Assume that an activation analysis is carried out as scheme represented below:



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e 1. Qualitative relationship of confidence, concentration, and y assurance effort. The quality assurance effort increases at a rate as the need for higher confidence increases and the analyte entration decreases. Eventually a point is reached where the y assurance effort increases rapidly as lower analyte concenn is approached and also where further quality assurance effort ices diminishing returns with increasing confidence.

V.I





Figure 5.14 (a) "On an average the duck was dead." A hunter fired both barrels of a shot gun at a duck. The first hit 2 ft in front, the second hit 2 ft behind. On an average the duck was dead. What the hunter really wanted was meat on the table. In duck hunting one muskeep trying until a single shot hits the mark, but in estimating the activity of a radioactive source the best estimate is usually the average. [Adapted from G. D. Chase and J. L Rabinowitz, *Principles of Radioisotope Methodology* (Burgess, Minneapolis, 1962).]

10.1

14



Fig. 10.3. Fast neutron flux pattern for a 14 MeV neutron generator: Transversal flux distribution (20).

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Fig. 10.6. Flux perturbation, flux depression and self-absorption.

## **NEUTRON ACTIVATION ANALYSIS**

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Fig. 10.7. Influence of sample size on the neutron self-shielding (48).

10.24

**Activation Analysis: Limitations** 



Figure 8.2 Neutron self-shielding factors for infinite slabs, cylinders, and spheres. [From P. F. Zweifel, Neutron Self-Shielding, *Nucleonics* 18, No. 11, 174–175 (1960).]

10.28





10.26



Fig. 30 — Scheme of different interferences in neutron activation analysis.  $x = \gamma$ , p,  $\alpha$ , 2n, f etc., x' — different from x in basic reaction,  $x_1$  — may be the same as or different from x in basic reaction, y — usually proton, r = radioactive decay  $\beta^-$ ,  $\beta^+$ , EC,  $X^*$  = arbitrary radionuclide of element X, T = target nucleus in basic reaction, T' = target nucleus different from T,  $Y^*$  = radionuclide of an element different from X

10.2C



Activation Analysis: Limitations

Figure 8.1 Nuclear data for the activation of silicon, phosphorous, sulfur, ar chlorine. The stable isotopes list the isotopic abundance in percent and the neutron capture cross section in barns. The radioactive isotopes list the half-lift



Fig. 10.11. Ratio of the observed number of counts (c') to true mumber ( counts (c) as a function of  $CT/T_{1/2}$  when using the life-time mode of counting FDT = fractional dead-time (88).

10.2e

