

27/10

Mercury

008616

OAK RIDGE NATIONAL LABORATORY

# 1055-1015

OPERATED BY  
UNION CARBIDE CORPORATION ORNL/M-2373  
NUCLEAR DIVISION



POST OFFICE BOX X  
OAK RIDGE, TENNESSEE 37830

June 9, 1983

Publicly Releasable

Mr. J. F. Wing, Chief  
Environmental Protection Branch  
Department of Energy  
Oak Ridge Operations  
Post Office Box E  
Oak Ridge, Tennessee 37830

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

Dear Mr. Wing:

MERCURY IN SOIL AND SEDIMENT AT ORNL

As requested by G. Marciante of your staff, we are enclosing three sets of sediment and soil data: White Oak Creek Sediment (1979 samples), White Oak Creek Sediment (1983), and soil core samples adjacent Buildings 3503 and 3592. Maps showing the sample points for each group are also enclosed. The points for the 1983 White Oak Creek sediment samples are shown on two map segments. Assessment of the environmental impact of this data is underway, and methyl mercury analysis is being performed on several of the higher samples.

Also enclosed are the results of the mercury sampling performed by the Industrial Hygiene Department in Buildings 4501, 3503, and 3592.

Sincerely,

T. W. Oakes

T. W. Oakes  
ORNL Environmental Coordinator  
Industrial Safety and Applied  
Health Physics Division

Environmental Restoration Division  
Document Management Center

TWO:WFO:aw

Attachments

- xc: R. L. Egli, DOE
- D. E. Ferguson
- A. S. Garrett
- D. C. Parzyck
- C. D. Richmond

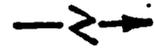
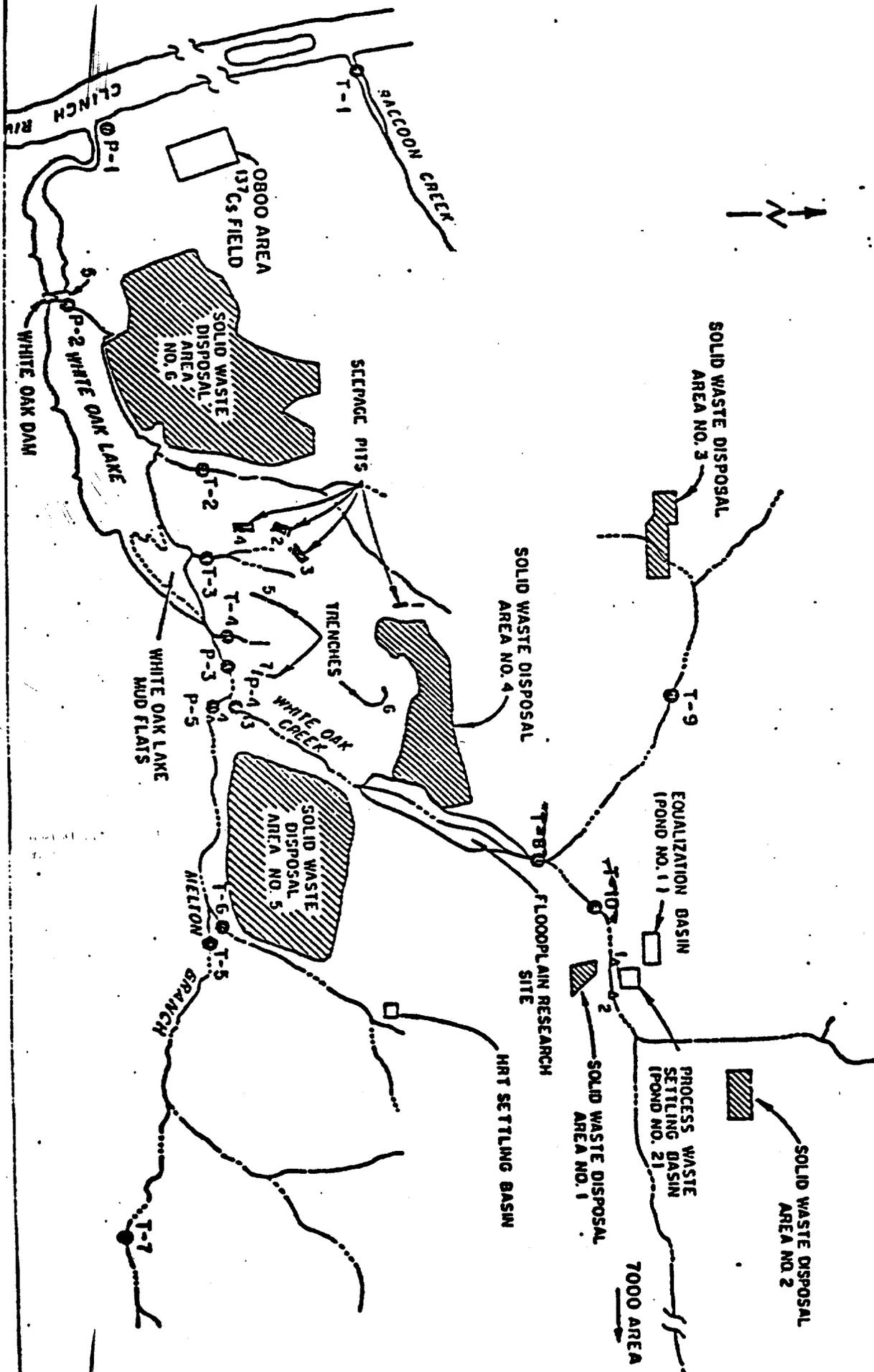
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PUBLIC RELEASE

#1055

1979 Mercury in Sediment\* of White Oak Creek  
(ppm dry weight)

<u>Sample Point</u>	<u>Concentration</u>
P-1	0.11
P-2	3.3
P-3	2.2
P-4	2.3
P-5	0.03
<del>P-6</del>	<del>0.03</del>
T-1	0.05
T-2	0.06
T-3	0.04
T-4	0.04
T-5	0.02
T-6	0.04
T-7	0.02
<del>T-8</del>	<del>0.02</del>
T-9	0.04
<del>T-10</del>	<del>3.8</del>

\* Surface sediment (<3 inches deep)

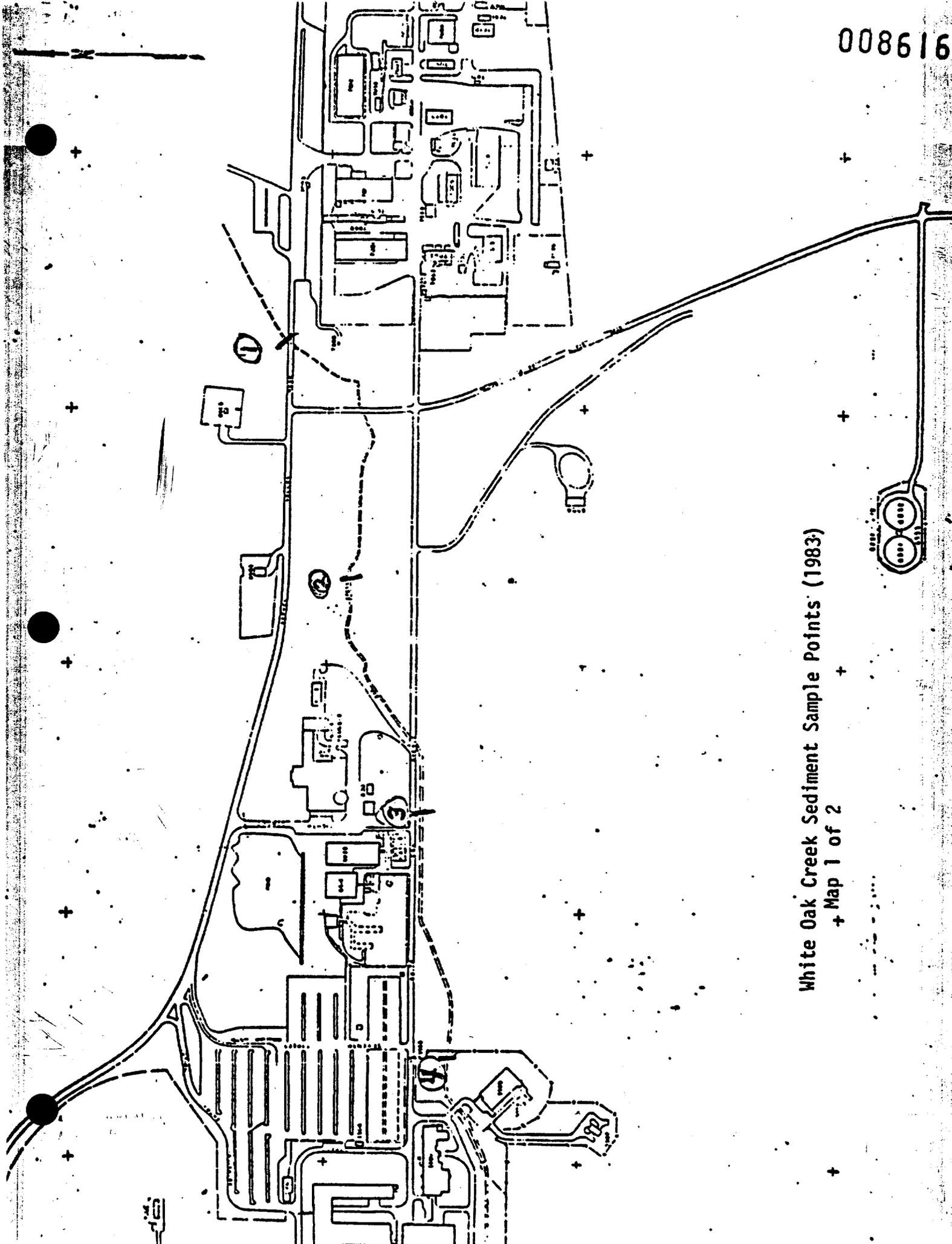


1979 Sediment Sample Points

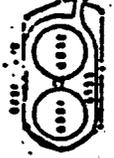
## Mercury Sample Results for Sediment in White Oak Creek (1983)

<u>Sample Location</u>	<u>Core Segment</u>	<u>Mercury (ppm dry weight)</u>
1-R(1)	C(2)	0.1
3-R	C	0.2
4-L	C	0.2
5-M	T	0.3
5-M	M	0.2
5-M	B	0.2
5-L	T	0.2
5-L	M	0.2
5-L	B	0.1
6-L	T	2.9
6-L	M	2.0
6-L	B	6.4
6-R	T	9.5
6-R	M	1.6
6-R	B	2.8
7-R	T	5.1
7-R	M	18
7-R	B	19
7-L	T	8.1
7-L	B	0.4
8-R	T	2.5
8-R	M	4.5
8-R	B	1.4
9-R	C	0.1
9-L	C	6.7

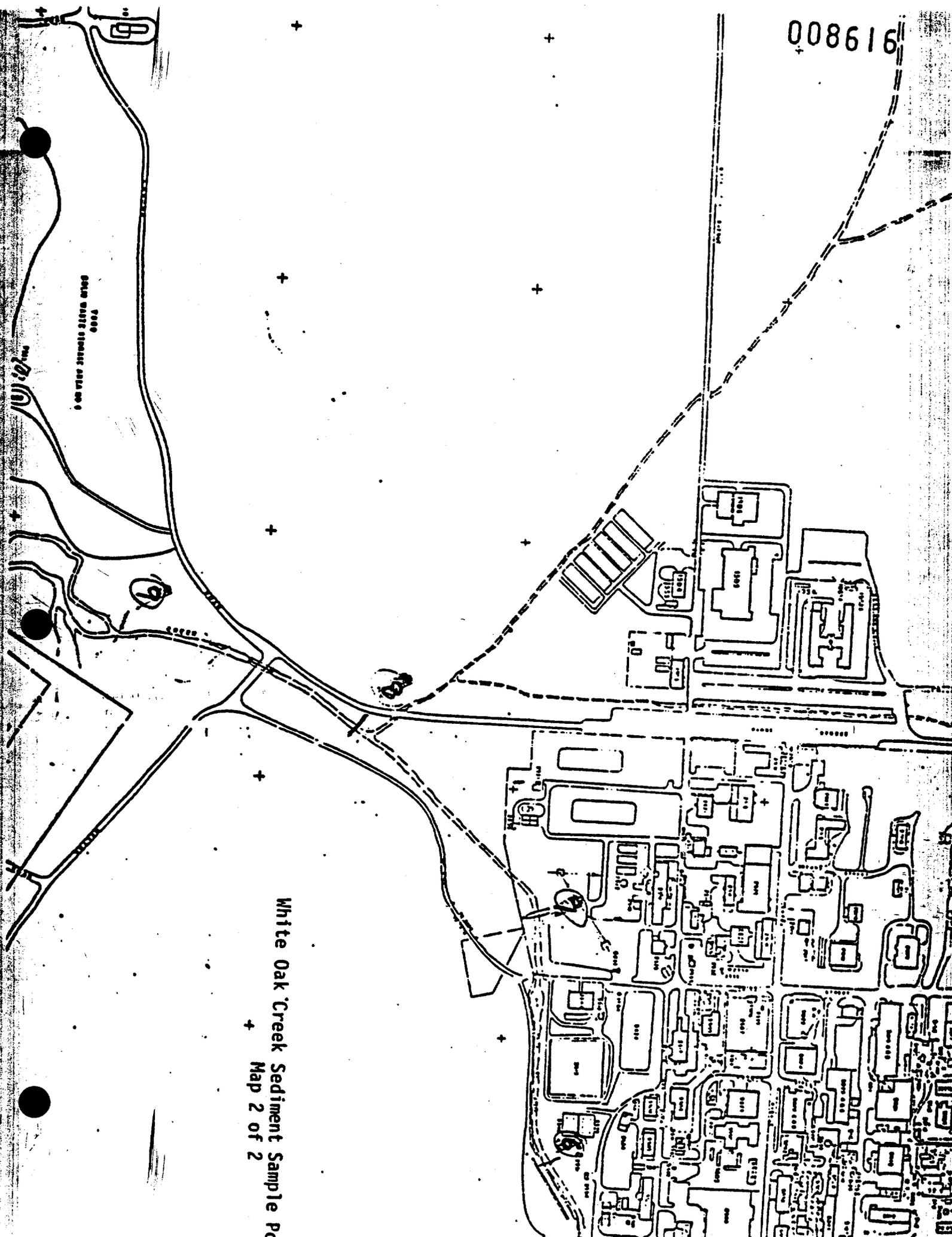
1. R, M, and L indicate the right, middle, and left of the stream looking downstream
2. T, M, B, and C indicate the top, middle, bottom, and composite of a 10-inch core



White Oak Creek Sediment Sample Points (1983)  
+ Map 1 of 2



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7000  
DATA DATE: 11/18/88

White Oak Creek Sediment Sample Pc  
Map 2 of 2

Mercury Results for Soil  
Samples Taken Near Buildings  
(ppm dry weight)

Sample Location

Concentration

South of Bldg. 3503

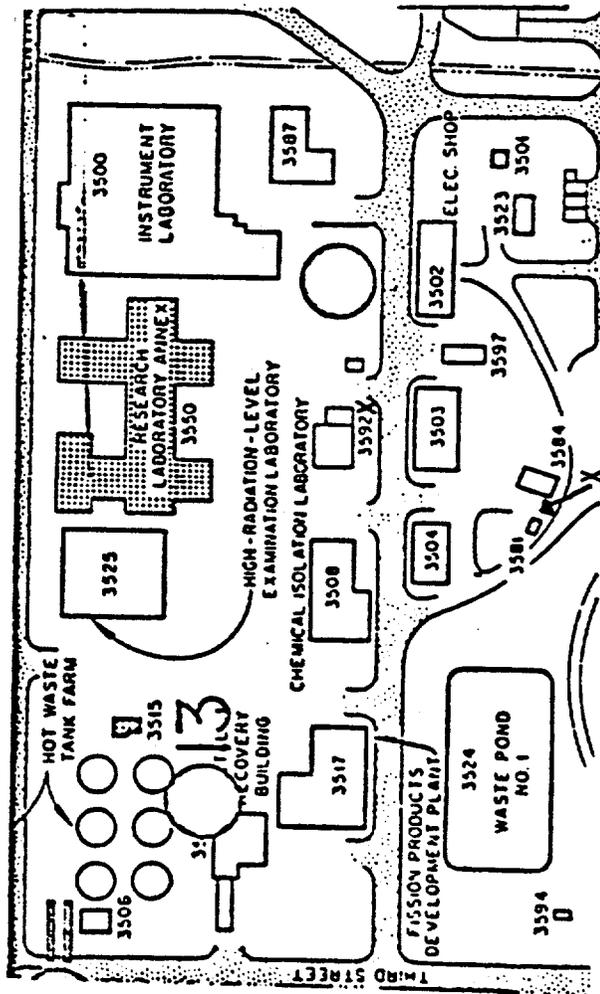
Storage Area 1  
Storage Area 2  
Storage Area 3  
Storage Area 4

25  
3.2  
6.5  
0.8

Building 3592

Sample 1  
Sample 2  
Sample 3

4.1  
8.8  
320



X Soil Sample Locations

## INTRA-LABORATORY CORRESPONDENCE

OAK RIDGE NATIONAL LABORATORY

June 9, 1983

To: K. W. Sommerfeld  
From: A. S. Garrett, Jr., M.D. (4-7431)  
Subject: Industrial Hygiene Sampling for Mercury

Attached you will find several examples of mercury sampling by the Industrial Hygiene Dept. in recent days at the three sites that we are aware that there have been mercury projects in the past, i.e., Bldgs. 4501, 3503 and 3592. Two different sampling techniques have been used. One is a TLV immediate read-out instrument that has a detection limit for mercury of  $.005 \text{ mg/m}^3$ . Of those measurements done by this technique, you will notice that almost all of them are reported as less than  $.005 \text{ mg/m}^3$ , meaning that it was below the detection capability of this piece of equipment. There was one sample in Bldg. 3592 where the sample was taken directly in a floor drain. The result was  $.01 \text{ mg/m}^3$ . This compares with the Threshold Limit Value allowable exposure on a time weighted average of  $.05 \text{ mg/m}^3$  allowed, so even in the floor drain the air level was only about 20 percent of that allowed.

The other technique of sampling involves long-term collection on activated charcoal and analyzed by atomic absorption methods. By this technique the threshold of detection is  $.001 \text{ mg/m}^3$ . You will note that samples are reported as less than  $.001$ , with the exception of the sample done on 5-26-83 in 4501, that is reported as  $.002 \text{ mg/m}^3$ , and another sample done on 5-25 in Bldg. 4501 that also was reported as  $.002$ .

All of this amounts to the fact that so far in our sampling program, we have found no areas where there is airborne mercury that comes anywhere near allowable limits for exposure. We plan to do some additional monitoring and will give you a follow-up report of the results.

ASG:ph

Attachment

Air Sampling for Mercury Vapor

(Long-term samples collected on activated charcoal and analyzed by AA method)

<u>Date</u>	<u>Bldg/Location</u>	<u>Sample Duration (Minutes)</u>	<u>Air Concentration (mg/m<sup>3</sup>)</u>
5/26/83	4501, directly over sump #2	373	< 0.001
"	4501, GB-74, SW	380	0.002
"	3503, SW Corner	405	< 0.001

## Air Sampling for Mercury Vapor

Building 4501

<u>Date</u>	<u>Location</u>	<u>Air Concentration</u> (mg/m <sup>3</sup> )
6/6/83	First Level	
	* Rm. 102 (Three locations)	< 0.005
	* Rm. 105 (Three locations)	"
	* Rm. 106 - Drain	"
	* Rm. 106 (Three locations)	"
	* Rm. 108 - Drain	"
	* Rm. 108 (Three locations)	"
	* Rm. 110 - Drain	"
	* Rm. 110 (Three locations)	"
	* Rm. 111 (Three locations)	"
	* Rm. 116 (Three locations)	"
	* Rm. 117A (Three locations)	"
	* Rm. 118 (Three locations)	"
	* Rm. 119 (Three locations)	"
	* Rm. 120 (Three locations)	"
	* Rm. 122 - Drain	"
	* Rm. 122 (Three locations)	"
	* Rm. 123 - Drain	"
	* Rm. 123 (Three locations)	"
	* Rm. 127 - Outside in Hall	"
* Machine Shop (Three locations)	"	
* East East-West Hall	"	
* West East-West Hall	"	
6/6/83	Second Level	
	* Rm. 201 (Three locations)	< 0.005
	* Rm. 206 (Three locations)	"
	* Rm. 208 - Drain	"
	* Rm. 208 (Three locations)	"
	* Rm. 210 - Drain	"
	* Rm. 210 (Three locations)	"
	* Rm. 212 - Drain	"
	* Rm. 212 (Three locations)	"
	* Rm. 220 (Six locations)	"
* Rm. 221 (Three locations)	"	
* Locker Room (Three locations)	"	
6/6/83	Basement	
	* Sump in BG 74	< 0.005

Building 4501, Cont'd

<u>Date</u>	<u>Location</u>	<u>Air Concentration</u> <u>(mg/m<sup>3</sup>)</u>
6/6/83	Basement	
	* Sump West of BG 74	< 0.005
	* Sump No. 1	"
	* Large Sump East 4501	"
	* Large Sump NW 4500N	"
	* Center of Basement	"
	* East Basement	"
	* West Basement	"
	* Center BG 74	"

\* Represent many single readings - grab samples taken with direct-reading mercury vapor analyzer.

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## Air Sampling for Mercury Vapor

Building 3592

<u>Date</u>	<u>Location</u>	<u>Air Concentration</u> (mg/m <sup>3</sup> )
6/6/83	* First Floor - Center of Room	< 0.005
	SW Corner	"
	SE Corner	"
	NW Corner	"
	NE Corner	"
	Floor Drain	0.01
	* Second Floor - Center of Room	< 0.005
	SW Corner	"
	SE Corner	"
	NW Corner	"
	NE Corner	"
	Floor Drain	"
	* Outside Building - N Side	< 0.005
	E Side	"
	S Side	"
	W Side	"
	Between Bldg. 3592 & 3541	"

Building 3503

6/6/83	* West End of Building	
	First Floor - SW Corner	< 0.005
	Center of Room	"
	N. Side of Room	"
	S. Side of Room	"
	E. Side of Room	"
	Second Floor - Catwalk	"
	* East End of Building	< 0.005
	First Floor - Center of Room	"
	N. Side of Room	"
	S. Side of Room	"
	E. Side of Room	"
	W. Side of Room	"

## Building 3503, Cont'd.

<u>Date</u>	<u>Location</u>	<u>Air Concentration (mg/m<sup>3</sup>)</u>
6/6/83	* Second Floor - East Side	< 0.005
	S. Side Catwalk	"
	N. Side Catwalk	"
	W. Side Catwalk	"
	Offices	"
	Labs	"
	* Change Room	< 0.005
5/27/83	* W. End of Building	< 0.005
	SW Corner	"

Represent many single reading - grab samples taken with direct-reading mercury vapor analyzer.

INTRA-LABORATORY CORRESPONDENCE  
OAK RIDGE NATIONAL LABORATORY

008616

June 1, 1983

To: A. S. Garrett, Jr.  
From: J. A. Ealy (4-6167) *JAE/JL*  
Subject: Industrial Hygiene Survey

The results of the industrial hygiene samples recently conducted in your area have been determined. The results of the samples do not exceed the TLV\*. This means that at the time the sampling was conducted, the operation was considered safe. Further sampling may be required if the operation is changed in any way or to verify these or any previous results.

Thank you for your cooperation in this matter. If you have any questions, please contact our department.

Area Air Sampling Results

<u>Date</u>	<u>Contaminant</u>	<u>TLV*</u>	<u>Concentration</u>	<u>Location</u>
5/25/83	Mercury	0.05 mg/m <sup>3</sup>	< 0.001 mg/m <sup>3</sup>	Bldg. 3503
"	Mercury	"	< 0.001 mg/m <sup>3</sup>	"

Comments or Recommendations:

\*The Threshold Limit Value (TLV) is based on a time-weighted average (TWA) concentration for a normal 8-hour workday or 40-hour work week, to which nearly all workers may be repeatedly exposed, day after day, without adverse effects.

cc: WEP (Bldg. File)

INTRA-LABORATORY CORRESPONDENCE  
OAK RIDGE NATIONAL LABORATORY

0086

June 1, 1983

To: A. S. Garrett, Jr.  
From: J. A. Ealy (4-6167) *JAE/JH*  
Subject: Industrial Hygiene Survey

The results of the industrial hygiene samples recently conducted in your area have been determined. The results of the samples do not exceed the TLV\*. This means that at the time the sampling was conducted, the operation was considered safe. Further sampling may be required if the operation is changed in any way or to verify these or any previous results.

Thank you for your cooperation in this matter. If you have any question please contact our department.

Area Air Sampling Results

<u>Date</u>	<u>Contaminant</u>	<u>TLV*</u>	<u>Concentration</u>	<u>Location</u>
5/25/83	Mercury	0.05 mg/m <sup>3</sup>	< 0.001 mg/m <sup>3</sup>	Bldg. 4501
"	Mercury	"	< 0.001 mg/m <sup>3</sup>	"
"	Mercury	"	< 0.001 mg/m <sup>3</sup>	"
"	Mercury	"	0.002 mg/m <sup>3</sup>	"

Comments or Recommendations:

\*The Threshold Limit Value (TLV) is based on a time-weighted average (TWA) concentration for a normal 8-hour workday or 40-hour work week, to which nearly all workers may be repeatedly exposed, day after day, without adverse effects.

cc: WEP (Bldg. File)