01.06 0038

National Aeronautics and
Space Administration

Lewis Research Center
Cleveland, Ohio
44135

NASA

Reply 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

Thomas L.Junod

3 Enclosures

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

1620/TLJunod:dbz:1/29/85

200-1e

8-12-80

	~~RUBBLER~~ TOP (TWIN LAKE)					~~TAMSON BROOK~~ BOTTOM (TWIN LAKE)					~~PLUM BROOK~~				
DATE	8-12-8					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									
PH	8.0					7.9					7.9				
COLI (MPN)	—					—					—				

NITRITE

~~SULFATE~~ By Conversion

~~NITRATE (N)~~ ~~TNT~~

8/14/80 D.L.L.

ANALYSIS REQUEST AND REPORT
CHEMICAL SERVICES

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

CHEMICAL SERVICES ANALYST

ANALYSIS REQUEST AND REPORT
CHEMICAL SERVICES

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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

ANALYSIS REQUEST AND REPORT
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ANALYSIS REPORT

Among many possible explanations, the most likely possibility is the presence of other organic materials containing nitrogen atoms. Currently, we are looking for an analytical method that is feasible for our type of samples and also specific for TNT.

CHEMICAL SERVICES ANALYST

Walter S. Kim

Top: 3125 ppm NO_3^-

$-$ 425 "

2700 ppm NO_3^-

$(2700 \text{ ppm } NO_3^-)\left(\frac{46\ NO_2}{62\ NO_3}\right) = 2003 \text{ ppm } NO_2$

$(2003 \text{ ppm } NO_2)\left(\frac{227\ TNT}{138\ NO_2}\right) = 3295 \text{ ppm } TNT$

Bottom: 1500 ppm NO_3^-

$-$ 350 "

1150 ppm NO_3^-

$(1150 \text{ ppm } NO_3^-)\left(\frac{46\ NO_2}{62\ NO_3}\right) = 853 \text{ ppm } NO_2$

$(853 \text{ ppm } NO_2)\left(\frac{227\ TNT}{138\ NO_2}\right) = 1403 \text{ ppm } TNT$