

ChemRisk/Shonka Research Associates, Inc., Document Request Form

OSFD

(Box 2)

(This section to be completed by subcontractor requesting document)

J. Lamb / 1034A
Requestor Document Center (is requested to provide the following document)

Date of request ~~6/14/96~~ 6/14/96 Expected receipt of document ~~7/14/96~~ 7/14/96

Document number _____ Date of document 1957

Title and author (if document is unnumbered)
Chromate Air Concentrations // Ammonia and Nitrate Water Concentrations // Fluorides.
=> copy marked page

(This section to be completed by Document Center)

From Folder 1.1. New-1.6
His bag

Date request received 6/19/96 (3 letters)

Date submitted to ADC 7/3/96

Date submitted to HSA Coordinator 6/19/96

(This section to be completed by HSA Coordinator)

Date submitted to CICO 7/3/96

Date received from CICO 7/22/96

Date submitted to ChemRisk/Shonka and DOE 7/31/96

(This section to be completed by ChemRisk/Shonka Research Associates, Inc.)

Date document received _____

Signature _____

2708

DM

INTER-COMPANY CORRESPONDENCE
UNION CARBIDE NUCLEAR COMPANY
A Division of Union Carbide and Carbon Corporation

RECEIVED
D.M. LANG 2908
1.3.1
FEB 11 AM 10.00

To: M. A. Fletcher
K-1101

Plant: Oak Ridge Gaseous Diffusion

Date: February 5, 1957

Copies To: J. C. Barton
S. Katz
T. Kwasnoaki
D. M. Lang ✓
D. L. Stoddard

Subject: Chromate Sampling in
the K-892 Area

Submitted herewith are the results of an air survey for chromate concentration taken in the vicinity of the K-33 cooling towers.

Four pans, with an area of one square foot each, were placed along the perimeter fence on the east side of the cooling towers. An additional pan was placed on the east side of Poplar Creek just north of the K-801 building. The chromate fallout was collected in these pans and a chemical analysis was made at various intervals. The results are shown in the accompanying table.

T. C. Whitson

TCW: jd

#2908

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

John Fletcher 7/24/96
Technical Information Officer Date
Oak Ridge K-25 Site

Union Carbide Nuclear Company, Oak Ridge Gaseous Diffusion Plant, Operating Contractor for the U.S. Atomic Energy Commission.

CrO_3 FALLOUT IN THE K-892 AREA, MICROGRAMS/Sq. Ft./Hr.

Date Sampled	Sampling Duration, hours	By Fence, NE Corner K-892 G	By Fence, SE Corner K-892 G	By Fence, NE Corner K-892 H	By Fence, SE Corner K-892 H	East Side Poplar Creek, East of K-892 G
11/6/56	144	0.06	0.06	0.07	0.06	0.06
11/23/56	236	0.03	0.02	0.02	0.03	0.02
12/7/56	168	0.22	0.18	0.08	0.10	0.15
12/12/56	120	0.20	0.21	0.21	0.23	0.23
12/14/56	72	0.56	0.99	0.22	0.42	0.65
12/21/56	168	0.56	0.46	0.46	0.61	0.14
12/26/56	120	0.25	0.25	0.25	0.42	0.17
12/28/56	48	0.42	0.42	0.21	0.42	0.21
1/2/57	120	0.17	0.17	0.08	0.17	0.17
1/10/57	101	0.12	0.12	0.27	0.11	0.11
1/15/57	20*	2.55	1.35	1.75	1.55	1.00
1/22/57	169	0.21	0.23	0.21	0.30	0.42

*High fallout rates are probably due to short sampling time.

RECEIVED
D.M.LANG

INTER-COMPANY CORRESPONDENCE
UNION CARBIDE NUCLEAR COMPANY
A Division of Union Carbide and Carbon Corporation

1.3
MAR 22 PM 3:20

To: Mr. D. M. Lang ✓
K-1005

Plant: ORGDP

Date: March 21, 1957

Copies To: Mr. R. E. Greene
File (JCB)

Subject: Ammonia and Nitrate
Concentrations in
Poplar Creek

As you know, we became concerned some time ago with a hypothetical case involving the introduction of 2,000 pounds of NO_3^- per day as $\text{Ca}(\text{NO}_3)_2$ in 50,000 gallons of water into Poplar Creek at the West Village Sewage Disposal Plant location. We have information which may throw some light on the fate of nitrate between the disposal plant and K-891, the source of our K-33 cooling water supply.

ASSUMPTIONS

1. For the purpose of this discussion, it is assumed that the 2,000 pounds/day of NO_3^- will be an addition to the present nitrate content of Poplar Creek.
2. Since analyses to date show very low concentrations of NH_4^+ , it is assumed that nitrate added at the sewage plant would reach K-891 essentially unchanged.

The West End Sewage Disposal Plant has a capacity of approximately 3,000,000 gallons of sewage per day, the effluent being dumped into the East Fork of Poplar Creek. The minimum flow of Poplar Creek, based upon Geological Survey Data, is estimated to be 15,000,000 gallons per day, of which approximately two-thirds comes from East Fork. Dilutions of the hypothetical quantity of nitrate are given in the table below:

DILUTIONS OF NITRATE WASTE

	<u>Pounds of NO_3^-</u>	<u>Gallons of $\text{H}_2\text{O}/\text{day}$</u>	<u>Pounds of $\text{H}_2\text{O}/\text{day}$</u>	<u>PPM NO_3^-</u>
Nitrate Waste	2000	5×10^4	4.17×10^5	4800
Sewage Disposal Plant	2000	3×10^6	25.0×10^6	80
Poplar Creek	2000	1.5×10^7	1.25×10^8	16
Clinch River	2000	1.9×10^9	16.2×10^9	0.1

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

John Thayer 7/24/96
Technical Information Officer Date
Oak Ridge K-25 Site

Union Carbide Nuclear Company, Oak Ridge Gaseous
Diffusion Plant, Operating Contractor for the U.S.
Atomic Energy Commission.

DML

RECEIVED
D.M. LANG
1.3
1957 JUL 16 AM 11:40

INTER-COMPANY CORRESPONDENCE
UNION CARBIDE NUCLEAR COMPANY
A Division of Union Carbide and Carbon Corporation

To: Dr. J. S. Lyon
K-1033

Plant: Oak Ridge Gaseous Diffusion

Date: July 15, 1957

Copies To: Mr. K. W. Bahler
Dr. S. Katz
Mr. T. Kwasnoski
Mr. D. M. Lang
Mr. R. W. Levin
File

Subject:

As you recommended, the Oak Ridge Gaseous Diffusion Plant and the Paducah Laboratories have reached an agreement on sampling methods and analytical procedures to be used at the outset of the air monitoring program being planned for the two laboratories.

A. Fluorine and Fluorides

1. Method of Sampling - Boyce-Thompson Sampler followed by distillation of fluoride.
2. Method of Analysis - Titration with thorium nitrate solution.

Paducah agreed to provide the ORGDP Works Laboratory with copies of their detailed procedures for both sampling and analysis.

B. Sulfur Dioxide

1. Method of Sampling - Atmospheric sample drawn into hydrogen peroxide solution by automatic sampler at rate of 1 cubic foot per minute. Size of sample - 40 cubic feet.
2. Method of Analysis - Titration with barium perchlorate solution.

Oak Ridge agreed to furnish Paducah with copies of their detailed procedure for both sampling and analysis as well as to provide Paducah with a sampler on a loan basis.

We would appreciate the opportunity to review the proposed scope of the ORGDP program with you as soon as feasible in order that the requirements for analytical services and equipment can be determined.

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

John P. ... 7/24/57
Technical Information Officer Date
Oak Ridge K-25 Site

JCB:ae

WCX-163 (8-55)

J. C. Barton
Union Carbide Nuclear Company, Oak Ridge Gaseous Diffusion Plant, Operating Contractor for the U.S. Atomic Energy Commission.

This form for Inter-Company Correspondence only

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K-1101

Plant: Oak Ridge Gaseous Diffusion

Date: February 5, 1957

Copies To: J. C. Barton
S. Katz
T. Kwasnoski
D. M. Lang ✓
D. L. Stoddard

Subject: ~~Chromate~~ Sampling in
the K-892 Area

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TCW:jd

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John F. Fletcher 7/24/96
Technical Information Officer Date
Oak Ridge K-25 Site

Union Carbide Nuclear Company, Oak Ridge Gaseous
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CrO_3 FALLOUT IN THE K-892 AREA, MICROGRAMS/Sq. Ft./Hr.

<u>Date Sampled</u>	<u>Sampling Duration, hours</u>	<u>By Fence, NE Corner K-892 G</u>	<u>By Fence, SE Corner K-892 G</u>	<u>By Fence, NE Corner K-892 H</u>	<u>By Fence, SE Corner K-892 H</u>	<u>East Side Poplar Creek, East of K-892 G</u>
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UNION CARBIDE NUCLEAR COMPANY
A Division of Union Carbide and Carbon Corporation

1.3
MAR 22 PM 3:20

To: Mr. D. M. Lang ✓
K-1005

Plant: ORGDP

Date: March 21, 1957

Copies To: Mr. R. E. Greene
File (JCB)

Subject: Ammonia and Nitrate
Concentrations in
Poplar Creek

As you know, we became concerned some time ago with a hypothetical case involving the introduction of 2,000 pounds of NO_3^- per day as $\text{Ca}(\text{NO}_3)_2$ in 50,000 gallons of water into Poplar Creek at the West Village Sewage Disposal Plant location. We have information which may throw some light on the fate of nitrate between the disposal plant and K-891, the source of our K-33 cooling water supply.

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1. For the purpose of this discussion, it is assumed that the 2,000 pounds/day of NO_3^- will be an addition to the present nitrate content of Poplar Creek.
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John Thelton 7/24/96
Technical Information Officer Date
Oak Ridge K-25 Site

Union Carbide Nuclear Company, Oak Ridge Gaseous Diffusion Plant, Operating Contractor for the U.S. Atomic Energy Commission.

There is no analytical data available concerning NO_3^- or NH_4^+ concentrations of influent and effluent waters of the West End Disposal Plant. This plant uses an anaerobic type of treatment in which some ammonia is formed; however, this plant does not make a complete treatment but retains most of the solids for digestion. Since the nitrates are soluble they probably pass through the disposal plant rather than being collected with the sludge, and thereby are not reduced to any great extent. After discharge into East Fork it seems unlikely that nitrates would undergo any reduction and it is more probable that any ammonia present would be partially oxidized by the process of nitrification in the stream. Analytical data available shows an ammonia concentration of 0.3 ppm. in East Fork at the junction with Poplar Creek, 0.1 ppm. at K-891, 0.1 ppm. at the Water Purification Plant and 0.1 ppm. in the Clinch River. The nitrate concentrations observed were 5, 4, 2, and 2.5 ppm. respectively for the same locations. These measurements were made during the period in which the total flow exceeded the minimum flow by a factor of approximately three; one could conclude therefore that under minimum flow rates nitrate content at K-891 might reach 12 - 15 ppm. and ammonia as high as 0.3 ppm.

At the present time there is no evidence of corrosion within the plant that can be attributed to either nitrate or ammonia in the Poplar Creek water. No significant change in corrosion rates is anticipated even though the addition of a hypothetical quantity of 2000 pounds of nitrate per day would possibly increase the total nitrate content of Poplar Creek by a factor of approximately two, to about 30 ppm. at a time of minimum flow. Ammonia, which can be produced from nitrates under certain conditions, can present corrosion problems. The tolerance of NH_4^+ for Muntz Metal (Brass 60% Cu - 40% Zn) is 0.3 ppm. maximum. Above this concentration treatment of the water is prescribed. In the lube oil coolers at the ORGDP there is some Muntz Metal which is in contact with Poplar Creek water.

CONCLUSIONS

It appears that the introduction of approximately 2000 pounds of nitrate per day in a hypothetical case would present no serious corrosion problems at the ORGDP. It is assumed that most of the nitrate would pass through the West End Sewage Disposal Plant and that it would reach K-891 essentially unchanged. It is also assumed that the ammonia concentration would not change to any appreciable extent; however, if the hypothetical addition should come into reality, more analyses, especially for ammonia at times of normal stream flow, might be advisable. In any event, the problem is a short termed one as Clinch River cooling should be in operation by mid-summer of 1957. The contribution of 2000 pounds of nitrate per day is an insignificant amount, about 0.1 ppm., when released in the Clinch River. If all of this nitrate could conceivably be reduced to ammonia, it would contribute only an additional 0.03 ppm. to the existing 0.1 ppm. of ammonia in the Clinch River. The only adverse effect foreseen is the possibility of stimulated growth of aquatic plants in undesirable quantities in Poplar Creek as a result of increased nitrate content.


J.C. Barton

INTER-COMPANY CORRESPONDENCE

UNION CARBIDE NUCLEAR COMPANY

A Division of Union Carbide and Carbon Corporation

RECEIVED

D.M. LANG

1.3

1957 JUL 16 AM 11:20

To: Dr. J. S. Lyon
K-1003

Plant: Oak Ridge Gaseous Diffusion

Date: July 15, 1957

Copies To: Mr. K. W. Bahler
Dr. S. Katz
Mr. T. Kwasnoski
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JCB:ae