1.97%
2	02/15/2007	III	0.8853%	0.16%	0.8978%	0.9861	-0.0125%	-1.39%
3	03/22/2007	III	0.8887%	0.29%	0.9004%	0.9870	-0.0117%	-1.30%
4	04/04/2007	III	0.8880%	0.20%	0.9013%	0.9853	-0.0133%	-1.47%
5	04/30/2007	III	0.8904%	0.19%	0.9032%	0.9858	-0.0128%	-1.42%
6	05/09/2007	III	0.8889%	0.28%	0.9039%	0.9834	-0.0150%	-1.66%
7	06/07/2007	II	0.8988%	0.32%	0.9060%	0.9921	-0.0072%	-0.79%
8	06/12/2007	III	0.8915%	0.17%	0.9063%	0.9836	-0.0148%	-1.64%
9	07/03/2007	III	0.8974%	0.20%	0.9078%	0.9885	-0.0104%	-1.15%
10	07/17/2007	III	0.8968%	0.24%	0.9089%	0.9868	-0.0120%	-1.32%
11	08/07/2007	III	0.8915%	0.28%	0.9104%	0.9793	-0.0189%	-2.07%
12	09/06/2007	III	0.8975%	0.19%	0.9125%	0.9835	-0.0150%	-1.65%
13	09/12/2007	III	0.8957%	0.35%	0.9129%	0.9811	-0.0173%	-1.89%
14	10/03/2007	III	0.8999%	0.26%	0.9144%	0.9841	-0.0145%	-1.59%
15	10/24/2007	II	0.9034%	0.19%	0.9159%	0.9863	-0.0126%	-1.37%
16	11/06/2007	III	0.9032%	0.26%	0.9168%	0.9851	-0.0136%	-1.49%
17	11/13/2007	III	0.9036%	0.25%	0.9173%	0.9850	-0.0137%	-1.50%
18	11/27/2007	III	0.9035%	0.27%	0.9183%	0.9838	-0.0148%	-1.62%
19	12/17/2007	III	0.9050%	0.25%	0.9197%	0.9839	-0.0148%	-1.61%
Mean:						0.9848	-0.0138%	-1.52%
Standard Deviation:						0.0029	0.0026%	0.29%
Standard Uncertainty:						0.0007	0.0006%	0.07%

Statistical outliers are in bold and are not included in graphs and tables.

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Appendix A

REPORT OF ANALYSIS

CALEX I **Working Reference Material**

In May 1979, Rocky Flats made six identical units of working reference material (WRM) standards for use in the calorimetry exchange (CALEX) program. The standards contain known masses of plutonium oxide material sealed in triple containment configuration. Prior to encapsulation the material was calcined at 900°C for fifty hours to homogenize the chemical composition.

During 1979-1982, Rocky Flats, Mound, Hanford, and New Brunswick Laboratory (NBL) analyzed Calex I plutonium oxide material by destructive methods to characterize the plutonium concentration, plutonium isotopic abundances, and ^{241}Am abundance. The characterized values for these parameters and the mass of plutonium oxide material in each unit of the standard are shown in bold type in this report.

In addition, Rocky Flats determined the concentrations of impurity elements in the material. These are given in Appendix A of this report. Destructive analyses experiments to verify the plutonium isotopic and ^{241}Am abundances were done by the Lawrence Livermore National Laboratory (LLNL) and NBL during 1987-1988. These results are also shown in Appendix A.

A. Mass of material in each unit (454.5987 ± 0.0063) gram as of 5/25/1979

The expanded uncertainty, as 95 % confidence interval, is the product of the standard error of the average mass and the coverage factor (k) of 2.571.

B. Plutonium concentration (0.8782 ± 0.0004) gram Pu . (gram material) $^{-1}$ as of 5/25/1979

The plutonium concentration of the material was determined at NBL and Mound by coulometry, a destructive method of analysis. The characterized value for the plutonium concentration is based on the NBL measurement. National Bureau of Standards (NBS) SRM 949e, a Plutonium Metal Assay Standard, was used for measurement quality control and traceability. The uncertainty, as 95 % confidence interval, is estimated to be about 0.05 % of the value – a typical value for uncertainty in NBL coulometric measurements (Type B evaluation of uncertainty). The Mound result overlaps with the NBL value, within the limit of experimental uncertainty.

C. Plutonium isotopic abundances in Calex I material as of 5/25/1979. Abundance in (gram ^iPu) . (100 gram Pu) $^{-1}$, same as wt %

	^{238}Pu	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
Abundance (wt %)	0.01002	93.7336	5.8564	0.3712	0.0290
Uncertainty (95 % C.I.)	0.00063	0.0040	0.0058	0.0027	0.0023

The plutonium isotopic abundances were determined at Rocky Flats, Mound, NBL, and Hanford using thermal ionization mass spectrometry. In addition, Rocky Flats and Mound determined ^{238}Pu abundance by alpha spectrometry, since isobaric ^{238}U nuclide interference was suspected in the TIMS analysis. The characterized value for the abundance of each isotope is the average of the measurement results calculated from the results reported by the four facilities. The expanded uncertainty, as 95 % confidence interval, is the product of standard error in the average value and the coverage factor k. For ^{238}Pu , k is 2.571; and for all other isotopes k is 3.182

D. ^{241}Am abundance $(61 \pm 36) \text{ (microgram } ^{241}\text{Am}) . (\text{gram Pu})^{-1}$ as of 5/25/1979

The ^{241}Am abundance was characterized at Rocky Flats, Mound, and Hanford using high-resolution gamma-ray spectrometry. The average of the three measurements is the characterized value for ^{241}Am concentration. The expanded uncertainty, as 95 % confidence interval, is the product of the standard error of the three measurement results and a coverage factor k of 4.303.

E. Impurity elements

Rocky Flats determined the concentrations of impurity elements in Calex I material. The total impurity elements abundance is estimated to be 4039 (microgram impurity). (gram material) $^{-1}$; it includes ^{241}Am as of 5/25/1979. See Appendix A of this report.

F. Half-lives and specific power of isotopes

The plutonium concentration, plutonium isotope abundance, and ^{241}Am abundance change with time as a result of radioactive decay. The half-life values given in the table below are used for performing radioactive decay corrections (reference: ASTM C 1458 Test Method).

The specific powers of the isotopes used for calculating the P_{eff} from the isotope abundance measurements are also given in the table below (reference: ASTM C 1458 Test Method).

Nuclide	Half-life /years	Specific Power / mW . g $^{-1}$
^{238}Pu	87.74 ± 0.04	567.57 ± 0.26
^{239}Pu	24119 ± 16	1.9288 ± 0.0003
^{240}Pu	6564 ± 11	7.0824 ± 0.002
^{241}Pu	14.348 ± 0.022	3.412 ± 0.002
^{242}Pu	376300 ± 900	0.1159 ± 0.0003
^{241}Am	433.6 ± 1.4	114.2 ± 0.42

Acknowledgements

The Calex I non-destructive assay standards were fabricated at Rocky Flats, and the destructive analyses experiments to characterize the plutonium concentration, plutonium isotopic abundances, and ^{241}Am abundance of the plutonium oxide material in the standards were done at Rocky Flats, Hanford, Mound, and NBL during 1979-1982. NBL and LLNL did additional experiments during 1987-1988 to verify the isotopic abundances characterized in 1982. A complete list of names of scientists and technicians who performed the characterization and verification experiments is not available; their contributions are acknowledged only indirectly through their institutional affiliation.

Jon W. Neuhoff

January 2008 Laboratory Director

Appendix B

Calex I Working Reference Material: Re-evaluation of plutonium concentration, plutonium isotopic abundances, and ^{241}Am abundance

Chino Srinivasan, Kattathu Mathew, Usha Narayanan, and Irene Spaletto*

Introduction

The Department of Energy (DOE) facilities perform plutonium accountability measurements using a combination of calorimetry and gamma spectrometry, both non-destructive analysis methods. The heat output (or calorimetric power) of the material is measured by a calorimeter, and the plutonium and ^{241}Am isotopic abundances by a high-resolution gamma ray-detector. The measurement results are combined to yield the plutonium content.

The New Brunswick Laboratory (NBL) calorimetry exchange (CALEX) program is set up to monitor the internal quality control practices in accountability measurements of plutonium-bearing materials. In this program, the participants analyze plutonium working reference material standards as an integral part of their routine measurements. NBL evaluates the measurement results for calorimetric power, plutonium isotopic abundances, ^{241}Am abundance for accuracy and precision; in addition, effective specific power, and plutonium mass two quantities calculated from the measurement results are also evaluated.

Two working reference material standards, Calex I and Calex II, are used in the program. Calex I was made in 1979 and Calex II in 1995. Both standards contain known quantities of plutonium oxide. The plutonium concentration, plutonium isotopic abundances, and ^{241}Am abundance of the plutonium oxide material were characterized by destructive analyses of the oxide material. But, formal “Reports of Analysis” publishing the characterized values were not issued at the time of completion of the destructive analyses experiments. This report that includes the official “Report of Analysis” and an Appendix to the official report documents the results of Calex I characterization experiments. A similar official “Report of Analysis” for Calex II was prepared and issued in April 2007.

Description of Calex I

In 1979, Rocky Flats made six units of the Calex I standard. Each unit contains a known quantity of weapons grade plutonium oxide. The material, prior to encapsulation, was calcined twice; once at 900°C for fifty hours and again at 300°C. These steps especially calcination at the higher temperature were done to promote formation of plutonium oxide material of uniform composition. The material was triply sealed, first in an innermost $\frac{1}{4}$ pint paint can, and then in two other outer cans of increasingly larger dimensions. See below for can dimensions:

- a) $\frac{1}{4}$ pint paint can of 2.5" dia. X 2" high containing PuO_2 sealed in multiple polyethylene bags.
- b) This package is wrapped in aluminum foil for cushioning and sealed in No. 2 short produce can ($\frac{7}{16}$ " dia. $3\frac{3}{8}$ " high).
- c) This assembly is wrapped in aluminum foil for cushioning and sealed in steel No. 2 $\frac{1}{2}$ ¹ produce can ($4\frac{1}{16}$ " dia. $4\frac{11}{16}$ " high).

¹ Retired NBL Employee

- d) The annular space in the triple containment is packed with light packing material, probably vermiculite, to prevent movement of the inner cans.

The mass of plutonium oxide in each unit is shown in Table 1. Mass measurements were made using a certified analytical balance with an estimated total uncertainty of 0.0005 g. The masses in the different units are very close to each other. The characterized value of the mass of plutonium oxide for all units is defined as the average of these masses. The distribution of the individual masses around the characterized value is shown in Fig.1.

Table 1. Material mass in Calex I standards as of May 25, 1979. The average and the uncertainty (95 % C.I.) in the average are given in the last row.

Unit #	Item ID	Material mass / g
1	4-41-03-9179C	454.5917
2	MO-1979-CALOR	454.5928
3	LA-1979-CALOR	454.6053
4	SR-1979-CALOR	454.6005
5	RH-1979-CALOR	454.6054
6	LL-1979-CALOR	454.5967
Average		454.5987 ± 0.0063

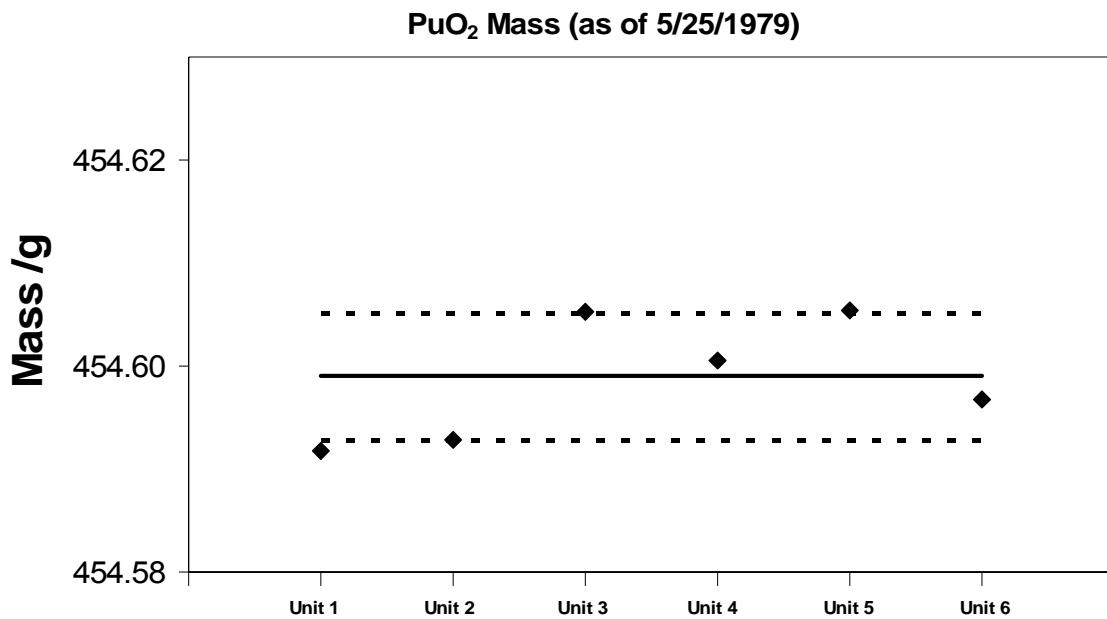


Figure 1: Distribution of the masses of individual Calex I Standard units around the characterized value. The thick line is the characterized value and the dotted lines represent uncertainty (95% C.I.) envelope.

III. Sampling and Analyses

Random samples of the material were analyzed at Rocky Flats, Mound, NBL and Hanford by destructive analyses to characterize the plutonium concentration, plutonium isotopic abundances and ^{241}Am abundance. The methods used to characterize the material and the years of completion of the analyses are shown in Table 2. In this report, the characterized values are reported to a common date, May 25, 1979, after making

corrections for radioactive decay of plutonium isotopes and ingrowth of ^{241}Am . Half-lives given in Table 3 were used in these calculations.

Table 2. Characterization analyses of Calex I material.

	Rocky Flats	Mound	NBL	Hanford
Plutonium concentration	Ceric titration; 1979	Coulometry; 1980	Coulometry; 1982	Amperometry; 1980
Plutonium isotopic abundance	TIMS; 1979	TIMS; 1980	TIMS; 1982	TIMS; 1980
^{238}Pu abundance	α -spec; 1979	α -spec; 1980		
^{241}Am abundance	γ -spec; 1979	γ -spec; 1980		γ -spec; 1980

Table 3. Plutonium isotopes and ^{241}Am half-lives².

Nuclide	Half-life /years
^{238}Pu	87.74 ± 0.04
^{239}Pu	24119 ± 16
^{240}Pu	6564 ± 11
^{241}Pu	14.348 ± 0.022
^{242}Pu	376300 ± 900
^{241}Am	433.6 ± 1.4

IV. Mound Calorimetric Measurements

Soon after the standards were fabricated, Mound measured the calorimetric power of one of the six Calex I standards and three other sub samples of the plutonium oxide material of much lower mass. The results for calorimetric power and the mass-normalized power in these four measurements, as found in the records kept in the NBL archives¹, are shown in Table 4. The calorimetric power is proportional to mass. On the other hand, the mass-normalized power (in mW g^{-1}) is a constant attesting to the homogeneity of the material.

Table 4. Plutonium mass, calorimetric power, and mass-normalized power of Calex I standard and three other sub-samples of the plutonium oxide material, as of March 15, 1980. mW stands for milliWatt.

Sample ID	Mass / g material	Measured Power* /mW	Mass-normalized power / mW g^{-1} $(\pm \text{one standard error})^{**}$	Ratio to bulk sample # ^{##}
MO-1979-CALOR	454.5928	923.850	2.03226 ± 0.00058	---
MO-1979-5-1	5.6759	11.5315	2.03229 ± 0.0002	1.00001
MO-1979-5-2	5.6779	11.5380	2.03209 ± 0.0002	0.99992
MO-1979-1 [#]	0.9999	2.0320	2.03220 ± 0.0010	0.99997

* All values decay corrected to 3/15/80

** One standard error is (standard deviation/ \sqrt{n}) where n = 5 in all cases.

Ratios calculated with respect to MO-1979-CALOR

This sample was then analyzed by destructive analyses experiments

V. Plutonium Concentration

The plutonium concentration was determined by coulometry, amperometry, and ceric titrations. The results of those experiments, as found in the records kept in the NBL archives¹, are shown in Table 5 and Figure 2.

Table 5: Plutonium elemental concentration / (g Pu) . (g material)⁻¹ as of May 25, 1979.

	Plutonium conc. / (g Pu) . (g material) ⁻¹	Standard deviation ($\pm 1\sigma$)	Number of replicates
Rocky Flat/Ce(IV) titration	0.8808	0.0006	6
Hanford/amperometry	0.8818	0.0013	2
Mound	0.8785	0.0004 [#]	6
NBL/coulometry	0.8782	*	2

[#] Uncertainties for Mound Pu concentration are calculated by folding in the uncertainties in the two individual determinations

* The two measurements yielded the same value for plutonium concentration.

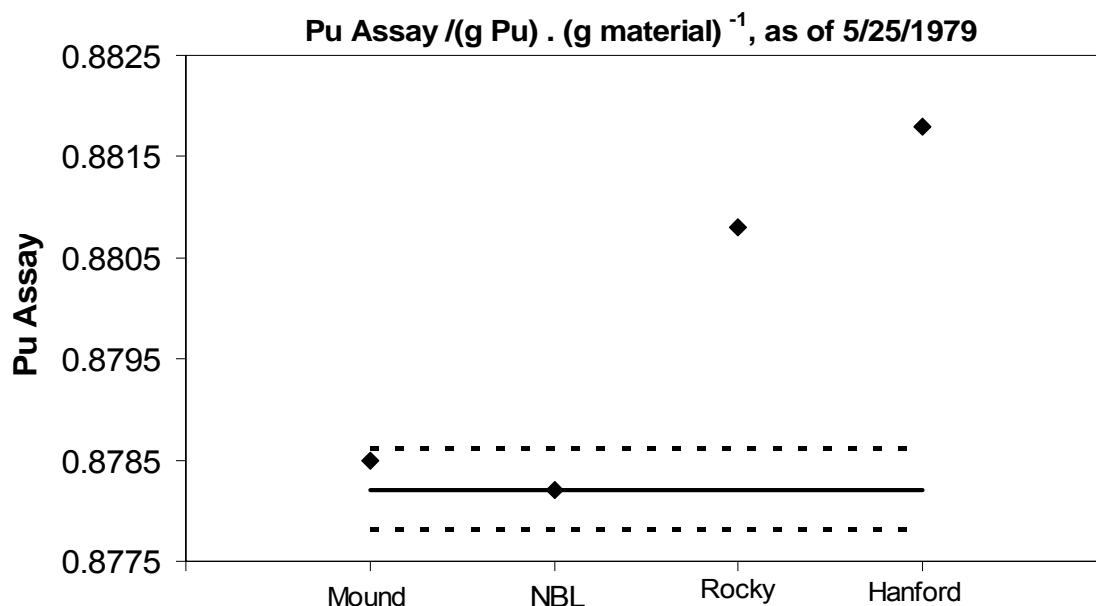


Figure 2: Distribution of plutonium elemental concentration measurements around the characterized value. The thick line is the characterized value and the dotted lines represent uncertainty (95 % C.I.) envelope.

Explanatory notes for Table 5:

- a) Rocky Flats analyzed the samples by titrimetry - ceric solution presumed to be the titrant - on 5/25/1979. No information is available on calibration standards and traceability.
- b) Hanford made two determinations on 1/24/1980. The analysis method was not specified, but presumed to be amperometry. The results were 0.8807 and 0.8826 g/g. The mean and the standard deviation of these two determinations, corrected to 5/25/1979, are given in the table. No information is available on calibration standards and traceability.

- c) Mound dissolved a 1g sample, divided it into two parts and determined the plutonium concentration in each part in triplicate by coulometry on 9/10/1980. The averages for each part are as follows: 0.87845 g/g with RSD = 0.036 % and 0.87814 g/g with RSD = 0.075 %. The mean of the two reported averages and the standard deviation, corrected to May 25, 1979, are given in the table. National Bureau of Standards (NBS) Reference Material 949e, Plutonium Metal, was used for calibration of the coulometer.
- d) NBL performed the coulometric analyses at Mound's request, since variations in the plutonium concentrations in the earlier determinations at Rocky Flats, Mound and Hanford were much larger than expected. NBL dissolved a one g sample and analyzed two aliquants of the solution on 7/9/1982. The plutonium concentrations were 0.87767 and 0.87761 g/g. The mean of the two determinations and the standard deviation, corrected to May 25, 1979, are given in the table. National Bureau of Standards SRM 949e, Plutonium Metal Assay Standard, was used for measurement quality control and traceability.

Apparently, the 1982 characterized value for plutonium concentration relied on the NBL measurements. The 1982 characterized value is retained in the 2008 evaluation. Uncertainty in the characterized value, as 95 % C.I., is conservatively estimated to be about 0.05 % of the value (Type B evaluation of uncertainty). The Mound determination completely overlaps with the NBL determination; Hanford and Rocky Flat determinations fall outside (see Fig. 2).

The characterized value for plutonium concentration is 0.8782 ± 0.0004 (g Pu) . (g Material)⁻¹ (95 % C.I.) as of 5/25/1979.

VI. Plutonium Isotopic Abundances

Rocky Flats, Mound, NBL, and Hanford determined the plutonium isotopic abundances using thermal ionization mass spectrometry (TIMS). In addition, Rocky Flats and Mound determined ^{238}Pu abundance by alpha spectrometry, since isobaric ^{238}U nuclide interference was suspected in the TIMS analysis. Note that the uranium concentration of the material is 22 $\mu\text{g/g}$ sample (see Table 9).

The plutonium isotopic abundances are shown in Table 6 and Figure 3. The average for each isotope is taken to be its characterized value. The characterized values for the plutonium isotopes along with the uncertainties (95 % C.I.) are shown in the last row of the table. The uncertainties are products of the respective standard errors and coverage factors k. For example, the ^{238}Pu uncertainty is the product of its standard error (standard deviation/ $\sqrt{6}$) and the coverage factor k of 2.571 for 5 degrees of freedom (df = 5). For the other plutonium isotopes k is 3.182 for df = 3. The last digits in the averages and their uncertainties are provided to reduce errors due to rounding and are not intended to convey reliability at that level.

Table 6. Plutonium isotopic abundance /($\text{g}^{\text{i}}\text{Pu}$) . (100 g Pu) $^{-1}$, where $\text{i} = 238, 239, 240, 241$, and 242 of Calex I material, as of 5/25/1979. In the text, Pu isotope abundances are also expressed as wt % same as ($\text{g}^{\text{i}}\text{Pu}$) . (100 g Pu) $^{-1}$.

Lab/method	^{238}Pu	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu	Total
Rocky Flats/TIMS	0.011	93.7317	5.8611	0.3700	0.0270	100.0008
Rocky Flats/ α Spec	0.0102					
Mound/TIMS	0.010	93.7367	5.8540	0.3696	0.0294	99.9997
Mound/ α Spec	0.0102					
NBL/TIMS	0.0092	93.7314	5.8573	0.3730	0.0290	99.9999
Hanford/TIMS	0.0095	93.7346	5.8531	0.3723	0.0305	100.0000
Average	0.01002 ± 0.00066	93.7336 ± 0.0040	5.8564 ± 0.0058	0.3712 ± 0.0027	0.0290 ± 0.0023	100.0002

The ^{238}Pu average in Table 6 is based on both TIMS and alpha spectrometry results for reasons stated below:

- a) The Rocky Flats ^{238}Pu abundance by alpha spectrometry is lower than the TIMS result, whereas the Mound alpha spectrometry value is slightly higher than the TIMS result.
- b) The NBL and Hanford TIMS results for ^{238}Pu are lower than the alpha spectrometry result.

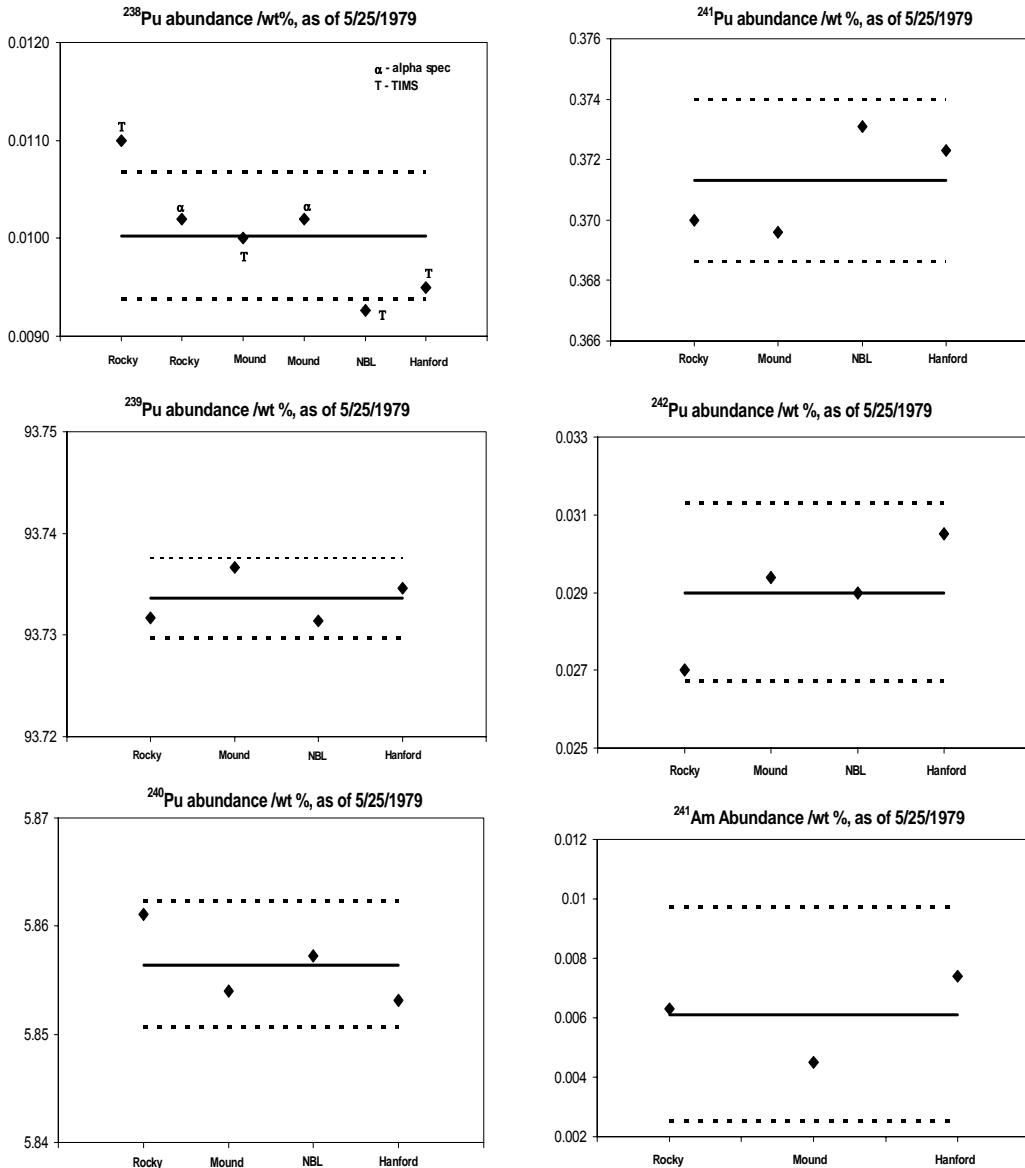


Figure 3: Pu isotopic abundance measurements and of ^{241}Am concentration measurements (in weight %) around the characterized values. The thick line is the characterized value and the dotted lines represent uncertainty (95 % C.I.) envelope.

The characterized values from the 2008 evaluation are compared against the 1982 characterized values in Table 7. The latter are from the records kept in the NBL archives¹. The following observations are made from the comparative study:

- The characterized values from the 2008 evaluation are defined with uncertainties, whereas the values from the 1982 evaluation are reported without uncertainties.
- The plutonium isotope abundances, except for ^{238}Pu , show no differences between the 1982 values and the 2008 evaluation. Note the 1982 values are defined with one less digit.
- The ^{238}Pu abundance is defined using both TIMS and alpha spectrometry values in the 2008 evaluation, whereas the 1982 evaluation was based on alpha spectrometry results only. The ^{238}Pu

abundance is 1.8 % lower in 2008 evaluation relative to 1982. Nonetheless, the two values overlap within the limit of uncertainty.

Table 7. Comparison of characterized values of isotopes abundance from the 2008 evaluation vs. 1982 evaluation. The atomic weight of plutonium is 239.1187.

	2008 evaluation (as of 5/25/1979)	1982 evaluation (as of 5/25/1979)
$^{238}\text{Pu}^*$	0.01002 ± 0.00066	0.0102
^{239}Pu	93.7336 ± 0.0040	93.734
^{240}Pu	5.8564 ± 0.0058	5.856
^{241}Pu	0.3712 ± 0.0027	0.371
^{242}Pu	0.0290 ± 0.0023	0.029
Total	100.00022	100.0002

* ^{238}Pu abundance from the 2008 evaluation is based on both TIMS and alpha spectrometry results, whereas the 1982 value is based on alpha spectrometry only.

VII. ^{241}Am abundance

Rocky Flats, Mound Laboratory, and Hanford determined the ^{241}Am concentration by high-resolution gamma ray-spectrometry. The results are shown in Table 8 and also in the last panel in Figure 3. The 2008 evaluation is simply a reproduction of the earlier evaluation, except that uncertainty quoted in the 2008 evaluation is calculated as a product of the standard error of the three measurement results and a coverage factor k of 4.303 for df = 2.

Table 8. ^{241}Am abundance /($\mu\text{g }^{241}\text{Am}$) . (g Pu) $^{-1}$ in Calex I material (as of 5/25/1979). The average of the three measurement results is taken to be the characterized value in both 1982 and the 2008 evaluations.

	2008 evaluation	1982 evaluation
Rocky Flats	63	63
Mound	45	45
Hanford	74	74
Average	61 ± 36	61

VIII. Impurity Analysis and verification of plutonium concentration

Rocky Flats determined impurity element concentrations in the Calex I material using a variety of spectrometry methods: spark source mass spectrometry, atomic absorption spectrometry, and emission spectrometry. The results given in Table 9 are reproduced from the records in the NBL archives¹.

The sum of the impurity element concentrations is $(4039 \pm 1010) / \square \text{ g.g}^{-1}$; it includes ^{241}Am (as of 5/25/1979). The uncertainty (95 % C.I.) in the total impurity is assumed to be 25 % of the value. Subtracting the impurities yields the purity of plutonium oxide material; it is $(100 - (0.40 \pm 0.10)) \% = (99.60 \pm 0.10) / \text{wt \%}$, as of 5/25/1979. This corresponds to plutonium concentration of $(87.85 \pm 0.10) / \text{wt \%}$; plutonium atomic weight given in Table 7 and oxygen atomic weight of 15.9994 are used in this calculation. The plutonium concentration by the (100 % - impurity) method agrees with the characterized value from coulometric measurements, within the limits of uncertainties.

Table 9. Impurity element concentrations in Calex I material. For ^{241}Am concentration, see Table 8.

Element	Abundance / $\mu\text{g. (g material)}^{-1}$	Element	Abundance / $\mu\text{g. (g material)}^{-1}$	Element	Abundance / $\mu\text{g. (g material)}^{-1}$
Ag	70	Fe	204	Np	40
Al	22	F	6	P	201
Ba	30	Ga	124	S	2
Be	0.55	K	84	Si	20
C	37	Mg	25	Ta	86
Ca	2534	Mn	6	Th	10
Cl	19	Mo	2	Ti	15
Co	1	Na	136	U	22
Cr	74	Ni	72	Zr	142

IX. Verification of isotopic abundances

The plutonium isotopic abundances and ^{241}Am abundance were verified by NBL and LLNL during 1987-1988. Samples for these analyses were provided by Mound.

A. NBL experiments

The plutonium isotopes were separated from ^{241}Am by ion exchange prior to determination by TIMS. Certified Reference Material 128, Plutonium-239/Plutonium-242, 1:1 Atom Ratio in Nitrate Form (Plutonium Isotopic Standard), was used to determine the mass discrimination factor in the TIMS analysis. NBS SRM 948, Plutonium Isotopic Standard, was used for quality control of TIMS measurements. The ^{241}Am concentration was determined using a combination of gamma spectrometry and IDMS, the former to measure the ^{241}Am and the latter to measure the plutonium content. NBL Certified Reference Material 130, Plutonium-242 in Nitrate Form (Plutonium Spike Assay and Isotopic Standard), was used as the spike in the IDMS assay.

The verification experiment results and uncertainties (two standard deviations), as of September 8, 1987, are given in Table 10. The characterized values are also shown in the table corresponding to the verification analysis experiment date; uncertainties in the decay corrected characterized values are 95 % C.I.

A comparison of the results shown in Table 10 results in the following conclusions:

- a) The plutonium isotopic abundances in the verification experiments agree with the characterized values, within the limits of the uncertainties.
- b) The ^{238}Pu abundance in the verification experiment is reported with a very large uncertainty (about 18 % of the value).
- c) The ^{241}Am abundance in the verification experiments agree with the characterized value, within the limits of experimental uncertainties.

Table 10. Plutonium isotopic abundances $(\text{g}^i\text{Pu}) \cdot (100 \text{ g Pu})^{-1}$, where $i = 238, 239, 240, 241$, and 242 ; and ^{241}Am abundance $(\text{g}^{241}\text{Am}) \cdot (100 \text{ g Pu})^{-1}$ in the verification experiments and characterized values from the 2008 evaluation.

	Verification (as of 09/08/1987)	Characterized Values (as of 09/08/1987)
^{238}Pu	0.011 ± 0.002	0.00940 ± 0.00059
^{239}Pu	93.848 ± 0.020	93.8525 ± 0.0040
^{240}Pu	5.863 ± 0.020	5.8601 ± 0.0058
^{241}Pu	0.249 ± 0.002	0.2490 ± 0.0027
^{242}Pu	0.030 ± 0.002	0.0287 ± 0.0023
^{241}Am	0.1268 ± 0.0041	0.1279 ± 0.0037

B. LLNL experiments

The plutonium isotopes were separated from ^{241}Am by ion exchange prior to determination by TIMS. Mass discrimination corrections were based on uranium isotopic analysis.

^{238}Pu and ^{241}Am abundances were determined by alpha pulse-height analysis. The ^{238}Pu was determined using Am-free purified Pu fraction; ^{241}Am was determined using samples as received, i.e., without purification. The alpha pulse-height analyses results were combined with mass spectrometry results to define the ^{238}Pu and ^{241}Am abundances.

The verification experiment results and uncertainties (two standard deviations), as of January 1, 1989, are given in Table 11. The characterized values are also shown in the table corresponding to the verification analysis experiment date; uncertainties in the decay corrected characterized values are 95 % C. I.

Table 11. Plutonium isotopic abundances $(\text{g}^i\text{Pu}) \cdot (100 \text{ g Pu})^{-1}$, where $i = 238, 239, 240, 241$, and 242 , and ^{241}Am abundance $(\text{g}^{241}\text{Am}) \cdot (100 \text{ g Pu})^{-1}$ in the verification experiments and characterized values from the 2008 evaluation.

	Verification (as of 01/01/1989)	Characterized Values (as of 01/01/1989)
^{238}Pu	0.009496 ± 0.000038	0.00930 ± 0.00058
^{239}Pu	93.873 ± 0.038	93.8675 ± 0.0040
^{240}Pu	5.854 ± 0.012	5.8604 ± 0.0058
^{241}Pu	0.2338 ± 0.0008	0.2337 ± 0.0027
^{242}Pu	0.02959 ± 0.00014	0.0290 ± 0.0023
^{241}Am	0.1414 ± 0.0014	0.1430 ± 0.0037

A comparison of the results shown in Table 11 results in the following conclusions:

- a) The plutonium isotopic abundances in the verification experiment agree with the characterized values, within the limits of the uncertainties.
- b) The ^{241}Am abundance in the verification experiment agree with the characterized value, within the limit of the experimental uncertainty.

X. Characterization Experiments: Plutonium Mass, Effective Specific Power, and Calorimetric Power

The mass of plutonium, effective specific power (P_{eff}), and calorimetric power of the Calex I standard are calculated from the characterized values using the following equations:

$$\text{Pu}_{\text{mass}} \text{ (in g)} = M_{\text{PuO}_2} \cdot \text{Pu}_{\text{conc}} \quad (1)$$

$$P_{\text{eff}} \text{ (mW/g Pu)} = ^{241}\text{Am} \bullet ^{241\text{Am}}\text{Specific power} + \sum_{i=238}^{242} i \text{Pu} \bullet i \text{Specific power} \quad (2)$$

$$\text{Calorimetric power (in milliWatt)} = \text{Pu}_{\text{mass}} \bullet P_{\text{eff}} \quad (3)$$

where M_{PuO_2} is the mass of the material in grams in the standard from Table 1,

Pu_{conc} is the coulometrically characterized concentration in g Pu/g material from Sec. V,

$i\text{Pu}$ is the fractional abundance of plutonium isotopes in g isotope/g Pu from Table 7 (where $i = 238, 239, 240, 241$ and 242)

$i\text{Specific power}$ is the specific power of the plutonium isotope in milliWatt . (g plutonium isotope) $^{-1}$ from Table 12,

^{241}Am is its concentration in g $^{241}\text{Am}/\text{g Pu}$ from Table 8, and

$^{241\text{Am}}\text{Specific power}$ is its specific power in milliWatt. (g ^{241}Am) $^{-1}$ from Table 12.

Table 12. Specific powers of plutonium and ^{241}Am isotopes²

Nuclide	Specific Power / mW.(g Isotope) $^{-1}$
^{238}Pu	567.57 ± 0.26
^{239}Pu	1.9288 ± 0.0003
^{240}Pu	7.0824 ± 0.0020
^{241}Pu	3.412 ± 0.002
^{242}Pu	0.1159 ± 0.0003
^{241}Am	114.20 ± 0.42

The characterized values for plutonium mass, P_{eff} , and calorimetric power calculated using equations 1, 2 and 3 are shown in Table 13 for the 2008 as well as 1982 evaluations. Uncertainties of input parameters in the calculated values are propagated quadratically.

The plutonium mass is the same in both evaluations. The P_{eff} and the calorimetric power are also the same within the limits of the uncertainties, but are up to 0.04 % lower in the 2008 evaluation relative to 1982, mainly due to the lower ^{238}Pu abundance in the 2008 evaluation.

Table 13. Characterized values for Pu mass, P_{eff} and Calorimetric Power

	2008 evaluation* (as of 05/25/1979)	1982 evaluation (as of 05/25/1979)
Pu mass	$(399.23 \pm 0.18) \text{ g}$	399.23 g
P_{eff}	$(2.2992 \pm 0.0055) \text{ mW.g}^{-1}$	2.3002 mW.g^{-1}
Calorimetric Power	$(917.9 \pm 2.2) \text{ mW}$	918.3 mW

* Uncertainties in the 2008 evaluation values are 95 % C. I.

XI. Plutonium Mass, Effective Specific Power, and Calorimetric Power of Calex I Standard vs. Time

The plutonium concentration and the plutonium isotopic abundances and ^{241}Am abundance change with time due to the decay of plutonium isotopes and in-growth of ^{241}Am . These changes are shown as a function of time in Tables 14 - 17.

Table 14. Plutonium mass and plutonium concentration as a function of time calculated for characterized values from the 2008 and 1982 evaluations. There are no differences between the two evaluations.

Date	Pu Mass / g		Pu Concentration / g Pu .g material ⁻¹	
	2008 evaluation*	1982 Evaluation	2008 evaluation*	1982 Evaluation
05/25/1979	399.23 ± 0.18	399.23	0.8782 ± 0.0004	0.8782
05/25/1984	398.84 ± 0.18	398.84	0.8774 ± 0.0004	0.8774
05/25/1989	398.53 ± 0.18	398.53	0.8767 ± 0.0004	0.8767
05/25/1994	398.26 ± 0.18	398.26	0.8761 ± 0.0004	0.8761
05/25/1999	398.04 ± 0.18	398.04	0.8756 ± 0.0004	0.8756
05/25/2004	397.85 ± 0.18	397.85	0.8752 ± 0.0004	0.8752
05/25/2009	397.69 ± 0.18	397.69	0.8748 ± 0.0004	0.8748
05/25/2014	397.55 ± 0.18	397.55	0.8745 ± 0.0004	0.8745
05/25/2019	397.42 ± 0.18	397.42	0.8742 ± 0.0004	0.8742

* Uncertainties in the 2008 evaluation values are 95 % C. I.

Table 15. Plutonium isotopic abundances $(g^{i}\text{Pu}) \cdot (100 \text{ g Pu})^{-1}$, where $i = 238, 239, 240, 241$, and 242 , and ^{241}Am abundance $(g^{241}\text{Am}) \cdot (100 \text{ g Pu})^{-1}$ change as a function of time. Results from 2008 evaluation.

Date	^{238}Pu	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu	^{241}Am
05/25/1979	0.01002 ± 0.00063	93.7336 ± 0.0040	5.8564 ± 0.0058	0.3712 ± 0.0027	0.0290 ± 0.0023	0.0061 ± 0.0036
05/25/1984	0.00964 ± 0.00061	93.8105 ± 0.0062	5.8590 ± 0.0055	0.2918 ± 0.0021	0.0290 ± 0.0023	0.0855 ± 0.0036
05/25/1989	0.00928 ± 0.00058	93.8718 ± 0.0061	5.8605 ± 0.0055	0.2294 ± 0.0017	0.0291 ± 0.0023	0.1473 ± 0.0037
05/25/1994	0.00892 ± 0.00056	93.9204 ± 0.0060	5.8613 ± 0.0055	0.1803 ± 0.0013	0.0291 ± 0.0023	0.1952 ± 0.0038
05/25/1999	0.00858 ± 0.00054	93.9592 ± 0.0060	5.8615 ± 0.0055	0.1417 ± 0.0011	0.0291 ± 0.0023	0.2323 ± 0.0039
05/25/2004	0.00825 ± 0.00052	93.9902 ± 0.0059	5.8612 ± 0.0055	0.1113 ± 0.00083	0.0291 ± 0.0023	0.2609 ± 0.0039
05/25/2009	0.00794 ± 0.00050	94.0150 ± 0.0059	5.8605 ± 0.0055	0.0875 ± 0.00066	0.0291 ± 0.0023	0.2827 ± 0.0040
05/25/2014	0.00763 ± 0.00048	94.0351 ± 0.0059	5.8595 ± 0.0055	0.0687 ± 0.00053	0.0291 ± 0.0023	0.2993 ± 0.0040
05/25/2019	0.00734 ± 0.00046	94.0513 ± 0.0059	5.8582 ± 0.0055	0.0540 ± 0.00042	0.0291 ± 0.0023	0.3117 ± 0.0041

* Uncertainties are 95 % C. I.

Table 16. Plutonium isotopic abundances $(g^{i}\text{Pu}) \cdot (100 \text{ g Pu})^{-1}$, where $i = 238, 239, 240, 241$, and 242 , and ^{241}Am abundance $(g^{241}\text{Am}) \cdot (100 \text{ g Pu})^{-1}$ change as a function of time. Results from 1982 evaluation.

Date	^{238}Pu	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu	^{241}Am
05/25/1979	0.0102	93.734	5.856	0.371	0.029	0.0061
05/25/1984	0.0098	93.811	5.859	0.292	0.029	0.0854
05/25/1989	0.0094	93.872	5.860	0.229	0.029	0.1472
05/25/1994	0.0091	93.921	5.861	0.180	0.029	0.1951
05/25/1999	0.0087	93.959	5.861	0.142	0.029	0.2322
05/25/2004	0.0084	93.991	5.861	0.111	0.029	0.2607
05/25/2009	0.0081	94.015	5.860	0.087	0.029	0.2826
05/25/2014	0.0078	94.035	5.859	0.069	0.029	0.2991
05/25/2019	0.0075	94.052	5.858	0.054	0.029	0.3115

* Uncertainties are 95 % C. I.

Table 17. P_{eff} and calorimetric power increase as a function of time.

Date	$P_{\text{eff}} / \text{mW.g}^{-1}$		Power / mW	
	2008 evaluation*	1982 Evaluation	2008 evaluation*	1982 Evaluation
05/25/1979	2.2992 ± 0.0055	2.3002	917.9 ± 2.2	918.3
05/25/1984	2.3867 ± 0.0054	2.3876	951.9 ± 2.2	952.3
05/25/1989	2.4543 ± 0.0054	2.4552	978.1 ± 2.2	978.4
05/25/1994	2.5064 ± 0.0055	2.5072	998.2 ± 2.2	998.5
05/25/1999	2.5463 ± 0.0055	2.5470	1013.5 ± 2.3	1013.8
05/25/2004	2.5766 ± 0.0055	2.5772	1025.1 ± 2.3	1025.4
05/25/2009	2.5993 ± 0.0056	2.6000	1033.7 ± 2.3	1034.0
05/25/2014	2.6162 ± 0.0056	2.6168	1040.1 ± 2.3	1040.3
05/25/2019	2.6284 ± 0.0056	2.6289	1044.6 ± 2.3	1044.8

* Uncertainties in the 2008 evaluation values are 95 % C. I.

The decrease in plutonium mass and the increase in P_{eff} and calorimetric power are shown in Fig. 4 also. In the figure the small differences (if any) between the 2008 and 1982 evaluations cannot be distinguished; the differences are in the range of 0.02 to 0.04 % during the forty year period.

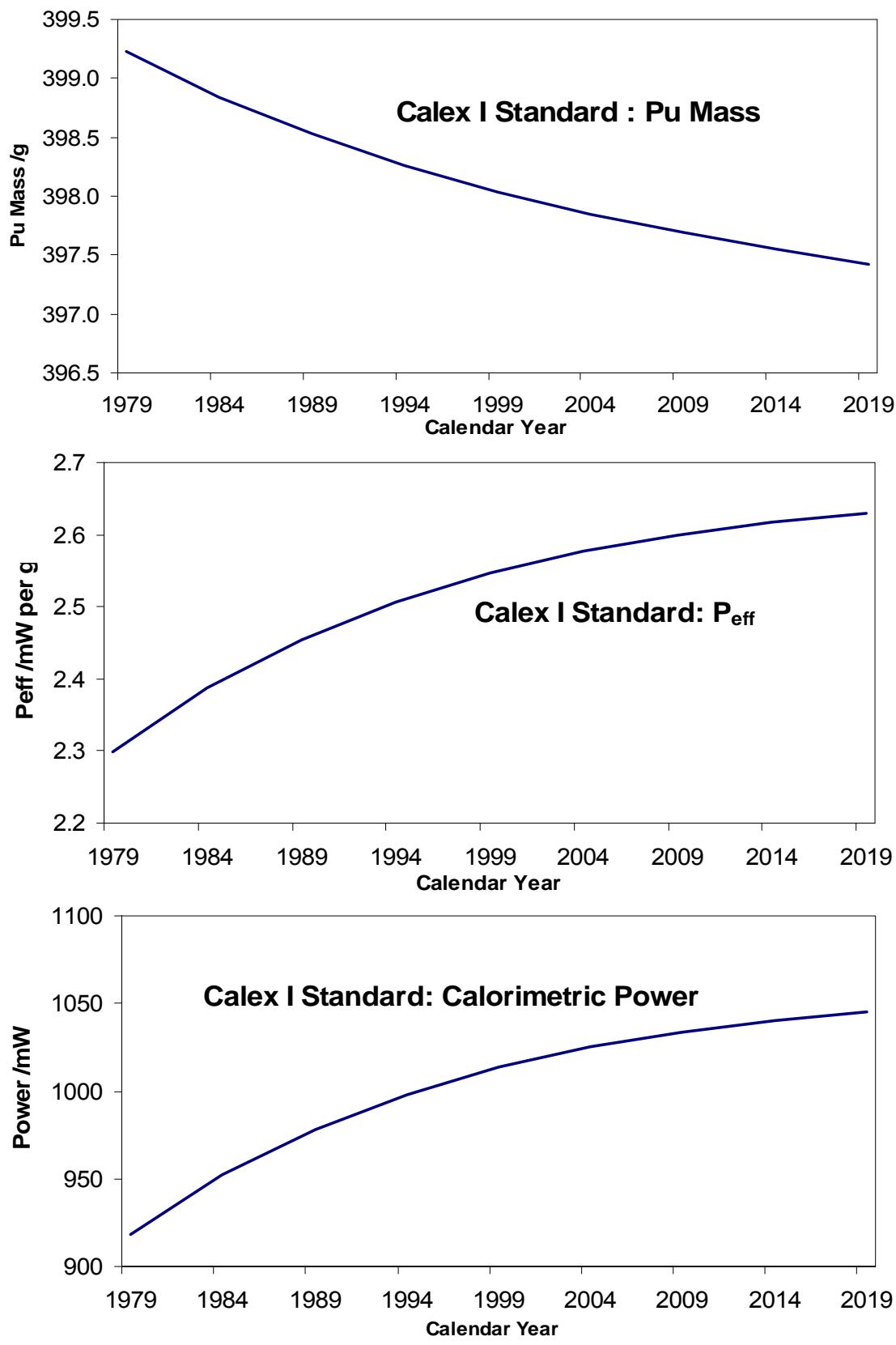


Figure 4: Pu Mass, effective specific power, and Calorimetric power of Calex I standard as a function of time.

XII. Summary and Conclusions

- a) The Calex I plutonium oxide material was characterized for plutonium concentration, plutonium isotopic abundance, and ^{241}Am abundance through destructive analyses experiments done at Rocky Flats, Mound, Hanford, and NBL during 1979-1982. The characterized values from these experiments (referred to as 1982 evaluation in this report) were not documented in an official report. The authors of this report have now prepared an official “Report of Analysis” by reviewing the 1979-1982 characterization experiment results, and also the 1987-1988 verification experiments results. This review resulted in affirming the 1982 characterization for all parameters except ^{238}Pu . The newly characterized values are shown as 2008 evaluation to distinguish it from 1982 evaluation.
- b) A comparison of characterized values from 1982 and 2008 evaluations show either no differences or only minor differences as shown below:
 - i) The plutonium concentration is the same in both 2008 and 1982 evaluations.
 - ii) The ^{238}Pu abundance from the 2008 evaluation is 1.8 % lower than the 1982 evaluation. As a result of lower ^{238}Pu abundance in the 2008 evaluation, the effective specific power and calorimetric power are about 0.04 % lower relative to 1982 evaluation.
 - iii) The characterized abundances for ^{239}Pu , ^{240}Pu , ^{241}Pu , ^{242}Pu and ^{241}Am are the same in the 2008 evaluation and 1982 evaluations.
- c) Uncertainties are assigned to the characterized values from the 2008 evaluation but not for 1982 values. These estimates are believed to be realistic even though a comprehensive evaluation as required in the GUM protocols for determining uncertainties³ was not possible.
- d) For all practical purposes, Calex I measurement evaluations either based on 1982 or on 2008 characterized values are expected to yield essentially the same conclusions on accuracy and precision.

Acknowledgements

The authors thank Tom Sampson of LANL and Mark Mount of LLNL for freely sharing their knowledge on calorimetry measurements, and emphasizing the need to officially document the Calex I standard characterized values, plutonium, and ^{241}Am isotopes half-lives and specific power values used in evaluating the non-destructive analysis results. The authors acknowledge Stefan Buerger of NBL for a critical review of this document.

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Appendix C

CALEX I WORKING REFERENCE MATERIAL: RE-EVALUATION OF THE INITIAL AM-241 AND PU-238 CONTENT

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ABSTRACT

The initial content of Am-241 and Pu-238 in the CALEX I Working Reference Material was re-evaluated. A large number of measured data obtained since the characterization experiments during 1979 – 1988 indicate an overestimation of the CALEX I Report of Analysis values for the initial content of Am-241 and Pu-238 and provided motivation for the re-evaluation. Calorimetry exchange data from the period Jan 2003 to Dec 2007 from laboratories LLNL and Hanford were used to calculate the initial Am-241 and Pu-238 content by fitting the radioactive decay equation to the experimental data. At this stage of re-evaluation, we propose to combine the best fit values with the original values from characterization period used to derive the Report of Analysis values without excluding any measured values. The proposed revised values for the initial Am-241 and Pu-238 content with expanded uncertainties at reference date (5/25/1979) are 53 ppm \pm 19 ppm and 0.00999 % \pm 0.00046 %, respectively, compared to the Report of Analysis values of 63 ppm \pm 36 ppm and 0.01002 % \pm 0.00063 %. The effective power at reference date would decrease by -0.06 %. We, the authors, like to submit this evaluation and the proposed revised values as a first step to resolve the observed biases in the initial Am-241 and Pu-238 Report of Analysis values, and subject it as open for discussion.

INTRODUCTION

In May 1979 six identical units of plutonium oxide working reference materials (referred to as CALEX I) were produced by Rocky Flats for use in the calorimetry exchange (CALEX) program. During the period 1979 – 1982, four laboratories (Rocky Flats, Mound, Hanford, and New Brunswick Laboratory) characterized the CALEX I plutonium oxide materials by destructive methods for mass of plutonium, plutonium isotopic composition (by thermal ionization mass spectrometry and α -spectrometry), and americium-241 abundance (by high-resolution γ -spectrometry). A revised Report of Analysis for the CALEX I working reference material utilizing a GUM approach to uncertainty in measurements [1] was issued by New Brunswick Laboratory (NBL) in January 2008 [2].

Verification measurements performed by destructive analysis at Lawrence Livermore National Laboratory (LLNL) and NBL during 1987 – 1988 indicated that the initial Am-241 content (reference date 5/25/1979) was potentially overestimated during the characterization analysis in 1979 – 1982. Additionally, calorimetry exchange results reported by two laboratories (LLNL and Hanford) over a period of many years indicate a systematic overestimation of the initial Am-241 and potentially Pu-238 content, too. The initial content of Am-241 during the time of the characterization analysis (1979 – 1982) was at a level of < 100 ppm (year 1979) to about 500 ppm (year 1982), difficult to quantify with high precision and accuracy at that abundance. This is reflected in the relatively large dispersion of the laboratory results (between 45 ppm and 74 ppm) with a relative standard deviation of about 25 % in the initial three Am-241 values. The initial Pu-238 content was determined by thermal ionization mass spectrometry (TIMS) and α -spectrometry during the characterization period at a comparably low abundance of about 0.01 %. This is a challenging analytical task because of the Pu-238 – U-238 interference in thermal ionization mass spectrometry and the Pu-238 – Am-241 interference in α -spectrometry. This too is reflected in the relatively large dispersion of the laboratory results (between 0.0092 and 0.011 %) with a relative standard deviation of about 6 % in the initial six Pu-238 values.

These indications suggest an overestimated (biased) initial content of Am-241 and Pu-238 values stated on the Report of Analysis [2] and it provided motivation to re-evaluate the initial Am-241 and Pu-238 abundances. This effort and its implications will be presented and discussed in this paper.

EXPERIMENTAL DATA AND METHODOLOGY

Calorimetry exchange data from the period Jan 2003 to Dec 2007 from laboratories LLNL ($N_{\text{Am-241}} = 384$ and $N_{\text{Pu-238}} = 385$ values) and Hanford ($N_{\text{Am-241}} = 485$ and $N_{\text{Pu-238}} = 485$ values) were used to calculate the initial Am-241 and Pu-238 content by fitting the radioactive decay equation to the experimental data. The experimental data were corrected to the initial mass of plutonium (reference date 5/25/1979). The best fit to the data yield the initial content of Am-241 and Pu-238 as sole unknown parameter. A value for the initial content of Am-241 and Pu-238 was determined separately for the LLNL data and for the Hanford data, thus yielding two best fit values for Am-241 and two for Pu-238. Values for the half-lives of the plutonium isotopes and americium-241 were used as listed in the CALEX I Report of Analysis [2] (extracted from [3])

RESULTS AND DISCUSSION

(a) Initial Am-241 content: The Am-241 calorimetry exchange data (LLNL and Hanford) normalized to the initial mass of plutonium (reference date 5/25/1979) are plotted in figure 1 (black and gray dots) together with the Am-241 content for the three initial Am-241 values (45 ppm, 63 ppm, and 74 ppm as determined during the characterization experiments in 1979 – 82, black dashed line, black dotted line, and gray dashed line, respectively). As can be seen from the plot, the initial values of 74 ppm and 63 ppm appear to be biased compared to the experimental data from LLNL and Hanford, only 45 ppm shows agreement with the calorimetry results. The best fit values to the calorimetry exchange date from LLNL (37 ppm, black solid line) and Hanford (46 ppm, gray solid line, it overlaps with 45 ppm black dashed line) are plotted, too.

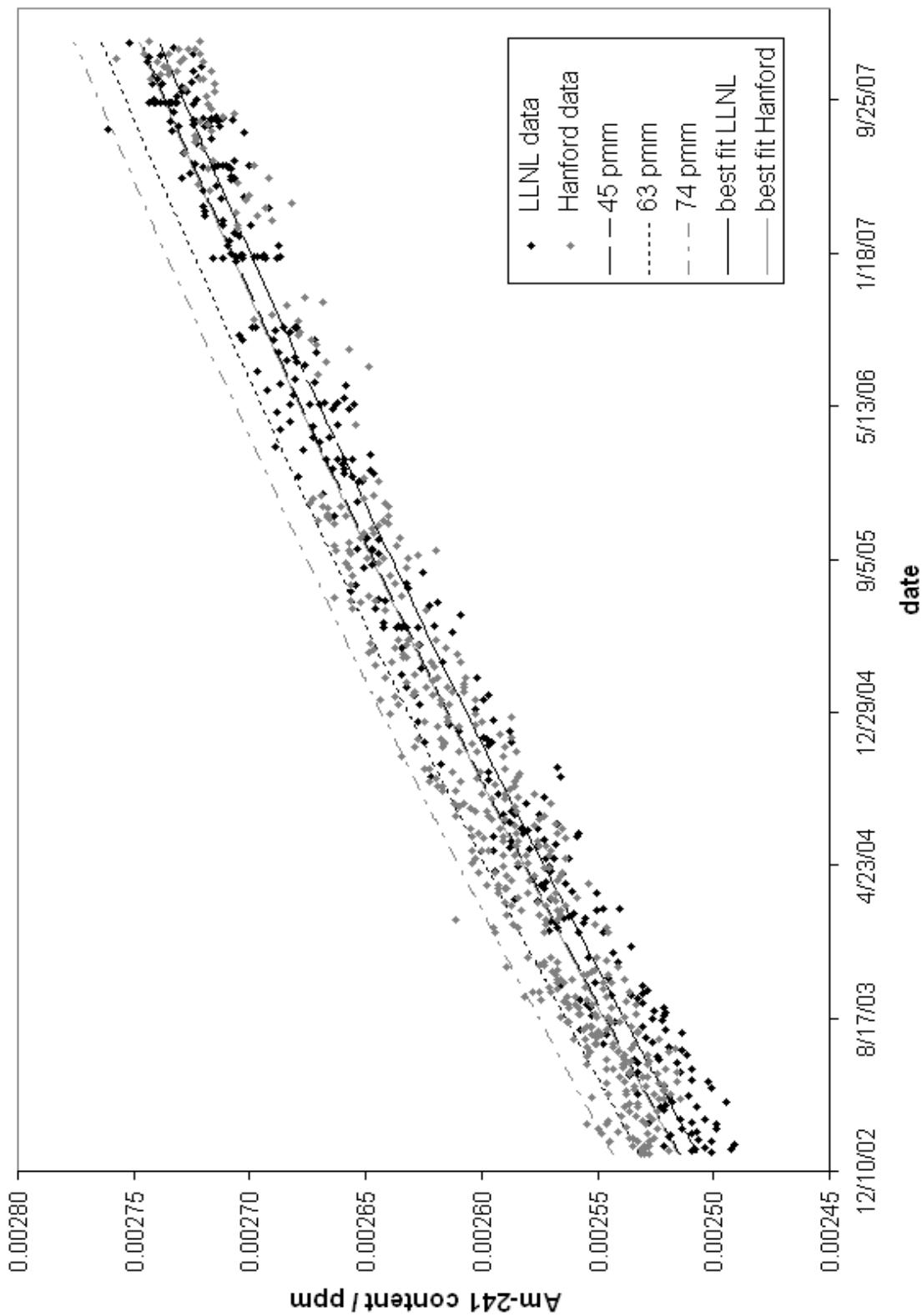


Figure 1: The Am-241 calorimetry exchange data (LLNL and Hanford) normalized to the initial mass of plutonium are plotted together with the Am-241 content for the three initial Am-241 values determined during the characterization experiments in 1979 – 82, and the best fit values based on the LLNL and Hanford calorimetry exchange data.

The results are summarized in table 1 and illustrated in figure 2.

Table 1: Results for the initial Am-241 content; all values except best fit LLNL and Hanford value are from Report of Analysis [2]

Result	Initial Am-241 content / ppm
LLNL (calorimetry, best fit)	37
Hanford (calorimetry, best fit)	46
Rocky Flats (high-resolution γ -spectrometry)	63
Mound (high-resolution γ -spectrometry)	45
Hanford (high-resolution γ -spectrometry)	74
Proposed revised value (expanded uncertainty)	53(19)
Report of Analysis value (expanded uncertainty)	63(36)

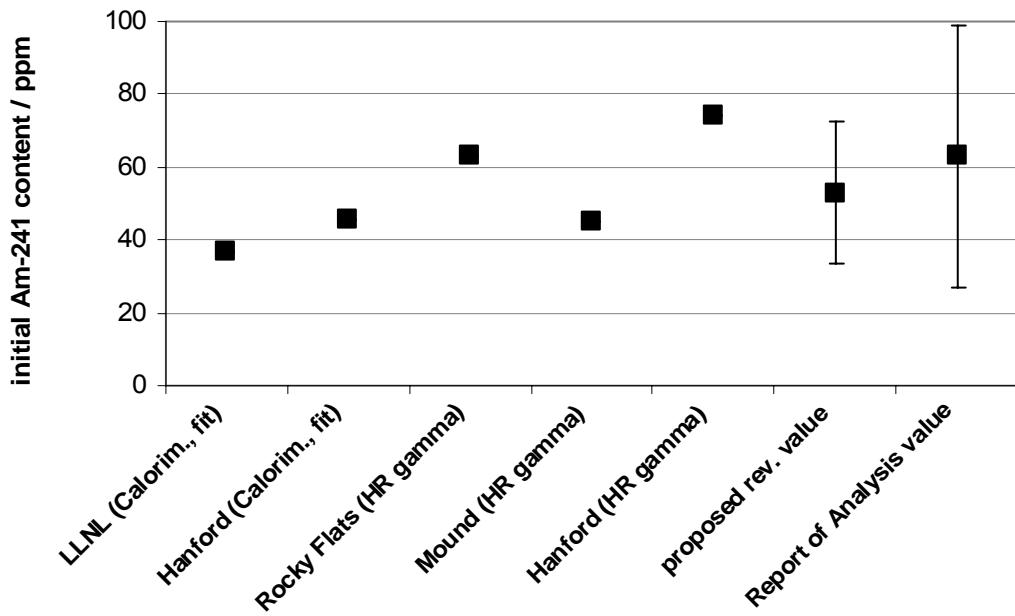


Figure 2: The two best fit values to the calorimetry exchange data (LLNL and Hanford), the initial Am-241 content results from the characterization experiment (1979 – 1982), the proposed revised value, and the Report of Analysis value [2] (with expanded uncertainties, about 95 % level of confidence) are plotted

(b) Initial Pu-238 content: The Pu-238 calorimetry exchange data (LLNL and Hanford) normalized to the initial mass of plutonium (reference date 5/25/1979) are plotted in figure 3 (black and gray dots) together with the Pu-238 content value of 0.01002 % (black dashed line) from the Report of Analysis. As can be seen from the plot, the initial value of 0.01002 % appears to be slightly overestimated compared to the experimental data from LLNL and Hanford. The best fit values of the experimental calorimetry exchange date from LLNL (0.00997 %, black solid line) and Hanford (0.00981 %, gray solid line) are plotted.

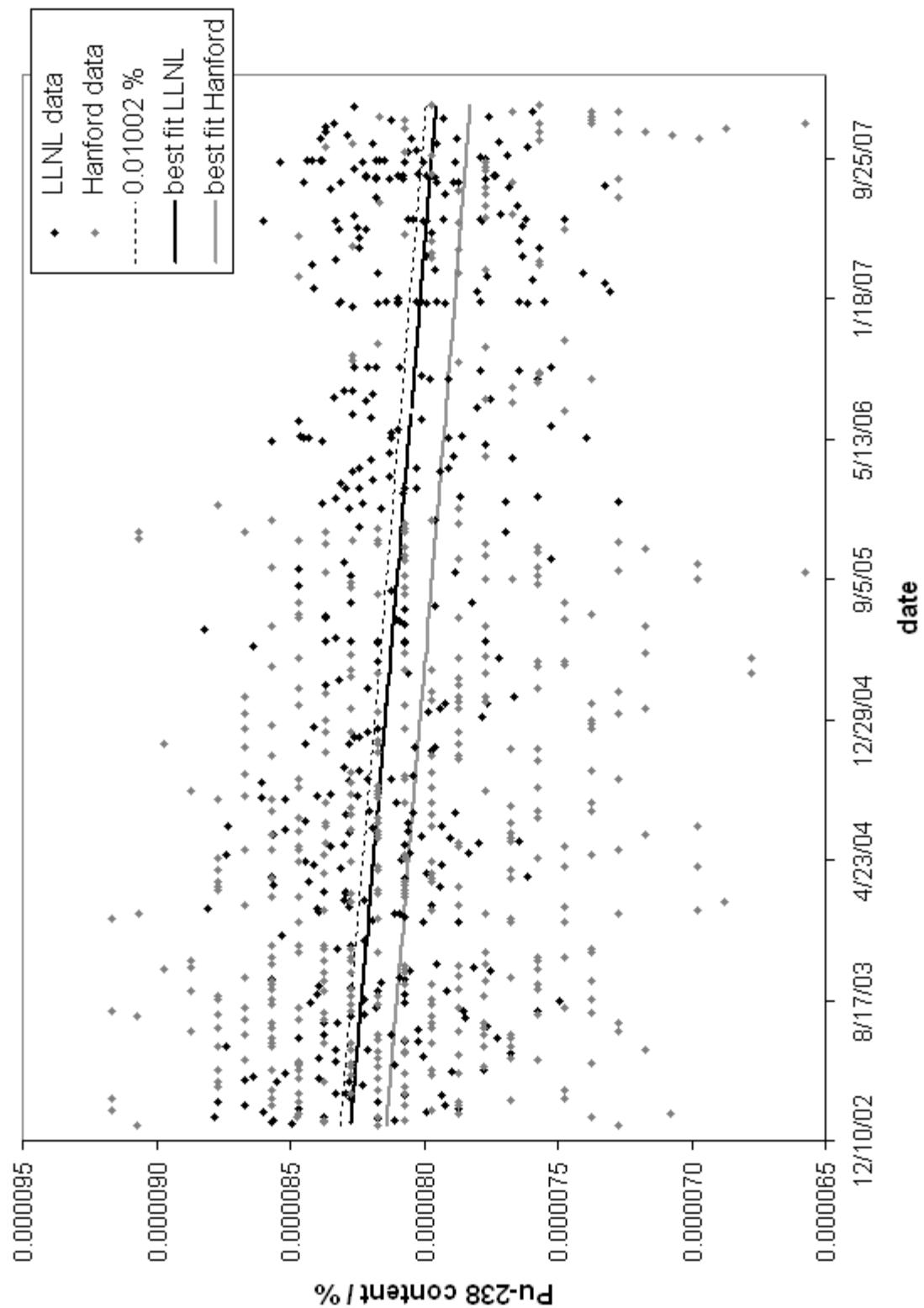


Figure 3: The Pu-238 calorimetry exchange data (LLNL and Hanford) normalized to the initial mass of plutonium are plotted together with the Pu-238 content for the initial Pu-238 value of 0.01002 % from the Report of Analysis, and the best fit values based upon the LLNL and Hanford calorimetry exchange data.

The results are summarized in table 2 and illustrated in figure 4. It should be noted that the TIMS data (Rocky Flats, Mound, NBL, and Hanford) overall support a smaller value (0.0993) more in agreement with the two best fit values.

Table 2: Results for the initial Pu-238 content; all values except best fit LLNL and Hanford value are from Report of Analysis [2]

Result	Initial Pu-238 content / %
LLNL (calorimetry, best fit)	0.00997
Hanford (calorimetry, best fit)	0.00981
Rocky Flats (TIMS)	0.011
Rocky Flats (α -spectrometry)	0.0102
Mound (TIMS)	0.010
Mound (α -spectrometry)	0.0102
NBL (TIMS)	0.0092
Hanford (TIMS)	0.0095
Proposed revised value (expanded uncertainty)	0.00999(46)
Report of Analysis value (expanded uncertainty)	0.01002(63)

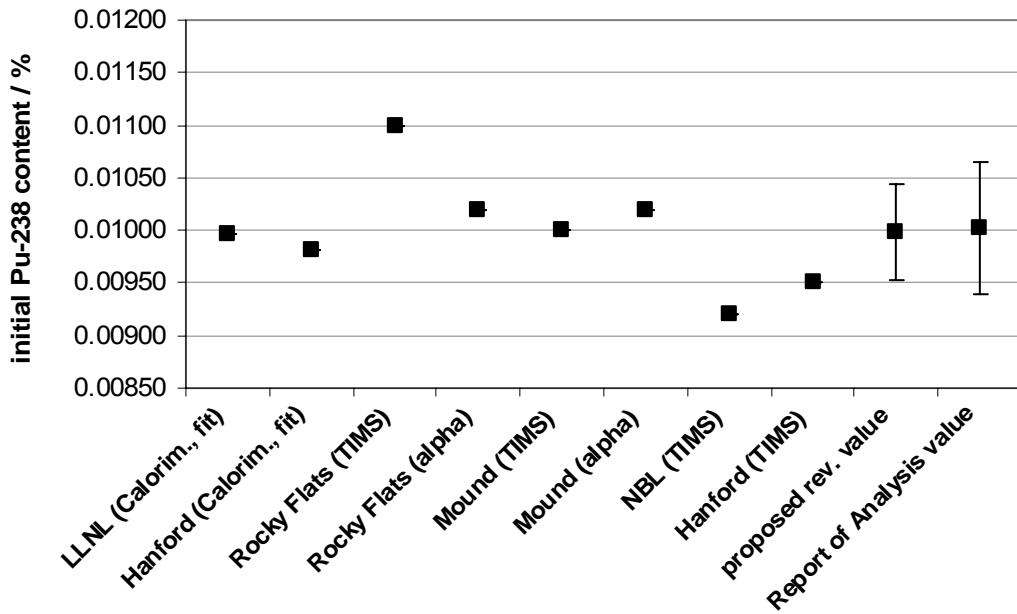


Figure 4: The two best fit values from the calorimetry exchange data (LLNL and Hanford), the initial Pu-238 content results from the characterization experiment (1979 – 1982), the proposed revised value, and the Report of Analysis value [2] (with expanded uncertainties, about 95 % level of confidence) are plotted.

(c) Proposed revised values: A revised value for the initial Am-241 and the initial Pu-238 content can be derived using one of two possible approaches:

1. Approach - average of all measured values: It is assumed that the best fit values and the original results from the characterization experiments (1979 – 1982), thus five values for Am-241 (see table 1) and eight values for Pu-238 (see table 2), are independent analytical results (i.e. have no significant correlations). The revised value for initial Am-241 is thus calculated as the ("grand") average of the five results and the revised value for the initial Pu-238 content as the ("grand") average of the eight results. The advantage of this approach is that no measurements have to be

- discarded based upon a pre-defined selection criteria; but it potentially yields a value with a more conservative (larger) expanded uncertainty due to the comparably large dispersion of the original three Am-241 and six Pu-238 results. For this approach, the revised values for the initial Am-241 content and initial Pu-238 content with expanded uncertainties are $53 \text{ ppm} \pm 19 \text{ ppm}$ and $0.00999 \% \pm 0.00046 \%$ and are listed as proposed revised values in table 1 and table 2, respectively. The proposed revised values are smaller than the Report of Analysis values, as expected based upon the indications listed above (see introduction). The bias observed between the LLNL and Hanford calorimetry exchange data and the Report of Analysis values is reduced by about 50 % for Am-241 and 30 % for Pu-238, and the bias observed between the verification measurements (1987 – 1988) and the Report of Analysis values by about 140 % for Am-241 (about 40 % overcorrected).
2. Approach - average of selected measured values: A selection criteria is defined and a selected number of the five Am-241 content values and of the eight Pu-238 values is discarded. Based upon the criteria that the initial Am-241 and Pu-238 content during the characterization experiments (1979 – 1982) was difficult to determine precisely and accurately because of low abundance and potential interferences, the original three Am-241 and six Pu-238 values would be discarded and the revised values would be based upon the best fit LLNL and Hanford values. The advantage of this approach is that the best fit values are derived from several hundred repeated measurements at higher Am-241 abundance and free of interferences Am-241 and Pu-238; thus they are potentially known with a higher precision and accuracy, which might result in a smaller expanded uncertainty compared to the first approach. The disadvantage is that at this stage of re-evaluation the systematic uncertainties (type B) associated with the LLNL and Hanford calorimetry exchange data are not known to the authors, but they have to be incorporated into the GUM uncertainty analysis for the revised values. Additionally, uncertainties associated with future results from LLNL and Hanford calorimetry analysis will be correlated to a yet unknown extend, if the here derived revised values with their uncertainties (this approach) are used to calibrate the calorimetry analysis; thus in case for LLNL and Hanford, the revised values can only be utilized for QC purposes, not for calibration purposes. From this approach, the revised value for the initial Am-241 content is 41 ppm and for the initial Pu-238 content is 0.00989 %. An expanded uncertainty can not be estimated yet because of an incomplete knowledge of the Type B uncertainties associated with the LLNL and Hanford calorimetry exchange data. The revised values are smaller than the Report of Analysis values (see table 1 and table 2) and the bias observed between the LLNL and Hanford calorimetry exchange data and the Report of Analysis values is reduced by about 100 % for Am-241 and 100 % for Pu-238, and the bias observed between the verification measurements (1987 – 1988) and the Report of Analysis values by about 170 % for Am-241 (about 70 % overcorrected).

CONCLUSION

At this stage of analysis we, the authors, are not able to estimate all type B (systematic) uncertainties associated with the LLNL and Hanford calorimetry exchange data used to calculate the best fit values for the initial Am-241 and Pu-238 content, but are needed to estimate reliable expanded uncertainties if utilizing the second approach. As a first step we therefore propose the more (conservative) first approach, i.e. to calculate the “grand” average without excluding any of the measured values.

Thus, the proposed revised value for the initial Am-241 content with expanded uncertainty at reference date (5/25/1979) is $53 \text{ ppm} \pm 19 \text{ ppm}$, the initial Pu-238 content with expanded uncertainty is $0.00999 \% \pm 0.00046 \%$, as listed in table 1 and table 2.

The effective power at reference date (5/25/1979) would be slightly smaller for the first and second approach with $P_{\text{eff}} = 2.298 \text{ mW / g Pu}$ and $P_{\text{eff}} = 2.296 \text{ mW / g Pu}$, respectively, compared to the Report of Analysis value of $P_{\text{eff}} = (2.2992 \pm 0.00055) \text{ mW / g Pu}$. This corresponds to a relative difference of -0.06 % and -0.14 %, respectively, which is within the expanded uncertainty of 0.24 % of the Report of Analysis value. The change in the mass of plutonium at reference date due to the change in the initial Pu-241 content is insignificant (about -0.0001 %).

We, the authors, like to submit this evaluation and the proposed revised values as a first step to resolve the observed biases in the initial Am-241 and Pu-238 Report of Analysis values, and subject it as open for discussion.

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