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CL-1302

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Technical Information Officer Date
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George E. Moore
ADD Signature Date

Single rereview of CCRP-declassified documents was authorized by DOE Office of Declassification memo of August 22, 1994.

Bldg. #706-B

Micro-max wet-dry bulb inst.

Dry bulb = #6 (purple) on bottom

Dew point = #5 (yellow)

#1 (blue) is on top

Temp. Gradient = diff. between #1 & #6.

Net counts/min ÷ Net wt = Counts per min/per gram.

Counts/min/gram X (factor) = Micro curries per gram.

$$\frac{1}{3.7 \times 60 \times 10^4 \times G.E} \times \text{Count/min/gram} = \text{Micro curries/gram}$$

Geometry factor = Source ÷ 3000 = %

2

Micro-Max wet-dry bulb inst.

#1 (blue) is on top of tower 1

#5 (Yellow) is wet bulb (D.P)

#6 (Purple) is on bottom of tower (dry). 2

Temperature Gradient is diff. between #1 and #6.

#1 should be lower than #6 (Normal Gradient), and is +.

If #6 is lower than #1 an inversion exists, & T.G. is −. 3

R.H.

A.H. : (Look for D.P [#5] in A.H. tables) 4

R.H. : (Find value where D.P. [#5] & Dry [#6] cross in tables)

B' : (Look in B.C. Tables for temp. then subtract that result from B.). MC/9.

Max. & Min. from 12:01 AM to 12:00 PM from #6.

Calculating Mud Samples

1. Net counts/min. = Counts/min. − Background

2. Grams/cm/cm = Net weight ÷ Dish (Area 13.8)

3. Counts/min./gram = $\frac{\text{Net counts per min.}}{\text{Net Weight}}$

4. Micro curries per gram. $\boxed{\text{Mc/gm.}}$

Step #1

$$Mc/gm = \frac{1}{3.7 \times 60 \times 10^4 \times \text{Geometry Factor}} \times \text{Counts/Min./Gram}$$

Step #2 Derive Geometry Factor as follows:
(Source "C" taken for 5 Minutes ÷ 3000)

EXAMPLE: 11,466 (source "C") ÷ 3,000 = 3.82% = .0382

Step #3
Substitute actual geometry factor in step #1 as follows:

$$\frac{1}{3.7 \times 60 \times 10^4 \times 0.0382} = \text{factor}$$

Solving:

$$\frac{1}{3.7 \times 6.0 \times 10^5 \times .0382} \times C/m/gm = \text{Micro Curries/gram}$$

$$\frac{1 \times 10^{-5}}{3.7 \times 6.0 \times .0382} \times C/m/gm = Mc/gm$$

$$\frac{1 \times 10^{-5}}{.844} \times C/m/gm = Mc/gm$$

$$1.19 \times 10^{-5} \times C/m/gm = Mc/gm.$$

Step #4
Micro Curries per gram = Factor (step #3) × Counts/min/gram.

Statistical Counting at Solway Gate.

Δ (delta) = Difference between the average of counts per hr (c/hr.), and the counts per hour (for any particular time).

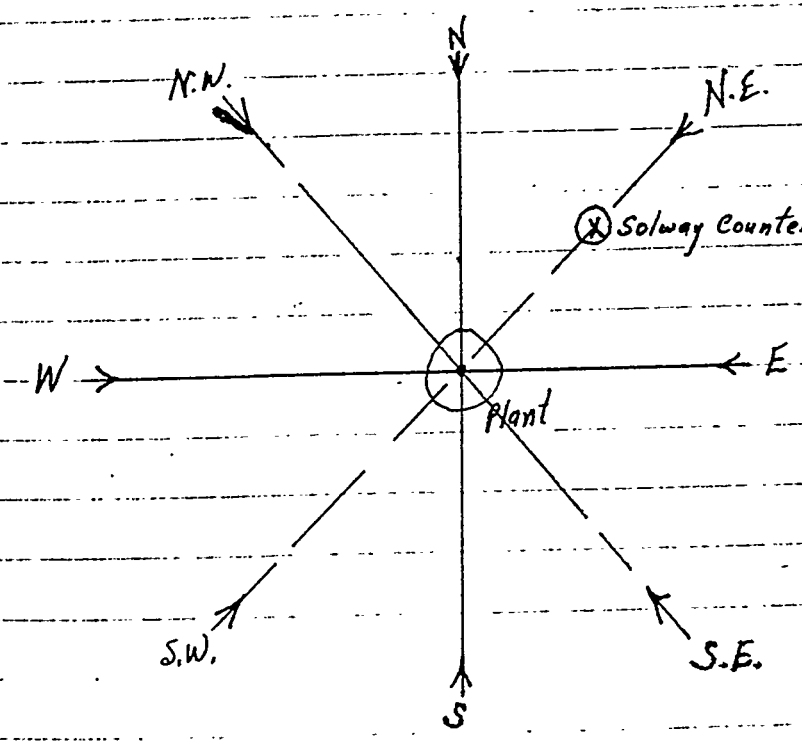
E = Probable error of the mean.

Formula: $E = .674\sqrt{\frac{\Sigma c}{\Sigma t}} = \sqrt{\frac{\text{Sum of c/m}}{\text{Sum of time}}}$

$E' = .674\sqrt{\frac{\Sigma \Delta^2}{N(N-1)}}$ (Sum of Δ^2) (use tables in handbook)

N = No. of readings

$X = V \cos\theta \, P$ V = Velocity, P = Counts/min



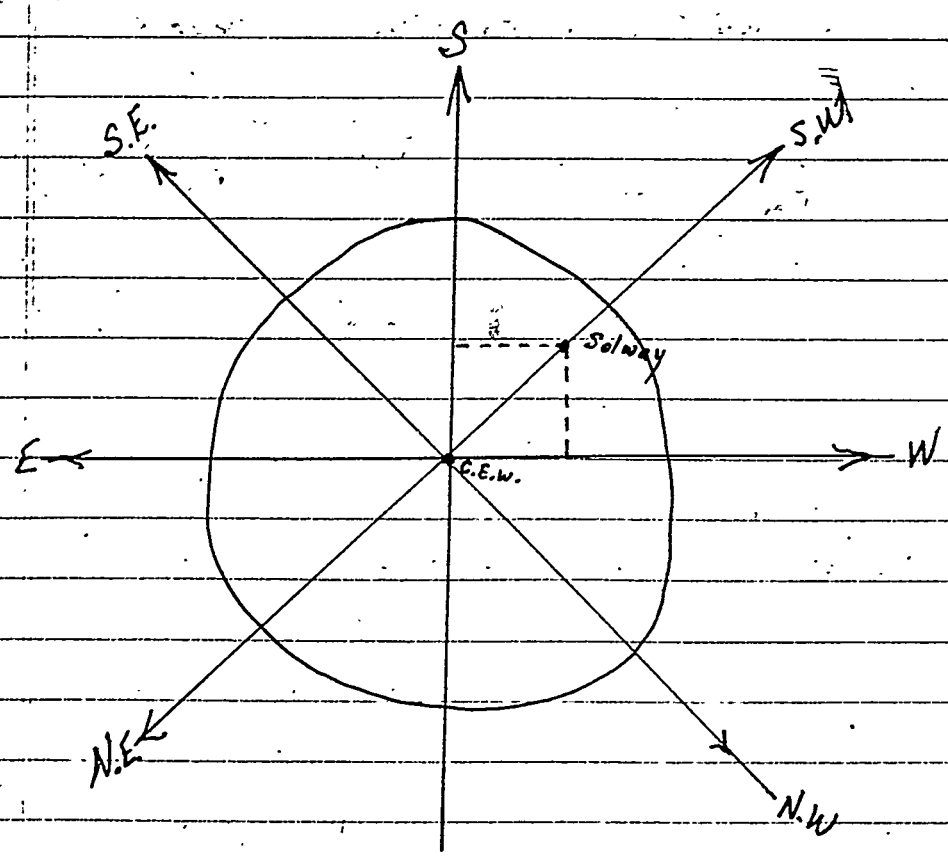
Statistical Counting at Solway Gate (cont)

If the data has a probability distribution, E' must not be consistantly larger than E.

Using $\cos\theta = 45° = .7071$

$X = V \cos\theta \; P$ $\quad$ V = Velocity for 1 hr.
P = Counts/min.

Using South West Direction as XX' axis.
∴ South Wind = 45°
∴ Use South West Line as XX' axis.



Electr

Proto

Neutr

Isotop

Isobar

eV = energy

e = elec. charg
electron in

V = electro

(cont)

ibution,

E.

Radiology

The atomic Number of each neutral atom represents the No. of orbital negative charges & therewith the number of positive neuclear charges.

Electrons The unit electric charge of an electron $= 4.77 \times 10^{-10}$ esu.

Mass of electron $= 9.035 \times 10^{-28}$ grams.

Diameter $= 4 \times 10^{-13}$ centimeter.

Protons Charge $= 4.77 \times 10^{-10}$ esu.

Mass $= 1.6609 \times 10^{-24}$ gms.

Diameter $= 2 \times 10^{-16}$ centimeter.

Neutrons Mass $= 1.6622 \times 10^{-24}$ gms.

The nucleus of an atom is called an Alpha (a) Particle

Isotopes: Elements with same atomic No., but diff atomic wts.

Isobars: Neutral atoms which have different Numbers, but identical atomic masses.

RADIATIONS

1. Corpuscular: If electrons, protons, neutrons, deutrons, alpha or other groups of subatomic particles travel together in streams at high velocities.

These form alpha, and Beta rays of radium.

All PARTICLES have definite mass and travel at various speed

eV = energy in ergs.

e = (elec. charge of electron in e.s.u.)

V = electron volts.

$$K.E = \frac{1}{2} MV^2 = \frac{eV}{300} \text{ ergs.}$$

RADIOLOGY

Electron Volt: Is the energy gained by an electron in falling through a potential difference of one volt.
It is equivalent to 1.6×10^{-12} ergs.

2. Electromagnetic Radiations.

A large range of waves known as the electromagnetic spectrum. The spectrum includes electric waves, radio waves, infra-red or heat rays, visible light, ultraviolet light, Roentgen and gamma rays of radium. All have the same characteristics — their magnetic oscillations travel with the same speed & differ only in the length of their wave. The shorter the wave length, the greater the penetrating power.

Physicians use radiations between 10^5 & 10^{-10}
1.5×10^3 cm : for long & short wave diathermy.
Between 1.2×10^{-3} & 7.6×10^{-5} cm : infra-red therapy
Between 3.6×10^{-5} & 1.8×10^{-5} : ultraviolet therapy

The Radiologist uses the region of Roentgen & Gamma rays of radioactive substances, between 10^{-8} & 10^{-10} cm.
(Units of measurements = ANGSTROM = 10^{-8}.)

Speed of light = 3×10^{10} cm/sec = 186,000 M.P.S.

ν (frequency) $\times$ λ (wavelength in cm) = C (speed in cm/sec).

Wavelength $\lambda = \frac{c}{\nu}$ Frequency $\nu = \frac{c}{\lambda}$

1 Coulomb = 6.3×10^{18} electron Charges = 3×10^{9} esu