7. Goals and Scope

A general discussion took place in which each participant identified the areas in which they could further contribute, or where they felt that new emphasis was required. Following this discussion three main topics were outlined:

i) k_0-software: recent improvements were acknowledged and gratefully appreciated, but the inclusion of correct uncertainty propagation in the calculation of peak areas and energies would be very useful, as will be the tutorial,

ii) k_0-database: a complete, unified database containing consistent k_0, Q_0 and γ-ray emission probability values is required, which will probably require further k_0 and Q_0 measurements,

iii) k_0-calculation methodology: the definition of a methodology for calculating k_0 values from differential data is necessary, as well as an understanding of the effect that differential data have on final k_0 values. Thus, in conjunction with an appropriate database of consistent differential data, new facilities could apply the k_0 method (with the k_0-IAEA software) more easily.

8. Measurements and Facilities

Z. Révay had already presented (see Section 2.8) two lists of "suspicious" k_0 and/or Q_0 values which require re-measurement. Following extensive discussion on the contents of these two lists, a set of values requiring re-measurement, or further investigation, was formulated and those participants with the capability to perform such measurements were identified. Table 2 gives the main details of the measurement facilities, and Table 3 summarizes the outcome of the discussion on the problematic nuclei.

Table 2: Available k_0-NAA facilities and their relevant characteristics

Facility	Country	f-value	Transit time
CNEA	Argentina	20-100	20-30s
CNEN	Brazil	24	120s
JSI	Slovenia	15-30	1s
CERT	Nigeria	20-50	180s
KFKI	Hungary	∞	1μs
TUD	Netherlands	30 (60)	>20s (>600s)

Table 3: Problematic nuclei requiring further investigation/measurement

Nuclide	Value	Method	Capability exists/comments
^{115}Cd	k_0,Q_0	Two channel	Arribére, Jonah, Jaćimović
^{192}Ir	k_0		k_0 value missing† from ADNDT 85 (2003)*
^{197}Hg	k_0,Q_0		Arribére, Jonah
^{75}Se	k_0,Q_0		Kennedy, Jaćimović
^{153}Gd/^{153}Sm‡	k_0		Kennedy, Jonah
^{159}Gd	k_0		Kennedy, Jonah
^{131}Ba	k_0,Q_0	Two channel/Cd covers	Arribére, Jonah
^{109}Pd	k_0	Beam chopper	Révay, Kennedy
^{116m,n}In	k_0,Q_0	Two channel	Révay, Jaćimović
^{134m}Cs	k_0,Q_0	Two channel	Révay, Jonah
^{36}S#	k_0	Beam chopper/enriched sample	Révay, Jonah

^{49}Ca#	k_0	Beam chopper	Révay, Jonah
^{95}Zr	k_0,Q_0		all participants could undertake measurements
^{90m}Y	k_0,Q_0		Blaauw
^{58}Fe	k_0,Q_0	}	problem when compared with the resonance integral value from differential data
^{186}W	k_0,Q_0		

† k_0 value was not included in the original publication, but was thought to have been measured.

* Frans De Corte and András Simonits, *Recommended nuclear data for use in the k_0 standardization of neutron activation analysis*, Atomic Data and Nuclear Data Tables 85 (2003) 47–67, doi:10.1016/S0092-640X(03)00036-6

‡ listed together as often only available as a mixed source.

\# requires extension of the energy efficiency curve beyond the usual upper energy limit, which could be achieved using a locally produced ^{24}Na source (has a γ-ray at 3.75 MeV).

9. Deliverables, Outputs and Tasks

The overall objectives and outputs of the CRP were well defined at the start of the project. Following the discussions during the meeting, they were restated for clarity.

1. The CRP will result in a selected set of newly measured k_0 and Q_0 values. These new values will be tested in the analysis of reference materials, and recommended to the wider k_0 community. (When conflicts arise between k_0 and Q_0 values measured at different facilities, an attempt will be made to reconcile them by means of the methodology described by A. Trkov.)
2. The CRP will produce a comparison database where the k_0, Q_0 and half-life values are compared with values in other databases. These results will be added to the Evaluated Gamma-ray Activation File (EGAF).
3. A k_0 consistent differential cross-section database of recommended data will be produced.

In order that the above can be achieved, a more detailed breakdown of the required tasks was defined.

a. A proficiency test of efficiency calibration in a summing free environment will be led by Z. Révay.
b. A list of monitor nuclides and a template for experimental results will be supplied to the participants by A. Trkov.
c. All participants will report their experimental results (three independent measurements) to A. Trkov.
d. The neutron spectrum shape for each facility will be derived by A. Trkov.
e. Selected participants will report experimental results for the suspicious reactions (based on three separate measurements) as listed in Table 3, to A. Trkov.
f. k_0 and Q_0 values will be derived from the experimental results, and discrepancies reconciled as necessary by A. Trkov.
g. Newly determined k_0 and Q_0 values will be tested by M. Blaauw.
h. A letter to IUPAC will be written by M.A. Kellett informing them of this k_0 activity.