

## INTRA-LABORATORY CORRESPONDENCE

OAK RIDGE NATIONAL LABORATORY

February 20, 1961

Please copy for  
NER  
ESW  
FILE Waste DisposalTo: D. M. Davis  
J. C. Hart

An investigation into the cause of an increase in percent (MPC)w at K-25 water intake from 13.3% for the week ending 2/5/61 to 44.7% for the week ending 2/12/61 revealed a loss in dilution in the Clinch River because of zero releases from Norris Dam beginning February 8, 1961 and continuing to the present date.

A check with TVA officials indicated that releases from Norris were curtailed in an effort to conserve water in the reservoir since there was a low power demand coupled with low inflow. This zero release condition is expected to continue through February 19, 1961 at which time releases from Norris will be in the order of 1500 cfs for the next week provided there is no rain.

The low pool elevation at Norris may mean sub-normal releases for the remainder of the winter and spring months, resulting in less of dilution for wastes released from ORNL. 3/7

E. J. Witkowski of the Operations Division has been informed of the circumstances in order that better waste management may be exercised.

Original Signed By  
H. H. Abbe

HHA:ms

This document has been approved for release  
to the public by:

David R. Hamlin 11/17/95  
Technical Information Officer Date  
ORNL Site

INTRA-LABORATORY CORRESPONDENCE  
OAK RIDGE NATIONAL LABORATORY

*Subj  
Radiation Safety  
& Control*

February 23, 1961

To: J. A. Swartout  
A. M. Weinberg ✓

It is not easy to answer your note of February 8 concerning the contamination in the Clinch River. Prior to receiving your note, I supplied the information to the Operations Division and asked for their comments. I enclose a copy of the answer that I received from Jim Cox.

This is not the first time that we have exceeded 50% of MPC for a short period. In fact, there have been occasions when it has gone above 100%, so I can't guarantee that it won't happen again. I enclose the report for the last two weeks in January - you will note it has gone down again. So long as the average for any quarter is well below MPC, we are not in serious trouble.

Unfortunately, we are not in a position to point to any single factor that is responsible for the high readings. Rainfall is a factor that works both ways - 1) it stirs up the mud and thereby increases the activity, and 2) it provides more water for dilution. Even so, our highest readings are frequently associated with rainfall.

It is apparent that we need more information about the sources of the activity. To this end, the Waste Effluents Committee recommended increased effort on monitoring and flow. These monitoring stations are being installed. When the source can be spotted, something can be done about it.

The installation of canal demineralizers should be a considerable help. I will be extremely uneasy about the situation until the new waste trench is completed and we can abandon the open pits. When the present clean-up operations at the Laboratory are finished, the situation should improve. But not until the new waste system is installed will we be able to "breathe easy". So I expect to hear from you from time to time over the next two years.

We are not in good shape and you should be aware of it. I could recommend a crash program on all the improvements and say "I told you so" if anything happens. I don't think the situation is that desperate and we should accept the risk involved in carrying out the programs in a normal manner - namely, slow.

Original Signed W. H. JORDAN

W. H. Jordan

WHJ:dwh

cc: F. R. Bruce

This document has been approved for release  
to the public by:

*David R. Hamilton* 11/17/95  
Technical Information Officer Date  
ORNL Site

FEB 15 1961



INTERNAL CORRESPONDENCE

UNION CARBIDE NUCLEAR COMPANY

POST OFFICE BOX X OAK RIDGE, TENNESSEE

To (Name) **H. F. Henry**  
Company **UCNC**  
Location **K-25**

Date **February 14, 1961**  
Originating Dept **Health Physics Division**

Answering letter date

Copy to **W. E. Jordan**  
**F. R. Bruce**  
**K. E. Morgan - E. G. Strunness**  
**J. C. Hart - D. M. Davis**  
**J. A. Cox**  
**NSA File**

Subject **Radioactivity in Clinch  
River Water at ORNL  
Water Filtration Plant**

The results of analysis of the weekly composite Clinch River samples which were collected by ORNL personnel for ORNL at the water filtration plant intake are given in the attached table. (MPC)<sub>w</sub> values for the mixtures have been calculated and are included in the table.

Original signed by

**H. E. Abee**  
**Health Physics Division**

NSA:dc

Attachment

**RAMMAGNETIVITY IN THE CUMBER RIVER AT OROUP WATER FILTRATION PLANT**

Sample No.	Week Ending	Gross Beta c/m/ml <sub>a</sub>	Gross Alpha c/m/ml <sub>b</sub>	Er Beta 10 <sup>-8</sup> μc/cc	Ru Beta 10 <sup>-6</sup> μc/cc	Cs Beta 10 <sup>-6</sup> μc/cc	Ce Beta 10 <sup>-6</sup> μc/cc	(MPC) <sub>v</sub> 10 <sup>-6</sup> μc/cc	% (MPC) <sub>v</sub>
-43	1-22-61	0.56 ± 0.015	0.05	1.08 ± .36	0.75 ± .014	0	.001 ± .001	6.50	17.9%
-44	1-29-61	0.06 ± 0.007	0.01	0.45 ± .23	0.20 ± .006	0	.001 ± .001	4.64	6.3%

... Gross beta counted at approximately 9.3%. Counting efficiency based on Tl<sup>204</sup> as a standard.  
 . Gross alpha counted at 52% geometry.

X-247

# INTRA-LABORATORY CORRESPONDENCE

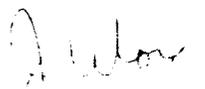
OAK RIDGE NATIONAL LABORATORY

February 14, 1961

To: W. H. Jordan

Art Rupp forwarded the analyses of the Clinch River water at the ORGDP Water Filtration Plant with the 53.2% MPC value during the week of January 8. We have checked our analyses of the tributary streams in the White Oak Creek drainage system and find that the increase was apparently due to a large amount of Sr<sup>90</sup> which went across White Oak Dam in December. Undoubtedly, the immediate cause of this was the high rainfall since a good fraction of the Sr was apparently retained in the stream beds in months of low or average rainfall and then washed out during periods of high rainfall. In the accompanying table, it is seen that over the three-month period (October - December) the total Sr accounted for in the different tributaries (disregarding the duplication of White Oak Creek below No. 4 Burial Ground) matches closely the total effluent across the White Oak Dam for the same period. However, while the largest release of Sr from the Laboratory occurred in October, the high release did not occur at the dam until December. Some increase also occurred in the Ru released from the waste pits; however, this was not as significant in the high MPC as the Sr. Apparently the creek bed acts as a reservoir holding part of the radioactivity during periods of low rainfall and releasing it during wet seasons.

I have asked Harold Abee to send us copies of the K-25 reports so that we can look for explanations of any similar conditions which may occur in the future.

  
J. A. Cox

JAC:bbh

Attachment

cc: H. H. Abee  
J. C. Hart  
A. F. Rupp  
E. J. Witkowski

Contribution of Main Branches in White Oak Creek Drainage System  
to Contamination Discharged into Clinch River

Waste Treatment Plant	White Oak Creek below Burial, No. 4 <sup>a, b</sup>	Melton Branch <sup>a</sup>	East Branch Waste Pit Area <sup>a</sup>	West Branch Waste Pit Area	White Oak Dam			
						Sr <sup>90</sup> (Curies)	Cs <sup>137</sup> (Curies)	Ru <sup>106</sup> (Curies)
October	5.2	3.2	0.3	.0006	.0004	2.7		
November	3.0	2.1	0.3	.0004	.004	2.2		
December	<u>3.0</u>	2.9	<u>0.1</u>	<u>.001</u>	<u>.002</u>	<u>6.2</u>		
Quarter	11.2		.7	.002	.01	11.1		
October	1.8			.007	.0003	2.0		
November	1.5					1.3		
December	0.7			.003	.003	2.7		
October	1.0			31.5	7	127		
November	.1			102.6	117	85.5		
December	.1			284.5	184	207.1		

<sup>a</sup>Grab samples were taken since no proportional sampler was available. These reduce the reliability of the results.

<sup>b</sup>This sample is obtained to determine whether a significant amount of activity is being leached from the No. 4 Burial Ground. Otherwise, it should contain the same activities as the Waste Treatment Plant sample.

## INTRA-LABORATORY CORRESPONDENCE

OAK RIDGE NATIONAL LABORATORY

Director's Files, 1960

Health Physics, Ecology Folder  
Shelf # 45

October 17, 1960

To: F. R. Bruce

Re: Potential Low Flow in Clinch River Starting Approximately  
October 24, 1960

M. E. Ramsey's office confirms that TVA intends to curtail the Clinch River flow at Norris Dam starting between October 24 and November 1 in order to perform certain maintenance functions at the dam. We learn further that:

- (1) the shutdown will probably extend over a period of about two weeks;
- (2) it is anticipated that the flow through the dam will be around 50 to 70 ft<sup>3</sup>/sec;
- (3) the expected flow at a point near Elza Gate and at the confluence of White Oak Creek will be approximately 150 ft<sup>3</sup>/sec and 200 ft<sup>3</sup>/sec respectively;
- (4) the present flow at the juncture at White Oak Creek is approximately 2000 to 2500 ft<sup>3</sup>/sec; and
- (5) starting around November 10 the Watts Bar pool will be lowered at a rate of 1/2 foot per week. (This may or may not complicate the picture.)

It is recommended that steps be taken immediately to set up controls over the release of radioactive liquid waste to the Clinch River during the period of low flow in the Clinch River. If the flow is reduced to approximately 200 ft<sup>3</sup>/sec as predicted, we lose a dilution factor of approximately 10 over that provided by the present flow. During the 30-day period which ended on September 25, 1960, the discharge at White Oak Dam resulted in an (MPC)<sub>w</sub> of approximately 11.8%. The concentration at the water intake at the K-25 plant was determined to be approximately 9.2% of the (MPC)<sub>w</sub>.

Original Signed By  
**J. C. Hart**  
Health Physics Division

JCH:dc

cc: H. H. Abee  
S. I. Auerbach  
K. Z. Morgan  
M. E. Ramsey  
E. G. Strunness  
E. J. Witkowski

This document has been approved for release  
to the public by

David R. Hamrin 12/15/95  
Technical Information Officer Date  
ORNL Site

FILE *H. P.*  
*Waste Disposal*

# INTER-COMPANY CORRESPONDENCE

OAK RIDGE NATIONAL LABORATORY

Operated By

CARBIDE AND CARBON CHEMICALS COMPANY

Post Office Box P  
OAK RIDGE, TENN.

(INSERT  
NAME)

COMPANY

LOCATION

TO **K. Z. Morgan**  
LOCATION **Building 2001**

DATE **April 2, 1954**

ANSWERING LETTER DATE

ATTENTION  
COPY TO

SUBJECT

I certainly agree with you that we should have better control over the disposal of toxic chemical waste from the Laboratory to the streams and surface water. We will set up a committee to review any new processes that are likely to discharge toxic chemical waste to the streams. This committee is to evaluate individual discharges that may be made.

Chairman of the Committee will be Harry Seagren, and a representative will be selected from the Operations, Chemical Technology, Health Physics and Engineering and Mechanical Divisions. You will be contacted in regard to the Health Physics representative.

*C. E. Larson*

C. E. Larson 

cc: Harry Seagren

MER:jl

ChemRisk Document No. 2671

This document has been approved for release to the public by:

*Daniel R. Hamlin* 4/16/96  
Technical Information Officer Date  
ORNL Site

FILE 142-3-11-10-1  
Waste

# INTER-COMPANY CORRESPONDENCE

OAK RIDGE NATIONAL LABORATORY

Operated By

CARBIDE AND CARBON CHEMICALS COMPANY

1954 MAR 26 AM 10 51  
Post Office Box P  
OAK RIDGE, TENN.

(INSERT NAME) COMPANY \_\_\_\_\_

LOCATION \_\_\_\_\_

RECEIVED - OPNL  
OFFICE OF DIRECTOR

TO Dr. C. E. Larson  
LOCATION \_\_\_\_\_

DATE March 25, 1954

ATTENTION  
COPY TO \_\_\_\_\_

ANSWERING LETTER DATE \_\_\_\_\_

SUBJECT Discharge of Non-Radioactive  
Wastes into White Oak Creek  
Drainage Basin

2	LARSON, C. E.	CEL
3	RAMSEY, M. E.	
4	RUEFF, P. W.	
1	SEAGREN, H. E.	D
5		
COPY TO (DATE SENT)		

Reference is made to your memorandum of September 26, 1950 (AR-No. 142) on "Ecological Study of White Oak Lake," in which you called attention to the ecological study of White Oak Lake under joint investigation by the Waste Disposal Section, Health Physics Division and the TVA, and suggested that prior to the discharge of waste materials into the drainage basin, clearance for such discharge should be obtained from Mr. Roy J. Morton, Leader, Waste Disposal Section. If discharge into the drainage basin was inadvisable, alternate methods of disposal were to have been indicated.

As you know, TVA has completed its study of the ecology of White Oak Lake, but even before completion of their study several instances were noted where fish caught in the area were covered with lesions, due to unknown causes. Such conditions were noted sometime during October 1951, October 1952, and March 1953. More recently, particularly during February 1954, distress in fish was again noted on three separate occasions. In one instance, large numbers of dead fish were found. Check and follow-up, in an attempt to determine the cause of the fish kill, indicated that substantial quantities (up to 30 gallons) of a solvent, propylenediamine, were discharged either through the settling basin or directly to White Oak Creek, during this particular interval. Since then some preliminary studies have been carried out on blue gills (one of the fish normally present in White Oak Lake) to determine the threshold dose of PDA. These studies indicate that a concentration of about 35 ppm appears to be toxic. The effects were most unusual since the solvent removed the protective slime covering the fish and seemed to affect their nervous system.

On March 17, large quantities of a strongly smelling organic material were discharged through the settling basin markedly changing its usual appearance. The source of these wastes has not been located. During discussions relating to this incident, it was learned that a Plating Shop was to be placed in operation in the very near future with the possible discharge of cyanides and hexavalent chromium. Investigation of this potential waste source and discussions with individuals concerned indicated that the toxic materials were to be discharged into the storm sewer and not into the process drainage system, which empties into the settling basin. However, the storm drains discharge directly into White Oak Creek and these materials will find their way into the White Oak Lake drainage basin.

# INTER-COMPANY CORRESPONDENCE

OAK RIDGE NATIONAL LABORATORY

Operated By

CARBIDE AND CARBON CHEMICALS COMPANY

Post Office Box P  
OAK RIDGE, TENN.

(INSERT  
NAME)

COMPANY \_\_\_\_\_

LOCATION \_\_\_\_\_

TO  
LOCATION

DATE

ANSWERING LETTER DATE

ATTENTION  
COPY TO

SUBJECT

- 2 -

*surface water  
is a spring*

Because of their toxicity, these substances should not be discharged into sources of public water supply. White Oak Creek discharges into White Oak Lake and the Clinch River, which serves as a source of water supply for K-25 and Kingston. In addition, it serves as a source of supply for the Kingston Steam Plant. Permissible concentrations of  $CN^-$  are reported to be 1 part per million (1 mg/l) and for  $Cr^{+6}$  to be 0.05 ppm. Also there is some evidence that mercury is being discharged into White Oak Creek. This is a very toxic substance. The toxicity level of some of the newer solvents for aquatic life is not known, and every effort should be made to keep these materials out of surface waters until their effects upon normal stream flora and fauna are more completely understood.

With this background information, it appears desirable to again call attention to the fact that waste materials should not be discharged into surface waters in the plant area until approval for their discharge has been obtained. In this connection, it would be desirable to give consideration to the establishment of an intra-division or inter-Laboratory waste disposal committee including representation from Health Physics, Chemical Technology, Chemistry, Operations, Health Physics Y-12, and possibly K-25. The function of this committee would be to review all new processes noting in particular the nature and amounts of wastes which are to be discharged. If toxic materials are encountered, provisions should be made for their removal from the waste streams before discharge, and their removal should be considered a part of the new process. In other words, no new process is complete nor should it be placed into operation until it is positively determined that the waste materials are neither toxic nor inimical to the flora and fauna of the streams in the area. The addition of possible toxic substances to any of these streams adds another factor to the many that have to be considered in an attempt to evaluate the effect of radioactive materials on the environment of the drainage area.

The Laboratory and the AEC have been cognizant of their responsibilities relative to the discharge of radioactive liquid waste materials, and have avoided the release of hazardous quantities of these materials into the environment. The same philosophy should govern the disposal of toxic chemical wastes.

CPS:KZM:fn

THIS FORM FOR INTER-COMPANY CORRESPONDENCE ONLY





# INTER-COMPANY CORRESPONDENCE

OAK RIDGE NATIONAL LABORATORY

Operated By

CARBIDE AND CARBON CHEMICALS COMPANY

(INSERT NAME)

COMPANY \_\_\_\_\_

LOCATION \_\_\_\_\_

Post Office Box P  
OAK RIDGE, TENN.

Notes

TO C.E. Larson  
LOCATION Building 2068

DATE 3-28-52

2	Emlet, L. B.	
1	Rueff, P. W.	
4		

ATTENTION  
COPY TO L.A. Krumholz

ANSWERING LETTER DATE \_\_\_\_\_

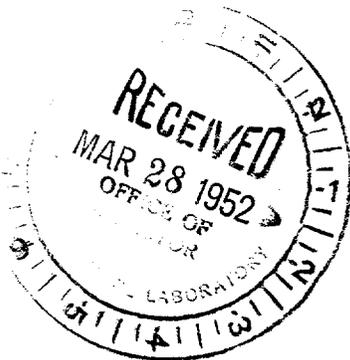
SUBJECT \_\_\_\_\_

COPY TO: \_\_\_\_\_

The excessive turbidity of the water in White Oak Lake has, in all probability, largely contributed to the marked changes in the fish population of that body of water during the past 18 months. Furthermore, it has masked the results of studies made on the effects of radioactivity on the plant and animal life of the area. Most of that turbidity is directly traceable to the removal of terrestrial vegetation in the 4,000 and 7,000 areas of the X-10 plant site and the areas in between. Although only a relatively small part of the White Oak watershed, the denuded area lies directly along the creek bank in many places and any runoff following rainfall carries a considerable silt burden into the stream and thence into the lake. The areas in the vicinity of the waste storage pits and the old burial ground also contribute considerably to the silt burden carried into the lake. In addition, the shoulders and ditch banks bordering most of the roads in the plant area are free of vegetation and easily eroded during periods of rainfall. Some roads near the upper end of White Oak Lake are not surfaced for all weather travel. Although such roadside areas may appear insignificant, their collective area is quite large and the amount of runoff from them is high.

If all of these areas were covered with vegetation that would form a good sod it is felt that there would be considerable gain in two major points:

1. The vegetative cover would materially reduce the amount of silt carried into the lake and the lake would become somewhat clearer.
2. The vegetative cover would materially reduce the amount of particulate radioactive material that might be blown about in the dust from the denuded area.



*R. Z. Morgan*  
R. Z. Morgan, Director  
Health Physics Division

LAKrumholz/r  
cc: D. W. Cardwell

This document has been approved for release to the public by:

Dwight Krumholz 4/15/96  
Date  
Technical Information Officer  
ORNL Site