

National Aeronautics and  
Space Administration

Lewis Research Center  
Cleveland, Ohio  
44135



Copy to Attn of: 1620

January 29, 1985

Mr. William Franz  
USEPA Federal Agency Coordinator  
Environmental Review Branch 5ME12  
230 S. Dearborne Street  
Chicago, IL 60604

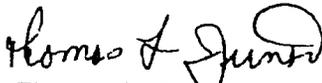
Dear Mr. Franz:

On January 16, 1985 we discussed the presence of red water holding lagoons at the Lewis Research Center, Plum Brook Station, Sandusky, Ohio. Prior to NASA acquiring the Plum Brook Station, the property was owned by the US Army and used as an ordnance manufacturing plant from 1941 through 1945. Two retention basins were established to store red water derived in the manufacture of pentolite and other explosives. During late 1945 the manufacturing facilities were decontaminated by the US Army.

By letter dated July 8, 1980 to Sandra S. Gardebring, Director, Enforcement Division, USEPA, the Lewis Research Center reported the apparent nontoxic and nonhazardous nature of the retention basins' contents. Vegetation grows and aquatic life including fish, frogs, and waterfowl are present. Raccoon, groundhog and deer drink from the basins.

As we discussed, and in accordance with your request, I am forwarding the results of two analyses of the water and soil from the basins obtained in 1980 and 1984. Enclosed are the following documents:

1. Analytical report of sample obtained August 12, 1980 (internal documentation).
2. Letter to Quartermaster General's Office from Battelle Columbus Laboratories dated December 2, 1983.
3. Memorandum from Ohio Adjutant General's Department to Ohio EPA dated January 4, 1984.

  
Thomas L. Junod

3 Enclosures

cc:  
1003/R.J.Koch  
6000/L.J.Ross  
1620/Official File

1620/TLJunod:dbz:1/29/85

	8-12-80	<del>RUBBER</del> TOP (TWIN LAKE)				TAMSON BROOK BOTTOM (TWIN LAKE)				<del>PLUM BROOK</del>				
DATE	8-12-80					8-12-80								
CHEMICAL OXYGEN DEMAND	36.36					72.72								
SUSPENDED SOLIDS	3.5					7.5								
DISSOLVED SOLIDS														
RADIOACTIVITY														
NITRATE (N)	<0.02					<0.02								
OIL & GREASE	2.8					2.8								
PHOSPHOROUS	0.13					0.22								
IRON	0.03					0.04								
ZINC	0.006					0.181								
LEAD	<0.01					<0.01								
COPPER	<0.03					<0.03								
CHROMIUM (TOTAL)	<0.01					<0.01								
CHROMIUM +6	<0.01					<0.01								
H	3.0					7.9					7.9			
COI (H2O)	-					-					-			

TRITE  
 NITRATE  
 NITRATE (N) By Conversion  
 TO TNT

~~53.75~~  
~~33.00~~

~~59.75~~  
~~37.00~~

8/14/80 P. L.E.

2/1

ANALYSIS REQUEST AND REPORT  
CHEMICAL SERVICES

SAMPLE NO. (S) "TOP" and "BOTTOM".		DATE COMPLETED 8-18-80	DATE REPORTED 8-18-80
REQUESTER R. J. Koch, Plum Brook	PAX 627-1205	DATE SUBMITTED 8-17-80	J.O. LOC0001

DESCRIPTION OF MATERIAL TO BE ANALYZED AND TYPE OF ANALYSIS  
Water samples for TNT.

METHOD  
Oxidation to nitrate - U.S. Army

ANALYSIS REPORT

Submitted aqueous solutions were analyzed for TNT after oxidation to nitrate. This method is described in the Anal. Chem. Vol. 49, No. 6, May 1977 by Daniel C. Leggett of the Department of the Army, U.S. Army Cold Regions Research and Engineering Laboratory, Hanover, New Hampshire.

After digesting the samples with potassium persulfate, nitrate contents were determined by ion specific electrode method. As described in the literature, separate samples were analyzed without the persulfate oxidation step and the difference assumed to be due to TNT. The validity of the method was evaluated, and this method was used to analyze the

ANALYSIS REQUEST AND REPORT  
CHEMICAL SERVICES

SAMPLE NO. (S)		DATE COMPLETED	DATE REPORTED
REQUESTER	PAX	DATE SUBMITTED	J.O.

DESCRIPTION OF MATERIAL TO BE ANALYZED AND TYPE OF ANALYSIS

METHOD

ANALYSIS REPORT

TNT in military waste effluents.

The following results were obtained.

TOP - 2003 parts-per-million (ppm) nitrate  
or 3295 ppm TNT.

BOTTOM - 853 ppm nitrate  
or 1403 ppm TNT.

One of the sample was also analyzed by the standard addition method, and the result obtained indicated reasonableness of the analytical procedure for determining nitrate. However, as you notice, the concentration of TNT is extremely high, where as the solubility of TNT in water is known to be about 130 to 200 ppm.

CHEMICAL SERVICES ANALYST



Top:

$$\begin{array}{r} 3125 \text{ ppm NO}_3^- \\ - 425 \text{ " } \\ \hline 2700 \text{ ppm NO}_3^- \end{array}$$

$$(2700 \text{ ppm NO}_3^-) \left( \frac{46 \text{ NO}_2}{62 \text{ NO}_3} \right) = 2003 \text{ ppm NO}_2$$

$$(2003 \text{ ppm NO}_2) \left( \frac{227 \text{ TNT}}{138 \text{ NO}_2} \right) = 3295 \text{ ppm TNT}$$

Bottom:

$$\begin{array}{r} 1500 \text{ ppm NO}_3^- \\ - 350 \text{ " } \\ \hline 1150 \text{ ppm NO}_3^- \end{array}$$

$$(1150 \text{ ppm NO}_3^-) \left( \frac{46 \text{ NO}_2}{62 \text{ NO}_3} \right) = 853 \text{ ppm NO}_2$$

$$(853 \text{ ppm NO}_2) \left( \frac{227 \text{ TNT}}{138 \text{ NO}_2} \right) = 1403 \text{ ppm TNT}$$