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NATIONAL LEAD COMPANY OF OHIO INC, MEMO FROM R. L. HOOVER TO W. J. MCCOMBE REGARDING CHEMICAL COMPOSITION AND ACTIVITIES OF RAFFINATE - (USED AS A REFERENCE IN OU1 RI)

02/03/56

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MEMO

MLC-28-LOTZ

NATIONAL LEAD COMPANY
OF OHIO
P.O. BOX 158
MT. HEALTHY STATION
CINCINNATI 31, OHIO

February 3, 1956

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SUBJECT: CHEMICAL COMPOSITION AND ACTIVITIES OF RAFFINATE

TO: Those listed below

FROM: Reynold L. Hoover

REFERENCE: Letter from C. L. Karl to G. W. Wunder, Possible Sale of Refinery Raffinates As Fertilizer, December 13, 1955.

In reply to the specific questions raised by the A.E.C. in the reference concerning the chemical composition and activities of raffinate the following is proposed for inclusion in a transmittal letter.

In accordance with the questions raised by the A.E.C. regarding the chemical composition and activity of raffinates in the letter from C. L. Karl to G. W. Wunder, subject, Possible Sale of Refinery Raffinates As Fertilizer, Dated December 13, 1955 the following information is submitted.

The chemical composition and activity of raffinates listed below is based on a composit made of all the raffinates generated in the Refinery from August 1, 1955 until November 1, 1955 unless otherwise specified and is thought to be representative of the material normally handled. This material was analyze on December 28, 1955.

1. Radium and Polonium content
   a. Radium - 1220 x 10^{-12} gm/gm sample
   b. Polonium - 1.3 x 10^{-12} gm/gm sample

2. Over-all alpha count
   a. Po^{210} - 12,700 d/m/gm alpha
   b. The alpha activity from other than Po^{210} is negligible.

3. Over-all beta-gamma count
   a. 108,107 d/m/gm
   b. Fresh raffinates range in activity from 1,723,000 d/m/gm to 778,000 d/m/gm.

4. Beta-gamma count from Ux_1 and Ux_2
   It is estimated that the Ux_1 and Ux_2 accounts for approximately 98% of the initial activity.

5. Activity from residual uranium in residues
   It is estimated that approximately 1% of the initial activity comes from residual uranium in residues.

6. Gross decay of raffinate activity
   The beta decay of raffinates exhibits a 24.5 day half life for about 4 to 8 weeks and then as more and more of the Ux_1 and Ux_2 decays the half life increases. For example, a sample collected March 30, 1955 and counted for successive weeks until January 1956 had an overall half life of 32.00 days.

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7. Quantitative chemical analysis showing major constituents of raffinate

a.

Th	.01%
Normal U	.13%
U + (Ux_1 Ux_2)	50%
Ra	1220 X 10^{-12} gm/gm
Po^{210}	1.2 x 10^{-12} gm/gm
Po^{210}	12,700 d/m/gm alpha
PO_4	4.[illegible]%
*NO_3	2.57% (Most of the NO_3 was evaporated off as NO_2)
N	.58%

*On previous samples analyzed without evaporation the NO_3 content ranged from 32.3% to 26.0%.

b.

Ag	.03%	Cr	.06%	Pb	.3 %
Al	2. %	Cu	.4 %	Sb	.04%
B	.05%	Fe	>4. %	SiO_2	>12. %
Ba	.2 %	Mg	2. %	Sn	.12%
Be	.001%	Mn	.4 %	Ti	.15%
Bi	.04%	Mo	.15%	V	.25%
Ca	1.5 %	Na	.6 %	W	.1 %
Co	.5 %	Ni	.5 %	Zn	<.04%

I would like your comments and suggestions on the material present as soon as possible so that the format and data presented in the letter to the A.E.C. can be prepared in final form.

ORIGINAL SIGNED BY
R. L. HOOVER
R. L. Hoover

RLH:mev

To: W. J. McCambe
F. Podlipec
T. C. [illegible]
[illegible]

cc: J. A. Quigley, M.D.
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