

Mark W. Napier, Esquire

-2-

APR 10 1986

In response to item 4 of your request, enclosed are copies of reports, including annual health protection program review reports, annual health and nuclear safety appraisal reports, annual health physics appraisal reports, progress and status reports, conducted by the Department of Energy of the FMPC for the period 1961 through 1985. Page one of the enclosed health protection program review dated August 22, 1961, indicates that a prior program review had been conducted in August 1957. This report has not yet been located, but a search is still in progress.

The enclosure consists of 504 pages and constitutes our complete response to item 3 of your request. When combined with the 249 pages provided you as of April 2, 1986, the total number of pages transmitted to date is 853. Eighteen (18) hours of clerical search time have been expended thus far in retrieving documents responsive to item 4 of your request. Search time was not involved in responding to items 1 through 3 of your request. When we complete our response and a final cost determination has been made, we will notify you of the full amount due. At that time, we will also advise you of your right to appeal any denial of a record, in whole or in part.

Documents responsive to item 5 of your request will be forthcoming at a later date.

Sincerely,

ORIGINAL SIGNED BY
P. T. MARQUESS

P. T. Marquess
Authorizing Official
Assistant Manager
for Administration

CC-10:TPS/RSS

Enclosures:
As stated

bcc: Wayne Range, M-4
Tom Jelinek, SE-33

CC-10:RSanders:6-1216:4/9/86

CONCURR
RTG. SYMB
CC-10
DATE
4/9/86
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Form 3811, July 1983 447-845

Put your address in the "RETURN TO" space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check box(es) for service(s) requested.

- Show to whom, date and address of delivery.
- Restricted Delivery.

3. Article Addressed to:
Mark W. Napier, Esquire
Martin M. Young & Associates Co., LP
Sixth Floor
130 East Sixth Street
Cincinnati, Ohio 45202 111111

4. Type of Service: Article Number

<input type="checkbox"/> Registered	<input type="checkbox"/> Insured	P 165 873 811
<input checked="" type="checkbox"/> Certified	<input type="checkbox"/> COD	
<input type="checkbox"/> Express Mail		

Always obtain signature of addressee or agent and **DATE DELIVERED.**

5. Signature - Addressee
X *Mark W. Napier*

6. Signature - Agent
X

7. Date of Delivery
4-14-84

8. Addressee's Address (Under 11 Registered and 12 Paid)
130 E

APR 14 1984
Special MP
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DOMESTIC RETURN RECEIPT

P 165 873 811

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE FEE
NOT FOR INTERNATIONAL MAIL

(See Reverse)

* U.S.G.P.O. 1984-446-014

Sent to	Mark W. Napier	
Street and No.	130 East Sixth Street	
P.O., State and ZIP Code	Cincinnati, Ohio	45202
Postage		\$
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Special Delivery Fee		
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TOTAL Postage and Fees		\$
Postmark or Date		

Form 3800, Feb. 1982

1114735

Martin M. Young
Richard E. Reverman
Mark W. Napier
Mark B. Weisser
Of Counsel
James Roy Williams
H. W. Young 1906-1977

**Martin M. Young
& ASSOCIATES CO., L.P.A.**
Attorneys at Law

Sixth Floor/130 East Sixth Street/Cincinnati, Ohio 45202
(513) 721-1078

Other Offices
Brentwood-Finneytown
Northgate-Colerain
Tri-County
Clermont County
Please refer to file number

January 30, 1986

Wayne Range
Freedom of Information Officer
Department of Energy
Oak Ridge Operations
P.O. Box E
Oak Ridge, Tennessee 37831

06 FEB 12 4:49
FEDERAL BUREAU OF INVESTIGATION
U.S. DEPARTMENT OF JUSTICE
USDOJ ORO

RE: Freedom of Information Request

Dear Mr. Range:

Under the provisions of the Freedom of Information Act, 5 U.S.C. 552, I am requesting copies of records relating to the Feed Materials Production Center in Fernald, Ohio and also information held by the Department of Energy regarding the health risk of cancer from exposure to uranium, uranium compounds, or other radioactive sources encountered by workers at the FMPC.

The specific records that I request are as follows:

1. Toxicology, clinical, occupational, or epidemiological studies or research conducted by the AEC, ERDA, or DOE regarding the health risk of cancer from exposure to uranium, uranium compounds, or other radioactive sources encountered by workers at the FMPC.
2. Research, reports, memorandum, correspondence, or other information provided by the AEC, ERDA, or DOE to NLO, Inc. or NL Industries as the past operators of the FMPC regarding the health risk of cancer from exposure to uranium, uranium compounds, or other radioactive sources encountered by workers at DOE facilities.
3. Health and safety complaints received by the AEC, ERDA, or DOE from workers or their representatives regarding exposure to uranium at the FMPC.

1114736

Wayne F. ...
Freedom of Information Officer
Department of Energy
January 30, 1986
Page Two

*HP has, plus
conclude in
retirement
20 hours*

4. Annual, periodic, or special health physics appraisals, reports, or investigations conducted by the AEC, ERDA, or DOE of the FMPC during the period 1955 through 1985.
- ? 5. Violations by NLO, Inc. of any federal regulations, statutes, or rules applicable to NLO, Inc.'s operation of the FMPC.

Please consider this letter an assurance of our willingness to pay fees in this matter. Please inform me, however, of the expected cost before filling my request if the total expected cost exceeds \$500.00.

If all or any part of this request is denied, please state the specific exemption that you believe justifies your refusal to release the information and also please inform me of the appeal procedures available to me.

As you may recall, a partly similar request was submitted by me previously in a letter dated April 5, 1985. Our request in that letter for waiver of fees was eventually denied. You may wish to refer to your letter dated June 12, 1985 when responding to my request for information regarding the estimated costs.

I would appreciate your prompt handling of this request and look forward to hearing from you within ten days.

Thank you for your assistance.

Very truly yours,

MARTIN M. YOUNG
& ASSOCIATES CO., L.P.A.

Mark W. Napier
By: Mark W. Napier

MWN/jj

1114737

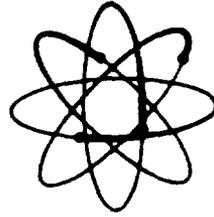
649

14 1986

NATIONAL LEAD COMPANY OF OHIO
A SUBSIDIARY OF NL INDUSTRIES, INC.

*Deleted
Version*

P. O. BOX 39158



CINCINNATI, OHIO 45239

FEB 7 1979

*BACK-UP
to Mr.
to NAPIER*

Mr. H. D. Hickman, Director
Manufacturing Division
Oak Ridge Operations
Department of Energy
P. O. Box E
Oak Ridge, Tennessee 37830

Dear Mr. Hickman:

[REDACTED], DECEASED, OCCUPATIONAL DISEASE CLAIM

By letter dated February 17, 1978, we advised you that a claim for death benefits under the Ohio Workers' Compensation law had been initiated by the widow of **[REDACTED]** a former employee. The claimant's application for benefits alleged that **[REDACTED]** terminal disease, leukemia, was due to occupational "radiation exposure."

We have now received a copy of the Medical Report dated January 26, 1979, from the Office of the Chief Medical Advisor of the Ohio Industrial Commission which medically approves the claim. Although the language of the Medical Opinion is ambiguous, i. e., "there (is) a causal relationship between decedent's death and his leukemia," it appears that the Industrial Commission's doctor has related his terminal disease to exposure to uranium at FMPC. A copy of the Medical Report is enclosed for your records.

We intend to examine the State's file in this case to determine the basis, if any, for the aforementioned opinion.

Sincerely yours,

S. F. Audia
Manager

WJG/rb

Enclosure

cc: H. D. Hickman
C. W. Hill - P. A. Kannan

W. J. Grannen
R. C. Heatherton
G. C. Smith

171

1114738

THE INDUSTRIAL COMMISSION OF OHIO
COLUMBUS, OHIO 43215

Case of _____ (Dec'd)

Fernald National Lead Co. of Ohio
P.O. Box 39158
Cincinnati, Ohio 45239
Employer _____

No. CD 172399
MEDICAL REPORT
OFFICE
CHIEF MEDICAL ADVISOR

Date of this Report: January 26, 1979
Date of Examination: January 26, 1979

RE: **Death Claim**
DATE OF INJURY: Patient died on January 10, 1978 of acute respiratory failure connective to leukemia

MEDICAL OPINION

Patient died of acute promyelocytic leukemia and strep sepsis on January 10, 1978. Claimant was a stationary engineer who started with leukemia symptoms on December, 1974. Patient was working with Fernald National Lead Company of Ohio for many years, with constant radiation of radioactive materials; therefore, there was a causal relationship between decedent's death and his leukemia. Radioactive uranium effect in the bone marrow is well known and the file is well documented. Approved medically. Expenses should be paid.

Respectfully submitted,

PS: 4113
cc: Boyer, Hechtman, Riley & Schmidt (Cl. Rep.)
Employer

JAMES A. RICHES
GOVERNOR



ROBERT C. FRANKLIN
ALMOND TRATOR

STATE OF OHIO
BUREAU OF WORKERS' COMPENSATION
DISTRICT OFFICE
100 E. 6TH ST
CINCINNATI 45202
PHONE 852-3323
August 1, 1979

CLAIM NUMBER: OD 174972
RE: XXXXXXXXXX

National Lead Co. of Ohio
Fernald Site
Harrison, Ohio 45030

Gentlemen:

The above captioned death claim is under investigation in the Cincinnati District Office, and the file indicates the deceased claimant died on April 5, 1977.

Enclosed please find Form C-2 which we request to have Part I completed and return to this office at the earliest possible date.

Any additional information you wish to submit will be made part of the file.

Yours very truly,

Everet P. Frady

Everet P. Frady
District Director

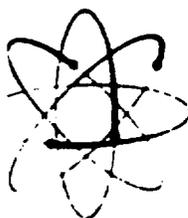
Virgil Spegal
Virgil Spegal
Investigator

VS/lan
Encl: CB-2
Envelope

1114741

NATIONAL LEAD COMPANY OF OHIO

P. O. BOX 39158



CINCINNATI, OHIO 45235

PHONE AREA CODE 513-751-1111

May 21, 1980

Bureau of Workers' Compensation
Claims Section
246 North High Street
Columbus, Ohio 43215

RE: Claim No. ODI76800
[REDACTED]

Gentlemen:

The Company has not certified the attached claim because the claimant has not described a disease which is compensable under Section 4123.68 of the Ohio Revised Code, nor is his disease one which is peculiar to the particular industrial process in which the claimant has been employed to which he is not ordinarily subjected or exposed to outside or away from his employment.

The Company denies that the complaint arose out of or in connection with the work at our facility.

Very truly yours,

ORIGINAL SIGNED BY
G. C. SMITH
INDUSTRIAL RELATIONS

G. C. Smith
Director of Personnel
and Industrial Relations

GCS:ag

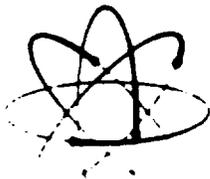
cc: H. D. Hickman ✓
W. J. Granger

1114742

NATIONAL LEAD COMPANY OF OHIO

A SURGEON GENERAL WARNING: Quitting Now Greatly Reduces Serious Risks to Your Smoking. 2777

P. O. BOX 39158



CINCINNATI, OHIO 45239

PHONE AREA CODE 513-736-1151

NEW YORK 10019

Mr. H. D. Hickman, Director
Manufacturing Division
Department of Energy, Oak Ridge Operations
P. O. Box E
Oak Ridge, Tennessee 37830

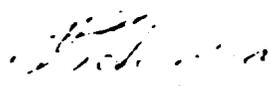
Dear Mr. Hickman:

OCCUPATIONAL DISEASE CLAIM - [REDACTED]

Attached is a claim filed by [REDACTED], Degreaser in our Plant 6 machining operation, who claims an occupational disease based on his exposure to, among other things, uranium dust. We feel that, ultimately, this claim may develop into a radiation claim in view of our belief that it is currently not compensable as an occupational disease.

We will keep you informed of further developments.

Sincerely,


S. F. Audia
Manager

GCS:jg
Attach.
cc: H. D. Hickman, w/attach.
W. J. Grannon, w/attach.
G. C. Smith

NATIONAL LEAD COMPANY OF OHIO

A SUBSIDIARY OF NL INDUSTRIES, INC.

P. O. BOX 39158

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Handwritten scribble

Undeleted Version

FEB

Additional Complaints

(This version not sent)

Mr. H. D. Hickman, Director
Manufacturing Division
Oak Ridge Operations
Department of Energy
P. O. Box E
Oak Ridge, Tennessee 37830

Dear Mr. Hickman:

[REDACTED], DECEASED, OCCUPATIONAL DISEASE CLAIM

By letter dated February 17, 1978, we advised you that a claim for death benefits under the Ohio Workers' Compensation law had been initiated by the widow of [REDACTED] a former employee. The claimant's application for benefits alleged that [REDACTED] terminal disease, leukemia, was due to occupational "radiation exposure."

We have now received a copy of the Medical Report dated January 26, 1979, from the Office of the Chief Medical Advisor of the Ohio Industrial Commission which medically approves the claim. Although the language of the Medical Opinion is ambiguous, i. e., "there (is) a causal relationship between decedent's death and his leukemia," it appears that the Industrial Commission's doctor has related his terminal disease to exposure to uranium at FMPC. A copy of the Medical Report is enclosed for your records.

We intend to examine the State's file in this case to determine the basis, if any, for the aforementioned opinion.

Sincerely yours,

S. F. Audia

S. F. Audia
Manager

WJG/rb

Enclosure

cc: H. D. Hickman
C. W. Hill - P. A. Kannan

W. J. Grannen
R. C. Heatherton

~~G. C. Smith~~

171

1111111111

THE INDUSTRIAL COMMISSION OF OHIO
COLUMBUS, OHIO 43215

Case of [REDACTED] No OD 172399
[REDACTED]
Employer Fernald National Lead Co. of Ohio } **MEDICAL REPORT**
P.O. Box 39158 } **OFFICE**
Cincinnati, Ohio 45239 } **CHIEF MEDICAL ADVISOR**

Date of this Report: January 26, 1979

Date of Examination: January 26, 1979

RE: Death Claim

DATE OF INJURY: Patient died on January 10, 1978 of acute respiratory failure connective to leukemia

MEDICAL OPINION

Patient died of acute promyelocytic leukemia and strep sepsis on January 10, 1978. Claimant was a stationary engineer who started with leukemia symptoms on December, 1974. Patient was working with Fernald National Lead Company of Ohio for many years, with constant radiation of radioactive materials; therefore, there was a causal relationship between decedent's death and his leukemia. Radioactive uranium effect in the bone marrow is well known and the file is well documented. Approved medically. Expenses should be paid.

Respectfully submitted,

ES:HLB

cc: Taylor, Hochman, Roney & Schmidt (C.L. Rep.)
Employer

1114745

NATIONAL LEAD COMPANY OF OHIO

P. O. BOX 1915



CINCINNATI, OHIO

*Wickman
Dutton*

AUG 21 1979

Mr. H. D. Hickman, Director
Manufacturing Division
Department of Energy, Oak Ridge Operations
P. O. Box E
Oak Ridge, Tennessee 37830

Dear Mr. Hickman:

WORKER'S COMPENSATION [REDACTED]

Attached is correspondence from the Ohio Bureau of Worker's Compensation and a claim form filed by the widow of [REDACTED] a former employee. The widow is alleging that her husband's death was the result of "continuous exposure to chemicals" at our plant.

Sincerely,
Original
S. F. Audia
Manager
S. F. Audia
Manager

GCS:jg
Attach.

- cc: H. D. Hickman, w/attach. ✓
- W. J. Adams, w/attach.
- W. J. Grannen, w/attach. (2)
- R. C. Heatherton, w/attach.
- A. Prickel, w/attach.
- G. C. Smith, w/attach.

94Lh111

1048
AUG 27 1979

JAMES A. ROODS
GOVERNOR



7-11

ROBERT C. HARRISON
ADMINISTRATOR

STATE OF OHIO
BUREAU OF WORKERS' COMPENSATION

DISTRICT OFFICE

100 E. 8TH ST.
CINCINNATI 45202
PHONE 852 3325

August 1, 1979

CLAIM NUMBER: OD 174972

National Lead Co. of Ohio
Fernald Site
Harrison, Ohio 45040

Gentlemen:

The above captioned death claim is under investigation in the Cincinnati District Office, and the file indicates the deceased claimant died on April 5, 1977.

Enclosed please find Form C-2 which we request to have Part I completed and return to this office at the earliest possible date.

Any additional information you wish to submit will be made part of the file.

Yours very truly,

Everet P. Frady

Everet P. Frady
District Director

Virginia Spegal
Virginia Spegal
Investigator

VS/mn
Encl: CB-2
Envelope

1114747

NATIONAL LEAD COMPANY OF OHIO

P. O. BOX 39158



CINCINNATI, OHIO 45209

PHONE AREA 513-521-1000

May 21, 1980

Bureau of Workers' Compensation
Claims Section
246 North High Street
Columbus, Ohio 43215

RE: Claim No. ODI76800
[REDACTED]

Gentlemen:

The Company has not certified the attached claim because the claimant has not described a disease which is compensable under Section 4123.03 of the Ohio Revised Code, nor is his disease one which is peculiar to any particular industrial process in which the claimant has worked and to which he is not ordinarily subjected or exposed to outside of work from his employment.

The Company denies that the complaint arose out of or in connection with the work at our facilities.

Very truly yours,

ORIGINAL SIGNED BY
G. C. SMITH
INDUSTRIAL RELATIONS

G. C. Smith
Director of Personnel
and Industrial Relations

JCS:ig

cc: H. D. Hickman ✓
W. J. Crannel

1114748

NATIONAL LEAD COMPANY OF OHIO

P. O. BOX 39158



CINCINNATI, OHIO 45239

Mr. H. D. Hickman, Director
Manufacturing Division
Department of Energy, Oak Ridge Operations
P. O. Box E
Oak Ridge, Tennessee 37830

Dear Mr. Hickman:

OCCUPATIONAL DISEASE CLAIM [REDACTED]

Attached is a claim filed by [REDACTED] Degreaser in our Plant 6 machining operation, who claims an occupational disease based on his exposure to, among other things, uranium dust. We feel that, ultimately, this claim may develop into a radiation claim in view of our belief that it is currently not compensable as an occupational disease.

We will keep you informed of further developments.

Sincerely,


S. F. Audia
Manager

GCS:jg

Attach.

cc: H. D. Hickman, w/attach.

W. J. Gramen, w/attach

G. C. Smith

1114749

C. L. Karl, Area Manager
Cincinnati Area Office

AUG 22 1961

S. E. Sapirio, Manager
Oak Ridge Operations

REPORT ON HEALTH PROTECTION PROGRAM REVIEW AT FISCALD (NLCO)

ORR:AS

Six copies of the subject report are enclosed. The cooperation and assistance of Area Office and NLCO personnel in the conduct of the review was appreciated and has been commended in the report.

It is hoped that your office and NLCO will find the report useful. It is requested that comments regarding the conduct of the review, the contents of the report and plans to implement the recommendations, be received by November 1, 1961.

S. E. Sapirio

Enclosure:
NLCO Report (6).

CC: R. C. Armstrong
H. M. Roth

OCC file copy
NLCO Annual
Rpts.

1114750

Bio. Br.

Res. & Dev.

Asst. Mgr. Opr. Manager

Schoen:ef

45988 = 8/22

8/14/61

8/ /61

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HEALTH PROTECTION PROGRAM REVIEW AT NATIONAL LEAD COMPANY OF OHIO
FERNALD, OHIO - MAY 1961

I. Introduction

A. A. Schoen and H. V. Heacker of ORO Research and Development Division visited the Feed Materials Production Center operated by the National Lead Company of Ohio, on May 25 and 26, 1961, to review the health protection program in accordance with Manual Chapter AEC 0504. The last formal program review was made in August 1957 by the ORO appointed Health Protection Study Committee. This review covered the major aspects of the health protection programs in occupational medicine, industrial hygiene, health physics, waste disposal, and nuclear safety.

II. Potential Hazards

The major health protection problems in the operation of this plant are associated with the potential for internal deposition of normal and slightly enriched uranium resulting from large scale uranium refining, metal production and metal fabrication operations. This also includes the hazards associated with nitric acid, fluorine and various solvents. Noise, lighting and control of mercury exposure pose problems of relatively minor concern.

The monitoring and controlled release of uranium and the potentially hazardous chemicals listed above to the atmosphere and neighboring surface streams are principal environmental problems.

Direct radiation is a potential hazard which is limited primarily to the uranium recasting area as a result of the separation of the beta-emitting daughter products in the recast uranium metal.

Nuclear safety is a continuing problem which is receiving increased attention. Slightly enriched uranium is presently handled and stored in several plant areas but will shortly be consolidated. The shipment of this material is another facet of the problem.

III. Health Protection Program

A. Responsibilities, procedures and training

The primary and direct responsibility for health protection rests with line supervision as an integral part of their overall responsibility for the operation of the plant. Operating groups do not use instruments, however, so that evaluation of hazards, routine and special surveys and audits of operations are accomplished by the Health and Safety Division staff.

A major emphasis is placed on health protection in connection with the design and initial operation of new facilities and equipment and the modification of those already in operation. The Health and Safety Division must approve all Standard Operating Procedures and engineering or construction proposals. A Fume and Dust Control Committee, under the chairmanship of the Health and Safety Division representative on the committee, has been established to resolve ventilation and air dust problems. This committee reviews and approves all ventilation installations or modifications thereto.

Annual audits of health protection in each of the various plants are submitted to the appropriate Plant Superintendent with a copy to the Plant Manager. The results of weekly inspections and routine or special surveys are submitted to the Plant Superintendents.

Basic health protection criteria are developed by the Health and Safety Division staff and are approved by the Plant Manager. These criteria are consistent with AEC Manual Chapters and other established standards.

Training is accomplished through the periodic safety meetings attended by plant personnel. There appears to be no feeling of need to pursue a formal training program for other than supervisory personnel and then only as new and special problem areas arise.

B. Area and Personnel Monitoring

All health physics and industrial hygiene surveys are performed by the Health and Safety Division staff. In addition to the routine annual audits of operations in each of the plants, special surveys and studies are made at the request of operating supervision or as day to day field surveillance of operations suggests the need. Weekly visual inspections are made of all buildings and operations.

ORNL-type film badges are issued to all NLO and AEC Area Office personnel. All visitors are badged although the same badge may be worn by more than one visitor. All badge films are processed monthly.

All hourly and supervisory personnel with a potential for internal deposition of uranium are included in a quarterly urine sampling program. Urine samples submitted in connection with the routine annual physical examinations are also analyzed for uranium content. Urinalysis for other toxic materials, e.g., Ra, Hg, Pb, etc., are performed as special circumstances warrant.

C. Environmental Monitoring and Waste Disposal

Effluents from each of approximately 50 dry exhaust stacks are sampled continuously. This stack monitoring program has resulted in substantial reductions in stack losses and is now actively pursued by plant management for economic and process control as well as health protection purposes.

Industrial, storm and sanitary sewer effluents are piped to a general sump, which is sampled continuously, and thence to the Great Miami River. Samples from monitoring wells and an adjacent surface stream are analyzed to monitor potential seepage from the raffinate pits.

Perimeter air samples, fallout trays and annual soil and vegetation samples are used to monitor airborne environmental contamination. Weekly samples are obtained of Great Miami River water above and below the sewer outfall. Samples and data are exchanged monthly with the State Health Department reflecting very close cooperation with the state.

D. Medical Program

Pre-employment and termination physicals are given all employees. Periodic physicals are scheduled for all employees every 12-15 months. EKG's are included in the examinations for individuals over 40 years old and others if their medical history warrants. A radiologist and two dermatologists are under contract as consultants.

E. Nuclear Safety

The Nuclear Safety Department reviews and approves all processes, procedures, facilities and equipment installations connected with the handling of enriched uranium prior to their approval by the Division Director. Such reviews constitute the major effort at this time due to the the current consolidation of enriched uranium handling operations and the consequent changes in facilities, equipment, etc. One inspector spends full time in the field and this effort will be increased as the process modifications are completed.

IV. Observations

- A. The Health and Safety Division Director and his staff were extremely cooperative in the conduct of the program review. The information was well presented and frankly discussed.
- B. In general, the health protection program established at Fernald is well organized and very effective. Coordination of the efforts and activities of the various Departments in the Health and Safety Division appeared to be very good.

- C. The degree of cooperation and collaboration between the Health and Safety and the operating and engineering Divisions is noteworthy. In particular, the activities of the Fume and Dust Control Committee reflect a concerted and cooperative effort to resolve operational health and safety problems.
- D. Relationships with the Ohio Department of Health on the matter of stream contamination control appear to be very good.
- E. It was noted that, after initial orientation, training of hourly personnel with respect to health protection was at the discretion of operating supervision. In addition, all contacts between the Health and Safety Division staff and operating groups are restricted to the supervisory or management levels. This philosophy appeared to be rigidly applied in practice. Some significant health protection "rule" infractions were noted during the plant tour which may be related in some manner to the limited communication with operating personnel on health protection matters.

V. Recommendations

- A. Provisions should be made to conduct emergency drills simulating radiation accidents to familiarize operating personnel with the emergency plan, and emergency team members with the problems associated with such incidents.
- B. There is an apparent need to provide operating supervision with criteria for guidance as to when health and safety staff assistance might be required (e.g., when to require hazardous work permits). It is understood that the manual which is being prepared by the Health and Safety Division will provide such guidance. The periodic review of operating procedures may also provide a means for accomplishing this.

ORB:AS

1114754

UNITED STATES GOVERNMENT

Memorandum

TO : C. S. Shoup, Chief, Biology Branch
Research & Development Division, OR

DATE: OCT 5 1962

FROM : C. L. Karl, Area Manager
Cincinnati Area Office

SUBJECT: COMMENTS OF CAO-NLO ON DRAFT REPORT OF HEALTH PROTECTION
PROGRAM REVIEW OF FMPC, JULY 16 - 18, 1962

E:ELG

This office has reviewed the subject report and has no comments to offer or corrections to suggest. We are in general agreement with the statements contained in the report, and feel that recommendations made are pertinent to our current program.

The National Lead Company has offered several comments as follows:

"Part III. - Manpower requirements in May, 1961 totalled 53; three of these positions were open at that time. These were a technician in the Industrial Hygiene and Radiation Department, a Technical Assistant in the Bio-Assay Department, and a Physician in the Medical Department. Manpower requirements in July, 1962 totalled 50 persons, all positions being filled. During the time between reviews, a technician and an industrial hygienist were eliminated from the Industrial Hygiene & Radiation Department; a receptionist, a nurse, and a technician from the Medical Department; and two nuclear safety inspectors were added in the Nuclear Safety Department. Fire & Safety Department personnel are not included in any of these figures.

Part IV. - Two inspectors were added to the Nuclear Safety Department staff in order to provide nuclear safety inspection on the second and third shifts, five days a week.

Part VII, A. The meaning intended in the first two sentences is not clear. Does the statement about health protection staffing mean that we are over-staffed or that other installations are under-staffed? In the third sentence the word "inspectors" is preferred to "auditors"."

OCT 8 1962

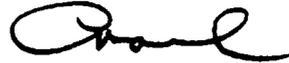
1114755

C. S. Shoup

-2-

0076 1902

We regret the delay in returning these comments to you, but feel that you can appreciate the careful scrutiny that this draft report has received from our office and from our contractor in view of some of the statements contained in the report.



C. L. Karl

1114756

UNITED STATES GOVERNMENT

Memorandum

TO : C. L. Karl, Area Manager
Cincinnati Area Office

DATE: November 5, 1962

FROM : S. R. Sapirie, Manager
Oak Ridge Operations, Oak Ridge

SUBJECT: REPORT ON HEALTH PROTECTION PROGRAM REVIEW OF FEED
MATERIALS PRODUCTION CENTER - JULY 1962.

ORB:WAP

Enclosed are six copies of the report of the second annual health protection review of Feed Materials Production Center which was conducted on July 16-18, 1962. The cooperation of personnel of both the Area Office and NLO is greatly appreciated.

Your comments with regard to the recommendations of this report and to the conduct of the review are requested by December 15, 1962.


S. R. Sapirie

Enclosure:
Report (6)

CC: R. C. Armstrong
J. D. Donovan, w/cy of Encl.
R. M. Smith, w/cy of Encl.
J. W. Ruch, w/cy of Encl.
H. M. Roth

1114757

**HEALTH PROTECTION PROGRAM REVIEW OF FEED MATERIALS
PRODUCTION CENTER, (FMPC), JULY 16-18, 1962**

I. Introduction and Summary

H. V. Hecker and W. A. Pryor of ORO Research and Development Division visited the Feed Materials Production Center operated by the National Lead Company of Ohio on July 16-18, 1962, to review the health protection programs. The last formal program review was conducted in May 1961 while a supplemental review of the nuclear safety program was conducted in July 1961.

The review consisted of three days of discussions with health protection staff personnel and included a tour of facilities. Emphasis of the health protection review was placed on the waste disposal operation, the on-site and environmental monitoring programs, and previous recommendations.

At the conclusion of the review, the observations and recommendations of the reviewers were discussed with an AEC Area Office representative and NLO management and are included at the end of this report.

II. On-Site Surface Contamination and its Release to the Environs through the Storm Sewer System

A large portion of the review was devoted to discussions, review of sample data and visual inspections of the liquid waste system.

It was evident that considerable uranium is being released through the storm sewer overflow during periods of high rain fall. Material being released through this system enters a small branch located entirely on AEC property and in turn flows into Paddy's Run.

A detailed study was initiated to determine the contribution of various legs of the storm sewer system in early 1961. However, the study only covered a twelve day period and appears that it does not represent current conditions.

III. Nuclear Safety

With the addition of two inspectors to the nuclear safety staff, all shifts are audited for conformance to nuclear safety as prescribed in SOP's. In addition, one nuclear safety audit per Division per month is made by a team consisting of a representative of the Division concerned, the Nuclear Safety Department and one other interested party. The audit program continues to be on a random basis.

Since full shift coverage has been obtained, the number of violations has been reduced by approximately 50%. By stressing the importance of the proper identification of materials (e.g., enriched or normal) and minimizing the use of temporary materials such as adhesive tapes in the color coding, identification-type violations have been practically eliminated. Painted drums and containers are now used extensively at the FMPC.

Some increase in safe mass quantities for U-235 enrichments processed at FMPC has been realized as a result of determining more accurately the margins of error of available critical experimental data and extending values by calculations which are based upon these critical experiments. As noted in the previous review, this data as well as other data and criteria in use at FMPC are being summarized for inclusion in a nuclear safety guide.

IV. Emergency Control Planning

In order to assist in locating the source in event of an accidental criticality, plans are underway to install an alarm indicator panel in the guard communication center which is in the administrative area. Each detector will be represented by an alarm light so that the affected buildings are readily identified.

As part of the training program, the appropriate action to take in event of a criticality has been stressed. Test evacuations for other than simulated criticality emergencies have been held in most plant locations; however, no specific criticality drill has been held to date. It was noted that a tape recorder has

been utilized during training sessions so that employees would be familiar with the sound of the criticality alarm without having to activate the alarm system.

Eleven additional fireproof type NAD's have been added bringing the total to 22.

V. Action on Previous Recommendations

- A. Provisions should be made to conduct emergency drills simulating radiation accidents to familiarize operating personnel with the emergency plan, and emergency team members with the problems associated with such incidents.

Action: To date a simulated criticality drill has not been conducted; however, a continuous training program has been in effect to inform employees of the proper action to take.

- B. There is an apparent need to provide operating supervision with criteria for guidance as to when health and safety staff assistance might be required, (e.g., when to require hazardous work permits). It is understood that the manual which is being prepared by the Health and Safety Division will provide such guidance. The periodic review of operating procedures may also provide a means for accomplishing this.

Action: A procedures manual covering the activities of the Health and Hygiene Department has recently been issued. Although this manual does go into great detail in regard to health physics and industrial hygiene procedures, it was primarily designed for H&S personnel. It has been distributed to both union representatives and operating foremen, etc. The manual indicates very well the scope of industrial hygiene and health physics operations. In addition, revised and new operations require SOP's which are approved by a procedures committee which has two members from the Health and Safety Division.

- C. Nuclear safety personnel should have access to all phases of plant operation involving enriched material.

Action: This situation was immediately corrected so that nuclear safety personnel no longer are prevented, due to security requirements, from having direct access to any phase of plant operation.

- D. NLO should consider revising the present procedure of issuing SOP's in an effort to minimize the administrative responsibility of Nuclear Safety Department in formulation of SOP's.

Action: Although this procedure was not revised, through clarification and dissemination of nuclear safety criteria and improved communications, it has been greatly improved. This permits the Nuclear Safety Department to retain control of the application of nuclear safety criteria in new and revised operations involving enriched materials.

VI. Observations

- A. The NLO Programs are in general adequate in view of the magnitude and scope of potential problems. Health protection staffing, particularly in nuclear safety, is greater than at other installations with satisfactory programs and comparable hazard potential. Health protection coverage provides for health physics, conventional safety, and nuclear safety inspectors on each shift.
- B. The overall planning with regard to nuclear safety problems and criticality incidents should be reviewed from an overall management viewpoint. During last year, the number of nuclear accident dosimeters were increased from eleven to twenty-two and an additional nuclear safety shift inspector was added to NLO nuclear safety staff to provide full shift coverage. These steps imply more concern for the accidental criticality problem; however, our previous recommendation for criticality drills was not fulfilled.
- C. General housekeeping in the operations areas was considerably improved. However, plant site contamination remains above desirable levels.
- D. Emergency control planning for criticality accidents are not detailed for the Health and Safety Division.

- E. We concur in the proposal to issue a FMPC Nuclear Safety Guide. This guide and the revised Industrial Hygiene and Radiation Department Procedures Manual should provide sufficient criteria to permit operating groups to accept health and safety responsibility without excessive audit.
- F. Improvement has been noted in the nuclear safety program, particularly in the decrease in the total number of violations and in the increase in usage of permanent type identification of containers.
- G. Concentrations of uranium obtained in the storm sewer overflow, which flows through a small connecting branch to Paddy's Run, indicate that regardless of the resulting stream contamination, the source of this material should be determined. After defining the source, only then can logical corrective action be taken, whether it be in changes in facilities or operating procedures. Such an evaluation should also reveal important information concerning the plant site contamination problem.
- H. Due to the unusual flow characteristics of sections of Paddy's Run, which periodically are actually dry, it would seem even more pertinent that mud deposition data be obtained. Concentrations in flowing water may be averaged over a period of one year; however, the problem of deposited material exists continuously and should be evaluated on this basis. Due to the flow conditions existing in both streams of Paddy's Run, the deposition would be expected to be considerably higher than stream with normal flow conditions.

VII. Recommendations

- A. The previous recommendation that a test drill simulating a criticality accident is re-affirmed and should be initiated promptly. Detailed plans for controlling a criticality type emergency for the Health and Safety Division, with particular emphasis being placed upon emergency team assignments and responsibilities, should also be completed and formalized.

- B. Additional data should be obtained and evaluated to establish the independent contribution made by both the waste pits and the storm sewer overflow system to Paddy's Run.
- C. A sampling program should be initiated to determine the source or sources of material being released through the storm sewer system. The results of this program are important not only to the present release rate but for the evaluation of potential larger releases.

Reviewers:

H. V. Hecker

H. V. Hecker
Health Physicist

William A. Pryor

W. A. Pryor
Nuclear Safety Specialist

UNITED STATES GOVERNMENT

Memorandum

TO : C. L. Karl, Area Manager
Cincinnati Area Office

DATE: July 10, 1963

FROM : S. R. Sapirie, Manager
Oak Ridge Operations

SUBJECT: REVIEW OF FEED MATERIALS PRODUCTION CENTER HEALTH PROTECTION
PROGRAM

ORB:WAJ

Enclosed are six copies of the report of the third annual health protection review of Feed Materials Production Center which was conducted on May 14-16, 1963. The cooperation of personnel of both the Area Office and NLO is greatly appreciated.

Your comments with regard to the conduct of the review, content of the review report, and plans for implementing or otherwise handling each of the recommendations are requested by September 3, 1963.


S. R. Sapirie

Enclosure:
Report

CC: R. C. Armstrong
J. D. Donovan, w/encl.
H. B. Mills, w/encl.
J. W. Ruch, w/encl.
H. M. Roth

1114764

HEALTH PROTECTION REVIEW OF NATIONAL LEAD COMPANY OF OHIO

May 14-16, 1963

I. Introduction

W. A. Johnson and H. V. Heacker of the ORO Research and Development Division visited the Feed Materials Production Center operated by the National Lead Company of Ohio on May 14-16, 1963, to conduct the third annual health protection review. This review included an extensive tour of the operating and environmental areas of the plant and appropriate discussions with members of the NLO Health Protection Staff. More detailed considerations during the review were given to the implementation of those recommendations included in the 1962 review report, emergency planning and control, nuclear safety and personnel monitoring.

The NLO health protection programs continue to be well organized and effective, and appropriate action has been taken on previous recommendations. A few observations and recommendations of the reviewers are included in the final sections of this report. These, as well as the general aspects of the review, were discussed with both AEC Area Office and NLO management personnel at the conclusion of the review.

II. Action on Previous Recommendations

- A. Appropriate action has been taken on the recommendation concerning evacuation drills simulating accidental criticalities and the formulation of emergency procedures for the Health and Safety Division. (See Section III following for additional information.)
- B. Additional data should be obtained to determine the degree of contamination contributed to Paddy's Run by the storm sewer and waste pits.

Data have been obtained which indicate that the source of contamination in Paddy's Run is from the plant storm sewer system and that there is no significant leakage from the waste pits to this stream at the present time.

- C. A sampling program should be initiated to determine the source or sources of contamination being released through the storm sewer system.

Considerable emphasis by NLO management has been placed on cleaning up the storm sewer and ground contamination. The following are major steps that have been initiated to reduce contamination of the grounds and storm sewer:

1. Responsibilities related to the contamination problem have been defined.
2. Routine sampling for locating the source of releases to the storm sewer has been established.
3. Violations of disposal procedures are documented and reported to management with explanations.
4. A Ground Contamination Control Committee has been established.
5. A training program concerning ground contamination is now in progress for supervision.

III. Emergency Planning and Control

Fifteen GA-2 Nuclear Measurements Corporation criticality alarm units are currently in service throughout the plant areas. They are set to alarm at approximately 80 mr/hr and are slaved to Guard Headquarters where emergencies are coordinated. The number and locations of these units are as follows:

<u>No. Units</u>	<u>Location</u>	<u>No. Units</u>	<u>Location</u>
3	Pilot Plant Areas	1	Plant 1
1	Development Machine Shop	1	Plant 7
2	Plant 8	1	Plant 4
2	Plant 5	1	Metal Warehouse
2	Plant 6	1	Plant 9

An ADT system serves as the general alarm mechanism for NLO with the local GA-2 criticality evacuation alarms operating automatically and independently of this system. Since the plant has no PA system, a Disaster Phone network emanating from Guard Headquarters is provided for one-way emergency instructions. These instructions are normally pre-recorded on tape to fit the various emergency situations and are transmitted repeatedly over the network following a designated ADT code alarm. Appropriate supervisory or foremen personnel are responsible for receiving the information and relaying it to personnel in their respective areas.

Only one radio network is provided at NLO, and it is used solely for security and emergency communications. The Health and Safety Division possesses two portable two-way radios for use in this network during emergencies.

Emergency procedures outlining the responsibilities and assignments of the Health and Safety Division have been prepared, and a personnel accountability system devised for emergency situations. The Disaster Planning Committee is continuing the evaluation of plant needs for improvement in emergency control. Two items currently under consideration involve the installation of a plant PA system and warning lights at building entrances to prevent inadvertent re-entry of personnel into areas of high radiation.

Evacuation drills simulating critical incidents have been initiated. To date, one planned drill has been held (for Plant 9), and two false alarms have occurred resulting in the evacuation of two plants. In addition, the sound of the criticality alarms has been made familiar to employees on all shifts by the sounding of alarms in all plants.

IV. Nuclear Safety

The organization, staffing, criteria and functions, as related to nuclear safety are essentially unchanged from that indicated in previous review reports. Presently, there are approximately sixty procedures in effect for operations involving enriched uranium at NLO where administrative controls are required for nuclear safety control. These operations, in addition to all off-plant shipments of enriched uranium, are audited with shift coverage by the Nuclear Safety Department for compliance with the provisions of these procedures. The number of deviations observed are continuing to decrease.

One of the basic considerations at NLO is the possibility of cross-over or the inadvertent intermixing of materials of differing U-235 enrichments. Scrap handling processes are regarded as offering the greatest potential for this to occur. A number of administrative steps have been taken to prevent cross-over in addition to the extensive use of color coding for material identification and the use of separate storage facilities. These steps include the use of check lists for clean-out of equipment prior to its use on a campaign basis involving materials of another U-235 enrichment. In addition, an inspection team, comprised of members from Production Control, Accountability and Nuclear Safety, certifies that the area involved is clean following each campaigned operation.

Nuclear safety training at NLO is accomplished primarily by lectures from the Nuclear Safety Department. So far, all supervisors and foremen have received these lectures which consist of a basic series of five talks with appropriate slides and discussions.

V. Personnel Monitoring

A. External Monitoring

External monitoring is achieved through the use of the ORNL-type badge and DuPont 545 and 558 film packets. The 545 packet contains the 555 dosimeter film and the 558 contains the 508 and the high range 1290 dosimeter films. All NLO employees, AEC Area Office personnel, and visitors are monitored in this manner. Presently, the 545 film packet in all badges is changed monthly, and the 558 is changed annually or as needed. NLO's highest exposure results for 1962 showed only one person in the 3-4 rem range. The badge also contains components to evaluate personnel exposures from criticality accidents; however, facilities for their evaluation are not yet in operating condition.

B. Bio-Assay Program

The frequency of routine urinary uranium sampling ranges from three to six months depending on individual exposure potential. Administrative personnel are sampled annually during their physical examination. Also, urine samples are included in pre-employment physical examinations.

Results of this program in 1962 indicated that thirty-seven employees had a six-month average excretion rate exceeding 25 ug/l; however, all were below the 50 ug/l average which is the NLO criteria for reporting exposures, in accordance with AEC 0502.

Urine samples are also obtained and analyzed for Pb, fluorides, Th, gross alpha and beta. The routine sampling program is currently based on individual job evaluations, and urine samples for Pb is restricted to those in the mechanical trades group. Adequate controls and procedures insure that routine and recall or special samples are submitted as requested.

VI. Observations

- A. The housekeeping of the general plant area is greatly improved. Locations most markedly improved are:
 1. The north side of the general plant area where a large number of contaminated drums have been removed.
 2. The outside storage area adjacent to the decontamination building where contaminated materials storage has been significantly reduced.
 3. Miscellaneous ground surfaces adjacent to roadways and storage pads where top layers of gravel and dirt have been removed where spillage had occurred.
- B. A method is currently under study by NLO for a better personnel notification system during emergencies. The methods being studied by NLO would provide more rapid notification to all plant employees and identification of involved buildings to avoid unnecessary re-entry.
- C. Considerable effort is presently being exerted to decrease ground and storm sewer contamination. It is felt that continued efforts in keeping with management policy and actions initiated will diminish this problem.

- D. It was noted that equipment for determining high personnel exposures is not currently in workable condition. This includes both gamma and neutron exposures from the film badge components and evaluation of the NAD's.

VII. Recommendations

The following recommendations are intended to improve dosimetry capabilities at NLO:

- A. Counting equipment for NAD and film badge components should be made functional as expeditiously as possible.
- B. The 1290 high range gamma film should be calibrated routinely to insure effective use in the evaluations of high personnel exposures.

Reviewers:

W. A. Johnson
W. A. Johnson
Nuclear Safety Specialist

H. V. Hecker
H. V. Hecker
Health Physicist

NLC

UNITED STATES GOVERNMENT

Memorandum

TO : C. L. Karl, Area Manager
Cincinnati Area Office

DATE: July 15, 1964

FROM : Herman M. Roth, Director
Research and Development Division, ORO

SUBJECT: REPORT OF THE ANNUAL HEALTH PROTECTION REVIEW AT NATIONAL
LEAD COMPANY OF OHIO - MAY 1964

ORB:RLH

Six copies of the subject report are enclosed for your information and action. The cooperation and assistance of your office and National Lead Company during the conduct of this review are appreciated.

It is suggested that your contractor be authorized and instructed to proceed with the implementation of the matters covered by the recommendations unless there exist sound reasons why a particular recommendation is not warranted in whole or part. In any event your comments and those of your contractor with regard to the conduct of the review, the general content of the report, and the detailed plans for implementing or otherwise handling the recommendations are requested by September 1, 1964.

Richard B. Martin
acting
Herman M. Roth

Enclosure:
Report (6)

CC: R. C. Armstrong
H. B. Mills, w/encl.
J. W. Ruch, w/encl.

HEALTH PROTECTION REVIEW OF NATIONAL LEAD COMPANY OF OHIO
MAY 19-21, 1964

I. Introduction and Summary

Representatives of the ORO Research and Development Division conducted the annual on-site health protection review of NLO during the period of May 19-21, 1964. This review gave detailed consideration to implementation of last year's recommendations, transportation of fissile materials, nuclear safety, monitoring programs, and the treatment and sampling of off-gas effluents.

It is the opinion of the reviewers that the health protection programs reviewed are effective and satisfactory to cope with the problems of NLO. Observations and recommendations for program improvement are included in the final sections of the report.

II. Implementation of Previous Recommendations

- A. Recommendation that counting equipment for NAD and film badge components be made functional as expeditiously as possible.

Action: The recommendation has been satisfactorily implemented and is discussed in NLO's reply dated August 20, 1963, to last year's report. The counting equipment, now fully operational, is checked periodically for calibration. Two NAD's and a few film badges exposed at the OENL Health Physics Reactor and counted in this equipment indicated deviations within 5% of appropriate values such as the Pu curve.

- B. Recommendation that the 1290 high range gamma film be routinely calibrated to insure effective use in the evaluations of high personnel exposures.

Action: The recommendation has been satisfactorily implemented, and films exposed from 6 to 500 r at 100 r increments will be used for calibration purposes. Sets of calibration film are exchanged at six-month intervals.

III. General Information on Programs Reviewed

A. Industrial Hygiene and Radiation Department (IH&RD)

ORLAD No. 0500-3 concerning posting requirements was implemented by posting the "Notice to Employees" on the bulletin boards at the two main entrances and the main locker room. Information contained in the Appendix to AEC Manual Chapter 0524 is included as a Plant Manufacturing Standard. In addition, a letter concerning the directive was sent to all division directors and holders of the Plant Manufacturing Standards Manual and the Technical Procedures Manual. Some modifications were necessary to meet the requirements of OR-0525 concerning Occupational Radiation Exposure Information. The modifications involve the preparation of a form letter for notification of visitors with exposures exceeding 50 mrem, and the compilation of required information on those Area Office personnel whose recorded yearly exposures exceed 50 mrem.

Procedures concerning the sale of contaminated scrap and/or equipment are in accordance with Manual Chapters OR-5182 and §170. Prior to any sale, a summary letter concerning the contents thereof and certifying that contamination levels are within the specified limits is sent to the Area Office for approval. Contaminated 55 gallon drums which are no longer useable and other scrap not meeting the limits are sold to a licensee such as the Knoxville Iron Company.

Although no overexposures have been observed at NLO during the past years, records indicate a continuing increase in both number and magnitude of exposures above one rem of penetrating radiation. Since 1960, incremental yearly increases of about 300% in the number of personnel receiving exposures above one rem were reported, (1960-12, 1961-33, 1962-120, 1963-331). The highest skin exposure for 1963 was reported as 22.9 rem which includes 4.4 rem of penetrating radiation. The beta plus gamma to gamma ratio for the plant population has decreased significantly since 1960 when the ratio was 20.7 to 1 as compared to a ratio of 5.4 to 1 for 1963. NLO feels that a partial explanation of the exposure problem would be the increase in the UX₁ and UX₂ daughter build up in the uranium "feed" and the increased storage of uranium in various areas.

The IH&ED annual report shows a significant increase in the general air levels for various operations in Plants 5, 9, and 4, and the surrounding area of the rod cooling bed in Plant 6. Modifications to various operations (e.g., breakout station Plant 5) are planned for improving the overall air levels throughout the plant. Although there was an increase in the general air levels, results of the bio-assay program show that no employee exceeded the NLO criteria (50 ug/l avg. in urine) for reporting internal exposures to the AEC.

All routine operations requiring ventilation are exhausted through sixty stacks throughout the various plants. Pre-treatment prior to exhaust to the atmosphere is primarily through Hersey Reverse Jet type filters (40 units) and through Sly Flat Envelope type or Shaking Tube Wheelabrator type filters. Each of the stacks is sampled continuously using a type "S" pleated type filter for collection of the sample. About eight stacks serve operations which have an off-gas with a high heat and/or moisture content. These off-gas streams utilize primarily a S&K Venturi Wet Scrubber for clean up and some use a cyclone separator before the scrubber on furnace off-gas streams. These stacks are spot-checked on a periodic basis using a Greenburg Smith Impinger type sampler. Results from the stack monitoring system show levels to be within appropriate health protection limits and the results are primarily used for monthly estimates of the amounts of uranium lost via the stack system.

Follow-up of last year's report concerning the clean up of the storm sewer and ground contamination problems shows that considerable improvements have been made in 1963. The improvements are summarized in the "Minutes Ground Contamination Study Committee Meeting held on March 3, 1964, and March 10, 1964." Monthly reports entitled "Incidents Detected and Corrective Action Taken in Storm Sewer System" by the Engineering Division and "Comments on Ground Contamination in Process Areas" by IH&ED are submitted to appropriate supervisors for action. The emphasis by NLO has resulted in a fifty percent reduction in the amount of uranium (i.e., 1230 lbs/month 1962 to 660 lbs/month 1963) losses via the storm sewer system. However, results for the first part of 1964 show an increase by a factor of about two in the amount of uranium lost via the storm sewer system. This increase is due in part to a rather dry latter part of 1963 and a wet first quarter of 1964.

Routine usage of respiratory protection devices for various extended operations is recommended on a job evaluation basis by IH&RD. A detailed review of the respiratory protection program was not made as IH&RD is currently evaluating and revising their program in view of recent publications. The program will be based on the recently revised Title 30, Code of Federal Regulations, Part 14, concerning the Bureau of Mines requirements and a recent book published by the American Industrial Hygiene Association entitled "Respiratory Protective Devices Manual."

B. Nuclear Safety

The organization and staffing, committee activities, criteria and functions as related to nuclear safety are essentially unchanged from those indicated in previous reviews. However, a recent change was effected in the FMPC Manufacturing Standards Manual Format concerning the preparations and review of Standard Operating Procedures (SOP). In this regard, temporary SOP's will be eliminated, and a more general nuclear safety section included in SOP's will be prepared to give more latitude to line supervision. It will be the responsibility of operations to request nuclear safety evaluation for operational changes involving enriched material. This change gives more responsibility to line organization with the anticipation of markedly reducing time required for SOP modifications heretofore considered excessive.

Current in-plant nuclear safety problems of special interest include the design of a metal dissolver and preparations for handling a limited amount of 20% U-235 enriched metal in the Plant 6 Blooming Mill. Procedures for the latter have been submitted to ORO for review and concurrence.

C. Transportation of Fissile Materials

Most fissile materials shipped to and from NLO involve low assay uranium metal in a variety of forms consisting largely of ingots, billets, and fuel cores. The bulk of this material is normal and 0.95% U-235 enriched uranium with a limited amount of 1.25% material. The uranium is packed in wooden boxes of two basic designs, B of E No. 265 and

1091, for cores and larger units, respectively. Mass limits are used where applicable with intermixing of relatively non-reactive materials to effect maximum loading for shipping economy. Essentially, all transport is by truck and rail under controlled conditions. All shipments are covered by Standard Operating Procedures or by special approvals.

A recent shipping incident involving load shift and breakage of wooden shoring has necessitated a re-evaluation of basic shoring methods on trailers and a change in tie-down technique. The change involves the use of two 1½" steel verticle bands wrapped around the boxes in a lengthwise direction. Additional horizontal bands are used to bind the boxes as a unit, and each vertical band passes through devices known as "brakeman plates" fastened to the truck floor. This type of shoring, known as meeting the controlled floating load principle, was recommended by the Signode Steel Strapping Company as being superior to wooden shoring. SOP's NLCO 828, Rev. 2 and NLCO 902 are being revised to reflect this change.

The mass limits imposed for criticality control are based upon enrichment, specific piece geometry (i.e., wall thickness, length, diameter, etc.) and optimum conditions of water moderation and reflection as could be postulated under severe accident conditions. In this regard, the lattice pitch or spacing of individual elements which determines the possible moderating ratios is a very sensitive parameter. To capitalize on this fact, NLO has recently modified the V-E shipping box by supplying two 1" thick plywood tube sheets to space individual elements (these being specifically Mark V-E fuel cores) out of the optimum region. The spacing is sufficient to assure a Volume Water/Volume Uranium Ratio of five which, for these particular elements, will prevent criticality if an unlimited number of boxes are flooded with water. Hence, although the individual mass per box will be reduced from about 1,000 lbs. to 300 lbs. by use of the internal tube sheets, the maximum load permitted will be increased from about 12,000 lbs. to the load limit of the railroad car or truck. The boxes have been shown to survive a 30' drop if 1½" steel bands are used. However, fire tests described in NLCO 899 indicate that the boxes may not survive a standard hour fire test, although they will withstand a 10-30 minute fire if double lids are used.

Special off-site shipments of enriched material are authorized by use of NLO H&S Form 2043 requiring the signatures of representatives of the Transportation Department, Procurement Division, Nuclear Safety Department, and the Health and Safety Division. In addition, sign off by a nuclear safety representative is obtained on routine in-plant and out-of-plant transfers of enriched material. In-Plant transfers of enriched uranium are scheduled in advance where possible.

More detailed aspects of shipping philosophy and criteria are described in appropriate ORO-NLO correspondence and in minutes of Enriched Feed Materials Transportation Meeting, March 3, 1964, and are not reiterated herein.

IV. Observations

- A. The health protection programs are well organized and receive adequate attention from upper management. The methods (e.g., summary reports of survey data, annual reports, etc.) used by IH&SD for documentation and informing operating groups of conditions throughout the plant are excellent. Liaison and cooperation between IH&SD and operating groups appear effective.
- B. The plant tour of the facilities showed that the house-keeping of the general plant area was good. In particular, the storage pad in Area 1 was greatly improved over previous years. The only process considered unsatisfactory from a health protection standpoint was the re-drumming, screening and similar operations performed by the Project Labor Pool Operations. It will be necessary to have adequate procedures and equipment if such operations are to be continued on a routine basis.
- C. The emphasis and actions by NLO management concerning the ground and storm sewer contamination have greatly improved the status of this problem. It is noted in the body of the report that the problem is still significant as evidenced by the quantities of recent uranium lost via the storm sewer. Hence, it is felt that the emphasis by NLO concerning the ground and storm sewer contamination should not be reduced in magnitude or scope.
- D. Personnel exposures to external penetrating radiation have significantly increased in both number and magnitude as noted in Part III A of this report. Although current

exposures are within recommended limits, it is felt that some exposures in excess of AEC manual chapter limits would occur if this trend continues for a few years. Also, such a continuing trend would indicate a need for modification of basic health physics controls for maintaining exposures as low as practical.

- E. Considerable amounts of re-cycle material from GE-HAFO are being processed in several plant areas. This material may contain impurities (e.g., increase in alpha, beta and/or gamma emitters) which are not found in other feed materials processed at this facility. The concentrations of such impurities could change depending on the number of cycles and other considerations concerning the process at GE-HAFO. Therefore, criteria and/or limits currently used for air and/or water concentrations may not be applicable for processes involving re-cycle material.
- F. The following items were not reviewed in detail but are considered worthy of NLO study:
 - 1. Completion of a detailed survey of the Neutron Generator is needed for formulating adequate health and safety operational procedures prior to routine operations. The detailed survey should consider the need for additional personnel monitoring (e.g., neutron film, etc.), potential air contamination problems from tritium in target and control room, radiation levels in and around target room, interlocks, and similar matters unique to such a facility. The initial survey by IH&ED indicated health physics problems minimal and facility design excellent.
 - 2. The bio-assay sampling frequency is important in obtaining good estimates of internal uranium deposition. Recent publications indicate that the quarterly sampling frequency may be inadequate for evaluating some exposure potentials. It is also noted that a method for estimating internal deposition of thorium is needed before thorium is again processed in significant quantities.
 - 3. The method of spot air sampling on a periodic basis used for estimating the general and breathing zone air concentration is good. However, there are no continuous samples of the general air, and such samples could provide meaningful information for those areas of greater hazard potential.

- G. The design and testing of shipping containers for V-E cores to effect improved safety and economical transport of fissile materials is considered highly important, and it would be of considerable value if similar principles for nuclear safety control could be applied to other materials with uneconomic mass restrictions.
- H. The lack of experimental data for low U-235 enrichment and unit dimensions peculiar to NLO production operations has necessitated conservatism in the application of appropriate safety factors to calculated data. It may be advantageous for NLO to avail itself of computer facilities, such as that at the ORGP, where personnel are available and experienced in the use of the latest codes for criticality calculations. The use of these codes may give trends, curve shape factors, etc., which could, by comparison with known experiments, justify relaxation of some parametric limits derived by straight line extrapolations. Hence, favorable results would offer, perhaps, economic gains in the application of less restrictive limits to the overall NLO production process.

V. Recommendations

- A. An evaluation should be made to explain the recent trend of increased personnel exposures and to implement corrective action when practical to lower such exposures.
- B. The health physics aspects of "re-cycle material" should be evaluated and adjustments to the personnel monitoring program made as necessary.
- C. NLO should continue its efforts to test and develop containers offering improved safety with economic gains in the transport of fissile material as noted in Observation G.
- D. The possibility of using computers and available criticality codes for checking basic nuclear safety parameters and limits, as noted in Observation H, should be explored.

Reviewers:

R. L. Herwin
R. L. Herwin
Health Physicist

W. A. Johnson
W. A. Johnson
Nuclear Safety Specialist

UNITED STATES GOVERNMENT

Memorandum

TO : C. L. Karl, Area Manager
Cincinnati Area Office

DATE: June 16, 1965

FROM : Herman M. Roth, Director
Research and Development Division, ORO

SUBJECT: REPORT OF THE ANNUAL HEALTH PROTECTION REVIEW OF NATIONAL
LEAD COMPANY OF OHIO - APRIL 1965

ORB:RLH

Six copies of the subject report are enclosed for your information and action. The cooperation and assistance of your office and National Lead Company during the conduct of this review are appreciated.

It is suggested that your contractor be authorized and instructed to proceed with the implementation of the matters covered by the recommendations unless there exist sound reasons why a particular recommendation is not warranted in whole or part. In any event your comments and those of your contractor with regard to the conduct of the review, the general content of the report, and the detailed plans for implementing or otherwise handling the recommendations are requested by August 1, 1965.


Herman M. Roth

Enclosure:
Report (6)

CC: R. C. Armstrong
H. B. Mills, w/encl.
J. W. Ruch, w/encl.

1114780

HEALTH PROTECTION REVIEW
NATIONAL LEAD COMPANY OF OHIO
APRIL 1965

I. Introduction and Summary

The annual health protection review of the National Lead Company of Ohio was made April 20-23, 1965, by Messrs. R. L. Hervin and W. A. Johnson of the ORO Research and Development Division. Nuclear Safety and Health Physics were emphasized during the review which included plant tours of operating facilities and formal presentations by NLO on accountability and nuclear safety control. During the review, a nuclear safety problem concerning the UF_6 vaporization step of the Pilot Plant operations was observed and called to the attention of NLO and CAO personnel. The NLO Plant Manager ordered this phase of plant operations discontinued until corrective action is taken. A recommendation concerning this situation is contained in the final section of this report.

It is the opinion of the reviewers that the health protection programs reviewed are, in general, satisfactory. More detailed analyses of the programs are contained in the Observations section of this report.

II. Implementation of Previous Recommendations

- A. Recommendation that an evaluation should be made to explain the recent trend of increased personnel exposures and to implement corrective action when practical to lower such exposures.

NLO has submitted a report, entitled "Gamma Radiation Exposures," which explains the recent trend of increased exposures. The major problem involves the build-up of UX_1 and UX_2 daughters due to the processing of aged material. Other than more frequent rotation of personnel on a few operations, no additional control measures were necessary to significantly reduce personnel exposures. Exposure results for 1964 show a 50% decrease in the number of personnel (1963-331, 1964-176) above 1 rem but less than 5 rem of penetrating radiation.

- B. Recommendation that the health physics aspects of "recycle material" should be evaluated and adjustments to the personnel monitoring program made as necessary.

The NLO study shows that external radiation problems involved in processing recycle material are not significantly different from other feed materials. The controlling impurity from an internal standpoint appears to be Pu which has an upper limit of 10 PPB in the uranium. In air, this limit would represent about 1.5% of the recommended limit for Pu when the air concentration for uranium is at the plant allowable limit. The specific activities of the various product streams (e.g., UO_3 , UF_4 , etc.) are around 132% of virgin material. A few by-product streams will also be evaluated for additional information. The study indicates that the NLO processes do not significantly reconcentrate the impurities. Hence, adjustments to the personnel monitoring program are not necessary at this time.

- C. Recommendation that NLO should continue its efforts to test and develop containers offering improved safety with economic gains in the transport of fissile material.

Considerable progress has been made in this area to effect economic transport of fissile material, particularly with regard to Hanford and RMI shipments. With the implementation of AEC and ORO 0529, containers and shipping methods have been evaluated, approved and documented.

- D. Recommendation that NLO consider the possibility of using computers and available criticality codes for checking nuclear safety parameters and limits.

Staff personnel were sent to Oak Ridge to discuss criticality calculations with personnel at the Data Processing Center. The accuracy of such calculations will best be known following metal lattice experiments planned at the Oak Ridge Critical Experiments Facility this year. It is expected that computer facilities will be used to greater advantage following these experiments.

III. Observations

- A. At the Pilot Plant, steam hoods are used for vaporizing UF_6 from 10-ton feed cylinders. In the event of a UF_6 release, the procedure calls for manual actuation by an operator of a water valve to "freeze-down" the cylinder whereupon the water, as well as the steam condensate under normal conditions, drains to the storm sewer system. It was observed, for the current U-235 enrichment involved, that unsafe collection geometries are available for accumulation of resultant uranium solution. It was also observed that no instrumentation exists for automatic release detection and/or control.
- B. In general, the approach to Nuclear Safety at NLO appears to be changing in that greater emphasis is being given to eliminating unnecessary or overly-restrictive conditions or limits. During the past year, economic gains without sacrifice of criticality control have been made with regard to in-plant storage and process limits and to off-plant shipment limits.
- C. The formal NLO presentations during the review on criticality and accountability control are being documented at Fernald and, hence, will not be included in this report. The presentations were considered excellent and did clearly indicate good management support for the health protection programs, an awareness and respect for the problems involved and a continuing emphasis on education and training.
- D. Although information obtained from the study of current recycle materials may not be valid for material from other sources, such as Nuclear Fuel Services, the information may be of value in identifying future potential problem areas. Both U-235 enrichment and impurities in material from other sources could be markedly higher than that presently handled. This could necessitate plant modifications based upon health protection considerations. These potential problem areas need consideration in an early stage of planning. Hence, NLO's continued awareness and understanding of the overall problem is important, particularly if and when commercially reprocessed material is handled at NLO.

- E. The staff of the Industrial Hygiene and Radiation Department (IH&RD) was reduced by two employees since the last review. This has resulted in an increased degree of introspection and self-evaluation of various programs (e.g., film badge, air sampling, etc.) over that noted in previous years. Changes may be proposed in certain programs to provide for more efficient surveillance activities with the reduced staff.
- F. The loss of uranium via the storm sewer increased from an average of 660 pounds per month for 1963 to 800 pounds per month for 1964. NLO is continuing its emphasis of the last few years concerning the ground and storm sewer contamination problem.
- G. The daily job weighted air sample results for Plant 8 were reported as 1.7 times the Plant Allowable Limit (PAL) for 1963 and increased to 4.2 PAL for 1964. Respiratory protection is required for most of those operations exceeding 1 PAL.
- H. New operations at NLO include the routine processing of thorium in the Pilot Plant on a production schedule. IH&RD has increased its surveillance activities of the thorium process over similar uranium operations due to the greater hazard of thorium and the difficulty in evaluating internal exposures. It is noted that analysis of urine, and/or feces is time consuming and in-vivo monitoring may be as practicable and would give more reliable results. The whole body counter at Y-12 is routinely used for monitoring thorium exposures; IH&RD is evaluating whether improved methods of thorium internal dose determination other than occasional spot air samples are desirable at NLO.
- I. The plant tour of a few facilities show that the housekeeping of the general plant area is good. However, as noted in last year's review, the Project Labor Pool Operations continue to be unsatisfactory as personnel are not following recommendations of IH&RD concerning health protection precautions. The facilities and equipment involved in the thorium operations resemble a pilot plant type operation with accompanying spills,

leaks, etc., rather than a tighter routine production operation. NLO management is aware of these conditions and feels that corrective action will be taken as necessary.

IV. Recommendations

- A. It is recommended that corrective measures be taken to eliminate the potential hazards arising out of the use of water for UF_6 release control at the Pilot Plant cylinder feed unit as pointed out in Observation "A".
- B. NLO should evaluate the need for better control of the increasing uranium air concentrations in Plant 8, and for increased study and control of thorium operation.

Reviewers:

R. L. Herwin
R. L. Herwin
Health Physicist

W. A. Johnson
W. A. Johnson
Nuclear Safety Specialist

UNITED STATES GOVERNMENT

NLO

Memorandum

TO : Herman M. Roth, Director
Research & Development Division, OR

DATE:

JUL 20 1965

FROM : C. L. Karl, Area Manager
Cincinnati Area Office

SUBJECT: REPORT OF ANNUAL HEALTH PROTECTION REVIEW OF NLO - APRIL 1965

E:ELG

Attention: C. S. Shoup, Chief, Biology Branch

Reference is made to your memorandum, subject as above,
dated June 16, 1965, symbol: ORB:RLH.

Enclosed is a copy of letter from NLO which contains specific
comments on the two recommendations of the subject report.

This office has no additional comments to add to those stated
by NLO.



C. L. Karl

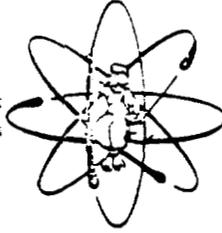
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JUL 20 1965

JUL 21 1965

NATIONAL LEAD COMPANY OF OHIO



P. O. BOX 39158

CINCINNATI 39, OHIO

JUL 16 1965

Mr. C. L. Karl, Area Manager
U. S. Atomic Energy Commission
P. O. Box 39188
Cincinnati, Ohio 45239

**SUBJECT: REPORT ON HEALTH PROTECTION REVIEW - NATIONAL
LEAD COMPANY OF OHIO - APRIL, 1965**

Dear Mr. Karl:

We have reviewed the report on the Health Protection Program Review conducted by ORO Health & Safety representatives on April 20-23, 1965. As in the past, this year's survey was good though on the topics covered, and we feel that the two recommendations made are appropriate. We have taken corrective measures on each of these and the status is as follows:

- COPIES**
- A. An investigating committee was formed to study the problem and to make recommendations to correct unsatisfactory conditions. This committee issued a report on 5/14/65 entitled "Interim Report: Investigation of Pilot Plant UF₆ Vaporization Facility" outlining improvements which were made prior to restarting the unit on June 1. Short range requirements given in the report have been considered and a status report submitted. A more complete final report is to be submitted for NLO management consideration after the plant vacation shutdown.
 - B. Starting shortly after the completion of the 1964 Plant 8 air dust survey and before issuance of the final survey report, a series of meetings was held concerning the rise in Plant 3 air dust levels. These meetings, the first of which was held on 11/11/64, were attended by the Plant 8 Superintendent and representatives of Maintenance, Engineering and Health & Safety. Definite plans were made for correcting undesirable conditions at the first meeting. Progress in specific areas was reported on at each of the subsequent meetings. After four such meetings, the last held on 2/24/65, it was decided that conditions had been improved to the point where no further formal meetings were required.

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The overall improvement in Plant's conditions cannot be completely evaluated, as our 1965 air dust survey has not been completed. However, the air dust samples taken to date indicate significant improvement has been made. For instance, the operators having the three highest Daily Weighted Exposures (DWE) showed reductions from 19 NCG* to 1.5 NCG, 13 NCG to 2.5 NCG, and 9.6 NCG to 1.9 NCG. Also the plant-wide average of general air samples shows a significant reduction from 1.8 NCG in 1964 to approximately 1.0 NCG in 1965.

*NCG - National Lead Company of Ohio Concentration Guide

There appears to be a slight difference in philosophy pertaining to the hazards associated with the handling of thorium. We do not consider one isotope any more hazardous than another as long as an acceptable NCG can be established and we can control exposures below that limit. We agree that some sites consider thorium to have approximately the same toxicity as plutonium; however, both NES Handbook 69 and AEC Manual Chapter 0524 list the maximum permissible concentration for thorium as 3×10^{-11} $\mu\text{c}/\text{cc}$ ($133 \text{ } \alpha \text{ d}/\text{m}/\text{m}^3$). We have established an NCG for thorium at $100 \text{ } \alpha \text{ d}/\text{m}/\text{m}^3$, the same as for uranium. We realize this does not give us as much leeway as our uranium NCG; however, the nature of the thorium-operation, in our opinion, gives our operating personnel more than adequate protection. A DWE of 0.3 NCG was calculated for the thorium operator and this assumes that one operator is assigned to this job on a permanent basis. This we know is not the case as the Pilot Plant operators are rotated from day to day and often from hour to hour. With the existing conditions and this rigid job assignment assumption, this exposure level approximates the worst conditions.

On this basis we do not feel that any increased evaluation of our thorium exposures is required at this time. There is no suitable urinalysis procedure for thorium available and at this time we see no need for whole-body counting. We will continue a close surveillance of the operation both by routine visual checks and by air dust surveys. If exposures seem to be increasing, we can evaluate the advisability of whole-body counting at that time. If a suitable urinalysis procedure is developed, it too will be evaluated.

Sincerely yours,
Original Signed By

J. H. NOYES

Manager

J. H. Noyes

Manager

RHS/mjs/mb

cc: C. L. Karl ✓

J. A. Quigley, M. D.

R. H. Starkey

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UNITED STATES GOVERNMENT

Memorandum

TO : C. L. Karl, Area Manager
Cincinnati Area Office

DATE: December 7, 1966

FROM : Herman M. Roth, Director
Research and Development Division, ORO

SUBJECT: REPORT OF THE ORO ANNUAL HEALTH PROTECTION REVIEW OF NLO,
SEPTEMBER 1966

ORB:WAJ

Enclosed are six copies of the subject report for your information and action. The cooperation of your office and the National Lead Company during the review is much appreciated.

It is suggested that your contractor be authorized and instructed to proceed with the implementation of the matters covered by the recommendations in this report unless there are valid reasons why a particular recommendation is not warranted in whole or part. Your comments and those of your contractor with regard to the conduct of the review, content of the report and plans for implementing or otherwise handling the recommendations are requested by February 15, 1967.


Herman M. Roth

Enclosure:
Report (6)

CC: R. C. Armstrong
H. B. Mills
J. W. Ruch

1114789

HEALTH PROTECTION REVIEW
NATIONAL LEAD COMPANY OF OHIO
SEPTEMBER 1966

I. Introduction and Summary

The annual health protection review of the National Lead Company of Ohio was made September 20-22, 1966, by Messrs. R. L. Hervin and W. A. Johnson of the ORO Research and Development Division. Emphasized during the review were plant applications and staff performance in the fields of nuclear safety and health physics with a major portion of the review devoted to the audit of operating facilities. A portion of the review was reserved for mutual discussions with appropriate staff personnel concerning transport of fissile material and associated regulatory requirements. Analyses of NLO costs and staffing are contained in the latter sections of this report.

Although the NLO health protection program as a whole is considered by the reviewers to be in line with current operating problems, there are phases of the program which need strengthening. More detailed analyses of these and other health protection aspects are contained in the Observations and Recommendations Sections of this report.

II. Implementation of Previous Recommendations

- A. Recommendation that corrective measures be taken to eliminate the potential hazards arising out of the use of water for UF_6 release control at the Pilot Plant cylinder feed unit.

An NLO committee was appointed to evaluate the problem and to make recommendations for equipment modifications. The committee, after visiting other ORO plants with UF_6 feed facilities, issued a report which outlined the necessary steps to be taken. The plant acted upon these recommendations which included the installation of a UF_6 release alarm system, sump geometry modification, and an improved water control system. The operation of the Pilot Plant was resumed only after concurrence by NLO, CAO and ORO staffs was given to the acceptability of these changes.

- B. Recommendation that NLO should evaluate the need for better control of the increasing uranium air concentrations in Plant 8, and for increased study and control of thorium operations.

The air dust surveys in Plant 8 show that significant improvements have been made in lowering uranium air concentrations. Initial sampling results of effluents at Manhole 175 show that 228-Ra from thorium operations is one of the principal isotopes being discharged at NLO. Hence, at ORO request, the Semiannual Environmental Monitoring Report will be revised to substitute 228-Ra concentrations for the total beta activity presently reported.

III. Observations on Nuclear Safety Programs

A. Nuclear Safety Staffing

Early in CY 1966, data collected from ORO contractors regarding cost and man year effort in health protection programs were analyzed to assure that the level of surveillance in the various facilities was commensurate with the needs therefor and/or the hazards potential. This study revealed NLO to be second highest of all ORO facilities in costs for the nuclear safety surveillance program and first in total man year effort. This large staff at this time (4.5 man years) was partly attributable to the use of shift inspectors. However, one technologist and one inspector were assigned on loan full time to the Production Division about July 1966 to assist in batch preparations. The technologist continued in this capacity until his termination from NLO in September 1966. The inspector only recently resumed his work with the Nuclear Safety Department. Thus, the current staff has been reduced by one and has during the year had additional responsibilities outside the nuclear safety field. Further, it was observed that Mr. Heatherton, who has been listed as acting head of the Nuclear Safety Department, has not functioned in that capacity for the past few months. This responsibility is now that of Mr. Dunaway. Hence, the current staff effort is three man years which is more nearly in line with other ORO facilities.

B. Nuclear Safety Surveillance Activity

One of the principal functions of the Nuclear Safety Department is the audit and inspection program which is chiefly carried out by inspectors. It was observed that a major portion of their time is spent performing "change-over" inspections that are required when processing equipment is changed to another U-235 enrichment. In addition, the department head continues to give

authorization for interplant shipments of enriched material. These time consuming responsibilities not only limit the effort that can be devoted to more significant problems but tend to weaken line supervision's overall responsibility for nuclear safety. The inspector's job at NLO consists basically of comparing plant operations and performance against approved procedure. Although this is an essential feature, it, alone, is but one part of a plant criticality inspection program. The ability to detect or anticipate potential problem areas is considered most important for plant safety. With the continued escalation of U-235 enrichments and variety of fissile material processing at NLO, the need for this aspect of nuclear safety surveillance has become paramount. Based upon other observations in this report, there is some doubt on the part of the reviewers that this capability exists to the extent desirable in the inspection program at NLO.

C. Plant Conditions Regarding Nuclear Safety

The following situations were observed during the tours of operating facilities:

1. The digestion area at the Refinery was observed to be quite disorderly with a number of batches in drums set aside with no regular pattern of storage. Two drums were stored together in violation of established procedure, and neither drum was color coded nor otherwise identified. Fixed barricades, painted spots, chains, etc., are not provided in this area for spacing containers either during digestion or in storage.
2. Emergency procedures posted in the NPR remelt furnace area were found to be out of date, one of them being dated June 1, 1962. Further investigation revealed that a more up-to-date SOP was applicable.
3. An "acknowledgment station" which was recently installed in Plant 9 as a control device for 2.1% U-235 enriched oxide accumulation was found to be inoperative. The foreman stated that he knew nothing of the status of the device. An SOP, "Signal System for Control of Black Oxide Accumulation," was issued August 9, 1966, and it was the understanding of the nuclear safety staff that the device was cleared for operation. This situation clearly indicates a lack of communication which is very necessary for adequate nuclear safety control.

4. Some operating facilities were observed to be deficient in the posting of operation limits and/or procedures. This was also evident in some storage facilities and, in general, these facilities are not equipped with physical spacers, lines or painted spots to indicate required spacing of containers.

D. Trends in Nuclear Safety at NLO

The volumes and variety of fissile materials handled at NLO has in more recent years thrust upon the engineering, production and safety staffs the problem of supplying production requirements safely with a plant originally designed to handle normal or very low enriched uranium. This demand has resulted in "make do" operations incorporating administrative control as the primary means of maintaining nuclear safety. With the continuing escalation of U-235 enrichments handled, this problem has become more acute until, at the present time, batch control is an established method of operation. For low U-235 enrichments, the built-in safeguards in batch processing, such as non-optimum range of moderation and the neutron absorption effect of nitrates, afford some additional safety in the event of inadvertent double batching. However, for some current and prospective materials handled, these safeguards are no longer considered adequate in the event of operational error. Processes principally affected are the Zirnlo and SERF programs. In these operations, batch control has been particularly restrictive to production. Also, problems appear to be eminent in the handling of metal chips in oil since none of the collection geometries are dimensionally safe for the prospective enrichments.

E. Nuclear Safety Training

Education and training in plant nuclear safety is effected primarily by line supervision's on-the-job training with assistance, upon request, by the Nuclear Safety Department. The type and amount of training varies at the discretion of the individual plant superintendent. There is no centralized or formalized plant program or training as such. Hence, for the reviewers to have received a comprehensive view of training given to plant operators, interviews with the several plant superintendents would have been required. Although time did not permit this detailed approach during the review, a "feel" for the effectiveness of training received was obtained by brief discussions with foremen and operators during the tours of operating facilities. For the most part, operating personnel appeared knowledgeable in the nuclear safety aspects of their jobs.

IV. Observations on General Health Protection Programs

A. Personnel Exposures

Both internal and external exposure results for 1965 show effective exposure control. For CY 1965, one hundred and thirty-eight employees received above 1 rem but less than 4 rem of penetrating exposure which is approximately the same as that of last year. Results of the bio-assay and the limited in vivo programs have shown internal exposures to be well below recommended limits.

B. Health Protection Costs

An informal study of the health protection costs indicates the level of surveillance effort to be satisfactory in the areas of industrial medicine, industrial hygiene, and health physics. It was apparent that costs associated with the contaminated clothing program are more extensive than warranted based solely upon health protection considerations. However, the clothing program is also included as part of NLO's contract with the union and, hence, is not based entirely on health protection considerations. Management feels that this program would be almost impossible to change because of the union involvement.

C. Plant Tour and Proposed Thorium Operations

It was observed during the plant tour that more emphasis has been placed on meeting production requirements without a commensurate effort on solving health protection problems generated thereby. For instance, this was particularly noticeable in the following areas: digesting (copious oxides of nitrogen fumes) and packaging (airborne contamination) areas of the refinery; excessive loose uranium at the feed station on the top of reactors in the UF₄ plant; and the deteriorated condition of Plant 6 burning drum inclosure. It was noted that the outside storage of uranium and thorium materials in drums has greatly increased over that of last year. Although the vast majority of drums appear in good shape now, they could cause problems and loss of material if allowed to deteriorate. An apparent laxness concerning enforcement of certain IH&RD recommendations on protective equipment, such as wearing of respirators for certain jobs, was also observed.

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Although operations involving thorium have not, thus far, given rise to airborne problems, recent proposals and modifications for expanding these operations will probably result in problem areas unless appropriate modifications are made in the equipment. Of particular interest is the need for improved containment from the main filter press through the final packaging operations during the processing of thorium oxide. Prior to the upgrading of the new thorium operations strict attention to health protection matters by the operating groups and close health physics surveillance will be required.

D. Staffing

Last year's review noted that the industrial hygiene and health physics staff had been reduced by two professional employees, and this year the staff was further reduced by one. Also, a nearly complete change-over (three of four) of the field technicians has occurred. The overall reduction of 3 professional employees and the required training of new technicians with the accompanying increase and diversification in production activities have significantly curtailed the staff capability to be flexible in making comprehensive health protection evaluations and to fully react to changing production activities.

E. Production Activities and the Impact on IH&RD

Recently there has been some diversification and escalation in production activities at NLO, and it appears that this trend will continue with the transfer of operations from MCW to NLO and with the introduction of new and varied materials (e.g., recycle thorium, etc.). Although IH&RD has evaluated certain phases (e.g., recycle uranium, etc.) of these production changes, the changes have been of such magnitude and number that the health protection considerations have not been adequately evaluated prior to and/or during operations. The processes which appear to need additional health protection evaluations are as follows:

1. Certain new operations give rise to the need for assessing potential problems from processing thorium and its daughters (e.g., Ra-228, Ra-224, Pb-212, etc.) with their ultimate disposition and/or reconcentration within the overall process. These operations are being expanded to include the

handling of thorium oxide at elevated temperatures which could result in excessive airborne concentrations of Th and its daughters if adequate ventilation is not provided. The need for evaluating these operations has become more apparent with the advent of processing "recycle" thorium which necessitates consideration of other radioactive impurities.

2. Evaluations of NFS material processing indicate no distinct associated problems thus far, although these evaluations are not completed. The proposed laboratory study involving spiked samples through all process steps should provide basic information concerning reconcentration or other problems that may exist. Also, it is noted that NLO may in the very near future process NFS returns containing approximately 50 ppm Np-237 (U basis). This may necessitate additional evaluations since the Np-237 may be concentrated and recovered.

F. Air Water Pollution and Environmental Surveillance Activities

The recent emphasis on air and water pollution by the Federal Government (e.g., Executive Orders 11282 and 11258) will necessitate additional efforts by contractors to evaluate plant effluents, particularly those pollutants involving toxic and industrial type materials. NLO continuously monitors plant radioactivity releases via the stacks and Manhole 175. However, releases of oxides of nitrogen, fungicides, Cr+6, slimicides, SO₂, fly ash, and other toxicants have not been adequately categorized by IH&RD. Although there is no apparent pollution problem near NLO, a more complete study of releases, particularly air pollutants, would provide assurance that we are in compliance with the intent of the recent Executive Orders and AEC's Immediate Action Directives. Also, such a review may indicate that some current environmental grab samples (off-site air and Miami River) may not be necessary in that present close-in sampling suffices.

G. Evaluation of Internal Exposures

The in-plant area air sampling program has over the past several years emphasized daily weighted averages for all jobs within the production areas. This includes air samples from rest rooms and other areas or operations which do not significantly affect internal exposure. It is recognizably difficult

to relate either air sample or bio-assay results to internal exposure. However, urine sampling and, in some instances, in vivo counting are generally considered more directly indicative and accurate in assessing internal exposure. Air sampling programs are, of course, necessary to provide assurance of adequate control and containment of airborne contaminants. It is felt that greater emphasis on the bio-assay (urine and in vivo) programs would improve the assessment of internal exposures.

H. Construction Proposals (CP's) and Reports

Recent NLO construction proposals, particularly on the new thorium operations and the electrolytic cell, have not contained sufficient health protection information to indicate that NLO has adequately assessed the handling of potential problem areas. It would appear desirable also that NLO attempt to integrate safety features into initial construction proposals rather than provide these as an afterthought.

It is noted that other reports or documents which have health protection implications are not always brought to the attention of IH&RD. For example, IH&RD was not on the distribution for receiving the report on insecticides and fungicides, and the investigation report dated August 2, 1966, concerning a large uranium loss from the Refinery. Although IH&RD did provide estimates concerning the amount of U loss, they were not informed of the recommended remedial actions necessary to preclude similar incidents. Hence, it is not apparent that the services of IH&RD are always utilized to the best advantage by other groups.

V. Recommendations

- A. It is recommended that NLO management place increased emphasis on the responsibility of line supervision to be aware of and assure the implementation of safety in operations and to obtain staff assistance when unique situations are encountered. This is desirable for both criticality control and health protection programs.

- B. It is recommended that NLO give thorough consideration to those aspects of the nuclear safety inspector's responsibilities and abilities as noted in Observation II-B to assure a maximum effort in the detection and practical solution of potential nuclear safety problems.
- C. It is recommended that NLO make a thorough review of all facilities handling fissile material to assure that up-to-date procedures and/or limits are appropriately posted where applicable.
- D. The use of fixed spacers, chains, painted lines or spots should be expanded to include those storage facilities where individual container spacing is mandatory; this includes temporary batch storage in the Refinery as noted in Observation III-C.
- E. NLO should emphasize and plan for the use of dimensionally safe equipment as noted in Observation III-D. In particular safe geometry should be considered for the Zirnlo and SERF programs as appropriate with the escalation of U-235 enrichments handled.
- F. NLO should assure itself that an adequate line of communication exists regarding safety applications so that there will not be a re-occurrence similar to the deficiency therein noted in Observation III-C-3.
- G. It is recommended that NLO expedite necessary health protection modifications to current operations (e.g., Refinery, etc.) and incorporate safety features at an early stage in new or proposed operations (e.g., thorium, etc.).
- H. It is recommended that additional health physics evaluations be made concerning various operations as noted in Observation IV-E and that adjustments be made in the monitoring program as necessary.
- I. A review should be made of the major sources and releases of toxicants, particularly potential air pollutants such as that released by burning of coal or waste materials, and that any indicated adjustments be made to current monitoring programs.

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- J. NLO should reconsider the roles of the air and bio-assay programs in their assessment of internal exposure in light of the discussion in Observation IV-G, and should propose such changes in emphasis as are indicated by the study.
- K. NLO should assure that an adequate line of communication exists regarding health protection matters so that the services of IH&RD are utilized to the best advantages as noted in Observation IV-H.

Be...

Reviewers: R. L. Herwin
R. L. Herwin
Health Physicist

W. A. Johnson
W. A. Johnson
Nuclear Safety Specialist

UNITED STATES GOVERNMENT

Memorandum

TO : Herman M. Roth, Director, Research & Development DATE: FEB 17 1967
Division, OR

FROM : C. L. Karl, Area Manager
Cincinnati Area Office

SUBJECT: REPORT OF THE ORO ANNUAL HEALTH PROTECTION REVIEW OF NLO,
SEPTEMBER 1966

M:ELG

Reference is made to your memorandum, subject as above, dated December 7, 1966, symbol ORB:WAJ, requesting comments on the report.

Enclosed is a copy of letter received from NLO, dated February 14, 1967, setting forth their comments. This office has commented verbally on the survey to members of the Biology Branch and has no further comments to make.

for *W. T. Warner*
C. L. Karl

Enclosure: *OK*
cy NLO ltr dtd 2-14-67

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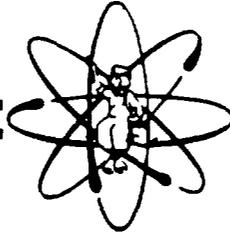


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FEB 14 1967

Mr. C. L. Karl, Area Manager
U. S. Atomic Energy Commission
P. O. Box 39188
Cincinnati, Ohio 45239

SUBJECT: REPORT OF ORO ANNUAL HEALTH PROTECTION REVIEW
OF NLO, SEPTEMBER, 1966

Reference: Letter, Karl to Noyes, 12/13/66, same subject

Dear Mr. Karl:

The following gives the status and plans for implementation of recommendations given in the reference report.

- A.** We have been placing greater emphasis on the line supervisor's responsibility in health and safety matters. In implementing recommendations regarding these functions we will expect each line supervisor to be fully aware of his duties and responsibilities to assure nuclear safety in all operations for which he is responsible. The very thorough preparation for the slightly enriched campaign just starting in the Refinery is an example.

I have asked to receive copies of all nuclear safety violation reports and notices of ground contamination and have given them personal attention so that supervisors are made aware of their responsibilities. We have begun a program for routine inspection of protective devices for safe operation of equipment and have emphasized recommendations for wearing of personal protective equipment. We have placed increased emphasis on the supervisor's role in training.

We will continue to look for situations where we feel a need to emphasize the line supervisor's responsibility.

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- B. Elimination of nuclear safety inspectors' participation in changeover inspections has been considered in a number of reviews and discussions. It is our consensus that no change should be made at this time. The matter will be given further study.

The form used for authorizing interplant shipments of enriched materials will be discontinued as soon as pertinent procedures can be revised and approved.

We are attempting to hire for the Nuclear Safety Department a technologist who has the educational background and the ability to recognize potential problem areas. We are also attempting to improve the quality of the inspections now performed by the inspectors. One of them has been assigned temporarily to the Refinery so that he can better understand that plant and hopefully recognize its problem areas.

- C. The Production and Technical Divisions have reviewed their areas for posted procedures to see that they are up to date and meet current needs. In addition, the Nuclear Safety Department has reviewed all areas and has made recommendations for posting of nuclear safety limits and special nuclear safety instructions. These recommendations have been made to Production and Technical and are being implemented by those Divisions.
- D. The Nuclear Safety Department has recommended the use of blocks to maintain safe spacing on skids which contain more than one safe-mass or safe-geometry container. They have also recommended the use of painted lines or spots to indicate proper spacing for enriched materials where optimum use of available space is an important consideration. These recommendations are presently being considered by Production and Technical for possible implementation. The Nuclear Safety and operating personnel will continue to consider needs for fixed spacers in enriched operations.
- E. The design of the safe geometry digester for the Refinery has been given top priority. However, with other engineering work in the Refinery it has not been possible to complete the design. July 1 is still the target date for this installation. Drawings have been approved for modification of the baskets used in Zirnlo to permit loading only two parallel rows of uranium pieces. As plans progress for processing higher enrichment uranium, an attempt will be made to design equipment which is geometrically safe.
- F. We recognize the need for improved communications and at the same time believe that this is a universal problem for which there are no ready solutions. At the December meeting of my staff we discussed the need for improved communications with particular emphasis on health and safety. We are trying to improve communications in

conducting our everyday business and will continue to stress the importance of communications in future meetings and through the use of bulletins.

- G. We have expedited health and safety protection modifications for current operations. Because we are short of Engineering personnel, we have devised a priority system for Engineering Division activities. Where health and safety items are considered critical, they will receive top priority.

Our Health & Safety Division has a representative on our Construction Proposal Review Committee which reviews all major projects (\$5,000 or more). Occasionally "crash" Idea Letters are reviewed by this committee after the fact; however, the H&S Division still must review the final engineering drawings. For "crash" items design work has not progressed beyond the point where a final health and safety evaluation can be made. Recent projects of this type include: Electrolytic Reduction of UO_2 , Integrated Thorium Production Facility, and Dense Thorium Oxide Production Facilities. H&S will continue to review Idea Letters and CP's and are now tailoring health and safety statements in the CP to specific conditions.

- H. Health physics evaluations of new and changing conditions are made just as soon as it is practical to do so. These evaluations usually involve both our IH&R and Bioassay Departments and frequently other Divisions. When we know in advance that we are to receive new materials, we evaluate the potential problems which might be encountered in their handling and later we follow them through the process to assure that no concentration of a potentially hazardous isotope occurs.

For several years we have analyzed our storm sewer effluents for Ra-224 and Ra-228 because of thorium in storage at this plant. This was determined to be no problem, but the analyses were continued then because of thorium work which had started at the Pilot Plant. These analyses of Ra-224 and Ra-228 isotopes in the waste streams showed that the Ra-224, which has the higher maximum permissible concentration (MPC), is of no concern. We have discontinued Ra-224 analyses and analyze for Ra-228 a monthly composite of the combined effluent to the river.

We are presently carrying out extensive studies in our Technical Division to determine if either plutonium or neptunium will concentrate in our production stream. In addition to the lab study, which is near completion, we are now following a special production run in plant equipment for more complete information. These tests will provide data on the process operations of denitration, hydrofluorination, reduction, and remelt.

Additional evaluations will be made if NLO is given the task of processing NFS returns containing up to 50 ppm Np-237. In anticipation of this task, the Technical Division is now making lab-scale tests of extraction methods.

Samples of process water and plant liquid effluent have been analyzed to determine the distribution of thorium daughters. During 1966, 135 radium and thorium determinations were made on water samples. Fission product activity was also identified in feed and waste streams from the processing of recycle thorium, and we have determined which of these fission products is the major contributor to the activity in our waste effluent.

- I. Executive Orders 11282 (air pollution) and 11258 (water pollution) have been thoroughly reviewed by our Engineering and H&S personnel and comments furnished your office on each. It is our opinion that we are well in line with the philosophy expressed in these orders and attempt to keep current on the developments in each field. As for a number of the specifics mentioned in Observation IV-F:
 - a. We do not monitor the oxides of nitrogen from individual stacks as these measurements would be meaningless. We do, however, take routine off-site air samples for which oxides of nitrogen concentrations are determined. In all instances, these have been well within acceptable limits.
 - b. The quantities of fungicides, pesticides, and slimicides we have used have been small and we have not considered it necessary to analyze for their concentrations in our effluents. We will continue to limit their use and will analyze our contribution to surface streams as soon as it seems advisable to do so.
 - c. We have analyzed for Cr^{+6} periodically over the years and have always found the concentration to be well below the 0.05 mg/l listed by the USPHS as a standard for drinking water. The only source of Cr^{+6} is in our cooling water system which is a closed system. We will continue to make periodic analyses to assure that we stay below 0.05 mg/l in the river.
 - d. Our purchase requisitions specify a "low sulfur" content coal (less than 2%), which automatically limits the SO_2 released to the atmosphere. Although no SO_2 measurements are made, we are assured that our effluent is satisfactory. The odor threshold limit is 3 ppm, whereas the 1966 Threshold Limit Value (TLV) is 5 ppm. No odor of SO_2 is ever noticeable at the FMPC.

All boiler off-gases must pass through multiclone dust collectors and the fly ash is removed to an on-site storage facility. This system

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has proven to be very efficient as indicated by the minimal erosion of the induced draft fans. We feel that we satisfy requirements of the Executive Order that "the emission of fly ash and other particulate matter shall be kept to a minimum" and "emission of sulfur oxides shall be minimized to the extent practical." On the basis of papers presented at the National Conference on Air Pollution held in Washington, D. C., on December 12-14, 1966, our boilers are as well equipped and operated as any industrial installation in the country with minimal losses to the atmosphere.

e. We believe that toxicants being released to the atmosphere and to surface streams have been adequately categorized even though we did not monitor for every potential toxicant used at the FMPC and complete environmental surveys were not made for every compound. Within the past year, however, we have analyzed for ozone, beryllium, lithium, magnesium, and manganese as new or changed operations indicated.

We feel that we are well within the intent of the two Executive Orders as well as "The Clean Air Act" and the "Water Quality Act of 1965."

J. We have for the past few years given serious consideration to replacement of the air sampling program with a bioassay program for exposure evaluation. We were of the opinion that bioassay was not acceptable as a sole means of evaluating internal exposure. We are now comparing our 1966 urine and air dust results. Following this, we will make a definite proposal in regard to either maintaining our present system or replacement of some portion of our air sampling with bioassay. Now that the portable whole body counter will be made available for our use, we are expecting that whole body counting can also be used in our exposure evaluation program for both uranium and thorium.

K. As indicated in our answer to Recommendation F, we are attempting to improve communications. We expect that as communications are improved the services of the IH&R Department and other departments will be utilized to better advantage.

Sincerely yours,

Original Signed By

M. S. NELSON

Assistant Manager

J. H. Noyes

Manager

for

RCH/mb

CINCINNATI WVEY

cc: C. R. Chapman

✓ C. L. Karl

J. A. Quigley, M.D.

SEP 28 1966

RECEIVED

SEP 28 1966

1114805

UNITED STATES GOVERNMENT

Memorandum

TO : C. L. Karl, Area Manager
Cincinnati Area Office

DATE: November 1, 1967

FROM : Joseph A. Lenhard, Director
Safety Division, ORO

SUBJECT: REPORT OF THE ORO ANNUAL HEALTH PROTECTION REVIEW OF NATIONAL
LEAD COMPANY OF OHIO, OCTOBER 1967

OSH:WAP

Enclosed are six copies of the subject report for your information and action. The conduct of the review was facilitated by the cooperation and assistance of your office and the National Lead Company.

It is suggested that your contractor be authorized and instructed to proceed with the implementation of the matters covered by the recommendations in this report, unless there are valid reasons why particular recommendations are not warranted in whole or in part. Your comments and those of your contractor with regard to the conduct of the review, content of the report and plans for implementing or otherwise handling the recommendations are requested by December 31, 1967.

Joseph A. Lenhard
Joseph A. Lenhard

Enclosure:
Report (6)

CC: R. C. Armstrong
C. A. Keller, w/encl.
R. H. Miller, w/encl.

1114806

HEALTH PROTECTION REVIEW
NATIONAL LEAD COMPANY

OCTOBER 1967

I. Introduction and Summary

The annual health protection review of the National Lead Company of Ohio was conducted October 3-6, 1967, by Messrs. F. E. Coffman and W. A. Pryor of the ORO Safety Division. The review generally covered all phases of health protection with potential problem areas being emphasized. In addition, in conjunction with Mr. T. H. Hardin, Chief of the ORO Transportation Branch, the transportation of radioactive materials was reviewed under AECM-0529. Extensive tours of plant facilities were made.

The NLO health protection program is considered to be generally satisfactory. The reviewers' findings and recommendations for program improvement follow.

II. Observations

A. Transuranium Studies

NLO appears to have met the intent of past OROO recommendations regarding studies of radioactive impurities in uranium feed and their effects on the health protection program. Potential problem areas are being periodically sampled and should be watched closely as recycle impurities in feed increase.

B. External Radiation Exposures

A review of annual film badge exposures indicates quite adequate control of external exposures.

C. Licensee Shipments

The frequent problems with incoming licensee shipments involving leaking containers and out of specification U-235 enrichments were reviewed. Although licensees are within the purview of the regulatory arm of the AEC, our staff will bring these

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problems to the attention of the OROO Production Division and the Regulatory. NLO should continue to advise Health and Nuclear Safety Branch of any future problems so that corrective action can be initiated.

D. In-Plant Noise Areas

Visits were made to and discussions were held regarding various noise areas. NLO staff is making studies of these areas and have located noise levels above that recommended by authorities (85-90db).

E. Drum Storage

The outside drum storage inventory has increased in the past few years. It is felt that continued efforts to work off this accumulation are warranted since widespread drum leakage to the storm sewer would be undesirable, as would expensive large scale redrumming.

F. New Penalty Schedule for Reprocessed Uranium

The new proposed penalty schedule for radioactive impurities was discussed and it was noted that NLO feels that if these higher levels are actually encountered at NLO, significant health protection problems will arise. The proposed schedule was reviewed and it was found that:

1. The proposed specifications were based upon feed to gaseous diffusion and could be altered if a serious problem is anticipated at NLO.
2. The majority of returns to NLO will be from production reactors. However, programs such as the U-236 enhancement effort could result in higher U-232 impurities in NLO feed. In addition, some of the higher burn-up power reactor returns will be sent to NLO as at present. In any event, increases in both U-232 and transuranic content can be expected as recycle feed increases and virgin feed material decreases.

It is understood that OROO Production Division will ask NLO to propose specifications that they can safely handle with documented reasons for such limits.

G. Radiological Emergency Capability

A fast, well-organized disaster call response in association with an RDA alarm was witnessed by the reviewers. However, further discussions of this response indicated that the IH&R Department has not adequately maintained a RAD emergency capability specifically for the nuclear incident situation. High-level radiation instruments were not readily available. Also, personnel training for handling criticality incidents with associated high radiation levels needs reemphasis.

H. Refinery Fuming Problems

Frequent burping or boil-over of the refinery digesters and resultant plant evacuations are not acceptable modes of routine plant operation. Not only is it a potential health hazard, but routine purging of a building with concentrated nitric acid fumes results in excessive equipment maintenance and depreciation. If the present operating technique and containment are to be continued, vastly improved ventilation would appear necessary to reduce fume concentrations.

I. Housekeeping and Dust Control

Extensive discussions were held with technicians, plant foremen, IH&R, and plant and Area Office management regarding the attitudes and philosophy concerning the appropriate degree of dust control and cleanliness in a production plant such as NLO. It is realized that housekeeping and dust control is a matter of degree. However, conditions in some plant areas appeared marginal during the plant tours.

Miscellaneous minor (and inexpensive) improvement such as patch-up of leaking ductwork, caulking cracks in dust enclosures, maintaining adequate gasketing on hoppers, and improvising to solve other minor dust

problems go a long way toward having a cleaner plant and lower exposure potential. This type upgrading can be accomplished at reasonable cost by having technicians look more closely for problems, while educating plant foremen as to the desirability of running a cleaner shop and encouraging them to implement and enforce dust control improvements, as well as protective equipment requirements.

J. Transportation

The transportation of radioactive and fissile materials was reviewed in conjunction with the ORO Transportation Branch. AECM-0529 requires that shipping containers be reevaluated and approved by the AEC and that Department of Transportation (DOT) permits be obtained by July 1, 1968. NLO has worked closely with ORO in obtaining the AEC approvals. While some difficulty has been encountered with the DOT, it is anticipated that the necessary permits will be obtained well in advance of the indicated cut-off date. The NLO transportation program appears to fully meet the requirements and intent of AECM-0529. While no specific regulations prevent the shipment of metallic chips and turnings, we concur in the FMPC attitude that these shipments should be banned until appropriate containers are developed.

K. Nuclear Safety

1. The NLO Nuclear Safety Program appears to have been strengthened. Of primary importance is the redirection of the inspection program whereby inspectors are spending more time becoming familiar with production operations. As a result, more meaningful inspections are now being made. Particularly noteworthy was the familiarity which one nuclear safety inspector had with the refinery as well as other production operations. In addition, a technologist has been added to the nuclear safety staff. The proper posting of nuclear safety control limits and/or procedures in the production areas was also noted.

III. Recommendations

- A. The margin for error for the current maximum U-235 enrichment of 10% in the refinery is rather small. Based upon refinery operating experience with enriched uranium and with a relatively small quantity of 5% to 10% U-235 enriched uranium available, there is some question in regard to the safe and practical limiting U-235 enrichment for this facility. Thus, until the refinery has been upgraded to a level which is more compatible with nuclear safety, the material > 5% U-235 enrichment should be stored rather than processed. The practice of separately storing the material > 5% U-235 enrichment should be continued.
- B. The training program for production supervisors and operators, particularly in the refinery, emphasizing the importance of following nuclear safety controls, should be strengthened and regularly repeated. ✓
- C. All noise areas should be surveyed for unsatisfactory noise levels of both continuous and impact type, and any necessary corrective measures should be implemented at the earliest practicable time.
- D. Regarding emergency planning and readiness, the following should be implemented as soon as practicable:
1. A minimum of two high level (≥ 500 R/hr) instruments should be maintained in workable condition for ready access in the event of a nuclear incident.
 2. The training program, established to familiarize IH&R staff with the type of actions that should be taken in a RAD emergency, should include sessions to orient staff members as to what the problems could be with an accidental criticality, what actions might be required, who should take them, etc.
- E. Prompt corrective action should be taken to eliminate the refinery fume problem. Until such measures are taken on this matter, preventive maintenance of the present ductwork should be rigidly enforced.

Reviewers:

F. E. Coffman
F. E. Coffman
Health Physicist

William A. Pryor
W. A. Pryor
Nuclear Safety Specialist

UNITED STATES GOVERNMENT

Memorandum

669

TO : Joseph A. Lenhard, Director, Safety Division, ORO DATE: DEC 29 1967

FROM : C. L. Karl, Area Manager,
Cincinnati Area Office

SUBJECT: REPORT OF THE ORO ANNUAL HEALTH PROTECTION REVIEW OF NATIONAL LEAD COMPANY
OF OHIO, OCTOBER 1967

M:ELG

Reference is made to your memorandum, subject as above, dated November 1, 1967, symbol OSH:WAP, requesting comments on the report.

Enclosed is a copy of a letter received from NLO, dated December 26, 1967, setting forth their comments. You will note that NLO has responded to all of the report "Recommendations" and has followed the report's marginal paragraph headings in their answer. This office wishes to include comments on NLO's response and is listing its statements in accordance with this same physical arrangement, as follows:

- B. - NLO has stated: "Initially, this program will be directed to Refinery personnel." Their response fails to establish a starting date for "training" which we believe should be as soon as practicable. CAO will effect an early start on this training program.
- D. 1. No comment.
- 2. We do not believe NLO is correct in their expressed attitude, and dispute their opinion in this matter. This Recommendation is being placed in "Concurrent Review" status for following by and between CAO and NLO personnel involved in health protection work. You will be advised at a later date of progress on implementation of this Recommendation.
- E. NLO has failed to include another step taken to reduce the fume problem. Their Production Division has made definite efforts to vary the feed input schedule in order to limit the materials which usually cause the most serious fuming problems.

This concludes CAO comments on the report and NLO's response for the present, however, we hope to be able to advise you very soon of further progress on Recommendations B. and D-2.


C. L. Karl

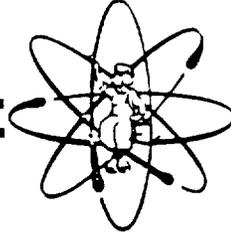
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NATIONAL LEAD COMPANY OF OHIO



P. O. BOX 39158

CINCINNATI, OHIO 45239

DEC 26 1967

Mr. C. L. Karl, Area Manager
U. S. Atomic Energy Commission
P. O. Box 39188
Cincinnati, Ohio 45239

SUBJECT: HEALTH PROTECTION REVIEW, NATIONAL LEAD COMPANY, OCTOBER 1967

Reference: Same as above

Dear Mr. Karl:

The following comments are relative to corresponding items under "Recommendations" made in the reference letter:

- A. As a result of the observation that nuclear safety was not adequate in processing 5-10% U-235 in the Refinery, NLO management declared a moratorium on the digestion of this material. The Cincinnati Area office was notified on October 20.

Secondly, an ad hoc committee, consisting of representatives for the Technical, Engineering and Health & Safety Divisions, was appointed by the Director of Manufacturing to recommend and/or design a method for processing this material which would be acceptable. This committee has reported informally to the Director, suggesting a safe geometry, continuous digestion facility. This is to be a scaled-down and simplified version of a facility considered earlier for processing $\leq 5\%$ U-235 materials. It was judged that the $\leq 5\%$ U-235 processing unit was not feasible relative to the quantity of uranium in this enrichment range to be processed. (See "Observations," Item II K.3 - it had not been planned that 5-10% U-235 be processed in the safe geometry unit which was

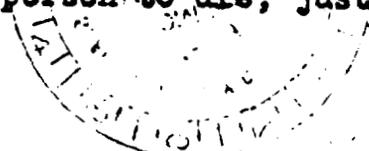
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being considered at that time.) A written report outlining the current plans is now being prepared for consideration by the AEC.

- B. NLO management announced the planning of a training program and the appointment of a "Training Coordinator" on November 16. This program will be designed to educate the supervisors and operators in all aspects of their job, including nuclear safety. Initially, this program will be directed to Refinery personnel.
- C. As mentioned in the ORO report, a complete noise survey is underway. As problems are encountered, corrective measures will be taken.
- D. 1) A purchase order has been initiated for two high level (≥ 500 R/hour) portable radiation monitoring instruments. This cannot be issued, however, until equipment funds are released. When these are received, one will be kept in the IN&R Department vehicle at all times. The second instrument, along with the present Civil Defense instrument, will be kept ready in the Health & Safety Decontamination Room at all times.
- 2) We do not agree that we "have not adequately maintained an RAD emergency capability specifically for the nuclear incident situation." There does seem to be a difference in philosophy between ORO Safety Division personnel and us; however, we do not feel that this in any way indicates we have not maintained an adequate program. The main area of difference involves whether or not our IN&R Shift Technicians should or should not approach an area in which a nuclear incident has occurred for the purpose of rescuing injured personnel.

We have thoroughly reviewed the Emergency Manuals from K-25, Y-12 and GAT that were sent to us by ORO Safety Division personnel; AEC Manual Chapter 0524, Part III, "Guidance for Emergency Exposure During Rescue and Recovery Activities;" and LA-3611, "A Review of Criticality Accidents." After much discussion among ourselves, we still do not think that our IN&R Shift Technicians, or any of our shift supervisors, should make decisions for any reason concerning the entry of an area in which a nuclear incident has occurred. Admittedly, we have mixed emotions concerning the fact that we might have to leave a person to die, just as we did when we developed our



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procedure some years ago. However, we consider radiation accidents in the same vein as other serious accidents and agree with AEC Manual Chapter 0524 which says: "Attempts to rescue victims of a nuclear incident should be considered in the same context as any other emergency action involving the rescue of victims, regardless of the type of hazard involved."

The main basis for our present procedure is to assure that plant personnel can return to their work areas as soon as possible following a false alarm. It has always been our intention that only "top" management personnel will make decisions pertaining to the entering of an area for any reason where a nuclear incident had occurred.

The UCC and GAT have shift superintendents, all of whom are specifically trained as Plant Emergency Directors. We do not maintain this capability on our off-shifts and would not propose to do so solely for the purpose of handling nuclear incidents. We do not see where any of the emergency manuals for these sites in any way indicate that even these men would make the decisions for personnel recovery. It might be mentioned that of the 34 criticality accidents listed in LA-3611 that the only attempt at personnel rescue was made following the SL-1 incident. These 34 incidents include all criticality accidents up to January 1967.

- E. The NLO Engineering Division has given the Refinery fume removal problem top priority. Following a meeting held by interested parties on October 27, 1967, a stepwise series of modifications and improvements was agreed upon to attempt to solve this very complex problem.

The first step of this project involves the installation and evaluation of the effectiveness of a Bete nozzle in the off-gas duct of Digester D1-7 which is the first digester in the continuous digestion system. This evaluation is underway and looks quite promising at this time. If this improvement is found to be permanent by using this first nozzle, then a second nozzle is to be tested in the discharge line of the feed line conveyor to the digester. If these nozzles are not found to be effective, a scrubber system will be installed on the D1-7 off-gas line.

We are presently studying the possibility of revising the Cold Side digesters to another continuous system. If this

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is done, the solutions found for the Hot Side could also be utilized for the Cold Side. If conversion of this system is not possible, then a much more elaborate solution to the problem will be involved, although plans are underway to evaluate a Bete nozzle in one of the Cold Side digestors based on the initial success being realized with the D1-7 nozzle.

Sincerely yours,

Original Signed By

J. H. NOYES

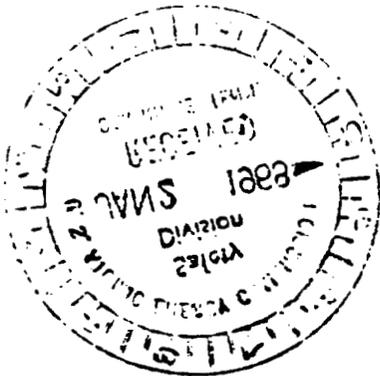
Manager

J. H. Noyes

Manager

RHS:DLD/lrr

cc: S. F. Audia
✓ C. L. Karl (lx)
S. Marshall
J. A. Quigley, M.D.
C. A. Schwan



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OCT 13 1967

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UNITED STATES GOVERNMENT

Memorandum

TO : J. A. Lenhard, Director, Safety Division
Oak Ridge Operations Office

DATE: JUN 21 1968

FROM : C. L. Karl, Area Manager
Cincinnati Area Office

SUBJECT: REPORT OF THE ORO ANNUAL HEALTH PROTECTION REVIEW OF NATIONAL LEAD
COMPANY OF OHIO, OCTOBER, 1967

M:WTW

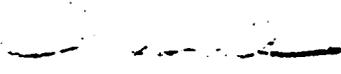
Reference is made to our memorandum of December 29, 1967, on the above subject.

Specifically we refer to Items B. and D.2 for which we supplied an interim response at the time of our December correspondence. Additional comments follow:

B. In regard to operator training the Refinery foremen have completed a review of 8 programmed instruction courses and the study of 2 of them. One additional course was completed on a pre-test basis. On May 31, 1968, 20 persons from the Maintenance Department attended a 2½ hour training session on Nuclear Safety and Plant Processes. Preparations are complete for a meeting with Union Officials to inform them of the training plans.

D.2. During the past months arrangements have been made and are now realized for the addition of Night Shift Superintendents. NLO has advised that they will now revise their procedures so as to have the night shift superintendents act as the Plant Emergency Director (PED) during emergency conditions. It is recognized that there shall have to be adequate training to handle nuclear accidents as well as other emergencies prior to the night shift superintendents assuming the duties of a PED. September 1, 1968 has been established as a target date for this action. We will meet with NLO on or about August 16, 1968, to review their progress in the training of the night shift superintendents.

This completes our follow-up action on the subject review.


C. L. Karl

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UNITED STATES GOVERNMENT

757

Memorandum

TO : J. A. Lenhard, Director, Safety Division
Oak Ridge Operations Office

DATE: JAN 19 1968

FROM : C. L. Karl, Area Manager
Cincinnati Area Office

SUBJECT: REPORT OF THE ORO ANNUAL HEALTH PROTECTION REVIEW OF NATIONAL LEAD
COMPANY OF OHIO, OCTOBER, 1967

M:WTW

Reference is made to our memorandum, dated December 29, 1967, on the above subject.

As noted in B. of the referenced memorandum, we considered it desirable to gain a better understanding of the NLO training program for nuclear safety. In response to our query to NLO of January 5, 1968, we have received the enclosed letter, dated January 18, 1968, subject as above.

We consider that recommendation B. resulting from your audit has been accomplished in an appropriate manner.



C. L. Karl

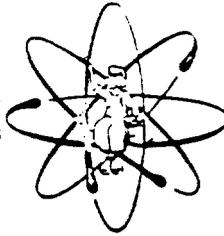
Enclosure: *ok*
As stated above

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Buy U.S. Savings Bonds Regularly on the Payroll Savings Plan

NATIONAL LEAD COMPANY OF OHIO



P. O. BOX 39158

CINCINNATI, OHIO 45239

JAN 18 1968

Mr. C. L. Karl, Area Manager
U. S. Atomic Energy Commission
P. O. Box 39188
Cincinnati, Ohio 45239

SUBJECT: HEALTH PROTECTION REVIEW, NATIONAL LEAD COMPANY, OCTOBER, 1967

Reference: Letter, C. L. Karl to J. H. Noyes, Same Subject, January 5, 1968

Dear Mr. Karl:

Paragraphs five and three of the reference letter invited comment on plans for strengthening the nuclear safety training program and information as to a starting date.

With regard to training in general, across-the-board operator training programs in the Production plants were conducted a little over ten years ago and have been supplemented by on-the-job training based on current SOP instructions, including emphasis on nuclear safety provisions, plus specific scheduled training activities. Specific activities in the Refinery included:

1. Prior to the start up of the SERF operation in the spring of 1965, a five-day operator training program was undertaken which covered administration, operation and nuclear safety requirements of the process. Continuation of this training was conducted on the job during the equipment shakedown phase.
2. During the summer of 1966, the higher enrichment batch digestion campaign was begun. Training was accomplished through explanations of the nuclear safety requirements that had been formalized and made a part of the Manufacturing Specifications Manual. The Standard Operating Procedures, also a part of the same manual, were reviewed in a step-by-step manner,

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Mr. C. L. Karl

Health Protection Review, National Lead Company, October, 1967

Page 2

explaining the principles involved. This was followed by practicing the actual operations. Training and supervisory assistance, on a three-shift basis, was provided by members of the Technical Division and of the Process Engineering Department for a period of seven weeks.

3. The start up of continuous digestion and slag leach early in 1967 was preceded by a meeting on each operation with Refinery supervision for training and review, conducted by the head of the Nuclear Safety Department.

Currently, we are developing curricula for a formalized, continuing program to be conducted initially in the Refinery. Meetings have been held among representatives of the Engineering, Health and Safety, Technical, and Production Divisions to discuss methods of achieving the objective and to furnish assistance in the development of Refinery oriented training courses. Facilities for training have been arranged in the Refinery.

This training program is to start January 22, 1968. Its objective is to update the supervisors' and operators' knowledge of the process and equipment and all limitations, inherent or imposed. The objective, therefore, will include emphasis on nuclear safety requirements. To supplement the training program, it is planned to include discussion of nuclear safety requirements during the monthly plant safety meetings.

Sincerely yours,

Original Signed By

M. S. NELSON

Assistant Manager

 J. H. Noyes

Manager

FNS/MSN:mlb

cc: ✓ C. L. Karl

C. R. Chapman - S. F. Audia

S. Marshall

J. A. Quigley

C. A. Schwan

J. H. Seidler

Central Files

1114820

UNITED STATES GOVERNMENT

Memorandum

TO : C. L. Karl, Area Manager
Cincinnati Area Office

DATE: November 6, 1968

FROM : Joseph A. Lenhard, Director
Safety Division, OR

SUBJECT: ANNUAL HEALTH AND NUCLEAR SAFETY APPRAISAL OF NLO

OSH:WAJ

The annual health and nuclear safety appraisal of the National Lead Company of Ohio was conducted September 10-11, 1968, by members of the ORO Safety Division. The findings were informally discussed with your office and NLO representatives at that time.

Enclosed are six copies of the formal report of the appraisal. No specific recommendations are made; however, the observations and conclusions should be noted. Your comments and those of NLO, if any, on the conduct of the appraisal and the general content of the report are invited.

The cooperation extended by members of your staff and NLO during the review is appreciated, and we are pleased that the report reflects continued safe operation of the NLO facility.

Wayne Smalley acting
Joseph A. Lenhard

Enclosure:
Appraisal Report (6)

cc: R. C. Armstrong, w/encl.
J. D. Donovan, w/encl.

HEALTH PROTECTION APPRAISAL
NATIONAL LEAD COMPANY OF OHIO

SEPTEMBER 1968

I. Purpose and Scope

The annual health protection appraisal of the National Lead Company of Ohio was conducted September 10-11, 1968, by members of the ORO Safety Division, Health and Nuclear Safety Branch. The appraisal covered the NLO health protection programs in general and emphasized the implementation of previous recommendations, nuclear safety and personnel exposure data evaluation.

II. Summary

It is concluded from this appraisal that NLO continues to be operated in a safe manner with a health protection program consistent with the hazard potential of the operation. Satisfactory action has been initiated toward the implementation of last year's recommendations and should be pursued to completion at the earliest practical time. No new recommendations are made in this report. The findings of the appraisal were discussed with M. S. Nelson of NLO and W. T. Warner of AEC-CAO.

III. Recommendations

A. Implementation of Previous Recommendations, October 1967 Appraisal

1. Recommendation that material above 5% U-235 enrichment be placed in storage rather than be processed through the refinery on a batch basis.

As reported in a letter from J. H. Noyes, NLO Manager, to C. L. Karl, CAO Manager, on December 26, 1967, a moratorium on the digestion of materials above 5% U-235 enrichment was declared by NLO management on October 20, 1967. In addition, an ad hoc committee, consisting of representatives for the Technical, Engineering and Health and Safety Divisions, was appointed to recommend and/or design a method for processing this material. Additional information on results of this committee is contained in Section IV-A.1 of this report.

2. Recommendation that the training program for production supervisors and operators, particularly in the refinery, be strengthened emphasizing the importance of following nuclear safety controls.

On November 16, 1967, a full-time "Training Coordinator" was appointed for the purpose of establishing a formalized training program at NLO. As reported in a letter from J. H. Noyes, NLO, to C. L. Karl, CAO, on January 18, 1968, a training program was scheduled to begin January 22, 1968, for refinery personnel, emphasizing nuclear safety. Further, in a memorandum dated June 21, 1968, from C. L. Karl, CAO, to J. A. Lenhard, Director, Safety Division, ORO, it was reported that a review of 8 programmed instruction courses was performed by refinery foremen. An additional course was completed on a pre-test basis. Other training sessions have been held for the Maintenance Department on nuclear safety.

3. Recommendation that all noise areas be surveyed and necessary corrective measures be implemented.

The noise survey has been completed. Evaluation of the survey data in conjunction with previous audiometric data is underway. A report of this evaluation will be compiled and the satisfactory implementation of the recommendation will be contingent on the successful resolution of problems and recommendations resulting from the NLO evaluation. The jolters in the Metals Plant and the Ball Mill operation in Building 55 are currently recognized as potential problem areas.

A new audiometric booth has been installed and should improve the quality of audiometric examinations.

4. Recommendation regarding emergency planning and readiness.

Two high range radiation instruments are now available for use. It appears that some definite procedure for periodically verifying the workability and quasi-calibration of the high range scale was yet to be firmly established.

Initial steps were being taken at the time of the appraisal to develop the NLO program of off-shift supervision and emergency planning. Meetings of the newly appointed NLO shift supervisor with the Y-12 Plant shift supervisor and emergency coordinator are planned. It is anticipated that the influence and impact of this planning at the higher levels of supervision at NLO will be felt in emergency training throughout the NLO organization.

5. Recommendation that corrective action should be taken to eliminate the refinery fume problem.

This problem has received a high priority at NLO, and conceptual engineering for correcting the problem appears to be adequate. Preliminary measures have been taken which have reduced the excessive fuming frequency somewhat; however, it was noted during the inspection tour that inattention to proper procedure continues to permit higher than desired fume concentrations, particularly at Digester D1-7.

B. Recommendation - September 1968 Appraisal

None.

IV. Findings

A. Nuclear Safety

1. Safe Digester

As noted in Part III-A.1 of this report, action has been initiated for handling U-235 enrichments above 5%. Current plans include the installation in Plant 1 of a geometrically safe continuous digester for enrichments to 10%. It is expected that this facility will be operational by March 1969. The installation of this equipment outside the Refinery is considered desirable and in keeping with recommendations of the NLO Health and Safety Division.

2. Current Refinery and General Plant Operation with Enriched Materials

Production requirements are somewhat lower than that observed in previous appraisals. Currently, the Refinery is processing normal enrichment uranium while only a small production campaign of 2.1% U-235 metal is in progress in other plant areas. Inventories of pads and general storage areas are significantly reduced from that observed in former reviews. Hence, with the implementation of previous recommendations and the status of current operations, the criticality potential is considered lower than that observed in past appraisals.

3. Projected and Anticipated U-235 Enrichment Processing

Discussions with CAO and NLO personnel have indicated that Fernald will probably reprocess cold fuel from several reactor sites including Hallam, BONUS, EGCR, Piqua, and perhaps from SRO. Significant portions of the fuel will range from 3% to 7% U-235 enrichment. In this regard, a campaign is scheduled to begin in February 1969. To upgrade the safety and economy for processing these materials, studies are underway for equipment modification in Plant 4 and in the Refinery Denitration Area. With regard to the latter, the ORO, NLO, and CAO staffs have been working together in statistical studies and computational efforts for establishing an upper safe enrichment limit for operating the 500-gallon denitration units without batch restrictions. Since water must be excluded from the denitration pots to utilize the "nitrogen poison-moderation control" principle under consideration, further studies are underway regarding the use of scrubbers, water cooling systems, etc., which could become sources of water leakage into the units. Detailed discussions and plant inspections with NLO engineering and operating personnel were held on these aspects during the appraisal.

4. General

The nuclear safety staff functions and responsibilities are essentially unchanged from that previously noted. A significant portion of the staff time is devoted to field observation and inspection of the potential hazard locations, such as the refinery. As evidenced by the low frequency of nuclear safety violations, about three minor ones being reported during the year, operator personnel are more cognizant of nuclear safety procedure. This may be in part attributable to the formalized training program initiated since the last appraisal.

B. Transportation

All fissile materials are being transported in DOT approved containers which have OR-0529 approval. One future shipping problem has arisen which will require container(s) outside those currently used. This involves the transport of 3.85% U-235 enriched 2.6" diameter x 30" metal rods from NLO to the 9213 Critical Experiments Facility. Plans are in effect to provide the ORGDP Unirradiated BONUS Fuel Shipping Container on a loan basis for this use. This container has OR-0529 approval for BONUS fuel with a DOT Special Permit pending. This permit will need to be modified to cover NLO as a shipper and the new package contents. The package as now approved meets all requirements as a Fissile Class I package.

C. Internal Exposure Evaluation

Recent in vivo monitoring of NLO employees utilizing the IVRML indicated eight employees apparently sustaining from 70 to 100% of a permissible lung burden of uranium. These employees were continuing in their regular work assignments at the time of the appraisal. Four of these employees were from the Metals Plant; including the highest, two are from the Scrap Plant and two from Plant 9. NLO appears to recognize the need to expedite the verification of these lung burden levels and to take appropriate restrictive action as needed to insure that none of the employees exceeds the lung exposure guide. A serious question has been raised regarding the validity of the job weighted air dust sampling approach long used by NLO,

since that data would not suggest lung exposure for these employees at the in vivo indicated level. It is understood that further in vivo measurements will be made, and increased surveillance of work areas involved will be effected.

No significant thorium exposures were found by the IVRML program.

D. Thorium Operations

Inspection of Plant 8 revealed generally poorly-contained and makeshift-type operations. For the most part, it appears that the thorium materials when handled in dumping or shoveling operations are wet sludges and present a minimal potential for increased air activity levels. However, some such operations were noted to be left with gross amounts of material deposited in an unkempt fashion which lead to significantly elevated thorium air levels, particularly at the feed station for the rotary kiln. It is understood that thorium operations at NLO may be increasing and that planning for improved facilities will be required.

E. Raffinate Storage Area

The raffinate pits were visited, and the previously noted problem of leaching of liquid through the west levy was discussed. NLO postulated that the leach had stopped by some self-plugging effect from the shifting pit residue. The water level in Pit 3 was within one foot of the top of the west levy pointing up the rather urgent need for the new pit. The construction status of the new pit was observed. A line connecting the new pit to the clear well was laid in the top of the west levy of Pit 3, and at the time of the appraisal no ground cover existed atop this levy. NLO agreed to the need to reestablish ground cover and to assure the stability of the levy especially in view of the high water level in the pit.

Reviewers:

W. T. Thornton
W. T. Thornton
Health Physicist

W. A. Johnson
W. A. Johnson
Nuclear Safety Specialist

H. W. Hibbitts
H. W. Hibbitts
Health Physicist

1114827

UNITED STATES GOVERNMENT

Memorandum

OPTIONAL FORM NO. 10
MAY 1962 EDITION
GSA FPMR (41 CFR) 101-11.6

RECORD COPY

2703

TO : Joseph A. Lenhard, Director, Safety Division
Oak Ridge Operations Office

FROM : C. L. Karl, Area Manager
Cincinnati Area Office

SUBJECT: ANNUAL HEALTH AND NUCLEAR SAFETY APPRAISAL OF NLO

M:ELG

DATE: DEC 15 1968

Reference is made to your memorandum, subject as above, dated November 6, 1968, symbol: OSH:WAJ.

Enclosed is a copy of letter from the National Lead Company of Ohio, dated December 9, 1968, indicating no comments on the survey. We are, therefore, closing our file on this appraisal.

J. L. Walper
for C. L. Karl

Enclosure: *OK*
cy NLO ltr dtd 12-9-68

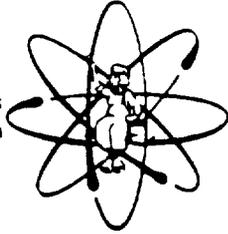


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1114828

2763

NATIONAL LEAD COMPANY OF OHIO



P. O. BOX 39158

CINCINNATI, OHIO 45239

DEC 9 1968

Mr. C. L. Karl, Area Manager
U. S. Atomic Energy Commission
P. O. Box 39168
Cincinnati, Ohio 45239

SUBJECT: ANNUAL HEALTH AND NUCLEAR SAFETY APPRAISAL
OF NLO

Reference: Letter, C. L. Karl to J. H. Noyes, dated
11/13/68, same subject.

Dear Mr. Karl:

We have reviewed the reference report and have no
comments to make concerning its contents.

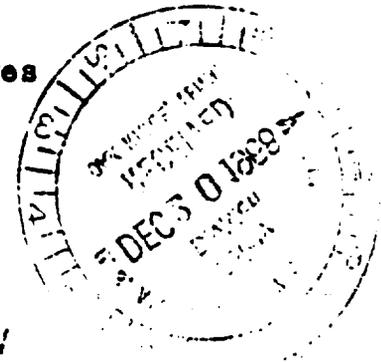
Sincerely yours,

Original Signed By
J. H. NOYES
Manager

J. H. Noyes
Manager

RHS:lrr

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



CINCINNATI OHIO

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UNITED STATES
NUCLEAR REGULATORY COMMISSION

December 15, 1969

C. L. Karl, Area Manager
Cincinnati Area Office

ANNUAL HEALTH AND NUCLEAR SAFETY APPRAISAL OF NATIONAL LEAD COMPANY
OF OHIO

The annual health and nuclear safety appraisal of the National Lead Company of Ohio was conducted September 23-25, 1969, by members of the ORO Safety Division. The findings were informally discussed with your office and NLO representatives at that time.

Enclosed are six copies of the formal report of the appraisal. It is suggested that your contractor be authorized and instructed to proceed with the implementation of the matters covered by the recommendations unless there exist sound reasons why the recommendations are not warranted in whole or part. In any event, your comments and those of your contractor with regard to the conduct of the appraisal, the general content of the report, and the detailed plans for implementing or otherwise handling the recommendations are requested by February 9, 1970.

The cooperation extended by members of your staff and NLO during the appraisal is appreciated, and we are pleased that the report reflects continued safe operation of the NLO facility.

Joseph A. Lenhard
Joseph A. Lenhard, Director
Safety Division
Oak Ridge Operations

OSH:HWH

Enclosure:
Appraisal Report (6)

cc w/encl:
R. C. Armstrong, AMO, OR
~~J. D. Donovan, O&P, OR~~

1114830

HEALTH PROTECTION APPRAISAL
NATIONAL LEAD COMPANY OF OHIO

BY

H. W. HIBBITTS

W. A. JOHNSON

W. T. THORNTON

SEPTEMBER 1969

1114831

I. Purpose and Scope

The annual health protection appraisal of the National Lead Company of Ohio was conducted September 23-25, 1969, by members of the Health and Nuclear Safety Branch, Safety Division, ORO. Emphasis was placed on the adequacy of the health protection program in light of staff reductions and personnel changes during the past year.

II. Summary

The health protection program at NLO continues to be of excellent caliber despite the recent reductions in staffing. The generally lessened activity throughout the plant, as well as improved efficiency in the health protection program, has allowed adequate services to be performed in this area.

Following this appraisal, comments and recommendations were made to C. R. Chapman, NLO, and W. T. Warner, CAO.

III. Recommendations

It is recommended that:

- A. The data pertinent to plant noise levels be evaluated and appropriate corrective action taken. (See IV-A).
- B. Emergency procedures be revised to require the involvement of the plant emergency director any time the "999" signal is sounded (See IV-B).
- C. Those employees whose average lung burden is greater than one-half the guide and who continue to work in areas of potential exposure should be counted as frequently as necessary to assure that a reportable lung accumulation does not occur. If such a frequency is not feasible, consideration should be given to reducing the exposure potential through uranium work restrictions. (See IV-D).
- D. Steps be taken to assure that the loose asbestos found in Plant 7 is not a personnel hazard and that attention be given the prevention of similar occurrences in the future. (See IV-E).

- E. The deficiencies noted at the irradiation facilities be rectified. (See IV-H).
- F. Storage and labeling of higher assay uranium materials should be improved at Plant 1. (See IV-I-1.a.).

IV. Findings

A. Noise

In the 1967 appraisal report it was recommended that all noise areas be surveyed and the necessary corrective measures be implemented. This survey had been completed at the time of our 1968 appraisal, and an evaluation of the data in conjunction with previous audiometry data was underway. More reliable audiograms have been collected during the past year using the new audiometry booth. These data reportedly indicate definite hearing loss for individuals working in the high noise areas. Whether aging effects alone can account for the losses have not been clearly determined. Corrective measures in these high noise areas have been minimal. In view of this and the publication of recent Walsh-Healey requirements relative to noise level criteria, the response of NLO to the 1967 recommendation is considered adequate. It is felt that the audiometry data should be analyzed to verify the physiological significance of plant noise and, if physiological correlation is apparent, consideration should be given to engineering a solution to this problem.

B. Emergency Planning - Procedure

It was noted that existing procedures permitted the emergency signal, "999" to be sounded, responded to, evaluated and an all clear announced without firm assurance that the Plant Emergency Director, PED, had been involved in the incident. The decision as to whether or not direct communication with the PED should be established was being made by the communications officer at Guard Headquarters. It is felt that this is basically an inadequate procedure since potentially significant decisions could be made by one without the required authority or background. It is recommended that the procedures be revised to require the involvement of the PED any time the "999" signal is sounded.

C. Staffing - Industrial Hygiene and Radiation

Two recent resignations have significantly reduced the IH&R staff. The department head and a senior industrial hygienist had terminated at the time of this appraisal. The staff now consists of two experienced field industrial hygienists and two technicians. The new department head moved from his previous position as head of the Bio-Assay Department. The Bio-Assay Department consists of a MS chemist, two experienced technicians and an instrument mechanic. The most significant change in staff capability appears to be the loss of a professional industrial hygienist. It is understood that NLO will fill the slot but may or may not be able to secure an individual of professional status. It is the conclusion of the reviewers that a critical reevaluation of routine operations in the department will permit the reduced staff to adequately discharge its responsibilities; however, this presupposes that the existing staff develops, at least to a compensating degree, the technical expertise in industrial hygiene which has been greatly reduced by recent resignations.

D. Personnel Monitoring

Monitoring of employees for exposure to external radiation consists primarily at present of monthly film badging. Levels at which IH&R investigates the exposure circumstances are 1250 mr/mo for non-penetrating radiation and 200 mr/mo for penetrating radiation. Operations providing the principal source of exposure are the Pilot Plant and Plant 5. A 10% reduction in this program resulted when **women employees, primarily secretarial and clerical**, were eliminated from the routine film change program. Consideration is being given to reducing the change frequency from monthly to quarterly for all but those employees in the higher exposure areas.

Internal exposure monitoring utilizing both bio-assay and in vivo methods indicates no employee averaging above the lung guide for the year. About eight employees are averaging above one-half the lung guide. No work restriction levels are imposed at NLO. If an employee shows three or more "start of shift" samples greater than

0.04 mg/l. discussions are held with operations to evaluate and correct the problem. About 600 employees are on a quarterly bio-assay sampling frequency. By staggering the sample collection dates during the quarter, the bio-assay program is used to provide an indicator of changing plant conditions. Job weighted air sampling has essentially been discontinued as a routine surveillance method. Recall urine samples are requested at a level of 0.04 mg/l and experience shows that less than 1% of all samples require recalls.

It is noted that work restrictions are not considered necessary for those employees averaging greater than one-half the lung guide. In support of this position, it is recognized that the potential for acute uranium exposures at the enrichments processed at NLO is not significant. However, when an employee, whose lung burden is greater than 50% of the guide, is allowed to continue work in uranium areas, it becomes increasingly important to have a monitoring program with adequate sensitivity to allow detection of the small increases which would be indicative of a lung burden approaching the reportable level. Due to the difficulty in assuring this degree of sensitivity through the use of bio-assay data, it is felt highly desirable for NLO to use the in vivo services on more than an annual basis, at least for those employees in the higher lung burden category. If it is felt that monitoring alone is not sufficient to achieve this assurance, then NLO should consider some type of work restriction to reduce the exposure potential.

E. Plant 7

The scrapping of Plant 7 process equipment is proceeding well, even though behind the original time schedule. The scrap contractor personnel (Deutch and Sons, Inc.) are being watched closely by a former NLO industrial hygiene surveyor who was rehired specifically for this job. His responsibilities include both safety and operational assistance. The Deutch job foreman reportedly is cooperative and tries to implement safety related suggestions. The NLO liaison position has recently been given to the Assistant Director of the NLO Health and Safety Division. This change tends to assure that the

present level of safety will not be compromised. In addition, NLO is providing both non-routine bio-assay and medical services as needed. Contamination surveys for the release of materials are provided Deutch by the Eberline Instrument Corporation. A large amount of loose insulation was observed on the upper floors of Plant 7 during the plant tour. Inquiries revealed that this insulation contained a significant percentage of asbestos. Precautions had not specifically been taken to prevent its inhalation, but fortuitously respirators had been worn during the dismantling of the insulation as a precaution against uranium inhalation.

F. Medical Program

NLO's industrial physician, Dr. Mick, resigned effective June 6, 1969, and left a vacancy which has been very difficult to fill. At the time of this appraisal, temporary, part-time help had been secured, thus helping to reduce the backlog of annual physicals. The outlook for securing a permanent replacement is uncertain.

During a brief discussion of emergency treatment of contaminated patients, Dr. Quigley expressed the opinion that, with relatively little effort, NLO could treat these patients on-site. Existing facilities could be upgraded for use by outside specialists who could be available on a short notice. This would eliminate the many problems associated with using hospital facilities. While the reviewers were very interested in this approach, the subject was not pursued in more detail since emergency preparedness is presently being reviewed throughout ORO by other Safety Division staff.

G. Water Pollution

A cursory review of water pollution problems since last year's appraisal revealed no significant changes in NLO's pollution abatement program. During this period, an unsuccessful attempt was made to decrease the amount of Ra-228 in the plant's effluent by diverting Ra-228 containing waste from the Pilot Plant to the Chemical Waste Pit rather than to the general sump. The desired coprecipitation in the pit did not materialize.

A stepped-up Ra-228 monitoring program was initiated to pinpoint the origin of the Ra-228 (Pilot Plant) and to determine the effectiveness of the diversion to the pit. This additional monitoring has accomplished its purpose and will be discontinued. Monthly composite analysis for Ra-228 at Manhole 175 will be resumed.

H. Irradiation Devices

During this appraisal, visits were made to the Cockcroft-Walton and sealed irradiation source facilities. Operating personnel appeared knowledgeable; however, it was evident that engineered safeguards are not tested routinely, deficiencies exist in the safeguards system, and detailed engineering analyses had not been conducted.

To strengthen this aspect of radiation safety, it is felt that the following should be done:

1. Provide visual alarms in the high radiation zones, preferably actuated independently of the source control circuitry.
2. Conduct a single failure analysis on both safeguard and control circuitry.
3. Provide redundancies where desirable (e.g., lights, relays, etc.).
4. Institute a routine, periodic safeguard testing program.

A conscientious effort to accomplish these items should result in a significantly reduced probability of a radiation over exposure at these facilities

I. Nuclear Safety

1. Operations with Enriched Materials

a. Plant 1

Principal activities in this plant involve the removal of uranium from clad unirradiated fuel elements for subsequent recovery operations. These

activities include the receipt, handling (including tube cutting) and storage of high density uranium oxides and pellets. The Hallam and EGCR fuels are examples of fuels which have been processed in this area. The processing of incinerator ash (up to 5% 235-U enrichment) from the ORGDP is currently under consideration.

Other activities in Plant 1 include the installation of a safe digester system for 235-U enrichment to 10%. It is anticipated that the facility will be completed this year. An ORO preoperational safety review will be performed for this facility.

It was observed that a sizeable outside storage area adjacent to Plant 1 was provided for uranium materials of various types including U metal billets at 10% 235-U enrichment. These particular billets were held secure on wooden pallets (one billet at each corner) by bending four nails over the peripheral surface. Each billet exhibited signs of oxidation, by not being in a sealed container, and identification marking was weathering away. It was felt that high value materials, as noted above, should be stored in sealed containers with positive labeling to assure that material identity will not be lost. A recommendation to this effect, including a review of other areas as well for similar storage problems, was made as noted in Section III.

b. Plant 2, Refinery

Operations at 235-U enrichments above 1.0% have been quite limited at this installation since the completion of the 2.0% denitration run this year. With the completion of the safe digester system in Plant 1, batch processing in this area will be substantially reduced.

c. Plant 8, Recovery Facility

For the past few months, only normal or 0.95% 235-U enriched materials have been processed

in this facility. The basic function of this facility is feed preparation for Plant 2. Principally, low density miscellaneous materials are involved. The equipment used consists chiefly of rotary, box and muffle furnaces for converting the materials to the oxide form. A water scrubber is provided; however, this scrubber is currently limited to 1.25% isotopic enrichment.

d. Plant 4, Green Salt Production

The maximum 235-U enrichment handled in this plant in the recent months has been about 0.80%, and production has been considerably reduced. Hence, the criticality potential in this facility is now very low. An evaluation has been made, however, for possible future operations at 2.0% enrichment. This evaluation appeared comprehensive and utilized updated computer technology.

e. Plant 5, Reduction-Remelt; Plant 6, Rolling and Machining

The uranium metal handled in these plants have, for the most part, been limited in recent months to 0.95% 235-U enrichment. Future orders may involve enrichments to 1.25%.

f. Plant 9, Special Projects Plant

Operations in this facility with enriched materials involve Zirclo scrap processing. Fuel decladding operations normally do not include 235-U enrichments above 2.1%. The dissolver basket design and mass limitations are considered adequate for nuclear safety control.

2. Nuclear Safety Training

Training manuals have been prepared for the Refinery and Plant 4, and work has been initiated on a manual for Plant 8. Several weeks of training have been given to supervisory, foreman, and operators during February-May 1969, involving about 30 employees in the Refinery and 25 in Plant 4. The training emphasis at NLO in nuclear safety is particularly noteworthy.

3. Nuclear Safety Procedural Violations

About 8 procedural deviations occurred during the preceding nine months; most of these were of a very minor nature. Two were considered significant, however, and involved the addition of excess material during a denitration operation and the operation of the Plant 8 scrubber at a non-approved enrichment.

4. Compliance with AEC and OR-0530

A summary audit report on nuclear criticality safety was issued February 12, 1969, by L. J. Zupancic, NLO, in which plant operations were evaluated against the requirements of AEC and OR-0530. This report concluded that NLO was basically in compliance. Later, the CAO advised NLO that a better management review system for nuclear safety would be advisable through the use of an outside consultant. The services of Dr. Morfitt of the Idaho Test Station was procured through ORO for this function. The consensus, including the opinion of the reviewers, is that NLO is in compliance with AEC and OR-0530 in all aspects including AEC preoperational facility review requirements.

Reviewers:


H. W. Hibbitts
Health Physicist


W. T. Thornton
Health Physicist


W. A. Johnson
Nuclear Safety
Specialist

UNITED STATES GOVERNMENT

Memorandum

TO : Joseph A. Lenhard, Director, Safety Division
Oak Ridge Operations Office

DATE: FEB 5 1970

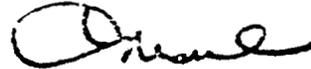
FROM : C. L. Karl, Area Manager
Cincinnati Area Office

SUBJECT: ANNUAL HEALTH AND NUCLEAR SAFETY APPRAISAL OF NATIONAL LEAD COMPANY OF OHIO

Reference is made to your memorandum, subject as above, dated December 15, 1969, OSH:HWH.

Enclosed is a copy of letter from the National Lead Company of Ohio, dated February 5, 1970, replying to the recommendations made in the appraisal. You will note their comments are limited to the recommendations.

This office has no comment to offer other than to assure you that the action listed by NLO in their response has been completed and is a matter of record.



C. L. Karl

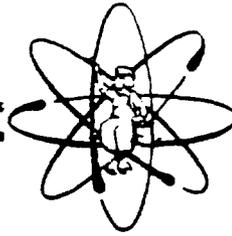
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cy NLO ltr dtd 2-5-70

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**SAFETY DIVISION
RECORD COPY**

NATIONAL LEAD COMPANY OF OHIO



P. O. BOX 39158

CINCINNATI, OHIO 45239

FEB 5 1970

Mr. C. L. Karl, Area Manager
 U. S. Atomic Energy Commission
 P. O. Box 39188
 Cincinnati, Ohio 45239

SUBJECT: ANNUAL HEALTH AND NUCLEAR SAFETY APPRAISAL OF NLO

Reference: Letter, C. L. Karl to M. S. Nelson, dated 12/24/69, same subject

Dear Mr. Karl:

As requested in the reference letter, we are supplying comments regarding the recommendations made by the ORO Safety Division. The comments are labeled with the same numbers given with the recommendations in the ORO report of their Health Protection Appraisal.

III. Recommendations

- A. Information regarding plant noise levels has been compiled and reported in the letter "Evaluation of Noise Exposures," M. S. Nelson to C. L. Karl, December 2, 1969. In order to comply with Federal regulations on noise exposure, the following actions have been taken:
1. A plant engineer has been assigned the task of obtaining the information needed to control and reduce noise by the use of insulation, equipment alterations, and proper specification of new equipment. He has attended a one-week Public Health Service course on noise control and a three-day seminar on noise control given by an industrial firm.
 2. Sessions are being arranged with the plant training coordinator to explain to supervisory personnel Federal noise regulations and methods of noise control.

**SAFETY DIVISION
 RECORD COPY**

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3. An Industrial Hygienist attended the one-week Public Health Service course on noise control and will be expected to make most of the future sound-level surveys.
 4. Most of the plant equipment producing high sound levels is large, heavy, and complex. Reduction of sound levels through equipment changes will not occur soon, if at all. Therefore, aural protectors will be issued to those employees whose weighted exposures exceed the Federal limits. Protectors will also be available for any other employee who may be annoyed by noise levels within the limits. Instructions for proper wearing will be issued.
- B. The procedure has been revised. When a Radiation Detection Alarm is sounded, a member of the Health and Safety Division will immediately proceed to determine the radiation level with a survey instrument. He will report his findings by radio to the Shift Superintendent (Plant Emergency Director). The Shift Superintendent will then decide the next action to be taken and will issue instructions accordingly.
- C. Efforts will be made to use the Oak Ridge In Vivo Radiation Monitoring Laboratory at least twice each year to count employees who may have a uranium lung burden greater than one-half the guide level. In our opinion, these counts, plus occasional air samples, urine samples, and knowledge of jobs being performed, will assure that permissible burden levels will not be exceeded.
- D. The loose asbestos was removed from Plant 7 and discarded with other solid waste in the unfilled portion of number one waste pit. Instructions were issued for use of respirators for this work and all future dismantling where asbestos insulation would be encountered. Respirators were used for these purposes.

Airborne dust samples were collected on millipore filters during the asbestos cleanup operation. These were analyzed by counting the asbestos fibres using the light microscope. Results of both breathing zone and general air samples were less than 3 million particles per cubic meter for particles of greater than 5 microns long. The recommended threshold limit value for 40 hours per week industrial exposure is 5 mppcm.

Microscopic examination of the millipore filters used for air sampling revealed spherical UF₄ particles of about 5 μ diameter.

These numbered about the same as the asbestos fibres of 5 μ length. A calculation of the uranium airborne concentration based on these assumptions shows that the radioactive concentration guide for uranium would be exceeded before the threshold limit value for asbestos is reached. Because of uranium contamination respirators were provided for dismantling before the possibility for asbestos exposure was recognized.

- E. A surplus radiation detector and alarm unit is being installed in each of our irradiation facilities. This will provide an independent audible and/or visual alarm at a preset radiation level. These units will be included in the Health and Safety Division Preventive Maintenance Program. Periodic scheduled tests will be performed by both the Technical and Health and Safety Divisions.

A failure analysis is being made. Results of this analysis will determine what redundancies are necessary in the interlock systems to provide a safe and efficient operation.

The SOP's governing use of these facilities will be modified to include these changes and to provide periodic tests to insure proper operation.

- F. In regard to storage and labeling of higher assay uranium materials at Plant 1, the deficiencies noted at the time of the inspection were corrected the following day. This area will be checked periodically to prevent recurrence of incidents of the type found.

Sincerely yours,
Original Signed By
M. S. NELSON
Manager
M. S. Nelson
Manager

MWB/DLD/RCH/fb

cc: C. L. Karl
S. F. Audia
P. G. DeFazio
J. A. Quigley, M.D.

Central Files

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UNITED STATES
ATOMIC ENERGY COMMISSION
OAK RIDGE OPERATIONS
P.O. BOX 116
OAK RIDGE, TENNESSEE 37831

January 20, 1971

C. L. Karl, Area Manager
Cincinnati Area Office

ANNUAL HEALTH AND NUCLEAR SAFETY APPRAISAL OF NATIONAL LEAD COMPANY
OF OHIO

The annual health and nuclear safety appraisal of the National Lead Company of Ohio was conducted September 22-25, 1970, by members of the ORO Safety and Environmental Control Division. The observations and recommendations were informally discussed with your office and NLO representatives at that time.

Enclosed are six copies of the formal report of the appraisal. It is suggested that your contractor be authorized and instructed to proceed with the implementation of the matters covered by the recommendations unless there exist sound reasons why the recommendations are not warranted in whole or part. In any event, your comments and those of your contractor with regard to the conduct of the appraisal, the general content of the report, and the detailed plans for implementing or otherwise handling the recommendations are requested by March 5, 1971.

The cooperation extended by members of your staff and the NLO staff during the appraisal is appreciated, and we are pleased that the report reflects continued safe operation of the NLO facility.

Joseph A. Lenhard
Joseph A. Lenhard, Director
Safety & Environmental Control Division
Oak Ridge Operations

OSH:WAP

Enclosures:
Appraisal Report (6)

cc w/encl:
R. C. Armstrong, AMO, OR
E. W. Jones, O&P, OR

1114845

HEALTH PROTECTION APPRAISAL
NATIONAL LEAD COMPANY OF OHIO

BY

WILLIAM T. THORNTON

RICHARD D. SMITH

WILLIAM A. PRYOR

SEPTEMBER 1970

1114846

I. Purpose and Scope

The annual health and nuclear safety appraisal of the National Lead Company of Ohio was conducted September 22-25, 1970, by members of the Health and Nuclear Safety Branch, Safety and Environmental Control Division, ORO. All phases of health and safety were reviewed with particular emphasis being placed upon environmental monitoring, internal exposure monitoring and implementing recommendations of the 1969 appraisal and the preoperational review of the Plant I Safe Digestion System.

II. Summary

The health protection program at NLO continues to be satisfactory. However, the reviewers made several recommendations for program improvement, which are stated in the following section.

At the conclusion of the appraisal, comments and recommendations were discussed with Mr. C. R. Chapman, Dr. J. A. Quigley and his staff, NLO; and Messrs. W. T. Warner and E. L. Giebel, CAO.

III. Recommendations

It is recommended that:

- A. The NLO plan for developing the capability to determine the ^{235}U enrichment of incoming materials be fully implemented.
- B. The present limit of 10 percent ^{235}U enrichment be retained for production operations at Fernald.
- C. The continued retention of the 20 percent ^{235}U enriched "button" in the Pilot Plant warehouse be reviewed. If no requirement is found, it should be appropriately transferred from the Fernald site. Similarly, if other uranium materials greater than 10 percent ^{235}U enrichment are on site, they, too, should be so disposed of.
- D. A limited number of approved containers be procured in order to accommodate the miscellaneous shipments of enriched uranium from Fernald.
- E. Hand exposure dosimeters be provided routinely to those employees meeting AECM 0524 Appendix monitoring requirements. (See Section VI-B.)

- F. Further study be made of operations involving hand exposure to assure compliance with AECM 0524 Extremity Exposure Guide. (See Section VI-B)
- G. All production employees be provided semiannual In Vivo surveillance. (See Section VI-C)
- H. The environmental monitoring program for air be upgraded to provide continuous sampling of strategic points on the larger site perimeter. (See Section VII-A)
- I. Future semiannual environmental monitoring reports include air data from only the sampling points suggested in Recommendation No. H. (See Section VII-A)
- J. The plant noise level evaluation be completed and abatement recommendations resulting from engineering studies in Plant 5 be implemented where appropriate. (See Section VIII-A)

IV. Previous Recommendations

The recommendations made in the 1969 Health and Nuclear Safety Appraisal and the 1970 Preoperational Inspection of the new continuous dissolver for 10 percent enrichment and the actions taken are summarized below:

A. 1969 Appraisal

1. The recommendation regarding the improvement of storage and labeling of uranium materials at higher enrichments at Plant 1.

The recommendation was fully implemented. The storage and labeling at this location during the period of the appraisal was satisfactory.

2. The recommendation that plant noise levels be evaluated and appropriate corrective action taken.

The noise level surveys have been made and a time weighted evaluation is in progress but not yet completed. Engineering improvements in 14 specific areas have been defined but no corrective action has been taken.

3. The recommendation that emergency procedures involve the plant emergency director for all "999" signals.

This has been implemented.

4. The recommendation that increased surveillance be provided for employees with greater than one-half lung burden.

The In Vivo surveillance frequency has been increased. Further comments on the In Vivo program are made in Sections III-G and VI-C.

5. The recommendation that the situation in Plant 7 during its demolition be evaluated to assure that no personnel exposure hazards exist.

The procedures were instituted to control loose asbestos. The job has now been completed.

6. The recommendation that suspected deficiencies in irradiation facilities be evaluated and corrected.

The necessary changes have been made on the ^{60}Co irradiation facility. Extensive modification of access control and monitoring systems at the Cockcroft-Walton facility was in progress but incomplete at the time of the appraisal visit.

B. Preoperational Inspection of 10 Percent Enrichment Operation of the New Continuous Dissolver

1. The recommendation regarding the shortening of the syphon breaker line from the digester to the drip pan.

The line has been so shortened.

2. The recommendation regarding the marking of evacuation routes from the Plant I digester area.

Appropriate arrow-type signs have been installed so that all possible evacuation routes are indicated.

3. The recommendation regarding the responsibility for control of the product solution transfer values.

Manufacturing Specification 1-BE-490-1 was revised and now assigns this responsibility to the Plant I general foreman.

4. The recommendation regarding instrumentation to indicate the status of the HEPA filters in the vacuum system.

A vacuum gauge has been installed across the filters, which indicates its status.

5. The recommendation regarding the use of a cart or table for removal of the glass cyclone separator collector jars.

In lieu of the table or cart, shelves were installed. Additional protection is provided since the glass jars are also shielded on the sides.

V. Nuclear Safety

A. Operations with Enriched Materials

Current operations where enriched uranium is being processed include the following:

Plant 1 - continuous digester only
Plant 4 - green salt plant
Plant 8 - scrap plant
Plant 9 - special products

The continuous digester, which was down for maintenance to the pumps, has been operating at about 5% ^{235}U enrichment. Approval was given by ORO earlier in CY 1970 to operate up to 10% ^{235}U enrichment. The ^{235}U enrichment of materials in the other facilities is less than 2 percent.

B. Nuclear Safety Audits

Audits of plant operations by the Nuclear Safety Department reveal continuous conformance to approved plant procedures. During the period covered by this appraisal, only one violation of nuclear safety concern was noted. The violation was minor in nature, and immediate corrective action was noted.

C. Nuclear Safety Training

The nuclear safety training program which was initiated in CY 1969 is continuing.

Initial emphasis was placed upon Refinery and Plant 4 operations. Since that time, organizational changes have resulted in the alignment of Pilot Plant operations under the Refinery. A second cycle of training was completed in May 1970, so that all supervisors and operators assigned to enriched operations of the Refinery have been trained.

A Plant 8 training program has been planned; however, its implementation has been held up due to the realignment of operations after the recent reductions of the plant personnel. This program is an excellent example of nuclear safety training.

NLO has also taken the initiative to encourage their salaried personnel to enroll in after hours' courses which were given at the plant. The instructor for the courses is Dr. James H. Leonard, Head of the Department of Chemical and Nuclear Engineering, University of Cincinnati. (Dr. Leonard also consults on nuclear safety matters. See the following section). The present course is entitled "Nuclear Processes and Safety Principles." An earlier course was entitled "Nuclear Fuel Technology and Economics." Approximately 50 plant personnel enrolled in each course. The NLO training department is commended for its excellent training programs.

D. Nuclear Safety Consultants

An independent nuclear safety review was made in CY 1970 by Dr. John Morfitt, Idaho Nuclear Corporation, Idaho Falls, Idaho. The review was quite comprehensive and his conclusions indicated that the Fernald Plant has a satisfactory nuclear safety program. One recommendation regarding identification of feed hoppers for higher enrichment operations was implemented.

Dr. James H. Leonard, who instructs the night classes mentioned in the previous section, also serves as nuclear safety consultant on technical studies. The employment of these highly qualified consultants appears to have strengthened the overall nuclear safety program.

E. Technical Studies

Recent experimental data on reflector sources for low enriched uranyl nitrate generated by Hanford have been applied to study uranium metal dissolver problems. Safe mass values for uranium rods in uranyl nitrate solution were determined. It was noted that the nuclear safety consultant concurred in the conclusion of this study.

F. Operational Problems

An unusual operational problem having nuclear safety implications has been uncovered at Fernald. Within the past few months, several incoming shipments of uranium from scrap recovery contracts by licensees and other uranium materials to be recovered at Fernald were found to have differences in ^{235}U enrichment between that specified by the shipper and that determined at Fernald. Materials having enrichments exceeding this limit as well as erroneous values for enrichment within the limit result in both nuclear safety and operational problems. There have been recent cases where the indicated shipping enrichments were significantly different from actual enrichments. The seriousness of the problem is illustrated by the incident in which 15% ^{235}U enriched fuel was inadvertently included with lower enriched fuel rods in a shipment from another fabricator. These rods were subsequently shipped out in a modified DOT Specification 6M container by ORO.

NLO is planning a facility where incoming materials may be gamma scanned for ^{235}U enrichment indications. The potential for criticality will be greatly reduced by the operation of such a facility. It appears, however, that 100 percent checking will be required in order to assure that the current operating enrichment limit of 10 percent is maintained.

G. AECM 0530 Compliance

It appears that the operations at Fernald fully meet the intent of AECM 0530.

VI. Transportation Safety

There has been a decrease in the number of enriched uranium shipments since the last appraisal. However, the transportation safety aspects remain essentially unchanged.

One incident occurred earlier and concerned the shipment of scrap in an open gondola car. The scrap was not considered to be significantly contaminated under DOT Regulations 49 CFR 173.397(a). However, the car was inadvertently placarded with a "radioactive" placard. A Federal Railroad Administration inspector spotted the car with scrap hanging over the side of the car. The placard apparently caught his attention, and a formal complaint was filed. NLO investigated the incident and satisfactorily answered the complaint. Appropriate action was taken to assure that this type of incident does not recur.

NLO continues to meet the intent of AECM 0529.

VII. Personnel Monitoring

A. Urinalysis

NLO continues to have a comprehensive urinalysis program. About 100 samples are processed per week at a cost of about \$0.75 per sample. About 130 employees are on a quarterly frequency, and they consist of Plants 1, 2, 3, 5, and 8 and mill area of Plant 6. Plant 4 employees are sampled 3 times a year; other employees are on a semiannual to annual schedule. The recall samples, which number about 50 per year, are usually connected with personnel involved in chip fires.

B. Forearm Exposures

NLO has performed a study of exposure to the forearms of some Plant 5 employees. The results of this study showed projected annual forearm exposures from about 14,000 to 46,000 mrem. In view of this, it is evident that AECM 0524 monitoring requirements have not been met. According to NLO estimates, about 300 employees would require extremity monitoring because of potential exposure to the hands. It appears necessary that further attention be given by NLO to this matter. Extremity dosimeters should be provided as appropriate and an evaluation of involved operations should be made to assure compliance with 0524 guides.

The study does not indicate the level of hand exposure for these employees. From previous experience at other uranium facilities, it would be expected that the hand exposure could be 2-3 times the wrist exposure.

C. IVRML

The IVRML visited NLO on two occasions during CY 1970. It was on site for two weeks, beginning March 30, and again from early July through the end of September. During the first counting period, about 24 employees were counted and during the second period 103 employees (including the 24 previously counted) were monitored. On the basis of data generated during these monitoring periods, 23 employees are calculated to have average lung burdens for 1970 equal to or greater than one-half the AEC guide. It is estimated that about 200 employees are currently working in production areas and have a generally comparable potential for uranium lung exposure. It is therefore noted with concern that only about half of those potentially subject to exposure have been monitored by IVRML during this year. It is further noted that a substantial fraction (approximately 20-25 percent) of the production work force has not received at least one IVRML count since the counter first went to NLO in 1968.

Based on the above data, it would appear that about 15-20 percent of those counted in 1970 were found to have more than 50 percent of the AEC guide criterion. Of the number exceeding the 50 percent level, one-third was counted for only the first time during the July-September IVRML visit.

Information obtained during the July-September counting period emphasizes the need to provide semiannual IVRML surveillance for all production employees.

Scheduling problems do exist when one must meet the "good count" criteria requiring three days away from uranium exposure prior to counting. Overcoming these difficulties will obviously require substantially greater cooperation and assistance from operating supervision involved in the production areas. In addition, it appears technically feasible to suspend the "good count" criteria to allow a screening count on an employee before he reports to work on any work day. This would assist in providing the comprehensive coverage required to assure that no production employee is significantly exposed without appropriate monitoring coverage. However, only data from "good count" procedures should be included in lung exposure calculations.

VIII. Environmental Monitoring

A. Air

The present air sampling program in the environment near the NLO Plant consists of four semi-continuous air samplers located at the security fence which defines the plant production area and spot sampling the air outside this area to points 12 miles from the plant. Radioactivity concentrations observed during CY 1970 have been reported at less than 5 percent of the offsite RCG for uranium.

In view of increasing public awareness in the field of air pollution and the developing trend toward lower air concentration guides for radioactivity, a reevaluation of the appropriateness of the NLO environmental air monitoring program appears advisable.

It would appear doubtful from a consideration of prevailing wind directions and the proximity of some production plants (e.g., Plant 6) to the area fence that one could convincingly argue that maximum average uranium air concentrations are always being measured by this existing semi-continuous sampler arrangement. Spot sampling as done by NLO could only indicate the concentration during a very small fraction of

the time. In the past this was considered acceptable. Since observed concentrations were such a small fraction of the recognized RCG, errors in even the non-conservative direction involving factors of 2 or 3, or even 10, would still leave the air activity concentrations well within the existing guides. The imminence of more restrictive guides indicates that NLO should evaluate its status with regard to such a reduction and upgrade the sampling program to assure representative sampling and adequate sensitivity.

Thus, NLO should restudy the program in light of the above comments and evaluate the possibility of locating continuous air samplers near the larger site perimeter. A plan should be developed defining the number of stations required to give reasonable assurance that concentrations of radioactivity in air, indicative of the impact of NLO operations on the local environment, will be measured. Future semiannual environmental monitoring reports should include air data from these stations only. It is assumed on the basis of guidance presently available that offsite air monitoring will not be required.

B. Liquid Effluents

At the request of ORO, NLO has given increased attention to reducing the ^{228}Ra concentration at Manhole 175. Concentrations at this point have been averaging about 30 times the RCG for offsite water. NLO reports that measurements at Manhole 175 for the month of August indicate ^{228}Ra concentrations are within the offsite RCG of 3×10^{-8} uCi/ml. This has been achieved largely through additional barium sulfate treatment of the waste streams from the Pilot Plant and Plant 8. It appears that ^{228}Ra concentration at Manhole 175 is a very sensitive function of operations at these plants and continuing control of procedures utilized for these operations will be required.

IX. Industrial Hygiene

A. Noise

A noise level survey of all plants has been completed by Health and Safety. The highest level, 122dB A-scale, was found during operation of the reamer at the breakout station in Plant 5. Several other areas in Plant 5 have noise levels

between 90 and 112dB. Since high noise level operations in this building do not continue for a full eight hours, Health and Safety intends to make a time weighted noise survey to determine which areas, if any, are in excess of Walsh-Healey standards. This survey has been started; however, a high priority does not appear to have been assigned to the project. Increased effort in this area is recommended.

It is noted that an estimated three man-months of engineering effort had been spent, resulting in 14 recommendations for design modification in Plant 5 alone. The estimated cost of the improvements in working conditions in Plant 5 amounting to about \$27,000, appears to be well worth the expenditure.

In August of this year all supervising foremen were given a safety lecture on noise. Employees were informed that ear muffs were now available through stores and ear plugs are still fitted by the nurse if ear protection is wanted.

B. Waste Pits

Pit No. 5, the Wet Chemical Scrap Pit, is the only pit being used for liquids. It receives the discharge from the general sump and rain water collected in other pits. Pit No. 5 is discharged through Manhole 175. Pit No. 1 has been filled in and Pit No. 2 is partially filled. NLO is trying to keep Pit No. 3 dry. It was used to collect sump cake and raffinates. Pit No. 4 is being used for the disposal of dry or nearly dry materials, including uranium and thorium residues and depleted uranium turnings and sludge.

X. Occupational Medicine

The occupational medical program appears adequate to the needs of NLO operations. One full-time and two part-time physicians have been able to keep the scheduled physicals up to date. Each of the part-time physicians is on site one and one-half days per week; however, their replacement by an additional full-time physician is desirable. NLO has not yet been able to secure one. Doctors have been interviewed and are either unsatisfactory or decline due to the low salary. Completing the OM staff are two nurses who work on the day shift, and two laboratory technologists. Each technologist has a BS degree which includes one year of internship.

Physicals are given annually to all plant employees which as of October 9, 1970, will number 905 with an average age of 48 for wage and 45 for salaried employees. The physicals generally consist of eye and hearing examinations, medical history, laboratory tests (cholesterol, sugar, blood, etc.), X-Rays (front and side view of the lungs), and vital capacity which is a recent addition. At age 35, EKG's are included in the physicals and given on a five-year interval unless the employee's condition requires it annually.

Eight cases of hearing loss by plant employees have been determined by the audiometric examination. In each of these cases, NLO feels that there is no reason to suspect that the hearing losses are occupationally related.

Reviewers


William T. Thornton
Health Physicist


Richard D. Smith
Health Physicist


William A. Pryor
Nuclear Safety Specialist

UNITED STATES
ATOMIC ENERGY COMMISSION
OAK RIDGE OPERATIONS
DIVISION OF RESEARCH
P. O. BOX 5400, OAK RIDGE, TENNESSEE 37831

MAR 12 1971

Joseph A. Lenhard, Director
Safety & Environmental Control Division, OR

ANNUAL HEALTH AND NUCLEAR SAFETY APPRAISAL OF NATIONAL LEAD
COMPANY OF OHIO

Reference is made to your memorandum on the above subject,
dated January 20, 1971.

Enclosed is a copy of letter from the National Lead Company
of Ohio, dated March 3, 1971, setting forth comments in response
to the recommendations made in the subject appraisal.

We do not agree with the comment made by NLO in regard to
paragraph G. of the Report Recommendation, and have asked
that they cover all production employees. A further discussion
of NLO's opinion is scheduled early next week.

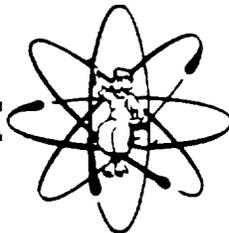


C. L. Karl

Enclosure: *ck*
as listed

1114859

NATIONAL LEAD COMPANY OF OHIO



P. O. BOX 39158

CINCINNATI, OHIO 45239

MAR 3 1971

Mr. C. L. Karl, Area Manager
 U. S. Atomic Energy Commission
 P. O. Box 39188
 Cincinnati, Ohio 45239

SUBJECT: ANNUAL HEALTH AND NUCLEAR SAFETY APPRAISAL OF NLO

Reference: Letter, C. L. Karl to M. S. Nelson, dated 1/26/71, same subject

Dear Mr. Karl:

The following comments are in response to the recommendations in the subject appraisal which was conducted September 22-25, 1970:

- COPY
- A. The NLO plan to develop a facility for isotopic verification of off-site receipts, CP-70-9, was approved by CAO-AEC on February 17, 1971. All materials such as the Hallam fuel rods will be gamma scanned for isotopic verification before they are processed.
 - B. We have no contention with this recommendation at this time; however, we believe that (safe geometry) operations at higher enrichments could be performed safely at NLO if it were desirable to do so.
 - C. The 20% ²³⁵U button and a small quantity (<1 lb) of 82% ²³⁵U U-Al alloy were shipped to the Oak Ridge Y-12 Plant on October 28, 1970. Except for isotopic standards in the Mass Spec Laboratory, there is no enriched material greater than 10% ²³⁵U stored at NLO.
 - D. Two 55-gal. and one 110-gal. DOT specification 6L containers have been fabricated by NLO. After discussion with W. A. Pryor, it was necessary to request an alteration of each container to comply with the portion of the specification which states, "Each spacer rod must extend at least 2.25 inches beyond the inner containment vessel at each end . . ." [§178.103-3(c)(1)]. Our containers do not comply in this

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respect with the cap in place. Perhaps the regulation should state specifically that it is required that the cap be in place in providing this spacing since most DOT 6L containers received at Fernald also do not comply in this respect according to our SS Receiving Group.

- E. We are attempting to purchase or make suitable wrist badges to use in estimating hand exposures. Because they require frequent changing and cleaning to control contamination effects, we do not intend to issue wrist badges for daily use. They would be used occasionally to provide exposure estimates.
- F. Further hand exposure studies will be made to identify those employees who are likely to exceed 10% of the permissible quarterly dose.
- G. We suggest that the phrase "all production employees" be changed to "all chemical operators." At the present time there are 72 chemical operators. If the IVRML is available for two-month periods, these employees could be counted on Mondays. The counts made after a two-day period away from exposure would be more reliable than the screening counts described in the appraisal.
- H. A proposal to establish boundary stations was submitted for AEC comments (letter, M. S. Nelson to C. L. Karl, dated February 8, 1971, Air Sampling Stations).
- I. When the boundary stations are complete, the present perimeter stations will no longer exist and routine off-site sampling will not be necessary. Therefore, the only environmental air data to report will be that from the boundary stations.
- J. Noise surveys in Plant 5 have been completed and the hearing conservation program has been described to all Plant 5 personnel. Those who have the higher noise exposures have been given ear protectors after individual visits with a plant physician who explained the need for correct fit and correct usage. We will continue to survey other noise problems as they arise, issue protectors when necessary, and seek equipment changes or repair when needed.

The Engineering Division has completed three modifications in Plant 5 which have made a slight reduction in noise exposures. Modification of

Mr. C. L. Karl, Area Manager

Page 3

major noise sources, such as the jolters and breakout station, is still under investigation.

Sincerely yours,
Original Signed By
M. S. NELSON
Manager
M. S. Nelson
Manager

DLD/MWB/fb

cc: ✓ C. L. Karl
J. A. Quigley, M. D.

Central Files

1114862

UNITED STATES
ATOMIC ENERGY COMMISSION
OAK RIDGE OPERATIONS
P.O. BOX 2
OAK RIDGE, TENNESSEE 37831

October 26, 1971

C. L. Karl, Area Manager
Cincinnati Area Office

ANNUAL HEALTH AND NUCLEAR SAFETY APPRAISAL AND ENVIRONMENTAL
POLLUTION APPRAISAL OF NLO - 1971

The annual health and nuclear safety and environmental pollution appraisal of NLO was conducted on August 10-13, 1971, by members of the ORO Safety and Environmental Control Division. The findings were informally discussed with your office and NLO representatives at that time.

Enclosed are six copies of the formal report of the appraisal for your information. No specific recommendations are made; however, the findings should be noted. Your comments regarding the appraisal are invited.

The cooperation extended by members of your staff and the NLO staff during the appraisal is appreciated.

Joseph A. Lenhard
Joseph A. Lenhard, Director
Safety & Environmental Control Division
Oak Ridge Operations

OSH:RDS

Enclosure:
Appraisal Report (6)

cc w/encl:
J. H. Hill, AMO
W. Jones, O&P
J. A. Lenhard, Safety

1114863

USAEC-ORO
HEALTH AND NUCLEAR SAFETY AND ENVIRONMENTAL POLLUTION APPRAISAL
NATIONAL LEAD COMPANY OF OHIO

AUGUST 1971

BY

W. A. JOHNSON AND R. D. SMITH
HEALTH AND NUCLEAR SAFETY BRANCH

J. F. WING AND H. W. HIBBITTS
WASTE MANAGEMENT AND POLLUTION CONTROL BRANCH

1114864

I. Purpose and Scope

The annual appraisal of health and nuclear safety and pollution control activities of the National Lead Company of Ohio was conducted August 10-13, 1971, by four members of the ORO Safety and Environmental Control Division. Tours were made of principal facilities and particular emphasis was given to the implementation of previous recommendations.

II. Summary

The health protection and waste management and pollution control programs continue to be satisfactory. Reduction of health protection staff has paralleled that of the general plant, and surveillance activities have been reduced to the essentials. Previous recommendations have been appropriately considered; no recommendations were made from the current appraisal.

At the conclusion of the appraisal, comments were discussed with both NLO management and the CAO staff.

III. Recommendations

A. Previous Recommendations (1970)

1. The NLO plan for developing the capability to determine the ^{235}U enrichment of incoming materials be fully implemented.

The verification facility is nearing completion (See Section IV-G-7). Laboratory analyses are being made as required.

2. The present limit of 10% ^{235}U enrichment be retained for production operations at Fernald.

This has been fully implemented.

3. Review the need for retention of the 20% ^{235}U enriched "button."

A review of enriched materials in storage was made and the 20% material was shipped from the plant.

4. A limited number of approved containers be procured in order to accommodate the miscellaneous shipments of enriched uranium from Fernald.

A number of containers have been procured and vermiculite containers, DOT SP-5765, are used principally for shipments offsite.

5. Hand exposure dosimeters be provided routinely to those employees meeting AECM-0524 Appendix monitoring requirements.

This recommendation has not been fully implemented; however, NLO is proceeding in a satisfactory manner. See Section IV-A

6. Further study be made of operations involving hand exposure to assure compliance with AECM-0524 extremity exposure guide.

All employees with extremity exposure potential have been monitored and their extrapolated annual exposures are less than the exposure guide. See Section IV-A.

7. All production employees be provided semiannual in vivo surveillance.

This recommendation has been implemented. See Section IV-B.

8. The environmental monitoring program for air be upgraded to provide continuous sampling of strategic points on the larger site perimeter.

The sampling points have been selected. The project to supply electric power and the sampling equipment is underway. See Section IV-M.

9. Future semiannual environmental monitoring reports include air data from only the sampling points suggested above.

This will be accomplished when these stations are operational.

10. The plant noise level evaluation be completed and abatement recommendations resulting from engineering studies in Plant 5 be implemented where appropriate.

This has been accomplished. See Section IV-J.

B. Current Recommendations

There are no recommendations as a result of this appraisal.

IV. Findings

A. Extremity Exposures

NLO has monitored wrist exposures of those employees in Plants 4, 5, 8, and the Pilot Plant where exposure potentials are considered sufficiently high to require routine monitoring according to AECM-0524. Approximately 40 employees require routine monitoring, and the largest extrapolated annual exposure is 51 Rem.

Until recently NLO had only 9 wrist badges; they now have enough to monitor everyone required. Contamination of the wrist badges has been and still is a problem. Currently, the badges are collected at the end of the day and decontaminated. Since the Health Physics and Industrial Hygiene staff is small, it can not afford the time necessary to continue the laborious task of decontamination on a daily basis. Hence, the staff has proposed to monitor extremity exposures for one week each quarter and to assign an annual exposure on the results. It was pointed out to NLO that a one week monitoring period may not be a good representative sample of exposure as most employees perform more than one job and the amount of time spent on each job could vary from week to week.

It appears that NLO is trying to provide the monitoring necessary to implement the ORO recommendations of 1970 on this subject. NLO agreed to include the following suggestions in the implementation of their program:

1. Monitor the 35 to 40 employees for about three consecutive weeks during the quarter rather than one week and try to determine whether or not a representative monitoring program is statistically valid. If it is not valid, then provide continuous monitoring.
2. Determine just how large a problem contaminated wrist badges really are and try to develop a means of keeping the badges clean or compensate the film reading for the

exposure received from the contamination. This would greatly reduce personnel time in handling the badges which would be a significant benefit should continuous monitoring be necessary. NLO was informed of Y-12's experience in this regard.

3. Since the reduction of the AEC's extremity exposure limit may be imminent, NLO should begin finding ways to reduce this type of exposure. NLO estimates that under present conditions about 10 employees would exceed 30 Rem/yr.

B. In Vivo

The whole body counter was at NLO twice this year. All the production employees have been counted at least once and all chemical operators have been counted twice as well as any terminating employee showing one-half a lung burden or greater. This year's counting data have shown that not all production employees need to be counted every year. The data will be further analyzed after September 15, and a definite counting schedule for employees will be set up. Preliminary investigation of the data indicates that the chemical operators and degreasers as a group will require counting twice a year as will those employees with one-half a lung burden or more. At present, no employees other than chemical operators have one-half or more of a lung burden. The other production groups will probably be monitored on a less frequent schedule of about once every two years.

There are three employees approaching a lung burden of ^{235}U , i.e., 80, 88, and 73 percent based on a two year average. One of these employees has changed his job to one with a smaller exposure potential, and NLO will probably have to place the others in jobs which reduces their exposure potential as well.

C. Film Usage and Exposure Data

NLO has switched to Kodak Type 2 film. Light streaks and fogging around the edge were exhibited in the first batch of film; however, their second batch has been much better in that the light streaks are essentially gone. Occasional streaking is confined to a small area

around the edge and is presenting no problem. One thousand sixty-eight employees were routinely monitored last year. Thirty-six had whole body (gamma) exposures in excess of one Roentgen with the highest exposure being 2.3 Roentgens.

D. Bioassay

The bioassay schedule for employees ranges from monthly to annually. Last year 1,512 samples were analyzed for uranium, 10 of which were recalls. All of the recall samples were below the action level of 0.04 mg/l uranium.

E. Procedures

Rather than being a separate document, the health physics procedures are incorporated with the standard operating procedures for each facility or operation requiring an SOP. A few SOP's were reviewed and the health physics portion appeared adequate.

F. Irradiation Facilities

Both the Cockcroft-Walton and the ^{60}Co irradiation facilities were reviewed with respect to procedures and interlocks. The interlock system associated with each facility appears more than adequate. The operating procedures, although not as complete as they could be, are considered adequate. Both units are operated by the same person who is the only one qualified to operate them. This operator appears to be well versed in each facility and well qualified to operate them.

G. Nuclear Criticality Safety

The nuclear safety staff has been reduced to one person who now also spends time on emergency planning activities. With the reduction of enriched operations throughout the plant, no apparent problems currently exist with such a small staff. The status of plant operations at the time of the appraisal are briefly noted below:

1. Pilot Plant - Work mostly is with thorium. One muffle furnace was being used for the oxidation of enriched material.

2. Plants 2 & 3 (Refinery) - These plants were being operated three shifts - seven days per week. Only normal uranium was involved; however, a nominal 0.81% ^{235}U run is scheduled.
3. Plant 4 - Not operating.
4. Plant 5 (Metals) - This plant was being operated mostly on depleted and normal material with some limited quantities of 0.95 and 1.25% ^{235}U NPR work.
5. Rolling Mill - Not operating.
6. Plant 1 - All incoming material is received in this area. In addition, slightly enriched uranium materials are repackaged for shipment to Portsmouth. UO_2 pellets (2 - 10% ^{235}U) are milled in this area.
7. Verification Facility - This facility, which is to be used to check ^{235}U assays of incoming materials, is yet to be completed. The building construction has been completed but the electronics will not arrive until October.

H. Transportation

NLO appears to be in compliance with the requirements of AECM-0529 and has submitted procedures to ORO in compliance with ORIAD No. 0529-16. Most offsite shipments have involved the shipment of UO_2 and U_3O_8 powder to GAT in vermiculite containers, DOT SP 5765.

Some consideration is being given to the possibility of shipping 2% assay green salt to GAT next year. Should this come to fruition, some practical solution will need be devised to provide suitable shipping containers.

I. Storage

All uranium materials appear to be stored safely. Plans have been effected (subsequent to the review) to dispose of the 10% metal stored outside Plant I.

Plans are in effect to provide an indoor storage area in Plant 1 Thaw Tunnel. Concrete block will be used as spacers. The effect of concrete as a neutron reflector has been determined by criticality calculations at ORNL.

J. Noise

The noise problems appear to be well in hand. NLO completed its time weighted noise survey of Plant 5 and designated several areas as mandatory ear protection areas. During the tour of Plant 5, it was observed that employees were wearing ear protection devices. Two engineering changes have been made to equipment which resulted in the reduction of their contribution to the general noise level. Continued effort on the part of engineering will be made to find additional economical solutions to reduce noise levels within Plant 5. The excellent management support afforded this project was noted.

K. Medical

The OM staff has been reduced by one nurse and one laboratory technologist. The number of physicians, one full-time, 2 part-time remains the same. With the overall reduction in the plant population the OM staff, in spite of its reduction, is able to maintain the OM program which remains unchanged. Since the large reduction in force, the number of workmen's compensation cases has increased.

With the creation of mandatory ear protection areas within Plant 5, the OM staff played an important role by talking with each worker involved and explaining the reasons for this new protective criteria. They also fit each employee in these areas with ear protective devices.

L. Environmental Pollution

1. Air

- a. Steam Plant - The coal of poor quality, acquired during the past year, is being worked off now that 1% sulfur coal is again more readily available and on hand. Through CP71-3, improvement to multiclone collectors is expected to increase the particulate collection efficiency 3-5% to a total of 90-91% at an estimated cost of \$15,000. Coupled with the use of better quality coal (low sulfur - 1% and 6-8% ash), this upgrading of the collection system appears to be a reasonable first attempt to achieve compliance with anticipated Ohio air pollution abatement regulations.

- b. Nitrogen Dioxide - The emissions are currently estimated as high as 1,000 tons/year and emanate from several intermittent sources, most with visible yellow to red-brown plumes. The engineering and technical staffs are continuing to study various alternatives for improved control of nitrogen dioxide emissions. The use of urea in metal and chip pickling operations has been reasonably successful in suppressing the formation of NO_2 . The nitric acid recovery tower system is achieving better efficiency through careful scheduling of refinery operations and some consideration is being given to using the columns in series to further reduce emissions. It is doubtful that any cosmetic treatment to eradicate the visible plumes will satisfy either the anticipated emission limits or the intent of E. O. 11507. Although the emission limits are unsettled at this time, adequate emission reduction will probably require the acquisition of an engineered system such as a catalytic combustion unit, molecular sieves or some other alternate. Until the applicable emission regulations are firm, NLO is pursuing a reasonable course; namely, conducting an emission inventory, applying reasonable operating and administrative controls, reviewing contemporary technology, and budgeting as appropriate. Preliminary "fence-line" environmental data indicate compliance with EPA's national ambient air quality standards.
- c. Incinerator - The upgrading project to reduce particulate emissions is completed for the general purpose incinerator; however, due to the reduced level of plant operations, the load requirement for efficient operation is not being met. These small loads also hamper effective sorting. Added supplementary heat from additional gas would improve particulate emission control through increased combustion in the afterburner. NLO is investigating the availability of more gas from Cincinnati Gas and Electric. An alternate method of improving operation is to store wastes until sufficient quantities are available to provide the needed heat for high combustion efficiency. Some modification of the facility would be needed to provide the additional storage space necessary for this approach.

2. Water

FMPC has exceptional water pollution control facilities capable of handling both routine and accidental releases of waste water with relative ease. These facilities could prove invaluable as effluent restrictions become more stringent in the future.

FMPC is the only major ORO facility which has not been surveyed by the EPA. It can reasonably be expected that a survey will be forthcoming, especially since EPA must advise the Corps of Engineers (CE) in regard to the CE discharge permit for FMPC. When, and if, this survey comes, it may not be limited to water since EPA is integrating their inspection functions.

At the present time, it appears likely that the new ORSANCO effluent limits will be applied to interstate tributaries of the Ohio River. However, it does not seem practical to use this conjecture as a basis for detailed planning. Rather, there should be sufficient time after application of any new limits to make final decisions for appropriate means to achieve compliance. In the meantime, a better assessment of FMPC's present status is being gained through an expanded water effluent sampling program begun in October 1970. In addition, the monthly report to the State of Ohio continues for certain selected parameters.

- a. Radium - Much effort has been expended to reduce ^{228}Ra concentrations to less than Concentration Guide levels in the plant effluent. Improved $\text{BaCO}_3\text{-Al}_2\text{SO}_4$ treatment in the Pilot Plant has greatly decreased the Ra contribution from that source. Unfortunately, increased refinery operations have been found to be discharging significant quantities of Ra, again causing plant effluents to exceed Concentration Guide levels. In June, Manhole 175 concentrations were ^{229}Ra 0.18 d/m/ml and ^{226}Ra 0.52 d/m/ml. The latter is about 10 times the AECM-0524 guideline of 0.066 d/m/ml. Now that the source of this containment has been firmly established, it is expected to be a straight forward water treatment problem to reduce the concentrations to acceptable levels. Treatment will probably involve neutralization-precipitation at the general sump.

- b. Water Plant Sludge - Unlike some other ORO facilities, the water plant sludge is not a pollution problem. The sludge is used for pH control at the general sump and/or routed to Pit 5 for settling and disposal. Its usefulness for pH control is limited, but still of some value in reducing the amount of chemicals otherwise purchased for this purpose.

- c. Diversion Capability - Plans now call for a valve installation for diverting storm sewer water to the general sump for storage and treatment in the event of a spill. Also proposed is the purchase and installation of two pH monitors which would signal the release of abnormal discharges to the sewer, providing a warning in sufficient time to divert the release to the general sump. This system could, of course, not handle the quantities of water present during hard rains, but the system should satisfy an expected AEC requirement for diversion capability at each discharge. This project is expected to cost about \$10,000; \$2,000 for the valve and the remainder for the pH monitor - telemetering system.

- d. Pits - The supernate has been removed from Pit 3 and covering has started. Due to the large size of the pit and the high water content of the sludges, this project is expected to present special problems and as a result is receiving a great deal of attention. Earth slides have already occurred during preliminary filling operations, probably due to the slope of the pit sides and to the sludge water content. Fill is being obtained onsite at a dump area, at a nearby high spot in the terrain, and from steam plant flyash generation. ORO is especially interested in the success of this operation due both to the existence of other pits needing stabilization and to the expected generation of larger sludge quantities at other sites as a result of increased water treatment activity. Any advice in providing for better sludge disposal as a result of the FMPC's experience will be most appreciated.

- e. Diking - Diking of bulk chemical storage tanks is also another area receiving attention elsewhere. Fortunately, many of FMPC's tanks are already diked and the previously discussed diversion valve will provide the equivalent of diking for all or most of the remainder. If, after providing storm sewer diversion, there still are bulk chemicals stored or used (in quantities and types hazardous to the off-site environment) which could be released, measures should be considered for providing dikes, etc.
- f. Chromates - Inquiries were made during this survey regarding the use of chromates and the problems that would be associated with meeting a pipeline effluent limit of 0.05 ppm. This is the ORSANCO maximum effluent limit presently applicable for discharges to the Ohio River, which may soon apply to the Great Miami River.

The present RCW reconcentration factor is only about 1.8 due to the lack of a tight system. It is not evident at present whether the system could be tightened enough, with reasonable effort, to decrease blowdown to acceptable levels. It would appear that a non-chromate corrosion inhibitor substitution might be the best approach if this very restrictive effluent limit is imposed.

- g. Oil Disposal - FMPC oil disposal consists of collecting non-contaminated oil and selling it for reuse and collecting contaminated oil for incineration. Both of these practices are consistent with accepted current practices.

"Oil" concentrations at Manhole 175 average about 20 ppm which represent a discharge of about 40-50,000 lbs/yr. This "oil" is actually any material which will dissolve in the solvent used in this analytical technique (ether or chloroform). If this is a correct extrapolation from an effluent concentration, it means that several thousand gallons of "oil" is lost to the river each year. We would suggest that if the accuracy of this conclusion be verified by the FMPC staff, then reasonable effort be expended to determine the significance of this discharge and reduce it to "as low as practicable" levels.

- h. Sewage Treatment - A brief visit was made to the sewage treatment plant during the survey. This plant provides secondary treatment and is operated by employees certified by the State. The general appearance of the plant was excellent; however, a detailed review of its operation, analyses, etc., was not made at this time.
- i. Nitrates - The concentration of nitrates at Manhole 175 has risen significantly with the increased levels of refinery operation. The present monthly rate of discharge to the river extrapolated to an annual total gives a result of about 6×10^6 lbs/yr. Most of the nitrates are contained in the refinery effluent of about 5.5×10^6 gal/hr; therefore, should it become necessary to reduce the quantity of nitrates discharged, the volume of waste water requiring treatment would not be excessive. Fortunately, there is no ORSANCO effluent limit for nitrates; however, a limit may be applied as a condition for a CE discharge permit.
- j. Phenols - Sodium pentachlorophenate is used in the RCW system as a fungicide. Its proper use and storage is very important as evidenced by its very low, 1 ppb, drinking water standard, and since it was shown to be the cause of at least one large fish kill. Effluent concentrations of phenols should be determined since no analyses have been performed.

M. Environmental Monitoring

1. Air

Ambient air monitoring is limited on a routine basis to radioactivity. The program is in the midst of a change of sample locations; while the grab sample procedure previously used has been dropped. Continuous perimeter (fence line) samples still show only about 1% CG for uranium and alpha activity and .02% CG for beta activity. The new sample locations on the plant boundary should show levels slightly lower than the perimeter results and reflect more accurately the maximum offsite concentrations attributable to plant operations. The boundary sample stations will include space for chemical monitoring should this be determined necessary.

At present, there is no routine NO_x ambient air sampling program, but there have been about 6 onsite sample sets taken downwind close to the refinery to determine the maximum offsite concentration that could reasonably be expected. This sampling revealed a maximum level which was about one-third of the National Ambient Air Quality Standard ($100 \mu\text{g}/\text{m}^3$ or .05 ppm - annual arithmetic mean).

2. Water

The routine environmental monitoring reports continue to reflect compliance with the existing water quality criteria for the Great Miami River. Currently, a weekly grab sample is collected upstream (Ross, Ohio) and analyzed for chlorides, pH, nitrates, total suspended solids, alpha and beta activity, uranium and ^{228}Ra . A 24-hour composite sample is collected daily downstream from the outfall (New Baltimore, Ohio). The composite collected on the same day as the grab sample is analyzed for the same parameters. These data, along with daily sewage plant data, are supplied monthly to the State of Ohio. This report includes the calculated contribution to the river based on daily analyses of the continuous proportional sample collected from the main effluent pipeline as sampled at Manhole 175 located near the sewage plant. Nitrate concentrations in the river above and below the outfall continue to average about 50% of the "MPC" used by NLO. A crude calculation indicates between 4 and 6 million pounds of nitrates is discharged annually through Manhole 175 depending upon the level of refinery operations. Although the fluoride concentration in the river at these points also averages about 50% of the NLO "MPC," the nitrate discharge is the only one of potential environmental significance.

Data from this sample point are quite important in assessing the impact of liquid discharges from the FMPC. During the site tour, it was noted that the sample container, a right circular cylinder partially buried, has a flat bottom and a drain line of very small diameter in relation to the sample container base. It appears that this arrangement makes it very difficult to assure the container is adequately rinsed of solids and other contaminants after each pickup. There is no

supply of rinse water (other than that in a nearby water bottle) and the flow from the sample container is too slow to effectively flush out the entrapped solids. Considering the importance of the monitoring data from this sample point, appropriate revisions should be undertaken to further improve the dependable quality of the sample.

Although not directly related to environmental monitoring per se, there are 8 test wells of varying depths in the pit area west of the production area, one northeast of the production area (old Administration Building), and one south of the pit area. The depths range from 43 to 180 feet. Test wells 1-D, 3, 5, 7, and 9 were deepened and redeveloped between 1963-1965. Data collected monthly from these wells are used to assist in the detection and evaluation of potential leakage from the pits into the subsurface.

3. Soil

The uranium soil sampling program was reactivated at ORO's request. Samples from nearby offsite locations show no increase over earlier results. One localized area of higher than normal uranium concentration was found near the incinerator and is accredited to its former mode of operation.

After reviewing the various ORO facility soil sampling programs, it has been determined of value to standardize sampling locations. It is, therefore, requested that the FMPC sample locations be transferred to the boundary of AEC property. These sites may be at the new air sampling locations. In selecting sites, in addition to seeking a representative distribution, it appears of value to also sample the area of high concentration previously mentioned.

N. Pest Control Programs

There currently are no large pesticide or herbicide programs being conducted; however, the materials selected are registered under the Federal Insecticide, Fungicide and Rodenticide Act and are applied according to the prescribed formulation. The majority of these bulk chemicals are stored and mixed in the Heavy Equipment Building. During the site tour, it was

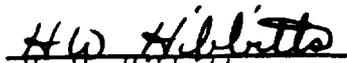
noted that a distinct possibility existed for spillage or leaks to reach a nearby floor drain which the reviewers were told leads to the storm sewer system. Appropriate steps should be taken to eliminate this possibility by providing a "catch-pan" or similar positive containment.

Reviewers:


W. A. Johnson, Chief
Health and Nuclear
Safety Branch


R. D. Smith
Health Physicist


J. V. Wing, Chief
Waste Management and
Pollution Control Branch


H. W. Hibbitts
Health Physicist

UNITED STATES
DEPARTMENT OF ENERGY
OFFICE OF REGULATORY AND SAFETY PROGRAMS
WASHINGTON, D. C. 20545
September 22, 1972

National Lead Company of Ohio
ATTN: Mr. M. S. Nelson, Manager
Post Office Box 39158
Cincinnati, Ohio 45239

Gentlemen:

ANNUAL HEALTH PROTECTION APPRAISAL OF NLO, 1972

The annual health protection appraisal of NLO was conducted on August 22-25, 1972, by members of the ORO Safety and Environmental Control Division. The findings were informally discussed with NLO and CAO representatives at that time.

Enclosed are six copies of the formal report of the appraisal. You may proceed with implementation of the recommendations unless there are sound reasons why they are not warranted. In any event, your comments with regard to the conduct of the appraisal, the general content of the report, and the detailed plans for implementing or otherwise handling the recommendations are requested by November 2, 1972.

The cooperation extended by members of your staff during the appraisal is appreciated.

Sincerely,

Charles A. Keller
Charles A. Keller, Director
Uranium Enrichment Division

OSH:TMJ

Enclosure:
Appraisal Report (6 cys)

cc w/encl:
C. L. Karl, CAO
J. H. Hill
W. O. Mickelson
W. H. Travis

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HEALTH PROTECTION APPRAISAL
NATIONAL LEAD COMPANY OF OHIO
AUGUST 1972

by

THOMAS M. JELINEK
ROBERT W. POE

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I. Purpose and Scope

The annual health protection appraisal of NLO was conducted by members of the Health Protection Branch, Safety and Environmental Control Division, ORO, on August 22-25, 1972. Emphasis was placed on compliance with AEC Manual Chapters and the Department of Labor Occupational Safety and Health Standards in the areas of health physics and industrial hygiene.

II. Summary

The overall health protection program continues to be satisfactory. Several areas within the program require modification and/or increased attention to comply with the Occupational Safety and Health Standards. Several plant areas visited were judged to be presenting hazardous working environments for employees and recommendations were made for immediate corrective action.

At the conclusion of this appraisal, detailed comments and recommendations were presented to NLO management and to the AEC Site Representative.

III. Recommendations

A. Recommendations of 1971 Appraisal

There were no recommendations made as a result of the 1971 appraisal.

B. Current Recommendations

It is recommended that NLO:

1. Continue periodic monitoring of extremity exposure for those operations which are identified as potentially exceeding 10% of the annual extremity exposure guide, and provide continuous extremity exposure monitoring for those operations identified as exceeding 50% of the annual extremity exposure guide. (See Section IV.A.)
2. Urine samples collected from the chemical operator group be spread out to cover the entire quarter, rather than one month as at present. (See Section IV.D.)

3. Immediately clean up the contamination in the refinery and recovery plants; that safety devices and operating equipment be kept in proper repair; and that increased attention be given to reducing contamination that results from abnormal operating conditions.
4. Post those areas where ear protection has been determined to be necessary.
5. Review and achieve compliance with the Occupational Safety and Health Standard concerning respiratory protection; further, those plant areas where respiratory protection is required should be posted.

IV. Findings

A. Extremity Exposure

Several areas of the plant present extremity exposure potentials which exceed 10% of the AEC guide of 75 Rem/yr. The operators in these areas have been monitored in the past on a periodic basis, and annual extremity exposures have been extrapolated from this data. Contamination of wrist badges has, however, resulted in large uncertainties in the results. NLO has recently acquired a new wrist badge which precludes much of the contamination. These new badges were used for a two-week period to monitor extremity exposure in Plant 5. Results indicate that extrapolated quarterly exposures range from 3-17 Rem/quarter. On the basis of these results, it is recommended that NLO continue the periodic monitoring of all potential extremity exposures; that those operations identified which result in greater than 10% of the annual limit be monitored at least two weeks each quarter; and that those operations identified which result in greater than 50% of the annual limit be monitored continuously. Should monitoring indicate a high exposure (greater than 50% of the annual limit) for certain operations, NLO should consider engineering or operational changes to reduce the exposure potential. (Specific reference is made to crucible loading in remelt area of Plant 5).

B. Whole Body Exposure

Whole body external radiation exposure continues to remain well within the AEC guides. The maximum whole body penetrating radiation exposure for the first half of 1972 was approximately one (1) Rem. Two employees received close to quarterly whole body skin exposures, approximately 9.5 Rem in the first quarter 1972. The employees were moved to lower exposure jobs to assure that quarterly limits would not be exceeded. Operational changes were also made to reduce the exposure potential.

Changes in job assignments necessitated by radiation exposure are not consistently requested in a formal manner, as is done for other medical job restrictions. It is suggested that the NLO Industrial Hygiene and Radiation Department formally notify supervision of the necessity to preclude further exposure for a specific time period.

C. In Vivo Monitoring

In vivo lung counting continues to be used by NLO as the primary means of assessing internal exposure to radioactive materials. At the present time, approximately eight chemical operators from the Refinery and four from other plants have lung burdens greater than 50% of the recommended maximum permissible lung burden (MPLB). NLO has determined that the chemical operators are the only group of employees that require annual lung monitoring. This group will be counted at least annually, and more frequently if the previous in vivo count, or the two-year average, is above 50% of the MPLB. Other employees with potential exposure will be counted as time permits, but at least 50% of these will be counted each year. The in vivo lung counting program is satisfactory.

D. Urinalysis

Urine samples are collected at least quarterly from those employees who have potential internal exposure. Except for the Refinery chemical operator group, urinalysis indicates no exposure problem. Several very high urine samples have been detected among the Refinery chemical operators. These data appear to indicate that the exposure is to relatively soluble uranium. The data have been used primarily as an

indication of operating conditions within the Refinery. The chemical operator group is routinely sampled on a quarterly basis, with the samples of the group being collected over a one-month period. It is recommended that the samples be collected over the entire quarter, thereby reducing the possibility that high exposure situations go unnoticed. Further, NLO should attempt to determine the significance of the large voidings of uranium noted in several of the chemical operators. In this connection, it would be desirable to obtain urine data on one or more individuals in that group after they have been removed from further exposure. The practice of obtaining special urine samples from chemical operators following operational difficulties or indication of high uranium content in the urine, should be continued.

E. Refinery and Recovery Plants

The refinery and recovery plants were toured extensively to observe operating conditions. In general, housekeeping was very poor, and some operating equipment was in a state of disrepair. Extensive radioactive material contamination was noted in the work areas, presenting hazardous working environments to the employees. Safety equipment, such as eye washers, were not in proper working order. At least one employee respirator was found to be contaminated. Inlet air filters were missing and/or extensively damaged on at least two air supply units. Water from eye washers was rusty or otherwise contaminated. Uranium concentrates were puffing out of a screw conveyor system, creating airborne and surface contamination. Inspection ports and vessel lids were not properly secured. The needle of a scrubber water pressure indicator was broken off.

These, and other conditions, necessitated a recommendation that prompt cleanup of the areas be initiated, that safety devices and operating equipment be kept in proper repair, and that increased attention be given continued cleanup of the areas, especially following abnormal operational occurrences, such as blockage of the screw conveyor system.

F. Irradiation Facilities

A ^{252}Cf source has been added to the neutron activation facility. The 153 microgram source is currently in storage; use is planned in 4-5 months. The procedures, interlocks, etc., in use for the Cockroft-Walton machine will also apply to the ^{252}Cf source. No radiation hazard exists at present, as verified by surveys performed by the IH&R Department.

G. Training

The professional staff of the IH&R Department participates in periodic seminars and technical sessions offered by universities and professional societies.

Plant employees attend monthly safety meetings. Health physics and industrial hygiene topics are occasionally presented at these monthly meetings. Subjects covered recently include noise and respirators. The IH&R Department distributes appropriate pamphlets and booklets pertaining to safety and also informs supervision by letter of selected hazardous materials or operations. This training program is considered to be satisfactory.

H. Noise

Major noise areas within the NLO plant have been identified. Those areas which exceed the Occupational Safety and Health Standard have been evaluated in terms of providing engineering solutions to correct the problem. Several of these engineering changes have been incorporated while others require further evaluation. Protective equipment is utilized where necessary. During this review only one operator was noted as not wearing the required ear protection. NLO should continue to stress the importance of wearing ear protection when it is required. None of the areas which have been determined to require ear protection was posted as such. It is recommended that these areas be posted. NLO should continue to resolve noise problems through the application of engineering design solutions. Where these are not feasible, exposure should be reduced through the use of administrative control and the use of protective equipment.

I. Respirator Program

The Occupational Safety and Health Standards, 1910 Subpart I, Paragraph 134, contain specific standards for the documentation and content of a respirator protection program. The NLO respirator program does not now comply with this standard. It is recommended that NLO review the standard and modify its respirator program to achieve compliance. It is further recommended that areas within the plant where respiratory protection is required be posted.

J. Ventilation

Laboratory hoods, a vapor degreaser, and ventilation systems for several drumming and dumping stations were evaluated to determine air flow rates. The basic standard used was 100 fpm, except for systems specifically covered by the OSHS, such as the vapor degreaser. With only few exceptions, the ventilation systems appeared to be adequate. NLO intends to perform a detailed review of all ventilation systems prior to November 1, 1972. Results of this review will be supplied to ORO. Subsequent to that review, it is suggested that NLO initiate a program of ventilation evaluation to assure that systems continue to function properly. Each ventilation system should be checked at least annually.

K. Heat Stress

Several areas within the plant appear to be capable of causing heat stress in employees. It is suggested that NLO evaluate these areas using the method of evaluation outlined by the American Conference of Governmental Hygienists. This evaluation should properly be performed during the hottest season of the year.

L. Control of Toxic chemicals

No formal program for control of toxic chemicals, with the exception of solvents, currently exists at NLO. Chemicals can be obtained by operating personnel from at least three sources, including direct purchase, with division approval, from a vendor. Industrial hygiene approval is required prior to the purchase of solvents. It is suggested that in order to assure that users of chemicals are aware of the toxicity, a method of inventory, labeling, and toxicity information dissemination be established. Similarly, chemical users should be encouraged to dispose of chemicals no longer needed, and storage areas should be checked to assure compatibility of the chemicals with the storage environment.

M. Standard Operating Procedures and Safety Manual

Documentation of the Industrial Hygiene and Radiation Safety programs was reviewed and found to be satisfactory. Standard Operating Procedures prepared for each plant operation contain sufficient detail relative to safety precautions and instructions.

Reviewers:

Thomas M. Jelinek

Thomas M. Jelinek
Health Physicist

Robert W. Poe

Robert W. Poe
Health Physicist



UNITED STATES
ATOMIC ENERGY COMMISSION

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AREA CODE 615
TELEPHONE 483-8611

December 6, 1972

Wiley A. Johnson, Chief, Health Protection Branch
Safety & Environmental Control Division

FOLLOWUP HEALTH PROTECTION REVIEW OF NLO, NOVEMBER 22, 1972

The annual health protection appraisal of NLO performed in August 1972 concluded that hazardous working environments existed in the refinery plant. The recommendation was made that NLO immediately clean up the contamination in the refinery and recovery plants; that safety devices and operating equipment be kept in proper repair; and that increased attention be given to reducing contamination resulting from abnormal operations. For the purpose of assessing progress to this end, a follow-up health protection appraisal was conducted on November 22, 1972. A brief discussion of findings was held with NLO management at the conclusion of this review.

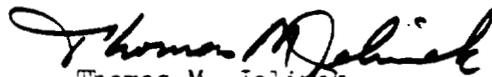
Conditions in both the refinery and recovery plants were again reviewed extensively. Considerable improvement was noted in the housekeeping, and all safety devices checked were operating properly. There has been considerable effort on NLO's part to maintain the facility in good working order. Equipment gaskets and closure devices have been repaired, and it is apparent that more attention is being directed toward the proper use of these items. The refinery plant in particular has been extensively cleaned, and it appears that contamination resulting from normal operations is promptly cleaned up. Heated makeup air equipment has been repaired, though minor problems still exist with keeping adequate intake filters in place. Engineering studies are presently being made to upgrade the entire building ventilation system. Design of local ventilation system for the Williams Mill is essentially complete. Safety devices, such as showers and eye washers, are checked for proper operation on a daily basis. Improperly functioning safety equipment receives high priority for maintenance. A minor area of concern is the large number of leaking or dripping water and acid lines in the refinery plant. Casual entrants to the facility have no way of differentiating the acid drips from the water drips. In some cases, it may not even be possible for people familiar with the area to make this distinction. NLO management stated that this matter would receive attention.

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Urinalysis data for refinery chemical operators was reviewed for the time period since August 1972. The level of uranium elimination has dropped considerably from that noted during the previous appraisal. This is in part due to the reduced production load in the refinery, but the major reduction can be attributed to the increased attention given to the elimination of contamination sources and cleanup of any contamination that does occur.

NLO is continuing to evaluate the extremity radiation exposure problems in the metals plant. The most recent badging of employees indicates that contamination of the wrist badges is still contributing a large amount of exposure to the film. Until this contamination problem can be eliminated or accurately accounted for, assignment of extremity exposures will be difficult. However, it does appear that continuous monitoring for extremity exposure in the metals plant will be required.

In summary, the recommendations made in the 1972 annual health protection appraisal appear to have been taken most seriously by NLO and corrective action is being instituted promptly and effectively. Refinery work activities are expected to increase again in early 1973; further evaluation of contamination reduction practices may be necessary at that time. The next full review of the NLO health protection program is currently scheduled for May 1973.



Thomas M. Jelinek
Health Physicist
Health Protection Branch
Safety & Environmental Control Division

OSH:TMJ

cc: C. A. Keller
W. H. Travis

*Put in 1140
branch file*

November 20, 1972

WRIST FILM DOSIMETER EXPOSURES IN PLANT 5 "B" AREA

M. W. Boback

K. N. Ross

Wrist film dosimeters were worn by selected employees in Plant 5 "B" area for two weeks during June. During September, all employees in the area wore them for four weeks.

The conditions of the test during June were that each employee would wear the dosimeters during the working period. During the hours he was not working they were to be left in his locker in the plant.

For the September test the badges were hung on a board in the "B" area office when not being worn. A pair of badges prepared in the same manner as the others were left hanging on the boards at all times as a blank.

Both sets of badges were processed and analyzed in the same way. The results of these two tests are compared in Table I.

The blanks used in the September test were found to have been exposed to an average of 58.0 mr in 28 days. This amounts to about 0.85 mry/hr. Since the wrist dosimeters were not in use for 512 hours, it would seem that 435 mr background should be subtracted from all measurements on the wrist badges used during the September test. This was done in Table II and extrapolated results for the quarterly and annual exposure are shown. There is no difference in the number of people who would require wrist dosimeters at all times, those who receive 50% or more of the annual MPE of 75 r. 43.5

The last column in Table II shows a more realistic annual exposure. In this column the three highest employees annual exposure was calculated using a 48-week year. This is realistic since all employees get at least two weeks vacation and there are ten paid holidays. Using the figures obtained from this calculation, only one employee would require a dosimeter full time. 2

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"B" Area

M. W. Boback

November 20, 1972

Another aspect of wrist film dosimetry was explored using the dosimeters from the September test. These dosimeters were opened and the exposed film removed from the polyethylene wrapper. A fresh, unexposed film was then inserted in the wrapper and this was replaced in the dosimeter. All the dosimeters were hung on the same board as used during the test and the board was placed in a nonradiation area, in the office. The results of this test are shown in Table III where the exposure of the film after one month's exposure to working conditions is compared to the exposure of the film after 1/2 month's exposure to the used wrist dosimeters. This certainly shows that the wrist badges were contaminated during their use in the plant. Unfortunately, it does not show how long the films were exposed to the contamination. The wrist badges could have become contaminated at any time during their exposure to working conditions. Even the blanks, which supposedly did not get exposed to working conditions, show some exposure, possibly from the other badges they were hanging near. Since we do not know how long the badges were contaminated during their exposure to working conditions, there is no way to correct the working exposure to the proper number. It is evident, however, that all the exposures to working conditions are really less than the figure in the table.

We are now engaged in a program to lessen the contamination of the wrist dosimeters to obtain a more correct measurement of the forearm exposure of all employees.

Original Signed By

K. N. Ross

KNR/vvs

Table I. Wrist Badge Exposure Tests

Badge Number	Wrist	2-week test, June		Extrapolated Exposures (1)	
		Rad/Qtr.	Rad/Yr.	4-week test, Sept. Rad/Qtr.	Rad/Yr.
[REDACTED]	R	6.7	26.8	4.6	18.4
[REDACTED]	L	6.5	26.0	5.4	21.6
[REDACTED]	R	10.0	40.0	11.0	44.0
[REDACTED]	L	16.9	67.6	10.7	42.8
[REDACTED]	R	(2)	(2)	7.2	28.8
[REDACTED]	L	(2)	(2)	11.0	44.0
[REDACTED]	R	(2)	(2)	3.2	12.8
[REDACTED]	L	(2)	(2)	3.7	14.8
[REDACTED]	R	(2)	(2)	7.9	31.6
[REDACTED]	L	(2)	(2)	6.9	27.6
[REDACTED]	R		21.2	6.0	24.0
[REDACTED]	L	5.3	24.8	5.5	22.0
[REDACTED]	R	6.2	13.6	3.0	12.0
[REDACTED]	L	3.4	11.6	3.8	15.2
[REDACTED]	R	2.9	46.8	4.9	19.6
[REDACTED]	L	11.7	62.4	6.1	24.4
[REDACTED]	R	15.6	40.4	5.6	22.4
[REDACTED]	L	10.1	42.8	7.8	31.2
[REDACTED]	R	10.7	31.2	8.6	34.4
[REDACTED]	L	7.8	23.2	6.3	25.2
[REDACTED]	R	5.8	(2)	21.8	87.2
[REDACTED]	L	(2)	(2)	16.3	65.2
[REDACTED]	R	(2)	(2)	2.4	9.6
[REDACTED]	L	(2)	(2)	2.4	9.6
[REDACTED]	R		36.4	6.2	24.8
[REDACTED]	L	9.1	27.2	6.4	25.6
[REDACTED]	R	6.8	29.2	6.2	24.8
[REDACTED]	L	7.3	27.2	5.7	22.8
[REDACTED]	R	6.8		2.0	
[REDACTED]	L			1.7	

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Blank (3)
Blank (3)

(1)Uncorrected for contamination or storage area background.
 (2)Did not participate in test during this period.
 (3)Left hanging on board in "B" area office. All wrist badges hung on this board during non-working hours.

Table II. Extrapolated Doses
Corrected for Background

Badge Number	Wrist	Wrist Dose, in Rads				
		Uncorrected Total 4-week Exposure	Corrected for Background Exposure			
			4-week	Extrapolated Exposure		
		13-week		52-week	48-week	
[REDACTED]	R	1.42	0.985	3.2	12.8	
	L	1.68	1.245	4.0	16.2	
[REDACTED]	R	3.40	2.965	9.6	38.5	35.6
	L	3.30	2.865	9.3	37.2	34.4
[REDACTED]	R	2.23	1.795	5.8	23.3	21.5
	L	3.40	2.965	9.6	38.5	35.6
[REDACTED]	R	0.99	0.555	1.8	7.2	
	L	1.13	0.695	2.2	9.0	
[REDACTED]	R	2.42	1.985	6.4	25.8	
	L	2.03	1.595	5.2	20.7	
[REDACTED]	R	1.85	1.415	4.6	18.4	
	L	1.72	1.285	4.2	16.7	
[REDACTED]	R	0.92	0.485	1.6	6.3	
	L	1.16	0.725	2.3	9.4	
[REDACTED]	R	1.51	1.075	3.5	14.0	
	L	1.87	1.435	4.7	18.6	
[REDACTED]	R	1.74	1.305	4.2	17.0	
	L	2.40	1.965	6.4	25.5	
[REDACTED]	R	2.65	2.215	7.2	28.8	
	L	1.96	1.525	4.9	19.8	
[REDACTED]	R	6.70	6.265	20.4	81.4	75.2
	L	5.02	4.585	14.9	59.6	55.0
[REDACTED]	R	0.74	0.305	1.0	4.0	
	L	0.75	0.315	1.0	4.1	
[REDACTED]	R	1.92	1.485	4.8	19.3	
	L	1.96	1.525	4.9	4.9	
[REDACTED]	R	1.92	1.485	4.8	19.3	
	L	1.74	1.305	4.2	17.0	

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Table III. Apparent Dose from Contaminated
Badges, Two-Week Test

<u>Badge Number</u>	<u>Wrist</u>	<u>M rads</u>	
		<u>Uncorrected Total 4-week Exposure</u>	<u>Apparent dose from badge contamination. Two-week Period</u>
[REDACTED]	R	1420	1170
[REDACTED]	E	1680	485
[REDACTED]	R	3400	840
[REDACTED]	L	3300	960
[REDACTED]	R	2230	530
[REDACTED]	L	3400	580
[REDACTED]	R	990	360
[REDACTED]	L	1130	465
[REDACTED]	R	2420	375
[REDACTED]	L	2030	545
[REDACTED]	R	1850	545
[REDACTED]	L	1720	1400
[REDACTED]	R	920	195
[REDACTED]	L	1160	770
[REDACTED]	R	1510	435
[REDACTED]	L	1870	360
[REDACTED]	R	1740	740
[REDACTED]	L	2400	690
[REDACTED]	R	2650	320
[REDACTED]	L	1960	225
[REDACTED]	R	6700	2125
[REDACTED]	L	5020	2675
[REDACTED]	R	740	150
[REDACTED]	L	750	255
[REDACTED]	R	1920	580
[REDACTED]	L	1960	485
[REDACTED]	R	1920	225
[REDACTED]	L	1740	180
Blank		625	180
Blank		535	86

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NATIONAL LEAD COMPANY OF OHIO
 CUMULATIVE MONTHLY URINALYSIS REPORT
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LEGEND * = NON-SCHEDULE SAMPLE TYPE
 ■ = MASTER RECORD WAS NOT AVAILABLE.

BADGE NO.	COST OR COST APP	NAME	SAMP TYPE	RESULTS NSL	RESULTS >0.025	DATE
[REDACTED]	220	[REDACTED]	20	0.018		01 13 72
			30	0.018		01 21 72
			50	0.009		01 28 72
			50	0.009		01 29 72
			50	0.017		01 30 72
			50	0.009		01 31 72
			50	0.015		02 15 72
			50	0.042	■	02 16 72
			50	0.010		03 12 72
			30	0.003		04 25 72
			50	0.047	■	06 23 72
			50	0.004		06 29 72
			30	0.007		07 12 72
			50	0.010		09 25 72
30	0.006		10 25 72			
[REDACTED]	220	[REDACTED]	30	0.064	■	01 18 72
			BR	0.034	■	01 22 72
			BR	0.032	■	01 23 72
			50	0.034	■	01 28 72
			50	0.027	■	01 29 72
			50	0.031	■	01 30 72
			50	0.100	■	01 31 72
			50	0.021		02 14 72
			50	0.052	■	02 15 72
			50	0.047	■	02 16 72
			30	0.038	■	04 19 72
			50	0.018		06 23 72
			20	0.030	■	06 28 72
			50	0.015		07 11 72
50	0.022		09 20 72			
30	0.011		10 18 72			
[REDACTED]	220	[REDACTED]	20	0.008		01 05 72
			20	0.023		01 24 72
			50	0.008		01 27 72
			50	0.009		01 29 72
			50	0.019		01 30 72
			50	0.014		01 31 72
			50	0.011		02 16 72
			50	0.009		03 08 72
			50	0.011		04 26 72
			50	0.011		06 23 72
			30	0.011		07 13 72
50	0.011		09 14 72			
[REDACTED]	220	[REDACTED]	30	0.017		01 12 72
			50	0.015		01 28 72

NATIONAL LEAD COMPANY OF OHIO
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BADGE NO.	COST CR CONT REF	NAME	SAMP TYPE	RESULTS MGL	RESULTS >0.025	DATE
			50	0.013		01 31 72
			50	0.005		02 15 72
			50	0.004		03 06 72
			30	0.013		04 12 72
			30	0.012		07 07 72
			50	0.011		09 05 72
			30	0.024		10 11 72
	220		30	0.007		01 12 72
			50	0.011		01 28 72
			50	0.010		01 29 72
			50	0.005		01 30 72
			50	0.012		02 14 72
			50	0.008		02 15 72
			50	0.012		02 16 72
			50	0.006		03 11 72
			30	0.025	F	04 12 72
			20	0.006		06 12 72
			50	0.003		06 24 72
			30	0.016		07 07 72
			50	0.008		09 19 72
			30	0.002		10 13 72
	220		50	0.013		01 12 72
			50	0.015		01 29 72
			50	0.020		01 30 72
			50	0.025	F	01 31 72
			20	0.021		02 09 72
			50	0.019		02 15 72
			50	0.014		02 16 72
			50	0.035	F	02 17 72
			50	0.014		03 10 72
			30	0.007		04 10 72
			30	0.009		07 06 72
			50	0.007		09 08 72
			30	0.012		10 09 72
	220		30	0.039	F	01 21 72
			59	0.160	F	01 26 72
			50	0.029	F	01 27 72
			50	0.037	F	01 28 72
			50	0.013		01 30 72
			50	0.038	F	02 15 72
			50	0.040	F	02 16 72
			50	0.043	F	02 17 72
			50	0.017		03 15 72
			30	0.014		04 24 72
			30	0.009		07 14 72
			20	0.018		08 22 72
			50	0.016		09 11 72
			30	0.011		10 24 72

NATIONAL LEAD COMPANY OF OHIO
 CUMULATIVE MONTHLY ANALYSIS REPORT
 MONTH ENDING 10 31 72

BAGGF NO.	COST OF CONT. COP.	NAME	SAMP TYPE	RESULTS PPM	RESULTS >0.025	DATE
[REDACTED]	220	[REDACTED]	30	0.004		01 25 72
			50	0.130	□	01 28 72
			50	0.037	□	01 31 72
			50	0.034	□	02 16 72
			50	0.026	□	02 17 72
			50	0.019		03 08 72
			30	0.013		04 26 72
			30	0.009		07 14 72
			20	0.003		10 13 72
			30	0.005		10 30 72
[REDACTED]	220	[REDACTED]	30	0.020		01 20 72
			50	0.025	□	01 24 72
			50	0.047	□	01 29 72
			50	0.120	□	01 30 72
			50	0.037	□	01 31 72
			50	0.065	□	02 15 72
			50	0.024		02 16 72
			50	0.033	□	02 17 72
			50	0.015		03 11 72
			50	0.014		04 22
			20	0.036	□	06 14
			30	0.022		07 12
			50	0.025	□	09 24
			30	0.031	□	10 23
[REDACTED]	220	[REDACTED]	30	0.005		01 12
			30	0.024		01 27
			50	0.055	□	01 28
			50	0.013		01 31
			50	0.190	□	02 14
			50	0.007		02 15
			30	0.004		04 02 72
			50	0.008		06 23 72
			50	0.003		07 03 72
			20	0.007		07 07 72
			50	0.006		09 07 72
			30	0.009		10 04 72
[REDACTED]	220	[REDACTED]	30	0.005		01 04 72
			50	0.008		01 27 72
			50	0.010		01 28 72
			50	0.010		02 14 72
			50	0.005		02 15 72
			50	0.010		02 16 72
			50	0.005		03 10 72
			30	0.004		04 04 72
			50	0.001		06 23 72
			50	0.005		09 12 72
			20	0.004		09 18 72

NATIONAL LEAD COMPANY OF OHIO
 CUMULATIVE MONTHLY URINALYSIS REPORT
 MONTH ENDING 10 31 72

RADGE NO.	COST CENT	OR OFF	NAME	SAMP TYPE	RESULTS MGL	RESULTS >0.025	DATE
				30	0.005		10 03 72
	220			30	0.023		01 11 72
				50	0.140	□	01 27 72
				50	0.034	□	02 10 72
				50	0.030	□	02 14 72
				50	0.030	□	02 15 72
				50	0.031	□	02 16 72
				50	0.021		03 10 72
				30	0.020		04 11 72
				50	0.013		04 12 72
				20	0.011		04 24 72
				30	0.015		07 07 72
				50	0.009		09 22 72
				30	0.023		10 10 72
	220			30	0.100	□	01 13 72
				3R	0.030	□	01 17 72
				3R	0.047	□	01 18 72
				3R	0.031	□	01 19 72
				50	0.056	□	01 28 72
				50	0.043	□	01 29 72
				50	0.110	□	01 30 72
				50	0.043	□	01 31 72
				50	0.043	□	02 15 72
				50	0.069	□	02 16 72
				50	0.052	□	02 17 72
				50	0.021		03 07 72
				50	0.009		03 15 72
				20	0.008		03 27 72
				30	0.038	□	04 13 72
				49	0.210	□	06 08 72
				40	0.019	□	06 09 72
				40	0.024	□	06 12 72
				50	0.031	□	07 07 72
				50	0.005		09 06 72
				30	0.013		10 16 72
	220			30	0.011		01 07 72
				50	0.110	□	01 28 72
				50	0.059	□	01 31 72
				50	0.072	□	02 16 72
				50	0.061	□	02 17 72
				50	0.022		03 11 72
				20	0.034	□	03 20 72
				30	0.007		04 12 72
				50	0.007		07 05 72
				50	0.008		09 29 72
				50	0.018		10 05 72
	220			30	0.034	□	01 21 72

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NATIONAL LEAD COMPANY OF OHIO
 CUMULATIVE MONTHLY ANALYSIS REPORT
 MONTH ENDING 10 31 72

BADGE NO.	COST OR CONT ORF	NAME	SAMP TYPE	RESULTS MCL	RESULTS >0.025	DATE
			50	0.027	☐	01 27 72
			50	0.017		01 30 72
			50	0.035	☐	01 31 72
			50	0.018		02 14 72
			30	0.013		04 21 72
			50	0.090	☐	06 23 72
			50	0.015		06 29 72
			30	0.016		07 12 72
			20	0.008		10 03 72
			30	0.010		10 23 72
	220		30	0.020		01 10 72
			50	0.039	☐	01 27 72
			50	0.027	☐	01 28 72
			50	0.031	☐	01 29 72
			50	0.027	☐	01 30 72
			50	0.030	☐	01 31 72
			50	0.032	☐	02 14 72
			50	0.035	☐	02 15 72
			50	0.039	☐	02 16 72
			50	0.018		03 07 72
			30	0.011		04 10 72
			50	0.011		06 28 72
			30	0.016		07 07 72
			50	0.008		09 06 72
			30	0.005		10 06 72
	220		30	0.057	☐	01 24 72
			3R	0.041	☐	01 26 72
			3R	0.016		01 27 72
			3R	0.041	☐	01 28 72
			50	0.034	☐	02 14 72
			50	0.018		02 15 72
			50	0.031	☐	02 16 72
			30	0.004		04 25 72
			50	0.009		06 26 72
			30	0.010		07 13 72
			50	0.005		09 08 72
			20	0.008		09 26 72
			30	0.009		10 25 72
	220		30	0.024		01 03 72
			50	0.015		01 27 72
			50	0.027	☐	01 28 72
			50	0.042	☐	01 29 72
			50	0.022		01 30 72
			50	0.026	☐	01 31 72
			50	0.004		02 14 72
			50	0.017		02 15 72
			50	0.023		02 16 72
			30	0.007		04 05 72

MINERAL LEAD COMPANY OF OHIO
 CUMULATIVE MONTHLY URINALYSIS REPORT
 MONTH ENDING 10 31 72

BADGE NO.	COST OR COST	OR REP	NAME	SAMP TYPE	RESULTS UGL	RESULTS >0.025	DATE
				50	0.021		06 23 72
				30	0.005		07 03 72
				30	0.005		09 19 72
				30	0.003		10 11 72
	220			30	0.190	□	01 18 72
				59	0.660	□	01 20 72
				39	0.470	□	01 21 72
				3R	0.200	□	01 22 72
				3R	0.260	□	01 23 72
				3R	0.240	□	01 24 72
				50	0.210	□	01 27 72
				50	0.150	□	01 28 72
				50	0.200	□	01 29 72
				50	0.110	□	01 30 72
				50	0.280	□	01 31 72
				50	0.240	□	02 04 72
				50	0.200	□	02 05 72
				50	0.110	□	02 06 72
				50	0.170	□	02 07 72
				50	0.055	□	02 08 72
				50	0.160	□	02 09 72
				50	0.053	□	02 11 72
				50	0.210	□	02 12 72
				50	0.120	□	02 13 72
				50	0.020	□	02 14 72
	220			30	0.037	□	01 03 72
				30	0.120	□	01 28 72
				50	0.034	□	01 29 72
				50	0.120	□	01 30 72
				50	0.120	□	01 31 72
				50	0.043	□	02 14 72
				50	0.020	□	02 15 72
				50	0.100	□	02 16 72
				30	0.021	□	03 06 72
				30	0.022	□	04 03 72
				20	0.016	□	06 14 72
				50	2.850	□	06 23 72
				50	0.220	□	06 24 72
				50	0.440	□	06 30 72
				30	0.170	□	07 03 72
				50	0.031	□	08 31 72
				50	0.016	□	10 24 72
	220			30	0.026	□	01 07 72
				30	0.022	□	01 27 72
				50	0.032	□	01 28 72
				50	0.016	□	01 31 72
				50	0.045	□	02 14 72
				50	0.024	□	02 15 72

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INDUSTRIAL LEAD COMPANY OF OHIO
 CUMULATIVE MONTHLY URINALYSIS REPORT
 MONTH ENDING 10 31 72

BAUFE NO.	COST OR CONT REP	NAME	SAMP TYPE	RESULTS MGL	RESULTS >0.025	DATE
			30	0.004		04 07 72
			20	0.015		04 19 72
			50	0.013		06 23 72
			30	0.014		07 07 72
			50	0.006		09 22 72
			30	0.030	■	10 09 72
	220		50	0.013		02 20 72
			50	0.005		02 21 72
			30	0.014		04 23 72
			50	0.003		06 23 72
			30	0.008		07 14 72
			50	0.002		09 18 72
	220		30	0.019		01 03 72
			50	0.025	■	01 27 72
			50	0.014		01 30 72
			50	0.035	■	01 31 72
			50	0.063	■	02 14 72
			50	0.023		02 16 72
			30	0.006		04 04 72
			20	0.023		04 17 72
			50	0.004		06 24 72
			30	0.015		07 03 72
5000			00	.		01 72 72

220

30	0.190	□	01 18 72
59	0.660	□	01 20 72
59	0.470	□	01 21 72
3R	0.200	□	01 22 72
3R	0.260	□	01 23 72
3R	0.240	□	01 24 72
50	0.210	□	01 27 72
50	0.150	□	01 28 72
50	0.200	□	01 29 72
50	0.110	□	01 30 72
50	0.280	□	01 31 72
50	0.240	□	02 04 72
50	0.200	□	02 05 72
50	0.110	□	02 06 72
50	0.170	□	02 07 72
50	0.055	□	02 08 72
50	0.160	□	02 09 72
50	0.053	□	02 11 72
50	0.210	□	02 12 72
50	0.120	□	02 13 72
50	0.020	□	02 14 72

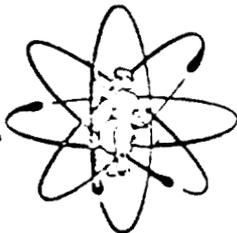
NATIONAL LEAD COMPANY OF OHIO
 CUMULATIVE MONTHLY URINALYSIS REPORT
 MONTH ENDING 10 31 72

PAGE NO. 043

BADGE NO.	COST OR CONT GRP	NAME	SAMP TYPE	RESULTS MGL	RESULTS >0.025	DATE
			50	0.250	□	02 15 72
			50	0.260	□	02 16 72
			50	0.065	□	03 07 72
			50	0.100	□	03 09 72
			50	0.040	□	03 10 72
			30	0.069	□	04 19 72
			3R	0.032	□	04 20 72
			3R	0.021	□	04 21 72
			3R	0.031	□	04 24 72
			50	0.050	□	06 23 72
			50	0.053	□	06 29 72
			30	0.033	□	07 11 72
			30	0.003	□	10 16 72
			30	0.013	□	11 18 72

1114903

NATIONAL LEAD COMPANY OF OHIO



P. O. BOX 39158

CINCINNATI, OHIO 45239

SEP 1 1972

5792

Mr. C. A. Keller, Director
 Uranium Enrichment Division
 U. S. Atomic Energy Commission
 Oak Ridge Operations
 P. O. Box E
 Oak Ridge, Tennessee 37830

SUBJECT: INDUSTRIAL HYGIENE CONCERNS IN REFINERY OPERATION

Dear Mr. Keller:

We wish to advise that prompt action was taken following the report to us on August 25, 1972 of the ORO Industrial Hygiene and Radiation Protection Survey team.

By way of background, we have been working on problems in this area for some time, guided by reports from our Health and Safety Division, including frequent consultations and reviews among Health and Safety and Production personnel. A potential problem was recognized in January, 1972 and corrective actions were initiated to reduce exposures. Although some improvement was achieved, the survey team's review confirmed the need for taking more drastic action.

From a health protection standpoint we are guided by urinalyses and in vivo body counts. Our procedure is to record urinalyses in our EDP system, and "flag" analyses above 0.024 mg U/liter. Individuals showing 0.04 or higher for start-of-shift samples are "recalled" for additional specimens. We have been routinely checking all Refinery personnel by taking a specimen during a one-month period in each quarter. At the suggestion of the survey team, the specimens will, in the future, be taken throughout the entire quarter.

1114904

During their visit, the survey team reviewed a urinalysis report which listed all 1972 results obtained up to July 31. That record shows that ten out of 32 Refinery workers never exceeded the recall level of 0.04 mg U/liter, but others did have high results in January and February. The highest start-of-shift result during this period was 1.5 mg U/liter. This chemical operator's in vivo count in March was 67% of the Maximum Permissible Lung Burden (MPLB). In August, his in vivo count was 27% MPLB.

From May through July, urine results were considerably better, with 26 of the 32 not exceeding the recall level. One chemical operator who was involved in cleanup of a severe spill, had a single result of 2.85 mg U/liter. In March, his in vivo count was 28% MPLB and in August it was 52% MPLB.

We have recognized the immediate need for increased emphasis on proper operation, good housekeeping, and proper maintenance of equipment; accompanied by close industrial hygiene monitoring. I met with Production and Maintenance personnel on August 25, 1972 to take immediate action in these areas, and a thorough cleanup of the entire area was completed by August 28, 1972. On August 28 additional maintenance craftsmen and supervision were assigned to the Refinery area. Overtime will be approved if necessary.

Longer range actions are also required. Shortcomings in ventilation and total dust control, particularly in the digestion and denitration areas have been recognized for years; engineering studies have been made; and construction proposals have been submitted on occasion. A combination of uncertainty of future operations, limited capital funds, and acceptance of a "make-do" philosophy under these circumstances narrowed the scope and degree of those improvements which were made. At least two such engineering studies were revived several weeks ago, and on August 28, 1972 I met with our Director of Engineering to request early completion of these studies and preparation of construction proposals if indicated. He and members of his staff met with production personnel on August 29, 1972 to review these items, and jointly determine what additional engineering studies may be required.

On August 30, 1972 the Assistant Manager and I met with the Director of Health and Safety, the General Superintendent, and the Director of Engineering to review actions to date, and plans for achievement of short and long range objectives. Production and Engineering details are attached. We are taking a similar approach to the recommendations for improvements in the Scrap Recovery Plant operations.

1114905

OFFICIAL USE ONLY

We believe that the verbal report of the survey team has made it possible to take immediate actions and formulate plans which will satisfy all of the recommendations in their forthcoming report. If there are additional recommendations, they will be acted upon promptly.

We will keep you advised of our progress.

Sincerely yours,



M. S. Nelson
Manager

MSN/rz:rb

Attachment

cc: S. F. Audia
J. M. Ciborski
P. G. DeFazio
C. L. Karl
J. A. Quigley

PRODUCTION DETAILS

Actions initiated on August 25, 1972:

1. Made a complete cleanup in the Refinery Digestion and Denitration areas.
2. Stopped all leaks in conveyor systems and bins by use of clamps and gaskets, or with tape as a temporary expedient.
3. Reinstucted supervisors and operators to inspect each shift for dusty conditions and to take appropriate action.
4. Reinstucted operators to follow SOP and instructions on dumping, packaging and use of respirators.
5. Job Orders and Minor Work Requests issued on items that cause dust or spills are to be classed as Safety Items.
6. Gulping tools to be placed in 30 gallon drums after use.
7. Safety showers and eye bubblers to be checked regularly.
8. Cleaning of floors and unplugging of conveyors will be done by use of vacuum or use of water hose.

ENGINEERING DETAILSI. Mechanical Items Currently in Progress

1. Inspect, test and repair where required all Refinery eye bubblers.
2. Inspect, test and repair where required all safety showers.
3. Inspect and repair screw conveyor covers. Regasket where required. Install more positive clamping devices for easy access for inspections.
4. Investigate dust leakages and eliminate sources of leaks.

ENGINEERING DETAILS (Cont.)

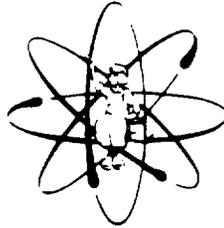
II. Engineering Projects Either Completed or Currently Being Processed

1. J. O. H-8555 - Feed-in Conveyors - Cold Side Bucket Elevators
(D-B approval received from ORO 8/28/72)
2. Reduction of airborne dusts - Refinery
(Inspections made. Traverses of dust collectors and scrubbers in Digestion Area under way. Similar inspections are being made in Denitration.)

III. Long Range Refinery Improvements

1. Redesign drum dumpers and doors and interlock with conveying system.
2. Provide a better and more efficient method for removing drum lids. Method must contain adequate dust ventilating system.
3. Review present materials handling system on north side of Refinery. If possible, elimination of conveyors, elevators and surge bins will be desirable.
4. Investigate and eliminate dust leakages throughout the entire packaging system from top to bottom, must include Williams Mill. System must be totally enclosed with adequate dust and fume control equipment.
5. Investigate and propose changes for a more efficient gulping system.
6. Review and recommend changes for improvements to entire plant make-up heated air system.

NATIONAL LEAD COMPANY OF OHIO



P. O. BOX 39158

CINCINNATI, OHIO 45239

NOV 1 1972

7051

Mr. C. A. Keller, Director
Uranium Enrichment Division
Oak Ridge Operations Office
U. S. Atomic Energy Commission
P. O. Box E
Oak Ridge, Tennessee 37830

Subject: IMPLEMENTATION OF APPRAISAL RECOMMENDATIONS

Reference: 1) C. A. Keller to M. S. Nelson, "Annual Health Protection Appraisal of WLO, 1972," 9/22/72
2) M. S. Nelson to C. A. Keller, "Industrial Hygiene Concerns in Refinery Operation," 9/1/72

Dear Mr. Keller:

The Health Protection Appraisal Report transmitted with reference letter (1) contained five recommendations. Actions have been taken to begin implementation of all items. Following are our comments regarding the recommendations:

1. Monitoring extremity exposures. Continuous monitoring of extremity exposures will begin in Plant 5 remelt area in November. This is the only area where preliminary tests indicated exposures might exceed 50% of the annual guide.

At the time of the appraisal, we did not have enough badges or information to immediately implement the recommendation. Additional badges were ordered, received, and altered to reduce the chance of contamination. Additional information was gained with a test in Plant 5 B Area. Employees wore a badge on each wrist for a four-week period. Doses recorded by the right and left dosimeters were similar and indicate that one badge will be adequate for routine use. Because of the importance of this decision, B Area employees will again have a badge on each wrist

1114909

during the first month of the continuous monitoring program. Frequent checks will be made to insure that the proper badge is on each wrist. If results are similar to those obtained with the four-week test, only one badge per man will be used in B Area in the future.

As recommended in the appraisal report, we will continue the periodic monitoring of employees whose exposures may exceed 10% of the annual guide.

2. Urine samples. At the present time, Refinery chemical operators are submitting samples on a monthly basis, even though the Refinery is at a low production rate. This urinalysis schedule will be continued until there is clear evidence that high exposures are not occurring during periods of increased production. When this group is returned to a quarterly schedule, the collections will be spread out over the entire quarter, as recommended.
3. Contamination clean-up. The contamination which prompted this recommendation was immediately removed following the appraisal. Since that time, Refinery equipment has received a maintenance overhauling to reduce the possibility of dust dispersal. Instructions have been given by Production Division supervisors to immediately halt operations when dust generation develops. In meetings with operating personnel, Production supervisors have stressed the need for immediate clean-up of spills and the necessity of carrying out that clean-up in a manner which minimizes personnel exposures.

A summary of actions taken and planned was listed in reference letter (2).
4. Signs - hearing protection. Warning signs noting the mandatory use of ear protectors have been ordered. Arrangements have been made to have the signs posted at those work stations where protection is required.
5. OSHA respiratory protection requirements. This item is being covered in the general review of OSHA standards being made at your request. When that review is complete, our respirator program will be modified as recommended.

Sincerely yours,
Original Signed By
M. S. NELSON
Manager
M. S. Nelson
Manager

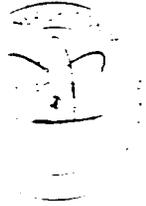
MWB/vvs

1114910

cc: C. A. Keller - 2x
S. F. Audia
P. G. DeFazio
C. L. Karl
J. A. Quigley, M.D.

Central Files

1114911



UNITED STATES
ATOMIC ENERGY COMMISSION
DOMESTIC OPERATIONS
PO BOX 8
OAK RIDGE, TENNESSEE 37831

July 18, 1973

National Lead Company of Ohio
ATTN: Mr. M. S. Nelson, Manager
Post Office Box 39158
Cincinnati, Ohio 45239

Gentlemen:

ANNUAL HEALTH PROTECTION APPRAISAL OF NLO, 1973

The annual health protection appraisal of NLO was conducted on May 24, 25, and 30, 1973, by a member of the ORO Safety and Environmental Control Division. The findings were discussed with NLO and CAO representatives at that time.

Enclosed are six copies of the formal report of the appraisal. You may proceed with implementation of the recommendations unless there are sound reasons why they are not warranted. In any event, your comments with regard to the conduct of the appraisal, the general content of the report, and the detailed plans for implementing or otherwise handling the recommendations are requested by August 24, 1973.

The cooperation extended by members of your staff during the appraisal is appreciated.

Sincerely,

Charles A. Keller
Charles A. Keller, Director
Uranium Enrichment Operations Division

OSH:TMJ

Enclosure:
Appraisal Report (6 cys)

cc w/encl:
C. L. Karl, CAO
D. A. Horsewood, O&P, OR
W. H. Travis, Safety, OR

1114912

HEALTH PROTECTION APPRAISAL
NATIONAL LEAD COMPANY OF OHIO

MAY 1973

BY

T. M. JELINEK

1114913

I. Purpose and Scope

The annual health protection appraisal of NLO was conducted by a member of the Health Protection Branch, Safety and Environmental Control Division, ORO, on May 24, 25 and 30, 1973. Emphasis was placed on the followup to last year's recommendations and to NLO's compliance with AEC Manual Chapter requirements in the areas of health physics and industrial hygiene.

II. Summary

NLO's health protection program continues to be satisfactory. Previous recommendations made as a result of poor contamination control in the refinery plant have been satisfactorily implemented. Housekeeping conditions in the refinery were much improved; however, continued efforts toward prompt cleanup is necessary. Extremity radiation exposure monitoring continues to improve. Additional emphasis on the control of toxic materials, particularly asbestos, is required. Management support is judged to be good.

Detailed comments and recommendations were presented to NLO management at the conclusion of this appraisal.

III. Recommendations

A. Recommendations of the 1972 Appraisal

1. Regarding extremity radiation exposure monitoring, present data indicate improvement in exposure assessment. Periodic, versus continuous, monitoring may be sufficient. Implementation of the recommendation is satisfactory.
2. Regarding urine sample collection frequency for the Chemical Operator group, the recommendation has been satisfactorily implemented. Refinery Chemical Operators should continue on a monthly urinalysis schedule during periods of increased production.
3. Regarding conditions within the refinery and recovery plants, substantial improvement has been noted. Continued effort toward prompt contamination cleanup is required. Implementation of the recommendation is satisfactory.

4. Regarding posting of mandatory ear protection areas, this has been accomplished.
5. Regarding respiratory protection programs to comply with OSHA requirements, implementation is incomplete. Further discussion of this matter is contained in the ORO review of NLO's report of OSHA compliance.

B. Recommendations Resulting from this Appraisal

1. It is recommended that a method be established whereby the Industrial Hygiene Department is notified prior to the installation, removal, or demolition of materials containing asbestos so that proper protection and monitoring can be provided.
2. It is recommended that the program for control of toxic materials include the dissemination to chemical users of information regarding toxicity, safety precautions, and appropriate immediate first aid measures for the material which they use.
3. It is recommended that ORO be put on distribution for future changes to the NLO Health and Safety Manual.
4. It is recommended that increased emphasis be placed on the measurement of the levels of toxic materials to which employees are being exposed to assure that exposure in excess of applicable TLV's is precluded.

IV. Findings

A. External Radiation Exposure

Efforts are continuing to resolve the extremity radiation exposure evaluation problem at NLO. Several modifications have been made to the film holding device to reduce the contribution to the radiation exposure from contamination. The latest efforts indicate that the maximum annual exposure is approximately 22 Rem to the wrist. Following the ORO guidance given last year,

this would mean that approximately 120 employees will require periodic monitoring for exposure assessment. No employee would be required to be continuously monitored. Best judgment indicates that the exposure assessment is conservative since contamination inside the film holder is not accurately accounted for and low energy gamma rays from uranium daughters are not accounted for in the film calibration technique. These low energy gammas (60-90 Kev), if not accounted for in calibration, produce excessive film darkening which, in turn, is interpreted as a larger exposure than has actually occurred.

Extremity exposures to employees with the highest exposure potential should continue to be closely evaluated. If trends indicate increasing exposures, continuous monitoring should be resumed.

Current records indicate that whole body radiation exposures continue to be well within the requirements of AECM-0524.

B. Internal Radiation Exposure

The latest in vivo counting data indicate that three employees have lung burdens in excess of 50% of the maximum allowable lung burden. This contrasts with twelve employees exceeding the 50% lung burden last year. Two other employees registered high counts during the last counting period, but these were attributed to thorium in the lung without sufficient time since removal from thorium operations. The thorium operations in the pilot plant were to be completed by June 15, 1973, and new counts will be made on these two employees during the next in vivo counter visit.

Urinalysis data were reviewed for the time period since the last appraisal. Elimination of uranium via the urine has been greatly reduced, particularly among the refinery workers. Few samples contained uranium in excess of the plant recall limit, most of those being from one employee who was later found to be performing a job incorrectly and was thereby being exposed unnecessarily. Exposure was not significant, however.

Refinery chemical operators are continuing on a monthly urine sample schedule. Other chemical operators on the urine program continue on a quarterly schedule. Since production in the refinery will increase considerably for the remainder of this year, that group of chemical operators should continue on a monthly urinalysis schedule.

C. Plant Tour

Tours of the plant areas were made on two occasions during this appraisal. In general, housekeeping had greatly improved from that noted in last year's appraisal. Equipment appeared to be kept in satisfactory operating condition in that closure bolts and gaskets were properly utilized in the refinery. Lack of noticeable contamination in the refinery plant was also noted. Safety equipment, such as safety showers and eye washers, was operating properly. In the upper levels of the refinery, a pungent odor was detectable and light vapor or mist could be seen in the air. This condition was attributed to an open port on a blend tank. Several bottles or glass vials of chemicals were stored in the refinery without proper labeling. In plant 1, a bottle labeled "acetone" contained something other than acetone.

During a return, unannounced visit to the refinery plant, contamination of the screw conveyor area was readily evident. Radioactive material could be seen on top of and beneath the conveyor; material was evident on the walls and door jamb; contaminated rodding tools were left near the doorway. It was obvious that insufficient attention was given to clean-up following equipment clogging and unplugging. Again, a general misty condition was noted in the upper levels of the refinery. The odor of ammonia and other organics was evident. Investigation attributed the condition to an open port on the F1-26 feed preparation tank.

Also during this second visit to the refinery, a brick-mason was observed replacing the firewall around a denitrating pot. The replacement material was 85% magnesia and up to 15% asbestos. There was a heavy concentration of airborne dust in the area as well as

substantial accumulations of scrap on the floor. No protective equipment had been provided to the worker. No evaluation of the hazard of the operation had been performed. Steps were immediately taken to provide the proper protective equipment and to obtain samples of the airborne concentration of asbestos. To preclude incidents such as this in the future, it is recommended that a method be established whereby the Industrial Hygiene Department is notified prior to the installation, removal, or demolition of materials containing asbestos so that proper protection and monitoring can be provided. (See recommendation 1)

D. Refinery Ventilation Projects

Partially as a result of last year's appraisal, three ventilation improvement projects have been authorized for the refinery. These projects consist of upgrading the refinery makeup air supply, enclosing and ventilating the packaging station, and improving ventilation in the digestion area. These projects amounting to about \$250,000 are scheduled for completion later this calendar year.

E. Control of Toxic Materials

NLO has recently prepared a new section for the Health and Safety Manual entitled "Control of Toxic Chemicals and Radioactive Sources." The program established by this document is acceptable and should enhance the safety of NLO operations utilizing toxic chemicals. A major part of such program should, however, be the dissemination to chemical users of information regarding toxicity, safety precautions, and appropriate immediate first aid measures for the material being used. It is recommended that this important facet of chemical safety be incorporated in the NLO program. (See recommendation 2). Considering the several observations made earlier of improperly labeled or stored chemicals, NLO should increase its efforts to assure proper labeling and disposal of unneeded chemicals.

It is ORO's desire to be fully informed of changes or additions to documentation which describes the safety programs in effect at its contractor plants. It is, therefore, recommended that ORO be put on distribution for future changes to the NLO Health and Safety Manual. (See recommendation 3)

F. Monitoring Programs

NLO does not now have established routine field monitoring programs to determine exposure of employees to toxic chemicals other than radioactive materials. NLO's operations are such that potential employee exposure to solvents, acids, hydrocarbons, nitrogen oxides, and other materials, is generally well controlled by ventilation systems or remote operations. However, it is becoming increasingly important to demonstrate, through the actual evaluation of employee exposure, that such systems are indeed performing properly to preclude exposure in excess of applicable threshold limit values (TLV's). To accomplish this task, it may be necessary to refine both sampling and analytical techniques and capabilities at NLO. It may also be necessary to increase the present staff level to accommodate the increased workload. It is recommended that increased emphasis be placed on the measurement of the levels of toxic materials to which employees are being exposed to assure that exposure in excess of applicable TLV's is precluded. (See recommendation 4). A similar recommendation has been made as a result of the recent ORO review of OSHA compliance at NLO. This is documented elsewhere.

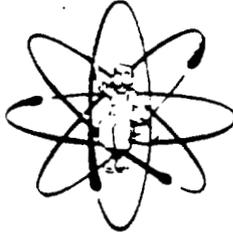
G. Noise

The control of employee exposure to noise through the application of engineered solutions continues to be pursued at NLO. Significant reductions in noise levels have been obtained in the metals plant, even though ear protection is still required in many areas. Use of ear protection devices is audited on an unannounced basis at

least once per month. Employee use of protective devices has been excellent. The hearing conservation program continues to be excellent and is judged to be in compliance with programs required by the DOL Occupational Safety and Health Standards.


Thomas M. Jelonek
Health Physicist

NATIONAL LEAD COMPANY OF OHIO



P. O. BOX 39158

CINCINNATI, OHIO 45239

AUG 9 1973

4759

Mr. C. A. Keller, Director
Uranium Enrichment Operations Division
Oak Ridge Operations Office
U. S. Atomic Energy Commission
P. O. Box E
Oak Ridge, Tennessee 37830

Dear Mr. Keller:

ANNUAL HEALTH PROTECTION APPRAISAL OF NLO, 1973

Ref: Letter, C. A. Keller to M. S. Nelson, same subject, 7/18/73

We have begun to implement the four recommendations contained in the report transmitted with the reference letter. Here's what we have done and plan to do. The recommendation numbers are those used in Mr. Jelinek's report.

Recommendation B.1. Compliance with this recommendation consists of the following actions:

1. During the next six months the Mechanical Department will inform the IH&R Department of all day-shift jobs involving the use of asbestos-containing material. IH&R will observe this work and collect air samples to determine the concentration of airborne asbestos.
2. Employees will wear respirators during the removal of asbestos-containing materials such as cements and insulation. Ventilation will be used to control airborne asbestos in locations such as manholes where respirators might seriously interfere with safe movement.
3. The Mechanical Department has begun a review of specifications for insulation and insulating cement. The object will be to find acceptable substitutes which do not contain asbestos.

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AUG 13 1973

4. The IH&R Department will hold sessions with Mechanical Department foremen to discuss recommended procedures for work with asbestos-containing materials.

Recommendation B.2. As one means of providing accessible data regarding toxic materials, the Library has updated a collection of Chemical Safety Data Sheets published by the Manufacturing Chemists Association. A list of the 99 currently available sheets has been distributed to supervisory personnel. These data sheets include information on the topics specified in the recommendation.

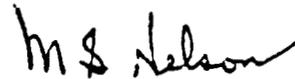
Chemical safety pamphlets published by NIOSH have been considered for plant-wide distribution. None are appropriate for this site. We will continue to look for handout materials published by health protection agencies.

Through a series of reviews, the IH&R Department has opportunities to learn of processes or purchases warranting renewed dissemination of toxicity data. These include the review of Idea Letters, Construction Proposals, Job Order Requests, Job Orders, Maintenance Status Reports, Plant Test Authorizations, Standard Operating Procedures, and Purchase Orders.

Recommendation B.3. Mr. Jelinek was given an up-to-date copy of our Health & Safety manual prior to the conclusion of his appraisal. Copies of future revisions will be provided.

Recommendation B.4. The recommended air sampling has begun. In the Refinery, exposures to nitrogen dioxide continue to be well under the TLV of 5 ppm. Exposures to trichloroethylene at the Plant 6 vapor degreaser are within the TLV of 100 ppm. Additional sampling for other contaminants will be done. Some sampling will be repeated during cold weather when different ventilation conditions prevail. Sampling will be done with indicator tubes whenever possible to minimize the increased workload. More reliable techniques will be used to substantiate results near the TLV values.

Sincerely yours,



M. S. Nelson
Manager

MWB/vvs

cc: C. A. Keller
S. F. Audia
P. G. DeFazio
W. C. Hill
H. Martin
J. A. Quigley, M.D.

Central Files

1114922



UNITED STATES
ATOMIC ENERGY COMMISSION
URANIUM ENRICHMENT OPERATIONS
DIVISION
KAMMERLIND, TENNESSEE 37430

August 22, 1974

National Lead Company of Ohio
ATTN: Mr. M. S. Nelson, Manager
Post Office Box 39158
Cincinnati, Ohio 45239

Gentlemen:

ANNUAL HEALTH PROTECTION APPRAISAL OF NLO, 1974

The annual health protection appraisal of NLO was conducted on June 4-6, 1974, by members of the ORO Safety and Environmental Control Division. The findings were discussed with NLO representatives at that time.

Enclosed are six copies of the formal report of the appraisal. You may proceed with implementation of the recommendations unless there are sound reasons why they are not warranted. In any event, your comments with regard to the conduct of the appraisal, the general content of the report, and the detailed plans for implementing or otherwise handling the recommendations are requested by September 20, 1974.

The cooperation extended by members of your staff during the appraisal is appreciated.

Sincerely,

Charles A. Keller
Charles A. Keller, Director
Uranium Enrichment Operations Division

OSH:WTT

Enclosure:
Appraisal Report (6 cys)

cc w/encl:
C. L. Karl, USAEC, Cincinnati
D. A. Horsewood, O&P, OR
W. H. Travis, Safety, OR
J. H. Hill, AMO, OR

1114923

USAEC-ORO

HEALTH PROTECTION APPRAISAL
NATIONAL LEAD COMPANY OF OHIO

JUNE 1974

by

WILLIAM T. THORNTON

ROBERT W. POE

1114924

I. Purpose and Scope

The annual health protection appraisal of NLO was conducted by members of the Health Protection Branch, Safety and Environmental Control Division, on June 4-6, 1974. The areas covered were the health physics, industrial hygiene, and medical programs. Particular emphasis was given to personnel exposure to radiation, chemical toxicants, procedures for handling health and safety related employee complaints, and the NLO respirator program.

II. Summary

The overall NLO health protection program continues to be adequate. Exposure to internally deposited uranium appears to be increasing and clarification of control action criteria and work restriction procedures is required to assure compliance with AEC guides. Extremity exposure monitoring programs must be strengthened in view of observed exposure levels and the anticipated reduction in the permissible forearm exposure. Program areas are identified in the report where documentation of survey records is marginal. Specific recommendations are made to improve the program in these areas.

III. Recommendations

A. Implementation of Recommendations from the 1973 Appraisal

1. Regarding Asbestos Work

Last year it was recommended that a method be established for the IH&R Department to be notified prior to the installation, removal, or demolition of materials containing asbestos so that proper protection and monitoring could be provided. Since that time, NLO has taken positive steps to preclude the purchase of new materials bearing asbestos. However,

local exhaust systems used to prevent exposure to toxic materials. This matter is further discussed in Section IV.F. and a followup recommendation is made in Section III.B.6.

B. Recommendations Resulting from this Appraisal

1. It is again recommended that a method be established whereby the IH&R Department is notified prior to the installation, removal, or demolition of materials containing asbestos so that proper protection and monitoring can be provided. (See Section III.A.1.)
2. It is recommended that employees with extremity exposure potential, i.e., those working in Plants 5 and 9 remelt areas, be provided extremity monitoring continuously.
3. It is recommended that action levels and work restrictions arising from indicated internal exposure to uranium exceeding the action level be formalized. Action levels should be selected so as to prevent exposure in excess of 0524 guides.
4. It is recommended that increased emphasis be given to maintaining current information on the inventory of sealed sources and assuring prescribed leak checks are made and documented.
5. It is recommended that a program for registering radiation producing equipment, e.g., X-ray machines, X-ray diffraction units, radiography units, etc., be formalized to include preoperational review and periodic inspection by the IH&R Department.

6. It is recommended that all ventilation systems installed to protect employees against exposure to toxic materials be identified. The minimum acceptable air flow should be specified and periodically checked. Confirmation of the adequacy of each system should be documented by appropriate TLV measurements.

IV. Findings

A. External Radiation Monitoring

The most significant external radiation exposure at NLO relative to AECM-0524 guides results from metal remelt operations in Plants 5 and 9 and involves extremity exposure. During CY-1973, twenty-four employees were monitored for two weeks during each quarter and the results extrapolated over the entire quarter. The average annual exposure was 10 Rem in Plant 5 and 13 Rem in Plant 9. Maximum exposures were 27 Rem and 31 Rem in the respective areas. The main source of exposure is crucible loading and cleaning. Badges are worn at the wrist or lower forearm.

Exposure monitoring during the first quarter of CY 1974 indicates, based on extrapolation of the two-week monitoring data, two employees in Plant 9 exceeded the quarterly extremity guide of 30 Rem. Analysis of the activities of these employees during the quarter leads NLO to question the validity of extrapolating the data in this case. Badge contamination is a problem if employees do not follow prescribed cleaning procedures. The reviewers tend to agree with the NLO evaluation; however, to preclude these

uncertainties in the future, it is recommended that employees on the extremity monitoring program be monitored continuously during the quarter. A much more rigorous program in this area will be warranted when NCRP recommendations lowering the forearm exposure guide to 30 Rem/yr are implemented in the revised AECM-0524. NLO should review its extremity exposure potential in light of this expected eventuality. (Recommendation 2)

Whole body exposure to both penetrating and non-penetrating radiation during the past year was well within the guides.

B. Internal Radiation Exposures

Employee internal exposures this year have increased over those received last year as indicated by whole body counts. Based on one count this year, 22 employees are showing lung burdens greater than fifty percent of the maximum permissible lung burden. Six employees show lung burdens of 80% of the permissible or greater. Last year 10 employees were reported as having a lung burden greater than 50% of the maximum permissible with the highest burden at 70%.

Informal actions have been taken by IH&R through employees' supervisors to restrict five of the 22 employees from jobs having potential exposure to airborne uranium. The other employees have been reassigned to work within other areas which will lessen their exposure potential to uranium. It is felt, however, that actions taken to restrict employees from exposure should be formalized. Such actions should become part of the employees radiation record especially when the exposure is approaching guide levels. Therefore, it is recommended that action levels and work restrictions arising from indicated internal exposure to uranium exceeding the action level be formalized. (Recommendation 3)

During September 1973 an employee was found to exceed the range of the in vivo counter. Medical radioisotopes and/or unsupported UX_1 - UX_2 daughters were suspected but NLO, as of the appraisal visit, had not taken action sufficient to confirm the significance and source of the excessive count. It was emphasized that NLO should increase its efforts to determine if the exposure is non-occupational and if it is occupational, take action to restrict further exposure until the magnitude of the exposure can be determined. ORO will follow these developments closely.

The amount of uranium excreted by employees appears to fluctuate with production; however, remains within the exposure guides.

C. Radiation Producing Equipment and Sealed Sources

The use of radiation producing devices, such as X-ray machines, X-ray diffraction units and radiography units, has decreased over the last several years. The primary use of X-ray machines is in the medical program and these machines are evaluated annually. The X-ray diffraction units, used by the analytical group, have not been evaluated by IH&R. The radiography units according to IH&R are presently in storage and have not received any evaluation during their occasional use.

There is no formal program at NLO which would require notification of IH&R of the purchase or reactivation of one of these devices. Certainly the radiation hazard associated with some of this equipment can be significant. The use

should be closely followed by IH&R including registration of each unit, and periodic surveillance and evaluation of the radiation hazard. Therefore, it is recommended that a program for registering radiation producing equipment, e.g., X-ray machines, X-ray diffraction units, radiography units, etc., be formalized and this program should also include preoperational review and periodic inspections by IH&R. (Recommendation 5)

The IH&R Department does have a formal program for surveillance of sealed sources. However, due to personnel changes and reassignments of responsibilities the program has not been implemented as prescribed. The records of IH&R sealed source evaluations indicate that they have not been performed in over twelve months. Thus, it is recommended that increased emphasis be given to maintaining current information on the inventory of sealed radioactive sources and assuring that prescribed leak checks are made and documented. (Recommendation 4)

D. Noise Abatement Program

Engineering controls continue to be emphasized by NLO in controlling noise problems. Last year considerable effort was spent in solving a noise problem in Plant 5. However, several areas remain, primarily in Plant 5 associated with casting operations, where workers are required to wear ear protection. Surveillance of these areas by IH&R staff shows that most of the workers are wearing the ear protection as required.

The IH&R uses the time weighted average (TWA) as the primary basis for prescribing ear protection. If the TWA is 90 dbA or less, ear protection is not generally prescribed. However,

there are several areas in which the TWA is slightly below 90 dbA and are closely followed by IH&R. Noise in the Plant 5 reduction area is presently the subject of an employee complaint which should be resolved by assigning the employee a different type of ear protection. Another of the areas currently being evaluated is the Refinery, denitration area, which has noise levels up to 94 dbA but a TWA less than 90 dbA.

F. Ventilation Systems

With the extensive use of chemicals at NLO, considerable reliance is placed on ventilation systems to prevent or control the exposure of employees to these chemicals. The minimum air flow needed to prevent employees exposure has only been prescribed for laboratory hoods. The general criterion for laboratory hoods is 75 linear feet per minute or greater for work involving radioactive materials in powder form, fuming, digestion or pouring of chemicals from one vessel to another. Otherwise, 50 linear feet per minute is adequate for other operations. All the laboratory hoods have been evaluated against these standards and only minor upgrading was required. The criteria for other local exhaust systems have not been developed. In fact, the adequacy of the present systems has not been determined for controlling toxins to below the threshold limit value (TLV).

In light of OSHA requirements and anticipated AEC manual chapter requirements that employees be apprised, on request, of their level of exposure to toxic material, it is imperative that a program be developed that will provide and document such determinations. Therefore, it is recommended that all

ventilation systems installed to protect employees against exposure to toxic materials be identified and the minimum acceptable air flow be specified and periodically checked. Confirmation of the adequacy of each system should be documented by appropriate TLV measurement. (Recommendation 6)

G. Respiratory Protection Program

The NLO respiratory protection program does not presently meet ANSI Z88.2 -1969. Plans are under consideration for upgrading the program to meet this standard by the end of the year. A staff member of IH&R has attended the LASL respirator training course and has been given primary responsibility for developing the program.

H. Employee Resolution Health Protection Complaints and Industrial Hygiene Injuries

Section 1 of the NLO Health and Safety Manual describes the organization and operation of plant safety committees and the method of resolving safety problems. The employee's main contacts for safety related problems are his foreman and the Union shift safety representative. Problems unsolved at this level go to higher supervision and may eventually reach the Executive Safety Committee, chaired by the Manager. This system appears to be very effective in resolving complaints.

Injuries from industrial hygiene hazards are very few at NLO. The few injuries listed in NLO's medical records had appropriate followup by the industrial hygiene staff.

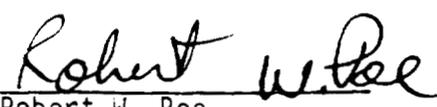
I. Staffing

In October 1973, Dr. Quigley retired as Director of the Health and Safety Division. Since that time Mr. R. C. Heatherton has been named to this position. The overall organization and staff level of the division remain the same as in past years. The IH&R, however, has added an additional industrial hygienist, D. A. Fuchs, a graduate of the University of Cincinnati. The position of Assistant Division Director is not currently filled.

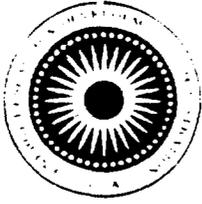
The occupational medical program is now manned by three part-time physicians, and three nurses (2 full-time and 1 part-time). The physicians are scheduled such that one works each day of the week during the day shift and on Thursdays one hour into the evening shift. Immediately after Dr. Quigley's retirement, attempts to recruit a full-time physician were made. However, this was not successful and the recruitment effort is being continued. (With the present arrangement, all day shift employees are receiving physical examinations once a year and the evening shift every sixteen months). There is also a full-time and a part-time medical technologist on the medical staff to perform all the X-ray and laboratory work.

Reviewers:


William T. Thornton
Health Physicist


Robert W. Poe
Health Physicist

1114933



August 28, 1975

National Lead Company of Ohio
ATTN: Mr. Clifford R. Chapman
Manager
Post Office Box 39158
Cincinnati, Ohio 45239

Gentlemen:

ANNUAL HEALTH PROTECTION APPRAISAL OF NLO, 1975

The annual health protection appraisal of NLO was conducted during the period June 30, 1975 - July 3, 1975, by members of the ORO Safety and Environmental Control Division. The findings were discussed with NLO representatives at that time.

Enclosed are six copies of the formal report of the appraisal. You may proceed with implementation of the recommendations unless there are sound reasons why they are not warranted. In any event, your comments with regard to the conduct of the appraisal, the general content of the report, and the detailed plans for implementing or otherwise handling the recommendations are requested by September 26, 1975. Until accomplished, the status of the recommendations, rationale for non-accomplishment in each case, and expected completion date should be reported to me every six months.

The cooperation extended by members of your staff during the appraisal is appreciated.

Sincerely,



H. Doran Fletcher, Director
Uranium Enrichment Operations Division

OSH:JTD

Enclosure:
Appraisal Report (6 cys)

cc w/encl:
C. A. Keller, AiMO
D. A. Horsewood, O&P
H. Travis, S&EC



1114934

USERDA - ORO
HEALTH PROTECTION APPRAISAL
NATIONAL LEAD COMPANY OF OHIO
JUNE 30, 1975 - JULY 3, 1975

by

ROBERT W. POE
JAMES T. DUFOUR
SAFETY AND ENVIRONMENTAL CONTROL DIVISION

1114935

I. Purpose and Scope

The annual health protection appraisal of NLO was conducted by members of the Health Protection Branch, Safety and Environmental Control Division, during the period June 30, 1975 - July 3, 1975. The subject areas of this appraisal were the health physics, industrial hygiene, and occupational medicine programs. Implementation of the recommendations resulting from the 1974 appraisal, the NLO noise program, the respiratory protection and the extremity exposure control programs were emphasized during this appraisal. The status of the NLO Water Treatment Plant was discussed with regard to meeting new EPA Regulations.

II. Summary

Overall, the NLO health protection programs continue to be adequate. Recommendations, in the industrial hygiene area, resulting from this appraisal reflect changes dictated by revisions in ERDA manual chapters and reporting requirements and a general policy of strengthening administrative controls.

In health physics, skin and extremity radiation exposures continue to be of concern. Recent changes in ERDAM-0524, which lowered these exposure limits, will necessitate reevaluation of some jobs to provide additional safeguards. Stricter compliance with existing controls will also be required by the NLO-IH&R Department to reduce exposures. The plant locations of greatest concern are Plant 5 and Plant 9 Remelt Areas.

III. Recommendations

A. Implementation of Previous Recommendations

- 73-1. It is recommended that a method be established whereby the IH&R Department is notified prior to the installation, removal, or demolition of materials containing asbestos so that proper protection and monitoring can be provided.

1114936

NLO has implemented a procedure whereby all jobs in which the materials being handled contain asbestos will be covered by a safety work permit requiring review by IH&R Department. It will then recommend appropriate work procedures and protective equipment to suit the operation in question. Since this procedure has been in effect, there have been only two minor asbestos jobs at NLO, one performed by a subcontractor and the other by NLO personnel. Respirators were worn and IH&R took air samples.

However, NLO does not have the capability to count the fiber concentration of these samples, as the amount of such work being done is too little to justify the expense of special analytical equipment. Contacts with outside laboratories have apparently been unsatisfactory. To alleviate this problem, the reviewers have arranged to have future spot samples in limited numbers analyzed by the Oak Ridge National Laboratory IH Department. Contacts should be established by IH&R to coordinate **sampling procedures and shipping methods** with N. E. Bolton or J. A. Ealy. Expeditious determinations of airborne asbestos levels associated with jobs governed by the asbestos procedures will serve to affirm the adequacy of recommended control techniques.

- 74-2. It is recommended that employees with extremity exposure potential, i. e., those working in Plants 5 and 9 Remelt Areas, be provided extremity monitoring continuously.

1114937

Since last year's appraisal, workers in Plants 5 and 9 Remelt Areas have received continuous monitoring of their extremities. This recommendation has been satisfactorily implemented.

- 74-3. It is recommended that action levels and work restrictions arising from indicated internal exposure to uranium exceeding the action level be formalized. Action levels should be selected so as to prevent exposure in excess of 0524 guides.

A specific procedure, "Internal Deposition Action Levels," dated March 1, 1975, has been promulgated since the last appraisal. The procedure has been reviewed by the Safety and Environmental Control Division and found to be satisfactory. This recommendation has been adequately implemented.

- 74-4. It is recommended that increased emphasis be given to maintaining current information on the inventory of sealed sources and assuring prescribed leak checks are made and documented.

Leak checks of sealed sources are now being carried out in accordance with NLO procedure. This recommendation has been adequately implemented.

- 74-5. It is recommended that a program for registering radiation producing equipment, e.g., X-ray machines, X-ray diffraction units, radiography

units, etc., be formalized to include pre-operational review and periodic inspection by the IH&R Department

In last year's appraisal, it was recommended that a formal program for preoperational review and periodic inspection by the IH&R Department be established for radiation producing equipment. In April 1975, NLO was further advised to review this equipment against ANSI Standard N43.2-1971, "Radiation Safety for X-Ray Diffraction and Fluorescence Analysis Equipment."

The IH&R Department has completed an initial inspection of all the radiation producing equipment on site. The review against ANSI Standard N43.2-1971 has also been completed and items of noncompliance noted. The satisfactory implementation of this recommendation, however, will be completed when fail safe devices are installed and radiation surveys around this equipment are made. IH&R feels that this can be accomplished within six months.

- 74-6. It is recommended that all ventilation systems installed to protect employees against exposure to toxic materials be identified. The minimum acceptable air flow should be specified and periodically checked. Confirmation of the adequacy of each system should be documented by appropriate TLV measurements

Implementation of this recommendation is progressing satisfactorily. With the completion of the evaluation of laboratory hoods, NLO is proceeding with its next priority, ventilation systems which control exposure to uranium dust. Once these systems are inventoried and characterized according to flow rates, the designed adequacy for control can be determined by job station air contaminant monitoring in conjunction with Recommendation 75-3. It was suggested that NLO consider installation of a go-no-go type of air flow monitor (cost about \$2 each) indicating instantaneous status and precluding the necessity of periodic inspections of ventilation systems. PAD-GPD has employed these gauges with considerable success.

Thus far, the surveillance program has indicated that most ventilation systems at NLO are affording control of air contaminants to the design specifications. This is probably attributable to what appears to be sound original design and a program of prompt maintenance.

B. Recommendations Resulting from This Appraisal

It is recommended that:

- 75-1. Industrial Hygiene and Radiation be factored into the reporting of occupational injuries and illnesses. IH&R should be advised of all illness cases, and participate in follow up investigations to assure accurate reporting and to determine means of avoiding future incidents

- 75-2. All areas having noise levels exceeding 90 dBA be identified and posted as requiring mandatory hearing protection for anyone entering the areas. Area supervision's primary responsibility for compliance should be reemphasized.
- 75-3. The IH&R air sampling and monitoring results be recorded as a time-weighted average (TWA) for an eight-hour exposure. The TWAs should be based on continuous work day monitoring or the application of professional judgment and time-motion studies to appropriate spot samples. A record-keeping program should be developed to allow individual employee exposure assessments to toxic materials and harmful agents from these records.
- 75-4. Actions be initiated to ensure that respirators located in the various plants are properly stored and returned to the cleaning facility for inspection and maintenance following routine usage.
- 75-5. Self-contained breathing apparatus intended for emergency use be upgraded to provide operation in the pressure demand mode.

IV. Findings - Health Physics

A. External Radiation Monitoring

As indicated in Section III, NLO is now providing continuous monitoring for employees receiving significant extremity exposures. However, problems associated with badge contamination continue. NLO has calculated an average correction factor

based on empirical data which is applied to monitoring results to correct for contamination. Another correction factor, representing attenuation resulting from wearing badges outside gloves and coveralls, is also applied to the results. These two factors together are considered 30% of the results indicated on the badge, 20% for contamination, and 10% for attenuation. While it is not surprising that badge contamination represents such a large percentage of the total exposure results, it is suggested that NLO continue to evaluate techniques to reduce the contamination; such as, having employees wear the badge under gloves and coveralls which should reduce both factors.

In 1974, the maximum extremity exposure received by an employee was approximately 60 Rem. In April 1975, the maximum permissible exposure for the forearm was lowered in ERDAM-0524 to 30 Rem per year from 75 Rem per year. If exposures continue at the same rate as last year, NLO may have employees exceeding this limit. Therefore, it is suggested NLO reevaluate those jobs in Plants 5 and 9 Re-melt Areas in the interest of reducing extremity exposures.

Last year, NLO had two employees who received skin exposures of approximately 16 Rem. This is another area in which the exposure limit has been lowered. The new limit is 15 Rem/year. Already this year NLO has had one employee accumulate a skin exposure of 11.2 Rem. This employee would have been restricted from further skin exposure had he not been reassigned to an area with low potential for such exposures.

Overall, there is need for NLO to reevaluate all jobs with extremity and skin exposure potential to effect safeguards which will lower exposures, especially for Plants 5 and 9 personnel.

The external whole body penetrating exposures were well within the ERDAM-0524 limits. The maximum exposure was 2.3 Rem last year.

B. Internal Radiation Monitoring

In vivo monitoring results showed 27 employees with internal depositions greater than or equal to 50% of the maximum permissible lung burden based upon one count in 1975. The highest percentage was 90. This is an increase from last year of the number of employees in this group.

Since last year, NLO has established definitive guidelines for restriction of employees showing internal deposition of radioactive materials. Basically, employees are restricted from any further exposure if internal deposition exceeds 95% of the maximum permissible lung burden and the restriction continues until the level is less than 85%. Since this criteria became effective, no employee has been restricted.

C. Radiation Producing Equipment

Since the last appraisal, NLO has conducted an inspection and review of all X-ray and X-ray diffraction limits for compliance with the requirements of ANSI N43.2-1971. The major item of noncompliance is the lack of positive indication of beam "on" condition on X-ray equipment. The necessary hardware to bring this equipment into compliance should be installed within six months. Currently, there are seven units in need of upgrading.

V. Findings - Industrial Hygiene

A. Occupational Illness Experience & Reporting

In 1974, NLO reported 19 instances of occupational illness (17 skin disease cases and 2 disorders produced by physical agents). This report appeared appropriate statistically; however, the reviewers upon closer scrutiny of reporting procedures have determined that NLO like other ORO contractors has not implemented a reporting scheme in which we can place a great deal of confidence. Therefore, the following recommendation is offered to strengthen the reporting of occupational illnesses as required by ERDA IAD-0502-26:

Industrial Hygiene & Radiation be factored into the reporting of occupational injuries and illnesses. In&R should be advised of all illness cases, and participate in follow-up investigations to assure accurate reporting and to determine means of avoiding future incidents.
(Recommendation 75-1)

During the appraisal, the auditors discussed the appropriateness of an internal review of safety reporting with NLO staff. The current ERDA required reports and frequency are as follows:

Quarterly Summaries

Form ERDA 102A - Injuries and Illnesses

Form ERDA 102B - Fires, Motor Vehicles and Property
Damage

Supplemental forms to detail the above tabulations for 102A: either ERDA-101, OSHA 101, or equivalent insurance form, etc., (only one); 102B: ERDA-271, ERDA 91A, ERDA-283, depending on type of occurrence.

Yearly Reports

OSHA-102 Yearly summary of occupational injuries and illnesses. (Contains same information as last quarter 102A, year to date.)

Continuous Reports

OSHA 100 -Log of Occupational Injuries and Illnesses. In essence, there are only four forms required on a routine basis, plus one backup - investigation form for each significant incident reported. NLO currently satisfactorily complies with these reporting requirements; however, the reviewers believe that NLO's internal records and transmittals can be streamlined.

An example of how this can be effectuated would be using the OSHA 100 form as designed, a clinical entry log. This form can be used to record the employee's name, badge number, etc., when the individual first appears for treatment and to initiate the subsequent reporting procedures as required. If it appears that an individual is not suffering from an occupationally induced condition or one involving merely first aid, the entry can be lined out. NLO is currently using several forms to accomplish this task. In view of other contractors who are successfully utilizing the OSHA 100 log, it is suggested that NLO review its procedures, modify the forms as necessary, and hopefully eliminate unnecessary paper work.

B. Noise

Occupational noise exposure has always been a major source of concern at NLO. Efforts at engineered abatement have been largely ineffective, the most recent example was a fire which consumed sound deadening material in the refinery. Further efforts in this area may not prove cost beneficial. Therefore, the reviewers feel that a strengthened administrative control program with mandatory hearing protection should be implemented as the primary means of controlling worker exposure.

It is recommended that all areas having noise levels exceeding 90 dBA be identified and posted as requiring mandatory hearing protection for anyone entering the area. Area supervision's primary responsibility for compliance should be reemphasized. (Recommendation 75-2)

The basic difference between this policy and the previous one is the setting of 90 dBA as a ceiling exposure point which will assure that each employee's net exposure for the work day will be less than 90 dBA. In cutting off the peaks above 90 dBA, a more satisfactory time-weighted average exposure (desirable in view of current standard discussions) will be obtained for most workers. If a more stringent standard is adopted by ERDA, then IH&R can concentrate its efforts on those individuals whose time-weighted average exposure falls between the new standard and 90 dBA. This recommendation is the result of observations at NLO as well as other ORO contractor sites that administrative control of worker noise exposure was less than adequate to assure compliance. Dosimetry results have confirmed these findings.

C. Air Sampling and Monitoring Records

IH&R performs routine and special sampling of NO₂ (from fuming HNO₃), ammonia, HF, uranium, and other hazardous material as warranted. The records of the results are maintained by IH&R, but other than to assure the continuing adequacy of control or to assess a single exposure, little use is made of them. In view of proposed ERDAM 0506 in which it is required that employees be apprised upon demand of their exposure to toxic chemicals (similar to assessing their cumulative radiation exposure), a program should exist to incorporate all sampling results in a meaningful and retrievable record system geared to satisfying this requirement.

The first step in accomplishing this is to design a system in which routine and sporadic samples can be coded according to job, location, employees present, etc., and the data recorded in a manner directly relatable to standards. This, in addition to work station by work station sampling, should produce a comprehensive picture of exposure experience at NLO.

To facilitate this program, it is recommended that the IH&R sampling and monitoring results be recorded as a time-weighted average for an eight-hour exposure. The TWAs should be based on continuous work day monitoring or the application of professional judgment and time-motion studies to appropriate spot samples. A record-keeping program should be developed to allow individual employee exposure assessments to toxic materials and harmful agents from these records. (Recommendation 75-3)

D. Respiratory Protection Program

Procedures governing the NLO respiratory protection program were being completed at the time of this appraisal. The IH&R Department has completed the standard practice procedures (SPP) assigning responsibilities to various NLO organizational units responsible for carrying out phases of the program. These units are preparing standard operating procedures describing their functions. A review of the SPP pointed up only one questionable area - responsibility for the decision of whether an employee is medically able to wear a respirator. The decision, in this procedure, was reserved for the Director of Health and Safety Division. It is suggested NLO reevaluate this point to allow the physician to make all medical judgments regarding an employee's fitness to wear a respirator, in keeping with ANSI Z88.2 requirements.

NLO is also in the process of upgrading self-contained breathing apparatus. Its plans are to replace as many of the older devices on plant site as prudent budgeting will allow. However, the model chosen does not operate in the pressure demand mode as recommended by authorities on the subject. It seems that the silicone face piece of these devices which fits a higher percentage of people has only a protection factor of 100 assigned to it.

Therefore, it is recommended that self-contained breathing apparatus intended for emergency use be upgraded to provide operation in the pressure demand mode. Operation in this mode will give a protection factor of 10,000 plus. (Recommendation 75-4)

While touring the various NLO plants, a number of respirators were found which had been abandoned on the job site or in such a state of disrepair that they were not usable. This is contrary to NLO procedures.

It is recommended that actions be initiated to ensure that respirators located in the plants are properly stored and returned to the cleaning facility for inspection and maintenance following routine usage. (Recommendation 75-5)

E. Control of Hazardous Materials and Operations

NLO has developed procedures whereby materials and products introduced into the facility which have potential of being injurious to health are screened and labeled. These procedures are incorporated into the revised Health and Safety Manual. Review of this program indicates that most items are appropriately labeled to identify the contents and that purchase orders are reviewed to indicate new and excessive use of hazardous materials.

Solvents are handled in much the same manner as well as being separately covered in the Health and Safety Manual which identifies carbon tetrachloride as being disapproved for use, while trichloroethylene, perchloroethylene, and 1,1,1-trichloroethane are approved. This classification approach is reasonable for purchasing purposes; however, solvent application must be reviewed on a case-by-case basis as even the most benign can produce hazardous vapors and skin disorders without adequate ventilation and work procedures. Additionally, care should be exercised in the acquisition and use of trichloroethylene, as it has been identified as a possible carcinogen in a recent alert published by the NIH. (OSH Reporter, BNA, Vol. 4, No. 48, P. 1562, May 1, 1975)

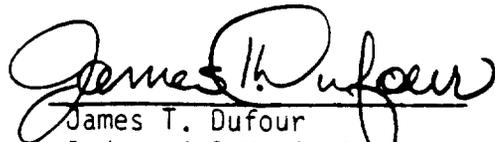
Work orders, engineering requests, and engineering proposals require IH&R sign-off. This procedure works well except for very minor jobs which occasionally slip through. However, other than asbestos jobs which have now been placed under a supplemental safety work permit system, few problems have been encountered.

Another related subject which was discussed is sub-contractor operations. The current health and safety program in this area provides for a kick-off safety meeting prior to start-up in which IH&R participates and then performs informal surveillance on the job site. Problems which have arisen are (1) health and safety concerns are not always identified in the bid packages, and (2) NLO has not developed a policy for providing respirators, or providing fitting, training and medical examinations for sub-contractor employees who must wear them. It is ORO's policy that these services be provided by the prime contractor, with an option to charge for this service (about \$25/man is the accepted figure). However, it is necessary to identify these requirements in the bid package in order to make implementation practical. Thorough IH&R participation throughout the subcontracting procedure would assure comprehensive coverage of health and safety concerns and eliminate unforeseen problems which inevitably surface during these jobs.

F. Water Treatment Facility

Provisions for treatment and quality assurance of potable water at NLO were reviewed. Operating procedures and water quality control appear excellent. Water plant staff is aware of and devising a program for compliance with standards being

promulgated by EPA pursuant to the Safe Drinking Water Act, P.L. 92-523. As ERDA-ORO has not formulated a policy as to compliance scheduling, NLO activities in this regard are adequate at present. Findings of the review are contained in the Appendix to this report.


James T. Dufour
Industrial Hygienist


Robert W. Poe
Health Physicist

Enclosure:
Appendix w/attach.

1114951

APPENDIX

NLO WATER SUPPLY FACILITY, OPERATED BY ENGINEERING DIVISION UTILITY DEPT.

Service Data: 700 persons served, none sold, plus sanitary, process, and cooling tower make-up water.

Source Data

3 deep wells
in bed rock 210' deep
62' static level monitored

capacity: two @ 1,000 gpm
one @ 750 gpm

General Treatment (normally operates at 600-700 gpm for 2 shifts)

process softener
lime and alum flocculants
pH adjustment (acid)
gassification
(9) sand bed pressure filters (backflushed 3 times/day for 20 minutes)

Storage 750,000 gallon tank

provides: process water
sanitary water
cooling tower make-up
potable water

Special Treatment

Cooling tower make-up - chemical additives
Potable water
chlorination .3% residual chlorine maintained

1114952

Quality Assurance Program*

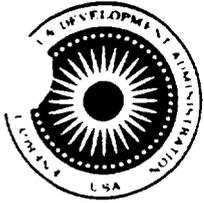
daily and monthly testing for contaminants and quality
40/month total coliform (millipore method)
all coliform samples from facility sites
no routine source samples -
turbidity - not done

Trace Analyses

Organics, Pesticides, Radiation - not done
Inorganics*

*See Attachment

Source	Test	Frequency
Raw Water (RW)	T. Hardness	Monthly
	Ca.	"
	Mg.	"
	Iron	"
	T. Alkalinity	"
Dist. Syst. (Drinking	Total Coliform	"
fountains, # 2		
reactivator		
38 fountains		
+ Guard hose		
emergency		
water		



UNITED STATES
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

URANIUM ENRICHMENT OPERATIONS
P. O. BOX 6
OAK RIDGE, TENNESSEE 37830

AREA 100-100
TELEPHONE 54-1111

November 3, 1976

National Lead Company of Ohio
ATTN: Mr. Samuel F. Audia
Manager
Post Office Box 39158
Cincinnati, Ohio 45239

Gentlemen:

ANNUAL HEALTH PROTECTION APPRAISAL OF NLO, 1976

The industrial hygiene aspects of the annual health protection appraisal of NLO was conducted on September 14-15, 1976, by a member of the ORO Safety and Environmental Control Division. The findings were discussed with NLO representatives on September 17, 1976.

Enclosed are six copies of the formal report of the appraisal. You may proceed with implementation of the recommendation unless there are sound reasons why it is not warranted. In any event, your comments with regard to the conduct of the appraisal, the general content of the report, and the detailed plans for implementing or otherwise handling the recommendation are requested by November 30, 1976. Until accomplished, the status of the recommendation, rationale for nonaccomplishment, and expected completion date should be reported to me every six months.

The cooperation extended by members of your staff during the appraisal is appreciated.

Sincerely,

H. Doran Fletcher, Director
Uranium Enrichment Operations Division

OSH:JTD

Enclosure:
Appraisal Report (6 cys)

cc w/encl:
C. A. Keller, AMO
D. A. Horsewood, O&P
W. H. Travis, S&EC



1114956

USERDA-ORO
INDUSTRIAL HYGIENE APPRAISAL
NATIONAL LEAD COMPANY OF OHIO

SEPTEMBER 1976

by

J. T. DUFOUR
SAFETY AND ENVIRONMENTAL CONTROL DIVISION

1114957

I. Purpose and Scope

This industrial hygiene appraisal of NLO was conducted on September 14-15, 1976, pursuant to ERDAM 0504 which requires health protection appraisals of ERDA contractors. The health physics aspects of the 1976 appraisal will be covered at a later date. Of the topics covered, the most significant was implementation of several past recommendations. One day was spent touring the facility.

II. Summary

The NLO industrial hygiene program evidences considerable progress toward achieving what ORO feels is a streamlined auditable program with meaningful data recordation. While NLO has always provided healthful working conditions, last year several recommendations were addressed toward enhancing the administrative aspects of its program. Progress on all previous recommendations is satisfactory. Clarification of requirements for emergency respiratory protective equipment was discussed during this review.

III. Recommendations

A. Implementation of Previous Recommendations

75-1 It was recommended that Industrial Hygiene and Radiation be factored into the reporting of occupational injuries and illnesses. IH&R should be advised of all illness cases, and participate in followup investigations to assure accurate reporting and to determine means of avoiding future incidents.

NLO IH&R has become active in the followup of all cases of industrial hygiene significance. In fact, the log of all visits to the Infirmary are checked routinely and initialed. Also, nurses who maintain the log are periodically reacquainted with the importance of properly recording and notifying IH&R of potential occupational illness cases. When cases are identified as occupationally related, IH&R assists in preparation of the ERDA 101 supplementary form and actively follows up to preclude recurrence. This recommendation has been satisfactorily implemented.

- 75-2 It was recommended that all areas having noise levels exceeding 90 dBA be identified and posted as requiring mandatory hearing protection for anyone entering the areas. Area supervision's primary responsibility for compliance should be reemphasized.

Although a bit late in the implementation schedule due to protracted discussions regarding the intent and justification of this recommendation, NLO has attacked the problem with considerable enthusiasm. Noise monitoring records have been reviewed to determine areas in excess of 90 dBA and notice has been given to Division Directors announcing the change in hearing protection policy. Areas requiring posting have been posted and employees in these areas have been sent to Medical for fitting of hearing protective devices and training. Considerable effort has been expended to indoctrinate

employees and supervisors as to the elements of the program and its benefits. In addition IH&R conducts random audits to assure compliance and brings all violations to the attention of supervision. It was noted that during extensive touring of areas during the course of the appraisal there were no observed violations of this hearing protection program. Also computerized audiometric examinations will be carefully scrutinized as a backup indicator of the effectiveness of the hearing protection devices. We commend NLO and IH&R staff on the effective implementation of this recommendation.

75-3 It was recommended that the IH&R air sampling and monitoring results be recorded as a time-weighted average (TWA) for an eight-hour exposure. The TWAs should be based on continuous work-day monitoring or the application of professional judgment and time-motion studies to appropriate spot samples. A record-keeping program should be developed to allow individual employee exposure assessments to toxic materials and harmful agents from these records.

IH&R has devoted considerable effort to develop a system of data recording which will implement this recommendation and not require significant man-power increases as was at first thought necessary. What has resulted is the design of an air monitoring form

which is compatible with data processing input requirements and also can be used in the field to record sampling information. This single form approach saves transcribing time and puts all the information in one place in fairly comprehensive form. Once computerized, a printout of cumulative results can be obtained at regular intervals (six months is contemplated) or on demand. Data may be retrievable keyed to location, employee badge number, or perhaps by material sampled. Presently, while this system is being installed, data are being recorded in a manner both compatible with the eventual forms and with the recommendation. The results are being recorded on a time-weighted average basis. ^{نحو} _{عدد} As we expect to find a fully operative system during our next review, this recommendation is regarded as satisfactorily implemented.

75-4 It was recommended that actions be initiated to ensure that respirators located in the various plants are properly stored and returned to the cleaning facility for inspection and maintenance following routine usage.

Subsequent to our last appraisal during which were noticed dozens of dirty or improperly stored respirators, NLO has issued a strongly worded letter entitled "Adherence to Respiratory Program Procedures" to all division directors. In addition, as a part of monthly housekeeping inspections conducted by a company chairman, a union representative and a member of the Safety and Health staff, compliance with respirator procedures

have been highlighted. Storage cabinets are also periodically inspected by Safety and JH&R. As a result of this emphasis, there were no significant violations of respirator storage, use or handling witness during our tours. We believe that NLO's prompt and effective action implements this recommendation and will assure future compliance.

- 75-5. It was recommended that self-contained breathing apparatus intended for emergency use be upgraded to provide operation in the pressure demand mode.

NLO has been actively involved in upgrading all respiratory protective equipment, especially that used for emergencies. New and improved masks have been put into use which will assure better fit and service. A single question which remains is the requirement of pressurized mode in the emergency equipment, which is the subject of the recommendation. Considering the expense of replacing all self-contained breathing apparatus, as those in service cannot be converted, the application of this recommendation across the board is not justifiable. Therefore, discussions to determine which equipment is designated for use in emergencies, and that which probably would be used, resulted in a finding that only the six units assigned to the emergency squad are truly "emergency equipment". These should be replaced by pressure demand mode-type equipment. In addition, in acquiring new self-contained breathing

apparatus, NLO should specify the pressure mode variety. In order to document and followup these actions, recommendation 75-5 will be reiterated in amended form.

B. Recommendations reiterated from past reviews.

75-5 Self-contained breathing apparatus assigned to the emergency squad be equipped with pressure demand mode and that all new SCBAs acquired by NLO have this feature.

C. Recommendations resulting from this appraisal

None.

IV. Findings

1. Staff and Organization

The IH&R staff, committed totally or partly to IH effort, remains unchanged, consisting of a Chief, two industrial hygienists, a technician, and a secretary. As noted in previous reviews, staff coverage of field problems is satisfactory. This group reports directly to the Director of Health and Safety. Communications between this group and other service, operating and maintenance units, appear good as evidenced by the effective response to the new noise exposure control program and respiratory storage deficiencies.

2. Maintenance

It was noted during last year's review that safety and health problems were occurring because of a lack of or delays in maintenance on ventilation systems and other plant equipment systems which caused unnecessary dust generation or noise. In

fact, one ventilation fan was found which was not only in a failure mode but had been generating excessive noise levels for a considerable period. This condition was ignored. We are happy to report that this situation is greatly improved. Maintenance status meetings are being regularly held, and IH&R has input into these; as a result, maintenance lag times are down, jobs are followed-up and most repairs are complete within a few days.

3. Ventilation

Considerable attention has been given in past appraisals to ventilation systems for health protection. A previous recommendation asked NLO to verify control by air sampling and to set up a program of routine certification of control velocity for these systems. In response, a program of ventilation surveys has been set up in which laboratory fume hoods are done on an annual basis and other work stations have been done once before and are now being done again. If the results are consistent, a yearly resurvey to compare present data with the established baseline should be adequate to verify performance.

4. Bird Population Control

While touring the drum reconditioning facility, it was again observed as it has been in past reviews that the droves of birds seeking shelter and warmth in the covered portion of this area had left a considerable accumulation of droppings. This problem has both health and labor relations ramifications. While several methods of control have been attempted

with little success, questions arose regarding ERDA's and other regulatory agencies' policies on the subject of bird population control. This problem has also been addressed at the Portsmouth Gaseous Diffusion Plant with remarkable success in both control of birds and establishing liaison with regulatory agencies concerned with pests and their control. This matter has been referred to the ORO Environmental Protection Branch for action.

Reviewer:

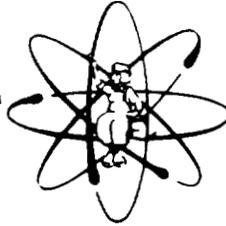

James T. Dufour
Industrial Hygienist

1114965

NATIONAL LEAD COMPANY OF OHIO

A SUBSIDIARY OF NL INDUSTRIES, INC.

P. O. BOX 39158



CINCINNATI, OHIO 45239

PHONE: AREA CODE: 513-738-1151

FEB 13 1976

996

Mr. H. Doran Fletcher, Director
Uranium Enrichment Operations Division
Oak Ridge Operations Office
U. S. Energy Research & Development Administration
P. O. Box E
Oak Ridge, Tennessee 37830

Dear Mr. Fletcher:

APPRAISAL RECOMMENDATIONS

Ref: Letter, H. D. Fletcher to D. R. Chapman, "Annual Health Protection Appraisal of NLO, 1975 (Your letter dated 9/24/75)," dated 12/9/75

As suggested in the reference letter, we shall proceed with recommendations 75-2 and 75-3. Proposed implementation methods are summarized below and will be started immediately if your staff concurs.

To comply with recommendation 75-2, "Noise," all work areas in which the sound level exceeds 90 dBA shall be identified. Signs posted at the area entrances shall require the use of hearing protectors by anyone entering these areas. Protector use shall be mandatory regardless of an employee's total daily time in posted noise areas.

In some plant locations, sound levels above 90 dBA occur only at specific operator positions. Signs shall be posted at these work positions requiring the operator to use hearing protectors. Such use of protectors shall be required even though the total noise dose during the work day is well within present standards.

Although we are prepared to proceed with the noise program as outlined, we are uncertain about the intent of the recommendation. In the discussion on page 11 of the appraisal report, the second paragraph contains the recommendation for the mandatory use of

1114966

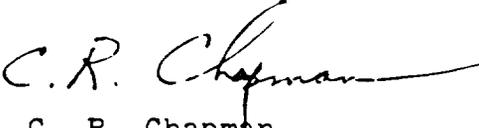
protectors by anyone entering an area in which noise levels exceed 90 dBA. In contrast, the third paragraph notes that if we follow the recommendation and more stringent standards are adopted, we need only concentrate on those individuals with a time-weighted average exposure between the new standard and 90 dBA. Two different hearing-conservation philosophies are embodied in these two sections.

For recommendation 75-3, "Monitoring and Recordkeeping," a data processing program will be developed. Data to be recorded for each air sample will include location, sample type (breathing zone or general air), contaminant, results, and the names and badge numbers of employees at the location sampled. The applicable standard (Radiation Protection Guide or Threshold Limit Value) will be recorded along with the fraction of the standard found.

For breathing zone samples the record will also contain the time-weighted average based on the length of time spent at the sampled operation and at other operations where the same contaminant is encountered. These TWA's may, in some cases, be no more than estimates, based not on sampling, but on observed conditions. It would not be a good use of IH&R personnel to devote time to continuous work-day monitoring for recordkeeping purposes when the object of sampling is merely to determine the contaminant concentration at a particular location of interest.

Periodic data processing reports will list all entries for the year by building number and by employee badge number. Annual reports shall be kept as permanent records and shall be used to respond to employees' requests for a record of their occupational exposure to toxic substances.

Sincerely yours,


C. R. Chapman
Manager

MWB/vvs

cc: M. W. Boback
H. D. Fletcher
R. C. Heatherton
P. G. DeFazio
Central Files

1114967



UNITED STATES
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

WASHINGTON, D. C. 20545
POST BOX 6
ARLINGTON, TENNESSEE 37203

May 18, 1977

National Lead Company of Ohio
ATTN: Mr. Samuel F. Audia
Manager
Post Office Box 39158
Cincinnati, Ohio 45239

Gentlemen:

ANNUAL HEALTH PROTECTION APPRAISAL OF NLO, 1977

The health physics aspects of the annual health protection appraisal of NLO was conducted on January 27-28, 1977, by members of the ORO Safety and Environmental Control Division. The findings were discussed with NLO representatives at that time.

Enclosed are six copies of the formal report of the appraisal. You may proceed with implementation of the recommendation unless there are sound reasons why it is not warranted. In any event, your comments with regard to the conduct of the appraisal, the general content of the report, and the detailed plans for implementing or otherwise handling the recommendation are requested by June 17, 1977. Until accomplished, the status of the recommendation, rationale for nonaccomplishment, and expected completion date should be reported to me every six months.

The cooperation extended by members of your staff during the appraisal is appreciated.

Sincerely,

H. Doran Fletcher
H. Doran Fletcher, Director
Uranium Enrichment Operations Division

OSH:RDS

Enclosure:
Appraisal Report (6 cys)

cc w/encl:
C. A. Keiler, AMO
J. W. Swafford, OPE
W. H. Travis, S&EC

1114968 *copy*

I. Purpose and Scope

The annual health physics appraisal of the National Lead Company of Ohio was conducted during January 27-28, 1977, by Messrs. R. D. Smith and B. J. Davis, Health Protection Branch, ORO Safety and Environmental Control Division. Emphasis during the appraisal was placed upon the extremity monitoring and internal exposure evaluation programs.

II. Summary

In general, the health physics program continues to be satisfactory. However, extremity radiation exposures continue to be of concern. While the extremity exposures remain within current maximum limits, it is the appraisal team's opinion that a significant reduction can be achieved with minimal changes in procedures and/or equipment.

III. Recommendations

A. Implementation of previous recommendations

74-5 It is recommended that a program for registering radiation producing equipment; e.g., X-ray machines, X-ray diffraction units, radiography unit, etc., be formalized to include preoperational review and periodic inspection by the Industrial Hygiene and Radiation Department (IH&R).

NLO was advised to review this equipment against ANSI Standard N43.2-1971, "Radiation Safety for X-Ray Diffraction and Fluorescence Analysis Equipment." At the time of the 1976 appraisal, two items remained outstanding:

1. Completion of installation of fail-safe devices on X-ray diffraction unit shutters, and
2. Area surveys around the equipment.

Item 1 has been completed with the installation of fail-safe warning light systems for indicating beam-on-shutter-open conditions.

Item 2 has also been completed with appropriate actions taken where survey results indicated additional health protection measures were required.

B. Recommendations resulting from this appraisal

- 77-1 NLO should review those operations which have high extremity exposure potential and where feasible modify protective clothing, equipment and/or procedural requirements to reduce personnel extremity exposures to the minimum practical level.

Certain of the NLO operations, particularly the UF_4 to ingot operations, and the remelt operation have a high potential for extremity exposures. Skin exposures during 1976 to the hand ran as high as 72 Rem (ERDAM-0524 exposure limit is 75 Rem) with a total of 17 individuals receiving exposures in excess of 10 Rem. From a review of the operations during the appraisal, it appears that with (1) more strict procedural controls, particularly in the area of protective clothing usage, (2) possible changes in types of protective clothing employed, and (3) utilization of shielding, extremity exposures could be significantly reduced with only a minimum expenditure of funds. For example, establishment of a minimum glove change frequency for these operations would help minimize exposure from contamination that becomes entrained in the glove material. Use of shielding, where possible, in the crucible loading

operation would minimize exposure from contamination entrained in the crucible walls.

IV. Findings

As noted earlier, emphasis during this appraisal was placed upon external and internal radiation monitoring. Problems associated with badge contamination continue to introduce difficulties and uncertainties in accurately assessing forearm and hand exposures. Contamination effect evaluations, which were conducted in 1974, yielded results which indicated a correction factor of 20% was appropriate. However, uncertainties occur in this value due to the tests being conducted for five-to-ten-day wearing periods before evaluation. Therefore, uniform acquisition of contamination must be assured. NLO is planning to conduct a program using a TLD system to more precisely determine badge contamination effects. The TLD system will provide much more versatility for making these determinations than the film badge system used in the past. The TLD system will also allow a more thorough study of the hand exposures and the effect of glove contamination (levels of up to 1 R/hr on the glove palm occur during certain operations). This will enable NLO to verify and refine the currently used dose relation factor of 3X for the hands versus the forearms.

The external whole body penetrating exposures were well within ERDAM-0524 limits; the maximum exposure for 1975 being 2.1 Rem.

In vivo monitoring results showed ten employees in 1976 with internal depositions greater than or equal to 50% of the maximum permissible lung burdens. The highest being about 76%. This is a decrease from 1975 when twenty-one individuals were above the 50% level.

V. Conclusions

The health physics program is being conducted in a satisfactory manner. Improvement is needed in the area of extremity exposure control in order that such exposures can be held as low as reasonably achievable.

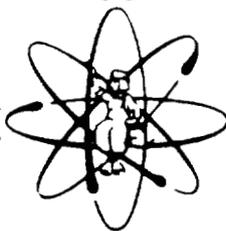


R. D. Smith
Health Physicist



B. J. Davis
Health Physicist

NATIONAL LEAD COMPANY OF OHIO



P. O. BOX 39158

CINCINNATI, OHIO 45239

January 24, 1978

Mr. H. Doran Fletcher, Director
Uranium Enrichment Operations Division
Department of Energy
Oak Ridge Operations
P. O. Box E
Oak Ridge, Tennessee 37830

753

Dear Mr. Fletcher:

STATUS OF APPRAISAL RECOMMENDATION

- Ref: 1. Letter, H. D. Fletcher to S. F. Audia, "Annual Health Protection Appraisal of NLC, 1977," dated 5/18/77
2. Letter, S. F. Audia to H. D. Fletcher, "Compliance With Appraisal Recommendation," dated 6/8/77

Reference 1 recommends a review of operations where high extremity exposures occur and a modification of clothing, equipment, and procedural requirements to bring about an exposure reduction. Reference 2 describes the initial efforts made to effect a reduction.

So far, our efforts have not resulted in a significant decrease in the measured extremity doses. A slight decrease did occur, overall, during the last six months of 1977 but some annual exposures would continue to be above the lower extremity exposure limits which OR anticipates.

The crucible shields referred to in item (4), Ref. 2, have been fabricated and put into use. Crucible load operators have been instructed to insert the shields prior to the hand loading of charge pieces. Measurements with survey instruments show that the shield reduces radiation from the crucible wall by more than 90%.

Efforts to reduce exposures are continuing. Changes have been designed for the Plant 9 delidding station to reduce the operator's hand contact with contaminated crucible lids. The alteration work

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will start soon. Thermoluminescent dosimeters are being used to assess the value of different glove materials and other protective clothing items may be obtained and tested. Data indicate a reduced hand dose when rubber-like gloves are worn in place of our slightly heavier leather palm gloves which are in routine use. The reduction is about 35%. This difference is due to the reduced pick-up of radioactive dust by the smooth impervious synthetic material. If this dose reduction is confirmed and no resulting safety problems are introduced, the use of the synthetic glove at some work stations will be made mandatory.

As requested in Ref. 1, the status of the recommendation will be reported to you every six months. We cannot, at this time, give a date when the recommendation would be considered fully implemented.

Sincerely yours,



S. F. Audia
Manager

MWB/vvs

cc: W. J. Adams
M. W. Boback
H. D. Fletcher
R. C. Heatherton
A. J. Mangold
R. W. Mode
A. F. Pennak
K. N. Ross

Central Files



Department of Energy
Oak Ridge Operations
P.O. Box E
Oak Ridge, Tennessee 37830

February 5, 1979

National Lead Company of Ohio
ATTN: Mr. Samuel F. Audia
Manager
Post Office Box 39158
Cincinnati, Ohio 45239

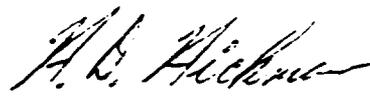
Gentlemen:

ANNUAL HEALTH PROTECTION APPRAISAL OF NLO - 1978

Enclosed are six copies of the appraisal report. Please provide your detailed plans for implementing the recommendations by April 6, 1979. Until accomplished, the status of the recommendations, rationale for nonaccomplishment, and expected completion date should be reported to me every six months.

The cooperation extended by members of your staff during the appraisal is appreciated.

Sincerely,


H. D. Hickman, Director
Manufacturing Division

MS-334:BJD

Enclosure:
As stated

cc w/encl:
C. A. Keller, OR
J. W. Swafford, OR
W. H. Travis, OR

1114975

USDOE-ORO
ANNUAL HEALTH PROTECTION APPRAISAL
OF
NATIONAL LEAD COMPANY OF OHIO
CINCINNATI, OHIO

AUGUST 2-4, 1978

BY

BOBBY JOE DAVIS
SAFETY AND ENVIRONMENTAL CONTROL DIVISION

1114976

I. Introduction

The annual health physics appraisal of the National Lead Company of Ohio was conducted August 2-4, 1978, by Bobby Joe Davis, Occupational Safety and Health Branch, Safety and Environmental Control Division, ORO. The appraisal covered the period since the last appraisal in January 1977. This report is an evaluation of existing conditions and the effectiveness of NLO's implementation of DOE policies and standards as contained in DOEM Appendix 0550, Part IV.A. A closeout critique was held with R. Spencely, Assistant Manager, and members of his staff.

II. Summary and Conclusions

The appraisal consisted of detailed discussions of the health physics program implementation with the industrial hygiene and radiation supervisor, tours of the facilities and observation of selected operations.

A strong effort has been made since the last appraisal in the area of extremity exposure reduction. Although difficult to quantify due to a number of contributing factors, a significant reduction in extremity exposures was achieved in 1977. Although the extremity, whole body, skin, and lung exposures remain within the DOE prescribed limits, the exposures are not considered to be "as low as practicable." This is primarily due to the lack of a formalized and aggressive exposure reduction program. This deficiency led to the only recommendation resulting from this appraisal. Even though this deficiency is considered significant, it is offset by the fact that the current program is effective in maintaining radiation exposures within prescribed limits and by the progress made in the extremity exposure area. These considerations led to the health physics program being assigned an adjective rating of excellent for the appraisal period.

1114977

Although not the subject of a recommendation, there is one additional item requiring continuing attention. NLO will have to continually evaluate the level of effort being devoted to offsite projects (Niagara Falls and Weldon Spring) by the industrial hygiene and radiation staff to assure that these efforts do not adversely affect the health physics program. This will be reviewed during the next appraisal.

III. Recommendations

A. Previous Recommendation

77-1 NLO should review those operations which have high extremity exposure potential and where feasible modify protective clothing, equipment and/or procedural requirements to reduce personnel extremity exposures to the minimum practical level.

Action Taken: A review of the indicated operations has been performed and several improvements made including changes in glove requirements, additional use of shielding and tooling modifications. Although for report purposes this recommendation is considered closed, continuing efforts in this area are required.

B. New Recommendation

NLO should formalize and strengthen its "as low as practicable" radiation exposure control program. This effort should include development of a written policy, objectives, and a plan for implementation covering existing, new and any reactivated operations.

IV. Commentary

The overall health physics program is effective and efficient insofar as the maintenance of radiation exposures within prescribed limits is concerned. Whole body exposures remain less than 60% of the annual limits with only a small percentage of individuals exceeding 10% of the limits. Lung exposures are of some concern since there are consistently around ten individuals who receive exposures in excess of 50% of the annual limit of 15 Rem; the highest for 1977 was 76% of the annual standard. As noted earlier, significant progress has been made in the area of extremity exposure reduction. Although not entirely due to the specific exposure reduction activities, the total extremity exposure for the sixteen individuals receiving the highest exposure in 1976 was reduced by approximately 40% during 1977.

Based upon observations made during the appraisal, the exposure potential can be further reduced in some cases quite readily through procedural changes and/or enforcement. Two examples from the Plant 5 area illustrate this. During the reduction pot delidding operation, it was observed that the last pot was opened outside the slot ventilation area resulting in unnecessary spread of airborne uranium into the work environment. It was also noted that the newly fabricated shield for the crucible loading operation was not being used resulting in the operator receiving unnecessary forearm and hand exposure. Minor procedural changes and/or enforcement of existing procedures would correct these situations.

In other cases, equipment modifications may be required to further reduce exposures. Two examples also from Plant 5 illustrate this. It may be practicable to provide local exhaust ventilation for the billet sawing operation to reduce the spread of airborne uranium into the operator's area. Modifications may be practicable for the derby knockout booth chute area where material sliding down the chute causes "puffs" of

material to escape capture by the table ventilation system and escape into the work area.

An aggressive "as low as practicable" exposure reduction program would detect and correct the procedural items. Such a program would also result in identification of areas where improvements might be made; e.g., the ventilation items noted above, as well as require a detailed evaluation of the cost versus benefit which will provide management with a basis for decision making.

Based upon the appraisal observations, the existing generally informal exposure reduction program is not resulting in exposures being maintained "as low as practicable." A formal program coupled with a strong management commitment is needed to achieve this basic DOE objective.

Reviewer:


Joe Davis
Health Physicist

NATIONAL LEAD COMPANY OF OHIO

P. O. BOX 39158



CINCINNATI, OHIO 45239

PHONE AREA CODE 513-738-1151

Mr. H. D. Hickman, Director
Manufacturing Division
Oak Ridge Operations
Department of Energy
P. O. Box E
Oak Ridge, Tennessee 37830

Dear Mr. Hickman:

RADIATION DOSE REDUCTION

Ref: Letter and attachment, H. D. Hickman to S. F. Audia,
"Annual Health Protection Appraisal of NLO - 1978," dated
10/27/78

The following activities are being planned in order to comply with the OR recommendation regarding reduction of radiation exposure to as low as practical:

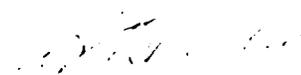
- (1) A policy statement signed by me will be disseminated in a letter to all division directors.
- (2) A review will be made of operations performed by personnel whose annual radiation doses in 1978 were in the upper 10%. Separate reviews will be made of: in vivo lung burdens; external radiation to the whole body and skin of the whole body; extremity skin doses.
- (3) The lung burden action levels will be revised to require that an employee be removed from all exposure if the in vivo estimate reaches 85% of the permissible limit. The present procedure requires removal when the lung burden reaches 95%.
- (4) Plans for new or reactivated operations will be reviewed to determine if a special dose reduction effort is justified.

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- (5) Sessions will be held for chemist operators to reinstruct them in basic health protection practices.
- (6) The Health & Safety Division shall report periodically to the Manager on the dose reduction progress. Reports shall include input from those divisions with operations targeted for a reduction effort.

Full implementation of the recommendation is expected within six months. As requested in the reference letter, a report will be made every six months until compliance is accomplished.

Sincerely yours,



S. F. Audia
Manager

MWB/vvs

cc: W. J. Adams
M. W. Boback
R. C. Heatherton
H. D. Hickman
W. C. Hill
N. R. Leist
Central Files

SEP 11 1979

National Lead Company of Ohio
ATTN: Mr. Samuel F. Audia
Manager
Post Office Box 39158
Cincinnati, Ohio 45239

Gentlemen:

REPORT OF INDUSTRIAL SAFETY APPRAISAL OF THE FEED MATERIALS PRODUCTION CENTER

The industrial safety appraisal of the Feed Materials Production Center was conducted June 18-22, 1979, by a member of the ORO Safety and Environmental Control Division. The findings were discussed with you and your staff at that time.

Enclosed are six copies of the formal report of the appraisal. Please provide your comments and plans for corrective action with respect to the recommendations made in Section III.A. of the report by October 22, 1979. Until accomplished, the status of the recommendation, rationale for non-accomplishment and the expected completion date should be reported to me every six months.

The cooperation extended by members of your staff during the appraisal is appreciated.

Sincerely,

ORIGINATED BY
H.D.H.

H. D. Hickman, Director
Manufacturing Division

MS-333:WME

Enclosure:
Appraisal Report (6 cys.)

cc w/encl.: C. A. Keller, MS-30
J. W. Swafford, PE-10
W. H. Travis, MS-33

MS-333:WMEwards: jm:6-0834:9/6/79

CONCURRENCES
RTG. SYMBOL MS-333
INITIALS/SIG. 47
DATE 9/6/79
RTG. SYMBOL MS-333
INITIALS/SIG. RH
DATE 9/6/79
RTG. SYMBOL MS-33
INITIALS/SIG. T
DATE 9/7/79
RTG. SYMBOL MS-31
INITIALS/SIG. [Signature]
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USDOE - ORO
REPORT OF INDUSTRIAL SAFETY APPRAISAL
OF
NATIONAL LEAD COMPANY OF OHIO

June 18-22, 1979

BY

William M. Edwards
Safety and Fire Protection Branch
Safety and Environmental Control Division

1114984

I. Introduction

This report was prepared as the result of an industrial safety appraisal of the National Lead Company of Ohio's Feed Materials Production Center conducted June 18-22, 1979. The appraisal evaluated existing conditions and the effectiveness of the contractor in implementing USDOE policies and standards as found in Manual Chapter 0504.

II. Summary

- A. The overall industrial safety program at NLO is rated satisfactory. The program was found to be operating in a generally effective manner in accordance with USDOE safety requirements and good safety practices. A qualified and experienced safety engineer has not been on the NLO staff since December 1977 when the previous safety engineer was terminated.
- B. Mr. R. W. Lippincott, Chief, Fire and Safety Department, accompanied the reviewer throughout the appraisal. At the conclusion of the appraisal, the findings were discussed with Messrs. S. F. Audia, Manager; R. M. Spenceley, Assistant Manager; William Wright, Transportation Department Head; R. C. Heatherton, Director, Health and Safety; and R. W. Lippincott.

III. Recommendations

- A. Recommendations made as a result of this appraisal:
 - 79-1 Add a professionally qualified safety engineer to the staff of the Health and Safety Group (See Section IV.B.).
 - 79-2 Expedite the repair of unsafe USDOE-owned railroad lines (See Section IV.F.).

- B. There are no outstanding recommendations from previous appraisals.

IV. Commentary

A. Management Interest and Support

Management interest in the industrial safety program appears to continue at a satisfactory level. The level of management's fiscal support to the program, however, appears marginal. This observation is made as the result of management allowing the plant to be without a professional safety engineer for almost two years, not arranging for the safety and fire protection staff to attend educational courses and conferences, and the delaying of the railroad repair.

B. Organization and Staff

There is currently no professionally trained industrial safety engineer on the NLO Safety and Health staff. The last safety engineer was terminated in November 1977, and was not replaced. The current plant population of about 550 in this industrial environment is justification enough to warrant this position. When the lack of a professional safety engineer is viewed against the current NLO safety staff, there is some indication the industrial safety function requires additional management support.

The industrial safety function is assigned to the Safety and Fire Protection Section of the Safety and Health Division. It would appear the reporting of the safety engineer (when position is filled) to the head of the Safety and Health Division, on a level equal to the other sections (Industrial Hygiene, Nuclear Safety, etc.), would be more conducive to getting the job done. This suggested change would also bring added plant visibility to the function. Professionalism in this function should be sought.

C. Education and Training

Routine safety meetings are held monthly for all employees. Examination of some records, however, indicates attendance is less than desirable. One month checked indicated 70% attendance while a second month's attendance was only 55%. This low attendance record may reflect on the quality of the meetings being held. There is no current auditing of these meetings to gauge the quality.

The Executive Safety Committee composed of the manager, all division directors, and the supervisor of the Safety and Fire Protection Section, meet on a monthly basis to discuss plant-wide safety business.

There is a NLO-Union Safety Committee meeting held quarterly, a Departmental Safety meeting held monthly, and an optional Divisional Safety meeting. The Divisional Safety meeting is held whenever the division director thinks he needs one. It is understood three divisions meet routinely. Those four division directors not meeting routinely with their supervision may be allowing a gap to exist in the safety communications chain and are not giving the visibility to their interest and support in industrial safety that is so important.

No representatives from the Fire and Safety Section (has responsibility for industrial safety) attended any safety or fire protection educational courses or conferences during 1978. It is important to stay abreast of new developments in both fields.

D. Inspection

All areas of the plant are inspected on a monthly basis with the inspections documented for follow-up action. This work is performed by inspectors whose responsibility is primarily directed toward fire prevention inspection and the direction of fire fighting efforts. Their industrial safety efforts for the most part are limited to a housekeeping type level of inspection. There is also an effort made each year to perform an in-depth Safety and Fire Protection Survey of all major NLO facilities. This inspection is performed by a fire protection engineer whose primary function is that of fire protection engineering. The workload is such this survey is extremely difficult to accomplish annually.

E. Pressure Vessels, Relief Devices, Other Equipment

A cursory look at records maintained for pressure vessels and relief devices indicated they are being inspected and tested in accordance with the NLO determined frequency. It was learned the pressure relief devices on two boilers were late. For one boiler, the test and inspection was seven months late and on the other, fourteen months late.

Dielectric tests are being performed annually on bucket trucks by NLO Electrical Maintenance personnel but no records are maintained of this. It would appear desirable to conduct this test in accordance with the ANSI procedures and to document it. An alternate approach to this is that of selecting an outside vendor to run this test for NLO. These services are available at reasonable cost and have several advantages to offer.

All personnel were not available for discussion relating to mobile cranes during the appraisal but it appeared two groups had a split responsibility for crane maintenance.

There also did not appear to be any central maintenance file. A split responsibility allows room for error and no central maintenance file would prevent the spotting of any unsafe trends showing up in the records.

F. Railroads

About midyear of 1978, a railroad consultant was brought in to inspect all the USDOE-owned railroad track. This inspection covered that track inside the plant area and the lead track outside the fenced area to the point where it ties into the C&O main line. The consultant came up with three pages of corrective actions necessary, and during the writer's appraisal, it was determined the repair was being deferred until FY 1981. Recommendations included replacement of rotted cross ties, realignment, replacement of some rail, replacement of 60 cross ties over a water area, replacement of ballast to raise rail to correct elevation, etc. An inspection was then made of portions of the track and as determined by the consultant, was in poor condition. In view of the recent publicity (Three Mile Island) relating to the nuclear industry and the catastrophe at Waverly, Tennessee, immediate corrective action should begin on those deficiencies existing on that portion of the track used to transport toxic or unusual materials. Until the track is upgraded, consideration should be given to utilizing other means of transportation.

G. Construction Safety

The NLO project engineer is responsible for the enforcement of all safety practices of construction contractors. Routinely, members of the Safety and Health Department monitor these operations for conventional safety hazards and lend assistance as needed on any unusual problems. Prior

to the contractor beginning work, the safety group meets with the contractor to explain NLO safety requirements. At the time of the appraisal, two construction contractors were on-site and a tour of the working area turned up no significant problems.

H. Safety Review of Contracts and Engineering Liaison

The NLO Safety and Health Department is not currently being given the opportunity to review construction contracts prior to their being awarded. A safety review before the contract is let would prevent any surprises to both NLO and the contractor. It was of interest to note the Safety and Health group was not aware of the findings which resulted from a railroad consultant's inspection of track which was dated July 1978.

I. Performance

During calendar year 1978, NLO experienced four lost workday cases for an incidence rate of 0.77. This experience was the poorest in a four-year period; however, there have been no lost workday cases during the first half of 1979. See Attachment 1 for a more detailed comparison.

During 1978 and the first six months of 1979, NLO has experienced no motor vehicle accidents. This is a significant betterment from the frequency rate of 40.34 accidents per million miles driven in 1977 to a 1978 record of 0.00. See Attachment 1 for a more detailed comparison.

William M. Edwards
William M. Edwards
Industrial Safety Engineer

ATTACHMENT 1

NLO PERFORMANCE DATA

<u>Year</u>	<u>Number of Cases Involving Days Away From Work</u>	<u>Number of Restricted Workday Cases</u>	<u>Number of Nonfatal Cases Without Lost Workdays</u>	<u>Incidence Rate of Cases Involving Days¹ Away From Work</u>
1975	0	3	24	0.00
1976	0	8	11	0.00
1977	0	3	9	0.00
1978	4	4	11	0.77
1979 (1st half)	0	4	7	0.00

MOTOR VEHICLE EXPERIENCE

<u>Year</u>	<u>Number of Motor Vehicle Accidents</u>	<u>Frequency Rate</u>	<u>Total Loss</u>	<u>Loss Per 1000 Miles Traveled</u>
1975	3	15.02	\$ 250	\$ 1.25
1976	2	10.23	884	4.52
1977	4	40.34	1,388	14.00
1978	0	0.00	0	0.00
1979 (1st half)	0	0.00	0	0.00

¹ Based on 200,000 employee-hours worked.

1114991

NATIONAL LEAD COMPANY OF OHIO

A SUBSIDIARY OF THE LEAD INDUSTRIES, INC.

P. O. BOX 39158



CINCINNATI, OHIO 45229

PHONE AREA CODE 513-752-1151

MAR 3 1980

Mr. H. D. Hickman, Director
Manufacturing Division
Oak Ridge Operations
Department of Energy
P. O. Box E
Oak Ridge, Tennessee 37830

Dear Mr. Hickman:

REPORT OF DOE OCCUPATIONAL SAFETY AND HEALTH PROGRAM INSPECTION
1980

Ref: Letter, H. D. Hickman to S. F. Audia, same subject, 2/22/80

In answer to the reference letter, the following action has been taken on the violations noted during the subject inspection.

1. A work request has been submitted for the fabrication and installation of a guard on the bench grinder. The cost of the work is being compared with that of a new approved grinder. If the guard installation is more costly, we will purchase a new grinder.
2. The sash on the hood in Room C-25 has been repaired and is now being operated per requirements.
3. This sling has been removed from service.
4. The oil spills on the floor in Plants 5 and 9 have been removed and the necessary steps taken to prevent their recurrence.
5. The missing tongue guards have been fabricated and installed on the grinders. Other tongue guards found not to be in compliance with OSHA requirements have been readjusted.

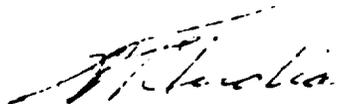
1114992

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6. Laboratories are presently being reinspected and all unmarked containers labeled. Employees have been reinstructed and periodic inspections and reinstruction will be provided to assure compliance with labeling requirements.

A notice of the violations was posted as required in DOE MC Appendix 0506 on 3/4/80.

Sincerely yours,



S. F. Audia
Manager

RWL/vvs

cc: W. J. Adams
R. C. Heatherton
H. D. Hickman
W. C. Hill
R. W. Lippincott
C. E. Polson

Central Files

SAFETY AND ENVIRONMENTAL CONTROL DIVISION

COMMENTS:

ACTION
INFORMATION
REVIEW AND CONCURRENCE
CONSOLIDATE COMMENTS - PREPARE ANSWER
EXPEDITE - COORDINATE WITHIN DIVISION
RESPONSE REQUIRED - DUE DATE
BRANCH CHIEFS & SMALLEY
S&EC MEMBERS
DIRECTOR
Francis T 4/2
Smalley
Harer KFF 4/7/80
(1) Warner Please put a copy in 3-ring binder 4/2/80
ENVIRONMENTAL PROTECTION
Wing
Hibbitts
Martin
Alexander
Marciante
Duguay
FACILITIES & SYSTEM SAFETY
Johnson
Lingerfelt
Harris
Leifheit
Sheffey
Henegar
HEALTH PROTECTION
Pryor
Smith
Davis
Love
Violet
SAFETY & FIRE PROTECTION
Handler
Edwards
Vandell
Mullins

Talked to Bob Lippincott - Jm#1,
 NCO will probably purchase a
 new grinder; violation still
 posted until completed; NCO will
 then send another letter
 confirming that the violation
 has been abated. KFF 4/17/80

Routed By:

Date:

1114994

f k c
12

NATIONAL LEAD COMPANY OF OHIO

A SUBSIDIARY OF NL INDUSTRIES, INC.

CINCINNATI, OHIO 45239

November 24, 1980

SUBJECT COMMENTS ON DRAFT REPORT OF HEALTH PHYSICS APPRAISAL, OCTOBER 7-10, 1980

TO B. J. Davis and K. Shank

FROM R. C. Heatherton

REFERENCE

As I commented to K. Shank over the phone on 11/21/80, we do take exception to some things which are said in the report. The exceptions represent a difference in opinion regarding the seriousness of some of the deficiencies found at the time of the appraisal. Our primary concern was how the report might be interpreted by opposition critics who might obtain the report under the Freedom of Information Act and quote from it for proof of our poor management and hazard to employees and the public in continued operation of the plant. If the report and our response do not convey the impression of undue hazard we are not greatly concerned.

We do take exception to the use of the word poor with reference to exposure control in the summary and conclusions on page one. Consider the plant has been operating for more than 25 years and most of our work force has been here that long. These people received their radiation exposure control indoctrination and initial job training when less stringent standards were in effect. We have emphasized the need to meet standards but also attempted to avoid creating fear of radiation or harmful effects of exposure at these levels. Additionally, allowable exposures have been periodically lowered. In view of the circumstances, it does not seem that one case of exceeding the current maximum permissible exposure to the skin can be called poor control.

We must admit to some failure in the commitment to the ALAP or ALARA principle. The foregoing comments, in part, explain why it is difficult to get our people to change some practices. While efforts were made, we realize now the effort and achievement were not what is expected.

Many of us at the management level believed our objective was to operate this plant to turn out a quality product safely, efficiently, and economically. In order to achieve this objective, judgments were made regarding cost of exposure control and expected benefit. Perhaps our judgment was poor, especially considering what is generally expected with ALARA.

1114995

COMMENTS ON DRAFT REPORT OF HEALTH PHYSICS APPRAISAL, OCTOBER 7-10, 1980
B. J. Davis and K. Shank
November 24, 1980

Some of the things observed, such as failure to use protective equipment, are not in any way excusable. There is now and will be a concerted effort to change these things. I would like to point out that smoking in areas exposed to radioactive material has been allowed. Perhaps most plants would prohibit this as poor practice. In our case it was a considered judgment that it caused very little exposure and improved the efficiency of the work force. Similarly, it was our judgment that routine monitoring of work clothing after laundering produced little benefit for the required expenditure.

Regarding recommendation 80-6 pertaining to film badge calibration, the impact of scatter was investigated many years ago. The error introduced by our present method of calibration is extremely small, much less than other errors which must be assumed for monitoring exposure by any dosimetry system. The documentation is not readily available because it was done at a time when documentation was not that important. This is not an oversight or failure.

This generally covers the exceptions we might take to the report. I realize it may make no difference in the report as you put it in final form. We realize we have quite a bit to do to get the program up to expected standards. We are making progress and expect to continue progressing at a faster rate over the next several months.

Thanks for the opportunity to comment.



R. C. Heatherton

RCH/fb

cc: N. R. Leist

1114996



Department of Energy
Oak Ridge Operations
P.O. Box E
Oak Ridge, Tennessee 37830

December 5, 1980

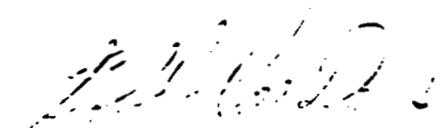
William H. Travis, Director, Safety and Environmental Control Division

NLO - ES&H PROGRAM

Based upon the appraisal conducted by the Health Protection Branch October 7-10, 1980, at NLO, I have serious reservations about the adequacy of the ES&H program. As noted in the attached appraisal report, serious deficiencies exist in the health physics program which was rated "poor" and there was evidence of lack of support and commitment on the part of line management toward health protection. In addition, other observations as noted in attachment 2 to this memo lead one to also question NLO's commitment to the industrial and construction safety programs as well, particularly when Items b. and e. are considered.

The observations indicate a pervasive deterioration and degradation of several of the ES&H program areas and suggest that continued safe operation of the facility is not assured.

I strongly recommend that an ES&H management appraisal be conducted in the immediate future to determine if this is in fact the case and to identify what generic changes if any are needed. Due to the seriousness and sensitivity of the situation, I believe it highly desirable for you to chair the appraisal and for a representative of the contract administrator to be included on the team.


Bobby Joe Davis, Chief
Health Protection Branch
S&EC Division

Attachments:
As stated

cc w/attach.: J. F. Wing, MS-331
R. Handler, MS-333
W. A. Johnson, MS-332

1114997

COMMENTS

We are quite disturbed about the performance of NLO in the area of health protection. During the last two fiscal years, we have been concerned with the lack of an aggressive radiation exposure control/reduction program particularly with respect to the Plant 5 operations. We have noted this in performance evaluation reports beginning with that for the first half of FY 1979 and in functional appraisal reports beginning in 1977. Yet in January 1980, there was a violation in Plant 5 of the DOE quarterly radiation exposure standard for the skin. The NLO investigation of this occurrence identified a number of contributing factors which (1) were previously identified by DOE as items needing attention, and (2) would have been addressed by NLO had there been an aggressive exposure control program. Given the above, we would have expected strong, immediate corrective actions to have been taken. During our recent functional appraisal, it was noted that action was being taken to quantify exposure sources and identify possible actions to reduce exposure, however, observations made including poor work practices and operations in violation of plant procedures cause us to question the degree of commitment to this effort. The lack of enforcement observed coupled with the appraisal findings that there are inadequate health protection staffing, a number of serious program deficiencies, and a continued lack of an overall ALARA program lead us to the following conclusions:

1. NLO has not been responsive to program needs in the health protection area.
2. NLO has not and is not meeting the basic performance objective in the health protection area.
3. It is questionable as whether or not radiation exposures can be maintained with the existing standards.

Your immediate attention to this matter is imperative. Not only are significant efforts in program development necessary but also a strong commitment to implementation by line management is required if program objectives are to be achieved.

TOUR OBSERVATION AND RELATED COMMENTS
EXCLUSIVE OF THOSE COVERED IN
APPENDIX B OF THE HEALTH PHYSICS APPRAISAL REPORT

- a. Plant 1
 - 1. Zenith Mill - As noted in appraisal report there was a willful violation of the hearing protection requirements. One employee was also smoking.
 - 2. Solvent Still - IH&R personnel were unaware of this operation. One employee observed without eye protection and two with safety glasses only for an operation involving open-top process equipment where splash protection would be desirable.
- b. Water Tower - Subcontractor employee standing on mid-rail of lift basket while painting tower. When NLO was asked if they assured that the man-lifts were properly inspected and certified they indicated they did not inspect them. In fact, they only check "critical equipment" such as cranes. Given potential fatalities if man-lifts fail, their rationale for not inspecting them is questioned. This appears to be a critical deficiency.
- c. Plant 6 - Two persons without safety glasses.
- d. Plant 9 - Construction activities.
 - 1. Scaffold being used without guardrails (height about 20 feet)
 - 2. Three individuals without eye protection
 - 3. No hard hats being worn
 - 4. Area access not restricted

e. Bldg. 53 - Roofing repairs initiated on this building during the appraisal by a three person crew.

1. Ladder did not extend a sufficient distance above roof.
2. Ladder improperly secured
3. No eye protection being worn
4. No head protection being worn
5. No guardrail or safety harness being used by operator of manually operated lift being used to raise equipment to roof level.
6. Improperly guarded gasoline powered sweeper
7. No warning signs on sidewalk surrounding building (in-place by Friday, October 10)
8. Lack of coordination with activities within building resulted in destruction of integrity of samples in hood due to sweeping activity on roof.
9. As noted in the appraisal report, improper respiratory protection being used - this had been detected by IH&R staff.
10. Inadequate health and safety plan
11. Inadequate enforcement by NLO
12. NLO had inspected work activities of the subcontractor on earlier work at the site. F&S on 8/7/80 recommended fire extinguisher, goggles, and respirators. IH&R inspections on 8/20 - no safety lines; on 8/26 - no safety lines; 9/16 - no respiratory protection; 10/6 - acceptable; 10/7 - acceptable. Judging from the findings during the appraisal, the adequacy of these inspections is questionable.
13. ES&H review of potential hazards judged less than adequate particularly with respect to contamination and impact of activities to buildings upon subcontractors.

f. Pit 4 - Being operated in a manner which offered little protection to the pit liner which is the environmental barrier.

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