

H. J. Sawyer 1398

DUPTON LABORATORIES

[Redacted]

CENTRAL FILES NUMBER

48-1-123

This document consists of 4 pages and 0 figures. No. 12 of 24 copies. Series A.

January 14, 1948

To: Forrest Western
From: T.H.J. Burnett
Subject: Water Activity Measurements Near Y-12

CLASSIFICATION CANCELLED
ADD signature *AS* Date 1/18/95
Single rereview of CCRP-declassified documents was authorized by DOE Office of Declassification memo of August 22, 1994.

In your letter to R.H. Firminhae, November 19, 1947, you outlined the viewpoint of W.M. Arnold of the Biology Division regarding the desirability of monitoring the activity of East Fork, Poplar Creek in the vicinity of Y-12 to provide a background for comparison with later periods of work by them in which large quantities of radioactive isotopes may be used and the question arise of the extent to which water contamination levels may have been increased.

In view of the probability and magnitude of fluctuations during the daytime it was expressed as desirable to collect samples hourly or, since this was grossly impractical, in some manner as to at least give an average or composite value.

Tentatively discarding such elaborate or elegant means as a hydraulic ram etc, a few tests with a drawn out glass tube resulted in a "slow leak" two hole rubber stopper arrangement which with a 5 gallon water bottle gave a collection of about 2 liters per hour. This would give a sample of the proper size for activity determinations of the low levels it was anticipated would be encountered.

Classification Cancelled

Publicly Releasable

Priority of *PLA* Date AUG 26 1971

This document has received the necessary patent and technical information reviews and can be distributed without limitation.

[REDACTED]

The jug in a wooden case and its slow leaking stopper were carried to the vicinity on the morning of December 17, 1947 and a search was begun for an appropriate spot at which to attempt collection of the desired sample. The requirements of a collection site were a stream depth sufficient that, sitting on the bottom, the jug top would be 3 or 4 inches below the surface. Almost all the points accessible (outside the Y-12 enclosure area) were found to be too shallow. One location, to the right of the East Gate approach road, a few hundred yards back of the service station was found which had this adequate depth although it can scarcely be termed really "accessible".

The empty jug in its case was carried down an embankment and, using hip boots for the wading, was placed in the water which there was adequate in depth (in some spots effectively greater in depth than the linear dimensions of the boots).

Very considerable difficulty was encountered in endeavoring to force the empty jug to remain submerged. At last with the aid of a number of large rocks from the reasonably close vicinity this was accomplished. At about the same time the next day (around 10:30 or 11:00 o'clock) the now full jug was removed having about 17 liters of contents, collected over a period of some 8 hours.

Results finally obtained on reduction in volume, filtering, drying and counting are tabulated herewith:

[REDACTED]

Distribution	Activity	Weight of Solids
Silt	3.6×10^{-4} μ c/l.	2.032 gm total = 0.135 gm/l
Supernatant	4×10^{-5} μ c/l.	3.933 gm total = 0.262 gm/l
Total	4.0×10^{-4} μ c/l.	5.965 gm total 0.397 gm/l

The evaluation of silt activity was made using a set of three samples to obtain correction data for self absorption which turned out to be quite large. As 1 minute counts were taken by the counting room and were rather small, the probable error will exceed 12 1/2%, however the three points were in an excellent straight line. Owing to the weights of the supernatant solid matter no self absorption evaluation was possible owing to lack of a second point, and an arbitrary correction factor of 10 was used, being of the order of magnitude of the correction for the silt sample of the nearest weight.

The values obtained compare reasonably with those of 7×10^{-5} μ c/l for background of Emory River water and $2. \times 10^{-4}$ μ c/l for Clinch River water at White King bridge.

It is felt that this specimen and its results, while a single case, are indicative of the order of magnitude of the effects to be observed.

For a more extensive and systematic survey of the present and/or future levels of waste water activity it would be desirable to have at such selected spots at which these measurements are desired, hollows or pools scooped out in the creek bed to a depth of approximately 28" and about 3 ft square. This will permit better handling of the samples, greater ease of collection and contribute to the dryness and health of those procuring them.

Further sampling will await such deepening of the creek at any preferred points, and any decisions arrived at in view of the magnitude of the values obtained. Previous handicapping laboratory difficulties have, for the present at least, been surmounted, and subsequent results may be hoped for earlier.


T.H.J. Burnett

THJB:rr

Distribution

1. F. Western
2. K.Z. Morgan
3. C.E. Haynes
4. R.H. Firminhac
5. W.A. Arnold
6. A. Hollaender
7. H.H. Ray
8. C.H. Perry
9. T.H.J. Burnett
10. J.H. Roberson
11. W.D. Cottrell
12. R.G. Lawler
13. Central Files
14. Reading Files