2016 Rio norm VIII
Eighth International Symposium on Naturally Occurring Radioactive Material – NORM VIII
Rio de Janeiro, Brazil, October 16 -21, 2016

INDOOR RADON INTERCOMPARISON EXERCISES: INTERNATIONAL EXPERIENCES AND PERFORMANCE EVALUATION AT THE BRAZILIAN COMMISSION FOR NUCLEAR ENERGY – POÇOS DE CALDAS LABORATORY (CNEN-LAPOC)

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OBJECTIVE

The Poços de Caldas Laboratory (LAPOC) of the Brazilian Commission for Nuclear Energy (CNEN) conducts indoor radon measurement studies (using 2 analysis approaches).

In order to implement quality control practices in laboratory and validate a measurement technique, LAPOC participates regularly in the **Intercomparison Program of Passive Radon Detectors**, promoted by *Public Health England* (PHE).

The PURPOSE of this study is to **EVALUATE HISTORICAL SETS OF LAPOC´S INTERCOMPARISON RESULTS AND ASSESS LABORATORY PERFORMANCE THROUGH THE YEARS.**

METHODOLOGY

Bias error values associated to measurement results from years of exercises were organized in excel tables.

Each table featured a set of bias values, pertaining to a different concentration exposure - **50 to 2500 KBq.m^{-3}.h**.

LAPOC participations → PHE Intercomparison exercises by year AND concentration references values (KBq.m-3.h).

Levels	2007	2009	2011	2012	2013	2014	2015
A	140	165	112	138	144	132	145
B	255	330	382	438	347	327	330
C			902	717	657	630	719
D		1436	1516	1487	1326	1477	1353
E	1913		2174	2385	2990	2382	2259

ANOVA tests were then applied to this data, evaluating the laboratory´s performance along the years for each of the 5 levels of radon concentration.

In this **one-way ANOVA** test, the years became the variable – as the target of this study was **a time progress assessment.**

SUMMARY OF RESULTS

Results obtained from **ANOVA tests** demonstrate, in general, a lack of bias consistency along the years in terms of **concentration levels**, for both **manual and automated analysis approaches participations**, as all resulting means observed were statistically different.

However, **bias reduction tendencies** (for automated approach) and a certain **steadiness of obtained bias values** (for manual approach) have also been observed with the passing of years.

Due to tendencies, observed on a given exercise year, of negative bias values as well as bias increasing with radon concentration levels, **correction of measured values was conducted through linear regression.**

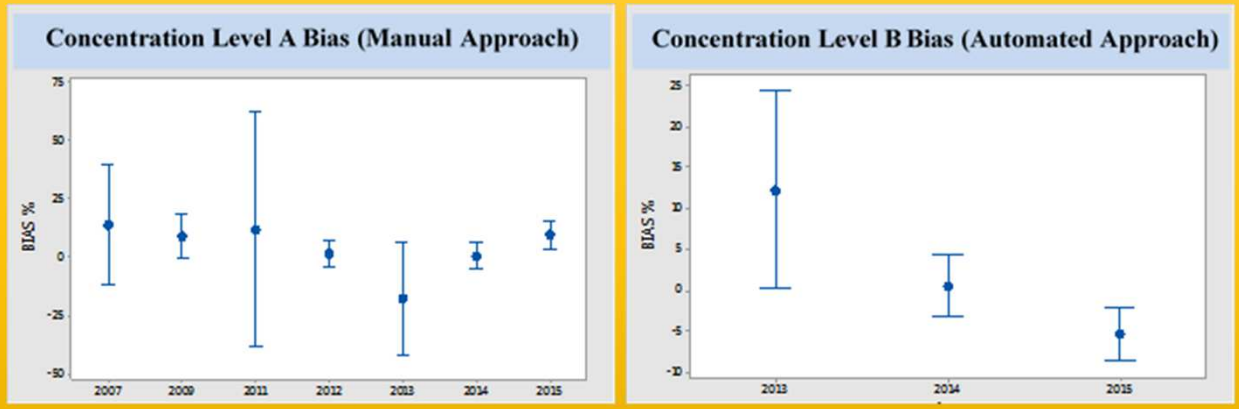

Fig 1 and 2. Bias interval plots produced for concentration level A for Lab 1 (manual approach) and concentration level B for Lab 2 (automated approach), respectively.